



COMPLACENCY: WHAT

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This is taken from the American Pacific Soaring Council (PASCO) Soaring Safety Seminar in November 2007. Martin Hellman is a Professor Emeritus of Electrical Engineering at Stanford University, was involved in the birth of internet security and has a deep interest in the ethics of technological development. He is a glider pilot in his spare time flying his Stemme out of Hayward California. Google his name for an interesting look at “Soaring, Cryptography and Nuclear Weapons” and the connections between these seemingly unrelated subjects. We also recommend that you take the time to go on line and check out the articles mentioned in the text.-Ed

We all know that complacency is our enemy. But probably none of us think of ourselves as complacent because once we recognize our complacency, we do something to change it. So, in a sense, the real enemy is complacency about complacency.

None of us think of ourselves as resembling Alfred E. Newman, the “What me worry?” Mad Magazine character – until after an accident, when we rigorously review what we could have done differently and often see ourselves looking just like him: stupidly happy and oblivious to danger. But that only seems to occur in hindsight. The goal of this article is to try and help us see complacency before it causes an accident, when it can make a difference.

To do that, I will focus on three areas. The first I’ll call the

99.9% safe manoeuvre. This is one that you can execute safely 999 times out of a thousand. But one time in a thousand, there will be an accident, possibly fatal. If we execute such a manoeuvre only once in our flying careers, there’s a small risk. But, if we execute it a hundred times, there’s a good chance we’ll get bitten. Worse, the fear level that we felt the first few times evaporates as we become comfortable with the manoeuvre. But that’s just complacency masquerading as confidence in our skill level.

Of course, there’s nothing magic about 99.9% and the danger also applies to a 99% safe manoeuvre or a 95% safe manoeuvre. Each success still builds more false confidence – complacency – but we tend to get bitten earlier. This was the case in the loss of two of the world’s most expensive gliders, the Challenger space shuttle in 1986 and Columbia in 2003.

The original design for the shuttle booster rocket did not allow for any O-ring erosion, but a number of otherwise successful flights with some O-ring erosion produced a mentality that there was nothing to worry about in spite of this unpredicted behaviour. In such a “What, me worry?” environment those who expressed concern were ignored. The Thiokol engineers who tried to delay the launch due to the cold weather were seen as overly cautious ninnies – with catastrophic results. Escaping the grim reaper time after time led to complacency instead of a design review and modification. Those steps only occurred after the disaster.

Similarly, a number of shuttles had experienced loss of some heat shield tiles due to fuel tank foam and ice hitting the shuttle during liftoff, but the level of concern only reached appropriate levels after Columbia was lost to this failure mechanism.

Returning to our more normal gliders and altitudes, here’s a list of manoeuvres I’m proposing for examination in this session – and I emphasize the word proposed:



Photo courtesy of Bret Willat, Sky Sailing, Warner Springs, CA

High speed low passes

Crossing ridges at low altitude

Close-in ridge flight

Becoming enveloped in clouds

Landing out - especially in difficult circumstances

I am not saying that you shouldn't do these things. But we have experienced fatalities among experienced pilots in all five categories, so they warrant some examination.

Considering high speed low passes (technically a missed approach), as most of you know, you start this manoeuvre from altitude and dive to convert height into speed. You skim a few feet over the runway, near the glider's maximum speed and then pull up, reconverting most of that speed into altitude. This gets you to an altitude of about 500 feet, from which you can fly an abbreviated pattern. It's an entrancing manoeuvre to watch, as you can see from the picture above.

While beautiful to watch, low passes entail added risk. Kempton Izuno is known to most of us for his superb piloting on long distance soaring adventures. When I spoke with Kemp about this session and low passes, he told me he no longer skims the runway because of a scare he had:

"I got a good scare from attempting this in my Libelle at Minden a number of years ago. It was the end of a long triangle flight and I was well ahead of my crew. So I got relaxed and hadn't noticed that a waving action had set up. On the long dive, I didn't notice that the speed wasn't picking up as it should. I was diving in sink, and by the time I reached the runway I only had about 100 knots and then was pulling up into sinking air. I had at best, 300 ft on the downwind leg and barely made the runway. Only on final did I notice puffs of dust blowing off the side of the runway indicating the rotor touching down. I was lucky it didn't turn out worse."

Am I saying you shouldn't do low passes, or that the pilot in the picture is taking an unacceptable risk? Absolutely not!

What happened to Kemp on this particular day? He hit unusually strong sink during the dive - one of those rare situations that made this a 99.9% unsafe manoeuvre for him. So he ended up close to the ground much earlier in the process than he should have, and he had no warning of the problem until it was too late - there was no easy way to monitor his total energy and note that it was dissipating more rapidly than normal, plus he was preoccupied with a number of other variables. While he pulled off the landing with no damage to himself or his ship, he decided it was a risk to which he didn't want to expose himself again. So now, if he does a low pass, it's two to three hundred feet above the runway, not right on the deck. That extra safety margin makes the pass a lot less risky.

Am I saying you shouldn't do low passes, or that the pilot in the picture is taking an unacceptable risk? Absolutely not! That's an individual decision, based on skill, the conditions (stable air would have removed the possibility of Kemp's particular problem), and more. What I am saying is that low passes entail extra risk that we need to take into account both in our decision making process and when we talk about them to others whose skill level we don't know. For example, the pilot shown above has over 16,000 flight hours, has been doing this manoeuvre at air shows for over 30 years. He will not do them in turbulent conditions, ensures that he has radio contact with a trusted spotter on the ground who is watching for traffic, and usually does them downwind so that he only has to turn around in a 'tear drop' to land. The fact that someone with that kind of experience exercises that much caution should say something to the rest of us.

Taking ridge crossings at low altitude as the next example, let's look at Bruno Gantenbrink's famous 1993 talk debunking the statement that the most dangerous part of soaring is the drive to the airport. It's available at DG's web site in the Safety section.

Gantenbrink exposes that foolish statement for what it is, calling it "the dumbest, most ignorant saying that has found a home in our sport." He also notes that in the 1985 world comps, when he was flying with Klaus Holighaus, they were about a mile from a pass with only a couple of hundred feet of extra altitude, and did not know the wind direction. Holighaus crossed the pass while Gantenbrink turned back into bad weather, and a loss. Gantenbrink states, "There was a 99% chance that I could have made it through the pass. Klaus was a little higher and made it. I would have made it if nothing unforeseen had happened. However, only the smallest thing needed to have gone wrong, such as flying a little to the right or left of Klaus' path. That can make a big difference in a pass."

In August 1994, a year after this talk was given, Holighaus was killed, apparently attempting to fly through a small pass. Was this



a case of a 99.9% safe manoeuvre gone bad? I can't say for sure, but it seems to have some of the earmarks.

Close-in ridge flying is a manoeuvre that kills experienced pilots at a too regular rate as noted by JJ Sinclair in his safety article, "Don't Smack the Mountain 101", also available on the DG website. There's also an excellent discussion in the September 1984 issue of Soaring magazine, by Henry Combs, entitled "That Beautiful Mountain and Her Sinister Trap: A Possible Explanation for Some Unexplained Ridge-Soaring Crashes". <http://ee.stanford.edu/~hellman/soaring/Combs.pdf>

Both of these articles note that it only takes about 500 fpm differential lift on the wings of a glider to totally overpower the aile-

period of time. And sometimes we don't realize that a good thing is going bad until it's too late. Kempton Izuno's "Into the Bowels of Darkness" (www.pacificsoaring.org/westwind/2005_12_WestWind.pdf) describes such an encounter that could easily have been fatal, but fortunately turned out fine for him and his ship. While reading his complete description is best, here's a short summary:

The day had been much weaker than predicted, and Kemp was ecstatic when he finally found a cloud with strong lift. But the lift became unusually strong as he got near cloudbase, accelerating so rapidly from about 10 kts to almost 30, that he didn't have time to retreat. Suddenly, he found himself in the cloud. Without the horizon to cue him as to what was up and what was down, Kemp

Witnesses with whom I talked soon afterward called it a fluke that the fence was in just the wrong place – again signs of a 99.9% safe manoeuvre.

rons. Most of us have experienced such 'bullet thermals' that hit one wing and bank the plane uncontrollably. At altitude, they're usually just a nuisance, but if you're close to the ridge and it's your outboard wing that has the extra lift, it's a recipe for disaster – you're banked into the ridge and can hit it within a second, leaving no time to recover. That combination of events doesn't happen often, which is what puts it in the 99.9% safe category. But it seems to happen often enough to kill some very good pilots on a regular basis.

We glider pilots love clouds, or more accurately, the lift that is often associated with them. They're like big road signs in the sky saying, "Come here for a great ride." But, like anything else, too much of a good thing can become big trouble in an amazingly short

became spatially disoriented and, as is usual in that situation, found himself in a high-g dive. Kemp maintained his cool, remembered a recovery technique that he'd read about in Soaring (see his article for a description), and was able to utilize it to escape before the wings were torn off the glider – but not before he found himself flying backward! Kemp now maintains a larger safety margin when flying near clouds and is alert to the fact that the feeling of ecstasy when you find strong lift can turn sour almost instantly. Note that the 'unusually strong lift' he encountered was what turned a 99.9% safe manoeuvre into an almost fatal one.

Not all attempts to get out of clouds end so well. Several years ago, I lost a friend in an accident that probably involved becoming enveloped in clouds. Since he didn't survive and there were no

witnesses, we don't know for sure, but the evidence points that way. He was flying in wave and appears to have been caught on top of the clouds as either the gap between them closed or as he was blown over a cloud by the strong winds and then got sucked down into the cloud when he hit the sink portion of the wave.

As to the danger involved in landing out, most glider pilots who routinely land out are rightfully proud of their ability to put their glider down in a farmer's field, a dry lake, or similar. While almost all landouts are uneventful, or involve at most minor damage to the ship, to avoid complacency it is necessary to remember that occasionally they can go terribly wrong. I've heard a number of pilots talk about coming close to hitting barbed wire fences or other obstacles that could not be seen from the air, and which could have resulted in disaster. While a fatal landout accident at Minden in May 2000 had other causal factors, he would have survived if he hadn't hit a barbed wire fence. Witnesses with whom I talked soon afterward called it a fluke that the fence was in just the wrong place – again signs of a 99.9% safe manoeuvre.

The second theme of this article is that new pilots need to be careful in imitating what they see more experienced pilots do – and that experienced pilots need to add cautions when describing exciting exploits that should not be imitated by newer pilots. Next time you hear someone describe close-in ridge soaring, high speed low passes, and similar manoeuvres that should not be attempted by newbies (or by anyone without recognizing the risk involved), notice whether they talk about the risk or just the thrill. In my experience, the risk is rarely mentioned.

On June 11, 2005, a student pilot was killed in what was almost surely a ridge flying accident. The NTSB accident report states that the glider "impacted terrain ... The student pilot ... was fatally injured [and] ... had approximately 12 hours of flight experience over 18 training flights ... this was the student pilot's first flight in this make and model of aircraft. ... A search airplane found the glider on the back side of a mountain ridge ... The tow-pilot stated ... that the 'ridge lift' just northeast of the airport was 'very good.'" As in most accidents, there were a number of factors, but I think you can see why I suspect inadequate caution when describing the thrill of ridge soaring to new pilots may have been one of them.

There's one last theme that I hope will help us see problems before they evolve into accidents or fatalities. Many years ago, I heard an expert on industrial safety give a talk in which he noted that for every fatality, there were roughly ten injury accidents; for every injury accident, there were roughly ten property damage accidents; and for every property damage accident, there were about ten "scares" or near accidents.

He then argued, and I heartily agree, that to avoid fatalities, we should try to treat an injury accident with as much concern as if it did result in a fatality. To avoid injury accidents, we should try to treat a property damage accident as if an injury did occur. And to avoid property damage accidents (we do love our ships, right?), we should try to treat scares as if an accident had resulted – and certainly not as if cheating fate means we have the skills needed to try a stupid manoeuvre again! That's called complacency and that's when we end up looking like Mad Magazine's Alfred E. Neuman.

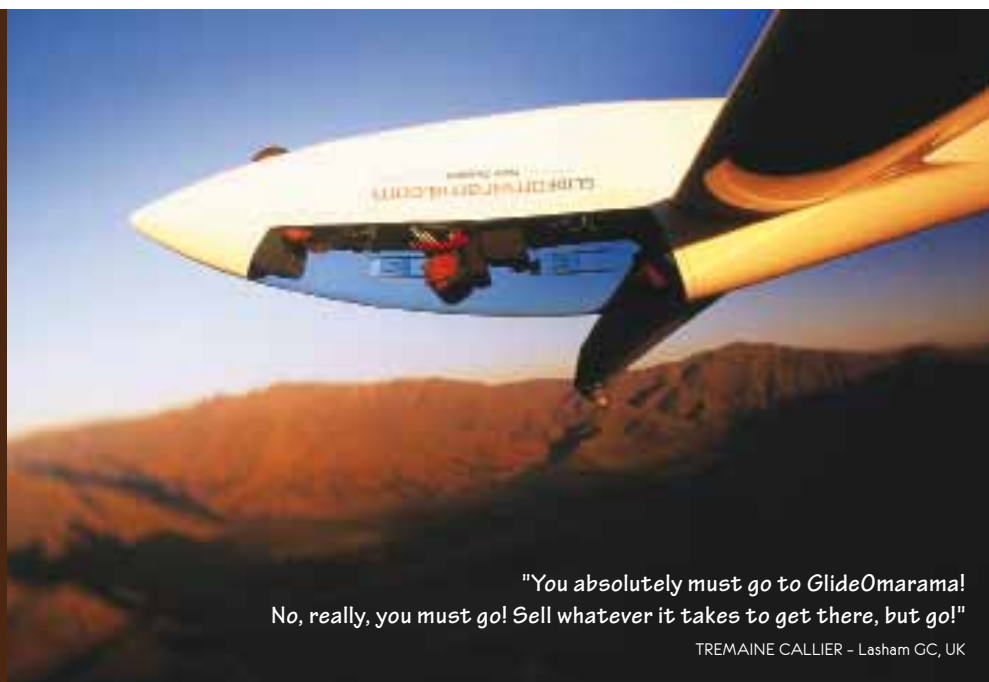
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