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## FALCON 880

Designed by  
Mark Allen

Now Available!  
The New  
FALCON  
600

Specifications:  
Wing Span: 112"  
Avg. Wing Chord: 7.86"  
Wing Area: 880 Sq. In.  
Aspect Ratio: 14.25  
Airfoil: S3021-S3014  
Weight: 60 Oz.  
Wing Loading: 10 Oz./Sq. In.

Kit Features • One Piece Epoxy-Glass Fuse Reinforced with Kevlar  
• Pre-Fit Canopy • Full-Size Foam Core Beds Combined with Fiberglass  
(Makes a Strong, Sharp, Straight and Easy to Build Trailing Edge.)  
• Accurate Machine Cut Foam Cores Cut from 1.5 Lb. Virgin Foam

FALCON 880 Kit: \$195.00  
FALCON 880 Kit with  
Pre-Sheeted Wing: \$305.00  
(S&H not included)

### Proven in the Real World!

*"It's the best flying plane I've ever had. It's fast, it floats, it's easy to thermal. It's the easiest plane to fly of all that I've ever flown. It has no bad habits. It launches easily. I love the airplane. Everyone I know who has one loves it."*

Daryl Perkins, Winner of the 1989 Hans Wise Memorial Slope Race,  
PSC Sept. 1989 F3B, SWSA May 1990 Thermal Contest

*"The Falcon has been a major contributing factor to my success. Moving to the Falcon was a quantum leap in performance...Like night and day."*

Bob McGowan, Winner of 1989, 1990 Western States, 1990 Masters,  
'89 LSF NATS

*"It was circling almost like a polyhedral ship...This is the best spiral, stability I've ever seen in an aileron ship. There is no tendency to tip stall at all. Nice! I'm impressed."*

Bill Forrey, Soaring Editor for Model Builder

*"I've been flying my Falcon since January and can vouch for its sweet flying characteristics. It launches beautifully (both winch & hi-start), has a good speed range, and is very easy to fly. All-in-all, it's about the most fun I've had with a glider!"*

Byron Blakeslee, Soaring Editor for Model Aviation

February, 1991  
Vol. 8, No. 2

Soaring  
G F S T

### EHECATL

A Pancho Morris  
Design



"My latest EHECATL is 100' with 906 square inches and weighs at 78 oz. for a 12.4 oz./ft<sup>2</sup> wing loading"...Pancho  
Featured on page 8.



Bob Bayard's Sweltzer 1-26. Photo taken at  
the Flying Lady at Morgan Hill, California on  
August 5th.

Jerry Slates Photo

## Schedule of Special Events

Date	Event	Location	Contact
Feb. 17	2 Meter/Standard Unlimited - Snow Fly	Plymouth, MI	A. Slagle (313) 451-0730
Feb. 23-24	WRAM Show '91 (S.A.S.E. to: Ed Alexis, 21 Pamela Rd., Peekskill, N.Y. 10566)	White Plains, N.Y.	Adv. tickets
Mar. 2-3	Old Timers Thermal - Over 55	Fresno, CA	Ed Holder (209) 434-0502
Mar. 10	F3J Handtow	Dallas, TX	Gordon Jones (214) 840-8116
Mar. 22-23	3RD Annual Masters of Soaring	Covina, CA	P. Olsen (714) 597-2095
Apr. 27-28	2 Meter & Unlimited - Spring Soaring Festival	Pasadena, CA	B. Matsumoto (818) 798-1662
May 24-26	Slope Race Mid Columbia Cup	Richland, WA	Wil Byers (509) 627-5224
June 1-2	International Slope Race	Santa Maria, CA	Rich Beardsley (805) 934-3191
June 2	Hand Launch 8TH Annual	Riverside, CA (Call after 6:00)	Ian Douglas (714) 621-2522
June 8-9	Western Soaring Championships	Farmington, CA	A. Stonner (209) 878-3462 Day (209) 878-3078 Eve
July 6-7	Unlimited Thermal	Seattle, WA	Waid Reynolds (206) 772-0291
July 13-21	AMA NATS		
Aug. 10-11	Unlimited Thermal	Seattle, WA	Waid Reynolds (206) 772-0291
Sept. 14-15	TNT 2 Meter & Open	San Antonio, TX	A. Coher (512) 599-4031
Oct. 5-6	Visalia Fall Soaring Festival	Visalia, CA	Ed Hipp (209) 625-2352

### Mid Columbia Cup SLOPE SOARERS RACE

May 24 - 26, 1991, Richland, Washington

Min. \$2000 Cash Purse, Trophies & Prizes  
Entry Fee: \$80 U.S. - Pre-registration Required

Limited To First 50 Applicants

Tri City Soarers, Rt. 4 Box 9544,

W. Richland, WA 99352

John (509) 627-2603

Wil (509) 627-5224

Roy (509) 525-7066

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Gordon Jones, Wil Byers

## The Soaring Site

The number of entries to the Mid Columbia Cup Slope Soarers Race scheduled for May 24-26 in Richland, Washington is, as most of you know, limited to 50. According to Wil Byers, that number will be reached, soon. If you're planning on registering, don't put it off any longer. Special festivities scheduled include a BBQ for spectators and entrants. If you plan on attending as a spectator, the cost is \$3 per person. Unlike last year's fun fly, where banquet seating was limited, the BBQ should accommodate everyone. However, please contact Wil with the number in your party so that they can determine how much food they need.

Three registrations to the Washington event were made by Greg Lewis of England. The group is bringing all the gear necessary to put on a full F3F demonstration! It looks to be a learning experience, as well.

An international slope race has been scheduled for June 1-2 at Santa Maria, California, by the California Slope Racers. Several people have noted that the Washington and California races are only one week apart. According to Wil Byers, this is due to some good planning on the part of coordinators. When it was realized that there would be guests from other countries as entries to the Washington event, a coordinated effort began to ensure that they would enjoy their stay in the U.S.A. and have an opportunity to fly at more than one contest. Contact Rich Beardsley (805) 934-3191 for more info. on the Santa Maria Slope Race.

Happy Flying -- J<sup>3</sup>

R/C Soaring Digest  
P.O. Box 6680  
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(415) 689-0766



## Jer's Workbench On the Subject of Aero- Towing

Scale gliders take weeks putting together the documentation and drawing the plans. Locating all of the building materials and miscellaneous hardware items is not always easy. The covering detail must be done as authentically as possible with appropriate lettering, miscellaneous markings, hand holds and inspections plates. The cockpit is filled with a life-like pilot complete with sun glasses and a 5 point safety seat belt. The instrument panel has been painstakingly constructed. There is even a working, retractable mono wheel with doors that close. It has been balanced, trimmed and test flown. The model is complete. If you've built a scale glider and are looking for something more, have you considered

aero-towing? It isn't often that one has an opportunity to be a spectator when aero-towing is being done. So, when I happened across Don Meeks and Rick Meyers at the Los Banos Reservoir in Northern California, I not only stopped to watch, but found myself returning to take notes and query and observe the pilots on the process that they used. I've done a lot of reading on the subject and found that both applied all the techniques I had read about. It was obvious that they had been flying together for some time, because they made it look so easy!

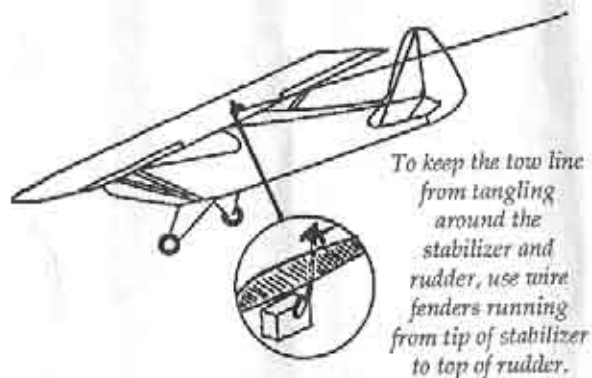
### What is aero-towing?

Aerotowing, when done correctly, is a beautiful sight to watch. Of course, it

requires two planes and two pilots to perform the tow. One plane is called a tow plane or tug plane. A 1/4 scale PA-18 or a Super Cub are two examples that come to mind. Whatever you choose, don't use a pattern type that can climb to the moon at 100 mph because it can rip the wings off of your glider!

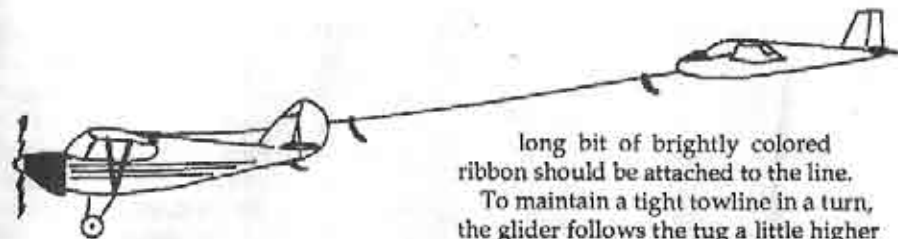
A high winged monoplane with plenty of power and that flies somewhat slow is a good choice for the tug. Keep in mind that 100% power is not required to maintain flight. 50-75% power should be sufficient to take off with a glider in tow.

The glider can be of the polywing ther-



To keep the tow line from tangling around the stabilizer and rudder, use wire fenders running from tip of stabilizer to top of rudder.

mal type or even be scale. It should have spoilers, however. Why? On tow the glider is going to roll only a few feet before it lifts off the ground and starts to climb. The ideal position of the glider is just a little above and behind the tug plane. If the glider climbs too high, the tug plane will become uncontrollable. Keeping in mind that the use of down elevator or down elevator trim in order to control the climb, will increase the airspeed and probably cause the glider to overtake the tug. If this occurs, the line goes slack and trouble occurs. To overcome this situation and control the climb, OPEN the spoilers about 25%-50% to start and keep the towline tight. (The spoilers may need to be open the entire time in tow.)



long bit of brightly colored ribbon should be attached to the line.

To maintain a tight towline in a turn, the glider follows the tug a little higher and outside or turns wider than the tug. In order to do this, the glider pilot and the tug pilot maintain a position where they can talk to each other while on tow. The tug pilot announces that he will start the turn and the glider pilot, with a little control, will drift to the left. This should put the glider in position to be high and outside, while following the tug into a right turn.

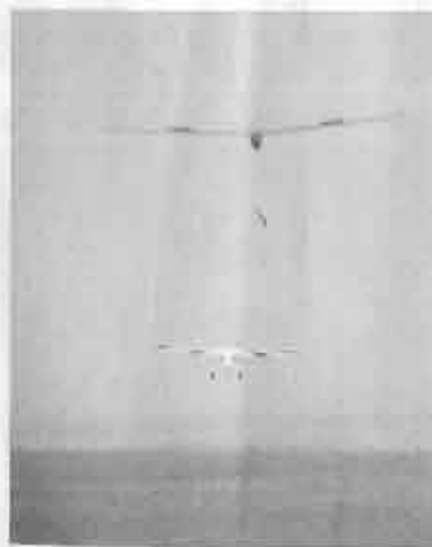
Once altitude is reached, the glider pilot will release the towline and call "CLEAR!" The tug turns and dives to the right while the glider turns to the left and begins a systematic pattern looking for thermals.

Prior to landing, the tug plane may want to do a fly-by and release the towline before landing. The condition of the flying field may dictate how the release is made. Trees and fences may snag the line if extreme care is not taken.

### Aero-towing at Los Banos

Let's put this all together and follow Rick Meyers of Hollister, California flying the 1/4 scale Schweitzer 1-26 and tug pilot Don Meeks of Salinas, California flying a 1/4 scale Citabria powered by a big Zenoh engine.

I watched as Rick carried his glider out to the runway and attached the towline to the glider. He checked the line to ensure that the release was working properly, and he seemed satisfied with the attachment. Then, Don started the motor on the tug plane and taxied the tug into position. He attached the other end of the line to his plane. He checked the towline release to make sure that everything was working properly. The two pi-



Glider on tow! Note the open spoilers.



Left — Don Meeks of Salinas, California is the pilot of the tug plane.

Right — Rick Meyers of Hollister, California is the glider pilot.

lots took their positions for take-off, and were close enough that they could speak to each other.

Don throttled up a bit, took the slack out of the line and stopped. Rick opened the spoilers on his glider about 25-50%. I took a deep breath as Rick told Don that he was ready to take-off. Don throttled up and, within a few feet of rollout, the glider lifted gently off the ground. While the tug plane did its job of towing in a straight line and gradually climbing for altitude the glider pilot worked the spoilers in order to control the climb. Don called for a 90° turn to the right, and Rick did a controlled drift to the left which put the glider in position to follow the tug through a right turn which was just a little higher and outside the turn of the tug. The towline was tight. After three or four turns, they were at approximately 500 feet. It was time to separate. Rick called "CLEAR" and simultaneously closed the spoilers. The towline was released and the glider turned to the left. The tug dove to the right and did a fly-by dropping the towline before landing.

They made it look so easy!  
**"First Step"**

John Clarke has finished his new video entitled "First Step". The tape contains many useful hints and tips on building techniques for the beginner. As John says, the tape does not show the actual step-by-step process of building a beginner's first sailplane, but rather provides a visual demonstration on some of the finer points that are not covered in the kit instruction manual. The video is available for \$19.95, plus \$3.50 S&H, from John Clarke, 911 Covert Avenue, New Hyde Park, New York 11040.

#### Model Plotting Software

Chuck Anderson has dropped me a line

*Schweizer 1-26B is built from Model Aviation plans #578.*



to let us know that he is working on a revision to his plot program and hopes to have it available in a couple of months. Chuck says, "I just had a complaint that the program will not run on some of the new MACs such as the IIsi. Microsoft has promised to send me an upgrade to MAC Quickbasic that will run on the newer MACs. I will send a free upgrade for those who have problems getting the program to run." Chuck Anderson can be reached at P.O. Box 305, Tullahoma, TN 37388; (615) 455-5788.

#### NSP 1991 Catalog

Stan Eames of NorthEast Sailplane Products has written to let us know that he expects to publish the 1991 NSP catalog in February. Stan says, "It will be larger than the current catalog, with more kits,

more articles, and tons of useful information. I've also completely redone the layout, making it easier to read and follow." Contact NorthEast Sailplane Products for more information at 16 Kirby Lane, Williston, VT 05495; (802) 658-9482.

#### A New Publication

We received a copy of a new quarterly publication for R/C enthusiasts who build scale models of full size craft. It is appropriately called *Scale* and is available from Verlag für Technik und Handwerk of Germany. The revolutionary graphic design of the magazine is not only beautifully done, but the editorial combines the topic of aeromodelling with the study of aviation history, as well. The cost is DM 9 per

copy at newsstands and hobby shops. The address for Verlag für Technik und Handwerk is Postfach 1128, D-7570 Baden-Baden, Germany. The text is, of course, in German, but the photos speak for themselves. If you can't find *Scale*, please let us know or write to the publisher.

*Sal Isilli, of New York, says, "The gliders in the photo are my 138" ASW-24 and in the background is the 1/3 scale Discus by Robin Lehman, which has a wingspan of 17 1/2' and*

*weighs 18 1/2 lbs. The two tow ships are 1/3 scale Laser and a 1/4 scale Curtis Robin with a Zenoa .62 engine, which gets the 1/3 scale Discus aloft effortlessly." (Aerotowing is done on the east end of Long Island.)*

*The 1/3 scale Discus by Robin Lehman. Photos courtesy of Sal Isilli.*



## On The Wing

...by B<sup>2</sup>

*We've been writing this column for over two years now, and have received an immense amount of mail during that time. Each and every letter received has been answered, and we've enjoyed the whole process tremendously. Many ideas for this column have been derived from readers' questions, and we wish to thank everyone for their positive comments, and ideas. Your interest and enthusiasm is very much appreciated.*

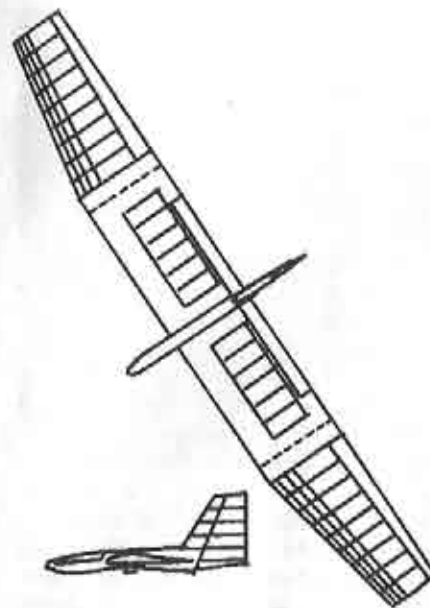
While many readers have written asking for airfoil data, computer programs, and current sources of flying wing information (hopefully in English rather than German), the most frequent request is for our suggestions regarding a first tailless sailplane.

Those who want to try a tailless sailplane have various motives. Some want a glider that's easily built, fun to fly, and a bit different than what's normally seen at the flying field. Others want to start construction of a flock of 'wings for competition because they believe that this is the best method of achieving a particular set of goals. One fellow wrote and said that his intention was to go through the whole League of Silent Flight program using only tailless designs! Since the majority have built kits and feel confident that a scratch built 'wing will not pose a difficulty, we normally suggest one of two gliders which are available as full sized plans. The main determining factor in making our recommendation is the experience of the builder. If the individual has been building, flying, and enjoying rudder and elevator type gliders, then we suggest Dave Jones' Raven. If the writer has experience with aileron sailplanes, then we recommend Dave's Blackbird 2M. This month we'll discuss the Raven; a description of the Blackbird

2M will follow next month.

The Raven is a plank design that comes in several versions. There's a Mini-Raven of 78" span at the smaller end of the scale, and a Raven-Super with a 124" span at the larger end. Our choice is the Raven version published in *Model Builder* magazine some years ago. It has a span of 110" and a very nice streamlined fuselage. The *Model Builder* Raven fuselage provides a snug fit for a 500mah battery pack, receiver, and the two standard size servos. Control is by rudder and central elevator. The wing is in three sections, with the center section being permanently attached to the fuselage. This means that the two servos in the fuselage can always remain connected to their respective control surfaces. The outer wing panels include the dihedral breaks and are of very light construction so that turns are not inhibited by unnecessary inertia. Construction is of balsa, plywood, and spruce; there are no exotic materials used. Neither of the two Ravens that we've built have required significant nose weight to achieve the proper CG location. The plans show an easy ballast tube installation.

We built our two Ravens by following the plans and directions exactly. Although neither has flaps, we recommend the necessary modifications. Use of flaps will allow higher launches and lower landing speeds. Due to the size of the fuselage, the flap servo will most likely need to go in the wing center section. As mentioned above, the center section is permanently attached to the fuselage, so there will be no need to disconnect any of the flap mechanism when disassembling the Raven after a flying session. The flaps themselves should be about 5% of the total wing area, be mounted on the lower surface of the wing with their leading edge at 40% of the local chord, and be capable



of 40 degree deflection. Flaps should not be used while thermalling, as to do so reduces performance.

The Raven is a very stable sailplane which we've found will automatically center in a thermal. A few years ago, at a Northwest Soaring Society Tournament in Richland, we launched, flew out, and thermalled for over five minutes while moving the controls only enough to make sure that the radio gear was still working. Later we realized that our options would have been severely limited had the radio gear not been working, and the flight would have perhaps been even better had we gone ahead and let her fly without any control input at all until it was necessary to bring her down to land.

Last year we found the above described realization to be more than completely accurate when, during a winch launch, the receiver battery pack shorted out. The Raven went up on tow without a waver, floated off, went into a nice gentle left turn, and did a picture perfect landing directly next to the winch several minutes later. That experience served to

confirm our belief that the Raven makes a great trainer. The performance certainly awed the spectators!

Our first Raven, affectionately called Lenore, is covered with black Monokote on the top and metallic charcoal on the bottom. Our second, Encore, built a short time later, is all white Monokote. Both have a chrome band around the right wing outboard of the dihedral break. We learned to fly proportional with Lenore, and both have had their share of collisions with soccer goal posts and landings in trees. But after more than six years they retain the majority of their original covering, and structural repairs have always been easily accomplished.

If we were to build another Raven, we would again choose the *Model Builder* version. We'd add flaps and use the CJ-25<sup>2</sup>09 section rather than the CJ-3309 shown on the plans. The CJ-25<sup>2</sup>09, the newer section of the two, has a bit better penetration capability with no noticeable loss of lift. Since both have large flat areas on their bottom surface, there is no change in construction method or completion time.

Plans for the *Model Builder* Raven are available from Dave Jones, Western Plan Service, 5621 Michelle Drive, Torrance CA 90503. The cost is \$8.00 plus \$3.00 shipping and handling. California residents need to add 6% or 6 1/2% sales tax. Ask for the CJ-25<sup>2</sup>09 information, and be sure to tell Dave you read about the Raven in RCSD!

Bill & Bunny  
Kuhlman  
P.O. Box 975  
Olalla, WA  
98359-0975

# Ehecatl A "Medium Tech" Sailplane

...by Pancho Morris

*I enjoy flying high performance sailplanes but, being a poor hobby shop employee, I cannot afford the latest high-tech kit.*



I also have this thing about not wanting to fly what everybody else is flying no matter how good it looks. There are good generic fiberglass fuselages on

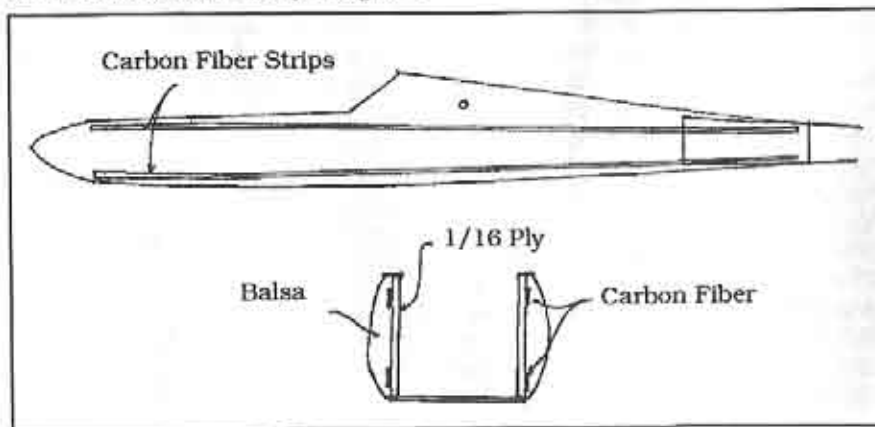
the market but even these can strain a tight budget. I do have access to conventional materials at a good price and so, over the years, I have developed what I call "MEDIUM TECH" construction methods.

My EHECATL series of planes began several years ago. EHECATL is the Aztec god of the wind. With our abundance of wind here in Texas and my Mexican ancestry, I thought this was a good name for my plane. The first was a 100" sailplane with ideas, outlines and dimensions borrowed from many designs. I

then built a two meter EHECATL II and my latest is another 100" EHECATL, THE SEQUEL. These have all had straight, plug-on wings, conventional tail, rudder, elevator, aileron and spoiler control. I also use a releasable towhook on my spoiler servo. My latest has flaps for the first time.

The wings are foam core construction, sheeted with balsa. The spars are 1/8 by 3/8 spruce with 3/8 balsa vertical sheer webbing to about half span. Carbon fiber laminate is applied top and bottom to a little past half span. Plywood, epoxy and microballoons and brass tube make up the carry through box for 5/16 music wire rod. The sheeting is applied by ironing it down with aliphatic resin glue. Thinned down glue is applied to both sheeting and cores and allowed to dry. The sheeting can then be ironed down at any time from days to weeks later. I have used carbon fiber laminate at the trailing edge. On my latest, I used the carbon mat on both top and bottom of the core at the trailing edge. This also is glued down by brushing aliphatic thru it. I don't launch as hard as a couple of people in our area, but I launch harder than most and I have not had a wing fail. I feel I could launch as hard as I want without problems. The sheeting glue added approximately one ounce to the wings.

The tail feathers are fairly conventional.

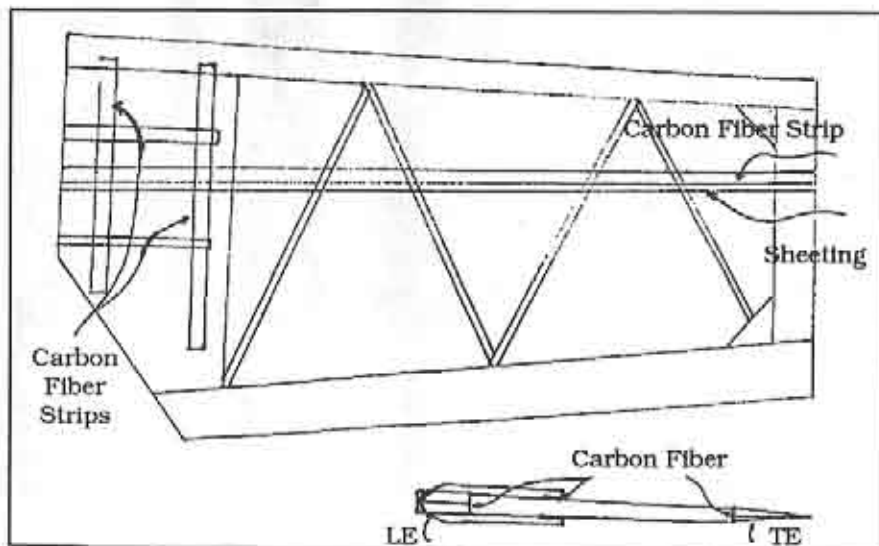


The leading and trailing edges of the vertical fin, rudder and stabs are built up of thin balsa with a layer of carbon fiber sandwiched in the middle. The carry thru pivot tube for the stab is supported by 1/16 ply sides on the vertical fin with a hard balsa block in the fin.

The stabs consist of leading edge, trailing edge and solid balsa sheet at the root to support the tubes. Diagonal bracing is run in the open area of the stab. Strips of carbon fiber are glued over the tubes and root block front to back on top

and bottom to provide support. The roots are fully sheeted and the stabs are sheeted to approximately 1/3 chord. The sheeting runs from the very root to the tip of the stab. Before applying this sheeting, a strip of carbon fiber is applied to the inside of the trailing edge of the sheeting. This strip on top and bottom of the stab acts as a spar. The roots of the stab are then glued for added strength. The carbon fiber in the trailing edge allows them to be sanded very thin and straight.

The fuselage consists of a built-up pod attached to a fiberglass boom which is a pool cue blank, I believe that one of the area designers gets. I think they are available from Bob Sealy. Don Chancey has been using them in his Pantera and Bounty Hunter design for years. The pod starts as an open topped box based loosely on the Antares design by Scott Christensen. I use 1/16 ply as it is lighter than 3 mm ply and much stronger. Strips of carbon fiber are then run the length of the box at the top and bottom of the sides. Light balsa sheet of about 1/4" thick is then glued over this. The boom is glued into the back of the box. A hardwood noseblock is attached and the bottom is



1/16 ply. Canopy and a hatch are built to leave the entire top of the fuselage open when removed similar to the Antares or Sagitta. This is all then shaped to a smooth, rounded shape. As my fuselages usually have a slight taper in the wing area, root fairings must be built. Once it is all shaped, the entire pod is glassed back onto the fiberglass boom. The vertical fin is epoxied onto the boom and glassed on up to the stab location. Medium glass cloth is used.

This produces a very strong sailplane. I don't build hanger queens. I fly my planes hard and often. I take a landing tape with me every time I fly and I am not timid about going for the spot. The main drawback about this type of construction is that it is a little heavier than a layed-up glass fuselage. Extreme care must be taken at the tail end to keep the tail feathers light. I think I can still take a little weight out of my vertical fin. The weight of my stabs seems good, but I still have to add more weight at the nose than I would like. My latest EHECATL is 100" with 906 square inches and weighs at 78

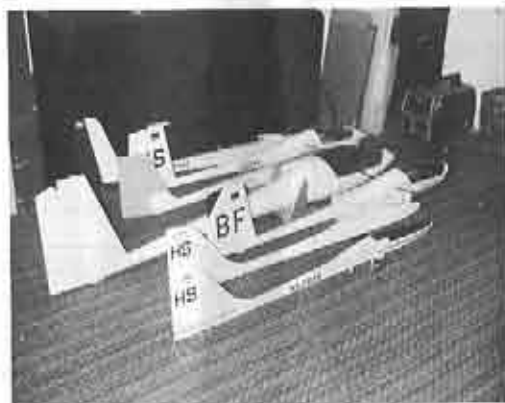
oz. for a 12.4 oz./ft<sup>2</sup> wing loading. This qualifies for Multi-task Sportsman if you use Don Edberg's proposal of 121/2 oz./ft<sup>2</sup> wing loading as the max.

No provision for ballast was made and even on the windiest of days (And here in Dallas we fly in some WINDY weather!), I have had no problem penetrating. My latest uses the SD 3021 and flaps, and I am very happy with its performance.

This has obviously not been a construction article on building my design. It was intended to describe some of the construction techniques that I have been developing that are between the low tech Olympic-Gentle Lady type of construction and the very high tech methods utilizing fiberglass and vacuum bagging which are beyond the expense and capabilities of many modelers.

Pancho Morris  
2715 Eastbrook Dr.  
Mesquite, TX 75150  
(214) 681-1098

Hugo Sandroni of San Pedro, California says, "I'm sending you some pictures just to let you know that I'm busy building new gliders all the time: 5 new in 1990 — Falcon 880, Pheabus, Fournie Motor Glider, Sagitta 900 flat with ailerons/flaps, and I'm finishing a multiplex ASW-22. I'm already working on an LS3 with a 15' wing span. This is 1/3 scale (exactly)! I'm planning to have full working instruments in it. Another project for early 1991 is a 1/4 scale Grunau Baby. I love this



sailplane...I did my solo in a Baby in 1956! The photograph shows part of my fleet: Sagitta #1, flat, ailerons/flaps • Sagitta #2, flat, ailerons/flaps • Graupner's Mini Nimbus, foam wings and full scale cockpit • Roland Sommer's LS3 (under construction) • Sula Bird (yellow tail) • Graupner Mini Nimbus with built-up wings and full cockpit details • Sula Bird (red tail)."

## Flying The 1/5 Scale Sperber

...by Ray Reiffer

*Having chosen this scale project for a number of personal reasons, I finally came full circle to start flying it in the spring of this year.*

I had several worries with this ship, and I am sure that other scale modelers are probably hesitant for reasons similar to mine and, thus, the reason for this paper. I will list my major concerns and then explain what I encountered.

- My primary worry was whether or not my Sperber would soar, as I did not have a slope available.
- I wondered if it would handle nicely enough to be a pleasant sailplane to fly.
- Would the tiny spoilers be effective?
- Because of the difficult form to hang onto, I didn't know if I could launch it by myself without a wingman.

I am happy to report that it soars fairly well. My first soaring flight, off a bungee cord, was not a very high release. Fortunately, I found a lift area soon enough to be able to climb out respectably. I had kept the weight factor in mind while building, and the resultant loading is a little over 10 oz. per sq. ft. This certainly has helped to make it fly well.

The handling is normal as long as a tight circle is not required. I've experimented while in thermals of fair to moderate strength and of a size that allowed me to turn in a nice open circle. Upon

forcing the ship into a steep bank angle, the nose drops inside the turn. This one enters this mode earlier than other ships I've flown. Perhaps better sealing on the ailerons will help me out. I stalled it in a turn, but recovery was without incident.

The pitch is very sensitive, as the distance between the wing and tail is shorter than the standard today. I reduced the elevator movement and achieved a nicer, more balanced control. It feels and flies very normal, now.

The tiny spoilers have proven to be of value beyond what their size would suggest. They work very well, and are torque rod actuated for nice closure.

The launches have been without incident even in a light wind. I can hold it well enough with one hand to level the 10 ft. span and resist the pull of the winch for a bit. I have found the climb on tow to be normal, but on top, before release, the rudder goes weak and it must be watched very closely.

This ship is different from the usual ships I fly, and a very welcome change for a fun time. I plan another scale ship for this winter's project.

If your goal is to obtain maximum performance for your efforts then, of course, these older, fat, scale jobs are not for you. As I do not fly in contests (I'm more interested in the magic surrounding these historical birds.), I am surprised to find that the Sperber is much faster and penetrates better than I would ever have guessed.

(Readers: Ray's Sperber is in the April issue of RCSD on page 11.)

Ray Reiffer  
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# Understanding Thermal Soaring Sailplanes

## Part 3...continued

...by Martin Simons  
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### Ballast

The picture is not complete. It has been assumed earlier that the wing loading of the two models being compared is identical. As mentioned earlier in this series, by adding ballast, any sailplane polar curve whatever can be shifted towards the higher speed end of the chart, improving penetration, with some increase in minimum sink rate and stalling speed. By reducing wing loading, the polar can be shifted the other way, reducing stalling and sinking speeds at the expense of

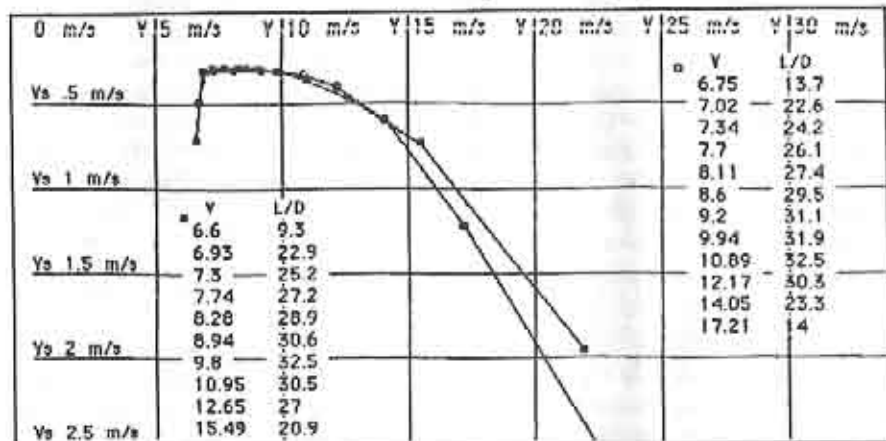


Figure 32 Performance Polar for Wing  
 SD 7032 SELIG -  
 Wing Loading = 3.70 kg/sq.m. DONOVAN 8000  
 Wing Loading = 3.00 kg/sq.m.

Velocity (Metres/Sec)	Sink (M/Sec)	L/D Ratio	Velocity (Metres/Sec)	Sink (M/Sec)	L/D Ratio
24.35	3.004	8.11	21.92	1.960	11.18
17.22	1.224	14.07	15.50	0.739	20.98
14.06	0.602	23.36	12.65	0.468	27.06
12.18	0.401	30.35	10.96	0.359	30.53
10.89	0.334	32.58 MAX	9.80	0.301	32.53 MAX
9.94	0.311	31.93	8.95	0.292	30.69
9.20	0.296	31.13	8.28	0.286	28.97
8.61	0.292	29.51	7.75	0.285 MIN	27.22
8.12	0.296	27.41	7.31	0.290	25.23
7.70	0.295 MIN	26.11	6.93	0.302	22.94
7.34	0.303	24.20	6.61	0.710	9.30

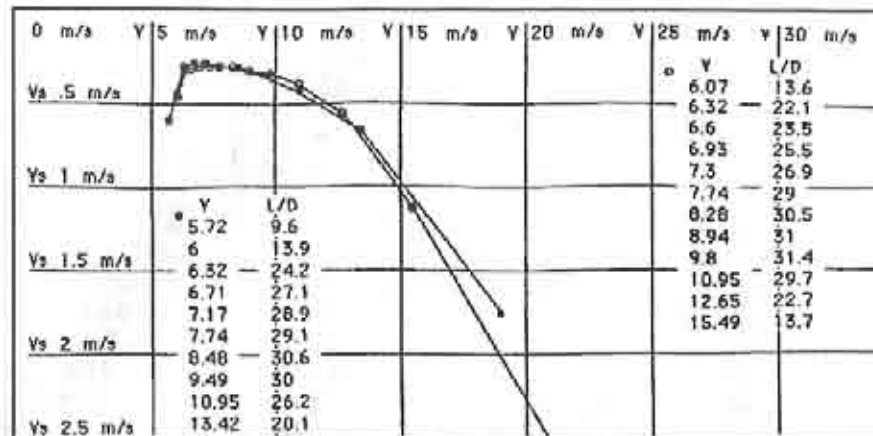


Figure 33 Performance Polar for Wing  
 SELIG - SD 7032  
 DONOVAN 8000 Wing Loading = 3.00 kg/sq.m.  
 Wing Loading = 2.25 kg/sq.m.

Velocity (Metres/Sec)	Sink (M/Sec)	L/D Ratio	Velocity (Metres/Sec)	Sink (M/Sec)	L/D Ratio
18.98	1.753	10.83	21.92	2.768	7.92
13.42	0.665	20.18	15.50	1.126	13.76
10.96	0.418	26.24	12.65	0.556	22.74
9.49	0.315	30.08	10.96	0.368	29.77
8.49	0.277	30.65 MAX	9.80	0.311	31.48 MAX
7.75	0.266	28.18	8.95	0.288	31.08
7.17	0.248	28.98	8.28	0.271	30.52
6.71	0.247 MIN	27.18	7.75	0.267 MIN	29.04
6.33	0.261	24.21	7.31	0.271	26.92
6.00	0.431	13.93	6.93	0.271	25.53
5.72	0.590	9.70	6.61	0.280	23.56
			6.33	0.286	22.16
			6.08	0.445	13.65

penetration.

The SD 7032 has been shown to be a very good low speed profile but inferior to the Clark Y at penetration speeds. The SD 8000 appears very good at high speeds and as good as the Clark Y for soaring. Therefore in Figure 32, the 7032 model is assumed to be ballasted up to the FAI maximum permitted all up weight of 5 kg. (The wing loading then becomes 3.7 kg/sq m, 12 oz./sq ft.) The resulting polar

is compared with that of the SD 8000 wing at the same total weight as before (4.05 kg, wing loading 3.0 kg/sq m.) Adding ballast in this way brings these two wings so close together at low speeds that it is unlikely any real differences would be detected in practice. Perhaps a slight margin still exists in favour of the SD 8000. At high speeds the 8000 profile retains some advantage.

Note also that the ballasted polar for



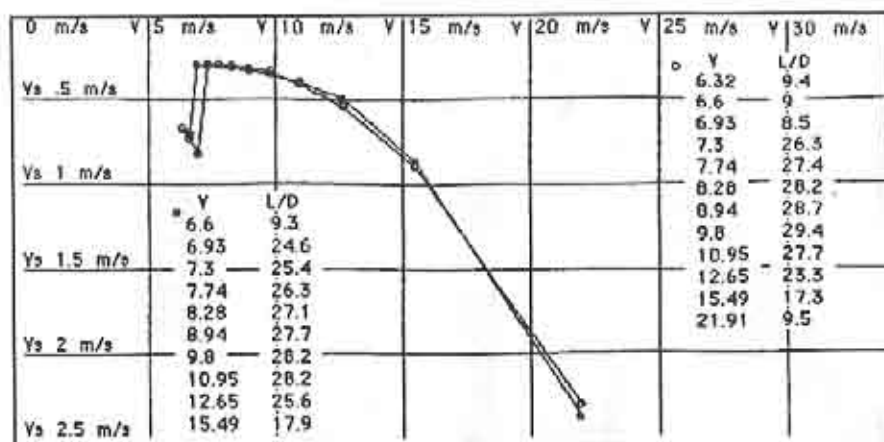


Figure 34 Performance Polar for Wing

Velocity Metres/Sec	CLARK - Y - PT		Eppler 205	
	Sink M/Sec	L/D Ratio	Sink M/Sec	L/D Ratio
21.92	2.301	9.53	2.375	9.23
15.50	0.891	17.39	0.861	18.00
12.65	0.543	23.31	0.494	25.62
10.96	0.395	27.71	0.388	28.26
9.80	0.333	29.41 MAX	0.347	28.27 MAX
8.95	0.311	28.79	0.323	27.71
8.28	0.293	28.25	0.305	27.12
7.75	0.282	27.48	0.294	26.33
7.31	0.278 MIN	26.30	0.287	25.45
6.93	0.815	8.50	0.281 MIN	24.63
6.61	0.734	9.00	0.709	9.32
6.33	0.670	9.44		

the SD 7032, as the respective tabulated figures show, is no longer superior to the unballasted Clark Y at low speeds. The Clark Y wing (at 3.0 kg/sq m) would climb slightly better and turn slightly tighter. Although the best L/D for the 7032 wing is noticeably better (32.58 vs 29.41), at higher speeds the Clark section once again edges ahead even at its lower wing loading. (It was explained in earlier articles that the best L/D of a sailplane is in practice very rarely important. Soaring requires lower trimmed speeds, penetration always requires a faster trim.)

Adjusting wing loadings and ballast in the other direction, in Figure 33 the SD

8000 model is assumed to have been built very lightly so that the total weight is 3.04 kg (6.7 lbs) and the wing loading only 2.25 kg/sq m (7.4 oz/sq.ft.). The 7032 and 8000 polars are virtually the same at low speeds though again a slight advantage lies with the 8000 profile. As Selig and Donovan remark, other sections originally designed for multi task sailplanes, such as the RG 15 and HQ2/9, behave very much like the SD 8000 and can be expected to give similar results.

#### Summing up

A rather long and perhaps difficult comparison of wind tunnel test results has produced results that some model

fliers will find hard to accept.

First, a very ordinary and long established profile, the Clark Y, performs remarkably well and remains competitive against even the best of modern aerofoil sections for thermal soaring sailplanes. It has quite a good low speed performance, does well at high speeds, is known to have a mild stall and does not seem unduly sensitive to small errors in construction. It also happens to be easy to build and is of moderate thickness, making for strength and stiffness without undue structural weight. It could thus be flown at very light wing loadings for the occasional 'light airs' contest, but loaded with ballast to penetrate better in more ordinary conditions. Reliable wind tunnel data is still lacking on a great many profiles of similar vintage. While it appears that Virginius Clark knew a few good things, there seems no reason to suppose that the Clark Y is exceptional. Probably any of the old NACA four digit or Göttingen profiles of roughly similar camber and thickness (i.e., about 3.5% and 11.5%) would do just as well. It may not be necessary to mention in this context the well known and well proved Eppler 205 (3.01% and 10.48%). Figure 34 is a direct comparison of Clark Y with an accurate model of the Eppler 205, both tested at Princeton. The point is perhaps sufficiently made, but the author can speak from some direct experience here. In 1982 when the E205 section was being widely and enthusiastically acclaimed, two otherwise identical model sailplanes, of 3 metres span, were built, one with E 205 and one with Clark Y profiles. No difference whatever could be detected in performance.

Secondly, providing the model flier is prepared to adjust the ballast of the sailplane to suit conditions, virtually the same performance can be obtained from a range of profiles between the SD 8000 (8.86% thick, 1.71% camber) and the SD 7032 (9.95% thick, 3.66% camber.) The

thin, slightly cambered profiles seem to have a marginal advantage at low as well as high speeds, assuming that the ballast has been correctly judged. Such profiles may, however, turn out to be rather tricky near stalling speeds and because of this it may not be possible in practice to realise their full thermalling potential. It has to be remarked, nonetheless, that F3B sailplanes using profiles such as this, when flown well by experienced pilots under a variety of weather conditions, show themselves to be very good thermal soarers as well as achieving high speeds in multi-task contests.

Some readers may wonder if the Princeton results have somehow falsified the situation. This is not the case. Before Soartech 8 was published, the author ran a comparable series of polar computations using the earlier test figures from Stuttgart. The Clark Y emerged from this, if anything, in an even better position but if any improvement was to be found, those calculations also pointed to an F3B section for a thermal soarer, the HQ2.5/9 or even the 1.5/9. Consequently two models currently being flown regularly by the author have these profiles and perform very well. So does the eight year old Clark Y example.

It may not be exaggerating too much to say that modern profiles have very little, if any, advantage over the Clark Y. It remains only to stress that the Clark Y referred to here is the real Clark Y section, plotted accurately according to Clark's original ordinates, not the strange 'bootsole' profiles carelessly described as 'Clark Y type' by some model designers.



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## Ridge Writer

...by Wil Byers

### Slope Soaring Etiquette

*Slope soarer's etiquette is a part of the hobby we unfortunately tend to overlook.*

*Etiquette as defined by Webster's is, "forms, manners, and ceremonies established by convention as acceptable or required in social relations."*

This much overlooked part of the hobby is an important reason slope soaring is fun. The manners we have, develop, and share help others enjoy it, also. Likewise, if slope soaring is to grow, protocol must be very visible. Visible to who? To site owners or guardians who are so generous to allow our trespass and to the flyers we share the hobby with. Besides, etiquette is a skill which can be learned like flying and, when cultivated, can gain a person much respect. Maybe even more so than one's ability to pilot a remote control glider.

Think about your experiences at your favorite slope site concerning etiquette. After talking with many fellow flyers, it is very apparent that we have all had a few experiences with an individual or individuals who did not practice good slope manners, demonstrating those manners by performing maneuvers, such as a glider being flown over someone's head at low altitude. Or a pilot flying their model over the spectator area or pits. Maybe they even guided their model through the much touted high speed pass, without following some type of pattern procedure. Or performing passes with a model not thoroughly tested. Have you ever been flying and suddenly, unannounced, someone launches right over your head or very near you? Unnerving, huh. Maybe you've witnessed a fellow modeler who is an outstanding

pilot, but doesn't have any regard for anyone else's air space. Then too, there is the sometimes inevitable situation where you have driven for six long hours to fly at your most favorite of sites. Upon arriving you find there is someone else flying the frequency you thought you had to yourself. To add to your frustration they fly for nearly an hour at a session. Wow, what a bummer! Yes, and then there is that fun loving, happy go lucky, alcohol consuming, and numbed individual who can fly a bit better with a couple of beers under their belt. If you've flown for very long you've seen these and more. Maybe you are even guilty of an infraction or two. I know I am.

Now, be so kind as to let me elaborate about this subject some more. I think we will all benefit from understanding how our slope behavior affects other flyers. As well, understanding may help us find new members and maybe some new sites.

Flying over someone's head, the spectator area, or the pit area is so obviously dangerous that most of us would never think of doing such a thing, right? Yes, that is right! But when the lift is very good and one has "The need for SPEED" things happen which otherwise wouldn't. Hey, I'm guilty of this in the past. But it is a dangerous practice. So, figure out where your fellow flyers are on the hill and avoid flying over them at all cost. Avoid situations such as this because we are not perfect flyers. The conditions may be more turbulent than expected (Remember you can't see the air.), and by some strange fate your model may have either a mechanical or electronic failure. A failure that most often results in a new kit, but very possibly could cause someone some injury.

Speaking of injury makes me think about the amount of energy stored in a model flying at a high rate of speed. Kinetic energy it is called (I'll discuss this more in another column) and a model weighing even a few pounds can store

up a great deal. I don't know how many of you have witnessed a slope model travelling a high rate of speed while diving from high altitude. But it is to say the least impressive, while at the same time scary. A short story about this very thing can better demonstrate the idea of energy and safety.

The story goes like this. A friend of mine, Ken Stuhr, a number of years back, built a very fast model he called Chuckar. The model was extremely fast. On more than one occasion it completed our club's 400 ft. long speed course clocked at 147 mph. Believe me that is fast! That is scary! The model must have been doing close to 200 mph when diving to gain speed to enter the course. Ken is a superb builder and had done some testing of the model before he attempted the course run. However, another individual, who shall remain nameless, attempted the same course with a model of less than perfect workmanship and radio equipment. The attempt, of course, was flawed from the start. To say it crashed during the attempt is not adjective enough to describe the scene. Additionally, it came within ten feet of an individual, watching the attempt, as it augured into the ground. Witnesses insisted the model was travelling at over 200 mph straight down.

Well, think about the consequences. If a baseball can kill by striking a player while travelling nearly 100 mph, what would a five pound model do going 200 mph? This is a rhetorical question, of course. It does suffice, to emphasize just how important it is that one take the time and money to have the equipment necessary, if you want to go fast. It also points out how important it is to know where the spectators are. Then, too, it shows how necessary testing is before attempting dangerous maneuvers, because "Murphy's Law" is always at work. Consider the aftermath of even something so simple as a clevis breaking while your model approaches 100+ mph.

Also, on occasion, we all get so excited about the lift when arriving at a site that we tremble just getting the model out of the car. Don't let the excitement stop you from being courteous to the other flyers that are already flying. Make sure you walk down to the launch site. Introduce yourself while at the same time making sure that those people flying aren't on your frequency. Check to see if they are using some kind of frequency identification. If they are, get yours. If they aren't, and you feel uncomfortable with the flying safety, suggest that they implement some. This short exercise will assure you that you will not launch into an unsafe condition. Or what is more important that you won't cause an unsafe condition. Unsafe because, maybe, you are going to launch too close to those already piloting their models. I'm sure that you can think of dozens of ways that things can happen which might result in a friendship being lost or worse. So, tremble on out, and make sure you understand the situation you are launching into.

This next topic of etiquette is very interesting, is most cumbersome to deal with, and probably the idea hardest to convey. It is the pilot whom everyone agrees has absolutely outstanding skill and unfortunately much daring. Here I'm going to quote from *Soaring* magazine and an article written by George Thelen. In the article George discusses the flying habits of some of our full size counter parts and the tendency of some of the "Hot Shot" pilots. Think about this scenario. "A well known pilot, recognized for his aerobatic skill approaches the pattern, and upon entering the downwind, rolls his aircraft inverted. He continues upside down until somewhere on the base leg, rolls upright, lands with perfection and leaves the ship to hired hands while he goes to greet the admiring throng." Does this sound like someone you might fly with? The point in George's article, of course, is that he could

kill himself or someone else. The point I'm trying to make is not quite as dramatic, but an implication that you may cause the fellows you fly with some indigestion. Therefore, maybe it would be better if you attempted to have fun while at the same time giving them enough room to, also. Likewise, one should avoid taking unnecessary risks that could eventually catch up with you or your model.



*Pavel's Olympia (Miese) & Grunau Baby II*

With the new radio frequencies arriving, channel sharing is not as much of a problem as in the past. However, frequency conflicts can still cause major irritations. If you haven't experienced this problem you are a lucky individual. For those of us that have, it can be a real nuisance. The best way to describe the problem is to have you put yourself in the other pilot's place. Imagine patiently waiting to fly your model from that most ideal of ideal sites. The individual you are having to share a channel with is a great guy, but hand him the transmitter and look out. He has the terribly bad habit of flying for a minimum of a half hour at a clip. You wait and wait. Today he is flying for a little longer as the lift is superb. When the time comes for you to leave, your friend has flown twice. He now is working on his third flight, for a total of two plus hours. You, unfortunately, were able to fly for all of twenty minutes. The problem can be even worse if you have more than two people on the same frequency. So, as a courteous flyer it is imperative that you be cognizant of others waiting to fly on your frequency. I will qualify this statement by saying if you know you are going to Saudia Arabia tomorrow you are justified, but otherwise give a bit to get a lot.

Pilot conduct that is not only bad etiquette but outright dangerous is flying

while under the influence of alcohol. Additionally, alcohol consumption while flying is an AMA safety code violation. Which is to say they probably would not pay any claims resulting from any accident that occurred while the pilot was using alcohol. Likewise, of all the things one could do to enhance their flying skills it's doubted that alcohol is among them. Besides those you share the hill with may very well not be comfortable with your ability to pilot your model about the skies while drinking.

Hey, I know that many of us including myself enjoy a drink of a beer. Maybe even a few! But is the place and time to drink while we are flying? Many pilots associated with the slope soaring community would say, NO.

I've asked a number of flying friends about the topics I've addressed in this article and I hope that I've represented their feelings fairly accurately. One area we were all very much in agreement on was the need to retain our flying sites. Using proper etiquette and manners will surely aid in this pursuit. Flying sites and especially good flying sites are hard to come by. So, one specific area of slope etiquette we think is most deserving of discussion is how to keep these sites. I would discuss how to get them, but I don't really know. I just know we need to

keep the ones we have.

If you are a slope soarer, the chance of you owning the site you fly at is most remote. Often times these sites may be owned by farmers, corporations, a city, a state, or the federal government. Therefore, you are accountable for the way you fly your model to someone. This could be a friend who has agreed to let you use his property or some other person who is guardian of that property. If you trespass without permission you may be jeopardizing the flying site for many other flyers. If you conduct yourself in less than a reputable way, you may be jeopardizing the chances for continued use of the site, too. I've seen this type of behavior and I know you have, too. So, take the time to say to those individuals (nicely) that they need to be aware of how they might have an impact on the needs of many other flyers. They too depend on your good judgment to maintain access to the flying site.

One of my most vivid memories of a site situation becoming a problem, was one involving a farmer. He came out to talk to a group of flyers I was sharing an afternoon of soaring with. It seemed some flyers had trespassed across his freshly planted wheat field. The factor that made it most vivid was the 30-06 rifle hanging

in back of the cab of his truck. And the fact that he was highly irritated at the group who had not recognized the error of their ways. Besides he looked as if he enjoyed steel wool for breakfast.

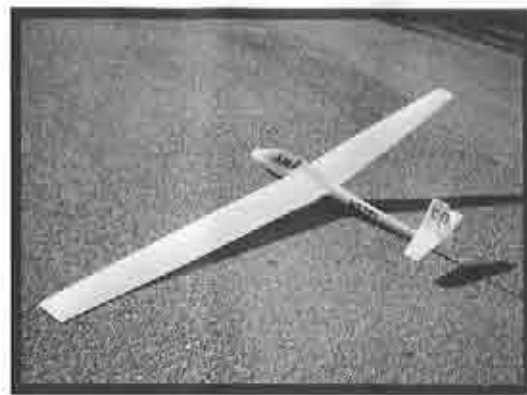
When you use someone's property for slope flying, think about how you can enhance the chances of this site being available for use for a long time to come. It could be something as easy as picking up a little garbage or stopping by the farmer's house to let them know you are using the property. Maybe it is even something as simple as driving slow up the bumpy dusty road that leads to the site to prevent the dust from becoming a nuisance.

Lastly, do not construe this piece as saying you can't have fun. But rather, it says have a great time, along with all the others who enjoy this hobby.

#### **Slope Scenes**

I've received a couple of letters, since my last column, that included some nice pictures, one from Greg Vasgerdsian. He has recently completed a very nice 1/6 scale Cirrus. He tells me the model turned out quite nice. However, the wing covering became a problem and resulted in some sagging. He was using monokote, and applied it by puncturing small pin holes with a pin and then applying the heat. Never the less, he still came up with a bit of sagging. Greg wonders what he can do to stop this problem when covering balsa sheeted wings.

I suggest he apply the monokote by first tacking it at the four outside corners while carefully pulling on it to remove all wrinkles. Then, tack it continually along the leading and trailing edges, working from the center out. Next seal the monokote at the root, finally sealing it at the tip while pulling any wrinkles out. Be sure and leave enough to pull around the tip. Lastly, using a



*Greg Vasgerdsian's 1/6 scale Cirrus  
Now working on a Viking 1/5 scale  
Nimbus 2*

heat gun and a cotton rag, shrink the monokote while rubbing it down on the sheeting. The pin holes work great, but monokote has a bad habit of sagging unless it is pulled very taut when being applied.

The best covering jobs I've ever seen are on some models built by Craig Robinson. He is a tremendous builder and maybe he would volunteer to write a short article for us on covering technique. How about it, Craig?

Another fellow wrote from a bit farther away. In fact, a lot farther away, Czechoslovakia. His name Pavel Ehrlich. He sent a picture of two beautiful models, an Olympia (Meise) and a Grunau Baby II. It certainly would be fun to visit this individual on a group flying tour of Europe.

#### Selig 6063 Airfoil

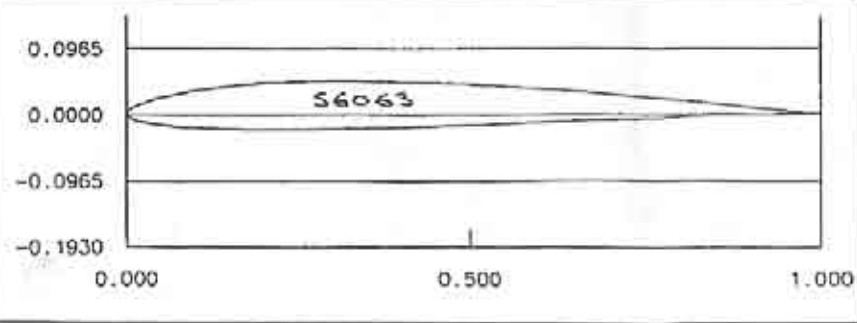
The last airfoil in the Selig 6060 series is the 6063. It is only 7 percent thick. Therefore, it should be extremely fast in a straight line because of its low profile drag. But, as with any of the thinner sections, it may pay a price in increased drag when turning, due to the narrowing of the drag bucket.



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*W. Richland, WA 99352  
(509) 627-5224 (7:00 PM - 10:00 PM  
weekdays, after 9:00 AM weekends)*

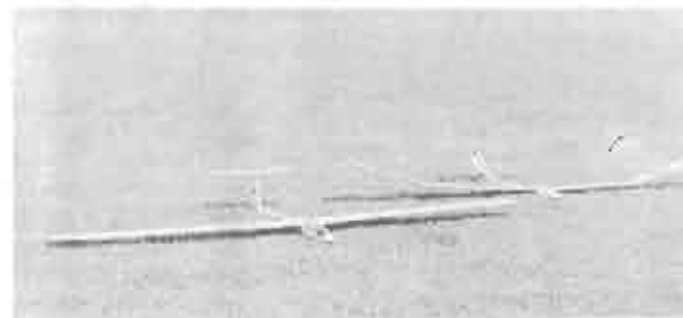
S6063 7%	0.00088	0.00242
1.00000	0.00000	0.00058
0.99687	0.00017	0.00605
0.98758	0.00078	0.01660
0.97238	0.00197	0.03215
0.95160	0.00383	0.05261
0.92565	0.00638	0.07786
0.89500	0.00956	0.10771
0.86012	0.01328	0.14190
0.82151	0.01739	0.18013
0.77969	0.02175	0.22201
0.73513	0.02617	0.26710
0.68835	0.03050	0.31491
0.63984	0.03457	0.36490
0.59007	0.03827	0.41652
0.53954	0.04152	0.46919
0.48881	0.04424	0.52232
0.43838	0.04633	0.57532
0.38877	0.04774	0.62759
0.34047	0.04838	0.67854
0.29396	0.04823	0.72758
0.24968	0.04725	0.77415
0.20803	0.04544	0.81769
0.16941	0.04280	0.85768
0.13413	0.03938	0.89359
0.10252	0.03523	0.92495
0.07481	0.03044	0.95132
0.05123	0.02513	0.97231
0.03194	0.01943	0.98758
0.01708	0.01355	0.99688
0.00671	0.00772	1.00000



*Hugo Sandroni's Grunau Baby*



*Vern Hurl's Aero L-39 Albatros, as shown flying, is available from Windspiel Models. Photo by Pete Bechtel.*



*Robbe ASW-19 & Larry Jolly Meteor  
Photo from Don Ginzel, LaMarque, Texas*

## Slope Flight

*...by Greg Vasgerdian*

© 1990

As mists swirl,  
In the valley below  
Sun warms the wind,  
Up on the hill

To the edge,  
With my new creation  
A gentle toss,  
Fears and expectations

Searching for lift,  
Circling around  
Running the ridge,  
Fly to the clouds

Breeze in my face,  
Warmth of the sun  
The whisper of wings,  
And nature's sounds

Sweeping loops,  
And gentle rolls  
My graceful machine,  
Dances over the hills

Across and back,  
Low and high  
Playing in the currents,  
As time passes by

Come back to the earth,  
Around and around  
With the final approach,  
My glider is down.

## THE RAVEN SC20

Mike Smart Designs —  
Great Britain

...by Iain Glithero

*This 2-Meter design has everything you need to get into a high technology "foam and fiberglass" soarer without breaking the bank or spending more time in the workshop than on the flying field.*

I was on a business trip to the Middle East in August 1990, and was reading in the latest issue of RCSD the article by Mike Smart on the development of his Raven series. I had built a Raven 2M some years ago, when they were first available, but a

switch malfunction on the model had led to an early severe rekit. The description of the SC20 seemed to be just what I was looking for, and I called Mike Smart and arranged to meet him in England on my way back home and to pick up a kit in exchange for 52 pounds sterling (\$100).

Mike is an architect, and I met him at his office and was able to spend a short time "interrogating the designer" which I find is worth several hours studying the plan and kit contents. Thanks, Mike!!

The kit contains a superb lightweight polyester resin and glass fuselage, a pair of fully sheeted wing cores with the aileron servo cut out and the wire trough already done, but the veneer left uncut in case you elect to build the two function version. The sheet balsa rudder and stabilizer are cut to outline but, of course, need shaping. (You must do some work!) The hardware bags contain all the other parts you will need except, of course, the glue, covering, and a radio. The "plans"

consist of three 11" x 17" sheets of full or reduced scale drawings of excellent quality and content, the instruction book consists of a page of introduction, five pages of construction, and one page of trimming and flying information. If you have built anything of this type before, you will find that the construction is easy. Mike told me there would be about 10-12 hours of construction, I worked about 20 hours from box open to first hand launch.

My model is covered with red "Solartex" on the wings, red "Econocote" on the stab and rudder and red enamel on the fuselage. (Yes, I like RED.) The weight came out to 38 ounces, a little over the recommended 32-36, but I used



SC20 Kit Contents

a 250mA pack and four ROYAL servos, two micros in the wings and two minis in the fuselage. I used my trusty Airtronics module 7SP radio which I believe is the best 'bang for the buck' on the market.

The first flight was late one Saturday afternoon. Two hand launches were followed by a launch on a very weak Hi-start belonging to a fellow club member. The flight was short as I was able to reach less than 200 ft on the launch, but that short excursion showed great promise. Subsequent launches from the club 12v winch have been great. The model tracks



Miss Cindy Webb & the RAVEN SC20

straight on the line and zooms very easily without having to wonder if the wings will come off! Flights so far have been stable and predictable and the speed range is quite wide. The first few landings were done at far too high a speed, until I realized that the model could be slowed down while still retaining good aileron response. The model is quite aerobatic and, if you get tired of soaring,

you can always do some loops and rolls for the crowds. Slope performance should be excellent, but I have not tried it yet.

The only change I made to the model was to increase the size of the wire used for the towhook, I hate towhooks that bend on launch and cause popoffs. The original design may be strong enough, but I did not want to take any chances.

You may sense that I am enthusiastic about this model. You are right. I may be able to

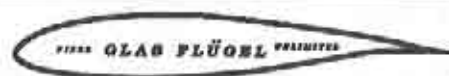
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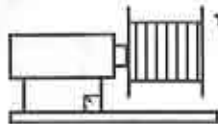
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## Winch Line

...by Gordon Jones

### Fall F3J - Same Song

#### Second Verse

*I think that Pancho Morris put it best when he said, "Those that do not believe that the wind and weather are living, knowing beings have never been contest directors. If you want a contest that requires a special type of weather for the best results, you can bet the weather will beat you."*

After our last F3J contest in October, I am a firm believer in that statement! With winds of about 10 to 15 miles an hour all week prior to the contest, we awoke to a still day. The redeeming factors about this contest were: one, I was not the CD and did not have to get the majority of the flack from the contestants and, secondly, I got to fly this time.

October 29th was calm and warm, almost identical to our earlier contest except that the temperature was about 20 degrees cooler. With the calm winds, this made launching of the heavy ships almost impossible. It was definitely a "floater" day.

Having held an earlier F3J contest, the pilots meeting was not quite as long as the earlier contest due to many repeat flyers. This also showed up in the speed of the contest, and the rotation among timers and towers. After our last contest, Pancho and I had sat down and analyzed

some of the problems that had occurred. We used an air horn to signify the times in each slot - beginning, end, and overflight. This alleviated the notification of time which had been our biggest problem and worked exceptionally well. It was even audible at the end of the tow line. If you are contemplating holding an F3J contest any time soon, give me a call and I will be more than happy to share some ideas that will save you some grief.

The contest itself was a ball. First, I got to fly which was nice, but the level of competition was excellent. We had good lift throughout the day and many flight groups scored maxes on time. It became almost a problem to get some of the floaters down at times. It was apparent early on that strategy was the name of the game on this day. A launch just a few seconds after the start of the slot could cost the flyer many points. And, if you had a down air slot, of which there were a few, you had to have your act together to come out in the points. There were a few relaunches and these were handled extremely well by the teams with everyone helping out. I was on the towing end of one and, with the lack of a breeze, I thought I would have trouble making it back after the second launch.

Even with the mix of air the scores were very close and the competition at the end was very interesting. It came down to what I thought would be three of us shooting for the top spot. This, however, was not to be as the normalization of scores sent me well down the list. It came down to myself and Jack

Hamilton in a semi-flyoff during the last slot of the last round. (Talk about a climax.) Jim Truitt and Jack's Hobbie Hawk had maxed each of his rounds and was quietly (other than the verbal barbs) watching with anticipation. I had maxed my early rounds and needed to max again to have a flyoff with Jim. One problem stood in my way:



Pancho rallies the troops.



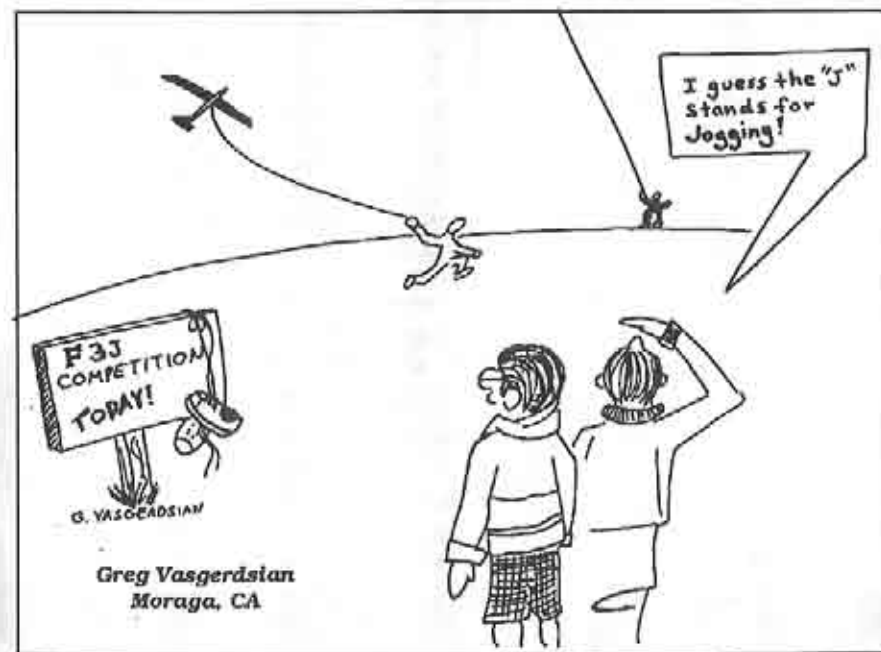
Do you think I'll MAX?

Jack Hamilton.

I have been flying against Jack for many years and do not often come out on top, plus Jack was flying his original design SkyJack that he has been flying for some 13 years. Needless to say, I was not happy with the circumstances. I was flying an Aguila Grande, which has been my mainstay for a number of years, so it got down to flying skill and a bit of luck. We both launched into some of the worst air I had seen all day and, upon realizing this, we headed for spots that had been

good for both of us during the earlier rounds. As we both fought for lift and the best L/D we could muster, it became apparent that this would be a short slot. I was lower and had to attempt to get a good landing to have any hope of equaling Jack. Once again the Gods of wind decided to have a little fun with me because, on landing approach, the wind came up just enough to spoil my landing, and my chances for a flyoff with Jim. I missed the landing as I had been nursing it back in with everything I had. Jack was not far behind and, with the differences in the launch time, I ended up a scant 22 seconds behind Jack.

This put me out of the flyoff, but I figured that with my earlier scores I would have second sowed up. Wrong again, stupid. That 22 seconds knocked me all the way down to fourth as Henry Bostic, flying Pancho's airplane (I'm going to have to talk to Pancho about that.), had stayed in the hunt with respectable scores in every round and sneaked into second place. Jack had



likewise put in a series of good flights and had enough to garner third place. I learned a great deal about figuring normalized scores that day needless to say. It was a great contest that was accented with good rounds, and a little excitement at the end which always makes for a better contest.

In talking with the group of flyers after the contest, all thought we had a good one. The only reservation being that for the next one we need to declare the contest on the day we hold it so there will be some wind to make launches better and allow the heavier ships to get into the fray. Several flyers I talked to said that they didn't come due to the wind on the morning of the contest. Pancho and I are already talking about when to hold the spring contest and about getting F3J on the regular contest schedule, so we are moving along.

#### Other notes concerning F3J

The event has met most of the international requirements for acceptance by the FAI and should be added to their events, soon. We, in the United States, should start taking F3J more seriously about Thermal Duration as it will eventually become an international event and we want to be well represented, as we are in every other international competition. The rules have now stabilized and are available from myself and other sources if you are interested in trying out F3J. In addition, I welcome any interest or

questions you may have.

#### Repairing Fiberglass Fuselages

Ever had a broken tail boom or nose from an oops? I think it really galls most people to ding a plane up and have to go in and repair it. There are times when it seems almost easier to build another than to repair one. This is especially true with fiberglass fuselages. But, the majority of the time, they can be repaired and live to fly another day.

There are actually some simple steps that, if followed with care, can revive that fuse. Start by deciding if the repair will work at all; by this I mean if it is shattered in numerous places it will probably be better to get another fuse. If it is cracked or split in a couple of places it can probably be put back together. If this is the case, clean the area(s) to be repaired by sanding it down around the break or crack. Clean the area with alcohol to remove all the dust and gunk. While doing this, try not to break off any ends or otherwise remove too much of that area as you will want to join that area in a temporary joint. Next, pull the break into alignment and check to see that everything is straight. While holding it together use some CA to spot joint the crack or break together. When this is dry check to see that your alignment is OK. If the break/crack is in the nose a visual alignment will probably be alright; but if the repair is to the boom you will want to install the wing and stab to verify the

alignment. This is very important because you will be unable to do so after later steps. If, for some reason, your calibrated eyeball didn't do so good, you can break the joint and do it again with a better idea of which way to move the parts.

Once you have a tack joint established and the alignment meets your satisfaction, use a dowel with a small paint brush connected to it to clean the inside of the fuselage with alcohol around the repair area. This will once again clean out any dust and gunk that is around the break/crack. Once this is completed, if you can, try to sand around the repair area on the inside of the fuselage about an inch larger than the area you are repairing. Next, measure the area to be repaired and cut a piece of fiberglass cloth about 1/2 to one inch oversize of the repair area. Once this is complete, attach an epoxy brush to a dowel and, using fiberglass resin (Be sure of the material that the fuse is made of prior to selecting your resin; some use polyester resin and others are made of fiberglass resin.), wet the repair area inside the fuselage about an inch oversize of the repair area. Next, wet the fiberglass cloth and, using a dowel or coat hanger, place the wet cloth over the repair area. When the cloth is in the proper position, use the epoxy brush to pat out all the bubbles. You can usually see them pretty well with the aid of a small flashlight. Try to get as many of these out as possible so you will get better adhesion from the cloth. Once this has been accomplished, set up the fuselage so that the repair area is down and let it dry.

After the inside of the fuselage has dried, check to see that the patch has provided the strength you need by lightly twisting the repaired area. It should feel really solid and not flex too much. This will depend somewhat on the cloth that you use. I try to use 3 ounce cloth for the inside patches as it is very strong and is course enough to take enough resin to

provide adequate strength.

The next step is to fix up the outside of the fuselage. This task is rather simple as you can see all of what you are doing. Sand down the area again to get any errant excess resin off the area to be repaired. Mix a batch of epoxy or resin with some microballons and fill the crack/break and smooth it down with a piece of scrap balsa. Once this has dried, sand down the area and check it for valleys and holes; refill these areas as necessary. Then, sand and repaint the repaired area. Presto, you are done, and ready to fly again. All it takes is some time.



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## The Peak of Speed

...by Martin Simons

*I was born and brought up in the Peak District of Derbyshire and still have friends there and fond memories of the region, so Jean and I return when we can.*

Our visit this year, not at all by accident, coincided with the Viking Cup International model slope soaring competition which was based in Buxton. Chas Gardiner, one of the gliding columnists for the *Radio Controlled Models & Electronics* magazine, was the organiser, with assistance from an expert and experienced team which included Nick Wright, the F3B Champion. We were able to stay only for the Saturday and Sunday, though the official meeting was scheduled for five days, from Friday 5th to Tuesday 9th October inclusive.

The Viking trophy itself was presented for international competition following the successful establishment of the format, which is known as F3F in anticipation of its recognition by the FAI. The rules were developed, I understand, chiefly in Denmark. The new competition class has been welcomed enthusiastically throughout Western Europe, entry lists being generally oversubscribed. The style of flying is exciting and nothing is needed in the way of launching equipment. The F3F class evidently suits many more sailplane fliers than the F3B, with its emphasis on expensive winches. All efforts can be concentrated on the model and the flying. One does, however, need to be prepared to climb hills, the weather can be cold and wet, and of course there must be wind; the more wind the better, up to the official limit of 25 metres per second (90 km/h or 56 mph).

In this contest there were teams from eight countries, or actually eleven if En-

gland, Scotland, Northern Ireland and Bavaria are allowed to count separately, as these teams would apparently wish. The group from Tyneside, which used to count as part of England when I lived there, also entered separately as Geordies. Other teams came from Iceland, Norway, Germany, France, Switzerland, Austria and of course from Denmark, where it all started.

The basic rules are simple. Everything depends on speed. Along the edge of the soaring slope, chosen according to the wind by the organisers, a 100 metre course is measured out and pylons are set up with sighting lines at right angles to the course. The pilot launches and stands in the middle of this 100 metre 'beat'. The models fly one at a time, so there is no danger of mid air collisions.

After launching, 30 seconds are allowed for the model to gain height and get into position to enter the course, which it must do before the half minute is up. Then ten laps (a total of 1 km) are flown as fast as possible. Observers at each end signal by electric buzzer (which is sited close to the pilot's position) when the model passes the pylon and a computer keeps count of the laps and timing, giving a distinctive bleeping on the horn when the distance is completed. Passing the pylons on the downwind side, behind the observer, is not allowed. After completing ten laps, the pilot must land in the designated safe area as soon as possible, but no points are scored for landing. The whole flight from launch to landing is normally over within two minutes.

The organisers provide, usually, a wind speed meter and any other apparatus such as pylons, computer, shelters for the observers and the transmitter pound.

The pilots fly in a sequence determined by their randomly issued contest numbers. After a complete round with every pilot having had the chance to fly once, the next round proceeds immediately, ten rounds altogether being flown with

an extra one for practice at the beginning of the competition. If weather or darkness prevents the completion of a round which has been started, it is abandoned and started again at the next available time. Scores are, as usual, normalised to give the best time in each round 1000 points. After the minimum number of five rounds, each pilot's worst round is dropped to even out the luck factor.

Friday 5th October was a practice day, flown in strong wind at Coombe, a magnificent bowl shaped slope overlooking the suburbs of Manchester. Some fast times were recorded, unofficially.

The site for the first official practice round and the start of the main event, was Coombe again, but as the convoy of cars, with models inside or in boxes on roof racks, left Buxton at 9 a.m., the situation looked grim. The wind had risen further overnight and heavy clouds rolled above the mountains. At the slope, it was hard to stand upright. Jean, wisely staying in the car park on the lee side, felt quite alarmed as the car shook in the gusts, but models were assembled and carried somehow to the shelter of a drystone wall just behind the crest. The

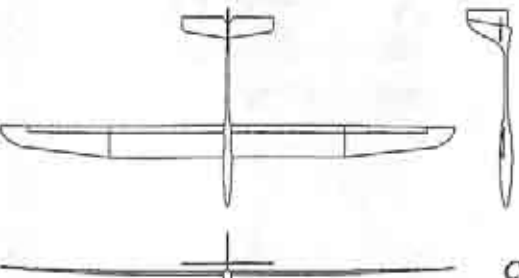
anemometer, set up and braced with wires and pegs above the steepest slope, showed a constant velocity of more than 22 m/s with occasional gusts to 28: (100 km/h), gale force.

The contest director required a consistent wind speed reading over 25 m/s before thinking of cancelling flying. Undaunted, or at least, not totally daunted, the practice round was begun at about 11 a.m. Most of the models launched succeeded in completing the task, but getting down safely within the nominated area proved difficult and several sailplanes, once having turned downwind, failed to get back to land on the top. Fortunately there were alternative places within reach and, so far as I know, no model suffered serious damage.

At lunchtime it happened. Rain, heavy and cold, came sweeping in, first blotting out the distant view of the city, then driving almost horizontally onto the hill. The heavy gusts became more frequent, the air rougher, and flying was rendered totally impossible. Only half the practice round had been completed when the convoy moved wetly back to Buxton. It

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was, Chas Gardiner admitted, a disastrous beginning. No-one had scored anything, everyone was tired and edgy, and in the Peak District weather like this can go on for days on end. Was the Viking Cup contest to end in an expensive fiasco?

Sunday dawned on a world totally transformed. There was not a cloud in the sky, the wind had swung to the north and dropped to a modest 10 - 12 m/s; ideal conditions for flying at Rushup Edge. The convoy left Buxton early. Nostalgia for me was very strong here, for I could see, in the crystal clear air, most of the countryside where I grew up, including the flying ground at Camphill where I did hops in a primary glider in 1947.

The competition was fully under way by the time we reached the top of the ridge after climbing up from the road below. Most of the models competing were either F3B models or more specialised slope racing versions of these. Nick Wright, for example, used his F3B model from a few years ago when the two-lap speed run was in force. The Kowalski brothers, Klaus and Peter from Germany, flew specialised models which were slightly smaller, with very slender fuselages, thin wings with little camber, and V tails. All the models had ailerons

except for a few with pivoted wing steering (i.e., the whole wing pivots at the root to provide aileron effect).

The flying techniques used varied a good deal and with few exceptions, the skill of the pilot, rather than the model, was decisive.

The first 30 seconds after launching was used to gain height, meanwhile moving out to one side beyond the start line. A few seconds before the half minute was up, the model would dive steeply to gain speed and pass the first pylon, thus starting the timing process.

The less expert pilots tended to fly somewhat too far out from the slope, started timidly and began their racing turns only after hearing the buzzer. They swept metres past each pylon. Seconds were wasted in this way. Some more adventurous competitors adopted a modified F3B method, rolling the glider inverted just before reaching the pylon, then pulling through in a half loop to accelerate back towards the other pylon. This, though very entertaining to watch, is probably not the fastest technique. To avoid hitting the slope the model has to swoop upwards before pulling through, so losing some energy. Another method, which seemed to produce good results when done well, involved rolling to a knife edged banked position towards the

end of each lap, then on hearing the buzzer, turning sharply with the elevators, to race back to the other end. This, too, can lose time if the vertical bank is held too long, since height is lost and has to be regained to avoid hitting the ground.

Probably the fastest times were made by those who simply performed smooth and accurate steep turns at each end of the run, flying low and just far enough in front of the slope to keep in the strongest lift. Too close to the hill, the lift weakens because of air friction with the ground; too far out and the lift is, again, weaker. Somewhere between these limits is the zone to fly fast and straight, with minimal control movements. It is crucially important to time the turns correctly, not waiting for the buzzer but starting the turn in just the right place to pass the pylon by the merest fraction. The best times were recorded by pilots who were able to do this consistently, cutting no corners but never drifting on too far past the pylon.

On this Sunday, five rounds were completed, reaching the halfway mark in the required ten round championship.

The scenery in such country is spectacular and many people do not need the excuse of a gliding contest to cause them to scramble up the hills. In Europe walkers and picnickers gather in hundreds where there is something unusual to watch. An element of public risk has to be taken into account and most of the sites used in England are on public land.

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Spectators assemble wherever there is something unusual to look at. Hang gliders took off from another place on the ridge and soared, paragliders floated gently down from the top into the valley, hikers hiked, watched and wondered, and as the dusk descended, anyone not well wrapped up became very cold.

We could not stay for the Monday's flying, but we heard later that there had been another good day with four rounds flown, and the final, tenth round was completed on Tuesday morning, leaving the rest of the day for sport flying.

Before leaving on Sunday evening we picked up a copy of the results hot from the computer after five rounds. Out of 49 competitors, Klaus Kowalski was leading, Nick Wright was second, Peter Kowalski was close behind in third place. The German Number 1 team was a clear 1000 points ahead of Denmark 1, the English 2 team third at this stage. The final result, we heard later, saw Nick Wright placed first after all, though we have no details yet of the other scores.

And the speeds? Klaus Kowalski in round 3, completed the ten laps in 33.03 seconds; 109 km/h, 68 mph. That is fast by any standards and it looks much faster when the model is whistling by only a few metres in front of the hill at eye level. Remember too that every contest flight involves nine turns, which take time.

The maximum speed of the gliders on the straight segments of the flight, must be faster than the averages suggests. Even the slowest scoring times represented more than 50 km/h.

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## Heat Box

...by Tom Overton

*With the cold weather and winter upon us comes some special problems with building this time of year.*

When the garage or workshop is very cold, working with resins, paints and epoxies becomes difficult, at best. Many of us have tried last minute cures like the microwave and hot water with limited if not drastic results.

The solution is a HEAT BOX. I fashioned a box out of plywood with one side hinged to open as a door. I picked up a control module for a waterbed heater, WITHOUT the heating pad that would normally go under the mattress. These units are usually rated at about 400 watts.

Next, I installed a 75 watt light bulb and the sending unit from the control module INSIDE the box. Then, with the control module mounted on the OUTSIDE of the box, I ran the wires from the light bulb to the control module where the heat pad would have plugged in.

This gives you total control of the temperature in the box, with the light going on and off as needed, thereby keeping the temperature within a few degrees of the reading you set the control module to (say, 75 degrees).

What all this means is that you will have resins that are thin enough to wet out glass cloth, paints and primers that will flow out well when sprayed, and epoxies that will set in the time that they are meant to.

Try it and see!

Tom Overton  
1302 Arleen Ave.  
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E/South Bay Soaring Society  
Silent Flyer Newsletter  
John Dvorak (Editor)

## Announcement from the Downeast Soaring Club

"We have just received our AMA charter, #2988. We believe that we are the only exclusive R/C sailplane club in the Maine, New Hampshire, and Vermont area."

"We recently obtained exclusive flying rights at a nearby 36 acre sod farm. Most of our members are from the greater Portland and Brunswick areas. Our members have designated the Southwind as our club contest plane, pilot against pilot. Of course, a few minor design changes will be made, such as foam SD7037 wing, foam tail feathers and a single (standard) servo for flaps. The plane will be scratch built by club members to expose them to foam wing construction and to minimize cost."

"We are openly seeking new members to join the club. We have access to several winches, high starts and one retriever. Most of our flying during the summer is thermal duration, although now with the changing season, several of us have been sloping some of the many regional sites."

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## Database for RCSD Articles and Sources (Part I) ...by Lee Murray

### Abstract

In the first part of this article a description is given about the index to RCSD articles and advertisers. In Part Two, a somewhat detailed instruction is given on how to take advantage of the free information which can be downloaded from a free 24 hour a day BBS and how to import that information into a MS Works database.

### Background

In addition to good reading for the RC sailplane enthusiast, RCSD offers information that helps one make good decisions about equipment, kits, construction projects or how to run a new contest format. You save time by learning about how others have applied new or special techniques. It provides information about where to buy special parts, composite products, software, scale documentation, kits, winch drums, etc. RCSD allows you explore the world of slope soaring, scale competition, aero towing or other aspects of the hobby you aren't likely to see without considerable effort. This information may be needed sometime after you read the magazine and it is not easily found without an index of some kind. The ideal index is one that summarizes or abstracts the information contained, cites authors, gives some specifics, and the reference to articles which can be obtained from the Judy & Jerry Slates if not in your personal RCSD library. What I have just described as the ideal index exists in the form of a database, a structured form of information which can be searched in seconds with the aid of a home computer. Each and every use of a name, a word, a phrase or part thereof in

the database can be retrieved instantaneously. And the computer doesn't even have to be your own to take advantage of the resource. Someone in your club can do it for you, or you can call the author or someone in your area who has the database. Perhaps you know nothing about databases but do word processing. This information, as provided in text file format, can be read by word processing programs to allow you to search the file for the words or phrases.

Illustrations of "Reference" and "Source" record from their respective database "form" views are shown below. The "Reference" database covers virtually all the articles that appeared in RCSD from volume one, issue one through 1989 and, shortly, through 1990. The "Sources" database has lists of companies, addresses, phone #, and products (specialty kits, products and services).

### Typical REFERENCE Records:

Vol: 2 No: 6 Pg 8

Contributor: Rondeau, Bob

Key Words: Control

C1: Flap/elevator & aileron/rudder mixing schemes are

C2: Illustrated as used with Dodgson sailplanes.

### Typical SOURCE Record:

Company: Vintage Sailplane Association

Key Words: References

Product: Bungee Cord Newsletter

Address: Rt 1, Box 239

City,State,Zip: Lovettsville, VA 22080

Phone: 703-822-5504

Reference: V5, #12

The "Key Words" field serves two purposes. It makes sure there are a few words that will be included in the description of an article that puts it into one or more standard categories. These categories serve as search and sort fields for printed reports. Since RCSD has been in print for 7 years, the complete printed index has become a book in itself. The listing of the key words below is a list of

the current "legal" categories covered. The list of key words has grown as new topics have evolved.

### Key Words (References Database)

Aerial Photography	Aerodynamics
Ailerons	Airfoil
Batteries	Book Review
CA(cyanoacrylate)	Clubs
Communications	Construction
Contests	Control
Electric	F3B
Fiberglass	Finishing
Flaps	Flying
Flying Wings	Foam
Fuselage	HLG (hand launch glider)
Kit Review	Launching
Powered Flight	Radio
Sailplane	Scale
Slope Soaring	Software
Spoilers	Stability
Std (standard class)	Thermalling
Trimming	Turn-around
2M (2 meter class)	
Unl (unlimited class)	Winch
Wing	Wingerons
X-Country	Winglets

### Databases on Disk

Developed RCSD databases are available for IBM (Microsoft Works Database) and Apple II (Appleworks Database) computers. In addition to these developed database applications, Bear's Cave BBS has comma and tab delimited forms for computer users to download and easily import into other Databases. Disks can be ordered for \$10 in IBM PC/PS-2 (Text or MS-WORKS Database), Macintosh (Text file), or Apple II (Appleworks 2.0) formats. Hopefully the list of completed databases will be expanded with the help of knowledgeable users.

Next month, I'll explain how to download the databases files from the BBS and how to import that information into MS Works database.

Lee Murray  
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## On the Subject of SMTS

Dear Mr. Gray,

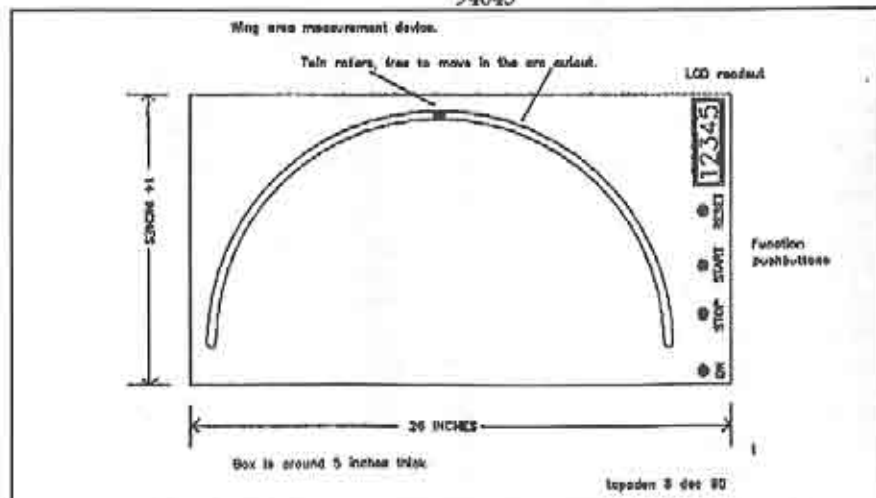
I recently read your article in *RCSD* about the dilemma of how to measure wing area to calculate wing loading in order to meet contest requirements. I'm an electronics engineer by profession (and hobby), and I couldn't help but think about solving this problem electronically. Here's my proposal.

A box about 14"D X 26"W and 5" thick, houses all battery powered electronics needed. Two rollers are free to move in an arc that would allow wings up to 20 to 22 inches in chord to pass between them. The rollers are attached to arms inside the box, which connect to the shaft and body of a potentiometer. A spring forces the two arms together. The pot is wired to the input of an A/D (analog to digital converter) so the microprocessor can determine wing width. On the bottom of one of the rollers, also inside the box, is a wheel with holes in it that will enable the microprocessor to gauge the length of the wing as it passes between the rollers. This is accomplished with an LED emitting light through the wheel, and a detector sensing the holes. The

holes would be spaced to give a resolution of 0.1". To use the device, the beginning of a wing (not attached to the fuselage) is placed between the rollers. The reset button is pressed to clear out the previous result. When ready to begin, press the start button. The wing is slowly pulled through the rollers, making sure that it's not skewed so that the true width is measured. Right before the wing clears the rollers, the stop button is pressed. The display now shows the wing area in square inches. For 2 piece wings, you could do both wings or just do one and multiply by two for total area.

I made some assumptions in this design. For example, will 22 inches handle most RC sailplanes? Is 0.1 inch good enough resolution for the length? What resolution is needed for the width measurement? I also was concerned about the size of the box required to be able to measure 22 inch wide wings. The hardware and software involved are not that difficult. To me, it was another challenging and interesting way to combine my two favorite hobbies: RC sailplanes and electronics. If you need any more information, feel free to contact me.

Sincerely (signed), Tom Paden, 100 N. Whisman Rd. #353, Mountain View, CA 94043



Response: Thanks for the very interesting letter addressing the problem of wing area measurement and calculation for use in determining wing loading. A very neat idea, and as you say, not terribly expensive or complicated.

I would very much like to see you develop a prototype unit to show around the contest circuit.

The chord of wings used in most competition sailplanes is likely to be no more than about 12 inches...but I refer only to the S-MTS/FAI types. Cross-country machines have much greater chords (usually for visibility as well as improved Reynolds Number, but these are not often wing-loading restricted other than as a practical matter and FAI limits.

Therefore, your device would be measuring half wings of approximately 10-12" chord and 50-60" span... typical of

a Multi-task sailplane perhaps.

One concern I have is how your device would handle unusual wing tapers, such as the now-popular discus wing leading edge shape, or multiple tapers, as well as straight tapers. I suppose the microprocessor would read out average width after scanning the whole wing, or would it integrate as it goes along?

Resolution of 0.1" ought to be good enough for our purpose, in answer to your question about length. Width resolution ought to be at least that good for the chord, although perhaps a better resolution for chord might be helpful. Let's take an example: Half-wing length 60", average chord 10"...total area 600 sq. inches. per half wing and 1200 sq. inches for total wing (less fuselage). Weight of glider is 85 ounces. Thus, the wing loading would be 10.2 oz. per sq. ft. In the type of sailplane we are con-

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sidering, the wing loading maximum would be 12.5 oz. per sq. ft., or a total weight (for example) of 6.5 pounds. Using the +/- 0.1" resolution on span, we would thus have 59.1" or 60.1" half span and 10.1" or 9.9" average chord. In the worst case (smallest chord and shortest span) the area would be 1186 sq. in for the whole wing...or 8.236 sq. ft. Using the max allowable wing loading of 12.5 oz. per sq. ft. - this sailplane could only then weigh 6.43 pounds...or 0.07 lbs - 1.12 ounces less than the first example. Taking another machine of 60.1" span and 10.1" chord, we are okay, because the larger area in this instance reduces the wing loading - hence is within the maximum allowance. So, we have only to consider the error on the low side.

In a total weight of 6.5 pounds, it seems to me that your proposed error would give a difference of +1.12 ounces. The wing loading would be at worst case only 12.63 oz. per sq. ft., or in the best

case 12.34 oz. per sq. ft. I can't see where a difference in loading of +0.13 oz. per sq. ft. would even be detectable as a performance advantage. Therefore, in my view, your proposed tolerance in measurements of +/- 0.1" would be totally acceptable.

Tom, build one and let's try it! Jim Gray  
Dear Jim, \* \* \*

Please forget about having maximum weight or wing loading rules in Multi-Task Soaring events. Just keep trying to get people to run these events. Both the AMA and the FAI have good rules to work from.

The AMA suggests that all contests should be MTS events. Rules are in the book, not only for Duration with a landing but also for Distance and Speed tasks. Clubs and Contest Directors for many good reasons do not and cannot run additional tasks. You shouldn't ask them to do more, as in checking wing areas and aircraft weights. AMA rules control the model configuration by allowing the CD

to determine the flight time in the Distance task and the number of laps in the Speed task. Simple, no need to weigh or measure.

Personally, I like the FAI, F3b rules. They are HERE, they work. The tasks are set and the model can be set up to obtain the best performance for each task. The best part about them is that the plane I have for one contest will work as well at any other. The worst part is that the pilot has to spend more money to get a set of rules and to be eligible to compete.

F3b isn't bad. There are too few contests, but plenty of flying. The models really perform and you have to be out there practicing, learning to fly and getting to know your plane and that's the real FUN part.

Sincerely (signed), Dennis Phelan, 31  
Millis St., Hamden, CT 06514

Dear Jim, \* \* \*  
I saw your challenge in the High Start column Nov. '90 RCSD to determine a simple way of finding wing area during

a SMTS contest. I think I have a straight forward idea.

First, I believe the philosophy behind the SMTS concept is to define a basic set of rules which will meet many requirements of cost, performance, creativity, and skill. The actual sailplanes produced for this event should allow some variability as well as creative optimization. I think the two variables of total weight limit and wing loading limit are necessary and sufficient.

A weight limit of 80-85 oz. would be OK. I think the 12.5 oz./ft<sup>2</sup> wing loading is about right.

So, assuming we have a reasonably accurate weighing scale, all we need to do is find the wing area. I propose that we can use the "covered trapezoid" approach. It requires a ruler and/or tape and taking 3 quick measurements on the aircraft.

Measurement 1. A root cord.	R
Measurement 2. A tip cord.	T
Measurement 3. A semi-span.	X
The area will be: $A = (R + T) * X$	

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The test, given the weight, W: W/A (oz./ft<sup>2</sup>) less than or equal 12.5? You pass. Ah ha, you say. What about my super elliptical convoluted wing planform? Well, you have to tell the judge where on (within) your wing you want he/she to take the three measurements to get a maximum A. The judge, of course, will take a line of sight between your Root and Tip cord designations to determine whether the defined trapezoid is covered by your wing.

In other words, A is only the real area if you have a simple, (easily constructible?) straight taper wing with square tips. If you choose to have a wing shape which hangs outside of the trapezoid for aerodynamic efficiency purposes, then you are betting that it will give you an edge over the loss in actual wing loading for the overall competition.

The area A is really a pseudo area for purposes of ensuring the model does not exceed the wing loading rule. It's a simple measurement and need not be taken unless the plane places in the contest. The contestant has the responsibility to make the measurement easily definable upon the individual model, by putting some markers on the wing and fuselage. If the plane is asymmetric, the smaller wing will be used.

The body center will be used to tie one end of the X measurement, the other being the intersection with the T line. If the wing is polyhedral, the X measurement will be made along the wing surface with a flexible tape.

So in summary: In keeping with the philosophy of SMTS, I think the "covered trapezoid" rule is appropriate for monitoring the necessary wing loading limit.

Allan Tomalesky, 241 Seasons Dr., Wexford, PA 15090

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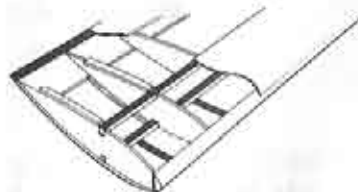
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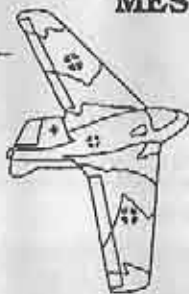
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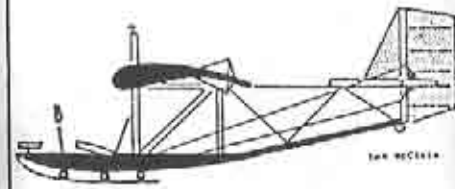


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