R/C Soaring DIGEST

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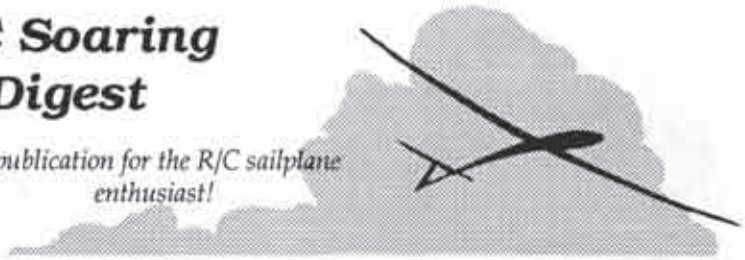
Into the Wild Blue Yonder With the Good Brothers

One of the founders of radio controlled model airplanes, Walt and Bill Good won their third straight title at the 1940 national model airplane championships. The story of "The Creative Flights of Fancy" is on page 26. Article and photos supplied courtesy of *Kalamazoo College Quarterly*.

R/C Soaring Digest

A publication for the R/C sailplane enthusiast!



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R/C Soaring Digest (RCSD) is a reader-written monthly publication for the R/C sailplane enthusiast and has been published since January, 1984. It is dedicated to sharing technical and educational information. All material contributed must be exclusive and original and not infringe upon the copyrights of others. It is the policy of *RCSD* to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of all articles, model designs, press & news releases, etc. are the opinion of the author and may not necessarily reflect those of *RCSD*. We encourage anyone who wishes to obtain additional information to contact the author. *RCSD* was founded by Jim Gray, lecturer and technical consultant. He can be reached at: 210 East Chateau Circle, Payson, AZ 85541; (602) 474-5015.

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The Soaring Site

The Use of Solvents

We received the following note from Ed Jentsch of Rockville, Maryland.

"A cautionary footnote to "Two of My Favorite Tips" from Garry Armstrong (*RCSD*, Feb. 1993, pg. 33): Acetone belongs to the Ketone class of solvents, all of which affect the central nervous system. Fortunately, it is the least toxic member of its class. However, its high volatility (vapor pressure = 266 mm Hg) and extremely low flash point (1.4° F), make it one of the most flammable/explosive solvents available. When using it, follow the golden rules for handling any solvent - don't ignite it; don't ingest it; don't breathe it; don't touch it (i.e., don't use it if you can avoid it).

"Having said that, add carburetor cleaner to the list of solvents that will remove Monokote adhesive, but treat it too with all the respect it deserves."

Thanks, Ed. Safety does indeed come first. As with any of the composite materials/solvents we use in this hobby, it is important to take the time to always read the label and follow the instructions, carefully. Use of a mask and gloves is also recommended.

"Spectra" Hinge

The photographs (on next page) were taken of a section of wing with a "Spectra" hinge that was sent in by Mike Watson of Asheville, North Carolina. He says, "I have not tried it in flight yet, but it appears to be very strong. This sample does not have any fiberglass at the trailing edge as I normally would put in a section. My two meter wing, recently completed, did have fiberglass across the hinge line and was somewhat stiffer than this sample. Omission of the fiberglass at the hinge line is recommended. Please tell your subscribers about this, if you will."

landing area in Texas. There is electricity, and permanent men and women facilities with showers, camping on the field (no hook-ups), and free air-conditioned indoor camping 3 minutes away (limited to first 10 requests)." The classes are unlimited & two meter, and we note on their flier that there is a free continental breakfast on Saturday, food available at the field for lunch and snacks, a big raffle, manufacturer/supplier give aways, and free T-shirts for the first 25 entrants. Tom says they want to have a fun time. Everyone is invited and manufacturers can display their wares. Tom can be reached at (713) 363-3384 evenings, or call CD, Max Taylor, at (409) 760-2654 (day/evening).

Jomar Products Corp.

Joe Utasi has recently moved and his new address is: Jomar Products, 3440 Riverhills Dr., Cincinnati, OH 45244; (513) 271-3903. Jomar is a manufacturer of electronic accessories and controls, and to obtain a free catalog just send him a S.A.S.E.

T.N.T.

The Texas National Tournament (T.N.T.) is scheduled for September 18-19. If you plan to attend, please double check your current schedule to ensure it doesn't reflect an older date, September 11-12, instead.

From Kansas, Texas & Utah

The March issue of *RCSD* contains an announcement on page 62 about a major soaring event which will be held on **May 1 & 2** in New Waverly, Texas. (Check out the map in Gordon's column to get an idea of where New Waverly is located.) This event is called **"EASTEX '93, Spring Soaring Challenge"** and is sponsored by the Tri-County Barnstormers. According to **Tom Jones**, a CD, they have "forty acres of the prettiest

Shortly after the Eastex '93 announcement arrived, we received a FAX from **Pat McCleave** of Wichita, Kansas. Pat says, "Please find attached a flier for an upcoming contest we are having here in Witchita. Last year's event drew 20+ contestants from 4 states and we hope to have a bigger event this year. If interest is high enough, we will try to have some kind of get together (Bull Session) on Saturday night. Please feel free to give out copies and give out to anyone in the Dallas area who is interested. Dallas is approximately a 6 - 7 hour drive to Wichita, depending on what part of the Metro area you are in. If possible, please add this to the contest schedule in the April issue of *RCSD*. Also, could you please list me and Wichita Area Soaring Association (WASA) in the appropriate section in *RCSD*. Thank you very much for any help you can give in spreading the word about our club and this contest." The **WASA Spring Fling** is scheduled for **April 24-25** at the WASA Club Field, and the pilots meeting begins at 9:30 A.M.

Classes are two meter / unlimited; it's an AMA Class AA sanctioned event requiring Gold Stickered radios. For additional information, Pat can be reached at (316) 721-5647 or FAX (316) 265-2179. His address is 11621 Nantucket, Wichita, KS 67212. The contest is included on the schedule and Pat is listed as a contact in the resource section, now.

The Intermountain Silent Flyers (IMSF) of Salt Lake City, Utah are having their **1st IMSF Wasatch Mt. Soaring Festival;** they have declared the week of **August 16 - 22** as "Soaring Week", and is a fun fly. The first part of the week will introduce newcomers to slope soaring fun flying and learning the sites. The activity will be an assisted Open (non-event) slope & thermal - casual flying. No fee or registration is required. The last part of the week will be 3 days of guided and assisted slope or thermal fun flying requiring pre-registration, proof of insurance and an entry fee (about $15). For additional details, contact **Bob Harman**, 10424 Golden Willow Dr., Sandy, Utah 84070; (801) 571-6406.

There have been so many announcements coming in that we would appreciate it if you would please check any material you sent in carefully to make sure we have not made any mistakes. Thanks!

Questions About Radios??

Do you have any questions about R/C radios? Well, David Woodhouse has volunteered to answer any questions you may have and, periodically, those answers will appear in *RCSD*. David has been involved in radio for most of his life and has been an amateur radio operator for nearly 20 years. David's address is 96 Division Street, Guelph, Ontario, Canada N1H 1R6. He can be reached at (519) 821-4346 between 19:00 and 21:00 Eastern time. By the way, he is also listed in the resource section. Should you find yourself in his area and want to check out the flying, give him a call!

Decalage, Again?

We received the following letter from a subscriber in Oxnard, California. Ted Off says, "I had to reply to Ed Jentsch's article titled "Decalage, Again?" in the January issue. It is wrong! Many free flight models fly with the center of gravity at the trailing edge of the wing. Thus, figure 1 has some major problems.

"First, no model will fly if the decalage is zero. By decalage I mean the angle between the zero lift line of the wing and the zero lift line of the stabilizer. (A normal wing section has a zero lift line of -2 to -4 degrees to the centerline of the airfoil. A symmetrical sections zero lift line is the same as the centerline of the airfoil. Thus, with a symmetrical stabilizer, the so called zero-zero setting still has a positive decalage). I stubbed my toe on this once before in a series of letters with Ken Willard.

"If the center of gravity is located behind the aerodynamic center of a wing (usually assumed to be at about the 25% chord position but can be 22-26% depending upon the airfoil) the stabilizer starts carrying some of the load. That is, it has upward lift instead of downward lift. There's nothing wrong with this although this is not what is shown in many flight training books such as the FAA's Flight Training Manual. They too are wrong! The lifting stabilizer is obviously discussed in most aerodynamic texts.

"The larger the stabilizer, the more of the load it can carry. The Flea of the 1930's had wing and stabilizer the same size. And to carry the argument further, canards have the wing in back. However, there is still positive decalage between the front and rear lifting surfaces.

"One critical concept which helps to understand the relationship of center of gravity, stabilizer size and tail length is the neutral point. The neutral point is the most aft location at which the c.g. can

be placed before making the airplane unstable (Perkins and Hage, "Airplane Performance Stability and Control", page 231 in my copy). Ferdi Gale in the latest Soar Tech (#9), which I received after I started this letter, has a reasonably complete discussion of all the factors that enter into the accurate determination of this point. Eric Lister in his "Sailplane Designer's Handbook" also goes into some detail. However, for simplification we might use a formula by Hank Cole in the NFFS Sympo 2 (1969). This formula has application in R/C soaring design. It is:

$$N = 0.25 + K\left(\frac{S_H L_{TO}}{S_W E}\right)$$

"Where N = neutral point measured from the leading edge of the wing's mean aerodynamic chord, S_W= wing area, S_h = horizontal stabilizer area, E = wing mean aerodynamic chord, L_{to} = tail length which is here defined as the distance between the wing quarter chord and the stabilizer quarter chord and K is a constant for similar models. The bracketed part of the formula is often called tail volume.

"What this tells us is that the larger the stabilizer relative to the wing or the longer the tail length, the further back the center of gravity can be moved and still have a stable model. For full size planes, a larger tail volume is associated with a wider latitude in the center of gravity.

"Bill Bogart and Bud Rhodes (in Frank Zaic's 59-61 Yearbook) plotted the above equation in a slightly different form for numerous successful power free flight models with aspect ratios of 7-9 and a center of gravity between 60 and 105% of the wing mean aerodynamic chord. Their neutral point is about 0.48. Looking at a graph of Hank Coles which relates K to aspect ratio of the wing and stabilizer, this neutral point might be about .55 for the average R/C glider. I haven't done my homework and measured some real numbers. For a stable model, the c.g. should be located about 10% in front of this point."

Thanks for sending in the above information. In regards to "Decalage, Again?", we're sure you realize that Bunky is used as a fictious character to over simplify the more complex points of aerodynamics. Judging from the input we have been receiving, he has been effective in providing some very simple explanations. But, as you point out, it is important, for those that have mastered the simplistic and want more detailed aerodynamic statistics and facts, that they begin by reading the references you list here.

This has raised a question that we received from Ed Jentsch of Rockville, Maryland. He says, "Ted did raise the interesting point of free-flight. Can he, or someone else out there, explain why free-flighters invariably choose to design, build and fly inherently unstable planes. That the force arrangement (i.e., CG behind the NP and positive stabilizer lift) results in a low speed, high-angle-of-attack glide begs the question. The same result can be achieved with a more traditional arrangement. Does it have to do with balancing power-on/power-off flight characteristics, or do free-flighters just like playing on the edge?"

Can anyone answer this question? ■

Jer's Workbench

Mold Making Part IV

Q & A, Tips & Hints

Now that I have completed a mold and laying up a fuselage, I would like to share some of the questions I have received, regarding the mold making process, over the last few months. I probably didn't make these items too clear earlier, and perhaps some of you have the same questions.

(Q) The first questions were about the plug used in mold making. What should the mold be made out of?

(A) You can use anything that will hold its shape; a good hunk of wood will do. As for myself, I have tried the following methods:

(1) Glued together small pine strips to make a big hunk of wood.
(2) Used a redwood fence post.
(3) Carved foam and fiberglassed over it.
(4) Used Jelutong.

Jelutong? What's that you say? Jelutong is a light tan wood from Indonesia and Malaysia. With its extremely fine and even texture, it is quite carvable and is excellent for precision models, patterns and plugs.

There are many woods that you can use, but what you want is "Kiln-Dried Lumber", so that your plug won't warp, something like Jelutong, Mahogany or pine. Any of these will work fine.

(Q) The next question was also about the plug. After I carve a plug do I have to think about any under sizing?

(A) No, not really. Make the plug exactly the size that you want; this should also include a paint job for its finish. When you cast or lay-up the plug, you are only working with the outside surface of the plug. So, what you see is what you get.

(Q) Do I need to make an off-set or step to do the lap seam?

(A) No. The material used in a fuselage, like 7.5 oz. fiberglass cloth, is only .011 thousands of an inch thick. This will easily bend and make the step required.

(Q) How do you do a lap seam?

(A) To do a lap seam you will find that a roller works best. I mentioned at one point in time during the process that this has to be made, as I haven't found any commercial ones this small.

My roller, as shown in the photo, was made from a 1/8th inch rod and 3/16th inch finder washers. It may look a bit loose and sloppy, but this is what I want. With the roller being loose fitting, it will tend to follow the bottom radius of the mold as the lap seam is rolled.

The roller should be cleaned immediately, or a new one will have to be made. To clean the roller, I drop it into a can of acetone and let soak for about 15 minutes or so. Then roll it around on a flat surface; repeat until clean. Remember to be careful when using any solvents.

(Q) Is the lap seam hard to do?

(A) Yes and no. After you do a couple, it gets easier, but I will say that some molds are easier than others. So far, I haven't found a mold that I can't do.

A couple of the more difficult molds that I have are shown in the photos. The first is a mid-wing sloper, The Valkyr. Note the hump behind the canopy and in front of the wing. This could not be reached by a roller, so with a long finger I reached up inside, working blind, and pressed the seam in place.

The other glider shown is my Facctor. See the thin part of the fuselage in front of the rudder? I could have probably made a roller to do this job, but I found that a 1/4 inch wooden dowel worked quite well.

Roller used for lap seams

Valkyr

Facctor

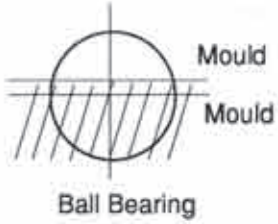
I inserted the wooden dowel in, through the tail, and pressed down and rolled the wooden dowel from side to side.

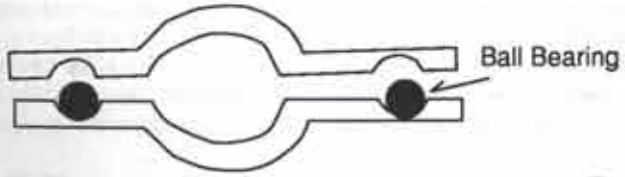
So, if any of you are making or are thinking about making a mold someday or would just like to talk to someone about mold making, give me a call. I will try to provide you with enough information so that you can decide whether mold making is for you, or not. If you have made a mold, send me a picture as I would like to see what you have done. You may have done something I am not familiar with, as well, that you would like to share with the readers.

★ ★ ★

Jim Hammond of Taiwan sent in the following contribution. It is a good idea although I have not been able to find small ball bearings in order to give it a try.

"When making molds for wings and fuselages, use 5/8" ball bearings for mold locators. Set slightly below one mating surface (as shown in the diagram). They allow 'jiggling space' to do overlaps, etc.; they don't wear out, and they provide perfect location." ■





Understanding Sailplanes

...By Martin Simons

13 Loch Street, Stepney,
South Australia 5069

Flying in Wind & Weather
Thermal structures

There is much debate about the structure of thermals and a good deal remains to be discovered. Modellers tend to imagine the thermals they use as more or less vertical columns of air or 'plumes' of fairly narrow cross section. Circling within such a column takes the model upwards. It is often possible for a model low down to fly underneath another one which is climbing, and enter the same thermal, and other models may follow suit until a whole 'gaggle' forms in a circling stack one above the other. Full sized gliders do exactly the same thing. (In both cases, the risk of mid-air collision is quite high.) This suggests that there is a continuous column or rising air all the way from the ground up to the top of the convection layer or into and beyond cloud base.

It may be supposed that each such column is associated with some 'hot spot' on the ground and many school text books reinforce this belief. Soaring would be simple indeed if the pilot could rely absolutely on known local warm spots producing a constant thermal column all day long, as these books seem to imply. There certainly are differences in temperature on the ground. Dark areas of bare soil and rocks, or city streets, macadam roads, car parks and runways tend to be warmer than greenery, growing crops, or forests. Irrigated land, swamps, lakes and rivers tend to be cool. These differences must relate to the formation of thermals and any model flier who has operated for a while in one district, soon gets to know places on the ground which do seem to produce lift on many occasions.

But thermals invariably drift away from the place on the ground where they are supposed to originate. This must cut off the supply of hot air at the roots. On many occasions a glider may fly underneath another one, or even try to join a 'gaggle' soaring, and fail to find any lift at the lower level. In the early days of soaring it was surmised that, rather than columns, thermal plumes were more or less bubble like. A mass of air, heated over an area of hot ground, might break away as a whole and ascend, perhaps taking on the shape of an elongated sausage, but once the plume had broken loose it must drift and there would be no more hot air fed in from underneath. The hot spot on the ground would then 'brew up' another bubble which, after an interval of perhaps ten or twenty minutes, would produce another detached plume (Figure 29). This could explain why gliders joining others from below would sometimes catch the lift, but sometimes would arrive too late and miss it. There seems to be something in this theory but it does not explain all the experiences.

Another puzzle is that a glider, contacting a thermal quite low down is usually able to climb in it for minutes on end and reach some great height. During this time, the circling glider must sink at its normal rate of descent through the rising bubble, while being lifted by it. If there is no continuous column all the way up from the ground, with new warm air constantly being fed in from below, it is hard to understand why the glider does not, so to speak, fall out of the bubble at the bottom after a little while, as the warm air rises past it. The glider must pass through hundreds or thousands of feet depth of rising air (Figure 30), much more than there is underneath it at the start of the climb.

The ring vortex theory

Observations in flight and experiments, originally with liquids of different densities in a university laboratory, indicate that a typical isolated thermal often has the ring vortex structure sketched in Figure 31. Rather than being a tall 'sausage' or plume, such a ring vortex is roughly spherical or, perhaps, doughnut shaped, the hole in the doughnut representing the core of strongest lift. The 'bubble' having been heated by close proximity to the ground, begins to rise as a plume but as it does so the upper part is retarded by the resistance of the surrounding air, spreading out somewhat like a mushroom as the rest of the bubble pushes up

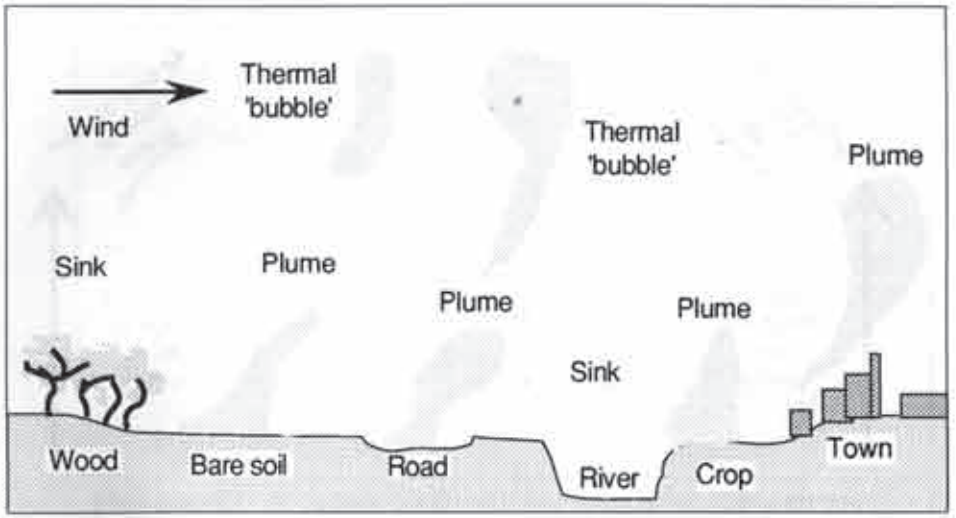


Figure 29 Early theoretical model of thermals

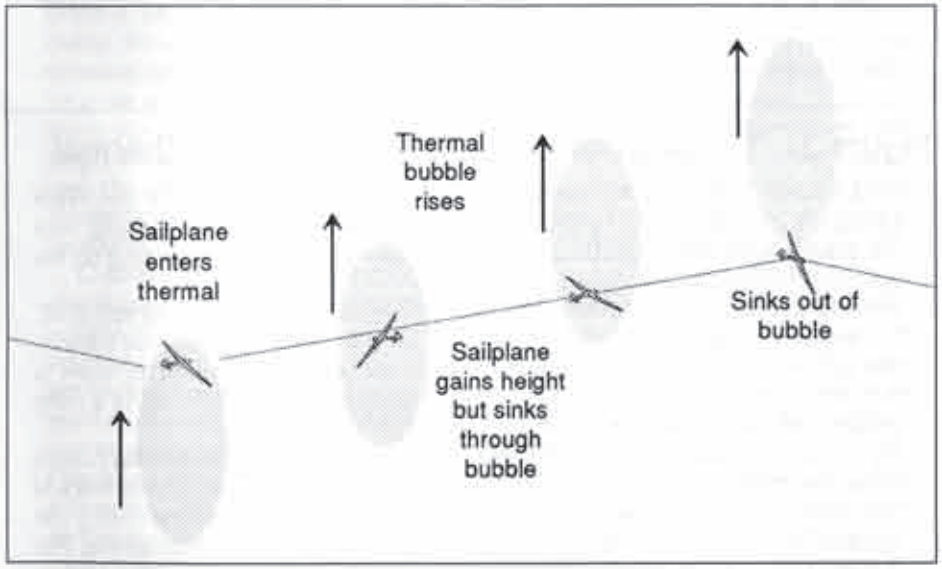


Figure 30 Problems with the thermal bubble theory.

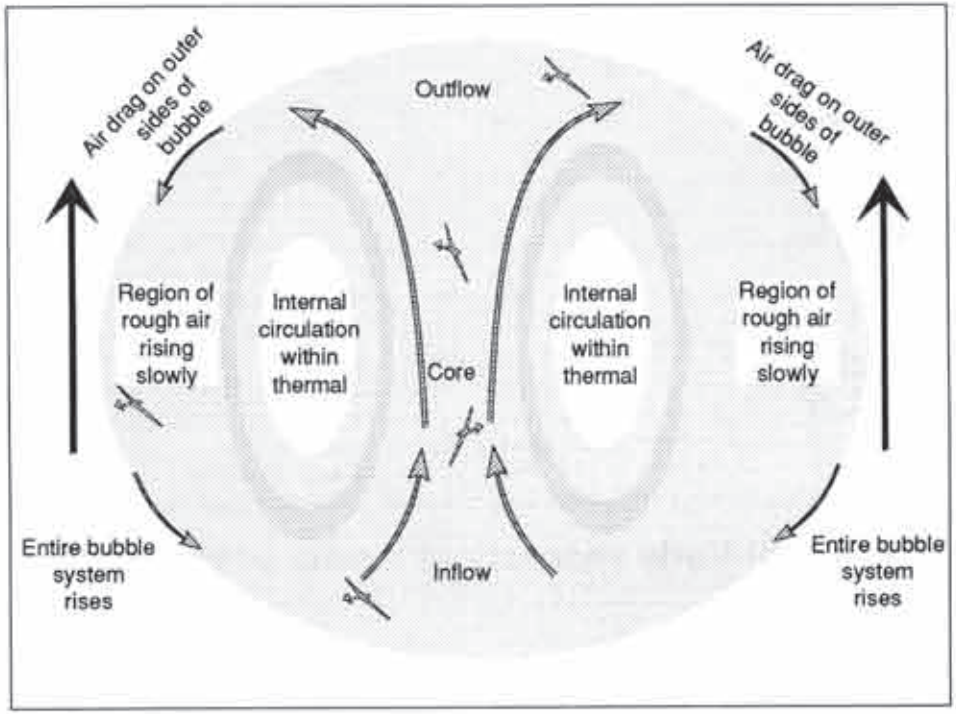


Figure 31 The ring vortex model of an isolated thermal

from below. This sets up an internal circulation within the bubble. At the top the air spreads outwards, is overtaken by the rest of the bubble still thrusting up, and is then drawn in again to create an inflow at the base. This keeps the core fed constantly from below. The air feeding in is not any longer connected with the ground, but is the bubble's own air, having circulated round the margins to re-enter the vortex from underneath. The 'doughnut', in a sense, is constantly turning itself inside out in a rolling motion, as it rises. Thus, a glider entering the thermal from below can circle and rise for long periods, using the same air going round and round the ring vortex, even climbing faster than the bubble as a whole. The sailplane may come up through the centre of the ring into the upper region where the air tends to flow outwards and thereafter it is likely to rise only at the rate of the whole bubble. Other gliders arriving underneath in time can catch the vortex ring, but the late coming pilot finds no column of lift extending far below.

To visualise a ring vortex of this kind, one of the declining number of tobacco smokers may be recruited to blow a smoke ring vertically upward in a calm room.

This model of a single thermal cannot explain everything that happens but it is a good beginning in understanding the complexity of the real atmosphere. For instance, there is little doubt that a large, strong vortex ring can draw smaller ones into and through itself in the manner suggested in Figures 32. The smoker can, with practice, blow one smoke ring through another, to make a working model of this. In the air, individual small ring vortices may be drawn laterally for some distance, even against the general wind drift, by the inflow effect under-

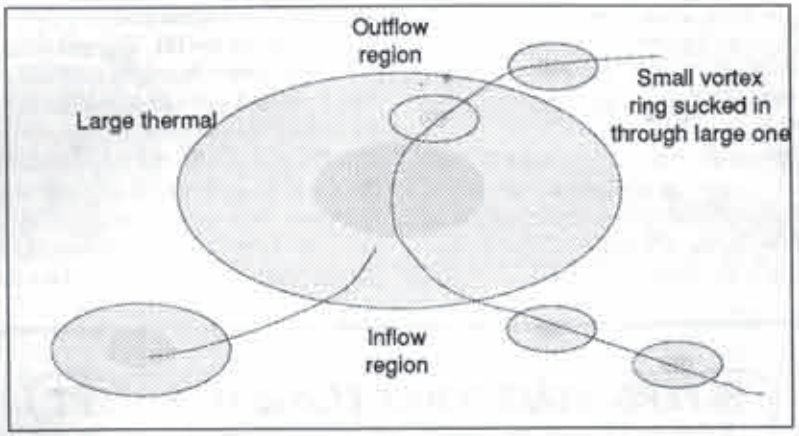


Figure 32 A large vortex ring thermal may draw smaller ones into itself

neath a large thermal. If the model is being flown accurately in correctly trimmed circles, movements like this will be quite noticeable. The model climbs, but drifts across the wind for some distance, then as the small thermal is sucked into the larger one, the rate of climb increases and the lateral drift changes direction.

To obtain an image of a good thermal soaring day, recruit a number of tobacco addicts (if any survive), place them on a sufficient number of reclining chairs and get each of them to puff a series of ring vortices towards the ceiling. It then becomes easy to envisage a day when thermals are following one another up in succession from particular warm spots, so that something like the plume or column may appear, but composed of separate ring vortices with smaller ones sometimes being drawn into and through the larger. Patches of dead or sinking air intervene between the rings. By fanning the air, some wind and turbulence is introduced so that many of the neat rings become broken. The situation is not really so neat in the world outside the smoking room.

Centering the ring vortex

An important point for model fliers is that the ring vortex structure involves a definite inflow in the lower regions of the bubble and outflow at the top. This probably accounts for the impression that models sometimes centre themselves in thermals. There is little doubt that this happens with free-flight gliders, but it is probably a mistake to suppose that it is the design of the models themselves which is responsible. Using the 'circular tow' technique, the free flight sailplane is 'pinged' off the line when lift is detected by the towline runner, and it begins to circle. But the glider is not likely to be in the strongest lift immediately. With luck, the inflow will carry it laterally into the core. The thermal itself is doing the centreing job. An indication that this is happening may sometimes be seen from the ground when several models are circling at some distance from one another and rising only slowly, and then, after a short time, all are found climbing much better and comparatively closer together, having been drawn into the bubble from all sides by the inflow and then carried up rapidly in the core. Radio controlled sailplanes, although rarely left to them-

selves long enough for such effects to show up, probably sometimes centre themselves in the same way, despite, rather than because of, the pilot's interference.

Of course this fortunate set of conditions does not always occur. Models which are already at some height and which are met from underneath by a rising ring vortex, will find themselves in the outflow region and are likely to be pushed out of the lift. The model entering a ring vortex from the side will meet rough air and even sink at the margins, and it takes a bold pilot to insist on pushing through this in the hope of finding the core. Ring vortices are often quite turbulent and models may be thrown about in them to such an extent that the pilot cannot locate and use the best lift. ■

LIFT OFF!

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WRAM 1993

This year, as in the past, the WRAM show was held at the end of February in White Plains, New York. It was especially fun going this year to see the new products and to renew some of the lost interest due to a very long, cold and snowy winter here on the East coast.

Due to recession there were not many new items, but this may be changing a bit. I talked to quite a few vendors after the show, and most seemed to be very upbeat. Many of the vendors told me that they had more interest and had sold more of their products this year than they did last year.

There were two things that for me stood out most at the show. The first was the obvious absence of Northeast Sailplanes. Northeast Sailplanes has had, for the last few years, the largest display of planes, all sailplanes, at the show. I always look forward to seeing Stan and Sal displaying all the planes and accessories. But it was not to be this year. I talked to Sal and he told me that they were not at the show this year because their new catalog was not completed. For those who may not know about Northeast Sailplanes, they have one of the most complete catalogs of sailplanes and related items in the industry. Northeast Sailplanes usually starts the new flying season by giving out their new catalog at the WRAM Show. With the new catalog not completed they decided not to attend. Let's hope we see them at the WRAM show next year.

The other thing that was very interesting was the Airtronics display. Hanging

Sonic-Tronics, (L) H.F. Hankinson, (R) Tim Hankinson - Props for electric

S&R Batteries, Larry Sribnick

RJL Control Systems, Rock Leone - RCD dealer and radio repairs

in the very front of the display was a Flite Lite Thermal Eagle, built by Ron Vann, and was one of the best finished planes I've seen. I have known for quite a few months that Flite Lite and Airtronics were negotiating some sort of a merger but

Davey Systems, Ted Davey - Electric Sailplanes

Tim Renaud of Airtronics with Thermal Eagle in foreground.

Jomar, Joe Utasi - Speed Controller

MR Nicad, Russell Graig - Batteries

Sermos R/C Connectors - Connectors for electric power

was not sure how it was going to be worked out. But at the WRAM show everything was made official by a press release that Tim Renaud was handing out. Even with the press release, I'm still not exactly sure of all the details. I think it goes something like this: Ron Vann and Fred Weaver, both of Flite Lite, will be manufacturing pre-sheeted wings, pre-sheeted stabs and fiberglass fuselages for the planes that they have always had. These components will be kitted by Airtronics and sold by Airtronics direct and through a few dealers. What this means for the modeler is that he or she will get a complete kit with instructions, plans and all the necessary hardware. In the past, this was not always the case. If you want more information on getting what used to be a Flite Lite plane, call Airtronics, not Flite Lite.

Let's hope the economy improves and next year there may be more sailplanes and electric sailplanes to report on.

The Power of *RCSD* Classifieds

Last month (March, 1993), I listed 37 planes that I wanted to sell. *RCSD* was sent out on a Thursday, and by Saturday afternoon, three days later, 16 of the 37 planes were already sold. As of this writing, which is 5 days after *RCSD* came

out, 6 more have been sold, for a total of 22 planes in five days. If any of you readers want to get rid of something, or if some of you have a model product to sell but are not sure about placing an ad, get a rate chart from Judy or Jerry Slates. The rates are very inexpensive (personal ads are free to subscribers) and believe me the word gets around fast. Now, if I could only pack and ship the planes as fast as they were sold!!!!!

Good Flying!!! ■

A Surprise Within A Surprise!

...by Judy Slates
Wylie, Texas

I'll never forget the first time I saw Jerry slope fly.

It was over 20 years ago and, after weeks of construction and meticulous detailing that took weeks of evenings and weekend work, his slope plane was ready to fly.

Bodega Bay, on the Pacific Ocean in Northern California, was a perfect test site, so over we went. I had seen thermal flying in Santa Rosa at local club contests, but had no idea how Jer was going to launch his new creation. Of course, I hadn't given it a lot of thought.

As I looked out over the ocean and watched the birds circling lazily in the sky, the waves gently brushing the rocks below, I realized that Jer was standing close to the edge, his new plane held high in one hand; the transmitter was in the other.

"You're joking!" I thought. You have to be out of your mind. Where is the high-start? There's no line to get the plane up! It's 10 pounds! *Wait...*

As the plane left his hand I gasped and began to survey the rocks below looking for what might be left after the impact. It took several seconds before I realized that something was very wrong. I couldn't find the plane! Where did it go?

I looked back to where Jer stood. His eyes were to the sky; there it was, above me, not below. My mouth fell open. It flew beautifully and gracefully in the air above.

Well, I never cease to be amazed at the different methods for launching planes and am glad I learned many years ago that the weight of a plane can be carried upwards by the currents of air flowing from the cliffs of the ocean shore.

20 Years Later

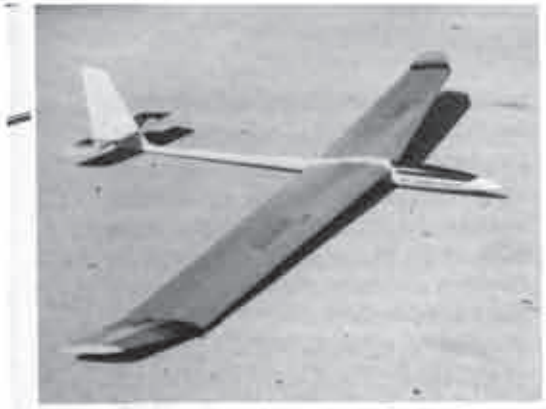
Jerry hasn't had a lot of time to spend building planes these past few years. Of course, he still loves to fly, weather and time permitting, but the coast is a long way from us now, having moved over 1500 miles from Northern California to Northern Texas. The slope planes have been gathering sawdust in the new workshop while Jer has been building, one-by-one, things like work benches and racks.

Jer's birthday arrived and with it came the Grifter (a European sailplane available from Northeast Sailplane Products); and a Falcon 600, ready-to-fly, was purchased from a local modeler as a Christmas present. My shopping was done! Jer has two planes to fly and my shopping is over for the year! *(Maybe, for the next couple of years, as well, if I work this right!)* But, I found myself still wanting to do something secretive for Christmas as it is our favorite time of year...

A Best Kept Secret

As most of you are well aware, being around sailplanes and talking to modellers on a daily basis, it is quite easy to find out what types of flying and planes people like without them realizing that there is an ulterior motive behind what appears to be an innocent question.

So, having obtained the necessary information, I called Ed Slegers and asked if he could find the time to build a plane for Jer. (It was around August, as I recall, and there was plenty of time.) Needless to say, Ed agreed and the task began, in



an effort to surprise Jer for Christmas.

Now, for those of you who have not had occasion to talk to Ed or see his handiwork, he is quite knowledgeable and a builder extraordinary; his current goal is to build 100 planes in one year! Yes, it takes approximately three days for one plane!

Ed called Flite Lite Composites to order a Falcon 880 kit, so now Ron Vann and Mark Allen knew our secret. The kit was sent directly to Ed, who immediately called to ask me about color scheme and servos... *Well, Jerry likes bright colors, like red, and he has an X-347...* So, Gordon Jones came by to check out the radio situation for Ed, while Jer was in the workshop, of course.

We hadn't counted on the "Sailplane Enthusiast's Network", however. Boy, word gets around, quick! Well, Ed asked me to write about what really happened because Jer got his Christmas present in October. Basicly, it seems like the "Network" generated too many calls and the latest ones didn't know that it was supposed to be a secret! When it arrived, however, he was surprised and pleased.

As the Falcon was carefully unpacked (which was not easy as Ed is into "Gorilla" packing boxes to insure safe delivery), we discovered another surprise within a surprise! Ed added a special touch and, as you can see in the photographs, *R/C Soaring Digest* was detailed on the wings and fuselage of the plane. (The lettering was obtained from a local graphic shop.)

The white epoxy fuselage holds wings finished with four coats of clear water-based varathane. Soarcraft servo mounts, 4 - 341 servos and 2 - 901 servos for the X-347 were already installed. The gross weight is 57 ounces.

What did Jer say? "I love it! It is expertly done, and much lighter than what I could have built. All I had to do was install the receiver and program it for rudder, elevator, ailerons, flaps, camber changing and crow. Thanks, Ed!"

So, am I planning any surprises for this year? Nothing, yet! An RnR Products Synergy III, that has been waiting patiently in its box for almost two years, has since found a place on the workbench and should be flying, soon. A scratch built Stiletto holds a prominent place on another bench, as well.

However, Jer has just discovered a few places where some slope flying can be done... Wonder what kind of shape the slope planes are in. I must remember to check. ■ If you're interested in how Ed can build as fast as he does, give him a call to let him know you're interested in a detailed article on the subject. ■

Is Wing Loading Meaningful?

(Just for the fun of it!)

...by Jef Raskin
Pacifica, California

One of the more-often quoted facts about a sailplane is its wing loading, which is simply the weight (say, in ounces) divided by the area of the wing (say, in square feet). This figure is usually given to indicate whether a model sailplane is a "floater" or not. Here is a list of the wing loadings in oz./sq. ft. for some of my gliders. What can you tell from these numbers?

A: 5.0
B: 5.4
C: 5.8
D: 6.2
E: 9.7
F: 15.7

If you think you can infer *anything* about their flight performance and characteristics, write down the letters A through F on a piece of paper and then put down what you can deduce about each plane given the wing loading figures.

Do it before you read on. C'mon, be a good scientist and write down what you think so that if you change your mind later, you'll have to admit it to yourself.

Now to describe these planes:

A: a 27" span aerobatic slope soarer made of solid styrofoam with a symmetrical airfoil. It can easily fly in winds well over 30 mph. It is fast and very agile using ailerons and elevator control. Probably unthermalable (except in a dust devil).

B: a 100" span thermal chaser. All built-up construction, flat-bottomed airfoil, rudder and elevator control. Definitely a floater.

C: a 51" span slope trainer built from an all-styrofoam toy airplane. It is quite slow and cannot fly in winds above 20 mph. It uses rudder and elevator control and has a poor glide (low L/D) but is a good slope trainer.

D: a 39" span aerobatic sloper with semi-symmetrical wing section at the root, symmetrical at the tips. Wood-covered foam wings, fiberglass fuselage, aileron, elevator, and rudder control. It is fast and maneuverable.

E: a 59" span electric-powered Mini-Challenger built from the Astro-Flite kit. It is a good thermal ship, with rudder, elevator, and motor controls. It uses a flat-bottom airfoil, and has a folding propeller to improve the glide. At the slope, it can fly in very light lift.

F: Modified extensively from a Carrera Trico kit with a 78" span, this plane can fly in light lift, thermals well, and has been clocked at over 100 mph at the slope. It has aileron, elevator, and rudder control and is moderately aerobatic.

Wing loading, then, does not correlate with span, mission, speed, or even ability to ride thermal lift. It is not clear to me that it has any utility in describing an aircraft unless you are comparing ships of the same size in which case citing the weight alone is just as meaningful.

If you still want a number that gives a feel for how much of a floater or a darter a sailplane is likely to be, it is helpful to normalize for size. Here we divide the wing loadings above by the span of each aircraft.

A: 0.185 (aerobatic)
B: 0.054 (thermal floater)
C: 0.114 (slope trainer)
D: 0.159 (aerobatic)
E: 0.164 (electric thermal)
F: 0.201 (speed and thermal)

Now, the "floater" stands out at one end, and the speed ship at the other. The smaller the number the "fluffier" the ship is to fly. This number corresponds more accurately with the kind of performance we are usually trying to describe with wing loading, as when we speak of a "lightly loaded floater" or a "heavily loaded slope racer".

Wing loading is not a useful parameter when comparing model planes of different sizes. Speed at best L/D or speed at minimum sink (if you could get either of these numbers) would really give what most people expect to learn by looking at wing loadings. Of course, if we could get every manufacturer to give the polar curve for the aircraft, that *would* tell us a great deal. But, if we want a number based on easily measured aircraft dimensions, we should at least normalize the wing loading for size. If we had done this by dividing by the average chord rather than the span we would have gotten a more common parameter, the span loading. This is simply span divided by weight, and is a slightly better measure than wing loading for the fundamentally misguided attempt to encapsulate the flying qualities of a model sailplane into a single number. ■

Dumpable Water Ballast?

...by Scott Metze
Tehachapi, California

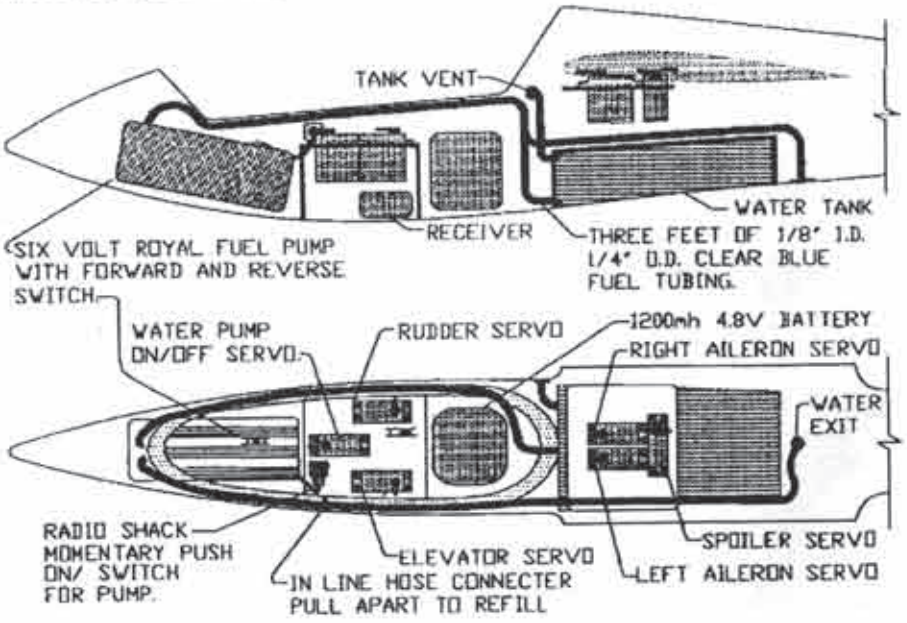
Yes, that's right! We have taken a 1/4 scale ASW-22, with a 4 meter wing span and built a water tank inside the fuselage!

It holds 22 oz. of water making the total weight 9.5 pounds when the water tank is full. This comes to 23 oz. to the square foot. The water is removed from the tank in flight with a Royal six volt fuel pump. The dump rate is 1 oz. per second, for a total of twenty two seconds of water dump. The water ballast pump is activated by a servo pushing on a momentary /on switch. This can be on any channel. The water exit spout is on the bottom of the fuselage under the T.E. of the wing.

A flying buddy of mine, Louis Hignite, has flown the ASW-22, which inspired him to convert this 1/5 scale DG-600 to hold water. Louis' water system will be completely removable. The DG-600 water exit spouts come out the left and right wing tips. Louis will keep us posted on how it flies once it is finished.

Dumping the water has actually saved me from landing at the bottom of the hill. It was noon and the slight ten mph wind decreased to 6 - 8 mph. The ASW-22 was at max altitude half way up the hill. I dumped 10 seconds of water from the tank with not much altitude change. I made a few passes to gain altitude. No luck, so I dumped the rest of the water. This brought me to ridge height and I was able to land on top of the hill. On better days, I am able to use the extra weight to travel farther and faster, do speed runs, and dump water over the top of us as we fly at the edge of the hill. The water stream leaving the plane turns to mist in only two inches. On the ground, it feels like rain! ■

MULTIPLEX ASW-22 WITH WATER BALLAST



Ridge Writer

...by Mike Bamberg

1059 NW Darnielle St.
Hillsboro, Oregon 97124, (503) 640-5926

Corrections, corrections, corrections! Ah the joy of exposing your ignorance to the world. I've received a letter from a diligent reader who kindly pointed out that speed is not distance times time. If we agree that what we want to know is the RATE of movement then the correct nomenclature is distance divided by time. Thus we get our normal designations of miles per hour or kilometers per hour. We also have to agree that we are interested in MOVEMENT. Two points that do not move in relation to each other have a speed of 0 relative to each other though they may be each moving through space at incredible speed. It was also pointed out that it would be presumptuous on my part to write a column on aeronautics. I agree! Especially in light of the fine experts who already grace the pages of this magazine. However, I was talking about physiological psychology which I have found few write about and I have some expertise. So I will continue to touch on it as seems appropriate. I do enjoy letters! Keep them coming. That way I know someone's reading my carefully crafted column.

Thermic Series

I've had the great pleasure lately to correspond with Frank Zaic. In discussion with him I made the following observation:

I believe one of the great contributions you have made is in the simple, excellent flying HL gliders and stick built towline gliders you used to produce. These models were used by almost every modeler I know, over the age of 35, to begin his modeling career. I work part-time at a hobby shop in Beaverton Oregon. At least a dozen times a week someone comes in wanting to get a youngster started in model flying without spending all the money for R/C. The options I have to offer them are slim: a few stick and former, die-crunched WWII fighters, a simple $15 glider kit purporting to be the beginners first plane, and a new reasonably priced series of all balsa towline gliders using a Jedelsky wing (not too bad, actually). Nothing like the THERMIC TRIO or THERMIC 18 or TROOPER or THERMIC 50. Your plans and planes were marvelous; they taught me how to trim a glider, cover a wing, launch a HL or towline glider. I marvel at how you distilled so much important information into such a small space. Now, I'm starting to run on, but I think there is a great today need for quality beginner models where the only thing you need to buy is glue, dope, maybe a paint brush, and not another $14.95 book to teach you how to make it work.

I recommended to Mr. Zaic that he consider re-introducing that Thermic series and I certainly hope it happens. As a matter of personal curiosity, I would be interested in hearing from any of you who also learned to fly using the Thermic series. My address is at the head of the column. I'll pass the letters on to Mr Zaic.

I'd also be interested in hearing how you feel about learning to fly using free flight gliders, both hand launch and towline, to teach flight trimming, balance and perhaps thermal detection skills.

Anabat

I've had lots of fun lately building a new indestructible slope soaring plane. Ah ha, that got your attention! I'm referring to an Anabat Combat ship. I built one this last month in preparation for a scheduled Aerobatic/Combat fun-fly. I sure am impressed with the "bouncibility" of this plane. I've landed it upside-down, done multiple cartwheels, dove into the ground and just about anything else you've ever done with a plane. The only damage was to knock the servos loose. In fact the only complaint I have of the plane is the difficulty in keeping the control surfaces centered with the servos sliding around in the soft foam. (NO, I'm not that bad of a pilot, it's just fun to try things you would never do with one of your "good" planes.) It has a fantastic roll rate, I estimate it at just under 720 degrees per second. Jef Raskin would probably consider it sluggish, but it's fast enough for me. We didn't get to actually do combat as the wind wasn't strong enough on this particular hill to keep the planes up for more than one or two passes of the hill. About the time you got lined up on the opponent, you were on the ground. Next time watch out. In the actual building I was impressed by the total simplicity. Two pieces of foam, 6 pieces of wood, one roll of tape and about 5 hours of work over 2 days results in a ready to fly plane. The whole technique of using the tape for EVERYTHING, hinges and covering will probably be copied by other modelers. I see no reason why you couldn't build other simple planes in this manner, even some semi-scale models. The only complaint is that the kit doesn't include any hardware. If the plane is built according to the instructions, which I did, exactly, you still need to get about $5 worth of materials for control horns, push rods, and servo connections. I agree with the control surface to servo connection system but the kit should include those materials or a list on the label indicating the additional items needed. I hate having to stop in the middle of building to go buy something to finish a plane. This plane builds so fast you reach the need for those additional materials faster than you would with any other kit. Make it a point to get yourself an Anabat series ship. I'm sure you won't be disappointed and it's sure a lot of fun.

Samurai

Last summer my son, Dale, was given a SIG Samurai kit as a gift and had a good experience putting it together. This is the first foam-wing glass-fuselage kit he has assembled and I made him do most of the work himself. Here is his review:

"I pretty much followed the instructions that came with the kit. The foam cutting and fiberglass work was very good and that made most of the rest of the work easy. Since the wing is supposed to be set up for either wingerons or pitcherons there really isn't much to do except glue in the spar and pivot system and sheet the wing. We glued the 1/64 ply to the cores with epoxy using a vacuum system. After that the leading edge and wing tips are put on and sanded to shape. The instructions include templates for the leading edge shape at the root and tip of the wing. I spent a total of about 6 hours to build the wings. The instructions show how to make a jig for drilling the fuselage for the holes that support the wing bellcranks and pivot tube. That's nice. I didn't have a radio that would let me use the wings as pitcherons, so I built the stab/elevator version. Everything was built according to the instructions.

"I didn't want to use iron-on covering, so I painted the tail and wings before the first flight, and then painted the fuselage, later. Not the fanciest paint job, but it keeps the water off. The plane was test flown on a pretty light wind day, so I couldn't really do all the aerobatics I wanted to. Later we flew it in 45 MPH winds and it moves!. The only problems I found in the instructions was in the picture of the canopy trimming as they didn't identify which end of the canopy to measure from, and the hole drill guide illustration had the balsa stick show as stuck to the opposite edge from where it should be. All together the kit was easy to assemble and I think it will be good to race. I really like the aerobatics."

★ ★ ★

Speaking of aerobatics, Jef Raskin will have to come up to Oregon to retain his title to Top Aerobatic Slope Pilot. The Portland Area Sailplane Society has scheduled a Slope Aerobatic contest for May 1, 1993. Come on up, we've been practicing!

Until next time, may the wind blow at least 15 MPH. I want to race! ■

on the Wing

B²

P.O. Box 975
Olalla, Washington
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Reminiscence

A small glider, tossed out over the hillside, just misses the top of the chain link fence, and its yellow wings rock in the turbulence created by the greenhouses below. The small orange rudder flicks momentarily to the right, and there is a barely audible hollow click as it does so. Another click is heard as the rudder snaps back to its original position. Climbing a few feet, the little ship begins to drift back and forth over the crest of the hill, slightly canted into the sea breeze.

A sharp turn to the right becomes a spiral, and when the rudder is returned to neutral the glider's excess speed bleeds off in the form of a loop. A turn to the left at the exit point gets the 'ship back on track across the hill.

Several passes later it lands rather awkwardly behind the pilot. He turns off the transmitter and walks to his creation, now with its wing slightly askew. The receiver is turned off, and the colorful little bird is brought back to the launching point.

Now the young flier picks up a hand drill, a wire hook clamped in its jaws. The hook goes through a small metal ring in the tail of the glider, and a gentle pull on the drill succeeds in drawing out the loop of rubber. The drill rapidly twists the rubber until a row of knots is formed along the entire length of the loop. The metal piece is replaced, the receiver and transmitter are turned on, and the small glider is tossed out over the hillside once again. By the end of the day, when the breeze stops, the Nomad will have put in another 25 to 30 flights.

I was that young pilot, lucky enough to live on the crest of a hill overlooking the Pacific Ocean, with steady 15 mph winds coming up the slope nearly every day. Although the Nomad no longer exists, all of the primitive radio gear is still around and capable of reliable performance.

The vacuum tube transmitter, a CG Venus, uses two large 67 1/2 volt batteries and a single 1 1/2 volt D cell. Its front panel has an on/off switch mounted on the left and a red push button on the right.

The receiver is a Citizenship LT-3, one of the first of the transistorized units, tunable over nearly the entire 72 mHz spectrum. Powered by two 1 1/2 volt batteries, it can drive either a solenoid or an electric motor.

In the Nomad, a solenoid was used to alternately release and stop a rotating shaft powered by a wound rubber loop. This escapement mechanism was connected to the rudder, driving it to extreme left and right positions and returning it to neutral when no signal was received.

When the pilot pushed the red button on the transmitter, a tone signal was sent to the receiver. The receiver then sent a three volt current to the escapement, releasing the shaft to rotate 1/4 turn and moving the rudder to the right. When the transmitter button was released, the current to the solenoid was stopped, and the shaft rotated another 1/4 turn, bringing the rudder back to neutral. The next time the transmitter was keyed, the rudder moved in the opposite direction. In flight, the diameter of a turn was controlled by the duration of rudder deflection and the time interval between commands.

While some fliers of the time rigged up additional mechanical systems capable of giving elevator control, I never really got that sophisticated. Being able to reliably steer left and right was for me a wonder in itself! One of my biggest advancements was the purchase of an escapement which always gave right rudder at the first command.

Flight times with this type of system were always dependent upon the number of turns placed on the rubber loop and the ability of the pilot to fly with a minimum of control input. Still, this basic system served me well for nearly twenty years, giving reliable control of several sailplanes and powered 'ships, a few electric cars, and even a tug boat.

In the early '80s I bought my second set of RC gear, a JR Century VII system. Proportional control of multiple surfaces and availability of mixing functions put this system light years ahead of the Nomad's equipment.

Newer systems, like JR's x-347, are even more advanced, offering multiple control presets, enhanced mixing capability, and other features. This setup allows one to build three control surfaces into each wing, and rudders into the fins, with independent control of each surface. The transmitter can then be programmed to move each surface so predetermined lift distributions are maintained throughout all flight regimes, extracting maximum performance from a swept wing tailless design.

Adequate means of control of high performance tailless RC aircraft has thus been possible only within the last decade or so, a fact not often appreciated. Now, with advanced airfoils, composite structures, and computerized radio systems, tailless sailplane performance is on the threshold of surpassing that of conventional designs.

A lot has been written about how this hobby should provide enjoyment for its participants - a notion with which we heartily agree. What an aeromodeler builds and flies is thus an indicator of what provides the most enjoyment for him.

I remember with great fondness the many hours of pleasure the Nomad gave me, and I often consider spending a few days at the building board constructing another. But the challenge of utilizing current technologies in building and flying what is still considered an unorthodox plan form has so far always won out. Being torn between these two extremes for over ten years has, however, been an extremely interesting experience and has provided much opportunity for introspection. ■

The Creative Flights of Fancy of Walt and Bill Good

(This article was originally written in August 1981 by Ray Wilson, Editor of the Magazine of Kalamazoo College at that time. The article and the photos are supplied courtesy of the *Kalamazoo College Quarterly*. Thanks go to Kalamazoo College for giving us permission to share the story of the Good Brothers with you! This article is reprinted in its entirety.)

The story of Walter and William Good is the story of the pioneering days of aviation and of radio, of scientific breakthroughs that helped turn the tide of World War II, and of video wizardry that makes a pilot feel like he's zooming across the sky when he's actually sitting in a chair bolted to the floor. It's the story of two brothers whose inquisitive minds drove them, even as children, to inquire just how things worked. It's the story of two eminent scientists who, despite their many achievements and honors, remain as fresh and friendly as when they attended Kalamazoo College in the 1930s.

It's the story of . . . well, the heck with the preliminaries, let's get on with the story!

The saga of the Good twins began April 25, 1916, in Hillsdale, Michigan. William Earl Good entered the world first, followed 20 minutes later by Walter Amos Good. When the boys were four years old, their parents, Lester and Fern Good, moved to Coldwater, Michigan, where Lester taught high school science and during the summers studied for his master's degree at the University of Michigan.

The brothers' science education began early, through the influence of their father and also their maternal grandfather, William Hallett, a retired engineer who lived with them in Coldwater. "Grandpa Hallett was making his own radios in the 1920s, so I guess we just grew up smelling the solder," says Bill. At that time, Coldwater contained a cigar box factory and the Good brothers gathered wood trimmings from the factory's scrap heap for their first model airplanes. After building the frames for the planes, Walt and Bill used an old green silk dress of their mother's (with her permission, of course!) to cover the models. The only problem the boys couldn't solve was the propeller - so their grandfather carved a wooden propeller for each boy .

Their father brought home some rubber bands from school to power the propellers, and when the day came for the models' maiden flight, the boys climbed the sloping roof of their parents' house and launched them off the precipice. "The planes went straight up into the air, stalled, and fell to the ground," recalls Walt. From this rather inauspicious beginning, the Good twins would go on to learn some crucial aerodynamic principles about balance and wing angles.

In 1927, the Good family moved to Kalamazoo, where Lester joined the faculty of Kalamazoo Central High School, teaching science for 35 years until his death in 1962. (Fern Good, who is 90 years old, still lives in Kalamazoo.) Walt and Bill enrolled at Kalamazoo Central, and their scientific interest diverged during high school. Walt stuck with model airplanes, refining his knowledge of aerodynamics and eventually building an eight-foot gasoline-powered model. Bill fell in love with radio (like aviation, still in its infancy in those days) and earned his amateur radio operator's license while still in high school.

When the twins entered Kalamazoo College in 1933, they brought their hobbies, and their enthusiasm for science, with them. So great was their enthusiasm, in fact, that they merged the two hobbies—radio and model airplanes — into the unheard-of venture of radio-controlled airplanes.

It's hard to imagine in these days of

"Divide and Conquer" was the scientific strategy of the Goods. Walt (top) concentrated on the aviation end, Bill (bottom) took care of the radio controls.

space shuttles and satellites just how precarious radio-controlled flight was in those days. There were no radio or airplane "kits" in those days — everything had to be built by hand, from scratch. The Goods' most successful airplane, the "Big Guff" (which they flew for more than ten years and is now on permanent exhibit in the Smithsonian Institution), was originally powered by a one-fifth horsepower engine. That engine was not powerful enough to provide the model with an unassisted take-off; the Goods' had to start the engine, grab a wing, and run like crazy with the model between them in order to launch it.

With transistors 20 years in the future, radio controls were also a touchy business. The radio receiver mounted in the airplane used a four-inch vacuum tube and required a 45-volt battery for operation. This was, nevertheless, a quite compact receiver in its day. The transmitter included two vacuum tubes and required hookup to commercial 110-volt electricity.

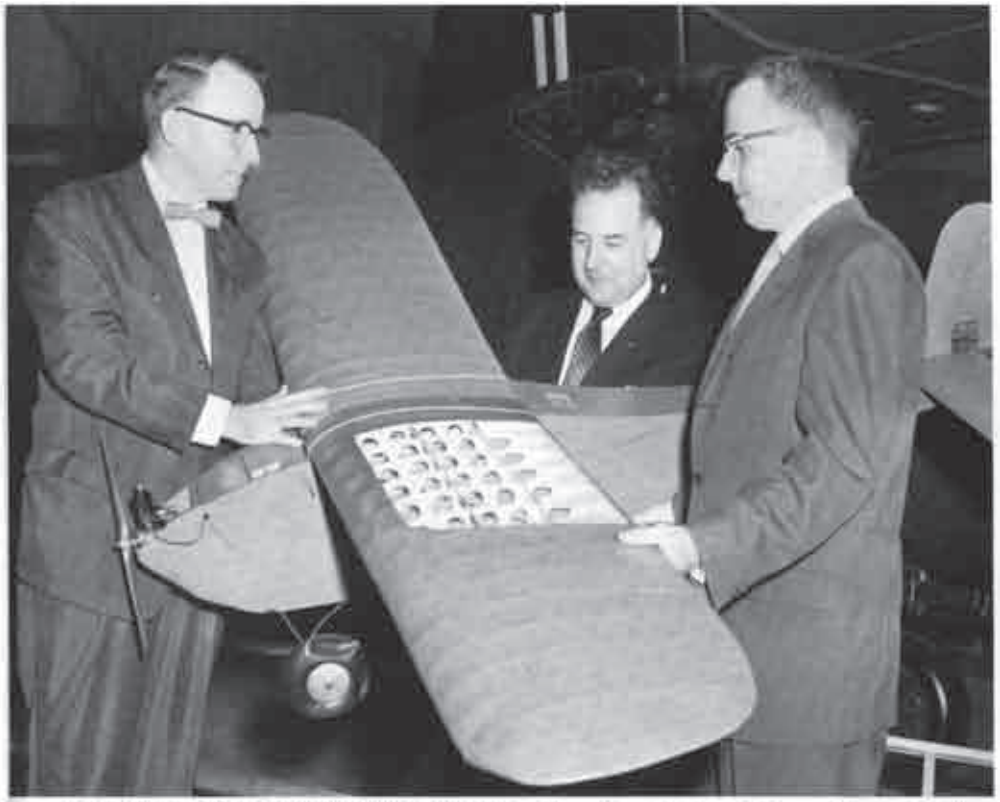
The Goods' received much help and encouragement with their hobby while at "K", particularly from Dr. John Hornbeck, physics professor from 1925 to 1951. "Dr. Hornbeck allowed us to work on the transmitter and receiver as a lab project," says Walt. "Looking back on it, that was probably stretching the rules quite a bit." For another research project for Dr. Hornbeck, Walt built a small wind tunnel and tested different airfoil sections in it.

Unlike many parents of model airplaners (fortunately), Lester and Fern Good gave their sons support in their hobby. Even in the tough days of the Great Depression, "There was always some money for model supplies," recalls Walt. The Good twins contributed their own financial resources, too, even scrimping on lunches in order to save money for model parts. "The only place our parents drew the line is when they found out that I was using some of my money that was supposed to be used for dating and College events for model supplies instead. They said, "Well, one thing you have to do in college is learn to know other people, and you better go to some of these dances and football games."

The Goods' test flew their models at the Kalamazoo Airport, and "very often just getting the plane back on the same airport was considered good," says Walt. "We did not have precision controls then." The Goods' modestly claim to be "one of the first" to successfully control a model's flight by radio, though others give them the distinction of being first. The twins' first successful flight took place in 1937, when the Big Guff landed with its rudder in a different position than at take-off. Therefore, they determined that the rudder had been controlled by radio.

1937 was also the year of the first radio-controlled event at the national model airplane championships. Six contestants entered the event, including Walt and Paul Krielick, who handled the radio in place of Bill, who could not attend. Only one contestant, Chester Lanzo, was able to get his model into the air, so he was declared winner of the event. In 1938, Walt and Krielick again entered the championships and this time their plane was the only one to get off the ground, thus earning the Goods' their first national championship.

During 1938 and '39, Bill and Walt perfected their equipment and got quite a few test flights under their belt prior to the 1939 national championships in Detroit. Bill was able to attend this championship to handle the controls, and together the Goods' launched their longest flight ever, totaling 14 minutes and consisting of a flight to a predetermined target and several turns and figure eights. "The word got around the field very rapidly while the model was still in the air," says Walt. "Practically all the contestants from the other events had gathered around the field by the time the model landed. That was probably the first really successful radio-controlled flight at a public demonstration.



First built in 1937, the Big Guff lived through many flights and was donated to the Smithsonian Institute in 1960 by Walt and Bill, where it now hangs on permanent exhibit.

The Goods' also won the 1940 national championships, the last one they entered before World War II interrupted these meets. By this time they were undoubtedly the premiere radio-control flyers in the United States. Although both were studying for their master's degrees (Bill at the University of Illinois, Walt at the University of Iowa) after their graduation from "K" in 1937, they frequently took time out from their studies to fly the Big Guff at demonstrations around the country. After a delay with some perplexed customs officials, they brought the plane into Canada and flew it at the Canadian National Exposition, which was the first radio-controlled flight in that country.

The brothers deliberately took turns at the radio controls during the flights so they would both be proficient at handling the plane, even though Walt did not have his amateur radio license at that time and was not supposed to touch the controls. "But," he says with a chuckle, "We figured that if a radio inspector came out to the field, he wouldn't be able to tell us apart."

After one demonstration near Detroit in 1939, the twins had already packed up their model when someone came up and asked them if they would fly the plane for Henry Ford. *The* Henry Ford. The boys hurriedly unpacked and set up their equipment and, sure enough, a limousine pulled up containing Ford. Henry seemed impressed with the flight of the plane, even though a disaster nearly occurred at the end of the flight. Because of

The Guff survived a close call with Henry Ford's head in 1939, but Bill and Henry could smile about it later.

the fast set-up, the controls were not responding properly, and as Bill brought the plane in for a landing it buzzed by Henry mere inches from his head. Walt, standing next to Ford, almost pulled him out of the way. "But Henry never batted an eye," he says. "He thought that was perfectly normal!"

World War II and separate careers interrupted the aviation exploits of the Good twins. After earning his PhD at Iowa in 1941, Walt joined the Applied Physics Laboratory of John Hopkins University to engage in defense research. Most of his work during the war was with the proximity fuse, whose impact on the course of World War II was probably as important as the atomic bomb. "While no one invention won the war, the proximity fuse must be listed among the very small group of developments, such as radar, upon which victory very largely depended," wrote Admiral Lewis L. Strauss in Men and Decisions.

The proximity fuse was a more efficient way of targeting anti-aircraft shells against enemy war planes. Previously, the shells were detonated by means of a time fuse — before loading an anti-aircraft shell, a soldier would activate a timer in the shell which detonated the shell a particular number of seconds after it had been fired at the enemy aircraft. This was not very effective.

But the proximity fuse operated by radar. The fuse, mounted in the nose of the shell, contained a miniature radar which monitored the distance between the shell and the aircraft once the shell had been fired. When the radar determined that the shell was a certain, effective distance from the plane, it detonated the shell, greatly increasing the likelihood of a hit.

That sounds fine in theory, but in 1941 at the beginning of the war, the practical problems seemed immense. What was required was to mount a fragile radio device, consisting of vacuum tubes and complex circuitry, on the nose of an explosive shell, fire it through a cannon, and get it to function perfectly while traveling through the air at hundreds of miles per hour. In fact, says Walt, the Germans investigated the feasibility of the proximity fuse but decided that the idea was too impractical for further research.

The United States, however, went ahead on the project and the progress was truly astounding. "The defense department brought together a bunch of outstanding people right out of university laboratories and research people from industry," says Walt. "We had plenty of money, plenty of people, and plenty of talent. We didn't have much time." Often, several different groups of researchers were assigned independently to study the same problem in order to reach a solution more quickly.

The same frantic pace existed in the deployment of the fuse. Production lines were set up before the fuses were perfected, and workers were trained to construct dummy fuses. When the fuses were ready to be manufactured, the already-trained workers were simply given workable parts to construct real fuses. "After the fuse was in production," says Walt, "they found a fault in the fuse. The problem was corrected and introduced into the production line literally over the weekend."

By 1943, the proximity fuse was in use in the South Pacific against the Japanese and in England against the V-1 buzz bombs. It proved to be five to 15 times more effective against enemy aircraft than conventional time fuses. Walt also worked on radar aiming devices called "directors" which helped gun crews fire their anti-aircraft shells more accurately.

The proximity fuse was also adapted for use in ground artillery against German troops after the Battle of the Bulge. The fuse with its radar measured the shell's altitude while traveling through the air and detonated the shell at a preset altitude above the enemy troops. "At the time, we were very happy with the results of the fuse," says Walt. "Now, you see it with a little different view. But it was an effective weapon, and helped win the war." For his work on the proximity fuse, Walt received the naval Ordinance Development Award, the War and Navy Departments' Certificate of Appreciation, and the Certificate of Merit from the Office of Scientific Research.

Walt stayed with the Applied Physics Laboratory after the war and continued his defense research. One of his most important contributions was his help in developing guidance control systems for supersonic missiles. The way that works, basicly, is the missile's radar determines the location of enemy aircraft and steers the missile into the path of the airplane. Though much more complex, this system was in principle similar to the workings of radio-controlled planes. "I helped balance the theory and the practice," says Walt.

Walt has also worked on the automatic controls of the Polaris submarine and lived in Germany from 1973 - 1974 as a consultant to NATO's Pershing missile program. Because of his success at managing teams of scientists throughout his career, Walt was appointed to teach technical management to new managers — "how to stimulate workers, and how not to destimulate them, which is very important," he says. A smart technical person does not necessarily make a good technical manager."

You might think that Walt's accomplishments would be a tough act to top, but brother Bill's career has been equally impressive. Bill was hired as a researcher by Westinghouse in 1941, and

when war broke out he was transferred to the radiation laboratory at Massachusetts Institute of Technology to study microwave radar systems for lighter planes. He and other scientists working on the project developed a successful system that was in use on the Navy's F6S airplanes during the latter part of the war.

Back at the Westinghouse Research Laboratory in Pittsburgh at the end of the war, Bill conducted groundbreaking research on microwave spectroscopy, part of the application of which is the analysis of the molecular structure of elements. This field was the subject of his PhD thesis, which he earned in 1946 from the University of Pittsburgh. In that postwar period, Westinghouse was seriously considering an expansion into the field of nuclear power, so it assigned several of its top scientists to nuclear laboratories in order to investigate the feasibility of nuclear energy. Bill went to work at the Argonne National Laboratory in Chicago, where he used his spectroscopy talents to analyze nuclear particles.

Bill soon got tired of counting protons and neutrons, however. Besides, he wasn't all that crazy about working in and around radiation. "Some of the people there took a neutron beam with the same amount of casualness that I would take some high-voltage electricity," he says. "I saw guys walk right through a neutron beam. I didn't like that invisible stuff. You didn't know when you were being zapped."

In 1950, Bill was hired by General Electric for research on color television at its Syracuse, New York, laboratory. Aviation, radar, nuclear energy, color television — Bill Good always seemed to be at the cutting edge of scientific research. Bill's work with color TV may have been the most frustrating, and he lost a lot of sleep over it — literally. You see, the only time the scientists could test their color systems was at night, after the television stations had ended their regular programming. In the wee hours of the morning, the scientists gathered around their experimental sets and tuned into test broadcasts from a neighboring television studio. One early problem that Bill and the other researchers faced was whether to use a three-color (red, blue, green) television system or a two-color (orange, cyan) system. Although the three-color system was more difficult to perfect — each color had to be transmitted separately on the same frequency used to transmit one black-and-white picture — they decided that the two-color system did not accurately reproduce several crucial colors. "The two-color system couldn't make the red in the American flag, which is a critical color because everybody knows what it looks like," says Bill.

One night, the scientists were studying a color transmission of a girl and a bowl of fruit. "The oranges were orange, the apples were red, and the girl's face looked proper," says Bill, "but the bananas were blue!" After many adjustments and a night's worth of frustration, it turned out that the practical joker at the transmitting studio had actually painted the bananas blue.

Bill's biggest project at General Electric was the development of the light valve projection system used for large-screen color television. Normally, a television picture is projected through a cathode ray vacuum tube, used in most TV sets. However, it becomes impractical to construct cathode tubes larger than about 30 inches, thus the light valve system was developed to project television pictures up to five or six feet in size. The light valve projector, in appearance, is similar to a slide projector, although the optical system is much more complicated in order to successfully project a moving television picture.

Bill Good's latest invention is beginning to break into the commercial market; you may have seen large-screen television in some bars and restaurants and advertisements for this new technology for home use. But its most extensive use to date has been by business and the military. Merrill Lynch's New York office uses 18 projectors, tied into a computer, to display the latest, up-to-the-second currency exchange information. The military uses the projectors on visual flight simulators, devices used to train pilots and give them the impression that they are flying, even though they are on the ground.

A few years ago, Bill was involved in tests at American Airlines' flight simulator in Dallas. His projector was fastened to the simulated cockpit mounted on a moveable platform, which banks, pitches, and dives when the pilot in the simulator moves his controls accordingly. During one test the pilot put the simulator in a dive and turned the vibration up to maximum. "The whole aircraft was shaking, but the picture remained rock steady," recalls Bill. "One of my co-workers said that we came through that test with flying colors!"

Bill, who holds 18 patents (13 for his light valve projector), was chosen a Fellow of the Institute of Electrical and Electronics Engineers in 1959 for his work in microwave spectroscopy and color television. He is also a Fellow of the Society for Information Display, and in 1977 he received the prestigious Steinmetz Award from General Electric for his distinguished career. The Steinmetz Award carried with it a $5,000 grant to the educational institution of the recipient's choice, and Bill chose Kalamazoo College to receive the grant.

After World War II, the Good twins dusted off their Big Guff model, installed updated radio equipment, and won their fourth consecutive national championship in 1947, an achievement never equaled. In 1949, Walt entered the championships with a new model and won again, and in 1952 he broke the record for the longest radio controlled flight. Walt was chosen a life member and Fellow of the Academy of Model Aeronautics in 1954, and served as president of that organization from 1958-60. As the United States delegate to the Federation Aeronautique Internationale, he received its Tissendier Award in 1960 for his pioneering work in model aviation. He also served as president of the Committee for International Aeromodels in 1965-66. Walt's aviation career was capped with his election to the Model Aviation Hall of Fame in 1969.

In 1950, Walt and Bill received the Kalamazoo College Citation "in recognition of outstanding achievements and services which reflect honor upon Kalamazoo College". The College paid homage to the twins again in 1977 when it gave its Distinguished Alumni Award to them during Founders' Day in April.

Walt retired from the Applied Physics Lab in 1977 (though he still does consulting work there) and lives with his wife Joyce, in Port Richey, Florida. They have a son, Terry, and a daughter, Ginnie, who graduated from "K" in 1966. Walt remains active in model airplaning, currently flying radio-controlled gliders.

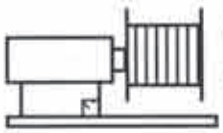
Bill, also retired and also a consultant to his former employer, lives in Liverpool, New York, though he spends his summers "puttering around" his 40-foot powerboat on Cayuga Lake in New York. Bill's interests have returned to ham radio and he maintains regular contact with friends all over the world, including Walt, who finally gave in and got his own license after his early years of "unsanctioned" radio operation. Bill and his second wife, Tudy (Bill's first wife, Carolyn, died in 1957), are parents of two daughters and four sons, including Bill Jr., a 1964 alumnus of Kalamazoo College.

So that puts the finishing touches on our story of Walter and William Good,

Kalamazoo College chose Walt and Bill Good as the 1977 recipients of the Distinguished Alumni Award. The decision was a snap.

two men who, through a little luck and a lot of creativity and perseverance, helped push the science of aviation from cigar-box models to supersonic aircraft. And all they needed was a little help from their mother's green silk dress! ■

Walt spoke at the M.A.R.C.S. National Sailplane Symposium in October 1992. (See *RCSD* January 1993, pages 4-5 for more information.) Walt is still in Florida with a great group of sailplane fliers called the Pelican Soaring Association, who put out a newsletter called *Pelican Droppings*. The editor is Bob Wargo. The Florida Soaring Society puts out a newsletter called the *Silent Flyer*; Bob is their editor, too. For additional information about their activities, Bob's address is 3333 Finch Dr., Holiday, Florida 34690; (813) 938-6582. ■



Winch Line ...by Gordon Jones

Gordon Jones, 214 Sunflower Drive, Garland, Texas 75041; (214) 840-8116 After 5:00 P.M. CST

Soaring in Texas

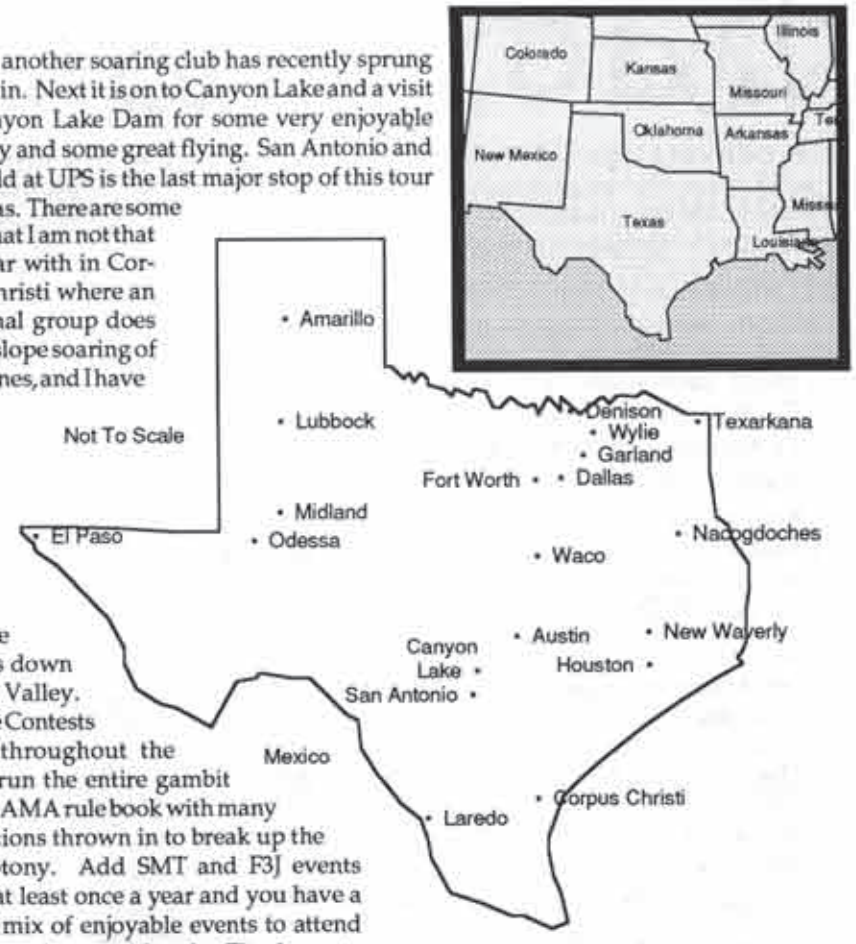
Texas, as most folks know, is a pretty big place that offers almost every imaginable type of flying known. It also has a very different geographical makeup that provides these opportunities. Texas is five "states" or more depending on who you talk to and where they are from. If you will, there is the "Piney Woods" of the eastern portion of the state. The "Valley" of the south is along the Mexican border. You have "West" Texas that encompasses the entire western slice of the state and the "CentraPlex" that picks up from the borders of the aforementioned areas. That leaves "North" Texas, which runs from somewhere between Austin and Waco north to the Red River. Each of these "states" has a different geographical face as well as a difference in weather characteristics. Thus each provides a little different feel and a little different look. But, all are great to be part of!

Soaring in Texas is available just about all year round, providing that Mother Nature is kind and Oklahoma doesn't blow us over during the late fall, or we don't get a blast from the south that can bring on the tropical storms sometimes. Aside from the weather, and the contest season, the flying in general lasts pretty much all year long. The major soaring clubs a number of years ago got together and formed a loose association called the Texas Soaring Conference. This group of representatives get together during the turn of the year and select a site for the next Texas National Tournament, and "special" contest dates. In addition, weekends of the month are reserved for club contests so that clubs do not hold contests on the same weekends thus affording flyers the opportunity to travel to out of town contests without missing the home contest. This makes for a very enjoyable circuit and one that has begun to draw flyers from other states, as well.

The contest circuit starts in Dallas on the 2nd Sunday of the month, then travels to San Antonio on the 3rd Saturday and then on to Austin for the last Sunday of the month. In addition, there are additional contests such as HandLaunch in Dallas every third Sunday, and San Antonio sneaks in one the first weekend of the month on occasion as well. There are also some power clubs that try to placate their sailplane members with contests throughout the summer as well at New Waverly to the south and Denison to the north. If you add in the slightly out-of-state contests at Oklahoma City and Tulsa that are held on the first weekend and last weekend respectively you can build a pretty full slate for the contest season (usually February through November) without really trying too hard.

Now with all these contests that indicates a pretty good representation of the state and says something about the soaring community in this part of the country. For a tour of the flying sites that cater to glider folks we can go almost anywhere and find a good soaring site to fly from. We can start at the NASA flying site of Houston, then move just north to New Waverly (My wife likes this one because they even have indoor plumbing at the field.) and from there we can find a small contingent over at Nacogdoches. We can then move northeast to Texarkana where another batch of soarers reside.

Next on the tour is Big "D" and its batch of community college campuses (also with the largest club in the state), and just north of it is Denison for the home of some more glider guiders. Moving west a "few" miles to Midland there is a group of enthusiasts manning the western part of the state. (They make some trips over into New Mexico to do some incredible slope soaring.) Our trip then takes us to the state capitol of Austin where another soaring club has recently sprung up again. Next it is on to Canyon Lake and a visit to Canyon Lake Dam for some very enjoyable scenery and some great flying. San Antonio and the field at UPS is the last major stop of this tour of Texas. There are some sites that I am not that familiar with in Corpus Christi where an informal group does some slope soaring of the dunes, and I have heard of a couple others down in the Valley.



The Contests held throughout the state run the entire gambit of the AMA rule book with many variations thrown in to break up the monotony. Add SMT and F3J events held at least once a year and you have a good mix of enjoyable events to attend on any given weekend. The keynote event of the year is the "TNT" aka the Texas National Tournament. This event regularly draws contestants from as far away as New York, plus a large contingent from the adjoining states. It is a two day blast where the big yearly get together brings out the usual non-travelers to see one another and enjoy the flying.

If you get to this neck of the woods give a call and we can put you on to some great flying. (Mother Nature permitting, of course.) ■

Dad, what's a Chuperosa?

A conversation with Stan and his four year old son, Alex:

Well, it's the smallest in a family of high quality sailplanes offered by Uncle Sal and Dad at Northeast Sailplane Products.

Family? Do sailplanes have brothers and sisters?

Umm, sort of. I guess that you could call the open-class Alcyone the Dad, and the Alcyone 2-meter the big brother. The new Dove could be thought of as the Chuperosa's sister. It's really a 2-meter Chuperosa with a beautiful fiberglass fuselage.

Is there a Mom? Why are they a family?

Oh, they have a Mom. The open-class Alcyone with the fiberglass fuse is the Mom, and the wood fuse version is the Dad. The real reason they are a family is that they all feature the same high level of kit quality, design excellence, and superb flight performance.

Is there a dog?

No Alex, there are no dogs in this family. The flight performance of the Alcyones, Chuperosas, and Dove is outstanding. The airfoil that Uncle Sal designed into the Alcyone works especially well. Its 7032-7037 trans-foil thermals very well, yet also penetrates great. The 7037-based Dove is a joy to fly, and the Chuperosa history of very high customer satisfaction speaks for itself. Couple the flight characteristics of this family with the kit quality and you have a group of sailplanes that represent super values in R/C soaring.

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You sound like an adbatizement on TV, Dad.

Sorry, bud, but I get excited when I talk about these kits. It's easy to sound like an ad when you really believe in the quality of a product.

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- Honey, I shrunk the Alcyone!
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- Takes a mean launch
- Also lots of fun on the slope

Dove

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- The latest family member
- Beauty and grace: the Dove
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- Easy and fun to fly

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Seminars & Workshops

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

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Reference Material

Madison Area Radio ontrol Society (M.A.R.C.S.) *National Sailplane Symposium Proceedings*, 2 day conference, on the subject and direction of soaring. 1983 for $7.00, 1984 for $7.00, 1985 for $8.00, 1986 for $8.00, 1987 for $9.00, 1988 for $9.00, 1989 for $10.00, 1992 for $12.00. Delivery in U.S.A. is $3.00 per copy. Outside U.S.A. is $6.00 per copy. Set of 8 sent UPS in U.S.A. for $75.00, outside U.S.A. for $80.00. Last 4 (1987-1992) in U.S.A. is $45.00, outside is $50.00. Allan Scidmore, 5013 Dorsett Dr., Madison, WI 53711.

BBS

BBS: Slope Tech, Southern California; (310) 866-0924, 8-N-1

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

Contacts & Soaring Groups

California - California Slope Racers, John Dvorak, 1638 Farringdon Court, San Jose, California 95127 U.S.A., (408) 259-4205.

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

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

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

Kansas - Wichita Area Soaring Association, Pat McCleave (Contact), 11621 Nantucket, Wichita, Kansas 67212 U.S.A., (316) 721-5647.

Maryland - Baltimore Area Soaring Society, Al DeRenzis (President), 5003 Wetheredsville Road, Baltimore, Maryland 21207 U.S.A., (410) 448-0808.

Nevada - Las Vegas Soaring Club, Steven Smith (President), 6978 Starwood Dr., Las Vegas, Nevada 89117 U.S.A., (702) 873-9591.

Texas - Texas Soaring Conference (Texas, Oklahoma, New Mexico, Louisiana, Arkansas), Gordon Jones (Contact), 214 Sunflower Drive, Garland, Texas 75041 U.S.A., (214) 840-8116.

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

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

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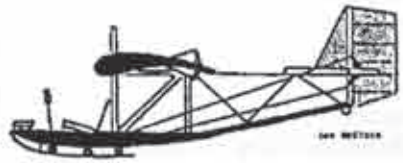

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Brand new SAGITTA 900 ready-to-fly (only test flown) w/used 4 CH Futaba AM radio, ch. 50 (Gold Sticker/wide band receiver), 500 MA battery pack, 2-S33 micro servos, 1-S48 standard servo and plywood shipping box... $200.00 plus shipping. Call Pat McCleave at (316) 721-5647 eve. & weekends.

ASW-24, 3.8 M, ready to fly (RTF), brand new... $520.00; ASW-24, 3.8 M, as a kit... $350.00; ASW-24, fiberglass fuselage w/ cockpit/canopy... $130.00; VENTUS "C", 3.6/4.2 M, RTF, new... $520.00; VENTUS "C", 3.6/4.2 M, as a kit, airfoil as per order... $400.00; VENTUS "C", fiberglass fuselage w/cockpit/canopy... $150.00; GROB 103A Twin Acro 3.4 M, brand new, RTF... $600.00; GROB 103A Twin Acro 3.4 M, as a kit, airfoil per order... $450.00; GROB 103A Twin Acro 3.4 M, fiberglass fuselage w/cockpit/ canopy... $200.00; SATURN 3M, RTF, new... $400.00; SATURN 3M, as a kit... $300.00; SATURN 3M, fiberglass fuselage... $90.00; TITANIUM wing joiner 3/8" diameter... $14/ft.; Retract landing gears for sailplanes aluminum made... $55.00 EA. Shipping not included. Call (305) 687-7706, Peter Zak, Florida.

Pre-Owned Gliders for Sale: KARAT by CHK Modelle... $425.00; FLIPPER by CHK Modelle... $325.00; Fiber Glas Flügel ASW 20L 3.6m, flaps, ailerons, JR servos... $900.00; Fiber Glas Flügel Salto 2.7m, flaps, ready to fly... $550.00; L39 Arco by Vern Hunt, ready to fly... $400.00; Windspiel Models FANTASY including wing bags... $200.00; Multiplex DG300 all glass, Garfield pilot, painted, never flown... $950.00. Contact Pete Bechtel (Windspiel Models) at P.O. Box 2121, Coeur d'Alene, ID 83816; Phone/FAX (208) 667-2276.

Custom built EAGLE, RG 15 triple taper, arrowshaft hinges, all servos inc... $700.00; IMPULSE electric, no servos... $125.00; BRILLANT electric 105", 2 channel fiberglass fuselage... $125.00; ASW 22, 4.5 M w/plug-in tips, very scale, excellent flier... $800.00 OBO. Call Ray Franz at (714) 362-5545 So. Calif.

Müeller COMET 89T, incl. 1200ma batt... $500.00; Colorado COMET, 88 Comet copy... $250.00; John Wyss Eclipse, includes 1200ma battery & 6 servos, ready to fly... $350.00; PANTERA, glass fuse, 205 airfoil, in box... $100.00; SAGITTA 600 kit in box... $50.00; SAGITTA 600 homebuilt, 214 airfoil, includes 4 servos & battery... $150.00; PARAGON, new, 80% complete... $100.00. Bob Edson, 3957 N. Bayou Hills Ln., Parker, CO 80134; (303) 841-0663.

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*.

Iron On Composite Fibres

...from California Carbon

California Carbon is pleased to announce the latest breakthrough in composites technology: Iron On Composite Fibres.

Available in Carbon, Kevlar or S-Glass, new American technology makes the use of this material near foolproof, even for the beginner!

Iron On Fibres are uni-directional fabrics impregnated with a low temperature thermoplastic web. This web provides two important features. One, the ultra light web holds the fibres together. This lends a natural no-fray tendency to the material so it can be handled and placed easily. Two, the low temperature of the thermoplastic web allows for ironing in place. Any covering iron or heat gun can be used to "tack" the fibres in place. Once the fibres are tacked in place, a light coat of C.A. or Zap wiped on easily penetrates through the fabric, and bonds the fibres to themselves and the balsa. This provides a strong high fibre content laminate.

Iron On Carbon Fibre can easily add strength and reduce weight. When used as a sandwich over balsa stick, it can give 4 times the strength of balsa alone. Replacing a spruce spar with a single balsa laminate of similar dimension yields a 15% gain in strength and a 20% loss in weight.

Iron On Fibres make excellent repairs, faster, stronger, and lighter than 5 minute epoxy. Simply C.A. fibres across any pinched or broken balsa and you're back in the air as soon as the C.A. dries!

Iron On Carbon Fibres are competitively priced at $5.50 for 12"x12", $9.00 for 2"x48", and $18.00 for 12"x48" plus $1.00 for S&H, or send S.A.S.E. for complete price list, product information, and free sample to California Carbon, P.O. Box 39, Jamul, CA 91935; (619) 579-5418. All products 100% guaranteed.

California Carbon is a team of aerospace workers who have formed to develop and bring advanced technology to scale aviation.

We have come from diverse backgrounds, but converged to bring our knowledge together on model airplanes. Cumulatively, we have 55 years experience in constructing and flying model aircraft. This experience is extensive, encompassing stick and tissue, free flight, u-control, RC gliders, RC power, scale and full scale aircraft.

Our knowledge of composite structures and construction is also extensive. Over 49 years of hands on expertise lies within our team. Composites manufacturing is our specialty. From the beginnings of fibre glass to vacuum bagging, RTM, wet lay up, filament winding, braiding, pultrusion, etc. — we have done it all!

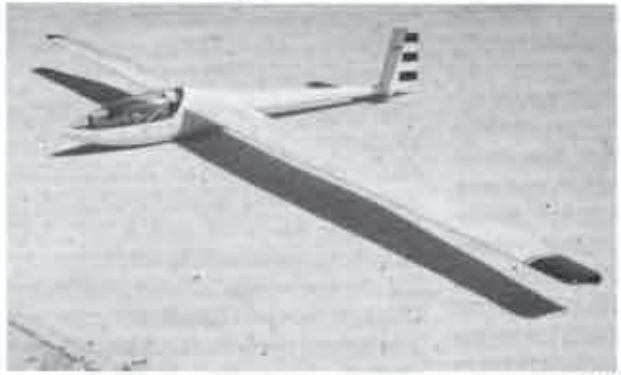
Advanced testing procedures is also a strong suit at California Carbon. All of us at California Carbon work in the aerospace field. Testing of mechanical and physical properties of all of our products are extensive and accurate. Many hours of static and dynamic tests (on the bench and in the air) are done previous to our marketing of any product.

California Carbon has its own flying field on 40 acres in Jamul, next to our manufacturing facility. The tests done at this facility include: stiffness or modulus, creep, viscosity, moisture content, specific gravity, tensile, adhesion and peel strength. We also have an on site wind tunnel to verify aerodynamic performance, modifications, and motor efficiency at air speeds. Many years experience lies within California Carbon, and we are taking that experience to the sky! ■

DG-100

...from Viking Models, U.S.A.

The original DG-100, a 15 meter sailplane, was designed by Wilhelm Dirks who flew the first prototype in early 1973. In May of 1974, 15 months later, the first production model rolled out from the Glaser-Dirks facility.



The finished DG-100 shown here is an example of what a finished DG-100 looks like, and was built by Gene Cope of Union Gap, Washington. It includes a retract.

A semi-kit is offered by Viking Models, U.S.A., and consists of a kevlar reinforced epoxy fiberglass fuselage, epoxy fiberglass canopy tray with pilot's seat, clear canopy, building drawing and a documentation package with photos and 3-view. The building drawing shows a fully sheeted built-up wing, but for ease of construction, foam wing and stabilizer cores are available when ordering the semi-kit.

Thermal, slope or aero-tow this beautiful scale DG-100. With its 64 inch long fuselage, 147.5 inch wing span and Wortmann airfoil, this model is for the experienced builder. There is ample room for full cockpit details and retractable wheel. The controls required are: rudder, elevator, ailerons, spoilers and the retract wheel is optional.

For more information on our other products, please write or call Jerry Slates at Viking Models, U.S.A., 2 Broadmoor Way, Wylie, Texas 75098; (214) 442-3910, FAX (214) 442-5258. ■

Kit Features

- Kevlar reinforced epoxy fiberglass fuselage 64 inches long with a clear canopy, epoxy fiberglass canopy tray with pilot's seat, building drawing & documentation package with photos & 3-view.
- Does not include wood or hardware.

Price is $175.00 without foam cores or $250.00 with foam cores. S&H in continental U.S.A. via UPS is $20.00. Texas residents, please add 7.25% sales tax.

Monarch DG Aerotech

...from Northeast Sailplane Products

NSP is pleased to announce what may be a true breakthrough in the performance range in handlaunch gliders. The Monarch handlaunch glider is a synergy of design innovations, from airfoil to fuselage to control system - all designed to either reduce drag, increase glide ratio, or decrease sinkrate.

Picture a canopied fiberglass fuselage that has the ruddervator pushrod sheaths molded in to save weight. This unusual fuselage is flattened, so the servos are mounted in tandem lying down. At high speeds and low Reynolds numbers, according to the designers, wetted area becomes a major factor in the overall drag of the glider. This design reduces wetted area by about 5 sq. inches - a significant reduction. The tail moment on the Monarch is quite long, providing smoother pitch response; in order to compensate, the nose moment is also long, so little or no lead is required with a 110mah battery pack. Nice touches have been added, such as canopy hold-downs; also, the leading edge bulkhead and wing saddle fillets are molded in. A fiberglass trailing edge fairing for the wing is also supplied.

Special modifications to the SD7037 airfoil provide transitions in both camber and thickness towards the tip. The tips are also swept back slightly to eliminate tip stalling. High quality 1-lb. density white foam wings are complemented with contest grade light balsa for sheeting the wing and the tail. Use of 4-6 lb. balsa for sheeting and a carefully designed lightweight fuselage has resulted in a kit which the builder can finish to the design weight of 10 to 11 ounces! That's right, ten to eleven ounces!

All hardware and plans are supplied for the builder, and the Monarch can be built in less than a week of evenings. Micro gear is an absolute requirement, as is a 110mah battery. We recommend micro servos such as the Hitec HS-80 or the Airtronics 501.

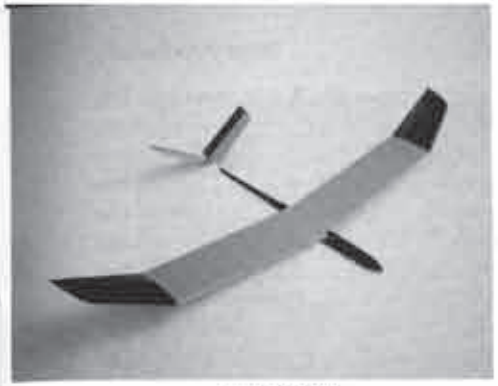
The V-tail on the Monarch uses foam tails with a thinned-out SD8020 airfoil. The moving surfaces are generous, resulting in good control even at the very slowest of speeds. Mounting the tail is no problem because the fuselage has a saddle molded in, automatically setting the incidence.

The fingerhole is another unusual arrangement. It can be made for either single or double finger launching and has a self-closing hatch for drag reduction. The Monarch gets a very high launch, an unexpected benefit considering its low weight. Due to the refinements to the airfoil, drag reduction, and low overall weight, the Monarch penetrates well but will slow and turn to take advantage of the lightest lift.

Very wide speed range and, due to the low-drag design, very high launches are the norm. The Monarch can range quite far, allowing the pilot to search a greater area for lift. Once lift is found, the glider can be slowed down and its amazing sinkrate allows the pilot to work almost any air that's going up. It's safe to say that the Monarch is an all-out competition class HLG that, in experienced hands, will be very hard to beat.

Sal: This is an amazing glider, I expected a very low sinkrate, but what astounded me is the Monarch's ability to range. I can fly twice as far away as I usually do, and if there's any lift at all, this beauty is going up! I ordered another for myself!

For more information, contact Sal at Northeast Sailplane Products, 16 Kirby Lane, Williston, VT 05495; (802) 658-9482. ■



Monarch

Wingspan:	59"
Wing area:	390 sq. in.
Weight:	11 oz.
Wingloading:	4.5 oz./sq. ft.
Airfoil:	special SD7037
Skill level:	INT/INT
Monarch Price:	$99.95

HLG Fuselage

...Northeast Sailplane Products

Here is a handlaunch-sized fiberglass fuselage that accommodates many needs. It is a perfect alternative to, or replacement for, those wood fuselages found in most hand launch kits such as the Vertigo, Climmax, and Chuperosa. And for builders/designers who like to build their own and are looking for a good fuselage, it's a fine choice. In any case, using this fuselage shortens building time considerably.

Designed for a bolt-on wing, the HLG Fuselage has a separate fiberglass canopy.

HLG Fuselage

Length:	36"
Weight:	56 grams
Wing saddle:	7-8 inches
Price:	$49.95

The wing saddle will take either the SD7037 or the E387 airfoil without modification, though nearly any airfoil will work with minor alterations. The tail boom is long and oval shaped; you can decide the length of the tail you want and simply cut off the excess. Since there is no fin, a variety of tails can be attached.

As with most HLG's, small radio gear is required. There is ample room for a 270 mah battery pack in the nose. A full-size receiver will fit under the wing. To minimize weight, the fuselage can be left unfinished.

Though the fuselage is light (under 2 ounces!), it will tend to be more durable than a wood fuselage, thereby adding to the overall life span of your handlaunch.

For more information, contact Northeast Sailplane Products, 16 Kirby Lane, Williston, VT 05495; (802) 658-9482. ■

Javelin Hand-Launch
...from Greco Technologies

Recently, hand-launch sailplanes have become very popular. Many people, including the design team at Greco Technologies, enjoy their convenience. Our pilots have been known to keep their hand-launches in their car (always making sure to park in shade) so at lunch or after work they can get in some flying time. The benefit is that the entire time is spent flying and looking for booming thermals. No time is wasted setting up or retrieving hi-starts. There is also a great sense of accomplishment if the pilot can throw the sailplane, find a thermal, sky out, come down, and catch the sailplane before it lands.

The Javelin Hand-launch is designed for the competitive hand-launch pilot. When designing the plug for the fuselage the measurements of the micro receiver and mini servos were taken. The size of the fuselage was built around these specifications, so they would fit perfectly. Then the plug was shaved down to a more aerodynamic and streamlined look. The fuselage is a pod and boom style. The pod is made of fiberglass and has a strip of Kevlar down the side to add strength. The boom is a black fiberglass tube that allows the wires for the elevator and rudder to be run through it. The boom is made of fiberglass, not carbon fiber because radio manufacturers claim that the carbon fiber tubes can cause radio interference if the radio antenna is run down it.

The Javelin Hand-launch wings are made of white foam with Obechi sheeting. The precision hot wire cut foam wing cores allow for an accurate airfoil. The wing is a single taper, polyhedral. The polyhedral helps maintain the stability of the plane. The airfoil is a SD7037, it works great for hand-launches. This airfoil has impressive flying characteristics and thermals well. It has a good L/D and penetration to cut though the air. The stabilators and rudder on this plane are built-up balsa, covered with MonoKote.

This wonderful little plane can catch a thermal just about anywhere. It is perfect for small places. If need be you can even fly it at a school field or a parking lot. This plane is also nice to use as a tester at the slopes to determine what the lift conditions are like. The Javelin is so light and has such a good L/D that you do not have to worry about throwing this plane off the slope. Even if there is next to no lift you can still bring the plane back.

The Javelin comes in an easy to assemble kit. Accurate airfoils are insured by the precision cut foam cores. Machine cut balsa parts allow for quick assembly. The detailed instruction manual is straight forward and easy to follow. It is illustrated with computer drafted plans and detailed diagrams. The kit also includes a complete hardware package.

Specifications for the Javelin Hand-launch include: Wingspan: 59 inches; Wing Area: 380 inches^2; Fuselage Length: 30.5 inches; Weight: 14 ounces; Wing Loading: 5.3 ounces/foot^2; Airfoil: SD7037; Wing Planform: Polyhedral, Single Taper, Top Mount Wing; Aspect Ratio: 8.8:1; Radio Requirements: 4 Channel Micro Receiver and 2 Micro Servos for the rudder & elevator.

For more information about the Javelin Hand-launch Kit or any of Greco's other kits please write to P.O. Box 10, South Pasadena, CA, 91031, or call (213) 680-2070, during standard business hours. ■

Bags for Sailplanes
...from TUK 'N' FLY

TUK 'N' FLY offers quilted, lightweight, and easy to carry bags for a fuselage and wings. There is a handy loop for vertical storage with separate compartments for wings and fuselage. Roomy pockets have velcro closure and comfortable, sturdy strap. The bags are custom made for each sailplane model.

Patterns currently available include: Nova Slope Racer ($75.00), Genesis ($90.00), Synergy 91 ($85.00), Synergy III ($95.00), Sagitta Air Jet ($75.00) and Flamingo ($80.00). There is no choice of colors. Shipping is $4.50; California residents, please add 7.25% sales tax.

Please send check or money order to: TUK 'N' FLY, 1035 Pintail Drive, Suisun City, CA 94585; or call (707) 434-0360. Allow 4 - 6 weeks for delivery. ■

R/C Scale Sailplanes

...from Windspiel Models

We have just received our first 1993 shipment and some very exciting things are coming from Fiber Glas Flügel, starting with the ASH 26 in full 1/4 scale with a wing span of 4.20m and an HQ 3-14 airfoil, including flaps and spoilers and optional retractable landing gear. By special order and for an additional charge, you have a choice of dark blue or red gelkote on the underside of your wings on most of the larger Glas Flügel sailplanes.

There are two airfoil changes: the ASW 24, 3.6m goes from an RG-15 to a Wortman FX 60-126, and the Salto 2.8m wings will be a Wortman FX 60-126. This is a much better airfoil choice for these little birds. They should do a lot better job thermalling and still be good for aerobatics and slope flying.

The sloper we have in stock now is called Sithebe (C-Tay-Ba). We call it "The Sithe" for short. It is all glass construction with a two piece wing, carbon fiber wing joiners, servo pockets molded into the wings, knuckle-jointed hinges, and the airfoil is an RG-15-15A. The wing span is 180cm. The standard is offered in white, however you may special order, for an additional charge, red or yellow gelkote.

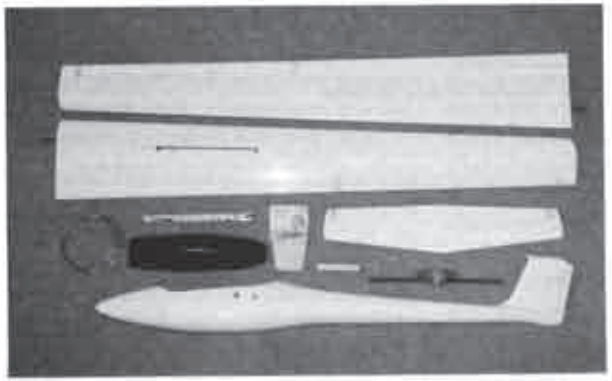
We have just received two of the large Saltos is solid YELLOW as they were from the mfg. Start and Flug.

As of now, the ASW 20 3.6m is no longer in production; it has been replaced by the ASW 24, 3.6m. Spare parts will still be available, however.

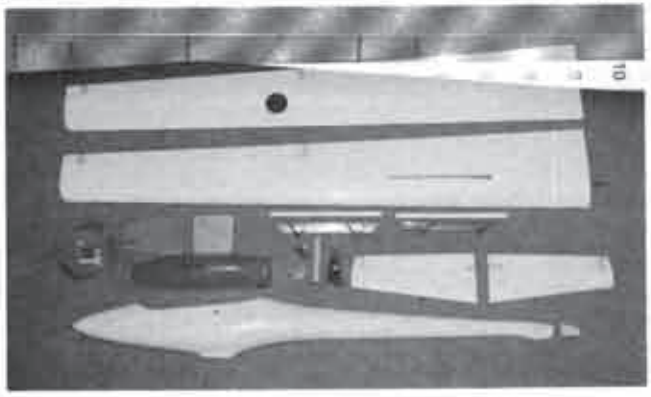
Prices: ASW 19 Semi-scale with ailerons, spoilers and wings prepared for servos... $595.00; ASW 20L 3.6m Scale 1:4.6 with ailerons, flaps and spoilers... $995.00; ASW 20L 4.15m 1/4 Scale with ailerons, flaps, wings prepared for servos, plus spoilers... $1350.00 (optional retractable landing gear with fiberglass shoe - add $140.00; ASW 20L 4.50m 1/4 Scale, with ailerons and flaps, wings prepared for servos, plus spoilers and retract gear... $1450.00; ASW 22B 6.25m 1/4 Scale with ailerons, flaps, flapperons, air brakes, retractable landing gear, and wings are prepared for servos (6)... $1892.00; ASH 25... Coming; DG 600 3.6m Scale 1:4.6 with ailerons, spoilers and flaps... $995.00; Easybird 2m wing span (all glass), rudder and elevator... $197.50; Kimbo 2.7m (Non scale T-Tail Salto), standard with ailerons only...$498.00 or $530.00 standard with air brakes - additional options available; Salto H101 2.7m Scale (1/6 approx.), standard ailerons only... $498.00 or $530.00 standard ailerons, air brakes - additional options available; Salto H101 4.25m, standard with fixed wheel, ailerons and spoilers... $1250.00 or $1350.00 with fixed wheel, ailerons, spoilers and flaps; Salto H 101 4.55m Scale 1:3.75, standard with fixed wheel, ailerons and spoilers... $1250.00 or $1350.00 with fixed wheel, ailerons, spoilers and flaps (Note: all wings are prepared for servos); ZE Ultimate F3B 280cm Contest Model, standard with carbon-fiber wings, kevlar reinforced fuselage, ailerons, flaps and spoilers... $1175.00 - options available include F3E. Prices subject to change without notice.

We carry spare parts and accessories for the entire Glas Flügel product line and are a dealer for Hobby Dynamics & J/R Radio and accessories.

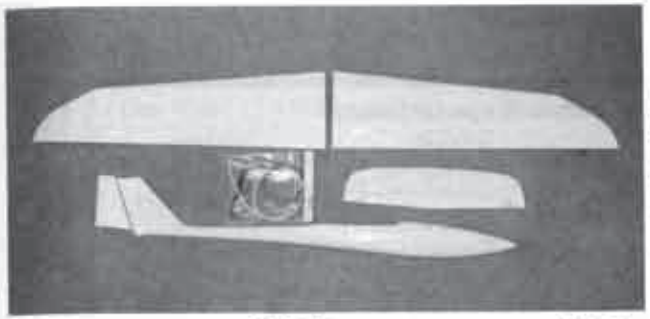
For more information or to obtain our full color $10.00 catalog, contact Pete Bechtel at Windspiel Models, P.O. Box 2121, Coeur d'Alene, ID 83816; Phone/FAX (208) 667-2276. ■



Kimbo - Standard with aileron only is $498.00.

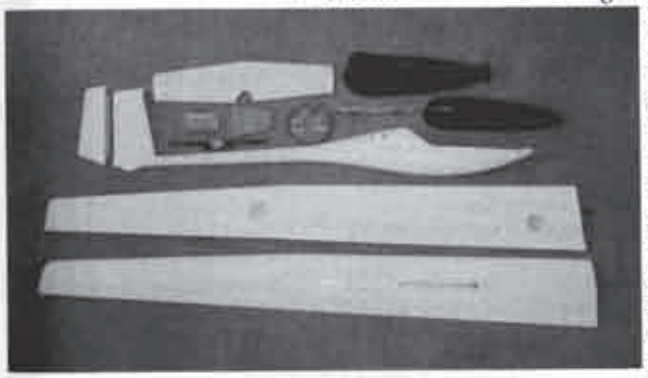


Salto H101 2.7m with Remote Servos & 2.8 m wing with Wortman FX 60-126 coming soon. Price: $498.00 - $530.00.



Sithebe

Span:	180 cm
Fuselage Length:	104 cm
Profile Girsberger:	RG 15/RG 15 A
Gross Weight:	Approx. 1500 g
Wing Area:	36dm^2
Aspect Ratio:	8.6
Wing Loading:	40 g/dm^2
RC Functions:	Rudder, Elevator, Ailerons



DG 600

Span:	360 cm
Length:	141 cm
Profile Quabeck:	HQ 3-14
Gross Weight:	3400 - 4200 g
Wing Area:	59 dm^2
Aspect Ratio:	22,1
Wing Loading:	55-65 g/dm^2
Price:	$995.00

Schedule of Special Events

Date	Event	Location	Contact
Apr. 17	H/L	San Antonio, TX	Arden Coher (210) 599-4031
Apr. 17-18	1st Annual Northwest Modeler's Rendezvous	Coeur d'Alene, ID Kootenai County Fairgrounds	
Apr. 18	TULSOAR Contest	Tulsa, OK	Bob Rhea (918) 743-5431
Apr. 25	TULSOAR Fun Fly	Tulsa, OK	Daryl Reimer (918)496-8328
Apr 24-25	Unlimited, 2M WASA Spring Fling	Wichita, KS	Pat McCleave (316) 721-5647
May 1-2	R/C Model & Hobby Show	Wilmington, MA Shriners Auditorium	
May 1-2	Unlimited, 2M EASTEX '93	New Waverly, TX	Tom Jones (713) 363-3384
May 1-2	Rose Bowl Soaring Festival	Pasadena, CA	Richard Burns (818) 812-0491
May 1-2	Unlimited Slope Racing I.S.R.	Torrey Pines, CA	Steve Condon (619) 565-4361
May 1-3	Slopeglide	Wales	Keith Nicholls 0656 667375
May 2	609, 611 DEAF Dallas Electric Aircraft Flyers	Dallas, TX	Frank Korman (214) 821-0393
May 8	MASS Handlaunch Glider Contest	Memphis, TN	Max Hurst (901) 989-3508
May 8	F3B Benefit Contest- Inland Soaring Society	Riverside, CA	Joe Rodriguez (714) 924-9537
May 15	Art Brown Memorial Open	San Antonio, TX	Bart Como (210) 650-4318
May 15-16	13th Annual Santa Maria Soaring Society X-Country Race	Santa Maria, CA	Steve Bircher (805) 928-3904
May 16	TULSOAR Task T4	Tulsa, OK	Perry Gilstrap (918) 455-5490
May 22-23	4th Annual Memphis in May Electric Contest	Memphis, TN	Bob Sowder (901) 757-5536
May 23	Davison Hilltoppers Spring Soar	Davison, MI	Gene Pastori (313) 636-7722
May 23	Task T1 Contest	Dallas, TX	Don Chancey (214) 495-8688
May 29-31	Radioglide	Pitreavie, Dunfermline	Brian Sharp 0738 828 646
May 29-30	GVRC Spring Dual Meet	Nunica, MI	Cal Posthuma (616) 677-5718
May 29-30	Memorial Day Contest - Inland Empire Soaring Society	Washington Area	Frank Wheeler (208) 772-9400
May 28-31	Mid Columbia Cup Slope Races	Richland, WA	Roy Lightle (509) 525-7066
May 29-31	Sport & Vintage Glider/Sailplane Meet	Mayville, NY - DART Airport & Museum	(716) 753-2160
May 30	TULSOAR Fun Fly	Tulsa, OK	Sandy Hay (918) 665-8069
June 6	610, 612 DEAF Dallas Electric Aircraft Flyers	Dallas, TX	Jaime Colley (214) 690-0247
June 12-13	Lift Summer Soar	Traverse City, MI	Jim Johnston (616) 938-1272
June 13	Great Rocky Mountain Handlaunch Contest	Denver, CO	Lenny Keer (303) 737-2165
June 13	Tasks T1,T7,T8 Contest	Dallas, TX	Gordon Jones (214) 840-8116
June 19-20	F3J EOLE International	Paris, France	Jean Francois Chevrier (33) 35 55 88 13
June 19-20	Slopeglide II	Ribble Valley	Ian Benson 0254 387176
June 19-20	Renewed CVRC North South Soaring Challenge	Visalia, CA	Ed Hipp (209) 625-2352
June 19	2M, Open Canyon Lake Classic	Austin, TX	Tom Meeks (210) 590-3139
June 20	H/L Canyon Lake Classic	Austin, TX	Gene Warner (210) 732-3101
June 20	TULSOAR Contest	Tulsa, OK	Mike Teague (918) 747-1245
June 26-27	NASF/MASS Mid-South Soaring Champs	Huntsville, AL	Ron Swinehart (205) 883-7831 Eve.
June 27	TULSOAR Fun Fly	Tulsa, OK	Jim Stephenson (918) 627-3809
July 4	610, 612 DEAF Dallas Electric Aircraft Flyers	Dallas, TX	Gary Warner (214) 235-1124
July 10-11	North American Scale Soaring Assoc. Rally	Richland, WA	Wil Byers (509) 627-5224
July 11	Annual Handlaunch	Dallas, TX	Bud Black (214) 235-0867
July 17-18	GVRC Summer Dual Meet	Nunica, MI	Cal Posthuma (616) 677-5718
July 16-27	AMA NATS	Vincennes, IN	
July 24-25	F3J Interglide	West Midlands	
Aug.	F3B World Championships	Sava, Israel	
Aug. 1	60-Min Enduro Dallas Electric Aircraft Flyers	Dallas, TX	Chuck Fisher (214) 270-2634
Aug. 7-8	Sailplane Meet Contest - Inland Empire Soaring Society	Washington Area	Robin Kirpatrick (509) 489-5841
Aug. 8	Task T1 Contest	Dallas, TX	Tom Peadon (214) 644-6131
Aug. 7-14	LSF NATS	Vincennes, IN	Mike Stump (616) 775-7445
Aug. 14	LIFT Aug. Soar In	Traverse City, MI	Jim Johnston (616) 938-1272
Aug. 14-15	Summer Soaring Festival - Soaring Union of L.A.	Carson, CA	Steve Addis (310) 320-2708
Aug. 14-15	F3J Hollandglide	Netherlands	
Aug. 16-22	Fun Fly Soaring Week	Salt Lake City, UT	Bob Harman (801) 571-6406
Aug. 21	2M, Open	San Antonio, TX	Perry Van (210) 658-8842
Aug. 21-22	F3J Euroglide	Belgium	
Aug. 28-30	British Gliding Nationals		RAF Cranwell
Aug. 28-29	GVRC 2-M Champs man-on-man	Nunica, MI	Cal Posthuma (616) 677-5718

Aug. 29	TULSOAR Fun Fly	Tulsa, OK	Mike Teague (918) 747-1245
Sept.	F3J	Germany	
Sept. 4	CAMS Northern MI Sailplane CH.	Cadillac, MI	Mike Stump (616) 775-7445
Sept. 4-5	NW Soaring Meet Inland Empire Soaring Society	Washington Area	Don Hendricks (509) 534-1664
Sept. 5	609, 611 DEAF Dallas Electric Aircraft Flyers	Dallas, TX	Robert Taylor (214) 279-9296
Sept. 9-12	World Cup	Czechoslovakia	
Sept. 11-12	Masters of Soaring (Sponsored by Weak Signals)	Temperence, MI	Art Slagle (313) 477-2228 Eve.
Sept. 18	H/L	San Antonio, TX	Jerry Caldwell (210) 438-4077
Sept. 18-19	TNT Texas National Tournament	Dallas, TX	Henry Bostick (214) 279-8337
Sept. 26	TULSOAR Fun Fly	Tulsa, OK	Terry Bryant (918) 482-5817
Oct. 2-3	20th Annual CVRC Fall Soaring Festival	Visalia, CA	Jerry Fox (209) 733-8091
Oct. 2-3	Annual DEAF Fun Fly - Electric	Dallas, TX	Frank Korman (214) 821-0393
Oct. 9-10	5th Annual MASS Fall Soaring Tournament	Memphis, TN	Bob Sowder (901) 757-5536
Oct. 10	Annual Dual Elimination	Dallas, TX	Jim Truitt (214) 348-2929
Oct. 16	Open	San Antonio, TX	Jerry Caldwell (210) 438-4077
Oct. 16	TULSOAR 12th Last Fling of Summer	Tulsa, OK	Sandy Hay (918) 665-8069
Oct. 17	TULSOAR 2M & Unlimited	Tulsa, OK	Perry Gilstrap (918) 455-5490
Oct. 24	TULSOAR Fun Fly	Tulsa, OK	Mike Stephenson (918) 445-3002
Nov. 7	610, 612 DEAF Dallas Electric Aircraft Flyers	Dallas, TX	Jack Hamilton (214) 348-4669
Nov. 14	Task T6 Triathalon	Dallas, TX	Chuck Fisher (214) 270-2634
Nov. 28	TULSOAR Fun Fly	Tulsa, OK	Doug Drullinger (918) 838-0282
Nov. 20	2M, Open	San Antonio, TX	Gene Warner (210) 732-3101
Nov. 21	5th Annual MASS Turkey Shoot	Memphis, TN	Mike Kelly (901) 756-9410
Dec. 26	TULSOAR Fun Fly	Tulsa, OK	Corey Gilstrap (918) 455-5490

** For more information about the Inland Empire Soaring Society, contact Al Lies, 1321 S. Rotchford Rd., Veradale, WA 99037.

***Additional information on the contests listed in Europe is available from *SOARER*, a British publication. Jack Sile, Editor, telephone 0449-675190 Suffolk, England.

The Texas State Soaring Championship

September 18 & 19 1993
Dallas, Texas

9th Annual Texas National Tournament

Task - Thermal Duration 3,5,7,9,11 w/FAI Landing

CLASSES:

2 Meter -Saturday
Open - Sunday
Junior, Novice
Sportsman, Expert

AWARDS:

1-5th place Sportsman & Expert
1-3rd place Novice & Junior
Overall Winner

INFORMATION: Henry Bostick (214) 279-8337
5517 Hidalgo Court
Garland, Texas 75043

Sponsored by

The Soaring League of North Texas

Pre-registration requested. AMA Sanctioned

TWO GREAT CLUBS SPONSORING ONE GREAT EVENT & TRADE SHOW

SECOND ANNUAL MID-SOUTH SOARING CHAMPIONSHIPS

The largest sailplane contest EVER held in the South will be held in
HUNTSVILLE, ALABAMA
Dates: 26 & 27 June, 1993

CLASSES: Unlimited Sailplane
Novice, Sportsman, Expert

AWARDS: 1st-5th both days
plus *HIGH OVERALL* all Classes

Juniors- Sponsored by RCSD: 1st - 3rd, both days only

COST: $ 15.00 1 Day/ $20.00 -2 Days Jnrs. $6.00 1 day/ $10.00-2 days

Due to the anticipated attendance to this event, pre-registration & payment will be requested. For complete information, write or call:
Ron Swinehart (205) 430-0113 Day, (205) 883-7831 Evn -HSV
Rob Glover (205) 883-2988/HSV: Mike Kelly (901)756-9410/MPS
Bob Sowder (901) 757-5536/MPS

SPONSORED BY
NORTH ALABAMA SILENT FLIERS
& MEMPHIS AREA SOARING SOCIETY
AMA Sanctioned

League of Silent Flight (LSF)

...by Mike Stump

(The following material was extracted from the third 1992 issue of *LSF Shortlines*. It is reprinted here for those of you who do not receive it. ED.)

Great strides have been made in getting vouchers processed and returned in a much shorter time frame than the past few years. Once again many thanks go to past President Bob Steele for his efforts in bringing the day to day operations back in line. For the next 6-9 months we will continue to use the Ft. Wayne, Indiana mailing address for vouchers and general communications. If you wish to speed things along however, you may send your vouchers directly to LSF Secretary Dave Corven at 61501 N. Ridge Tr., Washington, MI 48094; Phone (313) 656-1879. Dave and his daughter are currently processing all vouchers.

When we (the new LSF Board) began our duties we decided that with the permission and help from Bob Steele (actually by his suggestion) that we would continue to use his Ft. Wayne address to provide consistency through the change of administrations. This has added some slight costs in transferring these communications via mail and sometimes adds to our turnaround time but in this case it has provided that much needed consistency. I will finish on this subject by once again posting the reminder that if the LSF Voucher you have still has an Illinois address, change it. All postal forwarding orders for those addresses have been expired for some time and you can expect those communications to possibly become lost forever.

Another point that should be noted is for all Level V aspirants. When you complete the tasks, please send your voucher via Registered Mail. This gives you assurance the postal service gets this irreplaceable document to us for processing.

The LSF will again be offering opportunities for clubs to sponsor LSF Regional contests in 1993. These are opportunities for both clubs and LSF to raise funds if sufficient show for your contest. Club contest coordinators need to contact Mike Stump at (616) 775-7445 for information.

The LSF National Championships for 1992 were a success beyond our expectations. I am pleased to report that LSF will be returning to Vincennes for the 1993 LSF National Championships again. This decision comes from a voice vote of entrants at our banquet this year. The 1993 event will be held Aug 7-14. The daily schedule may be adjusted somewhat as compared to last year.

Many of you may not be aware that the AMA has changed the location of their NATS to the Lawrenceville IL/Vincennes, IN site from Lubbock, TX. The AMA NATS will be held July 17-25 and the Soaring and Electric events will be held at the same site we are using (Lincoln High School in Vincennes). The LSF Board's initial reaction was to re-set our date to a time prior in the AMA event or to try to consolidate the events. After discussions with many past attendees, and a lot of soul searching we have decided to stick with the Aug. date.

In the next several weeks, the event calendar for the 1993 LSF NATS and entry applications will be sent to all who attended last year. If you would like this information and did not attend the 1992 LSF NATIONAL CHAMPIONSHIPS, send a self addressed, stamped envelope to: Mike Stump, 607 Washington St., Cadillac, MI 49601.

The thermal duration events will once again be run using the man-on-man format used in 1992. Other events to be flown include: F3B, F3J, Scale, Cross Country, Hand Launch, SMT, and a special non-official event, H. L. Golf. All events (except H. L. Golf & Cross Country) will be flown at Lincoln High School. All fifty channels will be used. There will be a limit of 7 entries per channel in the thermal duration events, 5 per channel in F3B, F3J, SMT, and Hand Launch, and 1 entry per channel in H. L. Golf and Cross Country. ■

Fifth Annual 1993 Masters of Soaring

The Fifth Annual Masters of Soaring competition will be held on September 11 and 12, 1993. For the first time since its inception, the Masters will take place in the Midwest. Flying will be at the Toledo Weak Signals R/C Club's field located between Detroit, MI and Toledo, OH. In addition to the Weak Signals, a number of Michigan, Ohio and Indiana soaring clubs will provide workers and equipment for the contest.

Arthur Slagle, a 50 year modeling veteran and longtime R/C soaring activist, will be CD for the 1993 Masters. He says participants will be limited to the first 100 respondents to a special invitation to be mailed about April 1.

The Masters of Soaring is open only to pilots who have achieved significant R/C soaring accomplishments. To be eligible for invitation a pilot must have won a two-day contest, won a national or regional contest, set a national soaring record, hold the LSF rank of Level V, or have completed contest requirements for Level V and hold the rank of Level IV.

For further information contact: Arthur E. Slagle, C.D., 26314 Kiltartan, Farmington Hills, MI 48334; (313) 477-2228 Eves. ■

League of Silent Flight 1993 National Championships

EVENT SCHEDULE

SAT. AUG. 7.....F3J	SUN. AUG. 8.....F3B *
MON. AUG. 9.....HAND LAUNCH	TUE. AUG.10.....2 METER
WED. AUG. 11.....STANDARD	THU. AUG. 12.....UNLIMITED
FRI. AUG. 13.....SMT *	SAT. AUG. 14.....XC

SCALE WILL BE FLOWN TUESDAY & WEDNESDAY EVENING.
Thermal events will be flown man-on-man. * *May enter only one.*
ALL 50 CHANNELS WILL BE USED....THERE IS A 7 ENTRY PER CHANNEL LIMIT FOR THERMAL EVENTS, 5 PER CHANNEL IN F3B, F3J, HL, & SMT.
GOLD STICKERED TX REQUIRED...TRANSMITTERS WILL BE CHECKED.

****

ENTRY FORM

NAME_____PH._____

ADDRESS_____AGE._____

CITY/STATE/ZIP_____

AMA#_____LSF#_____LEVEL____(LSF membership not required to enter)

FREQ.	F3J	F3B/SMT	HL	SCALE	2 MTR	STD.	UNLIM.	XC

limit of seven entries per channel in thermal events, 5 per event in F3B, F3J, SMT, & HL (1 in XC)
ENTRY FEE; $20.00 per event ($12.00 for JR./SR) JR____ SR.____ OPEN____
Entry after June 10, 1993 include $10.00 late reg. fee, entry deadline July10,1993.
It is preferred that the same frequency be used in all your entries, although it is not required. AMA-R/CMA GOLD STICKER required on all transmitters.

EVENTS ENTERED_____ TOTAL ENTRY FEE ENCLOSED_____
SEND ENTRY TO: MIKE STUMP 607 WASHINGTON ST. CADILLAC, MI. 49601

NASF-MASS Mid-South Soaring Championships

...by Ron Swinehart

We have reserved a block of rooms at the Courtyard by the Marriott for 25th and 26th of June. The price will be $39.00 per nite, single or double. To make reservations, call 1-800-321-2211 and identify with the NASF group to get the special rate. Note that there will be a cut-off date of June 1 for these rooms. We are expecting a really big crowd for this event, so be sure to get your reservations in early to be able to share in the fellowship of the group like we did at Memphis last year.

Am looking forward to seeing ya'll this June for what will probably be the largest contest to be held in the South Eastern part of the United States to date. Be sure also to pre-register your entry for the contest, to aid us in the frequency control. Note that if you require a special flight order (i.e., you want to time for someone special), you must notify us with your pre-registration, as we will be unable to accommodate these requests the day of the contest. Thanks for your support. ■

Pre-Registration Form

Name _____

Address _____

_____

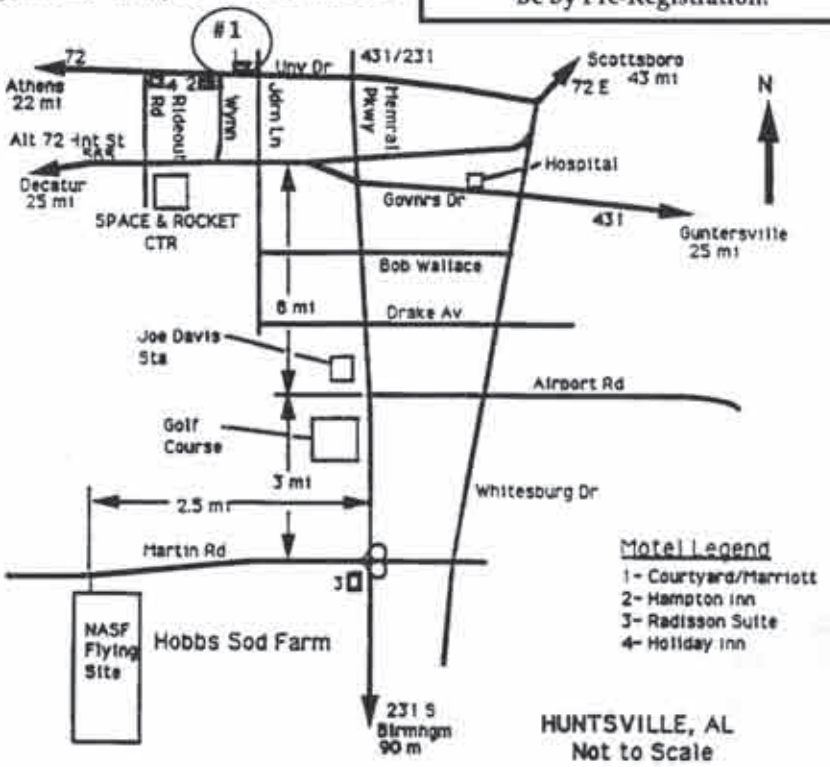
_____

Frequency _____

Entry Days Sat_____ Sun_____

Fee Enclosed _____

One Day: $15.00, Two Days: $20.00
Juniors (Age 15 & Under): $6.00 & $10.00
(Make Checks Payable to: Ron Swinehart & Mail to: 8733 Edgehill Drive, Huntsville, AL 35802.)
Special Flight Order Requests Must Be by Pre-Registration!



1993 UNITED STATES OF AMERICA F3B SOARING TEAM
SPENCER • WURTS • JOLLY • PERKINS

Official 1993 U.S. F3B Soaring Team Merchandise Order form

☞ YES! I'd like to support our 1993 U.S. F3B Soaring Team. Please send me the following merchandise:

If your merchandise total (not including S/H) equals $25 or more we'll send you a free team pin!

Qty	Item Description	Cost	Extension
_____	Raffle Entry Ticket	$5.00	_____
	Official Team T-Shirts emblazoned on front in full color with 1993 Team Logo & USA F3B Team on sleeve. Shirts are 100% preshrunk Cotton.		
_____	Medium T-Shirt	$15.00	_____
_____	Large T-Shirt	$15.00	_____
_____	Extra-Large T-Shirt	$15.00	_____
_____	XXL T-Shirt	$15.00	_____
_____	Official U.S. Team Pin	$3.00	_____
_____	Official U.S. Team Patch	$5.00	_____
_____	Official U.S. Team Sticker	$2.00	_____
		SUBTOTAL*	_____
	Shipping/Handling (Add 10% of Subtotal)		_____
	Donation (Optional)		_____
		GRAND TOTAL	_____

Please fill out your name and address below, and send your check or money order payable to 1993 USA F3B Soaring Team, 15781 Empire Lane, Westminster, CA 92683. Please allow two to three weeks for delivery.

NAME _____

ADDRESS _____

CITY _____ STATE ____ ZIP _____

EASTEX '93

SPRING

SOARING CHALLENGE

MAY 1 -2
New Waverly, Texas

UNLIMITED
MAN on MAN (L-1)
6 Rounds EVERYONE,
Flyoff top 8 plus ties

ENTRY/ INFORMATION call:
Tom Jones, 713-363-3384
B&C Hobbies, 409-760-1986

Adv. Entry Deadline: APRIL 15
(free T-Shirts for first 25 entries)

2-METER
PRECISION DURATION (L-6)
4 Rounds, Flyoff top 8

CD, TOM JONES

Understanding the "R" in R/C

...by David Woodhouse
Guelph, Ontario, Canada

In the past few years of flying with a couple of clubs, I have heard more than my share of mis-information about those black boxes in which we must place such faith: our radios. I find it interesting that we put hundreds of hours, not to mention dollars, into building and researching our aircraft and pay great attention to the various currently popular airfoils, but have virtually no knowledge of the radios that control them and allow us, on occasion, to bring them safely back to earth. For those of you who wish to keep it that way, stop reading here!

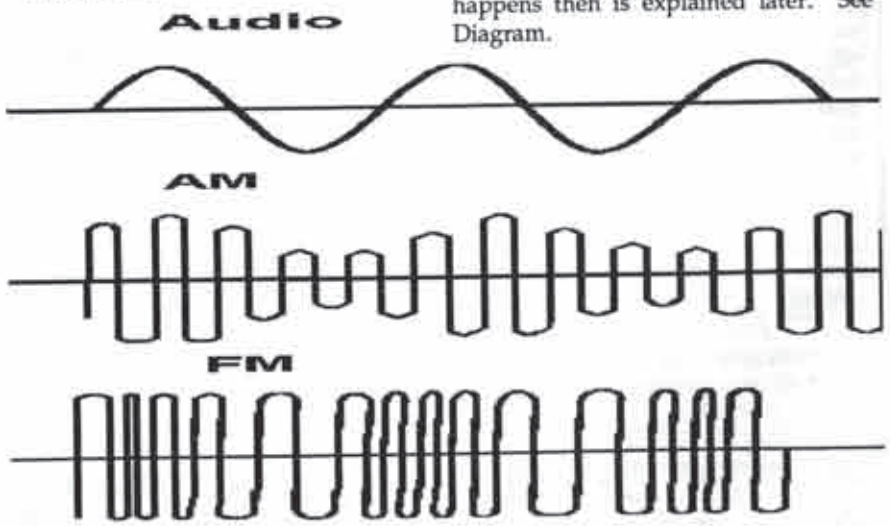
Some of you have seen me fly and I want to state right up front that while I am a relative newcomer to the joys of soaring, I have been involved in radio for most of my life and have been an amateur radio operator for nearly 20 years. This article will touch on the following topics:

A) Modulation Techniques: AM and FM
B) Encoding and PCM
C) Interference
D) The Care and Feeding of Your Radio and NiCads

MODULATION TECHNIQUES

All transmitters emit a stream of Radio Frequency (RF) energy called a Carrier. This carrier has a centre frequency and that is the frequency that is marked on the transmitter and receiver in MegaHertz(MHz) and occasionally as a Channel Number. Channel numbering is completely arbitrary and is only used to simplify identification. The Carrier contains no information but is just a vehicle. Placing information on the carrier is known as Modulation. There are two and only two modulation techniques used in R/C and they are AM (Amplitude Modulation) and FM (frequency Modulation). Although PCM stands for Pulse Code Modulation, this is not really a modulation technique. In the early days of PCM, you could buy an AM or FM version of several manufacturers product. FM is now used almost exclusively in PCM radios.

Amplitude Modulation modifies the amplitude of the carrier in proportion to the information that is being mixed with it. The carrier will then have a shape that conforms to the shape of the modulating signal. At the receiver, the carrier and the modulating signal are separated again through a process called Detection. What happens then is explained later. See Diagram.



Frequency Modulation starts with the same carrier with the same centre frequency, but rather than varying the amplitude, the frequency of the carrier is moved up or down in proportion to the modulating signal. Again, when the signal gets to the receiver, the carrier and the modulating signal are separated. If you look at the diagram, you will get an idea of how these two techniques work and what the similarities and differences are.

ENCODING

In the standard R/C radio, there is something called a FRAME. The frame is made up of a series of pulses whose length describes the positions of the sticks and switches on the transmitter at any given time. The centre value for the pulse is 1.5 milliseconds (msec). The minimum value is one msec and the maximum is 2 msec for a pulse. During a cycle, one pulse for each channel in the transmitter and one long pulse called a sync pulse is sent. This makes up a frame. The sync pulse is there to tell the receiver to start at channel one again. As soon as the transmitter is turned on, it starts to transmit a continuous stream of frames. When the receiver is turned on, it resets on the first sync pulse it receives and then starts to respond to the information in each frame. This encoding is the same for all modern AM and FM radios. The encoding at the transmitter and the decoding at the receiver are accomplished by tiny integrated circuits (IC's) which are all manufactured to the same set of specifications. Futaba transmitters will work with JR receivers etc., as long as they are on the same frequency and use the same modulation technique! This is one of the most persistent myths at the field. Servos are equally interchangeable and although there are several different connectors, the electronics are compatible. I was amused to hear about the new FM servos that appeared a few years ago. These were the same servos that had been sold with the AM gear, with new part numbers and slightly different connectors. It would appear that the changes had nothing to do with technology and everything to do with getting you to part with more cash to replace all the servos in your airplane.

Now we come to PCM. Pulse Code Modulation is a creation of the computer industry and is only made practical because of the advances in micro-electronics. To better understand the function of this technique, think of one channel only. The "frame" for our single channel contains 16 pulses, each about 400 microseconds in length. The 16 "bits" (a computer term which stands for Binary digITS) each have an assigned function and value. In the new "1024" technology, 7 of the bits are assigned to channel identification, error correction and end of frame designation. The other 9 bits (2 to the power of 9 equals 1024) describe the position of the stick. If our single channel represented the rudder, neutral would have a value of 512. Full right would have a value of 1024 and full left would be described as 0. This means that there are 511 discrete locations for the rudder on each side of centre. The resulting very fine and accurate positioning of the control surface helps explain why all the top precision aerobatics guys fly PCM. The other major advantage of PCM is its immunity to interference.

INTERFERENCE

The next time there is a thunder storm, turn on a radio and tune in your local AM radio station. You will hear the signal along with occasional static discharge which, if they are bad enough can completely cover up the signal from the transmitting station. Now, tune in an FM broadcast station from the same location and compare the quality of the signal. Static discharges are not even noticeable. The detection process in an AM receiver responds to changes in amplitude of the received signal. Static discharges change amplitude and can also obliterate the original modulating signal. Since the FM

receiver is designed to respond to variations in frequency only, changes in amplitude will go virtually un-noticed. Static discharge will have no effect on the fidelity of the received signal. Although we don't fly in thunder storms as a rule (contests excepted), there are lots of other forms of electronic "noise" that can cause interference to an AM signal such as car ignition systems, large electric motors and dirty insulators on power lines. When there is enough interference of the "noise" variety, an AM receiver can get confused, the receiver misses a sync pulse, and the wrong information goes to the wrong servo. If the condition persists, the pulse train gets saturated, the servos get driven to their limits and a perfectly good airplane gets re-kitted. Most PCM radios have an interesting feature called "Fail Safe" that takes over in the event that there is interference or a failure in the transmitter or if you are unlucky enough to let the aircraft get too far away. Having a bit of experience with your aircraft, you have a good idea as to how you would like the controls to be set if this R/C craft should accidentally become a free flight bird. While holding those settings on the sticks, press the "SET" button on the PCM transmitter and these control settings will be transmitted to the receiver and stored. Those settings will remain in the receiver's memory until the battery is disconnected. At the beginning of each flying session, check that the settings are still in memory and you will have a much better chance of retrieving your airplane in one piece.

So much for Mother Nature and other things outside the normal control of average flyers at an average field. Another form of interference is one that we bring on ourselves. This is called Intermodulation Distortion or IMD for short. Mostly we worry about adjacent channel interference, but that should have been taken care of with everyone going to "Gold Sticker" transmitters and receivers. The Gold Sticker program is designed to get the older transmitters and receivers out of general use. The problem with some, but not all, of the older transmitters is that the signal that they transmit is so broad that it can be "heard" by a receiver on the next channel up or down. Gold sticker transmitters have a much narrower transmitted signal. Gold sticker receivers respond to a narrower band of frequencies and therefore don't hear the transmitter on the next channel. IMD rears its ugly head when we have 3 or more transmitters on at once. If these transmitters are physically close to one another, mixing can occur between a pair of signals and the result appears on the third frequency. (For the technically inclined, the math goes something like this. F1 is the frequency of the first transmitter and F2 is the second. F' is the IMD resultant. F'= F1*2-F2 or F'= F2*2-F1. As you add more signals, the math becomes more complex.) The best defense for this is to maintain a spacing of at least 20 feet between transmitters and to have high and low channels fly at the same time. If you are the third or later guy in the air, turn on your receiver, hold your plane aloft and listen and watch. If you hear servos growling, or see control surfaces fluttering, do not launch.

The Care and Feeding of Your Radio

Modern R/C gear is very reliable and most of the "radio failures" can be traced straight back to pilot error. Perhaps it occurs at the field or maybe it happened much earlier, back in the basement. I had a fly-away early in the season which is a good example of this sort of thing. I was on the hi-start and I gave the sticks a wiggle and everything was fine. I gave the bird a shove and up it went. After a second or two, I tried to give it a bit of correction to the right and nothing happened! I couldn't believe it! In the few seconds between the pre-launch wiggle and the launch, I had a radio failure. The airplane was found and there was very little damage, but I couldn't wait to get my hands on the radio to see what the problem was. I recharged everything and turned it on. It worked perfectly. I did a range test and still no problem, but when I re-installed the switch harness back into the plane, I realized that the slot for the switch was a fraction of an inch too short. The switch was not free to travel to the full "ON" position. The force of the launch had caused the switch to slide back just enough to shut down the receiver. Radio Failure? No...Pilot Error.

Antennas are another source of problems and misunderstanding. Antennas, both on the transmitter and receiver are cut to a specific length. They are "tuned" to the frequency on which they operate. Don't trim the receiver antenna because you dislike that black wire hanging out of the tail end of the airplane. If you do, you will greatly reduce the range of control. Another problem that is more common to power flyers than to glider guiders is that of dirt and oil on the transmitting antenna. As the antenna is extended, each section must make a good electrical connection with the section above and below it. If this does not happen, you will, again, reduce the range of control. As I said earlier, antennas are tuned to the output frequency of the transmitter. Avoid extended periods of transmission with the transmitter antenna collapsed. The frustrating thing about this problem is that it usually occurs in the workshop and not at the field. As the servos and pushrods are installed, lots of testing goes on to make sure that everything moves smoothly and in the right direction. We usually do this testing with the transmitter antenna collapsed. This can cause the final output transistors to overheat and the repair is never cheap or quick.

Radio waves leap off the transmitting antenna and fly through the air at the speed of light (literally) in all directions, but not equally in all directions. Picture a donut with the antenna in the hole. Most of the energy radiates from the antenna at right angles and virtually none radiates from the tip of the antenna. For that reason, pointing the tip of the antenna at the aircraft cuts down on range.

Batteries are the source of great concern and dozens of articles have been written about the care and testing of NI-CAD's. I am not going to spend much time on them. New batteries can be charged for 48 hours on the standard charger. After flying they can be recharged in 24 hours or less. Don't let them get too hot. Don't leave your radio and plane in the car all week in the summer for example. During the off season, run your transmitters and receivers for an extended period, to simulate a flying session, and then recharge them. If you do this a couple times during the winter it seems to ward off evil spirits. (This is one of my own myths which I am too chicken to challenge.) Occasionally, batteries will fail to hold a charge. If, after a charge cycle, the batteries don't hold the charge for what you feel is a normal period, you have two choices. You can ignore the condition and risk your plane and your flying field, or you can cut the connector off the battery pack, trash the rest and buy a replacement. I highly favor the second option. Ni-cads do seem to have a "memory"; that is, they seem to develop a charge/discharge pattern. If you never fully discharge the battery pack, after a while, it will take a reduced charge. Cycling the packs as I described earlier will help to prevent this. There are also chargers which "cycle" the batteries to insure that they will take a full charge. Either method works and one or the other is well worth your attention.

That is all I have to say for now, but if you have any questions or comments, you can call me between 19:00 and 21:00 Eastern time at (519) 821-4346 or write to me at 96 Division Street, Guelph, Ontario, CANADA, N1H 1R6. ■ Mail your questions to David and, periodically, those questions and answers will appear in *RCSD*. Should you find yourself in his area and want to check out the flying, give him a call! ■

NASSA News

...by Wil Byers

From the members comes the following:

Herbert G. deBruyn writes, "What a wonderful idea! Please enroll me as a member."

Nick Demay says, "NASSA is long overdue! Sign me up. Also, I would like to participate in the Scale Rally. (That includes helping anyway I can.)"

"Sounds like fun to me!" writes Jess Walls.

From James Porter of Hudson, Iowa comes the following enthusiastic comment: "Hope to make the first gathering. Perhaps the Eastern Iowa Soaring Society & Sig Manufacturing could host the second event in '94 at the antique airfield near Blakesburg, Iowa." (Doesn't sound like a bad idea to me, we need participation from the central United States. W.B.)

From Boise, Idaho Tony Elliot sends the following information about his stable of scale sailplanes. "As a bit of background, I am an Englishman living in Boise. I moved here in November of 1991 from Stuttgart, Germany. My passion for R/C scale soaring really started in Germany and has blossomed since. I am the owner of several 1/4 and 1/5 scale ships, namely, a 3.75 M Pilatus B4, a 4M Discus, a 4.4 M ASW-22, a 4.15 ASW-20L, a 3.5M MU-28, and a 6.25M ASH-25 twin. I am also in the throes of designing a number of pre-/post WWII German gliders such as a 1/4 scale Rheinland, and a 1/4 scale Minimoa. I have every intention of making the drive from Boise to the Tri-Cities area for the Scale Meet in July."

Francis Gebo of Fort Meyers Beach, Florida put it simply saying, "I am a fan of Martin Simons' editorial efforts and that alone prompts me to seek membership. Good Luck."

Brian Chan on the other hand is a little more vociferous commenting, "It's great to hear that NASSA is here. I have been trying to promote scale in the club for three years, and it is not easy. Right now we have a group flying regularly at the club field whenever there is not a contest scheduled. We mainly fly aero-tow for scale. We have three 1/4 scale Cubs as tow planes and one 1/3 scale Cub in the making. On the towee side, we have about 10 pilots with 15 flying sailplanes and whatever number of planes being built. I am flying a Multiplex DG-300. I have an ASW-22 (Fiber-Glas Flügel) on the building board, a Rober's Discus, a 4.5M Grob Twin III, and a 1/4 scale Salto in stock waiting to be built. This is why I am so excited about NASSA. I hope the 1993 Scale Rally will include aero-tow too, as some of the planes are just too big to tow on winch safely." (The 93 Scale Rally is scheduled to have tugs available, however, if flyers want to bring their own they would certainly be welcome. W.B.)

Brian also included an article, with his dues, which I would like to pass along.

Scale Anyone?

Let's go fly SCALE sailplanes. Scale planes are so much fun to fly and like Earl Levin said, "The bigger, the better." Large scale sailplanes are so easy to fly and to detail out the canopy and what not. How often can you have retractable landing gear and water ballast release on a glider? And when you put all that detail on a large sailplane, you don't have to worry about the extra weight. So what if it will weigh in at 18 pounds! When you have two hundred feet of span and six acres of wing area, why worry about the wing loading? The latest AMA ruling says we can have twenty-one pounds of all up weight, anyway.

So you ask, now that I want to get into flying scale sailplanes, where do I go to obtain one of them. There are many sources. I'll list some for you.

Beemer R/C West Distributors Inc., 13827 N. Wendover Dr., Fountain Hills, AZ 85268-2775; telephone (602) 837-0311, FAX (602) 837-0155. The man there is Bob Boomer. He is the U.S. Distributor for Multiplex Modelltechnik of Germany. Bob Carries a full line of Multiplex scale and semi-scale sailplanes. Please call for product information.

Hobby Lobby International, 5614 Franklin Pike Circle, Brentwood, TN 37027; telephone (615) 373-1444. They carry Graupner, Wik, Krick, and other German sailplanes. They also carry a lot of related accessories. Send for one of their free catalogs.

Scale Glide Components, 7034 Fern Place, Carlsbad, CA 92009, (616) 931-1438. Bill Liscomb has U.S. made 1/3, 1/4, and 1/5th scale retractable landing gears for sailplanes. The 1/4 scale is standard or heavy duty.

Viking Models USA, 2 Broadmoor Way, Wylie, TX 75098; phone (214) 442-3910. Viking carries many large scale sailplane plans, semi-kits, and fuselages such as the ASW-20, DFS Reiher V2, DG100/200, Jantar-2A, Kestrel 22, Nimbus, Salto, and SZD-30 Pirat. I was told that Jerry is going to have some complete kits soon.

If you cannot find the kit of your choice, you can get plans for your favorite sailplane and build it from scratch. There are people out there who will cut a kit or semi-kit from the plan you send them. The prices are reasonable. You can get plans from model magazines and from plan services. Some contacts are:

Bob Holman Plan Service, P. O. Box 741, San Bernardino, CA 92402; (714) 885-3959. Bob carries many plans for scale sailplanes. His also is the MAP (Model & Allied Publications Ltd.) plans distributor. It costs $3.00 for "The Scale Glider Catalog".

If you want to take your sailplane to competitions, you will need some documentation regarding the sailplane type, manufacturer and general specifications such as the original size, wing span, and length. A set of color photographs to prove that your paint scheme is that of the real sailplane will also be useful. Read through the AMA rule book for more details.

Scale Model Research (Bob Banka), 2334 Ticonderoga Way, Costa Mesa, CA 92626, phone (714) 979-8058, offers a good line of documentation. They have over 200 "Foto" Paks for scale sailplanes documentation. Bob also has a research service and a "want list". Let him know if there is something special you want. Write Bob for a catalog and please enclose $5.00 in U.S.A. or overseas is $10.00. (There are franchised agents in Japan, Italy, Germany, Denmark, Australia and Spain.)

Jim Pepino's Scale Plans and Photo Service, 3209 Madison Avenue, Greensboro, NC 27403; (919) 292-5239. They carry plan and photo sets of sailplanes. Their 126 page catalog is $5.00 or $10.00 overseas. A limited number of sailplane photo sets are offered.

To find other documentation, look into different modeler magazines such as ***RC Modeler, Model Airplane News, Flying Models, Model Aviation,*** and ***Model Builder.*** Also, ***RC Models & Electronics*** or ***Silent Flight*** from England. Their plan service departments have a lot of plans that you can choose from. Order catalogs and you can start searching.

Purchasing from the above is the easy way to document your project. You simply pay them and they send the pictures. The other way is to take pictures yourself. In this case you will need to find out the where and when of major sailplane meets or contests and then trek to them with your camera. You can also get such information in ***Soaring*** magazine published by the S.S.A. (Soaring Society of America). Also, look through your telephone directory for glider ports which may have the full size version of your model, to be.

You can also obtain information by writing sailplane manufacturers. Manufac-

turers addresses can be found in soaring magazine ads. Books are also a good source of information. Examples would be **"Jane's World Sailplanes and Motor Gliders"** by Andrew Coates, published by Ziff-Davis Publishing Company. Also, see **"The World's Vintage Sailplanes 1908-45"** by Martin Simons, published by Kookaburra Technical Publications Pty Ltd, Melbourne, Australia. Get a copy of *Soaring* from the Soaring Society of America, P.O. Box E, Hobbs, NM 88241, (505) 392-1177 for additional info. If you look in the For Sale section, you may locate the plane you want to copy, but be sure to ask the owner permission to photograph his/her plane. The S.S.A. also can provide you information on locations of sailplanes in the country. You may also get information from the **Vintage Sailplane Association** at Route 1, Box 239, Lovettsville, VA 22080. VSA publishes a quarterly magazine, *Bungee Cord*, with a sample issue being $1.00.

★ ★ ★

Thanks, Brian. To close the column this month I will quote from Eric W. Meyers the Vice President of Horizon Hobby Distributors. This is what he wrote me in a recent letter regarding NASSA and the future of scale soaring.

"There is little doubt in my mind that you will grow NASSA into a viable organization with hundreds, maybe thousands of modelers pursuing the sport. I know that seems a little far out, but in 10 years a lot of things can happen. And mega-trends seem to indicate big scale is nowhere near saturation."

I hope you agree! And, I hope you enjoyed the extensive amount of information that was just passed along to via NASSA. **Please help us grow the movement!!! Send in your membership today. And, don't forget the J.R. X-347 raffle for new members in NASSA brought to you by Tom Kikuchi of Japanese Radio.**

To join NASSA, send $10.00 to 3540 Eastlake Dr., W. Richland, WA 99352. ■

1993 SCALE RALLY PRE-REGISTRATION FORM

July 10 & 11

Please PreRegister by June 1

NAME: _____

ADDRESS: _____

CITY: _____

STATE: _____ ZIP: _____

AMA # _____ PHONE: _____

Radio Frequencies: _____ _____ _____ _____

Model Design _____ _____

_____ _____

ENTRY FEE: — $20.00

ADDITIONAL MODELS: — QUANTITY _____ x $2.00 ea. _____

TRI-CITIES, WASHINGTON
HOSTED BY NASSA
3540 EASTLAKE DR., W. RICHLAND, WA 99352
509-627-5224

I'm Gonna Name My Next Glider "Rhino"

...by Al Clark
Madison, Alabama

Introduction

The other night while sitting in my old flying buddy John Chapman's shop, I spotted a red plastic Rhinoceros attached to a parachute that was hanging from the ceiling. The Rhino was about 2.5" long and the parachute was made from a 20" square of white garbage bag, with 2' long shroud lines. I said to John, "Hey, you still have that Rhino? I'd forgotten all about it! Man, that was one heck of a thermal flight!" John said, "Yeah, I got permission from Brian (John's #1 son, now 7 years old) to hang it from the ceiling." We talked about that amazing flight back in the summer of '90 and had a good laugh. I told John that a lot of glider guiders would be amazed by the Rhino's thermal flight. John agreed, and I decided to write a brief account for *RCSD* readers. So, settle back and read the true story of the red Rhino's amazing soaring flight.

The Facts

Ever try naming a sailplane? It's kinda tough. All the good names have already been used up, especially the bird names. And if it isn't named after a bird or maybe something sleek and fast, then it just doesn't seem to perform well. And animal names? Forget it, no way! No way, that is, until I saw an amazing soaring flight made a while back by a Rhino! Yeah, you read it right. I said Rhino, as in Rhinoceros. Let me explain...

The story unfolds on a nice summer day in Huntsville, Alabama. The sky was blue with small cu's, there was no wind, and it was about 1:00 P.M. I was flying my scaled up Airtronics Q-T (parasol wing power plane) at a field that is a couple of miles from our glider field. I had a dropping mechanism on the belly of the Q-T and was always dropping something for fun. On this day, John had brought Brian along to watch; John had also rigged up a garbage bag parachute about 20" square. John needed a weight for the 'chute, so he talked Brian into loaning his red plastic Rhinoceros to him, and tied it to the shroud lines.

John attached the rolled up parachute and Rhino to the belly of the Q-T. I took off and climbed to about 700 or 800 feet to make the drop. I wouldn't have climbed this high except for the fact that there was no wind, and I figured I'd go for a little duration! Well, I released the chute, but it didn't open right away like we expected. It fell to about hi-start altitude (450 - 500 feet), and began to descend. We figured this was going to be a routine drop, but at about 300 feet, bang! The Rhino hooked a thermal, and was climbing out!

The Rhino climbed to maybe 1500 feet and drifted southeast about a quarter mile off the field. By this time, Brian was getting upset with his dad for putting his Rhino on the parachute; Brian knows what thermals can do! We had just about written off the Rhino when, suddenly, it began to descend, and also started to drift back towards the field. It looked like this might be the end of the flight, but no! The Rhino hooked another thermal and climbed back up to about 1200 feet; you would almost think this thing had radio control! But, once again it began to descend. Surely, this would be the end of the flight? Nope — the Rhino "worked" two more thermals before it finally gave up! This Rhino was obviously a contest flier.

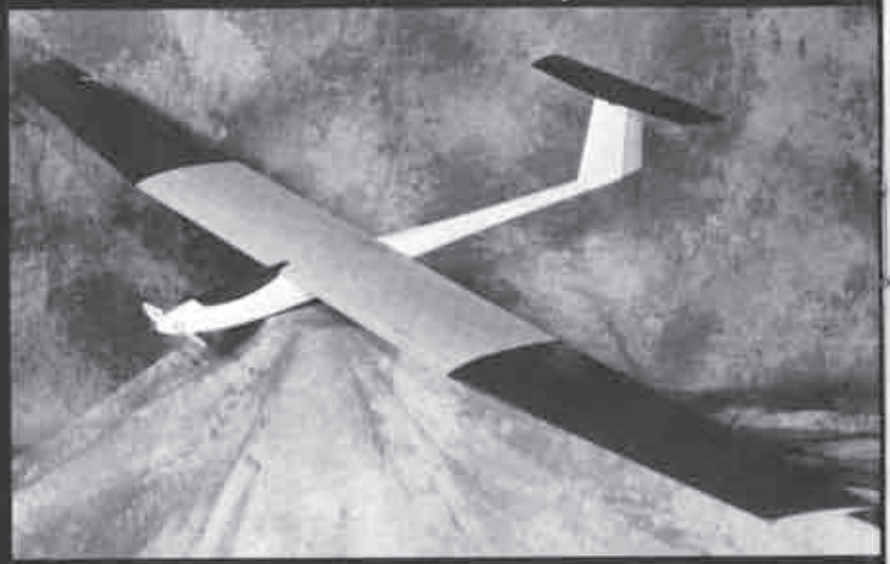
By the time the flight ended, the Rhino had drifted back over the field it was launched from, and had stayed in the air for a total of 32 minutes! Brian was happy to get his Rhino back, John was out of the dog house, and we were all thoroughly amazed by what we had just witnessed.

The best part was yet to come, as we found out the next day. John and I discovered that several of our glider flying buddies were flying at the glider field the previous day at the same time that the Rhino made its flight. So, before we mentioned the Rhino, we casually asked them how the flying was. One of them said, "Not too good. The most time anyone got was 18 minutes." John and I began to howl with laughter! We described the entire flight made by the red Rhino, and the guys looked at us like we were the biggest liars since Pinochio! We swore it was true; all they could do was shake their heads. After all, they had sailplanes with radio control; all the Rhino had was a parachute with no controls!

Yep, I'm definitely naming my next glider design "Rhino". I might even make it all red! ■

Brian Chapman and the offending Rhino with its parachute.

SATURN 2.2E - Thermal Electric Sailplane



Standard Kit Price: $179.00
Pre-Sheeted Wing & Stab: $299.00

Plus $15.00 S&H Continental U.S.A.
(CA res. add 7.25 % tax)

Features:

- ★ Ultra light epoxy glass/kevlar fuselage featuring an all molded motor mount for precise motor alignment, and a molded stab mount to insure perfect incidence;
- ★ Strong, yet light and practical, three piece wing featuring precision cut foam cores, a light weight spar, and obeche skins;
- ★ Great climb speed under power and thermal performance you would expect only from a traditional sailplane;
- ★ Strong enough to fly at high speed, and through aerobatic maneuvers without risk of wing failure.

Specifications

Wing Span:	85 In.
Wing Area:	660 Sq. In.
Airfoil:	HQ 2.0/9 - 2.0/8
7 Cell Wt.:	47 Oz.
10 Cell Wt.:	52 Oz.

IF YOU WANT AN ELECTRIC THAT WILL DO IT ALL, TRY A SATURN 2.2E.

★★★★

Special thanks to Ed Slegers for his expert assistance and support in the design, engineering, and performance testing of the Saturn 2.2E Thermal Electric Sailplane!

★★★★

LAYNE / URWYLER
1808 Applegate Dr.,Modesto, CA 95350
(209) 529-8457 ★ FAX (209) 549-1642

Also available from Slegers International, Rte. 15, Wharton, NJ 07885
(201) 366-0880; FAX (201) 366-0549

★ *Designs by LAYNE / URWYLER*

FOR PERFORMANCE OUT OF THIS WORLD

SATURN 2.5T

Standard Kit Price: $239.00
Pre-Sheeted Wing & Stab: $339.00
Plus $15.00 S&H Continental U.S.A.
(CA res. add 7.25 % tax)

FEATURES:

- ★ High quality, light weight, epoxy/glass/kevlar fuselage with solid wire pushrod tubes pre-installed;
- ★ Precision cut white foam cores with pre-installed spar for use with ultra strong 3/4" X 36" T6 aluminum alloy wing rod; Obeche wing skins;
- ★ Strong, ultra light, easy building T-tail featuring Layne/Urwyler carbon fiber bellcrank assembly and molded glass stabilizer mount;
- ★ One of the strongest and lightest airframes available in its class, producing maximum altitude on winch launches;
- ★ A world class HQ airfoil that provides great "hang time" in light lift, and the penetration required to move out in the wind, with or without ballast;
- ★ Ideal flap area designed to slow it down and hit the spot every time with maximum control.

SATURN 2.9T

SPECIFICATIONS:	2.9T	2.5T
Wing Span:	113"	99"
Wing Area:	938 Sq. In.	825 Sq. In.
Airfoil:	HQ 2.0/9 - 2.0/8	Same
Weight:	65 - 72 Oz.	57 - 65 Oz.
Wing Loading:	10.0 - 11.0 Oz./Sq. Ft.	Same