Radio Controlled Soaring Digest

May 2011 Vol. 28, No. 5

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Front cover: Mike Lance's 5.33m LET DG-1000 over the 300 foot cliffs at Torrey Pines. The model has foam core wings sheeted with obechi, spoilers, water ballast, and retract. Photo by Gary Fogel. Gary's photo essay of this model flying over Torrey Pines starts on page 4 of this issue. Canon EOS Digital Rebel XTi.

Back Cover: Winter on Oahu: Dave Hill launching his 160" Cloud 9 sailplane. Photo layout by Fred Olsen, submitted by Joe Nave.
Sony SLT-A55V, ISO 100, 1/1000 sec., f4.5, 22mm

R/C Soaring Digest

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In the Air

Several years ago we traveled from our home here in Olalla Washington to the cliff very near the Dungeness Spit in Sequim to do some slope soaring.

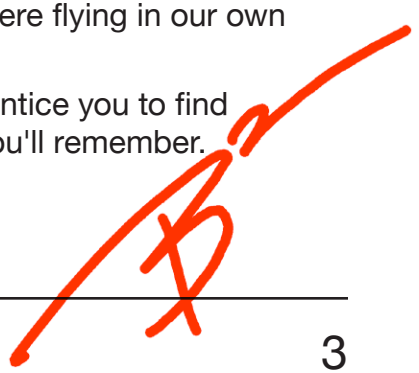
The near vertical slope overlooks the waters of the entrance of Puget Sound, and you can see the south end of Vancouver Island and the city of Victoria across the water to the north. Closer, and to the west, is the city of Port Angeles.

Several homes have sprung up along the edge of the cliff over the years and the slope is no longer flyable. But while it lasted, flying there was one of the more enjoyable experiences. The sea breeze, the screeching gulls following our models up and down the slope and the sighting of the occasional Bald Eagle were always eagerly anticipated, and flying there was an immensely enjoyable experience.

Gary Fogel, Piet Rheeders and Rene Wallage share their experiences on their own local slopes in this issue, complete with some stunning photos of birds flying with their models. Our minds were wandering while we were setting up these articles for publication, going back to those marvelous times when we were flying in our own little bit of heaven.

Perhaps Gary, Rene and Piet will entice you to find a slope near you for some flying you'll remember.

Time to build another sailplane!



Torrey Pines

A photo essay

Gary Fogel, gfogel@natural-selection.com

March 29, 2009 - Long-time Torrey Pines pilot Bill Liscomb launches Mike Lance's 5.33m LET DG-1000 over the 300 foot cliffs at Torrey Pines.

The model has foam core wings sheeted with obechi, spoilers (no flaps), water ballast, and retract.

Mike makes a few passes for the camera.

Skimming along on a high speed pass.

Heading back out over the blue Pacific.


D-1000


STURGIS
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HILLS

Opposite page: Coming south to north along the cliffs - the same pattern used by Charles Lindbergh in a Bowlus sailplane on his soaring flight in February of 1930 - and Mike Lance "having a great day"!

Above: On final approach.

Touchdown...

...and rollout. Who forgot to mow the runway?

For more information on scale soaring at Torrey Pines visit <http://www.tpsss.org>.

SINGLE FAILURE POINTS and Critical 1 components

You have one chance to get it right

Sherman Knight, duworm@aol.com

NASA reviews and categorizes each and every piece of hardware and software of a Space Shuttle based on its possible failure. NASA knows that parts and systems will fail so redundancy exists throughout the vehicle. It is the general policy of NASA not to permit the retention of single failure points (SFP's) in design unless special conditions prohibit designing it out. Retention of a single failure point requires that a justification or rationale be prepared which describes actions taken, safety margins, failure prevention measures, tests, or inspections that **will ensure that the critical item of hardware will not fail**.

The space shuttle has 800 SFP's where a failure would result in the catastrophic loss of life or the vehicle.

NASA calls these SFP's Critical 1.

On January 28, 1986, seventy-three seconds into Challenger's flight, one SFP failed. The vehicle and all those aboard were lost.

The vast majority of the shuttle SFP's are mechanical. Nearly all the electrical systems have at least one backup.

Except for the occasional RC aircraft with a second receiver battery, the typical RC aircraft has no electrical system redundancy. Simply stated, you have one chance to get it right.

The importance of a good electrical system cannot be overstated. I am a Team Horizon guy and I compete at crowded regional and national sailplane events. My weapons of choice are molded from epoxy impregnated carbon fiber and Kevlar. My pocket book is limited so I cannot afford electronics that

fail. My interest is keeping everyone in the air, no matter what brand you fly.

The potential for a Critical 1 SPF is not limited to the wiring harness. Every BRAND SPANKIN' NEW component (this includes soldered and crimped connections, wire, plugs and pins, switches and battery) you purchase may fail before you install it in the aircraft. Granted, the failure rate of new components is low. The failure rate is so low that today's pilot has little if any fear of a new component failure. It is this lack of fear that allows a pilot to install unverified brand new Critical 1 components.

If you are going to fly aircraft, big or small, you should expect an occasional defective component out of the box. NASA does. It is how you anticipate, test and deal with the rarely failed component that really matters. If the aircraft is inexpensive, there is little fear of losing your money. If there is little fear of losing (crashing) your aircraft, then typically, there is little time spent testing Critical 1 components.

Compounding this lack of fear is another problem. Many pilots are not aware of Critical 1 components and connections or where they are in their aircraft. I am sure that every pilot knows that if you disconnect the receiver battery, the servos stop moving. You can physically see what occurs when connecting and disconnecting the battery. Unfortunately, nearly all Critical 1 failure points are hidden from view. Most pilots do not know what to look for. There at two types of faults. One is much easier to find than the other.

The first type of fault is simple. The system stops working. The result of this type of failure is often catastrophic.

The second type of fault is the home of the Gremlin. An intermittent fault is a malfunction of a device or system that occurs at intervals, usually irregular, which functions normally at other times. A random intermittent fault is typically a borderline electrical connection where two conductors are very close and actually do or do not establish a connection, allowing enough current to flow for some operations but not others because of changes in temperature, vibration, orientation, voltage, proximity etc. Intermittent failure from gradual degradation of a connection can sometimes lead to catastrophic failure.

I spoke with a pilot the other day who had suffered from a bad case of the Gremlins. He lost three aircraft, all within 30 seconds of takeoff. The failure was remarkably similar for each aircraft. He was convinced the only possible conclusion was a radio problem. After a half hour or so, I asked if he used the same receiver battery in all three aircraft and he responded with, "the battery works just fine." I asked him to look into the battery and call me back. He never did. This intermittent fault cost him two aircraft.

Batteries and wiring harnesses are a good place to expect Gremlins to hang out. I had a receiver pack fail intermittently from bad spot welds by the manufacturer. Later, on a different aircraft, the power plug on a harness simply pulled off the wire because the pins were never crimped hard enough to make a good connection. In both cases, bench testing discovered the failures before the equipment flew in an aircraft.

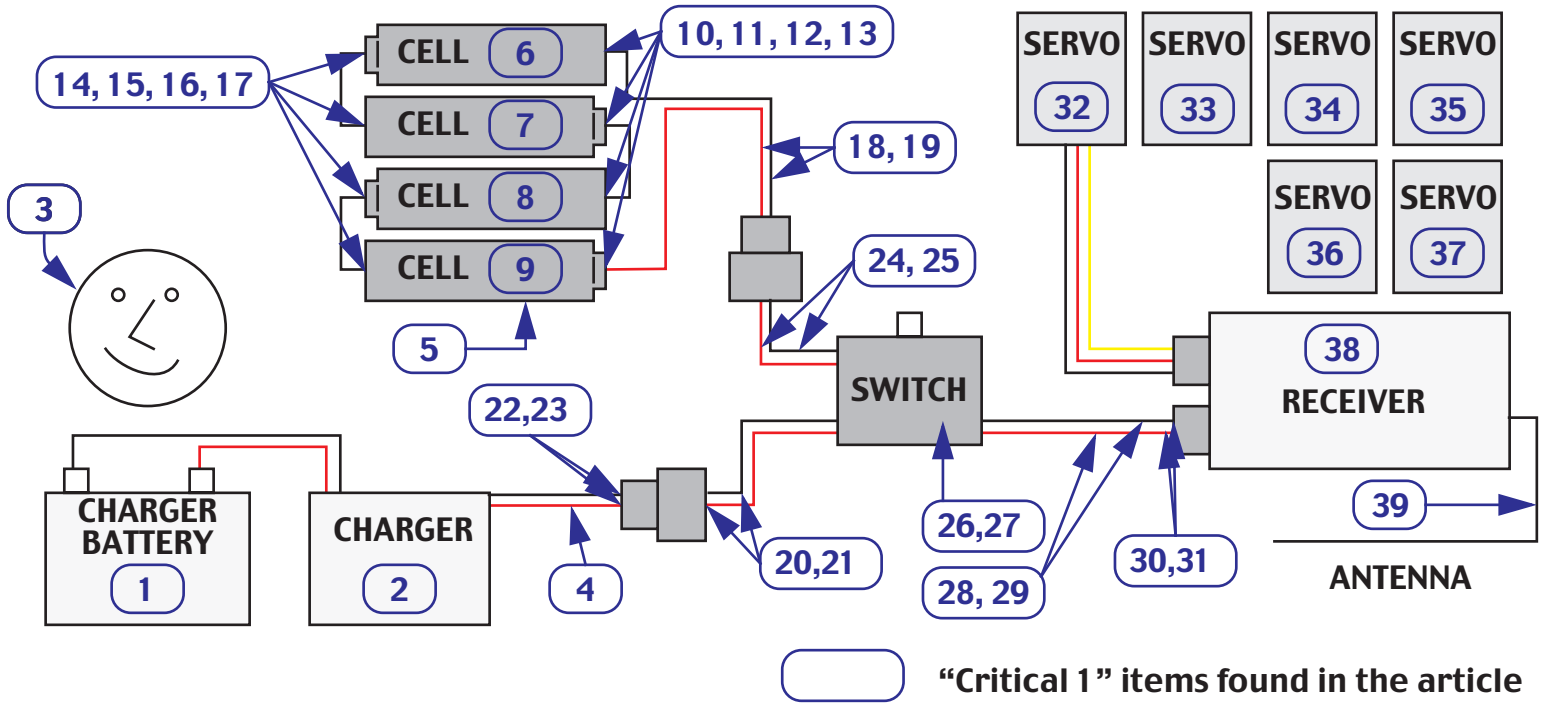
Both of these examples represent a Critical 1 single failure point. It is possible that, if unnoticed, the aircraft would have flown just fine — maybe for one flight, maybe for 100 flights. Because of the nature of the faults, it is possible to fail in flight and yet work during the post-crash autopsy. When "everything works OK," after the crash, the typical pilot will conclude that he/she was locked out or shot down.

Critical 1 components and connections deserve more attention. Remember, with Critical 1 failures you only have one chance to get it right.

The electric current to power systems in an RC aircraft comes from batteries. Therefore, we need to start with the first Critical 1 component, the battery charger power source.

Critical Item 1. **The Battery Charger Power Source.** The battery charger needs a power source. Typically, that source comes in the form of another battery or a wall outlet. If your power source voltage drops below a certain level, it may cause your charger to false peak the battery in your aircraft. A false peak occurs when the charger sensors indicate a fully charged battery when it is not. Flying with a dead or nearly dead battery is catastrophic.

After my nearly new, two week old aircraft performed a fly away (recovered with minor damage) it took several hours to figure out what occurred. I was charging from a large gel-cell battery while in the field. Unbeknownst to me, the gel-cell was no longer holding a charge (its gas tank was nearly empty). As the available voltage in the gel-cell dropped to match the voltage in the receiver battery, the voltage in the receiver battery "peaked" causing the peak detection circuit in the charger to indicate a fully charged battery (false peak). Once I figured out the charger deficiency, I replaced all my chargers with the type that show the voltage of the



charging battery and how much current the aircraft battery has taken in. The "current meter" lets me know just how empty the gas tank in my aircraft battery was and how much gas I put back in. For me, a green light next to the word "charged" is no longer good enough.

Critical Item 2. **The Battery Charger.** The charger itself may look OK, the display lights up, but it is not performing its job. The charger may over overcharge (cook) your batteries damaging their ability to hold a charge or the charger may false peak.

I own one of those $800 dollar chargers that is serviced every three years. Every time it has gone in, something was found that needed to be replaced. It is not a bad idea to upgrade or have your charger checked out every now and then. This is one area where technology advances make the purchase of a new charger every two or three years worthwhile.

Critical Item 3. **The Person Setting up the Charger.** The charger may be set to the wrong battery type, number of cells or capacity, tricking the charger into indicating a battery is fully charged when it is not. Another possibility is that the charger "cooked" (overcharged) your batteries. Once "cooked" there are several battery types that will never hold a full charge again. If you want to see a "cooked" battery do a Google search for "lithium batteries overcharge." Some of the new chargers are nearly idiot proof. Maybe it's time.

Critical Item 4. **Charger Lead Cables.** The wires between the charger and the aircraft battery may be excessively long (too much resistance), too small a gauge (too much resistance) or have an intermittent short in them. All of these may cause the sensors in the charger to misinterpret information from the battery and false peak or cook the battery. This is an easy upgrade.

Critical Item 5. **Undersized Receiver Battery.** As load is applied to a battery, it pulls the voltage down. To one degree or another, it happens in all batteries. The degree to which the voltage drops will vary significantly depending on electrical load and the type and size of receiver battery. Although this may occur with batteries of any size, it happens more frequently to batteries with high internal resistance. High capacity, four cell, AA NiMH receiver packs suffer from high internal resistance, but are perfectly adequate when used in the proper situation.

As aerodynamic loads on control surfaces increase, the number of servos increase, or additional flight systems are added to aircraft, the higher the peak load on the battery. As you step up to larger aircraft with larger control surfaces, larger and more servos, more speed, etc., it is dangerous, and sometime fatal to the aircraft, to assume that the battery used in a smaller aircraft will be sufficient in the larger aircraft.

The undersized battery may be forced below the minimum voltage the receiver may require to operate because of a spike in the load. A battery dropping below this minimum voltage is known as a brownout and will force 2.4 systems to "reboot." This reboot takes a few moments and if it occurs at the wrong time, the results are catastrophic.

Critical Items 6, 7, 8 and 9. **Each Cell in the Battery.** A battery pack is only as good as the weakest cell. A weak or defective cell may force a charger to false peak or self-discharge. Sometimes (rarely) a single cell is dead or defective upon arrival. A cell may have been dropped or dented, disrupting the internal structure of the cell. Overheating during soldering may resulting in damage to the internal chemicals of a cell or pop a relief valve. Just because it is new does not mean it will work as advertised. To know if a battery is good, you need to cycle the battery to make sure it will hold capacity. Although it is rarely done, every brand new battery should be cycled to verify capacity. How many pilots have a battery charger that will perform multiple charge/discharge cycles? If you don't, this one is easy, it's time for an upgrade.

Critical Items 10, 11, 12, 13, 14, 15, 16 and 17. **Cell to Cell Connections.** There

are eight connections in the typical 4-cell battery. Straps or wires link the cells together and the positive and negative wires go to the plug. Straps are spot welded on the cells by many manufacturers to reduce heat penetration into the cells. This reduces the chance of damage to the internal components. If the welds are of poor quality, they may create an intermittent fault or fail altogether. Poor solder technique may result in cold joints or lack of bond. The shrink-wrap around most batteries acts as a redundant system and may be the only thing maintaining contact between the cell and the wire or strap. (OK, so the shrink wrap is a redundant system, but I wouldn't want to rely on it.)

Critical Items 18 and 19. **Battery Leads.** There are two wires coming from the receiver battery to the battery plug. These two wires may be strained, nicked, or chaffed over time. Insulation may be melted off on an exhaust pipe or chaffed by a carbon fiber frame. If the positive and negative wires come into contact, you have a situation known as a dead short. Dead shorts are nasty. Not only can they cause a failure of your primary power systems, they can generate enough heat to melt the insulation right of a wire, cause soldered joints to melt, or start a fire

Critical item 20, 21, 22 and 23. **Battery Plug Pins.** The battery plug connects to the plug from the switch. There are two pins crimped to the wire on either side of the plug. A bad crimping job may allow the wire to pull free or continued pulling and flexing the plug wires can break the individual strands of wire over time.

A soldered pin has its own set of issues. The solder wicks up the strands making them brittle causing wires to fracture more easily. The resulting intermittent failure may degrade until it simply fails.

The bottom line is that a badly soldered pin is not any better than a poorly crimped pin. Gremlins love this kind of stuff.

Critical item 24 and 25. **More Battery Leads.** This is the wire from the battery plug to the switch. See Critical item 18 and 19.

Critical item 26 and 27. **The Switch.** Most switches have two contacts for some redundancy. Unfortunately, you never know if one of the contacts has gone bad leaving you without any redundancy. All switches have a duty cycle and wear out over time, and a little oil or liquid may act as an insulator causing the switch to fail.

Some swear that they will never use a switch because of the possible failure point or that the switch is just one more Critical 1 component that can be easily eliminated. Others believe that when using the battery connector as a switch, the associated wire strain from inserting and pulling the plug is more likely to fail than the switch.

This is a tough call. I prefer switches.

The majority of the Critical 1 failure points occur at connections.

Critical item 28 and 29. **More Battery Leads.** The wire from the switch to the receiver. See Critical item 18 and 19.

Critical item 30 and 31. **More Pins.** There are two more pins here. See Critical item 18 through 21.

Critical item 32, 33, 34, 35, 36 and 37. **Servos.** Each of the servos can also cause a problem with the battery. A stalled or bound servo can quickly drain the battery of its power.

Critical item 38. **The Receiver.** It is amazing how much is packed into such a small box. Miniaturized electronics and surface mount technology uses machines in place of the human hands to make nearly perfect solders every time, resulting in dramatically improved quality control. Unfortunately, a solder joint may open in a crash or with vibration over time and if mixed with a little nitro bath or a shot of WD-40 it may still cause issues.

Critical item 39. **Antenna.** Every receiver has an antenna. Sometimes two. Clip the end of the antenna wire and the antenna will fail to do its job. A broken antenna wire may reduce its range. At an airshow, within seconds after takeoff and about 400 feet from the pilot, the pilot lost control of the aircraft as it performed a slow roll into a crowd of spectators. A ten year old died when struck by the aircraft. The post-crash autopsy found the 72mhz antenna still coiled up and wire tied as it came from the manufacturer.

Critical item 40. **The Battery Eliminator Circuit.** The eliminator circuit REDUCES REDUNDANCY in an effort to reduce weight. Instead of a separate receiver battery, the electrical system draws off the same battery as the electrical motor used to turn the propeller. Like the battery charger and receiver, over time, BEC's keep getting better.

To keep from frying the BEC when overloaded, some BEC's have a "shut down" circuit which trips if the BEC becomes too hot. Unfortunately, some of these BEC's also shut down the circuit that powers the electrical system at the same time. This too may present as an intermittent failure. As the BEC cools off, the circuit is reset. After the crash, everything seems to work just fine.

Critical item 41. **Voltage Regulator.** The electronics in many aircraft are powered by lithium batteries of one type or another. Smaller, lighter, more power sounds good. However, the high voltage of some lithium packs can cause problems. The receivers all seem to handle the higher voltage, but some of the servos may not. For servos that can't handle the voltage, the servo just stops working and smells a little. Sometimes the servo gets so hot it melts the servo case and smells a lot. No matter what is going on inside the servo, grounding of the power lead will discharge the battery quickly. Unfortunately, the short may cause wiring, switches and plugs to rapidly heat up to the point where plug casing and wire insulator starts to melt.

In Conclusion

Even a simple aircraft setup will have 20 to 30 possible single point failures, more than most realize. As you can see, the majority of the Critical 1 failure points occur at connections. Next month we will review connections, both soldered and crimped, and investigate the Gremlins that live in many of them. We will also provide the tools and techniques to eliminate those Gremlins.

My hat's off to those that pay careful attention to these Critical 1 single point failure components or connections. I hope you are passing on your knowledge to the younger pilots.

Many of you will respond with "Well, I have never personally seen any issues like these before so I am not worried." If you never have seen or experienced a failure, great. I hope you never do. Just remember that luck is a fickle thing and tends to come to those that are prepared, practice and pay attention to details. Those that do nothing more than hope to get lucky, rarely do.

To those that view Critical 1 thinking as overkill and choose to let others pay attention to details, best of luck.

See ya next month.

One fine early Friday afternoon, somewhere on the Mediterranean coast

text by Rene Wallage, rene_wallage@yahoo.com
most pictures by Shahar Glass

I don't know about you guys, but for me, of all the various disciplines our hobby has to offer, slope soaring must be one of my favorites. My psychologist called it "self medication."

Virtually every Wednesday I start checking the weather forecast at <http://www.windguru.cz> in the hope of finding favorable winds the coming Friday (= fly day). The slope sites most frequented by us overlook the Mediterranean, so what we need are westerly winds, preferably five knots and more.

I knew the next Friday I'd have time to do some flying, and that Wednesday and Thursday there would be rain. That would make our regular flat field a glorious mud bath, so if I wanted to give my thumbs some exercise it would have to be on the slope, yeah.

Some posts on our Israeli RC forum <http://www.efly.co.il> (it's in Hebrew though) showed some lukewarm interest, but at least Shahar Glass showed he had the fire in his heart as well.

We decided on the Tel Baruch cliff as venue of choice. Tel Baruch sports a cliff about 30 meters high and almost 90° straight up! There is only a narrow sliver of beach at the bottom, so if you get into trouble...

It is situated just north of Tel Aviv, right next to the Sde Dov airport (but not close enough to get interference from them,

Shahar Glass readies to launch his second-hand Windrider Easy Pro.

The author sits back and enjoys the sun and sea breeze while flying. Heaven!

or give it to them), and easily accessible with a regular family car. And it's only a 20 minutes drive from my home. Many of the "more mature" Israeli RC'ers had their first flights here.

We both were spot-on-time Friday afternoon 12:15, and drove through the sandy dirt tracks up to the cliff. The wind was supposed to pick up around 13:00 so the distinct lack of wind didn't worry us too much as we knew we were early.

When launching my MPX E-EasyGlider (my sniffer plane) I could only just keep her afloat, and even had to resort to using the twirley bit in the nose.

Shahar brought his new 2nd hand Windrider EasyGlider Pro to the cliff for her re-maiden. Unfortunately, a range check showed an interesting twitter effect on the servos. The blame was squarely put with the old, old Futaba T7UHP transmitter and receiver with shortened antenna Shahar had brought with him. Now he had to go all the way home to pick up his regular radio gear. He was back in 30 minutes with his regular 10C. Living in a small country has its advantages!

By the time Shahar returned, the breeze had come up — although a bit north-westerly — and we could launch and stay up there for however long we wanted. Turned out his Windrider EasyGlider is a very cute little glider and great fun to fly. After giving my E-EasyGlider


TURNIGY

some airtime, I switched to my WeaselPro. I've spent the last four or five flying sessions moving a 35 gram piece of lead slowly further back. The first few seconds after launch made me realize that I now had it just a bit too far back for my liking. But after a few twists and turns I was used to it. Mind you, I may push the weight a smidge forward again when I'm home. Just to keep my blood pressure level you know…

But the highlight of the day must've been the close combat I had between my Weasel and a territorial crow (or was it a raven?). He only gave up chasing me after he couldn't follow my loop… I loooove this plane!

We may not have had the best day with the best conditions, but standing (and at times sitting) on that cliff, in the sun, with a nice sea breeze in our faces... aaah, our kind of heaven! Thanks Shahar!

And to all those e-FLY forum members who didn't make the trip; you lost, BIG time!

Programming Your Computer Transmitter for DLG/RES/Unlimited Optimum Launch Height!

Gordy Stahl, GordySoar@aol.com

I was honored and lucky to have been invited to help Barry Kennedy of Kennedy Composites fame in his sales booth at the March Toledo Weak Signals Model Expo. But working the booth and looking at the display models reminded me of an experience I had during a contest in Michigan a few years back.

A pilot was hooked up to the winch line with his new Supra unlimited ship, but was fidgeting with his transmitter settings. I was walking past after dropping the nose of my Supra dead on the 100 point spot exactly at the 8 minute task time and obviously feeling pretty good!

He caught my eye and I asked what he was up to, since there was clearly some great air just ahead of the launch zone (birds and sailplanes circling!).

He went on to tell me how he'd been futzing with CG, tow hook location and transmitter computer mix settings, but just couldn't get his Supra to launch like the others. I've since run into AVA pilots and other Supra pilots with the same problem, and I've read comments on RC Groups from pilots claiming those models don't launch as high as others - clearly incorrect.

With all my experience flying contest sailplanes (and building them)... I knew that none of those things where his problem... and that he would never figure it out on his own because it was too obvious and too easy.

First, let's take a close look at CG during launch... .there isn't any... .well not in the common definition anyway. There is, but it is NOT related to nose "weight" or some balance point. Instead of CG it's THL, tow hook location. How a sailplane teeters while perched on some pegs on the basement bench is not where it "teeters" when hooked to the tow line!

One thing I have noticed that is worth mentioning is that our sailplanes are NOT sailplanes when hooked to hand, winch/bungee line. They are kites. You pull kites up with a string. Sailplanes become sailplanes only after they disconnect from the tow line. That's when they are flying. Until then they are in fact being towed. Two different verbs and two different conditions with different set up needs – "Being towed"/"Flying." Notice they don't even sound similar!

Okay, so nose weight has nothing to do with launch height... unless you have more weight in your sailplane's nose than is needed to make it fall forward. If you have one dot more lead in the nose than is needed to make it fall forward it will then be constantly falling forward – and nose downward - which then means your model needs to be out of alignment; some up-trim dialed in to fight gravity's pull on that excess nose lead needed at

all times to keep it flying hands off level at cruise speed.

Here's a good thing to chant on your drive to work each morning 'til you actually get it, "Airspeed empowers tail feathers."

Quiz time:

How much airspeed does your model have teetering on those pegs in the basement and what affect does up trim have on it while perched perfectly on the recommended "CG"?

That up-trim needed to keep the model flying hands off level suddenly becomes doubled or tripled during the launch because airspeed empowers tail feathers and its the tail feathers that direct your sailplane's nose. And there are few times in your sailplane's job when it has more airspeed than during launch!

During launch you don't want to have any trim settings that are affected by airspeed changes other than camber. And even then, that needs to be limited to the minimum possible amount in order to provide the extra lift to the wing's normal lift capability to haul up the line weight!

If your model is flying with more lead than is needed to make it fall forward, then it will want to balloon on launch due to the up trim setting.

Most guys correct an improperly balanced model on launch by moving the tow hook forward. They are wasting the winch's energy and having extra drag caused by the up elevator trim. (Important point: This is in the context of a full flying stab, not a fixed stab with elevator (like V-tails often have).

Okay, here's the story... actually two.

The first was fairly common on my travels to other flying sites:

A guy has a plane that flies okay, he fairly often catches a big thermal for a 20 minute plus Sunday flight... .but he never has long flights unless it's a big thermal day. The model porpoises often and lands like a concrete rocket.

I pull a few ounces of lead out of the nose, enough so that the model "shouldn't fly" (after all, it has been flying with all that lead in the nose). The balance point was just forward of where the plans "suggested." Prior to removing the lead from the nose, I have the guy give it a firm left handed toss, then measure the "glide." On the toss, the nose zooms upward, but the guy gets it settled down and the model lands about 50' to 75' away. At the very end of its glide, the model stops in flight and drops its nose like there is a lead magnet on the ground.

I pull out wayyy too much lead than should be "safe," then, after adding a few clicks of down trim first, have the guy give the same toss. The model shoots straight out, but rising, and it glides about 200' to 300' with the same toss... and settles on its tow hook.

"Wow" says the guy, "Its never flown that far on a toss!" He flies the model for longer periods than ever before. But it launches pretty flat and I explain that the tow hook also needs to be moved back, since he doesn't have the up trim he had before. He is very happy!

Two things happen afterward. His local friends tell him that the manufacturer knows more about the model's aerobatic design than Gordy does and convince him to put the lead back in and that if he moves the tow hook back it will make the model too unstable. So he puts the lead back in and is doomed to fly a heavy, out of balance and out of trim sailplane... and will present no threat to the future win ratio of the local hot shots.

Story number two, and getting back to the pilot who was standing at the winch with his new Supra unlimited ship, hooked up but fidgeting with his transmitter settings...

Supras, AVAs, and many DLGs have "tipper" tails... the mechanism that allows the horizontal stabilizer to rock (or pivot) for up/down control. In the case of the guy frustrated with his model's launch, it was a Supra. I've explained that CG can only have a misleading affect on launch and that the tow hook is the key factor. This guy had moved his tow hook

actually too far back, causing the model to rotate severely when first released. His model was properly balanced, yet he had about ½" up trim programmed into his Launch setting!!!

I saw what the model did when the guy attempted to “ping” a previous launch. He’d pushed the model’s nose over just at the right time - he was a very good pilot by the way - but the model would almost tuck. Instead of rotating its nose back upward from the push-over, it would make a long slow arch upward to vertical!

I told him that I knew the secret transmitter program to make his Supra launch to the moon as the rest of the models there were doing, and said I’d show it to him. He began to unhook his model but I quickly instructed him to keep it hooked up and to hold his plane firmly. I said, “I am now going to show you the secret transmitter program” but instead of reaching for his radio buttons I simply put my finger on the back of his model’s horizontal stabilizer and pushed down. The same way the air pushes down when the elevator tries to push the tail down on the ping, directing the nose upward. With the slightest force I was able to push the stab trailing edge almost all the way to the tail boom (nearly two inches!). And as I did it, you could see the pushrod buckle between the few tie spots he’d used to secure it’s housing. Inside the nose, there was more than four inches of unsupported pushrod from the firewall to the servo arm. Instead of carbon pushrods he could have just as well used rubber rods.

You see, if you stop and think, just use common sense, it’s possible to understand everything about your sailplane and its operation to improve its performance.

Top New Zealand pilot, icon, legend, and frequent contributor to our hobby, Joe Wurts, wrote a short email on the RC Soaring Exchange a lot of years back about why the dive test was a waste of time unless you understood all the forces at play. The one phrase that has stuck in my head ever since is “aeroelasticity.” In those days, servos didn’t hold their positions very adamantly against high loads, pushrods were made of plastic or wood and seldom supported very well. Tail booms flexed, stabs twisted and bent under launch and dive pressures. So using CG as a way to balance a model for “flying” is misdirection at best. It was the way to protect fragile sailplanes of the past, which if they picked up excess speed in a dive would literally blow to bits in the air.

So they were balanced well forward, causing lots of up elevator trim set for normal level flight. That way if they got into a steep dive the flexing pushrod, servo, tail boom and stabilizer would flex only down to a setting of still some up, protecting the model from picking up too much speed in a dive. “Add lead till the nose pulls up on its own” was sage advice for those times and models. Unfortunately, the part of the story I just explained isn’t known or doesn’t get told nowadays.

Those models were seldom balanced for flight, they were balanced to protect against over-speeding in dives. Current models don’t flex, servos don’t give, and stabs for the most part don’t twist in high speed dives or launches, whether they are DLGs or sailplanes with tow hooks.

Want better launches? Be nuts about elevator stab linkage installations! And get your models balanced for flight, not for dives!

DLG champion Bruce Davidson was tossing his favorite DLG ship a few years back and mentioned to me that it flew fantastic but tucked if left in a prolonged dive. The answer was simple, “Who cares!” The model was his best thermaling and handling machine, so simply don’t dive it. Wrong! It tucked because of aeroelasticity of the thin balsa stab, not some mythical rearward CG measurement, and if it tucked due to high speed dive pressure on the stab, it was most certainly affecting its launch. Correcting the flex means cleaner higher launches, and more uniform

characteristics in all phases of flight. All good things!

If you find yourself pushing buttons to get higher launches, first take a look at how much flex at the very trailing edge of the horizontal stabilizer you have with your servos turned on, then tow hook position or throwing technique.

Okay, there's one disclaimer. Many DLGs do use transmitter programming to optimize their launch path. With the new carbon molded ships, aeroelasticity is mostly a thing of the past and these models use the programming to direct the flight path, not correct for parts flexing.

Hope you enjoyed this trip!

If you want to discuss the points brought up along the way, feel free to email me at GordySoar@aol.com. See you down the road.

Gerry Carter launches the 4m Xplorer of the 2011 Milang F3J International winner, Dave Pratley. John Blanchard photo. Event coverage by Chris Adams will be in the June issue.

A slope soaring excursion with a difference

Piet Rheeders,
piet.rheeders@gmail.com

For most of the soaring pilots who stay inland in South Africa, good slope soaring sites, and the accompanying consistent wind that is required, is rather the exception than the norm.

Our fellow R/C glider pilots who stay in other parts of the country like the coastal cities of Durban and Cape Town, on the other hand, do have some sites that have what it takes to make a good slope site. Although we have some good slope soaring sites right here in the middle of the country in Johannesburg, they are surrounded by houses and the landing

areas are not really fit for all types of slope soaring.

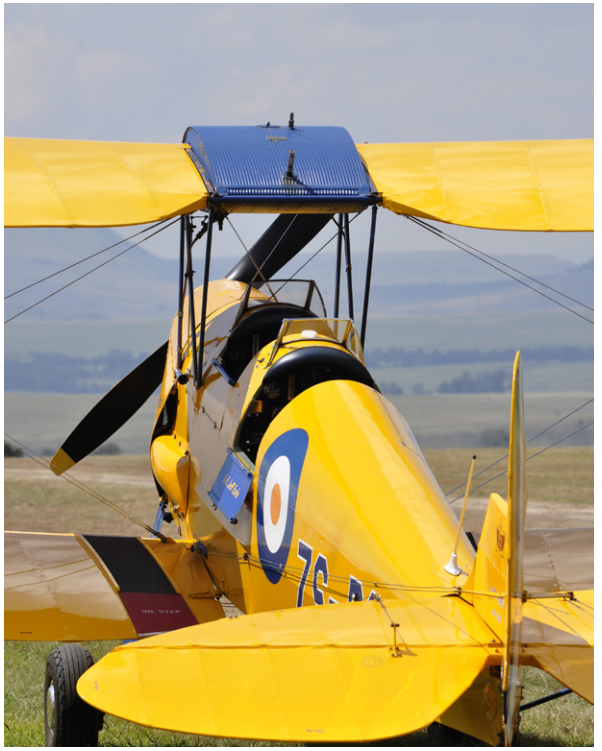
Therefore most of the R/C glider pilots here are more into thermal soaring, and rightfully so, because there is not much that can beat the experience of riding the strong midsummer thermals we get here. But, on the other hand, once the slope soaring bug gets into your blood you will always go back to a good slope.

This was the case when a small group of us set out on a slope trip over the long Heritage Day weekend we had in March (19 -21). Evan and I could only spend the Sunday and Monday on the slope, but this was one slope experience that had it all.

Due to the recent eye operations I had, my eyes were still on the recovery path and I did not take my normal quota of slope gliders with me, and instead of flying a lot I spent more time taking pictures and relying heavily on my camera's autofocus system.

Did you say we are going to the slope?

The first surprise came as we entered Volksrust town. We got a cell phone call from Paul to say that they were not on the slope but just out of town attending the EAA fly in at the local air field. So we made the detour to join Izak, Norbert and Paul and after 10 minutes arrived at the airfield. As you can see in the accompanying photos, all

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the golden oldies were there - a Piper Super Cub, an excellent condition Tiger Moth, a Chipmunk and a Harvard and an ex South African Air Force Albatross reconnaissance aircraft. At around 11 AM as the wind pickup nicely in a northwesterly direction we departed for the slope.

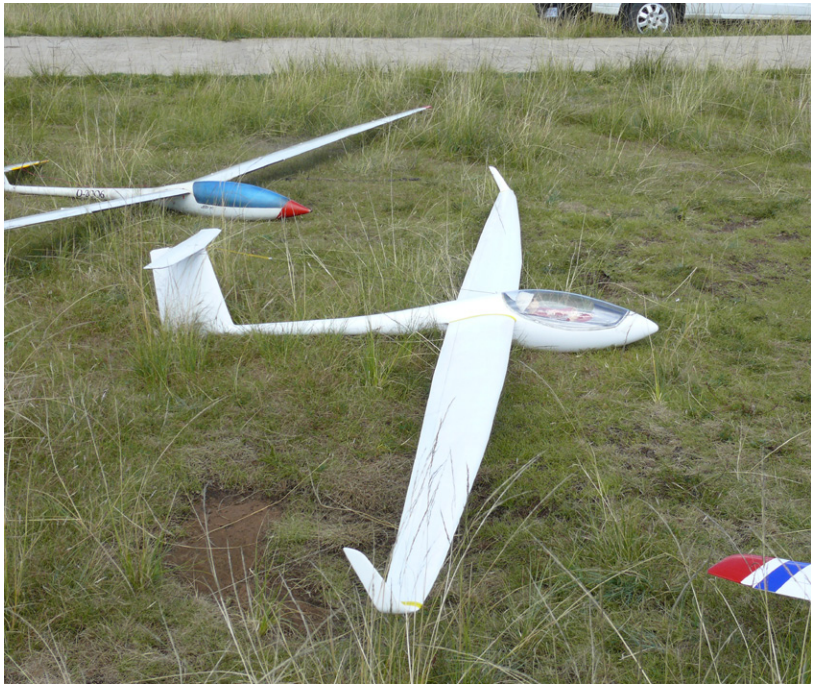
As we drove to the top of “Tamatieberg” we could see the slope planes already flying and we knew straight away that we were in for a good afternoon’s flying.

The wind coming up the slope was moderately to strong and once again you could fly just about anything that had some sort of wing on it. Norbert with his SB10, Izak and his ASG 29, Paul and his FOX as well as his scale Cessna “Dragonfly,” Evan and his ever green Tsotsi, and myself with an old Ellipse (just in case I lost sight of it) as well as my E-slope Mini Pulse.

They must brave to jump off here.

The second surprise of the weekend came when the paraglider men arrived. They had to wait patiently for the wind to die down somewhat before they could fly.

This happened only very late in the afternoon and both Izak and I got some stunning pictures of them flying in the most perfect afternoon light with dark clouds to groom the background. Unfortunately, Evan and I left the slope a little soon, but Izak took some more



pictures as the light got even more dramatic.

We had to stay at a camp site about 2 km form the slope this time 'round as our normal accommodation was fully booked. But the camp fire and the rise of the super full moon got as talking late into the night.

On Monday morning Izak's cell phone woke us up at 5 AM much to the dismay of my dear friends Evan and Paul. After a cup of coffee, Izak and I set out to take pictures of the dam and the upcoming sunrise over the dam.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4
U.S.NAVY


SP-P587
FDX


SP-P587

Where Eagles dare.

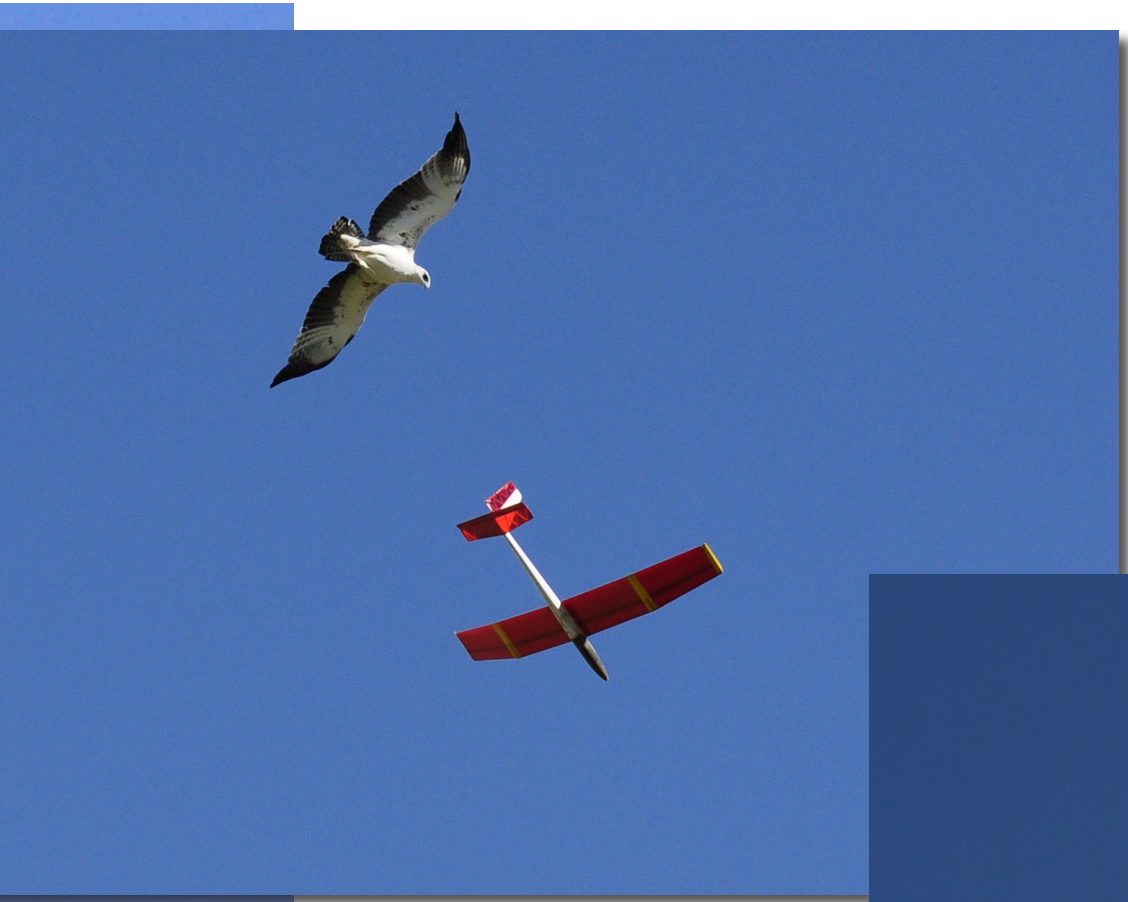
At 9 AM, after we helped Izak and Paul dismantle and pack up their camping equipment, we set out for the mountain for the last few flights as the intention was to start our return journey back to the concrete jungle at around 11 AM.

Evan and I were the first up on the mountain, but to my disappointment could not fly due the fact that I mistakenly left my transmitter on the day before and the Lipo battery had run down. Try as I want I could not revive it and Izak came to my rescue and helped me out with a spare transmitter battery he had.

While all this happening Evan's daughter, Klieg, called us and pointed out that a Martial Eagle (+/- 2 meter wing span) had joined Evan's Tsotsi and Immediately, and like one man, Izak and I rushed to get our cameras. This was surprise number three for the weekend and perhaps the best as we do not always get to see them.

I managed to get some shots and so did Izak. The action happens very fast and there is no second chance for a reshoot. Never the less, these encounters will always thrill us as for the beauty, power and grace these majestic birds have.

I managed to get a flight in with my E-Slope Mini-Pulse and shortly afterwards we departed for home with another, but not so usual, slope trip behind us.



Izak Theron

The 2011 Toledo Show

Pete Carr WW3O, wb3bqo@yahoo.com

The Toledo Show opened on Friday, April 1st at the Seagate Convention Center in downtown Toledo, Ohio.

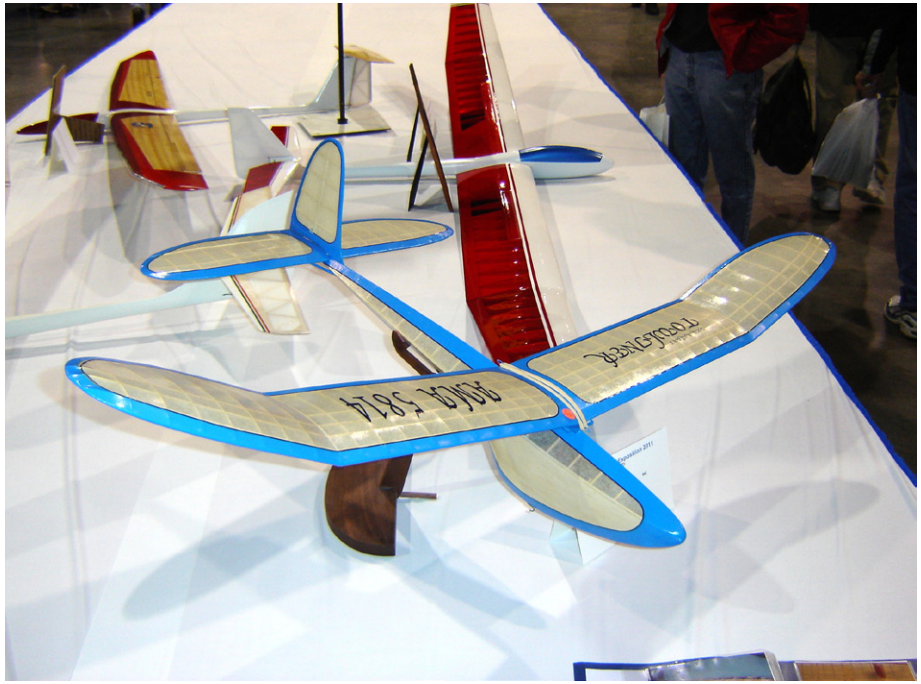
Although I wasn't looking for any special stuff, the Show always has the roll-out of the latest and greatest stuff and this year was no different. And, as in past years, there would be a meeting of the MicroStar 2000 transmitter encoder group on Saturday morning.

My son, Jeff, AE1O, was already in town so we arrived for the opening bell on Friday. The display models to be judged were of excellent craftsmanship but relatively few in number.

Jeff thought that, since the judging wasn't until Saturday afternoon and the prize presentations on Sunday, that the rest of the entries might be late in arriving. This didn't prove to be the case as, for example, there were only four sailplanes displayed at the Show.

The long tables that extend down the center of the main floor were rather empty. There were some very large scale aircraft such as a 12 foot span Fokker biplane. It was possible to spread these ships out for better viewing (and pictures) which made them even more impressive. The craftsmanship was the usual for Toledo, first rate, and they were all a joy to see.

There were only four sailplanes displayed and one was a free-flight design called a Towliner with tissue covering. There were also a Sagitta 900 and an Aquila Grande that were beautifully built. The last sailplane looked like a mix of Vladimir wings with a custom fuselage and T-tail. It was nice to see the highly varnished veneer wings with the fiberglass fuselage.



The Towliner sailplane with superb tissue covering. It appeared to be two-channel control although there was no radio gear displayed with it.

This ship is a hybrid with wings that looked like they were originally from a Vladimir's Model sailplane and nicely matched up to a T-tail fuselage. The finish on the veneer was wonderful.

Along the way I spotted an old Bramco transmitter with a single stick in a remote housing.

At the dawn of my modeling career, as a teenager in Buffalo NY, I saw several ground based transmitters that used 27 megacycles and had a cable-connected controller with buttons. The ones I remember were only single channel control where this Bramco was four channels. At the risk of being thrown out of the place I, very carefully, picked up the single stick and was amazed to find that it was a custom made gimbal assembly. The builder took considerable time and skill to produce that radio and it was worthy of special attention.

Jeff and I passed the Skip Miller booth that was very crowded every day of the show. Cody Remington was also at the booth answering questions and obviously enjoying the attention. He's a very nice young man and a super pilot. The sailplanes displayed above the booth were a usual mix of F3J and F3B models with incredibly small fuselages and flawless finishes. I didn't note any prices for these items, but can imagine that they were well north of a thousand dollars each.

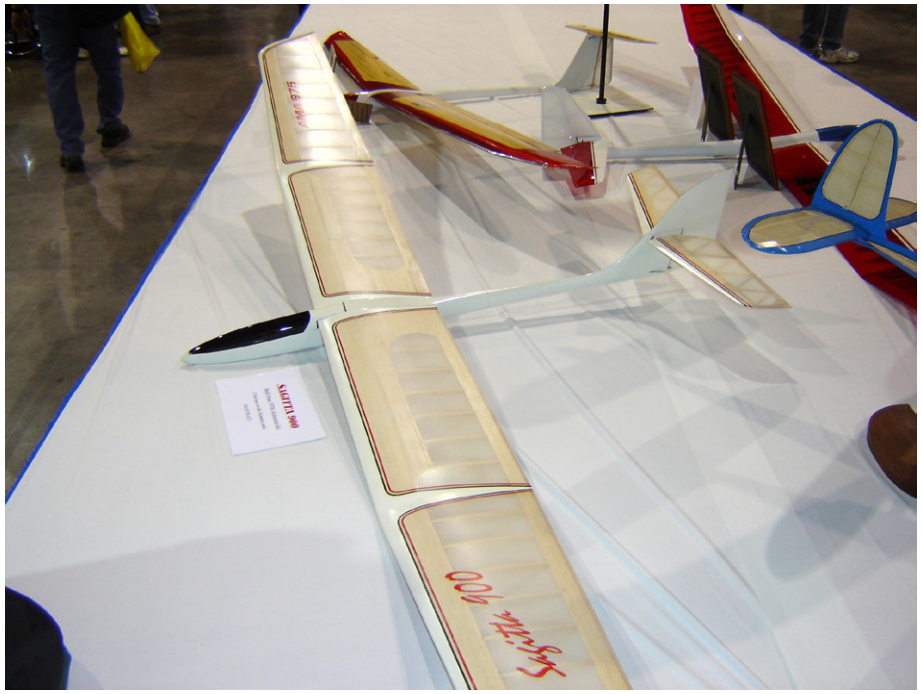
As we passed the booth for the Model Aeronautics Association of Canada (MAAC) we met Stan Shaw. Stan had been a MAAC Zone Director and an active sailplane competitor back in the

'70s and '80s when Jeff and I flew with our northern neighbors. Stan didn't look any different from back then, although he remembered Jeff as quite a bit smaller! Stan and the guys who populated the glider clubs of southern and central Ontario always treated us to a good time and the flying sites were amazing. It was terrific to chat with Stan and to remember those great times of long ago.

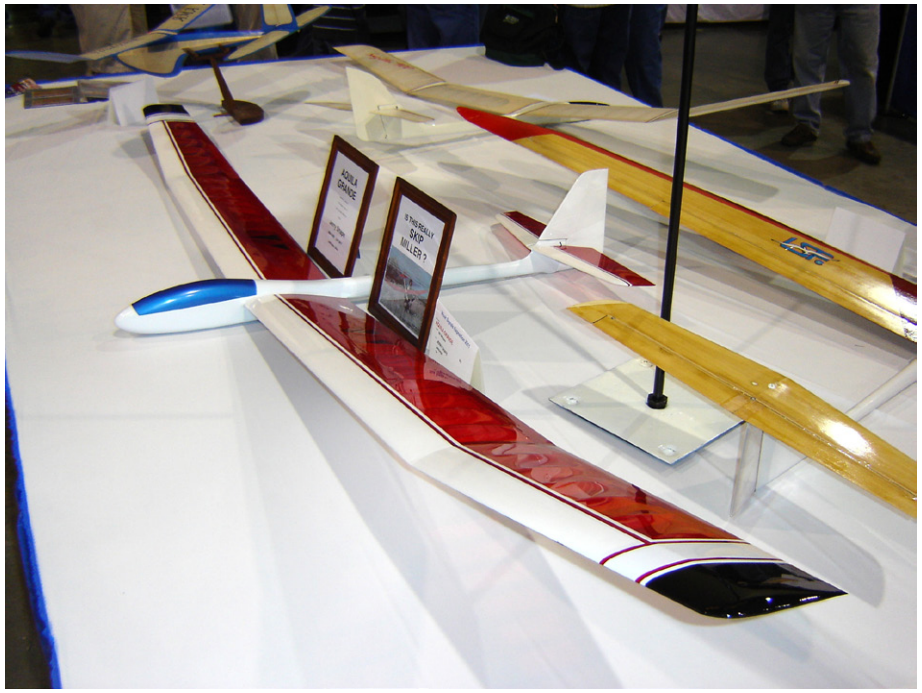
Mountain Models also had a booth at the Show so we stopped by to talk with Tom. The winter project of two years ago was a Mountain Models Scepter sailplane that is still on active duty with my squadron. Tom and I talked about the airfoil and he mentioned that it was chosen to handle the windy weather of Colorado. There's no doubt that the Scepter penetrates very well in a breeze but it suffers a little in light air. I told Tom that I was very pleased at its performance and would enjoy a larger version where flaps and ailerons could be added. We will see if he takes the heavy hint!

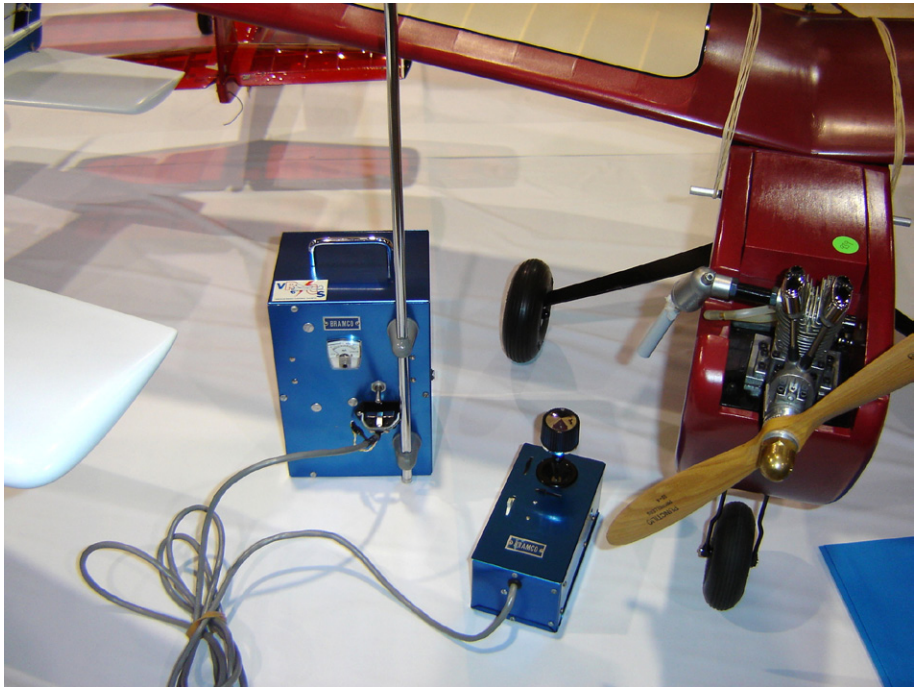
I did have a nice chat with Dave at the Winged Shadow Systems booth. We discussed the delay in the reporting of lift by the Thermal Scout. Dave mentioned that there is some improvement to the programming of the chip on the Scout and that it would be coming along shortly. He promised to send the details to me so that I could try them in a sailplane during the season. The thermal

A Sagitta 900 sailplane with silk covering. This ship was meticulously finished and was my personal favorite.



The Aquila Grande was a variation of the 100 inch Aquila that was so popular during the '70s and '80s. When cross country flying became part of the LSF Achievement tasks these larger sailplanes were used because they could carry larger batteries and thermal sensors. This example makes the wood fuselage look like it was molded fiberglass.





The Bramco transmitter with its single stick modification. It controlled that very nice aircraft with the 4-stroke engine next to it.

Skip Miller had a very large booth at the Show with all sorts of molded sailplanes hanging above. Some were offered for sale but no prices were shown on the cards attached to them.

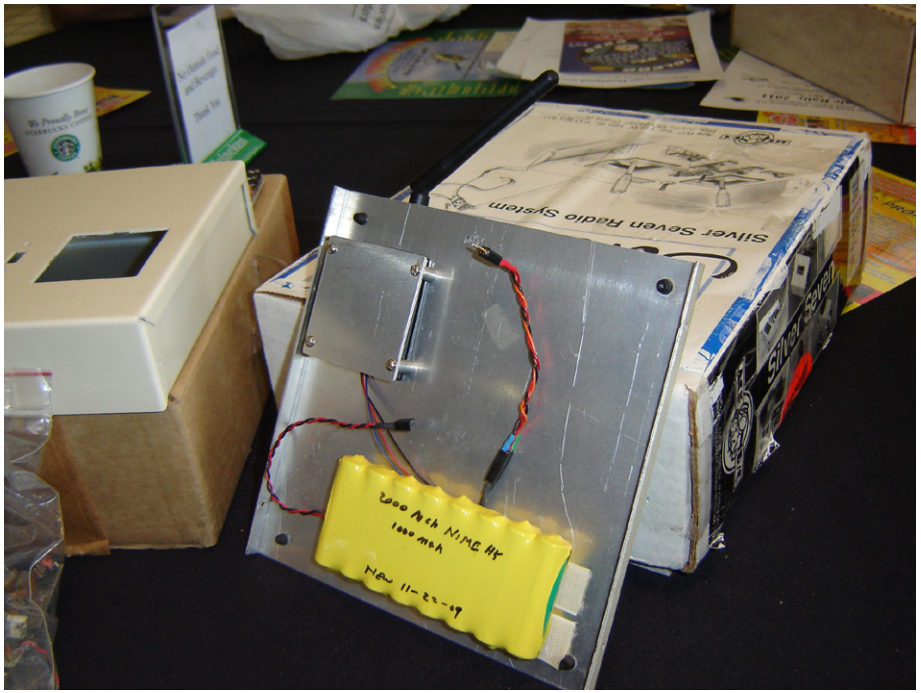
Cody Remington spent a lot of time talking to the sailplane pilots who stopped at the booth. No doubt they were looking for advice on how to match his skills!

Tom at Winged Shadow Systems had some interesting news about the Thermal Scout. The programmed delay in lift indication may be going away. Tom also mentioned some other advancements and will send them along when they are complete.

The Hitec booth had a display of telemetry modules for their radios. Much of the equipment was for monitoring gas or electric motors but they had a GPS unit that measures position and speed. Their web page has considerable details about each item.

The actual sensors are small and feed data to the aircraft receiver through the HPP-22 interface. The interface collects the data and presents it to the downlink.

Carl Luft, in the gray jacket, discusses the finer points of single stick transmitters. The table was littered with radios, all with the backs removed to show the fine workmanship.



*The rear panel of a MicroPro/ M*2K transmitter has the battery and 2.4 GHz RF module attached to it. With all the plastic radios in use today it's nice to see aluminum cases still used.*

Scout is one of two very interesting products for telemetry that were at the show.

The other telemetry product was actually a line of sensors that connect to the Hitec receiver and are displayed on a device as a add-on to their transmitter. Many of the sensors deal with engine or motor readouts for powered aircraft but the one that interested me was the GPS.

Jeff had mentioned that a sailplane had crashed in the bean field just off the sailplane launch area at last years AMA Nats. It came in hard and was not easy to locate. We all have had a ship land off the field and struggled to locate it. Well, this sensor and the downlink would easily solve that problem. For those of you doing the LSF cross country tasks this would be valuable to confirm the distance and also to determine speed over the course. Most of us have used Hitec servos and had excellent results so their line of radios warrants a closer look.

There is a group of modelers that build their own transmitters. The core of this effort is an encoder called the MicroStar 2000 that integrates all the controls of a transmitter into a data stream for transmission to the aircraft receiver. A gentleman by the name of Gordon Anderson produced the Version 1.0 encoder about 12 years ago as a kit and started a revolution in the sport. The core of the unit is a chip that is programmed to accept inputs from the

various sticks, sliders and switches and produces a stream of information that the RF deck can send to the sailplane. Over the years the programmed chip has been revised and expanded to offer such improvements as larger model memory and dual elevator servo control.

Yahoo Groups hosts a forum of people who are building and using these radios and the information exchange is fascinating. Lately, the move is to 2.4 GHz RF link where the older 72 and 50/53 MHz RF modules are being replaced by 2.4 GHz equipment. The M*2K encoder doesn't care what RF link is used so there is considerable creativity in the transmitter installation of this gear.

Saturday morning at 10 AM a few of the Yahoo Group showed up at the coffee tables for a face-to-face meeting. This was to show off the latest examples of their work as well as to meet the "listers"and "lurkers" of the Group in person.

Dan Thompson, the moderator of the Group, was sidelined due to health issues but someone called him on a cell phone and then passed it around so everyone could say howdy and wish him a speedy recovery.

Then the discussion returned to issues of RF getting into the encoder and such troubles. One transmitter that was passed around sported both a 2.4 GHz antenna and a 72 MHz antenna. The short antenna pivots at its base so is a poor flagpole for a streamer. We all joked that the 72 MHz antenna would work well for that! It was decided that the arrangement would allow the pilot to fly both bands with the same transmitter.

Carl Luft of Eastern Pennsylvania is a regular at the Cumberland MD slope events and mentioned that they held a Spring Meet in March that was a big success. There was a lot of aerotow and it's turning into a clone of the legendary November meet at Old Knobbly Hill. The event is very well attended and the use of 2.4 GHz radios has allowed more planes in the air at the same time for an awesome flying experience.

While the number of sailplanes displayed this year was disappointing there was plenty for the glider pilot to discover. ARF planes continue to dominate the market with laser cutting of parts that are amazing. The radio technology continues to improve with added features, easier programming and new accessories.

It was well worth the trip.

Resources:

Hitec Multiplex RC electronics:
<http://www.multiplexusa.com>

Model Aeronautics Association of Canada:
<http://www.MAAC.ca>

Winged Shadow Systems:
<http://www.wingedshadow.com>

Mountain Models by Laser Arts:
<http://www.mountain models.com>

The MicroStar 2000 Group:
<http://www.yahoo.com>, then go to Groups, then M*2K.

Kinetic 100 v2 inducted into Deutsches Museum Technik, Munich

Steven J. Seim, sseim@comcast.net

I have awesome news. The Kinetic 100 version 2 has been inducted into the Deutsches Museum Technik in Munich for permanent display and preservation. The Deutsches is the most prestigious science/technical museum on the planet.

I got the news from Spencer Lisenby, the person that commissioned the model designed, drawn and rapid prototyped, and who also served as the structural engineer. Dirk Pflug; the engineer that supplied the airfoil sections is the person that made all the arrangements. We three will have mentions, and there will be some narrative that talks to/about dynamic soaring. This is very awesome and cool.

The current acknowledged record speed for the model is 468 mph (real, not scale). 500 mph is not far away for it at all. In fact I think it will top out in the 520 mph range.

The story behind the model as well as its performance rates museum level acceptance and recognition, no question.

Spencer Lisenby at Weldon with a high visibility fluorescent orange Czech built 100" Kinetic DP.

It's a powerful and very real lesson in what happens when one person fixes a goal in their mind, then works to collect that beyond their own immediate people circles, knowledge, skills and tools available to get it done, all the while trusting that the people called on would naturally do their very best.

This is a very high honor, world class recognition of a great story as well as a great model airplane.

<http://dskinetic.com/k100.aspx>

Louisville Area Soaring Society
Summer 2011 Two Channel Contest Series

The Louisville Area Soaring Society will hold its annual "2 Channel" soaring contest series at our home field, Charlie Vettiner Park in Louisville Kentucky. The concept of the contest is to foster and welcome participation by anyone at any level of soaring capability and to provide a starting point to any soaring pilot who wishes to participate in larger contests or the achievement of League of Silent Flight tasks. Any sailplane may be used, but only TWO functions are allowed. Please come out and join us!

Contests will be Simple Duration, Seeded Man on Man

There will be 3-5 rounds of 7- 12 minutes duration per contest to be determined by weather and the contest director, there will be a minimum of 3 scoring rounds to qualify as an LSF contest.
First round group placement will be by random selection and number of launch stations. Subsequent group placement will be seeded Man on Man by score.
If the pilot succeeds in achieving the maximum time in the round, an additional 2 minutes will be allowed, without further flight score, to land the model. Flight beyond the 2 minute landing allowance voids the flight for flight score. Warm-up and test flights will be allowed before contest and between rounds if the field is clear. Normally start gathering at about 11:00. Pilots meeting will be at **12:00.**

Scoring

Scores will be simple duration, 1 point per second, then the landing scores added. The scoring for all rounds will be normalized to 1000 points for each group (i.e. there will be 2 or more flight groups per round, each flight group is normalized by only the pilots scores in their flight group).

Landings

Landings will be scored with the club's 100 point landing tapes.
If aircraft lands inverted or sheds parts during the landing the pilot receives a zero landing score.
Off field landing voids the flight score.

Launching Equipment

Club will supply launching equipment. Electrics are allowed with launches limited to high start altitude determined by timer or CD or altitude motor cut-off. Any further run of the motor disqualifies the flight. ONE re-launch per pilot per contest.

Dates

There will be 5 contest dates. May 1st, June 5th, July 3rd, August 7th, September 18th.

Entry Fee

An entry fee of $3.00 per pilot will be collected.

Prizes

Any donations of items will be given out as prizes at the final contest.

Website

http://louisvillesoaring.org/

Full size plans from Bruce Abell

It is with great pleasure that *RC Soaring Digest* announces the availability of full size plans for several of the models mentioned in Bruce Abell's "A Design Philosophy," published in the February 2011 issue.

Digitized plans for the two meter Scimitar and two meter Dragonfly, Dragonfly 120, Dragonfly Electric (68" span) and an optional two meter wing for the Dragonfly Electric are now available for downloading from the *RCSD* web site.

All plans are available in both TIFF (ZIPped) and PDF versions. The following pages include thumbnails of the available plans and the relevant URLs for downloading.

Plans for the 120" version of the Scimitar, mentioned in the original article, were published in issue No. 88 of *Airborne*, the Australian aeromodeling magazine, hence the name, "Airborne 88er." Full size plans for that model are available from the Airborne web site <http://www.airbornemagazine.com.au>. The Airborne e-mail address is <airborne@interdomain.net.au>.

Full size plans from Bruce Abell

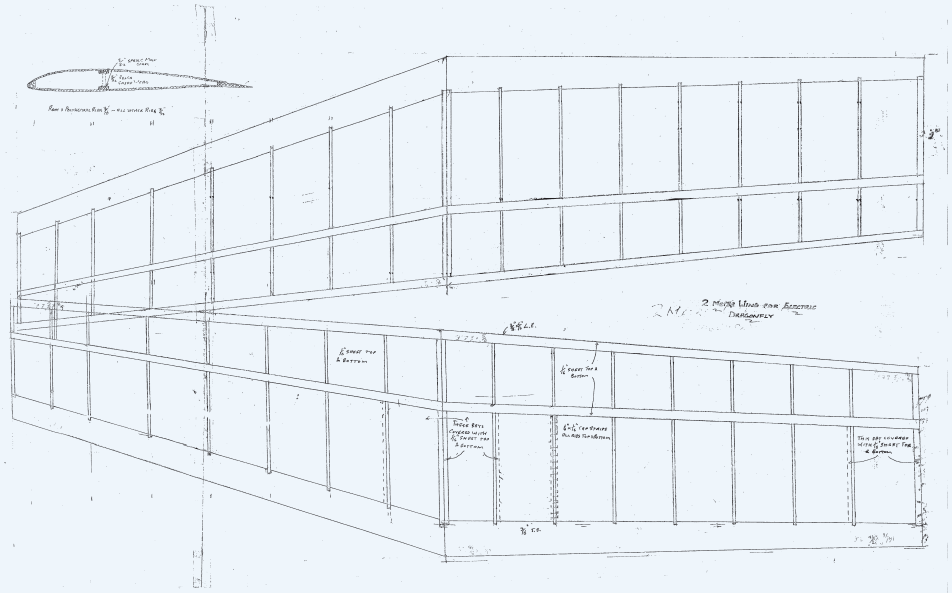
Dragonfly Electric

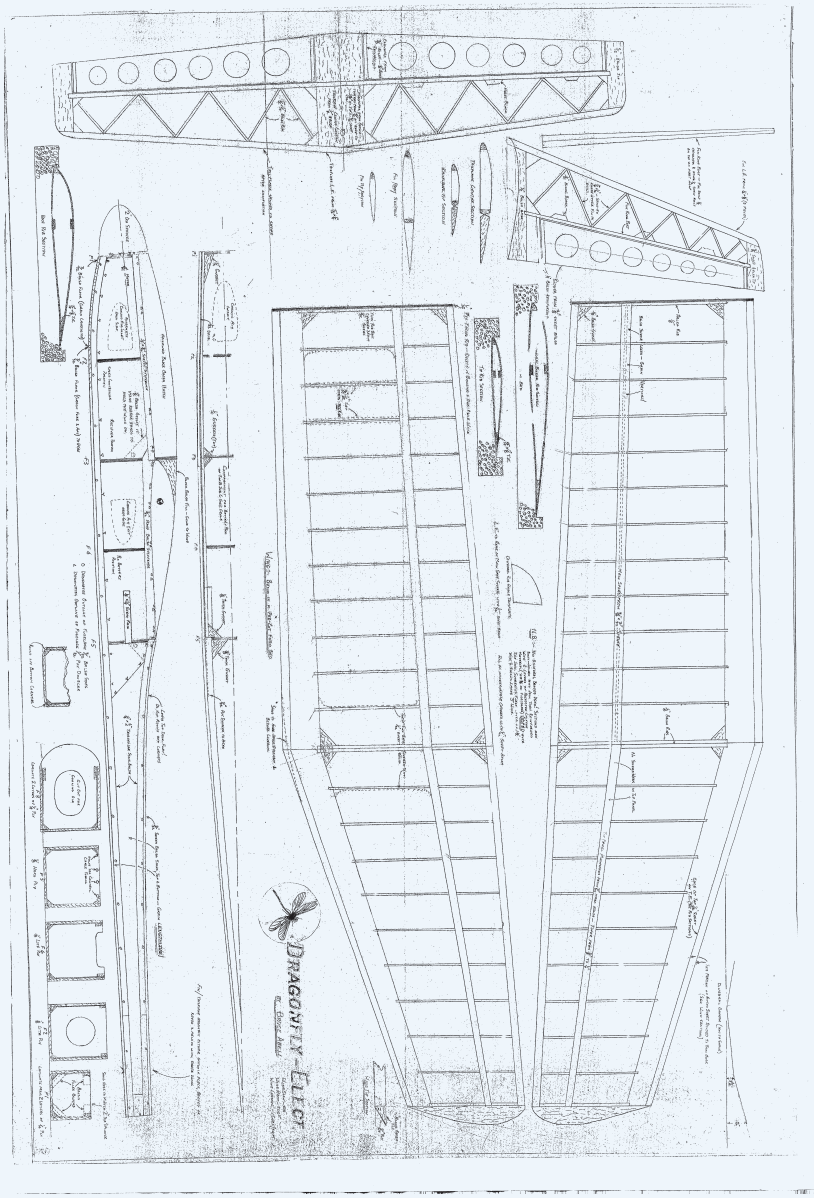
68" span

<http://www.rcsoaringdigest.com/Abell/eDragonfly_68.tiff.zip>
<http://www.rcsoaringdigest.com/Abell/eDragonfly_68.pdf>

Optional 2m span wing

<http://www.rcsoaringdigest.com/Abell/eDragonfly_2m_wing.tiff.zip>
<http://www.rcsoaringdigest.com/Abell/eDragonfly_2m_wing.pdf>

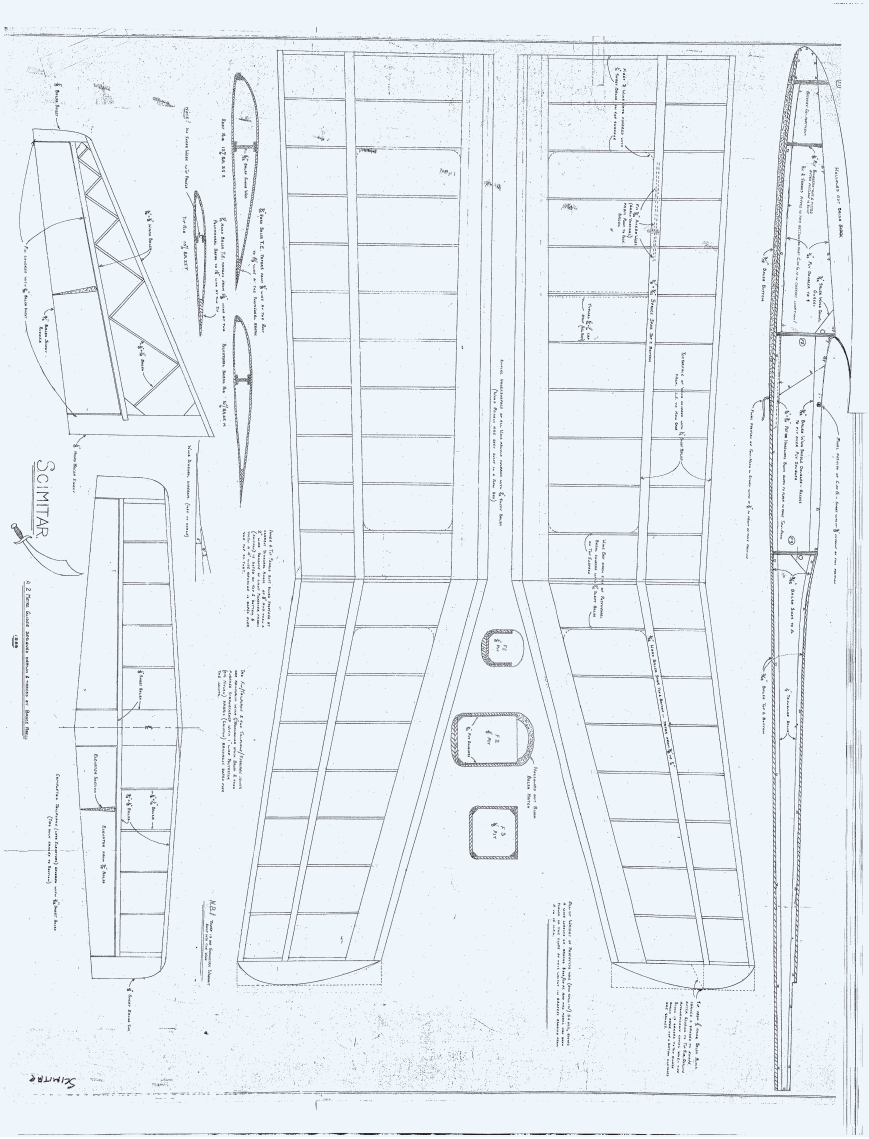




Full size plans from Bruce Abell

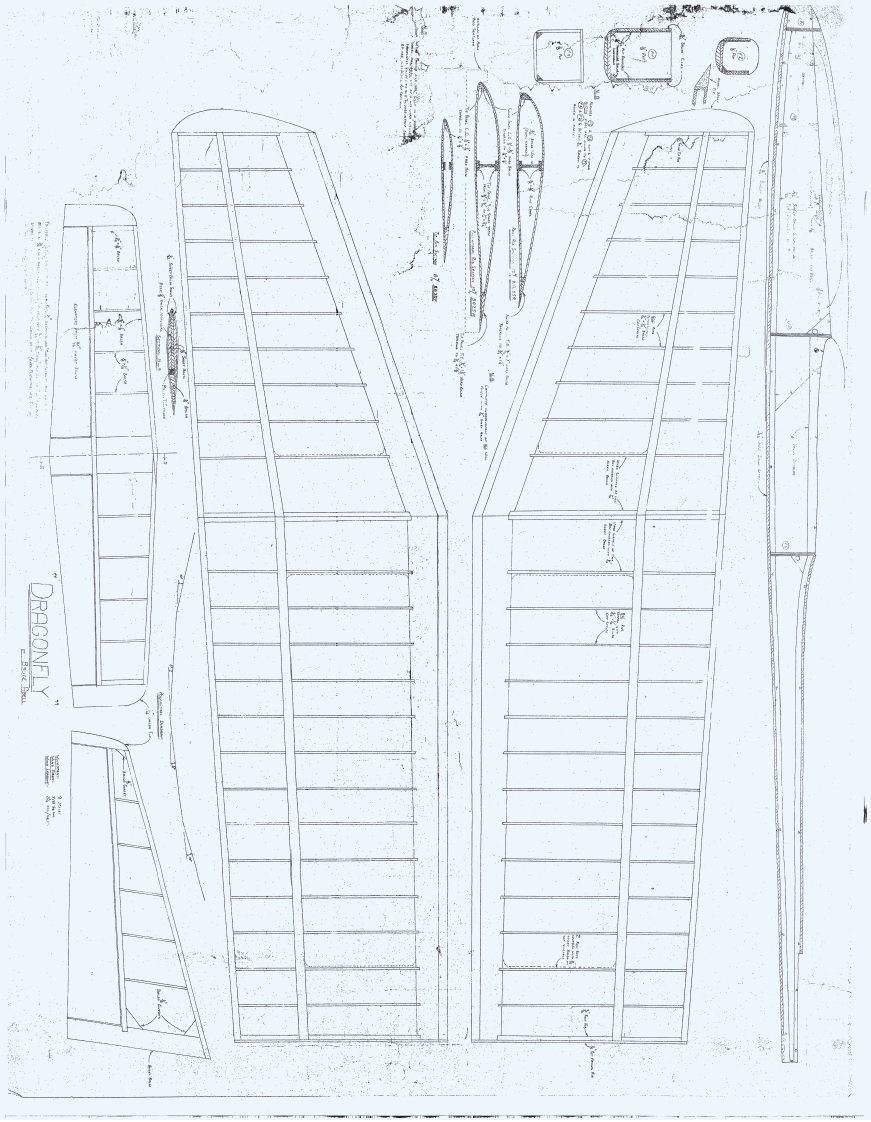
Scimitar 2m

<http://www.rcsoaringdigest.com/Abell/Scimitar_2m.tiff.zip>
<http://www.rcsoaringdigest.com/Abell/Scimitar_2m.pdf>



Dragonfly 2m

<http://www.rcsoaringdigest.com/Abell/Dragonfly_2m.tiff.zip>
<http://www.rcsoaringdigest.com/Abell/Dragonfly_2m.pdf>



Full size plans from Bruce Abell

Dragonfly 120

<http://www.rcsoaringdigest.com/Abell/Dragonfly_120.tiff.zip>
<http://www.rcsoaringdigest.com/Abell/Dragonfly_120.pdf>