

2012 SSA Rules Committee Safety Review

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Final 10/21/2012

Disclaimer 1: This is a summary of information available to the rules committee as of the November meeting, collected for the purpose of examining rules and procedures in the interests of improving future contest safety. This is not the NTSB, and we have not done any independent accident investigation. Errors are likely.

Disclaimer 2: This is a report from the safety subcommittee (me) to the rules committee. Recommendations are mine only, and not endorsed by the RC.

Part I Events summary

We had the following serious accidents this year at SSA contests

1. Mifflin. Pilot crashed into trees while thermalling low over a ridge. Glider destroyed, pilot badly injured.
2. Ionia. Pilot crashed just off the end of the runway. Suspected stall/spin or strong sink, may have been attempting to thermal low. Fatal.
3. 1-26. Rough off field landing, pilot sprained back, went to hospital.

Though not at US contests, the following accidents this year are worth considering for implications.

1. Canadian Nationals. Pilot crashed hitting trees on off-field landing, less than a mile from the finish line. Canada uses rules very close to the US, so the accident is worth considering in our discussions.
2. Uvalde WGC. 1 minor midair (teammates, landed safely). 1 major midair (1 elevator severed, pilot bailed out). 1 glider nearly took off with tail cover still on. 1 glider tried to self launch with spoilers out, damaged in ditch and withdrawn from the contests.

We also had the following minor (no-injury) accidents reported.

1. Crazy Creek. Glider hit rock on off field landing, damaging bulkhead
2. Wing drop, groundloop on launch, hit runway light and damaged wing. Ballast.
3. Fairfield. Groundloop on landout, broke tail boom. Rushed landing into small field.

Part II Details:

Mifflin:

NTSB: He ... was looking for lift and performing "S" turns, while flying away from a ridgeline. During one of the "S" turns, he encountered a 200 to 300 foot increase in lift and elected continue turning to the left. As the glider turned directly toward the ridgeline, it encountered a large downdraft and loss of airspeed. The glider stalled, spun to the left, and immediately struck trees. The glider's tail boom separated and both wings were substantially damaged. The pilot...stated that he should not have continued the left turn and that standard training techniques called for continuing to do "S" turns when close to ridges or mountains until at least 200 to 300 feet above the highest point, which would provide for adequate altitude to recover from possible stalls caused by wind gusts.

Brian kindly sent me the trace. I classify this as a "there but for the grace of God go I" accident. He flew flawlessly until the last second. I can think of no reasonable change in rule or procedure that would prevent this sort of accident. But it is an accident each pilot should study as many of us are vulnerable.

The day was blue, with decent, high but widely spaced thermals over the high ground, and the hope that SE winds might pick up to make backside ridges work. The idea of weak backside ridge was not a surprise to anyone, and the task was set so that it might be finished on the back side of Jacks if the wind cooperated. In the end, the wind was just on the edge of supporting ridge lift. A large fraction of the fleet fell off the ridge and landed the Jacks valley, including yours truly.

The rest of the fleet thermaled down to Altoona in a big and rather desperate gaggle. Brian left early and headed for the east face of the Allegheny plateau behind Tyrone. As a contest pilot, I can only say this was brilliant. It hadn't occurred to me that this might be ridge soarable, and it solved the day's tactical problem, of how to put distance into the Altoona cylinder. The escarpment faces more east than other ridges making it more likely to work in the wind, shown as 113 at 6 mph on the trace.

The first picture shows the end of the flight, contacting the ridge at Tyrone and proceeding to just past Altoona and starting to return. The second picture shows the google map terrain view, which gives a better idea of the area. The escarpment is steep, though punctuated by gaps. Brian neatly flew the entire ridge-soarable length.

Though the wind was light, his trace shows ridge soaring working remarkably well on the trip south. He averaged 76 knots the whole way. Most of the time he flew 75-80, though slowing to 55-60 through the gaps. He is always well above ridge height, guesstimate at least 50-100 feet.

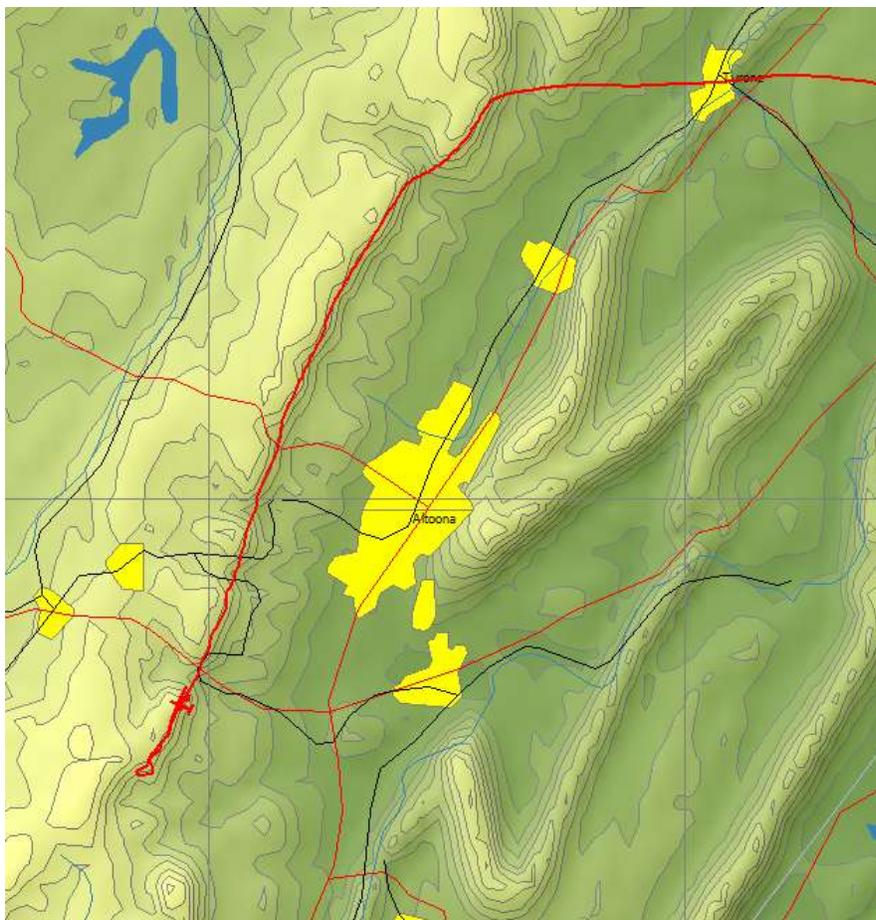
The last little segment was weaker. Going southbound, Brian was flying 60-65 knots, and level with the ridge top. He turned around, and got back to the gap having lost no altitude. Rather than cross the gap, leaving level with the ridge top, he turned around and did an S turn.

The third picture shows the final moments of the flight. The first S (N to S) turn gained 100 feet. (I.e. as he prepares to do the second 180, he is 100 feet higher than the first time he passed that area.) As he starts the second S turn to the left, See You shows 2.5 knots lift. (See you "vario" is inaccurate of course, but it does tell you if you're going up or down). As he is pointing 90 degrees away from the ridge, the vario says 4.6 knots. Pointing parallel to the ridge heading north, the vario still says 2.5 knots. The 3d

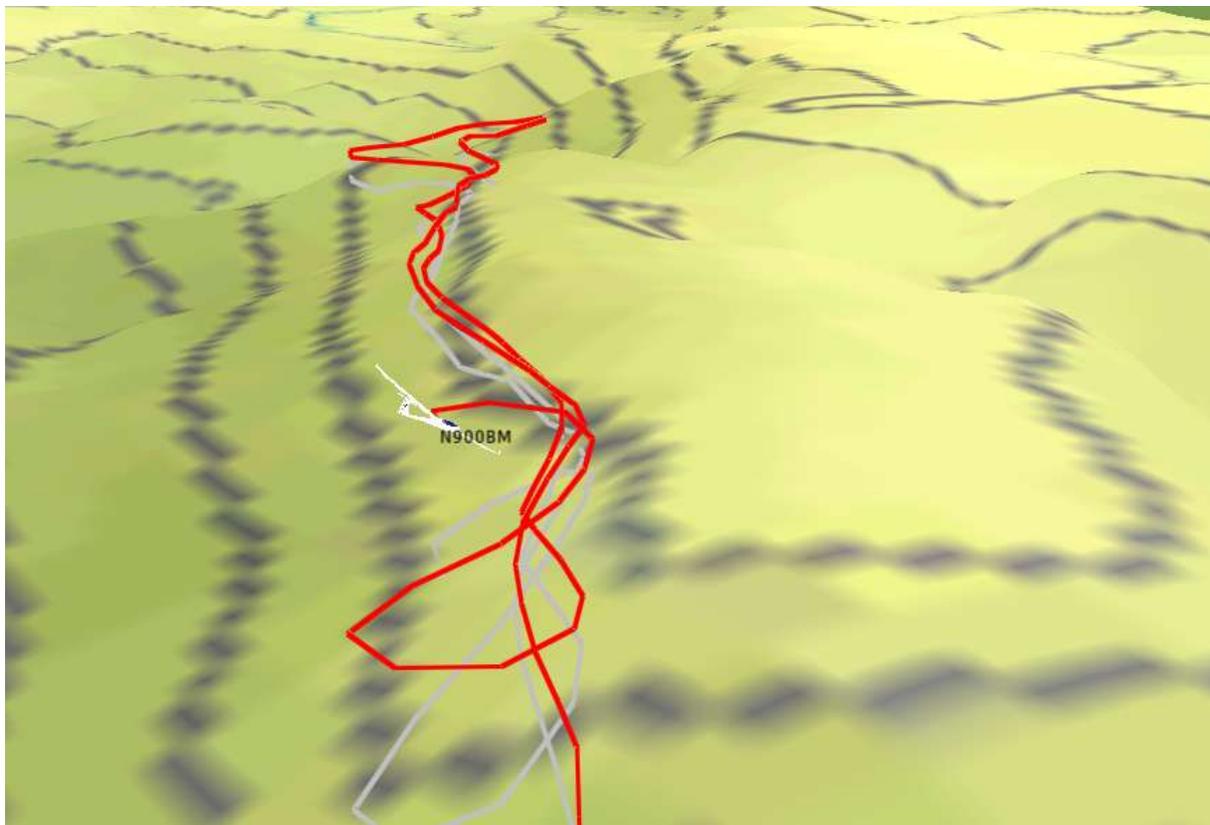
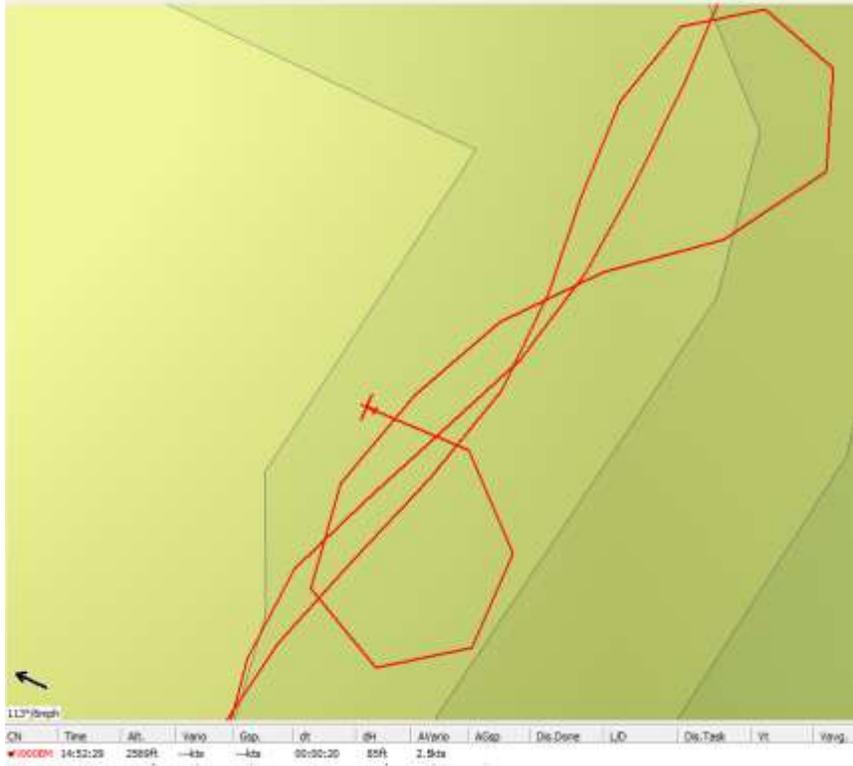
view shows him above the ridge line at this point. Heading straight in to the ridge, the vario is still showing positive. His speed is good throughout the maneuver. The next fix is in the trees.

Every pilot should look hard at these pictures, especially the 3d view. Think of the competitive situation, imagine you were planning on doing S turns, you just heard 4.6 knots on the vario, you're above ridge top and still going up, and think whether you would make the split second decision to turn hard right and leave the thermal for another few S turns – which means a good chance losing the thermal -- or crank it around to the left and core it now.

There are dangers in mountain soaring, and we all need to give the mountain a little more room – move out before thermaling, do a few more S turns, etc.





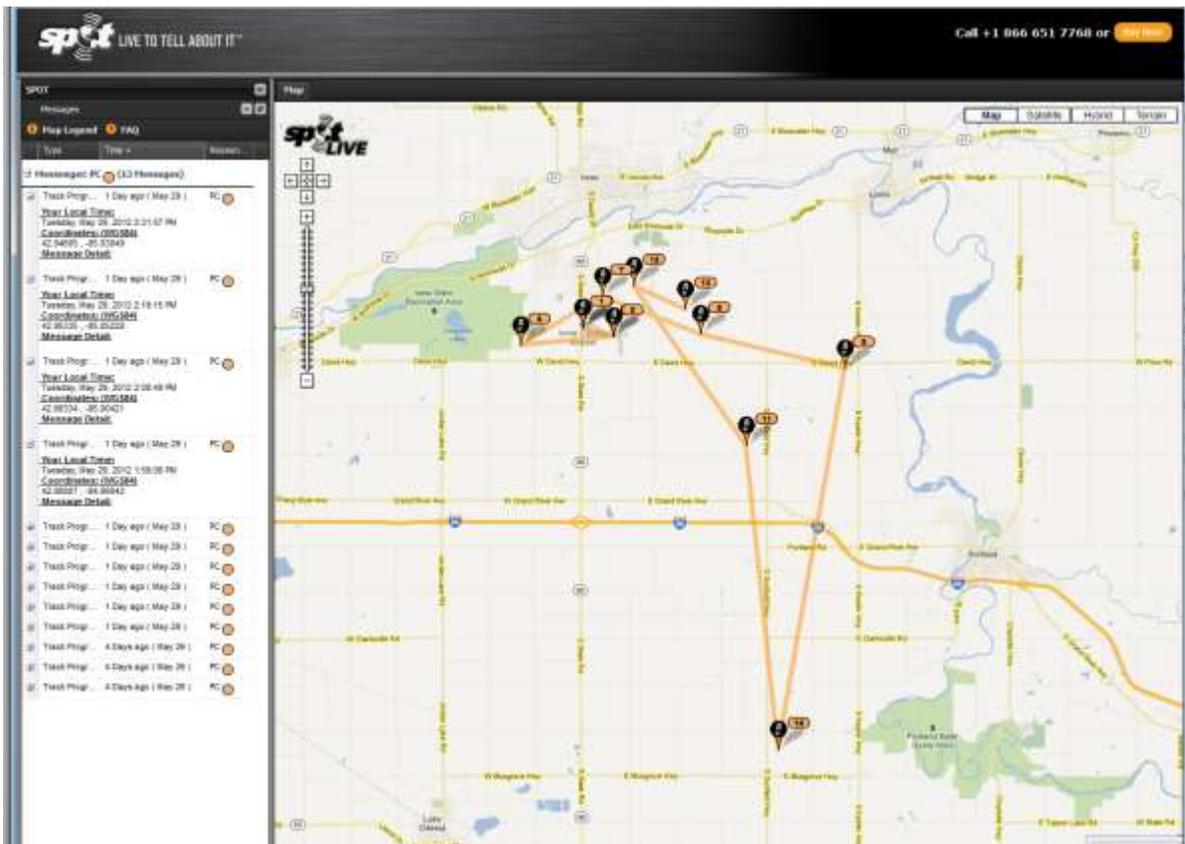


Ionia:

CM report excerpt: Low altitude (300 - 400 ft.) left turn (would be speculative to guess as to if this was a thermaling effort or the beginning of a very abbreviated pattern) nearly overtop intersection of 27/36 runway resulted in apparent stall/spin (roll to left, nose drop, rapid descent). The aircraft then entered an area of trees south of the airport at significant speed killing the pilot instantly.

Additional comments: I received a report from another pilot who shared his trace for the day. The trace shows wind 260 degrees at 30 mph at the time of the accident, with 1-2 knot thermals.

We do not have a trace, but I was able to get the spot track. The pilot climbed out and made some distance from the airport before returning. Though task open was 13:30, other starts were 14:56 through 15:38 (SSA scoresheet) so it is likely the pilot had not started yet. The track and reports are consistent with losing lift, returning, and on the edge of a reight, and the fatal turn either being a low-altitude maneuver to enter the pattern or an attempt to thermal.



Excerpts from an email sent by another pilot: (see below photo of the airport for reference)

We gridded and took off on Rwy 27 on the grass. It was a very windy and gusty day. Pilots reported having difficulty connecting with thermals and reported that thermals were broken up. I experienced this on my flight, but mostly stayed high and had little difficulty.

There were at least four witnesses to the crash, and I spoke to several. This is what they described:

About 30 minutes after the launch or start of the task (I'm not sure which) [the] glider was observed east of the airport with the landing gear down headed toward either the hard surface Rwy 27 or the grass Rwy 27. He reportedly had plenty of altitude to land on either runway. One person I spoke to said he seemed to be porpoising as he approached the airport. Instead of landing on either of the two available runways (relights were using the hard surface), he turned to the south in the area of the north-south grass runway. One person who witnessed the crash said he made a 270 degree turn that ended in a spin from which he did not recover. The aircraft went into woods east of the north-south grass runway. Both wings came off on contacting the trees.

The winds all day were strong from about 260 degrees, in the 15 -20 knot range with gusts. Those are my estimates, not measured winds.

As we all know, [the pilot] was a very nice person, a good pilot and not one to take risks. Immediately before the flight we sat together waiting for the launch to open and he seemed to be ready to fly and in good spirits.



1-26.

From The SSA website: We got word at the pilots meeting this morning that [pilot] had a rough landing down by Maypearl in 97. He sprained his back and spent some time at the local hospital but is OK and recovering at the hotel today. We're looking forward to seeing him tomorrow. Apparently the glider is fine and Cathy should be flying it today.

(No other information available. As I write, the 1-26 / 13.5 contest has not turned in its paperwork including crash reporting. There is no NTSB report.)

Canada:

The Canadian NTSB has not issued any information. This is gleaned from correspondence with several other glider pilots



Note 1: Location: N 43 48' 7" W 80 24' 43.71" Fuselage approx 15' south of the treeline. Facing SW, parallel to the treeline. On its belly. Debris field contained to approx 50' radius.

Note 2: Little is known about the crash but this is what I can tell you: It was a windy day with wind predicted to be increasing and shredding the thermals later in the day. The task was a 2 hour MAT with a mandatory turnpoint at New Hamburg about 50 miles downwind. The crash site was about 3 miles from the finish at Arthur. I did not see the scene nor the flight trace but I spoke with Ed Hostelle who

saw both (and helped Transport Canada recover the flight log) and he said that it showed a circuit for an attempted land out into an appropriate field but the glider got into the trees at the downwind/approach end of the field, cut a 5" tree limb then got another tree limb into the wing causing it to hook around and plunge into the ground. The cockpit was shattered and the pilot was killed instantly. ...

My guess is that it was a late/rushed/mishandled landout in fairly high wind. I landed out on the same day in a farmfield at St. Agnes about 20 miles south of the crash and about 45 minutes earlier. I saw 16kts wind at ground level and significant ground drift on my circuit to land out - but nothing that you would expect an experienced pilot to have trouble with.

Note 3: ...was 4km from the finish and realized he would not make it. The (head) wind at the time was 30-35 kph and gusting more. He picked a bean field at about 500 ft. and flew a short circuit. The trace shows that just before the turn on final he hit heavy sink. After impacting the trees the glider hit at a very steep angle on the downwind side.

The trace was downloaded at the site by Luke Szczepaniak and was viewed by the Transportation Safety of Canada officers that were present at the crash site. Luke has been asked to only release it to our officials at this time.

Comment:

The crash location reported above is, by Google maps, 1.17 miles east of a nice-looking "Arthur Aerodrome" and less than 3 miles from the home airport.

The Canadian rules (12.5,12,6,18.2) available at <http://www.sac.ca/> use a 2.0 kilometer (1.6 mile) finish cylinder with 500 foot AGL minimum. The penalty for a low finish is the same as the US used before last year's change, i.e. $5 + (\text{Finish Floor height} - \text{actual finish height})/5$, i.e. 20 points per 100 feet. Canadian rules do not require a pilot to land at the home airport to complete the task. Thus, a pilot who glides in to the ground 1.9 km from the finish point will receive full speed points and a 100 point low finish penalty.

1.17 miles from a good airport, 3 miles from the home airport, and about 1 mile from the finish cylinder offering speed points all point to the "coffin corner" scenario of a marginal final glide with very fast low-altitude decisions that need to be made: 500 feet of altitude would generate a zero margin final glide to the home field so it is unlikely a pilot would choose to land out from that altitude. 500 feet is also pretty low to start planning patterns.

Fairfield

A groundloop with severe glider damage but little injury might be regarded as a routine part of the glider business. On the other hand, any landing that goes this wrong has the potential for a worse outcome, so it's worth covering.

Excerpts from an email from the CM: ... a violent ground loop during a field landing. The fuselage is crushed forward of the rudder pedals, the aft end of the cockpit suffered circumferential cracks, the tail

boom was broken and there were significant axial cracks in the remainder of the tail boom. The vertical stabilizer shows obvious delaminations, and there is a crack in the horizontal stab. Multiple control rods and fittings are bent/broken. The fuselage is probably unrepairable...

The day was a very benign blue day with plentiful but tight blue thermals to 4,500. Task was a 2.5hr AAT over the Route 15 corridor, which is populated with many hard surface and grass airstrips. The day began to die around 3:45, and the last thermals were 1-2 kts to 3,000. A number of us had to stop at 10-15 miles out to climb up to final glide (I chose to grind it out over the last grass airport about 9 miles out). The glider was "close to final glide" but lost several hundred feet against glide flying toward Emmitsburg, about 5 miles out. He bounced around in zero sink over the town while scoping out landing fields. He apparently chose a very nice, flat 2,000 foot long field initially. ... he said the field looked "too good" (his words) and he diverted to his alternate, which was also plenty big but slightly rolling. He said he made a minor adjustment to his track during roundout which resulted in the lowered wing contacting the slope. A violent ground loop ensued which caused the damage described above. A potential contributing factor according to the pilot is that the flaps "popped out of L and back to 8 at some point in the pattern" (28 degrees landing flap vs 8 degrees thermal flap). The pilot walked away with only a minor scratch on his scalp.

Ironically, the morning safety talk on off-field landings by SM emphasized that "there's a time to quit soaring and start landing". The pilot felt that he more-or-less done this.

Further analysis: Here is a picture of the field, with green arrow showing the glider's last fix. The long straight fields are those of an abandoned sewer plant. It turns out they are "smooth as a billiard table," but their unusual appearance may be what "too good" means, and the pilot may have worried about irrigation or other obstacles.

As the second google maps picture makes clear, however, the landing field is quite small, and there are many good fields in the area.



The trace below shows the last part of the flight. The Downwind leg – the point of transition from blue to yellow here – is 430 feet AGL. The first time around he was higher, at 600' AGL on “downwind”. However, both of these are very close and tight. The saving grace is that the speed is good, 65 knots IAS.

The puzzle here is why the pilot took a second orbit, though only 600' AGL the first time around. He may have had hopes of thermaling. Or he may have been indecisive about which field to select. Starting the second "downwind" at 430 feet and so close that it's basically a 180 degree turn to land makes a landing into this very small field much more difficult.

I suspect indecision. Reviewing my traces for the year, I did one off field landing that looks similar, abandoning plan A with downwind at 600 feet, and turning round to enter plan B downwind at 450 feet. In my case, after a long trying flight, it was simply indecision about which of the many good fields to land in, and whether to land in the slightly favored direction, or roll out to the access road leading to an easier retrieve. I felt it was the worst off field landing of my career. And so, I'm sure, does the Fairfield pilot. It only takes once.

Reviewing many contest off field landing traces, low, tight patterns are very common. The lesson for all of us is clear: Stop thermaling, commit to a field, and commit to doing larger, higher patterns. And the frequency of low thermaling and low tight patterns reveals just how tempting it is to break these rules.



Part III Recommendations

(Disclaimer 2 reminder: These are my (Cochrane) recommendations to the RC only, not RC endorsed!)

This year's theme was crashes involving low-altitude thermaling or low-altitude maneuvering in preparation to land. Windy or gusty conditions contributed in some cases. All of the pilots involved had very high hours, decades of flying and contest experience, and were known as safety-minded pilots. These accidents should ring each pilot's bell – *Do not dismiss these crashes as “well they were dumb, a great pilot like me won't do this.” You will be tempted to try to thermal at low altitude, to plan your landings from too low an altitude resulting in dangerous low-altitude maneuvering, or to thermal too close to the ridge. This could happen to you!*

Recommendations:

1. Get out the word. The proper approach to low altitude thermaling and low, hurried patterns in landouts should be a focus item for our safety talks and pilot outreach activities. I will write a Soaring magazine article. I have a good collection of “how not to do it” outlanding traces. Including a few of my own.

2. Relight procedures. I corresponded quite a bit with the Ionia CD, who in retrospect would like an ironclad rule against thermaling near the airport below 500 feet enforced by traces. He did not know that it is in his authority to impose that now, and that many contests have relight procedures that forbid low altitude thermaling. Insisting that pilots join the pattern and land while at a reasonable altitude is also useful to help sequence landings with towplane traffic.

In the safety nag's opinion, this is a part of local relight procedures, and not something that should be a blanket rule. However, we should add it to the safety checklist, and make sure CDs are aware that a lower limit for thermaling within some distance of the airport, and established patterns for relights, is within their authority to declare.

3. Points. Pilots do unsafe things even when contest points are not at stake. So no rule involving points will eliminate accidents. On the other hand, pilots may occasionally take greater risks when contest points are at stake. So, reducing the points incentive, where possible without greatly affecting the character of the race, can help to reduce the accident rate. This year's accidents suggest three considerations for rules.

3a. Finish. Though we cannot know the exact cause, the Canadian experience is consistent with the “coffin corner” scenario that motivated our change to finish rules this year. A few hundred speed points one or two miles away over pretty benign terrain would be a temptation for any pilot.

Recommendations:

- a) We should not revert to finish rules that give a strong incentive to continue marginal final glides.
- b) I also recommend specifying that the minimum altitude for completing the task (currently MSH-200') should be at least 500 feet above the ground at one mile and 700 feet at two miles.

3b. Drop a day scoring. Currently, a landout is often a scoresheet disaster. Drop a day scoring was developed precisely to counter this effect. Drop-a-day scoring would reduce the incentives for low-altitude thermaling. A pilot facing a landout or low save situation can console himself that this will be his “dropped day,” so will not necessarily ruin his chances at the contest.

Drop a day scoring has been tried on a waiver basis. As with other waivers, few CDs are interested in trying our ideas.

We ought to implement drop a day for a year at regionals and see if it improves pilot satisfaction overall, as well as to see if pilots feel a reduced incentive to try for low saves and marginal glides.

3c. Hard deck. Low saves are now an accepted, rewarded, and necessary part of serious contest soaring. This does not have to be the case. At some point – 500 feet? 200 feet? 50 feet? – over some terrain – trees? quarries? -- we can decide that we no longer give points for thermaling out. This can be handled by sua files that specify minimum MSL altitudes, by visual examination of the top 5 traces, or other means. It can apply only over known bad terrain. Ridges or known ridge routes stick out.

Simply giving CDs the explicit option to declare minimum altitudes over known bad terrain, in regional contests, would be a start, so we can experiment with the concept.

There is no technical limitation that forces us any more to give points for low-altitude thermaling. Yes, pilots will still do it, points or no points, just for the convenience of getting home, but rewarding this behavior with hundreds of points cannot be good for safety. It can be a “boy that was stupid” event, not a great story of how I won the day at the campfire.

The RC has discussed this issue at length, and I know it’s not going anywhere soon. I include the suggestion here as suggestion to the broader pilot community. If you think we should stop giving points below some altitude, speak up. It won’t happen until pilots support the idea and pester the rules committee that they don’t want thermaling below 500 feet to be an accepted and rewarded part of contest soaring – as cloud flying, flying in restricted airspace, flying over max gross, 100 mph retrieves to restart and other behaviors, once accepted and a necessary part of the competitive pilots’ toolkit, are now for the history books.

4. Midairs

The flarm system is a great advance in our efforts to reduce midair collisions.

The Midair at Uvalde should remind us that Flarm is a collision *warning* system, not a collision *avoidance* system. *Midairs can happen even when both gliders have flarms!* I am worried about the possibility that pilots will think “now we have Flarm, we don’t have to look out anymore, or worry about flying close to other gliders.”

There was also a fatal crash at the Norwegian nationals with two pilots who had Flarm. They converged on final glide, one over the other where neither could see the other – and where Flarm is blocked.

Recommendation:

- a) The RC should continue to express its support for widespread Flarm adoption. In my judgment, mandatory Flarm is not wise at the moment, but there is a strong feeling for it which we should discuss.
- b) A second stress item for safety talks and RC information aggregation should be understanding Flarm and its limitations.
- c) Flarm offers a second antenna for mounting in the wheel well or belly hook and making gliders above/below visible. We need to understand if this works and if so encourage adoption.
- d) The Uvalde crash was on an assigned task, and the long-MAT task at Mifflin also produced many reported close calls. Though the school of thought that says we should train for the worlds wants more assigned tasks, it's worth noting that the midair rate in the US is much higher for assigned tasks and the assigned portion of MATs than for turn area or free portion of MAT tasks, and near 180 degree course changes particularly problematic.