R/C Soaring DIGEST

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THE RUBBER DUCK

Photos courtesy of Brett Jaffee. His review of The Birdworks' Rubber Duck is on page 6.

Russ Kegler launches the Rubber Duck.

R/C SOARING DIGEST

A Publication
for the R/C Sailplane Enthusiast!

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The Soaring Site

By now most of you will have noted the format change in *RCSD*. Right? Well, we hope you like it! It started back with the December, 1994 issue when we changed printers. That's when we found ourselves faced with going completely electronic or paying a 25% increase in printing costs. Not much of a choice here. We went electronic.

The discussions that ensued between that little person behind the screen and the human brain that demands total submission are unrepeatable. At one point, our new printer, Sam, suggested that we apply a more subtle technique and use a mallet (sponge, of course). Wouldn't you just know that the latest copy of our favorite computer supplies catalog didn't carry one! (Must have been another little person at work...) Anyway, we muddled through.

Well, we're humming along now, and see what appears to be an endless array of format opportunities to play with, time being the only factor, but the material is still the same. It's written by you, the readers. Thanks for your support and caring about the hobby.

What's New?

Well, we're sponsoring an Entry Level Design (ELD) Contest, and the details are included in this issue. If any of you want the ELD brochure that we handed out at the Mid-South Soaring Championships, please let us know. And speaking of the Mid-South, the event went quite well. Congratulations to all the participants and volunteers! Kendall McDonald took high overall championship honors for the thermal duration event over the two days. The details of the event will be included in a future issue.

Happy Flying!
Jer & Judy

(L - R) Jeremy Bechtel, Brendan Williams (Front), Prema Trettin, Erin Lancaster, Seth Brookman, Kate Caniglia, DaQuaan Carter, Peter Sheridar, Kurt Drstvensek

Radio Controlled Airplanes, CBL's and Physics

...by Jim Ealy
Hightstown, New Jersey

This year, 25 teenagers from The Peddie School, a private boarding school near Princeton, New Jersey will have an opportunity to learn to build and to fly model gliders. I was awarded a $10,000 grant by the Toyota Corporation and the National Science Teacher Association to help pay for the cost of providing some of the needed supplies to my physics students. The grant money will be used to purchase the Calculator Based Laboratory devices, TI82 graphing calculators, desktop computer, radios, glider kits and airfoil/design software. Much time will be spent teaching the students how to fly with good, solid stable gliders, such as the Olympic II. Certainly, not all will or want to learn to build or fly, and they will have other responsibilities.

The CBL collects data from probes, and these probes are usually of an electrical resistance type. The CBL collects the data at specific time intervals. For comparing flap defection and altitude gained, we might collect data every 0.1 of a second. When we are comparing airfoils, we may only collect data every 10 seconds. Some of the probes the students will use at the beginning of the research are: barometric pressure (altitude), accelerometer, (changes in direction), and velocity.

After the data is collected, it can be downloaded into a Texas Instruments graphing calculator, the TI82 or 85. These data can then be graphed on the TI82 and it can also be entered and manipulated on a desk top computer, as well. One of the first student attempts at research will most likely involve a simple cause and effect relationship, such as flaps Vs height gained during launch. The students will be able to compare the effects of different flap deflections and altitude gained. These data will be graphed to show time (from beginning of launch) Vs altitude gained at a specific flap deflection. This would necessarily be done many times to average the external effects of launching, wind conditions and atmospheric conditions. If we compare several dozens launches at the same (as similar as possible) sets of external conditions, we will be able to make some comments about the relationships between variables.

One of the most important considerations for this project is the student involvement. The students will engineer the mechanical aspects of the testing, as well as selecting the variables and conditions to be evaluated. They will design and build the mechanics for attaching the probes to the flying surfaces. In many instances, many tests will have to be done just to see if we are collecting the data we think we are collecting. Most experimental research time is involved in just getting ready to do the experiment.

With a force probe, we will be able to tell very easily how much drag is produced with any number of stab sections. One of the easiest experiments, would be to use different thickness of stab sections and measure the induced drag generated at various velocities. These are just a few of the very simple but important experiments that we can conduct with a minimum of time and effort.

One of the most exciting aspects for the students is the actual flying. I wonder why? I have taught several dozen school students over the last 15 years how to fly and I know just how difficult and frustrating it can be. However, the testing does not rely on all students learning how to fly. If we have only a few who can fly well, then they can collect the data for the "engineers".

We will purchase several large body scale fuselages and a set of wings with a specific airfoil. We will then use this wing plan and vacuum bag several sets of identical wings with different airfoils. We then can collect the same data for several different airfoils on the same platform. This will be one way to arrive at some sound statements about airfoils, or launch height and flap deflection. Likewise the optimum size of the flaps can be a very simple, but important experiment for the students to investigate.

As we begin the experiments, the direction that this research takes will be very interesting and to a great extent unexpected. It would be very nice if these experimental methods became the industry standard. This would allow the consumer to tell at a glance if the stated claims are really valid. I am hoping that some of these student researchers will come up with a way to strip down a CBL, so that it will fit inside the small 2 inch diameter fuselages. This would give us access to data for the more common high performance ships and allow a rigorous comparison.

We will also use the airfoil and design software programs that are already on the market. We will be able to see if some of the predictions made by these programs for specific airfoils/airplane/platforms are really valid. As this project gets underway next fall, we will send to Jerry, updates for *RCSD*. If, in the mean time, anyone is interested, we can be contacted through the Internet. The Peddie School has a Home Page on the World Wide Web with all the students and faculty addresses. I can be contacted at "jimealy@peddie.k12.nj.us" on the internet. ■

This is a novel, innovative use of technology and, as Jim says, "This little device would be an ideal set-up for clubs or manufacturers." Neat idea, Jim, and we will be looking forward to hearing about the results! ED. ■

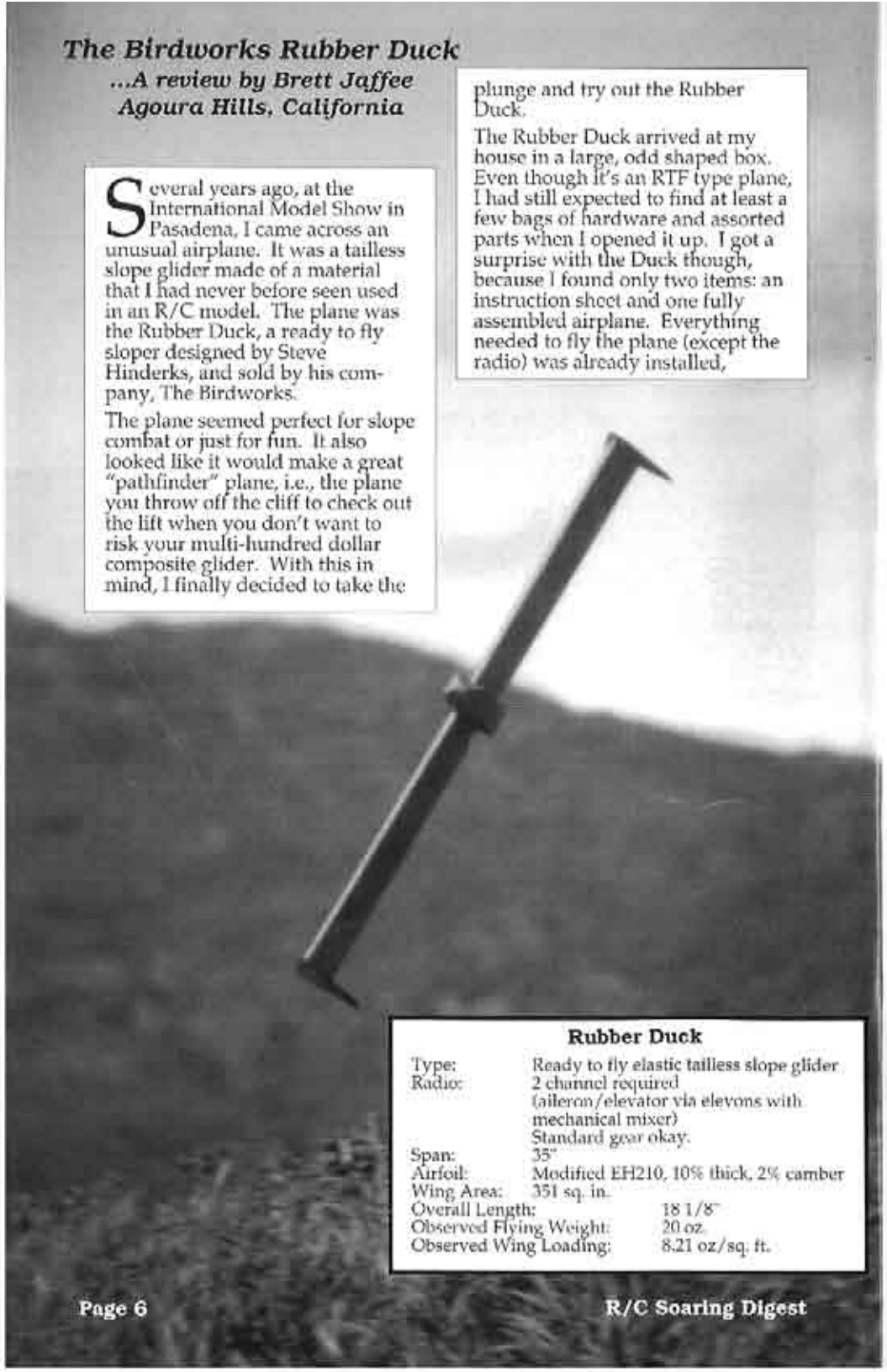
The Birdworks Rubber Duck

...A review by Brett Jaffee
Agoura Hills, California

Several years ago, at the International Model Show in Pasadena, I came across an unusual airplane. It was a tailless slope glider made of a material that I had never before seen used in an R/C model. The plane was the Rubber Duck, a ready to fly sloper designed by Steve Hinderks, and sold by his company, The Birdworks.

The plane seemed perfect for slope combat or just for fun. It also looked like it would make a great "pathfinder" plane, i.e., the plane you throw off the cliff to check out the lift when you don't want to risk your multi-hundred dollar composite glider. With this in mind, I finally decided to take the plunge and try out the Rubber Duck.

The Rubber Duck arrived at my house in a large, odd shaped box. Even though it's an RTF type plane, I had still expected to find at least a few bags of hardware and assorted parts when I opened it up. I got a surprise with the Duck though, because I found only two items: an instruction sheet and one fully assembled airplane. Everything needed to fly the plane (except the radio) was already installed,



Rubber Duck

Type:	Ready to fly elastic tailless slope glider
Radio:	2 channel required (aileron/elevator via elevons with mechanical mixer) Standard gear okay.
Span:	35"
Airfoil:	Modified EH210, 10% thick, 2% camber
Wing Area:	351 sq. in.
Overall Length:	18 1/8"
Observed Flying Weight:	20 oz.
Observed Wing Loading:	8.21 oz/sq. ft.

including the control horns, push rods and clevises. The Rubber Duck is 99% ready to go. All that's needed to get it flying is to push your radio parts in place and hook up three clevises.

My first impression of the plane was that it appeared to be very well made. The foam wings were immaculate, with a smooth, even surface and no warps or other imperfections. The foam was firm and resilient, almost like that used in Nerf footballs, but denser. The installed balsa elevons were fitted perfectly to the wing and hinged at the top with fiberglass filament packing tape. The black triangular fin plates which capped the wing tips were made of a different type of foam than the wing, but they were also tough, yet flexible. Their trailing edges were capped with tapered balsa. Made from yet another type of foam, the stubby gray fuselage seemed a bit softer then the other components. It had holes pre-cut for the servos, elevator, and battery.

Radio Installation

The two pre-cut servo holes in the fuse are sized for standard servos, which simply press in place. Small holes have been provided between all the radio equipment cut-outs to allow the servo leads to be routed through the fuselage.

Located up front is the pre-cut battery bay, which will hold a 500 mAh square pack tightly. Steve recommends gluing the battery in with either hot glue or contact cement in order to add strength to the forward fuselage.

The receiver cut-out appeared to be sized for the typical seven channel FM unit. Since I was using a Futaba four channel AM receiver, the hole was much too large. In order to get a good fit, I cut up a piece of the discarded foam plug material that had been in the radio holes when the plane came out of the box. This gave the receiver a tight and secure fit. A nyrod, which I tack glued to the side of the fuselage, was used to allow the antenna to trail out beyond the elevons.

Once the radio is in, it's a simple matter of connecting the servos to the push rods. The push rods control the elevons via a mechanical mixer, which comes already installed. The mixer consists of a couple of brass parts that link the elevon horns and push rods. It is simple and elegant, and worked flawlessly the very first time it was connected.

The instructions are somewhat vague about control throws. They simply state to use a small servo arm for novices, or a big arm for experts. Feeling fairly confident, I choose the biggest servos arms that I could find. Next, I set the elevons with a bit of reflex, as is indicated in the instructions. This is set by placing a straight-edge across the top of the wing and measuring the gap between it and the hinge line.

With everything in place, I checked the balance. The CG is located 1 3/8 to 1 3/4 inches behind the leading edge. My plane balanced towards the rear of this range, with no additional weighting required. Final flying weight was 20 ounces.

For finishing the plane, there is the option of reinforcing the fuselage by wrapping it from the nose to the leading edge of the wing with electrical or cloth tape. For the initial flights, at least, I chose not to do this. The wing can also be painted, if desired, with enamel or epoxy paint.

Flying

The first trim flights were made at our local hill, which has a steep grass and brush covered face that rises approximately 150 feet from the ground below. Upon arrival at the slope, we found that we had zero wind, so the Duck was taken to the top of the hill and simply heaved off. I wasn't sure what to expect, having never flown a tailless airplane before. The Duck held no surprises, though, as it glided easily down the ridge, with the controls being responsive, even at slow speed.

The wind did eventually pick up, but lift conditions were less then ideal. I estimated the wind speed at about five mph, with the slope lift being relatively weak. During these flights, I noted that the Duck needed absolutely no aileron trim changes, however it was taking increasing amounts of elevator trim to remain airborne. The glider would continue to descend, and after a

few turns in the pattern, I would be forced to land on the face of the hill.

Eventually, the wind picked up to ten to fifteen mph, and the Duck began to feel more in its element. I was now able to easily keep the plane in the pattern. In flight, as on the ground, the Rubber Duck is a unique-looking airplane. Everyone seems to have an opinion about what it looks like. One

friend said it looked like a space ship or U.F.O., while another commented that it resembled a flying TV dinner tray. Personally, I think it looks like the nose from an IndyCar. It certainly doesn't resemble anything else you are likely to see on the slope.

Despite having no dihedral, I found the plane stable and easy to fly. Stalls are gentle, and the plane tends to mush forward without falling to either side. It also seemed very resistant to tip stalling. One of the things I found interesting is that the Duck will begin to bob its nose up and down before the onset of a stall. The plane does not like to be given large elevator inputs, especially at lower speeds. A "bank and yank" type turn will result in a few pitch oscillations before the plane loses most of its speed and sort of skids around the corner. Keeping the elevator movements small, smooth, and progressive is necessary to get tight turns when flying slow, though this isn't as critical when the Duck is going faster. Despite this it is very easy to fly the Duck though a tight pattern. In better lift, the Rubber Duck will carve through the turns nicely.

One consequence of the Duck's pitch response is that loops can be a bit tricky to do. At first, I found it hard to get the plane through the top of the loop. Often, it would get to the top and stop before getting completely on its back. This would result in the plane somersaulting through the last half, rather then completing a smooth circle. Once I got the hang of using the elevator correctly though, I was able to perform loops properly.

The roll rate is fairly fast, but not blisteringly so. Rolls that the Rubber Duck produces in lighter lift conditions are from axial, needing quite a bit of elevator correction throughout to keep the plane "on a wire". They tighten up as the plane gets some speed going though, and I eventually found myself confidently rolling the plane while flying only inches off the ground.

Inverted flight is possible, but it does take a fair amount of lift to get it to maintain altitude. Quite a bit of down elevator is needed, but the plane is very easy to fly upside-down.

Eventually, I got the opportunity to test the Rubber Duck on a high-wind day. One thing that becomes apparent is that relatively large trim changes are needed for varying conditions. In light wind, quite a bit of reflex is needed in the elevons. As the lift improves, much or all of the up elevator can be neutralized.

The Duck will never break any speed records, but unbalasted, it still moves around at good clip in high wind, and penetration is good as well. When doing a high speed dive, I found that the plane was becoming overly pitch sensitive, as though it were tail heavy. To counter this, I taped a half ounce weight to the nose, which smoothed everything out. This weight was removed when the lift got light, as it tended to make the turns more sluggish at low speeds and increased the amount of up trim needed when the wind started to taper off.

Damage Assessment

The Rubber Duck has held up remarkably well after being put through a great amount of intentional thrashing and abuse. The bottom of the fuselage had some gouges caused by slide-in-the-dirt landings made before it was tape-reinforced. One of the balsa trailing edge fins had broken off early in flight testing but it was easily glued back in place. The surface of the wing got a few small punctures, caused by crashes on sharp twigs, as well as some scratches caused by mid-air collisions. The leading edge did pick up a few

nicks before I taped it, but over all, it held up very well, showing no obvious areas where impacts have occurred. What's interesting is that when the wing gets dented, the foam in the damaged area will often expand back to its original shape after a few hours. Aside from the broken balsa trailing edge fin, the only repair I had to make was a quick one to the wing center and saddle. Early on, it appeared that the seam between the two wing halves had widened a bit, and the wing seemed to be a bit loose on the saddle. This problem also occurred on a Rubber Duck owned by a friend and another one I saw as well. It was quickly fixed with a few dabs of hot glue in the affected areas. (You can use contact cement for repairs, too.) The problem has not reoccurred, despite even more harsh punishment after this repair was made.

Conclusion

The Rubber Duck is an extremely fun little sloper, a real grin machine. In the course of writing this article, I let about a half-dozen people take the controls. Without exception, they said that it was a neat plane to fly, and all commented on how much they were impressed by the unusual construction materials. It is one of the most durable gliders that I have ever flown. This plane laughs at danger and shrugs off crashes, whether they are from mid-air collisions, or dumb-thumbing into the ground. What this does is make the Duck a totally care-free flying machine. It's ideal for the times when you just want to have fun buzzing the slope just inches off the ground, do a little combat with you buddies, or simply relax after flying your expensive, high performance gliders. The ability to absorb mistakes, along with its stability and friendly personality seem to make the plane a good aileron trainer. In fact, I've seen a couple neighborhood kids use it successfully as a first airplane. The Rubber Duck's unusual design is sure to attract attention anywhere it flies, and its small size makes it very portable. In fact, you can just throw it (literally!) into the front seat of your car.

I feel that the Rubber Duck is also a great deal, at $55 (plus shipping). For that price, you get a fun flying airplane that is 100% assembled right out of the box, and can be made ready to fly in less then thirty minutes. It is available with either red or blue wings.

Steve Hinderks, The Birdworks
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■

Combat And Fun....

...by Brett Jaffee

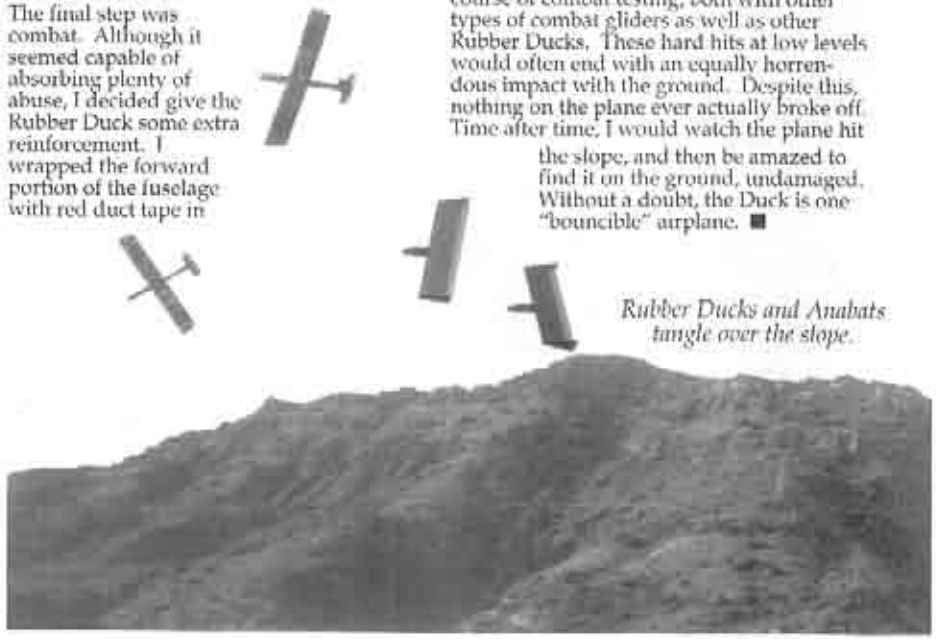
What's the point of having a "bouncible" slope glider if you don't try to bounce it once in a while? With that it mind, my friends and I put the Rubber Duck through the wringer.

The first step involved touch and goes in the brush and some target practice. The Duck excelled at this, and seemed to have the unusual ability to skim through the grass for relatively long periods before pulling up and flying off. Next, an aluminum can was set up on top of a tall, thin branch, and the Duck was given the job of knocking it off. It was very easy to line the plane up to hit the can, though in many cases it ended aiming slightly low and hitting the branch. At one point, the branch knocked it out of control, and the plane cartwheeled into the thick skull of the unsuspecting photographer (me) before tumbling across the ground. There was no damage to either the photographer or the Duck. In a later, slightly more successful attempt, the Duck managed to break the twig in two and send the can hurtling skyward. I was able to snap a picture of this at the instant it happened. The photo showed off the Duck's amazing resiliency. In it, the plane's wing can be seen being heavily deformed as it hits the branch. Despite this, there was no evidence of leading edge damage or deformity on the wing. The plane is truly an "elastic sloper", as the manufacturer claims.

The final step was combat. Although it seemed capable of absorbing plenty of abuse, I decided give the Rubber Duck some extra reinforcement. I wrapped the forward portion of the fuselage with red duct tape in order to prevent the possibility of it being torn in a mid-air or the resulting crash. I also taped the leading edge of the wing. Because the trailing edge of this plane would be totally exposed in the event of a rear-end collision, I felt that it would be a good idea to reinforce this too, so I taped the balsa elevons with two layers of heavy, clear packing tape.

The Duck proved itself to be a durable and tough plane in combat. When hit, it usually simply bounced off the other plane. A hard enough hit would knock the Duck out of control, sending it spinning like the rotor of a helicopter. Often, the Duck would recover and continue to fly while the other plane involved would go spinning into the ground. About the only thing that's really tricky to pull out of is a collision that puts the Duck inverted and at low altitude. One thing I really liked was the Duck's unusual ability to get into the area between the wing and tail of conventionally designed gliders without getting tangled up. Usually when this type of hit occurs at lower speeds, the planes tend to lock together and spiral to the ground in a deadly embrace. (Okay, so maybe it's not all that dramatic, but it looks cool when it happens.) Since the Duck has no tail, it would not lock into the other plane. Instead, the victim would be sent cartwheeling or spinning, while the Duck flew on like nothing had happened.

Although we usually try to avoid them, head-on collisions eventually occur. The Duck took some horrendous head-ons in the course of combat testing, both with other types of combat gliders as well as other Rubber Ducks. These hard hits at low levels would often end with an equally horrendous impact with the ground. Despite this, nothing on the plane ever actually broke off. Time after time, I would watch the plane hit the slope, and then be amazed to find it on the ground, undamaged. Without a doubt, the Duck is one "bouncible" airplane. ■



Rubber Ducks and Anabats tangle over the slope.

Thoughts on the Monthly Club Contests

...by Jonathan Spoer
Agoura Hills, California

One day you go to the mail box and, looking through the mail, say to yourself, "Bill, bill, bill, advertisements, *Model Aviation* news, TOSS newsletter..." Gee, let's back up there; time to open the newsletter. Well, it's just the normal "stuff": the meetings, the news and the contests. They just keep urging you to go to the monthly club contest. You say you'll go to one, but you never do.

One Friday night, you decide that you are going to go to the Sunday contest. What do you do? Well, you go to your work space to see what you have. You see you have one of these, one of those (half of which are not even built), and then decide to pull your old two meter trainer out of the trash. (Why not use it for something like the new trainer or sports plane class?)

The next Saturday, you look over the plane, patch over the holes where the monokote is missing, fix up the broken parts, and finally it all comes together. Later that night, you put the plane on the charger and go to bed. That night you could hardly get to sleep and you have a dream (or a nightmare). You dream of launching that plane, specking out, and thermalling on up there; when it comes to landing, you dream of landing on the exact center. Well, this goes on through all the rounds, and finally your dream comes to a close with you in first place being carried off the field on everyone shoulders.

Then suddenly, "BEEP, BEEP, BEEP, BEEP, BEEP..." The sound comes from your am/fm alarm clock. That morning you feel refreshed. You hop into the shower and then get dressed. You have your usual morning breakfast, still dreaming of a perfect day. You take that last hour to pack all your last minute supplies (tape, glue and such for those occasional crashes, like you really need it, and of course don't forget the stopwatch), and pack the car up. Now, you drive to the field. As you're driving out to the field, you're probably wondering if you charged the batteries fully and wonder if you have your radio. Seeing you have arrived early, you decide to help out the contest director (CD) as much as you can. First though, you put your plane together, get your frequency pin and check the glider's controls. "Heh," you say, seeing your batteries are charged. You hear the CD calls everyone over to pay their entry fee and you whip out the cash. Finally, the contest starts. Meanwhile, you start to think, "What if the wings fold on launch? Where is my timer? Oh yea, I don't have one!" Being too scared to step up to the electric winch, you decide to time for the others. Finally, you say to yourself, "I'm going to do it." You pick up your plane, trembling, and your heart is going a mile a minute. Before you launch, you decide to plan out your flight thinking of the what if's like, "What if I get caught in massive sink (down drafts)?" You put that all behind you, step up to the winch and check for traffic. Seeing that all is clear, you yell, "Launching!" And then you pulse your plane on up into the sky.

You fly to a area of the field and speck out to a high altitude. Meanwhile, you and your timer walk over to the landing tape, keeping twenty-five feet away. Now your "timer" says, "Three minutes left." Then again, "Two minutes left." Thinking to yourself that this is the best day of thermal, you never want to come down, that is until the last minute. You zoom your plane down, and do a few stunts to lose altitude. Your timer says, "Thirty seconds left," realizing you're not even half way to the landing area, yet. Now, you start to set up your landing approach, and out of the blue, "Fifteen seconds left," comes from your timer.

Now, you're on final, and you're all lined up. You try to pull flaps, finding out you don't have any. "Five, four, three, two, one, beep." You nose your plane in. You walk over to your plane and your timer says, "Looks like you got five minutes and two seconds on your flight and a 77 on your landing. Excellent job." You pick up your plane and walk over to the CD's table. Now, you fill out your card for that flight while being filled with pride and joy.

Well, the rest of the day goes on like this, with some flights good and some bad. Finally, the morning contest comes to a close. Everyone goes over to the CD's table and the CD reads out the scores. This is where some of the thrill is. You keep saying to yourself you placed or lost big time. Well, things turn out for the best and you place in the top five. Even though this is not the "Fall Soaring Fest" at Visalia, California, it is still a neat experience to have. Before the winches are packed up, you might just think about launching a few more times and just have as much fun as you can. The point of this is to try to encourage others to come out with that old beat up plane of yours and just for the fun of it. It is neat to fly your first contest or have another contest under your belt. The point of these contests is to just have fun, and not to add stress to your life. So keep thermalling and have fun. ■

Jonathan Spoer is a member of the Thousand Oaks Soaring Society (TOSS) in Southern California. He is a youth involved in soaring, and is still in high school. Thanks for sharing with us, Jonathan! ED. ■

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A Four Chambered Heart

You can have the very best plane, the latest transmitter, and be an ace at the controls, but if your batteries cease to function it's all balsa bits.

A battery pack is comprised of cells. Each cell is 1.2 volts, but they can be of different capacities ranging from 50 milliamperes(ma) to over an amp. The amperes determine the amount of current which can be drawn from the battery pack. A 500ma battery will produce 500ma for one hour. A 800ma battery will produce 800ma for an hour.

Receivers normally require a 4.8 volt battery pack. Transmitter packs are almost exclusively 9.6 volts. The servos are what draw on the battery. Servos driving tight or stiff controls will draw more of a current load; so will servos required for emergency up elevator to pull your plane from a hellish dive. A larger plane like a quarter scale or racer which requires faster control speed will also draw a heavier load and need more juice. Instead of the normal four cell pack, they might need a five cell pack.

Capacity and weight are the first considerations in battery selection. Use as large a battery pack as your plane can take without having to add balance weight to the nose. The battery does dual duty. It is the heartbeat of the receiver and it is the ballast. The larger the battery pack, the greater the capacity. A small hand launch will only be able to take a small battery pack which will have a limited running time. A two meter will be able to take a grand pack and stay in the heavens forever or until you are ready to perish of thirst.

The second consideration is to pick a battery capacity which matches your flying time. If you fly out your batteries, you will not have to concern yourself about cycling them, just about setting the timer on your watch to remind you to bring your plane to earth thus avoiding the recycling process.

A plane like my little hand launch uses a 4.8 volt battery pack which is made of four 1.2 volt, 150ma cells. They will drive my two servos for one half hour. So, if by the luck of the Irish, I haven't crashed in half hour it's time for me to test my instructor's mettle and land. After the impact is a good time to check the batteries with an analog expanded scale voltmeter(esv). The needle movement will indicate broken wires. I can also see if the batteries have been discharged. Then, I get a chance to unkink my neck and put on more sunblock. The plane can either have a battery transplant or be recharged.

The disadvantage of the small packs is that you must have a charger capable of charging the small packs with enough current to charge them fast, but not so much that they overheat or degrade.

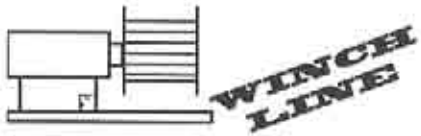
If you are flying with a large pack which does not fully discharge, it is a good idea to put it on a battery cycler and discharge it occasionally.

Nickel Cadmium is the battery of choice. They can be both charged and discharged quickly without damage. There are different types of Nickel Cadmium cells with both high and low discharge rates.

One of the major battery problems is broken wires in the battery packs. Loss of control is the deadly symptom. If you start to lose control, check the transmitter radio frequency meter. If it reads zilch you have a ray of hope and a glimmer of a chance. You can switch the transmitter off momentarily and the cells will bounce back. Switch it back on and make a quick command to level the plane and direct it homeward. Switch the transmitter off again and let the batteries bounce back again. Judicious use of the controls can actually get the plane down in one piece. It only requires skill and luck; or is that luck and skill?

On the other hand, if the problem is with the receiver pack in the plane, your only recourse is to stop all controls and hope that the pack will come back enough for one last control.

Batteries are particular creatures. First, you must be very particular and purchase the ones with the right stuff. Secondly, you must be treat them in the particular manner they require. ■



Gordon Jones, 214 Sunflower Drive,
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UIUC Update

The following is a synopses of the wind tunnel testing that has taken place so far. This information was compiled from Program Bulletin No. 2 and discussions with Jim Guglielmo.

The first phase of the Low Speed Airfoil Tests have been completed with over 300 hours of wind tunnel test time logged and over 80 MB of data accumulated. Airfoil performance data was gathered on over 30 airfoils for free flight, sailplanes, sport planes (power), and more.

All of the results will be published in an upcoming volume of SoarTech, which has just been completed and should be available in early August. It will be approximately 300+ pages and has been put together in a slightly different format from SoarTech 8.

It will provide more data with velocity distribution and computational results being included. The airfoils will have a set of remarks concerning the airfoil, followed by the polars and drag/lift data. Coordinates and table data will be included; and all of the data for a particular airfoil will now be in one location as opposed to the several locations found in the SoarTech 8 format. Yes, they are listening to your comments.

In addition, a disk will be available, through SoarTech, with all the data in IBM and Mac formats. The disk will also include all drag values computed during the tests. With the additional airfoil types this will provide for some interesting viewing as you will really be able to compare a sailplane airfoil against free flight and some of the Quickie 500 type airfoils. Might make for interesting viewing.

Besides taking performance measurements for use in the design codes, detailed wake measurements were taken to document the peculiar airfoil wake behavior at low Reynolds numbers. These tests will be used to help determine the importance of the model leading edge accuracy. Expect the conclusions to be surprising.

The next phase of testing is scheduled to begin in August. Some of the airfoils now being designed include: 3 - thermal duration/F3J airfoils, 2 - hand launch airfoils, and 2 power airfoils. Part of the focus on the next test series is to look at the flap effects on the SD7037 and RG15. Using trips on airfoils is still being explored. Plus, in the discussions with Jim, they are quite enthusiastic about the upcoming tests.

Another note that should be passed along deals with the S9000 (Black Hawk) and S9037 (OI'US 750) airfoils. Several people have asked for the coordinates for these airfoils; the story is that these are proprietary airfoils that were developed for a manufacturer and are not available. The Princeton tests, nor donations for those tests, did not pay for these designs. Further, they will not be wind tunnel tested.

For those of you that have helped out, the UIUC gang wish to say thanks for the support, both in monetary terms and the test panels that have been built for the tests. This is truly a worthwhile program and if you or your club are able, this is a great way to support our hobby.

If you wish to contact the UIUC team or SoarTech their addresses are listed below.

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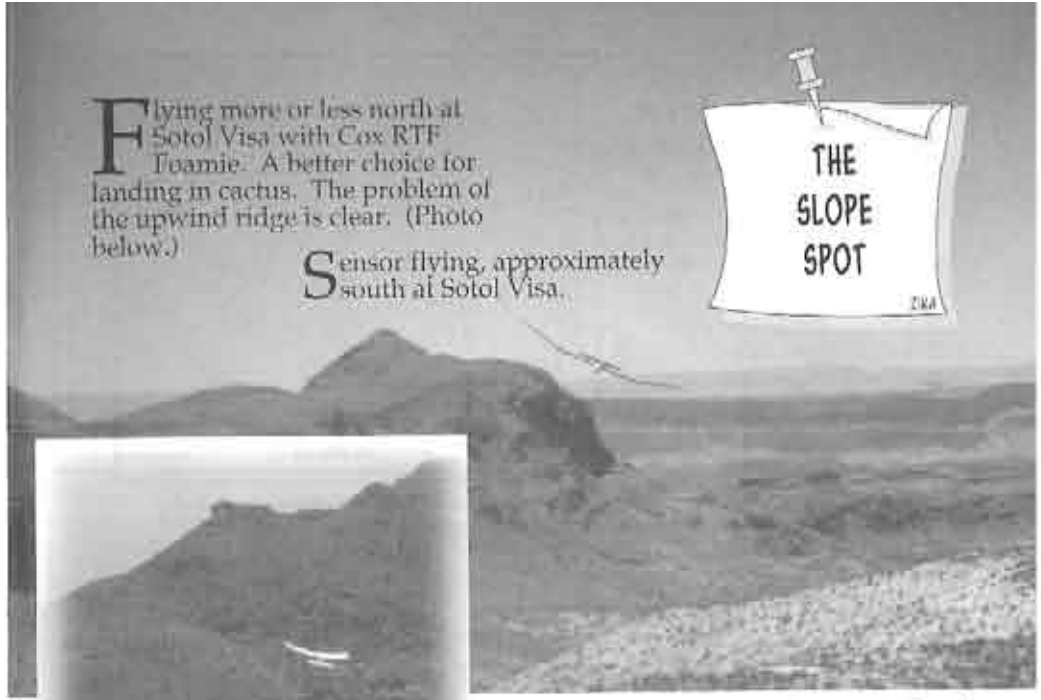

Flying more or less north at Sotol Visa with Cox RTF Foamie. A better choice for landing in cactus. The problem of the upwind ridge is clear. (Photo below.)

Sensor flying, approximately south at Sotol Visa.

Slope Soaring
Big Bend National Park

...by Bill Baker
Norman, Oklahoma

A family vacation, planned far in advance for the first week of May at Big Bend National Park, gave me the opportunity (I thought) to do bunches of slope soaring. The park is a huge area of desert, but with a mountain range to over 7,000 feet, and a great many ridges, peaks, and canyon walls. There are three main, paved highways radiating out from the center, and many other four wheel only trails and foot paths. I limited myself to potential sites that I could park at and walk to in less than 100 yards. The terrain is awful for landing, with tough brush and cactus, and rocks. Forget sand! This desert is rocks!

I had one day with enough wind to get in some flights from the best site I found: Sotol Visa overlook. On the other days, the wind was just not quite enough, even for my Sensor "floater". The wind was such that I felt that an ideal slope might work, but there were many problems; much of the time, the slopes were parallel to the wind, with the most common problem being that nearly every slope, or ridge of consequence, has another ridge just upwind of it.

I was left with the impression that there may be many usable sites, if one is able to hike (and climb!) several miles to some of the higher peaks. Perhaps, some of the four wheel only trails would reach some usable sites. As for the wind, certainly one week is not a fair sample. I know that there are some locals who slope there (somewhere), and my hope is that they will share that information with the readers of this publication.

I had the impression that, if I had taken a hand launch glider with me, I could have "made out" easily, many times in the flatlands. I saw no space where a high start could have been used, due to the harsh terrain described above.

We enjoyed the Park for the birding and other wildlife, the scenery, and the wildflowers. The more hardy of our party enjoyed the hiking, and assured me that there was plenty of wind at 7,000 feet, even when I could find none down below.

■

Jer's Workbench

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Cope Retract

I have just received a new retract which will be installed in my next scale project, something that I hope to have completed in 1996. I'm still collecting parts and data for this new project. I would tell you what it is, but I may change my mind if all the necessary parts and data can't be found or obtained. For now, I want to tell you a bit about this new retract.

Photo #1

Gene Cope, a long time modeling friend, is now producing two sizes of mono-wheel retractable landing gears for sailplanes. The sizes are 1/5 and 1/4 scale. They come in the form of a kit, and assembly is required.

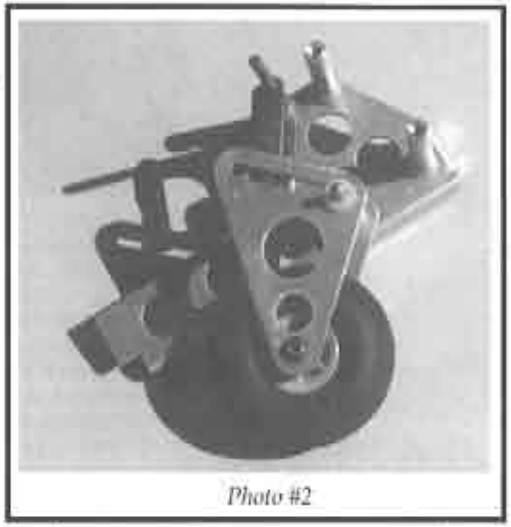

Photo #2

The retract kit comes in a plastic bag. Having assembled other projects like this before, I got myself a TV tray and emptied the plastic bag onto the tray. There are a lot of very small screws and washers in the kit, and I didn't want to lose anything. All of the bits were then separated, with small screws in one corner of the tray, and washers in the other corner. I sorted the spacers and pins, and matched the different plates. In reading the parts list, I found that I had an extra washer. Gene must put in one extra washer for the one he knew that I would drop on the floor and not be able to find.

I have seen retracts before, but to be on the safe side, I took some time to read the assembly instructions. The instructions are well written, and even a first time builder shouldn't have any trouble working through these step-by-step instructions.

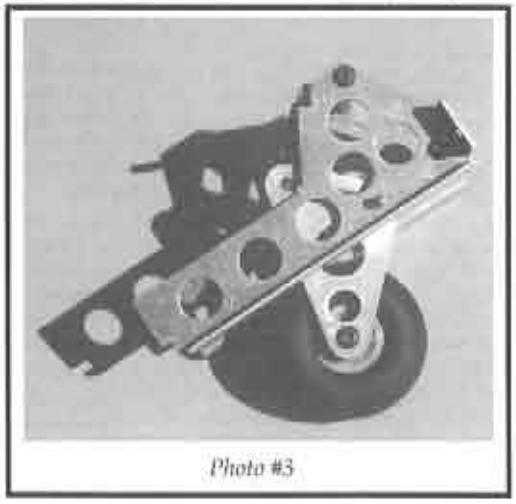

Photo #3

The instructions call for a bit of filing; also, a small hammer is required, as one of the pins is a press fit. Once started on the assembly of the retract, it was completed in about 40 minutes.

The photos show how easy the retract goes together. First (Photo #1), the wheel strut was assembled. (The wheel is not included in the kit, by the way.) Next (Photo #2), I put together one half of the frame and installed the wheel strut. Then, the other half of the frame was added (Photo #3).

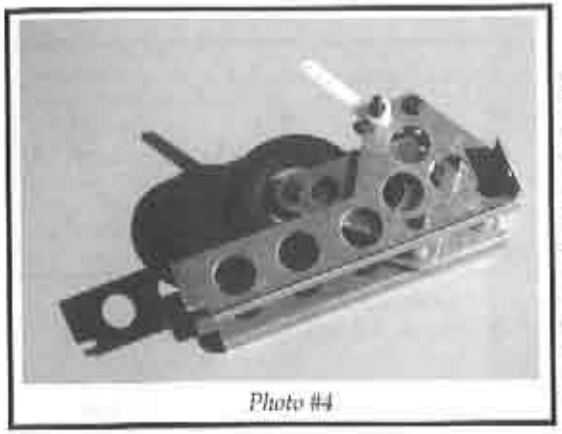

Photo #4

If you find that the retract servo can't be mounted in front of the retract, a servo arm can be added (Photo #4), and the retract servo can be mounted somewhere else. (The servo arm is not included in the kit.)

Gene's retract is very strong. It also has a positive lock when pulled up to the retracted position, or down in the extended position.

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■

The Care And Feeding Of Your Winch & Retriever

...by Sherman L. Knight
Bellevue, Washington

Several years ago I purchased a brand new RAHM Winch and Retriever. With their machined aluminum drums, welded frames and hardware painted fire engine red, it was quite a sexy combination.

I grabbed two 12-volt deep cycle batteries, my airplane and couldn't get to the flying field fast enough. Over the next several months, over a zillion knots appeared in both the tow line and the retriever line, I experienced several occasions where the retriever line literally wrapped itself around the tail of the airplane, and went through more spools of twine than I can count.

Well, we finally got this winch/retriever thing figured out and typically run it now for an entire day without a twist, tangle, or broken line. However, achieving nearly faultless operation, was the result of hours of experimentation.

The Winch

The RAHM winch is a nice piece of equipment. However, over the last two years it has suffered from overuse and abuse. In two years I've gone through four sets of brushes. These are real easy to replace on the Ford longshaft starter motor.

The most difficult part of brush replacement is finding an automotive store that have the brushes in stock. Once you've found the brushes, you also need a **large** soldering iron. Wattage isn't critical. What's important is that the tip of the soldering iron be at least a 1/4 inch in diameter, 3/8" if available. You can get a 40-watt soldering iron with this large tip at Radio Shack for less than $10. The 200/250 watt induction soldering iron simply does not have a large enough tip. (You know the type I'm talking about; it looks like a ray gun with its own trigger and light bulb.) Because of the small size of the tip, it is unable to heat the large solder connection inside of the starter motor rapidly enough.

Disassembly of the motor is simple. Retract the springs from the brushes with a pair of needlenose pliers and

pull the brushes out of their holders. Two long bolts pass through the brush mounting plate. Remove the bolts and the end plates slide off. Two of the brushes are simply bolted to the motor housing. Unbolt the old brushes and bolt on the new ones.

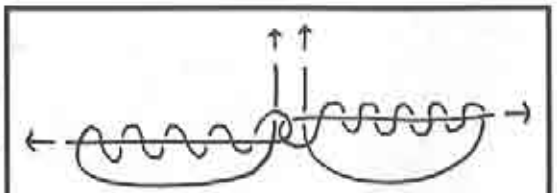

Diagram 1

The other two brushes are soldered onto the induction terminals. Simply place the large soldering iron at the solder connection, heat the solder to a liquid state and pull. You might have to pull fairly hard because some of the connections have a metal clip that was installed before the connection was soldered. Don't worry about destroying the clip.

To solder the new brushes on is simple. First, tin the wire end of the brushes. Then heat the induction terminal until it accepts solder. Once cool, place the tinned end of the wires on top of the solder on the induction terminal. Now place the solder iron on top of the tinned wire. Let the solder liquefy in the wire. Hold the solder iron in place until the solder on the induction terminal liquefies, then remove the iron. Easy. Don't worry about replacing the clip. I've never had a motor get hot enough to melt any of the soldered connections.

Here in the Pacific Northwest we use twine sized between 21 and 18. 21 is actually the larger size and is typically installed on the drum out to the turnaround. We then install size 18 from the turnaround back to the airplane. This appears to result in higher launches, the smaller diameter line has less drag and the stretch in the #18 line adds extra energy to the zoom.

Knots in the twine that come untied are a real bummer. Not only does it delay the launching of the aircraft, but it may result in the crash of a perfectly good airplane. Double bummer.

Knots are critical and only one type of knot works. This is an offshoot of the knot developed in the fishing industry for tying together different sized lines or tying together monofilament line. (Monofilament line likes to come untied all by itself. I think that stuff has a mind of its own and just wants to tick someone off.)

The knot is simple and when properly tied, the loose ends of the twine can be cut off within an eighth of an inch of the knot. (See Diagram #1.) **Do not "lock-in" the knot with CA.** CA is strong but brittle, like glass. It fractures like glass leaving edges just as sharp. The fractured CA will ultimately destroy the knot.

The metal ring that gets tied in the end of the tow line can also cause difficulty. I've actually seen people launch on a winch where the metal ring simply came apart. When the ring comes apart within seconds of launch, the airplane gets real ugly, real fast. Ouch. Triple bummer.

This problem can be resolved by a trip to your neighborhood fishing tackle store. Split rings that are purchased at the neighborhood hardware store are of car key ring quality and not strong enough to take the abuse of a winch launch.

The split rings that you buy at a tackle shop are stainless steel and could probably lift your car without bending or deforming. Not only that, but you can purchase split rings at the tackle shop in lots of 10, 20, 50, or 1,000. And they're cheap.

Finally, when the winch is staked to the ground, the turnaround's located and the line is returned to the winch, you need to do a firm dry run. In other words, grab that chute with all your strength and put the pedal to the metal and don't let go! You need to find out before your first launch whether or not the winch is crooked, balling up the line on one side of the drum. Make your adjustments now, and you'll save a lot of headache down the road.

The Retriever

The most typical problem encountered with the retriever is all the twists imparted on the line during launch and the problems that creates during retrieve.

The RAHM retriever has a relatively small diameter spool and therefore puts twice as many twists in the line per launch as most retrievers. Launch enough times, and I swear that retriever line has a life of its own. (Once, when stepping over a heavily twisted line, I swear the line jumped up and tripped me. As I fell, I could hear it laughing.) We tried everything. We tried putting propellers on the line to untwist the line during retrieve. We used electric screwdrivers to untwist the line after every 20 or 30 launches. We tried bungee cord arrangements, sliding swivels, and everything we could find to solve this problem. Again, the problem with the twisting retriever line was resolved by a trip to the local fishing tackle store.

At the fishing tackle store, we met several individuals that use "down rigger" equipment when trolling for salmon. This involves the lowering of bait and tackle into the ocean with a large lead ball (the size of a junior bowling ball) on the end of the line. The fishermen then connect several lures, flashers, and assorted paraphernalia to the bottom of the line. These flashers and assorted paraphernalia are designed to twist through the water. Therefore, the use of swivels is a necessity that cannot be lightly overlooked.

He then asked me to show him the type of equipment that we were using. At the time we were using ball bearing swivels with snap hooks on one end. (See Photo No. 2, top swivel.) He just looked at what we were trying to do and shook his head in disbelief.

The first thing he did was get rid of the ball bearing swivels that had the snap links on one end. They were simply too small, didn't swivel and broke too easily.

As a general rule of thumb, the shearing strength of the ball bearing swivel should be double the breaking strength of the line. (Any smaller and friction overcomes the ability of the swivel to perform, making it useless.)

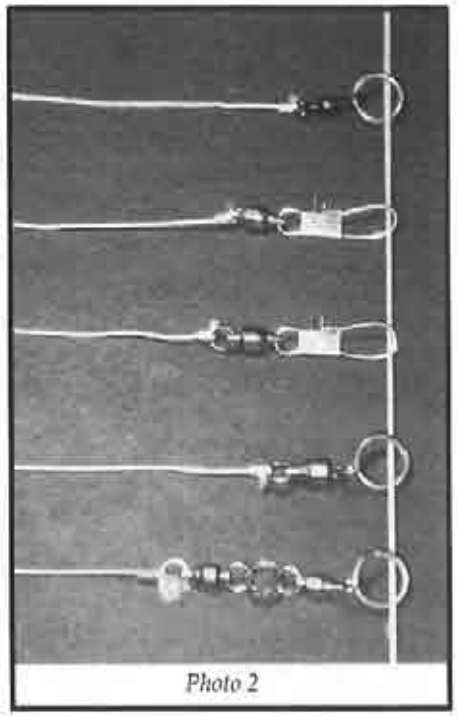

Photo 2

Number 14 twine has a breaking strength of approximately 80 pounds. Therefore, you must use a ball bearing swivel of at least twice that strength. Several ball bearing swivels in the 150 pound breaking strength range were available.

He then further stated that two such ball bearing swivels were necessary. Not only that, but the swivels had to face in opposite directions. (See photo No. 2 bottom swivel.)

These swivels are beefy enough, that they come with their own welded ring in both ends. This individual again pointed out that these welded metal rings on both ends of the swivel are an important part of the swivel mechanism.

If the welded ring is cut off the end of the swivel and the line tied on to the bare end of the swivel (in an effort to save weight) the pull of the line on the swivel will no longer automatically center under tension. (See photo No. 2 second swivel from top.) If the pull on the ball bearing swivel is not centered, the swivel simply doesn't work. Therefore, these welded rings in the

end of the swivels are an integral part of the swivel assembly.

Since adopting the swivels set up in photograph no. 2, bottom swivel, there are no twists in the retriever line. Now I don't mean fewer twists, I mean exactly what I say. No twists at all. The line is limp, twist free and lays there like a rag doll. Perfect.

Since going to this double ball bearing swivel set up, launch and retrieval has become a simple exercise.

We've all seen, and probably used, the ball bearing swivels that have the built-in snap link it makes attachment to the launch line easy. (See photo No. 2 top swivel) However, they're worthless. Instead, use the ball bearing swivels and a stainless steel split ring. Because the split ring has a thicker surface, it does not fray the launch line nearly as quickly as the old snap ring does.

Set Up

When I first started flying off a winch, the retriever hardware would slam against the fuselage of the airplane. Ouch! Also, on two separate occasions, I had the retriever line wrap itself around the tail of the airplane. (However, in both situations, I was able to return the airplane to the ground under full flaps with little or no damage. Only a near bummer, but a heart beating so fast I had to lay down.)

Also, when the retriever line is pulled immediately up to the tow hook (after launch), any pull imparted by the retriever line (snagging on the knot, etc.) resulted in the winch line being pulled off the tow hook. These unnecessary pop-offs were frustrating.

We tried everything. This included surgical tubing inserted on the retriever line to keep the retriever from pulling the winch line off the tow hook. We tried inverted swivels, streamers, and the insertion of a split ring in the winch line, five feet from the actual tow ring. The result of these various efforts was to cause more problem and headache.

Sitting off to the side of the launching area one day, I realized the retrieve hardware wasn't slamming into the airplane, it was the airplane slamming into the retriever hardware. During the first instant of the winch launch, many aircraft travel parallel to the ground before starting to climb. It's during this phase that the aircraft slams into the retriever hardware. If the aircraft continues to travel parallel to the ground after passing the retriever bale, the retriever line may wrap around the tail of the aircraft.

All of the above issues can be resolved by moving the retriever bale further from the retriever. Approximately 25 feet works good. By doing this, several things are accomplished. The retriever hardware no longer slams against the fuselage. Because the retriever mechanism is 20 to 25 feet from the tow hook, any snags in the retriever system (from knots, etc.) no longer jerk the tow line from the tow hook.

The RAHM retriever came with the neat looking bale that almost ended in disaster. On windy days, it's typical for the retriever line to blow backwards over the bale. We encountered a

Photo 3

Winch cady in back of Sherman's vehicle.

situation where the retriever line became wrapped around the top of the bale and during the zoom, the bale was forcibly ripped out of the ground and landed behind a row of parked cars approximately 70 feet away. Fortunately, there was no injury.

The simplest bale around is nothing more than a 3-foot length wire. This can be purchased at the hobby shop for less than a dollar. Simply bend the piano wire into a U-shape and stick both ends in the ground. There's nothing to snag or hook on and replacements are cheap.

Often when the retriever drum is setup perpendicular to the ground, the retriever line turns into a weed eater and cuts the grass immediately in front of the retriever. To stop this, simply prop up the front end of the retriever approximately 1-1/2 inches. It really is this simple. At first, I was concerned about uneven pull during launch. However, just the opposite resulted. The retriever line seems to come off the spool smoother than before and no more cut grass.

Turnaround

Some thoughts on choosing a turnaround. The turnaround that came with the RAHM equipment was first class. However, the actual part of the pulley that turned with the launch line was heavy. Because of its excess mass, it does not start and stop instantly with the launch line. Because the winches are typically pulsed during launch, a chive or pulley that cannot accelerate or stop instantly with the winch line simply wears out over time. We have all seen bicycle hubs used for turnaround and over time, a groove is literally cut into the metal bicycle hub.

Fishing Rings & Swivels

For a piece of Dacron twine to cut a groove in metal must be the result of a lot of friction: not only is it hard on turnarounds, but imagine what must be happening to the launch line!

There's a simple way to resolve this problem. The chive needs to weigh almost nothing. There's one turnaround out here that satisfies this bill. The one made by Timb's Engineering appears to use a wheel made out of Darolon or some space-age material. See photo 3. This lightweight material is often seen in some of the sailboat equipment made by some of the more expensive hardware manufacturers. I've been using the turnaround from Timb's Engineering now for two full years and there are absolutely no signs of wear to the Darolon hardware. This appears to be because of its ability to instantly accelerate or decelerate with the pulsing of the winch.

The Retriever Operator

Finally, the retriever operator needs to realize that consistency in the retriever operation results in fewer breakdowns.

The retriever operator shouldn't be watching the airplane. He should be listening instead. Listen to the winch and the pulsing by the winch operator. You quickly become aware of the pulsing by the winch operator and the change in sound at the end of the zoom. You know instantly when the winch operator is done with the winch. By placing your hand under the retriever spool, you can actually grab the retriever line before it stops coming off the spool. Then, drop the retriever line over the turnaround wheel and pull the trigger. DO NOT PULSE THE RETRIEVER. Use the retriever itself to center the retriever line on the turnaround spool. Do it quickly, before the launch line is on the ground. The additional friction from pulling the lines through the grass may be enough to break the retriever line.

Pulsing of the retriever results in loose wraps on the retriever spool. These loose wraps can snag much worse than a knot, or may pull more than one wrap at a time off the spool resulting in rats nest and temporally shutting down launching operations.

Again, I'd like to thank all my flying buddies with the Seattle Area Soaring Society and their involvement in coming up with a nearly foolproof launch and retriever system. If any of you have any further questions or comments, or other ideas to help simplify the launching of a sailplane, please feel free to give me a call at (206) 455-2345. ■

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Masters of Soaring

Finally! I won a contest that would get me into the Masters of Soaring. After much work and practice, Cornfed would be going to the contest with the best. You know, the thing that surprised me the most was the fact that not all the best were there. I mean, the East Coast and the Mid-section of the country had poor or little representation. The boys from Chicago, Tom Kallevang and Jim McCarthy represented the North. Dale Nutter showed for the Mid-West, and I represented the Deep South. Now, I know that there are many good flyers East of the Mississippi, so you folks try to make a show next year, ya'll hear!

I arrived in California a day early, hoping to fly on the field before the main event. And I did. First, Mark Levoe took me by the Rose Bowl for a warm-up practice session. It was quite a treat flying in the Bowl. The mountains seem to be all around the field. I sure liked the thermal wave action on the top of the hill above the tennis courts, but the light poles at the base of the hill were tall, and setting up for a landing was tight. The wind blew pretty good after lunch; that was fun.

Me and the baby at Easter. His name is Christian, and he's three. That's my boy!

in a school parking lot, and pulled the ol' faithful plane out just as the 5:00 train went by the fence; it was just a shakin' the car and the ground. You know, that got my attention. I mean, as I stood up and looked around, I realized I wasn't fixin' to go flying in a cow pasture. I was in downtown California! Dale said, "Cornfed, you coming with us?" I replied, "I'm comin'!" This was a real culture shock. Ol' home boy had come to town, and here I was flying my plane in a school yard with buildings to the left of me and the highway behind me. There were trains on the right, and there were businesses in the front. My, oh my! Now, let me stop here and say that I'm not knocking the flying sights of the Los Angeles flyers. It's just that I'm not used to tight spaces, and I know that large amounts of land are hard to find in a heavily populated area such as this. So, guys, don't take it personal.

Then, it was on to the real thing, what I had waited for and worked so hard for: The Masters Field of Champions. Well, we got there kinda late in the afternoon. My, my, you should have seen the traffic on the California highways! Kinda looked like everyone was heading to Mardi Gras on a parade day back home. The cars were as many comin' as goin'.

Oh yeah, back to the field. I pulled up Out on the field, Dale and Mark were shooting landings, so I eased out and got me a few, too. My count down for the landing was under control; I checked for the wind holes. They were all right. It was getting late, and it was time for supper.

Saturday dawned early and the pilots meeting went quick. The first flight would be three minutes, followed by a four, seven, and ten. We flew eight

The flight line. They looked happy, but you could tell fear of failure was trying to grip their hearts.

A few of the competitors planes. Almost a third were V-tails.

Masters 1995 Final Results

1	Joe Wurts
2	Steve Condon
3	Roger Lackey
4	Keith Kindrick
5	S. Sadorf
6	B. J. Weisman
7	Jim McCarthy
8	Randy Spencer
9	Fred Sage
10	Daryl Perkins
11	Fred Rettig
12	Mike Regan
13	Tom Kallevang
14	Ben Clerx
15	Mark Levoe

Airtronics Peregrine

rounds on Saturday and six on Sunday. I dropped a round on Saturday, which put me at the back of the bus. But one thing is for sure, the seats on the bus kept rotating!

Daryl Perkins broke his plane while practicing on Saturday morning, so he had to borrow one. Now, that man can really fly I'm here to tell you, but he dropped a round on Sunday, too. Up until his bad round, he and Joe Wurts fought it out tooth and nail, with Roger Lackey in close pursuit; Steve Condon was just a breath away. There were 8 - 10 guys in all flying for top honors!

Well, I know ya'll saw Roger Lackey's plane on the cover of *RCSD* in May. But, let me clear up this matter about the bow in the elevator during landing. Roger's plane is well built, and can take the abuse that contest flying puts on planes. And, yes, the plane was under a lot of stress. But, that weren't nothin'. You should have seen the looks on the faces of the contestants. Stress was written all over the top flyers. This contest was hammered out to the wire, with just points standing in the way of the top five flyers by Sunday afternoon. But, old faithful pulled it off; yep, Joe Wurts took honors. Kinda strange. Joe finished tenth last year, I think, and Daryl finished first. This year, Daryl was tenth. They traded places. Suppose they planned it that way?

In closing, I want to thank the folks of Covina, California: Peter, Frank, and the gang, for hosting the Masters. Thanks, also, for the support of California Soaring Products.

Signing Off,
Cornfed

P.S. Say your prayers and give the dog a bath.

ATTENTION: The Cash Ain't Trash Contest.
Pensacola Air Modelers
October 21 - 22, 1995
$1000.00 First Place
Pensacola, Florida
Contact: Cornfed (Fred Rettig)
(334) 343-2300 (work)
(334) 660-1318 (home)

■

on the Wing

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"Six-flap" Control Systems

In response to requests, here's an examination of multiple control surface systems. These are commonly called "six-flap systems" in the literature, although, as you'll see, some may have more than or less than six control surfaces in total.

The usual reason for a multiple control surface system is to more closely approximate the ideal lift distribution for all conditions, including maneuvers. Since a thermal sailplane is very seldom flying straight and level at a moderate speed, maintaining an appropriate lift distribution during other flight regimes has become a very important consideration. With modern

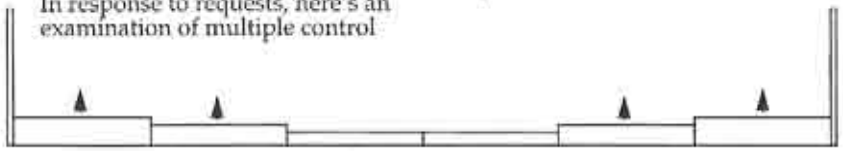

Figure 1.1: up elevator

Figure 1.2: right aileron with right rudder

Akaflieg Braunscheig's SB13

computerized radios, it is possible to configure the transmitter such that control surfaces can be automatically adjusted to proper deflection without direct input from the pilot.

To begin, we'll look at the control system used on the SB13, the full sized swept wing sailplane built by Akaflieg Braunschweig and detailed in this column. This control system, depicted in Figures 1.1 and 1.2, uses elevator and aileron functions, along with differential rudders. The SB13 follows the Standard Class rules and therefore does not employ flaps.

The elevator function utilizes the outboard surfaces to produce a very strong force at the greatest possible distance from the CG. The movement of the inboard surfaces acts to distribute the aerodynamic load across a larger portion of the wing, thus reducing any stress rise.

As can be seen by Figure 1.2, aileron function involves some complex mixing of the control surface linkages. The aim here is to produce equivalent but opposite roll forces on the two wings, while at the same time reducing adverse yaw. This allows a rolling movement without the influence of either pitch or yaw forces. In a turn, the pilot can induce roll and pitch independently of rudder induced yaw.

The rudders are set up for differential movement. The outer rudder moves inward, albeit a very small amount, thus lifting it forward. The inner rudder, on the other hand, moves toward the center of the turn a great

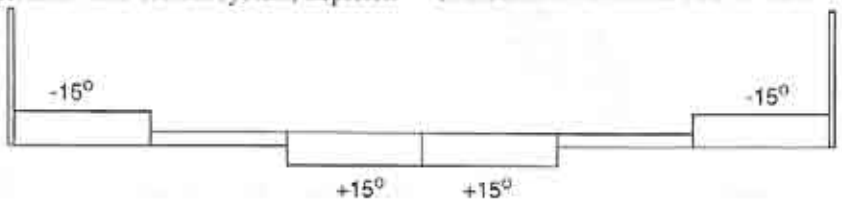

Figure 2.1: up elevator

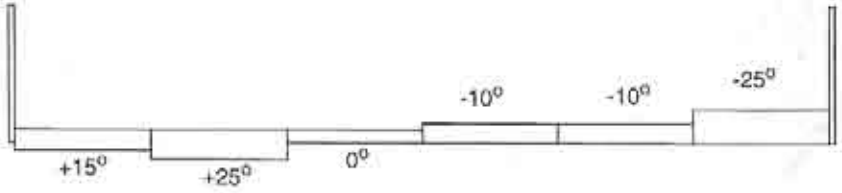

Figure 2.2: right aileron

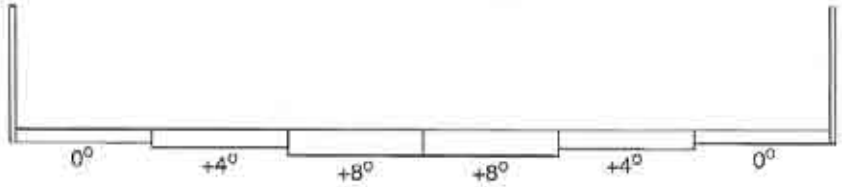

Figure 2.3: positive flap

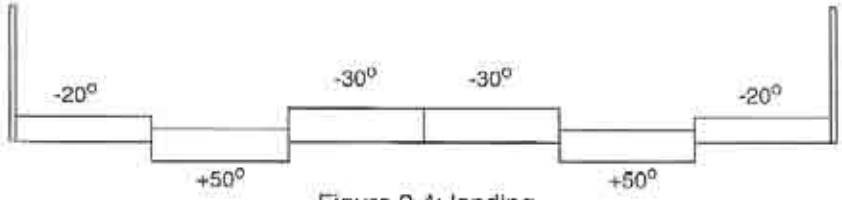

Figure 2.4: landing

Dr. Michael Wohlfahrt, 1989

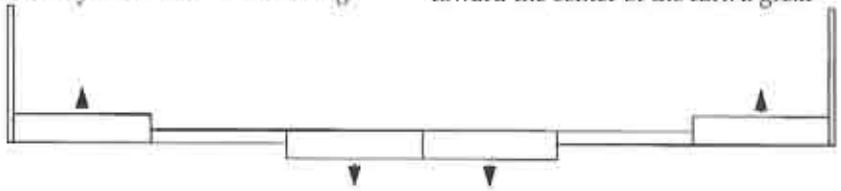
Figure 3.1: up elevator

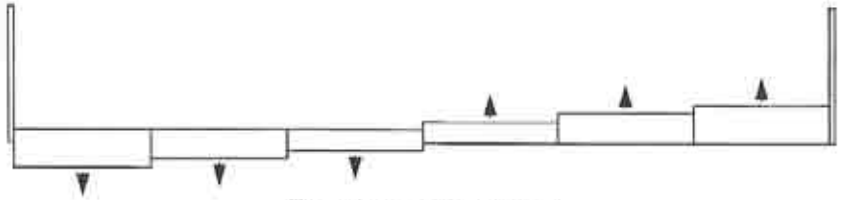
Figure 3.2: right aileron


Figure 3.3: positive flap

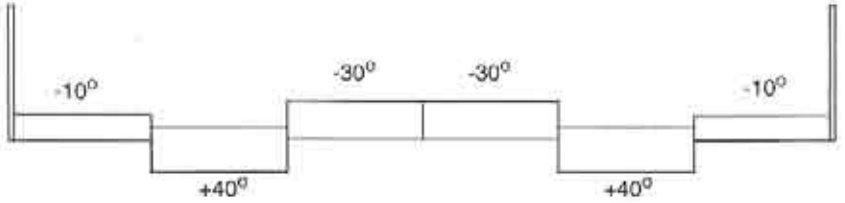

Figure 3.4: landing

Dr. Michael Wohlfahrt, 1990

deal, creating a significant drag differential which slows the inner wing. Combined with appropriate pitch and roll inputs, the pilot is thus capable of making very efficient coordinated turns.

The next two systems we'll look at have been used by Dr. Michael Wohlfahrt. Dr. Wohlfahrt is co-author, with Dr. Karl Nickel, of "Schwanzlose Flugzeuge," a very extensive and complete book on tailless aircraft, with sailplanes the primary focus. The two control systems described here (Figures 2.1- 2.4 and 3.1-3.4) were published about a year apart, with the latter system being the most recent.

These two systems are roughly

Figure 4.1: up elevator

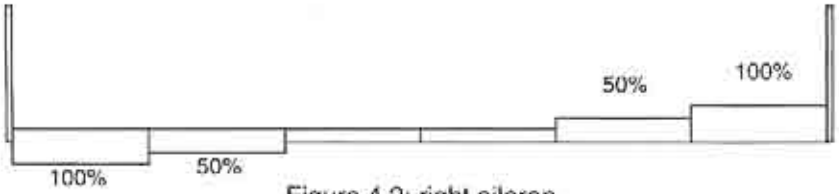

Figure 4.2: right aileron

Figure 4.3: thermal

Figure 4.4: speed

Figure 4.5: landing

Hansjorg Ackerman, S.W.A.L.C.

equivalent, with the exception of aileron function and a small difference in deflection angles in landing mode. It would appear aileron function was changed from a rather complex mixing configuration, similar to that seen on the SB13, to one which is more simple and seems to derive added effectiveness from increased leverage.

We've kept the most complicated control system for last. DELTA #4 provided information on Hansjorg Ackerman's SWALC (Swept Wing Automatic Lift Control). This control system, which uses Multiplex equipment with a "Softmodul," allows inclusion of some rather unique control functions and is illustrated in Figures 4.1- 4.5.

It is interesting to note the SWALC elevator function, as it is directly opposite to what is seen in the SB13. Mr. Ackerman's intent is to promote a very specific lift distribution over the outer wing. Since the wing incorporates washout, and produces a "bell shaped" lift distribution when no control surfaces are deflected, elevator function must overcome that initial lift distribution and produce a lift distribution which is most effective at giving the pitch authority needed. Aileron function is unique in its own way as well, in that includes absolutely no differential. We have talked about swept wings and aileron differential previously, and Mr. Ackerman's control system adds credence to our contentions.

Rudders, if they can be called that, are not used in turning. However, they play a very important role in thermal and speed modes, where they trim the vertical surface to best advantage for a specific flight regime. In thermal mode, the rudder surfaces move outward, and the vertical fins become pseudo-winglets which contribute to improving lift. In speed mode, the rudder surfaces deflect slightly inward, reducing the drag of these surfaces to a minimum.

In landing mode, flaps go down and outboard control surfaces move up. This is a "butterfly" configuration, and the control surfaces move in relative unison. Pitch control in this configuration is accomplished by deflection of the middle control surfaces and should be very effective.

It should be noted that each of the described control systems is installed in a different wing planform, with sweep angle and taper ratio sometimes varying markedly between designs. Before incorporating any multiple control surface system into a design, great care needs to be taken to assure the lift distribution will be affected in the exact way the designer wishes.

Please let us know if there is a specific topic you would like to see discussed in a future "On the 'Wing...," column.

Bill & Bunny (B^2) Kuhlman, P.O. Box 975, Olalla, WA 98359-0975 USA

DELTA 4. Reinhard H. Werner, Editor. "SWALC - Swept Wing Automatic Lift Control." Halle/Westfalien Germany, Reinhard H. Werner, August 1986, pp. 23-27.

Faszination Nurflügel. Hans-Jürgen Unverferth, Editor. "Die Steuerung von (Pfeil-)Nurflügeln." Baden-Baden Germany, Verlag für Technik und Handwerk GmbH, 1989, pp. 60-68.

Schwanzlose Flugzeuge. Prof. Dr. Karl Nickel & Dr. Michael Wohlfahrt. "Ein 6-Klappen-System." Boston, Birkhäuser Verlag, 1990, pp. 407-411.

Silent Flight. Dave Jones, Editor. "The SB-13." Hemel Hempstead Herts. England, Argus Specialist Publications, Autumn 1991, pp. 51-56.

■

THREE PEAS IN A POD

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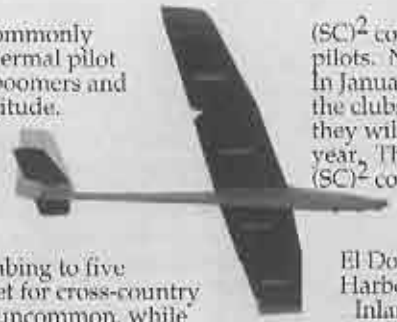
Southern California Soaring Clubs $(SC)^2$

Curt: Recently, while on vacation, I was at my workbench in the garage, kinda fiddling-around with a new glider and watching TV at the same time. Somewhere between O.J., the soaps and tweaking the travel volumes, I found myself channel-surfing for something more provocative, stimulating and thought-provoking. I stumbled into a popular daytime talk show whose host and topics are as finely tuned-in to the network ratings dumpster as any of the others in the same time slot. But somehow, this show was different. It offered a theme that I could relate to, a subject that I've often researched in depth, one that has substantially elevated all of my senses and capacity to function within society. It was all about competition. It was the ultimate challenge. It was the "East Coast Bikini Babes vs. West Coast Bikini Babes", a common sight during the summer months here on Southern California beaches and cruising Pacific Coast Highway in Jeeps and sporty convertibles. During the Jeopardy-like segment on U.S. geography, one of the East Coast contestants won a bonus point when Miss Hawaii, my personal favorite, placed Ohio where Oregon is supposed to be. The East Coast later lost the point when they miss-spelled the President's last name. Emotionally drained, I turned the channel before the final results were announced, but hazard a guess that it was pretty much a toss up. All of the girls were attractive: each side was equally talented, but in different ways.

There have long been rivalry's, but in this hobby most pronounced is likely between the East and West coast pilots, what we fly, and the conditions we fly in. Essentially, Southern California is a desert basin with many organized club fields that commonly afford the thermal pilot substantial boomers and excessive altitude.



Rapidly climbing to five thousand feet for cross-country work is not uncommon, while fun-flying at half that height is also realistic.

At a previous Masters of Soaring held on the East side once proved, California flyers actually do know how to fly in the wind. Year-round, we thermal in the morning and fly hundreds of inland and coastal slopes throughout the state into the late afternoon. Torrey Pines, Kite Hill, Davenport, Hughes, Turtle Rock and Point Fermin are just a few that come to mind and provide west coast glider pilots with a huge playground of pump zones. It's not unusual to toss a HLG into the back seat of the car to catch a thermal during lunch from the parking lot at work, or to get caught flying in the downpour of a winter's rain. We get to fly a lot, and that's one of the most significant differences between coasts. Whether one coast can dominate the other is yet to be seen, but I believe we're up for the challenge. Any takers?

Mike: Southern California Soaring Clubs $(SC)^2$ is an R/C soaring federation which promotes competition and camaraderie among the soaring clubs here in Southern California. There are eleven clubs which participate in the competitions with nine clubs currently hosting precision/duration thermal contests during the year. Contests are usually held on the last Sunday of the month, beginning in February and ending in November, with one month off during the season for summer vacation break. A typical turnout at an $(SC)^2$ contest is usually from 80 to 120 pilots. Not bad for a monthly contest!! In January, bids are made by each of the clubs to determine what month they will host the $(SC)^2$ contest for that year. The following clubs are hosting $(SC)^2$ contests this year:

El Dorado Silent Flyers (Long Beach)
Harbor Soaring Society (Costa Mesa)
Inland Soaring Society (Riverside)
North County Clouds (San Marcos)
Pasadena Soaring Society
Silent Wings Soaring Society (Covina)
Soaring Union of Los Angeles
Thousand Oaks Soaring Society
Torrey Pine Gulls

Clubs hosting a contest, must prepare a contest notice at least 60 days in advance. A few of the items which must be included in the notice are: location, contest description, scoring, landing surface, type of winches, etc.

$(SC)^2$ rules govern all contests and cover a wide range of requirements including safety, collisions, launching system malfunctions, definition of an acceptable landing, minimum contest requirements and pilot classifications. Although the terrain and soaring conditions may vary from site to site, these rules provide continuity during the season. Occasionally, they are amended, as in recent changes which created a 60+ and Masters classes.

Speaking of classes, all contests are Unlimited Open Class. There are currently four pilot classifications: Sportsman, Expert, Master and 60+. The pilots previous $(SC)^2$ contest performance determines his or her classification, except in the 60+, which obviously requires other prerequisites! Once a pilot meets a predetermined level of performance, he or she is moved up to the next higher classification.

Each club can establish its own format,

as long as there are at least three rounds and the 60 days prior notification is observed, otherwise almost anything goes. Times and landing types are always being varied. We also fly "man-on-man" and "called flight order" from time to time.

The competition is what brings us all together, but there is much more to an $(SC)^2$ contest than competition. Attendance at an event affords the opportunity to chat with old friends, make new friends, fly at fields other than your club field, see new high tech and low tech sailplanes and have a lot of fun.

In my opinion, $(SC)^2$ competitions have been a major contributor in producing some of the finest R/C soaring pilots in the world!

Paul: Well, I'm not as long-winded as these other two guys, but if we're talking about competition, this is one pea in the pod that would like to get his two cents worth in. Each of the clubs that Mike mentioned also hold a monthly contest at their respective fields, and usually at different times of the month. Some clubs even have separate 2 Meter contests with an occasional hand launch or classic event thrown-in on a different weekend. I guess that what I'm getting at is if you want to fly competition, here in Southern California, you could probably find a contest to enter every weekend of the year. To me, this is what makes good pilots. What do you think? These "Three Peas In A Pod" would like to hear from you, so feel free to drop us a line in c/o California Soaring Products.

Until next month..... "Boomers!"

■

Everyone Has a Full House or Hand-Launch Topics

...by Scott Smith
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evenings after 7:00 PST

Passing of an Era

It happened at the venerable 12th annual ISS hand-launch contest in Riverside, California. Full-house hand-launch gliders (computer radio controlling 4 servos for aileron-flaps, rudder, and elevator) swept the first 4 places and took 8 out of the top 10 in a field of 27 pilots. With the exception of Merrill Farmer's Illusion, the gas bags didn't even peep.

I'm excited by the advances in hand-launch, and, in the overall scheme of things, the additional cost (say $200-$300 more for the full-house capability) isn't all that troubling. I'm saddened, though, at the passing of an era in hand-launch. It was the last RC soaring category that was "primitive" and "hard scrabble". There was lots of design exploration: airfoils, configurations, and so on. It was an exciting era, and the era has passed. Let's hope the new era is even more exciting!

The Era's Last Great Pilot

At this Riverside contest, one pilot flew in a class by himself (literally). Merrill Farmer went up against the best HL pilots anywhere and accomplished 5th place with a conventional built-up wing, fuselage, and "tail feathers". Many accomplished pilots with full-house airplanes came in behind Merrill and his Illusion, making his feat all the more remarkable. Congratulations, Merrill!

Time for a Standard HL Class?

Perhaps it's time to talk about a standard hand-launch class. Airplanes are limited to 2 servos and no mechanical mixers. This holds down costs for the newcomers and still affords a fine flying airplane (witness the Climmax, for example).

When I discussed the idea with Joe Wurts, he pointed out that the number of sailplanes isn't big enough yet in any RC sailplane class for this kind of division. I suppose he's right, and yet the "classic" thermal contests are beginning to become a regular fixture here in Southern California. With handlaunch becoming more popular, maybe in time there will be a sufficient

Art Marchewitz with 1st place

Scott Condon with 3rd place

The top ten finishers. Notice only one gas bag and another rudder/elevator. Rest were foam/full house. (End of an era.)

Joe Wurts with 2nd place

Gordon Jennings with 4th place

27 contestants at the 12th Annual ISS hand launch contest.

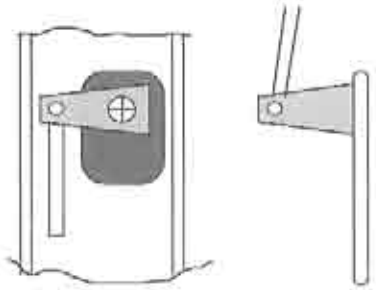
Merrill Farmer with 5th place. Notice his "gasbag". REMARKABLE!

threshold of pilots ready to do this.

Controls Adjusting Subtleties

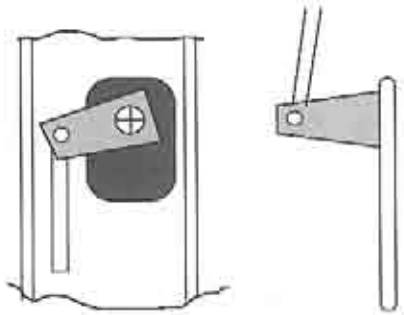
I discovered this one by accident.

For some reason, my rudder didn't turn evenly. I thought I had the cable and everything set at right angles as in the diagram:



As you can see, the rudder is straight back when the servo is at 90°. But the rudder turned more in one direction than the other. Can anyone guess why?

I had to set the arm on the servo slightly cock-eyed in order to make the rudder turn evenly as follows:



Of course I needed to take up the extra slack in the cable, but now the rudder turns evenly. Why did I need to do this? It's because the cable connecting to the rudder clevis is arriving at an angle other than 90°. I need to compensate by setting the same opposite angle at the servo. It so happens that the length of the servo arm is the same as my clevis. If the control arm and clevis in your sailplane are different lengths, then you will have to account for that by adjusting the angle.

Of course, I could have also fixed it by re-routing the rudder cable to come out the back of the fuselage at a right angle, but since the airplane was completed, that was discerned to be "inconvenient" (like tear the fuselage apart to do this).

Funny how I never noticed this before.

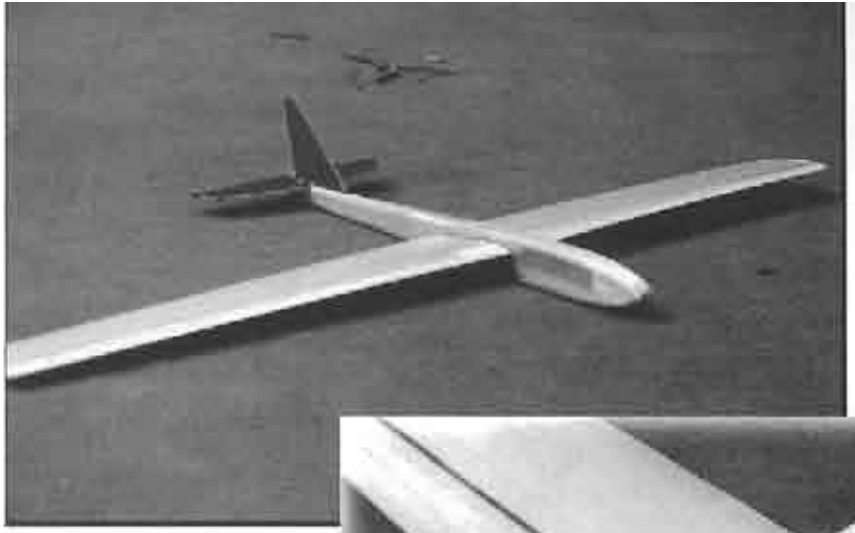
■

This Old Plane

Photo courtesy of Fred Mallett.

There once was a pilot named Fred,
Whose Corn Dogger pod was red.
One day his luck lacked,
Beloved "Corney" got smacked,
But was soon resurrected from dead.
Chris Boultinghouse
Cedar Park, Texas

Gaggle of Corn Doggers
Chris Boultinghouse (L), Fred Mallett (C), Dale O'Donnel (R)



Foameron RG-14 internal control version

View of wingeron controls.

This Old Plane

...by Fred Mallett
334 Haroldson Dr.
Corpus Christi, Texas 78412
(512) 991-3044 (Week Days)

ZIKA

The Foameron Slope Ship

Curiosity kills the cat, and in this case, I was the cat. My curiosity drew me in on this one, and I ended up with three of these planes (gotta have em for friends to fly combat with). I suppose that's not so bad; in fact, it turned out to be loads of down and dirty fun. It all started with my seeing a message go by on America Online's message board on slope soaring. Someone (CTENT) mentioned "wingeron" and "foam plane" in the same breath. Since I am a committed slope nut, and love wingeron controls on the slope, it was a given that I would follow this one up. Could not figure out how to make a foam plane with wingeron controls. (Foameron, get it??) Sounded like a cool construction technique, and that is what this column is supposed to be about.

I tracked down the designer/builder, Joe Galletti, at a good time, as he just finished a pre-production run of planes, and was looking for testers. He said he would send me a pre-built plane if I promised to crash it a lot before sending it back. Couldn't refuse that one! Besides, I was overly curious about a foam wingeron, and especially dubious about its durability.

A couple days later it took all of 20 minutes to install the radio, and off I went to the slope. We have a small bowl (about 25 feet high) that works on a north west wind, and it was normal winds for spring that day, about 18-22 mph. Having owned a couple "popular" foam construction planes, it did not look like a foam plane day. They usually just kinda hang there on windy days, not fast enough to fly sideways to the slope. Then I remembered that it was not my plane, so I chucked it anyway, and was quite impressed; it flew straight out into the breeze. It didn't take long to decide a turn was in order, as salt water is not very good for electrical connections. After getting the elevator trimmed out, I was doing down the line loops in 20 mph breeze with a foam plane!! I am not going to stretch it and say this is a super fast sloper (Mine is only 10.5 oz. wing loading.), but it sure beats the other foam planes, and I have to enhance that by saying it flies like a real slope plane, and not a foam plane. In the 7037 foil version it flies quite a bit like a Dodgson Pivot. It has flown in as low as 5 mph wind on the same hill. When trimmed back, the slow speed flight was quite stable. The RG-14 version flies faster, and with the big steel (optional) wing rod, it has some momentum for vertical stuff; when built with the internal controls (upside down root rib, and servo installed from the bottom), it flies comparable to the Quicksilver. The roll is much more axial, and inverted flight is good. On the first day, one of our newer fliers showed up and was asking how to land in higher winds, so, I demonstrated some approaches, then showed him a "bad" approach and a down wind stall. (Joe SAID to crash it!) I acted cool, but thought sure it would be broken from the down wind cartwheel with a full twist thrown in. After pushing the fin back in its slot, it was out flying again. That plane has crashed at least a hundred times so far, not bad for a

FOAMERON Specifications

General

Span:	62"
Length:	33"
Weight:	25 oz. Minimum (full size radio gear) 5 oz. w/long ballast wing rod
Type:	Foam Wingeron
Loading:	9 to 12.5 oz./sq. ft.

Wing

Blue foam core, aluminum full length spar

Area:	405 sq. in.
Root chord:	7.75 in.
Tip Chord:	5.75 in.
Dihedral:	0°
Airfoil:	RG-14 (or 7037)

Tail

Conventional:	52 sq. in. stab 18 sq. in. fin

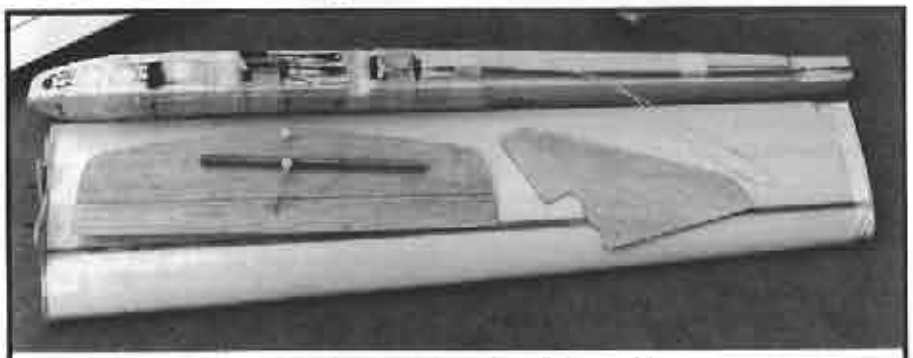
Fuselage

Blue foam, plywood sides, tape covered

Controls

Wingeron-Elevator

Designer: Joe Galletti, Torque & Recoil Club



Less than one minute from flying to this. (Prototype wooden tail surfaces shown.)

foam plane that flies like a "real" plane. Knowing the crashability, this plane inspires me to try things I would not do with my own creations that took more time to close out the ailerons than this thing took to build.

We made a game with our Foamerons called "Backwash". You take a beer can with only the backwash left in it (needed to keep it from tipping over in the wind), and set it on the stairway railing; then we tried to knock it over with the foameron. Great fun, especially when someone else hits the railing with your plane; the look of sorrow they give you is great, and then you go fling the plane again. "Limbo" would be another great game.

Combat, of course, is great 'cause the planes actually can attain some speed for dive attacks.

Now, back to the construction. The trick to the wingeron controls was to put 1/8" plywood planks down both sides of the fuselage with holes in them for the wing pivot rod. The control horn for the wing pivot is actually just an extension of the root rib. It sticks up an inch or so to get the throws down to something reasonable. Great idea! Simple! When the plane is flying at slow speed, if you use lots of wingeron control, you will learn the meaning of adverse yaw. A light stick is required at slow speeds. This is not apparent at higher speeds. The wingeron controls can be seen in the picture, the rubber bands keep the wings on. The wings use a full length arrow shaft for a spar, and it also acts as the wing pivot tube. Tape holds the shaft in the wing. Joe recommends using a dry sponge to remove the hair from the wing cores, and it works great. The rest of the plane is pretty much typical foam construction: "tape it all up". A couple interesting points are that it uses glass strapping tape, and there is no glue used anywhere. A new vinyl one piece covering is available, and it makes the wing super smooth. (Adds a lot of color also, which is kinda helpful in a combat pack.) The stab is held on with nylon through bolts with a backing plate, and the fin just sticks in a slot. Both the stab and fin are made of that corrugated plastic.

All hardware is included, including the ball joints for the wings, which simply snap off. The plane is 60 inches, but in 20 seconds you can pop off the wing controls, slip the wings off, pull the fin, and throw the thing in the trunk. If you really want it to fit in a small box, it takes a little over an hour, as there are two screws that hold the stab on, and you know there won't be a screwdriver in the trunk. The whole thing fits easily and quickly back in the original box with room to spare.

Getting a real production kit for a buddy, I decided the instruction manual is almost as fun as the plane, 'cept it don't fly. Here are a couple excerpts from the manual:

- Kits contents: Enough parts to make a plane.
- First flight: Very important, turn the radio on.

Actually, the instruction manual is if anything, over detailed, aside from the jokes. Joe even tells you which hand to hold the tape roll in. It took longer to read the manual than build the plane. For a beginner builder, it would be great, as all the important parts of building a straight flying plane are pointed out.

The only trouble I had in building it was that I kept wanting to go back to composite construction techniques. (What if I carbon/glass bag the wing, glass the fuse then melt out the foam, ...) Don't do it! I started building a plane at 7 PM, and was done for the 10 PM weather report, after taking out time for dinner. With that little time vested in the project, you can smile when trying to pull off an inverted pass through the stairway railings.

As for the test plane? I still have it, and Joe lives a long way away. Besides, he didn't say WHEN to send it back.

There is one thing that bothers me about buying one of these planes, and that was writing the check out to the "Torque and Recoil Club" (Joe's company), as I hate smoke, and noise.

Joe Galletti, Torque & Recoil Club
608 East 48th Street
Austin, TX 78751
(512) 454-0061

■

Los Banos Slope Scale SOAR-IN 1995

...by Sean Sharif
San Jose, California

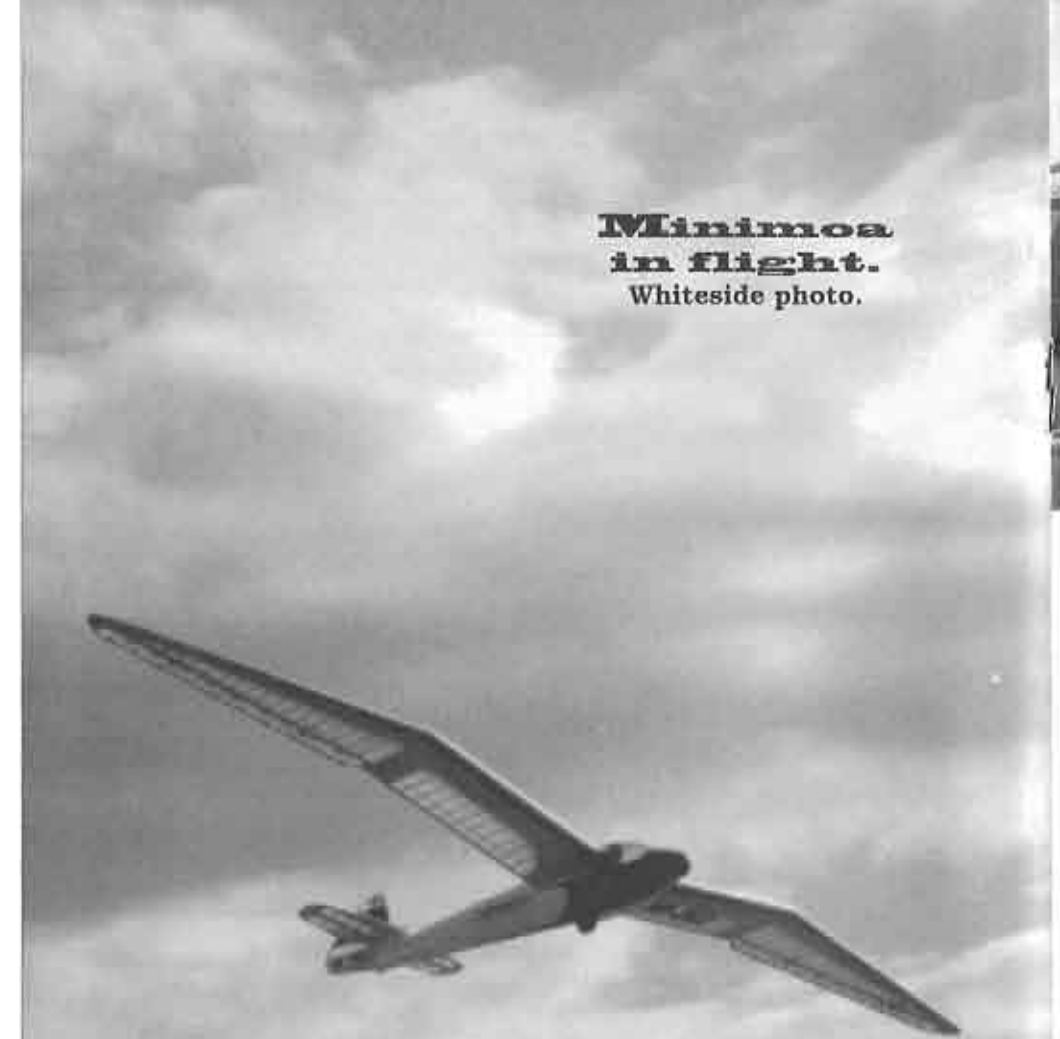
Randy Banta's Multiplex DG-500. A great performer. Sharif photo.

Photography by
Sean Sharif, Don Whiteside, and Joe Thomas.

Author's Thermo-flügel Pilatus B4. Sharif photo.

Scale soaring is alive and well in the U.S. if the Los Banos scale event is any indication. For an event that is only two years old, the number of participants, spectators, models, quality of models, and variety of scale models were quite surprising. Two and a half years ago, when Lynsel Miller and I were planning the Los Banos event, we figured getting twenty scale models together would make the event successful.

At this event, estimates ranged from seventy-five to one hundred! This, despite the fact that the unusually wet California weather threatened to cancel the event all week, and left some registered participants at home. The participants came from the San Francisco Bay area, Southern California, Oregon, Washington, Canada, and Florida. They started arriving and camping at the site on



Minimoa in flight.
Whiteside photo.

Thursday.

Friday was a casual, get acquainted day, with most fliers flying sport and scale models, and trimming out their ships. The winds blew from 20 - 40 mph all day. Saturday, the big day, started with calm conditions, and started to pick up in the afternoon. Until this time, both aero towing and winch were available for those who wanted to take advantage of the excellent thermal conditions present. Dozens of successful aero tows were performed. By 3 o'clock, the winds were high enough that the vintage models were flying off the slope and, before long, the modern ships joined in. By late afternoon, the sky was full of sailplanes of every description, from SG-38 and Minimoas, to DGs and Discuses (or is it Discii?). Soon afterwards, the heavy PSS ships such as Lynsel's ME-109 and the giant ME-110, belonging to Tom Overton, were strafing the slopes. Tom's ME-110 weighed around 35 pounds, and a special bungee system had to be devised to launch it after letting it

The PSS contingency at Los Banos. Whiteside photo.

A gathering of some of the PSS models. The weekend coincided with VE Day celebration. Sharif photo.

Lynsel Miller, Event Director, with his PSS ME-109. Sharif photo.

pounds. But the aircraft was carefully tossed into the wind and flew surprisingly well. The pilot's scarf whipped out in the open breeze, and was a particularly nice touch. Just goes to show you that when there's enough lift, you can fly just about anything.

Sunday was a repeat of Saturday with the winds kicking up around 4 o'clock. Many stayed late and flew into the evening. On Saturday, before starting the slide and rise off the slope into the air. It was quite spectacular!

The lift continued to get better, and Jim Thurmond decided to make one of the most anxiously awaited flights of the day: the maiden voyage of his 1/4 scale Genesis. This aircraft is so new to the modeling and full-size world that not too many people were familiar with it. To the cheers and applause of spectators, the aircraft flew beautifully and looked great in the air.

We had another surprise when Tom took out his quarter scale Spacewalker power plane, with the engine and prop removed, and decided to fly it on the slope. This is not the most aerodynamically clean airplane around, what with the landing gear and bracing sticking out, the open cockpit and all, and weighing about twenty some

Dan Fulmer launching his scale P-38. Whiteside photo.

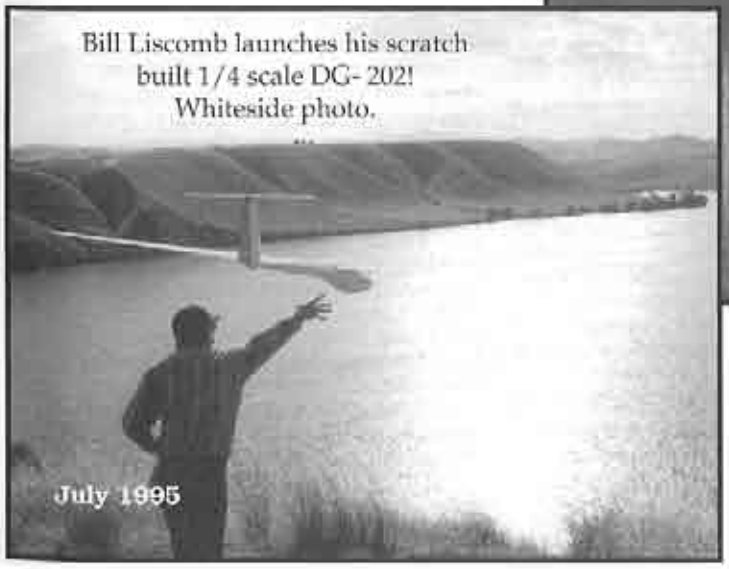
Steve Henderks from the BIRDWORKS with his award winning Albatross. Whiteside photo.

open flying, the pilots were asked to vote for the favorite plane in each category. Following are the results:

PSS: A-6 Intruder, Jose Serrano
Vintage: 1/4 scale Minimoa, Dennis Brandt
Modern: Genesis, Jim Thurmond
Pilots Choice: Albatross, Steve Hinderks

Overall, this was a fun, social, casual event and we plan to do it again next year in May. Please join us! ■

Jim Thurmond & Genesis. Joe Thomas photo.



Bill Liscomb launches his scratch built 1/4 scale DG-202! Whiteside photo.

Understanding Sailplanes

...by Martin Simons

13 Loch Street, Stepney,
South Australia 5069

Flight Without Figuring Part 5
More about wing sections

The design of wing sections

Aerofoil section design has advanced a great deal since great pioneers like Horatio Phillips experimented with wind tunnels. Phillips invented the double surfaced, cambered wing section in 1884 when most other people at his time had been working with single thicknesses of fabric stretched over light frames. Having found that a pointed leading edge tended to cause flow separation, Phillips introduced a carefully shaped bulge on the under side which guided the flow round this critical area. He called this the Phillips Entry. It was patented in 1891.

It is astonishing that some model fliers still talk about the Phillips Entry, not realising that they are a full century out of date! Moreover, the original Phillips Entry was quite different from the feature that is usually intended now. It is time the term 'Phillips Entry' made its final exit!

One of the important things that has been proved since Phillips' time, is that we cannot treat the airflow over and under a wing as entirely separate.

In a flow of air, just like a flow of water, a disturbance in one place spreads its influence out in all directions, upstream, downstream and sideways. Any alteration, anywhere on a wing section, affects the whole. Changing the shape of the underside has some effect on the upper surface flow, and vice versa. An alteration at the trailing edge has some effect at the leading edge and even further forward, ahead of the wing altogether. It is not possible to alter one part without changing everything else to some extent. The profile has to be taken as a whole.

Aerofoil section design is now done by a repetitive mathematical process of *iteration*. The total variations of air pressure and flow speed around the entire profile are calculated. Each tiny bit of the wing surface is taken in turn, working out how it affects the flown not only over itself but also over the next adjacent segment downstream. From an approximation at the beginning for one small panel, the result is applied to the next panel in sequence and so on, all the way over and around both surfaces until the iteration arrives back at the place it started from.

This produces different figures for the first panel from the approximate ones used to start the process. Hence the first panel has to be recalculated and so does the next and the next and the next and so on. The iteration goes all round the profile a second, third, fourth time or more, however many times it takes. When all the answers on the 'nth' time, everywhere round the profile, come out the same as the last time, the iteration stops. Such work would be impossibly time consuming without a computer.

For full sized aircraft wings, the results are very good. For models, although a good deal has been done, the full scale formulae do not apply with very great accuracy. Progress has been made but the final answers to our problems are not yet known. There is still much to be learned about the vital boundary layer, the thin zone in the air flow closest to the skin of the wing, at very low flight speeds with small wings.

Model sections

While we cannot afford to ignore the modern research, experience remains the most important teacher.

This is all the more true when actual wings constructed by modellers are compared with exact section ordinates. Not many of us work to the fine limits required to reproduce a section with mathematical accuracy. If the model has a wavy skin, as when covered with plastic film or fabric over an open frame, or if a foam cored wing is slightly wobbly, or the wing has a badly shaped leading or trailing edge, or if there are blobs of paint or small steps where a paint trim line or a piece of decorative tape has been stuck on, these alter the character of the section. (Not all such variations are necessarily bad. As will be explained, turbulator strips correctly placed can sometimes improve a wing.)

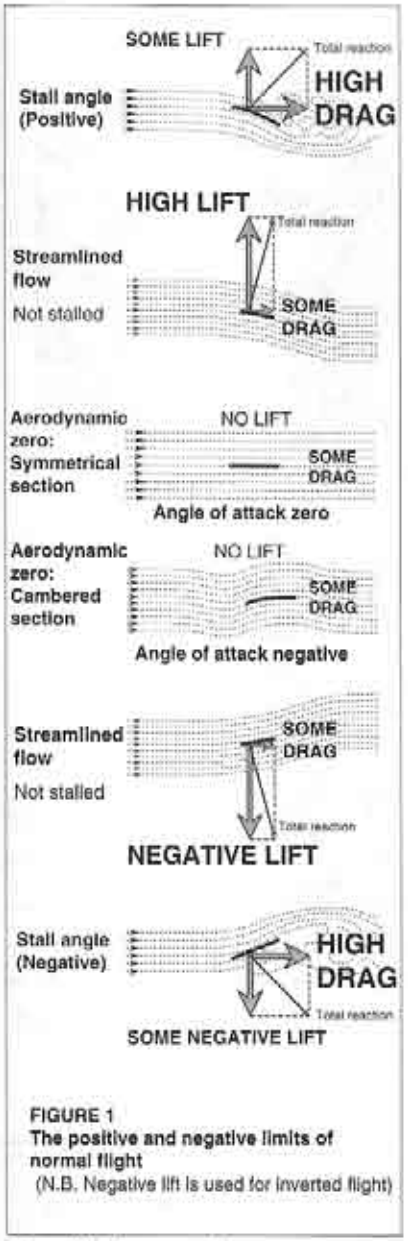


FIGURE 1
The positive and negative limits of normal flight
(N.B. Negative lift is used for inverted flight)

It is still fair to say that two fundamental things about wing sections should be understood: camber and thickness. **Nothing much can go wrong if we get the camber and thickness right.**

We shall now look at camber and thickness separately, but bear in mind that any change will change everything else to some extent.

Camber

In an earlier article (RCM News No. 5, p 6 -7) it was explained that a slightly arched or *cambered* piece of card or thin wood, held in an airstream like a wing, will develop lift if it is held at an appropriate angle of attack. Some diagrams from that article are repeated here (Figure 1). If the angle is too large the wing will stall, if too negative (equivalent to upside down in flight), it will stall in the negative sense. These are the practical limits for normal flying. Somewhere between the positive and negative stalling angles there is an angle of no lift, called the aerodynamic zero.

If the section is perfectly symmetrical or *uncambered* this aerodynamic zero coincides with the geometric zero angle of attack.

With a *cambered* surface, aerodynamic zero appears at a negative geometric angle.

Some model aeroplanes and gliders are flown with wing sections which are cambered surfaces of almost no thickness. For example, the best indoor models have very flimsy wing frames covered with the thinnest possible membranes of microfilm. For such very light, slow flying models these work well. It is easy to judge amount and type of camber simply by looking at the wing.

Radio controlled models require some depth in the wing to provide strength and stiffness for flight in the ordinary, turbulent atmosphere. (There are other reasons why a thickened section is often preferable to the thin sheet wing, but discussion of this will be left on one side for the present.) The camber of such wing sections cannot really be assessed simply by looking at them.

The model flier may think of any aerofoil section as an arched or *cambered line* buried within the thickness. It may be imagined as the skeleton of the profile. Some of the main features of the wing are determined by the shape of the skeleton just as bone structure determines important human bodily features. The flesh, or thickness of the wing, may be imagined as grown around the camber line, equally on both upper and lower sides. ■

Part 5 will be continued next month. ED.

■

New Products

NEW PRODUCTS

The information in this column has been derived from manufacturers press releases or other material submitted by a manufacturer about their product. The appearance of any product in this column does not constitute an endorsement of the product by the *R/C Soaring Digest*.

T.U.F. Line

...from Willoughby Enterprises

T.U.F. Plus line is much like cotton string, soft, and pliable. Made of Spectra, it is extremely thin, incredibly strong, and has very little stretch. Willoughby Enterprises currently has 80# test line in stock; it is .020" in diameter, thus presenting very little drag in the air on launch.

It is shipped on a white plastic spool via the post office, usually taking 5 to 7 days in the U.S.A. Next day air in the U.S.A. is offered for an additional $12.00. (UPS does not deliver to APO or PO Boxes.)

Stock #072, 100 yards (300 feet), one spool, is $13.00 postpaid. Stock #073, 150 yards (450 feet), continuous, is $21.00 postpaid. Stock #074, 300 yards (900 feet), one line, is $40.00 postpaid. Stock #075, 500 yards (1500 feet), one piece, is $70.00 postpaid. Stock #075 can be used on a number of winches or divided with a buddy.

To place an order send a postal or bank money order to Willoughby Enterprises, 41560 Terwilliger Road #127, Anza, CA 92539-9666. For a 10 foot (3 meter) sample for testing, please send $1.00 and a SASE.

(T.U.F. line was designed for fishing. It was written up in the 3/94 issue of *RCSD*, page 3. ED.) ■

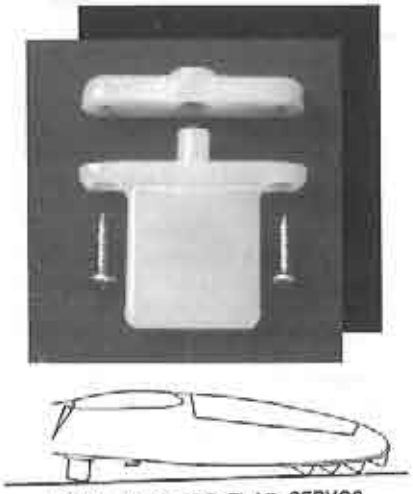
Lancer

...from Soaring Specialties

The 2 meter Lancer features a balsa sheeted foam wing, 'glass/Kevlar fuselage, and built up stabilizers. This 30 oz. design offers light weight for excellent thermalling and strength for zoom launches. At 522 sq. in. and an 8.3 oz./sq. ft. wing loading, Lancer utilizes the camber changing ability of the SD7037 airfoil, and 5 micro servos keep the weight down, but still allow for full trailing edge camber control.

The kit comes with complete hardware. Wings are two pre-sheeted panels. Assembly consists of installing two ply dihedral braces, joining the two panels, and installing the fiberglass reinforcement. Rudder and full flying stab are built up. Construction can be completed in relatively few evenings.

Lancer is available exclusively from Soaring Specialties, 1403 Lincolshire Rd., OKC, OK 73159; (405) 692-1122. ■



SKEG PROTECTS FLAP SERVOS

Skegs & Skids

...from Tim McCann

The injection molded, polyethylene, plastic Skeg is designed to protect your flap servos and improve your landing scores. The Skeg is virtually unbreakable, and utilizes an energy absorbing .250" boss that extends into the fuselage and is held in place with a matching backing plate. It is easily attached to most sailplanes, and is a perfect compliment to the one piece "Sharkstooth" landing skid. Both are available for $4.95 each postage paid (U.S. orders, U.S. funds) direct from: Tim McCann, P.O. Box 2091, Harrison, AR 72602. ■

Radio Control Transmitter Tray and Performance Pad

...from F.K.H. Enterprises

The Radio Control Transmitter Tray and Performance Pad was designed using Human Factors Engineering technology. Ergonomically friendly, it will reduce fatigue, and enhance performance. It allows the use of thumb and forefinger, and not just the thumb.

The assembly is made of high strength acrylic materials, and high quality components. Assembly is easy, and maintenance is negligible.

The cost is $35.95 plus $3.00 shipping. Available from: F.K.H. Enterprises, 21651 Balerma, Mission Viejo, CA 92692; (714) 859-3208, fax (714) 859-1223. ■

Model Aviation Education

...by Jerry & Judy Slates

We got a bit of a surprise when we opened up the March 1995 *CIAM Flyer*. Jack Sile, the editor, gave *R/C Soaring Digest* a very nice write-up regarding all our efforts to help promote model aviation education. As Jack says, "This is an international team effort and we hope to continually report the success of this venture and hope that it will in some way inspire other countries and other modellers to get involved in aerospace technology." Thanks, Jack!

The package Jack is referring to was addressed by Ed Slegers in his column in the March 1995 issue of *RCSD*, page 5. Mr. Bachmeyer has done a wonderful job on his little book, "Radio Control Soaring", but whether we will have an opportunity to have input, say 5 years down the road, only time will tell. It is but one project in many on the subject of model aviation education.

In the meantime, one area that several of you have pointed out is the lack of entry level, built-up sailplanes on the market today. It is rumored that the Airtronics Olympic 650 may eventually be manufactured again, but in the meantime there is little to chose from, and hence one of the reasons for the Entry Level Design ELD Contest. What's that? Keep reading, and you'll see!

The actual idea for the contest came from Mark Nankivil of Saint Louis, Missouri. Back in October 1994, Mark sent us a letter regarding a project that he was working on. At the time, it was seemingly unrelated to what you are reading here, today.

Mark's Request

"I am writing to enlist your help with a project that I have become involved with. I have been developing my own Interactive Distribution business for a couple of years, now, and work with many other businesses in the process. This December 3rd, we are having our 4th Annual "Dream Night" in Peoria, Illinois. This is an evening where many different displays are set up highlighting many of the things people look forward to doing in the future such as travel, boating, flying, hunting, etc., and also many of the day-to-day things we're all looking to improve on such as cars, homes, and hobbies. I have met many people in our business who have wanted to partake of R/C Modeling and almost to a person, soaring has been new and something of a revelation to them. Since soaring and electrics are my primary focus in the hobby, I naturally plan to emphasize those aspects of the hobby in my display area.

"I have been involved in LSF for a number of years, and have helped Mike Stump and the rest of the Clan each year at the LSF NATS. This year, you sent a number of back issues of *RCSD*, and this went over extremely well with those in attendance at the banquet. I would like to ask the same type of help in spreading the word, particularly to an audience with little or no knowledge of what it is we do. I will be setting up a display booth with models on display and photos and drawings mounted on a wall at the back of the booth. I would like to be able to have hand outs available for those interested in taking one with them. We anticipate having approximately 1500 people in attendance for "Dream Night". I don't expect everyone to be interested in what we are displaying, but I know that there will be many that will be intrigued by what they see. As such, I would appreciate whatever help you may be able to give."

Neat idea, Mark! And did we help? You bet! A later note from Mark said, "It was a success!"

Because of Mark's interest, we sent him a copy of the "Radio Control Soaring" book, the Pitsco catalog, and the CIAM Flyer 1994. We wanted to get his input on the material.

Mark's Response

"Thank you for the bag of goodies! The "Radio Control Soaring" handbook is a great idea and I am a bit amazed that something like this exists, but has not shown up in any hobby shop or other more common source. I will be talking to various hobby shops in the area, and leave them copies of the pertinent pages from the Pitsco catalog showing the soaring and other various handbooks that are available.

"I am going to present this information to our club this evening at the monthly meeting and let it be known that it is available. I presently have two individuals who have expressed a strong interest in learning to fly sailplanes, and I plan on using this manual to guide them along the learning curve. Some time back, the St. Louis County Parks and Recreation Department planned on having a summer course on R/C Flying, though the intent was for gas powered models. I do not know what happened to the program, but I will make the effort to track down who might have been involved and see if this project could be a basis of any future developments.

"The only item in the book that may be a bit dated is the use of the Airtronics Olympic 650 kit. They are difficult to find and as I understand it, out of production for now. I think a reasonable substitution would be the Great Planes Spirit. All in all, a small point.

"In addition, you might want to include Mike Stump, President of the LSF, on your mailing list for this project. With the LSF credo of achievement and not necessarily competition, this could be something that would dovetail nicely with possible future developments.

"I appreciate your including me on the mailing list and will keep in touch with you to let you know how it goes. The *CIAM Flyer* is interesting, too - thanks!"

From "Dream Night" to hobby shops, club meeting, training, kit substitution recommendation and a request to add Mike to the list, which we of course did. Now just what could Mark dream up next? Sure enough, another letter arrived.

Mark's Idea

"For the last couple of years, discussions with other glider guiders, either in our club or elsewhere at various contests, has invariably brought up the subject of the sailplane you would recommend for a beginner and/or the general rise of the cost of models today. Face it, the choices for a good, basic beginner's model have narrowed considerably over the last few years. With the demise of the Airtronics Olympic II and Olympic 650, as well as the general trend towards foam cores and fiberglass, there's not a big variety of readily available kits out there to help a newcomer get off to a simple, straightforward start. Even the use of the Olympic 650 as the basis of a beginner's model in the "Radio Control Soaring" book is obsolete because of its unavailability. Herk Stokely's column in the June issue of *Flying Models* was the final impetus for getting me to sit down and write this letter to you and outline a proposal for your thoughts and comments on.

"Why the general lack of "new" blood in the sport? The reasons are many and varies, as today there are many competing activities for younger people to choose from, much more than when most of us were bitten by the "model/flying bug". Suffice it to say, that won't change by our wish or hoping for it to. Cost is also a point of concern, as Herk's column states quite well. So, what are we to do?

"Manufacturers today have left the basic model behind primarily because of economics, and I really can't blame them. The profit margin isn't there because of the labor and material costs in making the model, and the low selling price that the market (newcomers) demands. But the manufacturers need to realize that the future will dry up if few newcomers join in and as the present fliers fade away. I'm not saying there is nothing on the market in the way of entry level models, but instead that there is room for a new generation to appear.

"A number of years back, *RCSD* sponsored an SMT Design Challenge that helped lead to the Falcon 880 and other models that were the beginnings of what are being flown today. The challenge allowed Mark Allen and other designers to have a focal point that showcased their models and gave them exposure to take their models into production. With the exposure came a better chance of success. Simply look at the ads just 6 months later and you could see the new designs spawned by the Challenge. Looking back on that Challenge, it helped set an impetus that led to those successful models, and then beyond that to the Legend, Peregrine, Thermal Eagle, Spectrum, Prism, Mako, etc. Let's take that successful genesis as a basis for a new generation of models that can both guide a newcomer into the hobby and yet have the ability to be competitive for those of us that have progressed beyond the initial part of the learning curve. With laser cutting and the other technologies available today, the cost of kit manufacturing can possible be controlled to make these new designs a viable money maker for the manufacturer.

"I would like to propose an Initial/Intermediate Design Challenge that will lead to a new generation of models for the newcomer and intermediate, alike. A suggested list of design goals would be: 1) Wingspan - 2 meter or as Herk outlines, 110" - 120" (Possibly both?), 2) Controls - Rudder/Elevator/Spoilers upgradable to ailerons and flaps (Spirit 100 is a great example of this flexibility), 3) Construction - Whatever it takes to keep the cost down and affordable! Ease of construction for a newcomer, plus strong!

"...Well, what are your thoughts? Something does need to be done to attract newcomers to our great hobby and the cost is the first thing they'll see when they walk into the hobby shop or read the advertising in the model magazines. I am excited by the potential of such a Challenge. Just look at what SMT has brought to the modeler! And I feel that *RCSD* is still the best source for open discussion, and action for such a Challenge."

Yep, we agreed that the time had come. Guidelines and criteria were prepared, and the ELD contest announcement was distributed at the 4th Annual Mid-South Soaring Championships, June 15th - 18th.

The purpose of the contest is to design and build a "low cost" thermal sailplane with two function control, yaw/pitch (rudder/elevator), that can be built and flown by a beginner with little or no help. The final judging will be a year from now at the 1996 Mid-South Soaring Championships (MSSC) which will be held in Memphis, Tennessee. So, you'll have plenty of time to think about this and get started.

The rules and judging criteria you see here this month may be subject to some modification or clarification; the flight tasks may change a bit. We'll know more as we work out the details with the folks of the Memphis Area Soaring Society and the North Alabama Silent Flyers. Some participants of the 1995 Mid-South Soaring Championships have already expressed interest, as have others in phone conversations. It appears that some folks are already off to a fast start!

And where is Mark going to be? Well, he plans to attend the 1996 MSSC, and will naturally be drafted as one of the judges, for the ELD Event. Actually, he's already agreed!

Oh, and you probably noted that the framework for the ELD says "Advancing the Hobby". Our thanks to Bob Sowder for that phrase, as we think it very appropriate.

In Summary

If any of you, or your club, are doing anything in the way of education, we would like to hear from you; if you wish to obtain a copy of the *CIAM Flyer*, March, 1995, please let us know. The *Flyer* has a limited distribution of 30 in the U.S.A., until now. Jack Sile has been kind in sending us additional copies, and we have permission to reproduce them if more are required. As with the March, 1994 issue, it is about youngsters, education, and team efforts.

One of the first projects that we intend to share with Jack for the pages of the *CIAM Flyer* is Jim Ealy's project, "Radio Controlled Airplanes, CBL's, and Physics", which is included in this issue. Another project is underway in the Appleton, Wisconsin area; Lee Murray will be sharing the MARCS educational program efforts in the future. Will the Bike & Hobby shops make a comeback? Well, we understand that work is being done in this area, as well. So, let us know what you're doing.

Please remember, all the material that appears to be appropriate for the CIAM Flyer will be held for awhile, and submitted to Jack Sile for consideration for the March 1996 issue of the *CIAM Flyer*. ■

ENTRY LEVEL DESIGN (ELD) CONTEST

SPONSORED BY RCSD

PURPOSE

TO DESIGN AND BUILD A "LOW COST" THERMAL SAILPLANE WITH TWO FUNCTION CONTROL, YAW & PITCH (RUDDER/ELEVATOR), THAT CAN BE BUILT AND FLOWN BY A BEGINNER WITH LITTLE OR NO HELP.

DESIGN RULES

DESIGNER:	RCSD Subscriber, Immediate Family Members (Subscriber may represent club.)
ENTRY FEE:	None!
JUDGING:	MSSC 1996, ELD Special Competition Event Memphis, Tennessee
TROPHIES:	1st - 4th
AWARDS:	1st Place - 4 Channel Radio 2nd - 4th - To be determined. 1st - 4th - Free Assistance Advertising Drawings
DESIGNER:	The designer does not have to be in attendance, but the plane does. The designer may designate someone else to fly. The designer may enter the plane by sending it to a designated MSSC represenatative. It will be flown by an experienced pilot.
AMA MEMBER:	Required

DESIGN CRITERIA

Type:	Thermal
Controls:	Two Function, Yaw & Pitch (Rudder/Elevator)
Braking Device:	Optional (Spoilers or Flaps)
Fuselage:	Built-up
Wings:	Built-up
Wing Span:	No Limit
Price:	Under $100.00 (Excl. Radio Eq./Gear)

DESIGN ENTRY REQUIREMENTS

3-View

Full-Size Construction Drawing
- Must show side, top, and front view.
- Must show patterns and detailed construction figures, if required.

Specifications

Building Materials List
- Cost of each item must be listed, and totaled.

Building Instructions

Photograph

DESIGN JUDGING CRITERIA

Ease of Construction
- All items must be available over-the-counter.
- All items must be easy to obtain by a beginner.
- No home-made or exotic items can be used.
- Must hold standard size receivers & servos.
- Must accomodate at least 550ma battery pack.
- There will be no fiberglass wings or fuselage.
- All construction must be built-up.
- Model must match the drawing, and all entry requirements.

Clarity & Completeness of All Entry Requirements

Cost of Materials
- This is the actual cost to purchase the materials, new.

Final Cost with Radio & Servos

Flight Characteristics
- Model must be launched from high start, only.
- Model will be judged on 12 minute add 'em up thermal ability, ability to land within 10' diameter circle, and the distance the plane can cover by hand toss.

Marketability

DESIGN DISQUALIFICATION

The purpose of this event is to advance the hobby by designing and building a marketable sailplane that a beginner can easily build and fly at a low cost. Any effort to circumvent this overall purpose will result in immediate disqualification. All trophies and prizes will be awarded for Design Excellence in Support of Advancing the Hobby.

Anything published before is NOT eligible.

PRE-REGISTRATION FORM 7/95 RCSD

I am interested in entering the Entry Level Design (ELD) Contest which will be held in Memphis, Tennessee at the Mid-South Soaring Championships in 1996.

- ✧ I'll be there.
- ✧ Put me down as thinking about it.
- ✧ Include me, tentatively.

Additional information about this event will be included in RCSD, or will be mailed to those that send in pre-registration forms.

Name ----------
Address ----------
City/State/Zip ----------
Telephone #, FAX ----------

Please return to R/C Soaring Digest, P.O. Box 2108, Wylie, TX 75098-2108
(214) 442-3910 • FAX (214) 442-5258

Classified Advertising Policy

Classified ads are free of charge to subscribers provided the ad is personal in nature and does not refer to a business enterprise. Classified ads that refer to a business enterprise are charged $5.00 per month and are limited to a maximum of 40 words. The deadline for receiving advertising material is the 5th day of the month. (Example: If you wish to place an ad in the March issue, it must be received by February 5th.) *RCSD* has neither the facilities or the staff to investigate advertising claims. However, please notify *RCSD* if any misrepresentation occurs.

Personal ads are run for one month and are then deleted automatically. However, if you have items that might be hard to sell, you may run the ad for two months consecutively.

For Sale - Business

GLIDER RETRACTS - high quality, 1/5, 1/4, 1/3 scale made in U.S.A. 1/4 are standard or heavy duty. Contact Bill Liscomb, 7034 Fern Place, Carlsbad, CA 92009; (619) 931-1438.

PC-Soar Version 3.5 Sailplane Performance Evaluation Program Optional Sailplane Library now expanded to 54 models including: Alcyone, Anthem, Genesis, Mako, Probe, Thermal Eagle, and Synergy-91. Free Library Upgrades. PC-Soar Upgrade to Ver. 3.5 $10, PC-Soar New Purchase $40. New Libraries of Sailplanes and Airfoil Polars $30. Please include $3 P&H for all purchases & upgrades. Also available: *RCSD* Database and Laser cut airfoil templates. LJM Associates, 1300 Bay Ridge Rd., Appleton, WI 54915; ph: (414) 731-4848 after 5:30 pm weekdays or on weekends.

Ford long shaft motors, new shafts, brushes, commutators, and hi-torque windings. Polyurethane paint and custom fitted bushing, or "Real Balls" end plates. Complete, contest duty winches. Turn arounds with lo-mass hubs. Foot pedals, solenoids, line, swivels, switches, plugs, etc. Contact Mike Wade, Wade Supply Co., 17441 N Nunneley, Clinton TWP, MI 48036; (810) 228-9695.

PRECISION AMAP WING CUTTER, replacement parts, and service. AMAP Model Products, 2943 Broadway, Oakland, CA 94611. Butch Hollidge, (510) 451-6129, or FAX (510) 834-0349.

For Sale - Personal

Banshee 2 meter, RTF, no servos... $275.00 or with all servos, $450.00; Beautiful 4 meter ASW-22 Multiplex semi-scale glider, completely built & flying with all servos... $500.00; Impulse 2 meter slope ship, NIB... $50.00 + shipping. Call Jay, (303) 973-6436, eve, Colorado.

Rebuilt Ford 3115 long-shaft starter motors, complete winches, bare frames and components, photos & specs. avail. Steve Haynes, (508) 771-0041, 5 - 8 PM EST, Massachusetts.

For Sale - Personal

Spectrum, S3021 airfoil, used in Slegers ads... $300; Synergy 91, w/1000 ma battery... $400; Saturn 2.9T, built/never flown... $300. Will consider trades. Prices + S&H. Gordon Jones, (214) 271-5334, Texas.

Airtronics PCM 7, ch 38... $165.00; O.S.F.S. Twin 120 II, NIB, never run... $495.00; 1/4 scale Kinner sportster covered in 21st century blue & yellow, never flown... $500.00. Robin Lehman, (212) 744-0405, New York.

Lovesong original and complete kit, NIB... $125.00. Erich Schlitzkus, (717) 993-3950, Pennsylvania.

Prism RG-15, RTF w/6 servos installed & wired for Airtronics, natural clear finish w/ red tips... $550.00 or best offer, shipping included (USA only). Pat McCleave, (316) 721-5647, 6 - 9 pm, anytime on weekends, Kansas.

Slegers International Spectrum, RG-15 airfoil, RTF, add receiver and go fly. Comes with wingbag... $500.00 firm or $300.00 without servos, includes shipping. Ray Cindric, (704) 549-5511, 5 - 9 pm EST, anytime on weekends, North Carolina.

NIB kits: Dodgson Designs Sprite... $100.00; Spirit 100... $60.00; Weston Magic, bagged wings & V's, Wortman FX60-100... $320.00; 2m Mariah... $100.00; Multiplex Schaumpus (3 or 3.5m)... $375.00. RTF: Airtronics Cumic Plus w/3 servos... $125.00; Airtronics Sagitta 900 w/3 servos... $125.00; Airtronics Sagitta 600 (aileron version) w/3 servos... $100.00; Graupner Pink 2m Electric, geared Astro 05, Futaba 4 channel TX/RX-motor controller, extra 4 channel receiver... $350.00; Astro Challenger w/geared 05, Futaba 4 channel TX/RX-motor controller, 2 extra 4 channel receivers... $275.00. Shipping on all items extra. Jim Thomas, (206) 488-2524, Washington.

Complete F3B winch, Bosch motor, calibrater resistor, brake, Fredette drum, clam shells, mono line, turnaround pulley, foot switch, wheels, battery... $400.00; "Reaction" F3B ship, RG-15, excellent condition, wired for Airtronics, RTF... $250.00 or $350.00 w/Becker wing servos; Falcon 550E, great electric sailplane for 05 motor and 7 cells, glass fuse, obechi/foam wing, E387, 2m wing, perfect condition... $150.00 or $200.00 with 3 micro servos. Lenny Keer, (970) 737-2165, Colorado.

Sig Samurai, 60" pivot wing sloper, vacuum bagged birch ply w/carbon reinforcing, Airtronics mini-servo for elevator, new 74 oz. BB JR servo, white lacquer glass fuse (carbon reinforced), red laquer painted wings & stab, test flown, pretty fast/agile/stable... $170.00 + shipping. Gordy Stahl, (502) 592-2923 mbl., Kentucky.

ASH-25 by Robbe, NIB, 3 - 3.6 meter span w/ plug in wingtip extensions, obechi covered wings w/spoiler slots pre-cut, Plura fuse... $275.00. John Derstine, (717) 596-2392, Pennsylvania.

ULTRA GP 55 3/8" molded wingeron, receiver only needed to get airborne, Airtronics 680Z 732 & JR341 installed, easy switch over for Futaba, extra tail section included with original packaging and paperwork, flies great at 27 oz. in 35 mph winds... $300.00 + $25.00 shipping US; LASOAR 650, electric, 5 turn .05, 1700X7, Flightec speed control, JR341 in tail, building of obechi wing only needed... $399.00 + $25 shipping US. Daniel Danrich, (808) 665-0314, Lahaina, Hawaii.

1/3 Discus over 5 meter span with all servos rigged for Futaba, includes airtow nose release & retractable wheel, with cockpit detail... $1500.00; 1/3 Club Libelle (Krause), 5 meter span with servos rigged for Futaba, with nose release, absolutely ready to fly... $1400.00; Twin Astir (Wik), 4 meter all glass, excellent condition, completely finished, ready to fly, slight hangar rash, has an immaculate detailed twin cockpit - competition worthy, all servos rigged for Futaba radio, nose tow release for airtowing... $1000.00; Thurmoflug all glass 4 meter Salto with Futaba servos, slight hangar rash, absolutely ready to fly... $900.00; Krause 1/3 Salto with Futaba servos, nose release for airtow, mint condition... $1500.00. Robin Lehman, (212) 879-1634, New York.

Wanted

2M Sonic fuselage. Any condition. Gordon Jones, (214) 271-5334, Texas.

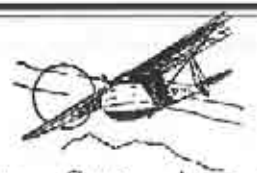
Right wing or both wings for Multiplex LS-3. Gerald Fukuoka, Johnston Atoll, P.O. Box 049, APO/AP 96558.

Left wing for Multiplex DG-300 or 300/17 (obechi). Will consider entire kit, NIB, or damaged plane. John Derstine, (717) 596-2392, Pennsylvania.

Left wing for Multiplex Kabe, or a pair of wings. Ron Wahl, (315) 331-7417, NY.

Vision 8SP, well cared for, reasonably priced, with or without servos, etc. Any channel. Michael @ (206) 631-8269, 9am - 9 pm, Washington.

Gliders: old, wood scale or modern, Baby Bowlus or Albatross, Nelson Ka6, Minimoa or Primary, Synergy 91, F3B and F3B types. Wings: Multiplex, DG-600 (end feathers), DG-300, 100" or 130" (carbon fiber), Hobe Hawk (tail feathers - I have a right wing if anyone needs it.). JR receivers and crystals, stuff - anything. I restore old wooden gliders and just can't stand to see anything thrown away! If you have something that you are going to throw away, please call me first. I'll work with you, on a trade or whatever. Gene, (805) 527-8582, California.



The Vintage Sailplane Association

Soaring from the past and into the future! The VSA is dedicated to the preservation and flying of vintage and classic sailplanes. Members include modelers, historians, collectors, soaring veterans, and enthusiasts from around the world. Vintage sailplane meets are held each year. VSA publishes the quarterly BUNGEE CORD newsletter. Sample issue: $1.00. Membership is $15.00 per year. For more information, write to the:

Vintage Sailplane Association
Route 1, Box 239
Lovettsville, VA 22080

T.W.I.T.T.

(The Wing Is The Thing)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation which is dedicated to furthering education and research in a variety of disciplines. Full information package including one back issue of newsletter is $2.50 US ($3.00 foreign). Subscription rates are $18.00 (US) or $22.00 (Foreign) per year for twelve issues.

T.W.I.T.T., P.O. Box 20430
El Cajon, CA 92021

LSF

The League of Silent Flight (LSF) is an international fraternity of RC Soaring pilots who have earned the right to become members by achieving specific goals in soaring flight. There are no dues. Once you qualify for membership you are in for life.

The LSF program consists of five "Achievement Levels". These levels contain specific soaring tasks to be completed prior to advancement to the next level.

League of Silent Flight
10173 St. Joe Rd.
Ft. Wayne, IN 46835

R/C Soaring Resources

These contacts have volunteered to answer questions on soaring sites or contests in their area.

Contacts & Soaring Groups - U.S.A.

Alabama - North Alabama Silent Flyers, Ron Swinehart, 8733 Edgehill Dr. SE, Huntsville, AL 35802; (205) 883-7831.

Arizona - Central Arizona Soaring League, Iain Glithero, (602) 839-1733.

Arizona - Southern Arizona Glider Enthusiasts, Bill Melcher (contact), 14260 N. Silwind Way, Tucson, AZ 85737; (602) 325-2729. SAGE welcomes all level of flyers!

California - California Slope Racers, John Dvorak, 1063 Glen Echo Ave., San Jose, CA 95125; (408) 259-4205.

California - Desert Union of Sailplane Thermalists, Buzz Waltz, 3390 Paseo Barbara RD, Palm Springs, CA 92262; (619) 327-1775.

California - Northern California Soaring League, Mike Clancy (President), 2018 El Dorado Ct, Novato, CA 94947; (415) 897-2917.

California - South Bay Soaring Society, Mike Gervais, P.O. Box 2012, Sunnyvale, CA 94087; (408) 683-4140 after 5:00 pm.

California - Southern Calif. Electric Flyers, John Raley (President), 1375 Logan Ave., Costa Mesa, CA 92626; (714) 641-1776 (D), (714) 962-4961 (E), e-mail: E-Flyer@ix.netcom.com.

California - Southern Calif. Soaring Action, Pete Young, 6592 Belgrave Ave., Garden Grove, CA 92645-1802; (714) 892-3473.

California - Torrey Pines Gulls, Ron Scharck, 7319 Olivetas Ave., La Jolla, CA 92037; (619) 454-4900.

Florida - Florida Soaring Society, Ray Alonzo (President), 3903 Blue Maidencane Pl., Valrico, FL 33594; (813) 654-3075 H, (813) 681-1122 W.

Georgia - North Atlanta Soaring Association, Tim Foster, (404) 978-9498 or Tom Long, (404) 449-1968 (anytime).

Hawaii - Maui Island Slope Soaring Operation, Gerald Fukuoka, Johnston Atoll, P.O. Box 049, APO/AP 96558.

Illinois (Chicago Area) - Silent Order of Aeromodeling by Radio (S.O.A.R.), Jim McIntyre (contact), 23546 W. Fern St., Plainfield, IL 60544-2324; (815) 436-2744. Bill Christian (contact), 1604 N. Chestnut Ave., Arlington Heights, IL 60004; (708) 259-4617.

Iowa - Eastern Iowa Soaring Society (Iowa, Illinois, Wisconsin, Minnesota), Bob Baker (Editor), 1408 62nd St., Des Moines, IA 50311; (515) 277-5258.

Indiana - Bob Steele, 10173 ST Joe Rd., Fort Wayne, IN 46835; (219) 485-1145.

Kansas - Wichita Area Soaring Association, Pat McCleave (Contact), 11621 Nantucket, Wichita, KS 67212; (316) 721-5647.

Kentucky - Bluegrass Soaring Society, Frank Foster (President), 4939 Hartland Pkwy., Lexington, KY 40515; (606) 273-1817.

Maine - DownEast Soaring Club (New England area), Steve Savoie (Contact), RR#3 Box 569, Gorham, ME 04038; (207) 929-6639. InterNet e-mail <Jim.Armstrong@acornbbs.com>.

Maryland - Baltimore Area Soaring Society, Russell Bennett (President), 30 Maple Ave., Baltimore, MD 21228; (410)744-2093.

Maryland and Northern Virginia - Capital Area Soaring Association (MD, DC, and Northern VA), Steven Lorentz (Coordinator), 12504 Circle Drive, Rockville, MD 20850; (301) 845-4386.

Michigan - Great Lakes 1.5m R/C Soaring League & "Wings" Flight Achievement Program & Instruction. Ray Hayes, 58030 Cyrenus Lane, Washington, MI 48094; (810) 781-7018.

Minnesota - Minnesota R/C Soaring Society, Tom Rent (Contact), 17540 Kodiak Ave., Lakeville, MN 55044; (612) 435-2792.

Missouri - Independence Soaring Club (Kansas City area, Western Missouri), Edwin Loy (Contact), 12904 E 36 Terrace, Independence, MO 64055; (813) 833-1553, eve.

Nebraska - B.F.P.L. Slopers, Steve Loudon (contact), RR2 Box 149 E1, Lexington, NE 68850; (308) 324-3451/5139.

Nebraska - S.W.I.F.T., Christopher Knowles (contact), 12821 Jackson St., Omaha, NE 68154-2934; (402) 330-5335.

North Carolina - Aerotowing, Wayne Parrish, (919) 362-7150.

New York, aerotowing Long Island Area, Robin Lehman, (212) 744-0405.

New York, aerotowing Rochester area, Jim Blum and Robin Lehman, (716) 367-2911.

New York - Long Island Silent Flyers, Stillwell Nature Preserve, Syosset, NY, Joe Coppola (President), (516) 798-1479, or Taylor Fiederlein (VP), (516) 922-1336.

Northwest Soaring Society (Oregon, Washington, Idaho, Montana, Alaska, British Columbia, Alberta), Roger Breedlove (Editor), 6680 S.W. Wisteria Pl, Beaverton, OR 97005; (503) 646-1695 (H) (503) 297-7691 (O).

Ohio - Dayton Area Thermal Soarers (D.A.R.T.S.), Walt Schmoll, 3513 Pobst Dr., Kettering, OH 45420, (513) 299-1758.

Ohio - Mid Ohio Soaring Society (MOSS), Hugh Rogers, 888 Kennet Ct., Columbus, OH 43220; (614) 451-5189, or e-mail tomnagel@freenet.columbus.oh.us.

Oklahoma - Central Oklahoma Soaring, George Voss, (405) 692-1122.

Tennessee - Memphis Area Soaring Society, Bob Sowder (contact), 1489 Wood Trail Circle, Cordova, TN 38018, (901) 757-5536, FAX (901) 758-1842.

Texas - Texas Soaring Conference (Texas, Oklahoma, New Mexico, Louisiana, Arkansas), Gordon Jones, 214 Sunflower Drive, Garland, Tx 75041; (214) 271-5334.

Utah - Intermountain Silent Flyers, Bob Harman, (801) 571-6406. "Come Fly With Us!"

Washington - Seattle Area Soaring Society, Waid Reynolds (Editor), 12448 83rd Avenue South, Seattle, WA 98178; (206) 772-0291.

Outside U.S.A.

Australia - Southern Soaring League, Inc. (SSL), Mike O'Reilly, Model Flight, 42 Maple Ave., Keswick SA 5035, Australia. Phones: ISD+(08) 293-3674, ISD+(08) 297-7349, ISD+(018) 082-156 (Mobile). FAX: ISD+(08) 371-0659.

Canada - Manitoba, Winnipeg MAAC Men Gliding Club, Bob Clare, 177 Tait Ave., Winnipeg, MB, R2V 0K4, Canada, (204) 334-0248.

Canada - Southern Ontario Glider Group, "Wings" Program, dedicated instructors, Fred Freeman, (416) 627-9090, or David Woodhouse (519) 821-4346.

England (BARCS & Europe), Jack Sile (Editor), 21 Bures Close, Stowmarket, Suffolk, IP14 2PL, England; Tele. # 0449-675190.

Hong Kong - Robert Yan, 90 Robinson Road, 4th Floor, Hong Kong; (852) 25228083, FAX (852) 28450497.

Reference Material

Still a few copies available of some issues of the printed transcripts of talks given on RC Soaring at the Previous Annual National Sailplane Symposium. Prices reduced to clear out stock. Talks were on thermal meteorology, flying techniques, hand launch, cross country, plane design, airfoil selection, vacuum bagging, plastic coverings, flying wings, etc., etc. Send SASE or call for flyer giving details. Many copies of most recent (1992) transcript left. Clubs have found them good for raffle prizes, gifts, etc. Al Scidmore, 5013 Dorsett Drive, Madison, WI 53711; (608) 271-5500.

BBS/Internet

BBS: SLOPETECH, Southern California; (714) 525-7932, 14.4 baud - 8-N-1

BBS: South Bay Soaring Society, Northern California; (408) 281-4895, 8-N-1

Internet - Email list/resource of RC soaring related folks, including US and international club contacts, vendors, kit manufacturers/distributors, software, equipment and supplies. Also a resource for aeromodelling related WEB sites on the Internet. Contact Manny Tau at taucom@kaiwan.com, or on CompuServe: 73617,1731.

Hobby Shops that Carry *RCSD*

Action Hobbies
3723 S. Mendenhall
Memphis, TN 38115
(901) 365-2620

Air Capital Hobbies
8989 West Central
Wichita, KS 67212
(316) 721-4164

California Soaring Products
1010 North Citrus
Covina, CA 91722
(818) 966-7215

Finney's Hobbies
3455 Peachtree Industrial Blvd., Ste. 980
Duluth, GA 30136
(404) 495-8512
(404) 495-8513 fax

Gunnings Hobbies
550 San Anselmo Ave.
San Anselmo, CA 94960
(415) 454-3087

Gyro Hobbies
23052 Lake Forrest Dr., Unit C2
Laguna Hills, CA 92653
(714) 583-1775

HiTecHobbys
284 - B Wellsian Way
Richland, WA 99352
(509) 943-9241

Hobbies'N Stuff
9577 L Osuna Rd. NE
Albuquerque, NM 87111
(505) 293-1217

Hobby Counter
1909 Greenville Ave.
Dallas, TX 75206
(214) 823-0208

Hobby Town USA
8090 S. 84th St.
La Vista, NE 68128
(402) 597-1888

Hobby Warehouse
4118 South Street
Lakewood, CA 90712
(310) 531-8383

Tim's Bike & Hobby
2507 Broadway
Everett, WA 98201
(206) 259-0912

Seminars & Workshops

Free instruction for beginners on construction & flight techniques, Friday & week-ends (Excl. contest days), Bob Fairman, 3274 Kathleen St., San Jose, CA 95124; (408) 377-2115.

Schedule of Special Events

Date	Event	Location	Contact
July 12-13	COGG XC Dash for Cash	Cookstown, Ontario	Jack Nunn, (707) 728-4467
July 14-16	Canadian Nationals	Barrie, Ontario	Neil Tinker, (416) 491-5823
July 15	1.5m Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
July 15	MARCS 1.5M HS/HL	Madison, WI	Al Scidmore, (608) 271-5500
July 15	Ohio Cup HL & STD	Dayton, OH	Bob Massmann, (513) 382-4612
July 16	Ohio Cup 2m & UNL	Dayton, OH	Jim Martin, (513) 376-9046
July 15	HL/Open	San Antonio, TX	Mike Howell, (210) 657-3332
July 15-16	SOAR 95 (Unl, 2M)	Redmond, WA	Jim Thomas, (206) 488-2524
July 16	TPG Thermal Contest	Poway, CA	George Joy, (619) 748-2167
July 16	July Jamboree	Rochester, MI	Jack Iafret, (810) 694-2490
July 16	Hand Launch Ste.JULIE DE V., Canada		Dan Gregory, (514) 684-1795
July 21-24	Wasatch Mt. Scale/PSS Soaring Festival	Pt. of the Mt., UT	Bob Harman, (801) 571-6406
July 22-23	SWIFT/Western XC	Mead, NE	Christopher Knowles, (402) 330-5335
July 23	SOAR F3B Contest	Plainfield, IL	See Illinois R/C Soaring Contacts
July 29-Aug. 6	NATS - Soaring	Muncie, IN	
July 30	Triathalon Coteau Station, Canada		Dan Gregory, (514) 684-1795
Aug. 5-6	MATS 20th Annual/Coteau Station, Canada		Dan Gregory, (514) 684-1795
Aug. 12-13	ORCC - XC	Manotic, On., Canada	John Elliot (613) 729-9395
Aug. 12-13	Thermal Grabber UNL/2m	Redmond, WA	Jim Thomas, (206) 488-2524
Aug. 13	TPG Thermal Contest	Poway, CA	George Joy, (619) 748-2167
Aug. 18	Dawn-to-Dusk Challenge	Everywhere - Jimmy Prouty, prouty@emh.kadena.af.mil	
Aug. 19	Handlaunch	San Antonio, TX	Jerry Caldwell, (210) 438-4077
Aug. 19	1.5m Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Aug. 19-20	SBSS Summer Classic	Gilroy, CA	Scott Meader, (408) 244-2368
Aug. 20	SOAR Contest	Plainfield, IL	See Illinois R/C Soaring Contacts
Aug. 20	MATS-ORCC Duel Coteau Station, Canada		Dan Gregory, (514) 684-1795
Aug. 27	Slope Soaring Coteau Station, Canada		Dan Gregory, (514) 684-1795
Sept. 2	SASS HL 2	Redmond, WA	Joseph Conrad, (206) 630-2670
Sept. 9	TPG HLG Contest	Poway, CA	Art Markiewicz, (619) 753-3002
Sept. 9	1.5m Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Sept. 9-10	13th CASA Open	Gaithersburg, MD	Steven Lorentz, (301) 845-4386
Sept. 10	Grand National Nostalgia	Rochester, MI	Jack Iafret, (810) 694-2490
Sept. 10	7th Annual Coteau Station, Canada		Dan Gregory, (514) 684-1795
Sept. 16	2M/Open	San Antonio, TX	Gene Warner, (210) 732-3101
Sept. 16	1.5m Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Sept. 17	TPG Thermal Contest	Poway, CA	George Joy, (619) 748-2167
Sept. 17	SOAR Contest	Plainfield, IL	See Illinois R/C Soaring Contacts
Sept. 17	Team Duration Coteau Station, Canada		Dan Gregory, (514) 684-1795
Sept. 23	MARCS F3J	Madison, WI	Al Scidmore, (608) 271-5500
Sept. 23-24	Astro Champs	Fountain Valley, CA	John Raley, (714) 641-1776
Sept. 23-24	2m & Open	Orlando, FL	Hank McDaniel, (407) 831-3688
Sept. 24	F3J Coteau Station, Canada		Dan Gregory, (514) 684-1795
Oct. 1	Great Pumpkin Coteau Station, Canada		Dan Gregory, (514) 684-1795
Oct. 7	1.5m Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Oct. 7-8	Fall Soaring Festival Western States Triad	Visalia, CA	
Oct. 7-8	SOAR Fun Fly	Plainfield, IL	See Illinois R/C Soaring Contacts
Oct. 14	1.5m Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Oct. 14	TPG Unltd. Slope Race	Torrey Pines, CA	Eric Larson, (619) 793-7640
Oct. 15	TPG 60" Slope Race	Torrey Pines, CA	Eric Larson, (619) 793-7640
Oct. 14-15	Fall Soaring Tournament	Memphis, TN	Bob Sowder, (901) 757-5536
Oct. 14-15	2m & Unl.	Morriston, FL	Frank Strommer, (813) 844-7225
Oct. 15/18	Slope Soaring	Cape Cod	Alex Wenzl, (514) 984-7957
Oct. 21-22	Canyon Lake Classic	Canyon Lake, TX	Greg Dickerson, (210) 656-1796
2M, Open, HL - Potters Creek Park			Tom Meeks, (210) 590-3139
Oct. 21-22	Pensacola Contest	Pensacola, FL	Cornfed, (334) 660-1318
Oct. 21	1.5m Hi-Start Contest	Washington, MI	Ray Hayes, (810) 781-7018
Oct. 22	TPG Thermal Contest	Poway, CA	George Joy, (619) 748-2167
Oct. 22	SOAR Contest	Plainfield, IL	See Illinois R/C Soaring Contacts
Oct. 29	One Design Contest	Orlando, FL	Rick Eckel, (407) 365-9757
Nov. 4-5	2m & Unl.	Morriston, FL	Ken Goodwin, (904) 528-3744
Nov. 4	TPG HLG Contest	Poway, CA	Art Markiewicz, (619) 753-3002
Nov. 5	TPG Fun-Fly & BBQ	Poway, CA	Steve Stricklett, (619) 741-1037
Nov. 5	SOAR Turkey Shoot	Plainfield, IL	See Illinois R/C Soaring Contacts
Nov. 11	TPG 60" Slope Race	Torrey Pines, CA	Eric Larson, (619) 793-7640
Nov. 12	TPG Thermal Contest	Poway, CA	George Joy, (619) 748-2167
Nov. 19	Open	San Antonio, TX	Perry Van, (210) 658-8842
Nov. 24-26	22nd Tangerine	Orlando, FL	Ed White, (407) 321-1863
Dec. 9	TPG 60" Slope Race	Torrey Pines, CA	Eric Larson, (619) 793-7640
Dec. 10	TPG Thermal Contest	Poway, CA	George Joy, (619) 748-2167
Dec. 9-10	Winter Soaring Festival	Indio, CA	Buzz Waltz, (619) 327-1775

TIDBITS & BITS

Calendars

The following information is from Joe Thomas of San Jose, California.

"In the March issue, Robert Steinhert of Olathe, Kansas wished for a calendar ad. Since no one has placed such an ad, I looked up the ordering information for two sources of calendars for full-size gliders.

"The German calendar, Segelflüg-Bildkalender, is available from:

Aero Smithing
809 Dothan Ct.
Raleigh, NC 27614
(919) 676-8876 (voice)

"The cost of the 1995 calendar is $19.50 plus $6.00 shipping. Visa and Mastercard are accepted, with an additional $1.00 bank charge.

"The calendar for the Soaring Society of America is available from:

SSA
P.O. Box E
Hobbs, NM 88241-7504
(505) 392-1177 (voice)
(505) 392-8154 (fax)

"The cost is $8.95 plus $4.25 shipping. Visa, Mastercard, American Express, Discover, checks, or money orders are accepted. SSA also has a free merchandise catalog featuring books, clothing, posters, and accessories."

From Maui

We received a newsletter called the Maui Island Soaring Operation (MISO) Newsletter from Gerald Fukuoka, who says, "Please enter our club in your contacts column." Following is some information about their Operation dated June, 1993.

"MISO and MISSO (Maui Island Slope Soaring Operation) were formed in 1986 as a way to organize various soaring activities on the Valley Isle. We are blessed with many fantastic sites for both thermal and slope soaring. The graceful uprising slopes of Haleakala provide several ideal thermal sites including the Waipoli ranch area, as well as the "Mile 4" marker along Haleakala Highway. Costal areas from Haiku to Kahakaloa provide an exciting time for slope soaring with plenty of year-round trade wind lift. All of this, together with breathtaking views and the friendly company of seasoned flyers and eager newcomers, leads to few places on earth that rival our wonderful, naturally friendly, soaring sites."

"As members of the MISO and MISSO team, you help develop, promote, and enhance our organization so that every one's soaring skills and capabilities can be improved and preserved. We don't take for granted the thrill and enjoyment that Maui has given our sport."

The following is dated March, 1995 and is written by Hank Vendiola, President.

"As of February 16, 1995, Maui Island Soaring Operation (MISO) was officially recognized as an AMA chartered club #3628. As of this date, MISO is 31 members strong, with membership growing monthly. Hopefully, at the end of the calendar year, everyone will be a card carrying AMA member!! For the past several years, AMA contest guidelines have been used during the "Fun Flys", with some leniency shown. Now that we are chartered, AMA contest rules will be fully employed. It is of the utmost importance that we, as AMA members, observe first of all, the safety rules of our particular sport. The safety rules may seem to be designed to obstruct enjoyment of the sport, but guidelines must be set if we are to prove ourselves responsible pilots we proclaim to be. Congratulations to all members and supporters for taking the club from weekend flying on the hill to a recognized chartered club! We made it!!"

A Club in California

We received a newsletter called *The High Flyer*, which is the newsletter of the Santa Clarita Soaring Association. The newsletter editor is Hank Schorz, 19108 Drycliff St., Canyon Country, CA 91351.

1.5M Postal Contest

The following announcement is from Ray Hayes.

"Great Lakes 1.5 Meter Soaring League

announces its First Annual World Wide 1.5 M Postal Contest. This is an open invitation to all that enjoy flying 1.5M sailplanes. Join us on September 16, 1995 in this unique event to bring the enthusiast from around the globe together in the spirit of competition. Join in this event as an individual flying alone, or as a group of flying buddies, or make it your club event. We have designed the contest in two parts; hand launch and/or high start. You can enter one or both categories.

"Hand Launch Tasks: Round one, maximum of twenty launches to achieve six flights of two minutes each; Round 2, maximum of thirty launches to achieve six flights of four minutes each; Round 3, maximum of twenty launches to achieve two flights of six minutes.

"Hi Start Tasks (thirty feet of 1/8" OD rubber with one hundred feet of tow line): Round one, maximum of six launches to achieve six flights of two minutes each; Round 2, maximum of six launches to achieve six flights of four minutes each; Round 3, maximum of six launches to achieve two flights of six minutes each.

"Rules for Both Formats:

1. Flying begins 9 AM and ends 6 PM your local time.
2. Tasks may not be mixed. All attempts must be completed in one category before starting tasks in the other category.
3. Rounds may not be mixed. Once you have started round one in either category, you may not start the second or third rounds until the previous round is completed.
4. All launches must be recorded on the official flight log and signed by your timer.
5. If you fly both categories (launch modes), you may choose which one you want to do first. Once started, you may not switch to the other category until your first selected category has been completed.
6. Any number of models may be used during the course of the tasks.
7. Hand launching is restricted to pilot launching, only.
8. This is a flat ground contest, and no slope flying is permitted.
9. Models are restricted only to a wing span of 1.5 meters.
10. Flight time starts at release of model from your hand, or if Hi Starting, at moment of release of model from tow line.

"Awards: Top places in each category will receive a commemorative. Ties will be broken by date of post mark on return score card. Results may be obtained by sending a SASE.

"Entry deadline is September 1, 1995. Entry fee is $1.00 for individual, or $1.00 for a group, or $1.00 for a whole club event. Send entry fee to receive official flight log to: Ray Hayes, 58030 Cyrenus Lane, Washington, MI 48094 USA."

Contacts Wanted

We would like to add a resource contact for Houston, Texas and the northeast area of Pennsylvania. We have had several calls within the last year from subscribers moving from out of state into the Houston area, in particular. They are looking for folks to fly with or clubs in their vicinity. Would anyone like to volunteer? Please contact *RCSD*. Thanks!

■

Advertiser Index

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