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## Luck, Longevity and the Limits of Skill

By John Halle

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Some twenty five years ago, I was fresh out of school, flying F-9s in Texas at the end of the Navy's pilot training program and, like every other junior birdman in residence, had convinced myself that I was the Ace of the Base. After learning to fly in T-34s and T-2s we had learned to FLY in F-9's. In basic training we were made to memorize stall speeds. Fly slower than the published stall speed and the aircraft assumes the aerodynamic properties of a manhole cover, with predictable consequences to pride, career and longevity. In advanced training, we learned that published stall speeds applied only to one-G conditions and that a really clever pilot could fly in full control at 30 knots and zero-G. In the course of proving to ourselves that this was so we convinced ourselves that the ordinary rules of aviation were only for the faint of heart and did not apply to anyone with aspirations to be a true Ace.

Armed with this knowledge I took off one day on a "field carrierlanding" practice mission. The mission was flown in groups of six aircraft at an outlying field. All six aircraft had to arrive at the initial point at the same time (give or take thirty seconds) and at the maximum fuel weight for landing (less than that and the mission could not be completed.) Something had happened on the ground and I took off about five minutes late. If I flew straight to the outlying field, I would arrive too heavy. If I took a few detours to burn off fuel, I would arrive too late. Nothing an Ace can't deal with; instead of reducing power after takeoff, I extended the speed brakes. Same speed, same arrival time, much greater fuel consumption. I arrived at the initial point on time, and at the required weight, except for my ego which had gained five pounds during the trip. Nothing to do now but make sure I don't run into the other five airplanes that are supposed to be exactly here, exactly now.

A mere mortal faced with this problem cranes his neck back and forth; an Ace requires a more dignified solution. Don't crane your neck, crane the plane! I attempted a flaperon roll to check the airspace immediately below me. An F-9 is perfectly capable of performing a flaperon roll in normal conditions. I may be the only pilot that has ever tried one with the speed brakes extended. In the second or so that it took me to realize what had happened, I had rolled through about 120 degrees and my nose had fallen about 30 degrees below the horizon. Already committed, I retracted the speed brakes, continued the roll and hoped for the best. It may be an exaggeration to say that I was close enough to the trees to pick a few leaves but, at the time, it was not nearly enough of an exaggeration for my comfort.

Sitting at launch sites or in cars or pizza joints with other paraglider pilots almost twenty-five years later, I am reminded of this episode as I listen to some of the stories of tree landings, catastrophes avoided at the last second, extreme maneuvers, forty mile cross countries in 1200 f.p.m. thermals and the other "there I was" stories of a new generation of Aces. Unfortunately, in some of these stories, the catastrophe was not quite avoided and that reminds me of Fred, my fellow student and Ace, who, a week or two before my exercise in idiocy had succeeded in doing what I only narrowly avoided. Coming back from a night mission in good weather, he flew his airplane into the ground. Various investigators spent months examining pieces of airplane and concocting theories of what caused the crash but I knew what it was all along: an inadequate fear of the deterioration in the lift generating characteristics of an F-9 while attempting to fly through dirt.

My war story (and others like it) may prove many things; among the things it doesn't prove is the lesson we unfortunately most often learn from such experiences, which is that sufficient skill and cunning, or just that certain "je ne sais quoi" that emanates from all true Aces, is sufficient to overcome risk. Most of us, after flying for a while in a variety of conditions and not being dead, are led, consciously or not, to the conclusion that we have "what it takes" to survive and therefore no longer need to worry. What we should understand instead from these experiences is that extreme good luck will offset the effect of extreme stupidity or extreme carelessness or both for as long as it lasts. A pilot who takes off in marginal conditions, gets blown back and lands in the trees without ill effect may accept this incident as proof of the invulnerability that results from truly awesome skill and cunning but most of the time what it proves is that the pilot was stupid and lucky. When you stop being lucky you will stop being awesome; you may also stop being alive.

Every aviation survey that I know of that compares accident rates with experience levels reaches what may seem like a counterintuitive result -- just as experience levels reach the point that represents mastery of the environment, accident rates go sharply up! This is generally understood to result from a natural tendency to relax one's vigilance once one has concluded that the environment can be mastered and is therefore no longer threatening. What is even more interesting is that these surveys show that, after reaching

a peak at the point of basic mastery of the environment, accident rates taper off and are considerably lower for the most experienced pilots. A cynic can explain this by observing that a principle akin to Darwinism accounts for this by removing those with the worst judgment early in the process. What is more likely, however, is that, as the statistical consequences of large numbers take over with increasing experience, there is an increasingly small number of pilots that have not, at one time or another, suffered through a terrifying example of how close they regularly come to disaster. As the paragliding community in the United States approaches maturity, it is particularly important that we continue to think about the unavoidable danger of our sport.

Aviation consists of hurtling through the air in defiance of the law of gravity. The only thing that keeps gravity from taking over and killing the pilot is the continuing generation of lift. If lift ceases to be generated, the law of gravity takes immediate effect. If lift is not restored in time (often only a few seconds) the result is usually serious and can be fatal. In all aircraft, adequate lift is generated only while two conditions exist. First, the airfoil (wing in most cases) must retain essentially the shape it was designed to have; second, molecules of air must continue to pass over the airfoil at a sufficient rate to cause the generation of the required amount of lift. Paragliders are particularly at risk with respect to both conditions. A paraglider wing is less resistant to change in shape than any other kind of airfoil; also, the range of acceptable relative wind speeds for a paraglider is narrower than for most other airfoils, rendering it more susceptible to danger resulting from shifts in wind speed or direction.

What all of this means is that paragliding cannot be made safe by a sufficient amount of skill. In a thirty knot headwind, the most skilled pilot in the history of paragliding will still be going backwards. A pilot who runs into a dust devil on landing approach is going to get a collapse and will very likely crash. There are simply conditions that can be mastered by paragliders only by staying away from them. More important still, many conditions that are unflyable are also unpredictable. With all of the weather lore and pseudo-lore that one hears at launch sites, all of us are regularly surprised by weather conditions encountered after we are airborne. On a ridge that is predictably soarable in any wind over seven or eight knots, I have in less than three minutes gone from just barely able to maintain altitude to unable to penetrate and this happened during what is commonly referred to as evening glass off, not during a period of foreseeable development.

While paragliding, like all aviation sports, cannot be made safe, it can certainly be made as safe as possible. You cannot eliminate the risk of encountering turbulence sufficient to cause a collapse but you can lengthen the odds if you don't fly in the desert at midday in the summer. You cannot, as a practical matter, eliminate all risk of equipment failure in flight but you can make the risk extremely remote by adhering to a regular pattern of preflight checks. You cannot guarantee that you will not someday land in the trees but it helps if you have some idea where the LZ is before you launch.

The thing worth noting about all of the risk avoidance techniques described above is that none of them has anything to do with skill. It takes no skill to sit at the launch site while the big thermals are popping off all over the place; it takes almost no skill to do a thorough preflight check; it takes no skill to plan a flight so as to be always within gliding distance of a suitable LZ. I make this perhaps obvious point because I am hearing more and more frequently statements from more experienced pilots (in a relative sense only because, compared to other kinds of aviators, there are no experienced paraglider pilots) that indicate their belief that their newly acquired skills have caused paragliding, as they practice it, to have become safe. Who among us has not heard someone say, as the wind meters record gusts increasing to 18-19 knots and beyond, that perhaps the Class I pilots might consider doing some driving today? The fact is that, while skill and experience certainly have a role to play in accident avoidance and handling marginal conditions, if you get into an unflyable situation, you are not going to fly no matter who you are. The range of conditions that can be handled by an experienced pilot but not by an inexperienced pilot is just simply narrower than most newly experienced pilots think it is and what they attribute to a high level of skill is, more often than not, the result of luck and the vagaries of statistics as they apply to small numbers.

There are times in aviation when luck is the only thing that counts. I learned this from another war story, also from naval air training. In basic jet training, a student assigned to a mission would go to the ops room to select an aircraft tag from the ready aircraft board. He (in those days "he" was the accurate pronoun) would then check that aircraft out from maintenance, meet his instructor and fly the mission. On one such occasion, when I reached the ops room there were two aircraft tags on the board. I selected one at random and proceeded to fly my mission, without unusual event. Returning to the base, I noticed a column of dark smoke just off the end of one of the runways. Since that was the first time I had seen an airplane crash (although unfortunately not the last), I had no idea what it was until I got back to the squadron spaces. There, I discovered that the other aircraft on the ops room board when I had left had crashed, killing two instructor pilots on an instrument currency flight. The investigation revealed an abraded flex cable in the flap actuator mechanism. On a missed approach, a few hundred feet off the ground, one of the pilots had retracted the flaps, as is normal for that procedure. One of the flaps had retracted and the other had not, creating the fixed wing equivalent of an asymmetric collapse. In contrast to most paragliders, a T-2 will not fly with one flap extended and the other retracted. The only theoretical possibility for avoiding the crash would have been immediately to reextend the retracting flap and even that would have had to be done within less than a second following the first evidence of a flight abnormality. The practical chances that the problem could have been correctly identified and appropriate action taken within that amount of time were nil.

Because I was lucky on that occasion (and on others) I have lived to enjoy the thrill of flying in a variety of conditions and with a variety of wings. Because the two young instructors were not lucky, they have not flown since (at least not in the usual way.) But if luck can be so important at various times in our lives, it is a shame to squander it, which is what you will inevitably do if you believe your awe inspiring skill makes luck unnecessary. Having done it a few times myself, I know how satisfying it can be to work up a nonchalant attitude toward what, not so long earlier, had inspired abject terror; the next time that opportunity arises for a reader of this piece, I hope he or she will think just for a moment of our friends from past paragliding experiences who have not been so lucky and say, quietly so no one else will hear, "There but for the grace of God ..."

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