June, 1999
Vol. 16, No. 6
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R/C Radio controlled SOARING DIGEST

THE JOURNAL FOR R/C SOARING ENTHUSIASTS

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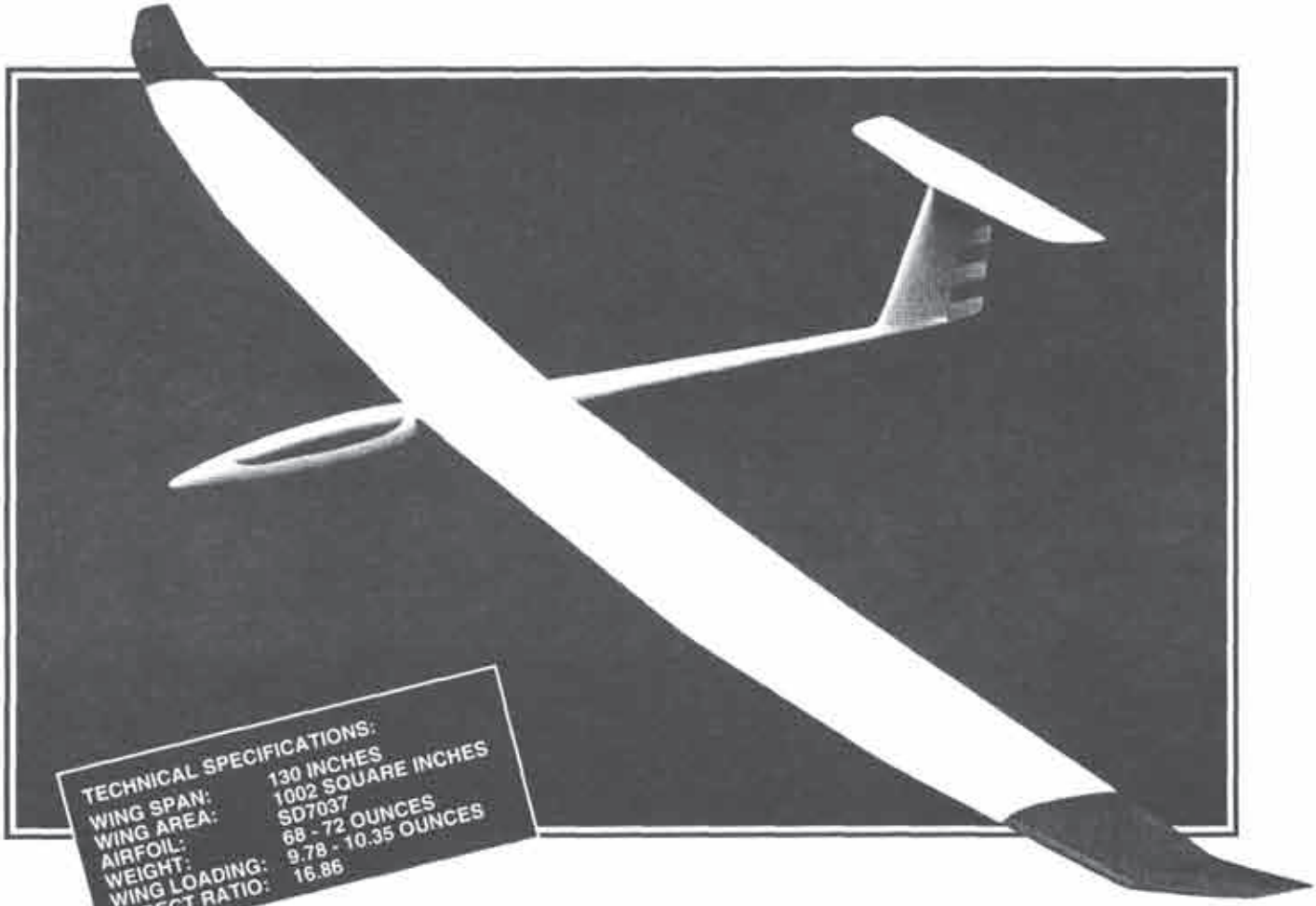

TECHNICAL SPECIFICATIONS:

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WING AREA:	1002 SQUARE INCHES
AIRFOIL:	SD7037
WEIGHT:	68 - 72 OUNCES
WING LOADING:	9.78 - 10.35 OUNCES
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MODIFYING & BUILDING THE MB RAVEN "BUILD ALONG"

Bill Kuhlman with MB Raven at 60 Acres, Seattle Area Soaring Society (SASS) field in Washington state. "On the Wing..." column by Bill & Bunny covers part 1 of the MB Raven "build along", 4 part series.

Photography by Vaughn Entwistle.

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; (520) 474-5015, <jimpeg@netzone.com>.

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Please address correspondence to:
Jerry & Judy Slates
R/C Soaring Digest
P.O. Box 2108
Wylie, TX 75098-2108 U.S.A.
(972) 442-3910, FAX (972) 442-5258
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Complete RCSD Index, 1984-1998

The Soaring Site

Build Along

This month, Bill & Bunny Kuhlman have begun a 4 part series on constructing the MB Raven. This is the 4th "Build Along" series especially designed for those of you that wish to build a plane from scratch.

For those of you that are building along, please be sure to drop the authors a line, should you have any questions, need assistance, or would like to share a completed project with the other readers. The scratch projects are:

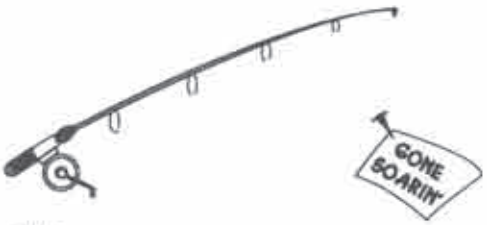
Jerry Slates, Pilatus B-4
Steve Savoie & Dave Garwood, U-2
Jerry Slates, RES Design, "Flat Topper"
Bill & Bunny Kuhlman, MB Raven

The U-2 is on countdown this month, and plans to put in an appearance, *with or without Steve*, at the annual scale sailplane event in Elmira, New York. Steve's put in some unbelievably long hours on this one of a kind project, and likely has a long list of honey do's to fulfill, particularly after using the dining room table as a prop for this project.

Dave Register's cleaning his workshop basement, and is uncovering some long lost treasured wings & things. And, Jerry Slates is chasing a roof leak, having just finished replacing a patio roof, which had a really *big* leak! And, don't ask about Gordy, 'cause it's hard enough trying to figure out which state he'll turn up in, next!

Anyway, regardless of what major projects are at hand, each month we try to find something new to share by way of sailplane related information. We hope you're enjoying the "Build Along" series, and if there's something specific you'd like to build or read about, please don't hesitate to let any of us know.

Happy Flying!
Judy & Jerry Slates



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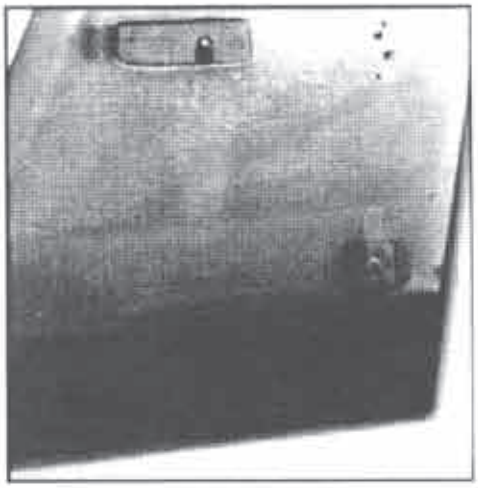
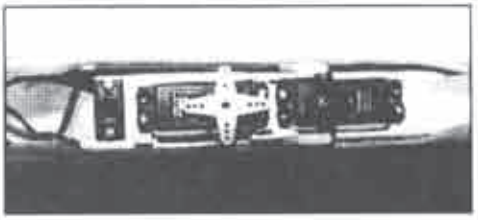
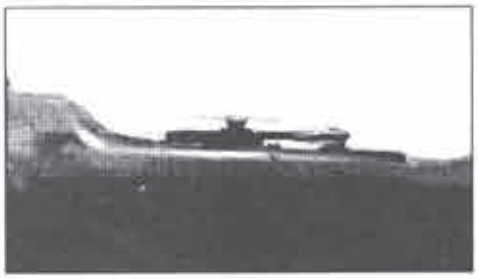
A Letter on Pull-Pull Systems







Hi Jerry,

"Awhile back, you ran an article and photos of your sailplane with pull-pull on the elevator. Enclosed are some photos showing what I do on my planes. I can't take credit for it, as two good friends in Pennsylvania gave me the ideas.

"The photos are of my "Pelican"; I did the same on my two meter "Laser", with no problems, so far. I also use pull-pull on my rudders, and think it's the only way to go. On my two meter, I used 80 lb. "Spectra Spyder wire line" (the one that's coated).

"The pulley is a "perfect" 3/4" wheel, with the tire cut off. I then use whatever size ply to take up the slack; then, drill a 1/16" hole through the fuse and ply. I use a 2/56" threaded rod to hold the pulley; the rod is sealed with thick CA. I run my line into the fuse, and then thread the line through a "Sullivan #509" yellow rod, from where the servo plugs exit the fuse, to the canopy area where I glue them to the sides. This opens up the fuse for the Rx, and the rod protects the line from the servo wires to the wings.

"Then I run the line through "Du-bro #201 2/56 threaded rigging couplers". (I chamfer the hole on both sides a little with a 1/8 drill bit to take off the edge of the hole.) Then, I use a small piece of copper tubing and crimp down on the line, tie it off, and use thin CA to finish it off. I use nylon mini kwik-links on the couples to adjust the tension to the servo arm.

"Keep up the great work in *RCSD*, Jerry, and good flying."

Regards,
(signed) Pete Petrowske
Salt Lake City, Utah

■

Apogee flown on October afternoon in Wisconsin. Dale Uecker photo.

Apogee - An Example of a Basic RES Design

by Lee Murray
Appleton, Wisconsin

The Apogee shown in the photo was once, but is no longer, a DynaFlite kit. However, it is an example of a basic RES design with good handling and light wind performance. It is an all wood model with an elegant look that is pleasing to look at as well as fly. The model was available directly from DynaFlite or thorough Tower Hobbies. The 100 inches of rib wing construction is not difficult to assemble. The one shown was built by Dale Uecker. Dale made some modifications to improve performance and its durability.

1. The Bob Johnson modification was used on the trailing edge. This modification amounts to applying 1/64" plywood beneath the trailing edge stock that allows the trailing edge to be sanded to the thickness of the plywood without distortion. (See *RCSD* January 98, pg. 18 for Bob's modification details.)
2. The wing strength was improved by using sheer webs out further into the wing.
3. An additional fuselage former was added past the trailing edge of the wing to improve the ability of the model to be gripped when being launched from a winch or hefty highstart without crushing with fuselage.
4. In addition to the two above modifications, the control system for the flying stabilizer was modified from a curved cable connecting the servo to the stab to the use of a straight pushrod with an "L" shaped bellcrank.
5. A larger block was used for mounting the tow hook.
6. A reinforcing member was added to the canopy to keep the canopy more secure against the moving batteries and heavy launches.
7. The polyhedral angle was reduced 2 degrees from about 13 to 11, and 1/8" of wingtip washout was used to help with tip stalls at low speeds.
8. A 1/2" hole was drilled in the nose block to hold some balancing weight.

Framed up Sophisticated Lady.

Dale with Sophisticated Lady.

The photographs were taken on an October afternoon after Dale called with an offer to go flying after work. While I didn't have a model charged, we shared the model and flew off a highstart. We had a couple 12 minute flights at about 4 p.m. on that October afternoon. Later flights were repeating at 6 minutes +/- 15 seconds. The model is a joy to fly. The Apogee launches very well with a high start or sport winch.

One of Dale's first models was a Sophisticated Lady. After trying multi-channel and full house models, Dale decided to revisit his experiences with the Sophisticated Lady by building another. The model is shown in framed up and covered form. One of the differences between the Sophisticated and Gentle Lady is the amount of leading edge sheeting. Some improvements which Dale uses include reinforcing the fin with 1/64 plywood along the post end to make it stronger when the landings are not perfect. This is a typical weak spot for "T" tail models and this small weight penalty does wonders in keeping it together. The nose of the model can use some reinforcement since the nose has a tendency to burrow when landing on soft turf.

Quote from Ray Bradbury on intellect and love:

Intellect is there to tell you when you're wrong. If we listen to our intellect, we'd never have a love affair. We'd never have a friendship. We'd never go into business because we'd be cynical. Well this is nonsense! You're going to miss life. You've got to jump off the cliff all the time and build your wings on the way down. ■

Jer's Workbench

Jerry Slates
P.O. Box 2108
Wylie, TX 75098-2108
(972) 442-3910
RCSDigest@aol.com

Low Tech Design & Construction Rudder, Elevator, Spoiler Model RES - Part III

I was planning to have completed a lot of the construction detail on the "Flat Topper" this month, to show you just how easy it is to build a model from scratch. Unfortunately, too many "little" projects cropped up this last month. However, I have managed to pull together most of the supplies required, and most of the parts have been cut out: fuselage sides, fuselage side doublers, and wing ribs. Of course, a pattern or patterns was required in order to cut out each part.

Conveniently hiding in the back of the shop was a sheet of 1/8th inch plywood door skin, which was just the right size to make one fuselage side pattern. Using it as a pattern, I was then able to cut out two fuselage sides and two fuselage side doublers. The pattern was then laid aside, as it will be saved for a later date, just in case I decide to build another model, or require a replacement fuselage should I crash the model I'm currently building.

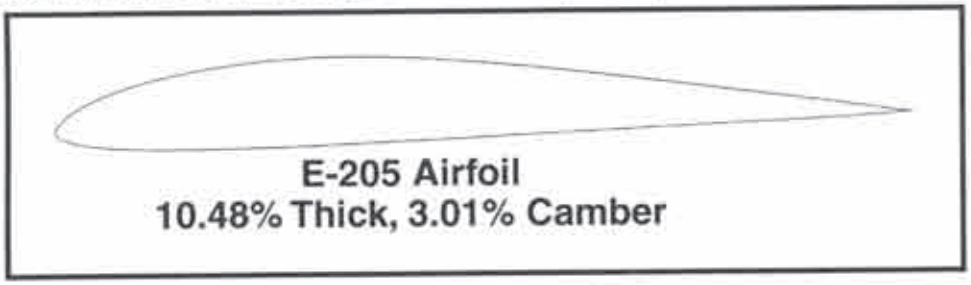
Next, I tackled the wing ribs. The ribs were laid out and plotted using Chuck Anderson's "Airfoil Plot Program". The computer prints out 9 ribs, which can then be glued onto a sheet of 1/16th inch plywood; a scroll saw is used to cut them out. Using just the 9 patterns, I was able to cut out all 36 ribs, one at a time.

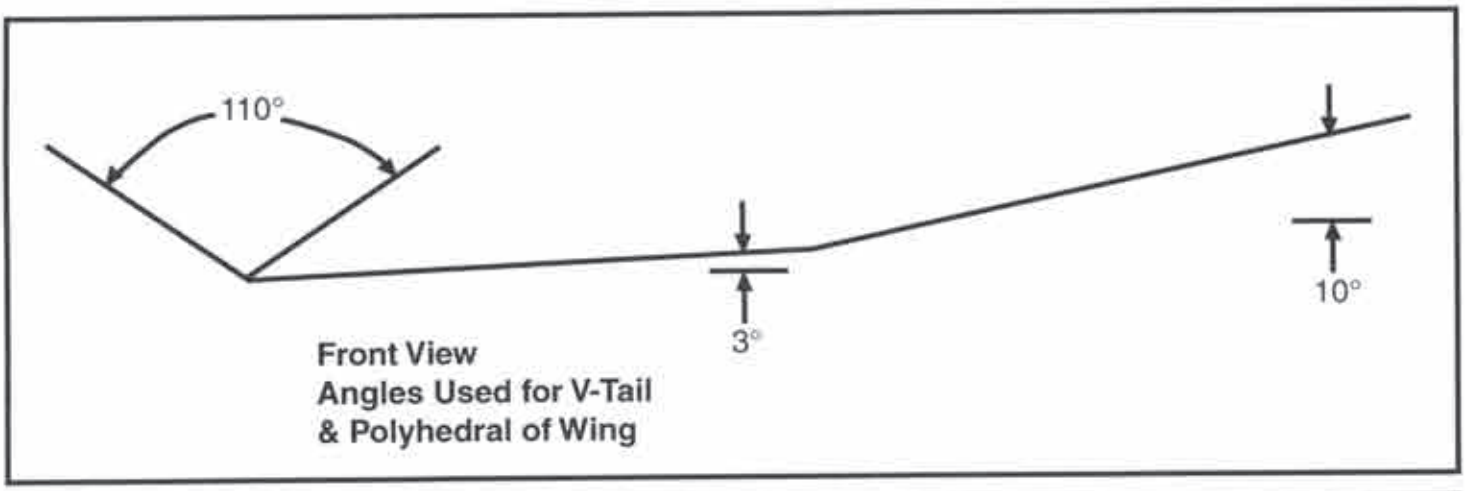
Now, cutting out ribs will likely stop many folks from even considering scratch building a model. But, it really isn't that hard to do; I find that it goes really fast for me, if I just sit down and do it. So, for those of you that would like to give it a try, let me explain the process I use to cut out all

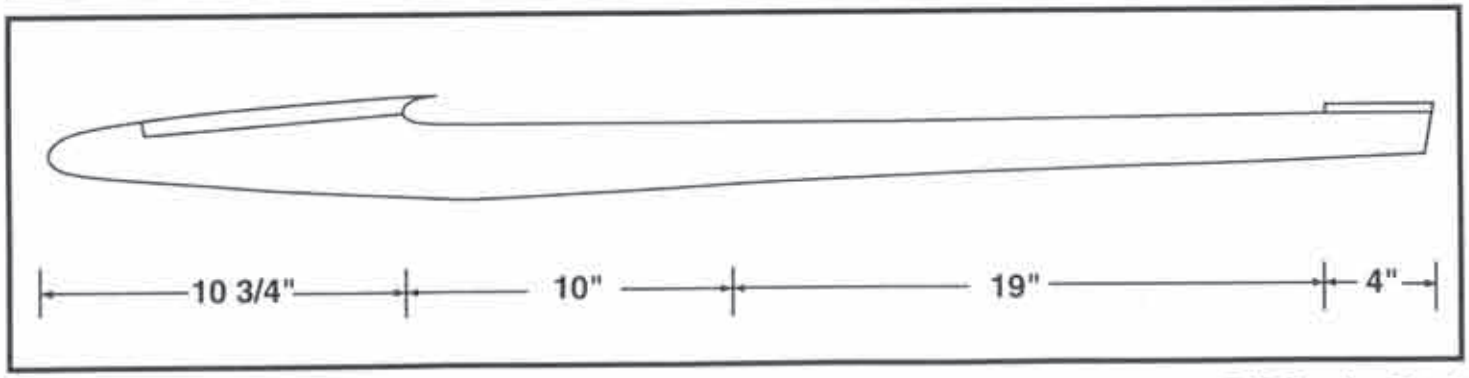
Figure 1 - 1/16th inch plywood patterns used to cut out ribs.

Figure 2 - Push pins used to hold pattern in place while cutting out ribs.

Figure 3 - Use a new blade when cutting out ribs; they make a nice, clean cut.







those ribs.

In addition to the rib patterns, we also require a cutting board, push pins, and a couple of brand new blades for a model knife. I selected 1/16th inch hard balsa wood for the ribs.

The balsa wood is laid on the cutting board, and the rib pattern is pinned to the top with 2 push pins; the pins are pushed all the way through the balsa and into the cutting board. By pinning everything together, there is less of a chance that anything will slip.

With a brand new blade inserted in the model knife, I carefully cut around each rib. I use 2 or 3 light cutting strokes as I go around each rib pattern. When the pins are removed, each rib should look perfect, with no mashed edges. After about half way through the ribs, I recommend replacing the knife blade. The 36 ribs took a little over 2 hours. I saved the rib patterns, putting them away with the fuselage pattern, just in case.

Now that most of the parts have been cut out, It's time to get to work and build the model.

See Ya Next Month!

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■

on the Wing

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Modifying and Building the MB Raven
Part 1, Preliminary Decisions

Dave Jones of Torrance, California was a prolific designer of tailless aircraft. Western Plan Service, which he owned, served as the distributor of his many full size plans. His basic philosophy was that models should be relatively easy to construct, with little sanding and shaping needed, yet they should consistently perform well. The Raven series (Raven, Mini Raven, Raven 2M, Raven NFF, and Raven S) exemplified these goals. The last in the series, the Raven S, had several advanced design features, yet used simple materials and construction methods.

The Raven series was formulated to provide a competition soaring machine with different capabilities than those of conventional tailed sailplanes. All of the aircraft in the series relied on a plank planform. A reflexed airfoil section provided pitch stability. The resulting aircraft were stable wings with no sweep or twist. Because of low pitch inertia, the elevator on these models is quite powerful, despite a short lever arm. Dave designed the Raven so the center wing panel, fuselage, elevator, fin and rudder are a single unit, and all controls are permanently connected. The wing loading of these models is very low — just 4.3 oz/ft^2 for the prototype MB Raven — yet penetration in windy conditions is not a problem. Ballast can be added to bring the wing loading up to around eight oz/ft^2.

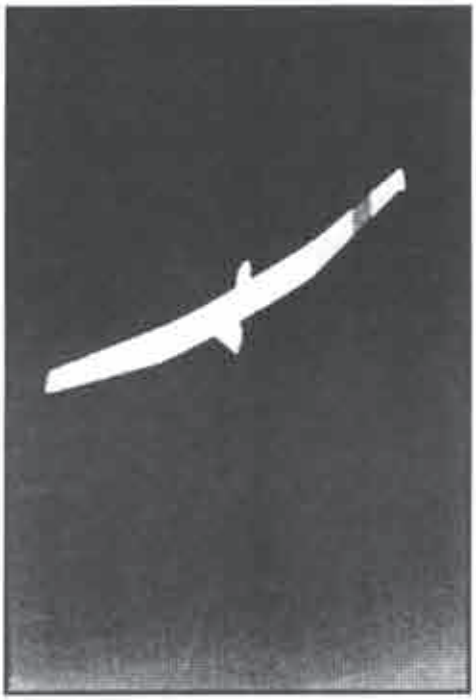
Our first tailless model was Dave's MB Raven, which appeared as a construction article in the January 1982 issue of *Model Builder* magazine. As newcomers to the world of proportional radio equipment, we both used this model to learn to fly. In fact, we had so much fun with it that a second MB Raven, this with ballast tubes, was built a short while later. Both of these aircraft, each with several minor and a few major repairs, are still being flown.

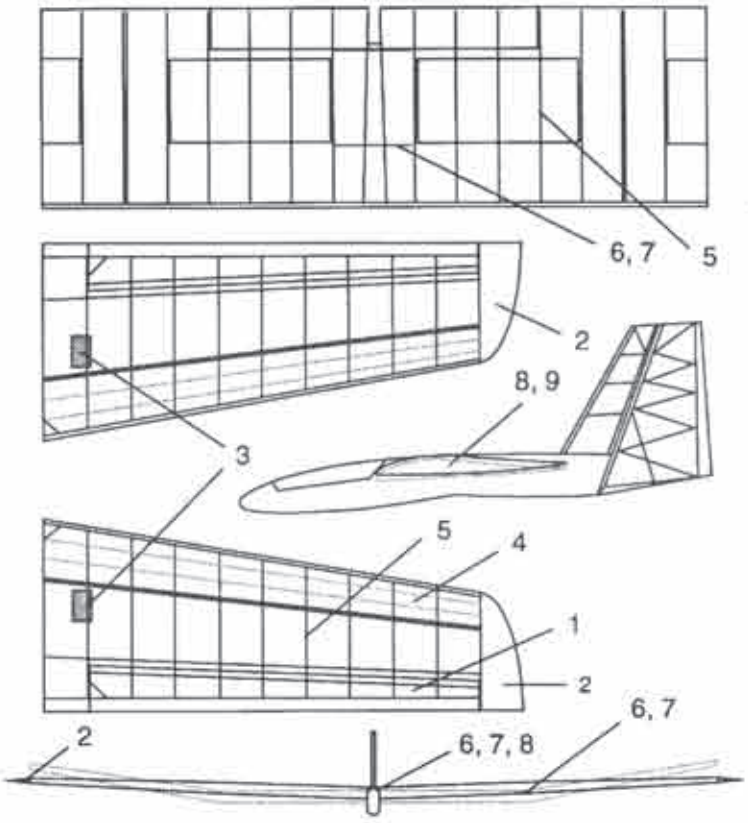
Having already built two MB Raven, we had initially planned to build a Raven S this year. When the idea of a "build-along" construction article for *RCSD* was presented, however, we decided to delay building the Raven S and instead build a modified MB Raven. Continued availability of MB Raven full size plans from Bill Northrop's Plans Service was the deciding factor in making this decision. The plans are printed on two large sheets, and a copy of the original construction article is included. (Full size plans for the Raven S have not been available since Dave's death and the demise of Western Plan Service in 1991.)

There are nine modifications which are to be incorporated into this new model. Most of these changes are derived from information gathered from the MB Raven construction article, from the Raven S plans, or from personal correspondence with Dave.

- The original MB Raven was designed for a two function radio system. Control surfaces shown on the plans consist of a centrally located elevator and a large rudder mounted on a slender fin. Miniaturization of on-board radio equipment allows for a far more sophisticated control system to be installed, so our first modification will be to add ailerons. This will mandate some connections be made on the flying field, but the added maneuverability is a fair trade-off.
- To remove the ailerons from the adverse effects of being in the tip vortex, the outer end of the ailerons will be some distance away from the end of the wing. To maintain aileron length, new wing tips will be fabricated.
- The ailerons will be driven by direct linkages to wing-mounted servos, so we'll be adding servo mounts in the outer wing panels at the inboard end of the ailerons.

- The outer wing panel turbulator spars will be replaced by balsa sheeting. This will increase torsional rigidity so aileron deflection at high speed does not twist the wing.
- Cap strips will be added to all ribs where sheeting is absent. This is being done because it adds strength to the ribs, improves appearance, and makes the ribs easier to cut out.
- The MB Raven construction article contains very much more information than simply how to build the model. Dave included suggestions for modifying the airframe for specialty applications like electric power and slope flying. Several other possible minor modifications are outlined as well. One of the presented modifications is to straighten the wing so dihedral can be used rather than the polyhedral shown on the plans. As this makes the aircraft appear a bit more realistic, we've decided to build a straight wing. This modification simplifies construction of the joint between the center section and outer panels of the wing, but necessitates fabrication of a dihedral brace for the center of the wing.
- The *Model Builder* article also mentions the dihedral angle can be lowered significantly, promoting flatter turns. We're not looking for flatter turns, but we are looking for aileron deflection to produce the rolling moment rather than the aerodynamic interaction of yaw and dihedral. The original MB Raven had a flat center section and five and a half inches of dihedral — about ten degrees. We're going to use four degrees of





MODIFICATIONS TO MB RAVEN

1. add allerons to outer panels
2. add new wing tip extensions
3. place aileron servos in outer wing panels
4. replace turbulator spars with leading edge sheeting
5. add cap strips to unsheeted portions of wings
6. change polyhedral to simple dihedral
7. lower dihedral angle to four degrees
8. raise wing root 1/4 inch to match decking
9. airfoil change from CJ-3309 to BW 05 02 09

dihedral, the minimum recommended by Dave in the construction article.

- We're going to take advantage of the reduced dihedral to also raise the wing root position on the fuselage so it is flush with the upper deck of the fuselage. Because of the reduced dihedral, the distance between the CG and the tow hook will remain nearly the same, so there should be no noticeable increase in pitching during launch.
- The MB Raven uses the CJ-3309 section (3.3% camber at 30% chord, 9.4 percent thick), while the Raven S plans show two airfoils: the CJ-25-09 (2.5% camber at 25% chord, 9.5% thick) is denoted as the standard airfoil, the BW 05 02 09 as the option (2.0% camber at 27.5%, 9.4% thick). In a 1984 letter from Dave, he said, "This airplane is still in the design stage. Plan two identical models except for the wing sections. The other section is by Barnaby Wainfan, well known free flight flying wing designer. He is also an aerodynamicist and won P30 at the last NATS with a flying wing." The BW 05 02 09 is beautiful, very much like an EH section in appearance. We contacted Barnaby Wainfan and discovered there are no published coordinates for the BW 05 02 09 section. We've derived coordinates from the printed sections on the Raven S plans and will be using it for this model. The coordinate set will be published in the installment covering wing construction.

The radio system will be either our trusty JR Century VII or a JR PCM 10. As the entire control system is relatively straight forward, the Century VII is the logical choice. We do, however, want to do some experimentation. One thing we'd like to do is be able to utilize the ailerons as spoilers; the central elevator would then be used for trimming out any pitch change as the ailerons are deflected upward. Another option we'd like to try is to use the ailerons as elevons. This would free the elevator to be used as a trimmer only, promoting more efficient thermalling. These two experimental setups would require use of the PCM 10, as it has a multi-position flight mode switch and five separate channel mixing functions. The Century VII lacks these functions.

As with the second MB Raven we built, provision for ballast will be incorporated. Half inch paper tubes, as used in model rockets, will be placed in the center section of the wing. Ballast in the form of half inch steel rod can be inserted into the paper tubes by removing the outer wing panels. Filling the tubes adds two pounds to the aircraft weight, raising the wing loading by about 3.4 oz/ft^2.

We begin construction in the next installment, starting with the wing.

Stay tuned!

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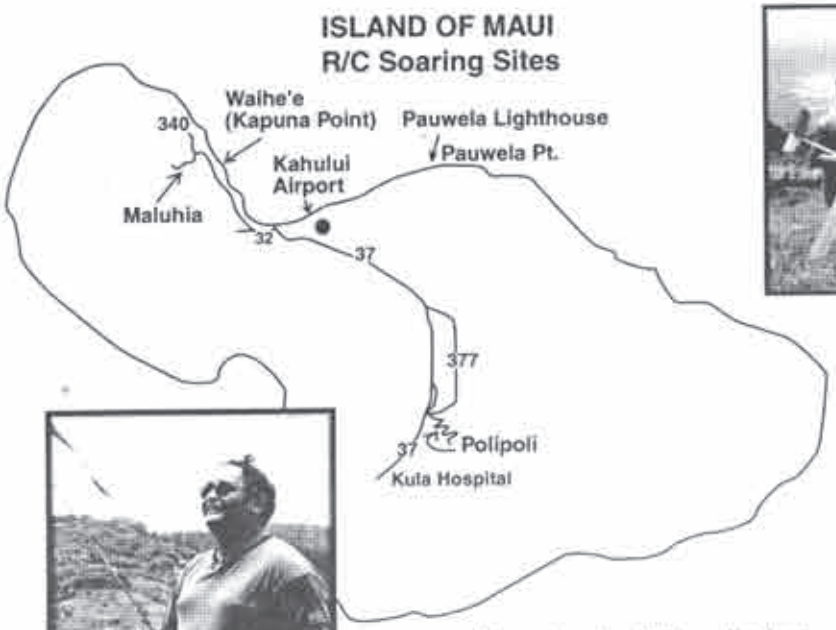


(L-R) Duane Asami, Randy Bullard, (unknown flier), and Gerald Fukuoka. Taken at Maluhia. Courtesy of Randy Bullard.

Duane Asami of Hawai'i. Taken at Maluhia. Courtesy of Randy Bullard.

HAVE SAILPLANE, WILL TRAVEL!

Tom H. Nagel
904 Neil Ave.
Columbus, OH 43215
tomnagel@iwaynet.net

This column is dedicated to soaring vacations.

RCSD ran Duane Asami's article about flying on Maui in the March, 1999 issue. Duane is a native Hawaiian, and invited *RCSD* readers to contact him if they were coming out to the islands. A similar invitation is posted on the web site of the club Duane flies with, the Maui Island Soaring Organization (MISO). Randy Bullard, of Charlotte, North Carolina and Kurt Dumas from Burbank, California each decided to follow up on that offer. And they each independently wrote an article for HSWT on their trip. I have decided to edit these two articles together, a sort of conversation by two happy flyers that never actually happened.

Tourist Sloping on Maui

More Adventures with Duane Asami

KURT: Let me start off here. There were a couple of typos in Duane's article. On the map "Waihe'e" was changed to "Waihe's." That can't be right. There is no "S" in the Hawaiian language.

EDITOR: Thanks for pointing that out. How does the IRS handle that?

KURT: Also, in Duane's article the directions to the Polipoli flying site the correct road name is Waipoli Road. (There actually is a Polipoli Road, but it doesn't go to the Polipoli flying site.)

EDITOR: Well, that's the kind of thing that happens when you fly in a place where the language only has 13 letters. Randy, what made you decide to go flying in Hawaii?

RANDY: In July of 1998, I got to fill a long time dream of mine by slope soaring Maui. Maui is one of the most popular of the Islands of Hawai'i, and probably my favorite. With what I consider almost perfect weather, Maui, like a lot of the other Hawaiian Islands, offers a wide range of climate. From the warm, breezy coast of the windward side to the cold stark beauty of the 10,022 foot Haleakala Crater, Maui offers something for almost all outdoor worshipers like myself.

KURT: I'll second that. It's not just fun, it's therapeutic. I couldn't think of a better way to spend my vacation than with the sun at my back, wind on my face and radio in my hands. I was looking for consistently flyable conditions, a variety of beautiful yet accessible locations and some local pilot guides. Thanks to Duane Asami, Lance Endo and the rest of the MISO pilots, my hopes were met and exceeded.

RANDY: My big dilemma before the trip was deciding which plane to take. We only had room for one plane because this was also going to be a family SCUBA diving trip among other things and SCUBA takes up a lot of room. After much lamenting, I decided on my 60" Vindicator slope racer. I knew the Vindicator would be more limited in what sites it could fly, but it is my favorite slope plane. The Vindicator fits perfectly in a gun case my son had given to me for just such occasions.

KURT: I contacted Duane via e-mail after reading the MISO web site and he provided me with a wealth of information, including the specific aircraft I would be flying, tips on where to stay, even a great place to go hiking if I ever got bored with flying. (I never did go hiking.)

RANDY: Through the Internet *RCSE* list, I had met Duane Asami who said to give him a call when I got there. After a couple of days of tourist stuff with the family, I called Duane. He picked me up at my room the next morning and we headed to Polipoli. It is one of the local flyer's favorite places because it has generally light winds and good lift, making it a good thermal plane site. To get there, you go up the same twisty mountain road that takes you to the peak of Haleakala.

After a while, we were in the clouds. When we reached Polipoli, I met Gerald Fukuoka, one of Duane's friends and flying buddy. Like Duane, Gerald is a native Hawaiian and also, like Duane, he is a super nice person as well as a soaring fanatic.

Flying was somewhat difficult because of the clouds hanging on the slope. This is an inland slope and so the lift is more like thermal lift than slope lift. Because the clouds were cutting out the sun, the lift was fairly light. We were able to have some limited flights, but I kept losing sight of the Vindicator in the clouds. It was a bit too scary for me. Because of the weak lift and low clouds, we decided to try it again another day and at another slope. Of course, when we got back down to the flat lands, it had cleared up on the mountain. In spite of the clouds, I still had a wonderful time because I had met new friends and the area is typical Maui beautiful.

KURT: I flew my ICARE Carbon D-Light at Polipoli, and it is not a site you would want to miss. The beauty and serenity is enough to draw you there let alone the great thermal conditions. The Carbon D-Light flew like it had been specifically designed for that spot.

RANDY: On another day, Duane also took me to Waihe'e. It has very good lift and a fantastic view overlooking the ocean with crashing surf several hundred feet below. You have no doubt here that you are on a volcanic island. You are overlooking a near vertical drop off to the ocean with volcanic rocks everywhere. It really does have a very bad landing area. It was small and rocky with a barb wire fence right behind you. This is a foam-only slope. I wished that I could have brought the Zagi for this

one. Duane let me fly one of his foam planes for a while.

KURT: Waihe'e was my favorite sloping spot on the island. The winds were typically 15-25 mph, and for a first-time coastal sloper, the conditions were ideal. I flew a ZAGI-LE that I had modified for travel with bolt-together wing halves. As foamies go, it was a little slow. I was fortunate to have chosen durability over "ludicrous speed" as the local balsa/FG pilots refer to it, since the landings at Waihe'e are not soft.

RANDY: My last day on Maui, Duane took me to Maluhia, their new secret slope. You would never find if you didn't know where it was.

EDITOR: Not much of a secret if he takes everybody there.

RANDY: Quiet, Nagel. Maluhia was even more beautiful than Waihe'e. It actually is almost above Waihe'e but quite a bit higher and also much greener. The landing area is a large lush cow pasture behind you. You are a fairly good way from the water, but most of it is vertical. Because of the altitude gain, it was also much cooler. My shorts and tee shirt weren't enough. Gerald loaned me extra clothing to put on so I wouldn't freeze.

The lift was fantastic, the scenery was spectacular and the company was great. I got to really practice my aerobatics skills. Something I don't get to do very often on my inland slope at home. We did some plane swapping and I flew some of their planes and Gerald flew my Vindicator. By the end of the day, I was tired but very happy. It was time to go, so I set up for my last landing of the day. I came screaming in and turned toward the landing area behind me and I found that it had been filled with cows! Fortunately, I had enough speed and height to make it around the cows and land safely. I understand Hawaiian cows are really expensive if you have buy one after you kill it with your plane.

The best quote of the day came when a new flyer got too fancy and ended up in the trees to the right of the field with lots of plane crunching sounds. Duane said, "Those Guava trees, they don't give very much." At least you can have a fruit snack while you get your plane out of the tree.

KURT: When I flew it at Maluhia, which Duane calls his "fly what you like site" the low wing loading of the Carbon D-Light was a disadvantage, particularly on landing. There was low level turbulence and you had to come in fast.

EDITOR: Did either of you have any equipment problems while flying on Maui?

KURT: I made a bolt-together modification to the Zagi so that it would be easy to transport in its original box; however, it did nothing to improve its structural integrity.

The winds were steady at about 40 mph for my first and only launch at Kahakuloa. I gained about 200 feet of altitude, dropped the right wing and pitched down, putting the airplane with about a pound of lead into a dive for a high speed pass. Just as I began to pull back on the stick, the aircraft went into a mad flutter, flapping its wings like a terrified pigeon. Almost instantly it folded like a book and then was ripped apart by the relentless wind. The two halves fluttered down and came to rest in the long grass behind me, behind the wall of wind.

The moral to the story.... Well, there is no moral. The lesson is if you're going to fly the big wind on Maui, build strong.

EDITOR: Here's an idea: how about pre-building a Zagi? Do all the messy work before you leave home - stuff like cutting out the holes for the battery, receiver and servos. Lay out your pushrods, finish the elevons, put on the control horns and such, cut a slit for the antenna wire. You could even cut a spar channel in the bottom to stiffen it up. Then take out the gear, and spray the M-77 on the two wing halves, wrap them in wax paper, and stuff everything back into the box. It travels really well in the box.

When you get to your vacation paradise, all you have to do is epoxy the wing halves together, slap on the tape, stuff in the gear and tape on the elevons. Fly the thing through vacation, and then take the gear out when you head home. You can donate the airframe to the local guys - when you are on vacation you probably will spend more than the cost of a Zagi kit at the bar before dinner. Why haul a hunk of foam halfway around the world?

Any other tips for Maui travelers?

KURT: Many of the local pilots have field kits and are usually more than happy to provide tools or epoxy to keep you flying. But not everyone has a good field charger. The wind out there will outlast your batteries. I found my Hitec CG-335 indispensable.

Also, I'd suggest a trip scheduled to include MISO's fun fly contests, as I did this March. The dates are listed on MISO's website. It is a chance to meet a lot of the local pilots and test your skills. Be fore-warned—they fly a lot!

RANDY: If you go to Maui, take a foamie and something else so that you can fly in the different conditions. If you only have thermal planes, that's good too. Duane and Gerald fly thermal planes a lot, especially at Polipoli.

The upper slopes like Polipoli and Maluhia are fairly cool, so take something to keep you warm. It is an honor to fly at any of these sites, so if you go, treat the area with respect. Maluhia in particular has a sacred Hawaiian site right next to it, so act accordingly. Take only memories and pictures and leave only footprints. Now if I can just find a way to make a living there.

Here's a handy travel item that I picked up from Al French, Washington D.C., who posted it on the Radio Control Sailplane Exchange (*RCSE*).

For wind forecasts anywhere in the United States check out: http://www.intelicast.com/kitecast/

I tried this site and immediately added it to my bookmarks list. Who says nothing good ever comes out of Washington, D.C.?

Thanks, Al!

Randy Bullard has been flying RC gliders off and on for 18 years and full scale power planes and gliders for more than 30 years. He moved to Charlotte, NC area from Atlanta, GA seven years ago and flies with two different groups of pilots: a small thermaling group in Charlotte and another group which slope on the Blue Ridge Parkway, a 2.5 hour drive from where he lives.

This was Randy's second trip to Maui, but the first time he has flown there. Randy was a tech support manager for a computer industry company when he lived in Atlanta, but in Charlotte works in a SCUBA dive shop. He hopes to retire on Maui.

Kurt Dumas began flying full scale aircraft in June of 1996. His interest in model aircraft started at the same time. His first sailplane was a Wanderer but says, "My lack of proficiency as an RC pilot (I taught myself.) and anxiety about crashing prevented me from flying what took so long to build. I began building and flying with cheap radio systems. I mean cheap, not just inexpensive; when your aircraft performs better when you forget to turn the Rx switch on, you know it's time to use the good radio."

Kurt does most of his flying in light inland slope conditions, in and around the hills of Burbank and Glendale, CA. He just finished building a foamy P-40 Warhawk and is headed out to Malibu with it.

Kurt works at the Nickelodeon studios in Burbank as a storyboard director.

■

If you have a favorite sailplane saga, consider writing it down for *RCSD*. If you are planning a vacation that includes your plane and transmitter, consider making notes as you go, and working up an article later. Take photos. Collect maps. And send your story to Tom Nagel at tomnagel@iwaynet.net for gentle editing and suggestions. *Tom*

■

TECH TOPICS

Dave Register
Bartlesville, Oklahoma
RegDave@aol.com

Every now and then, we each receive important calls in our lives. Calls in which the message is so compelling as to demand our immediate attention. Recently, I received such a call.

While raiding the refrigerator, the voice of my lovely bride of 30 years came wafting through the floor boards from the basement, "Can't you do something about this pigpen?"

A word of counsel - for those of you who are unmarried, or perhaps only recently married, you'll learn that there is no good answer to the rhetorical complaint. Don't even try!

So for the last several days, I've been excavating the basement workshop. In addition to discovering many bits and pieces that were thought to be lost at the flying field, I came across 2 items that are the subject of this month's column.

As readers of "Tech Topics" are aware, I enjoy doing calculations for aircraft performance and then putting those design principles in action at the field to see how they work. Among the topics of interest over the last several years has been understanding the appropriate design for a V tail.

V-Tail Design Comments

After clearing out much of the flora and fauna in the workshop, I discovered a total of 12 V tails that have been used for design trials over the past 2 years. I can recall at least three other tail groups that were damaged irreparably and tossed in the trash. Of this total, six were for a 2-meter design while all the rest were for HLG. Based on this experience, it seemed appropriate to share a few thoughts on V tail design and implementation.

The basic principles for V tail stability were outlined in several *RCSD* columns about two years ago. To briefly recap the results of that analysis, we found that reasonably good metrics for pitch and yaw authority could be captured in the tail and rudder volume coefficients (TVC for pitch, RVC for yaw):

TVC = Ah • M / (Aw • Ca)
RVC = Av • M / (Aw • S/2)

Where Ah, Av = horizontal (or vertical) stabilizer area, M = tail moment (distance from 1/4 chord of the wing to 1/4 chord of the stabilizer), Aw is the wing area, Ca is the wing average chord and S is the total wingspan.

A survey of some 20 commercial designs indicated that values for these coefficients were:

0.380 < TVC < 0.500
0.040 < RVC < 0.060

These values were for a cruciform tail. To convert to a V-tail, one uses the rules outlined on the DJ Aerotech web site (http://www.bright.net/~djwerks/) and also suggested in Martin Simons' book, "Model Aircraft Aerodynamics". Simply put, those rules are:

V-tail area = Ah + Av
Included angle = 2 •
ATAN(SquareRoot(Ah/Av))

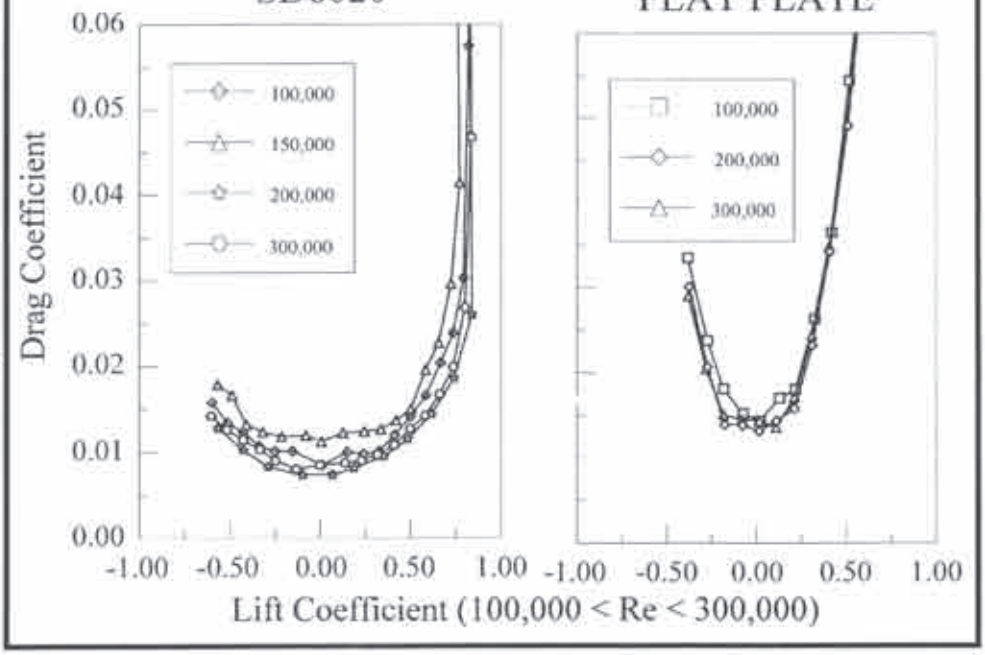
So, what have we learned to refine this over the past 15 or so tail groups?

Well, in terms of pitch stability a minimum value of 0.42 has always worked. A number of designs have dropped below 0.38 and, in every case, pitch stability has been a problem. This shows up as poor definition of the CG location and a tendency for the aircraft to "hunt" in pitch no matter where the CG is located. In each case, bringing the TVC to 0.42 or greater immediately corrected the problem.

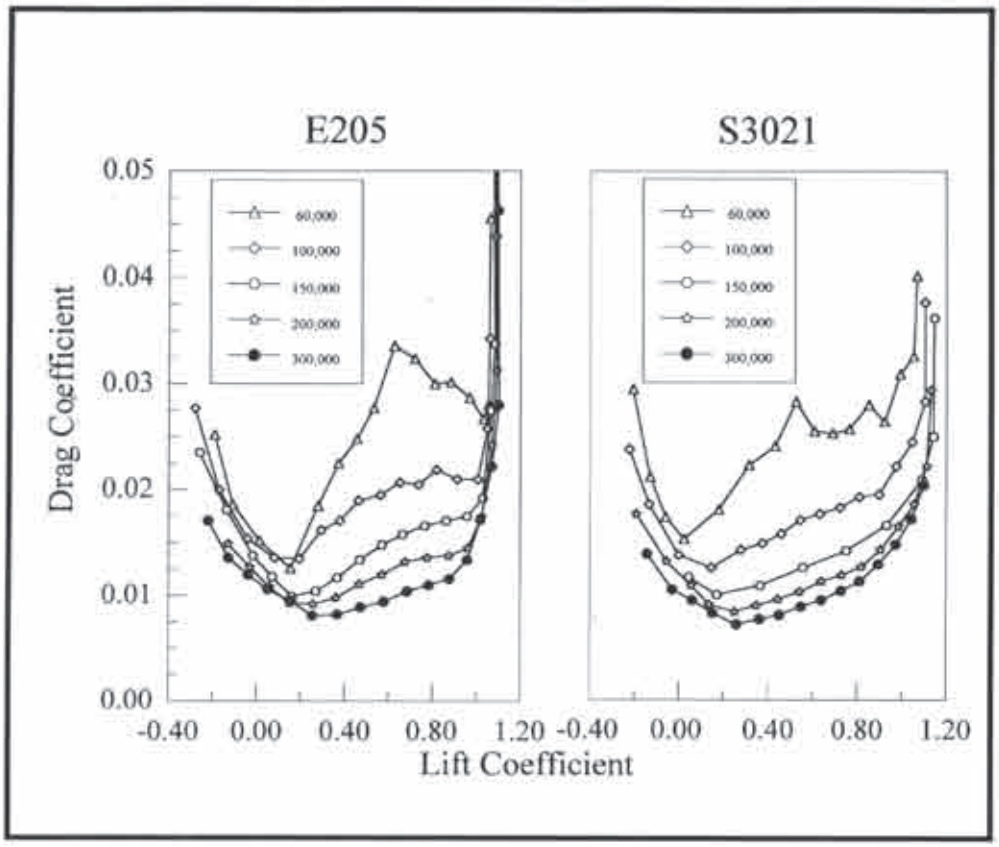
This is different from setting the area of the horizontal stabilizer to a fixed percentage of the wing area. The effect of the moment arm plays a significant role. There appears to be a trend towards lower TVC values with a longer moment arm. At the far end of this spectrum is the Logic HLG which has a relatively small tail on a relatively long moment arm. However, in all my designs a minimum value for TVC of 0.42 appears to provide very acceptable pitch stability and control.

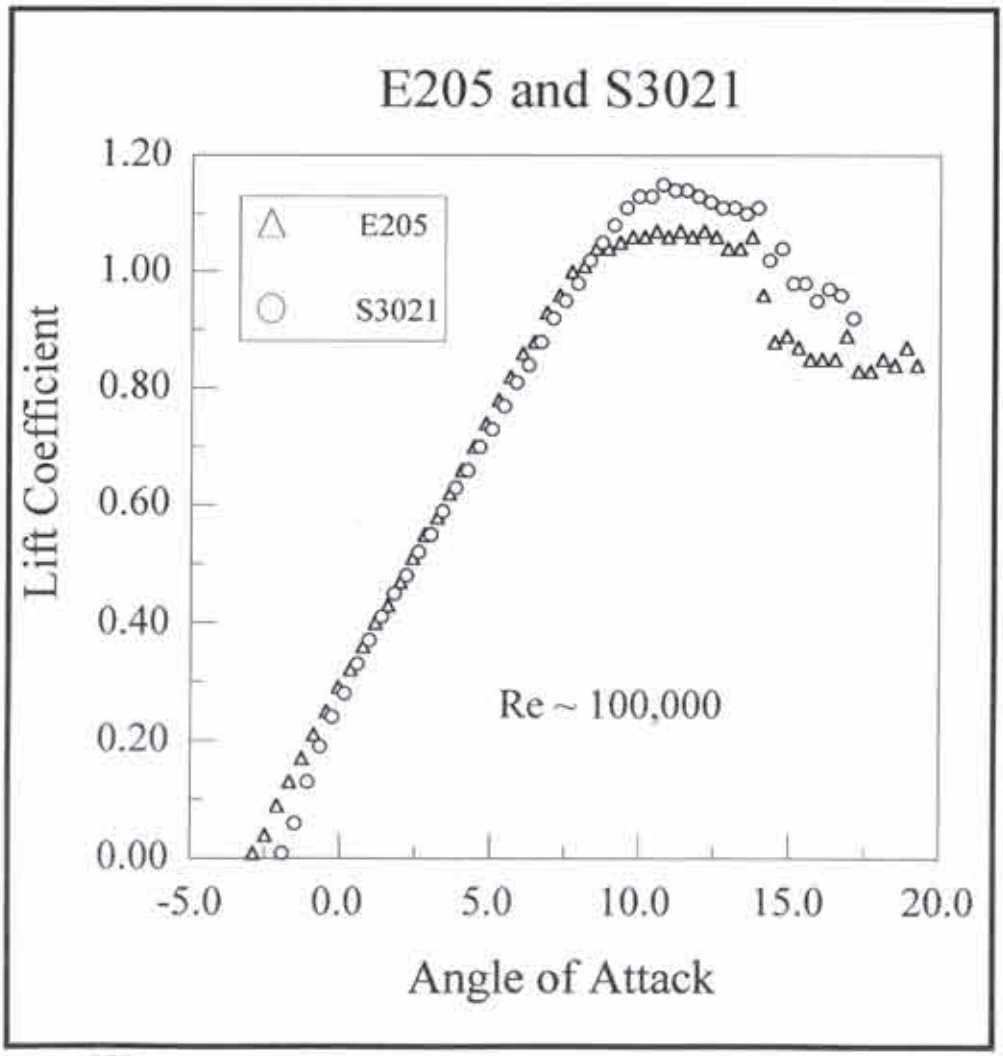
When we consider the vertical stabilizer designs, things are a little bit different. For the 2 meter (6 servo) ship, an RVC of 0.045 appears to work best. Significantly larger values (~0.055 or greater) cause excess "weather vaning" - a tendency to point into the prevailing wind even with some rudder throw. For the higher RVC designs, there is also a tendency for the in board wing to tuck (or drop) in the turn. This often requires opposite rudder to coordinate the turn. However, this correction tends to throw the ship out of the turn, so coordinating thermal flight is a constant battle. This is a form of spiral instability most likely related to the larger rudder working with the low dihedral angle.

Figure 1



S3021	Cm (calc) = -0.0544
Camber:	2.95% at 38.3% of chord
Thickness:	9.46% at 29.8% of chord





For HLG designs, a larger RVC appears appropriate. Somewhere around 0.050 seems to work well. A major difference is that these are polyhedral ships and rely exclusively on yaw-roll coupling for turn initiation. The RVC value appears to hold up well for a wide range of tail moments and aspect ratios. Tail moments have been from 17" out to 22" and aspect ratios from 8:1 to 13:1. In every case, the best 'feel' for yaw response has been when the RVC value is in the 0.048 to 0.056 range.

When you stop and think about it this makes pretty good sense. One thing that is very clear to me is that for the same amount of control throw, V-tails are more sensitive in pitch than they are in yaw. However, in a 6 servo ship, vertical stabilizer control is primarily for adverse yaw. In a poly ship, it's the major control input for initiating a turn. So if your horizontal and vertical throws are the same, then you need relatively larger vertical stabilizer control to get the yaw sensitivity right for the polyhedral ship.

Although the RVC, TVC terminology is accurate to capture these effects, what you really see when you go to a higher RVC is a decrease in the included angle of the V. Most folks set this to some nominal value and just go fly. However, this angle is one of your design parameters and does have a significant effect on yaw response. Using the numbers noted above, this generally means you'll wind up with an included angle of 100 to 105 degree range for a 6 servo installation (straight dihedral ~ 5 degrees) but in the 95 to 100 degree range for a polyhedral ship.

One last trade-off for the poly designs is the amount of poly angle. In many ships, the included angle at the center joint is between 6 and 8 degrees while the included angle at the poly break is about twice that value (12 to 16 degrees). The higher end of these ranges seems to work well for cruciform tails. However, when used with a higher RVC (reduced included angle) for a V-tail, reducing the poly angles slightly will help control the roll response while still giving good turn initiation. Taking this too far will again lead to spiral instability which is self-correcting from a design point of view since these ships are often quickly eliminated from the gene pool.

FLAT PLATE or SD8020??

For 2 meter and HLG applications, the difference between a flat plate airfoil and a true aerodynamic section doesn't seem to be worth the effort. I'd just go with the flat plate for simplicity and weight savings. To what can I ascribe this heretical comment? How about the UIUC database and some field performance?

My assumption has always been that for straight and steady flight (no acceleration or deceleration, no turns), the stabilizers

are providing stability but little, if any, lifting force. That is, they provide corrections to the angle of attack of the wing to maintain a constant angle of attack but do not contribute to the overall lift force in steady flight.

With that assumption in hand, take a look at the drag bucket (UIUC data) for an SD8020 and a flat plate near 0 degree angle of attack (Figure 1). What you find is that for low Reynolds numbers (which is where our tail groups normally operate) the difference in drag is not very significant. Thus, there is little penalty for the simplicity of the flat plate for stabilizer designs.

From the graph you will also note that the width of the drag bucket for the flat plate airfoil is pretty lousy. So this would be a poor choice for a wing which has to operate at high angles of attack. However, for a stabilizer flying near 0 degree incidence, the drag bucket width is not a terribly important consideration. During turn initiation, the stabilizer IS changing angle significantly, but this is (or should be!) quickly settled out once a coordinated turn has been stabilized. Having built tail sections with both types of airfoils, I can't honestly say I can see a significant difference either way.

Of course, if I'm paying a couple of hundred bucks for a composite kit, I expect to see a fully molded airfoil on the tail feathers. But if I'm putting something together for my own edification, the extra effort to cut a true airfoil tail section is hard to justify.

Conclusion - so what if you've got a flat tail! Be proud to show it when you go flying. It works just as well as the curvy ones!

Airfoil of the Month - S3021

The second item discovered during work shop excavation was a small piece of art made up by Dave Fredricks while I was editor of the PSS newsletter about 20 years ago. Dave worked part time doing layout for *RCM* magazine and loved to create artwork for articles and headers. We were discussing an occasional airfoil review for the newsletter, and Dave just showed up with the logo a few days later. Unfortunately, the original art work is a bit too tattered to use anymore, but it reminded me that introducing an occasional airfoil review might be useful. Please let me know if this is NOT a good idea in future columns.

An 'Airfoil of the Month' is not an original idea. Several soaring columnists have done this in the past. However, we have a number of new airfoil designs developed from Dr. Selig's wind tunnel testing and it seems appropriate to review a few of those from time to time. Let's start with one of the more popular airfoils first developed in this research, the S3021.

The S3021 airfoil first appeared in the original Soartech 8 Publication "Airfoils at Low Speeds". It was intended to be an improved version of the E205. Prof. Eppler's design has been a popular section for R/C soaring. Having flown several 205's a number of years ago, it struck me as a great thermal duration ship, but a bit sensitive in stall.

A look at the C_d vs C_l plot for the E205 and S3021 indicate that there is a reduction in drag at lower Re. The intent of the S3021 design was to provide the lift capability of the E205 while controlling the laminar/turbulent separation better. The drag bucket plot indicates this objective was achieved.

Turning to the lift curves for these airfoils, the S3021 model used in the UIUC tests has a more gradual stall response than the E205. This is also likely due to the improved transition and bubble separation control with the S3021. Consequently, the S3021 is likely to exhibit a smoother stall response and relatively faster recovery than the E205.

Measured moment coefficient data is not available for these airfoils at low Re. However, it can be calculated from thin section theory. For the E205 that number is Cm = -0.0461. As can be seen, the pitching moment for the E205 is slightly lower than the S3021 from this calculation. However, the difference is small and the two airfoils should be interchangeable without a perceptible difference in pitch stability or CG location.

The S3021 was used in a number of kitted ships a few years ago. It is still an excellent higher lift airfoil with good handling and stall response. It was very successful in Troy Lawicki's 'Duck' series of sailplanes but has been supplanted in popularity these days by the SD7037, SD7080 and SA7035 to SA7038 series. The good lift capability of this airfoil will require it to be ballasted to penetrate as well as an SD7080 in modest winds.

My first 'full-house' ship was a standard Duck which Art Slagle sold to me a number of years ago. The S3021 was the perfect airfoil as it was very forgiving in turns and stalls. At a wing loading of ~ 10 oz./sq. ft., it could fly reasonably slow, but still handled our normal Oklahoma breezes (5 - 10 mph) with no problems. On gusty days (10 to 20 mph), about 12 to 16 oz. of lead were needed to get it to cover ground well. I've seen other S3021 pilots have the same experience. So this airfoil is an excellent thermal duration ship with no obvious bad habits. Although it works more in the 'floater' class, with proper ballast it will cover ground very efficiently.

■

How to Finish Wing Leading Edges

by Dave Garwood
Scotia, New York

This brief article aims to improve your efficiency at shaping and finishing balsa and spruce wing leading edges. While shown on a foam-core wing, the tools and methods have applicability to built-up wing construction.

Two important tools are employed. First, a small modeler's plane, which shapes wood quickly without making clouds of sawdust. I like the Solingen Mini- Plane available from Hobby Lobby which uses replaceable single-edge razor blades.

Second, make some long sanding blocks which increase the efficiency of shaping with sandpaper because they bring more sandpaper to bear on the work than small sanding blocks. Interestingly, for me, the long blocks cause fewer inadvertent nicks and gouges than do small blocks. These blocks are cut from 3/4 inch pine shelving stock, or for the hot setup, track down some 5/4 pine stock which makes them thicker and easier to grip. Size the blocks so they take a full sheet of 9x11 inch sandpaper without waste or cutting. Sandpaper is attached with common thumb tacks.

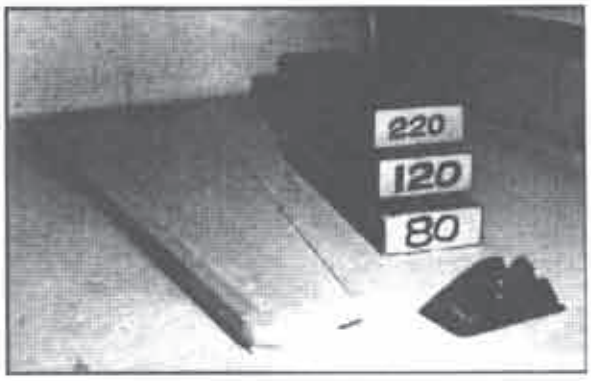
Here are the steps for shaping and finishing a set of newly edged wings in a couple hours assuming the LE and TE or sub-TE have been installed. When selecting the LE/TE mounting adhesive, consider Titebond (TM) or Elmer's (TM) Carpenter's glue (aliphatic resin glue). It's cheap, secures the parts well, and gives plenty of time to set up the parts. I tape the LE and TE on with masking tape strips and let them dry overnight.

1. Rough shape the LE and TE with the plane, making long, smooth, shallow cuts. Having a sharp blade in the plane adds to the precision of your work and reduces the muscle needed, but the blades last a long time. It may be helpful to put masking tape on the wing sheeting, then plane down to the tape, but with practice you can skip the tape.

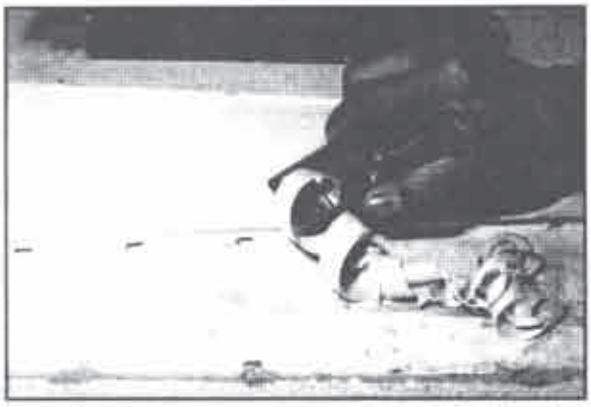
2. Sand the LE and TE with your long sanding blocks. I start with 80 grit, switch to 120 grit and then finish up with 220 grit. This system makes quick work of shaping the sticks; if you find yourself laboring, change the sandpaper. For accurate LE/TE shapes, use drawings or templates provided by the kit maker, or look at the airfoil section plot.

3. The final step in a pro LE/TE installation job is to fill any small nicks and scratches with either Carl Goldberg Models Model Magic or light spackling compound from the hardware store. They are the same material as near as I can tell. Let it dry overnight and go over the filled areas with the three sanding blocks.

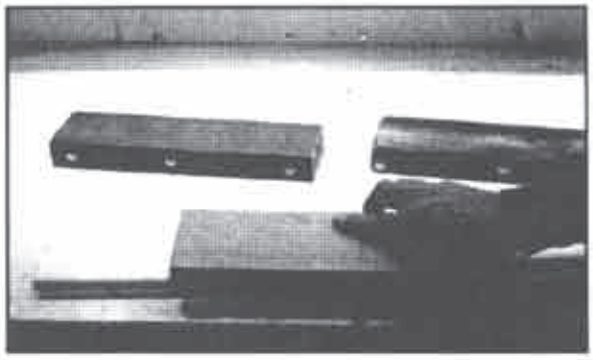
Now you're ready for iron-on covering or any other final finish method you choose. ■



The tools of the task - long sanding blocks and a modeler's plane shown with a sheeted foam core wing with leading edge and sub-trailing edge stock installed and tip block attached.

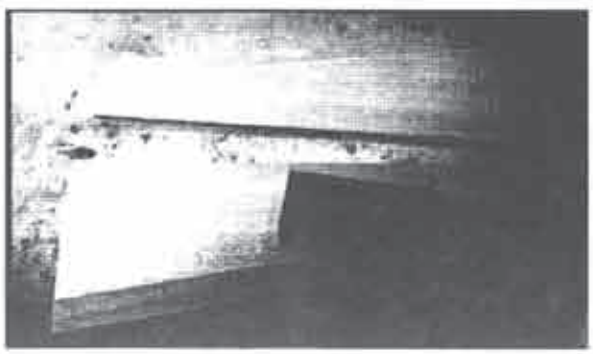


The modeler's plane makes short work of shaping the leading edge stock, avoiding the sanding dust created by sandpaper.



Shaping and smoothing the leading edge with long sanding blocks, starting with rough grit and moving to medium and then fine grit.

Fix nicks with light spackle or model filling compound.



Final sanding is a breeze with long sanding blocks. Wings shown here with LE, sub-TE, TE, and ailerons installed. Cover or finish according to your preference.

HOW TO (NOT) CRASH YOUR AIRPLANE IN 18 EASY LESSONS

Robin Lehman
63 East 82nd St.
NYC, NY 10028
(212) 879-1634

A few unfortunate recent mishaps might benefit those of you new to the R/C scene (and the rest of us, for that matter). As careful as most of us try to be, every once in awhile an accident does happen. While it's true that (very rarely) there are unexplained crashes (due to genuine radio problems), almost all crashes occur because of some sort of pilot error. Most of us are out there flying at this time of year, so I thought it might be useful to run through some of these unfortunate incidents. What follows is in no particular order.

1) Don't take your eyes off your airplane if you are flying very high.

If you are flying alone in the sky, don't even think about taking your eyes off your bird. When very high, the glider can easily disappear in the blink of an eye, and when you look back again it's gone! If you're very lucky, a flash on the wing or a movement in the sky will catch your eye, but a lot of the time you might never see your sailplane again, intact.

If you're flying with other gliders nearby, there's another problem should you happen to glance away. If you take your eyes off your sailplane, even for just a second, and then look back to where you thought your glider was, you can accidentally "lock onto" someone else's bird. To make matters worse, in this case, you might well not notice that you're flying somebody else's model until it's way too late. Suddenly, can come the horrible realization that the model you're looking at (and you think you're flying) doesn't respond to the controls. It can be a sickening feeling...

It doesn't take very long for a sailplane to cover quite some distance, especially it there's some wind up there. By the time you've realized that you're not flying your bird, your sailplane could be flying in an entirely different part of the sky. In just a few seconds it may be nowhere near where you last saw it and, after that, the chances are it'll never be seen again.

We witnessed just such an unfortunate incident recently, and the lesson to be learned is that if other pilots are nearby and aren't flying, recruit as many pairs of eyes as you can and have each person look at a different part of the sky. Don't all look at the same part of the sky.

This particular sailplane ended up crashing way downwind, behind where everyone was looking. If there are other people around, and if you do lose sight of your sailplane, make the problem known as soon as possible and have folks search every which way – not only where you last saw it.

2) Be sure to check all the control surfaces on EVERY flight.

Not only make sure that the controls work properly, but DO make sure that the ailerons, elevator, and rudder are moving in the correct direction. This is especially important on the first flight of the day.

Wear and tear, rough landings, hangar rash, and other problems all take a toll on a model. It really pays to check all control surfaces to see if they are working properly EVERY time that you go to take off.

Sooner or later, if you remember to do these checks, you'll save an airplane from an avoidable crash.

3) Do a Battery Check.

Do a battery check (under load) EVERY time you go to take off. It's pointless just to check the battery voltage. What you need to do is to check whether or not the battery has enough juice to fly the airplane. Most modern R/C voltmeters – battery checkers – have a way to check the voltage UNDER LOAD. That's what counts, under load, with a simulated servo drain similar to actual flying conditions.

4) Do a Range Check.

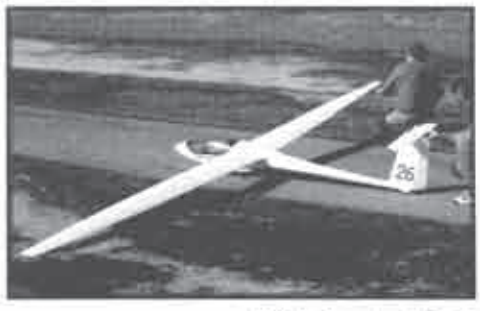
Make certain that you range check your R/C airplane at the beginning of the day every time you go flying. Your transmitter should have the antenna down (collapsed to as short as possible) and you should walk out for a hundred feet or so and still have control of all flying surfaces without jitters. The actual distance varies from radio to radio. Your radio should have instructions telling you how far you should walk out for a radio check.

If you fly an ignition motor, it's best to do the radio check without and then with the motor running. Sometimes, the ignition interferes with the receiver and you can get a good distance without the motor running, and a drastically reduced radio check with the ignition working. In such a case, you could have an installation problem with the ignition interfering with the receiver. This is especially important on first flights with a new motor installation. If the ignition causes a problem, DON'T fly without changing where you installed the ignition and battery. It's best to put all ignition relate way up front, and all receiver batteries and wires as away as possible. That usually solves the problem.

5) Fly in the same direction - Thermal Etiquette.

When joining another glider in the same thermal, do fly in the same direction as the other guy. If he's flyir clockwise, you should try to thermal clockwise, as w When really high, it's quite difficult to see who's hig you do happen to have a mid-air, when you're both in the same direction, the chances are the damage wi

Steve Dentz took this photo of some of his stable of glider towplanes: 1/4 Wilga, 1/4 Roedelmodell Fox, and 1/3 Duo Steve is an excellent and very fast builder. No doubt some these ships will have been seen at Los Banos.



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(Above) Ron Wahl with his Roedelmodell Fox. The red, white, and blue is quite a nice all-American color scheme!

much less than if you had a head on collision.

6) Call out your landing - Landing Etiquette.

Do call out your landings if there are other folks flying at the same landing strip. When you let others know you're coming in, they will clear the landing strip and let you have the right of way. If more than one airplane is coming in at the same time, the two pilots should try to talk to each other and decide who will land near, and who will land far. This should avoid any possible collisions on the ground.

7) If more than one pilot is sharing the landing strip, do land and takeoff in the same direction!

Two aircraft landing in opposite directions at the same time is a recipe for lots of needless repairs! Usually, when there's wind, this situation won't occur because it's always nice to land into the wind. However, in no wind situations, it doesn't matter which way you land; in situations like this, it's prudent for everyone to decide which way to land before you take off.

It also helps to let other folks who are flying know that you're on the field if you walk on to retrieve your airplane. Do call out, "On the field," and then when the field is clear, call out, "I'm now off the field," so that all pilots know that the landing strip is free.

8) Establish a flight pattern - Slope Etiquette.

If more than one of you are sharing a slope, it helps to establish a flight pattern – one glider higher, one lower. Or, flying to the right - in towards the hill and to the left - out and away from the hill (or vice versa depending on the wind direction). The more gliders flying in the same airspace, the more prone to midairs, and the more important an agreed upon flight pattern becomes.

9) Apply flight pattern control when launching a glider off a slope.

It also helps to let other folks know when you are about to launch a sailplane off the slope. A little "flight pattern control" goes a long way in avoiding midairs! Do look around and be sure not to launch a glider just as someone else is making a low pass.

10) Don't forget to turn on your transmitter and receiver before flying.

I once saw a guy throw a glider off the cliff at Torrey Pines without turning on the receiver. You all know the rest of the story. If you do a radio check before every flight, to make sure all control surfaces are working properly just before you fly, you can't possibly throw a glider off a hill without the radio turned on. So, DO check all control surfaces before every flight!

11) IF IN DOUBT, GET OFF!

When being airtowed, be certain to fly with your finger on the release switch or button. If you have the slightest doubt about what's going on, DO RELEASE. If you release extremely low, you can fly straight and land. If you release a little higher, you can do a 180 degree turn and land downwind. If you release still higher, you can do a circuit and land. If you release even higher than that, you might well catch a thermal and have a wonderful flight. Above all, if the airtow is not going well, immediately release. It's much better to walk for it than have to repair a glider!

12) Don't tell your towpilot you've released until you're absolutely certain the glider is unhooked and off the towline.

When you are satisfied with your airtow, push the release button or switch, and wait until the glider parts company with the towplane. You should be able to see that the glider is drifting further away from the tug. Only when you are absolutely certain that the glider is off tow, should you tell your tow pilot that you've unhooked.

Flicking the release switch doesn't necessarily guarantee that a glider has released. Should you have servo trouble (with the tow release), you might flip the release switch and still be hooked up. In such a case, the last thing you want to have happen is for the towpilot to cut the throttle and then dive with the glider still attached.

Should you not be able to release, you can ask your tow pilot to dump you. Simply have a nice flight with the towline attached!

Should you have to ask the towpilot to release the towline because the glider won't unhook, do NOT the fiddle with the release to try to get the towline off. If you drop the towline, it will probably be lost. Better to bring the towline back to the field (hooked to the nose of your sailplane)!

13) Beware of hungry trees.

Don't feed those hungry trees! If there're any trees in the landing pattern, be aware that your sailplane is probably further away than it looks. Try and keep some sky between the glider and the trees and you'll be OK. Don't trust your depth perception or you'll wind up having to climb for your bird! The trees are always nearer than they seem! The glider is always further away than one might think!

14) Don't get bitten by your towplane!

When starting up a towplane, ALWAYS

wear a glove. Glow motors are especially prone to biting you, as they often run backwards. Gas motors are so powerful that you never want to take the chance of getting bitten by one of these! All it takes is one backfire to mess a hand up for the season.

15) Tie that towplane down!

Always either tie it down or have somebody hold the towplane when starting the motor. You don't want a nasty surprise and have the airplane suddenly coming to eat you if you accidentally bump the throttle or have a radio glitch.

ALWAYS start the motor at low throttle. If you wish to run the motor up to see if the high throttle carburetor setting is correct, DO have everyone (including yourself) stand behind the propeller. If that prop should come off at high throttle, it will whiz forward at an amazing speed and fly for an astonishing distance. You don't want anyone to get hit!

16) Propeller Maintenance

Don't ever fly with a cracked or split propeller. Even the smallest nick in the propeller can cause it to split apart at high speed. Should this happen in flight, the ensuing vibration from a drastically unbalanced propeller spinning at high speed can easily cause an airframe to fall apart in a second.

17) Check for frequency conflicts.

Before turning on the transmitter, be certain to find out if someone else is on your frequency! This is obvious, but it can get overlooked.

If you can easily change frequencies with modules or plug-in crystals with your radio, DO be sure to label what frequency your radio has been changed to. You can't be too careful in this regard.

When most pilots get together at an organized club airfield, there's usually a frequency board which, when used, avoids most of the problems. However, if your transmitter is wrongly labeled, you're likely to take the wrong frequency pin and might well shoot someone else down who has the correct frequency pin.

18) Speak up if you've spotted a possible problem!

Don't be afraid to tell somebody about a possible problem you've spotted. The rest of us can use all of the help we can get! So, please DO speak up!

Unfortunately, there are many other ways to crash airplanes, but all of the above have resulted in demolished airplanes at one time of another. Do the best you can and try to fly as safely as possible.

Remember, a little courtesy goes a long way. Try to treat your fellow pilots as you would like to be treated yourself, and in doing so you will be richly rewarded with many hours of flying fun and fun flying!

A Most Unpleasant Incident

There are many ways to *accidentally* crash someone else's airplane – you can accidentally step on a wing, or drive over it, or have a midair, but of all the possible ways to do in another, turning on you radio and shooting someone out of the sky is one of the worst and most damaging.

I have unfortunately witnessed two such sad experiences in the past 20 years, and I've heard of a few others. In all of these similar accidents that I've ever heard of (but one) the pilot who made the mistake either replaced the crashed airplane with an identical one, or worked out some monetary remuneration with the guy who got crashed. Something like that, and an immediate apology are about the best that can be done under these circumstances, because usually a duplicate airplane cannot be had at any price.

Let's take a moment and think about how we would like to be treated if our wintertime project got accidentally shot out of the sky by another pilot. Let's say we've spent months getting our model ready to fly. We've spent good money on covering materials, servos, batteries, etc., and we just love the new bird. Lots of TLC and meticulous building went into it; it's a gorgeous new flying machine.

One minute we're out flying and having a ball; the next minute our pride and joy starts to jitter. There's a sickening feeling in the pit of the stomach. We know it's a radio problem. We call out the radio frequency. The bird is really going wild. Then, we scream, "Turn off the radios!" In the 20 or so very, long seconds the airplane takes to dive into the ground, time slows. We keep screaming, "Turn off all radios!" Then, a sickening thud. The beautiful bird has buried its nose up to its armpits in the soft dirt. The worst nightmare has come true. When we take the long walk over to retrieve the corpse, only the stab and rudder give a faint reminder of what was; a winter's work is now demolished.

As we retrieve the bits and pieces, we wonder what could possibly have gone wrong with the radio. We were so very careful with this bird; we checked the batteries, did a range check and everything seemed fine, until things went haywire in the sky. We keep asking ourselves what might have been done differently...

What if, sometime later, with the help of a frequency scanner, it's determined that somebody accidentally shot you down. How would you like to be treated under these circumstances? Think about it. What do you think the other pilot should do to try to make things right for you?

Should the guy who caused the crash immediately come over and apologize? What more should he offer to do? Please don't read what comes next until you have made up ***YOUR*** mind...

Have you come to some decision as to how you would like to be treated under these circumstances? Good! Now let's continue...

Let's add some more factors to the equation. Let's say that the fellow who just shot you down doesn't feel like doing anything for you. Under these circumstances, one could easily walk away from this unfortunate experience. Do you think that's fair?

In circumstances like this, shouldn't there be some sort of flying etiquette which spells out what should be done?

It would seem that in the USA at least, there IS usually a written or unwritten rule already in place everywhere we fly. "The offending pilot should offer to replace – in one way or another – the demolished airplane. That's the starting point. No, ifs, ands, or buts." Whatever acceptable arrangement the two pilots make between themselves from this point on is really up to them.

Now what happens in a "shoot down" if the pilot that causes the crash starts out by not wanting to apologize and offering nothing? Should it really have to be up to you to negotiate with this guy, to get compensated for what he accidentally destroyed?

To avoid such unpleasant confrontations, it might be a good idea for every R/C club in the world to have a "shoot down" policy firmly in place to cover just such an unfortunate eventuality. If your group doesn't already have one, you might consider adding this "shoot down rule", in written form, to your group's flying field rules.

Consider the following incident, which occurred some weeks ago:

Mistake #1

A pilot took the wrong frequency pin, and turned on with his antenna fully extended. The pilot thought he was flying on a different channel, mistakenly taking the pin to the frequency he thought he was on.

Mistake #2

The frequency flag on his transmitter was incorrect.

Mistake #3

When another pilot realized he had been hit, we all called out, asking EVERYONE not flying, to turn their radios off. We had the time to call out four or five times. There were perhaps twenty seconds when the sailplane could still have been saved.

There was a single pilot, sitting on the field not fifty feet from the rest of us, that did not respond to our request. There's no doubt in my mind that he heard the request, but for some reason chose not to do so.

Mistake #4

After the crash, the pilot was asked if he EVER flew anything on channel 52. He said, "No." (Channel 52 was the crashed airplane's channel.)

Mistake #5

With the help of a frequency scanner, we located channel 52, loud and clear, on the scanner's screen. Only at that point, did the pilot who caused the crash appear to realize he had made a mistake.

Mistake #6

We suggested that the pilot apologize to the pilot whose plane just crashed. At this point, he refused.

Mistake #7

The crashed pilot suggested he be given a replacement airplane. The pilot who caused the crash refused to do so.

In this most extraordinary case, the pilot who shot the other pilot down had an identical airplane right then and there at the field. He could have had the grace to offer to replace the other pilot's crashed plane on the spot!

All said and done, isn't it a pity that the airplane gods didn't plan things the other way around, and that the guy who made the mistake and took the wrong frequency pin didn't get shot out of the sky by his own mistake? Frankly, I'm pretty sure that when folks screamed out, "Turn off all radios," that most folks would have cooperated and done so.

There's more...

What if somebody purposely turns their radio on to crash you? Now, this is a scary thought, indeed.

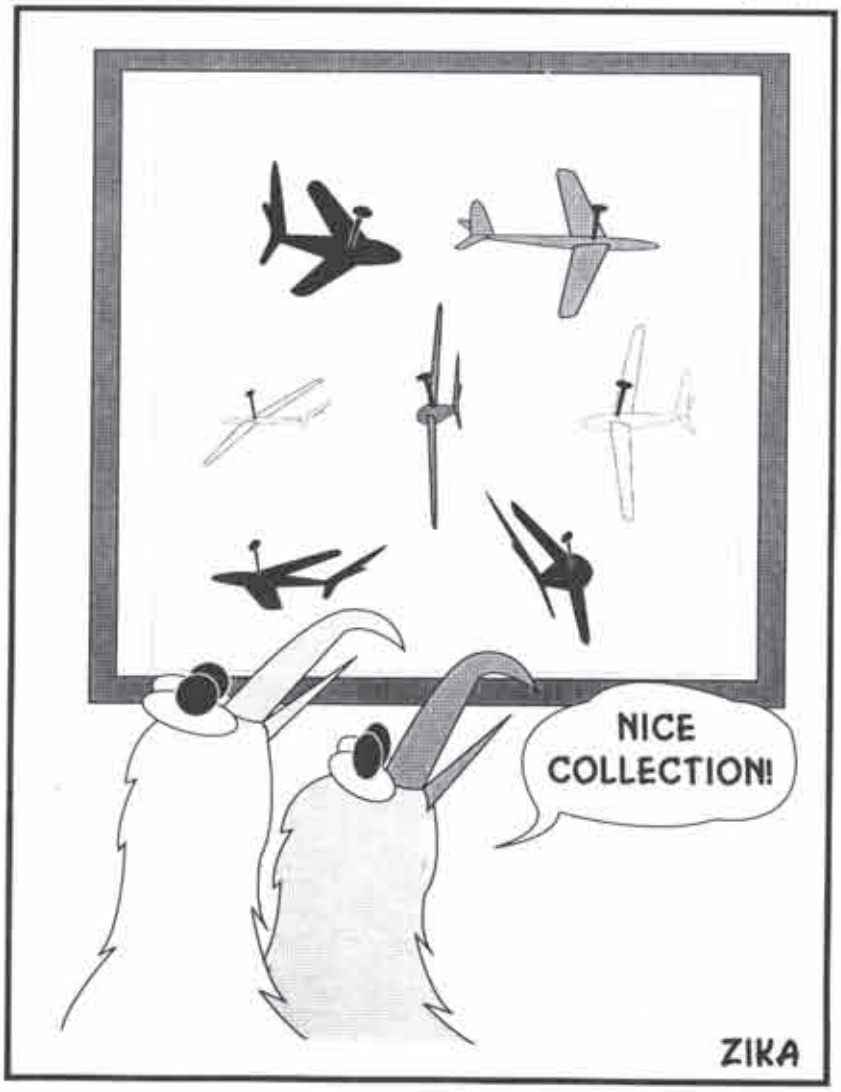
Recently, during a conversation with a pilot, he said, "I'm afraid to fly with you guys because you'll shoot me down on purpose." What!! To my way of thinking, anyone who would even consider such an action is vindictive and nasty beyond belief and should be banned from our R/C flying community.

So, perhaps it's time to spell out some sort of etiquette; when someone clearly makes a mistake, there should be specific guidelines. Don't you think that a "shootdown rule" should be firmly in place everywhere we fly? If a similar situation is to be avoided in the future, DO put a "shoot down rule" in place wherever you fly as soon as possible!

The final chapter in this story has yet to be written. After much unpleasant arguing, the pilot that caused the crash has agreed to build another identical airplane to replace the plane lost in the crash.

After reading all this, I'd bet you need a flying fix. Let's all go on out there and have a GREAT flying season!

Happier landings to you all! ■



GORDY'S TRAVELS

The Simitar Centron *Foamie* Project

"You can go back home..."

By Gordy Stahl
Louisville, Kentucky
GordySoar@aol.com

Wayyy back when I first began thinking about getting into RC, my dad called and said he was jumping in with sailplanes and already had a Gentle Lady started. His friend had given him a stack of back issues of magazines and he said I could borrow them.... And that lead all the way up to this story.

In one of those magazines was an article about the Simitar series of tailless aircraft and its designer, Bill Evans. Bill was a sailplane guy who had designed and sold some contest winning TD ships, slopers and some powered aircraft. The idea for a tailless sailplane was born because of a challenge by a friend to create a viable tailless sailplane. Little did Bill know that the challenge would inspire the most published model aircraft in all of RC model aircraft history (still!).

Bill was the first to publish a simple mechanical mixer for operating elevons. He created and marketed X-hinge, an iron-on gap-sealing cloth hinge, which could arguably be consider the inspiration to our current tape hinges.

But this is about his first tailless ship, the Saracen. He experimented with various foils of the day, planforms and aspect ratios until he found a combination that had the right performance characteristics. What were they? A wide speed range, good looks, great low speed control, and easy/quick construction. Sixteen variations, both powered and un' were tested, and while the powered versions turned out to be very exciting and overtook the series' interest, the sailplane version worked pretty well.

The Saracen has a hawk-like look, straight leading edge, tapered trailing edge, and a pod type fuselage with a single vertical mounted just behind the fusepod. The span he settled on was 72".

The airfoil can loosely be described as a semi-symmetrical, reflexed section with a very steep entry point. What it DOES is fly very nicely. It has an extremely wide speed range, with no tendency to stall. Cg range is also unusually wide but is basically located at about 10% of the root chord (that's about a 1 1/2" back from the leading edge). Yeah, I know that's way up there, but moving it back another inch doesn't seem to make a lot of difference!

Anyway, after building what seems like over a hundred Simitar variations, powered up to 16 hp, and plenty of slope versions, my dad built the Saracen in the photo; due to strokes, he never had a chance to fly it. I figured as sort of a tribute to him, I'd radio it up and put her in the air, and then send him the photos so that he could see his work fly. It had been a long time since I had flown my Simitars and flying the Saracen reminded me of how nice they were and provided the inspiration to build another.

The Saracen was first published in *RCM*, April issue 1976, but the version I liked the best was the Simitar Centron. It was published in *RC Sportsman* Magazine, June of 1979, and it became the 'template' for my current EPP Foamie project. For those of you who don't remember the magazine (I don't.) it was sort of like *RCSD*, a magazine written by RC guys for RC guys and, while it covered the full spectrum of RC aircraft, it did provide a forum for the non-commercial contributions to our hobby.

The Simitar Series is really based on an airfoil that flies good tailless. It's a lot easier to understand that regardless (pretty much) of planform, radio box holder (fuselage) shape, hedral up or down, sweep or the shape or placement of the vertical, you are assured that however it looks it will fly mostly just like every other Simitar! That's why there are X-wing Simitars, Simitars that look just like P51's or Cessna's, but just don't have horizontal stabs!

Their original construction consists of a bead foam core sheeted with balsa or 1/64" birch ply. The leading edge is capped with a length of 3/8" balsa, then shaped; the trailing edge is capped with a piece of 1/4" balsa. No spar was used. The elevons are made of 2" x 1 1/4" tapered balsa stock. The elevons are tapered down to 1" at the tip, unlike the current batch of 'cranked plank' EPP combat wings. (That's not a judgment, just a note.)

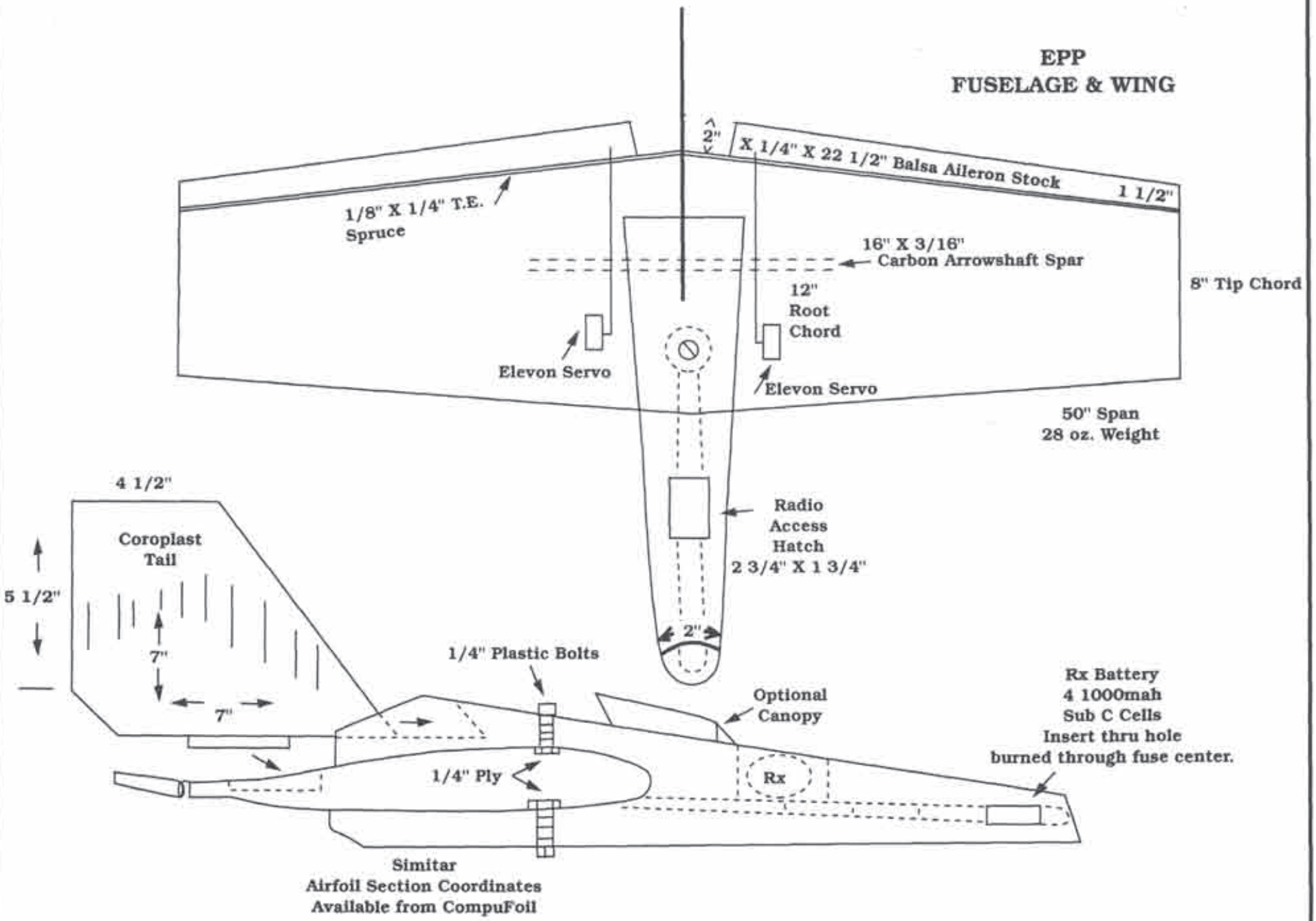
I decided to keep the span in line with the current combat ships, although goal was not necessarily to build a combat plane so much as it was to build a Simitar. A friend had access to EPP stock and I still had the templates I had made the first time around. I fired up the hot wire and shaped the fuse. Since I still had some wing panel sets up in the rafters, I chopped them to the span I wanted, cut a 1" taper at the root joint in order to get a slight leading edge sweep (for looks), and angled the tips to correct them to match the sweep. They were not EPP but expanded bead foam, and what the heck, I had them cut already!

I glued on the leading and trailing edge balsa, did the sanding, 3m'd 'em for taping, taped and covered. I had some X-hinge and installed the elevons. I choose Volz Mini-Maxx servos for their power and tough metal gear train. (You see, anytime you fly something different than a cranked combat plank, they tend to use you as the target of choice; that means installing tough servos makes good sense!)

Most of the serious combat ships hope to weigh in at about 14 oz. One way they do that is by sweeping their wings back; that moves the balance point way back, and it

(Above) Simitar Saracen (2m span, elevon control) First in a series of over 60 published variations. Built by Bob Stahl, Milwaukee, Wisconsin, Midwest Simitar Squadron.

SIMITAR EPP CENTRON



doesn't need so much weight forward to get it balanced. Well, my Centron's wing has an almost straight leading edge so the fusepod helps get weight forward of the balance point. In my fuse I used a 1000 mah sub C pack in a stick configuration.

I heated up a 1/4" piece of music wire to burn a round hole from the nose of the fusepod straight back through to the wing opening. I made it so that the hole was large enough that I could slide the stick of cells into the fuse from the front. The idea being that when the plane was done I could slide the pack in until I got the balance I wanted. Mine weighed about 28 ounces; that's about double the 'usual' combat wing, and I think it provides double the enjoyment.

Recently, flying in Brookville, Indiana's dam slope site with two top Kentucky combat guys and their ships, I found the I always had double the altitude, and I could roam way out away from the slope, then come ripping back and up again.

The details of the Centron's dimensions aren't that critical; that's one of the great things about the Simitar Series; you have some artistic license to individualize the vertical's shape. You can make it dihedral'd, flat or anhedral'd. Just keep the foil as close to the original, especially at the leading edge, and the CG somewhere close to 10% of the root chord.

A tow hook you say? Sure no problem, but also not much reason for it, other than flat field shots; don't expect to thermal like a Monarch, Logic, Maple Leaf or any of the other dedicated TD ships. This one is for fun, like most of the current breed of Foamies.

Now, imagine an all EPP Simitar Astron? (An all EPP X-wing fighter!)

Okay — the servos are mounted in the wing and the RX is hidden under a hatch in the fusepod. The fusepod rear is 'notched' with the leading edge shape, so that it can be slipped onto the wing. I chose to bolt my fuse pod to the wing, so that it could be transported easier.

I used a piece of coroplast for the vertical stab instead of balsa, figuring it would be more durable. I used a hot glue gun to do all the gluing, which really made things easy and fast.

My Stylus transmitter has lots of mixers, so I didn't need an on board elevon mixer. However, Bill Evans' Mechanical Sliding Tray Mixer lets you use a standard radio to mix the functions of your right stick. The ailerons are both hooked to one servo, which is mounted in a sliding tray. The elevator servo is then hooked to the tray, pulling it and pushing it, causing both ailerons to go up or down simultaneously! It works; I used it on a 100" gasoline powered giant Simitar as have many others. 'Course, there's nothing like the direct connection of servos electronically mixed by the TX.

The Flying Part

I took my EPP Centron to our local river slope (not the best lift, but it works), and gave it a hand toss just to see if it was flyable. Things looked good and the wind was steady; so, at the edge, I gave her a good heave and ...no problems. She grabbed air and lifted about 50' up (which is optimum for this site) and cruised the edge. Roll rate is great, but you need some airspeed. Inverted worked good and CG felt okay. I worked with adjusting my throws and dual rates until I felt it was tuned in pretty well. Definitely deserving of some decorative trim!

Like I said, "Simitars always fly great." I was just very happy that this one also flew great!

The last published Simitar variation was just a few months ago, so just because the Centron was done in 1979 don't even think it is some 'yesterday' design. Stable, fast, slow, and maneuverable are descriptive words that have always accompanied Simitar tailless aircraft - not bad words!

I think you can tell I am enthused about Simitars and, for those of you into scratch building and want something different, but that is sure to fly great, try one for yourself! Hope you enjoyed this trip as much as me. See you on the road!

(Bill Evans can be reached for plans on all of his many Simitar variations and for X-hinge at: Simitar40@aol.com or 760-873-4932.)

■

"SHORT CUTS"

Steve Savoie
926 Gage St., Bennington, Vermont 05201
(802) 442-6959

U-2 Building Project, Part 6

Well, here we are again; two deadlines approaching and not enough time. It's Wednesday June 9th and my editorial deadline is the 10th (Ain't e-mail great?), and I'm leaving for Elmira Aerotow tomorrow morning. That being the case I'll keep this update short so that the plane is finished in time. Since the beginning, Dave and myself planned on taking the planes to Elmira. Several weeks ago, we decided to pool our resources and get at least one plane finished: mine. Dave built the tail group and I finished the rest. It looks like the completed weight will be approximately 7 pounds, which is not bad with the HQ airfoil group and 130" wingspan supporting 1150 sq. inches.

My apologies to all the readers, but I gotta go. The wings are ready for paint and I've got to get wing servos installed, as well as balance off the plane. Looks like the battery will be the balance weight and it's almost right on top of the CG. Next month's article (and maybe one more) will fill in the gap. See Ya.

Elmira or Bust! ■

Mongo 16 over Los Banos campground, February '99.

Perspective

By William G. Swingle II
Pleasanton, California
bill_swingle@electro-test.com

"Bigger is better!" It's a common phrase that has a lot of truth to it. Unfortunately, if left unchecked, it can snowball into an all encompassing disease!

It all seemed so innocent at first. I built a Mongo (8 foot span foamie flying wing) and thought it was huge. In my world, an 8 foot span is big, and I was content. My buddies at BASH Enterprises (Mike and Roy), though, were not.

To them, 8 feet was fast becoming common place. While I was fat, dumb and happy thinking I was flying the 300 pound gorilla of the slope, BASH Ent. was going bigger.

My first question was, "How much bigger?" And, second, "Why?" 16 feet was the answer to the first question, but the second question had no solid answer. I pressed the issue and found that my buddies had been infected. They didn't have an answer to "why" but they didn't care. There seemed to be a pressing desire to be big. The difficulty was that the definition of big wasn't a constant. Their idea of big was like a cancer growing out of control!

For the sake of my friends' welfare, I tried to inject a dose of reality. I some what politely reminded them that, "It has to fit in the truck." A slope plane that you can't transport to the slope is not very useful and I thought I'd made a definitive point. But, they were way ahead of me. Turns out one of the BASH boys has a trailer which would hold the plane quite smartly and his wife had already begun making a custom fitted trailer cover out of tent fabric. Coincidentally, the trailer is now sporting a glossy coat of fresh black paint on the frame with a light blue paint on the body. Sheesh! Sensing a logical outcome to be highly unlikely I threw caution to the wind and offered to help.

You really haven't lived until you've hot wire cut a wing core with a 36 inch cord! I was able to successfully conceptualize a 36" chord but it wasn't easy. The mental gymnastics were grueling as I tried to redefine my idea of what constitutes large. Just seeing the templates made my eyes bulge. Any mistakes while cutting a core that large could lead to a whole lot of wasted foam. With typically sized airplanes, the cost of a wasted core is predominantly the lost time. But, this was different. Now there was serious money invested in the foam sitting on the cutting bench. About $120 total, just for the raw foam. I tried to be extra careful!

We cut the plane in four pieces, each four feet long. The center sections were glued together while the outer two would be attached at the slope. The thought of hinging the outer sections like a navy plane occurred to us, but was then dismissed as *too* extreme!

CG was an interesting issue. With the planform drawn in a CAD program I was able to easily find the point at the root, which yielded 25% of the wing area ahead of the CG and 75% behind. While fiddling with the area calculations I found that the elevons made quite a difference in the results. Each elevon is 258 square inches! Ignoring them made a difference several inches in CG location! This was a bit of a shock. I'd have never guessed them to be so significant. The location derived by computing the simple areas was 21 inches. I then used the Panknin formula from the B Squared web page and got a CG location of 24 inches. This was 3 inches behind the value derived from the area method. Hummm... A third method was tried where I drew lines starting at the root and extending to the tips. The lines were located at 24% of the chords for each half of the plane. These two lines were then connected with a third line whose end points were located at the mid points of the first two. This yielded a CG location of 24.4 inches. It was good to finally get agreement. Fortunately, the 8 foot Mongo flies very tolerably with an aft CG, so I hoped there would be some room for error. We settled on 24 inches.

Ballast is something that I hate to add. However, I know the importance of proper CG location. If lead is needed then it's needed, period. It's fortunate that a local sporting goods store sells fishing weights by the pound. The sales person must have thought we were going deep sea fishing when we approached the counter with ten pounds of lead. No thanks, "We don't need fishing licenses. It's for a model airplane. Honest."

With all gear installed, but no ballast, the plane weighs 12 pounds. With its "healthy" 34 square feet of wing area that's a wing loading of under 6. Unfortunately, to get the CG even near the appropriate location, it needed some ballast. We began to add lead. Lots of it. Once again my perception was being shoved upward as I quickly revised my definition of heavy. I felt like I was loading bombs on a B-2! 2 pounds, 3 pounds, 4 pounds... Will this madness never cease? Fortunately for my already

taxed brain, 4 pounds of lead put the CG at the desired location. The wing loading was now at about 8. Not too shabby for most any sloper but, for a sloper with a 36 inch wing chord, we're very pleased with it.

The question of what to name the plane was difficult. I suggested it be named Mongo Max, but Mike and Roy didn't like that. They felt the word Max indicated there will be none bigger and they just didn't like that kind of limitation. I think they're nuts. We decided on Mongo 16.

Hooking up the elevons gave a little bit of concern about pushrods. Out of habit we installed the servos at the thickest part of the wing. Then we realized that this required a very long pushrod! Typically a single length of 2-56 wire is sufficient, but we needed a push rod just over 20 inches long. A single wire this long was way too flexible. But, time was getting short. The weekend was fast approaching. We knew they would have to be corrected but were in a rush to complete the plane; we decided to live with the flexing pushrods.

When we arrived at the slope the wind was light but seemed sufficient. We assembled the Mongo 16.

With the wind too light for all but the floatiest of planes we tossed the 16 foot Mongo and its maiden flight was a success! It was able to use the patchy lift and majestically take flight over Los Banos Creek Reservoir. The shadow it cast over the pilots as it made a low pass was awe inspiring. If the lift was only a bit better I'm certain Mongo 16 would have really rock & rolled but, instead, had to make due with low passes and several consecutive loops. The landings were great to watch because at 16 pounds it slowed to a stop in a most graceful way! One launch was particularly

(Left) Roy makes a low pass.

Roy, co-designer, makes a running launch at Los Banos.

shocking as Roy jumped before letting go of the plane. It looked for a moment like he was being carried away!

Our good friend Charlie happened to be present for the flights. During the third flight, Charlie was volunteered by those present to hand catch the Mongo 16; and he ACCEPTED! The Mongo 16 (all 16 pounds of it) was brought around several times as the pilot perfected his approach to Charlie (who loves a challenge). The Mongo 16 came in chest high at a moderate but survivable speed; Charlie jumped a bit and caught it with one hand on top and one hand on the bottom. It accelerated him backward a bit but Charlie landed with the plane successfully caught and the biggest grin on his face! It's not every day that you can hand catch a 16 pound airplane!

During the first flights, the flexing pushrods didn't appear to be a problem. However, since the servos pull the elevons for pitch up commands, this isn't surprising. For inverted flight though, it was a significant problem. With some altitude, the plane was rolled inverted. As the plane rolled onto its back, the stick was naturally pushed forward. At which point, the roll ceased and the plane started going downward fast, exceedingly fast. The nose dropped and the plane accelerated to the ground. More forward stick did nothing. Apparently the pushrods had buckled and were no longer translating the wishes of the servos to the elevons. There was a split second of decision making for the test pilot. With the pushrods ineffective he had nearly no control.

Inverted wasn't working. If the flight profile was continued, the future was inevitable. Mongo 16 would go down, inverted, a long ways down the slope and hit at an unknown, but probably near vertical, attitude. Not an attractive option. Especially the "unknown" and "inevitable" parts. Instead, a proactive course of action was chosen. The stick was pulled firmly, thus performing a split S with the hopes of quickly returning to right-side-up level flight. The plan was executed and seemed promising. Unfortunately, the plane's altitude at the time was about 5 feet too low for the split S and Mongo 16 nosed into the Los Banos slope with a tremendous thud. The outer wing sections suffered no real damage. But, the nose of the center section was crushed, significantly; repairable yes, but it will take some work. The slope took a big impact as well. A healthy furrow was cut by the Mongo 16 nose.

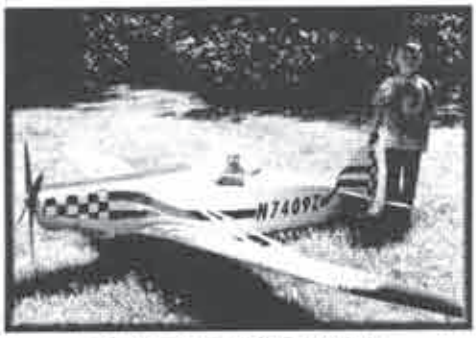
The Mongo 16 was a journey into the unknown. A journey of which we've only taken the first steps. Our efforts have agreed with the "bigger is better" saying but who knows; gigantic may be best.

■

ZIKA

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.



Bruckmann 1/3.5 Pawnee
...from Sailplanes Unlimited, Ltd.

Weight: ~25 lbs
Scale: 1/3.5
Wing span: 3.1 m (123")
Wing profile: The wing section is Bruckmann's own design which gives the Pawnee wonderfully slow landings with flaps down and excellent and stable towing characteristics with flaps up.

This is one of the nicest-flying and best towplanes available today. Herr Bruckmann first showed it to the public at the 1998 Akro Cup competition in Germany. There it towed up to the largest sailplanes (20 kilos), and even did a demo flight towing two gliders at once! With flaps deployed, this tug comes in very slowly and is extremely easy to land and fly. It's a real show-stopper!

Specifications for the 1/3.5 scale Pawnee kit:

- Kevlar fuselage, fiberglass sandwich with forward bottom reinforced, rivets and panel lines molded in
- Fiberglass cowl with molded panel lines
- Obechi/foam wings
- Fiberglass landing gear and struts
- Gel-coated fiberglass outer canopy frame with molded window lines
- Hollow molded fiberglass inner (structural) canopy frame
- One piece clear PVC canopy
- Flaps and ailerons cut out
- Aluminum wing tube
- Gel-coated fiberglass wing fairings with molded panel lines
- Balsa stab and rudder pre-built
- Horner gel-coated fiberglass wing tips
- No fittings or accessories

The Pawnee kit is comprised of very high quality components designed for the experienced kit-builder who can make control surface hook ups on his own. It is not recommended for novice or intermediate builders. Although the kit includes hardware for mounting the wings and the stab to the fuselage, there is no hardware for hinging, for flying wires, or for servo installation or placement, other than for the wings.

Here is what needs to do be done to build the Pawnee:

Drill holes where marked for wing joiner and glue the center joiner into fuselage. The wings come with ailerons and flaps cut out, servo boxes routed, wing tube receptor installed, servo wire channels, and rear alignment tube in place. The end plate on the wing root needs to be aligned and glued on, and the fiberglass wing forward fairings glued to this. The wings have the dihedral angle pre cut, and the center joiner has the dihedral built in.

The stabs and rudder are ready to mount, very light balsa rib with balsa sheeting. The joiner tubes are installed in the stab. The builder needs to drill the holes in the fuse where marked and add the enclosed tubes and rods with suitable reinforcing. The supplied rudder post has to be cut out and glued in after. Flying wires for the stab are required but not supplied, hard points are in the stabs.

The landing gear requires careful layout, but parts are included for a workable scale gear.

The supplied firewall needs to be glued in as well as the gear mount plate. The canopy frame, windows, and outer frame are one of the nicest parts of the kit; all fits well, windows need to be cut out of outer frame and the unit assembled.

Scale wing struts are included, molded from foam and glass. The builder will decide how to mount these to suit personal preference, as no hardware is included for this. There are hard points in the wings for anchoring the struts. The struts are not functional, but really add to the appearance of the Pawnee.

The motor installation is left up to the builder/pilot. 70 to 100cc motors are appropriate. The builder will also have to check the wing stab incidence. All specs are supplied.

Sailplanes Unlimited, Ltd., 63 East 82nd Street, NYC, NY 10028; (212) 879-1634, <sailplanes@worldnet.att.net>. ■

LET L-33 SOLO
...from Hobby Club

The LET L-33 SOLO is a 1/4th scale model designed after the full size, which was made in former Czechoslovakia in 1992. This flapless sailplane was designed for the Ostiv World Class early solo/club pilot; constructed similar to the Blanik line of gliders, with all metal surfaces, flush rivets, and fixed main landing gear.

LET L-33 SOLO is an ARF with a 3.5m span, ready made & covered wings & stab, white gelcoated fuselage (markings are done), canopy details, and aero-tow release installed. Functions are spoilers, ailerons, rudder, elevator, and aero-tow release. Aileron, spoiler servo wire installed; wells framed with nice plastic covering.

Introductory price: $799.95 from Hobby Club, P.O. Box 6004, San Clemente, CA 92674, (949) 240-4626, <www.hobbyclub.com>. ■

MARKET PLACE LISTINGS

VACUUM FORMED PRODUCTS, CANOPIES
Viking Models, U.S.A.
2 Broadmoor Way
Wylie, TX 75098
(972) 442-3910 • fax (972) 442-5258
RCSDigest@aol.com

SCHEDULE OF SPECIAL EVENTS

July 3-4

ESL/LISF Hosted USA F3J — Long Island, NY
Team Selection Competition
Fritz Bien, fritz@spectral.com

July 17-18

TMSS Open — Richmond, VA
Josh Glaab, (757) 850-3971
jglaab@pinn.net

July 17-18

CRRC RES Contest — Sudbury, MA
Dick Williamson (Sat.), williamson@ll.mit.edu
(781) 981-7857
Les Gerhardt (Sun.), lesgerhardt@aics.net
(978) 263-3246

July 10-11

LASS Open — Lancaster, PA
John Murr, jmurr@redrose.net
(717) 285-7025

July 10-11

Nats Warm Up - LASS, OVSS#3 — Louisville, KY
Ed Wilson, ewilson1@bellsouth.net
(502) 239-3150

July 10

CAF's 2M & Unlimited — Tullahoma, TN
Herb Rindfleisch, herb@cafes.net
(931) 455-1836

July 24-31

AMA NATS — Muncie, IN
24th: Sport Scale Sailplane, F3B, XC
25th: F3J
26th: HL
27th-28th: 2M
29th-30th: Unlimited
31st: NOS & RES

August 7-8

MVSF — Princeton, NJ
Bill Miller, jerseybill@worldnet.att.net
609-585-6779

August 13-15

GNATS Aerotow '99 — Ontario, Canada
Phil Landray, (905) 468-3923,
linden@niagara.com
Gerry Knight, (905) 934-7451
Lou Kleiman, (905) 688-4092,
mistral@niagara.com

August 14-15

CRRC Open — Boston, MA
Fritz Bien, fritz@spectral.com
(508) 369-1720

August 14-15

DARTS Man-on-Man Challenge, OVSS#5 — Yellow Springs, OH
Bob Massmann, rmassmann@in-touch.net
(937) 382-4612

August 21-22

Blanco II, The Pilgrimage — Cape Blanco, OR
Mike Shaw, (541) 269-2423
grizzy2@gte.net

August 21-22

BASS Open — Frederick, MD
Jack Cash, jcashjr@cyberun.net
(301) 898-3297

August 21-22

Mid-American Championships — Lexington, KY
Bluegrass Soaring Society, OVSS#6
Buzz Bruszewski, 76722.3421@compuserve.com
(606) 382-4612

August 28-29

SKSS Open — Newark, DE
John Kirchstein, kirchste@voicenet.com
(302) 731-2831

September 4-5

LOFT/OVSS Fall Round Up (2M, Unl, RES) — Muncie, IN
Marc Gellart, isoar2@wcoil.com
(419) 229-3384

September 11-12

CASA Open — D.C.
Steve Lorentz, lorentz@fred.net

September 18-19

LISF-2M — Long Island, NY
Gordon Stratton, (718) 847-8299

September 25-26

ESL End of Season — Reading, PA
T. Kiesling/J. Glaab, kiesling@ctc.com
(814) 255-7418

September 18-19

CAF's 2M & Unlimited — Tullahoma, TN
Herb Rindfleisch (Sat.), herb@cafes.net
(931) 455-1836
Chuck Anderson (Sun.), canders@edge.net
(931) 455-1836

October 1-3

Great Midwest Oc-TOW-berfest — St. Louis, MO
Scale Aerotow
Pete George, (314) 664-6613
twometer@worldnet.att.net

October 9

NASF Unlimited — Huntsville, AL
Lars Ericsson, lars_ericsson@atk.com
((256) 859-0255

Hobby Shops that Carry RCSD

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

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

Gyro Hobbies 2
17431 Brookhurst Unit H
Fountain Valley, CA 92708
(714) 378-8924

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

Hobby Town U.S.A.
8060 S. 84th St.
La Vista, NE 68128
(402) 597-1888

Hobby Warehouse
4105 South Street
Lakewood, CA 90712
(562) 531-8383

King R/C
Five Forks Village
King, NC 27021

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

4TH ANNUAL

G.N.A.T.S. AEROTOW '99

"Come fly with us in Canada's beautiful Niagara Wine Country!"

August 13 - 15, 1999

To be held near Winger, Ontario, Canada
(Approx. 30 Miles West of Buffalo/Ft. Erie)

Co-sponsor: Canadian Model Aerotow Society

Emphasis will be on fun and aerotowing. Tow planes and experienced pilots will be available to tow you to altitude. Bring your 3 meter (118") or larger sailplanes, fitted w/ ailerons and tow release, and join the fast growing aerotow movement. Scale Motorgliders will be welcome at this event as will non-scale large sailplanes fitted with tow releases.

Pilots' choice awards include Vintage & Modern sailplanes, and tugs. Proof of 1999 MAAC or AMA membership is required, along with gold sticker radios. Meals and accommodation are available nearby in Dunnville. Registration fee: $12 ($10 US).

For information package & map contact:

Phil Landray, (905) 468-3923
Linden@niagara.com
Gerry Knight, (905) 934-7451
Lou Kleiman, (905) 688-4092
Mistral@niagara.com

Classified Advertising Policy

Classified ads are free of charge to subscribers provided the ad is personal in nature and does not refer to a business enterprise. Classified ads that refer to a business enterprise are charged $5.00 per month and are limited to a maximum of 40 words. The deadline for receiving advertising material is the 15th day of the month. (Example: If you wish to place an ad in the March issue, it must be received by February 15.) *RCSD* has neither the facilities or the staff to investigate advertising claims. However, please notify *RCSD* if any misrepresentation occurs. Market Place Listings are $5 a month. Personal ads are run for one month and are then deleted automatically. However, if you have items that might be hard to sell, you may run the ad for two months consecutively.

For Sale - Business

PC-Soar Version 3.7 Sailplane Performance Evaluation Program with Airfoil and Sailplane Library expanded to 60 models including Chrysalis, Anthem, Genesis, Peregrine, Probe, Thermal Eagle, and Spectrum. Airfoil library includes 322 polars with 56 UIUC polars. PC-Soar with Libraries of Sailplanes and Airfoil Polars plus a new Excel utility for working with multi taper wing areas and aerodynamic centers. Reduced Cost: $50 + $3 P&H. PC-Soar library and software Upgrade to Ver. 3.7: $10 + $3 P&H. LJM Associates, 1300 Bay Ridge Rd., Appleton, WI 54915; ph: (920) 731-4848 after 5:30 p.m. weekdays or on weekends. E-mail: lmurray@athenet.net. PC-Soar Web Page: <http://www.athenet.net/~atkron95/pcsoar.htm>.

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

A.M.P. Aerial Model Products, sport, slope, race prototypes - all airfoils. 60" Del Valle Snake, 94" H&K Cobra, AMAP Flair, Kevin Cutler's full house Davenport Monitor. All race tested. Butch Hollidge, (510) 680-0589, eve, California.

PARACHUTES: $10. Dale King, 1111 Highridge Drive, Wylie, TX 75098; (972) 475-8093.

Custom Cut FOAM WING CORES. White, pink, blue, and Spyder foam available; most airfoils available. Send copy of drawing for quote. Viking Models, U.S.A., 2 Broadmoor Way, Wylie, TX 75098; (972) 442-3910, fax (972) 442-5258.

For Sale - Personal

1/4 Roedel Super Cub (towplane), 2.687 meter span, wing profile Clark Y mod. (suitable motors are 160 T, 300 T, OS BGX-1, Brison 3.2 or similar), NIB... $385.00. Contact Robin Lehman, 63 E. 82nd St., New York, NY 10028; (212) 879-1634.

Synergy 91 w/servos in wings... $420.00; Oden 135" span, battery & all servos, test flown only, red/white/blue, RTF... $650.00; Glasflugel Mosquito 1/4 scale, scratch built w/all servos (8) & battery, set up for aerotowing, wonderful flyer... $950.00; Giant Stinger tow plane, 2 piece wing extended to 96", 3W60 eng, excellent for towing w/all servos, ready to go... $1200.00. Add shipping to all the above. Dale King, (972) 475-8093, Texas.

Please send in your scheduled events as they become available!

For detailed information on events outside of the U.S.A., please view www.sailplanes.com event schedule.

R/C Soaring Resources

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

Contacts & Soaring Groups - U.S.A.

Alabama - North Alabama Silent Flyers (NASF), Ron Swinehart, (256) 722-4311, <ron.swinehart @lmco.com>, or Rob Glover at AMA3655@aol.com, http://sh1.ro.com/~samfara/

Alabama - Central Alabama Soaring Society, Ron Richardson (Tres.), 141 Broadmoor Ln., Alabaster, AL 35007, <ron_mail@bellsouth.net>.

Alabama - Southern Alabama & NW Florida Aerotow, Asher Carmichael, (334) 626-9141, or Rusty Rood, (904) 432-3743.

Arizona - Aerotowing, slope sites in AZ (rugged), Arizona Flying Eagles R/C Demo. Show Team, Dave Wenzlick, (602) 345-9232, <azdw@uswest.net, or visit CASL at <http://www.public.asu.edu/~varsanfo/casl>.

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

Arizona - Southern Arizona Glider Enthusiasts, Bill Melcher (contact), 14260 N. Silwind Way, Tucson, AZ 85737; (520) 825-2729. SAGE welcomes all level of flyers!

Arkansas - Northwest Arkansas Soaring Society, Tom Tapp (President), RT 2 Box 306, Huntsville, AR 72740; (501) 665-2201, eve.

California - DUST, Buzz Waltz, 68-320 Concepcion, Cathedral City, CA 92234, (760) 327-1775.

California - High Desert Dust Devils, Stan Sadorf, 14483 Camrose Ct., Victorville, CA 92392; (760) 245-6630, <Soareyes@aol.com>.

California - Inland Soaring Society, Robert Cavazos, 12901 Forman Ave., Moreno Valley, CA 92553, RCAV@aol.com.

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

California - Sacramento Valley Soaring Society, Dudley Dufort, 225 30th St., Suite 301, Sacramento, CA 95816, (916) 448-1266, <www.svss.org>.

California - South Bay Soaring Society, Mike Gervais, P.O. Box 2012, Sunnyvale, CA 94087; (408) 683-4140 (H), (650) 354-5469 (W).

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

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

Colorado - Rocky Mountain Soaring Assn., Phil Weigle, 1290 Salem St., Aurora, CO 80011; (303) 341-9256 eve.

Eastern Soaring League (VA, MD, DE, PA, NJ, NY, CT, RI, MA), Tom Keisling (Pres./Editor), (814) 255-7418, kiesling@ctc.com; Ben Lawless (Sec./Tres.), LawlessB@ang.af.mil; Anker Berg-Sonne (Scorekeeper), (508) 897-1750, anker@ultranet.com; Josh Glaab (Contest Coordinator), (757) 850-3971, ljglaab@pinn.net; <http://www.eclipse.net/~mikel/esl/esl.htm>.

Florida - Florida Soaring Society, Mark Atzel (President), 1810 SW Terrace, Ft. Lauderdale, FL 33312, (954) 792-4918.

Florida (Central) - Orlando Buzzards Soaring Society (www.specs-usa.com/~ingo/OrlandoBuzzards), Jerre K. Ferguson (Pres.), 4511 Pageant Way, Orlando, FL 32808, (407) 295-0956, <jerre@bellsouth.net>.

Georgia - North Atlanta Soaring Association, Tim Foster, (770) 446-5938 or Tom Long, (770) 449-1968 (anytime).

Hawaii - Maui Island Slope Soaring Operation (MISO), Duane A.K. Asami, 262 Kamila St., Kula, HI 96790, pgr. (888) 932-6247, <dasami@mauigateway.com>.

Illinois (Chicago Area) - Silent Order of Aeromodeling by Radio, Jim McIntyre, 23546 W. Fern St., Plainfield, IL 60544-2324; (815) 436-2744. Bill Christian, 1604 N. Chestnut Ave., Arlington Heights, IL 60004; (847) 259-4617.

Illinois (Northwest) - Valley Hawks R/C Soaring Club, Jeff Kennedy (President), 414 Webster St., Algonquin, IL 60102, (708) 658-0755, eve. or msg.

Indiana (NE Indiana and NW Ohio) - League Of Flight by Thermal (LOFT), Ft. Wayne, Marc Gellart, (419) 229-3384, <isoar2@wcoil.com>, <www.rc-aero.com/LOFT>.

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

Iowa - Eastern Iowa Soaring Society (IA, IL, IN, KS, NE, WI), Ed Harris (editor), 2000 NW 84th Ave., Ankeny, IA 50021; (515) 965-5942, <harris.edwin@mcleodusa.net>, <http://ciss.cnde.iastate.edu>.

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

Kansas - Aerotowing, Jim Frickey, (913) 585-3714.

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

Kentucky - Louisville Area Soaring Society, Ed Wilson (Contact), 5308 Sprucewood Dr., Louisville, KY 40291; (502) 239-3150 (eve), e-mail <ewilson1@bellsouth.net>.

Louisiana - Capitol of Louisiana Soaring Society (CLASS), Leonard Guthrie (contact), 12464 Fair Hope Way, Baton Rouge, LA 70816, (225) 275-2122, flyngufs@aol.com.

Maine - DownEast Soaring Club (New England area), <Jamesiii@blazenetme.net>.

Maryland - Baltimore Area Soaring Society, Erich Schlitzkus (President), 52 North Main St., Stewartstown, PA 17363; (717) 993-3950.

Maryland & Northern Virginia - Capital Area Soaring Association (MD, DC, & Northern VA), Chris Bovais, 12504 Circle Drive, Rockville, MD 20850; (703) 643-5513.

Massachusetts - Charles River Radio Controllers, Dick Williamson (past president), 21 Pendleton Road, Sudbury, MA 01776; (781) 981-7857 (W), <williamson@ll.mit.edu>, <http://www.charlesriverrc.org>.

Michigan - Greater Detroit Soaring & Hiking Society, Greg Nilsen (Sec.), 260 Rosario Ln., White Lake, MI 48386-3464; (248) 698-9714, GNilsen624@aol.com.

Michigan - Great Lakes 15m R/C Soaring League & "Wings" Flight Achievement Program & Instruction. Ray Hayes, 58030 Cyrenus Lane, Washington, MI 48094; (810) 781-7018.

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

Missouri - Independence Soaring Club (Kansas City area, Western Missouri), Edwin Ley (Contact), 12904 E 36 Terrace, Independence, MO 64055, (816) 833-1553, eve.

Missouri - Mississippi Valley Soaring Assoc. (St. Louis area), Peter George, 2127 Arsenal St., St. Louis, MO 63118; (314) 664-6613.

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

Nebraska - Lincoln Area Soaring Society (Wilson Slope Races), Jim Baker, 920 Eldon Dr., Lincoln, NE 68510, (402) 483-7596, jcbaker@inebraska.com, <http://www.geocities.com/CapeCanaveral/Hangar/1671/lass-2.html>.

Nebraska - SWIFT, Christopher Knowles (Contact), 12821 Jackson St., Omaha, NE 68154-2934, (402) 330-5335.

Nebraska - Ken Bergstrom, R.R. #1, Box 69 B, Merna, NE 68856; (308) 643-2524, <abergst@neb-sandhills.net>.

Nevada - Las Vegas Soaring Club, Jim Allen (Pres), 7117 Caprock Cir., Las Vegas, NV 89129; ph (702) 658-2363.

Nevada - Sierra Silent Soarers (Reno/Sparks/Carson City/Minden area), Chris Adams, (775) 345-1660, chris@scrollsander.com, <http://www.scrollsander.com/SierraSilentSoarers.htm>.

New Jersey - Vintage Sailplane R/C Association, Richard G. Tanis (President/Founder), 391 Central Ave., Hawthorne, NJ 07506; (201) 427-4773.

New Mexico - Albuquerque Soaring Association (all soaring & electrics), Jim Simpson (contact), 604 San Juan de Rio, Rio Rancho, NM 87124; (505) 891-1336, <jimbonee@aol.com>, <http://www.abqsoaring.com>.

New York, aerotowing Rochester area, Jim Blum and Robin Lehman, (716) 335-6515.

New York - Elmira - Harris Hill L/D R/C, aerotowing & slope, John Derstine, (717) 596-2392, e-mail johnders@postoffice.ptd.net.

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

New York - (Buffalo/Niagara Falls area) - Clarence Sailplane Society, Lyn Perry (President), (716)655-0775; e-mail perryl@sstaff.sunyerie.edu; Jim Roller (Competition Coordinator), (716) 937-6427.

New York - Long Island Silent Flyers, Stillwell Nature Preserve, Syosset, NY, Ze'ev Alabaster (President), (718) 224-0585, or Peter DeStefano (VP), (516) 586-1731.

New York - Syracuse area, Central NY Sailplane Group, Dave Zinteck, Minoa, NY, (315) 656-7103, e-mail Zinteck@aol.com.

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

Northwest Soaring Society (Oregon, Washington, Idaho, Montana, Alaska, British Columbia, Alberta), Sandie Pugh (Editor - NWSS Eagle), 1119 SW 333rd St., Federal Way, WA 98023, e-mail: parrot2luv@aol.com, (253) 874-2429 (H), (206) 655-1167 (W).

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Ohio - Mid Ohio Soaring Society (MOSS), Hugh Rogers, 888 Kennet Ct., Columbus, OH 43220; (614) 451-5189, e-mail <tomnagel@iwaynet.net>.

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Oregon - Bay Area R/C Fliers, Mike Shaw, <grizzy2@gte.net, (541) 269-2423.

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Tennessee - Soaring Union of Nashville, Terry Silberman, PO Box 17946, Nashville, TN 37217-0946, (615) 399-0846.

Texas - aerotowing, Dallas area, Andrew Jamieson, 9426 Hillview, Dallas, TX 75231, (214) 349-9346, e-mail ajsleep@aol.com. Larry Sengbush, (972) 291-4840.

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Virginia - Tidewater Model Soaring Society, Herk Stokely, (757) 428-8064, herkstok@aol.com.

Virginia - Appalachian Soaring Association, Virginia's Southwest (Bristol area), Greg Finney, 106 Oakcrest Circle #5, Bristol, VA 24201; (540) 645-5772, e-mail <gfinney@naxs.com>.

West Virginia & Pennsylvania - Tri-State Soaring, Chip Vignolini, 2784 Mill St., Aliquippa, PA 15001; (724) 857-0186, Voicemail (412) 560-8922, <ydne30a@prodigy.com>.

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

Wisconsin - Valley Aero Modelers, Lee Murray, 1300 Bay Ridge Rd., Appleton, WI 54915; (920) 731-4848, <lmurray@athenet.net>.

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Australia - Southern Soaring League, Inc., Mike O'Reilly, Model Flight, 42 Maple Ave., Keswick SA 5035, Australia. Phones: ISD+(08) 8 293-3674, ISD+(08) 8 297-7349, ISD+(018) 8 082-156 (Mobile). FAX: ISD+(08) 8 371-0659.

Canada - Calgary R/C Soaring Society (Alberta), thermal duration & slope soaring, Chris Gregg (Pres.), (403) 226-1019, cgregg@cadvision.com; Eric Weder (Sec.), (403) 289-8844, eaweder@telusplanet.net.

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Reference Material

Summary of Low-Speed Airfoil Data - Volume 3 is really two volumes in one book. Michael Selig and his students couldn't complete the book on series 3 before series 4 was well along, so decided to combine the two series in a single volume of 444 pages. This issue contains much that is new and interesting. The wind tunnel has been improved significantly and pitching moment measurement was added to its capability. 37 airfoils were tested. Many had multiple tests with flaps or turbulation of various configurations. All now have the tested pitching moment data included. Vol 3 is available for $35. Shipping in the USA add $6 for the postage and packaging costs. The international postal surcharge is $8 for surface mail to anywhere, air mail to Europe $20, Asia/Africa $25, and the Pacific Rim $27. Volumes 1 (1995) and 2 (1996) are also available, as are computer disks containing the tabulated data from each test series. For more information contact: SoarTech, Herk Stokely, 1504 N. Horseshoe Circle, Virginia Beach, VA 23451 U.S.A., phone (757) 428-8064, e-mail <herkstok@aol.com>.

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ESL Web Site: http://www.eclipse.net/~mikel/esl/esl.htm

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The Condor is designed by Mark Allen, who is considered one of the best model sailplane designers in the United States, if not the world. Mark has taken all of his previous experience in competition thermal duration flying, plus all the knowledge he has gained from his earlier contest and sport designs, to design the Condor. Mark Allen's previous planes, to name only a few, are: Falcon 880 and 800, Falcon 600, Swift, Thermal Eagle, Vulcan, Night Hawk, Sky Hawk, Electric Hawk, Falcon 550E, Rocket, Pocket Rocket and, of course, the molded, world championship F3B Eagle. By taking the best of these designs and the new construction techniques available today, Mark has come up with, what we feel, is the absolute best open-class sailplane available.

The wings are made in America by Ron Vann, owner of Spectrum Enterprises. Ron is also an avid competition flier, and is considered to be one of the best wing manufacturers in the industry. Taking his years of experience in manufacturing wings, Ron has produced wings and stabs for the Condor that we feel are world class. Starting with the spar that Mark Allen designed, Ron uses only the best and most accurately cut foam cores available. He then uses hand-picked obechi from Kennedy Composites, which is applied with West Systems epoxy.

CONDOR

Tomorrow's Sailplane, Technology Today

This is after he has first reinforced the wing with carbon fiber and fiberglass. The servo wells are routed out, as are the flaps and ailerons. What this means for the sailplane enthusiast is a minimum amount of work before getting the sailplane into the air. The wing is light but strong enough to take "pedal to the metal" launches. Also available as an option is Ron's unique internal capped hingeline. This means even less work for the modeler.

The fuselage is made by Steve Hug, owner of the Fuse Works. Steve is another master at what he does. Fuse Works makes what we consider to be the best fuselage in the business. Steve uses only the best fiberglass and Kevlar™ available. All fuselages are manufactured using the West Systems epoxy. Steve's fuselages have the least amount of pinholes, if any, that we have seen. In fact, the fusolage is so pretty that many people do not paint it. The fuselage is extremely light, and yet strong enough for very aggressive flying and landing. For those with very little building time, and those who don't like to paint, there is an optional pre-painted, in the mold, fuselage which includes a unique carbon fiber canopy.

All kitting is done at Slegers International's new and larger manufacturing facilities. We have spared no time or expense with supplying the modeler with the best materials available. The kit contains pre-sheeted wings and stabs by Ron Vann, fiberglass and Kevlar™ reinforced fuselage by Steve Hug, 3/8" diameter titanium wing rod from Kennedy Composites, optional 3/8" diameter steel wing rod by Squires Model Products, control horns and tow hook by Ziegelmeyer Enterprises, pushrods by Sullivan, or optional one piece steel rods. All wood is custom cut. Specially cut basswood of 60" is supplied to eliminate splices in leading edge, flaps and aileron capping. All balsa is hand picked, light to medium, to ensure light weight wing tips, stab tips, and rudder. Aircraft ply is used for the pre-fit servo tray and towhook block. A comprehensive instruction manual is included.

The Condor, designed by Mark Allen, wings by Ron Vann, fuselage by Steve Hug, and kitted by Slegers International, we feel, is the best open-class, thermal duration sailplane available, at an affordable price of $395.00 plus S&H.

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