



TUTOR HANDBOOK

**THIS BOOKLET CONTAINS INFORMATION FOR THE
CANOPY TUTOR TO HELP PREPARE FOR AND RUN A
CANOPY CONTROL COURSE FOR THE NOVICE AND
INTERMEDIATE SKYDIVING PILOT.**

**EDITION #1 OCTOBER 2005
ROBERT B. MCMILLAN**

Index

| | |
|-----------------------------------|-----------|
| INTRODUCTION | 3 |
| TEACHING STRATEGY | 4 |
| TUTOR TO STUDENT RATIO..... | 4 |
| TUTOR PREPARATION CHECKLIST..... | 5 |
| MORNING BRIEFING | 8 |
| GOAL SETTING..... | 9 |
| DZ BRIEF..... | 10 |
| WEATHER BRIEF..... | 11 |
| ENERGY LEVELS..... | 11 |
| HEIGHT AWARENESS..... | 11 |
| BREATHING..... | 12 |
| THE BIG PICTURE..... | 12 |
| CIRCUIT PATTERNS..... | 13 |
| SIGNALS..... | 16 |
| ORGANISING GROUPS..... | 17 |
| THE JUMPS | 18 |
| THE SLOW JUMP..... | 19 |
| STUDENT NOTES..... | 19 |
| TUTOR NOTES..... | 22 |
| THE TUTOR JUMP..... | 23 |
| STUDENT NOTES..... | 24 |
| DEBRIEF CONSIDERATIONS..... | 24 |
| TUTOR NOTES..... | 25 |
| FOLLOW THE LEADER..... | 26 |
| STUDENT NOTES..... | 27 |
| TUTOR NOTES..... | 28 |
| DEBRIEF CONSIDERATIONS..... | 28 |
| TEAM SKILLS JUMP..... | 29 |
| ADDITIONAL ACTIVITIES..... | 31 |
| ACCURACY COMPETITION..... | 31 |
| BAD WEATHER ACTIVITIES..... | 32 |
| STORY TELLING..... | 32 |
| KITES..... | 32 |
| GROUND HANDLING..... | 33 |
| VIDEO DEBRIEF..... | 35 |
| RUNNING A SEMINAR..... | 37 |
| CONFLICT MANAGEMENT..... | 40 |
| PUZZLE SOLUTION..... | 41 |
| ACKNOWLEDGEMENTS..... | 42 |
| PUBLICATIONS. | 43 |

Introduction.

This handbook is designed as a teaching tool to accompany the Fly or Fry Student handbook. It describes the manner in which many canopy control courses have successfully been run in the past. It contains notes for the tutor to use whilst helping your students brief and debrief their canopy flight.

This course is aimed at the novice to intermediate level skydiver (20 – 700 jumps), though you may tailor it to suit any skydivers needs.

This document is not about reinventing the wheel, it is simply about ensuring that the basics are taught, that their importance is emphasised and that students implement them to their advantage so that they are more able to execute a safer, more informed and most importantly enjoyable canopy flight.

Teaching strategy.

It is not the intention of this course to dictate how this material should be taught. Every instructor will have different experiences to share and will feel comfortable with their own teaching techniques. It is important however to realise that you will not be able to teach them everything they need to know in one jump, one day or even a week. *Your objective should be to teach your students good habits, briefing and debriefing skills, and how to have more fun safely whilst flying their canopy.* If your students begin to realise, if they haven't already, that flying a parachute isn't easy and it requires patience, persistence and determination, then your students should be well on their way to becoming better canopy pilots.

ENSURE THAT EACH STUDENT CHOOSES ACHIEVABLE GOALS.

SUCCESS WILL FOLLOW IF THEIR GOALS ARE MET.

Tutor to Student Ratio.

To maximise your students learning potential you should limit the group size during the practical phase of the seminar. An ideal ratio is 1:4, although you do need to be flexible and be prepared to increase this ratio. You also need to be well prepared and organised with a greater ratio. For example; If you are using a five place Cessna aircraft then a group of 12 is suitable if two tutors are available. This will allow you to have three loads of students and tutor on each load. Whilst one tutor is in the air, the other can be debriefing and packing with the last load, and ensuring the next load is readying themselves. By keeping the same four students on each load, it is possible to easily rotate each student through the jumps. The process is made a lot easier by matching each load for experience and canopy loading. This will also make the follow the leader jump much easier. You will find that as the day progresses your student will get the

hang of each jump and will be learning from the experiences of others in their group and your job will become easier.

Tutor Preparation Checklist.

STUDENT DETAILS.

When you register the student for the course, you should acquire the following information. It will make the task of separating the students into groups significantly easier.

1. Name
2. Jump number and number of jumps on current canopy.
3. Size and make of their main canopy
4. Their exit weight. This will help to pair up the groups.
5. Previous experience? Any CRW?

STREAMERS.

In order for everyone to complete the follow the leader jump, you will need a 50m long crepe paper streamer for each participant. Streamers are available from Party supply shops and retail stores such as Big W or Target for about \$3 a throw. You should factor this into your course fees as you may spend between \$40-\$60 for the streamers. Some streamers available are not as durable as others. So you might need to test them yourself before commencing the course. You may choose to reuse each streamer, though it takes 10 minutes or more to roll them up and they may become shorter depending upon whether the follower tagged the streamer or not.

VIDEO EQUIPMENT.

You should have a video camera dedicated to record your students approach and landings. Ensure you have the following:

1. Sufficient tape to last the day (normally one is enough)
2. Two fully charged batteries (the second for the '*just in case*' scenario)
3. A dedicated video-grapher who is familiar with the camera and its functions.
4. A second person on standby, should the first person become temporarily unavailable.
5. A place to keep the camera so that it is always easy to locate.
6. A television and room large enough to house your students for the final debrief.

A CHOICE OF SUITABLE CANOPIES.

In order to successfully fly relative with your students, you will need to have a range of canopies available to you and the other tutors. New Zealand Aerosports (Icarus Canopies) has provided two canopies, a Sapphire 139 (gold) and a Sapphire 169 (Orange) for the purpose of teaching canopy control. Each canopy comes with risers and for the time being there are no permanent rigs available for them. The canopies will be made available for the cost of postage to and from the DZ that they were last used. The canopies may also be used as demo canopies.

It is up to the convenor of the course to arrange suitable equipment for the tutors to use. You will find that even though the canopy that you use may be smaller than your students, you will still be able to fly relative with them by flying in small amount of brake. You should brief your student to continue to fly in trim and not mimic your actions (more on this in the tutor jump briefing). You may

need to borrow other rigs and canopies from other jumpers in order to be successful, though most people will be happy to lend you a rig for the purpose of teaching safe canopy control.



OTHER TEACHING AIDS (PICTURES, PUBLICATIONS, ETC.)

It is always handy to have a range of publications with safety related articles to fill in time while waiting for a load or while you are on weather holds. Such publications include ASM, APF News-sheets (incident reports), the High Performance Canopy Manual, Parachutist and Skydiving magazines. There is a more comprehensive list available in the publications section at the end of this handbook.

CLASSROOM SPACE.

It is beneficial to have classroom space to host the morning and afternoon briefing/debriefing sessions. The room should have ample space and perhaps have a whiteboard, large screen television and comfortable seating for all participants.

Morning Briefing.

OBJECTIVE:

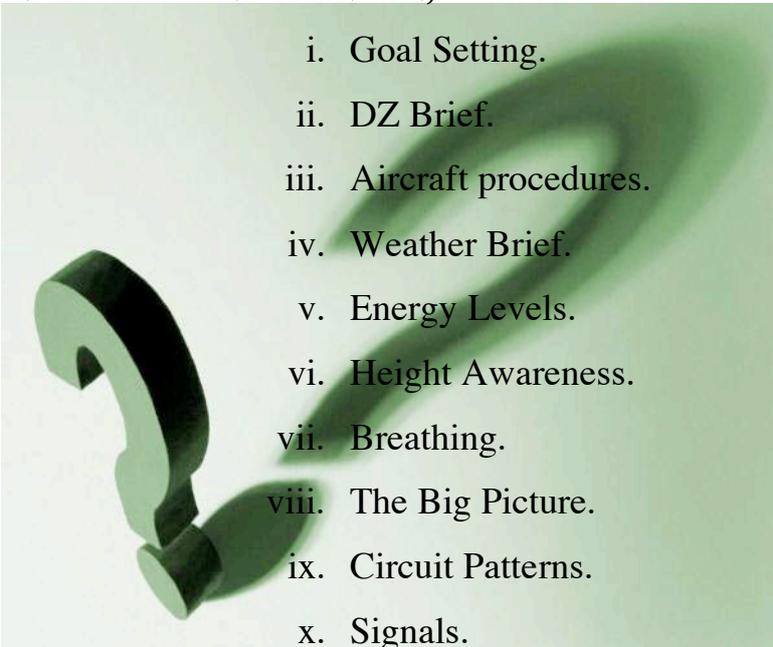
- ❖ To inform students of the program for the day.
- ❖ To answer any relevant questions.

TIME ALLOCATED. 30-45 minutes. Normally you should allow approximately half an hour for the morning briefing and another 15 mins for dirt diving.

Prior to commencing the briefing, you should ensure that you have collected their registration and jump tickets, as this will save you a lot of time and effort throughout the day.

The emphasis of the morning briefing should be to introduce the students to the program of jumps that they will aim to complete during the course of the day.

THE BRIEFING SHOULD INCLUDE;

- 
- i. Goal Setting.
 - ii. DZ Brief.
 - iii. Aircraft procedures.
 - iv. Weather Brief.
 - v. Energy Levels.
 - vi. Height Awareness.
 - vii. Breathing.
 - viii. The Big Picture.
 - ix. Circuit Patterns.
 - x. Signals.

GOAL SETTING.

In order to learn your student's expectations and to help them create realistic ones you should ask each individual one at a time to state what they expect to improve during the day. Typical responses may include

- *'I'd like to improve my landing technique.'*
- *'I'd like to learn more about my parachute and how it flies'.*
- *'I would like to learn to do better hop 'n' pops.'*
- *I would like to learn to fly better circuit patterns.*
- *I would like to start doing swoop landings.*

Regardless of their response, hopefully they have either stated broadly or specifically what they hope to achieve. When you take a thought and put it on paper it becomes a goal. Therefore to be true goals, their goal should be written in their logbooks. To become achievable and realistic they must be specific for a particular task. They must also have a completion date, whether it is for a jump, a days worth of jump or for the next month or year of jumping. Goals are rarely achieved by themselves and therefore must have specific action steps or they won't get done. Finally they must be prioritised. Simply stated, if you have ten goals you must prioritise them using the numbers 1-10. For example.

GOAL FOR THE DAY;

1. *I would like to learn briefing and debriefing skills specific to canopy control, by attending this seminar, listening to the instructors, gaining knowledge by actively participating. I would particularly like to improve my hop n' pop exit technique.*

GOAL FOR A JUMP;

2. *I would like to overcome my fear of flying close to other parachutes by flying with an experienced pilot and by learning appropriate techniques*

to deal with emergency situations. I want to learn to use new techniques involving riser inputs to help me improve in this area.

GOAL FOR THE YEAR;

10. *I would like to attend as many canopy seminars as possible. I would like to adopt a mentor, who can advise me of the most appropriate path to take. I hope that by being coached, I can improve my skills to a point where I can safely compete at the intermediate level by the end of next year.*

As the instructor, you should also state your goal for the day as well. A realistic goal would be something along the line of *‘I hope to help everyone enjoy learning new canopy control techniques in a safe, friendly and fun environment. I hope to achieve this by being patient with everyone and teaching in an understandable manner. By the end of the day I hope to have met as many of my students needs as possible.*

DZ BRIEF.

Not necessarily everyone on your course will be from the DZ that you are jumping at, so it is essential that they will be briefed on the following.

- ❖ DZ Hazards.
- ❖ The best and worst places to land in different wind conditions.
- ❖ No Landing Zones, i.e. Any neighbouring properties where the local farmer is unhappy for skydivers to trespass.
- ❖ Alternate Landing Areas.
- ❖ Prevailing winds.
- ❖ Aircraft and door procedures.

Part of the DZ brief should involve a walk around the landing area and perhaps some of the neighbouring areas. Your students will develop a greater appreciation for the texture of the landing surface by doing so. You may use this time productively and discuss some of the rest of the brief whilst doing so. If you are unfamiliar with the DZ, you should seek the assistance of the DZSO or a local instructor.

WEATHER BRIEF.

Using information gathered from weather forecasts, current weather from AV faxes or www.airservicesaustralia.com.au and the knowledge of local jumpers, you should be able to give the students a reasonable idea of what the weather may be like for the remainder of the day. As the day evolves it is important to remain aware of variations in conditions and to relay them to your students. Some, though not all of your students will realise that the weather may change significantly within a few minutes, or certainly within the time it takes for a load to reach jump altitude.

***UNDERSTANDING THE WEATHER IS A COMPLICATED MATTER,
THOUGH LOOKING FOR SIGNS OF CHANGE IS AN ESSENTIAL
SURVIVAL SKILL.***

ENERGY LEVELS.

Completing five jumps in a day is normally a taxing exercise for a novice or intermediate jumper, especially when they are predominantly doing canopy exercises. It is essential that students self monitor their energy levels and those of their partner. They should recognise in themselves when things are getting too much to cope with. You should remind your students to remain hydrated and allow time for food breaks. It is not uncommon for an occasional student to not attempt a jump, because they are worn out. It is important that you monitor how they are feeling and remind them that it is OK if they are not able to complete the jumps.

HEIGHT AWARENESS.

You should remind your student's that height awareness is everyone's responsibility and certainly doesn't cease once you have deployed your parachute. You should work towards training your eyes to judge your height

above the ground and then double check using your altimeter, rather than solely relying upon your altimeter. Be aware of neighbouring terrain, hills, mountains and even dense forests as your height above such hazards may be considerably less than if you are over the DZ. *Remind your students to always remain within safe gliding distance of a safe landing area.*

Similar to SCUBA divers, when we start to run out of air (altitude) we may start to make irrational decisions. This is the time where you must be relaxed and focused on landing safely. Your students can help themselves significantly in this situation by planning ahead, knowing their options and outs, and by breathing.

BREATHING.

Just as some people may find themselves being tense in freefall, they are just as likely to find themselves being tense under canopy. The simplest way to relax is to breathe. By focusing on your breathing before you need to make a decision, your students will be able to relax both physically and mentally. Hopefully then they will be able to execute a smarter choice.

THE BIG PICTURE! WHERE AM I GOING?

It is very easy to lose track of where you are and where you are going relative to the DZ while flying relative to someone else. At all stages of the jump it is essential that all pilots are thinking about '*Where am I going?*' eg toward the wind line, or '*I am going to run into someone*' and '*which way am I heading?*' eg. Crosswind.

Every time that a student completes a turn they should think about these two questions. It seems a lot to think about though this is more important than any exercise that they may be practicing during the jump. Once the student begins to

regularly ask these questions of themselves, it will start to become second nature.

During the *Follow the Leader jump*, it is normally the role of the leader to keep track of 'The Big Picture', though it would be foolish of the follower to chase someone to territory where they really shouldn't be. As you are descending you should be aiming to stay upwind and arrive at the 2,000ft wave off checkpoint at an appropriate distance from the DZ along the wind-line. A decision can be made even before you get to this point as to which landing field and which direction you will be landing in. From this point you should work yourself to your 1500ft holding point and then to the 1,000ft approach point where you will join the circuit.

CIRCUIT PATTERNS.

These jumps are designed to teach students a basic circuit pattern. Rather than descending in a random manner it is much more predictable if everyone observes a circuit pattern. This is particularly important for the approach and landing phase of the flight. The aim of practicing circuits throughout the descent is to allow the student to become more comfortable and familiar with techniques that allow them to turn to a heading rather than just turning to face a general direction. *As part of the briefing for each jump, the tutor will nominate a circuit direction either Left or Right.* The choice may be dictated by the conditions of the day and the safest and most appropriate approach. It is important to try to do different circuit directions, as some pilots tend to be left or right dominant. By practicing a circuit on their weak side the students will have an opportunity to develop a different **sight picture**.

AIMS.

To recognise the difference between techniques used to turn to a heading.

Examples.

- A 90° left hand turn to face downwind may also be achieved by turning through three turns to the right, if height permits.
- A 90° turn may be achieved by using any or all of the different inputs (risers, toggles, or harness weight shift)

To achieve these aims your students should....

Before commencing the turn, think about how much input is required to complete the turn without using an opposite input to stop the turn.

It is not always necessary to use full toggle movement to begin a turn. The speed and amount of input that is given to the canopy may be varied to give a different rate of turn and descent rate.

While they are turning aim to stop on your required heading.

It is not necessary to hold the input till you are facing the direction that you wish to fly. You have to allow for the recovery of the input to complete the turn.

After you turn, say to yourself, ‘which heading am I on?’. Double-check it with a wind (penetration) check. Eg. Crosswind, Downwind or Upwind.

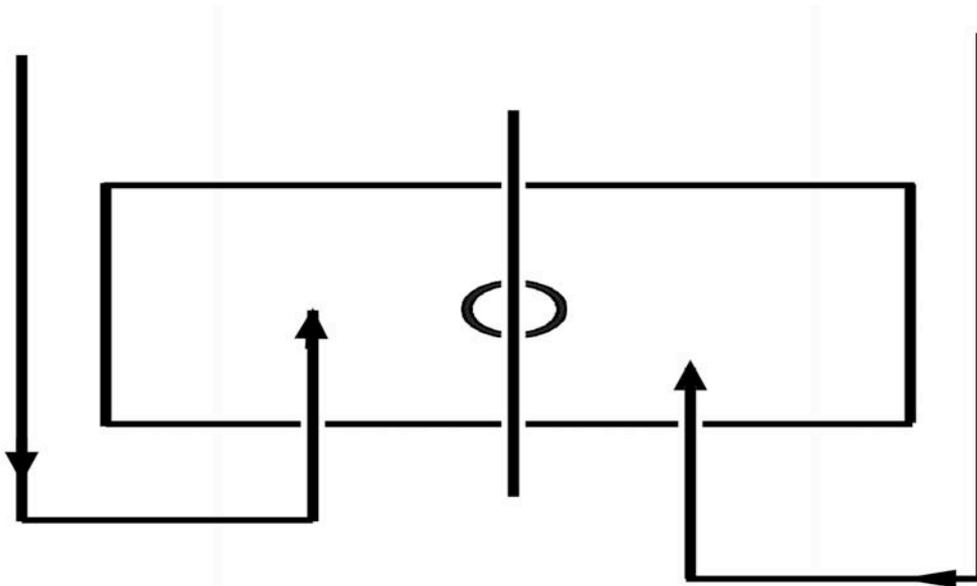
REMEMBER TO DO WIND CHECKS THROUGHOUT YOUR WHOLE DESCENT PERHAPS EVERY THOUSAND FEET AS THE WIND CURRENTS MAY BE DIFFERENT AT VARIOUS LEVELS AND MAY CHANGE BEFORE YOU HAVE HAD A CHANCE TO REALISE IT.

The best landing approaches are such if they are planned to fly over and not towards the most obstacles.

APPROACH AND LANDING DIRECTIONS WILL OBVIOUSLY VARY WITH DIFFERING WIND CONDITIONS.

Pilots should talk among themselves prior to embarking the aircraft regarding

- Exit and opening separations
- Likely order of groups landings
- Approach points,
- Landing circuit direction



Your students should learn to think of the target area as a landing arena rather than a circular target zone. This will hopefully begin to reduce the amount of convergence of different landing directions of individuals landing within a similar time frame. Remind your students that if you are going to land at a similar time to others then they should land on a parallel runway. This will allow them to avoid congestion and reduce the chance of flying through someone else's wake turbulence.

If you approach the landing arena using left hand circuit then you should not cross the centre line and vice versa for a right hand circuit.

The centre line lies through the imaginary centre of the landing field and may move depending upon the wind direction.

SIGNALS.

Leg signals are a useful method to communicate with your fellow jumpers whilst flying under canopy. By kicking either leg you can signal the pilot following you that you are about to turn. Normally three leg kicks are sufficient to allow other pilots to understand your intentions.

A 'wave off', scissor kicking action is useful to signal a break off and no further exercises. Either pilot should wave off until they see the other respond. This is normally done at around 2,000ft or at an earlier altitude, eg. You are a long way from the DZ and need to head back earlier or are running low on energy.



ACTION: Both legs scissor kicking.

Meaning: *Wave Off, Maneuvres Complete, time to break off and separate.*



ACTION: One leg kicking either left or right.

Meaning: *I am about to turn 90° to the left or right (depending upon which Direction was indicated).*

ORGANISING GROUPS.

If you obtain a list of participants before the day of the course, then you will be able to plan ahead, which helps to save time. Ideally you should ask each participant's jump numbers, canopy type and size, their wing loading and currency when they register for the course.

Initially, you should divide the class into groups of four. Each group should be comprised of people with similar sized canopies and wing loadings. This will make the tutor's job a little easier as you should be able to jump the same canopy and be able to fly relative to each student with ease.

Each group should then be split into pairs. When dividing the group you should try to pair people together that are happy to jump with one another. Students tend to feel more relaxed when they are jumping with people that they have jumped with previously. Each pair should have similar wing loadings so that the follow the leader jump is a little easier for them to fly together and stay relative. This scenario may not always be achievable, though students will learn how to improve their relativity after the first jump together and use the knowledge and skills to improve their relativity when they swap roles on the next jump.

One pair should complete the follow the Leader jumps, while the second pair should be attempting the slow jump and the tutor jump. On the groups third and fourth jump of the day the pairs should swap roles. As a tutor you should nominate the more experienced pair to do the follow the leader jumps first. The other pair will probably feel more comfortable doing a solo or a tutor jump first.

The Jumps

These jumps are designed to teach your students some new skills that they may not have tried before. You should remind your students that they should not expect to master these skills in just one jump. It takes dozens and maybe even hundreds to master even the most basic skill. What it will provide your students with is a repertoire of skills that they will be able to practice on future jumps and that will undoubtedly help them out of a difficult situation in the future.

Remind your students that on any and every jump they should conserve their strength both mentally and physically for their approach and landing. Reinforce to them that they should have a *landing approach in mind BEFORE reaching two thousand feet*. Remind them to check the landing pattern and ensure that they have left sufficient time and room after the previous jumper. It is easy to get carried away and forget about your most important objective, landing safely.

These jumps will not necessarily be completed in this order but will be organised by each tutor so that everyone on the load has an opportunity to complete each exercise.

The jumps are as follows.

FOLLOW THE LEADER; A series of two jumps where students take turns to act as the Leader and then the follower.

THE SLOW JUMP; A solo jump where the slower aspects of flight are explored, including rear riser turns and brake turns

TUTOR JUMP; this jump gives the student an opportunity to be introduced to relative canopy flight with an experienced tutor (i.e. You)

TEAM SKILLS; this jump allows your students to extend their team flying skills from freefall into the canopy flight and ultimately landing.

The Slow Jump. SLOW IS SMOOTH AND SMOOTH IS FAST.

OBJECTIVES:

1. To do as short a delay as safely possible.
2. To explore the slow range of canopy flight using combinations of rear risers, toggle and weight shift.
3. To practice stall and recovery techniques.
4. To be the last one of your group to land. The slow jumper should exit last on this pass and perform a short delay. (approx. 2 seconds).

THE JUMP

The first two circuits should be performed with the brakes still set.

1st circuit: Rear riser turns.

2nd circuit: Weight shift.

Stall and recover the parachute using rear risers

Release Toggles.

Stall and recover the parachute using rear risers or toggles

3rd circuit: Rear riser turns

4th Circuit: Weight Shift

5th Circuit Braked Turns at waist level.

6th Circuit Braked Turns at shoulder level.

Stop your exercises by 2,000ft. Wave yourself off to remind yourself to concentrate on approaching the landing pattern.

STUDENT NOTES:

- Don't compromise your safety during deployment. If you are not stable after two seconds, then continue to free-fall until you are.
- Occasionally there will be the need to release the brakes upon opening to deal with a slider hang up or end cell closure. These problems can be dealt with by using rear risers. It is acceptable to leave your brakes set until a height that you are happy to cut away from (perhaps as low as 2000ft. What is your limit?). You will need to mentally rehearse not releasing your toggles immediately after opening as students instinctively do so.
- The reason for leaving your brakes on is to practice flight in the opening configuration of your canopy. With practice and time you will find that your canopy behaves very

differently to inputs during opening. Turns will be tighter and your input will have a greater significance.

- Weight shift turns may be achieved by several means.
 1. **LOOK** in the direction that you wish to turn.
 2. **LEAN** your upper torso towards and slightly forwards of where you want to turn.
 3. **LIFT** the opposite leg. To effect the turn you need to get the articulation point on the side that you are turning to, lower than the other side. To do so you need to lift your upper leg and hence your hips on the opposite side to the turn.

Place both feet together and extend them forwards toward one of the corners of the leading edge of the canopy. You can control the rate of the turn by moving them closer toward the centre of the canopy. After the turn is initiated, you may bring your legs to a position where they are more underneath rather than in front of your body. This particular type of weight shift will work better when the canopy is smaller and highly loaded than the average novice-intermediate canopy, though it will still work.

- Normally weight shift is used in combination with a toggle or riser input. It allows you to move as one with the canopy rather than causing the parachute to turn and then allowing your body to catch up. It is important to practice weight shift turns in isolation, to establish what affect it has on your canopy. The higher your canopy is loaded the greater the effect will be. The point of your skydive where you will notice the influence most is during the landing flare, particular if you reach out with one leg. This is simply because your weight shift has a greater influence the deeper that your brakes are pulled down.
- When performing a **stall** it is important to notice two things.
 - Firstly the feeling of ‘mushiness’ just before the stall actually occurs, which is called the **incipient stall**. If you ever feel this during the flare stage of your landing, then you should stop flaring any further otherwise the canopy will stall and you will drop out of the sky and probably land going backwards or on your back. You should be ready by this stage to do a PLR regardless, though this is when it is really going to matter. This is potentially a very hazardous situation that may result in serious injury.

- Secondly, recognise the feeling of the stall itself. The canopy will start to fall behind you as you swing forward. In order to reinflate the canopy you should do the following

1. **SLOWLY** lift the risers or toggles back to the resting position.
2. **SMOOTHLY** lift them, rather than abruptly letting them go.
3. **SYMMETRICALLY** lift them so the canopy reinflates in a straight line rather than causing the parachute to turn.

The canopy reinflation process may result in line twists if you are too abrupt or asymmetric. This is precisely the reason why you practice a stall at a higher altitude. (The higher the better)

- If you are jumping at a time of year where there are ample thermals, then you may actually be able to use your flat turns to stay at the same altitude or if your canopy is sufficiently large enough compared to your weight you may be able to ascend. This is a useful technique to use if you are on a long spot and need extra lift to help you get home. Thermals may be found commonly over hot, flat and dark surfaces such as roads, runways or paddocks. Your tutor will be able to further discuss this technique with you.
- If you are getting tired throughout the jump, then give your arms a rest and continue to fly on full flight. If you are catching up to the rest of your group then make the decision early to land before them. Do not congest the landing area by arriving at the ground at the same time as everyone else. Use your initiative early and land somewhere else if the need arises.

Points to consider during the debrief:

- ❖ Was it easier to turn with your brakes on or off?
- ❖ Were you able to fly in deep brakes for long periods of time? Is this something that you need to work on?
- ❖ Were you the last one to land? Are you capable of ‘floating’ longer than the others?
- ❖ What situations might you need to do a braked approach?

TUTOR NOTES:

- Students need to be encouraged to spend more flight time in 'slow mode'. Far too often all that jumpers are interested in is going faster, without stopping to contemplate 'how do I slow down?'
- Normally not much attention is paid to flight in deep brakes. It is a common to see novice and intermediate jumpers lose their balance and then reach with an arm or a leg before reaching the touchdown phase of their landing flare. This is the primary reason why you should brief them to explore brakes flight at waist level or deeper first before practicing at shoulder level.
- You should remind your students that this jump probably requires the most amount of physical energy exertion. They should save their physical and mental energy for the approach and landing phase of the descent.
- Remind your students to wave-off by themselves at 2,000ft and return to full flight. They may inadvertently continue to fly the whole descent on deep brakes and forget to return to full flight for the final stage of the circuit.
- You should make it absolutely clear to your students that slow flight is an essential skill to have in order to become a better canopy pilot. It will allow them to control their descent rate at the slower end of the spectrum by being able to 'float'. These skills will also improve their landing technique considerably.

The Tutor Jump.

OBJECTIVES. *To introduce the student to*

1. Relative canopy flight.
2. The effects of converging and diverging flight paths
3. The effects of turbulence and burble on a parachute.

THE DIVE

- ❖ Novice exits as Base and does a 4-5 second delay.
- ❖ Tutor observes students exit, follows after an appropriate interval then performs a shorter delay.
- ❖ Student aims to continue flying on aircraft heading whilst releasing brakes and observing tutors approach technique.
- ❖ Tutor flies to a relative point to the side. (Right side if doing a left hand circuit and vice versa)
- ❖ Tutor and student begin to fly a circuit together until a desirable heading is achieved i.e. downwind if a long way from the Dz or crosswind or into wind if closer to the DZ. Either instructor or student can give a signal to turn.
- ❖ Tutor flies straight and acts as a relative base while the student performs two slides using risers to move away from the tutor and then back towards one another. If front risers are utilised during the first slide then the student should use front risers to fly back to the tutor. Then use rear risers on the second slide.
- ❖ Student then dives their canopy down using both front risers, so that they are below, though still off to one side of the tutor. They may then rear riser back up to level with level with the tutor.
- ❖ Student floats, using rear risers until they are above their tutor's parachute (though still off to one side), then front risers back down to level.
- ❖ Tutor slides in front and student behind. The student should just be a couple of canopy distances behind the tutor and be able to experience what it feels like to fly in a canopies wake (burble). The student should then slide out of and back into the burble, exploring its boundaries. They should also try and float behind the tutor so that they can feel the burble on their body, not just on their canopy.
- ❖ Novice and tutor fly side by side again until 2000 ft. During which time the objective is to fly relative and to follow the leader. i.e. the tutor.
- ❖ After wave- off the tutor should float and the student should concentrate on completing a successful approach. The tutor's role is to continue to

follow the student until landing and then critique the student on their choice of turns, approach and landing.

STUDENT NOTES:

- ❖ Remember to anticipate slowing down when converging towards one another. A useful analogy is to visualise how a car should gradually slow down when you are driving towards a set of traffic lights as opposed to slamming on the hand brake when you get there.

- ❖ If you are feeling uncomfortable at any stage of this jump, then you can always fly towards clear air. i.e. If you are on the left of the formation then fly toward the left and vice versa.

- ❖ When multiple canopies are landing at a similar time, it is very important that you do not fly in the burble of another canopy. The last thing that you would like to experience when you are landing is wake turbulence.

- ❖ Even after a canopy has landed, turbulent (disturbed) air may still exist in its path for up to a few seconds afterwards, particularly if the canopy is highly loaded and flying fast.

POINTS TO CONSIDER DURING THE DEBRIEF.

- ❖ Did you feel comfortable flying relative to someone else in a predictable fashion?
- ❖ Did you notice how such a small input to create divergence might lead to a large separation in just a matter of moments? More importantly do you appreciate how convergence can happen very quickly if you're not paying attention?
- ❖ Did you appreciate the difference in the feel of your flight while flying in burble?
- ❖ Were you able to reach for all of your riser inputs without having to look at the grips?
- ❖ Could you feel the increase in speed of the canopy when you applied double front riser inputs?

TUTOR NOTES.

As much as you can you should 'sit still' while the student does most of the moving. This will help them to appreciate the effect of their input. In between manoeuvres you might choose to reposition yourself back to the side-by-side flight path. In such a case, part of your briefing should be to inform your student that once the task is complete, they should stay still so that you may reposition yourself, then continue with the next task.

This jump is incredibly flexible. Most students will be able to complete the tasks easily. Depending upon their skill level, you may choose to add a fly-around into the brief.

The fly around involves using the sliding, diving and floating techniques that they have been practicing. Starting from the side by side the student can dive their canopy down and in front of you, then slide in front though lower than you. Stop the slide. Then float up and reposition themselves above and behind you. Slide across using rear risers. Stop the slide and then dive back down using front risers to the original side-by-side configuration.

The tutor may opt to land before the student if the student appears to be feeling tired. Ensure that your student is aware of this before they jump. In which case you may opt to act as a leader and get your student to follow, at a distance, along your flight path.

You may choose to follow them off to one side and behind the student. This will give you an idea of where they are looking, what type of turns they are doing, their turn-points and their approach set-up. This will form an important part of your debrief.

Always allow the student to debrief their version of the jump first. This will enable you to judge how they perceive their flight. You should add comments regarding their technique, anticipation skills and choice of flight path for final approach.

The Follow the Leader Jump.

This exercise involves two jumps whereby each student takes turn at either being the leader or the follower.

OBJECTIVES:

The aim of this jump is to demonstrate the difference in glide path of different jumpers under differing wing loadings and throughout different manoeuvres. This will be easily visualised by the leader carrying a 50m crepe paper streamer.

The **objective of the leader** is to fly as predictably as possible in a circuit pattern. *The leader should keep track of ‘the BIG Picture’ so that both may make it to a safe landing area.*

The **objective of the follower** is to fly as close to the end of the streamer as possible. The follower should aim not to break the streamer. The follower should take note of the difference in steepness of the streamer as the flight path changes. The follower should also remain aware of *‘the BIG Picture’*.

Determine a pattern as a team that involves both faster front riser manoeuvres and slower rear riser or brake configurations. Plan to use the same type of turn for each of the four turns during the circuit. For the subsequent circuits choose another type of turn to practice. Your tutor will help you to determine a pattern that will help you to remain in relative flight.

Student notes.

- ❖ When you attach the streamer to your chest strap before you jump ensure it is adequately wrapped around at least 3-4 times. The remainder of the streamer should be tucked down the top of your jumpsuit. When you are ready to deploy the streamer, ensure that you have allowed more than an arms length of streamer as excess. Drop the streamer off to one side of your body. Watch it as it unfurls. The end of the streamer describes where you were 50 metres ago. Its angle describes your flight path and acts as a great visual for the follower.
- ❖ When you fly slowly its path will flatten out and even begin to swirl as it trails in your burble. When the speed is increased through a turn it will increase its gradient.
- ❖ The follower should use the streamer as a relative base. Try floating to get above it and then dive by front riser in order to catch up to it. Try flying around it without breaking it.
- ❖ This jump is designed to teach you to work as a team. If you found it difficult to get together and stay together then with help from your tutor during your debrief you should experience greater success on the second jump.
- ❖ If a slower canopy is the follower then the leader should try flying on either rear risers or on brakes. The leader should aim to do flatter turns i.e. Rear riser or braked turns, in order to not lose too much height and hence increase separation during the turn. The follower should try to fly on the inside of the circuit, rather than on the outside of the arc.
- ❖ If the follower is on a faster canopy then the leader should opt for faster turns such as toggle or front riser turns. The follower should fly on the outside of the arc in order to avoid overtaking the leader.
- ❖ Both team members are responsible for keeping track of the 'BIG Picture', especially the leader. Always know where you are in relation to the ground and to the other members of your group.
- ❖ If you break the streamer, then continue flying as if the streamer was still there. The streamer does add drag to your canopy and may cause you parachute to turn slightly if it is a faster canopy and if you caught it on an outside line. Canopies are still safe to land with the streamers attached.
- ❖ After wave off at 2,000 ft, start to increase the gap between each other by floating as the follower and diving or spiralling as the leader. Once you have increased separation continue to follow each other until landing. If the follower is getting tired and is unable to fly their slot, then take the initiative early and overtake the leader. Ensure that you pass them on the outside of the circuit. Continue to communicate with one another by signalling your intention to turn. The leader should take the initiative if this is the case and float to increase separation.

TUTOR NOTES.

Students often find it easier on the second jump as they have a better feel for how one another are flying together. After debriefing the pair, aim to help them use their new knowledge to improve their compatibility on the next jump.

If the leader is on a larger, slower canopy, the follower may need to fly a wider arc than the leader and fly in either deeper brakes or on rear risers in order to stay with the leader. In the opposite situation the follower may need to fly on the inside of the arc and on front risers. The leader may need to recognise the situation during flight and slow down by applying a small amount of brakes.

POINTS TO CONSIDER DURING THE DEBRIEF.

- ❖ Was there are big difference in freefall time and opening time that caused the initial separation?
- ❖ Once you got together, was it relatively easy to stay together?
- ❖ Was everyone aware of '*the BIG Picture?*'
- ❖ Did you find it easier on the second jump to get together and stay together?
- ❖ Do you now have a better appreciation of glide angle and relative speeds?

The Team Skills Jump

OBJECTIVES:

- ❖ The objective of this jump is to apply acquired canopy skills into a skydive involving freefall.
- ❖ To demonstrate that flying, as a team does not just involve freefall manoeuvres.

THE JUMP.

The group of five will exit the aircraft together, either linked or unlinked. Then build a simple formation and track away with sufficient altitude left to complete a canopy exercise. You might still choose to exit at seven or eight thousand to keep the costs of each jump the same or fly higher to get some extra freefall time. Either way the emphasis is on being in freefall together, safely separating by flat tracking and deploying so that everyone safely flies away from the centre.

It is important that everyone tries to deploy at the same altitude to keep everyone within close proximity. There will always be differences in deployment altitude and time taken to fully open.

By agreeing on a circuit pattern during the brief all team members should be able to fly back together and fly as a flock. To achieve this the team should...

- ❖ Work down to the lowest person by turning in a predetermined direction.
- ❖ The low person should begin to float and wait, perhaps by leaving the brakes set until the rest of the flock have caught up.
- ❖ The low person becomes the leader and should begin by flying towards the DZ and ensure that all participants will be able to make it back safely.

- ❖ Once this is determined begin to signal and then turn cross wind and then into the wind in a box pattern.
- ❖ Slower canopies should endeavour to catch up, on the inside of the turn, faster canopies on the outside of the turn.
- ❖ The team aim is to regroup in either a carousel or stair step formation.
- ❖ Once the team has reached 2,000 ft everyone should wave off and separate and land in a predetermined order
 - The order should be determined by canopy size and loading. Smaller, faster canopies should opt to land first and perhaps perform several dive turns and floatier canopies should opt to land last by flying in deep brakes to help the separation process.

BIRDS OF A FEATHER SHOULD FLOCK TOGETHER.



Additional Activities.

ACCURACY COMPETITION.

The aim of the accuracy competition is to encourage your student to constantly aim to improve their accuracy skills. It also fosters a competitive spirit amongst the group. You are only limited by your imagination for prizes, however some suggestions are six packs, log book covers or jump tickets.

Small tarps or bright coloured towels make good targets. Pegs may be needed to tether the targets to the ground. The targets should be arranged across the wind line so that everyone doesn't try to land in the same confined area. Your students should be reminded that the objective should always be to **LAND SAFELY and parallel to others** if they are landing at the same time. Remind them not to get target fixation.

Your students should be taught that *every jump is an accuracy jump*, regardless of whether they are likely to land on a target or not. Your students should be recording whether they are constantly overshooting or undershooting their target. After some time they may begin to see a pattern emerging and then seek advice on how to improve their turn-points, approach speed or choice of technique to improve their accuracy. You should reward students for 'being the most consistent', even if they were consistently off target, being 'a safe canopy pilot' or even doing the 'best PLR' of the day.

Bad Weather Activities.

We all know that the weather doesn't always agree with our plans. So it is important to have some bad weather activities in mind in case Mother Nature doesn't want us to play our game.

STORY TELLING.

This activity will normally occur as par for the course, whether it is during the seminar or at the bar at the end of the day and it is a valuable way to spend time. It should be emphasised that the stories should not be exclusively told by you, everyone has experiences to share and should be encouraged to do so. The story should highlight the lessons they learned about the mistakes that were made, and how actions could have been different to ensure a safer outcome.

KITES.

Kites are not only an excellent source of entertainment during windy periods; they are a great teaching tool. Here are a few things that may be learned from kite flying.

TENSION IN THE LINES: The tension will increase as the kite moves faster through the arc created by the movement of the kite.

WIND GRADIENT: The difference between the wind speed close to the ground compared to the wind at various altitudes. Students need to learn that the wind is closer to the ground actually moves slower than the air above it due to the friction between it and the earth. This is why wind speed measurements should be made at 30ft above the ground to give a true measurement. Or add 25% to the value of a wind measurement taken on the ground.

BURBLE BEHIND OBJECTS: If you fly the kite behind an object, your students will be clearly able to see that the kite is much more difficult to fly as it rolls and dives through the rolling turbulent air.

NATURE OF THE AIR: By spending quality time standing in the landing field your students will develop a greater appreciation of the nature of the air. They may note that it is not always consistent in either direction or speed.

Ground Handling.

This activity should be incorporated into your course as time permits between loads before your students have packed their canopies.

In order to inflate the canopy, put your rig on backwards, take both front risers in one hand and both rear risers in the other and try to keep the slider near your risers, so it doesn't slide up the lines (photo a). Face the canopy and pull your hand that has the front risers closer towards your body. If you need to collapse the canopy before inflation, walk towards it and pull the rear risers towards your body and allow the front risers to go to arms length (photo b). The more preparation that you do to the canopy before you inflate it then the easier it will be to get it to fly over your head. If the canopy does not begin to inflate symmetrically then collapse the canopy and try again.

Once you get the canopy above your head you will need to shift your body so that it remains under the centre of the canopy to keep it inflated. You may now start to manipulate risers and toggles to fly the parachute on the ground (photo c).

Now you could try putting the rig on properly, inflate the canopy by facing toward it with half a line twist, then turn around and face into wind and practice collapsing your canopy. It isn't as easy as it sounds and will require practice.

As a tutor you should demonstrate proper technique for inflation and deflation of the canopy. Be wary of attempting this in strong conditions. **DO NOT TIE YOURSELF TO ANYTHING!!** Serious injury or death may result if you do, as some have lived to testify.

In lighter conditions it may be necessary to remove the bag and pilot chute to allow for easier inflation. You may need to walk further upwind in order to keep the canopy inflated as the wind lulls.

The benefits of learning to ground handle a parachute include.

- Continuity checks are simple when you are able to inflate the canopy and visually check that all of the lines have been reassembled correctly.
- You are able to spend quality time looking at the change of shape of the wing when you move different control inputs such as risers or weight (harness) shift.
- It is a great way to practice deflating the canopy during windy conditions.

If one of your students does not know how to collapse their canopy on a 15knot day, should they even attempt to go and jump during such conditions?



Photo B



PHOTO A

PHOTO C



Video Debrief.

Most students will not have seen many or any of their landings on video before. Therefore an essential learning tool during this course is a video camera and a competent video-grapher. If possible you should enlist the help a person that is willing to video all of the approaches (the last 10-15 secs is generally enough) and the touchdowns. Otherwise you may need to delegate the responsibility to different people throughout the day.

As much as you can, you should be watching the approaches and landings. Address any distinctive issues as soon as possible, so that your student may endeavour to improve on the next jump.

TIPS FOR VIDEOGRAPHERS.

- ❖ Always have a charged battery and a spare ready.
- ❖ Start the day with a fresh tape, so there is little chance of running out.
- ❖ Always return the camera to the same storage area. In case someone else needs it for review or to video a load, then the camera will be easily sourced.
- ❖ Use zoom if needed, though try to focus on the 'BIG PICTURE'. During the landing phase ensure that you have the person, ground and the canopy all in frame. This will show what is happening as a whole, rather than just what the student is doing.
- ❖ Let the instructors know if you see anything that needs immediate addressing, such as a bad landing or a close call.

TIPS FOR DEBRIEFING.

- ❖ Add a low volume of background music to add some good vibes
- ❖ Always start and finish an individuals debrief with a positive comment. Add constructive criticism in the middle of your assessment of a landing. Students will always feel better about themselves if you finish with a positive comment.
- ❖ Occasionally, ask a student to debrief their landing out loud to the group. Consider asking them their thoughts and reason for choice of action.
- ❖ Remember not to isolate a student, rather use their actions as a common example of a bad habit.
- ❖ Praise students for examples of good technique and habits. Remind your students that any landing that you walk away from is a good landing.
- ❖ Always praise and thank the videographer(s) for their hard work. Encourage students to indulge them with frosty cold beverages.

Running a Seminar.

There are a number of different ways that you might choose to run a seminar. If bad weather occurs you might choose to run a series of seminars throughout the day.

GEAR MAINTENANCE. TOPICS SHOULD INCLUDE:

- ❖ How to do a proper gear check.
- ❖ Common points of wear and tear on a rig and canopy.
- ❖ Monthly three ring maintenance.
- ❖ How to check the trim of a canopy and compare a new canopy with an older one.
- ❖ How to check for correct length of a kill line and closing loops.
- ❖ *The Three-Bloke Pull Test.* Suspend a pair of risers from a strong point, sufficiently high enough for the person wearing a rig to be above the ground and only have a short distance to fall onto a mattress or soft surface. Better still, have a set of safety straps available, so that once the student cuts away they only fall as far as the safety straps will allow them. Safety straps are easily made out of old inner tandem bridle with a #6 rapide link or reef knot to hold the ends together. Twist the risers together, and load the harness up and with three people hanging off it to simulate a hard pull, which may be caused by poor maintenance or a fast spinning malfunction. This exercise will reinforce the importance of gear maintenance and give students a feel for a worst-case scenario.

INCIDENTS & STORY TELLING.

It is a good idea to dig the incident book out and review some of the recent and significant incidents on the DZ. You should highlight the preparation that could have been made before the incident, the cause and effect of the actions of the individual(s) and the consequences of such actions. Always allow your students

to think about the situation before offering a better solution. Involve your students as much as you can in the thought processes necessary to understand the situation and consequences. Essentially this activity will increase the knowledge but also improve their decision making process which is a key to survival.

GENERAL SEMINAR.

An effective way to run a seminar is to start with a particular topic and then work your way through a 'typical skydive'. Ask your audience about their experiences, how they dealt with them, and better ways to improve their chances of a successful skydive. You may choose to deal solely with canopy issues. Or you might choose to start with....

Making a plan.

What works? Briefing canopy first, then freefall or vice versa.
What is in your plan? What does it include?

Gearing up.

Do you check each other's gear before emplaning and exiting?
What are the essential safety factors to consider during climb-out and exit?

Tracking.

What are people looking out for on track-off?
What are some good techniques for keeping your canopy opening and flying in the direction that you want it to?

Under Canopy.

What are some techniques that I can practice under canopy?
What options do you have to choose from when choosing a landing field?
How do you deal with a busy landing pattern?
What differences in technique are there for flaring?

There are a million different issues and questions that you could address and you definitely won't have time to answer all of them. Generally speaking you will have a range of people in your audience from novices to advanced pilots. Hopefully the seminar will deal with a lot of issues and everyone will benefit or have a valuable contribution to make.

You might choose to simply run a question and answer seminar. If you do then it is always a good idea to have ‘a few questions that you prepared earlier’. This will help should your audience find it difficult to ask questions.

TIME FRAME.

This will depend upon the size of the group that you are working with and the amount of information that they are able to take in. If you are running a seminar at the end of the day, after dinner and everyone has had few frosty beverages, normally an hour is sufficient. Here are a few tricks to running a successful seminar and keeping everyone’s attention.

- ❖ **Thank everyone involved** in the seminar and drop zone organization. Gratitude is always appreciated.
- ❖ **Be Confident, Smile, Have Fun.** It is never an easy task to talk in front of a large group of people, especially if you are not use to it.
- ❖ **Act as a mediator/convenor**, rather than dictator, your job is to keep the seminar flowing and move the conversation forwards when it is getting bogged down on a particular topic. People will get sick of your voice if you talk too much.
- ❖ **Have an off-sider**, someone that you can throw to when you are stuck on a topic or sounding repetitive.
- ❖ **Use Humour** as much as possible, though emphasise the serious nature of particular topics.
- ❖ **Involve your audience** as much as possible. Value their opinions. Praise them for speaking up.
- ❖ **Use Audio/Visual media** to break up the conversation.
- ❖ **Watch for people’s reactions.** Look for signs of tiredness or boredom. Your audience will soon tell you when they’ve had enough by walking out.

Conflict Management

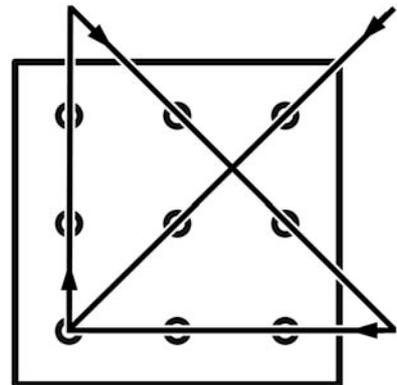
It is important to recognise and remember that you are playing a key role in a team of people to make this canopy seminar happen. The team includes the manifestor, pilot, Chief Instructor, packers and most importantly your students. John Hoover of the Golden Knights suggests a few things to make your life and everyone's involved a lot happier and easier. They include.

- ❖ **Recognise everyone as an individual;** each with their own needs and their own style of learning. Everyone has a right to express his or her opinion.
- ❖ **Always act as a team;** work together to achieve your goals.
- ❖ **Everyone matters;** never isolate any team member, everyone has his or her role to play.
- ❖ **Never be confrontational;** Praise in public, criticise in private.
- ❖ **Motivate and inspire one another;** encourage one another, pick someone up if they're feeling down.
- ❖ **Have Selfless Dedication;** Be passionate about what you are trying to achieve. Strive to do the best that you are capable of.

PRACTICE WHAT YOU TEACH.

Puzzle Solution.

What should your student's learn from this experience? Firstly, there are more rules to learn and there will always be more rules to learn. I only said that 'there **are** four simple rules', rather than 'these are the **only** four simple rules'. Don't believe only what you read; your students will need to make rational decisions for themselves.



Did they look outside the Box (square) that they live in?

Extend their existing knowledge past the boundaries that define what you know. Did they add any more tools to help you solve the problem? If more time were available, would they have a better solution? If you had seen the puzzle before hand than perhaps they would be better equipped to find an answer.

Last and certainly not least the most important thing to remember is that canopy flight is never simple. Pulling the strings is simple, but flying the canopy is not. Encourage your students to devote as much time as they can to learn, understand and enjoy the full range of performance of their parachute.

SO HOW CAN YOUR STUDENTS APPLY WHAT THEY HAVE LEARNT TO THE FLIGHT OF THEIR PARACHUTE?

- **Don't be scared to have a go...** In the right environment, relative canopy flight is better than freefall relative work. Why? Because it will teach you more about that piece of fabric that helps you survive.
- **Practice the basics.** The old "Keep it Simple Stupid" principle has a lot of merit.
- **Build a repertoire of skills,** practice each skill separately, fast to slow, left to right, up and down, explore every avenue.
- **Fly the same landing pattern as everyone else on the load.** Talk to them before explaining about which direction is most suitable for today's conditions. Agree upon a set direction for landing.

Acknowledgements. This project would not be possible without the assistance of the following people.

MY PARENTS, JOHN AND MARGARET. For being great teachers and giving me the freedom to follow my dream.

ROZ CARRE’; For teaching me the passion of flight and to love all disciplines of skydiving.

MIKE CARRE’; For having enough faith to teach me the first jump course and to believe in my ability to teach others.

BRIAN GERMAIN. For producing an outstanding resource for the skydiving pilot, “The Parachute and Its Pilot”. Brian has also been an enormous source of inspiration.

JOHN LE BLANC OF PERFORMANCE DESIGNS. For the valuable lessons that he continues to teach.

DREW LIPINSKI; For his unlimited passion for canopy flight and the teaching of safe canopy control.

PAUL ‘JYRO’ MARTYN FROM NEW ZEALAND AEROSPORTS (ICARUS CANOPIES). For their continued support of sport Parachuting in Australia and for providing two demo canopies for these courses.

PHIL ONIS. For teaching me to love skydiving right from my first jump, and for his ongoing support throughout my jumping career.

PAUL ‘POO’ SMITH. For being a great mentor and his never ending support.

STEVE SMITH. For providing the computer graphics.

GREG ‘ZIPPER’ SITKOWSKI of Parachutes Australia, for his continuing support of sport skydiving in Australia.

PAUL NEWBOULD, JIM SMITH AND RAY STYLES. For being a great source of inspiration for my articles.

MICHAEL VAUGHAN For his editing assistance and for pushing my flying skills further.

LUKE OLIVER For motivating me to finish this project.

PAUL BAKER, JULIA MCCONNELL, TIM RADFORD, AND W.O. KEN STONE from the Parachute Training School for their assistance with the photographs.

THE NEW SOUTH WALES, VICTORIAN, WEST AUSTRALIAN AND QUEENSLAND PARACHUTE COUNCILS for their continuing financial support of these canopy courses held throughout these states.

Publications

THESE PUBLICATIONS WERE A GREAT SOURCE OF INFORMATION AND THEY WILL ALSO PROVIDE YOUR STUDENTS WITH VALUABLE READING MATERIAL EITHER DURING A WEATHER HOLD OR FOR FUTURE REFERENCE.

THE PARACHUTE AND ITS PILOT Brian Germain.

Read this Book and encourage your students to do so. It covers a vast range of topics from the basic design features of a canopy and what makes it fly to the psychology of flight. It is a comprehensive and easy to read book. Available from www.briangermain.com \$US 29.95

ELLIPTICAL PARACHUTES AND CANOPY CONTROL. Taken from notes and Lectures by **John LeBlanc** of Performance Designs. Available from The APF.

WING LOADING AND ITS EFFECTS John LeBlanc

Available from www.performancedesigns.com

CHOOSING A CANOPY Kevin Gibson. An article reprinted from the USPA Parachutist magazine (June 1998 edition). Available from www.apf.asn.au

CHOOSING A CANOPY. MAINTENANCE OF A CANOPY.

Available from www.icarusnz.com

THE LOWDOWN ON LOW TURNS: WHAT EVERY SKYDIVER SHOULD KNOW. Scott Miller

Available from www.performancedesigns.com

HIGH PERFORMANCE CANOPIES. A GUIDE TO THEIR CHARACTERISTICS AND HANDLING. John Chapman. Available from www.apf.asn.au.

FEEL THE STRINGS. Rob McMillan

Available from www.parachutesaustralia.com

