Serious Paraglider Racing Accidents

Why are there so many?

The Evolution of Airborne Risk Management
(and a changing attitude to risk?)

Possible reasons for the high accident rate in Vol Libre (paraglider) cross country racing competition, compared with other types of sporting flying.

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It is assumed that this personal view of paragliding vis-à-vis other types of aerial sport will also be read by those with no experience of paragliding – hence the explanations that will be obvious to many paraglider pilots.

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Introduction

The paraglider is a new species. Its evolutionary history is only a quarter the length of other traditional flying machines. It has developed in isolation. There is no common ancestor . . . and successful society in general has changed over the last 50 years. Under the comforting notions of democracy and freedom governmental and commercial influences are demanding and legislating for an increasingly risk-free life experience for their citizens (who are able to pay for this luxury). The results have been an increase in nanny-state lifestyles, and a transfer of anxieties from managing the risks of the everyday great outdoors towards perceived areas of threat which can be alleviated by spending more money, staying at home watching others do things on the television, or wandering the shopping mall. Opportunities for learning to manage genuine personal risk (a fundamental human survival skill) are less available to the developing young person, and the concept of individual responsibility for safety decisions is retreating. But – nonetheless - humans relish challenge and excitement . .

The Fédération Aéronautique Internationale (FAI) is a non-political organisation that looks after sporting flying of all kinds - aeroplanes, gliders, balloons, parachutes . . . It was founded in 1905. 1905! - that's a long time ago: the Wright Brothers only took off in 1903. Do the people who come and go at the offices in Lausanne know something about sport flying safety, and that which is considered acceptable after the collective experience of 106 years? Probably yes. Since Vol Libre (paraglider and hang glider flying) joined the fold (as CIVL) much concern has been expressed within the FAI about the accident/incident rate in CIVL competition. This rate is perceived as being different from the rest of the airborne sporting world (too high). Is this perception justified - and, if so, why is there a difference?

I began paragliding after an airline career, much sporting flying, and some experience of international competition aerobatics (managed by CIVA - Voltige Aérienne), as pilot, trainer, judge and national delegate. Seeing me with my paraglider, and aware of my aeroplane background, people still ask me 'Don't I think paragliding is dangerous?' I'm certainly not the sharpest, most athletic or quick-learning pilot, but do I look so bad? Why should they think me so stupid if this is what they believe? Where did such an idea come from? "It's just another aeroplane, it needs the same level of understanding and (paraglider) judgment as any other type of flying," is my honest opinion; "A Concorde (or a Sukhoi, or an F-18) is a very dangerous machine in the wrong hands, (but a delight if you know what you are doing)" would be my suitable conversation stopper. What the public, educated by television and newspapers, thinks does not matter, the fact remains that Vol Libre appears to be the dangerous member of the FAI. Why should this be?

1. What does the 'libre' in Vol Libre mean?

I've had it on good authority (*'de la bouche du cheval'* if you like) that the word libre here means 'free from outside assistance, equipment or an engine' (except perhaps a winch - another way of providing some necessary potential energy if a hill is not to hand). That's all it means.

Free Flying does not mean free from the laws of physics. They apply to all flying things, cheap or expensive, fast or slow, sporting, commercial or military. If the laws of physics are challenged someone will get hurt. That is why traditions have built up over the one hundred and six FAI flying years as to how to go about dealing with them, and help the people who take to the air stay acceptably safe, sometimes despite themselves. To fly 'free as a bird' sounds a nice idea, but there is a difference - the birds have been doing it for millions of years: they've learned a lot. Individual birds only live for a few years; how do they know so much about risk management?

2. Is all flying risky?

Always. It's a matter of degree. If you wish to be totally free from flying risks stay on the ground, wear a tin hat and keep a good lookout for things approaching from above. 'Safe' flying requires good risk management.

3. What do pilots need for good risk management ?

3.1 The best possible understanding and assessment of all predictable risks.

3.2 Rational decision-making about those risks.

Can I learn all about *3.1* myself?
No, you can't live long enough. You need to make the most of the collective wisdom available (106+ years'). That's how the birds do it.

Are pilots rational decision-makers *(3.2)?*
Sometimes, but not when unsuitable feelings come into play which disturb the ideal *Angst* (emotional arousal) level of the good pilot. Denial does not help either: the evidence must be faced and considered rationally.

How can a pilot get a good decision-making state-of-mind?
Experience, good training, good advice, good role-models, a good frame of mind to take off with. This last implies a realistic (honest) assessment of his ability, strengths and weaknesses, and realistic expectations. Extraneous thoughts and problems must be left on the ground.

4. Why is Vol Libre at a disadvantage? Why is it different?

Paragliding does not share much of the collective experience and wisdom of most of the other FAI sports, because it does not share the same pedigree. In addition, the title 'Vol

Libre' reinforces the attitude, privately assumed by many free flyers, that the rest of aviation must be 'vol non-libre', and therefore something different, with different problems. Like voters, free fliers respond emotionally to the notion of freedom, without being specific, or appreciating the freedoms they already have. Without definition 'freedom' means nothing. My initial question in 1. (above) seems to refute this attitude. There is no real justification for these assumptions, but the paraglider's different lineage may be an answer.

The basic forms of most current flying machines were invented at approximately the same time. I think the balloons were first, and they continue much the same - plenty of ballooning wisdom there. Aeroplanes, powered or not, are, today, versions of the same original animal. We've just celebrated 100 years since Louis Blériot crossed the English Channel (La Manche for you in Lausanne or Paris). Is his monoplane much different from a Sukhoi or an Extra? Only in the detail. Sailplanes, fighters, airliners, Cessnas, X-15, space shuttle: they all have wings and centre of mass in the same place, tail probably at the back, etc. Suitable ways of dealing with these machines have developed along similar lines. Training principles, operating philosophy, *risk assessment and safe decision-making;* there's a lot of common ground we take for granted. In this family pilots step from one sort of machine to another - they can assume similar cultures - these machines are closely related, even if their size and performance are dramatically different.

The parachute came into being at the same time as the balloons and aeroplanes. It has a symbiotic relationship with the aeroplane. It has proceeded along its evolutionary line in parallel. It's also a century old. The square ones developed from the round ones. They go along as well as down. The Rogallo parachute was originally designed to help spacecraft descend, as indeed was an early paraglider design.

5. Where did hang-gliders and paragliders come from?

They are parachutes that glide well, like an aeroplane, and they grew up on the hills and in the mountains. Mountain enthusiasts discovered that square parachutes and Rogallo wings could be launched on foot, and used to fly down. These devices have developed apace. They now fly very well and are freely available. Many Vol Libre pioneers have backgrounds in mountaineering, climbing, hill walking etc. These pursuits are taken very seriously by their exponents. Risk management is essentially of a high level, but it should be understood that the exposure to very high risk that is taken for granted by the mountaineer and rock climber is of a completely different order to that accepted as normal for almost all forms of established flying. Even though those paraglider pilots who have grown up in a rural and old-fashioned environment of responsibility and self-reliance may themselves be excellent role models, this background of extremeness may have had an influence on the level of risk assumed to be acceptable by some paraglider pilots of the cool Subaru persuasion.

6. Is there a difference between Hang gliding and Paragliding?

Of course. The hang glider is more-or-less rigid and flies like an aeroplane. It has a much better gliding performance. It is heavier to carry, more fiddly to put together (requires more care and attention to detail), takes longer to learn to fly safely (because takeoffs and landings are faster and more critical), in other words it requires a longer apprenticeship

and is likely to encourage a long and lasting bond with its owner. Windsurfing and kiteboarding make a good comparison. The waveriding windsurfer is the aristocrat of wind-powered waveriding machines. It takes time to master, and the equipment, even today, is cumbersome to pack up and transport. The kite and its small board are convenient, easy to carry around, and the board resembles a skateboard – cool, streetwise. Given an easy place to learn you're up and away in a couple of days – knowing not a lot, and of great potential danger to others (maybe yourself as well). The kite on the move across the sky has incredible power, and the lines great cutting potential. Does the new student understand this – probably not – but he may think that international success is not far away, together with some cool street-cred.

7. The Vol Libre response to accidents

While accidents are regretted, and their lessons taken to heart to some extent by those around, the Vol Libre culture accepts that accidents will happen, to a much greater degree than in most mainstream flying circles. This is similar to the general view held in the aeroplane pioneering days, or during the desperate days of world wars. Today, even in wartime, aviation accidents are invariably the subject of exhaustive investigation, so that lessons can be learned, and the same accident avoided in the future. Human behaviour and decision-making is largely responsible for Vol Libre accidents, and Swiss pilots receive, from the SHV (Swiss Hanggleiter Verband) together with their new licence, an excellent booklet about this very subject written by Dr Bruno Banzer, a hang-glider and paraglider pilot who is also a clinical psychologist at Zurich University, and an advisor to the national accident prevention organisation. In clear common sense terms it describes the mechanisms and pressures that cause pilots to make unwise decisions. It could be recommended reading for pilots of all kinds. Once again, these are concepts well understood in current aviation training circles, but not to any particularly sophisticated level in the global Vol Libre arena.

8. Training and qualification culture

The evolution of the Vol Libre attitude to racing safety will continue to be slow, or may continue to deteriorate in line with the people's changing attitudes to risk-taking, unless a more sophisticated and comprehensive approach is taken to training, experience-building and suitability for the challenges of competition and its decision-making, taking into consideration much that is already known about training and human factors in other activities. Accident analysis and the dissemination of conclusions is essential, including training accidents: "The pilot made a mistake", "That's paragliding," and "The other schools are much worse," should not be suitable conclusions in 2009; 1909 perhaps (or should they? Times are changing.).

Any competition pilot, flying any paraglider, ought to have a comprehensive understanding and command of his glider in extreme conditions. For certified gliders there are many teachers who cover the SIV (safety manoeuvres) subject with devotion and enthusiasm. The fact remains that the repertoire is complicated and often difficult and frightening for the early student, and the end result is often salutary rather than helpful. A decision to give up paragliding, or a resolution never to try these manoeuvres again may be the result. A satisfactory end to this training ought to be confident, unassisted performance of the exercises, not a radio-controlled rush-through. Much private practice is then required if the pilot is to attain the level of emergency handling skill necessary for safe and successful

racing at top level. Pilots who do not have ready access to high enough takeoff places are at a disadvantage here – they must back off their competitive spirit to stay safe in strong conditions. In addition, experience and practice in dealing with the actual emergency situations that may be encountered by a high performance paraglider in the field are difficult to come by, except in real conditions - where there is usually not much height available for experimentation. There appears to be no easy way of gaining the comprehensive and elusive skills of the seasoned racing pilot, except by starting young and flying a lot in typical mountain conditions (every day for ten years, maybe).

9. Is paragliding more difficult than other types of flying?

(A comparison with solid flying in general)
Yes and no. The knowledge, handling and airmanship gulf between the newly-licenced beginner (whatever 'licenced' means) and the seasoned pilot capable of long independent cross country flights or the safe leading of a race is very large – equivalent to PPL/ unlimited aerobatic participation.

9.a At the supervised learning stage (smooth air and the paraglider's natural static flying behaviour) the answer is no. In the air the paraglider is extremely stable in pitch, roll, yaw and speed, and lands slowly. It really does fly itself - you only have to steer. So long as the pilot has a grasp of the concepts of left and right, fast and slow, shallow and steep (as seen against the surroundings) a licence can be gained without too much trouble. A significant proportion of paraglider pilots choose to stay in this regime, and enjoy quiet top-to-bottoms or smooth cruises along the cliffs and foothills. They do not seek out turbulence. The FAI will not hear from them. Let us call them one third of the total. They are the equivalent of the vast majority of powered aeroplane pilots for whom flying means transport of one kind or another (99+%).

9.b This is another significant proportion of paraglider pilots who look for thermals (turbulence and more manoeuvring). They have raised their game considerably, and will know about two new faces of the heretofore benign paraglider - virtual structural failure (collapse) and violent exchanges of potential and kinetic energy (surging, cascades, spiraling, spinning). Dramatic as they sound, these behaviours are rapidly self-correcting (usually) but, in any case, can be prevented or countered as a result of understanding and experience. In addition to the necessary on-going glider handling activity a considerable amount of tactical decision-making is required, predominantly as to where to go, both in the interests of finding turbulence (thermals) and not go (too much turbulence and/or not far enough from the ground). Accidents occasionally result if a pilot is caught out too near the ground in conditions beyond his capabilities, but we are still far from international competition territory.

Pilots in this independent thermaling group also venture cross country, but with no special pressures. They might do a 50 careful kms on a good day. They are equivalent to the aeroplane aerobatic pilots who compete at levels up to intermediate, a minute fraction of the total of all fixed wing pilots. Maybe half of all paraglider pilots come into this category, so, as pilots in general go, they have plenty of aviating skill. The most important routine decision for pilots in these two groups (9a and b., 80+% of all paraglider pilots) is whether to take off at all, so atmosphere-sensitive is the sport.

9.c Then we have the remaining 1 in 6 of paraglider pilots – dedicated cross country pilots, serious acro enthusiasts, test and development pilots. Is what they do difficult as flying goes? Yes: equivalent to advanced/unlimited aerobatic competition pilots - right to the very top, and beyond. Like dedicated unlimited aircraft, high performance paragliders have some excellent qualities - in the hands of a suitably skilled pilot. They can also behave very violently but (unlike the unlimited aerobatic aeroplane, with the exception of real structural failure) sometimes unrecoverably if driven beyond their controllability limits by excessive turbulence, usually compounded by high speed. Some of these experienced and skilled pilots will also take part in cross country racing competitions. Consistently successful winners will more than likely be from this group. High profile contests are held in sunny places where there will be plenty of thermals, mountains, thermally generated wind and a more than good chance of a meteorological wind that plays over the mountain tops as it wishes. Both thermals and wind are of use to the racing pilot, but deciding safe places to go in this arena needs care. A sizeable proportion of racing pilots fall into another category. They appear to be an anomaly, but there are reasons for this.

9.d Racing enthusiasts who may put themselves at high risk
There are many racing enthusiasts who do not come into category **9.c** because they do not have the experience, maturity, independent decision-making qualities or handling skills to match the competition environment and its psychological pressures. They clearly are also members of group **9.b** (or even 9.a) who may have taken a step too far. Some will be fortunate and go on to success – others will lose the gamble they are able to take.

10. What is the appeal of racing?

The racing environment has many helpful advantages for the relatively inexperienced pilot.

10.1 It can be an effective fast track cross country learning experience. There are always other, better people to follow – navigation and tactics are not a problem. The other gliders indicate where the air is going up or down – just what you need to know. There is a kind of pilot who enters competition for this reason, understands what there is to be learned here, does not expect to win first time, and learns racing lesson one – getting into goal. He will not come last, and will probably survive for many years, learning the cross country craft very efficiently. His attitude to risk is very much the same as that in traditional aviation.

10.2 Flying in the same airspace as others offers a high degree of ersatz confidence. Insufficient experience to deal with handling problems and a lack of the confidence to make safe decisions based on weather assessment are major problems in paragliding, once the school environment has been left behind. Dr Banzer (referred to in 7. above) explains how independent and valid safety decisions become modified when others are involved. This is a fundamental problem of paragliding – it is a function of a lack of individual experience and knowledge, and is mainly at variance with the rest of established aviation, including hang-gliding; it reflects the relatively very high significance of wind and turbulence to the paraglider. There are racing champions who do not like to fly by themselves at all for this reason.

10.3 Independent, solitary exploration of the air and the mountainsides on a Monday does not supply the excitement and thrill expectations of many who view paragliding as an ‘extreme’ sport, associated as it is (by the public anyway) with the machismo of military (or sport) parachute operations, nor does it impress ones friends. The broad-ranging reduction

of exposure to risk management experience for young people is increasing the attraction of thrills through sport. Unfortunately a fall from the sky usually hurts more than a tumble off the mountain bike.

10.4 Compared with other forms of aviation that require airmanship of a high order the paraglider is freely available, with a minimum of stricture once the basic 'licence' has been obtained. In motoring terms the basic licence would allow the would-be racer to buy a Formula 1 car and drive it pedal-to-the-metal. There are many tyros who believe that this is all that is required to beat the seasoned mountain-raised successful survivor. Some of them will feature in the accident statistics. Ought they be on the starting line anyway? If not, who is to stop them? [In FAI terms it should be their national representative body, but we live in liberal times.]

10.5 In many countries with small-scale participation in the sport there seems to be little machinery in place that would say 'Despite your licence you're not good enough to be flying this sort of glider in this sort of race." This situation could be seen as 'libre de trop'. There are (or were) pilots who take part in competitions with high performance wings who fly very infrequently (virtually only at the competition). From an ordinary recreational also-ran such an insouciant and dilettante attitude would generally be regarded as highly irresponsible by the knowledgeable paraglider establishment – of course there are exceptions, but these will be entered by responsible national authorities.

National representative bodies are responsible to the FAI for entering the members of national teams. The pilots are not entitled to enter themselves. This is a responsibility to be taken seriously, and the opportunity to send anyone, let alone a full team, just because they wish to 'get the practice', muddies the waters for the others, and puts the inadequately experienced or skilled under dangerous pressure.

11. Are the successful paraglider pilots as good (and safe) as successful unlimited aerobatic pilots?

A resounding yes! The pilots who repeatedly win top level paragliding competitions have all the necessary qualities - in spades! I know some of them. I could not find better candidates as aeroplane aerobatic students. Give me a suitable machine and one year and I could surprise you. Safe-enough paraglider racing is possible.

12. Reserve throwing

This should not necessarily be regarded in the same light as an emergency bale-out or ejection from a conventional aircraft. The paraglider's close connection with the parachute has an influence on how readily it is used - especially within abbreviated training circles. For pilots who have little or no experience of extreme (advanced) manoeuvres or their recovery techniques (many of the pilots in **9.a** above) it is a first, not last resort, and is sometimes taught as such. It provides a relatively safe compensation for a lack of skill and experience. At the top level of the sport the situation is quite the reverse. Pilots of the calibre suggested in **11.** above have extensive experience and skill in preventing, or dealing with difficult situations. Adequate experience of competition pressure also enables them to make clear safety decisions. A reserve thrown in competition may represent the only safe and correct decision, or a compensation for deficient skill and/or judgment. This

will invariably turn out to have been one relatively safe option (and should **not** give rise to excessive concern – reserve parachutes are part of the culture).

13. Competition weather

This is something of a specialized subject because of the paraglider's sensitivity to weather, and also its ability to cope with it, depending on the pilot's skill. Broad-brush concern over 'flying-in-the-lee' for example does not start to encompass the problems – and 'flying-in-the-lee' is not necessarily a problem. Mountain and flatland conditions differ – the experienced mountain flyer will find thunderstorm behaviour in the flatlands a surprise – and vice versa (not to mention mountain winds systems etc). Each flying place is different. Even though some experienced pilots are very good at assessing what's likely at a strange site there is no substitute for informed local knowledge. At a contest overriding weather decisions must be made by an experienced local authority figure. This is essential. Noone else will know better.

14. Is the situation improving?

Difficult to say. Here's an extract from XCmag edition 124, July/August 2009, in *Ten years ago*: about the 1999 world championships:-

Cu-nims developed along the line of the course and their associated gust fronts caused the kind of carnage that took four helicopters, three mountain rescue crews and 15 trained medics to deal with. Then came days and days of rain. . . .

As day after day of rain, low cloud and drizzle followed, organisers got more and more desperate to run tasks, taking the pilots up the hill in cloud towards the end of the two week period, and in sheer desperation running a task in drizzle under "a developing cu-nim" on the last-but-one day. A Taiwanese competitor hit power lines, possibly because he couldn't see due to the rain. He received massive burns and later died of his injuries.

It is easy to raise the pertinent questions. Even allowing for the contest nerves one must ask whether the pilots would have done anything different if they had encountered the developing cu-nims while flying a cross country at home. One would hope so, but many do not fly by themselves at home anyway, so the question does not arise. The laws of physics do not change for a competition, of course. And what about the desperate officials? All competent aviators know that there are two kinds of weather - good weather and below limits weather. Although it takes courage to say "Hard luck competitors, see you in two years", at least one Taiwanese competitor would have benefited from yet another visit to the national folk dancing display or the Koala bear farm. Perhaps the situation is better today, although the more recent Australian thunderstorm incident seems to indicate that the learning process is a slow one (of Darwinian attrition).

15. High quality management is especially important in paraglider competitions

Pilots in all types of flying competitions have to carefully balance a measure of cognitive dissonance (conflict) during the event. On the one hand they feel motivated to try hard to

do well, on the other they are conscious of the need to stay safe, despite the pressure to push their own limits. Competition aerobatics is a good example, and the psychological stress generated by these conflicting pressures can sometimes be indicated by illogical points of view taken by otherwise highly experienced and competent competitors. They have a hundred years of tradition to put them straight; paragliding has no such evolutionary tradition.

Paraglider racing is very skill and judgment-intensive. The comparatively short evolutionary development of paragliding means that pilots with a shortage of risk management experience, combined with inadequate skill for the job in hand, may suffer from something of a kamikaze attitude to winning at any cost. Paraglider racing therefore requires a high degree of quality management (like front-line military flying). Can the FAI guarantee a high enough quality of local contest management at all its levels?

Perhaps Stefan Schmoker might be still with us if the Mexico event could have been held at a time of year (earlier) when conditions are known to be more suitable.

The quality of contest management appears to be variable. Strong and unequivocal safety-based decision-making is essential, taking into account all the pilots accepted for the contest, together with the diplomacy that goes with all successful people-management. Pilots should not able to exert pressure on fly/no-fly decisions to suit their own tactical requirements. Their entry fees actually relieve them of these irksome decisions, and free them to enjoy the flying, or alternative local cultural attractions. Above all, management style and stature must retain the trust and confidence of the pilots, so that mutinous distractions are not allowed to take priority – the pilots have enough to think about anyway if they are to remain safe. (Pilots who feel that their superior status gives them the right to special consideration could be invited to move into contest management next time, as the best way for the sport to benefit from their superior experience.) It is essential that all the pilots in a safe competition are given the best chance of maintaining a sane balance of enthusiasm and self-preservation.

A significant proportion of inexperienced but keen/lucky/reckless pilots appear to be fuelling a sense of dangerous ‘go-for-broke’ desperation amongst otherwise rational and accomplished competitors. This can often be seen at local contests, and is understandable but unfortunate, and will not help paragliding grow in stature as a legitimate and very worthy way to extend man’s venture into the air. There should be less of them in top level competition (even though they would be a Godsend in the straitened times of war).

Compared with other forms of sporting flying paraglider racers appear to be deficient in the ability to make their own safety decisions, and would rather depend on the contest organization to do it for them (or just follow the herd, come what may). More experience and independent safety-decision-making seems to be required. A lemming culture does not make for aviating longevity, in any of its forms.

16. Recommendations

16.1 There should be a more effective and progressive system of contest experience and qualification. It takes a long time to become a good (enough) paraglider pilot. Adequate evidence of competence within the serial classes should be a sine qua non prerequisite to open (unlimited) class racing. Expensive and inconvenient though it seems, this must

include foreign participation at the intervening levels: flying in a different environment is more stressful than flying at home. A satisfactory system would mean that (like unlimited aerobatics) open class glider design then need not be over-restricted – open represents progress. The pilots, not the machines, are dangerous.

(There is already, of course, a FAI qualification structure along these lines, but does it work? Some countries have an effective qualification structure, but how does one ensure worldwide compliance with an ideal interpretation of FAI standards?)

16.2 Contests must be managed exclusively by suitably experienced people who have the appropriate management qualities and local experience. If suitable people cannot be found – no event.

16.3 Weather is extremely critical for a successful and safe event. Planning decisions must not be influenced by political or commercial pressures. If the time is not right – no event.

16.4 Consideration should be given to reducing the number of competitors at a contest. Although there are x-billion inhabitants of the earth very few of them are interested in paragliding. Even though organisers are always concerned with entry fees the financial reality usually lies elsewhere, and fewer, better, more mature competitors might encourage a more airmanlike approach to contest flying. (This appears to be the case with the more selective PWCA events. If this assumption is true there appears to be a demonstrable experience safe/unsafe cut-off level.)

It must always be understood by all pilots, whatever their experience, that they bear prime responsibility for their decisions and safety in flight. Only a universal change to a less risk-assuming and accepting culture (along the lines of other flying sports), and the provision of more organised competition training and qualifying opportunities (in addition to competitions themselves) will make up for the evolutionary late start. The birds (who seldom make dangerous decisions) have a lot of history behind them.

The thoughts above assume a communal/traditional assumption that safe/safer racing is what the people want, but is it what they want? Is there is another way of facing reality?

An Alternative view

17. Changing attitudes to the value of life (the fall of the republic)

As daily life becomes increasingly affluent, secure and threat-free in developed societies (by decree – and despite disquieting and popular notions to the contrary) individuals will seek physical challenges and sources of excitement which (perversely) they are increasingly less well-equipped to manage. It's a self-regulating process. It happened to the Romans – it's happening to us now. Should we resist this force of nature? Darwin would say there's no point. He could be right. Should we accept it and go with the flow? The alternative may be to submit to Health and Safety fascism and rot our minds with television instead (hastening the demise of the human – and the ability to do clever things like paragliding).

Is the world short of people? Do we want to live without a sense of genuine risk? Does it matter if a few people get killed doing a sport they want to do – and don't harm anyone else, make a big bang or create a fireball that the popular press will be keen to photograph? Why do we accept the many daily deaths on the road without demure? Why does the public at large not respond to avoidable airline industry accidents, just because they are considered to be statistically acceptable? Are there many people who do not accept that they will die one day or another? Is it not but by staring death in the face that the dangerous paragliders know they're alive?

Maybe that's enough of that – but it's worth thinking about. Perhaps the popular press should be taken for what they're worth – ephemeral, tomorrow's fish and chip paper. Perhaps we should just get on with it, bury the dead, help those who will not walk again, sympathise with those free spirits who will suffer chronic and increasing back pain the rest of their lives, and say it's Vol Libre – nobody makes you do it.

Summary of main points

- Paragliding is an excellent recreational form of flying. It is cheap, and available to all. At its top level it demands extremely high levels of handling skill and airmanship (knowledge, understanding, rational decision-making under pressure).

- It has no historical connection with the traditions of most other forms of aviation. A recent offshoot of the parachute, the paraglider has become a glider, with little in common with parachute operations.

- In general, paragliding culture assumes a higher level of risk than other forms of flying, justified by its low airspeeds. This is a reasonable view when applied to school take offs and landings. (That is not to say that there are not many pilots and teachers who share a sanguine view of paraglider safety with traditional aviation. They tend not to feature in racing accidents, although they may safely enjoy what racing has to offer.)

- Cultural isolation and lack of pilot experience (enough for the possible difficulties to be encountered) results in a shortage of genuine independent pilot decision-making. Seeing others in the air is a strongly reassuring factor, whether applied to a takeoff decision or racing technique. This problem is well understood.

- Acquisition of the level of handling skill necessary for safe and successful racing is not easy to come by. It is mostly learned on the job, with attendant risk and stress (or the desired sense of uncertainty, thrill and excitement).

- Unlike modern sailplanes (who circle occasionally high above the mountains to climb, then move gracefully on) paragliders have to spend a lot of time at ridge level, where (often very localized) areas of problematic turbulence lie. It is also frequently necessary to fly close to the mountain sides to find the necessary rising air. This requires a lot of skill or a defensive flying style. For all but paragliding virtuosi defensive flying may get to goal, but is unlikely to win a race (but it's a good start).

- For safe paraglider flying a pilot's level of defensive flying must complement his handling skill level. If this is not the case the level of risk is open-ended, and unpredictable.

- Paraglider racing accidents appear to be caused by a degree of competitiveness that is not matched by the required skill and safe decision-making level. The sense of justification gained by following others is an important contributory factor. The necessary balance needed for safety can only be achieved by pilot maturity and experience.

- It is possible that parts of the Vol Libre community assume (tacitly) that the title implies a freedom from responsibilities and concerns that longer-standing forms of flying take for granted. There could be more interest taken in *why* pilots do (and think) things that cause accidents rather than *what* they do.