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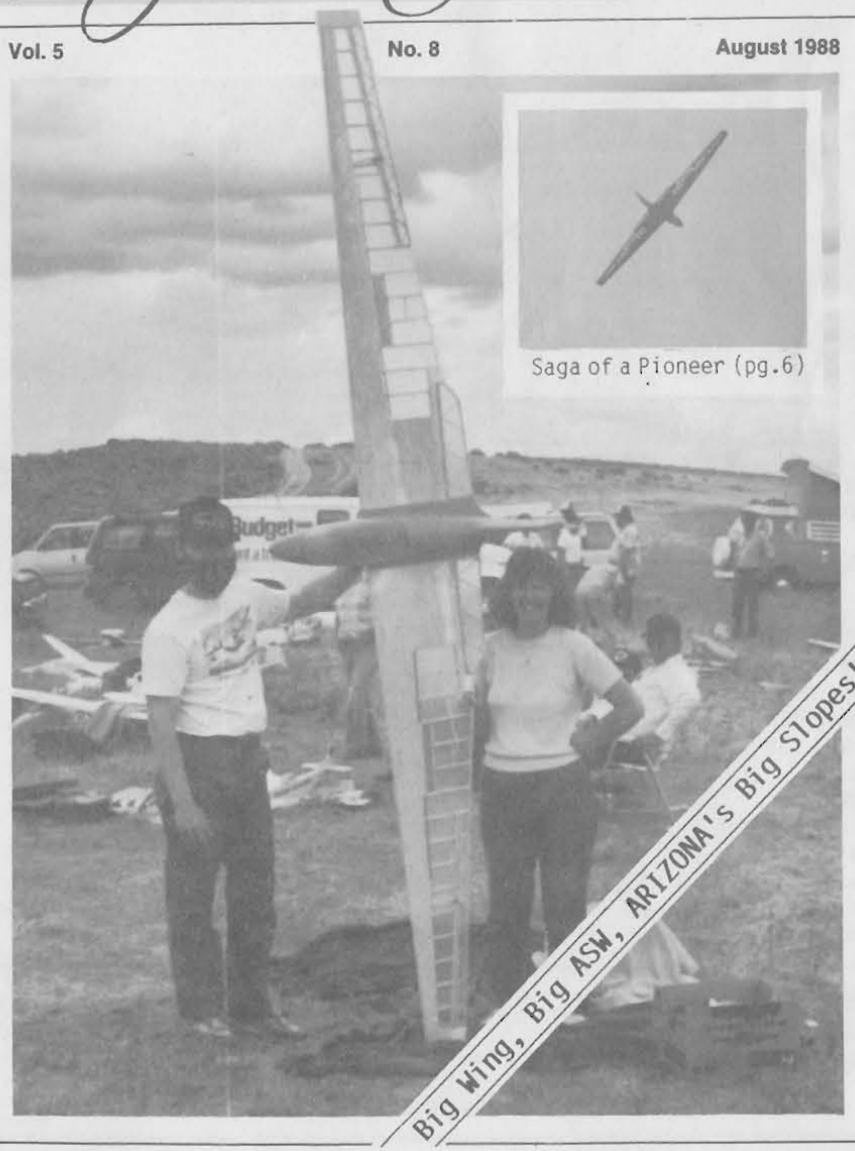
R/C Soaring DIGEST

Vol. 5 No. 8 August 1988



Saga of a Pioneer (pg.6)

Big Wing, Big ASW, ARIZONA's Big Slopes!

Bill & Bunny Kuhlman at the Richland Slope Scale Fun Fly. Photos by Tony Palenthorpe.

MARCS Symposium dates and Chairman Announced.....RCSD

Bill Vogelsang has agreed to chair the annual MARCS sailplane symposium for 1988. It will be held **November 12th and 13th** in Madison, Wisconsin. The format will be similar to that of previous years, with table clinics, talks, etc. For those who may wish to arrive a day early, we are going to arrange a trip to the EAA museum in Oshkosh. Announcements will be sent later this summer to anyone who attended previous symposia.

Anyone who would like additional information may write to me at **5933 Mayhill Drive, Madison, WI 53711.**

Flying Wing Announcements

RCSD has had - and continues to have - a great interest in flying wing developments; i.e., tailless sailplanes in particular and tailless aircraft in general. The general public has had its interest awakened by reports in the press about the stealth bomber and Northrop Corporation.

Recently, RCSD had the privilege of receiving a couple of flying wing sailplane kits for testing and review. One is BIG WING from Houston, Texas -- and the review and all details appear elsewhere in this issue, by Ben Trapnell.

The other, is the Klingberg wing from Future Flight, 1256 Prescott Avenue, Sunnyvale, CA 94089. Rolin Klingberg tells me that dealers are now stocking his beautiful design, and you may obtain one from Tower Hobbies, Hobby Lobby, or Hobby Shack. If you really must call Rolin, please be discreet and try to call at a reasonable hour. His telephone number is (408-245-6168. Frivolous calls will not be welcome, I'm sure, as Rolin is a very busy person. Doug Klassen will do the review for RCSD.

We have a report of the success of the 1/4-scale Marske Pioneer II, flown at the Washington Fun Fly for Scale sailplanes at the end of May. Not only that, the builders -- Bill and Bunny Kuhlmann -- will begin a series of articles on flying wing theory, design and construction.

RCSD will continue to feature news of flying wings, including the latest rumor from Germany: their next F3B World Championship aircraft will be a flying wing sailplane! Don't believe me? Well, I wouldn't want to bet against it!

Ninth Annual KRC Electric Fly

September 17 - 18, 1988 will see the now-famous and well-attended Electric Fly at the Buc-Le Aerosportsmen Flying Field on Heller Road in Quakertown, PA. It is, as always, a FUN FLY, and all electric R/C models are welcome. Sailplanes, motor-gliders, scale, sport, aerobatic, old-timer, etc. AMA sanction 1117 has been issued, and a current AMA membership card will be required to register. For more information, call Bruce Fenstermacher at (215) 723-0470 between 5:30 PM and 10:00 PM Eastern Daylight Savings Time, Monday through Friday. Pot luck on weekends!

Major Progress at Princeton.....Selig/Donovan

Michael Selig and John Donovan have been taking data since June 25th and report that the tests have been going surprisingly well. They have included a preliminary draft containing data on the Eppler 387 built by Bob Champine and they have compared it with the data taken at NASA-Langley in the Low Turbulent Pressure Tunnel facility. There is excellent agreement with the L.T.P.T. and with Delft in the Neatherlands which gives them confidence about the flow quality and the measurment system. The following airfoils have been tested: Clark Y(Watson & Boren), E-214 (Lukenbach) S-4061(Miller) E-387(Miller),E-387(Champine),S-3021(Champine),S-4233(Champine),MB-253515 (Bame & Krainock),WB-135/35(Blanchard),WB-140/35(Blanchard),S-2091(Jones et al) E-214(Sawyer),E-205(Batey & Kunath),FX-60-100(Border), S-4062(Watson) They hope to test about 15 more models if the ones currently being built arrive in time. R.C.S.D.hopes to be the first to publish the test results with the first installment before the end of the year.

R/C GLIDER SLOPE-SOARING IN ARIZONA.....W.A. ROSEBERRY*

* 4922 West La Mar Road, Glendale, Arizona 85301 (602) 939-3909

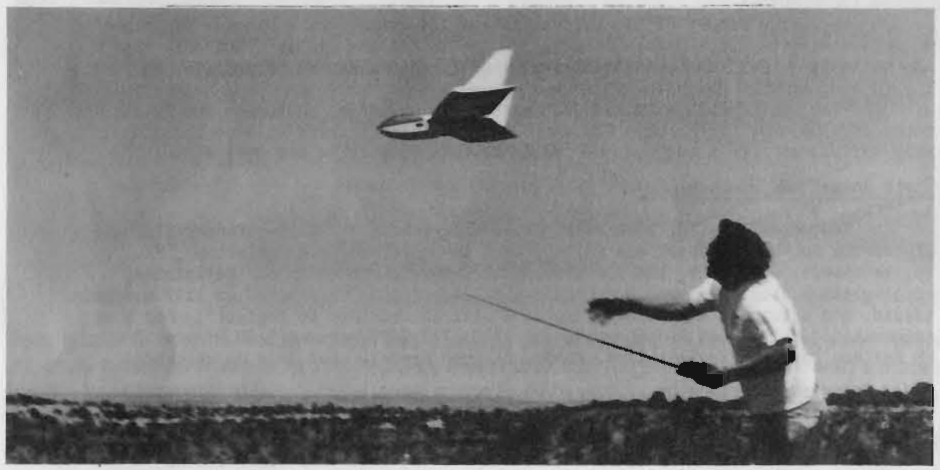
Three sites are currently in use: 1. Merriam and Sheba craters, off FAS 419, on the road to Leupp, northeast of Flagstaff. 2. Green's Peak, off State Route 260, about 12 - 17 miles west of Springerville. 3. Cave Creek Hills, off I-17, on the road to Carefree, about 12th Street, 2½ miles East of I-=17.

Glider types flown include Mark Smith's Wanderer modified by adding a larger rudder and a sharp leading edge for light lift, and a Dura-lene fuselage with a foam wing with ailerons for strong lift.

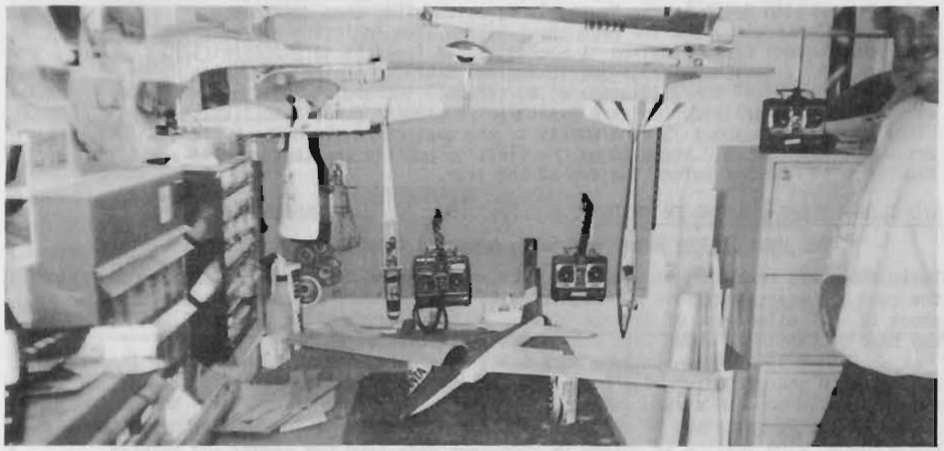
All gliders should be able to carry ballast as sometimes the wind is strong and a higher wing loading is needed to penetrate away from the slope. The reverse is true in l/ight winds, so your Wanderer can fly while your aerobatic ship is on charge.

Rick Palmer and Mike Holland live in Springerville, Arizona, about 100 miles east of Payson. THey are avid slope soarers and fly more slope than thermal...although they do both. Their favorite site is Green's Peak and the photos below (courtesy of Rick and Mike) show a little of their activities.

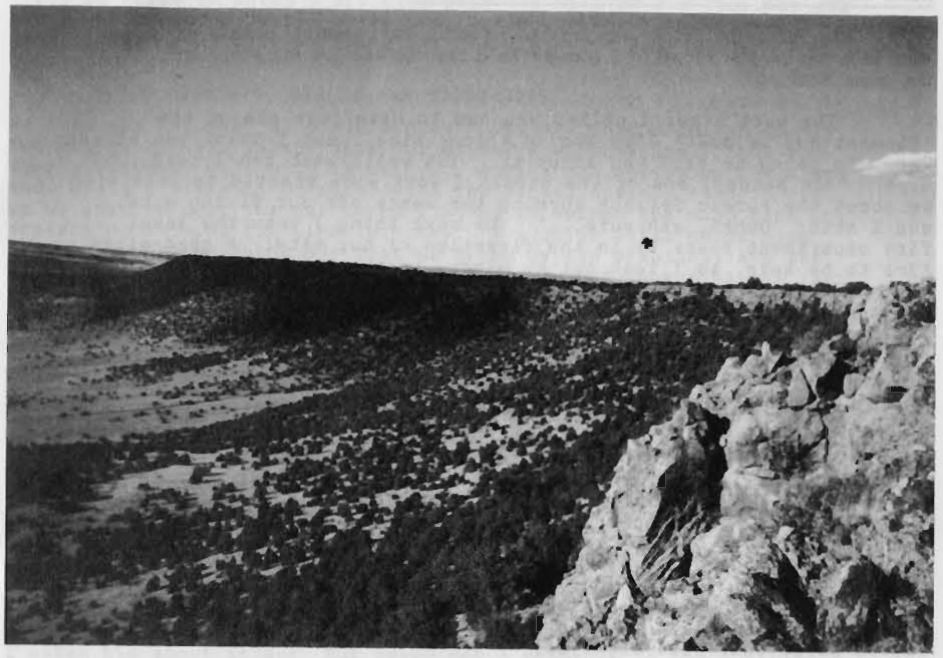
Green's Peak near Springerville, AZ.



Rick Palmer launches his GEIER flying wing.



Well equipped shop belongs to Rick. Smiling face belongs to Mike Holland. The F-20 is latest PSS design for slope.



New Arizona site: "Palmer's Plunge" Note rocks... and trees!

Emergency landing area below - if lift is lost...note trees!

MORE RICK PALMER* and ARIZONA SLOPE SOARING

The following letter was written in April and describes some fun that Rick had on the slopes. I thought he'd like to have us all share in the great soaring.

"The week after I called you had to have been one of the 'funnest and wildest' I've had in a long time...and I think you already know I'm going to tell you about it. (Oh well, what can I say?..JHG)

" On Monday, one of the people I work with started to joke with me about the Forest Service burning the weeds off our flying site... and I said: 'Duhhh, yah sure...' The next thing I know the local fire department roars by in the direction of our site! A good-sized fire to be sure, so I look out my window at the flying iste, but the fire is about a half mile away. The first thing I think of when I see the smoke is that the wind is good enuf to fly...you guessed right. The brush fire was pulling the wind right into the hill!

Well, lunch time was coming up (oh sure, likely story...JHG) so I picked up a glider and spent a half hour of my one-hour lunch period flying in some of the best lift that hill has ever produced!

The next day I thought about looking at a spot I've had my eye on for a long time (gosh, that must have been uncomfortable, Rick...JHG) I hoped that this would be a good slope, but I didn't know if I could drive to it; if it had landing areas on top or below; or even if it had any lift. With a little luck I found the road out to it, but it was only so-so. Landing areas? Yes, but they needed to be marked, as there are some pretty big rocks in places, and below the hill there was a landing place, too. I had to take some test cardboard to flip out over the slope to see if they would go up. (An old Arizona trick that beats losing a glider in strong lift...JHG). Sure enough, the wind flipped the cardboard about twenty yards behind me...so it looked as if this site might do.

The next day after work (yeah, sure...JHG) a glider was sent off for a twenty-minute flight, so I went home and called my friend Mike Holland and told him the good news. He said that if I went out there the next day to put a note on his door (no telephones in that part of Arizona - pretty primitive...JHG) to let him know I was flying he'd be out as soon as he got off work.

It was, he came, and he threw a fit: "Darn, why didn't I bring a glider?" The next day he was off, so he went out to try the new slope. Well, as the story goes, it's only a few minutes from my doorstep, and the pictures are in this letter.

On Saturday, Mike and I went to WAR! Me and my Index One and Mike with his Ridge Rat. The wind was out of the northwest at 22-25 miles per hour. At times we were 700-800 feet above the top of the hill...moving out to our right about 350 - 400 yards and back. We flew two 'rounds' of about 30 minutes each. Mike flew some extra to get needed landing practice on this new slope as the wind can play strange tricks up there.

Today, the wind was down some, so we went thermal soaring. Another friend, Aubrey Stanton, came out and BIF! BANG! POW! we were all over the sky for twenty & thirty minute flights!

Hope you can come out and fly with us, too. I like to see a lot of gliders flying at once...and I'll be writing Tim Webb (designer and kitter of Index One) to tell him about it. Then he can tell Doug Klassen a thing or two. Bah, that dummy! Arizona's GREAT! You just need to know where to go for slope soaring! (This refers to an earlier article by Doug which allowed as how there ain't no slope soaring in Arizoney...JHG).

"Green's Peak is open now, but still a little cold. We'll go up there in a week or two, depending on the wind. Be sure to call us if you plan to come around, and bring some 'fly friends' if they'd like to come. The more, the merrier. 'Til later then, Happy Flying. (Signed) Your friend Rick Palmer."

* P.O. Box 1513, Springerville, AZ 85938. Tel.: (602) 333-2386.

Letters Worth Mulling Over.....B^2 Kuhlmann*

"B^2" is really Bill and Bunny Kuhlmann, a husband and wife team of fliers, builders, designers, and all-round good folks. They have written some things for us in the past, but now embark on a "Tour de Force in which 5 articles plus one will be put together and run in RCSD over a period of months, taking us through December at least. Boy, will this be fun! They also welcome your letters and comments, questions and ideas.

* P.O. Box 975, Olalla, WA 98359-0975

We flew our FAI Max "wing" on Sunday! Our original required nearly two pounds of lead in the nose for proper c.g. location. This one does acceptably well with 1¾ pounds. Moving the servos to the wings made a big difference compared with the curved plastic conduit hook-up we used before. We got three flights in before the wind came up, presenting us wiht downwind launches. The glide still needs some trimming, but the turns are just as grand as the original, and she lives up to her name -- Pirouette. We did a zoom launch on the last flight and managed to (slightly) bend the 5/16" diameter drill rod wing rod. We're going to ream out all of the brass tubing and replace it with 3/8" capacity stuff. The 3/8" diameter rod has about 50% more cross sectional area than the 5/16" diameter rod, and should solve the problem. With batteries up front and receiver behind, the fuselage is cavernous; great for an ACE thermic sniffler. No problems with leads -- antenna interference, either on the ground with the antenna removed or in the air. (JR Century VII, FM, Ch. 44 and ABCW receiver).

Other than the Pioneer IID (the one in the report on the Washington Fun Fly in this issue) we haven't decided on other aircraft to bring to Richland. (Ed note: this was written in April, a month before the Washington meet...JHG). Speaking of which, the wimngs get covered this weekend, along with ailerons and elevators. We dissolved the foam fuselage mould and are very happy with the fiberglass shell we obtained. Finally found someone constructing a (full size) IID and so documentation is hoipefully forthcoming. Re: Marske's 15-M Pioneer. I asked him about it but but never got a response to the question. I suspect that it was not as successful as had been hoped. The biggest problem, I think, is getting a higher aspect ratio planform to turn tightly, if at all. Drag hurts the performance so much, and the only way to get a high AR wing to turn is by increasing the drag on the inner wing quite a bit. There was a proposed three-view in Jim's book, but we have never seen/heard more about it.

Other aircraft in planning? 1. Finish off the Dodgson Windsong which we are building for our son in the Marines who is stationed on Okinawa. We still have some time, but we are through with A) kits and B) tailed airplanes, and we can't wait to get it off the building board. 2. Build a flying wing of the same span and total area as the Windsong that will out-perform it! This has been a project for 3 years now, and the information we've accumulated is pretty substantial in quantity and quality...and fuel for articles! We definitely believe that such a machine is possible (and so do I...JHG). 3. Some scale "wings" utilizing foam and epoxy/fiberglass cloth, such as the Douglas Skyray, the Vought Flying Flapjack, etc.

Brass airbrakes: on the IID the airbrakes are of aluminum with piano hinges at the leading edge, on upper and lower surfaces of the wing. We took 1/16" brass tubing and made a close approximation. (See sketch). They didn't have to be covered -- only painted. They won't warp, they won't bend under flight loads, and the look good! We're pleased with them. I'm really looking forward to the article series for RCSD! (and so am I...JHG).

We saw an article in KIT PLANES (by Harry Riblett in last month's issue) and we wound up purchasing one of his books -- wow! Included was quite a bit of information on leading edge droop. In sum, this is a method of controlling outer panel stall by corecting poor design. Mr. Riblett also argues convincingly against the Ames modification (upper surface and nose radius mod).

Finally, Asher Carmichael's articles are GREAT! We'll be writing to him directly and thought you'd like to know.

Good soaring, B^2

RICHLAND SLOPE SCALE FUN FLY..(Saga of a PIONEER) ..... B^2 KUHLMAN*

Bill and Bunny Kuhlman were a bit reluctant to have me print this letter, but after much arm twisting, pleading, and a bit of whining, I managed to get it away from them long enough to commit it to paper. Hope you find it as interesting as I did. JHG.

"We flew our 1/4 scale Marske Pioneer IID in Richland, WA over the (Memorial Day) weekend, and thought we'd drop you a note letting you know of our success.

"This was really an 'un' contest -- a Fun Fly. In fact, it was advertised as the '1988 National Mid-Columbia RC Soaring Scale Fun Fly and Soaring Social'. It took place over the 27th, 28th and 29th of May at a site that is probably one of the best slope soaring sites in the USA: a hill with a face of about 40° slope. a height of several hundred feet, and a length of over a mile. It rained Saturday, but Friday amd Sunday were great days for flying the ridge lift, with a wind speed of about 25 mph on both days. The air was fairly turbulent against the hill, but even 50 feet out it was very smooth, with tremendous lift at all times. When the wind slowed down at all, it was because of the large amount of air backfilling a thermal that was going through, Visibility from this site is 30 miles to the horizon, and three major thermal 'streets' were visible at all times on Friday.

"Sixty-plus fliers (officially 68 entries and 108 sailplanes) entered over 100 sailplane and 'Power Scale' models (F-16, P-51, F-111, Mirage, 'Dago Red', etc.). MOst of the sailplanes were constructed from kits produced in Germany -- fuselage of fiberglass, wings of foam covered with balsa, obechi, plywood. (There were) ASK's, a Twin Astir, a DG-400, Sisu, Discus, Schweizer 1-26, etc. The Power Scale ships were of foam with a fiberglass and epoxy covering. Erik Eiche of Canada had a beautiful German Primary glider (SG-38) complete with pilot and antique white fabric covering. He also brought a beautiful late 30's design from Germany - a Reiher. His Primary and our Pioneer IID were about the only rib-and-fabric structures at the meet, save perhaps a beautiful Grunau Baby IIB built from Charlesworth plans....and the only ones to fly.

"Our Pioneer was flown in 'blueprint' configuration, without the modifications of John Irwin's N86TX (which will be added as soon as possible). We tried to get acrylic to conform to the canopy mold, but without success, so $13 in materials later we decided to cover the mold in Saran Wrap and just get the shape in fiberglass and epoxy. Several people with plastics molding expoerience talked with us at the meet, and we will soon have a clear canopy, showing our pilot and instrument panel. The fiberglass seat was done already, and it was a simple matter to wrap the receiver in foam and seat-belt it in place with a strip of Velcro. On the prior Wednesday, we finally had some decent weather and we took her out for a test glide. With just a bit more weight in the nose she was flying fast and straight from a hand launch.

In Richland on Friday we were a pretty anxious pair. Wind at 22 to 28 mph, first soaring flight, etc., etc. Sonce we had built the whole airplane together, Bill's half was forced to follow Bunny's half when she decided to fly it. We straightened out a few minor problems and were ready. Many people had inquired as to whether a 'real' Pioneer IID actually exists; if our model was a kit that we had assembled; if it had flown before; and just how 'scale' it really was. We were able to tell them about N86TX and that it was (hopefully) being flown this same weekend, that it was not a kit, that we had three hand-launched glides on her (only the last being a true success), and that it was indeed true scale, airfoil and all. Bunny had constructed the rudder single handed...and it's a work of art that a lot of people appreciated. The 1/64" plywood gusseting and 1/32" plywood cap strips could be seen through our still-clear covering.

Mike Bamberg, a member of the Portland (Oregon) Area Soaring Society was drafted to launch her in front of an audience of about 100. Probably half felt that she wouldn't fly at all; that she would just tumble through the air into the gravel 'like all flying wings'; the other half were hoping that we had done everything right and that it would fly at least well enough to land again in one piece.

" Mike aimed her down at about a 20° angle, and effective angle of attack of zero (due to the up-slope wind component) and pushed her gently into the air. She continued down for a few feet and then rotated into a beautiful climb - a maneuver that was met with a cheer from everyone in the crowd. Mike's a good coach, and he had us exploring the flight envelope with gentle turns, attempted stalls, tight turns with full up elevator, and later with crossed controls. We tried the airbrakes, too. She simply dropped her nose and slowed down, maintaining altitude. Mike flew her for awhile, of course, and he remarked that she was a very smooth flying machine. We did a couple of big graceful loops and a nice gentle roll, too!

"This site has a gentle roll at the top and a slightly angled grassy area behind that for landing. There is not rotor and just a bit of turbulence during the last few feet before touch down. Use of the airbrakes was not necessary as her flying speed was just a bit faster than the wind velocity over the crest of the hill, and she settled right in with no problem.

"The second flight on Friday was relatively anticlimactic following that initial performance, but more and more people came over for a closer look after each of the two flights. Now they asked about fuselage molds, airfoil templates, construction plans, etc., etc. It was amazing.

"our third flight was on Sunday afternoon. Many people had arrived on Saturday and so had not seen Pioneer fly previously. Again, we were inundated with questions both before and after our flight.

"Our Pioneer flies just like it's a full-size sailplane, and also like its big brother (sister?). Turns can be made flat and gentle or can be very steep and tight; use of elevator in a banked turn not only makes it tighter, but the sailplane accelerates noticeably. The nose doesn't drop below the horizon in a stall; it just comes down a bit and the sailplane immediately starts flying faster.

"Full up elevator in a combination of slope and thermal lift makes for an interesting experience - the nose goes up to about 20° and she lifts straight up. After awhile the nose comes down, but if you're still holding full back, it rises again and the whole airplane goes straight up again. We climbed over 800 feet in four 'steps' this way and stopped only because the thermal we were in got stronger with each step, and we were unsure of getting her down if the thermal became even more intense. With just a small touch of down elevator, she can move extremely fast.

"There were three flying wings at the meet - our Pioneer IID, a foam-and-fiberglass (sort of a Horten IV) of 12-foot span and a true-to-scale 14-foot span Northrop YB-49 constructed of foam and fiberglass with fences and fins of lite ply. It used the same airfoiulas the original (NACA $65_1$3-019/$65_1$3-018) and the same wing twist (-4°) but the only controls were elevons; no flaps or drag rudders. Sadly, the Horten did not do well at all - possibly due to a combination of interference and being tail heavy. The Northrop YB-49 had an abortive first flight due to being launched straight out; it stalled and fell, suffering

minor damage. The launch for the second attempt was great (three people and the nose down) -- it rotated just like the Pioneer and was off. It looked to be flying at about scale speed, but there were a couple of really close passes for the cameras that were unbelievably fast. The turns were graceful and wide, and the whole flight could well have been scenes from a late 50's sci-fi flick. This airplane flew only once, but definitely 'stole the show'.

One thing that impressed us was that the failure of the Horten was nearly disregarded, and the flights of the YB-49 and our Pioneer IID turned a lot of people on to flying wings! At first, they were curious, then intrigued, and then genuinely interested. We watched a number of people there become converts. In three flights our Pioneer was flown by both of us (B^2), Mike Bamberg, Alan Halleck (builder of the Horten), and Wil Byers, Contest Director. Wil has extensive slope experience, and lives just a couple of miles from the contest site...but had n ever flown a 'wing' before. He said: 'This thing flies just like it has a tail! It's really smooth. This is great!'

Alan has designed and flown several flying wings for aerobatics and racing, but he commented on how well Pioneer flew, also. We're wondering how the flight characteristics will improve once all of the hinge gaps are sealed. We've mounted releasable tow hooks under the wings, so our next flights may be off the winch.

"We're going to try to write an 'On the Wing...' about Pioneer IID and our model. By unanimous vote of those in attendance, there will be a repeat next year over the same weekend - "

BIG WING: Ben Trapnell

One of the most enjoyable aspects of R/C modeling is the incredible variety of designs available on the market these days. Though I enjoy the more conventional types of sailplanes, my fascination lies with the tailless variety: the flying wings! Through many hours on the phone and numerous letters, Jim realized this and was probably the reason behind his asking me to review the Big Wing flying wing kitted by Carl Boddie of Houston Texas. Jim mentioned that the plane was nearly complete and that I would have no problems finishing it in an evening. (An ARF flying wing...this was going to be neat!) With the decision made to do the review, I couldn't wait to see what was new on the market. (Remember what it was like being five years old at Christmas time?) When the box arrived, I thought that our editor had been pulling my leg. He couldn't have been serious about this kit! Believe me, when I set the pieces out on the living room floor, my first thought was, "What six year old was I going to get to build this toy!" Previous experiences with flying wings led me to believe that they were sophisticated machines requiring a great deal of skill to build and fly! These bits of foam and plastic certainly didn't look like much. So, with a fair amount of disappointment, I didn't hold the

greatest of expectations. As it turned out, I couldn't have been more wrong.

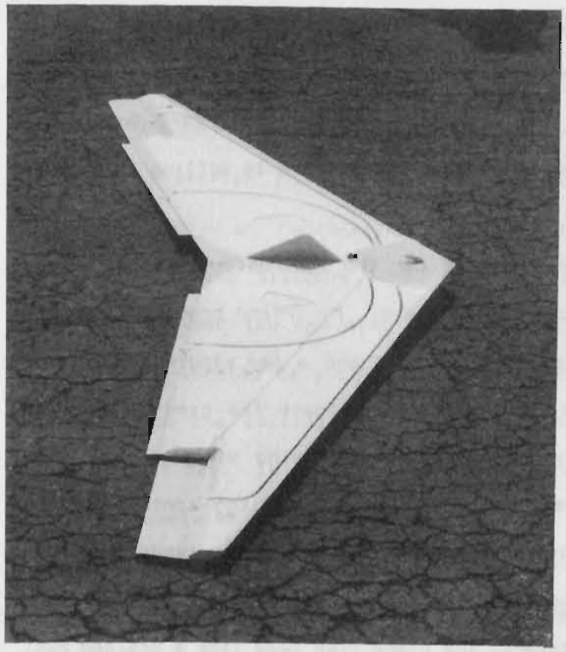
The wings are made of foam, injection-molded, with formed plastic leading edge "sheaths" on each. These sheaths not only ensure a more precise airfoil shape, they greatly stiffen the wing as well as provide a good measure of impact protection. Servo and radio wells are molded in and all the pushrod tubes come pre-installed using silicone adhesive. A plastic keel section is provided which fits between the two wing halves and includes an integral tow hook as well as a pre-located balancing tab. When the wing is completed, the builder hangs it from the ceiling by this tab and adds ballast to the appropriate molded ballast bay. It's actually pretty slick. The spars consist of a couple of wooden dowels which are pressed into holes in each wing panel. The whole thing is then taped together using 2 inch packaging tape and the radio installed. If you're really slow, it may take a couple of hours to assemble the wing and install the radio. (It took me 15 minutes to assemble mine!) Be sure to have your radio charged before beginning construction!

The building sequence is presented in an eighteen page booklet with all necessary diagrams and written instructions very professionally and clearly printed. The quality here is outstanding! It is obvious that the designer went to great lengths to provide the best instructions possible. (Anybody able to install a radio should be able to complete this kit!) The only flaw I saw was the lack of information about the finished product. No dimensions, weights, wing loadings, etc are included. Though not necessary, it's stuff I like to see when I build a kit.

The wing can be controlled using either elevator and ailerons or elevons (if your radio supports this option). An electronic mixer works well while diagrams of both options are included in the instructions. Using a Futaba Conquest with Micro's, I opted for rudder and elevator control. I really didn't expect much in the way of performance from this kit so I didn't want to commit a great deal of resources to it. One servo was used for the elevator control while two servos were used to motivate the ailerons. All required hardware to connect the radio to the control surfaces is listed as included, but was not in the box when my wing arrived. (I called the manufacturer and he immediately wanted to send replacement parts. Since I had already completed the kit, I declined the offer. It's obvious, though, that Carl Boddie has really gone out of his way to make this a fun project and is willing to back it 100 percent.)

With radio installed and the wing balanced per the instructions (total weight of 40 oz), it was off to the local flying field. My friend brought along his upstart for motivation. After a couple of pics and a few minutes explaining flying wings to the power types at the field, we gave the bird a few hand tosses to get a "feel" for any irregularities. Flying wings can be very unforgiving if not properly designed and balanced. Pitch control can be especially tricky. In the case of the Big Wing, though, no bad tendencies were noted. (Hey, this thing might just fly after all!) Using only the recommended 3 pound maximum tension on the upstart, the plane flew away like a scalded cat! The tow hook being too far forward didn't allow for much altitude gain but confirmed our growing suspicions that the plane was fast and, should it get a bit of altitude on launch, should fly very well indeed. The glide, like all flying wings, is very flat. In spite of the lack of any vertical surfaces, turns are surprisingly crisp with the plane exhibiting a great deal of stability. When a little bubble came though, it was amazing to see the Big Wing really balloon. "Yes, Martha, this thing will thermal, too!" Greg and I were impressed! Teaching us a valuable lesson (You can't judge a book by its cover or, in other words, fly it before you jump on it), the crow for dinner was going to be a bit tough to swallow...

Drawing from information obtained from Northrop as well as his own hang-gliding background, Mr. Boddie's design is actually quite sophisticated, making use of some "radical" employment of airfoil sections to produce the required washout at the wing tips and reflex along the trailing edges. It's obvious that the designer has spent a great deal of time ensuring a good flying project for the average to intermediate pilot. If there is a slope nearby, the Big Wing is perfect for it. I haven't ballasted the plane for stronger winds, but 10-15 mph seems ideal for the slope. If you plan to use an upstart for launching, I



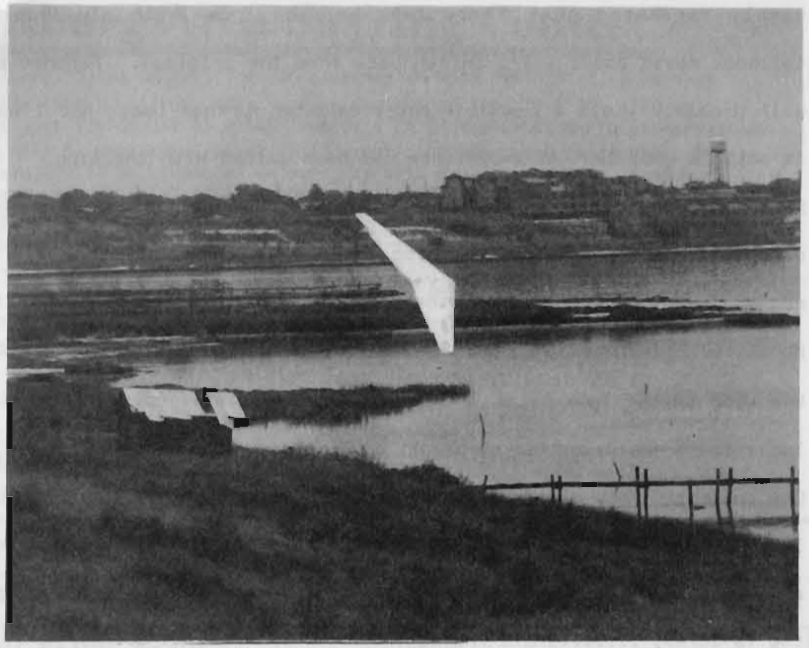
Technical Specifications:

Wing Span	92"
Wing Area	1140 sq in
Aspect Ratio	7.42
Root Chord	20 in
Tip Chord	5.5 in
Empty Weight	2 lbs
Flying Weight	2.3-2.5 lbs
Wing Loading	5 oz/sq ft!
Cost	$40.00 (approx)

Reciever & servos are under the plastic panel on the nose - note cut-away wing tips give the wing the proper washout/reflex as does the sloped trailing edge.It works!

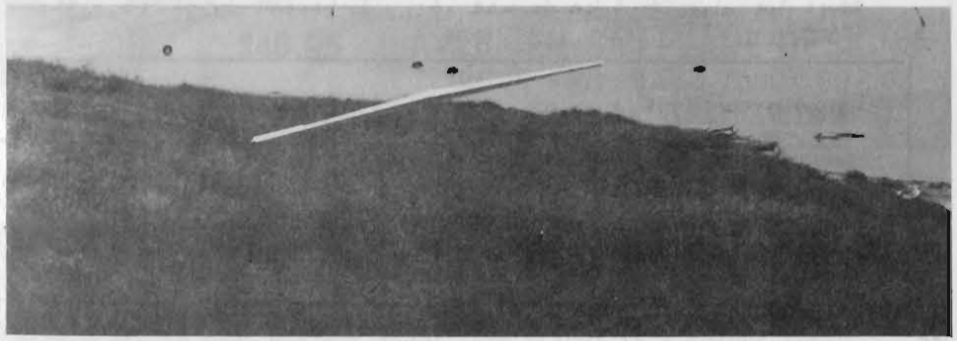
Note pre-installed nyrods.

At the time of this review, Big Wing was available direct from the manufacturer for $44.95 plus shipping. The author believes this represents a good value.



Like the Cortina, the Big Wing is Silent...

Any wonder why "stealth" means flying wing? Take it too far along the slope and you may loose it!



highly recommend that a new keel be made from 1/8th ply incorporating a tailhook moved about 1-1/2 inches back from the original. Further experiments will probably yield a tow-hook position even further back, but I wouldn't try it until a good deal of experience has been gained with the wing.

Other than that, don't mess with the design. It was intended for fun, and it does this job better than anything I've flown. It's easy to build, and flies remarkably well. On the other hand, some folks have sheeted the wings, Monokoted them, etc. As long as the shape isn't disturbed, it should only make the wing better looking on the ground and a bit stiffer. In the air, though, looks don't really matter as beauty is as beauty does!

One thought: This plane bares so much resemblance to the Northrop wings of the late forties and early fifties, I can't help but wonder, with a few cosmetic additions here and there, how well it would fare as a semi-scale slope-model of the YB-35/49? .....Next Project!

If your looking for something different, this is the perfect introduction to the world of true flying wings. Though not a heavy-air plane, if your conditions allow flying a Gentle Lady, you'll be able to fly the Big Wing and probably out-performing most others. For pure fun, the Big Wing, having all the good qualities of flying wings, is pretty hard to beat! Look for Tower Hobbies to be offering them soon.

P.S. If you like the wing or have any questions, Carl would sure like to hear from you.

Big Wing 8980 Scranton Street Houston, TX 77075-1088 (713) 943-8451

Jim: Carl includes a nice motor mount for use with an 049, but says he doesn't like to use it. I haven't tried it, either.

Harrisburg Area Soaring Contest

AMA Charter # 576

The West Shore Flying Society,Inc.,in cooperation with The Lift Club of York sponsors the 1988 Harrisburg Area Soaring Contest on Sept.24 & 25, 1988 at the WSFS's east field,just 1½ miles from exit 24 of I-81,just North of Harrisburg. The event will be open class using ESL's Expert and Sportsman catagories. A separate event will be conducted on each day with 3 places awarded in each catagory,each day (a total of 12 trophies) Pilot's meeting at 9:00 Am.

Pre-registration by September 16,1988 required. A limit of 5 flyers per frequency. Please indicate channel choices. AMA Control Flag, Plane I.D. Numbers required.

Mail Registration Form Below with check to:
George D. Burns, 501 N. 30th Street, Harrisburg, Pa. 17109 . Tel. (717)238-5487

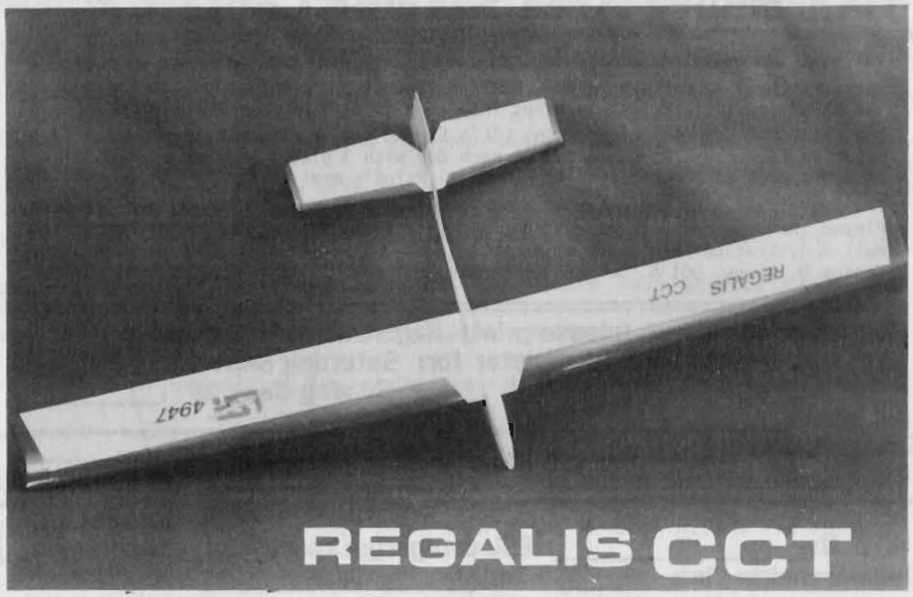
Registration form: (please print) Registration is $10 per day
I would like to register for: Saturday Sept 24 :_____
Sunday Sept 25 :_____

Last name:_____ First name:_____
Street Address:_____
City:_____ State:_____ Zip:_____

ESL MEMBER YES ___ NO___
AMA #:_____ ESL category:Expert_____Sportsmen____
Channel choice: 1st:_____ 2nd:_____ 3rd:_____

F L A S H !

JOE WURTZ BREAKS THREE CROSS-COUNTRY RECORDS: FAI WORLD RECORD WITH HIS 140-MILE FLIGHT FROM THE LANCASTER/BARTO CALIFORNIA AREA TO CHAMPLES, CALIFORNIA; AND TWO UNITED STATES RECORDS WITH THE SAME FLIGHT: OPEN DISTANCE AND DECLARED DISTANCE. CONGRATULATIONS, JOE. RCSD HOPES TO HAVE A STORY ABOUT THIS FLIGHT IN A FUTURE ISSUE.



TIPPERON CONTROLLED SAILPLANE

AT LAST! A 100" CCT. The REGALIS. Everything the ACCIPITER is plus "forever" floating glide and excellent thermaling charactistics.

Specifications:

Span	100 In.
Wing area	918 In.
Aspect ratio	10.9 to 1
Wing loading	11 Oz./Sq.Ft.
Airfoil	Eppler 214

Control functions:
Tipperons
Rudder
Stabilator
Flaps 6°Neg. 80°Pos.

Coupling:
Tipperons to Rudder
Flaps to Stabilator

Construction:
Wings Foam core
Balsa sheeting

Fuselage Epoxy glass

Stabilator Foam core
Balsa sheeting

Rudder Built up

Price: $179.50 + $6.00
Shipping

CAL SOAR

California residents add 6½% Sales tax

All kits are custom made.
Please allow 4 to 6 weeks for delivery.

CALIFORNIA SOARING PRODUCTS

P. O. BOX 367• TOPANGA, CA • 90290 (213) 455-2808

TIPPERON CONTROLLED SAILPLANE

A superbly smooth handling, responsive and stable aircraft with exceptionally wide speed range and aerobatic capabilities.

specifications:

Span	2 Meters
Wing area	723 Sq. In.
Aspect ratio	8.6 to 1
Wing loading	11 Oz./Sq. Ft.
Airfoil	Eppler 214

Control functions:
Tipperons
Rudder
Stabilator
Flaps 6°Neg. 80°Pos.
Releasable tow hook (optional)

Coupling:
Tipperons to Rudder
Flaps to Stabilator

Construction:
Wings Foam core
Balsa sheeting

Fuselage Epoxy glass

Tail feathers Built up

Price: $159.50 + $6.00
Shipping

Also available: **ACCIPITER CCX**
The original aileron version.
$149.50 + $6.00 Shipping

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All kits are custom made.
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KIT REVIEW BY DOUG KLASSEN

KIT: ASW 20 BY AMERICAN SAILPLANE DESIGNS
MFG. ADDRESS: 2626 CORONADO AVE., SAN DIEGO, CA. 92154

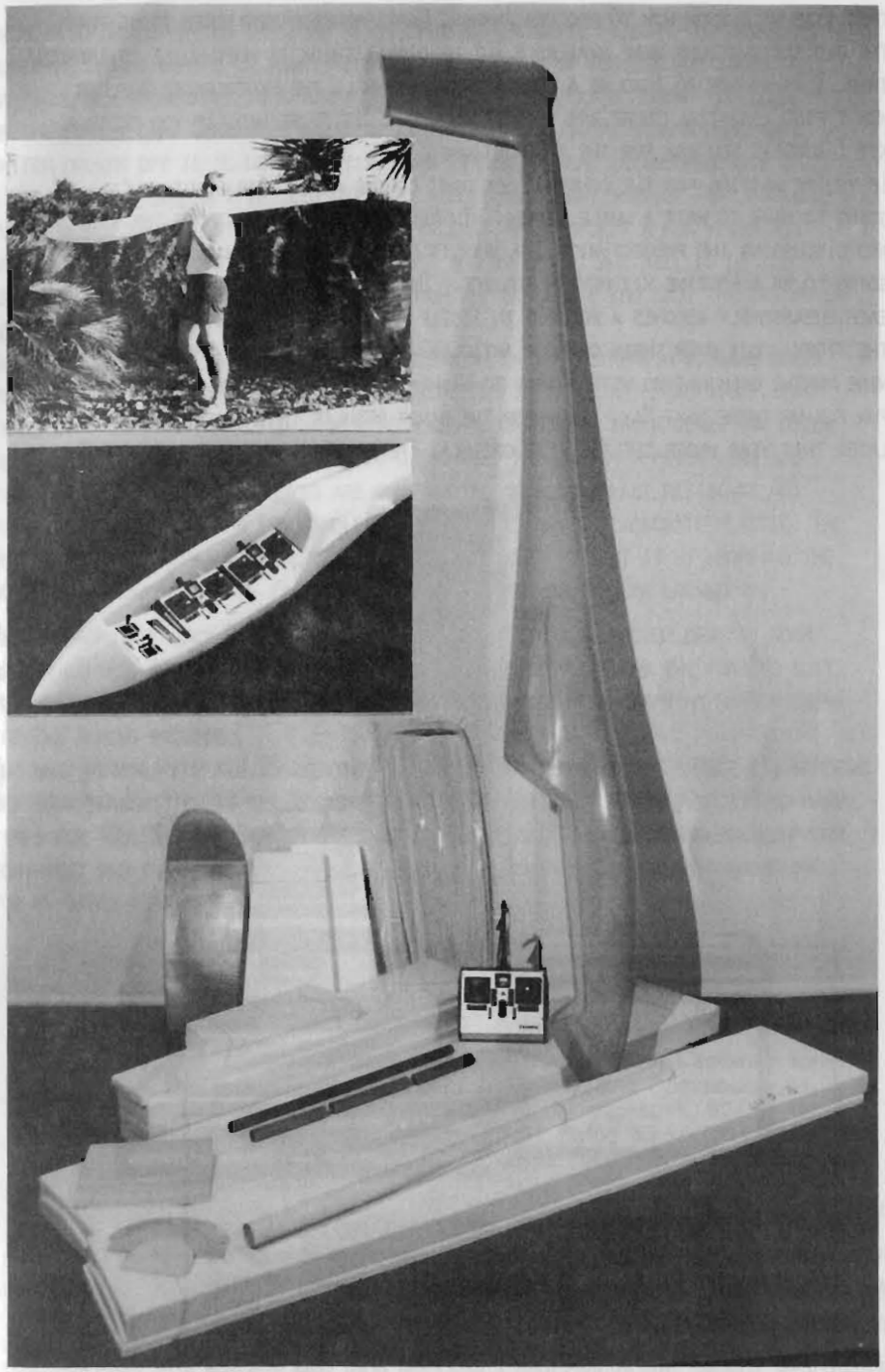
DESIGN: 1/3 SCALE REPLICA, FOAM CORE WINGS WITH EPOXY GLASS FUSELAGE,
CONTROLS: AILERONS, FLAPS, ELEVATOR, RUDDER, OPTIONAL SPOILERS AND RETRACT GEAR
WING AREA: 1793 SQ. IN.
WING SPAN: 192 INCHES
FUSELAGE LENGTH: 96 INCHES
SUGGESTED RETAIL: $275. (SEMI-KIT) $675. (DELUXE KIT)
ESTIMATED FLYING WEIGHT: 15LB 14OZ

I'M IMPRESSED. I DON'T MEAN I'M IMPRESSED LIKE "GEE, THAT'S NEAT" I MEAN I'M IMPRESSED LIKE "OH MY GOSH, I'VE GOT TO BUILD THIS MONSTER!" I'VE BEEN AROUND MODELING OF ONE SORT ANOTHER ALL MY LIFE AND MIXED UP IN R/C FOR ABOUT 11 YEARS SO I DON'T USUALLY GET TOO WOUND UP ABOUT A KIT, BUT THE 1/3 SCALE ASW 20 FROM GARY ANDERSON AT AMERICAN SAILPLANE DESIGNS REALLY GOT ME EXCITED.

BELOVED RCSD PUBLISHER JIM GRAY CALLED ME FROM HIS MOUNTAIN TOP ESTATE IN PAYSON, AZ AND ASKED ME IF I WOULD MIND PICKING UP A KIT THAT GARY ANDERSON WAS SENDING HIM FOR A KIT REVIEW. "NO PROBLEM" SAYS I. I JUST GOT MY NEW STATION WAGON AND EVEN THOUGH JG TOLD ME IT WAS A BIG BOX I FIGURED IT COULD'NT BE THAT BIG. WRONG! IT'S THAT BIG. THE GUY BEHIND THE COUNTER AT THE AIRFREIGHT OFFICE ASKED ME WHEN I SHOWED UP: "YOU GOT SOMETHING BIG TO HAUL THIS IN?" WELL FRIENDS, I FLIPPED THE PASSENGER SEAT FORWARD, THEN I FLIPPED THE FRONT PASSENGER SEAT FORWARD. THEN I SET ONE END OF THE BOX ON THE DASHBOARD; THE OTHER END STILL HUNG OUT THE BACK! WE'RE TALKING BIG.

WHEN I GOT HOME I PROCEEDED TO UNPACK THE KIT (ACTUALLY WE GOT A SEMI-KIT). OPENING THE END OF THE BOX THE NOSE OF THE FUSELAGE LOOMED LIKE SOME GREAT WHITE SHARK ABOUT TO DEVOUR MY WORKSHOP. I LATCHED ONTO TO NOSE AND BEGAN PULLING AND WALKING. FUSELAGE JUST KEPT COMING OUT AND COMING OUT AND COMING OUT. !NBELEIVABLE. GARY ANDERSON HAD TOLD ME THAT THE ASW 20 WAS THE LARGEST MODEL KIT MADE IN AMERICA AND NOW I BELIEVED HIM. THIS IS THE LARGEST, MOST IMPRESSIVE PIECE OF MODEL SAILPLANE GLASSWORK I'VE EVER SEEN. OTHERS WHO HAVE SEEN IT READILY ACKNOWLEDGE THE SAME. THE FACT IS THAT ANY PICTURES YOU MAY HAVE SEEN OF IT SIMPLY DON'T DO THE PLANE JUSTICE. THE FUSE ALONE IS WORTH THE ASKING PRICE OF $275.

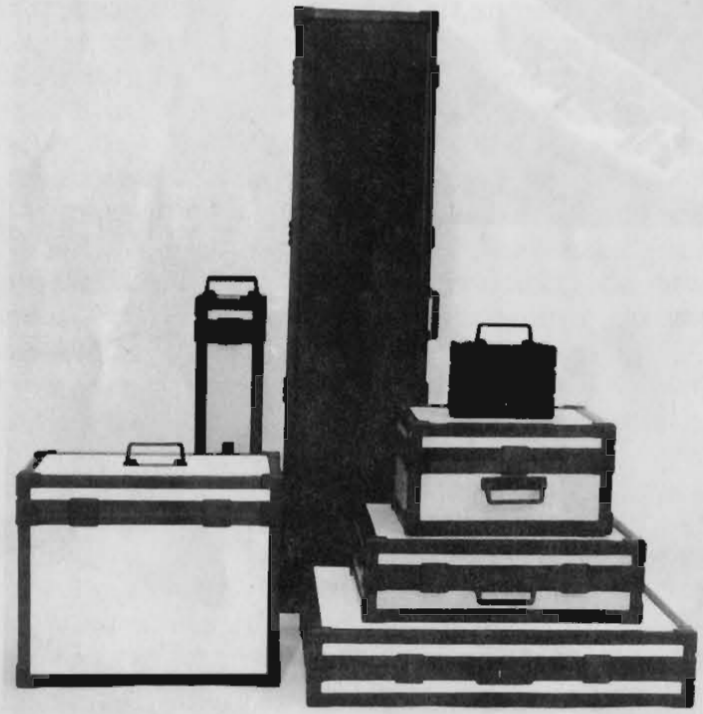
ALSO INCLUDED IN THE SEMI-KIT IS A MOUNTAIN OF NICE WING CORES CUT FROM WHITE FOAM, A CANOPY BIG ENOUGH TO USE AS A GREENHOUSE, AN EXPOXY GLASS CANOPY TRAY (NICE TOUCH), FOAM STAB AND RUDDER CORES, SOME LIGHT-PLY BULKHEADS FOR THE FUSE, A LENGTH OF 3/4" DIAMETER 4130 CHROMOLY TUBING (THE WING ROD TO YOU BUILDERS OF TINY GLIDERS), 3 PIECES OF 7/8" ALUMINUM TUBING (WING ROD TUBES) AND ONE SHEET OF ROLLED PLANS. THE QUALITY OF EVERYTHING IS FIRST RATE EXCEPT THE PLANS WHICH ARE A BIT DATED. IN CASE YOU DIDN'T RECOGNIZE IT THIS IS THE SAME KIT ORIGNALLY PRODUCED BY MARK SMITH AT MARK'S MODELS (NOW DYNAFLIGHT) A FEW YEARS AGO AND THE PLANS ARE MARK'S ORIGINAL DRAWINGS. NO WRITTEN INSTRUCTIONS ARE INCLUDED WITH THE KIT ON THE PREMISE THAT ANYONE WILLING TO TACKLE A PROJECT



Did they say **Semi-kit**? ASW kit features 192" of foam wings, stabs and rudder, a big clear canopy and a glass tray, also ply bulkheads, wing rod set and 96 inches of fuselage. **Top Inset:** No,this is not an ivory poacher,but rather our intrepid builder Doug contemplating hand launching his ASW. **Bottom Inset:** Standard Radio gear is no problem !

THIS SIZE WILL KNOW HOW TO PROCEED ANYWAY. GARY ANDERSON MENTIONED TO ME THAT THE OLD INSTRUCTIONS WERE AVAILABLE BUT HE DIDN'T THINK IT WORTHWHILE TO INCLUDE THEM. I ASKED HIM TO SEND ME A COPY ANYWAY AND WHILE THE EXPERIENCED BUILDER WON'T FIND THEM ESSENTIAL THERE ARE SOME USEFUL COMMENTS TO BE HAD. IF YOU ORDER A KIT I SUGGEST YOU ASK FOR THE INSTRUCTIONS.

IF YOU'RE WAITING FOR THE CONSTRUCTION PART OF THE ARTICLE TO START YOU'RE GOING TO HAVE TO WAIT A WHILE LONGER. IN REVIEWING THE CONTENTS OF THE KIT AND DISCUSSING THE PROJECT WITH JIM GRAY IT BECAME APPARENT THAT THIS WAS NOT GOING TO BE A ROUTINE KIT REVIEW PROJECT. BECAUSE OF THE SHEAR SIZE OF THE GLIDER EACH SUBASSEMBLY BECOMES A PROJECT IN ITSELF AND SO WE HAVE DECIDED TO SPREAD THE STORY OUT OVER THREE OR FOUR ARTICLES IN THE COURSE OF THE NEXT EIGHT OR NINE MONTHS CULMINATING WITH A TRIP TO WASHINGTON FOR THE SCALE SLOPE SOARING FUN FLY UP THERE NEXT MAY. LOOK FOR THE FIRST REGULAR INSTALLMENT IN THE SERIES LATER THIS YEAR UNDER THE TITLE: "GODZILLA: THE GLIDER THAT ATE MY WORKSHOP".



PRODUCT REVIEW BY DOUG KLASSEN

PRODUCT: "SPACECASE" BY MATRIX ENTERPRISES, INC.
MFG. ADDRESS: 7015 CARROLL ROAD, SAN DIEGO, CA. 92121
TELEPHONE: 619/450-9509

RECENTLY RC SOARING DIGEST RECEIVED A BOX FROM ALAN BERG AND THE NICE PEOPLE AT MATRIX ENTERPRISES. IN THE BOX WAS ANOTHER BOX, SPECIFICALLY A SPACECASE # SC-2024 WHICH HAS BEEN DESIGNED BY MATRIX AS A TRANSMITTER CARRYING CASE. FOR MOST R/C ENTHUSIASTS TRANSPORTING THEIR TRANSMITTER SAFELY IS AS MUCH A PROBLEM AS TRANSPORTING THE LONG WINGS OF THEIR FAVORITE GLIDER. THE NEWER SUPER-WHIZ-BANG RADIOS OF TODAY WITH THEIR MULTITUDE OF TOGGLES AND KNOBS ARE PARTICULARLY VULNERABLE TO EXTERNAL DAMAGE IF LEFT TO SLIDE AROUND THE TRUNK OF THE FAMILY CAR. CERTAINLY ARRIVING AT THE FIELD OR SLOPE WITH A DUAL RATE SWITCH BROKEN OFF IS NO LESS ANNOYING THAN FINDING A SNAG IN THE MONOKOTE OF A WING. ODDLY ENOUGH I'VE SEEN VERY FEW PILOTS USING ANY SORT OF REAL PROTECTIVE CASE FOR THEIR RADIO GEAR. TRANSMITTER BAGS WERE POPULAR A FEW YEARS AGO AND DO A TOLERABLE JOB OF KEEPING THE DUST AND ROCKS OUT BUT WILL DO LITTLE TO KEEP THE STICKS FROM BE JAMBED BACK THROUGH THE GIMBLE IF YOU DROP THE BAG WHILE LOADING OR UNLOADING.

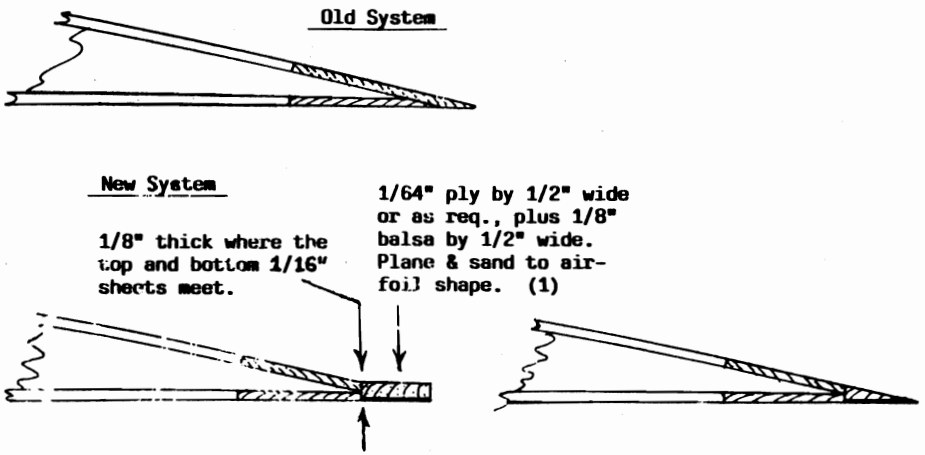
BASICALLY SPACECASE IS A COMPLETE LINE OF HIGH STRENGTH STORAGE BOXES FOR EVERYTHING FROM TRANSMITTERS TO HELICOPETERS TO MODEL RAILROAD STUFF. LAST YEARS U.S. SOARING TEAM USED SPACECASE BOXES TO TRANSPORT THEIR GEAR. BOX SIZES RANGE FROM 90 CUBIC INCHES TO OVER 10 CUBIC FEET AND CUSTOM APPLICATIONS ARE AVAILBLE FROM MATRIX. THE BOXES ARE CONSTRUCTED OF HIGH IMPACT RESISTANT ABS PLASTIC WITH THE LATCHES AND HANDLE MOLDED FROM LEXAN POLYCARBONATE PLASTIC. THE ONE WE RECEIVED APPEARS TO BE VERY DURABLE. I WANTED TO TEST IT BY DROPPING THE BOX WITH A TRANSMITTER IN IT BUT JIM GRAY KEEPS HIS RADIO GEAR LOCKED UP.

WERE APPROPRIATE EACH SPACECASE COMES WITH A SELECTION OF MEDIUM DENSITY FOAM RUBBER LINING. A FEW MINUTES WITH A RAZOR BLADE CUSTOM TAILORS THE FOAM TO SUIT YOUR TRANSMITTER AND THEN ALL THAT'S LEFT IS TO ATTACH THE CARRYING HANDLE USING THE TWO SCREWS PROVIDED.

THE UNIT RETAILS FOR $29.95 AND THAT'S NOT INEXPENSIVE. BUT LET'S FACE IT, SENDING OFF YOUR TRANSMITTER TO GET IT REPAIRED ISN'T CHEAP AND YOU CAN'T DO IT TOO MANY TIMES FOR $29.95. THE SPACECASE IS A WORTHWHILE ADDITION TO YOUR FLIGHT SUPPORT EQUIPMENT AND THE BEST THING I CAN SAY ABOUT IT IS THAT I'M GOING TO ORDER ONE FOR MY OTHER TRANSMITTER.

TRAILING EDGES AND STABILIZER HORN BEARINGS.....Leon Kincaid *

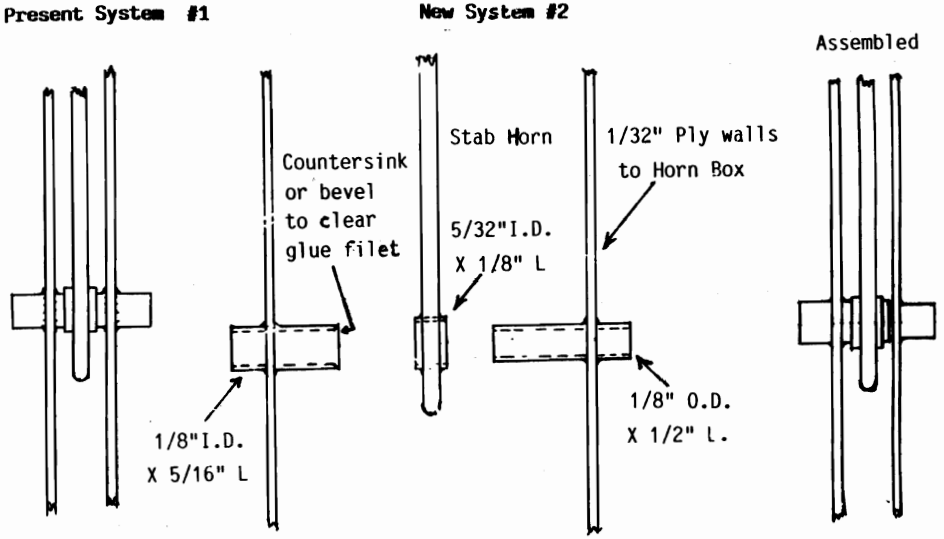
Leon Kincaid certainly doesn't need an introduction to most RCSD readers, but for those who don't know Leon, his famous SCOOTER designs speak for him. In this issue, he talks about (very little) and shows (a lot) about how to make those nice sharp trailing edges and non-wobbly stabilizer attachments. If you wish to correspond with Leon, his address is at the end of this article. (*)



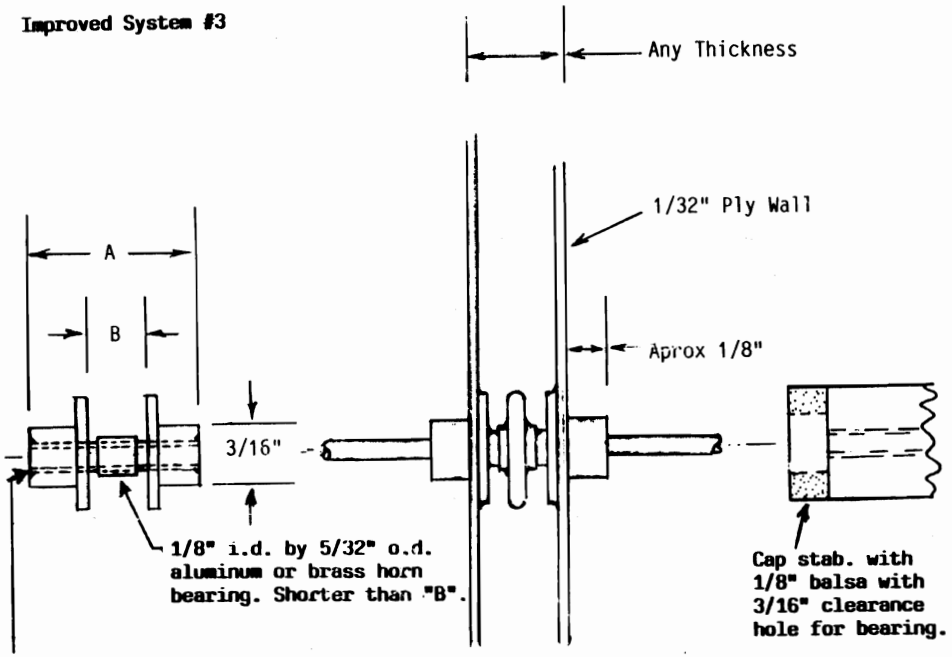
Note: Use epoxy, ply and balsa for best results- no warp. Add to wing with epoxy or CA. Line up bottom surface to add extension to T.E. Works super on 3/4" wide T.E. for hand launch gliders. Make thickness as required. My 8% H.L.G. wing has 1/64" ply, 1/8" balsa, 3/4" wide. Must notch for ribs.

(1). Width of ply-and-balsa extension. Depends on the thickness and angle of top and bottom camber of the airfoil you are using.

Stabilizer Horn Bearings



Telescoping tubes- Simple, Low cost-Impossible to glue horn during assembly.



3/32" i.d. x 1/8" o.d. brass tube, same length as "A". Flare ends slightly with center punch to hold in place. May be epoxied.

Note: For best results and fit, I recommend using K & S tubing and SIG music wire. SIG wire has slightly larger o.d.

* Leon Kincaid 1971 Groveland Road, Palm Harbor, Florida 34683.

IS THERE A BETTER WAY TO INSTALL WING SPARS?.....George Voss*

* 1403 Lincolnshire Road, Oklahoma City, OK 73159-7709

After taking a few engineering courses, I've begun to question the reason for installing wing spars in the direction shown by most designers. Figure 1 shows the method used in the majority of airplane and sailplane models. Figure 2 shows a much stronger (in flexure) method. Using standard engineering information, the "upright" method yields a spar system **4 times stronger** than shown in Figure 1. (ed. note: for the same spar cross-section area).

My next thought is actually a continuation of the first: attachment of shear webs in relation to Figures 1 and 2. Using Figures 3, 4, and 5, the following gluing areas are noted. These values are based on 1/16" thick shear webs 3" long, and 1/8" x 1/4" spars. Note that Figure 5 has 4 times the gluing surface area of Figure 3.

While an "I" beam is, theoretically the strongest of monolithic structures, we are dealing with pieces of wood glued to each other...not single one-piece structures. Unless I'm WAY off base our wings should be constructed as in Figure 5. Assuming yu agree with me, I can sense your next thought: there isn't much area to overlap the sheeting/cap strips...and you're right...so I have a solution for that. Figure 6. shows spruce spars from Figure 5 with a balsa "I" for gluing the sheetng and cap strips to. This ought to give enough area to attach these to, and assure a strong joint.

Thanks for your time, and feel free to use this info/question in RCSD. It may make a good sequel to Ken Willard's downwind turn question. I'd be interested in knowing what the engineers have to say!

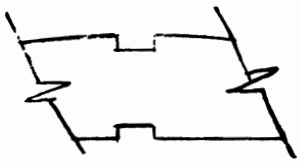


Figure 1
usual method

Figure 2
better method?

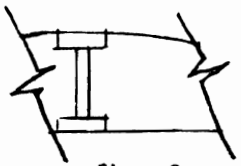


Figure 3
.375 in^2

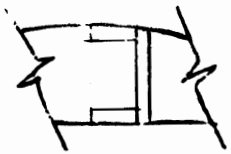


Figure 4
.75 in^2

Figure 5
1.5 in^2

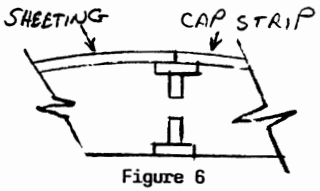


Figure 6
Best of All???