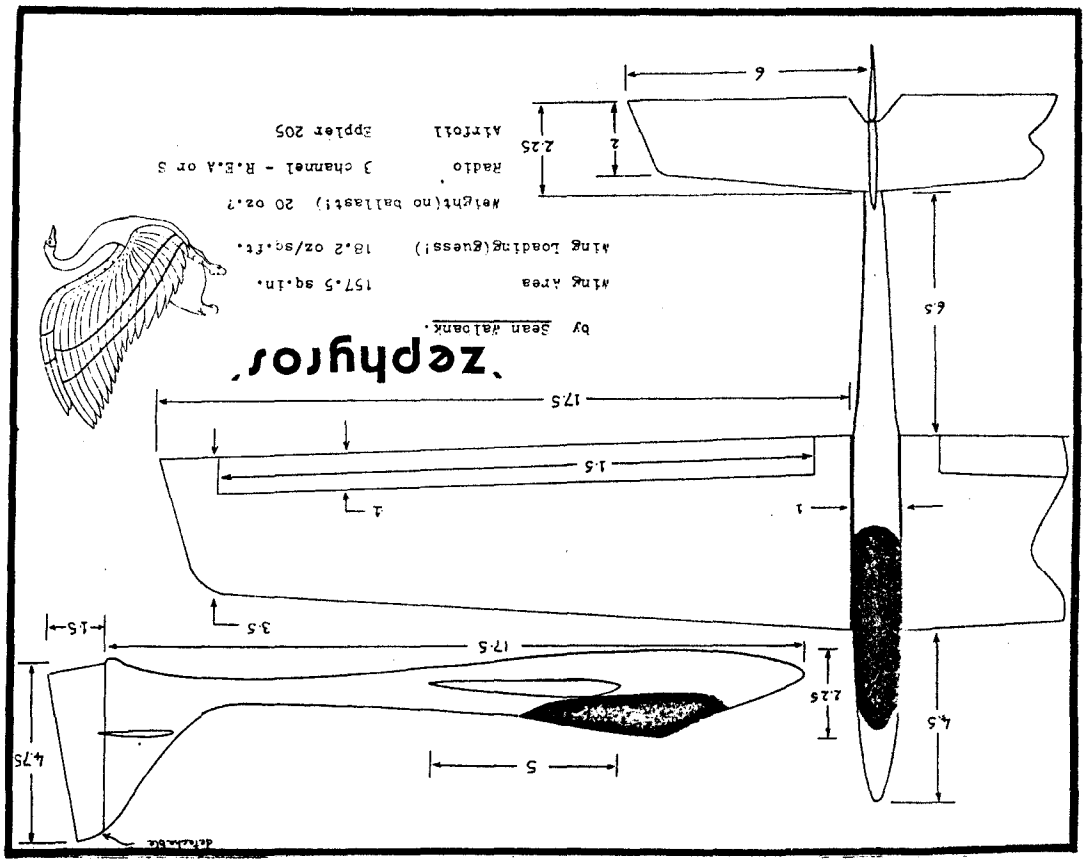
Soaring RC Digest

MAY 1984

VOLUME 1 NO. 5



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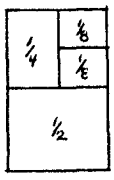

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RC Soaring Digest
P.O. Box 186
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HI START

This month's cover features 'ZEPHYROS' an aerobatic soarer by Sean (three-view) Walbank, editor and publisher of the White Sheet newsletter in England. Sean is a prolific designer and builder of fine soaring machines, a top-notch contest pilot, and a writer-compiler of soaring esoterica. You saw his Puffin in the April RCSD. Now, let Sean tell us about his newest creation.

"Please note, this design has not been built or flown(Yet!). At present it is just a design exercize which has come about in response to Chas Gardiner's plea in his column (Jan. 1984) for a small aerobatic glider that can be packed up into a box measuring 15 in. x 9 in. x 18 in. Obviously, to fit such a small package it would be beneficial if the model were to be capable of a breakdown into a number of smaller components. This, therefore, is the reason for the two-piece wings, an all-moving (therefore detachable) tailplane, and removeable rudder. Inevitably, a model of this size is going to have a fairly high wing loading, so I have chosen the ubiquitous Eppler 205 for the airfoil. Personal experience has shown that this section offers a very reasonable aerobatic performance whilst it also retains the ability to 'scratch' in lighter conditions. This leads on to the next logical development...a four-piece, lightweight, polyhedral wing, using the same section (about 60" span seems right) which could also fit into the box and so offer the ability to fly in a wide range of conditions. This dual role necessitates using three servos, as rudder is rather necessary on a polyhedral floater. With a little bit of ingenuity (and a bit of help from the servo-reversing facility on the Tx) the aileron servo could easily double as a spoiler servo for the R/E variant. (Please carefully note that Sean suggests 2 wings...JHG).

"The fuselage outline owes most of its lines to the French 'Axel' aerobatic soarer. Clubmate and RM columnist Keith Thomas has one of these, and I have to admit that I love its looks! Besides which, the extra depth at the canopy outline provides valuable additional space in which to fit the servos. I did toy with the idea of a pivotting wing but decided against it, as it would have prevented using the servo for spoilers.

"There you have it. Having got this far, I may even get around to building it. If anyone fancies a go, feel free; I'd love to hear about it! I think I would start off with the C of G in a safe position of about 33% and then play around with it from there. I reckon you should be able to build the model using conventional structure in the 20 oz. regipn, and this would give a wing loading of approximately 18 oz./sq. ft. If you can, on the other hand, manage to keep the weight down to 16 oz., then it would be possible to achieve a very satisfactory wing loading of about 14 oz./sq. ft. Being the heavy-handed builder that I am, however, I fear that my attempt would be nearer the 20-oz. mark. Now you see why I have made plans for a second set of wings!

"The name? Well, as any good Greek scholar knows (Chas' holiday in Greece having prompted the design exercize in the first place) 'ZEPHYROS' was the West Wind. Apparently he used to travel around the countryside in the guise of a swan (hence the term 'swanning about'!) and, anyway, West is a good direction on my local slope. If you are one of those who feels that no model is complete without a pilot, then a gentleman called Hyakinthos is your obvious choice since Zephyros is known to have given him a lift in his guise as a swan...and, anyway, everyone knows that you have to be a bit of a Spartan to go slope soaring!"

*** ***

I hope that someone will try Sean's design and let me know how it flies. I'll pass it on to Sean and to the rest of our subscribers.

Happy Soaring

Jim Gray
Editor and Publisher

WHAT KIT SHOULD I BUY?

by Charlie Spear*

As a professional photographer, I'm often asked: "What camera should I buy?" Usually, my answer is: "Buy the very best camera you can afford!" There is a certain amount of pride in owning a nice camera, and -generally speaking- a better camera will usually take better pictures.

As an experienced sailplane pilot, I'm frequently asked: "What kit should I buy?" The analogy is very similar...buy the best kit you can afford.

Let us look at a sailplane kit from an economic standpoint. A kit manufacturer, being an individual or a large company, calculates costs, which may include all materials, outside purchases, accessories, printing, packaging, and advertising...then adds a very small percentage (usually only 3% to 5%) for profit. A low-priced kit generally means that it was designed for mass marketing, and may sacrifice quality. On the other hand, a high-priced kit should be of high quality; but - because of a limited market - the manufacturer may be only trying to recover costs. I guess what I'm trying to say is that quality should be identified with price; or, to use the old adage: "You get what you pay for." Not all high-priced kits are of good quality, and not all low-priced kits are of poor quality.

As with a fine camera, there is a certain amount of pride when a quality kit has been purchased. The parts usually fit so well together that it becomes a joy to assemble. A quality kit should contain all of the needed accessories. This means fewer trips to the hobby shop, and few additional expenses. Just the opposite may be true of a cheaper kit...all of which adds up to the fact that your proud ownership of a well-constructed sailplane cannot help but contribute to its flying proficiency.

Now, this does not mean that you should go out and buy an expensive camera and a high-priced sailplane kit at the same time! If you are a serious amateur photographer, go ahead and get one of the fancy 35 mm. jobs; but, if you only want to take snapshots, get one of those auto-winding, auto-focus, auto-shutter, auto-everything kind.

If you are tired of flying your old tired-but-true ship, and you have the experience, step up to a straight-wing design, complete with ailerons,flaps, and every other goodie in the book. BUT, don't do it if you don't have the experience! If you're now flying a trainer, just move up to the next stage. All we're trying to say is wath out for the quality of your next kit, and make sure it meets a high standard. Let your editor and publisher know if you are interested in seeing a series of articles in RCSD on a review of the various kits on the market. This type of review could also include such things as radios, winches, retrievers, and a whole line-up of accessories.

* Charlie Spear was editor of Sailplane, the NSS newsletter. He also was a regional V.P. of NSS, and successfully campaigned a LEGIONAIRE for many years. We welcome his experienced observations.

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TALESPINS ... ...LETTERS FROM READERS

From Kurt Rosner of Boulder, Colorado we received a letter that discusses the neat power glider by George Haycroft (Feb. '84 RCSD). Kurt also tells us some other things about scale, electrics, and other matters. Here's his comments.

"Dear Jim: When I saw your comments about George Haycroft's HP-21 powered glider in the February issue, I had to grab a pen and paper and put in my 2¢ worth on the subject of powered R/C gliders.

"If you happen to want an R/C aircraft that looks like an airplane, takes off, lands, and taxis like an airplane, performs neat aerobatics and goes up nicely in thermals, then you wind up with a scale or semi-scale model of a full-size powered glider, and hours of fun and satisfying flying.

"I got into this type of RC aircraft for the above reasons - not as a substitute for launching pure gliders by the usual methods.

"Electric power is the answer for glider-launching problems, like availability of sufficiently large fields for HI-STARTS and winches or winchophobia (fear of winches). Electric-powered gliders

TALE SPINS (continued)...

also seem to be opening an entirely new type of flying, as in F3E competition.

"BUT, if you have a model that looks like a GROB or a FOURNIER, or one of that ilk, then the quiet roar of a 4-stroke up front adds tremendously to the pleasure of flying the bird.

"My credentials for this burst of wisdom consist of an ASTRO-FLITE FOURNIER RF-4 that I built a couple of years ago to go with an OS Max .15 that I somehow acquired. (I am, after all, a glider pilot, and -yes, I know that the OS .15 is a 2-stroke).

"I threw away the ASTRO-FLITE instructions, modofied the be-jeepers out of the kit, and wound up with a sturdy bird with conventional tail-dragger landing gear, scale dihedral, and ailerons. Before I spun it in, wrecking the wing, I was getting 20-minute-plus flights on a four-ounce fuel tank, mixing full-throttle aerobatics with engine-idling thermal soaring, and still being able to taxi back to the pit area at the end of that time. The only sour note was the scream of that 2-stroke engine.

"The remains sat on a shelf until the HP-21 was announced. (I have been busy with SAGITTAs and such). Now, I'm completing a foam wing for the RF-4, with flaps, ailerons, and one of the 'sophisticated' airfoils, of seven-foot span. The kit RF-4 had a six-foot span, and didn't look enough like a sailplane wing to suit me (or some of my glider-flying friends). Of course I have a nice, shiny HP-21 all broken in, ready to power this dream bird, with a 2-ounce fuel tank to provide the same flight times as before!

"Nothing in life is perfect: where do you fly a bird like this? My R/C glider club, the Rocky Mountain Soaring Association, does not allow engine power at our field, except for a rare demo of R/C aero towing. (I fully agree with this policy). The local power field is glopped up with screaming flying buzz saws being flung aimlessly about the sky...who WANTS to fly a murmuring, graceful, powered glider under those conditions? I have to, but I'm not happy with it.

"Radio info on the near-FOURNIER: I bought an Airtronics Championship system so I would have electronically-coupled aileron-rudder, plus all of the other wonderful adjustment capabilities. For the new, flapped version, I'll have the elevator/flaps mixing module in the transmitter. Bells & whistles? Sure, I love 'em. Thanks for listening and good luck with the 'news;etter.' (signed) Kurt Rosner, Sugar Loaf Star Route, Boulder, Colorado 80302."

Kurt, it's always a pleasure to get a letter like yours, for sveral reasons. First, it makes me realize how lucky I am to be able to fly what I want and where I want it, with a minimum of rules and regulations...or interference from anyone. Second, it points up real and ever-increasing problems and restrictions for pilots of RC craft everywhere. What are we to do about fields? About noise? About irate owners of land? About the sharing of power and pure soaring flight? Etc. etc. There aren't any totally satisfactory answers, but there are directions we can be thinking about. As unsatisfactory as electrics may be to the "purist" sailplane pilot, or even to the guy who loves the scream of a Schnule-ported .40, we;re going to have to have some answers SOON. Your letter tells us how one guy gets by and still enjoys life. I hope others will tell us about their solutions, too.

Boy, I thought we had settled that turnaround suggestion once and for all, but NO! Here's another viewpoint from C.A. Dews, Jr. of Hampton, Virginia, relative to the suggestion of a bike-wheel.

"...I can't imagine having to carry the size and weight of a turnaround like that 300 yards or so. Then, how are you going to hold it in the ground? The moment arm would be 12" or so...and think what the pull would be for a 10-pound, three-meter ship in a stiff wind. You would have to use a telephone pole to hold it down. (okay, I might just do that...JHG...heh, heh)

"Also, I think it would be quite a trick to keep the line on the rim. We usually use our launch system until the wind is about 30 degrees or so off to the side, and then it isn't much fun to launch. You will also have an occasional fellow who gets offline and stays that way all the way to the top. There is nothing like a fouled turnaround to make your day!

"Vernon Saunders and I made our own turnaround, winch, and retriever, and have it working darned near perfect. I should think you would keep the bicycle wheel for a retriever, and forget it for the turnaround. (okay, okay, guys; it's forgotten!)

MORE TALESPINS...

"Now, some thoughts about our winch, if I may. The winch has a Lucas 12-volt, 4-pole starter motor with homemade aluminum drum, mounted on an aluminum frame with battery, wheels, and push handle that folds down. Foot switches plug in for 'fast' and 'slow' and, of course, a big knife switch to kill the power if a solenoid hangs up. We use a cam-over bicycle brake pad for F3B-legal and anti-backlash, and a hand-operated bicycle brake pad to stop the drum on retrieve. That drum really hums when the retriever is going.

"The retriever is a 17" spoked bicycle wheel on a wood frame complete with a homemade pickup, and powered with a 12-volt power-winch motor of the kind used to pull boats on to trailers. This is geared down 5:1, but it still takes only about 15 seconds to get the line back. Plenty of power in this motor. We use 600 yeards of 30-pound line on the retriever because of the billow on a windy day.

"The winch turnaround is a 2"-diameter spool with a slight 'V' towards the center, and the ends are recessed into the side plates to keep the line from getting caught. It sits about 4" off the ground, and we use an 18" rod to stake it down. Even this rod will work loose in soft ground, but we've never had it come out yet.

"To recap about the turnaround: we would say to keep it small, keep it low to the ground, and check the bearings once in awhile... and you shouldn't have any trouble, even with a big ship.

"Keep up the good work. RC Soaring Digest shows real promise, and we sure could use tips from other places. Very truly yours, (signed) C.A. Dews, Jr. and Vernon W. Saunders."

Thanks a lot, boys, for the fine info and for sharing the experience you've had with home-made launching systems. We can all learn from tips like yours. Write again.

***

1984 NATIONALS - "THE NATS"

Most of you already know that the "Nats" will be held in Reno, Nevada this year. Toss-Up, newsletter of the Thousand Oaks Soaring Society, edited by Art Ames, had this to say in the February issue: "Dates - August 5th thru 12th; RC Soaring will be held on grazing land, similar to the Free Flight site, with plenty of room in all directions for winches. Plans callfor more days of NATS week for the Soaring events. RC Helicopters will be flown on a separate site, with as much time as they need. Aerobatics, Pylon Racing, and Scale will share the north-south runway of Stead airport, a world-class site."

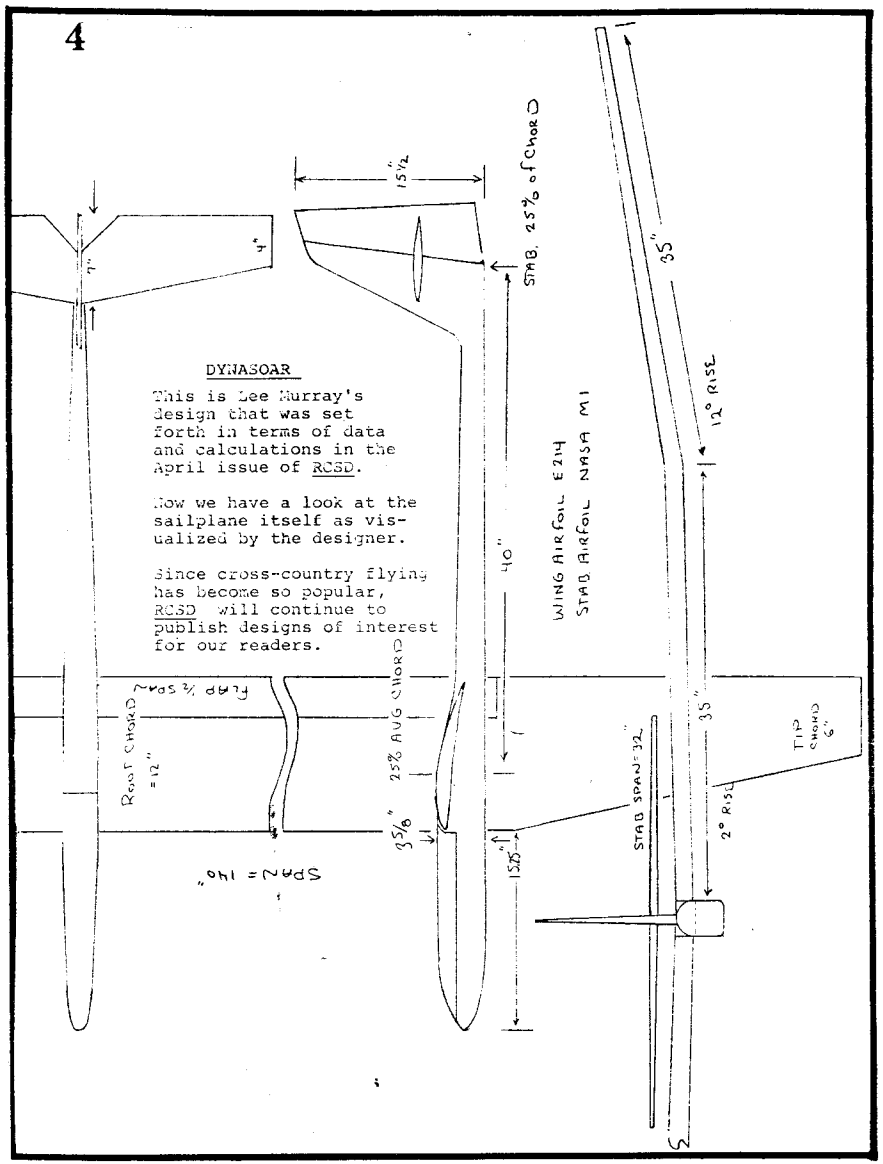
"Call or write AMA Headquarters NOW for ROOM RESERVATION INFORMATION. Special rates are available for AMA members and their families. Call (703) 435-0750 or write AMA Headquarters, 1810 Samuel Morse Drive, Reston, VA 22090."

This release is excerpted from the AMA release. There was much more, but this was the gist for glider guiders. Incidentally, you should know that the grazing land was described as follows: "There are literally miles of chasing and retrieving room (for Free Flight, but applicable to RC Soaring, too...JHG). You will be flying on a huge pasture ranch, with thousands of acres of grass - no trees, no brush, no corn, no canyons..."

Sounds pretty darned good to me. Hope the weather is good, too, but that's one thing the organizers can only pray for. It ought to be a lot of fun. By the way, there's a rumor about that the 1985 NATS may return to Chicopee, Massachusetts where they were held in 1983, and I had to miss 'em, darn it! Maybe '85 will be different, and I'll see you there. Sure hope so.

VINTAGE SAILPLANE ASSOCIATION

For those interested in 'old-time' sailplanes, the Vintage Sailplane Association (division of the Soaring Society of America) is for you. Their publication BUNGEE CORD comes out four times each year, and each issue is jam-packed with information about early sailplanes...usually written by someone who actually worked on them and flew them, or by someone who has done some thorough research. Editor Jan Scott, Scott Airpark, Lovettsville, VA 22080 (703-822-5504) owns and flies eleven different vintage sailplanes! Secretary and archivist Bob Storck, 3103 Tudor Road, Waldorf, MD 20601, is deeply involved in building, flying, and researching vintage sailplanes. The 16-page BUNGEE CORD costs an incredibly low $8.00 per year.



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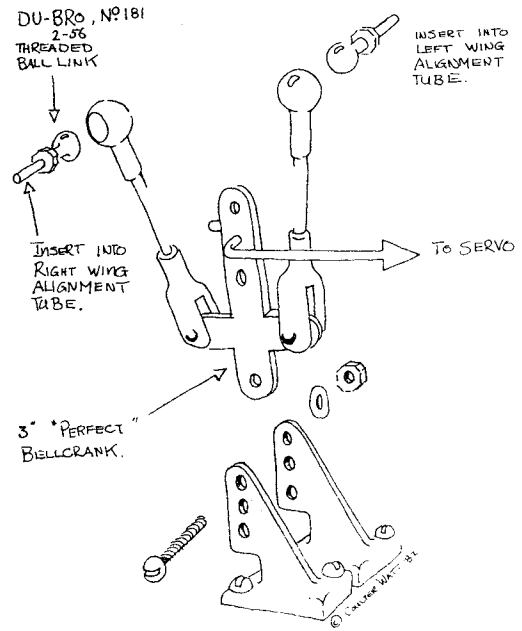


THE HAUFF TWIST

HERE IS A VERY SWEET, SIMPLE AND EFFECTIVE DESIGN FOR "WINGERONS." LENNY HAUFF OF THE LISF (LONG ISLAND SILENT FLYERS) DESIGNED THIS SYSTEM AND IS USING IT SUCCESSFULLY IN HIS FLAT-WINGED SAGITTA AND MINI BIRD OF TIME.

THE MODIFICATIONS TO THE SAILPLANE ARE VERY EASY. YOU ELIMINATE THE ALIGNMENT TUBE IN THE FUSELAGE, AND CUT A SMALL VERTICAL CHANNEL FOR THE BALL LINK TO MOVE IN. THE 'THROW' MEASURED AT THE TRAILING EDGE OF THE WING IS +/- 3/16". THAT AMOUNT OF MOVEMENT WILL GIVE YOU A HEALTHY ROLL RATE.

I WOULD ADD ONE ITEM TO THIS SYSTEM IF YOU INSTALL IT INTO A SAGITTA: THE VERTICAL CHANNEL CUTS INTO THE FUSELAGE LONGERON (1/8" x 1/4" SPRUCE) THEREBY MAKING A STRUCTURAL WEAK POINT. ADD A SHORT PIECE OF 1/8" x 1/4" SPRUCE BELOW THE CHANNEL, RUNNING THE LENGTH OF THE COMPARTMENT.

This material was taken with the permission of Coulter Watt and Gordon Stratton from the Long Island Silent Flyer, newsletter of the club. We appreciate the opportunity to bring you these absolutely first-class drawings and suggestions from Coulter's talented pen.

Jim Gray

EFFECTS OF WING TIP SHAPE ON CLIMB PERFORMANCE OF GLIDERS

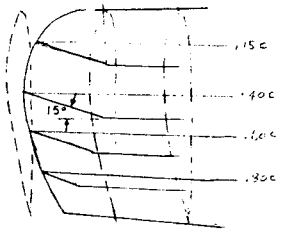
O.W. Nicks and D.B. Landrum presented the above paper (dated January 1984) during the Proceedings of the Fourth Annual Symposium on the Science and Technology of Low Speed and Motorless Flight, held in Hartford, Connecticut, in March 1984.*

The tests were conducted in a wind tunnel and employed a 1/7 scale high-wing monoplane.

Abstract

"Wind tunnel studies of a general aviation aircraft model have shown that significant improvements in climb performance can be achieved with tip shapes having sharp edges and unmodified upper airfoil contours (Ref. 1-3). The wing employed NACA 6-series airfoil sections and had an average aspect ratio of about 8. Based on tests of six configurations, a simply developed tip shape provided the best wing efficiency at high lift conditions. Test data for two configurations were extended to an aspect ratio of 23, allowing an estimation of the potential benefits to gliders. Results show possibilities for improvements in climb performance at high lift coefficients with a small drag penalty at high-speed conditions."

A full discussion of the test methods and measurements is beyond the scope of this Digest, but the results are extremely interesting and could well have some significance for improving the efficiency of RC Sailplane models in circling flight. The climb parameter used for calculations was the well-known $C_L^{3/2}/C_D$. C_L is the lift coefficient and C_D is the drag coefficient. When the climb parameter is plotted against the lift coefficient, a curve is obtained for each wing tip shape. Wing tip shape E2 was found to offer the most promise. Shape E2 is shown in the sketch below. This planform is achieved by a 15-degree inclined plane extending upwards from the bottom of the wing and intersecting the top surface in a sharp edge. The inclined plane is parallel to the airfoil section chord line at the tip, and the resulting tip shape is determined by the inclined plane.



WING TIP EXTENSION E2

WINGTIP SHAPE (continued)...

The tests were conducted at a Reynolds Number of 800,000 which represents a sailplane wing tip having a chord length of a foot-and-a-half. This is roughly ten times the expected Reynolds Number for the tip of an RC sailplane wing and, therefore, may not be applicable to our use. However, tip shape experiments have been conducted with RC sailplanes for many years, and each investigator has claimed that his tip shape is the best.

It is suggested that someone try these tips with a model glider and compare results with the other tips they may have used in the past. I, for one, would be very interested to see the results of a series of such tests.

Induced drag, that is the drag that is caused by the wing producing lift, is highest at low speeds (such as in circling flight). Induced drag is the result of airflow over the top of the wing having a higher speed than the airflow over the bottom of the wing. The air on the bottom tries to flow around the tip to meet the air flowing along the top, and produces tip vortexes; that is, funnel-shaped swirling flow of air that trails behind the wing. Aerodynamicists have tried to develop tip shapes that minimize the vortexes. Dr. Hoerner in his book Fluid Dynamic Drag gave some indications of tip shapes that would reduce the magnitude of the vortexes, and -since then- these shapes have become known as "Hoerner Tips." Independent studies made with various wing shapes and different types of aircraft have resulted in widely different reports of performance improvement. It appears that Hoerner tips do work on full-size airplanes and sailplanes, but may not work at all on model sailplanes or airplanes. It has been suggested that the apparent performance improvements on model aircraft have been more psychological than physical. Nevertheless, designers and builders have continually tried to reduce drag losses, seeking that extra edge in L/D that can spell the difference between a contest win or an 'also ran.' When you consider the fact that some contests are won by only a percentage point or two, it can be seen that this degree of improvement in overcoming drag could well separate a winner from the losers.

It seems important, then, that we try the Nicks-Landrum tip shape to see if it does, in fact, make any noticeable difference in our climbing performance in thermal flying. It is likely that pilot efficiency and technique in flying thermals will be far more noticeable than tip shape improvements, but it's worth a try.

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* Write to the Soaring Society of America, P.O. Box 66071, Los Angeles, CA 90066, for information about how to obtain copies of the Proceedings.

WINDSONG REVIEW: "...kits should be judged against a known standard..."

In the April Soaring Digest Bob Sealy reviewed the Dodgson designed and kitted WINDSONG. This month we have excerpts from a rebuttal by Bob Dodgson himself:

"...I believe that the model press has a responsibility to their public to critique kits fairly. The first prerequisite should be that the kits are constructed stock and that they are tested as such.

"The next point is that kits should be judged against a known standard...you represent the WINDSONG with a kit review saying that the W' can't be built stock and still be flown in serious competition, on the slope or do aerobatics because the wings need to be beefed up beyond the end of the standard 32" spar.

"...I saw 6 WINDSONGS entered in the (1983 Nationals) with four of them winning trophies. There were no structural failures among the WINDSONGS. All four of the winning WINDSONGS had no spar mods. In fact my WINDSONG (2nd place in Open Class) still has the original 24" spar raher than the now standard (since early 1983) 32" spar.

"...How is the soaring public being served...when you cast a cloud on the structural integrity of a ship that to my knowledge has never had an in-flight wing failure, beyond the spar end,with the 32" stock spar system? I have heard of only 2 failures with the old 24" spar out of the hundreds of kits sold, and these failures occurred under tow in unusual circumstances; i.e., the tow was so hard that the winch box was sliding down the field distracting the person running the winch pedal, getting his eyes off the plane, while another person was flying the glider. No failures have ever occurred in the Northwestern U.S. where more WINDSONG flight hours have been logged than anywhere else in the country.

"...Indeed, there is a serious question whether even the 32" spar is not a case of overdesign.

"Jim, if you are to serve the soaring public, you must select meaningful information to present...you cast a cloud of doubt over the structural integrity of a kit, advertised for thermal duration work which fact has shown is actually stronger than many ships advertised for FAI work.

"After 14 years in the design of high performance multichannel gliders, I feel that the WINDSONG is the pinnacle of performance in thermal duration competition. One reason why our WINDSONG is the best performing thermal duration glider in the world is because the WINDSONG has been designed to have each part very strong with no part wastefully overdesigned. This is why our gliders are the only solid-core wing gliders that have ever proven successful as floaters. In fact, the WINDSONG can even out float the best of the floaters.

"...My four years of structural engineering along with five years of design, drafting and presentation drawing in getting my architectural degree combined with 14 years of doing nothing but designing, flying and producing world class multichannel glider kits have all been focused into and utilized in the evolution of the WINDSONG design. It therefore disturbs me when structural modifications are recommended in a national publication with no checking out oftheir validity or need, and when I know that these mods are going to hurt the performance of the WINDSONGS built by eager souls who have faith in your publication, the very people you are trying to serve. Erroneous information (especially on a national scale) is worse than no information at all.

"By the way, enclosed is my $15 for a subscription to Soaring Digest. I wish you much success with this much-needed publication. Also being sent under separate cover for your information is a copy of our factory videotape which shows many WINDSONGS with standard spars in action. Take special note of the slope aerobatic sequences which were flown with my WINDSONG which still has the 24" long spars. Does this look like a plane that is not strong enough to be flown on the slope?

"...Thank you Jim, and good luck with the R/C Soaring Digest."

Sincerely, Bob Dodgson

While I did not reprint all of Bob's letter, I did set forth his main points. I left out other comments not directly related to the WINDSONG, and comments about other sailplanes which need not be a part of the discussion. Wherever you see an ellipsis (...) you will know that parts were left out. However, nothing was ommitted that changed Bob's meaning or the thrust of his argument. It is my own view that Bob's points are valid. I am equally sure that most WINDSONG builders will follow the plans and instructions to the letter. Bob Sealy had no intention of casting any doubts or aspersions on the WINDSONG design. He only wished to point out to us the modifications that he made to some of the ships he built for his own personal and particular reasons. He did not and does not suggest that all WINDSONG kits should be so modified, nor does he suggest in any way that the WINDSONG is weak or unsound.