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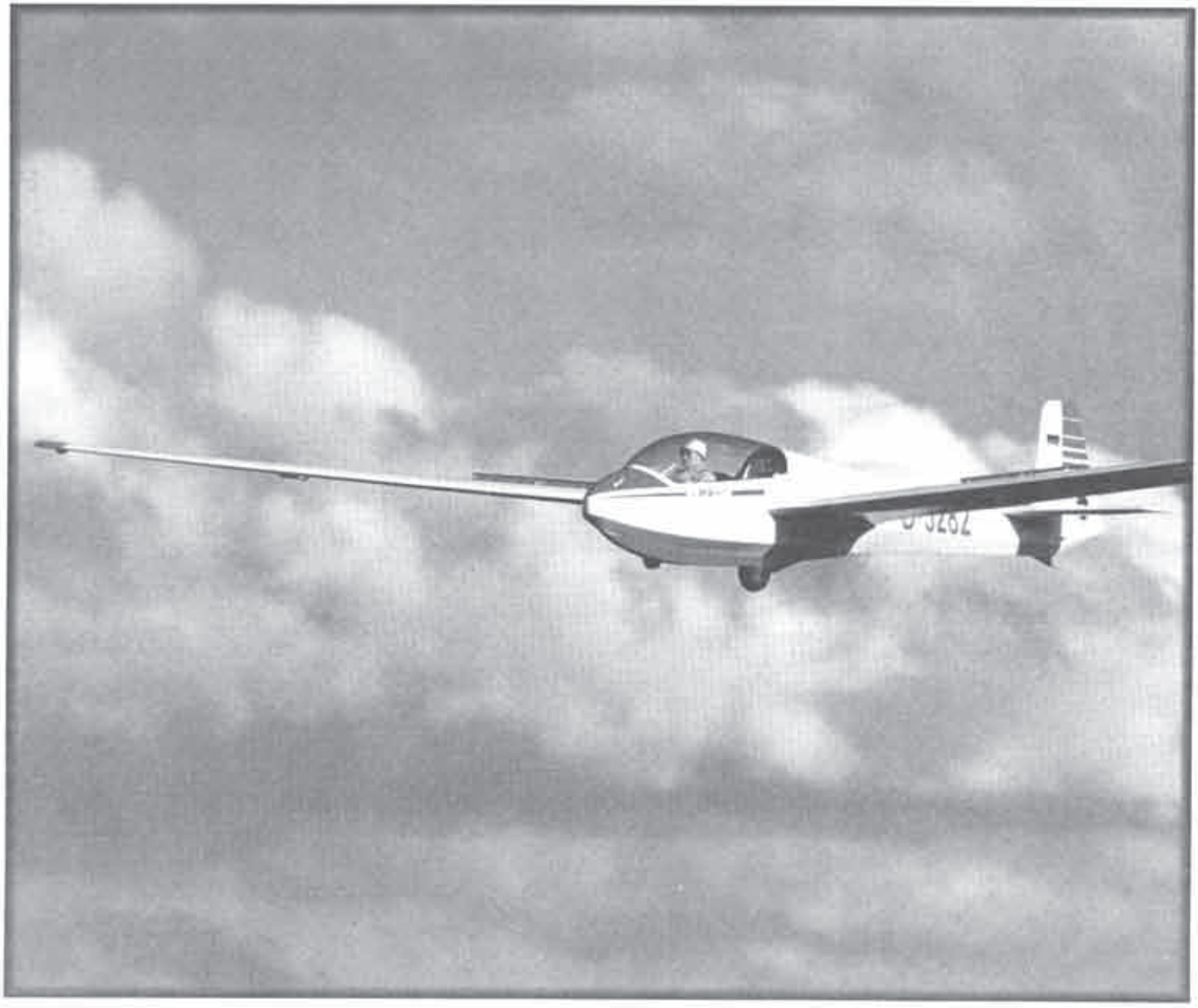
R/C Radio controlled SOARING DIGEST

THE JOURNAL FOR R/C SOARING ENTHUSIASTS



R/C Soaring Digest

Radio controlled

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SCALE BEAUTY

A beautiful 1:3 ASK 13, built by Andreas Bindenwald, is coming in for a landing.

Photography by Robin Lehman, New York.

R/C Soaring Digest (RCSD) is a reader-written monthly publication for the R/C sailplane enthusiast and has been published since January, 1984. It is dedicated to sharing technical and educational information. All material contributed must be exclusive and original and not infringe upon the copyrights of others. It is the policy of *RCSD* to provide accurate information. Please let us know of any error that significantly affects the meaning of a story. Because we encourage new ideas, the content of all articles, model designs, press & news releases, etc. are the opinion of the author and may not necessarily reflect those of *RCSD*. We encourage anyone who wishes to obtain additional information to contact the author. *RCSD* was founded by Jim Gray, lecturer and technical consultant. He can be reached at: 210 East Chateau Circle, Payson, AZ 85541; (520) 474-5015; <jimpeg@netzone.com>.

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Artwork

Gene Zika is the graphic artist who designs the unique ZIKA clip art.

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The Soaring Site

Cross Country Soaring

We've begun our 17th year of publishing RCSD. And, the new year kicks off with another new soaring column entitled "Cross Country Soaring" written by Scott Gradwell of Medford, Oregon. This month, Scott will introduce himself, explaining how he got hooked on Cross Country soaring. Welcome on board, Scott!

Hobie Hawk

Last month, Dave Acker, up in Washington state, needed some help with a Hobie Hawk. Buddy Roos from Woodstock, Georgia dropped us an e-mail for Dave, and we hope that Hobie is up flying by now! Thanks, Buddy!

Flying Weather? That's Cold!!

We received the following e-mail from Brian Olson in Canada. We thought you'd enjoy hearing what kind of weather they're flying in!

"We have been having great weather up here in Calgary this winter, with very little if any snow and a lot of relatively good soaring days. Our first really cold weather didn't arrive until New Year's day but it didn't deter several of us more hardy types from going to the local flying field to see the year 2000 in. The temp. was -10 deg. Celcius with freezing fog and a very low ceiling (about 1/2 of normal launch height). All of us did a couple quick circles around the field (in and out of the fog) with my venerable old red clear monocoated Gentle Lady (built in 1985) and then we put away the winch and sampled a glass of 1985 champagne. A little chilly but we all agreed that it was a great way to usher in the next 1000 years of RC soaring.

"All the best to you and Jerry in the new year. Keep up the good work. Although I liked the old (small) format better, I must say that the content of *RCSD* is as good as it was when I first subscribed quite a few years ago and I look forward to receiving it each month!"

Kindest regards,
(signed) Brian Olson
Director-Canadian Soaring Society

Thanks for the note. We appreciate the feedback, as well! And, all the best to you & yours as we enter the "next 1000 years of RC soaring"! Ed.

A building Question

We received the following question from E.O. Wiley in Kansas:

"I have a building question. I built a Kestrel 2M two years ago, For a relative beginner (LSF Level 1), it represented a step up and I have had fun with it, except for the fact that I break the fuse a lot due to what is probably over aggressive landings. It now has carbon tow reinforcements and beefed up wing mounts (the NSP-style wing bolt system). My wife bought me a 100" version of the Kestrel, and I will put it together this winter between F1B (Wakefield) building. Do you have any advice as to how to beef up the fuse? From my free flight building, I have lots of light Kevlar cloth and a limited amount of carbon cloth. I was thinking of plastering some Kevlar."

Response from Jer:

I haven't seen a Kestrel kit, but would think the following suggestions would apply to most models.

Do the plans show a double layer of wood in the nose? If so, is the inside doubler made of balsa wood or lite ply? If it is balsa wood or lite ply, I recommend replacing the doubler with 1/16 or 3/32 inch plywood. Make sure that this plywood doubler runs from the nose to the trailing edge of the wing. For a little extra, laminate your lite Kevlar in between the fuselage side and the doubler.

There are probably some formers in the nose, at the leading edge of the wing, and at the trailing edge of the wing. If they are balsa wood or lite ply, I suggest replacing them with 3/32 or 1/8 inch plywood.

Is the bottom of the fuselage flat and sheeted with balsa wood or lite ply? If so, I suggest replacing it with 1/16 inch plywood.

I wouldn't worry about the extra weight of the plywood. It's not going to add that much. Any extra weight will all be in the nose, which means less lead.

Hope my suggestions help.

Apogee Question

Emerson Ford has an interest in Apogee, and dropped us the following e-mail:

"Recently I obtained a third-hand ship and have enjoyed messing with it. In the article (*RCSD* June 1999, page 5), most of the suggestions dealt with minor structural changes. However, the ship seems quite strong as it is. Am not convinced that 2 degrees less polyhedral would help it; would it not simply reduce the "roll rate" slightly, without significantly improving the sink rate or glide angle? A tad of washout is of course helpful in ships of this type. Did a hole in the nose block, to hold more lead seem necessary? I took lead out of the ship as it was delivered to me. It's politically incorrect, perhaps, but it seems to me that Brian Agnew was right when he said that the more lead in the tool box and the less in the nose of a glider, the better, within limits, of course. Ships balanced at the rear of the "envelop" seem to have lower sink rates and flatter glides, although they may not be quite as easy to fly. (The flier needs to be comfortable.) Less nose weight also allows less elevator throw, a further reduction in drag, or so it seems.

"Recently I added a 12 inch "trip" to the top outer portions of each wing and flew the ship (without any ballast) in wind that

was gusting over 20 mph. After a modest high start launch, the ship found a "standing wave" and managed to climb without circling for an eleven minute flight, which was all the more beautiful against a rather dark sky. (Could have been longer, perhaps, had I done a better job of staying in the wave.) The "trip" did seem to enhance both performance and stability, but more testing is called for.

"Mr. Murray said the ship has "good handling and light wind performance." What exactly did he mean by "light wind"??"

Response from Lee Murray:

Thanks for your feedback, Emerson. What I meant was that the best flying speed for the model is under 15 mph. In a wave you can handle a higher wind speed, but if you need to find a thermal and the wind speed is 15 mph, you won't be able to go down wind with the model very far or go up wind very far to find a thermal. With ballast it might do fine. We didn't try that.

Do you think we sold the model short for windy conditions?

Happy Flying!
Judy & Jerry Slates

CROSS COUNTRY SOARING

by Scott Gradwell
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Welcome current and future Cross-Country enthusiasts. I was asked to write this column to spark interest in R/C Cross-Country soaring and so we would have a place to share ideas with each other about Cross-Country soaring. I don't claim to be an expert, but I do claim to be enthusiastic and willing to learn and share what I learn with others about Cross-Country soaring.

To help you understand a little bit about me, I will tell you about my history with aviation. I have been involved with aviation since my first memories. About the time I was born, my father started construction on a Cherokee II homebuilt sailplane, and had been interested in modeling before that. I built Comet and Guillows kits when I was in grade school, and eventually wound up graduating to a Mark's Models Wanderer. This sailplane taught us how to fly until it lost a battle with an asphalt taxiway. I don't think we ever caught a thermal, just a lot of fetching the high start followed by sled rides back down. My second sailplane was an Airtronics Super Questor. This was about the time my father started flying his Cherokee II in Siskiyou County. We did catch thermals with that one, but it wasn't skill; we would just bumble into one and were amazed when it went up. I really didn't do much more with R/C soaring until I became involved with a local club, the Southern Oregon Soaring Society.

My first contest I showed up with a Pussycat and got whacked pretty well, but I knew I liked it and wanted to learn more so I could get better at it. While I was building better gliders and trying to become a better pilot, I learned about R/C Cross-Country soaring. This really interested me and my father because we are also full size sailplane pilots and felt this emulated full size soaring a lot better than the thermal duration contests. So he went out and bought a SB/XC by RnR and formed the first Montague Cross Country Challenge so we would have a competition to fly it in. We formed our team and were pretty excited when the entries started rolling in. The first day of the competition was our first day to ever jump in the back of the truck and chase a sailplane around a course. Our team had a blast — part of that I am sure was because we went 20 miles, won the day, beat some pretty good pilots, and then ate a fantastic barbecue meal. But we also found out there was a lot to learn about doing Cross-Country soaring. This is what I hope this column can be; I hope people will e-mail me with tips so I can pass those along, and questions so I can go out and find answers to those.

Next month, I will try and describe some of the basics of Cross-Country soaring and some of the requirements for giving it a try. ■

Jer's Workbench

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Getting Hooked in RC Soaring

In November, the *RCSD* team prepared the guide "Getting Started in RC Soaring", which we discussed in-depth last month. This month, I'd like to take that notion one step further, and share one possible approach for welcoming others into our wonderful world of RC soaring.

Let's say you are out flying one weekend. A car that you do not recognize pulls up, a spectator gets out, and walks over to the pit area, eyeing all the different models. Likely feeling out of place, but obviously interested in the goings on, he walks back to his car, watching from a distance. After awhile, he strolls back over to the pit area, trying to get a closer look at the models. Before long, your eyes meet, and you wave him over. Returning your smile, he quickly takes you up on your offer, and asks the kinds of questions one would expect from someone not familiar with the hobby. After answering the basic questions, you give him a copy of the handout "GSinRCS".

When it's your turn to fly, you invite the spectator to join you at the flight line, explaining what you're doing, and why. After a few minutes of flying, watching his look of awe and wonder out of the corner of your eye, you casually ask if he'd like to take the controls. Nervously accepting your offer, the transmitter exchanges hands. There's a turn to the right, a turn to the left, and then he quietly says, "I've gotta have one of these..." He's just been bitten by the RC bug.

Where do you go from there?

Let's take the scenario a step further, yet.

You invite him to attend your local club meeting. He agrees and shows up all smiles not knowing what to expect. You just happen to have a copy of *Model Aviation* handy, the club rules and regulations, and you carefully explain the importance of insurance, etc.

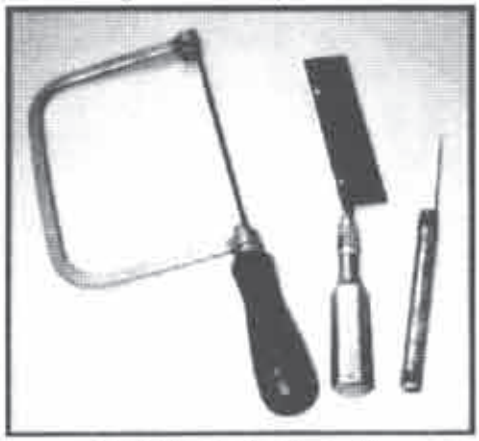
The spectator really appears to be interested in learning more. So, after the meeting, you offer to meet him at a local hobby shop, and help him do some comparative shopping for a radio, kit, and miscellaneous building supplies. You explain that the hobby shop likely will not carry everything he needs to get started and that some things would need to be ordered via mail.

After shopping and perhaps over a cup of coffee or a coke at the local fast food place next to the hobby shop, you discuss his purchases and the things that are still needed to get started. And, you offer to walk him through building his first model, giving him your telephone number just in case.

Everything's in hand!

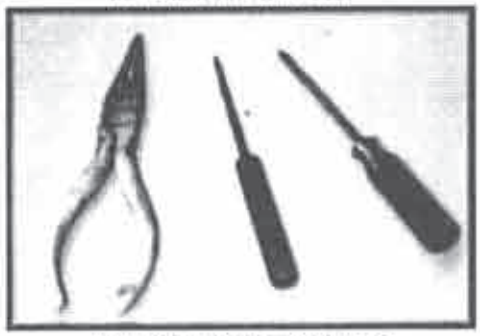
Later in the month, the telephone rings, and it's the beginner, excited about the boxes that have arrived. He's read the manuals with the radio and the kit, and isn't sure what to start on first. The easiest thing to do at this point is say, "Come on over to my shop, and we'll discuss what needs to be done."

Miscellaneous cutting tools: razor blades, modeling knives with replaceable blades.



Small hand saws - easy to use.

Inexpensive hand drill with miscellaneous small bits.



Long nose pliers, small straight, and Phillips screwdriver.

Assortment of small clamps.

The beginner arrives, his questions are answered, but he's not ready to leave just yet. He's seen your workshop and wants to know what all the power tools are used for. From his expression, he's obviously wondering if he's made a mistake and this hobby is gonna cost him more than he thought...

Assuring him that all those tools aren't necessary, after awhile he hurries home to start building his first model.

Basic Tools for Modeling

As most of you know, all one really needs to build a first model are a few basic hand tools and accessories as shown in the photos. T-pins and sandpaper (not shown) are also handy to have around.

And the Beginner?

Over the years, I have indeed invited spectators and beginners over to my workshop or garage shop, helping them with kits or scratch built models. That's also when I find out what they don't know about the hobby, and where I can help out.

If any of you have had similar experiences, or want to share your approach to helping others learn about our wonderful hobby, we'd like to hear from you.

■

on the Wing

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Swept Wings and Effective Dihedral - Part 1

One facet of tailless aircraft performance has always intrigued us — the ability of swept wing tailless sailplanes to travel at high speed without exhibiting Dutch roll, yet demonstrate excellent spiral stability while thermalling. This differs from what is seen in high performance conventional tailed sailplanes.

The designer of a conventional cross-tailed competition F3B machine must very carefully balance wing dihedral and vertical stabilizer surface area. There is a tendency to Dutch roll at high speed, and opposite aileron must be applied during thermal turns to prevent a spiral dive, even when the aircraft is optimized.

Since both vertical stabilizer area and geometric wing dihedral are held constant during flight, what is it about swept wings which allows them to "violate the rules"?

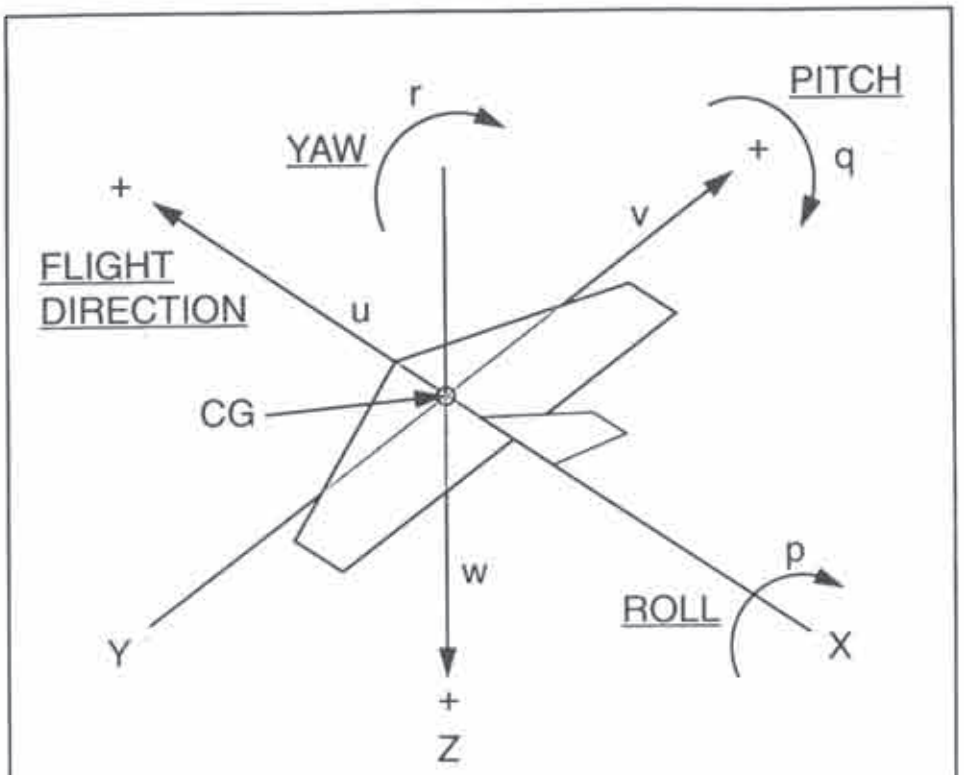
To begin, we need to go over the fundamentals, and so Parts 1 and 2 of this four part series will be devoted to explaining effective dihedral itself — how it is derived and how it influences aircraft stability.

Pitch, Yaw, and Roll

Diagrams of aircraft in which the three rotational axes are noted can be found in most aerodynamics textbooks. Our rendition is included here as Figure 1. In simple terms, the nose of the aircraft can move up and down through an axis which parallels the wing span (pitch, Y axis), and it can move right and left through a vertical axis which passes down through the fuselage in the region of the wing (yaw, Z axis). The aircraft can be also be made to rotate around an axis which roughly goes through the nose and tail cone (roll, X axis).

Elevator deflection changes the camber of the horizontal tail (stabilizer and elevator), increasing lift in the direction opposite to elevator deflection. By moving the elevator up or down, the aircraft tail may be lowered or raised, thus raising or lowering the nose. This is a change in pitch (Y axis). The size of the elevator and the distance between the center of gravity (CG) and the elevator determine elevator power. The larger the elevator surface area and the larger the distance between the CG and the elevator, the more elevator power.

If the elevator is deflected upward, the aircraft tail is pushed downward and the nose is thus raised. It must be clearly understood that the elevator controls the wing angle of attack, that is the angle of the wing to the freestream airflow. A larger upward deflection of the elevator will place the wing at a higher angle of attack. However, when elevator deflection is neutralized, the wing will return to its "normal" angle of attack. This is because the horizontal tail acts as a longitudinal stabilizer.



Axis	Linear velocity	Angular displacement	Angular velocity
X (roll)	u	ϕ	p
Y (pitch)	v	θ	q
Z (yaw)	w	ψ	r

Figure 1, rotational axes

The rudder, when deflected, pushes the tail either right or left. Rudder deflection changes the camber of the vertical tail, increasing lift in the direction opposite to rudder deflection. When the rudder is deflected to the right, for example, the tail swings to the left and the nose swings to the right, inducing yaw, a rotation around the Z axis.

Larger deflections of the rudder will result in greater yaw angles, but the aircraft will return to zero degrees yaw when the rudder is neutralized. The vertical tail thus acts as a directional stabilizer.

Aileron deflection changes the camber of the wing in the region of the aileron. Upward deflection reduces lift, and further deflection may cause negative lift. As one aileron deflects upward, the opposite aileron deflects downward. Downward deflection increases wing lift in the region of the aileron. These changes in lift promote the lifting of the wing for which the aileron is deflected downward, and the depression of the wing for which the aileron is deflected upward. These coordinated actions induce roll, a rotation around the X axis.

While increased elevator deflection increases the angle of pitch and hence the wing angle of attack, and increased rudder deflection increases the angle of yaw, increased aileron deflection increases the rate of roll. Holding a specific wing angle of attack or aircraft angle of yaw is accomplished by steady continued deflection of the relevant control surface, elevator or rudder. Holding a specific angle of bank, however, dictates neutralizing the ailerons. There is no restoring moment when aileron

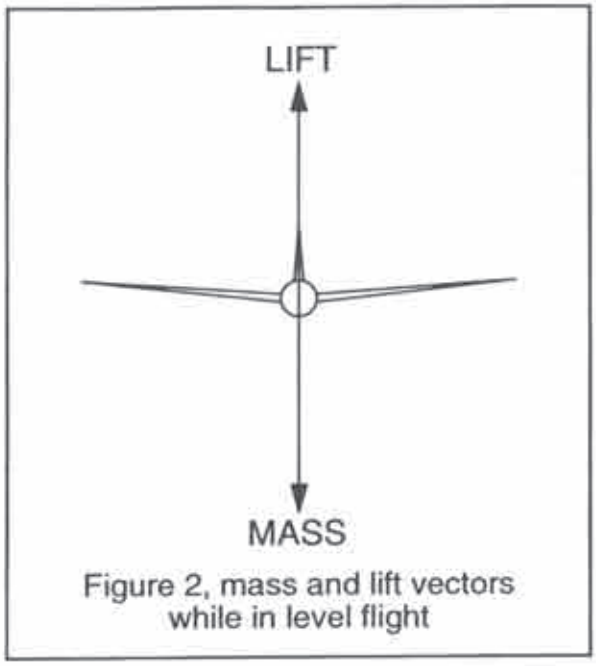


Figure 2, mass and lift vectors while in level flight

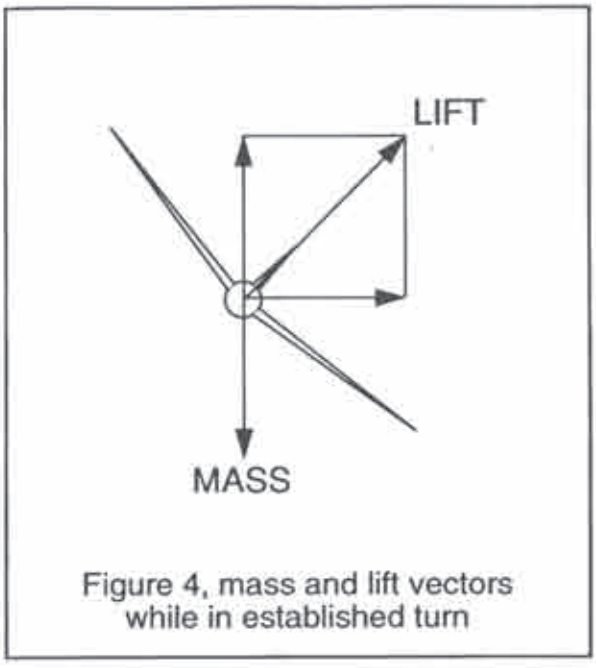


Figure 4, mass and lift vectors while in established turn

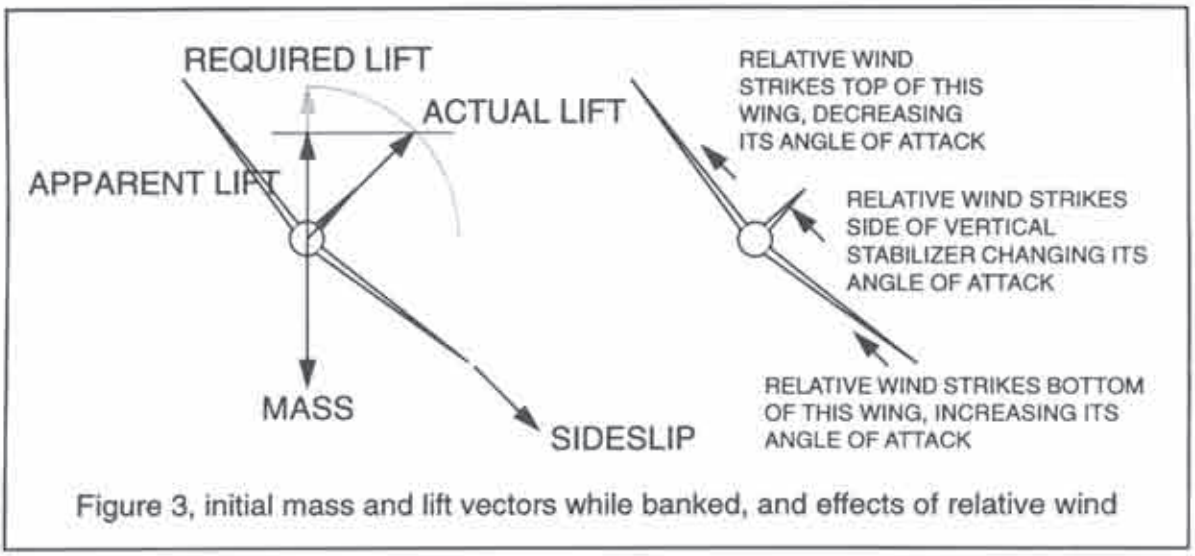


Figure 3, initial mass and lift vectors while banked, and effects of relative wind

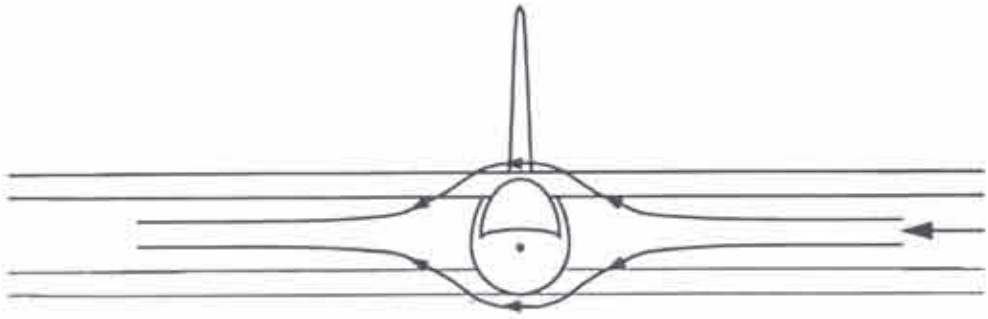


Figure 5, effect of fuselage on airflow over wing during sideslip

deflection is neutralized and so the wings do not return to level. Instead, the roll rate reduces to zero and the bank angle is maintained.

The horizontal and vertical stabilizers are thus direct mechanism for returning the aircraft to its equilibrium attitude in pitch and yaw, but there is no equivalent mechanism for roll.

Lateral Stability

The above discussion is somewhat simplistic in that roll never takes place by itself. Rather, roll always causes some other motion. In straight and level flight, lift equals aircraft mass. See Figure 2.

First, and most important, roll causes a sideslip. When there is no pitch input to change the angle of attack of the wing, and the airplane is rolled to a specific angle of bank, the vertical lift component is less than the mass of the aircraft. A sideward component is at the same time acting in the direction of the eventual turn. See Figure 3. The aircraft drops and its velocity increases so the vertical lift component will equal the mass. The aircraft accelerates into a circular path because of the sideward lift component. See Figure 4.

When this process is initiated — the aircraft is banked but the lift is too small, through lack of airspeed or lack of C_L — a component of the mass acts along the wingspan and the aircraft sideslips. It is important to recognize that no component of lift acts along the span, so the lift does not cause the sideslip. Once the turn is established, the lift and centrifugal effects balance the mass, but initially it is the unbalanced mass which causes the sideslip.

As an example, if the aircraft rolls to the left, the aircraft will sideslip to the left. This is equivalent to yawing the aircraft to the right, as the air is coming toward the left side of the aircraft. Such a sideslip to the left may thus be caused by either an initial roll to the left, or by moving the rudder to the right.

If the wing has some dihedral (wing tips higher than wing roots), the sideslip creates a situation in which the lower wing, which is moving into the sideslip, meets the

oncoming air at a greater angle of attack than the higher wing. This generates a restoring force. It should also be noted that the lower wing, because it is operating at a greater angle of attack, is generating more drag than the higher wing. This creates a yaw to the right, thus reducing the sideslip. The result of all of these effects is to both reduce the sideslip and restore the wings to level.

An aircraft is said to have static lateral stability if the right wing rolls upward when there is a sideslip to the right. Because dihedral causes this response to a sideslip, lateral stability is sometimes referred to as "dihedral effect."

Another contributor to lateral stability is the position of the wing on the fuselage. If the wing is mounted on the top of the fuselage, any sideslip will change the flow of the air over the fuselage in such a way that the low wing, which is moving into the sideslip, will be operating at a higher effective angle of attack. The raised wing, on the other hand, will be operating at a lower effective angle of attack. When the wing is located on the top of the fuselage, the wing acts as if it has some positive geometric dihedral. This is because of the airflow over the top of the fuselage. See Figure 5.

If, on the other hand, the wing is mounted on the bottom of the fuselage, the wing moving into the sideslip operates at a slightly lower effective angle of attack, while the raised wing operates at a slightly higher effective angle of attack. This is due to the airflow over the bottom of the fuselage, and accounts for the observation that high wing monoplanes have very little dihedral, some times none at all, while low wing monoplanes have obviously steep dihedral angles.

As the aircraft rolls to the right, the angle of attack of the left wing is immediately reduced because of the airflow coming from above. The right wing, on the other hand, operates at a higher angle of attack because the airflow is now coming from the bottom. There is an accompanying differential drag effect as well. These effects take place only while the aircraft is actually rolling, however, and hence have a damping rather than a corrective action. That is, if the wings are held at a constant bank angle there is no vertical velocity on the wings, and no damping forces are generated. It should also be noted that if the angle of attack is such that the wing is near stall, the downgoing wing may in fact stall, thus reducing lift precipitously and allowing the already lowered wing to fall.

A swept wing, without fuselage or tail, tends toward lateral stability. This is because the air more directly meets the wing which is moving into the sideslip, creating more lift and, as stated previously for conventional aircraft wings, more drag. Both of these actions result in restoring moments. See Figure 6.

A small restoring force in roll is also generated by the vertical tail if it protrudes from the upper part of the fuselage. See Figure 3.

In Part 2 we'll cover yaw-roll coupling and adverse yaw, directional stability, spiral instability, and Dutch roll, and the effects of taper on effective dihedral. OK, there's one formulae, but we'll give you all of the relevant information in graphic form, so don't worry. See you next month!

Suggestions for future topics may be sent to us at either P.O. Box 975, Olalla, WA 98359-0975, or <bsquared@halcyon.com>. ■

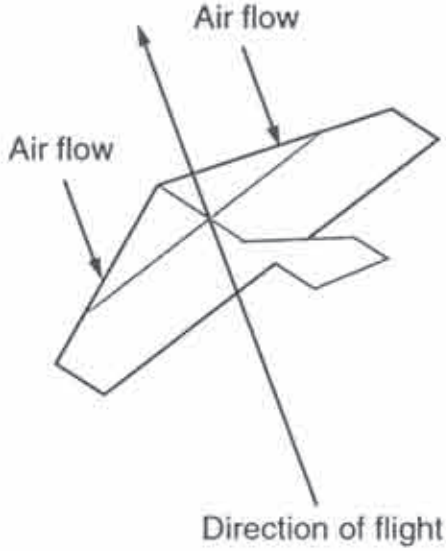


Figure 6, air flow during sideslip for swept wing

International Scale Soaring Association

There is a growing interest in scale soaring in the U.S. We are dedicated to all aspects of scale soaring. Scale soaring festivals and competitions all year. Source for information on plans, kits, accessories and other people interested in scale. For more information, write to:

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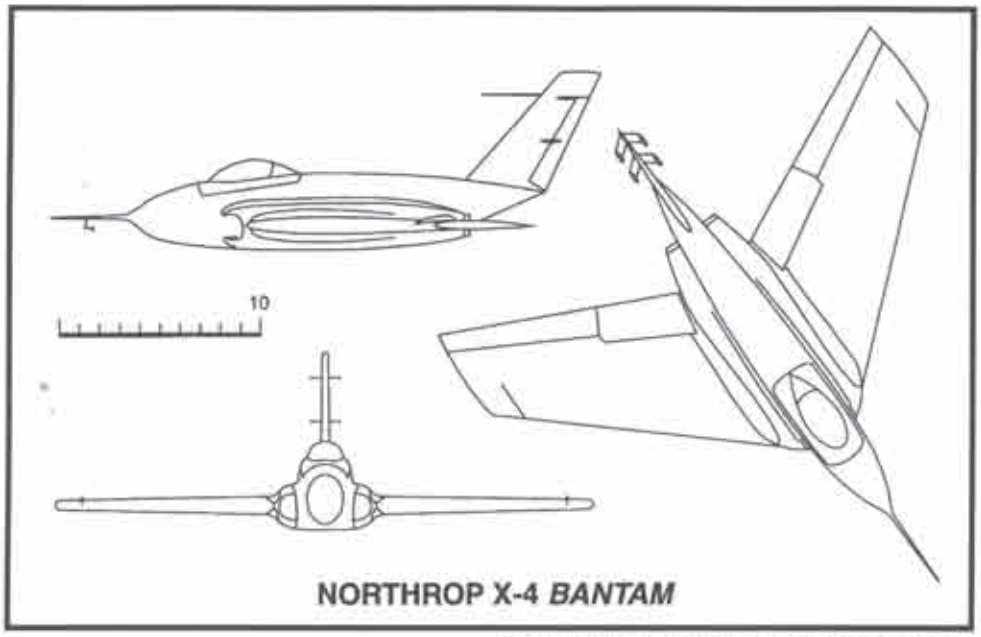

NORTHROP X-4 *BANTAM*

"SHORT CUTS"

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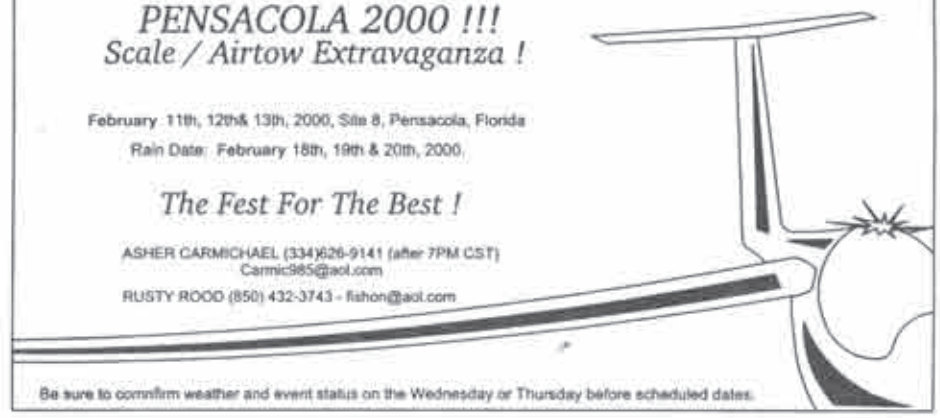
X-4 Part 1

As most of you know the X-4 is the current building project this Winter/Spring. So far, the project has started off a bit slow, but is picking up pace. B Squared did a great job kicking off the project last month, with the wing analysis as well as aircraft history. It is nice to know that at least a 1/6 scale version has been built and, most importantly, flown. As for airfoil selection, I'm leaning towards EH-2.0/10.0 since it will give me a lot of working space (thickness) to develop the split flap/dive break system, as well as improving wing strength with a thicker root section.

So far to date, all requests for plans have been for 1/6 scale most likely due to portability. As for myself, I'll opt for 1/5 scale. The development of the plans is nearly complete and began when B Squared provided me with 3 views and sections in a graphic format, forwarding them to me, via e-mail, and our kind editor, Judy Slates. I imported the files into a Computer Aided Drawing (CAD) package. Once imported, I drew over the relevant outlines and sections needed to develop full size plans. The graphic was then saved separately for future reference, panel lines, markings, etc. The true CAD drawing is now available to manipulate in order to build to scale, with just a few key stroke commands, as well as separately copying and flipping the wing outline.

With drawings available to proper scale, sections A - H were printed, then shot with 3M-77 spray adhesive and applied to scrap 3/8" Rohacel R-51 foam. Rohacel is quite pricy and not available to most builders, but there are several available substitutes. I would recommend 1/4" light ply as a substitute or similar wood structure, but not foam. The plan here will be to use Rohacel, or light ply formers, to maintain the sections both for shape and structural integrity. These sections should also be fitted with lightening holes to reduce weight as well as allowing for the lost-foam method to be used.

I plan to insert and shape pink or blue foam between the sections, shape the entire plug, glass it over, and "melt" out the foam chemically with either acetone or another liquid to reduce the foam. Rohacel R-51 is pretty much inert to these solvents, so they and their bond to the glass should remain intact. The extreme ends of the fuse will be fitted with R-110 Rohacel or hard balsa with extra glass overlays. Well that's it for now, more to follow next month. ■



LAIMA: THE FIRST ATLANTIC CROSSING BY UNMANNED AIRCRAFT

Part II

By Tad McGeer © copyright 2000
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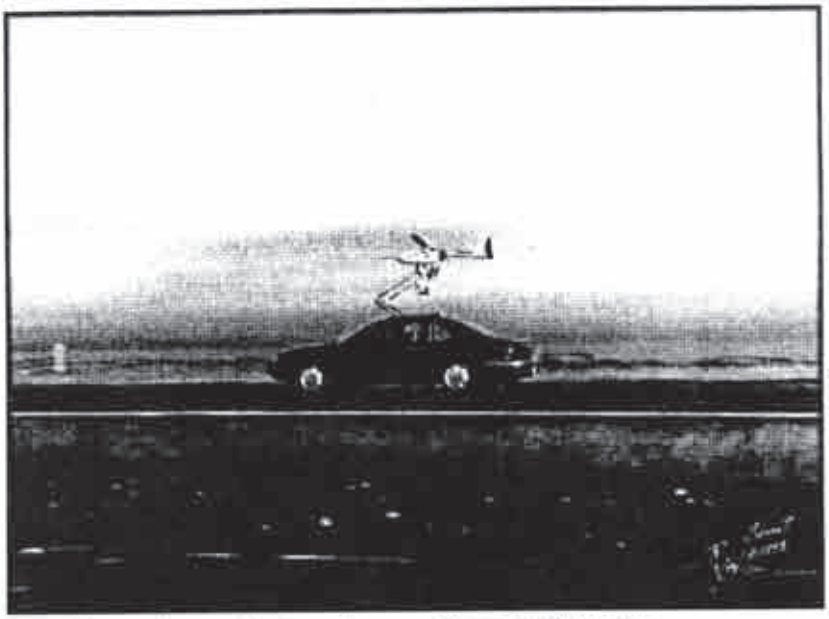
25 February 1999

(Thanks go to Air & Space Magazine and Tad McGeer for sharing this wonderful story. And, thanks also to Robin Lehman who coordinated its appearance in RCSD.)



The adventure begins

The official letter of approval from the CAA arrived on Monday 10 August. Our gear left for Newfoundland that afternoon, and the landing party - Bill Vaglienti from Insitu, and Steve Huffman and Greg Lipski from UW - flew off to Scotland the next day. There was little time to lose. Commitments at the end of the following week awaited my two companions in the launch crew: Kip Jackson, the pilot, and Ross Hoag, the engineer whose meticulous husbandry of field hardware was essential to all of our flight operations. Margins had become disconcertingly thin; we would have only a few days to catch acceptable weather.

We left for St John's on the Thursday night. Next morning, on the flight up from Halifax, I gazed out across the Atlantic, placid but immense and forbidding all the same. I had by then caused tens of thousands of dollars to be spent, and compounded that investment with the extraordinary efforts of people scattered over three continents, and now it was all on the line for the preposterous illusion that, only a few days hence, one of our puny toys would survive out there beyond the edge of the world. It was surreal.

There was little time to feel overwhelmed: we had made our plan and we hit the ground running. Still, my grip on reality was hardly improved by being given the job of getting the gasoline. Here I was, first browsing the caverns of Wal-Mart for two jerry cans to supply A TRANSATLANTIC FLEET, and then presenting myself at the airport Esso in hopes of actually buying some aviation fuel. The staff eyed me suspiciously: company policy, it emerged, told them to beware of geeks bearing jugs. I tried to imagine a persuasive way to establish my bona fides, but even lying a little by saying that the fuel was for only one Atlantic crossing seemed unlikely to be convincing. Stymied, I retreated to Shell, where fortunately they had no qualms about how clients carried off their purchases. The bill came to C$28.43. And so, with my few hard-won litres in hand, I embarked on the MV Flanders for Bell Island.

Kip and Ross had deposited our gear at the airport, and found the facilities, and the welcome, as accommodating as we could possibly imagine. The three of us were adopted for the duration by Gord and Marilyn Shea, both Bell-Island born, and now Bell-Island returned in retreat from the bustle of southern Ontario. They became our superb hosts in sharing the ups and downs; the comings and goings; the continual calls and harrowing waits; and the ultimate triumph of the week to come.

I had checked the long-range weather forecasts with Cliff Mass while passing through UW two days before, and, while initially discouraging, the expectations turned out to have improved. By Saturday morning, the Sunday and Monday were shaping up to be excellent launch opportunities. Bill's landing party had by then done the preparatory work at the Scottish end, and we worked with a will to be ready at ours - preparing two aircraft, checking equipment; surveying the runway; doing simulations - but then we ran into a problem. The Web site with the Atlantic wind forecasts, which until that day had been updating every 12 hours for weeks, suddenly wasn't. Even though we knew that the weather was good, we could not do flight planning and fuel estimates without those vital wind numbers.

It became essential to find Steve Lord in Washington on a sultry August weekend. Directory Assistance put me through to several Steve Lords in the Washington area, but none seemed to know or care very much about weather over the North Atlantic. I switched to a Web search, and eventually, through a balky long-distance connection that kept hanging MS Explorer, teased out a home-phone number. But that only led to Steve's answering machine: not necessarily better than his e-mail boxes, by then cluttered with frantic appeals - some of which, ominously, had bounced back undelivered. Increasingly desperate, I tried again that evening and found Steve just as he arrived home from vacation! It wasn't much of a welcome: after midnight he called back from his office, where for several hours he had been battling a crashed disc and a broken server. By then the chance for a morning launch was long gone, but the next day, with much phoning and improvised internetting of data between Washington, Seattle, and Bell Island, we got ourselves organised for an attempt on Monday.

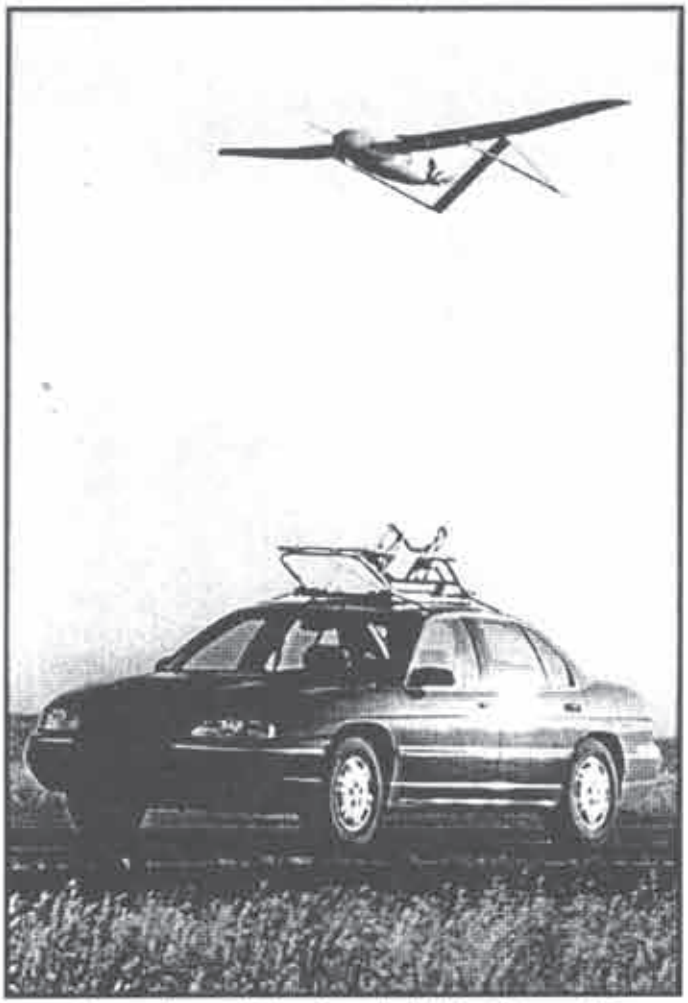
Between these scrambles we did a short shakedown flight late Sunday afternoon, using Millionaire. The flight turned up some data-communication anomalies as we circled over the airfield under manual control, with the autopilot having to take over several times when signals from the ground station were blocked. Similar, albeit unreproduceable, anomalies had led us to scrub some test flights back home, and we had attributed them to use of an unfamiliar frequency band. (We normally communicated at about 420 MHz, but had moved down to 406 MHz for the Atlantic program in order to satisfy European spectrum rules.) The fades were unnerving, but it looked as if we would have to live with them.

Our first pair of Atlantic aircraft, Trumper and Piper, were left fueled and ready at the airport. Flight-planning work continued into the night. Meanwhile the boys in Scotland were all set - Bill having by then mollified Her Majesty's Customs and Excise, which had got wind of the itinerant robotic tourist and insisted on stamping her passport! The crew was anxious, suffering under the pressure of an assembling multitude of visitors, and further sapped by Hebrides isolation and relentlessly bad weather. Yet it was not so bad that they couldn't manage some sort of landing - if an Aerosonde made it that far.

Launch

On launch morning we were up around four to check the final flight plan, e-mailed overnight from Seattle. Cliff Mass and Scarlett Bendana, an undergraduate in Aeronautics and Astronautics, had been up late watching the forecast. The weather was holding: launch was definitely on. I transcribed the route for loading into Trumper, with a final simulation just to be sure. Dawn came up as we arrived at the airfield. It was windy, as forecast, and clear with a lovely view down Conception Bay into the maw of the Atlantic.

The familiar drill kept us moving through



Trumper leaves the launch cradle, 7:14 local time on 17 August. Minutes later, after some checks over the Bell Island airfield, she was sent down Conception Bay and out into the Atlantic. Everything was normal when she disappeared behind Cape St Francis, and she was due in Scotland about 24 hours later. But Trumper never arrived.

Ross Hoag and Kip Jackson rest Piper on the ground beside the Bell Island runway, just before turning power on to run the preflight checklist. Both were veterans of fours years of development and field trials, Ross as the engineer overseeing all flight hardware, and Kip as technician and pilot. But the North Atlantic was a challenge like no other. Keith Gosse photo.

pre-flight, but the stress was inescapable, and our edginess mounted as, for the first time in our experience, a crowd gathered to behold the proceedings. The Bell Islanders had quickly taken a proprietary interest in the whole adventure, and launch was an event not to be missed. As the time for engine-start approached, Kip and Ross signed Trumper's fuselage. My talisman was in the avionics bay, a set of pilot's wings given me years before by John Blackmore - the Spitfire pilot and kindly, firm, and thoroughly decent model of a headmaster who had been a friend and flying companion since grade school in Vancouver. He had died just months before; Trumper was named after one of his beagles, which is about as much of a memorial as he would likely have countenanced.

I addressed the audience briefly, with thanks and a word of advice that Trumper, being a prototype aircraft, should be trusted only as far as it takes to run for cover. Everyone dutifully retreated behind the line of cars parked off the airport road. We drove the launch car back and forth on the runway to check communications, and, while there were hints of communications fades, they seemed small enough to be manageable.

We launched on schedule and took a few minutes to verify performance over the field. Then the time had come. It required only that I enter a new waypoint on my laptop, and Trumper would start along the programmed track to Scotland. In simulation after simulation it had been just three casual keystrokes. But now my fingers hesitated. Ross and I considered the enormity of the moment. We decided to go.

Trumper was out of sight in a trice. We tracked her on the laptop, switching to a longer-range antenna as she moved down the bay, and finally lost signal behind Cape St Francis with the aircraft 40-odd km from takeoff. In other circumstances, loss-of-contact would have brought apprehension. This disappearance, however, took a weight off our shoulders. We had all been worried about screwing up, about some unspeakable catastrophe scuttling the enterprise before it had even begun. But now we were off according to plan; Trumper's wind reports were as forecast; and all of our telemetry indicated that she was well on her way. Only time would tell.

We had a break in the sun. Three hours were planned between Trumper and Piper, to allow for some uncertainty in flight durations along slightly different routes - and for the extended ceremony that would doubtless follow landing in Scotland! Interviews and photography filled the interlude. Then back to work, and, as we went through the pre-launch checks on Piper, the communications problems had become worryingly worse. Yet they were not easily reproduceable, and, after protracted tests proved inconclusive, we had to make a decision. Clearly we were facing a significant risk of intermittent communications loss, but the autopilot would take charge if manual control was blocked during takeoff. Having come this far, going ahead was our best option.

Launch was fine, and we had no problem until about 30 seconds into the climb. Then there was a communications fade, and the autopilot came on automatically - but, instead of flying ahead smoothly, it put the aircraft into a rapid left roll. The nose dropped straight down, and Piper disappeared behind the cliffs in a rolling dive - followed after a couple of seconds by the sickening thump of impact in the water.

Even more sickening was the diagnosis. After reviewing telemetry and checking the flight software, I realised that I had made a mistake in the code. It turned out that the autopilot was not being initialised properly when it came on automatically (as opposed to the usual enabling by ground command). Often the initialisation would nevertheless be okay, as indeed it had been on those rare occasions over the 4 previous years when we had had similar blockages of manual control. But I could recall quite a number of instances on the ground - including those during Piper's pre-flight checks - when interrupted communication had caused the ailerons to jump. Had I given this a bit of elementary thought we would have saved $25,000 - and perhaps more had Piper made it to Scotland!

But now Trumper carried all of our hopes. In St John's that afternoon I stopped where Alcock & Brown had taken off a lifetime before. The site was long since engulfed by the spreading city, and, standing on a busy corner, I had to strain to imagine the clamoring takeoff and leaden climb of that overloaded Vickers bomber. It carried not merely their hopes but also their lives, and very nearly took them. John Alcock was forced, with mixed results, to improvise instrument flying in those days before instruments, while Arthur Brown had to chance a night wing-walk to chip ice out of their engines' strangling intakes. We lesser pioneers crossed the Atlantic while snug in our nice warm beds.

Snug indeed, and, despite the worry, tired enough to sleep. Trumper was due about seven Newfoundland time, and I turned in with the fatalistic hope of someone shaking me awake, red-hot telephone in hand. When I eventually woke of my own accord, sometime after seven, just the daylight in the room told me that hope was already faint. We stuck it out through the morning, the phone stubbornly silent except for the odd caller wanting the latest report - and to whom we could only say that no news was bad news. Eventually Bill rang from Scotland wondering how long to stay on watch. It had already been a very tough day for his crew, waiting forlornly together with an audience of expectant media, anxious officials, and sundry restless friends. When Trumper was a few hours overdue it was time to pull the plug.

Now we steeled ourselves to face it all again - or worse, not to have the chance for lack of fair weather. Laima was on deck, named by Juris Vagners, drawing on his Baltic heritage, after the ancient Latvian deity of good fortune. At that point we would take our luck wherever it could be found.

But we weren't allowed to let Trumper go so cleanly. That afternoon we were back on the runway, verifying the diagnosis, and the cure, for Piper's crash, when Bill rang urgently from Benbecula. They had been called about an aircraft fitting Trumper's description, flying at low altitude, 100 km to the north over Stornoway! It was hard to imagine: it would imply failure of both navigation and range safety, compounded by flight endurance at or beyond expectation, and moreover by some byzantine evasion of the mountain range between Stornoway and the ocean. Nevertheless we had to investigate quickly, and I left Bill to do what he could while I rechecked the flight plan in Trumper's telemetry. It was correct: there was no question of having sent her to the wrong place. Presently Bill called back, having boiled the commotion down to two reports, and only one of those described something at all like an Aerosonde. A mistaken witness, however, seemed far more likely than Trumper actually materialising in the area that was claimed. We decided that a search would probably be a wild goose chase - but still left word with the local police, just in case. Then on Wednesday we received yet another in-flight report, now more than two days after launch. Trumper, it seemed, had transmuted into a robotic Flying Dutchman.

A second chance

Weather precluded launch on Wednesday, with the Hebrides even more dismal than usual, rain in Newfoundland as well, and poor winds enroute. But Thursday looked more promising, so we geared-up flight planning and aircraft preparation to have another try.

We had to run Laima's engine for a while to check oil consumption. At home it had seemed high at idle, but a retest at cruise power turned out to be satisfactory. Laima was cleared to go. Then our eyes wandered to Millionaire. She was one of the original ten Aerosondes, built by Insitu in 1995 for our first Australian trial (and named,

Ross Hoag holds Piper's mangled electronic brain, retrieved from the water below the airport in an afternoon salvage expedition mounted by ever-helpful Bell Islanders. A communications outage shortly after takeoff had provoked an obscure error in the Aerosonde's autopilot software, and Piper dropped in a rolling dive beneath the Bell Island cliffs. A change in pre-flight procedure avoided the problem on subsequently launches. Ron Bennett photo.

following a dinner at Gilligan's in Darwin, after the cast of television characters). She had last flown offshore at the Oregon coast in 1996, and in test work since then had gone through countless engines, wing sets, and sundry modifications and upgrades. We hadn't planned for her to take an Atlantic adventure, but, having come this far, we had to shoot our bolt. We fitted her with the last of our batch of lean-running engines; tested her on the ground; and had a pair of aircraft ready for the morning.

By this time Steve Lord's wind server was back in action, but Windows data-transfer was still crashing continually as it grappled with the long-distance lines from Benbecula and Bell Island.

Truly impressive phone bills ran up as we tried to coordinate the far-flung flight-planning operation. But by late afternoon in Seattle, Cliff Mass and Scarlett Bendana were offering a route south of the great circle through winds around a mid-Atlantic high. The estimate was about 26 hr enroute with 1.2 kg fuel remaining - not as good as Monday's numbers, but certainly good enough, and the weather for arrival in Scotland was expected to be quite tolerable. There would be a lot of rain and convection over the ocean, but, based on our experience in tropical thunderstorms and British Columbia downpours, I had told Cliff that rough weather would not be a problem.

And so on Thursday we repeated the pre-dawn launch preparations. First light at the airport showed good weather, with high clouds and moderate winds, and a crowd of ever-encouraging islanders assembling to lend moral support. Preflight turned up a few communications fades, and before starting to roll I made quite sure of a good initialisation should the autopilot come on automatically. We launched just before 7:30, and 30 seconds later I called for Kip to enable the autopilot. Laima was then out of the danger zone. Overhead checks were fine, and then it was again time for the fateful few keystrokes that led off to Scotland. By 7:40 Laima was out of sight. We tracked her down the Bay at 350 m altitude; the air was smooth; the wind west at the forecast 15 kt. Half an hour later we lost contact off Cape St Francis, with Laima running as well as we could wish.

Three hours later Millionaire went down the same track. Her performance was much the same, except that the cylinder head was running on the warm side. After launch we had had to nurse her up to avoid overheating, but, with cruise temperatures settling back within acceptable limits, we had decided to go ahead. Millionaire's signal vanished at 11:20, just where Laima had gone before. Now both dice were in the air.

Kip was instantly in a car and heading for St John's - he had stayed an extra day for the Thursday launch window, and now he was overdue back home. Only the packing-up was left for Ross and me. We had our equipment off the field by noon - and then wondered how we managed to fill all the boxes despite being three Aerosondes short! After a few hours the gear was packed, and the bulletins posted, and more interviews done for a press still steadfast and eager. Then we slipped into tourism, with a peer through one of the labrynthine iron mines sprawling out beneath the Bay. Hard evidence indeed of a cold, dark, tough life for little reward, but a life which had made Bell Island a thriving, chimney-puffing place in the days when Lindbergh and Earhart had passed overhead. Now the pace was much slower and the island traded on charm.

Our ship comes in

First thing Friday morning I checked the itinerary updates, which Greg Tyrrell of the Melbourne group had calculated using the overnight wind posting. Laima's arrival at the holding circuit was still expected about 10 am Newfoundland time, so contact with the ground station was likely between 9:30 and 9:45. Bonhomie had kept tension at bay the night before, but now we were all tightening like drums - Ross, me,

Laima sits in the South Uist grass with her landing crew: Bill Vaglienti, Greg Lipski, and Steve Huffman. In addition to her remaining kilogram of fuel, she carried a puddle of water collected during what must have been a lengthy transect through rain in the mid-ocean frontal band. Gracious and patient hosts of the UK Defence Evaluation and Research Agency had dispensed large rations of scotch to sustain the crew through a wearing week, but now the celebrations could begin in earnest.

Gord and Marilyn Shea, the crew at Benbecula, and a few keeping late vigil in Australia. I took a walk along the cliffs, relieved by the warm, azure day, and telling myself that, after all, perhaps just making the attempt had accomplished most of our objectives. It might not happen today, but already we had broadcast the message that robotic aircraft were a'comin' in.

Ross and I had our freight to ship home, and we queued for the 9:50 ferry. I strolled, or perhaps paced, by the quay, integrating as I imagined through some Gaussian curve of probable contact times. Seen in this way, half of our chance of success would already have slipped away before the expected time of arrival - a hard business to endure, particularly when our chances with Trumper and Piper had already been lost entirely.

My pocket phone rang at 9:40. The Gaussian slipping stopped; very nearly my heart as well. The voice at the far end was channeled into classic NASA-controller monotone:

"This is Bill. We are in contact with Laima."

Mine was not:

"FAN-tastic!"

Bill checked a point about setting Laima's altimeter and then hurriedly signed off. I ran back toward Ross in the ferry line, thumb high in the air. "We're in!" Elation, relief, and pure happiness flooded through us, and it was hard to collect our thoughts. The post-contact protocol hadn't been part of the rehearsals. "Who do we call first?" Ross called his wife. (It was 5:15 in Hood River). I decided on Marilyn Shea, who at that moment was probably more wound-up than anyone; she burst into tears. Then down the list: Kip; Andy von Flotow; Juris Vagners, all in bed on the west coast; Greg Tyrrell waiting up in Melbourne. But it turned out that the Australians already knew.

We found out much later that the Melbourne group had cracked under the strain and called Benbecula. On their first try the phone had rung and then been hung up; they tried again and were dismissed with a terse "It's Laima! Gotta go!" Laima had just then started to toy with the Benbecula crew. At 13:01 (local time) she did a periodic wind-measuring maneuver - an S-turn around track - and so briefly flashed her antenna favourably toward the ground station 57 km away. It was just enough to squeeze through a short burst of telemetry. The ground-station PC, which had been torturing the crew for hours with impassive silence, suddenly piped up with a beep and a new colour to show active communications. Then nothing. "Was that Laima?" Bill, who well knew the communications software, insisted that it really couldn't be anything else. But there were five long minutes of electrified tension before the oracle spoke again, finally in firm contact at a range of 48 km. Then the tension released and the control room exploded.

Greg Lipski went through the arrival checklist, and uplinked new waypoints to bring Laima onshore. She slipped in past the surveillance radars on Benbecula and St Kilda islands (which, despite knowing where to look and trying hard, didn't see a thing). At 13:40 she crossed the beach and entered a circuit of the landing field. Control was then switched to a second ground station: the long-range operation was done from a blockhouse inland, while the landing had to be flown from a Land Rover parked down on the field. Little time was wasted. Bill turned up from the laptop and there was Laima, brilliant white under the scattered cumulus charging in from the Atlantic. He quickly selected manual control and wheeled her steeply into the chill 20 kt breeze. "ENGINE OFF!" Two keystrokes from Steve Huffman stopped the propellor for landing. Touchdown was a gentle plop into the tall grass - whereupon, as Eric Sorensen of the Seattle Times put it in his account, "researchers and a handful of onlookers erupted in cheers and hugs."

"We have something you lost," said Bill's monotone, back on the phone as the Flanders pulled into dock at Portugal Cove. Ross and I drove on to St John's in a state of total relaxation, and unhurriedly ran our errands in town. Even Millionaire's arrival time came and, sadly, went, with only a faint echo of the morning's worry. It was also sharper: Laima's trailblazing had narrowed Millionaire's Gaussian, and we had to count her out shortly after lunch. For our senior Aerosonde it was a poignant final curtain, but easily seen as an honourable and glorious finale. For us, that day, all sides were incorruptibly bright.

When Bill next called we were back on the Flanders for the return trip to Bell Island. Our first thought was for Millionaire, but it was clear by then that there was little hope, and none was on offer. We agreed to call it quits after another hour or so. Meanwhile there was more information on Laima. Her nose boom, for measuring static pressure, had snagged in the tall grass and ripped out on landing, but that was incidental. More remarkable was a load of rainwater found sloshing in the avionics bay. We had been doubly careless: first, having run out of our preferred tape for sealing the wing/fuselage junction, we had used a poor substitute that the rain had undermined; and second, we had not made a drain hole! Laima's Latvian luck had been with her all the way.

But there were more than just Baltic deities to thank. The plethora of enthusiastic help and encouragement that the Atlantic program had enjoyed deserved a gratitude that I could hardly express. Back on Bell Island I sent off a few messages, swept up in the flurry of e-mails that were by then ricocheting round the globe. No form of words would even begin to seem adequate.

That afternoon I stood in the warm sun on a cliff overlooking the brilliant turquoise of Conception Bay, stared into a television camera, and considered whether I was surprised. No, I told my interviewer, not surprised. We wouldn't have come without good reason to expect a successful result. But on the other hand, when considered in purely visceral terms - tiny aeroplane, big ocean - the whole idea had, admittedly, seemed pretty far-fetched. And this is really the compelling conundrum that draws one into such an enterprise: if one fails one is puzzled; but if one succeeds, one is amazed. Amazement - that sort of amazement - is surely one of the great pleasures that experimental science has to offer. And what pleasure became ours to share! So it was shared that night, not least in the pubs of Benbecula and the boisterous salon of the Sheas' Bell Island home.

The next day Laima was boxed up and squeezed aboard the Saturday flight to Glasgow. Bill really had had to clear her through customs for coming into the United Kingdom, but, with an exquisite bureaucratic symmetry, her papers were thus perfectly in order when the time came to go back out again! She wended her way slowly home to Seattle, and into retirement at the Museum of Flight after a career of only two flights.

Our gamble had paid off in full measure. An attentive media soon fulfilled all our hopes by reporting Laima's success far and wide. Where previously the idea of long-range operations by miniature robotic aircraft had been a bit of conceptual esoterica, now it had become a well-known fact on the ground. And in the collegial circles of meteorology and aviation, the possibilities for routine service suddenly seemed a lot more real, and a lot closer. Much engineering remains to be done, both to achieve satisfactory reliability and to make these small aircraft much more efficient and long-ranged. But the path ahead is clear.

An interviewer asked why all of this hadn't

been done before. It was a good question. The first robotic aircraft had predated even Alcock & Brown, and the engineers of forty years ago doubtless could have managed an Atlantic crossing between their busy expeditions to Mars and the Moon. But it would have had no point. Nobody was prepared to pay the huge bill that a transatlantic aircraft would then have carried, nor, moreover, to make use of the information that it might have supplied. Laima's moment came at the convergence of need and opportunity: need created by fast forecasting computers and their voracious appetite for a steady diet of environmental data, and opportunity by modern technology in its manifest forms: GPS, of course, and other small and cheap novelties carried onboard, but also the laptops and cell phones and Web connections upon which we relied on the ground (and indeed, at whose mercy we were sometimes left to fume and flail). One might have expected the rush of technology, and particularly of remote-sensing satellites, to leave far behind the quixotic notion of a little toy aeroplane slowly poking its nose hither and yon into faraway nooks of atmosphere. Instead it conjures it up insistently, and thrusts it onto the widest stage on the globe.

■

WINTER FUN!

My Airplane's Icy Adventure

By Andy Mitas

It was an ideal winter evening for flying. Just picture it — barely a sprinkling of snow on the ground, no wind, pretty sunset, and just cold enough to keep you from getting lazy. I was flying my "Pocket Rocket" (a 38 inch pod-and-boom HLG) in a space behind my house of ~100 x 100 ft. When properly trimmed, the Pocket Rocket floated beautifully. In fact, I would challenge the wing loading of any fine undersize HLG to a shot at the Pocket Rocket. Anyway, I was still learning to fly the thing (I'm terrible on the sticks.) and had done a couple of nice, short flights in this little flying area.

At this point, more specifics on my flying spot: flat & grassy, rectangular, with trees on three sides and a sharp slope ending at a lake on the fourth side. The lake was frozen...

So, back to the story — I figured it might do no harm to fly over the frozen lake, because I would probably not land on it anyway, and if I did, the plane would simply slide to shore. That doesn't seem like a tremendous lapse of judgment, does it?

I gave the Pocket Rocket a good, strong toss. It flew unimpressively to the trees, at which point I turned it around. It was now flying over the lake. It was a beautiful sight indeed. I just gazed at how my airplane lightly glided through the wintry air, not how it was lightly gliding progressively farther from shore. From a great desire to make this airy moment last forever, I pulled up a bit to maintain altitude. That wasn't a tremendous lapse in judgment either, was it?

The Pocket Rocket stalled and made a hard landing, right in the middle of the lake. It slid about five or six inches.

Within a second or two, I realized that $200 of radio equipment, not to mention the project of my winter vacation, was about 80 feet from shore, sitting ever-so-peacefully on one inch of ice that was supposed melt within the next day or two.

I quickly ran into my only option — my fishing rod, the big one that I used for bass fishing when I ran into free time. I tied on this huge, red-and-white lure with about nine large hooks bristling from it. If I was gonna get my prized baby back, this bass-terrorizing beast would be the method. With little examination, I discovered that the closest point on the shore to the poor airplane was my neighbor's dock. It was about 2 1/2 feet wide and ten feet long. Near the end of it was a little Christmas tree. I went behind the Christmas tree and began to cast the lure towards the unfortunate aircraft. It soon became apparent that it would take a miracle to reach the airplane. Within minutes, I was doing more praying than plane fishing. Before I knew it, it was no longer the beautiful flying day it had been. It was getting quite dark now. The wind was picking up. Above all, it had become positively frigid.

I finally, more out of desperation than courage, pushed past the little Christmas tree and stood at the edge of the dock. After more casting and much more praying, I managed to hook the airplane and reel it back to myself. I brought the thing home, dropped it on the ground and plopped myself into a couch. Despite the fact that I had succeeded in my mission, I felt more stupid than heroic. ■

BOOK REVIEW

"Fundamentals of Sailplane Design" By Professor Fred Thomas Translated from German by Judah Milgram

Reviewed by Martin Simons
Stepney, South Australia

Fundamentals of Sailplane Design is a magnificent book which anyone with an interest in soaring should own and read. Although dealing entirely with full scale sailplanes, every chapter is also relevant to radio controlled model gliders. There are some sections which ought to be read with care even by pilots who claim to have no interest in design or theory. They need to appreciate what they are asking a sailplane to do and how they might, with safety, get the best performance from it. We all benefit from a better comprehension of what is happening to our aircraft as the air flows over and around them.

This is the third edition of a standard German work, revised by the author and translated into excellent and very clear English by Judah Milgram. It is the only comprehensive book of its kind available in any language and is destined to become recognised as a great classic. (The original German edition, entitled 'Grundlagen fuer den Entwurf von Segelflugzeugen' was published in 1979. A second edition followed in 1984.)

Fred Thomas, the author, has held senior positions in the DLR (the German Aerospace Research Establishment) and was Professor of Aerodynamics at the Technical University of Braunschweig (Brunswick) from 1966 until his retirement in 1998. During this period the famous 'Akaflieg Braunschweig' (a society of students and staff dedicated to research and practical development of new aircraft) produced some of the most innovative sailplanes, the SB 7, 8, and 9, the giant SB - 10 with 29 metres span, the SB - 11 with variable geometry wings which won the world soaring championships in 1978. More recently, the tailless SB - 13 has excited much interest around the globe and, it is admitted, caused its pilots some agitation too. The new family of wing profiles devised by Horstmann and Quast also came from this University Department and have led to considerable advances in wing design. Thomas is also a sailplane pilot.

The book requires careful study rather than a quick skimming. There are, of necessity, some mathematical passages. Despite this, by reading all around them and studying the diagrams with attention, anyone can understand what the equations are saying. The text is highly readable even by those who are put off by formulae; Judah Milgram has done a first class job here.

The level of mathematical difficulty is not great. In most cases the reader needs only the four simple rules of arithmetic. Some understanding of basic trigonometrical ratios is helpful and the occasional square root sign or fractional power appears. Integral calculus is hardly needed although to know at least the meaning of the symbols is, in a few places, useful. (As Sylvanus Thompson said in 1910, "What one fool can do, another can." The elongated letter S in calculus means only "add up all such little bits as..." and the large Greek letter like a capital E, sigma, means much the same thing. These will take most of us fools far enough.)

As the title states, this is a book dealing with the fundamentals, an introduction to its subject, not a detailed manual for designers. However, there is a very fine bibliography and many well-directed references to be followed up.

In addition there is an appendix with over 140 small three view drawings, a few of 'vintage' sailplane types but mostly modern, and a most useful set of tables giving full data, including not only the usual figures but tail volumes, aileron and air brake particulars, aerofoil sections and wing twist. This section will doubtless be referred to frequently by scale model makers. The drawings themselves are not sufficiently detailed but enough is given to direct attention to promising subjects.

Finally are sections describing routine flight testing procedures, and excellent indexes.

In summary, a book not to be missed, worth every cent of its price ($50 US plus shipping), and likely to be well used.

Published 1999 by College Park Press, the book can be ordered directly from them at:

College Park Press
PO Box 143
College Park, Maryland 20741 USA
(301) 422-4626
http://www.cgpp.com
http://www.cgpp.com/gr.html (book info.)

(274 pages, 270 x 230 mm, Foreword by Prof. Loek Boermans, bibliography, two appendices, German-English glossary, indexes.)

ISBN 0-9669553-0-7

■

HAVE SAILPLANE, WILL TRAVEL!

Some of the diehard group there almost every weekend that the weather is flyable.

by Tom H. Nagel
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This column is dedicated to soaring vacations. This month, Randy Bullard takes us to a mountain slope in North Carolina.

Randy Bullard has been flying RC gliders off and on for 19 years and full scale power planes and gliders for more than 30 years. He moved to the Charlotte, North Carolina area from Atlanta, Georgia eight years ago and flies with two different groups of pilots: a small thermaling group in Charlotte and another group at the Lump, which is a 2.5 hour drive from where he lives. Randy was a tech support manager for a computer industry company when he lived in Atlanta. He and his wife now co-own a web site business in Charlotte.

The Lump

By Randy Bullard
bullards@earthlink.net

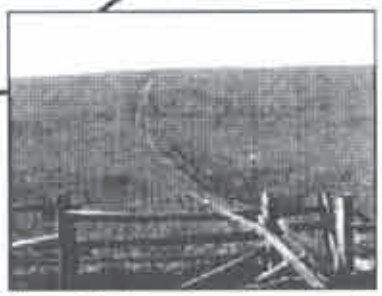
Finding good soaring slopes on the east side of the US is a challenge. Most of the east coast is fairly flat, other than a few sand dunes. Although there are a lot of inland mountains, most of them are covered in trees. The majority of the slopes that aren't covered in trees are on private property and it is difficult to obtain permission to fly there.

An exception to this is a mountain slope called the Lump. Located on the Blue Ridge Parkway in the northwestern part of North Carolina, the Lump can rival most west coast slopes for lift when it is working.

The Lump is just south of that point where the North Carolina "flat top" border with Virginia heads southwest along the Tennessee line. Look for a parking lot just south of mile marker 264 on the Blue Ridge Parkway. This is about four miles south of where highway 16 crosses the Parkway. The closest towns are West Jefferson, Glendale Springs and Deep Gap. The larger town of Wilkesboro, is south of the Lump on highway 16.

Located on Blue Ridge Parkway property, the Lump has a large paved parking lot at the bottom the hill. The Lump itself is a large grassy knoll that is clearly visible from the road. The large rectangular hill runs east-west, with the widest part facing south. You won't have any trouble finding it because it is the only large grassy hill with a paved parking lot close to mile marker 264. A wooden picket fence separates you from the hill, but there is a cattle gate entrance that allows you access. Simply park in the parking lot and walk up the big hill.

Randy Bullard & ICARE Hades.



View of the Lump from the parking lot.

Being an inland mountain slope, the Lump is not only dependent on wind direction, but it also gains a large part of its lift from thermal activity. However, don't confuse the thermal lift of a mountain slope with the wimpy thermals you find in the flat lands. The lift on a lot of inland mountain slopes can not only very powerful but is also more continuous than you normally expect thermal lift to be.

Mountain slope lift starts in the valley and gains strength as it moves up the face of the mountain. The Lump seems to amplify this even more because it faces south and, because we are in the northern hemisphere, the sun is always to the south. This heats up the face of the Lump more than if it faced any other direction.

Also typical of mountain slopes is that the lift there can be fickle and unpredictable. One day can have fantastic lift and you feel like you could fly a manhole cover, and the next time on a similar appearing day, you are lucky if you can keep a floater up.

Still when the Lump is working, it is a fantastic place to fly almost any thing. There are times when the lift is good from sunup and until well after dark. Also unlike most coastal slopes, the lift ranges from launch height to out of sight both vertically and horizontally. You can "speck out" either way on good day.

On an average lift day, almost any type plane with ailerons will work fine. Aileron planes are best because if there is much wind, the landings require the faster roll rate of ailerons to handle the turbulence. F3B/F3F/F3J type planes are especially nice here because they can gain lots of height for some truly awesome high speed passes. These type planes are also strong enough to survive the high speed dives from spec height without shedding parts. It is also easier to see these larger planes when they are way out or way up there. The top of the Lump has a large grassy landing area with only a few rocks, so molded planes are relatively safe flying here.

Most 60" slope racers are also a blast at the Lump. Their quick handling and ability to work a wide range of lift conditions makes them almost ideal for here.

EPP slope planes are lots of fun on the Lump. My old beat up Zagi has many hours flight time here. I often fly it when I'm really tired and still want to fly but don't want to risk a breakable plane.

On the average day, there isn't quite enough lift for some of the "lead sled" type slope planes. However, sometimes we get days that almost require something that is fast and strong. These days are mostly in the spring, but it can happen in the fall and early winter too.

If you would like to fly at the Lump there are some things you should know before you venture there. 3,400 feet may not sound that high, but it is high enough above the valleys below to have weather very different than what the local forecast say for the surrounding area. It can be nice and warm below the mountain, but be cold and windy at the Lump. So bring a wide range of clothes when you come. Even in summer, it can be cool on occasion. It is normally around 10 degrees cooler here than in the flatlands.

Because it does often have its own weather, predicting lift here is tricky. To be at its best, the Lump needs some wind from the south, but it does not have to be all that strong. The lift is usually best with the wind out of the south at 10 to 15 mph. Now I can hear all coastal guys snickering at this because for you, the stronger the wind the better. The Lump does not work that way for a combination of reasons. First, the Lump's strongest lift comes primarily from thermal activity. A 10 to 15 mph wind just acts as a turbo charger. However, if the wind is too strong it breaks up the thermal component. Also, all except the top of the Lump is covered in heavy forests. All those big trees cause lots of turbulence, which not only breaks up the lift if it is too windy, but also make landings really hard.

While a south breeze is usually best, the Lump also works well with a wind direction anywhere from east to southwest. The lift is often really good off the southwest corner. A west wind is flyable, but usually not as much lift is produced on this side. I've seen it blowing 35 to 40 mph and yet you could barely stay up. If the wind is out of the north, northwest or northeast, leave your planes in the car and go site seeing. The only thing being produced are really nasty rotors guaranteed to trash your plane.

Oddly enough, there can be good lift that lasts till after dark when it is totally calm. This phenomenon happens a lot in early summer. A typical pattern is good lift during the day, then it dies for a little while in the late afternoon. Then this gentle but steady lift fills in and lasts till you can't stand up any more. Larger wing span planes are able work this type lift the best.

The trees in front of the slope create a launching problem. The lift zone is father out than you can throw most planes. You will need a tow hook and a short bungee to launch all but hand launch planes. The only time you can fly a hand launch plane here is when the wind is almost dead calm. Otherwise, the turbulence will eat them alive because they just don't have enough wing loading and roll rate to handle it.

One other word of caution. During the spring when the weather first becomes nice and during the fall when the leaves have turned their bright colors, the Lump will have lots of tourists wandering around. Be careful when you are landing. Make sure your intended landing area is clear. Also please do not fly over people's heads. We are flying on Parkway property and we need to be careful not to frighten or damage the tourists.

On any flyable weekend and often during the week, there will be other pilots flying at the Lump. Most of us have been flying here for several years and can give you some pointers on flying this slope. The scenery here is great with a very good overlook of the valley and surrounding mountains. We all share each other's bungee launchers, so you probably won't need to set something up if other people are already flying when you get there. Please do not check your radio in the parking lot. You cannot see pilots at the top of the hill from the parking lot. Walk to the top of the hill and make sure no one is on your frequency first.

To check the weather conditions, there are two web sites that I have found especially useful.

http://www.weather.com/weather/cities/us_nc_west_jefferson.html is a local forecast that gives the best idea of what the local conditions are like.

http://www.intellicast.com/Golf/World/UnitedStates/Southeast/NorthCarolina/Wilmington/WINDcast/d0_18/ shows the wind direction in a very detailed manner. If the arrows are pointing straight north indicating a south wind, expect good lift unless rain is also forecast.

While the parking lot is a nice paved parking lot, there are no other facilities other than the trees, so be prepared. The Park Vista Motel & Restaurant is a very inexpensive motel and restaurant about 5 miles further south on the Parkway (336-877-2750). If I want to fly two days in a row, I often stay there so I don't have to make the long drive back and forth to Charlotte.

There are picnic tables near the parking lot, but I usually bring a folding chair to the top of the hill for all day flying. Also bring water, suntan lotion and food. If you forget something, we probably have it and will be more than happy to share. Feel free to e-mail me if you wish further information.

***

Thanks, Randy!

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

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■

Spectators at the Seglerschlepp event in 1998.

Alex Frisch discusses how to tow up a skydiver. Crowd entertainment after the Akro Cup last year.

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How Often Do Most of Us Get Out to Fly?

I received a most interesting fax from Frank Oeste this fall. I thought my Schlepper towed a lot. This fax gave me a sense of perspective. I sure wish I lived near these guys! Read on!

A Fax From Frank Oeste (23 September 1999):

"I did four flights (on my 1:2.5 Bruckmann Swift) at my second club near Dreieich and everything was OK. We use a Schleppmaschine with a 140ccm King-twin Boxer; it is only a tow aircraft without a full size origin (non-scale). A simple fuselage, on top a 300cm wingspan wing — that's all. It is flown by a person who is already retired. His name is Edgar; he was the Flugleiter — that means the responsible man at the runway, at Roedermark on Saturday. He is a good tow pilot. He writes down every tow in a little book.

"The Schleppmaschine had its first flight in April 1997. Until now, it has about 8000!!! tows, all flown by Edgar. This is true. I'm not kidding. I'm sure he is the guy with the most air tows in Germany, much more than Frisch and Wagner together. He is flying (both flying) our SWIFTs. They get in a lot of flying with a group of nearly 15 retired men and all are flying scale gliders. They are flying five days a week, during the whole year, about 30-50 tows a day, depending on the thermals. I fly there about 3-4 days a week, so I do about 500 glider tows a year. This is glider towing heaven! Because they fly on Mondays, Wednesdays, Fridays, Saturdays and Sundays, Andreas and I have been there yesterday...."

The "Toy Airplane" Syndrome

In the USA, many of us are faced with the "toy airplane" syndrome whenever we go flying. Our families often look down upon our little models and silently wish we would do something other than play with our "toys". This attitude seems to be prevalent all over the USA: how often have you had a conversation about your latest sailplane with someone who doesn't know you're talking about model sailplanes? When your friend finds out you're talking about "toy" airplanes and not "real" airplanes you sit in, what happens? That strange expression sparkles in the eyes: "What? Are you nuts?" Comes the thought...

It's Different in Europe

The attitude towards our "toy" airplanes is completely different in Germany! First of all, it's a family affair! The kids, wife/girlfriend, and the rest of the family all come to the flying fields (where there are clubhouses, toilets, playgrounds and usually a stove for hot food).

Secondly, whenever there is a sailplane event (in Germany) such as the Akro Cup or the Fun Fly in Rödermark, the whole town turns out to visit and spectate. In the case of the Akro Cup, the mayor of the Bad Neustadt attended the opening ceremonies, and handed out the trophies to the winners at the awards ceremony! Everyone had a ball!

Lots of Kids: the Future!

Perhaps even more importantly, many, many children attend these events and were wildly enthusiastic about seeing all these models on the ground and flying. After the Akro Cup was finished, there were many fun flights to entertain the crowd. Some of the sailplanes did a performance with smoke on their wings. There were "model" parachute jumpers; gliders of all sizes and shapes took to the air to keep the crowd entertained. There were also some younger pilots (under 10 years of age) who pleased the crowd with their piloting skills. Appreciation for a particularly good performance or a good landing brought applause from the spectators.

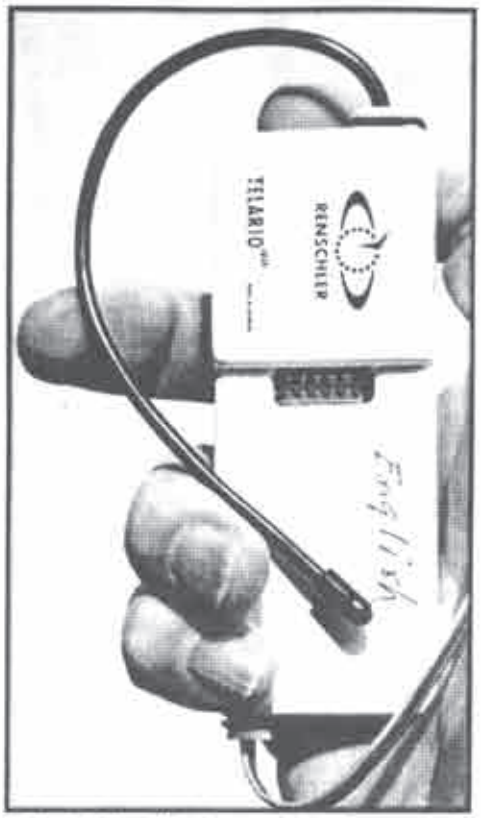
Huge Crowds Come to Watch Models!

The Germans certainly seem to have a different attitude and a different approach toward model airplanes. A year ago, the DMFV (equivalent of the AMA) put on a model air show in Berlin. This "model" air show included jets, powered aircraft, airtows with sailplanes, helicopters, and just about anything you can think of. Well over 100 pilots participated. Can you guess how many people attended this event? 1000 people? 2000 people? 5000 people? 8000 people? Well think about it; if you held a similar event in the nearest large city in the USA, how many people do you think would turn out? A couple of hundred? Well, the best illustration of the German attitude towards our wonderful hobby is the simple fact that over 100,000 people attended this model airplane event!!!!!! And you can fit many Germanys inside the USA!

More From Frank...

"Arnold phoned me this morning. He had his first flight with his big "Doppelraab" last Friday. It is flying very slow and realistic. It must be a huge glider, about 1:2.2 scale. Arnold is very happy.

"Yesterday we had our Acro meeting in Bruchsal. There were about 100 acro pilots there, 25 from us (the rest were "full sized" pilots). We heard a lot of interesting things about new proposed programs from the full size guys.



TelarioTalk will fit into any 1:4 or larger sized sailplane. It weighs only a couple of ounces. I attached mine with Velcro. Don't even think about getting one unless you plan to get addicted! Thommy makes good English instructions, so you can get everything out of this wonderful unit!

"Then we model pilots had two hours time for discussion about our thing in a separate room. Things will change a little bit next year:

- "The judges will be two from the full size team, two from Klaus Dettmer's motor acro judges and two from our acro cup judges. With Klaus we will have 7 judges then; actually we will need 5, so 2 will be on stand-by.
- "The way how to score the flights will change. Klaus Dettmer will make a new score system. The best pilot will get 1000 points, the others will be measured on him.
- "We will fly an unknown stunt routine, out of a catalogue of 25 figures. That means that we have to cancel the idea of flying with teams, because it is not possible, that one pilot flies the unknown as a team pilot and again as an individual pilot..."

More USA Airtow Events Than Ever in 2000!

A friend pointed out to me that this year there were probably 20 – 30 airtow events planned throughout the USA this year. That means that most of us had the opportunity of attending 1 or 2 nearby fun fly airtow events. It would seem that our opportunities are expanding, and that it's getting easier and easier for some of us to fly a little more. As we fly more, we'll fly better, and have more fun at it! Let's hope this trend continues, and that next year we'll have the opportunity of flying even more!

You guys who are hosting these events might take a feather from the Germans' hat: post notices of your event in nearby towns. Who knows? You might even get a bunch of enthusiastic spectators with kids!

Telario Talk

There's a superb new altimeter available called "Telario Talk". This fantastic tool is used by many German sailplane pilots. I saw it being used in Rödermark this summer.

Telario Talk speaks to you (in German or English). It tells you the altitude (in meters) every 50 meters, which is good for being towed up. It also gives you the altitude whenever you want – just activate the channel on your radio where the Telario Talk is plugged into. Most of the guys had their Telario Talks plugged into a Y-harness, sharing the tow release channel, so that once off tow if they wished to have an altitude reading, all they did was activate their tow release and Telario Talk would tell them how high they were. Sharing the channel works with all other radios, but NOT with Airtronics.

The altitude is given from ground zero, which is where the airplanes took off from. (In other words, the altitude is how high you are above where you are standing.) Telario Talk also gives an audible signal telling the pilot whether the sailplane is climbing or descending. Last but not least, every so often it "talks" and tells you the battery voltage. You can program all these features and get it to tell you when and what you want to know (altitude and voltage and whether you are climbing or descending).

It costs $400 from Thommys Modellbau (Thomas Seidel). He speaks English and is very easy to deal with. You can reach him by e-mail at <info@thommys.com>. Thommy is making a number of nifty improvements to this wonderful device. What follows is a recent e-mail message detailing the changes.

> From: "Thomas Seidel" <info@thommys.com>
>
> To: "Robert O. Lehman" <sailplanes@worldnet.att.net>
>
> Hello Robin,
>
> I have received the Telario, we have a new version of software and I am just doing some final tests. End of next week the English version should be available.
>
> In the new version a flightbook is included. This means if you have landed, you push the small red button and the friendly female voice tells you maximum and minimum altitude, maximum and minimum voltage, climb rate and sinking rate. The data is also saved in a constant memory, so you can compare different flights (up to 10) so you can easily use the Telario to optimize props of towplane or electric gliders ;-) without any extra sensors.
>
> The flightbook is initialized with the first "altitude on demand" so you can start the flightbook after you have been flying (airtowed), otherwise the climbing rate announced in the flightbook is a better indication for the quality of the towplane than the quality of your glider or your adjustments.
>
> There is also another change. In the setmode 4, you can select a time interval in which altitude announcements will repeat. This happens, if you put the switch or slider at your TR to high position. You will get the usual "altitude .254 meters.. voltage 5.3 volts".. and with a pause of 10 up to 60s, depending of setmode 4, "250 meters"..."200 meters"... and so on, as long as the switch is on high position.
>
> This is very useful on alpine soaring: if you have lost 200 meters and there is no clear vario signal, an automatic altitude announcement is very helpful.
>
> This year at the Hahnenmoos Pass in Switzerland, the altitude announcement saved the prototype of my 3m-Fox. I was 120m down the slope, and everyone thought this flight would end in the trees, but I knew, when I was only 130m down, and was not in the trees. This information let me still try to gain altitude. As it turned out, I gained 10 meters, and then some more and finally after a hard fight, made it back up the hill. Hearing the comments of the Swiss pilots on the video tape, one of them made, makes me very proud. They said that never ever under these conditions has a pilot managed to bring his glider up again - not with thermal gliders and especially not with an acrobatic glider like the Fox. But there must be a first time for everything....
>
> PS: I have met Jan-Kurt Hoffmann at model-fair in Stuttgart. We spoke about Elmira 2000, we both plan to be there next year. I hope to present some new gliders and a US-legal version of the Telario there.

For Use in an Airtow Thermal Duration Contest?

If you want to thermal, and have very long flights without worrying how your battery is doing, the Telario Talk is priceless! It will save many gliders from running out of battery juice, not to mention all its thermal potential. How about using it in a towplane in a thermal duration contest?

If a Telario Talk was installed in the towplane, it would be easy enough to establish a height limit (300, 400 600 meters?) at which point all sailplanes must be released. Everyone gets released at exactly the same height and "start your timers..."! If you use your imagination a little bit, knowing exactly how high a towplane is flying at any given moment opens up many new horizons for Fun Fly contest formats.

Aerobatics with a maximum start ceiling for all pilots? How about cross country using a towplane to get everyone up? Other ideas?

Let me take this opportunity to wish everyone the very best flying season ever! Let it be a memorable 2000! Great flying and good landings to all!

■

GORDY'S TRAVELS

Stylus Out of Power?

Re-'Pack' It with Bigger Ni-Cads!

By Gordy Stahl
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My travels took me to three awesome inland slopes (Cumberland, Maryland – Carlisle, Pennsylvania - Boone, North Carolina) and it made me really frustrated! Not the soaring opportunities, but rather with my radio batteries. You see, I put in a lot of air time on those slopes and found that I had to switch packs and fast charge packs in order to keep in the air.

Like most computer radios, the Airtronics Stylus is no exception to driving a battery pack down in short order. As you Stylus owners know, it has a very convenient feature of a quick-change battery pack. Just pop open a door and slip the pack out, then pop in a fresh one.

Well that is fine, but once I forgot the spare in my room; once I forgot to charge the spare. I thought I had the situation solved by re-fitting the pack container from the 700mah AA's to the new 1100mahAA's but, while it gave me more time, it didn't seem like all that much more time.

So when I got home from that trip, I went looking for an alternative battery, one with even more capacity. Now unless you do a piggy-pack (too bulky and heavy) I thought for sure the only answer would be in Nickel Hydride cells. I wasn't all that excited about going to NH cells because of the special care needed to charge and care for the cells; I mean, Ni-Cads were old friends, I knew what to do with them and what to expect from them. I have sophisticated chargers to care from them.

My search led me to an old RC swap-meet friend and professional battery guy, Mr. Ni-Cad. I explained that the Stylus had a removable plastic case which held 8 AA Ni-Cads, but that the space that held the plastic case was larger and that I might be able to fit some other cells in its place.

Warranty Disclaimer!!!

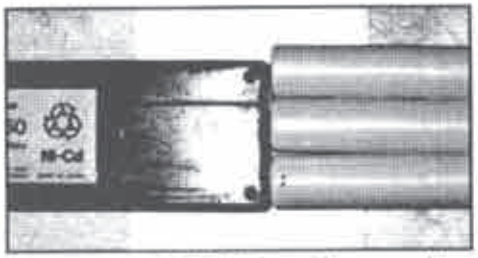
Remember, any modifications done to your radios automatically voids the Manufacturer's Warranty. This modification will not affect your radio's operation or its health, but your construction slip ups could cause you to damage interior circuitry. This modification is a huge advantage for those flyers who want to add flight time without switching packs, mid-flight, and is working well on my Stylus transmitter. Just take care... And, be aware of the pitfalls of modifying your equipment.

We discussed using NH cells but, in the end, I still felt NC's were the cells for this project. Mr. Ni-Cad came up with a new 'A' cell rated at 1700mah! Think about it! That's nearly three times the life of the original pack!

Those of you who follow my column know that my Stylus is kind of 'tricked-out'. It's got a Hitec Spectra, synthesized module, so that I can choose which of 50 frequencies I want to use. (I hate waiting for a pin!) It also has Hobby Lobby's 5" hard 'ducky' antenna, so modifying the battery pack was a logical next step.

So, I ordered two packs, pre-configured to a layout just like the original set of cells as they are in the plastic container. My discussions with Mr. Ni-Cad had given me the new cell's dimensions and, while the 'A' cells are the same height as the 'AA's, the diameter is larger. I figured, no problem - the difference in diameter would be compensated for by leaving the new pack out of the plastic case, just shrink wrap the new pack. But when the packs came, I found I was mistaken.

Undaunted, with closer examination of the radio case battery opening, I could see that with a slight amount of radius'ing with a Dremel sanding drum to each of the squared ends of the battery compartment opening, the new pack would slide right in. And you wouldn't even noticed that it was done!

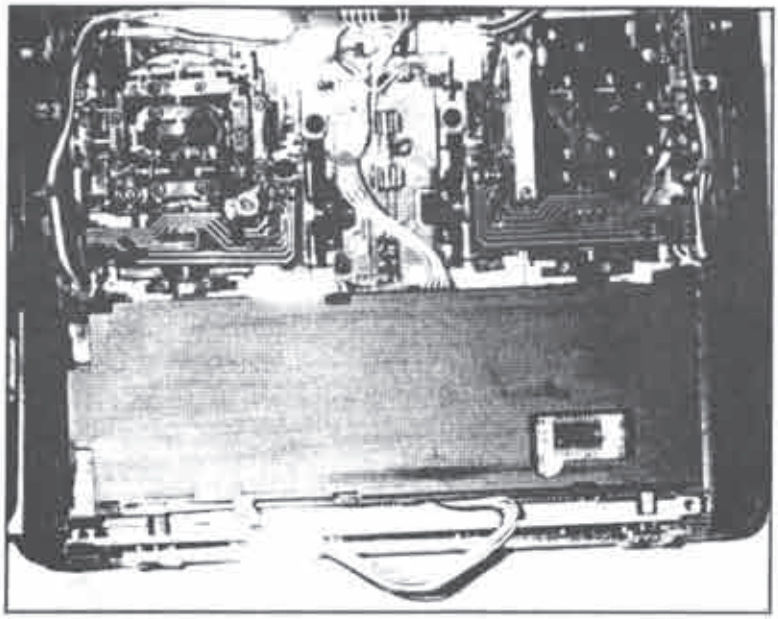


Stock battery pack compared to new 1700mah "A" cell pack.

The TX's battery compartment interior is actually a mounted Case, held in with two mounting screws from the bottom. Once the back was removed, that Case was visible. It consists of three components: the Basecase, which cradles and guides the Powerpack in to align with the Powerplug, and sort of a 'coffin' Cover that is held to the Basecase with two screws on the power plug end.

Since the new pack is wider than the original plastic Powerpack, it was clear that some slight modification of the Basecase was necessary. I carefully cut the upper edge of the Basecase off. I left the Cover's screw-lug on the Basecase, in order to maintain some stiffness at that end of the Case to hold the Powerpack's Powerplug secures against jiggling and to insure alignment of the Powerpack's Plug&Socket. I wanted to keep the Powerpack's ability to be replaced with another one... Just in case!

Once the Case was modified to allow the new pack access, it was time to fit the PowerSocket from the original plastic case and the Chargesocket to be mounted to the new pack. Without the plastic case there was plenty of room on either end to glue both sockets to the pack ends. I chose to use Goop as the adhesive versus epoxy, because I felt that having a small amount of flexibility wouldn't hurt. I removed the components from the plastic case - both are mounted on small, printed circuit boards, which helped add some gluing surface; I left the wires in place, needing only to attach the positive and negative connections to the battery pack ends. By the way,



Battery box inside of Tx.

the packs I ordered came with tabs, so connecting the wires was a breeze.

Aligning both sockets was simple, too. I first plugged the Powersocket onto the Case's Powerplug. I noticed that its board was just high enough to allow me to lay two small lengths of music wire in the crevices between the two sticks of cells, which fit under the circuit board for some extra support. I Goop'd up the crevices and the end of the Powersocket's board, where it met the end of the pack, and slid the pack up tight, then let it dry. (Note: make sure that the Powersocket and the mating Powerplug are seated all the way down in the case, ***before*** the goop dries, to insure/maintain that the original plastic Powerpacks will still work!)

After the goop dried, I confirmed that both the new pack and the original (I have a spare.) still self aligned with the Powerplug; it was time to Goop in the Chargesocket. What I found is that it just fits. I used the Chargeplug from the Wall Charger supplied with the radio to align the Chargesocket, while the Goop was curing, by inserting the CP through the access door charge hole and into the Chargesocket. Once that was secure, I soldered the wires in place. (I found that I had to replace one wire with a longer piece.)

The next step was to shrink-wrap the entire pack with the shrink-wrap that Mr. Ni-Cad sent with the packs. (Make sure you ask that the wrap is at least 1" longer than the pack, so that it overlaps the Powersocket board as well as just overlaps the charge end of the pack.)

Next, I realized that there was nothing to hold the pack in place other than the Powerplug connection; the edge of the Case I had removed, to allow the new one to fit, held the old pack from shifting vertically in the transmitter's bowels.

I noticed that the Stylus' antenna storage box (located on the TX's inside back) was spaced about 1/2" from the top of the new pack. So, I cut a 'wedge' of EPP foam to hold the pack in place. I beveled the foam's ends so that the entering pack would slide into place without bunching up the foam block. I used a small strip of two-way tape to secure the block of EPP to the antenna storage box. That solved any problem with the pack shifting around and also ensured alignment of the socket to the Powerplug during insertion.

Since the Case's Cover has screws to hold its end secure, but nothing to secure the rest of the cover's edges, I used some strapping tape along the edge along the bottom of the case more firmly. Then I put the TX back on.

Of course, it's never all that simple, and it turned out that the Powerplug just sort of sits in a slot at the end of the Case - for some reason was moving just enough to make it impossible to get the Powerplug and socket to align. So I went back in and put a dab of Goop on the Powerplug's board and slid the Pack in till it made contact to hold everything aligned.

Once that was cured, checked, and put back together, I then found that the Case needed a little more 'finessing' with the Dremel to allow the pack-with-shrink-wrap to insert easily, without binding at the edges of the opening.

That was it. Making a second pack was easier; all I had to do to make the second pack was to Goop another Powersocket and Chargesocket to its ends, then slide it in place to cure. This can be done without disassembling the radio back, once the Batterybox has been modified. (I was careful to do it with some shrink-wrap around the pack so that it would still align after the pack was shrink-wrapped.) After that cured, I Gooped in the Chargesocket and used the same trick with the charge plug inserted through the access door.

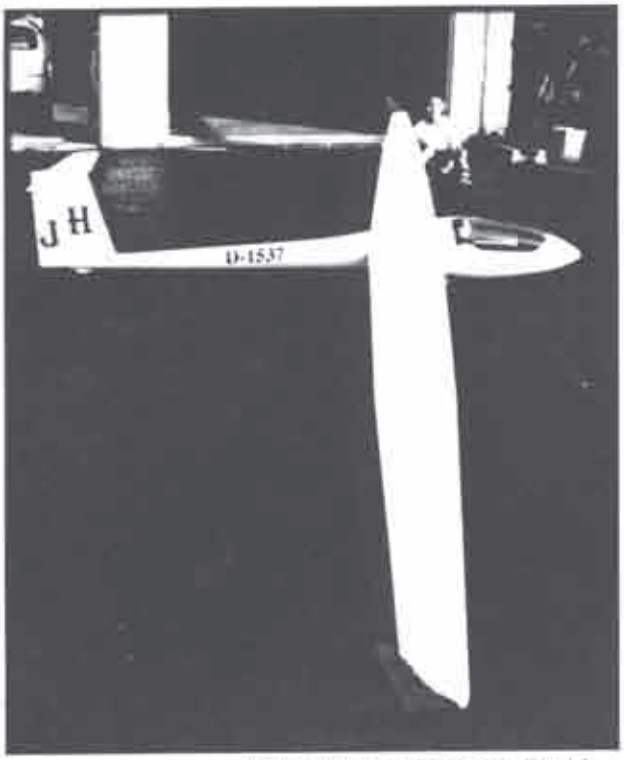
Charging the pack is still done with the TX's wall charger or with a fast charger. (Keep the charge amps under 1 amp to prevent the pack from cooking.) What do you do with the empty Pack case? Keep 'em with all the other stuff you might need some day!

This modification sounds a little complicated, but actually it is very simple to fabricate and complete. The original packs still work just fine, so the modification allows for new larger pack or the stock packs. The interesting thought is about the future… Chances are better that a higher capacity pack will be in the 'A' diameter cells, Ni-Cad or NIHM's!

If you have any detail questions, feel free to contact me via my e-mail at <GordySoar@AOL.com>.

My 1999 Travels have covered some interesting miles, locations, products and people, and 2000 promises to be just as interesting. My next trip is to Maryland to FMA for a review of the new FMA 'bounceable' foamie flying wing, the Razor. The FMA Razor 'series' consists of electric and slope versions. It's so pre-fab that it… Well, that's for the article!

Welcome to the future! And thanks for reading my articles and for the hospitality when I visited your flying sites! ■



1/3 Nimbus-2 and Joe's son, Daniel.

Recommended Radio Set-Up For Large Size Open Class R/C Scale Gliders

by Joe En-Huei
Lawrenceville, New Jersey

Introduction

Large size, open class R/C scale gliders (1/3 to 1/4) have become much more popular after the recent takeoff of the aerotowing movement in the USA. Why? Because aerotowing is the safest way to lift big gliders to altitude for flat field, thermal soaring. These big, scale gliders are extremely efficient and enjoyable to fly; in fact, it is quite easy for the pilots to become addicted. Here are a few examples of ARF's available on the market: Nimbus-2, 3, 4 and 4D, ASW-22, ASH-25, SB-10, etc.

These gliders often have wing span ranging from about 6 to 10 meters (with an aspect ratio between 30 and 40 and relatively thin airfoil), designed for the highest level of soaring efficiency. The long wings are therefore often quite flexible in flight, especially during speed runs and on tow, which might buckle the trailing edge control surfaces if there is one break between aileron and flap.

A mid-flap added between aileron and flap becomes desirable in the design for some long wings. In addition, perhaps the efficiency of long wings can be enhanced if the mid-flap functions as a transitional control surface. Another benefit of a mid-flap (with a separate servo) is to relieve the heavy loading on the flap servo when the flap and mid-flap are lowered in unison to slow down the plane. The concept of adding a mid-flap to the long wings of R/C planes comes from full size sailplanes.

Radio Set-up

About 2 years ago, I bought a 6.75 meters Müller Nimbus-2 (1/3) from Dan Troxell of Laguna Hill, California. The wings came with flap, mid-flap and aileron; I had no knowledge about how to program my radio (a JR 10SX) for this. I called Dan, a veteran pilot for mega size scale sailplanes, and Dan's guidance is described below:

- Call up the Flaperon option in the airplane mode. Right aileron goes to aileron channel and meanwhile left aileron goes to Aux. 1 channel.
- Call up aileron differential say 50 percent, to minimize potential for adverse yaw.
- Couple right mid-flap (say use Aux. 2 channel) with right aileron (master channel), but with 50 percent of the aileron deflection so that aileron and mid-flap move in unison. The aileron differential will be built-in for mid-flap.
- Couple left mid-flap (say use Aux. 3 channel) with left aileron (master channel), but with 50 percent of the aileron deflection so that aileron and mid-flap move in unison. The aileron differential will be built-in for mid-flap.
- Y-harness right and left flaps as one channel (say use Aux. 4 channel – hook up with a servo reverser so the flap servos can be installed symmetrically).
- Couple right and left mid-flaps with flaps (master channel), but with 50 percent of the flap deflection so that flaps and mid-flaps move in unison.

I have used 5 channels so far, and I still have 5 open channels — just enough for spoilers, elevator, rudder, tow release, and retract wheel.

Once the programming is done, it is time to check how the system works. I move the aileron stick to the right, the right aileron moves up say 1 inch, the right mid-flap moves up 0.5 inch, the left aileron moves down 0.5 inch, the left mid-flap moves down 0.25 inch and meanwhile the flaps stay neutral. Vice versa, if I move the aileron stick to the left. I lower the flaps down 1 inch, the right and left mid-flaps move down 0.5 inch in unison, ailerons stay neutral and, meanwhile, the mid-flap is coupled with aileron. Obviously, the purpose of the set-up is to use mid-flap as a transitional control surface between aileron and flap.

Most large size, scale sailplanes penetrate very well and I found there is no need to reflex the entire trailing edge of wings during speed runs.

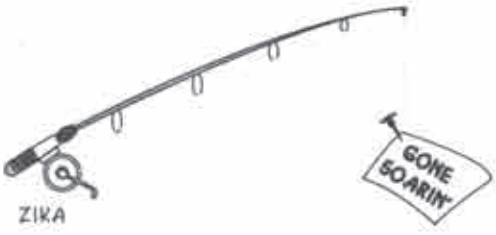
Test Flight with Mid-Flap Set-up

I have been flying the 1/3 Nimbus-2 for about 6 months with the fore-mentioned radio set-up. The plane is no doubt one of the highest performance R/C gliders in existence with proven ability to thermal well in light lifts. I often dial the flaps and mid-flap down about 10 and 5 degrees, respectively, to slow down the plane during thermal searching and during circling in thermals. The roll controls are still effective during low speed flight with little tendency to slip/skid in turns. Due to its super high glide ratio, the plane covers a lot of distance with little loss of energy. The 1/3 Nimbus-2 is very stable in strong wind condition due to tremendous energy it carries.

Conclusion

With a mid-flap as a transitional control surface, a 1/3 Nimbus-2 flew wonderfully up to my expectation. Of course, the radio system can be set up differently to suit the pilot's preference. The feedback from Dan Troxell is greatly appreciated for the successful test flights of the 1/3 Nimbus-2. I hope that this article could be of use to pilots of R/C sailplanes.

■



2000 MONTAGUE CROSS COUNTRY CHALLENGE

Location -	Siskiyou County Airport, Montague, CA
Date -	June 9th - Practice and LSF Task Days June 10th & 11th - Contest Days
Time -	Pilots meeting at 9am, flying begins at 10am
Task -	Saturday - Free Distance within a prescribed course Sunday – Speed Task, 2 hour minimum, 3 hour maximum
Classes -	Open, Electric, Sailair
Rules -	All sailplane pilots must be AMA members. The team will decide who and how long each pilot flies the sailplane. Sailplanes must be winch launched. There will be unlimited attempts allowed, no relaunching on course. Each sailplane must be identified with the last 3 numbers of the team captain's AMA number. The numbers must be 3" high and placed both sides of the vertical fin.
Prizes -	Plaques will be given to 3 members of the top 3 finishing teams in each class.
Entering -	Entry fee is $65 per team, each team will receive 3 event T-Shirts, and 3 tickets to a Saturday night BBQ. All entries must be received by May 9th, 2000. There will be a limit of 20 teams, so don't delay.
Lodging -	Camping is available on-site, no services available. Motels are available in Yreka, approximately 12 miles away.
Info -	For additional info please call Dean, Scott, or Randy at (541)899-8215 days, or Dean (541)899-7034 evenings, or e-mail us at dgair@cdsnet.net

Miss Manners Visits Davis Field

By Dr. Richard C. Williamson
Sudbury, Massachusetts

(Our club had some discussion concerning "guidelines" and realized that a lot of flyers, especially relatively new ones, don't really understand the unwritten rules. To help the situation, I wrote up the following for our club, Charles River Radio Controllers, newsletter.)

One Sunday morning, a car pulled into the parking lot at Davis Field and a very nice woman got out. After watching several sailplanes spiraling upward in a thermal, she walked over to one of the CRRC members and asked, "I was just driving by and noticed those beautiful planes up in the sky. How do you get them up there?"

"We use these electrically powered winches to tow the planes up and then we fly around looking for rising air currents."

"Does each flyer have his own winch?"

"No. One or two people bring their own winches and these other things we call retrievers. We all share the use of these pieces of equipment, so we all pitch in to help the owners set up the units and pack them away at the end of the day."

Then she noted, "I see a lot of planes in the air at the same time and a bunch of pilots holding those little boxes with all of the switches and levers. How do you know that you are controlling the right plane?"

"Each of those boxes (we call them transmitters) sends out a radio signal on a particular channel and we make certain that only one flyer is on a particular channel at any time. To do this, we have that frequency board over there that has all of those numbers running up the sides. Those are the channel numbers. Before a pilot turns on his transmitter, he goes over to the board and checks to see if anyone is using his channel. Each transmitter has associated with it a thing we call a pin, which is a closepin that has a tag attached indicating the flyer's name and his channel number. A flyer clips the pin on the board over the channel number before he turns on his transmitter. If he finds that someone else has already clipped a pin over that channel number, he knows there is a potential problem. First of all, he must not turn on his transmitter or he could cause someone else's plane to crash. What he should do is talk to the other person and arrange to take turns on that channel. When two or more pilots are on the same channel, the pilot who is flying must turn off his transmitter right after landing, take down his pin, and inform the other pilots that the channel is free. That way everyone can get in the most flying time."

"Gee. I find this intricate dance rather fascinating," noted the women. "It seems that in every social situation, people evolve a set of unwritten rules that help everyone to better enjoy the experience. How do you know when it is your turn to launch?"

"Well first of all, we need to make certain that our channel is free. Then we look around to see if others are waiting to launch. There is usually some sort of informal queue of flyers waiting to launch so we inquire around us to see if anyone is waiting. Sometimes, we place our planes in a queue behind the winch, if the winches are quite busy. When we use a winch without a retriever or use a high start, we have to walk down the field to retrieve the parachute end of the towline. In that case, the person who walked down to get the tow line usually has next priority."

"I notice that when you use that retriever, someone is sitting there ready to turn it on whenever a pilot is ready to launch on the winch. Why can't you retrieve that towline at just any time? Why does there seem to be such a hurry to get the tow line in right after a launch?"

"Just after we release from tow, there is a lot of tow line and retriever line floating in the air. If we wait too long to retrieve, the lines will drape all over the field and often get tangled with planes, people, or equipment. The potential problems are worse if the planes are being launched in a strong wind. By retrieving the towline as soon as possible after release from launch, we minimize such problems. That's why the person launching always has someone lined up to run the retriever."

She looked a little worried. "Those planes fly pretty fast. How do you keep from hitting someone with a plane?"

"Avoiding a collision starts right at the launch. We make certain that no one is standing near the winch lines down field because an errant plane can veer off rather suddenly on launch. At the same time, we don't stand near the winch lines when flying. After we launch, we move away from the winch and walk some distance down field, far to one side or the other of the winch lines, so that we don't interfere with the next person to launch. Also, we want to put ourselves in position to land the plane far away from the winches, the winch lines and all of those people and planes sitting behind the winches. Landing on the winch lines just as some one is launching is a good way to destroy two planes at once!"

"I notice that those sailplanes go up rather fast when towed by the winch. How do you keep from hitting another plane in the air?"

"If another plane is flying over the winch lines, we wait until the plane is out of the way. If we are flying, we pay attention to whether someone is ready to launch and then keep the plane away from the area of the winch lines. In any case, we shout out "Launching!" to warn everyone just before we launch."

Looking off to the side, the woman said, "I noticed that some people are using that stretchy thing to tow their planes into the air. But it is set up off to one side. Why is that?"

"That stretchy thing is a high start. We worry that the towline on the high start may get tangled with the lines of one of the winches. When that happens, a terrible

rat's nest occurs. By setting up the high start off to one side and trying to put it on the downwind side of the field, we can best avoid these tangles."

"Look at that plane over there. It seems to be going up without being attached to a towline. In fact, it looks like it has a propeller on the front. What kind of a plane is that? It doesn't seem to make much noise."

"That is an electrically powered plane so it doesn't need a tow to get it into the air. Because electrically powered planes are relatively quiet, we can fly them at this field, but we discourage people from flying the noisier gas-powered planes because they can disturb people in the neighboring houses or those taking a walk in the conservation areas which adjoin the field. We especially try to keep all of our planes, including sailplanes, away from the house which is just across from the field on the north side of the road."

"Don't you have to worry about the electrically powered planes interfering with all of those tow lines, and with the sailplanes?"

"Yes, we do. To avoid problems, people who fly electrically-powered planes move off to the east side of the field right next to that tall grass and take off from there. Do you see how the hill slopes down to the east? By taking off over that tall-grass area to the east, the electrically powered planes avoid conflict with the sailplanes. The electric planes also land away from the winches and the winch lines, just like the sailplanes. The only problem we have is when some landing targets for the sailplanes (We call these tapes.) are set up down field alongside the tall grass. In that case, the electric and sailplane flyers have to carefully coordinate their flights so no one gets hit."

As her eyes swept over the field and the wooded areas nearby, she sighed, "It must be very nice to have this beautiful and convenient field all to your selves for flying your planes."

"This is indeed a wonderful place to pursue our hobby. We do have the field pretty much to ourselves during the summer, and on those few days when it is decent to fly in the winter. However, the Sudbury Park and Recreation folks manage this area so it is open for use by anyone. During the spring and fall, the Sudbury soccer program uses the field and they have priority over anyone else. Also, we don't want to hit any kids with our planes, so we don't fly when soccer players are around."

Glancing at some of the flyers engaged in conversation, she noted, "Many of you seem to know each other rather well. Do you all belong to some kind of club?"

"Many of us belong to the Charles River Radio Controllers club which has arranged a permit with the town of Sudbury to fly here when there is no soccer activity. All of the members of our club belong to Academy of Model Aeronautics which provides insurance coverage for club members should an injury or property damage occur. We do not have exclusive use of the field. Anyone can fly here."

"Do you have any formal set of written rules and a field marshal to enforce the rules?"

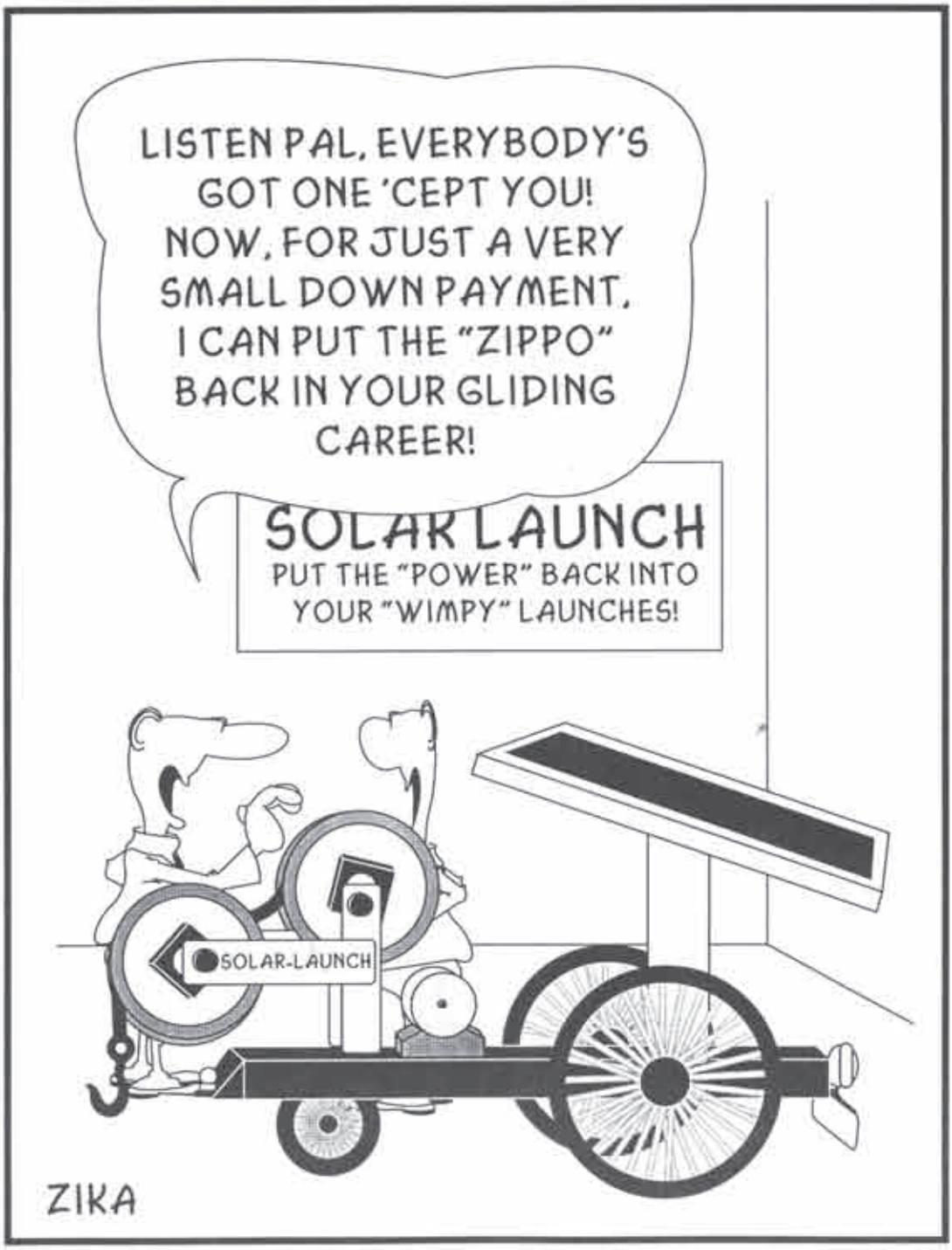
"Nah. We just come here to have fun and fly. We don't need any rules."

She responded, "Well, it seems to me that you may not have rules, but you do have some well-thought-out guidelines which everyone seems to understand and which make flying more enjoyable all around. This hobby of yours is fascinating. I will have to come back again and watch you fly, and do your special social dance." With that, she strolled to her car and left. ■

Better get started now!

Real pilots go places!!

Montague Cross Country Challenge - June 2000



SCHEDULE OF SPECIAL EVENTS

February 4-6
Southwest Classic — Queen Creek, AZ
http://www.public.asu.edu/~vansanfo/casl/

February 11-13
Pensacola 2000 — Pensacola, FL
Asher Carmichael, (334) 626-9141
Acarmic985@aol.com
Rusty Rood, (850) 432-3743, fishon@aol.com

May 5-7
Texas National Tournament — Dallas, TX
Jay Schultz, jkschul@juno.com
Henry Bostick, (972) 279-8337

May 19-21
Midwest Slope Challenge — Lake Wilson, KS
Loren Blinde, (402) 467-4765
mwsc@alltel.net

June 7-10
Elmira Scale Aerotow 2000 — Elmira, NY
John Derstine, (570) 596-4392
johnders@postoffice.ptd.net
http://www.Geocities.com/~scalesoar

June 9-11
Montague Cross Country Challenge — Montague, CA
3rd Annual, Practice June 9th
DG Airparts, Inc., dgair@cdsnet.net
(541) 899-8215

June 23-25
MSSC 2000 — Louisville, KY
Ed Wilson, (502) 239-3150
ewilson1@bellsouth.net

June 24-25
Spring Fling 2000 — Sacramento, CA
Dudley Dufort, (916) 448-1266
www.svss.org

August 3-6
International Electric Flight Festival — San Diego, CA
Ron Scharck, (858) 454-4900
Scharck@aol.com

August 6-12
F5 World Championships — San Diego, CA
Ron Scharck, (858) 454-4900
Scharck@aol.com

August 26-27
Washington Scale Aerotow Fun Fly — Yakima, WA
Gene Cope, (509) 457-9017, gcope@ixpnet.com
Frank Smith, (509) 924-8440

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

Please send in your scheduled events as they become available!

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Hobbies"N Stuff
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For Sale - Business

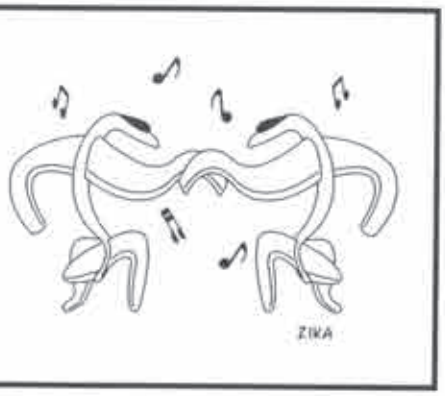
PC-Soar Version 3.7 Sailplane Performance Evaluation Program with Airfoil and Sailplane Library expanded to 60 models including Chrysalis, Anthem, Genesis, Peregrine, Probe, Thermal Eagle, and Spectrum. Airfoil library includes 322 polars with 56 UIUC polars. PC-Soar with Libraries of Sailplanes and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

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

DesignAire: EASY TO USE AIRCRAFT DESIGN SOFTWARE (PC). 3-D sketch, performance, Wt/Bal, inertias, color graphs, panel analysis, static stability, airfoils, envelope, FAR 23A loads and envelope. Runs "airfoil ii". $119. JammAero POBox 236, Horntown VA 23395. www.jammaero.com.

For Sale - Personal

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



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1/3 Pribek ASW 27 - 5 meter span (196"), wing profile HQ 2.5/12, ca. 20 lbs.

1/4.2 FiberClassics Nimbus 4 - 6.28 meter span (246"), wing profile E 68-66, ca. 18 lbs.

1/3.6 Roedelmodell DG 800 - 4.15 meter span (163"), wing profile E 207, ca. 11 lbs.

1/3.75 Roedelmodell Fox MDM-1 - 3.8 meter span (149"), wing profile RG 12, ca. 15 lbs.

1/2.77 PriBek ASW 19 - 5.4 meter span (212"), wing profile Ritz 3 mod., ca. 20 lbs.

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Dear Scratch Builder,

Many of you have asked for fuselages that we have not been in a position to provide, as most of you know, until now. But, we're back, at least for a limited time.

The thermal/slope, epoxy fiberglass fuselages shown below, are the first of our Viking line, and include suggested specifications (wing span/airfoil/radio channels). We ***will not*** carry an inventory, but rather custom make each fuselage as the orders are received. We want to do things right, so delivery time varies, and can take up to a month or longer, depending on what you want.

Jer

STILETTO RG-15

Design Suggestions

Fuselage designed to take a heat shrink battery pack in the nose, with a standard size receiver, on/off switch, and 3 standard size servos in tandem. Fuselage designed by Bernard Henwood. Recommended for thermal or slope, intermediate to expert.

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Epoxy Fiberglass Fuselages	Price	S&H
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Condor 3m (bolt-on wing mount/up to 10" chord)		
52 1/4" fuse, nose cone	$90.00	$15.00
Contestant (148"/E205/3-4/10.5" chord)		
60" fuse, canopy, tray	$90.00	$15.00
Elf 2m (bolt-on wing mount/up to 10" chord)		
44 3/8" fuse, nose cone	$80.00	$15.00
Oden (100-130"/S3021/As Req./10.25" chord)		
51" fuse, canopy	$85.00	$15.00
Raven 3m (119"/Mod. E193/As Req./10.75" chord)		
51" fuse, plans	$90.00	$15.00
Stiletto II (100-136"/Any/As Req./10" max. chord/bolt-on wing)		
49" fuse	$85.00	$15.00
Stiletto RG-15 (100-136"/RG-15/As Req./plug-in wing)		
49" fuse	$85.00	$15.00
Stiletto S-3021 (100-136"/S-3021/As Req./9.5" Chord/plug-in wing)		
49" fuse	$85.00	$15.00
Stiletto S-7037 (100-136"/S-7037/As Req./9.5" Chord/plug-in wing)		
49" fuse	$85.00	$15.00
Stiletto HQ 2.5/9 (100 - 114"/HQ2.5/9/As Req./10" root cord/plug-in wing)		
49" fuse	$85.00	$15.00
Zen (100"+/None/Var.)		
51" fuse, hatch	$85.00	$15.00

All fuselages are Kevlar™ reinforced.

R/C Soaring Resources

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

Contacts & Soaring Groups - U.S.A.

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

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

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

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

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

Arizona - Southern Arizona Glider & Electric (Tucson area), Philip Brister (contact), (520) 394-2121, pbrister@juno.com. SAGE welcomes all level of flyers!

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

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

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

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

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

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

California - Soaring Union of Los Angeles, John Bruce, 908 W 245th St., Harbor City, CA 90710, (310) 534-0948, <rcflyinman@aol.com>.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Michigan - Great Lakes 1.5m R/C Soaring League & "Wings" Flight Achievement Program & Instruction. Ray Hayes, 58030 Cyrenus Lane, Washington, MI 48094; (810) 781-7018.

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

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

Missouri - Mississippi Valley Soaring Assoc. (St Louis area), Peter George, 2127 Arsenal St., St. Louis, MO 63118; (314) 664-6613. Mark Nankivil, nankmc@quixnet.net, (314) 781-9175.

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

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

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

Nebraska - Ken Bergstrom, R.R. #1, Box 69 B, Merna, NE 68856; (308) 643-2524, <abergs1@neb-sandhills.net>.

Nevada - Las Vegas Soaring Club, Ray Dinoble, 10812 Hollow Creek Lane, Las Vegas, NV 89144, (702) 254-7911, <dinobler@juno.com>>.

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

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

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

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

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

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

New York - (Buffalo/Niagara Falls area) - Clarence Sailplane Society: www.paradox.net/homepages/mtimm/css.html or Lyn Perry, President (716-655-0775; perryl@ecc.edu); Jim Roller, Competition Coordinator (716-937-6427; Rolj98@aol.com).

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

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

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

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

Ohio - Cincinnati Soaring Society, Ed Franz, 7362 Ironwood Way, Burlington, KY 41005; (606) 586-0177, <ejfranz@fuse.net>.

Ohio - Dayton Area Thermal Soarers (D.A.R.T.S.), Walt Schmoll, 3513 Pobst Dr., Kettering, OH 45420, (513) 299-1758.

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

Ohio, Kentucky & Indiana - Ohio Valley Soaring Series, Marc Gellart, (419) 229-3384, <isoar2@wcoil.com>, <www.dma.org/DARTS/ovss/ovss.html>.

Oklahoma - Central Oklahoma Soaring, George Voss, (405) 692-1122.

Oklahoma - Tulsa R/C Soaring Club (TULSOAR), http://www.mccserv.com/tulsoar

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

Oregon - Portland Area Soaring Society (PASS), Pat Chewning (Secretary), 16766 NW Yorktown Dr., Beaverton, OR 97006, (503) 645-0323, e-mail: patch@sequent.com, www.europa.com/~patch/

Oregon - Salem Soaring Society, Al Szymanski, CD, (503) 585-0461, http://home.att.net/~aszy/sss/>.

Oregon - Southern Oregon Soaring Society, Jerry Miller, 3431 S. Pacific Hwy. TRLR 64, Medford, OR 97501, e-mail Milljer@aol.com, ph/fax (541) 535-4410.

Tennessee - Memphis Area Soaring Society, Bob Sowder, 1610 Saddle Glen Cove, Cordova, TN 38018, (901) 751-7252, FAX (901) 758-1842.

Tennessee - Tullahoma (Southern Middle Area), Coffee Airfoilers, Herb Rindfleisch, 106 Inglewood Circle, Tullahoma, TN 37388, (931) 455-1836, <herb@cafes.net>.

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

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

Utah - Intermountain Silent Flyers, Tom Hoopes, (801) 571-3702 (eve). "Come Fly With Us!"

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

Virginia - Blue Ridge Area Soaring Society (Central Virginia - Waynesboro), Tom Broeski, (540) 943-3356, <tjb@rica.net>.

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

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

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

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

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

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Outside U.S.A.

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

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

Canada - Montreal Area - C2VM Glider Club, Jacques Blain (President), days (514) 443-5335, eve. (514) 652-6167.

Canada - Greater Niagara Area Thermal Soarers (GNATS), Flat Field Soaring & Aerotowing, Gerry Knight, (905) 934-7451 or Don Smith, (905)934-3815.

Canada - MAAC Men Gliding Club, Jim Holland, 168 Verona Dr., Winnipeg, Manitoba, Canada R2P 2R8, (204) 697-1297.

Canada - Southern Ontario Glider Group, "Wings" Programme, dedicated instructors, Fred Freeman, (905) 627-9090, or Bill Woodward, (516) 653-4251.

England (CIAM Flyer), Jack Sile (Editor), 21 Bures Close, Stowmarket, Suffolk, IP14 2PL, England; Tele. # 0449-675190.

England (southwest) - Sean Walbank, Woolcombe Hays, Melbury Bubb, Dorchester, Dorset, DT2 0NJ, phone 01935-83316.

Hong Kong - Robert Yan, 90 Robinson Road, 4th Floor, Hong Kong, (852) 25228083, fax (852) 28450497, yanr@asiaonline.net.

Japan - Dr. Paul "Sky Pilot" Clark, 2 - 35 Suikoen Cho, Hirakata Shi 573, Osaka Fu, Japan; IAC+(81) 720-41-2934, <pclark@osk3.3web.ne.jp> http://www3.osk.3web.ne.jp/~pclark/skypilot/

Scotland - Ron Russell, 25 Napier Place, South Parks, Glenrothes, Fife, Scotland KY6 1DX, ph. 01592 753689.

RCSD Index/Database

Available from: <http://www.athenet.net/~atkron95/pcsoar.htm>. Or, send 3.5" high density disks & SASE with stamps for 2 oz. Lee Murray, 1300 Bay Ridge Rd., Appleton, WI 54915; (920) 731-4848 after 5:30 pm weekdays or on weekends, <lmurray@athenet.net>.

Reference Material

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

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Books by Martin Simons: "World's Vintage Sailplanes, 1908-45", "Slingsby Sailplanes", "German Air Attaché", "Sailplanes by Schweizer". Send inquiries to: Raul Blacksten, P.O. Box 307, Maywood, CA 90270, <raulb@earthlink.net>. To view summary of book info.: http://home.earthlink.net/~raulb

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BBS/Internet

Internet soaring mailing listserve linking hundreds of soaring pilots worldwide. Send msg. containing the word "subscribe" to soaring-request@airage.com. The "digestified" version that combines all msgs. each day into one msg. is recommended for dial-up users on the Internet, AOL, CIS, etc. Subscribe using soaring-digest-request@airage.com. Post msgs. to soaring@airage.com. For more info., contact Michael Lachowski at mikel@airage.com.

Sailplane Homebuilders Association (SHA)

A Division of the Soaring Society of America

The purpose of the Sailplane Homebuilders Association is to stimulate interest in full-size sailplane design and construction by homebuilders. To establish classes, standards, categories, where applicable. To desiminate information relating to construction techniques, materials, theory and related topics. To give recognition for noteworthy designs and accomplishments.

SHA publishes the bi-monthly ***Sailplane Builder*** newsletter. Membership cost: $15 U.S. Student (3rd Class Mail), $21 U.S. Regular Membership (3rd Class Mail), $30 U.S. Regular Membership (1st Class Mail), $29 for All Other Countries (Surface Mail).

Sailplane Homebuilders Association
Dan Armstrong, Sec./Treas.
21100 Angel Street
Tehachapi, CA 93561 U.S.A.

The League of Silent Flight (LSF) is an international fraternity of RC Soaring pilots who have earned the right to become members by achieving specific goals in soaring flight. There are no dues. Once you qualify for membership you are in for life.

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c/o AMA
P.O. Box 3028
Muncie, IN 47302-1028 U.S.A.

The Vintage Sailplane Association

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Vintage Sailplane Association
13312 Scotsmore Way
Herndon, VA 22071 USA

The Eastern Soaring League (ESL) is a confederation of Soaring Clubs, spread across the Mid-Atlantic and New England areas, committed to high-quality R/C Soaring competition.

AMA Sanctioned soaring competitions provide the basis for ESL contests. Further guidelines are continuously developed and applied in a drive to achieve the highest quality competitions possible.

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

ESL President (99-00): Tom Kiesling (814) 255-7418 or kiesling@ctc.com

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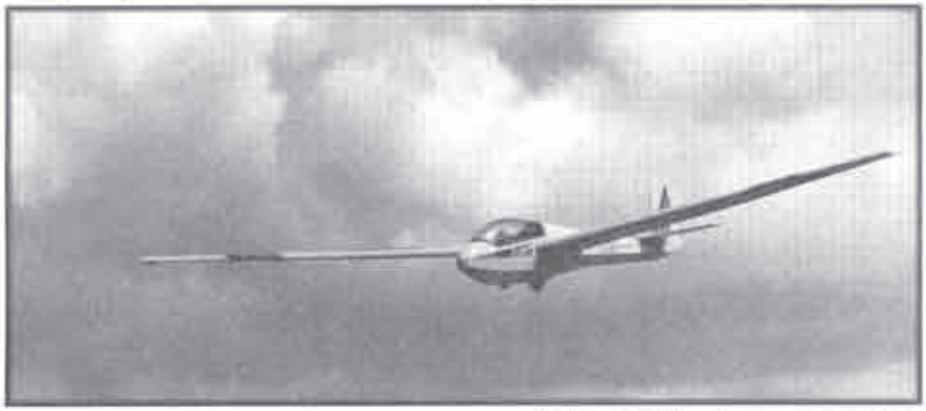
The Ka6 is a classic beauty and very docile to fly. It's a favorite of modelers all over the world and consequently you are likely to see one almost anywhere. It's one of the very last all wood ships and consequently comes in all colors - this one is a very pretty yellow.

There's nothing quite like a DuoDiscus! This one is well over seven meters span and is a gorgeous floater!

Frank Oeste (the guy who got the German Akro-cup going) poses with his Bruckmann 1:2.2 Swift, which he flew in the 1999 Akro-Cup. You could hardly find a better performing and more realistic scale aerobatic sailplane. It does every maneuver in the book gracefully yet is very crisp on the controls. There were two of the giant birds flown in the Akro-Cup this year. In a practice flight I saw one do a rolling circle only fifty feet off the deck. I expected the pilot to bail out of the maneuver at any time, but no! He completed the rolling circle without losing height and with no appreciable increase of airspeed. It was quite amazing and illustrates how well these larger scale models can fly. They really do begin to duplicate the flight characteristics of the real thing. As you probably know, the Swift and Fox are at present considered the very best aerobatic sailplanes flying today. Tomorrow, who knows...



Yellow ASK 13 sports a very nice visible color scheme, which can be seen a long way off. Yellow seems to be one of the most visible colors. This very docile two-seater catches the lightest of thermals!

Arnold Hofmann, five time winner of the German scale masters for sailplanes carries in his 1:2.2 Breguet Choucas. One of these was ever made and it's now "lost". A two seat version was also built, but it too was lost, due to an unfortunate fire. The German scale sailplane masters is held yearly. Every inch of the airplane is measured for accuracy, and then the model has to be flown and perform a series of predetermined maneuvers. It's quite a feat to win this event once; but, five times! Arnold is a master builder!

Breguet Choucas comes in for a landing. It's a beautiful thermal ship and it can perform aerobatics, as well. Its generous wingspan (the model is 1:2.2 scale) lets it fly slowly and scale-like. It has a particularly striking color scheme (red and white) and is very visible when flying.

There were mostly very large sailplanes at the 1999 Rödermark event, but Artur Lissner seems to be the specialist of small sailplanes. He brought a 1:12 Minimoa and the LO-100 seen here. It was most amusing to see the giant 1:3 Wilga tow up these minuscule sailplanes!