

**Soaring Association of Canada
and
Canadian Advanced Soaring**

Soaring Coaching Manual

Approved by the Flight Training & Safety Committee

1 January 2011

Version 2 April 2015

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Introduction

This manual contains notes that have been prepared through a collaborative effort with the Canadian Flight Training & Safety Committee, the Canadian Advanced Soaring group, and experienced cross-country pilots to provide information and techniques to help post-licence pilots and Bronze badge qualified pilots achieve more from their flying. In most cases, post-licence flying for the most part has been left up to the personal interests and self-education of the pilot. This was achieved by trial and error unless a more experienced club pilot or instructor was willing to take the fledgling pilot under their wing. The concept here is to formalize this process and provide some tools to do the job.

Most pilots take years to learn the skills and judgment required to achieve badges and become effective in contests. The coach can mentor and guide the pilot in an attempt to avoid some of the frustrations of learning by trial and error. When well established coaching techniques are applied, aspiring pilots can be encouraged to pursue advanced flying skills. These notes are not all-inclusive and reference to other educational materials will be made where possible.

Encourage pilots to be inquisitive and expand their personal soaring library. The primary reference for this manual is the excellent book, *ADVANCED SOARING MADE EASY* (2nd edition) by Bernard Eckey¹. We recommend all coaches be familiar with its content and that pilots obtain their own copy for reference. Most of what the developing pilot needs to know is in this easy to read and understand manual.

The training of glider pilots within SAC will be the responsibility of the SAC instructor to Bronze badge standard. Training beyond Bronze badge should be assigned by clubs to experienced cross-country pilots who are interested in coaching.

Coaches may or may not be instructors, but should have an interest in encouraging the sport of soaring. These individuals should have good interpersonal skills and promote safety. Larger clubs will need several coaches as most coaching requires the mentor to follow their charge over a longer period of time than an “ab initio” student with an instructor. Such mentoring arrangements may last for many years and be fulfilling for both parties.

¹ copies are available from MZ Supplies, www.mzsupplies.com.

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Coaching may involve sending trainees solo on exercises or tasks, flying dual lessons/exercises, and/or flying in leader/follower scenarios. Trainees being coached may eventually be required to progress to new aircraft types. Type training is recommended to be conducted by instructors familiar and current on type. Type training should be supervised throughout the first few flights by radio.

Once the pilot is certified ready on type by an instructor and has flown several thermalling flights in that glider they will be ready to be coached on new exercises. Rushing this step for a new type has led to accidents and is considered higher risk.

These notes are presented in three parts as follows:

- Coaching techniques
- Exercises and skill development
- Tips and information including handouts

Also see *Advanced Soaring Made Easy*:

- Chapter 4 – Extended local soaring
- Chapter 5 – Advanced cross-country soaring
- Chapter 7 – Flying Competitively

Part I – Coaching Techniques²

Your role as a soaring coach

THE FIRST THING to ask yourself is, “why am I coaching?” People have a variety of reasons to be a soaring coach: they may want to be more involved because they have been an instructor in soaring, they may be or have been competition pilot, or they simply want to help others in their local club. No matter what your reasons are, every coach in every sport has the same basic roles. To be a coach means you have to play the roles of teacher, leader, organizer, and counselor.

Think about your title “coach”. What does it mean? It sounds important because it is important. Try to recall your experiences with coaches, both good and bad. Try to remember some of the lessons that you learned such as good sportsmanship, teamwork, and problem solving. Consider how you felt when you had learned new things, and how you felt when things didn’t go as planned. Visualize the positive experiences you had such as fun, memorable experiences, and meaningful experiences.

Think about the negative experiences such as stress, anxiety and the feelings of low self-esteem. Coaching affects the positive and negative experiences of us all at times in our lives. As a new soaring coach you must learn to provide positive experiences, and if negative experiences occur it is your job to learn quickly, and rectify the faults. Remember, you can make soaring experiences memorable, meaningful and fun. Your task is to ensure that your coaching needs comply with the needs and development of your soaring trainees. Adopt this and you all win!

- Your role as a *teacher* will mean that soaring trainees will ask you to share your knowledge of the sport and to help them prepare for their accomplishments through exercises and skill development, as well as mental preparation.
- Your role as a *leader* will mean that your soaring trainees will want you to make the right decisions on their behalf. They must trust you to select the most appropriate goals, and help them to attain them. Your job is also to motivate by learning to use goals as a tool.
- Your role as an *organizer* will mean that you will have to manage practices and schedules, plan and evaluate practices and, more importantly, correctly evaluate your soaring trainees.
- Your role as a *counselor* will mean that you will have to develop good listening skills, and provide the right amount and type of guidance to support your soaring

² Adapted from Leigh Robinson – Coach and Director, Sports Development Solutions, Coaches Infoservice, Sports Science Information for Coaches

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trainees. You must have a clear understanding of policies and procedures, and the boundaries of where your role as coach starts and ends.

It is very important to develop an understanding of your soaring trainees goals because they are there for a variety of reasons, and may be social or achievement oriented. The skill of the coach lies in the ability to differentiate, and meet the needs of each group of individuals.

Make soaring fun

The essence of soaring for young (and not so young) people can be found in the opportunity for safe adventure, trying new things, taking new risks, and to test their own performance and their own potential. For all these factors to fall into place an environment that is encouraging, supportive and safe must be created and maintained.

Your job is to encourage and support, so the primary rule of working with soaring trainees is to always give positive feedback first and then suggest to the pilot ways of improving. Never! And I can't reiterate this enough, *never* openly use negative feedback such as, "Oh well, you didn't do ..." or, "That was wrong because ..." Always respond positively.

Soaring should always be fun first, work second. Trainees who are having fun may not necessarily be laughing all the time. A good measure of fun is to ask yourself "Are the trainees coming back week after week?" If the answer is "Yes", then you are on the right track. If the answer is "No", then something is seriously wrong and you need to find out what it is.

Fun is about challenge that is realistic and encouraging. Fun is about exploring one's own capabilities and expanding horizons. As a coach you want to have fun coaching, so you must make the trainee's focus fun too. Coaching is fun!

Your coaching style needs to be based upon cooperation. Too much authority, and fun goes out the window. Too little control and activities become unsafe – a breeding ground for anxiety. Fun has to be negotiated!

Beware self-esteem and self-image

Ask any sport psychologist about self-esteem and self-image, then sit back and watch their reaction. The hardest psychological damage to undo is in these two key areas. Once there, they effect a pilot's development for the rest of their lives. Remember your negative experiences – how did they get where they are and why are they still so memorable?

Self-image and self-esteem are so important. Poor feelings lead to drop-out from participation at worst, or at the very least a marked decrease in performance and failure to meet goals and individual potential. This is where the slippery slope begins. Coaching is about developing the soaring trainee's self-image, and how they

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feel about themselves. Coaches must make trainees feel good about themselves and the way they are performing.

Organization of practice

Remember the 4 P's: Plan, Prepare, Perform, Post-Evaluate.

Coaches plan yearly, monthly, weekly, daily. They plan for what is about to happen, as well for what may happen. Planning is the script for the play. What, how, who, where and why are the justifications a coach needs. Like your trainees, you need goals too! Plan for your soaring trainees (Action Planning / Development Planning) but plan for your own personal development (Personal Development Plan). Understand your weaknesses, plan to eradicate them.

Have a system of plans that refer to each other. Your yearly development plan should direct your monthly plan, and so on. Plan for all the soaring trainees you mentor, but particular attention should be given to new trainees you coach. Remember; they don't have much skill, experience or knowledge. If you are new to coaching, neither do you! If you are happy and confident about what you are doing, your trainees will be also.

Coaching practices

Segments are easier to manage than whole pieces. Break your activities into small skill exercises. That allows trainees to achieve success at a simple task then move on to the next level. This is called Progression. Also, attention spans are less likely to decrease over shorter amounts of time. Adopt the following order: it's well-proven.

Review previous learning

Make use of skills that have been previously learned or that practice fundamental basics. Use adaptation of previous learning by allowing for progression on levels of difficulty building upon the foundations of previous experiences.

Learn new skills

- Describe the new skill.
- Pick 2-3 teaching points to highlight learning aims.
- Use exercises that allow for the development of new skills/experiences/knowledge.
- Use plenty of post-flight positive feedback and encouragement.
- Modify activities as trainees improve.

Flight exercises & conditioning

- Simplify exercises – initially reduce distances or complexity of tasks.
- Try to match activities to the soaring conditions available.

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Flight review

- Review the exercise and negotiate plan with trainees
- Prepare trainees for next exercise.
- Evaluate the exercise.

Effective air exercises

- Ensure goals are achievable.
- Build on previous exercises.
- Provide meaningful results towards development.

Good communication = good coaching

Communication between soaring pilot and coach has to be a two-way thing. As a coach you must be a good listener as well as speaker. You must make sure that you are clearly understood, and that you clearly understand your trainees. Here are some useful tips:

Speaking

- Use vocabulary appropriate to the audience.
- Don't speak too quickly.
- Make sure everyone understands. Use random questions to check understanding.
- Repeat yourself when necessary.

Listening

- Establish eye contact.
- Make gestures to demonstrate that you are paying attention.
- Paraphrase what has been said, and summarize for the benefit of others.
- Be positive about what was said, even if it was wrong. There is a lesson in everything.
- Make sure you thank them for their input. Make them feel valued.

Giving feedback

- Give feedback immediately while it is still fresh in the pilot's mind.
- Be positive – start with what is being done well.
- Be specific – explain the ways to make improvements – use demonstration where possible.
- Be realistic – make sure the pilot is capable of reaching the goals.
- Ensure the pilot understands – ask questions or ask them to give you a quick demonstration.

A safer soaring environment

As a coach, one of your main priorities will be to minimize risk of injury to your trainees, you, and other persons involved in the coaching environment. You can never totally eliminate risk from a coaching/soaring environment but you can plan to protect. You are in control of the trainees and their environment, and it is you who is responsible to ensure the exercise or task is within their capability.

Ensure that:

- Trainees prepare aircraft and equipment in the correct way, and teach them the do's and don'ts of handling new equipment safely.
- Always survey the environment before beginning exercises/tasks. Look for potential hazards. Undertake a risk assessment and record it properly.
- Ensure the trainees are properly equipped/prepared for exercises/tasks.
- Ensure emergency equipment and procedures are available at all times, along with all the necessary contact and recording information.
- Know your trainee's medical situation, i.e. fit to fly?

For the coach:

Make sure you are comfortable with risk assessment, hazard identification, and have the club policies and procedures relating to flying.

What to do when things go wrong:

Things go wrong! Fact! From time to time things don't go according to plan. The secret here is preparation. See also "Part III – Coaching Safety" later in this manual. An emergency plan/procedure exists at the club you will be coaching from and should highlight the following:

- Location of nearest phone.
- Location of emergency equipment.
- Phone numbers of local hospitals and ambulance services, SAR.
- Ensure the person making the call is suitably qualified/trained.

Summary

Thank you for taking time out to review the basics of coaching practice. Welcome to what will be probably one of the most constructive experiences of your life. Coaching can provide you so much. If you realize this then realize the effects upon the people you work with. You are an unsung hero. You are selfless and a positive role model for others. Use what you learn to good effect, keep learning, keep developing but most of all enjoy your role, your trainees, the soaring sport, the competition, and most importantly the fun!

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For all good coaches, rewards come in small ways. Forget winning, awards, and trophies. The best reward you can receive is, “Thanks coach, I’ve learned a lot from you today”.

Enjoy your time as a coach; enjoy the season, the athletes, the challenges, the frustrations, disappointments, and the rollercoaster ride that is coaching. I guarantee you that you won’t find anything quite like it! I hope you have been bitten by the bug; good luck!

Part II - Coaching Skills & Exercises

THE SKILLS AND EXERCISES listed below are not all-inclusive but intended to be a start point to assist coaches in developing their own mentoring programs. Coaching is not a rigid program and must be flexible for the individual and group. Cooperative goal-setting and accomplishment/recognition by the coach is critical. Activities have been broken down to develop the advanced soaring skills identified. Use your experience to develop and improve on this baseline. The only caveat is to plan safety into all your exercises. The aim here is to stretch the pilot by challenging them outside their normal comfort zone but at no time to push them beyond their personal limits.

Along with these exercises, pilots should be encouraged to read advanced soaring literature. Where ever possible the best references or handouts on the subjects have been included. Trainee pilots should pursue additional study!

Last, but not least, the coach can perform these exercises dual or solo. In addition, the coach can supervise the exercises from the ground, in the back seat, in their own glider, or on a soaring simulator (e.g. Condor). What is right is situational dependent based on the trainee capabilities and confidence level.

Advanced soaring skills

What makes a better soaring pilot? After canvassing experienced soaring pilots, the list of advanced skills/knowledge below is what differentiates them from the basic Bronze badge pilot:

1. Thermal centering/climbing techniques
2. Navigation and turn point techniques
3. Speed/distance improvements (flying faster and farther)
4. Weak conditions soaring
5. Cross-country tactics, reading thermal conditions/streets etc.
6. Dealing with emergencies
7. Pilot selected tasks (strategies and tactics)
8. Ridge flying (patterns/lookout) strategies and techniques
9. Wave flying techniques/glider performance

Advanced exercises (when soaring conditions exist)

1. Thermal centering techniques practice

Better soaring pilots just thermal better. Contests are won or lost in the ability to climb more quickly, not flying faster between thermals. This skill development will be a major factor with respect to progressing and time spent in this skill is key to development. Trainees need to recognize how to find the best lift, center more quickly in the core, and know when to leave. This should include techniques for weak lift and tilted thermals in wind. Many of these exercises are best done dual. Also, do not be shy to send trainees dual with other good competition pilots to learn how they have mastered these skills.

Common faults to correct include difficulty identifying best lift, slowness in centering/identifying core, correcting for core pushing out (use of top rudder), staying in weakening lift too long, exit strategies). Techniques include slipping slightly towards the core to prevent being pushed out.

No one method of centering is best for all situations. Top pilots actually use all thermal centering techniques, sometimes at the same time.

Safety There is higher risk of collision in thermals. A circling glider attracts others. Coaches need to emphasize look out techniques and procedures for thermals, where to look and how. Fatal collisions/spins have occurred with the high speed pull-up to a climbing turn into thermal. In addition, it is more difficult to scan for airline or general aviation traffic when in a thermal so knowing your airspace situation at all times is critical. Stay away from IFR navigation aids and routes. This includes STAR/PNR approach profiles. If possible, gaggle flying should be practiced (see exercises below) with emphasis on consistent and predictable handling of the glider in thermals. (See also *Advanced Soaring Made Easy*, chapter 1)

2. Practice final glide exercises

This skill development can be done safely at altitude. Trainees are exposed to this at least once in the Bronze Badge (dual exercise). Solo practice can be set up with longer final glides of 10-20 km. These can be set up with much higher initial altitudes to observe the differences in height loss that occur with different speed or wind conditions. Trainees should continually assess if they are on glide slope or not. Other exercises can be linked together if finishes are planned at a target elevation several thousand higher than normal. (See also *Advanced Soaring Made Easy*, chapter 5.12)

Safety Many accidents have occurred where the pilot has flown themselves into the ground. Attention must be drawn to regular assessments of the glide to determine if sufficient altitude remains, maintaining safety margins based on experience, and always having an exit plan (landable area available before height runs out. Look-out techniques for final glide are important. Contest fin-

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ishes (low high speed pass over field) after final glide have lead to conflicts or collisions. Risks of this behavior should be discussed and, although fun for many, increase risks to the pilot especially in contest flying (See also *Advanced Soaring Made Easy*, chapter 5.13).

3. **Flying faster (75-90 kts) exercises**

One skill that is weak with trainees is their ability to manage faster cross-country average speeds. Thermal climbing capability is the predominate factor. However, inter-thermal transit is often done too slowly or too quickly. The key is to find the balance and not over speed but maximize performance. Set up exercise on a close-in triangle task for them to practice optimum speeds to fly. Also review MacCready theory.

Safety Aircraft handling at high speed must be well understood. Smooth use of controls and careful use of wing loading to prevent overstressing the airframe must be understood. This includes turbulent air penetration, maneuvering speed limitations and reduction of Vne with altitude. (See also *Advanced Soaring Made Easy*, chapter 5 & 6)

4. **Race track exercises** (see Annex D template)

This set of exercises should be set up as a task or weekend contest on a triangle or rectangle course with the turn points within gliding distance of the field (minimum altitude floor on task). Strong/weak conditions can be accommodated and it is easier for coach to monitor or suggest strategy, etc. Candidates can practice thermalling, navigation, use of instruments, speed or distance points achievement, etc.

Safety Keep the direction of the course the same for all participants to avoid potential for head-on conflicts. GPS and other cockpit chores will interfere with lookout and this needs to be managed before the flight. Lap mounted display screens should be banned from use. Displays need to be mounted higher in the panel to keep the view outside. Maximize use of PowerFLARM. (See also *Advanced Soaring Made Easy*, chapter 4)

5. **Gaggle flying exercise (including thermal entry/exit protocols)**

This is an important skill set for contest flying. Often pilots will leave the only good thermal at the start of a contest because they are out of their comfort zone in a gaggle. On course there may be only one good thermal in the area. In contest strategy, pilots often choose to stay together to even out the luck factor.

Getting the trainee comfortable with procedures to enter, circle in, and leave a thermal gaggle safely will develop their confidence. You will need at least two other experienced thermal pilots to set up a series of exercises. This is often best started dual with the trainee but can also be coached solo with the coach

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flying. Practice flying with one, two and three gliders at the same altitude in the same thermal). (See also *Advanced Soaring Made Easy*, chapter 5.11)

Safety High risk part of thermalling. It is best to leave a gaggle when it gets crowded, but in contests it is possible to get boxed in when there is only one thermal in the release area. Emphasis should be on staying calm, communicating intentions before executing, good lookout, and predictable handling of the glider (gentle turns at appropriate time to leave).

6. **Setting triangles / off-field landing exercises** (See also *Advanced Soaring Made Easy*, chapter 3.4)
7. **Coach leading 100, 150, 200, 300 km flights** (See also *Advanced Soaring Made Easy*, chapter 4.6)
8. **Ridge flying dual** (See also *Advanced Soaring Made Easy*, chapter 11)
9. **Wave soaring dual** (See also *Advanced Soaring Made Easy*, chapter 12)

Exercises when soaring conditions weak or do not exist

1. Task declaration / flight preparation / use of GPS and software such as “See-You” and “Microsoft Pilot”.
2. Automobile driving navigation exercises to familiarize the student with the flight software and hardware before first flights
3. Use motorglider / power aircraft to practice map navigation and flight software and hardware
4. Emergency procedures discussions / flight exercises (See also *Advanced Soaring Made Easy*, chapter 9 - Outlandings, chapter 10 - Safety)
5. Spot landing exercises, strong wind exercises.
6. Use soaring simulator such as Condor to practice flights.
7. Review competition psychology. (See also *Advanced Soaring Made Easy*, chapter 6)
8. Review high performance instrumentation and tuning. (See also *Advanced Soaring Made Easy*, chapter 8)

Part III – Coaching Safety

IF YOU PLAN TO FLY DUAL FLIGHTS with a trainee, review the importance of “I have control – you have control”. Include read-back requirement from other pilot. Many accidents have resulted because this was not done properly. For example: the two instructor pilots who landed glider, and when the PIC complemented on the landing, the other admitted he was not flying!

Pilot-in-command

Regardless of who is flying the glider, determine who is the PIC ~~is~~ before the flight. Do not transfer PIC until after the flight is completed. Don't let a situation get too far out of your comfort zone. The PIC should take control before it is too late to react. The PiC must leave some time to be able to get the situation back to normal. Know your and the aircraft's limitations.

Situational awareness

Do not get so consumed with the flight lesson that you lose situational awareness. Navigate/communicate/mitigate:

Navigate. Know where you are and gliding distance to landable areas. Be alert for midair situations.

Communicate. Let others know if you are going to execute a non-standard circuit or off-field landing demonstration.

Mitigate. Take action for strong winds, trainee difficulty with navigation or situational awareness (don't be taken too far from landable areas). Anticipate what may go wrong with the flight or lesson then be prepared for it with options.

The majority of glider fatalities around the world result from stall/spin and midair collisions. Surprisingly, it is experienced pilots who have most of these accidents. Off-field landings also lead to many accidents.

Collision avoidance

Pilots need to have superior awareness of the limitations of human sight and scan techniques. This includes visual perception, airmanship, and techniques of collision avoidance. There are seven types of scan technique (see articles attached). In addition, cross-country pilots must be aware that there is a higher collision risk in certain areas that include the circuit, thermals, cloud streets, and ridges. Coaches must ensure these subjects have been thoroughly covered. (See also *Advanced Soaring Made Easy*, chapter 10.3)

Stall/spin

Experienced pilots continue to be killed in inadvertent spins. Advanced flying tempts pilots to push the flight envelope of their gliders. Higher performance

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gliders provide less warning of the stall/spin and many have been bitten. Coaches and their charges must maintain proficiency in recognition, avoidance and recovery techniques. This must include scenario-based training exercises since problems don't always present themselves to be easily recognized, and avoiding a developing situation is more likely to achieve safety. In addition, coaches should never let trainees fly a glider cross-country/ridge/wave if they have not been thoroughly checked out. This should include solo flight when playing with the flight envelope and stall/spin characteristics in different configurations, attitudes, and spin entry situations. Gliders carrying water ballast also handle differently and pilots should be made aware how they will perform.

Off-field landing

Most skills to be learned here are taught as part of the Bronze badge. However, as pilots' progress and take on more challenging flying experiences and venture over less hospitable terrain, or advance in contest or badge flying, they take on more risk. Managing these risks and understanding one's own limitations is fundamental. Top contest pilots and record setters generally do this well. Coaches must instill this attitude and understanding of finding one's comfort zone in to their pilots. Safety in advanced flying is 90% attitude and 10% skill. (See also *Advanced Soaring Made Easy*, chapter 9).

Safety zones

Coaches need to understand the "comfort zone", "stretch zone", "risk zone" and "danger zone" for pilots. All non-training solo flying should be in the pilot's comfort zone. Learning can occur in a controlled environment when the pilot is coaxed into their stretch zone when hazards are minimized or monitored. The objective is to stay out of the risk zone and never go into the danger zone. For example, in primary flight training instructors stay in their comfort zone which is much larger than their students, while the student performs the lesson in their stretch zone. If a student ventures into their risk zone, the instructor should assist or take control. Good instructors never put a student in their risk zone or danger zone and the instructor never plans to fly in their own risk zone. A better explanation of the comfort zone follows.

Comfort zone

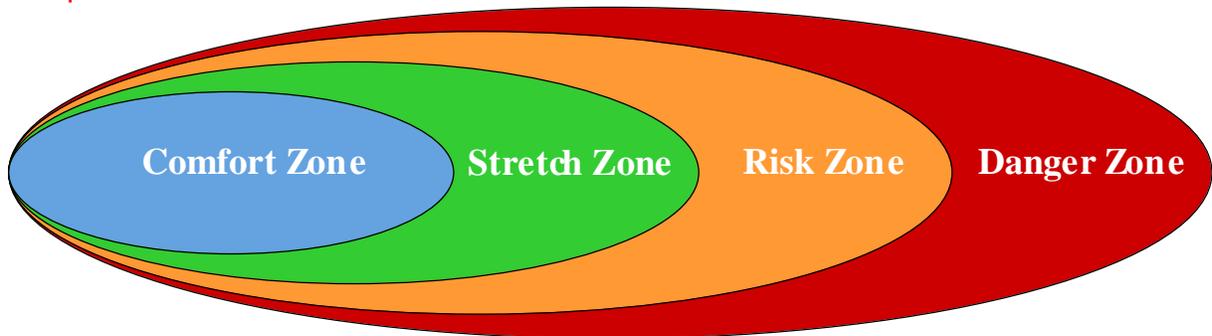
The three areas coaches need to emphasize for establishing a comfort zone are recognizing accident sequences, recognizing departures from one's routine, and personal discipline by knowing one's limits. Comfort zone is finding your personal level of satisfaction with the risks in gliding. Identifying elements that protect you and make you comfortable. This includes items such as checklists, minimums, personal routines, etc.

Recognize that when a pattern develops, it could lead to an accident sequence. This is also known as the domino effect (or Swiss cheese model). You need to discipline yourself to take action to break the sequence or to correct a missed pat-

tern. An example is someone interrupting a DI and the pilot going back two steps to restart so nothing was missed. Pilots need to stay in their comfort zone, unless they are in a training environment.

The Comfort Zone Principle

The comfort zone model illustrates how challenging situations can have both positive (expanding) and negative (reducing) effects upon a personal view of their own experience.



Stretch zone

If an individual remains consistently within their comfort zone, there is little opportunity for them to learn much from their flying experiences. In a controlled environment the coach can use this stretch zone to offer more challenging training without increasing the risk to the trainee. The challenge for the coach is that they need to monitor the trainee and identify the trainee's zones to use the stretch zone effectively. Each pilot will have zone boundaries unique to their experience.

Ideally, one's stretch zone will expand with training and experience. For example, what is safe for a veteran contest pilot may be too risky for a new contest pilot.

(See also *Advanced Soaring Made Easy*, chapter 4.3 and 4.6)

I've got my licence; now what?

by **Georgette Wanttobe**

WHEN WE GO UP in a single-seat glider, we go to the loneliest place on earth. You are more unreachable than at the top of a mountain, wandering in the northern forests or in a submersible at the bottom of the ocean. The only comparable places are in the cockpit of a jet fighter or at the control bar of a hang glider. It is in this ultimately lonely and hostile environment that you will spend most of your gliding career (instructors excepted). Your survival and continued growth in the sport require that you learn how to learn, and learn with the minimum of risk required to acquire new skills and knowledge. In your pre-solo and pre-licence instruction, the training unit guided your learning along well-understood paths in a progression that has been determined through years of collective experience. Experienced instructors provided assessment, feedback, planning and exercises.

Derek Piggot recommends having at least a year of post-licence flying before going cross-country, and the collective experience at our club suggests that he is not far off. In the year between licence and cross-country you have the opportunity to learn to manage your own path. You will need to learn to assess your flying – what is working, what isn't – without falling victim to the human tendency towards unrealistically positive self-assessment. You will need to choose learning experiences to fill holes in your knowledge and skills. You will need to learn to sequence your learning experiences so that you learn skills in the right order (for example, perfect your field selection and circuits before going cross-country). You will need to learn how to manage the inevitable risks involved in learning to get the most learning for the least risk (for example, don't start your first cross-country in Invermere.)

Depending on your personality, you may need to learn to manage your feelings about your own and other people's performances in the sport (for example: continuing to work on your own skills is much more valuable to you than trying to keep up with the pack, or fly the same tasks as Joe Contest Pilot or even Fred It's-my-airplane-and-I'll-do-what-I-want.) You will have to choose who to go to for advice (and maybe a confession). Remember, the best coaches and teachers may not be the highest-achieving athletes, or charismatic, outspoken opinion leaders.

I have written a list here, but it is really just a set of hints on where to look and what to try. I hope that in reading the list and trying the activities, you will begin to understand that gliding is in no way mechanistic, nor is it an armchair sport. It is an improvisational art form, like jazz. You have to practice and practice and practice, and then when you actually perform, you make it up as you go along. Unlike jazz, it actually matters if you hit a sour note, so I would add one more "practice". Good luck and good flying!

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Perfect your circuits

A safe landing results from having set up for a safe, simple, worry-free final approach. Show up early on what is likely to be an uninspiring day and, with due respect for traffic conditions and safety, try every possible circuit variant again and again until you don't have to think about it, you just put the airplane in the right place to have a nice, easy final approach. (By this time, every landing should be a low-energy spot landing.) Try it a few times without looking at the altimeter. Now, try landing diagonally in the intersection. What errors do you make? What do you have to do to fix them? Would you fix them before going cross-country? Why or why not?

Watch people landing on 14. What errors do they make? Stand near the fence and judge by how much the planes clear the fence. Don't just think about it, *do* it. How steep are their approaches? How much energy are they carrying into the flare? Where do they touch down? What will happen if an airplane hits the fence? What does all of this imply for your circuits? On a day with a roaring wind from the south, land across 07/25. What was different? What was the same? Volunteer for an aerotow to Cowley. Ask to do the circuit and landing, then ask for feedback. Take an intro ride at another club. What choices did your pilot make? Would you have turned in the same places? Why or why not? Would you have survived your first off-field landing?

Learn how the airplane glides

Which way is the wind blowing at altitude? Climb up; pick your next cloud and go. How much altitude did you lose? How far did you go relative to the ground? How long did it take to find the thermal? Did you find lift on the way? Did you follow the lift you found on the way? Why or why not? Did you stop and turn? How much time did it take? How much altitude did you gain or lose? Was it worth it? Why or why not?

Climb up and use your map and final glide calculator to set up a 15:1 glide to the general location of IP, but at a height that keeps you within easy gliding distance of the field. Try it a few times from upwind and downwind. When you are really comfortable with this, set up a 20:1 glide to IP that allows you a right-circuit option (why a right-circuit option?). Do this a few times. Would you ever, ever consider flying a maximum performance final glide? How would you "de-risk" the situation?

Push the envelope

At *altitude* and prepared for a *spin*, see how tightly you can thermal – don't be afraid to bank. Is there such a thing as too much bank? See how slowly you can thermal. See how gently you can thermal. Try different speeds. See how quickly you can react to stall, and what is exactly the right amount of control movement required to recover. Try all of this with and without flap, if you have them. What happens with flap when you stall/spin (hint: put your hand on the flap and leave it there)? What happens when you fly with top rudder? Why is it so hard to fly a constant airspeed?

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Learn when to call it a day

Go up late in the day when the lift isn't so good anymore. Remember that you want to start a standard circuit at the standard altitude. Now, *scratch* and keep at it until you have to "bail out" to make it to your standard circuit. What will you do if you try too hard? What will you do next time to avoid having to use your back-up option? What does this imply about off-field landings?

Learn to see where the airplane is going

Look out the front of the airplane. If nothing changes, where will you hit the ground? During a glide there is a point on the ground ahead of you that is coming straight toward you, neither rising nor falling in the canopy. Our vision can be trained to see this. See how the view changes when you go upwind and downwind. See how it changes when you are in sink. Yes, your calculator may tell you when you can reach a goal that is out of sight, but when your eyes tell you loud and clear where you will hit the ground, pay attention.

Learn to look at the sky

I remember talking to a senior pilot and getting the strangest feeling about his relationship to me. I eventually noticed that he was never looking *at* me, but *past* me, to the sky. When the picnic table talk turns to matters unrelated to gliding, get out and retrieve ropes or gliders, or at least help on the line. This allows you to spend more time watching the sky. The more you look at the sky, the more you will learn. Watch other people flying, especially the circuit, approach and landing – you can learn from that too.

Learn about lift and clouds

Go up a lot. Think about each day – what kind of clouds do you see? How quickly do they change? Do you see wisps? Can you see movement? Hooks? When you fly, are the thermals straight, sloped or W-shaped? Which end of the cloud do you find them at? Look at the clouds down-sun, and then look at the clouds up-sun. Pick clouds and try to fly straight to the thermal. Were you right?

On a quick-cycling day, try flying to puffs. Did you pick the right puff? What happened when you tried to fly to the "good" cloud? What happens when the wave shows up? On a nice day, climb up to 4000 or however high ATC lets you go, descend to 2000 and then climb up again. Is there a "best lift" altitude or altitude band? Go up when it sucks. If you go cross-country, sucky conditions can materialize in minutes when its hours to get back home. Go up when it sucks – I mean it! – your cruel and heartless contest director isn't going to set tasks only on Diamond distance days.

Learn about weather

Start watching the weather on the Internet, on TV, and in the newspaper *every* day (not just when you think you might go flying.) Look at the analysis maps. Phone the automated flight services weather and get the winds and temperatures

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at the various altitudes. Make your own forecast, and then see how well you do. Estimate lift strength, then go flying. How well did you do? When a cold front is forecast, watch for it. If it will pass on a flying day, plan around it. Do you want to get up, down, and put away before it reaches the field? How do you motivate people to put the equipment in the hangar when you sight the approaching gust front from altitude? Why would you do this? Would you try to “ride the front”, and if you did, who would you go to for advice on how to do this? Do you just skip that day and come out the next day?

Learn to manage your body

Book a three-hour task and run through the other air work ideas while feeding and watering yourself. Where do you want your blood sugar and electrolytes to be for landing? For men only: learn to take a pee in the cockpit. The first time to try this is *not* while you are struggling to climb out 100 km from home. Didn't unzip before getting in the glider? Hmm, too bad for you – at least you have the option of landing.

Learn to use a map

Yes, you know where the local towns are. Yes, you have a GPS. So what? Get a map and mark concentric circles around the airfield. You can use 5 nm (corresponding to a 30:1 glide), or some other spacing as suits you. Laminate it in plastic, mark a course between those landmarks on it, and then actually *use* the damn thing. Put it in the side pocket, pull it out, refer to it, and put it back. Pull it out, re-fold it, and put it back. Can you hold it so that the course line is in front of you? Can you figure out which orientation works best while you are parked in a thermal? Are all of the farmhouses marked on the map? All of the roads? What happened to your lookout while you were doing this? Your speed control? How much altitude did you lose?

Listen to other pilots

Listen to all of them, the great and the not so great, the outspoken and the reserved, the friendly, the taciturn, and the downright grumpy. Listen to tow pilots! You'll learn more if you listen rather than talk. Who would you go to for advice? Why? Is there anyone you would avoid? Why?

Become an OO

If you have been in the game long enough, you can get your OO certification. This gives you opportunity to look at planning, recording and documentation from a critical perspective, and vastly improves your chances of getting your Silver badge on the first try. Like everything else, practice makes perfect.

Learn to look at fields

Pick a “nice field” from the air. Pick an appropriate approach. Land, drive to the field and *look* at it. Walk it. How big is it? Look for rocks and gopher holes. Look at the slope and the relief. Look for obstacles. Were those green patches you saw from the air wet spots, or places too steep to drive a harrow? Has a trac-

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tor recently been there? Was it a quarter section? Have you ever landed in a field like this? Would you have made it? What makes you think so?

Go on a retrieve

Did all of the required equipment get loaded? How did the trailer handle? What kind of field did the airplane land in? Was it damaged? What decisions led to the airplane landing in the field? How long did the retrieve take? What part do you think luck played in the story? What part did the pilot think luck played in the story? How long did the whole operation take?

Get your Bronze badge

The Bronze badge helps you put together many of the skills, and is one of the required qualifications for taking club aircraft cross-country.

Team-fly a contest

People learn a great deal about cross-country in contests because they a) have a built-in reference in the form of other competitors and b) you go cross-country on decidedly less-than-perfect days. Get together with a group of friends and talk a cross-country instructor into flying a two-place with you in a contest. Go through all of the cross-country preparation: registration, weather forecast, task planning, recording equipment, trailer prep, food, water and retrieve crew, the whole nine yards.

Your instructor shouldn't have to do anything but keep you out of major trouble and help you overcome minor trouble. At the end of the day, compare your experiences with the other competitors.

Study and plan tasks

Plan a number of Silver distance flights. Are there nice places to land along your route? Are there any places at all? Set up the recording equipment you will need and *use* it. Fly locally, but talk to the pilots who went cross-country. What was their skill level? What did they have to say about the day?

Have fun, and do it safely

This is not a job. We are here to have fun and fly gliders for hopefully a long time. Our society conditions us to value achievement above all else, but gliding achievements – cross-country, badges, and contest placings – are only a direction, not ends in themselves.

The essence of gliding is the practice of flight, practice so we can enjoy the experience of flight in this beautiful country, for the satisfaction of exercising and developing skills and in a club environment, for the joy of sharing with our friends for many safe and happy years. Practice and the achievements will follow. You might find that when they do come, they seem relatively unimportant, simply because flying, like the playing of music, is its own reward.

How to be a Winner

sports psychology by **George Moffat**, from *Sailplane & Gliding*

THERE ARE three elements to success in soaring – or just about any other high-stress endeavour. They are talent, skill and mastery of the emotions. Talent is usually the least of these. It provides a jump start but will amount to little if the other two are unattended. Skill requires time, discipline and plenty of practice. Luckily, there are books to help out. All the skills of Reichmann and others are available for study.

The skills are vital, but I'll let you in on a secret: most of the top-level competitors have all the skills needed to win. Who does win? The guy with the emotional control, the emotional strength, flexibility, responsiveness, and resiliency to let his talents and skills do their thing unimpeded. This is where sports psychology comes in. I'd like to tell you about two aspects of this emotional control.

The first is the so-called "*Peak Performance State*", that blessed state of grace, common to most sports, where you just can't seem to make a mistake. I've had it several times in different sports, most notably during both of the World Championships I've won and most recently in 1995 when winning the Canadian Nationals. I had always thought of it as now-you-see-it, now-you-don't: great when it happens by. Sports psychology types have studied the state in many sports and say it's most likely to happen if you feel:

- Confident
- Automatic and instinctive
- Relaxed and calm
- Ready for fun and enjoyment
- Challenged
- Energized with positive emotion
- Focused and alert

Notice that there's nothing about what bank angle you should fly, interthermal speed, or any such? What's the common factor here? They are all emotional aspects. Make no mistake, emotions are key in sports. "Emotions are biochemical changes in the body, leading to a cascade of powerful changes in the body", says Dr. James Loehr, the sport psychologist whom the skater Dan Jansen credits for his Olympic Gold.

Let's have a quick look at some of these factors. Confident, relaxed, calm, challenged, energized, focused – yes, they all make sense – but ... fun? Enjoyment? They, it turns out, are vital to this wonderful "on" state, and they are the first things to go when you over train, lose your focus, or allow distractions. Want to hear a horror story? Two months before the Hobbs Worlds, I stopped by at Dick Brandt's on the way back from flying in New Zealand to put in a week or so fine-tuning Dick's already fine-tuned Nimbus 3 which I was to fly. Sixty-one days later – days that started at 8 am and finished any time between 10 pm and midnight several things had hap-

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pened: the Nimbus had grown six feet more wing, a new rudder, a complete profiling job and tested at a very carefully-measured 62:1. It was fascinating. Working with Dick has to be one of life's great privileges. But I was beat and had done almost no flying. On top of that we had endless car trouble on the long trip to Hobbs. Peak Performance State? Forget it. Dick was so tired that one morning he spent half an hour polishing the wrong Nimbus! State of grace? It was the contest from Hell. I had the best ship in the world, the most local knowledge, certainly a world-class case of stupidity, and was lucky to wind up fourth.

For what it's like when you're "on" and things go well, consider the last day at the 1995 Canadian Nationals. The day started late and was iffy, with blue thermals of 2-3 knots to maybe 3500 feet. The first leg was into a 7-10 knot wind; some 120 km of damp, flat terrain. I started well after most of the others, having dumped half my water, and headed out, surprised to find I lost only 400 feet in the first 10 miles.

Obviously a blue street. By meandering back and forth a bit, I was able to get to the turn using only four or five thermals, catching up with all the early starters. On the second leg, still blue, heading towards a gaggle, I connected with 5 knots up to 6000 feet, almost 2000 above the others. On the last leg almost everyone did the accepted thing by deviating 20 miles to the mountains, but I felt sure straight-in was the way to go and was rewarded with a boomer back to 6000 feet and an easy final glide home to win by over twenty minutes. The whole flight just felt right. If you want an extended look at what it's like when things go well, try the last chapter of my book *Winning on the Wind*.

But let's look at the second interesting factor on the magic list: "automatic and instinctive". The truly great in all endeavours – scientists, fighter pilots, bullfighters, or soaring pilots – agree that to achieve the real breakthroughs, the busy, rational, reasoning brain must be left behind in favor of the instinctive, creative brain.

Jump of intuition

Einstein puts it succinctly: "Logic finally only leads you in a circle. The jump of intuition enables new insight." The great French mathematician Henri Poincare said much the same thing in his essay: *Mathematical Creation*. In a recent *New Yorker*, professor David Baltimore, the holder of the Chair of Molecular Biology at MIT, said: "Scientists give primacy to logic and evidence, but the most fundamental progress in science is achieved through hunch, analogy, insight, and creativity." And all the truly great soaring pilots – Ingo Renner, Helmut Reichmann, and George Lee whom I've flown against in many contests, would certainly agree.

Years ago when I was giving one of these talks on soaring technique favoured by convention audiences, a friend leaned over to his wife and said, "George isn't telling all he knows." I was a bit annoyed when she told me – I thought I was doing the best I could. But he was right. I was talking about logic, analysis and technique, which I thought was what the audience had come to hear. But that's not how I fly when I'm "on".

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Pilots at these conventions make an interesting audience. Have you considered how logical and reasoning we usually tend to be as glider pilots? First of all we're mostly male, all but about three per cent in the case of competition pilots, heavily brain-washed to distrust the non-rational or the non-analytical. Secondly, the vast majority of all the pilots there have ever been were trained by the military or by pilots trained by the military. It very much favours a by-the-numbers, 1-2-3-4 approach, which is reasonable given the mission of teaching large numbers of 20 year olds not to kill themselves in some very expensive toys. But in soaring we are talking about finding our way around the invisible geography of the sky. Logic and analysis are fine tools when there are plenty of knowns in the equation. But when the unknowns mount, as in art, or creativity, or soaring, then intuition, which deals with understanding and perception, becomes the mode of choice.

Unreliable you say? Sure. Not even Shakespeare produced a masterpiece every time out. But will even the fanciest computer – the epitome of logic – produce a Hamlet or beat an Ingo Renner? Even once? If intuition is an undeniably good friend to winners, be sure to avoid its evil cousin, impulse. The two can look a lot alike since both are non-logical, but there's a world of difference. Impulse is most often born of impatience, anger and frustration – and Lord knows soaring is capable of serving up heaping platefuls of all three. Example: in a recent nationals, a two-time World champion, standing a close second on the last day, frustrated with a rapidly-failing electrical system, dialed the wrong TP into his logger after an in-the-air course change and finished dead last for the day, blowing a likely win. It was me.

At a higher stakes level, one of the US Team pilots in last summer's Worlds, distracted by non-flying matters on the last day, failed to do his pre-takeoff checklist. Going to the wrong turnpoint mistakenly entered in his flight recorder for the POST task dropped him from a likely third overall to eleventh. Both cases are examples of heavy losses by top level pilots due to impulsive actions. So how do you tell these equally irrational but very different cousins apart? If the feeling grows out of sudden negative emotion – frustration, fear or uncertainty, the chances are that it's impulse. If it grows out of a unified view of the whole and just feels right, it's probably intuition.

Go with your feelings

Here's what I know. If the problem is simple and open to logic, by all means use it. But if there are two or three possibilities and especially if there's a lot of emotional stress in the mix and not all that much information, go with your feelings, listen to your intuition. It knows in ways you might not yet have figured out. How do you do this? Open your mind – all of it, not just the logical part and more importantly, your gut to what nature is trying to tell you.

But remember that all the intuition and sports psychology in the world won't do any good if you haven't really practiced. No matter how psyched you are, pouring out of an empty bottle produces nothing. But no matter how full of skills the bottle may be, not much will come out if it's stoppered by emotional chaos.

Annex C

Trainee recommended reading, tips and techniques, possible topics for coaches

The primary reference for this section is *Advanced Soaring Made Easy* by Bernard Eckey. Additional information can also be found in *Cross-Country Soaring* by Hemut Reichman and many articles in *free flight* magazine. Coaches should add to the list from their experience.

Silver Badge

Recommended readings: (*Advanced Soaring Made Easy*)

Tips and techniques:

- Height requirement factors
- Five-hour duration factors
- 50 km task factors

Achieving Gold

Recommended readings: (*Advanced Soaring Made Easy*)

Tips and techniques:

- Escort coach
- Group flying

The elusive Diamonds

Recommended readings: (*Advanced Soaring Made Easy*)

Tips and techniques:

- Diamond distance factors
- Diamond height factors

Advanced Instruments

Recommended readings: (*Advanced Soaring Made Easy* & Reichman, *Understanding Gliding* by Derek Piggott)

- Installation of gust filters and compensators where and why
- Proper static and pitot plumbing
- How to recognize instrument/plumbing problems

GPS and Flight Computers

Recommended readings: (*Advanced Soaring Made Easy*)

- What's available?
- How to make flight computer work for you

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Contest Flying

Recommended readings: (*Advanced Soaring Made Easy, Winning* by George Moffat)

Rules and regulations

Techniques and tactics:

- Starts

- Finishes

- Reading clouds & terrain

- Gaggle Flying tips

Getting the edge

Crew selection and landout tips

Safety:

- Checklists & tips

- Risks and Hazard avoidance

Contest psychology and strategy

Team flying

Mountain Flying

Recommended readings: (*Advanced Soaring Made Easy, Stalking the Mountain Wave* by Ursula Wiese)

Ridge soaring tips and techniques:

- Reading the ridge

- Safety

- Weather factors

Mountain wave tips and techniques:

- Safety

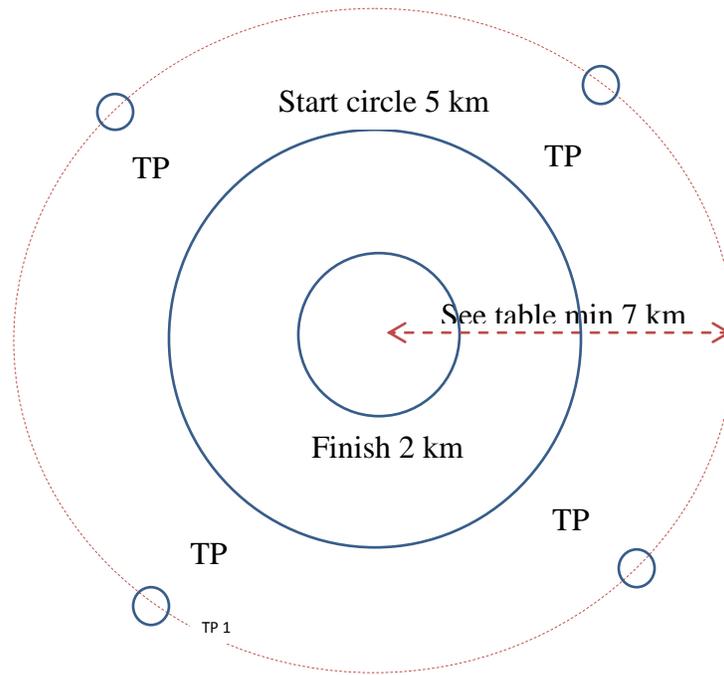
- Medical Factors

- Oxygen systems and use

- Weather Factors

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Annex D Pre Bronze Overlay



Final glide
 Circuit height 1000'
 Safety height 500'
Final glide 7km 1000'
 Min altitude floor 2500'

Minimum Final Glide	Cloud Base Required	4 TP Task & start/finish	Optimal dist between TP
2,500'	4,500'	47 km	10 km
3,500'	5,500'	101 km	20 km
4,500	6,500'	195 km	40 km
5,500	7,500'	369 km	80 km

Notes:

- Novice (pre Bronze badge) and experienced (post Bronze) can be in weekly contest
- 2000' operating band planned, adjust Template into wind for anticipated winds & final glide requirement for lowest performing glider 28:1
- Self-scoring with OLC handicapping using PowerFLARM IGC file.
- Any time pilot hits floor they must fly towards airfield. If find a thermal they can resume task.
- WX – Dr Jack or similar soaring forecast. Rule of thumb for cloud base prediction is expected surface temp – dew point x 200 = height of cloud base.

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- Map and compass navigation dead reckoning then introduce LK 8000 on inexpensive platform \$100-\$200
- Introduce Turn area see below (max task approximately 373KM and min 47km for 4500' cloud base). Pre Bronze min task and post bronze can maximize task based on lift available.

TAT Overlay (incorporate pre Bronze task minim

