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SOARING & MOTORGLIDING

The JOURNAL of the SOARING SOCIETY of AMERICA Volume 47 • Number 5 • May 1983

Gus Scheurer addresses the Old-Timers Breakfast at the 1983 SSA convention. Later he had an opportunity to address a somewhat larger crowd; for details see page 6.

The Soaring Society of America is a nonprofit organization of enthusiasts who seek to foster and promote all phases of gliding and soaring on a national and international basis. The Society is also a division of the National Aeronautic Association (the U.S. national aero club) which represents the U.S. in the Federation Aeronautique Internationale (FAI, the world sport aviation governing body comprised of national aero clubs). NAA has delegated to the SSA the supervision of FAI-related soaring activities such as record attempts, competition sanctions, issuance of FAI Badges, and the selection of a U.S. team for the biennial World Gliding Championships. SOARING is the Society's official journal.

Division: The 1-26 Association, 3490 Lockwood Dr., San Diego, Calif. 92123

Division: The Vintage Sailplane Association, 3103 Tudor Rd., Waldorf, Maryland 20601

Division: The SSA Sailplane Homebuilders Association, P.O. Box 488, Bryan, Ohio 43506.

Affiliate: The National Soaring Museum, Harris Hill, RD #3, Elmira, New York 14903

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Cover: It's that time of year again. Spring flowers are beginning to pop up along with thermals, cu's and the petals they bear when they blossom — namely, sailplanes. Photographer George Uveges caught them all on one color slide at takeoff time in Hemet, California, and we're glad to share this seasonal treat with you.

Total paid circulation of the April issue was 18,200.

"Soaring Mail" may include letters from members who are advocating or opposing changes in SSA policy or operations. In this respect, *SOARING* strives to serve as an open forum and publish as representative a sampling of all views as space permits.

But publication of a letter can only give an idea exposure, not implementation. Society bylaws delegate policy and decision-making to the SSA Board of Directors (The SSA Regional Directors) and, between meetings, its Executive Committee.

Correspondents who want action should contact their SSA Regional Director or the Executive Committee (Names and addresses of Regional Directors are in the *SSA Membership Roster*, and the names of the three Executive Committee members are given at the close of the Executive Director's Report which is published in *SOARING* following each Directors' Meeting.)

Material published in SOARING magazine is contributed by individuals for the reading pleasure of soaring enthusiasts. Monetary payment is made only for the front cover photograph ($40). Anyone is invited to contribute articles, reports, and photos concerning soaring activities. However, any material that is to be returned must be accompanied by a stamped self-addressed return envelope. Manuscripts accepted for publication are subject to whatever deletions, additions, or revisions are necessary to adapt the material to the space requirements and quality standards of the magazine.

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Membership in SSA is open to anyone interested in the art, the science, or the sport of motorless flight. Membership categories are:

FULL MEMBER	$ 28
Two-year membership	52
STUDENT MEMBER	18
FAMILY MEMBER	14
LIFE MEMBER	450
BUSINESS MEMBER	100

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SOARING MAIL

Can Zoom Data Measure Climb Performance?

Wil Schuemann's theories on the relation of sailplane wing planform to climb performance (*Soaring*, Feb. '83) are provocative and, I suspect, will be far reaching. His ideas stimulate new thinking in many directions. For example, a spin-off from his main emphasis yields a solution to the old and vexing problem of devising a still-air flight test of sailplane climb performance; a solution, moreover, which by extension of Schuemann theory, should correlate with the real world of turbulent thermals.

Schuemann suggests that zoom performance would be significantly correlated to circling climb performance. If so, then a still-air flight test which measured the average gain in height of a series of standardized zooms would give data related to critical climb performance factors. Of the results of such tests, Schuemann theory predicts significant differences between sailplanes, even when their level flight still-air sink rates are similar.

If Schuemann is right, if zoom performance correlates with circling climb performance, then measurement of height gains in still-air standardized zooms would, at last, give quantified data with which to evaluate this important aspect of sailplane performance.

CHARLES COURY

Fairfax, California

Old Designs: Bring 'Em Back To Life

I read Frank Kelsey's article on the Bowlus *Baby Albatross* (*Soaring*, Jan. '83) and am sure that many others did, too. The *Baby* sounds like the answer to the little guy's dream of getting an established design in today's hodgepodge market of homebuilts. What would it take to get the *Baby Albatross* on the market again in kit form — or at least make the plans available?

Come to think about it, a lot of the old designs that were reviewed during the anniversary year might be worth bringing back to life. After all, wood has been around a lot longer than fiberglass and it just might be the thing that would get a lot of us back in the air.

W.L. GRAHAM

Whittier, California

★ *The Society's Vintage Sailplane Association Division is doing exactly that. Besides restoring or maintaining vintage sailplanes, the Association sells plans for a number of older sailplanes, including the BABY. VSA's address is listed on SOARING's masthead on Page 1.* — ED.

More On Kevlar

Having been a soaring pilot for 16 years and having paid for my soaring habit by working with high strength and stiff synthetic reinforcement fibers for the past 10 years, I feel a need to respond to David Shapiro's humorous and entertaining comments (*Soaring*, Jan. '83) about his difficulties fabricating parts reinforced with tough and strong Kevlar aramid fiber. It is a shame to have this reputation deter people from using Kevlar to solve structural problems and, thereby, improve the performance, safety and crashworthiness of sailplanes.

Recommendations for fabricating with Kevlar can be obtained for the asking from Du Pont (Industrial Fibers Marketing Group, Centre Road Building, Wilmington, Delaware 19898). Those of you who have been frustrated with Kevlar will be amazed at the good finish obtained through wet sanding and by the smooth cuts and holes that are achieved when the right tools and techniques are used. Experienced commercial manufacturers are now very successfully making major structures out of Kevlar, and there is every reason to believe that even homebuilders will be just as successful once the proper techniques become widely known.

HALVAR Y. LOKEN
E.I. Du Pont De Nemours & Co.
Wilmington, Delaware

It's a Devil of a Hot Issue!

This is more on dust devils. Art Brown read my letter to the Feb. '83 "Soaring Mail" in which I commented on Peter Newgard's letter in the Dec. '82 "Soaring Mail." In my letter I questioned the contribution of dust to the buoyancy of dust devils. Art asked me if I had considered the solar heating of the entrained dust in a rising dust devil as a factor in its buoyancy, and I told him I hadn't but would certainly do so. This letter reports the results of a quick look and my subsequent second thoughts.

I estimate that the temperature of a dust devil would increase about ½ degree Fahrenheit per minute due to solar heating based on the assumptions that: (1) the dust weighs 1.0% of the air it is mixed with (I guess this is a high value); (2) the dust particles are one thousandth of an inch in diameter (also too large in my opinion); and (3) the effective solar radiation is 2.16 British thermal units per square foot per minute.

In a strong thermal going up 1000 fpm this would improve the lapse rate about 10% which sounds to me like a pretty substantial effect.

The heating should increase with a larger amount of dust and with smaller dust particles so maybe the two weakest assumptions tend to compensate for each other. I can imagine an extensive research program to remove these uncertainties but I doubt if the results would justify the effort.

So I must reverse my position and agree with Newgard that, most likely, the entrained dust has a favorable effect on the success of dust devils — no free rides!

HARRY HIGGINS
Seattle, Washington

Young is the Best Time to Start

Enclosed is a photo of our Schweizer 2-22, serial number 51. The 2-22 is on tow with my son Cleve as pilot. I purchased 3890A as a wreck two years ago and my son and I rebuilt it for a total of $3000. We have had some super fun with this glider! I have now started my daughter Chloe flying the 2-22; she is 12.

DAVID SCHUETZEBERG
Leander, Texas

Is Soaring Already Too Big?

I am a relatively new member of the Society, having just paid my second year's dues, and I must admit, like most new members, I found little encouragement from *Soaring* magazine or other members as I set out to learn to soar. At first I was somewhat discouraged; I felt as though I would never fit in. Each month I would wait for my new magazine, only to find I understood very little of what was in it. I wasn't interested in all the contest info as I'm still a long way from that, and most of the technical data was way over my head. But I loved the stories and sailplane evaluations.

With the passing of time, and with great effort, I have found some wonderful friends among the soaring set, people who love this sport as much as I do. I have also found that most of them feel the same way that I do about preserving it. You see, I was once a snow skier, and I used to own a dirt bike, and I love to water ski. However, over the last 20 years I have watched as over-population of these sports has destroyed them for those of us who don't care for crowds. I realize that there are those who would like to see our sport grow, and many of them would profit financially from that growth, but many of us who fly for fun prefer not to gaggle with 10 to 20 ships. We, in fact, fear rapid growth that could overpopulate our sport. I recognize the fact that there will be growth, and that we will benefit to a certain extent from it, but if we rush and encourage it, we may be sorry. Soaring is a basically solitary experience, and ours a very exclusive Society. I for one prefer it that way, and hope that it is never destroyed by over-population. If you don't believe that can happen, you are not soaring in southern California.

Folks, I appreciate your efforts to improve our sport, and I still wait every month for my new *Soaring* magazine, but I'm afraid I will have to decline your invitation to join your "membership safari." Thanks anyway, but I would rather sit this one out.

MIKE MCFARLAND
Hacienda Heights, California

Michelle Silver, SSA Promotions Manager, is involved in the Membership Safari program to recruit new members for a sport which the writer of the above letter clearly feels has enough, or maybe even too many, members already. Here is her response:

Mike, it was with more than a twinge of concern that I read your letter. I know there are many who agree with the idea that preserving soaring means keeping it small. I know there are many who feel that sharing the beauty of the sport will not lead to respect for the king of sports, but will destroy it by over-crowding. But this attitude is not only selfish, it is self-destructive. You want to preserve the sport; so do I. And that is why we *need* membership growth. I doubt that you agree with me yet, so please read on.

You say you are a relatively new member of the Society and presumably new to soaring, so perhaps you don't know of some of the struggles the soaring movement has encountered. But I do, and there are members of the SSA Board of Directors who remember things from before my time.

In 1979 the Federal Aviation Administration published a Notice of Proposed Rule Making to lower the ceiling on uncontrolled airspace from 18,000 to as low as 12,500 feet, except above mountains where safe clearances were allowed. As a California pilot, you know soaring flights above 12,500 are not uncommon. Only by a group effort nationwide by SSA Members and other aviation enthusiasts was the noise of opposition made audible to the FAA. The NPRM was withdrawn. We can still soar to 18,000 feet without asking for permission or carrying a transponder.

One may say that we are strong enough as we are, but I disagree. Without growth, without bringing present non-member soaring pilots into the Society, we will not have the strength to withstand future pressure from outside. As the saying goes, united we can stand. Other areas of aviation

are growing by leaps and will continue to do so. Compare the 16,000 soaring enthusiasts with the 100,000 hang glider pilots. When push comes to shove, who will the FAA listen to? Who will Congress listen to, the 16,000 or the 100,000? When I consider the mushrooming tide of unregulated ultralights in this country, I know that protecting your right to fly and my right to fly is becoming more and more crucial. Don't fool yourself by thinking that because ultralights and hang gliders are unregulated their growth and influence does not impact soaring. It is precisely *because* they are unregulated that we must keep careful watch.

As the airspace becomes more congested with airlines, small aircraft, hang gliders, ultralights, balloons and sailplanes, who will be restricted — those who are unregulated or those who are regulated by the FAA? Will it be those who represent a large number of followers or a small number? We both know that in the U.S. numbers talk. These groups have strong lobbyists in Washington. Look beyond yourself and into the future five or 10 years. As they grow, these competing groups will become more and more powerful and airspace will be more congested whether soaring grows or not.

As far as over-population of soaring goes, I don't believe it will happen. By the way, I do soar in southern California. In fact, I *used* to fly at Crystalaire; I *used* to fly at El Mirage. I never had the chance to fly at Elsinore or Brown Field. If lucky, I *may* get to fly at Torrey Pines, and I plan to fly at Santa Ynez soon. Santa Ynez closed down once. Fortunately, we were able to assist them in reopening, but they still face great pressure.

Since you are a self-avowed newcomer, you may not realize that Torrey Pines was established as a soaring site in the 1930's. For more than three decades it flourished and pilots enjoyed gliding along the Pacific Coast cliffs where Charles and Anne Lindbergh first learned to soar. But then uncontrolled hang gliders discovered Torrey Pines and later radio-controlled modelers, also unregulated. Soaring activity dropped off and was finally kicked off by the California State Department of Transportation, not because there were too many sailplanes to fly there safely, but because the sailplane pilots were the only group the FAA could exert influence over. Amid the sparse cries of the exclusive society of sailplane pilots, Torrey Pines was closed. It has *only* been through the preseverance of members of the Associated Glider Clubs of Southern California that Torrey Pines has been reopened for a few weekends this spring. I can't help but feel that if we as soaring pilots showed a strong support of Torrey Pines as a group, our right to fly and utilize Torrey Pines as a soaring site would be expanded.

I won't bother to go into the reasons for the closing of El Mirage Soaring, Great Western Soaring or Skylark South. I doubt that any of those places closed due to overcrowing; quite the opposite. Overcrowding comes when soaring sites are closed and we have only two or three sites to choose from, instead of three times that number. I only hope that 10 years from now the few left today will be still with us. But then, these operations need people soaring from their sites to stay alive. Yes, this means they will make money. Why not? Don't you? I'm a realist. Every gliderport needs to make money to stay in operation. Don't expect the operators to continue to struggle to serve you without benefit for themselves. They'll soon give up — I've seen it happen many times. *And if you think this is happening just in southern California, talk to soaring enthusiasts on the east coast.*

The Membership Recruitment Safari is not designed to improve our sport, it is designed to *preserve* our sport. I'm selfish. I want to protect my right to fly. You can sit this one out if you like, but I'm going to send you information on the Safari anyway. I hope you'll put some more thought into your position and reconsider. Think about the *future* and join me. Protect your right to fly. — MICHELLE SILVER

A Call for the Exchange of Inside Scoop

Attention owners, former owners and pilots of the Fournier/Sportavia SFS-31 motorglider: I would like to compare notes with you about this exciting but temperamental machine. Drop me a line or call collect to (213) 796-3920.

ALEC BROOKS
125 S. Sierra Madre Blvd., #312
Pasadena, California 91107

Remember, Pilots: *It* May Spin *You*

May I offer some thoughts on the idea of spin currency as opposed to spin avoidance in reference to Barry Schiff's "Stall-Spin Awareness" (*Soaring*, Feb. '83). Mr. Schiff's thoughts were, I believe, sparked by the FAA's *Stall-Spin Awareness* study cited in his reprinted article and were originally written for *power* airplane pilots.

I have read the FAA study; it leaves the reader with the idea that spin awareness and avoidance training is all pilots need to stay out of spin trouble and rejects the idea that spin currency is necessary. The idea is that if you never spin, then you never need recover from one. There are many experienced pilots, and I have talked to some of them in the FAA, who disagree strongly with that premise. It is especially questionable with sailplanes, which may spend half their flying lives on the verge of stall.

When a pilot spins for the first time, especially if he is alone and does it accidentally, it can be a wild and frightening ride! This can be so even if he does it intentionally and/or with plenty of altitude.

Should you be too low when it happens to you unexpectedly, your life may depend on a prompt and orderly recovery. But only with practice will spin recovery be prompt and orderly. The danger of it being followed by a secondary spin, which you must recover from all over again, or a high speed dive, possibly above the maneuvering speed of the glider, is a major threat. After that, there may not be any room between you and the ground — which would be disastrous — or if there is room to recover safely and get gliding again, there may not be enough to soar away again. The only thing to do then would be to find a place to put your sailplane down where, hopefully, you could walk away unscathed. The more prompt and orderly the recovery, the more room there will be to get out of your jam.

So long as there are aircraft that can be made to spin there is a chance that any one of us may be flying one when it happens. Should it be in a single seater, there will be no one to look over your shoulder and say how you are doing. So let's have been there (or close to it) already, should it happen.

Spinning frightens many pilots, but it does seem less hairy the more times you do it. This could be reason enough to have had the spinning experience. The best advice for a pilot who has not done any spinning is to find a qualified (repeat, qualified) instructor and a proper two-seat power plane or glider (not all are suitable), and go up and DO IT. Do it enough times that you will no longer be terrified should you be the type who are frightened by such things. Maybe if you can't bring yourself to such a state of mind, you shouldn't be flying!

Let me assure you that there is no more persuasive thing than actually having spun yourself to keep you in the frame of mind to avoid doing it accidentally. You will probably raise your mental thermaling floor, too, after a few spins.

In closing, may I remind the reader that the sailplane you fly may be placarded against spinning. If this is so you will not know why, and it could be because of some objectionable spin recovery characteristic of the design that prevented it from being certificated for intentional spinning. But although the placard forbids you from spinning it, there is no prohibition for *it not to spin you*, which might happen when least expected. The very reason for the placard may be another reason why you should be a spin-proficient pilot.

STEPHEN DU PONT
Osprey, Florida

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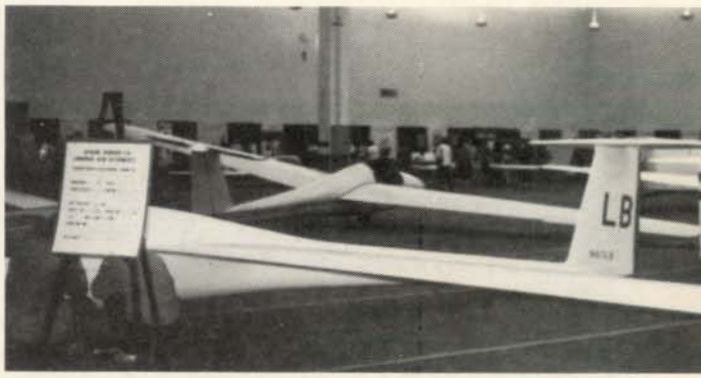

Photos by
Cindy Brickner, Jindy Andert and Cindy Dezzutti

The 1983 SSA International Soaring Convention

An outstanding convention. Surprisingly informative seminars. These guys really know their stuff. Great facility. Everything's happening on time. Best I've been to.

These representative comments from attendees, overheard and jotted down in the meeting rooms and hallways of the MGM Grand Hotel in Reno, Nevada, pretty well sum up the flavor of the 1983 annual convention of The Soaring Society of America held March 21-27. It was (depending on what you signed up for) anything from three to seven days of outstanding exhibits, lectures, panel discussions, seminars, bull sessions, planning

Opposite page, clockwise from bottom left: The frisbee thrower at the SSA booth is Norma Burnette of Fallon, Nevada. SSA President Carl Herold (left) gives Society's top award, the Warren E. Eaton Memorial Trophy, to Gustave Scheurer. Latest sailplanes dotted busy exhibit hall. Carl Herold presents certificates of appreciation to convention committee co-managers Nancy Davis and Bernald Smith. This page, clockwise from top left: the new self-launching sailplane Windrose. Tom Madigan, co-chairman of the '85 San Diego convention, here to learn how it's done. Bill Nolan, exhibits chairman of the Reno convention, here to see it's done right. Solitaire, SHA design contest winner, in her final configuration; plans due out soon.

meetings, films, parties, banquets and assorted good times. Not to mention, of course, the fun and games.

Upwards of 800 persons registered for the convention, which this year was honored by the attendance of more than a dozen foreign dignitaries involved in overseeing the preparation of the 1983 World Championships at Hobbs, New Mexico. These visitors, members of the Gliding Committee (Commission Internationale de Vol a Voile, or CIVV) of the Federation Aeronautique Internationale, were honored at a special reception together with members of the U.S. team which will fly at Hobbs.

The exhibit hall was, as usual, a major focus of attention at this year's convention. The aircraft ranged in size from ultralights and homebuilt powered sailplanes, such as **Burt Rutan's** *Solitaire* and the *Windrose* by **Jim Maupin** and **Irv Culver,** all the way up to whoppers like the *Nimbus 3* and the side-by-side Caproni jet A-21SJ. In between were one sparkling Schweizer 1-36 from the U.S. and a representative sample of the high-technology equipment from European manufacturers. All of this shiny flying machinery held center stage, surrounded by booths in which delegates could get unending supplies of advice, almost unending supplies of literature and ample supplies of gadgets, components, equipment and ideas. It was a grand place to visit, and it got heavy foot traffic for three solid days.

The same can be said for the meeting rooms in which the almost non-stop series of speeches and seminars was conducted. Large audiences were the rule, and discussions often were so fruitful and rewarding that it was all the moderators could do to end one program so the next one scheduled in the same room could begin.

All of this speaks exceptionally well for the co-sponsoring Pacific Soaring Council and AirSailing, Inc., and to the co-managers of the convention committee, **Nancy Davis** and **Bernald Smith.** They, on the other hand, give all the credit to the corps of gnomes and dwarves who, unseen by convention-goers, actually did all the work behind the scenes.

Soaring cannot recapitulate every lecture or seminar; if you were expecting us to do so, let that be a lesson to you to attend the next convention yourself! But several sessions had such pointed bearing on the flying activities of SSA members that they cannot be ignored here. One of them dealt with the soaring program at the Air Force Academy, and there are two things about it that are highly significant to the future of the sport, and to you.

One is simply the size of the program. At present the Academy solos about 800 cadets per year in sailplanes, and with the acquisition of eight new Schweizer 2-37 motorgliders this year that number will jump to 1200. This program would appear to be the largest single activity in the world for introducing new candidates to the sport of soaring. With the motorgliders, the training syllabus will include three dual flights in the powered glider and eight to 10 more in a glider before solo.

Most of the instruction (though not that in motorgliders) is given by upperclass cadets, and that brings up the second notable point about the Academy program — even with students as instructors, it is remarkably safe. That means the students themselves must

Clockwise from below: Master of Ceremonies Duane Russell and banquet speaker Dr. Paul MacCready Jr. Executive Director John Dezzutti presents the Exceptional Service Award to Richard H. Johnson, author of the popular Flight Test Evaluations in Soaring magazine. Awards Chairman Floyd Sweet and Shirley Sliwa, who received an Exceptional Achievement Award. John Dezzutti presents another Exceptional Achievement Award to Marion Barritt, membership drive chairman.

have been well taught, and they have been. There is intense pressure from cadets to get into the program, and one false move gets a cadet bumped out, so the incentive is much stronger than in a civilian school. The environment is a rigidly disciplined one, the students are highly motivated and the resulting safety record makes the rest of us look shamefully inept.

In England, where instruction is much more stringent and the safety record much better than ours, they expect one accident (resulting in aircraft damage or injury to persons) for every 4600 flights. At the Academy the record is rather more than three times that good. They crank off about 28,000 glider flights per year, and there has been only one fatality (a classic low altitude stall-spin) in more than eight years and 200,000 flights.

If you think all this is boring, check on how much you pay for insurance on your bird, or how much you pay to rent a glider (the bill has insurance costs built in). Those costs are directly related to a problem the Air Force Academy doesn't have: accidents. If they can cure the problem, why can't we? They fly hard all day, eight gliders and four towplanes busy in a pattern that also has a full-time parachute jumping operation *inside* of it, and they simply don't have the accidents we do. Their wave flying, aerobatics and cross-country programs are likewise remarkably hassle-free. *Soaring* recommends that as many of you as possible find out how they do it and spread the word. Ask them for advice, literature, etc.; they are glad to help — and we need it.

SSA Awards Banquet

A highlight of the convention was the presentation of awards to nine distinguished recipients during the annual awards banquet, which was addressed this year by **Dr. Paul B. MacCready, Jr.,** developer of the first successful man-powered and solar-powered aircraft.

The Warren E. Eaton Memorial Trophy, the Society's highest honor, is named after its first president, who was one of the founders. The hand-made silver cup went this year to **Gustav Scheurer,** whose soaring roots go back to the Wasserkuppe in Germany and whose SSA membership card was signed by his friend and flying companion, Warren E. Eaton.

Gus came to the U.S. in 1925, immediately became active in the infant soaring movement and helped found the Aero Club Albatross, which has been continuously active since 1929. He holds SSA membership No. 28, was the designer of the first launching winch used in the U.S., has built his own glider (a Cherokee) and restored various other ships, and is a member of the U.S. Soaring Hall of Fame. Gus received the Tissandier Diploma from the FAI in 1979.

SSA Exceptional Service Awards for activities "whose service to SSA has been of utmost value to the Society," went to **Richard H. Johnson,** author of the popular Flight Test Evaluations in *Soaring* magazine, and **Bernald S. Smith,** whose services in connection with the Society's publications and its insurance problems at least equals his performance as a convention organizer and Regional Director.

Exceptional Achievement Awards were presented to **Marion I. Barritt, Elbert (Burt) L. Rutan** and **Shirley Sliwa.** Marion is running the vitally

Clockwise from bottom left: SSA's Ernie Schweizer designed the base of Steuben crystal bird awarded to former Soaring editors. President Carl Herold presents the special memento to Doug and Lianna Lamont, who produced this magazine for nearly 13 years. Another view of the memorable award to pioneer soaring pilot Gus Scheurer of the Warren E. Eaton Memorial Trophy. Equally memorable was Carl Herold's announcement that the 1983 winter meeting of the Board of Directors found every member of the Board in his/her seat.

important Membership Safari in an effort to increase our numbers; Burt designed the *Solitaire*, winner of last year's contest to develop a self-launching sailplane; and Shirley has long been a tower of strength at the National Soaring Museum in Elmira, New York.

The Lewin B. Barringer Memorial Trophy for the longest straight-line non-contest distance flight of the previous year was awarded to **Wallace A. Scott** and **William H. Seed, Jr.** for a two-plane flight from Brownsville, Texas to a simultaneous landing five miles southeast of Bowie, Texas for a distance of 533 miles (857.5 km) in 10 hours and 21 minutes.

George J. Vakkur won the Paul E. Tuntland Memorial Award for an important contribution to the science of soaring flight disclosed in a published article or paper and describing a soaring flight by the author. George wrote an outstanding article in the March, 1982 issue of *Soaring*, describing the strip maps he developed for ridge soaring in the Appalachians.

A special award in the form of a crystal bird was presented to **Doug** and **Lianna Lamont,** former editor and production editor of *Soaring*, for their years of outstanding service to the magazine and its readers.

The presentations were made by **Floyd Sweet,** Region 4 Director and SSA Awards Chairman.

BOARD OF DIRECTOR'S MEETING

All 26 members of the SSA's Board of Directors were present in Reno for their 1983 Winter Meeting. During that all-day session the Regional Directors discussed and made decisions on a variety of topics. The following are highlights of that meeting:

Long Range Planning

Sterling Starr, Chairman of the Society's Development Board, chaired an extensive discussion on strategic planning for the SSA. His report covered the critical factors facing the Society, such as the economy, the increasing costs of participating in our sport, the loss of soaring sites and the lack of growth in SSA membership. As a result of these discussions, his Board will be presenting a long-range plan for the SSA including such possible areas as reducing our accident rate, securing permanent soaring sites and office automation, as well as self-regulation and certification.

Membership Relations

Judy Lincoln was appointed Chairman of the Member Relations Board replacing **Paul Schweizer,** who will continue as Chairman of the Affiliates and Divisions Board. Judy was asked by the Board to work with the membership in expanding the visibility of and participation in the Kolstad Junior Soaring Award. This award, a scholarship for a deserving student member, has not generated as many applicants as it should and Judy will be directing the SSA's efforts to promote it more. In addition, other plans to generate more student membership participation in the SSA will be the focus of Judy and Youth Education Committee Chairman **Gunter Voltz.**

FAA

Considerable time was spent on the status of the Society's work with the FAA to gain relief from the recent changes in FAR Part 43 regarding preventive maintenance and sailplanes (see Apr. '83 *Soaring*). While no solu-

Clockwise from below: Chief answerers of questions at General Membership Meeting were, from left, competition committee chairman Eric Mozer, convention co-manager Bernald Smith, insurance agent Ron Wyatt and Gene Hammond, chairman of the Flight Training and Safety Board. Bill Ivans is chairman of CIVV, which met in conjunction with convention. Eric Mozer addresses a competition pilots' session, one of the outstanding series of special seminars.

tion has been worked out yet, SSA Executive Director **John Dezzutti** and **Al Blackburn,** Chairman of the Governmental Liaison Board, will be meeting with FAA officials in Washington soon in an attempt to negotiate a favorable rule change.

Further actions by the FAA regarding certification in the experimental category also were discussed. These actions, the subject of yet another meeting in Washington, may curtail the advantages U.S. pilots have had in using the racing/exhibitions category as a means for certifying their sailplanes at higher gross weight limits. Given the variations in interpretations of these FAA actions at the various field offices, clarification will be requested from FAA headquarters.

Mailing Lists

After considerable discussion, it was determined that the use of SSA's membership list for approved solicitations represents a potential revenue source for the Society. Although the exact details of how this will be implemented are yet to be worked out, it was approved in principle by the Board. However, before any action is taken, all SSA members will be notified so that they may elect not to receive any such mailings. A full report on this will be made in a future issue of *Soaring.*

U.S. Team Selection

The process by which a Team is selected to represent the United States at the Internationals has been revised. These changes, which will be implemented for the 19th World Soaring Championships to be held in 1985 in Italy, will require that pilots wishing to be considered for the team declare in advance of the 1984 Nationals in which single class they wish to compete for qualifying for the Team. The winning "declared" pilot at each of the three principle nationals will thus be selected for the team. The fourth team member will be the next "declared" pilot having the highest percentage of the winner's final score. In addition, if six pilots are permitted on the team, the other second place "declared" pilots will be selected in the same manner. This system will replace the peer review voting procedures we have used previously.

Summer Meeting Site

The Board accepted the invitation of the Soaring Society of Boulder, Colorado, to hold its summer meeting at the National Center for Atmospheric Research in Boulder on August 20th, 1983. — JOHN DEZZUTTI

CIVV MEETING

The international delegates of the CIVV, which is the FAI committee in charge of world gliding activities, took one action which will impact the Hobbs contest and all future World Gliding Championships. The CIVV voted to require that the gross weight of gliders in the competition "not exceed the manufacturer's recommended and certified gross weight." Thus ships that have been re-certified in the U.S. or elsewhere at weights higher than those certified by the ship's country of origin will not be permitted to compete at the excess weight.

COACHES CONFERENCE

Fourteen representatives from 10 countries met for three days in Reno to review the current practices in flight training in sailplanes. The senior national coaches (flight instructors) from the United Kingdom, South Africa, Canada, France, West Germany, Australia, Norway, Denmark, the Netherlands and the United States met

(Continued on page 46)

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SSA IN ACTION

SSA MEMBERSHIP RECRUITMENT SAFARI

The first Official Towpilot of the SSA Membership Recruitment Safari has already signed up two new members to the SSA. SSA'er Bill Nicoli of Seattle, Washington was so enthusiastic that he signed up Jay Fletcher of Westminster, California and Marty Stilling of New York City by giving them gift memberships!

Other SSA members have also joined the Safari. Bill Bitter of Van Nuys, California called the SSA office as soon as he got his March issue of the magazine. Bill's ready to go and believes in supporting soaring in the United States. In fact, Bill says he's going to win the trip to Hobbs by bringing in the most new members before June 11. Larry Lutton, President of the Utah Soaring Association, had already planned on doing some promotional work on his own when he learned about the recruitment safari and has now decided to join the membership committee. Larry is planning a short spot on a local radio talk show and possibly showing some films at the library.

These SSA Members have each found their own personal way to support soaring, as have many others. Take a minute to think about what works best for you. Simply send us the names and addresses of people you think would be interested in learning more about the sport and the SSA and let us take it from there; or ask us to send you information that you can hand out when the subject comes up over lunch with a friend.

Many people who are not familiar with the Society do not realize the wide range of services that the SSA provides. SSA Membership is more than a magazine and a lapel pin. SSA Membership is representation in Washington, D.C. by the only national organization concerned with the rights of soaring pilots. SSA Members also earn special rates on seminars such as the Sailplane Homebuilders Workshop and the Women's Cross-Country Soaring Seminar. *Only* SSA Members are provided with the SSA Membership Handbook which offers information on soaring awards, records, contests and badges. The handbook also provides information on barograph calibration laboratories, soaring schools and clubs, a metric conversion table, oxygen training, standard American soaring signals, etc., in addition to the membership roster which is your key link to soaring enthusiasts from Florida to Alaska and beyond.

Access to personal assistance from SSA office staff and from your volunteer Regional Directors and State Governors is one of the most valuable services extended to SSA members, and it is often overlooked. These people work for you and are available to answer your questions and address your concerns.

The official dates for the SSA Membership Recruitment Safari are April 1 to June 11, 1983. The next issue of *Soaring* will contain the first list of Official Safari Towpilots who will be competing for prizes while supporting their favorite sport. *Join the Safari and Launch a Friend.* For information on how to participate and for a list of potential members to sponsor, contact the Soaring Society of America, P.O. Box 66071, Los Angeles, California 90066. Join the fun! — MICHELLE SILVER

1983 SAILPLANE DIRECTORY

By popular demand, an updated and expanded *Sailplane Directory* is being planned for one of the fall issues of *Soaring*. The last complete Directory was published in August, 1974, with a supplement published in the August, 1978 issue.

A mailing has gone out to manufacturers and designers of sailplanes known to the SSA, but it is expected that there are some new designs which have been overlooked.

Members are asked to contact Janet Bell at *Soaring* with the names of any new designs that *Soaring* may not be aware of, along with the names and addresses of the designers. With your help, this can be the most comprehensive directory of information ever published about the sailplanes presently flying in the United States.

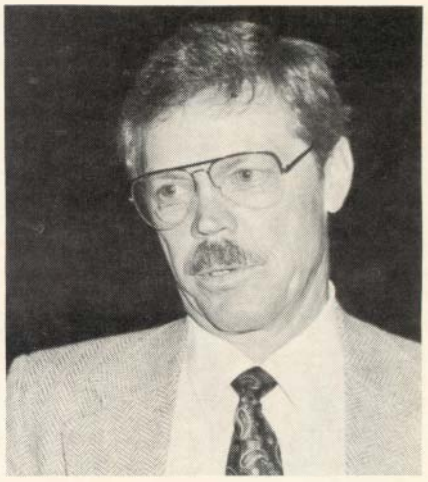
— JANET BELL

DIRECTORY OF U.S. SOARING SITES

Work is beginning on the 1984 edition of the *U.S. Directory of Soaring Sites and Organizations*. SSA Chapters and Business Members will be contacted soon with a request for information. Clubs and sites which have been listed in previous editions also will be contacted for updated information. In the past there has been a problem when information was requested from a club or commercial soaring site and the organization did not respond. Since we do not have the funds to make a second follow-up, all clubs and soaring sites not responding will be dropped. This is the only way to keep the information in the directory as up-to-date and accurate as possible.

SSA Members are asked to send in information about new sites and clubs or about those which have been inadvertently omitted in the past. Send the names and addresses to Michelle Silver at the SSA office, and these groups will be contacted for more detailed information. As in the past, advertising space will also be available to clubs and commercial operators.

— MICHELLE SILVER



MEET THE TEAM — RAY GIMMEY

"Most of my pre-contest preparation is involved with thinking of Hobbs and the Hobbs environment," says Ray Gimmey, three-time national champion and member of the U.S. International Soaring Team. "Particularly I'm thinking about the weather, but I'm also thinking about the strategy I'll use in flying the new start gate if it's in operation at that time."

Since he took his first sailplane ride at Calistoga Soaring in 1964, Ray has logged well over 3000 hours and now he says all of his soaring is in conjunction with contests. In addition to his national championship wins (one in each class), Ray has won several regional contests and competed as a member of the U.S. Team in 1981 in Paderborn, West Germany.

In his earlier days, Ray indulged in pleasure and cross-country flying more, and in fact was founder of the Chico Soaring Association and president of the Pacific Soaring Council. Now he prefers to stick to competition soaring.

"When you're not flying in a contest, you're not paying as much attention," he says.

Ray will be flying the new AS-W 20B in Hobbs this summer, one of five to compete for the first time. He describes the plane as an AS-W 20 with small holes under the wing to generate a vortex, similar to the arrangement on the AS-W 22. These holes, in conjunction with a slightly different airfoil shape on the bottom of the wing, will help to improve the laminar airflow and increase performance. Even with this specially-designed ship, Ray is concerned about the effect the new CIVV ruling on sailplane weight limitations may have on him and other competitors.

In any case, Ray is looking forward to some good flying at Hobbs. "If Hobbs lives up to its normal weather patterns, the contest will be very well remembered. Paderborn had all the nice facilities, good organization, scenic countryside and good people, but the weather was lousy. It was just very unreliable, and the flying in many ways was quite depressing."

One of Ray's most memorable flights originated not far from Hobbs, in Marfa, Texas, site of the 1970 World Soaring Championships. This was a flight in 1971 during a national championship. "It was a free distance flight, one of a very few free distance tasks I have ever flown. I thought that I had good radio contact with my crew since I had heard them on the radio all along. Then I made a blind transmission and figured they heard me because their radio was stronger than mine. I had to make a course change and was headed on my way to Gallup, New Mexico as I left Texas.

"The scenery was truly inspiring flying over the desert. Below were a multitude of colors of earth and land formations as I passed over the Navajo reservation. I didn't have any problem finding lift, and I stayed high for two or three hours until I crossed over Route 66. Then the flight turned from enjoyable into sheer panic when the land on the other side turned out to be a lot higher than I had expected and I had to land on Route 66. It was the Fourth of July, and as you can imagine, there was a lot of traffic."

That 550-mile flight turned out to be worth the risk as it was the first day Ray won in a national contest, something he hopes to repeat in international competition this summer. "I'm going to give it my best shot," he says. "I want to thank all of the SSA Members who have contributed their support, and I hope the Team and I justify their confidence in us. Most people have the mechanical skill and ability to make the right decisions at the right time, but in order to be on top you must also have some natural ability. It has to thrill you, and it can never take second place in your life.

"The people who will win are those who are willing to make the commitment to succeed. You do whatever is necessary to win: you fly every weekend, you skip buying a new car so you can buy a new sailplane. It also takes commitment from those around you. I'd like to see us take the top position in all three classes — or how about the top six?" — MICHELLE SILVER

WOMEN'S SOARING SEMINAR

"It might have taken me years on my own to accomplish what I gained at the 1982 Women's Soaring Seminar — a taste of real soaring," wrote **Nancy La Riviere.** That was the first Women's Seminar Nancy attended, and this year she is working as coordinator of the Fifth Annual Women's Cross-Country Soaring Seminar being held in Ephrata, Washington, May 23-27. Nancy has put together an impressive program of seasoned cross-country pilots such as **Chris Lomax, Nelson Funston** and **Robert Lee Moore.**

Monday morning will open with a local field orientation by Chris Lomax, an instructor with many hours of local cross-country experience with an emphasis on safety. Nelson Funston, also a seasoned cross-country pilot, will share his insight on basic cross-country techniques and "breaking away" from the local airport. Following local field and equipment check-out flights, attendees will indulge in a pizza party in Ephrata, and then return in the evening for an open forum discussion on "Women in Soaring." Seminar participants will be encouraged to set goals for the week and support each other in attaining these achievements.

Tuesday will focus on preparation for cross-country flight. **Gene Larcome** of the local weather service will speak on weather forecasting from information readily available from the evening news and the Flight Service Station. Individual soaring will be followed that evening by a discussion on the FAI Sporting Code by national Record Holder Robert Lee Moore, and SSA Promotions Manager **Michelle Silver** will present an update on the Bronze Badge.

Celinda Kotsogean, nutritionist and glider pilot, will discuss nutrition for cross-country flight Wednesday morning, and Chris Lomax will discuss preflight planning, equipment inspection and task planning in preparation for a group cross-country safari to another local airport. Leaders and participants will be teamed up in two-place and single-place ships for the journey. On Wednesday evening **Eric Greenwell,** noted competition pilot, will talk on transitioning to higher performance sailplanes.

Thursday will center around a turnpoint photo workshop. Developing facilities will be set up and seminar participants will have the chance to fly and take turnpoint photos, and then have them developed and analyzed on-site. **Thoville Smith,** FAA Safety Specialist, will present a Pilot Proficiency Program that evening, and FAA Designee for gliders **Delmar Randall** will discuss soaring safety, airspace restrictions and high altitude flying.

Lap races and a sports class contest are scheduled for Friday, so participants can get a taste of contest flying. Friday evening an informal banquet will top off the week with SSA Director **Marion Barritt** as featured speaker. Marion holds Diamond Badge 257, one of only a few women to have earned this distinction.

The 1983 SSA Women's Soaring Seminar will be hosted by the Seattle Glider Council. A variety of ships from a 1-26 and a Pilatus B-4 to a *Blanik* and single and multi-place *Lark* will be available for lease. Towplanes and instructors will be available throughout the week, and pilots are encouraged to bring their own sailplanes.

Registration for the Seminar is $50 for SSA Members in advance and is open to women and men alike. Non-SSA Members and on-site registration is $75 per person. Registration includes admission to all Seminar sessions and the Seminar Kit which incorporates local sectional charts, cross-country briefing data, FAI rules and applications, flight declaration forms, safety reference data and background materials. To register and for further information contact Michelle Silver, Soaring Society of America, P.O. Box 66071, Los Angeles, California 90405.

— MICHELLE SILVER

HOMEBUILDER NEWS

A half-year has slipped by since completion of the first Homebuilt Sailplane Design Contest. SSA's judges selected **Burt Rutan's** *Solitaire* as winner and **Marty Hollmann's** *Condor* as runner-up. So far, neither has been built by sailplane homebuilders. Everyman's sailplane probably seems as remote as ever to the grass-roots enthusiast.

Don't give up hope. Plans for the *Solitaire* were due out on the market last month. One reason for the delay was the vexing problem of finalizing a reliable, foolproof, retractable/extendable self-launch engine.

"We're satisfied now," said designer Rutan when recently contacted by *Soaring*. "We have developed an electro-hydraulic, switch-activated setup that raises the 25-hp KFM 107 engine on a pylon. Operational tests made us decide against the original idea of housing the motor in a fuselage power bay. The pylon now pivots at the rear of the compartment to erect the engine and tractor propeller."

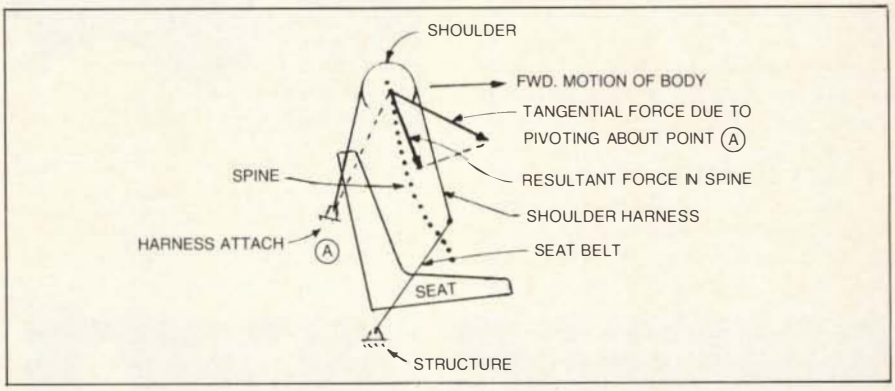
At the time of the interview, RAF had not decided whether it will build kits or limit itself to plans and authorize aircraft supply houses and manufacturers to fabricate and sell parts.

Einar Enevoldson has completed his flight test evaluation of the *Solitaire*. Readers can expect a report in the near future.

Marty Hollmann's *Condor* will evidently not be produced. A family member indicated that Marty has written off the prototype due to the extreme damage resulting from the failure of its Revmaster/VW engine on takeoff. Unfortunately, he suffered spinal injuries and has only recently gotten out of his cast.

Contest judge **Stan Hall** examined the wreckage; he feels there are lessons to be learned from this accident. Writing in the March issue of the SSA Sailplane Homebuilders Association newsletter, *SHAp Talk*, Stan says, "I am convinced that the attach point he used for the shoulder harness contributed to his grievous injury. I'm also convinced it saved his life."

Marty went heavily forward and down when he hit the dike two feet from its top. Stan notes that the structural attach point for the shoulder harness was 10 to 12 inches *below* his shoulders — too low to restrain Marty from going forward without also forcing him down in the seat (to the detriment of his spine). Stan offers an analysis of the force vectors in the accompanying seat-pilot-harness diagram.



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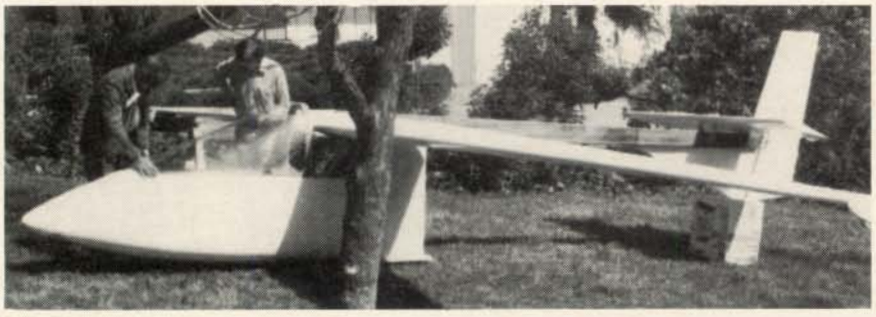
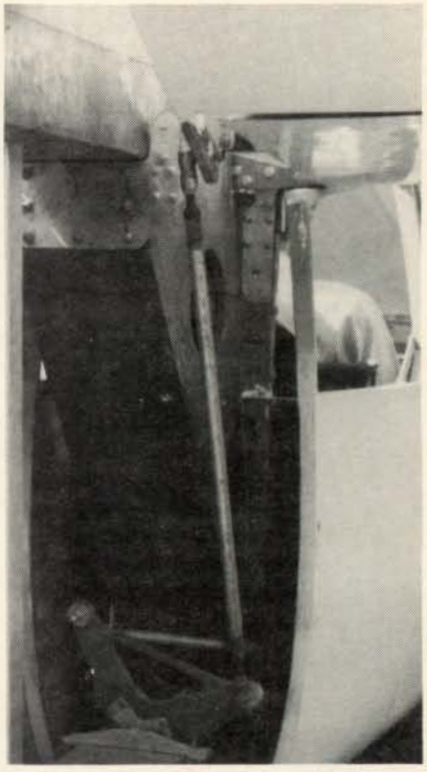
Those of you who attended the 1983 convention in Reno saw the *Windrose* self-launching sailplane on display, but for those who couldn't make it here's a look at a very promising approach to low-cost, high-performance soaring. Jim Maupin, who did most of the building on the bird, and Irv Culver, who did most of the designing, appear to have addressed the real concerns of most soaring homebuilders. They have designed a sailplane that doesn't cost a lot, doesn't take an amateur long to build and promises to perform on a par with much more costly machines.

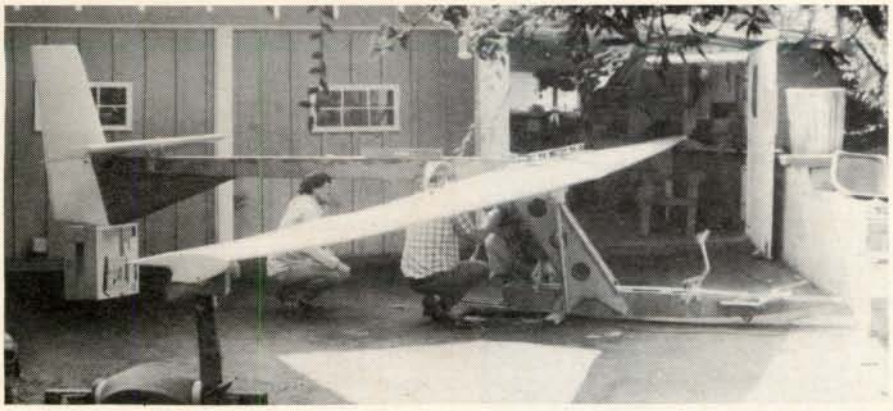
Two things make *Windrose* and other aircraft in its class possible: the KISS design philosophy (keep it simple, stupid!) and modern technology. Simplicity is essential to prevent escalations in the level of skill required and

By golly, it fits! Designer Irv Culver positions the Windrose canopy over a happy Jim Maupin. The flat-bend plastic sheet is capped by a small molded sheet glued to the top section, but is basically a single-curvature canopy. Plenty of headroom has been provided.





The rocker arm at bottom, located just forward of the mounting pad for the engine, is connected by torque tube to the stick mixer. Lateral control movements translate into direct aileron drive at inboard end through vertical pushrod, eliminating internal wing passages.



Windrose

Specifications and Calculated Performance

	Unpowered	Powered
Wing span	41 ft. 7 in.	
Wing area	95.25 sq.ft.	
Aspect ratio	18.25 to 1	
Empty weight	315 lbs.	390 lbs.
Payload	210 lbs.	210 lbs.
Gross weight	525 lbs.	600 lbs.
Wing loading	5.5 lbs./sq.ft.	6.3 lbs./sq.ft.
L/D max	30/1 @ 48 mph	29/1 @ 50 mph
Minimum sink	2.1 fps @ 39 mph	2.3 fps @ 40.5 mph
Takeoff run (sea level, std.)	N/A	500 ft.
Rate of climb (sea level, std.)	N/A	600 fpm @ 52 mph

the time necessary to complete the project. Technology has made available construction materials offering unprecedented strength and lightness, and powerplants of much improved power-to-weight ratios and reliability. When these ingredients are intelligently put together, sailplanes like *Windrose* can emerge.

There are both conventional and unconventional features to this design. The wings, for example, are of low density foam shaped by hotwire and covered with fiberglass and resin, but the spar concept is unique. The designers felt that building a spar and then gluing blocks of foam on the front and back of it complicated the job too much, so they invented a new spar idea entirely. Bands of undirectional roving are epoxied into recesses in the upper and lower surfaces of the foam airfoil to serve as spar caps. To take compression loads, a row of dowels functions as a spar web. The dowels are installed as follows: sharpen one dowel and use it to push holes through the foam at intervals and down the intended centerline of the spar caps *before* they are installed. Then cut dowels for each hole just long enough to fit flush against the inside of each cap. Now, when the caps are epoxied in place, there is a row of dowels between them

From May 23 to 27, soaring enthusiasts from novice to expert will meet in Ephrata, Washington, for the most intensive, inspiring soaring workshop possible. Please join us.

The Women's Cross-Country Soaring Seminar

hosted by the Seattle Glider Council

The Women's Cross-Country Soaring Seminar is designed to bridge the gaps in your soaring career, help you gain confidence, and transition to cross-country pilot, to badge pilot, to competition pilot. Rediscover the thrill of motorless flight for yourself.

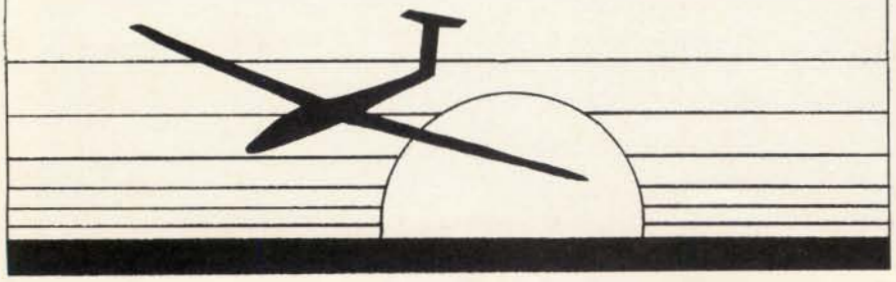
Novice, intermediate, advanced, and expert pilots share insight and tips on a variety of topics including beginning cross-country soaring, meteorology, parachute care, and women in soaring, their goals and barriers. Informal discussion groups led by accomplished soaring pilots combine with daily flying at one of the West's best soaring sites.

The Seattle Glider Council and its members extend a special invitation to fly Ephrata! A variety of sailplanes will be offered to lease at reasonable rates; instruction and towing services will also be available during the entire week.

Over 50% of those who attended the 1982 Women's Soaring Seminar attempted badge/cross-country flights for the first time *ever* — and over half of these completed their flights successfully.

Registration for the 1983 Women's Cross-Country Soaring Seminar, May 23 to 27, is $50 in advance for SSA Members. Nonmembers and on-site registration is $75. To register, contact the 1983 Women's Cross-Country Soaring Seminar, The Soaring Society of America, P.O. Box 66071, Los Angeles, California 90066.

It's not just for women!



to take the crushing loads off the foam.

This design leaves no internal paths through the wing for control runs, but *Windrose* doesn't need them, as her ailerons drive from the inboard end. There is no provision for dive brakes or flaps, either, which called for another bright idea from her developers. Culver decided to install a simple, low aspect ratio, negative-lifting delta wing atop the centerline to provide glide path control by functioning as a spoiler when needed.

The simple plywood spine of the ship is a hollow box just about anybody could assemble in a couple of weeks. The all-flying tail surfaces are glassed foam, as is the fuselage pod. The plastic canopy is a flat-sheet, single-curvature bend. Everything about the aircraft is, to make the point by verbal contrast, ingeniously simple. The wings took six days each to build.

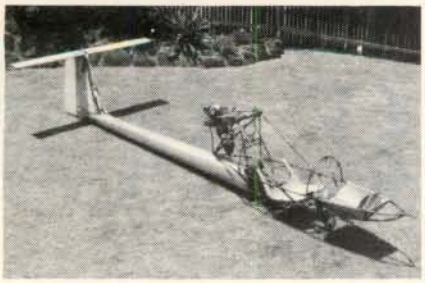
Cuyuna's new UL II-02 engine, which can turn up to 6250 rpm and deliver 35 hp, will be downrated in the *Windrose* to yield 32 hp at 5500 rpm. That's enough to take off without paying for a tow and climb out at 600 fpm to wherever the lift is, at which time it can be shut down for soaring at a calculated L/D of 29.

Windrose will be marketed three ways: plans and a detailed instruction book, complete kits or partial kits (hardware, molded pod, etc.). To get on the mailing list for further information, drop a line to Jack Benedict, 9 Stirrup Road, Rancho Palos Verde, California 90274, or call him at (213) 548-3669.

* * *

BLUE WREN, the Australian design which almost, but not quite, made the flyoffs of the first SSA Homebuilt Sailplane Design Contest, may very well be ready this year. In February, 1983 builder Reg Todhunter wrote that he was hoping to have the ship on static display at an Australian air show at just about the same time that SSA members were admiring Jim Maupin's *Windrose* at the 1983 Reno convention. "The steel tube assembly is almost ready for painting and installation in the pod," he wrote. "The whole tail assembly has been glassed with the exception of the elevator, and at the moment the wing assembly is under way — behind schedule, of course! The foam blocks are profiled, the control installation almost complete and by the end of February, 1983 we should have the starboard mainplane assembled, though not glassed."

The accompanying photo is of an earlier construction phase, but shows the mounting of the two German chainsaw engines which are installed



as opposed twins to turn a third prop shaft by a 2:1 reduction belt. This powerplant has had close to 40 hours of highly successful bench running using an electric starter and a custom-designed capacitor discharge ignition system. It is intended to give 15 hp for a fuel consumption of about half a gallon per hour at full power and a weight of 26 pounds not including the CDI. As soon as *Blue Wren* flies and Reg gets us the dope, we'll have a complete story with nitty-gritty details and lots of photos.

HOMEBUILT DISTANCE BADGE FLIGHTS ON THE RISE

The survey of distance badge flights accomplished on homebuilt sailplanes and published in *Soaring* during 1982 shows a healthy increase by almost a factor of three. The strongest homebuilt showing is still by the venerable but reliable Ka-8, younger sister of the famous Ka-6.

All in all, 28 flights were accomplished as compared with 10 flights reported in 1981. In addition to the flights accounted for in the accompanying chart there have been an as yet unspecified number of flights made on *homebuilt* Schweizer sailplanes. Following my call in *Soaring* (Dec. 1982) for the Schweizer homebuilders to report their Badge flights we received one report from the U.S. and one from Canada. Taking the Schweizer numbers pro rata, we estimate that in 1982 six or so Schweizer homebuilt flights should be added to those reported in the accompanying chart.

I did hope that my own Silver C, flown in August, 1982 and perhaps first ever in a homebuilt *powered* sailplane, would find its place in the table above; but the paperwork being what it is, I will be accepting congratulations in 1983. — ALEX STROJNIK

Sailplane	50 km	300 km	300 km Goal O&R/or Triangle	500 km	1000 km Diplome
Annebula	1				
BG-12	1				
Duster	1	1			
Gehrlein Precursor	1				
HP-11 A	1				
HP-13		1			
HP-14	1		1	1	
HP-18	4				1
Ka-8	6		2		
RS-15	1				
Tern			1		
Witcher				1	
Woodstock	1		1		

Shopping for

by JAN SCOTT

An American FBO Samples What Europe Has to Offer

	Grob G-109	Scheibe SF-36	Dimona
Wing span (meters)	16.6	16.3	16.0
Empty weight (lbs.)	1276	968	1034
Best L/D	30	28.5	27
Best sink (M/S)	1.14	0.9	0.9
List price	$36,700	$34,320	$37,850

The powered gliders appear to have come of age with the new models that are now being marketed. Sleek fiberglass structures, sports-car-like cockpits, powerful engines with feathering propellers and convenient conventional landing gear are tantalizing buyers all over the world.

As we were considering one for our Virginia fixed base operation, we traveled to Germany last summer to try out four models: the Grob 109, Hoffmann *Dimona*, Valentin *Taifun* and Scheibe SF-36. Our primary requirement was the ability to operate out of our 2500-ft. grass strip on a hot summer day. This, we soon decided, eliminated the *Taifun* from consideration, due to its very small wheels. We then concentrated on the other three, flying each for about 30 minutes in similar wind and weather conditions. No sales people or company test pilots were present to influence our judgment. We thought our impressions might be of interest to others.

The single ignition 80-hp Limbach engine common to all three aircraft is started like a car: pull the choke and push the starter button. The engine comes to life with a reassuring roar, but little else happens. It takes **a lot** of power to get these aircraft moving! Steering and visibility are quite good during taxiing. Engine warm-up is painfully slow, and a run-up before departure is necessary to assure that the propeller is in climb mode. No mag check. The takeoff run is unsteady due to the narrow, fast-moving prop wash hitting the fin. That and the roar of the engine gives visions of P-51-type takeoff performance. A thousand feet down the runway, one realizes that this is not going to happen with any of these machines. Each aircraft leaves the ground rather reluctantly and climbs no faster than a 2-33 behind a Super Cub.

After reaching cruising altitude, the propeller is jerked into traveling mode, and the efficiency of all three aircraft becomes apparent — more than 100 knots indicated at three gallons per hour! Fantastic! We liked it even better at 65 knots, with the engine turning over with a quiet whisper and getting 50 miles to the gallon. To glide, one simply turns off the ignition and pulls the feathering handle after the propeller stops. The aircraft keeps flying with very little change in nose attitude.

The sink rate is somewhat high for a 28-30 L/D aircraft, and climbing in thermals may not be as easy as the performance figures indicate. (All three of the aircraft we flew had undampened varios that were nearly useless for soaring.) The spoilers allow excellent glide path control and should be left out until after touchdown to avoid an embarrassingly long float. The propeller returns to the climb mode automatically when the engine is restarted in flight.

Below are some of the impressions we received from each model:

Entry-Exit: The *Dimona* was best, with the canopy swung open to the rear and the landing gear serving as a step. Getting into the Grob was difficult.

Headroom-Legroom: Superior in the Scheibe; adequate in the other two.

Visibility-Ventilation: Visibility is good to excellent in all three. Ventilation is very bad in the *Dimona* but Hoffmann is promising improvements. Only the Scheibe can be taxied with the canopy in the open position.

Controls: Stick and rudder feel comfortable in the Grob and Scheibe. The *Dimona* we flew had excessive friction in the aileron system and insufficient rudder control on takeoff and roll out.

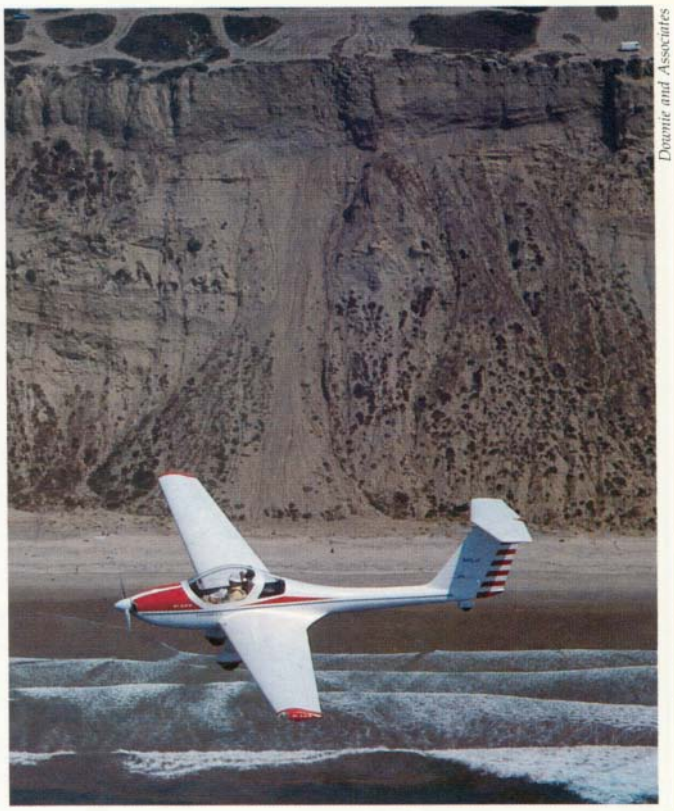
Cockpit layout in Grob G-109

Photo courtesy of Grob

Motorgliders

Jan Scott

Author liked control layout in Hoffmann Dimona



Downie and Associates

Grob G-109 off Torrey Pines, California

Jan Scott

Scheibe SF-36 is lightest of the three

Best control harmony — Scheibe. While the Grob has the best looking cockpit, it is also the least functional. I got my little finger painfully stuck behind the spoiler handle and the wall, an elbow hit the rear of the cockpit while retarding the throttle, and the manual propeller control handle had to be pulled halfway across the cockpit. These controls are much better laid out in the *Dimona*. The Scheibe has a panel-mounted throttle quadrant with a 180° throttle movement. This is confusing, since one has to move the throttle aft initially to increase power. The Grob has individual wheel brakes, which makes it the best handling on the ground. It was also the heaviest of the three and the poorest performer.

Service: The Scheibe appeared to have had cooling problems; it is the only one with cowl flaps, and our test aircraft had a retrofitted oil cooler. Engine access was very good, and all maintenance access looked simple. The *Dimona* had the quickest engine access, but beware — one lost its cowling in flight while we were there. It also has a swingback wing arrangement for easy storage. Tiedown provisions are good on the Scheibe, less suitable on the Grob.

In summary, one can see that all three aircraft have problems that will hopefully be corrected on later models. If the best features of each were combined, one would surely have a terrific product. We would have chosen the *Dimona* if it had better rudder authority on the ground. We believe the main gear is located too far forward, thereby causing this problem. We considered the Grob to be too sluggish for our grass runway. We are thus favoring the Scheibe and are eagerly awaiting its certification.

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BUSINESS MEMBER

A Matter For Your Attention

What Puts Us At Risk: Flying, or Pilots?

The matter at issue is a tolerably important one: human life. When you pursue an enjoyment that poses some degree of risk to your life, ordinary intelligence requires that you take every possible step to minimize that risk. People in soaring have not been doing that.

If you question whether or not they have been doing it, read the accident statistics (or merely check the trend in your insurance costs over the past few years) and your doubts will pass.

There is, of course, some element of risk in virtually any human recreational activity involving motion. For balanced minds the question is not whether risk is present, but whether all reasonable steps have been taken to remove as much of it as possible. Croquet and shuffleboard are by their nature less hazardous than, say, bullfighting or scuba diving. Likewise, soaring (when the risks have been reasonably minimized) is less hazardous than rappelling down the Matterhorn, racing motorcycles at your local dirt track or doing many of the other things people do for sport.

Furthermore, when a lot of pilots have flown for 25,000 hours and retired in good health, or spent 40 or more years aviating for pleasure without ever breaking bird or bone, the act of flying cannot by definition be classed as intrinsically dangerous. The danger which does manifest itself from time to time must logically be resident in the deficiencies of the practitioners, not in the nature of the activity itself.

The hard fact is that a great many of us have not, repeat **not,** paid enough attention to the simple dictates of basic flight safety. These are by no means exclusive to soaring; they dictate (the word choice was intentional) to everything manmade which passes through the air. Aviation, it has been said, is not inherently vicious or cruel, but it is terribly unforgiving of any inattention, carelessness or neglect.

The stamping out of inattention, carelessness and neglect is, therefore, the subject of today's sermon. Clearly these are utopian goals, the species being what it is. Nevertheless, your Society feels that the number of widows and orphans, maimed survivors and ruinously damaged aircraft is ample proof that efforts more strenuous than those made in the past must now be made to abate this nuisance. And who better to make such efforts than the flight training and safety experts among us?

There is an immense reservoir of talent and experience among the membership of this Society, and a great deal of it lies right square in the middle of flight safety. There are pilots among us who have flown about everything there is, in about every circumstance you can imagine. We have people who know what can happen and how it can happen, because it has happened to them. We have people who know how to clarify and explain and teach, because that is what they do for a living, and do well.

Soaring is now going to tap those resources a little more vigorously than in the past, for the benefit of your life and limb. The decision to increase the emphasis originated in the Soaring Society's Flight Training and Safety Board, passed with enthusiasm through the Board of Directors, and is greeted with satisfaction and complete approval by the *Soaring* staff. Here's how we propose to tap SSA's savings account of smarts:

From time to time we will pose some questions in these pages. You might call them life support questions, because that's what they will do for **your** life any time you **have to** answer one of them and you do it right. We will invite — nay, we will implore — you to answer them in your own mind, and PROVE to yourself that you understand the issue correctly. We will urge instructors to focus on these questions in their teaching. And we will ask all of you for your written comments, opinions, disagreements, insights and questions, without which the whole exercise will be futile.

When enough response has been received at the *Soaring* office we will filter it all through our panel of experts (i.e., the Flight Training and Safety Board or specialists designated by that Board) for comments, conclusions, recommendations, warnings, etc. Then we'll re-publish the original question together with all of the accumulated wisdom that has collected on it along the way. These summaries, usually appearing several issues after the original question, may appear under the Safety Corner heading, under Teaching Soaring, or elsewhere as appropriate to the subject matter.

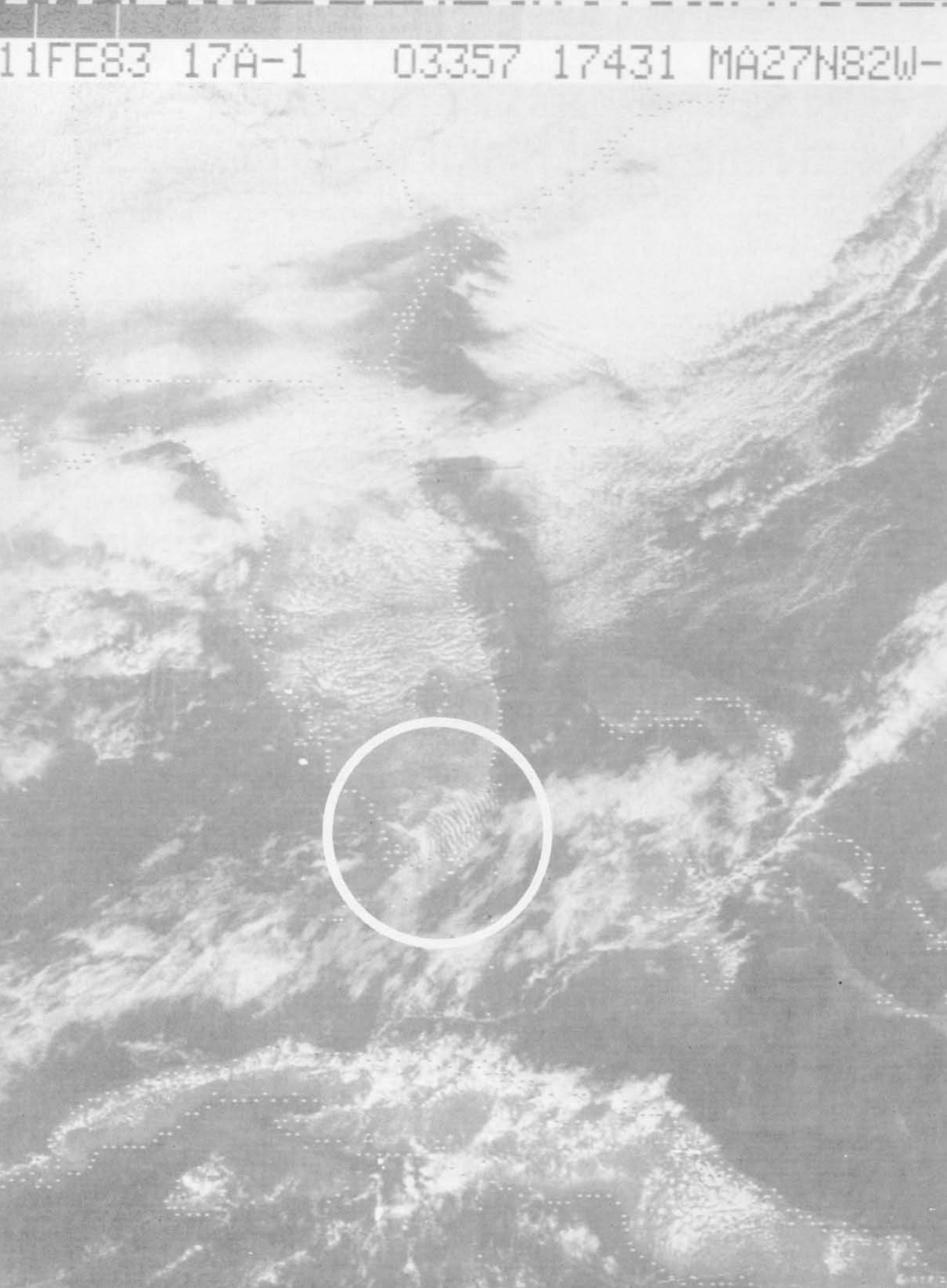
The purpose of all this is to commence a much more active dialogue on basic questions of sound airmanship, and then to more or less hold that dialogue under the noses of the entire *Soaring* readership in the hope that people who would otherwise be about to have accidents will be induced to avoid them.

Will you help? Will you participate to the extent of dropping us a line now and then to tell us what you think the answers to our questions are, and why? It's no big burden, and your contribution might just be the one that saves some other pilot's structural integrity.

Now then, let's get to business. If you've read this far you are not entirely disinterested in keeping your body in its present shape and texture, and knowing all (or at least most) of the answers to the following question will help you keep it that way:

What angle of bank is best for turns in the traffic pattern?

(Look for answers in a couple of months.)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Catching a FLORIDA WAVE

No, it isn't the kind you ride on a surfboard. But did you say Florida *Wave?*

by BOB YOUNGBLOOD

Not much has been written about south Florida soaring, most likely because people are under the impression that great soaring cannot be associated with a body of land surrounded by water. Certainly we all read about the great thermal soaring of the West, the ridges of the East and the wave camps of the Sierras, the Rockies and other favored locations.

South Florida, however, offers yearly soaring that would amaze most enthusiasts. Soaring conditions in the Miami area range from springtime Q cloudbases that may reach 7000 feet to an occasional sea breeze front stretching for miles, making possible some of the best cloudstreet runs imaginable.

If Miami does have a soaring drawback it can be associated with cross-country soaring. The reason is the Everglades, a vast area of the roughest terrain one could imagine. If you were to be forced down in the 'Glades there would be little possibility of making it out in one piece. But even with such drawbacks, one can only say that south Florida soaring is different, rewarding and dynamic.

So dynamic, in fact, that only recently a condition was experienced that should be shared with all soaring enthusiasts.

Day: Friday, Feb. 11, 1983

Place: Thermal Research, Miami, Florida

As usual I arrived early to open the hangar doors and hopefully prepare for one of our daily flights of three or four hours. Little did I realize what we would experience before we landed.

Bennie Flowers and I have been soaring partners for about a year. We certainly have had some great flights together, and this day was to hold something special for both of us. We prepared our ships as usual, wiping down every square inch of shining white surface, and then spent a few minutes talking with Paul Crowell, our volunteer tow pilot for the day.

We debated on the weather for awhile before Paul (everyone calls him Pablo, and from here on so will I) finally said, "If you're going it had better be now, because it doesn't look like much except for that funny-looking cloud to the south." At best it only looked like one of those character-building days where you work like crazy to stay up.

Pablo was readying the tow ship while Ben and I were making our final adjustments for the flight. Ben helped me get ready for takeoff as I was going first, but he would be up there soon after me. When Pablo was taking up the towline slack I was completing the checklist for my Standard *Cirrus*, and he came on the radio: "Okay Yankee 6, how is it back there?"

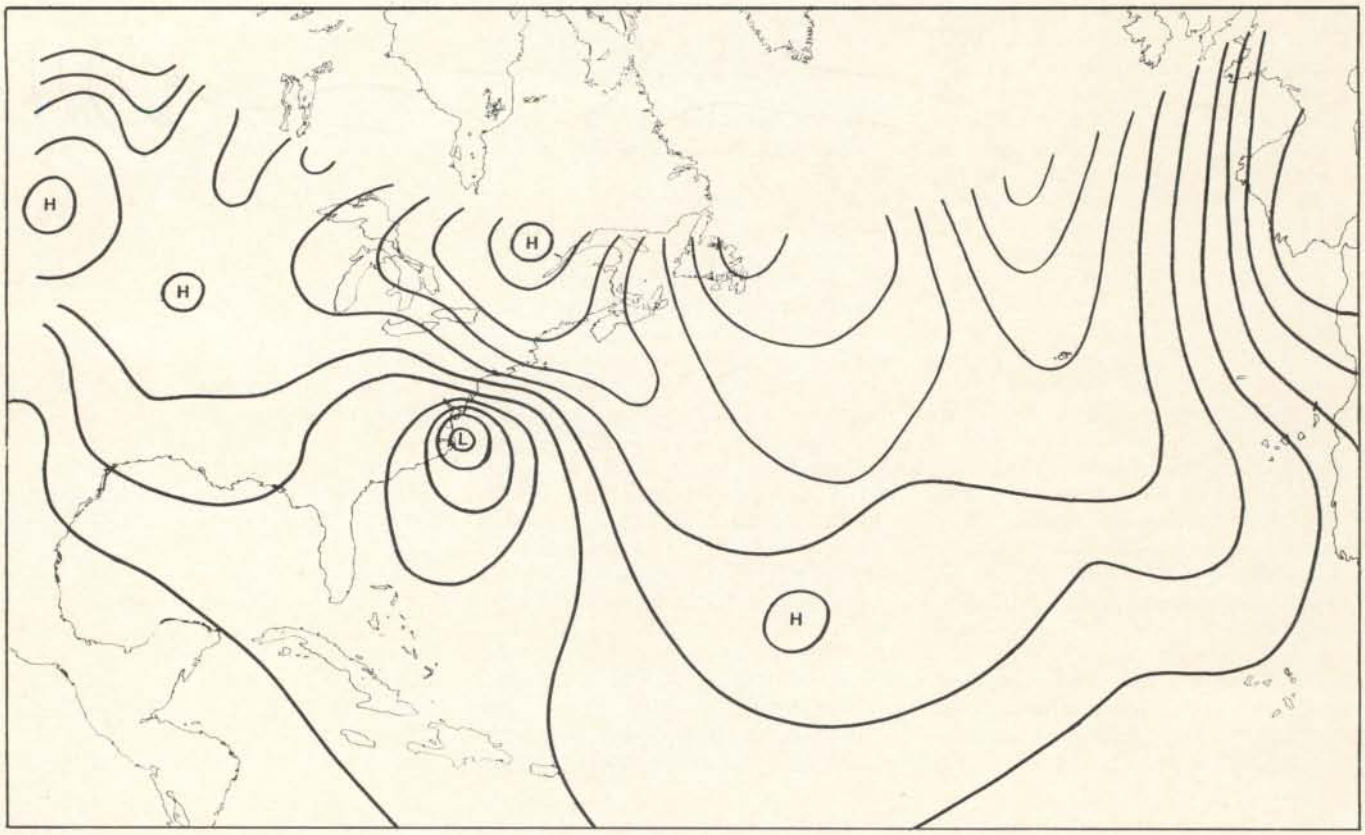
"Okay, Pablo, ready for takeoff."

The Super Cub roared down the runway and we were soon gaining altitude, heading in the direction of the developing cloud formations to the south. I radioed Pablo to ask for a slight course adjustment, and he responded, "Okay, Bob, hold on a bit until I reach 2500 feet."

I acknowledged and we soon were in the general area where I felt the chance of finding some lift would be best. We reached release altitude, I released and Pablo headed back to the field where Ben had his *Mosquito* ready for takeoff.

Only shortly after I cut loose I found

Satellite photo clearly shows wave pattern over south Florida (circle), and it continues under high cirrus as far east as the Bahamas islands.



A high pressure system centered in eastern Canada blocked the normal northerly movement of the low shown off Cape Hatteras. The low "parked" there, drawing up moist air from the south and southwest in a counter-clockwise flow and intensifying into "the great snowstorm of 1983."

a little lift and was able to work it to cloudbase at 3200 feet. I got on the radio and called Ben to give him my location, hoping that he would tow over toward me so we could work the same area together. Not far to the north I could see the towship closing on my position, and Ben soon released below me to begin his search for lift.

My altitude was still about 3000 feet and I began exploring the vicinity for areas of stronger lift. Ben was still hunting down below; it seemed like one of those days when the lift area was good at cloudbase but rather weak at lower altitudes.

"Hello Bravo Foxtrot, have you anything yet?"

"No, but I've spotted birds ahead and I should have something soon."

As I watched from above Ben racked the *Mosquito* into the thermal with the buzzards, and I knew it wouldn't be long before he made it to cloudbase.

Breaking away from my cloudbase position I headed northeast toward the perimeter of the cloud, only to find myself in a strong sink area where I was rapidly losing altitude. Ben came up on the radio and we exchanged our present locations. I told him of the sink area, and he said he was going to head southwest of the cloud area.

My own plans were to go back over to the lift area I had just left, and hope to climb back to cloudbase where I could join Ben. But almost immediately he came back on the radio: "Yankee 6, join me to the southwest of the cloud. I have good lift in the blue."

I grabbed my mike and replied, "Roger Bravo Foxtrot, as soon as I get back to cloudbase." When I hit the lift area I racked the *Cirrus* in tight hoping to center the thermal quickly and get high enough to go over and join Ben.

Within a couple of minutes my altitude was nearing cloudbase and I was about to call Ben when he came over the radio: "Four thousand five hundred and still climbing." Instantly I pushed the nose down and cruised toward the area where Ben was.

"Bob, have you found it yet?"

"Just getting into it now."

"I'm at 5000, even with the tops of the clouds."

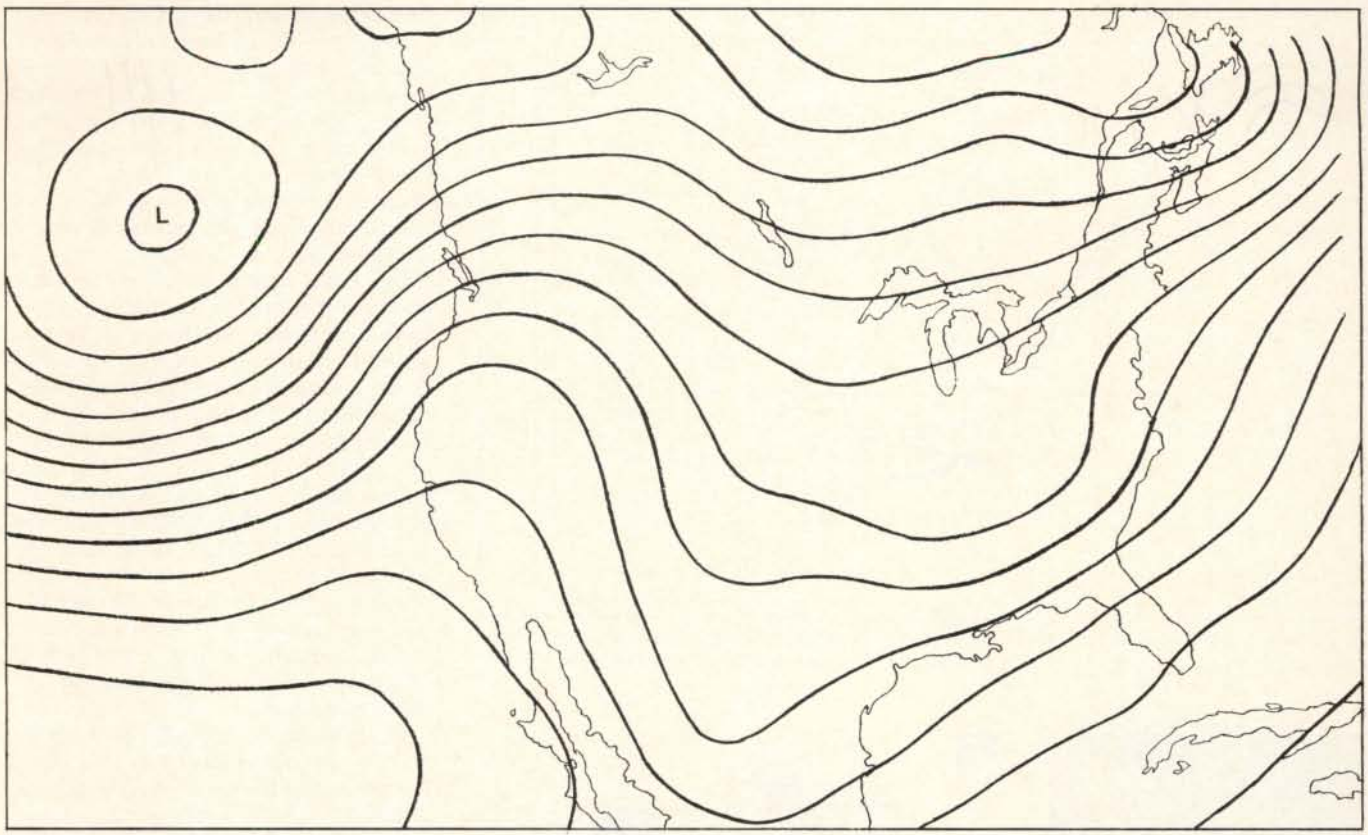
My vario was showing better than 700 fpm, and I was cruising straight and level! I reduced airspeed to minimum sink and continued the cruise. As I approached cloud tops close to 5000 feet the temperature inside my cockpit shot up abruptly and dramatically; it was like flying into a furnace, and it stayed hot for the remainder of the flight. My altimeter was winding like the second hand on a clock. It was unbelievable; I had never seen anything like this before. My altitude was approaching 5000 feet, the ride was as smooth as velvet, and my varios were now showing a steady 400 fpm.

Peering in a direction beyond my left wingtip I could see the building tops of the clouds — one of the most beautiful sights one could imagine. "Fantastic, absolutely fantastic," I transmitted exuberantly. Never before had I experienced anything like this. My altitude was now approaching 7000 feet.

Ben was on the radio to the gliderport when Pablo asked his altitude. "Bravo Foxtrot, eight thousand feet." Pablo immediately queried, "Did you say eight thousand feet?"

"A–ffirmative, Bravo Foxtrot eight thousand two hundred."

My varios were now going crazy; they were showing a steady and strong 600 fpm. I continued to climb in the strong area until it weakened, then



Surface analysis chart for day of flight shows parallel isobars across Florida, indicating an even flow of wind from southwest to northeast into the low pressure system just off the top of this map. No frontal activity or other atmospheric feature is shown upwind of Florida that could start a wave.

made a 180 and headed back for more. Soon I was going through 9000. Quickly grabbing my mike I radioed Ben to report my altitude: "Nine thousand two, three, four, five . . ."

"Yankee 6, what is your location?"

I glanced beyond my right wing and saw the *Mosquito* at a distance. "Three o'clock position, two cloudstreets over," I replied.

As I was approaching 9700 feet I looked directly above and saw the most beautiful view of a sailplane one could imagine: the glittering, sleek and graceful silhouette of the *Mosquito* passed across my canopy against the tranquillity of a deep blue sky.

"Ten thousand feet," Ben reported. Congratulations were passed from Pablo on the ground, and from myself as well. Ben topped out at 10,100 feet.

As for myself, I was cruising south toward the cloud's end. Within minutes I peered below to see the northern islands of the Florida Keys and surrounding waters. What a beautiful sight! I could scarcely imagine being southeast of the Keys.

After a couple of minutes I turned out over the east coast of southern Florida and continued to cruise eastward for some time until my position was well offshore from the coastline. From this altitude and in the wind conditions prevailing, I could without a doubt have made a final glide which would have put me on the island of Bimini in the Bahamas.

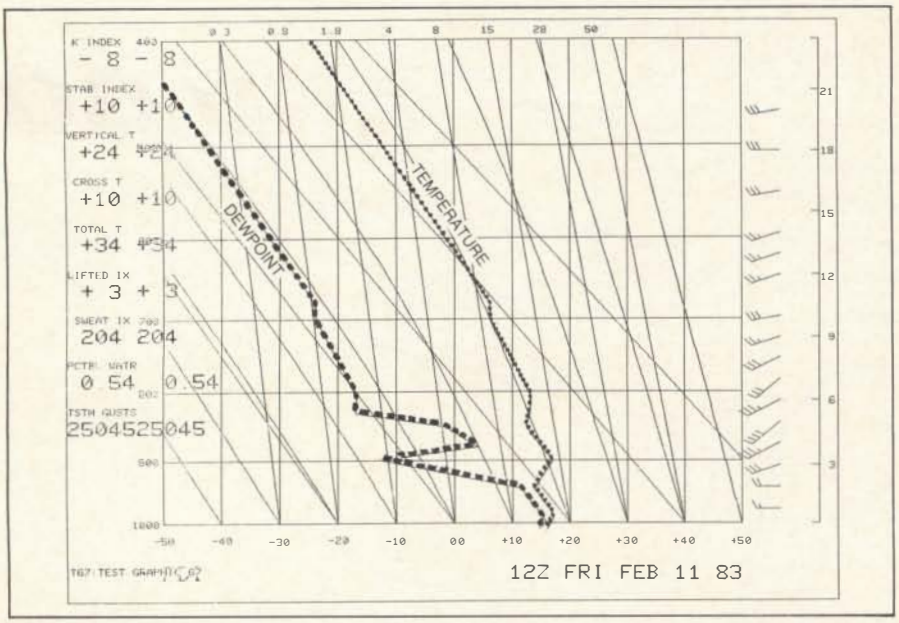
Not having any pontoons on my *Cirrus*, however, I made a 180 and headed back toward the coastline vis-

---

The cloud patterns over southern Florida and the Bahamas in the satellite photo on page 24 exhibit the classic characteristics of standing lee waves, but they are not standing in the lee of any terrain feature capable of causing the initial orographic lifting which sets off a mountain wave. Upwind of the waves, the surface is sea-level flat all the way to the coast of Yucatan. The waves must, therefore, have been triggered by atmospheric and not topographic formations.

The parallel isobars on the surface weather map (above) indicate an even flow of wind across the Florida peninsula, with no frontal activity or other apparent phenomenon in the way of the flow which might initially have deflected the wind upward to set off a wave. One possibility is that a strong inversion aloft (page 28) measured on the day of the flight, may have served as an airborne obstruction to the prevailing wind, causing the downstream ripples which appear as cloud streets on the satellite photo. The weather experts offer other theories as well, among them such esoteric causes as "gravity waves," although these normally occur at much higher altitudes.

The fact is, not even weather experts really know a great deal about what causes atmospheric waves in cases where mountains are not the obvious culprit. The readers of this magazine, however, include people with more than ordinary knowledge, experience and understanding about the atmosphere in general. Let's hear *your* explanations on why waves develop in areas where waves are not normally expected to be. — ED.

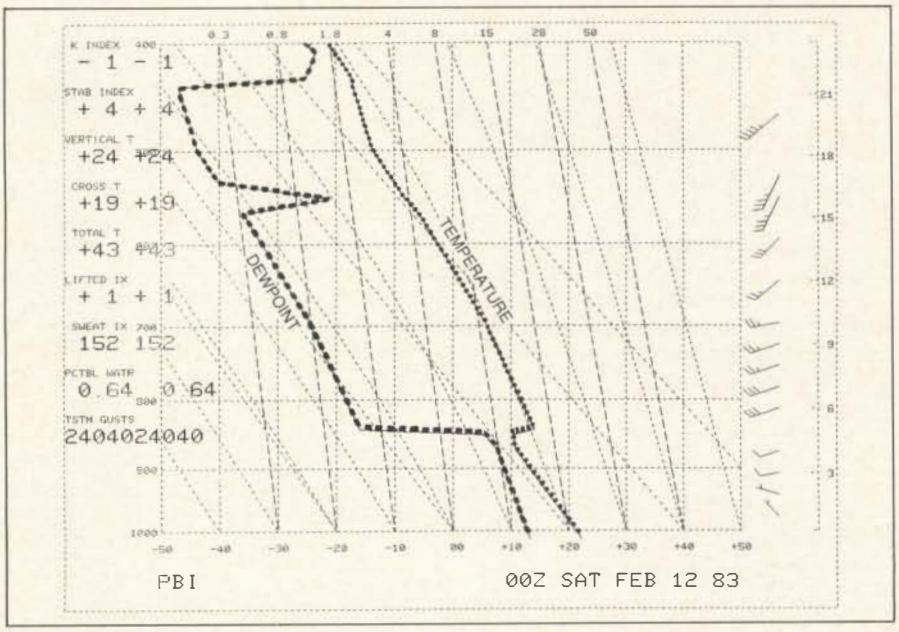


At 7 a.m. on morning of flight a radiosonde balloon at Coral Gables found a temperature inversion and dramatic humidity change from 2000 to 3000 feet. Observers had trouble making sense of this.

Bennie Flowers and his MOSQUITO

Bob Youngblood and his CIRRUS

By evening inversion was stronger and dewpoint spread even more radical, but they had risen to 5000 feet. This ridge or layer in the air may well have been what touched off the unusual wave activity.



ible in the distant west. Cruising hard toward the shore but with plenty of altitude, I decided to continue westward and satisfy an urge to fly over the Everglades before returning home.

One cannot imagine how mystified I was about all this. Never had I dreamed of being able to fly in a wave condition where the terrain is only a few feet above sea level.

Ben landed about an hour after I did, and we both had strange smiles on our faces and gleams in our eyes. We sat around the hangar, downed a six of Coors and spoke about the uniqueness of our flight. From that point on I knew I could not be content without finding out why we were able to experience such a flight. So I decided to visit the National Hurricane Center in nearby Coral Gables, Florida for a thorough explanation of the day's weather. Having access to one of the world's premier weather research centers should certainly make it possible to obtain excellent information on the day's conditions.

On Monday morning I was knocking on the door at NOAA (National Oceanographic and Atmospheric Administration). After a brief explanation of our flight to Bob Case of the center's research department, he arranged for me to meet a number of forecasters who received information on the flight with much interest, and provided me with a great deal of the relevent weather data.

One of them, Gill Clark, told me, "The last time I can remember such a development in this part of the country was in February of 1958." What he was referring to was an intense low pressure system of great magnitude which developed below the 25th parallel. The surface analysis chart for the following day (page 26) shows this development, which very seldom occurs at such low latitude in the area.

The more interesting piece of documentation is the satellite photo taken from about 22,300 miles above the earth's surface and covering the whole of Florida, the Bahamas and most of Cuba. It clearly shows a distinctive cloud-streeting formation of at least 17 rows covering the southern tip of Florida. When closely examined, the photo shows clouds of the same pattern over parts of the Bahamas and in the Gulf of Mexico.

One can only hope that, with the wealth of data and talent available at NOAA, it will become possible in the future to predict and spot such conditions. I hope so, because they sure make for great soaring.

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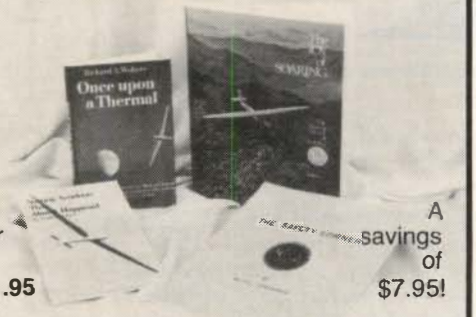

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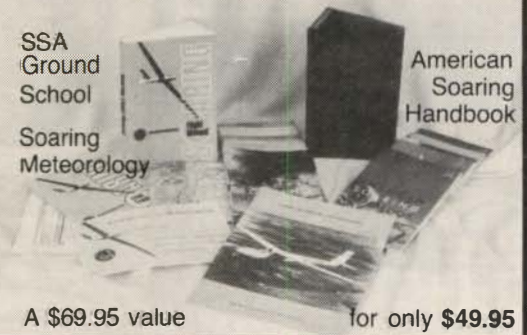

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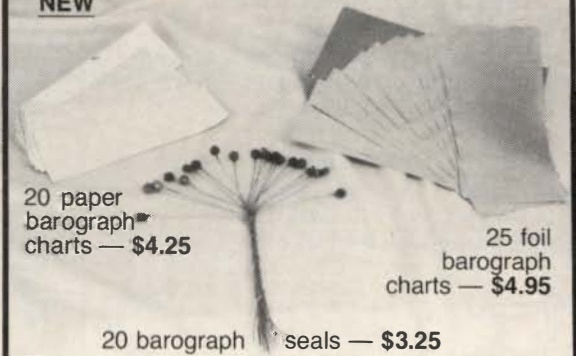

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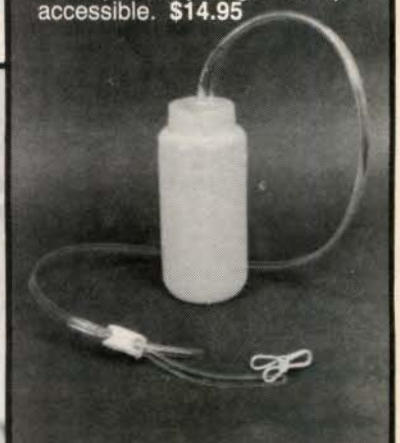

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A technical history of soaring—

From Paleoaeronautics to Altostratus

by M.K. CHEN and J.H. McMASTERS

Acknowledgement

The authors wish to thank Doug Lamont, former editor of *Soaring*, and Bob Storck, archivist of the Vintage Sailplane Association, for providing data and drawings for this article. Thanks also go to Dan Knutzen who transformed the authors' sketches into art.

PART I

An unconventionally long time-line has been selected in the following history of soaring. It includes an overview of the evolutionary process in the belief that this often poorly appreciated and significant part of aeronautical development led to the technical and aesthetic triumph of the modern sailplane. Thus, the story progresses from the true dawn of flight with the emergence of biological flying devices (animophilous seeds, pterosaurs) through a discussion of future trends in sailplane development. It will outline the history of the technical developments which have allowed progress from the tentative hang glider experiments of Pilcher, Montgomery, and Lilienthal in the last two decades of the 19th Century through the present range of sport and competition sailplanes. Modern sailplanes are at the forefront of important technologies such as laminar flow aerodynamics and routine production use of advanced composite materials. Yet, in no category of modern aircraft is the influence of *natural* models of flying machines more clear and direct than in the sailplane. To put this in clear perspective, the historical time-line of this presentation extends back to the very origin of flight some 300 million years ago.

Any winged flying device can, inadvertently or by intent, become a glider. As shown in Figure 1, a steady glide is characterized by the balance of the weight by lift and drag forces with gravity acting as the propulsion device. Since

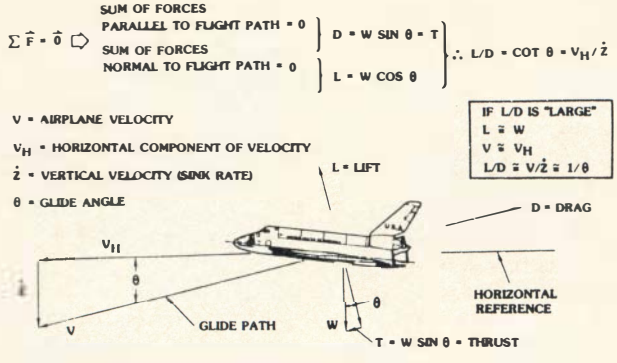


Figure 1. Forces on an Aircraft in an Equilibrium Rectilinear Glide in Still Air

the aerodynamic forces are generated in proportion to the motion of the machine relative to the air, the descent velocity (sink rate in gliding parlance) is proportional to the aerodynamic efficiency (lift-to-drag ratio) achieved at a given velocity along the flight path. But gliding flight is merely expedient or unavoidable, and, while occasionally exciting, otherwise uninteresting.

The fact that the atmosphere is seldom completely quiescent leads to a splendid additional possibility, however. If the glider is capable of flying sufficiently slowly (i.e., has a low wing loading) and possesses some minimum value of aerodynamic efficiency, the resulting sink rate will be "low." As pointed out by Lord Rayleigh in 1883 (Reference 13), if the proper combination of atmospheric conditions and topographical features produces air currents which rise ("lift") as fast or faster than the glider sinks (in still air), then the machine will remain aloft or climb. This is the basic principle of *soaring* flight, the classic conditions for which are shown in Figure 2.

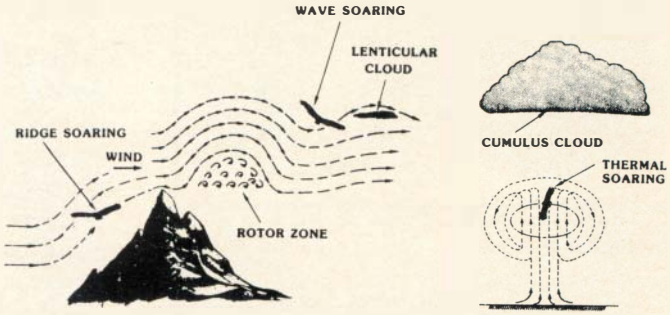


Figure 2. Classical Forms of Soaring Flight

Thus, flying in ridge lift, a crude Rogallo wing hang glider (M/S≈6 kg/m², L/D≈5 at 35 km/h), and a U-2 type airplane transformed into a glider (M/S = 200 kg/m², L/D = 22 at 150 km/hr) would have roughly the same still-air sink speed of about 1.9 m/s, making them both capable, in principle, of marginal soaring under sufficiently strong wind conditions. But the soaring performance of either aircraft pales in comparison with that of a modern fiberglass racing sailplane, as shown in Figure 3.

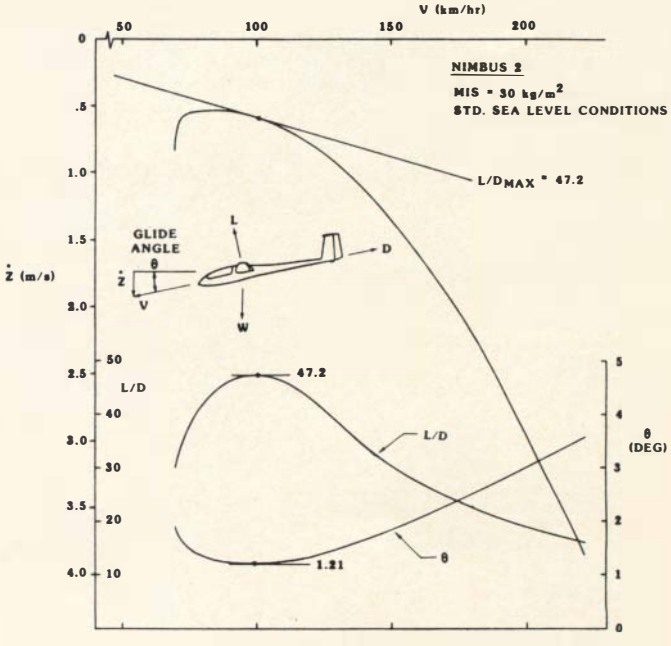


Figure 3. Typical Open Class Sailplane Performance

THE BASICS OF MODERN SOARING

Before discussing the evolution of soaring technology, it is first necessary to review a few of the finer points of how an efficient glider can sustain itself, and, in fact, fly substantial distances, borne aloft only by the motions of the atmosphere derived ultimately from energy from the sun. In the process of this review, several of the dominant principles in sailplane design will be illuminated. Further details may also be found in Reference 1.

The advances made in the evolution from gliding to soaring make an interesting story involving experimentation leading to sporting competition and then to the discovery of unsuspected aspects of dynamic meteorology. Had "motorless" flight in the historic era been limited to the range of possibilities offered by simply gliding over hills and ridges, it would have suffered the fate of the Zeppelin by the early 1920's. However, as sailplane performance capabilities (advanced by the application of wing theory and structural developments) outstripped the limits of flying techniques and competition goals, the discovery of thermal lift made possible the shift in performance objectives from endurance flights in a local area of favorable topography to more ambitious cross-country distance flying. This discovery and the rise of competition soaring resulted in even higher performance machines capable of exploiting atmospheric motions in ever more subtle and complex ways. Modern sailplanes are capable, under the right conditions, of flying literally from dawn to dusk over distances in excess of 1600 kilometers. Thus the present competitive challenge lies in racing over a specified course. Competition soaring has evolved into a sport which is a direct three-dimensional analog of competitive sailing, demanding a superb level of both physical and mental ability, a profound understanding of aerodynamics and meteorology — and good luck.

Central in the evolution from ridge soaring to cross-country racing was the discovery and appreciation of how to exploit thermal lift. While thermal flying had become common prior to WW II, it was not until the early 1950's that Dr. Paul B. MacCready, Jr., published a practical theory of optimal cross-country thermal soaring strategy. The apocryphal story goes that MacCready went on to become world soaring champion in 1956, having published the simple graphical construction shown in Figure 4 to provide his competition with a first-rate red herring, while he himself paid proper attention to the weather — and won the contest.

Be that as it may, the classical MacCready construction shown in Figure 4 demonstrates, in an idealized way, the tactics by which a properly designed sailplane should be flown in order to exploit a sequence of thermal updrafts to achieve an optimum overall cross-country speed. By flying slowly in a banked turn, the pilot seeks to achieve the greatest rate of spiraling climb in a thermal of given strength and profile. Having achieved (in the pilot's judgment) an acceptable height gain, the sailplane then is put into a high-speed rectilinear glide to the base of the next thermal upcurrent encountered, the sport in this game being, in part, the fact that the next thermal is usually invisible to the pilot. The optimum speed to fly (V*) between thermals to maximize the average cross-country speed ($\bar{V}$), which accounts for the time spent thermaling, is determined simply from a knowledge of the total glide polar (plot of vertical versus horizontal speed) of the sailplane in still air, and the rate of climb achieved in the thermal involved, with adjustments made for any horizontal wind which may prevail.

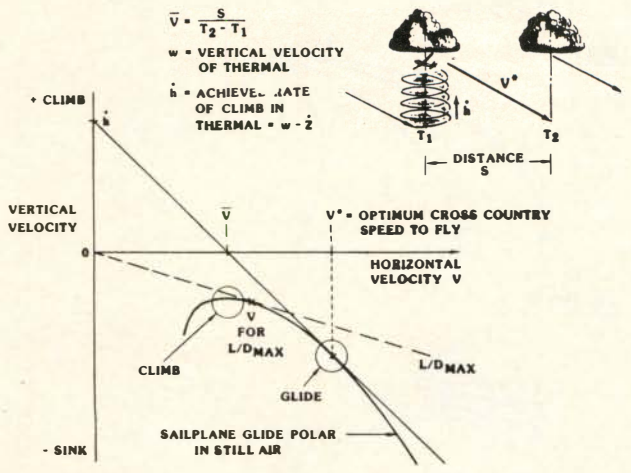


Figure 4.
Classical (MacCready) Optimal Cross-Country Soaring

According to the simple construction shown in Figure 4, the optimum sailplane needed to execute this sort of flight strategy is that which possesses both a low minimum sink rate at low forward speed (for optimum climb) and a flat glide polar (low sink rate) at high speed. The speed for maximum lift-to-drag ratio is seldom flown, although L/D maximum and the speed at which it occurs are a useful index in assessing a particular sailplane's overall performance.

Recognition of the importance of the basic features shown in Figure 4, and the fact that the L/D performance of the sailplane is independent of the weight of the machine (cf. Figure 1), leads to the construction shown in Figure 5. Under certain conditions (the presence of strong thermal lift) adding weight to the sailplane in the form of ballast can actually increase racing performance. The usual practice is to load the sailplane with water carried in bags running spanwise along the wing spar. The additional weight is then distributed across the span, providing a relieving bending load, and the wing loading can be increased by as much as 40 percent of the minimum flying weight. The effect of this is to shift the still-air gliding polar of the machine downward and to the right — the loss in climb performance hopefully to be compensated for by the increase in interthermal speed at a given sink rate for a net gain in average achieved cross-country speed.

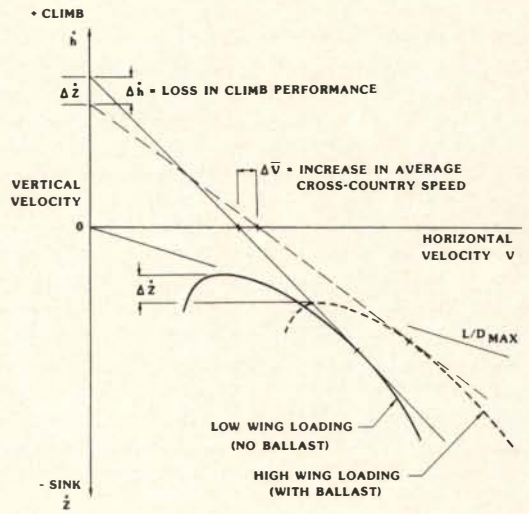


Figure 5.
The Influence of Wing Loading on Classical Cross- Country Soaring Performance

Having reached the level of performance necessary to

fully exploit these effects, the sailplane now becomes (with some minor resizing) capable of thermal soaring *without* circling. This alternative *dolphin mode* in soaring is shown in Figure 6 in contrast to the more traditional approach. With the lift-to-drag ratios of modern Open Class racers exceeding 50, this approach to competition racing has become routinely viable. The next step in this progression is to provide the sailplane with the variable geometry capabilities of span and/or area change which birds possess. Despite the spectacular levels of performance (and cost) achieved by modern racing sailplanes, major advances remain possible.

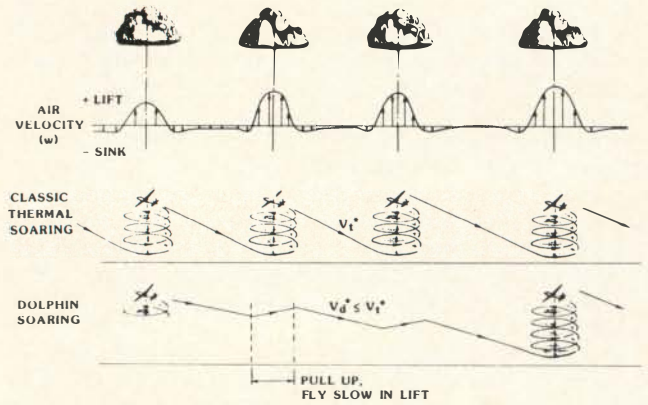


Figure 6. Variations on a Theme in Soaring

THE NATURAL HISTORY OF SOARING AND GLIDING

Lip service is paid frequently in aviation historical writing to the inspiration natural flying devices provide to the designers of airplanes. Despite the addition of high technology gadgetry such as winglets to business jets, it often remains difficult to see much direct connection between these sorts of machines and a pigeon or a bat. In the case of gliding and soaring, the parallels are far more direct and valid, although sometimes obscure or not fully appreciated. In order to put the present discussion of soaring technical development in a properly broad context, the developments which preceded human flight are briefly outlined here.

The relevant natural flying "devices" are: flying seeds, birds, bats, and pterosaurs. As shown in Figure 7, these organisms and creatures have evolved over huge time scales, and those which survive today can be assumed to have been nearly perfectly optimized (compromised) to fill their various ecological niches.

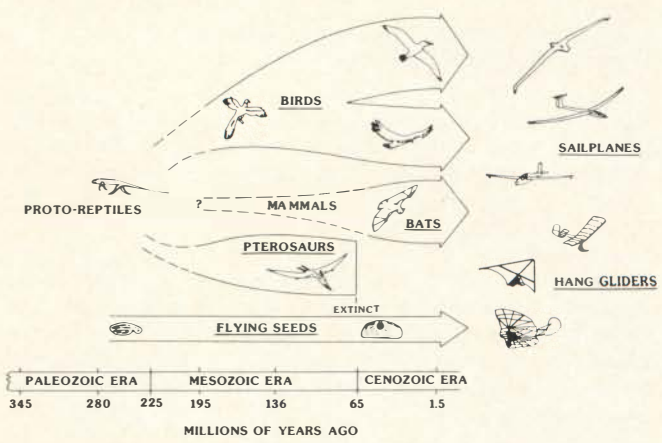


Figure 7. The Natural History of Gliding and Soaring

Earliest of the natural fliers were the animophilous seeds, evolved to provide their parent species more effective means of competing for sunlight and fertile soil even before the advent of pollenating insects and other means of dispersal. Common examples are the milkweed seed, which may be considered a direct natural antecedent of the parachute, and the maple seed, a natural prototype of the autogiro. Of considerable historical interest, because it demonstrated to aviation pioneers the feasibility of constructing a true self-stable tailless airplane, is the seed of the Javan palm tree, *Zinonia macrocarpa*.

Few insects glide or soar, and the next range of natural flying devices having a direct influence on man-made flying machines were the birds and pterosaurs which appear to share a common (although uncertain) reptilian ancestor. While often overlooked and largely unknown to the pioneers of human flight, the grand line of warm-blooded, fur-coated pterosaurs were to dominate animal flight for a period of some 120 million years until their eventual eclipse by birds and their extinction some 65 million years ago at the close of the Age of the Dinosaurs. An interesting aspect of pterosaur flight which is emerging from recent studies is the remarkable parallel in wing structure, and apparently in flight performance, of the larger species with modern high aspect ratio Rogallo wing hang gliders.

Bats are a relatively poorly studied class of flying machines, and, although several species (e.g., Central American fishing bats) do glide on a regular basis, they are generally more akin to fast-flapping smaller bird species. Of interest in this discussion is the alternative wing architecture employed by the bats (cf. Figure 8) which allows them

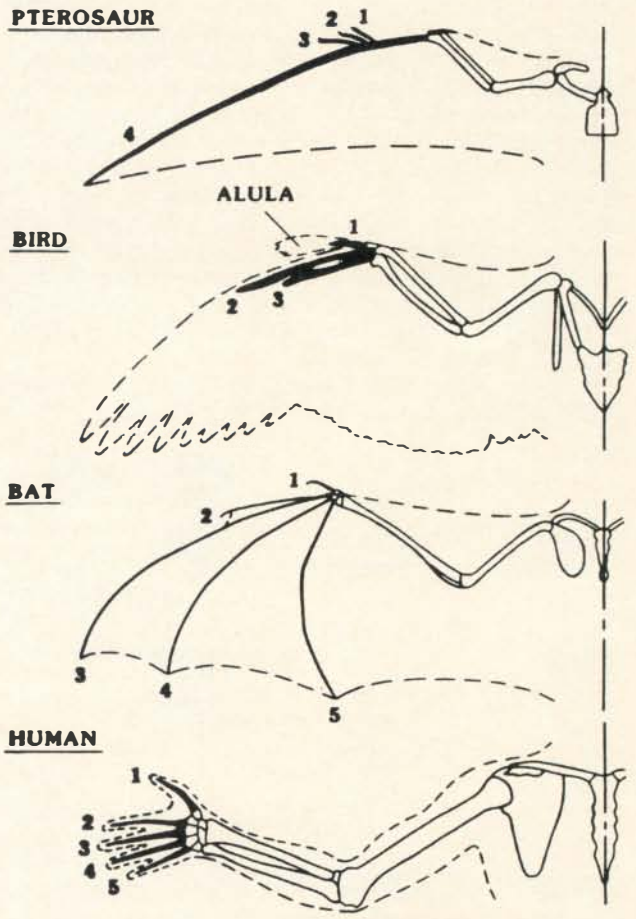
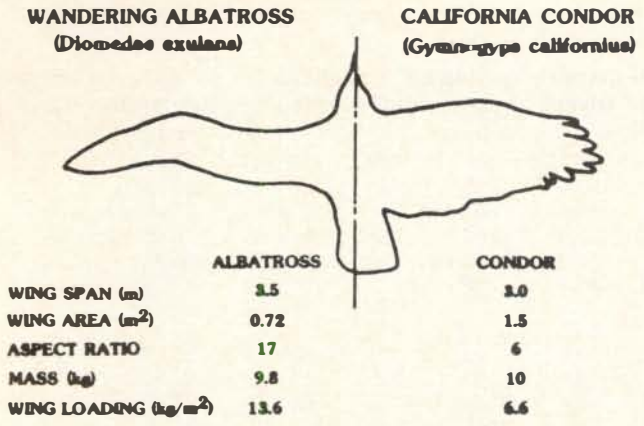


Figure 8. Natural Models of Wings and Their Homology to the Human Arm and Hand (Digits Indicated)



	ALBATROSS	CONDOR
WING SPAN (m)	3.5	3.0
WING AREA (m^2)	0.72	1.5
ASPECT RATIO	17	6
MASS (kg)	9.8	10
WING LOADING (kg/m^2)	13.6	6.6

Figure 9.
Planform Comparison of Large Land and Sea Soaring Birds

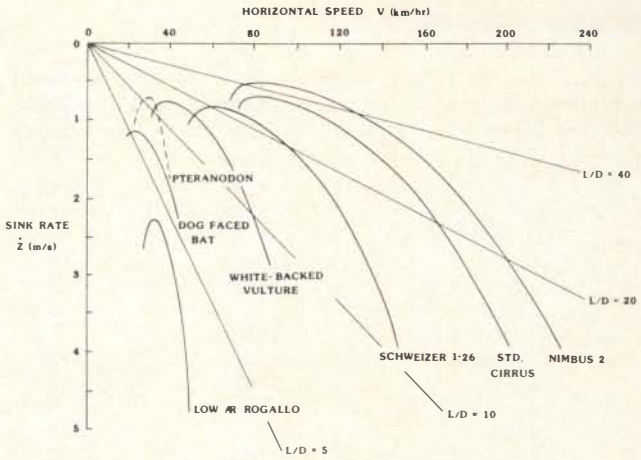


Figure 10. Relative Performance of Various Gliders

to maintain a very high degree of control over the camber and twist distribution of their wing beyond that possible for birds or pterosaurs. However, this capability is gained at the expense of the birds' ability to radically alter their wing span and area.

An interesting commentary on the general lack of appreciation of the importance of this characteristic — the ability of natural fliers to control and alter their wings' twist, camber, span, and area — was recently recounted by a paper documenting aeronautical research in the United States. In a mid-1930's attempt to determine by experiment the lift and drag characteristics of a seagull, a dead specimen was frozen in what was thought to be its optimum flight configuration (wings outstretched). The frozen bird was then placed in a wind tunnel and forces were measured. The conclusion of this experiment was that dead birds can't fly!

It is the range of soaring birds which has had the main influence on human soaring. Birds (which some modern paleontologists argue are the direct modern descendants of the dinosaurs) are a remarkably successful class and cover a very wide range of sizes and functions. Of interest here are the two divergent types of soaring flight practiced by land-soaring types (e.g., vultures, hawks) and sea-soaring types (e.g., gulls, albatross), and the differences in wing geometry and loading which the two categories exhibit (cf. Figure 9).

A book could easily be written on the topics outlined in this section, and the interested reader is referred to References 2 through 16 for further background. For comparison purposes here, the relative gliding performance of various natural and man-made gliding and soaring devices is shown in Figure 10.

This brings the discussion to the main topic of this paper — the technical development of the high-performance sailplane. As a map to the history to be discussed, Figure 11

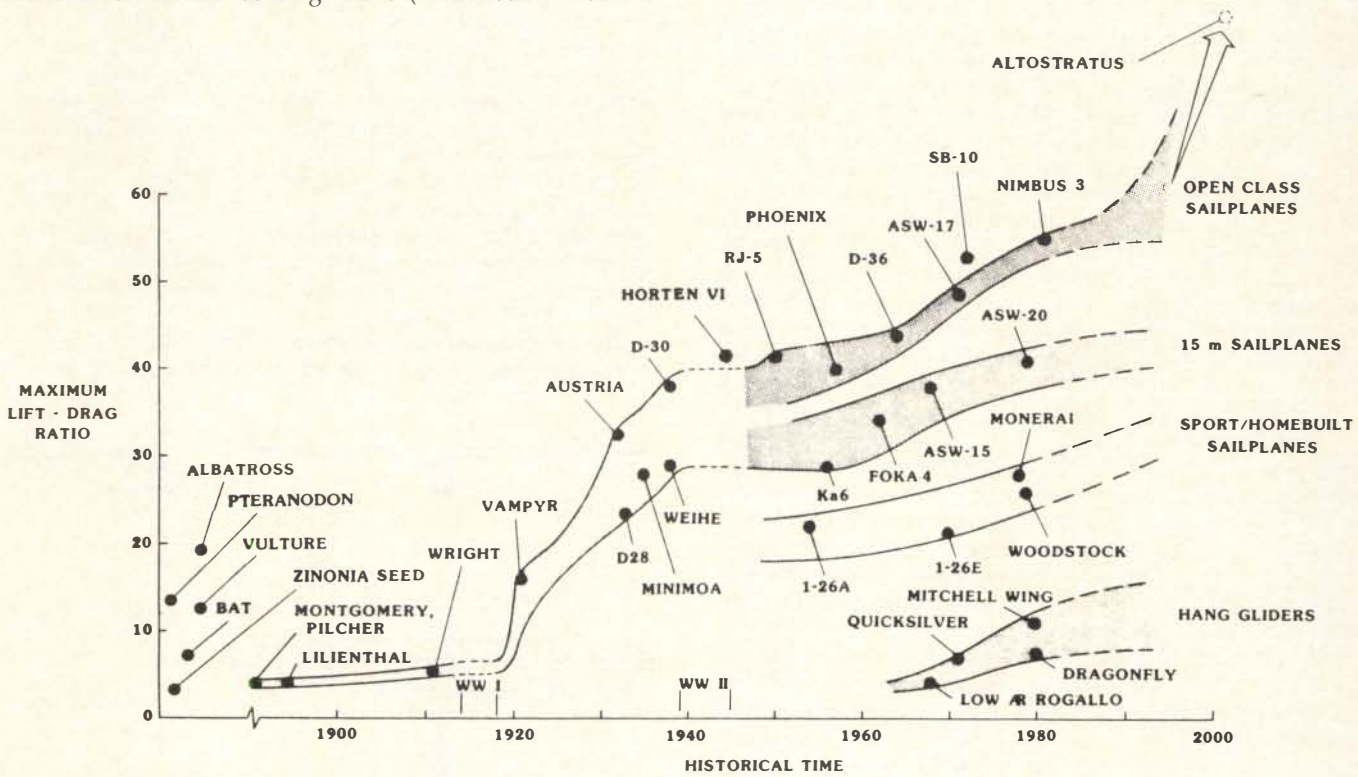


Figure 11. Historical Trends in Gliding and Soaring Performance

Table I

Type	Year	b (m)	S (m^2)	AR	M/S (kg/m^2)	M(kg) empty	M(kg) loaded	L/D_{max} @(V-km/h)	z_{min} @(V-km/h)
Wright	1911	9.8	27.9	6.8	5.7	86	160	8 (46)	.75 (42)
Blaue Maus	1921	9.5	15.5	5.8	8.3	53	128	12 (54)	.80 (52)
Vampyr	1921	12.6	16.0	9.9	12.2	120	195	17 (52)	.80 (50)
Konsul	1923	18.2	21.0	15.8	13.3	200	280	21 (52)	.75 (47)
Darmstadt II	1928	18.0	16.9	19.2	14.4	162	245	21 (58)	.70 (54)
Wien	1929	19.2	18.4	20.0	13.9	160	255	22 (54)	.60 (52)
Fafnir I	1930	19.0	18.6	19.4	16.9	220	315	24 (60)	.58 (56)
Austria	1931	30.0	35.0	25.7	13.8	392	482	26 (60)	.55 (56)
D-28 Windspiel	1933	12.0	11.4	12.6	11.9	55	136	24 (52)	.66 (47)
D-30 Cirrus	1938	20.1	12.0	33.7	24.7	198	296	36 (77)	.52 (72)
Weihe	1938	18.0	18.3	17.7	18.3	230	335	29 (70)	.58 (60)
Olympia Meise	1939	15.0	15.0	15.0	17.0	160	255	26 (69)	.67 (59)
Horten IV	1941	20.0	21.1	19.0	16.5	230	349	32 (72)	.55 (56)
RJ-5	1950	16.8	11.5	24.5	27.1	223	314	41 (80)	.55 (74)
Schweizer 1-26A	1953	12.2	14.9	10.0	17.5	161	261	23 (79)	.82 (64)
Schleicher Ka-6CR	1956	15.0	12.4	18.1	24.2	190	300	29 (78)	.68 (67)
Phönix	1957	16.0	14.4	17.8	18.5	164	265	40 (78)	.51 (69)
Foka 4	1962	15.0	12.2	18.5	31.6	245	386	34 (95)	.70 (79)
D-36	1964	17.8	12.8	24.0	32.0	282	410	44 (93)	.56 (83)
AS-W 15	1968	15.0	11.0	20.5	37.1	230	408	38 (90)	.59 (73)
SB-10	1972	29.0	23.0	36.5	39.0	577	897	53 (90)	.41 (75)
Ventus A	1980	15.0	9.5	23.7	45.0	215	430	44 (109)	.66 (93)
Nimbus 3	1981	24.5	16.8	35.7	41.8	360	703	60 (80)	.36 (76)

shows the trend in maximum lift-to-drag ratio of sailplanes from Lilienthal's to the present. The principal characteristics of these machines are listed in Table 1.

HIGH-PERFORMANCE SAILPLANE DEVELOPMENT 1911 - 1981

Early Development

The Wright brothers, celebrated as pioneers of powered heavier-than-air flight, are perhaps best credited for the practical realization of the three-axis, aerodynamic flight-control system without which the evolution of powered and unpowered aircraft could scarcely have progressed beyond the hang glider stage. The Wrights were early to grasp the significance of atmospheric lift to the soaring flight of birds. They continued to experiment with gliders even after the success of the 1903 *Flyer*, and in 1911 Orville succeeded in making a number of true soaring flights of more than five minutes duration. On October 24 of that year he was able to soar over the sand dunes near Kitty Hawk for 9 minutes and 45 seconds, establishing a duration record which was to stand for 10 years. This was slope soaring in its most elemental form, flying almost directly into the wind and essentially hovering over a small area (these early soaring flights were conducted in winds of up to 40 miles per hour).

This first "sailplane" of 1911 was typical of Wright brothers designs. It was a biplane, the two planes being of equal span with no stagger, with twin vertical stabilizers and an elevator on the fuselage frame behind the wing (a conventional configuration, except that there was also a vertical stabilizer mounted just ahead of the wing leading edge). The span was 9.8 meters, and the wing loading somewhere around 7 kg/m^2, which is about the same as a modern high-performance hang glider.

The real soaring movement began in post-World War I Germany, where aeronautical development was restricted by the Treaty of Versailles to low-powered or unpowered aircraft. The first glider meet, organized by Oscar Ursinus, was held in 1920 on a mountain in the Rhön region called the Wasserkuppe. Twenty-four young Germans showed up with their gliders. Outstanding among this early crop of soaring machines was Wolfgang Klemperer's *Schwarzer Teufel*, a streamlined, cantilever, low-wing monoplane with very low wing loading (8.3 kg/m^2). Launched into the wind by bungee cord, Klemperer easily set a world's record for gliding distance, covering 1.82 kilometers. Orville Wright's endurance record still stood, however, and neither the *Schwarzer Teufel* nor any of the other participating gliders ever actually achieved soaring flight that year.

The next year, Klemperer was back with the *Blaue Maus*, a development of the *Schwarzer Teufel* with a better cockpit enclosure (the pilot was still exposed from the chest up, however). The 1921 contest was the occasion of an interesting demonstration of the relative effect of parasite drag and induced drag on gliding efficiency at low flying speeds. The *Blaue Maus* was tied for the lowest sink rate (about 0.4 m/s) with a glider built by the Aero Club of Munich. The Munich glider was not streamlined (i.e., it had much higher parasite drag relative to the *Blaue Maus*) and was only 9 kilograms lighter (about 5 percent of the gross weight). Both gliders had the same wing area, but the Munich glider's wing had 1.5 meters more span and hence less induced drag than the *Blaue Maus*.

The most significant technical achievements of 1921, however, were embodied in the *Vampyr* (Figure 12), designed

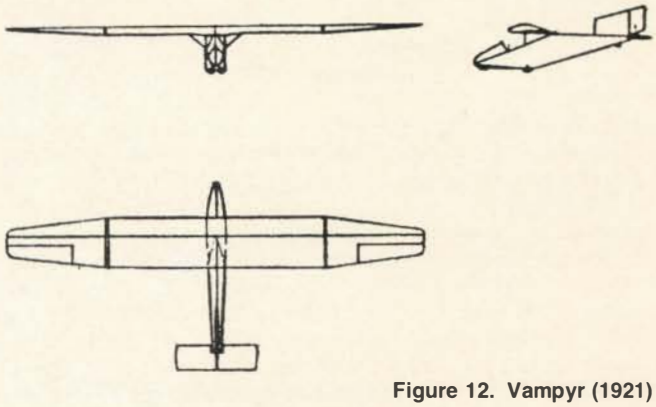


Figure 12. Vampyr (1921)

by Madelung, Blume, Hentzen, and Martens of Akaflieg Hannover. The *Vampyr*'s wing was laid out in a serious attempt to minimize induced drag. With an aspect ratio of nearly 10, its wing spanned 12.6 meters, far greater than any of its contemporaries. The outer wing panels were tapered and mated to a constant chord center section. In order to keep the parasite drag level down, all but the pilot's head was enclosed in the fuselage, and the landing gear consisted only of three leather footballs on the belly of the aircraft. The airframe was constructed primarily of wood, as were nearly all aircraft of this period.

Madelung's stated design goal for *Vampyr* was a glider with minimum sink rate, the most important performance parameter for slope soaring. What Akaflieg Hannover really accomplished with *Vampyr*, however, was a dramatic increase in maximum lift-to-drag ratio. Based on wind tunnel measurements, *Vampyr*'s maximum L/D was 16, compared to an L/D_{max} of about 5 for the Wrights' first "sailplane." Its measured minimum sink speed was 0.8 m/s, twice that of the *Blaue Maus* and the Munich glider.

In the *Vampyr*, Martens was able to break Orville's long-standing endurance record with a 15-minute flight, including two full circles, but in fact no altitude was gained and this was not considered true soaring flight. It was not long, however, before the first true slope soaring flight was accomplished by Friedrich Harth in a Harth-Messerschmitt glider along a ridge near Hildenstein. The following year, *Vampyr* achieved spectacular success at the hands of Hentzen and Martens slope soaring from the Wasserkuppe, including a record flight by Hentzen lasting 3 hours and 6 minutes with an altitude gain of over 300 meters.

If the *Vampyr* was a trend-setter aerodynamically, it also incorporated one very important structural innovation, the single-spar wing with stressed skin nose. The single full-depth spar carried the bending loads while the nose formed with the spar web a torsion-resisting D-tube. This construction method allows an accurate airfoil leading edge shape to be maintained from one rib to the next. The concept remains in common use today.

The German Akaflieg system has had no counterpart in the United States. Due to the many contributions of this unique institution to soaring technology throughout the history of the sport, it merits special mention before resuming this narrative. An Akaflieg (AKAdemische FLIEGergruppe or, literally, academic flying group) is essentially a combination undergraduate technical fraternity and flying club associated with a technical university (notably those in Aachen, Braunschweig, Darmstadt, Hannover, Munich, and Stuttgart). The students in an Akaflieg, at their own discretion, undertake the design, construction, and testing of experimental aircraft. University faculty serve mainly in an advisory role. Financial assistance is provided by donations from private sources and the government. The various Akafliegs have traditionally been the source of many of the major advances in sailplane technology.

Progress During the 1920's and 1930's

For the most part, sailplane development through the 1920's was characterized not by major technological breakthroughs but by refinements within the limits of existing technology. Akaflieg Darmstadt, which would figure heavily in the future technical development of soaring, took the quest for increased aerodynamic efficiency a step forward by building one of the first successful long-span cantilever wings in 1923. Their sailplane, the *Konsul* (Figure 13), had a span of 18.2 meters. It was of high aspect ratio (AR = 16) and was first to use the Göttingen 535 airfoil section which would remain popular with designers for the next 15 years. Other design innovations appeared in this sailplane which

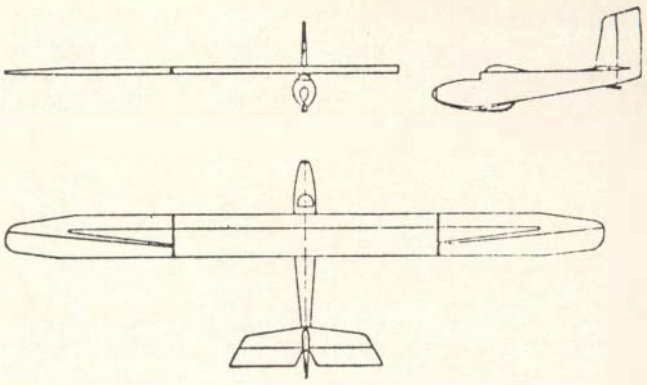


Figure 13. Konsul (1923)

were soon widely adopted by other designers. The fuselage was well-streamlined with an elliptical cross section to minimize drag. The ailerons were rigged to move differentially in order to minimize adverse yaw.

Akaflieg Darmstadt introduced the elliptical planform cantilever wing in 1927. Based on the work of Trefftz, it was believed that the most efficient wing must be of elliptical planform in order to achieve an elliptical variation in span loading and hence minimum induced drag (it was also recognized that induced drag could be reduced by increasing span). A series of sailplanes was produced to exploit this idea, including the *Darmstadt I*, the *Darmstadt II*, and the *Starkenburg*. By 1928 it was clear that this line of development had reached its limit, for attempts to further improve performance by increasing span were foiled by the increased weight associated with such a change.

During the late 1920's, as slope soaring techniques were perfected, more able pilots found they could use ridge lift to soar cross-country, eventually covering distances of over 100 kilometers. Simultaneously, the possibility of using convective air movement to stay aloft began to be explored, beginning with an inadvertent ride in the updrafts of a developing thunderstorm by Kegel in 1926 (he survived).

By 1928, it was realized that a straight tapered wing could be nearly as efficient as an elliptical wing — and with considerable weight savings. Alexander Lippisch of the Rhön-Rossitten Gesellschaft (RRG), an aeronautical research institute located on the Wasserkuppe, accordingly designed the *Professor* in 1928 and, in 1929, the larger, more refined *Wien* (Figure 14) which had highly-tapered, cantilever, outer wing sections with a strut-braced, constant-chord center section. The reversion to strut bracing allowed an increase

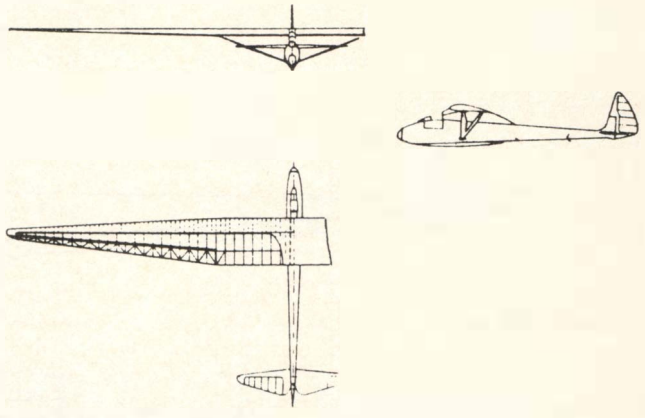


Figure 14. Wien (1929)

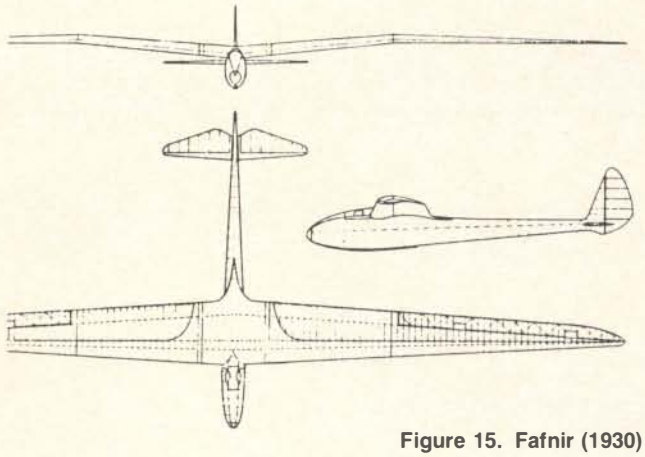


Figure 15. Fafnir (1930)

in span and aspect ratio without a corresponding weight penalty. The *Wien* proved to be outstanding in competition, and at the hands of Robert Kronfeld made one of the first cross-country flights using thermal lift as well as ridge lift.

With the increasing sophistication of soaring technique came the realization that not only low sinking speed and high glide ratios but also high maneuverability about the pitch and roll axes were required to take full advantage of ridge (and later, thermal) lift. Lippisch was the first to meet this new design challenge. Like the *Vampyr*, the *Konsul*, and the *Wien*, his *Fafnir* (Figure 15), which appeared in 1930, incorporated design features which would become standard on high-performance sailplanes for years to come. Rolling inertia was minimized by using a strongly tapered wing planform and by mounting the wing on top of the fuselage, closer to the center of gravity, rather than on a pylon. The wing was built in a cranked (gull-wing) configuration, ostensibly to provide ground clearance on takeoff and landing, and for improved stability in turns, but aesthetics may have been as much a factor in this design decision as aerodynamics. Aerodynamic twist was built into the wing by varying the airfoil section from the Göttingen 652 at the root, to the less highly cambered Göttingen 535 at midspan, to Clark Y at the tip. Several degrees of washout were also incorporated, and in this way aileron effectiveness at low speeds was improved and premature stalling of the wingtips was avoided. Aileron effectiveness was further improved by maintaining a constant aileron chord length over about 80 percent of their span from the inboard ends. With the highly tapered planform this resulted in increased aileron chord fraction and thus increased aileron effectiveness toward the tips.

Lippisch also paid attention to drag reduction. Like *Vampyr*, the *Fafnir*'s wing was fully cantilevered. The potential for increased interference drag due to the proximity of wing and fuselage was recognized, and by trial and error a satisfactory wing fairing and cockpit enclosure were developed.

Fafnir was built by RRG and entered by Günther Grönhoff in the 1930 Wasserkuppe meet. The ship flew well, and the next year he set a world distance record of 220 kilometers after a bungee cord launch from the Wasserkuppe.

The patterns of sailplane development have tended to be dictated largely by the style of soaring which predominated at a given time. Through the 1920's and well into the 1930's, ridge soaring was the predominant mode of soaring flight. Designers, therefore, assumed that a glider would spend more time in lift than in sink, so their sailplanes were optimized for low sink speeds at low forward speeds, and for high maximum lift-to-drag ratio. Low wing loadings and thick highly cambered airfoils were considered necessary to achieve the desired low sink speeds. Even after the advent of thermal soaring, designers continued to emphasize low-speed performance in their sailplanes.

This pattern of sailplane development was taken to its practical limit with the *Austria* (Figure 16), designed by Dr. Kupper and constructed by Akaflieg Munich in 1931 to the order of Robert Kronfeld. Kronfeld thought that dolphin soaring might be the best way to utilize thermal lift for cross-country soaring. The design of the *Austria* represented an all-out effort to achieve high L/D and low minimum sink speed at the expense of maneuverability. According to the principle that induced drag is driven (down) by increased span, the *Austria's* wing was given a span of 30 meters, to be equaled (almost) only by the recent SB-10 of Akaflieg Braunschweig. At that time, state-of-the-art sailplanes had spans of about 20 meters. Without the benefit of modern materials, a wing of such great span was unavoidably going to be quite heavy. In order to keep the wing loading in line with contemporary practice (12-17 kg/m^2), the wing area had to be increased drastically to about 36 m^2. This resulted in an aspect ratio of about 25. All that span and all that area made for a magnificent floater, but *Austria* never set any records. Why? With such a low wing loading the airfoil section had to work at very low lift coefficients in high-speed flight. Despite the incorporation of camber-changing flaps (deflected up to reduce the camber for flight at higher

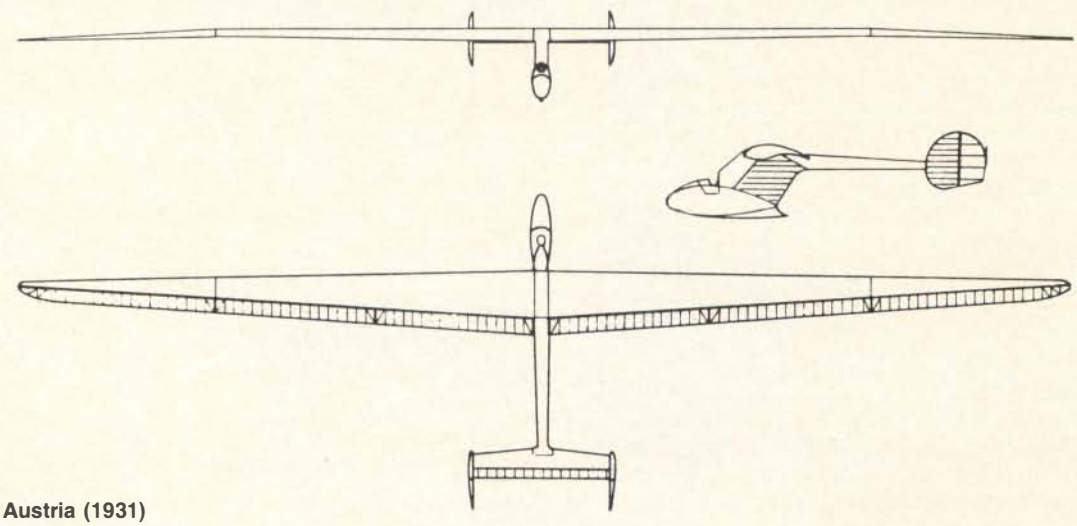


Figure 16. Austria (1931)

speeds), its thick, highly-cambered Göttingen 652 airfoil section was simply unsuitable for interthermal dashes. This airfoil had a high maximum lift coefficient and maximum L/D, but was inefficient at low lift coefficient values (more discussion on this topic later). Needless to say, the unwieldy *Austria* was not particularly well-suited for circling in thermals either, but this technique was just being developed as the *Austria* was being built.

Although not a complete success, the *Austria* was an impressive technical achievement and incorporated many innovations now taken for granted. Besides being the first sailplane to use cruise flaps, the *Austria* was also the first to have full-span segmented flaperons, a wing skinned entirely with plywood, and air brakes. The *Austria* met its untimely end in July of 1932 when the turbulence inside a large cumulus cloud proved to be more than Kronfeld and his minimal blind flying instruments could handle. The ship broke up in a steep spiral dive.

By 1932, a better understanding of how to use thermals had been reached. There was at this time a prominent school of thought which argued that most thermals were small in extent and rather weak. Akaflieg Darmstadt hypothesized that a highly maneuverable sailplane with the minimum possible sink speed would best be able to take advantage of such small thermals. From such thinking came the D-28 *Windspiel* (Figure 17), which appeared in 1933.

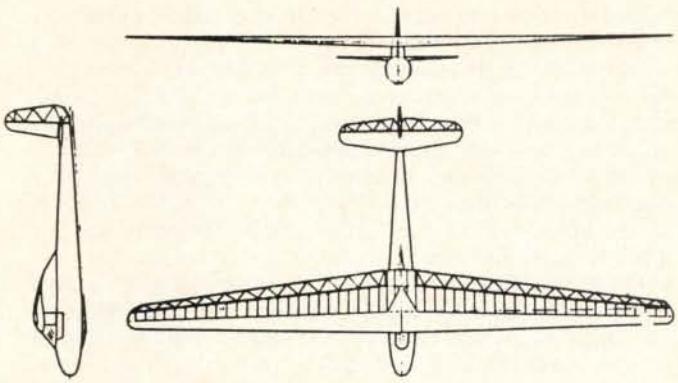


Figure 17. D-28 Windspiel (1933)

Spanning only 12 meters and weighing only 55 kilograms empty, the *Windspiel* was a true ultralight sailplane. Low structural weight was achieved by milling out most of the structural members, by keeping very close dimensional tolerances, by removing excess glue from joints, and by using light alloys for fittings and the aileron spars. As with the *Austria*, great pains were taken to minimize excrescences, and the cockpit was fully enclosed. An interesting innovation was the "flapped" rudder. The vertical fin was deflected with the rudder at a 1:2 differential, which increased rudder effectiveness and reduced required rudder area. Although the *Windspiel* was compact, it was inordinately expensive and difficult to build and required careful ground handling.

In March of 1934, Hans Fischer set a world distance record of 240 km in the *Windspiel*. The following year, however, this record was broken by Wolf Hirth, flying his 20-meter *Moazagotl*. Hirth is said to have been the first to have demonstrated that a sailplane could circle within a thermal to utilize such lift to best advantage. His 262-kilometer flight showed that a large-span sailplane could be made sufficiently maneuverable to use thermal lift effectively, thus rendering the *Windspiel* obsolete. Too great a penalty in induced drag was paid in limiting span to a mere 12 meters.

The middle to late 1930's saw a general awakening on the part of the soaring community to the importance of a flat glide polar for an effective cross-country soaring machine. Designers went to more moderately-cambered airfoils and higher wing loadings and found that good high-speed performance could be achieved while maintaining sufficient low-speed capability for climbing in thermals. The D-30 *Cirrus* (Figure 18) can perhaps be considered the crowning achievement of this period of sailplane development. Like the *Windspiel*, the *Cirrus* was a project of Akaflieg Darmstadt. Its span was only 20 meters, but with only 12m² of wing area (giving it an aspect ratio of 34!), its wing loading was well over 20 kg/m², remarkably high for its time. The *Cirrus* was a very clean sailplane as well, and its glide ratio was around 36 at a respectable 77 km/h. This kind of performance would not be equaled until the early fifties. The light weight of the *Cirrus* could be attributed to the use of aluminum and magnesium in its primary structure. The high wing loading, the incorporation of cruise flaps, and the use of an NACA airfoil section of low camber contributed to its excellent penetration (high-speed) capabilities.

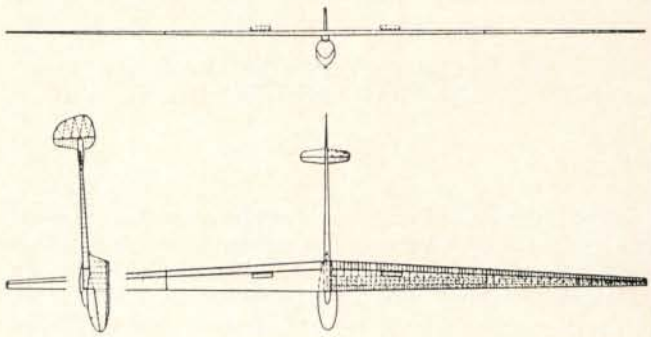


Figure 18. D-30 Cirrus (1938)

★ *Next month author John McMasters will pick up the story of soaring's technical history following WWII with sections devoted to the introduction of composite structures, the continuing evolution of sailplane airfoils, significant designs, and a rundown on recent developments.* — Ed.

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(Additional references will appear next month with Part II)

TEACHING SOARING

BETTER CROSS-COUNTRY TRAINING
FOR SOARING PILOTS SHOULD START EARLY

by Frank E. Conner

Most glider pilots flying cross-country today have learned the art by trial and error, and current accident statistics clearly show just how much error still prevails. Since very few training schools which teach cross-country exist at all, and many CFI-G's have no cross-country training themselves, the outlook for immediate improvement in the accident rate seems poor. In the hope of making some constructive suggestions I have developed some thoughts on the subject and invite the constructive comments of qualified instructors.

My basic belief is that until a glider pilot is properly trained in safe cross-country soaring, he should not be granted a full pilot's license. Perhaps a Restricted Private License (such as the one now under study for powered flight) would be one solution. The instructor who signs off a student as being adequately trained in cross-country soaring should recognize the responsibility inherent in that endorsement. "Adequately trained" should be clearly defined and that training should be more extensive than is common today. Let's clean up our act, before Big Brother really screws things up.

Many schools are reluctant to rent their ships for cross-country flights since that is where so many accidents occur. I submit that a properly trained pilot is a minimal risk. It is the overeager, *untrained* pilot who is dangerous. By instituting a thorough cross-country training program a school can: 1) acquire additional business in instruction and rental; 2) greatly reduce the risk to its equipment; and 3) retain soaring pilots who might otherwise become bored simply orbiting the field. In time, the improved training could be reflected in insurance savings.

How do we make these changes? First, let's quit treating cross-country soaring as a separate activity and include it as a normal part of the student's basic training. Any CFI-G who is not competent in cross-country soaring should become qualified, as the student will reflect the attitude and experience of the instructor.

There is nothing mysterious about safe cross-country soaring. Like any other soaring activity, it is merely a matter of acquiring the proper technique and applying sufficient self-discipline to follow the rules. My personal approach is as follows:

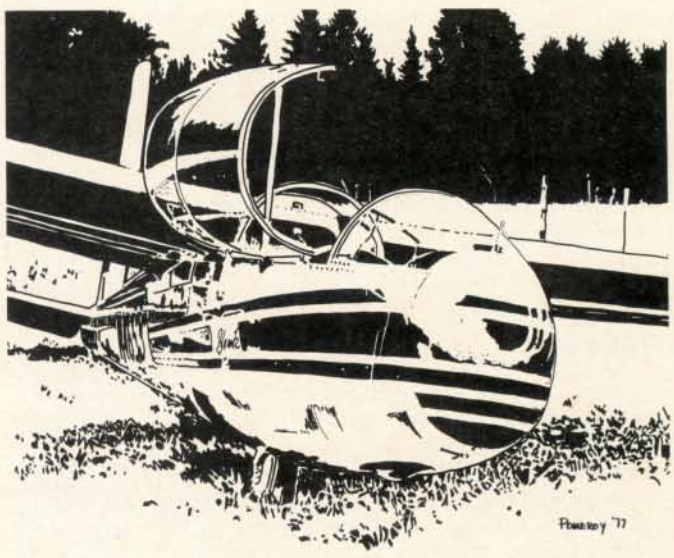
As soon as a student has a fair grasp of landing, I begin to teach him to land in an area 500 to 600 feet in length without the aid of the altimeter. At the same time, I have him examine this landing area from altitude and pick out nearby fields which appear to be at least that long and acceptable for landing. Then, on the ground, we go out to the fields he has selected and verify his judgment, noting any problems that may exist. With some practice the student should be able to consistently select an acceptable field and plan a pattern and landing on it. Success in this effort will substantially increase student confidence and reduce the danger of an off-field panic landing. Practice in this technique should continue after solo.

As the student develops proficiency in locating and centering thermals, he should simultaneously be taught to judge his glide range in various wind conditions. Dual cross-country instruction is excellent if flights can be arranged. Some ground school in navigation and flight planning is necessary at this time. The student should plan all aspects of the flight and the instructor should carefully review the plan, questioning the student about possible problems and appropriate responses.

There are three important altitude decision points in cross-country flight, and every student should understand them thoroughly. First is Departure Altitude, which is the minimum altitude needed to assure that the pilot will reach the next known safe landing site and which will also provide a high degree of probability of completing the flight. The Proceed-with-Caution Altitude is the altitude at which the speed ring should be reset to "0" and altitude conserved in order to reach the next safe landing point. Perhaps the most critical is the Decision Altitude, which is the point at which the student shifts his attention from continuing the flight to selecting an acceptable landing site and planning his pattern, final approach, touchdown and rollout. Should lift be encountered *before* entering the pattern, it may be utilized. After entering the pattern no lift should be accepted, no matter how seductive. The landing must be executed exactly as planned.

The importance of self-discipline in executing the flight according to plan cannot be overemphasized. The plan provides a track which leads to safe, successful flight. Any modification of the plan introduces unknowns which can be of serious consequence. A delay in shifting to the Proceed-with-Caution mode may result in landing short of an airport. A delay in field selection at Decision Altitude can result in a hurried, poorly-planned approach and landing, with vastly increased danger. Any attempt to "dig out" at low altitude after entering the pattern can really bring on a full-fledged disaster.

While other factors have important bearing on a good cross-country soaring flight, I consider these the basics for *safe* beginning cross-country. The actual training will, of course, cover procedures in much greater depth and detail.



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F.A.I. BADGES

VICKI BARRETT

INTERNATIONAL F.A.I. BADGES FOR SOARING

Earned or Recorded in the United States Through February 1983

GOLD BADGES

1442. Dean G. Watts
1443. Robert Greenblatt

ALTITUDE DIAMONDS

5000-meter gain (16,404-ft.)

Gordon R. Boettger; 1-35; California City, CA
Ross W. Gibson; 1-26E; Black Forest, CO (Certified to Canada)
Jay R. Long; Pilatus; California City, CA
Kim Shrier; 1-36; Black Forest, CO
Alan H. Vollbrecht; Lark; California City, CA

DISTANCE DIAMONDS

500 kilometers (310.7 miles)

Hal Lawrence; 313 miles from Tocumwal, Australia; DG-200; February 6. (Certified from Australia)

GOAL DIAMONDS

300 km O&R or Triangle (186.4 miles)

David C. Penning; PIK-20; Tocumwal, Australia (Certified from Australia)

GOLD BADGE LEGS

Altitude: 3000-meter gain (9842-ft.)

Gordon R. Boettger (See Dia. Alt.)
John A. Carter; LS-1; North Conway, NH
Robert Castlebury; 1-26; California City, CA
Carol L. Deihl; 1-26; Black Forest, CO
Charles Dunnifer; 1-34; Black Forest, CO
Ross W. Gibson (See Dia. Alt.)
Robert Greenblatt; Std. Cirrus; Petersburg, WV
Douglas Hall; 1-36; Black Forest, CO
Edward Hindman; HP-14T; Waverly West, CO
Jay R. Long (See Dia. Alt.)
Gary L. Neely; 1-34; Black Forest, CO
Rob Peterson; Pilatus; California City, CA
James M. Payne; 1-26; California City, CA
Alan E. Stallings, Jr.; Std. Cirrus; Black Forest, CO
Lawrence W. Stein; 1-26; Black Forest, CO
Theodore Radvany; 1-34; Black Forrest, CO
Alan H. Vollbrecht (See Dia. Alt.)
Dean Watts; C-Hornet; Livermore, CA

Distance: 300-kilometers (186.4 miles)

David C. Penning (See Dia. Goal)

SILVER BADGE LEGS

Altitude: 1000-meter gain (3281-ft.)

Robert Castlebury (See Gold Alt.)
Elwin C. Cramer; 1-34; Petersburg, WV
Douglas Hall (See Gold Alt.)
Jay R. Long (See Dia. Alt.)
Rob Paterson (See Gold Alt.)
Lawrence W. Stein (See Gold Alt.)
David J. Stubbs; Blanik; California City, CA
Alan H. Vollbrecht (See Dia. Alt.)

Duration: 5 hours

Jay R. Long (See Dia. Alt.)
Stanley H. Mick; AS-K 13; Thompsonville, MI

C BADGES

60-min flight

11,744. Ted Chatham
11,745. Edward Cleveland
11,746. Guy S. Croydon
11,747. Hugh R. Hunton
11,748. Barbara B. Kalb
11,749. Lisa Mahony
11,750. Michael P. McCarthy
11,751. Judith A. McDonald
11,752. Gary L. Neely
11,753. Ronald Ruble
11,754. Steven R. Sanchez
11,755. T.M. Sullivan
11,756. Jeff Zimring

B BADGES

30-min. flight

John Covey, Jr.
Guy S. Croydon
Scott M. Daniel
Olin E. Hartley
Hugh R. Hunton
Erik Kaminski
Margaret A. McCue
Gary L. Neely
Ronald Ruble
Brian L. Smith
T.M. Sullivan
William K. Walker
Jeff Zimring

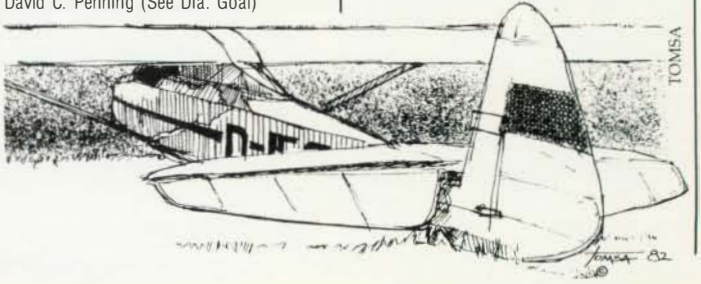
RECORDS CLAIMED

World; Single-place; Motorglider; Distance; 405.3 mi. (652.68 km); B.J. Wilson; January 11; Kalgooelie, W. Australia.

OTHER LONG FLIGHTS

Non-badge flights over 250 miles

March 7; Henry Combs; Libelle H-301; 331 mi. from California City to Wickenburg, AZ; 6 hrs. 50 min.



"A BUCK A MILE" FLIGHTS REMEMBERED

International Fund donations over $200

Judy Lincoln; 192-mi. triangle from Estrella, AZ, for Diamond Goal; AS-W 20; 5:05 hrs.; June 20, 1982.

John Lincoln; 185-mi. O&R from Estrella, AZ; AS-W 20; 5:30 hrs.; May 24, 1982.

Francis P. Bundy; 325.3-mi. from Odessa to Perryton, TX, for Diamond Distance; 1-23D; 7:43 hrs.; July 9, 1969, to earn Diamond Badge #170.

Jack Nees; 206-mi. from Crystalaire, CA, to Twentynine Palms, to Apple Valley, CA, for Diamond Goal; Kestrel; 6:08 hrs.; August 31, 1969.

Howard C. Blossom; Duration flight, max altitude 200-ft. MSL; Wolf; 7:43 hrs.; Cape Cod, MA; September 15, 1939.

Bee Brandt; for a memorable experience crewing for George Moffat and Klaus Holighaus; over 200 miles; 15-Meter Nationals; Minden, NV, July 1981.

John M. Brittingham; 510-mi. from Marfa, TX, to Selling, OK, June 27, 1969, during the U.S. Nationals.

Barrant V. Merrill; Diamond Altitude and Single Lennie at Black Forest; Alt. Gain 18,800 ft.; Topped out at 30,400 ft.; SGS 1-34; 1:03 hrs.; February 7, 1976.

William B. Cleary; Final Day, 1-26 North American Championship; Estrella, Arizona. First place after being last pilot to take off, being delayed by a rope break, and helped by penetrating a thunderstorm to get second turnpoint photos; July 1971.

R.W. Mozer; 396 mi. from Adrian, MI, to Frederick, MD; Ka-6CR; July 3, 1961.

The Dallas Gliding Association, sponsors of the Dick Johnson "Flight Test Evaluations."

St. Louis Soaring Association, sponsors of last year's Region 7 Contest.

Carl D. Herold; 572-mi. O&R from Minden, NV to Mojave, CA; AS-W 12; 5:05 hrs.; 112.6 mph: 83.7 mph out and 172 mph return; April 8, 1974.

Erica Scurr; 213-mi. triangle from Waikerie, South Australia, Day 1, International Week Contest; AS-W 19; 4:07 hrs; February 6, 1983.

CALENDAR OF EVENTS

Duncan Gillespie

Contests listed in bold-face type are sanctioned by SSA.

May 2-11, Inter-Airline Gliding Get-together & Competition for professional airline glider enthusiasts, Vinon sur Verdon in the Alps. Contact F. Hersen; 1, Avenue du Marechal Devaux; 91550 Paray; Vieille-Poste, France.

May 13-15, United States Soaring Hall of Fame Weekend and 1983 Exhibit Opening (WWII Military Gliders). Contact Shirley Sliwa, Director, National Soaring Museum, Harris Hill, RD #3, Elmira, New York. (607) 734-3128.

May 17-26, 8th U.S. National 15-Meter Class Soaring Championships, Ionia, Michigan, sponsored by Benz Aviation. Contact Jerry Benz, 3148 S. State Road, Highway 66, Ionia, Michigan 48846. (616) 527-9070.

May 20-23, Provinciale '83, the 4th Quebec Soaring Championships at Bromont Airport, Bromont, Quebec, sponsored by the Champlain Soaring Association. Contact Robert Di Pietro, 14 Place de Boheme Cr., Candiac, Quebec J5R 3N1. (514) 659-6482.

May 21-22, 28-30, Region 8 Contest, Ephrata, Washington, sponsored by the Seattle Glider Council (bid subject to approval). Contact: Norm Dalke, 526 N. 137th, Seattle, Washington 98133. (206) 363-4419. Practice date, May 15.

May 21-22, 28-30, Region 11 South Contest, Minden, Nevada, sponsored by Pacific Soaring Council. Contact George Thelen, 6632 Northbrook Way, Fair Oaks, California 95628. (916) 961-0362. Practice dates, May 14-15. Rain date, none.

May 21-June 5, 3rd European Women's Gliding Championships, Saint-Hubert Airfield, Belgian Ardennes, Belgium. Contact Federation des Clubs de Vol a Voile, Rue Montoyer 1, 1040 Bruxelles, Belgium. Practice days from May 14. Non-European women are welcome to fly as guests.

May 23-27, SSA Women's Cross-Country Soaring Seminar hosted by the Seattle Glider Council at Ephrata, Washington. Contact SSA, P.O. Box 66071, Los Angeles, California 90066. (213) 390-4447.

May 28-30, Annual Chilhowee Glider Meet, Chilhowee Gliderport, Tennessee. Contact Phillip Edmonds, 347 Vermont Ave., Oak Ridge, TN 37830. (615) 483-0640

May 28-30, 1-26 Regionals, Rabbit Dry Lake, California (must belong to 1-26 Association). Contact Phil Dufford, (619) 443-4637.

May 28-30, 35th Annual Wright Memorial Glider Meet, Caesar Creek Gliderport, Waynesville, Ohio. Contact Pat De Naples, Caesar Creek Soaring Club, 5385 Elbon Road, Waynesville, Ohio 45068. (513) 932-7627.

May 28-30, Southeastern 1-26 Championships, Peach State Gliderport, Williamson, Georgia. Contact Mitch. Deutsch, 128 Mimosa Place, Decatur, Georgia 30030. (404) 377-2349.

May 28-30, Vintage Sailplane Regatta, Elmira, New York. Contact Bob Storck, 3103 Tudor Rd., Waldorf, Maryland 20601.

Telephone News Service
Attention is called to the after-hours recorded telephone news service at SSA headquarters. Latest developments in the soaring world are recorded on tape every Friday evening (daily during major contests). The recording may be heard by dialing (213) 390-4440 between the hours of 5:00 p.m. and 8:00 a.m., Los Angeles time, and all day on weekends. To reach a staff member who might be in the office during these hours, please call (213) 390-4447.

May 28-30, Vintage Sailplane Regatta, Fantasy Haven Gliderport, Tehachapi, California. Contact Les Arnold, (916) 675-2289; Ron Martin, (805) 822-4114; or Fantasy Haven, (805) 822-5267.

May 28-June 3, Eastern Division 1-26 Championships, Caesar Creek Gliderport, Waynesville, Ohio. Contact Pat De Naples, CCSC, 5385 Elbon Road, Waynesville, Ohio 45068. (513) 932-7627.

May 30-June 3, Region 9 Contest, Estrella Sailport, Arizona, sponsored by The Arizona Soaring Association. Contact Judy Lincoln, 6827 N. Highland, Paradise Valley, Arizona 85253. (602) 840-5287, 274-6774. Practice date, May 29. Rain date, June 4.

May 31-June 9, 14th U.S. National Standard Class Soaring Championships, Cordele, Georgia, sponsored by the Mid-Georgia Soaring Association. Contact Robert P. Grey, 200 Grey Creek Drive, Athens, Georgia 30606. (404) 543-6469.

June 5-11, National Soaring Week. Clubs, Chapters, or Business Members interested in sponsoring events contact: Michelle Silver, SSA, P.O. Box 66071, Los Angeles, California 90066.

June 7-16, 50th U.S. National Open Class Soaring Championships, Marana, Arizona, sponsored by Arizona Soaring Association. Contact Mark Arndt, 1724 West 10th Place (Suite #2), Tempe, Arizona 85281. (602) 968-4486.

June 11-18, 9th Annual Taos Soaring Fiesta, Taos, New Mexico. Limited number of ships. Contact Fred Lidinsky, (303) 421-3957 or Dick Gray, (303) 364-4653, 163 So. Eagle Circle, Aurora, Colorado 80012.

June 13-17, Region 11 North Contest, sponsored by Montague Aviation. Contact Terry Weathers, Montague Aviation, P.O. Box 128, Montague, California 96064. (916) 459-3456. Practice date, June 12. Rain date, June 18.

June 14-18, Region 11 North Contest, Montague, California, sponsored by Montague Aviation (bid subject to approval). Contact Terry Weathers, Montague Aviation, P.O. Box 128, Montague, Calif. 96064. (916) 459-3456.

June 17-18, 6th Annual Sports Class Great Sailplane Race and Fun Country Soaring, Botsford Field, Wellington, Ohio. Contact Wayne Jenkins, 2905 Scheid Rd., Huron, OH 44839. (419) 433-4977.

June 20-24, Region 1 Contest, Sugarbush, Vermont, sponsored by the Sugarbush Soaring Association. Contact Duncan Gillespie, 32 Cordis Street, Charlestown, Massachusetts 02129. (617) 242-2926. Practice date, June 19. Rain date, June 25.

June 21-July 11, 18th World Soaring Championships, Hobbs, New Mexico, sponsored by The Soaring Society of America and The National Soaring Foundation. Contact The Soaring Society of America, Box 66071, Los Angeles, California 90066. (213) 390-4447. June 21-25, practice days. June 26, opening ceremonies. July 11, closing ceremonies.

July 2-4, Annual Sportsmen's Competition, Hinckley, Illinois. Contact Al Freedy, Hinckley Soaring, Hinckley, IL 60520. (815) 286-7200.

July 2-4, 15th Annual Soaring Fun Meet, hosted by the Kearsarge Soaring Association, New London, New Hampshire, to be held at Parlin Field, Newport, N.H. Contact Harold Smith, New London, N.H. 03257. (603) 526-4219.

July 2-6, Region 4 Contest, Fairfield, Pennsylvania, sponsored by Mid-Atlantic Soaring Association. Contact Helmut Bucholz, 19224 Walters Ave., Poolesville, Maryland 20837. (301) 349-5066/663-8411. Practice date, July 1. Rain date, July 7.

July 3-9, Region 7 Contest, Hinckley, Illinois, sponsored by the Chicagoland Glider Council (bid subject to approval). Contact David Lowy, 2535 North Wayne, Chicago, IL 60614. (312) 248-2166.

July 13-20, 18th 1-26 Championships at the Texas Soaring Association near Midlothian, Texas. Contact Tim Farr, 569 Medina Dr., Highland, Texas 75067. (214) 436-9383. Practice date, July 12.

July 23-Aug. 3, 11th International Old-Timers Rally, Farkashegy (15 Km southwest of Budapest), Hungary.

July 29-30, WW II Military Glider Symposium at the National Soaring Museum. Contact Shirley Sliwa, Director, Harris Hill, R.D.#3, Elmira, NY 14903. (607) 732-3128.

July 30-Aug. 7, Annual Sun Valley Sailplane Regatta, Contact Susanne at (208) 788-3054 or write to Sun Valley Soaring, Box 119, Hailey, Idaho 83333.

Aug. 1-5, Region 10 North Contest, Sunflower Aerodrome, Hutchinson, Kansas, sponsored by Wichita Soaring Association and Sunflower, Inc. Contact Robert D. Leonard, 12001 Beaumont Ave., Wichita, Kansas 67235. (316) 722-2183. Practice date, July 31. Rain date, August 6.

Aug. 8-12, Region 5 South Contest, Cordele, Georgia, sponsored by the North Florida Soaring Pilots. Contact Robert P. Grey, 200 Grey Creek Drive, Athens, Ga. 30606. (404) 543-6469. Practice date, August 7. Rain date, August 13.

Aug. 14-18, Region 11 Sports Class, AirSailing, Nevada, sponsored by Pasco & AirSailing Inc. (bid subject to approval). Contact Gertie Russell, 798 Londonderry Drive, Sunnyvale, California 94087.

Aug. 22-26, Region 6 Contest, Ionia County Airport, Michigan, sponsored by Benz Aviation, Inc. Contact Jerry Benz, 3148 S. State Road, Ionia, Michigan 48846. (616) 527-9070.

Aug. 27-28, Sept. 3-5, Region 12 Contest, California City, California. Contact Trip Mellinger, 24743 Quigley Canyon Rd., Newhall, Calif. 91321. (805) 259-4749.

Sept. 1-4, National WWII Glider Pilots Association 1983 Reunion at Dutch Resort Hotel, 1850 Preview Blvd., Lake Buena Vista (Disney World), Orlando, Florida. Contact Ed Evans, Jr., 1961 Tilburg Avenue, Deltona, Florida 32725. (904) 789-5062.

Safety is no accident.

Calendar of Events

Sponsors of all soaring events are requested to submit details so they may be included in the SOARING calendar. Deadline for calendar items is the 20th of the month, two months previous to the cover date (i.e., March 20th for the May issue). Prospective participants and visitors should write to activity contacts for information on entry applications, rain dates and practice days. Send calendar items to: Janet Bell.

SOARING Magazine
Box 66071
Los Angeles, Calif. 90066

Sept. 3-5, 11-12, Region 10 South Contest, Georgetown, Texas, sponsored by Fault Line Flyers and Soaring Club of Houston (bid subject to approval). Contact Bob Eli, P.O. Box 44, Round Rock, TX 78664. (512) 863-5511.

Sept. 10-11, 17-18, New Jersey State Meet and "Little Guy's Meet," Sky Manor Airport, Pittsdown, New Jersey, sponsored by Aero Club Albatross. Contact Diana De Lange, Box 174, So. Bound Brook, N.J. 08880. (201) 469-1598.

Sept. 17-18, Central Ohio Soaring Association Fall Round-Up. Contact Karlee Lemley, 5288 Butternut Ct. W., Columbus, Ohio 43229. (614) 888-1987.

Sept. 18-24, Region 4 South Contest, sponsored by Blue Ridge Soaring Society, New Castle, Virginia (bid subject to approval). Contact Glenn S. Maxwell, 2515 Nottingham Rd., Roanoke, Virginia 24014.

Feb. 11-26, 1984, Petersburg Wave Camp, Petersburg, West Virginia. Contact Tom Knauff, Ridge Soaring Gliderport, Julian, Pennsylvania 16844. (814) 355-1792.

Mar. 1-4, 1984, SSA National Convention, Hartford, Connecticut. Hosted by the New England Soaring Council. Contact Jon Mead, P.O. Box 401, Fairfield, Connecticut 06430.

SAFETY CORNER

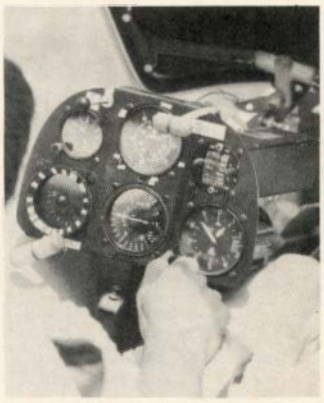
ROBERT GAINES

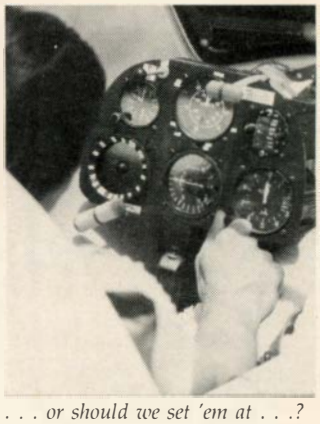
This month we are indebted to Tom Cooper and Tom Knauff for calling attention to two safety-related items that deserve our attention.

ALTIMETER SETTING: MSL OR ZERO?

Tom Cooper's letter may upset a few of us die-hards; however there is reason to believe that his proposal will prevent accidents. He is identifying what many of us have been doing for some time. At a national contest last year I checked every cockpit and found that exactly half were using zero altimeter setting. I questioned a few pilots and learned many reasons for using zero. I also learned that they were convinced that zero is the only setting to use. Read Tom's letter, and then decide. — R.G.

Should we set 'em at . . .





. . . or should we set 'em at . . .?

When I was taking flying lessons, two of the things I was encouraged to make automatic were fastening the belts and setting the altimeter to field elevation (MSL). After finding once upon landing that I had failed to fasten my belts before takeoff, I decided the only way to make it automatic was to fasten any seat belt at any opportunity. Since then I have always used the belts when driving or riding in cars or flying in commercial airliners; and since then I've never failed to buckle up before takeoff.

But I'm not sure it's such a good idea always to set the altimeter at field elevation. I think it makes more sense to set it on zero for local flying and on MSL field elevation for cross-country flying. I don't expect instant agreement on this, and I'll admit I haven't been able to persuade some of the older pilots at our field to my point of view.

Let's look at the arguments. Those who always set the altimeter at field elevation are following the safety-belt principle: if they always use field elevation, they will never make the mistake of setting off cross-country with the altimeter giving wrong information. They will always know their altitude above Mean Sea Level, and, by doing a mental subtraction, their altitude above any given airport on the sectional.

Let's imagine you're taking a friend for a ride on a sunny, windy afternoon. Your friend is impressed with your calm and effortless mastery. Suddenly you hit severe sink where the thermal was supposed to be, and now the only way to make it back — maybe — is a long, glide-stretching approach straight in to a downwind landing. One moment you were having a pleasant Saturday afternoon flight entertaining your passenger in the front seat, and now you're in trouble. You have a lot of things to think about in a hurry: Alternate landing places? Correct airspeed to conserve altitude? Allowing for a 15-knot tailwind? Wind gradient? How will I explain this one? Flaps in, out or in between? Gear up or down? Other traffic landing head-on in the normal pattern? Call traffic now or commit first? And, of course, altitude. Not altitude above the ocean, but altitude above the field.

I don't know whether you'll make it back, hit the fence trying or land out. But wouldn't it be nice not to have to do mental subtractions at a time like this?

Robert Gaines tells me that on a number of airlines it's standard procedure to set one altimeter so it will read zero at the destination airport, and that the RAF does the same. There must be something to the idea.

With two or more altimeters they can have their cake and eat it, of course, while we have to make a choice. But until I start landing on beaches, my choice will be zero setting for local flying, and an MSL setting when there's a reasonable probability that I'll be landing out.

— Tom Cooper

* * *

FAN THAT RUDDER

Tom Knauff sent the following letter about a good procedure the French are said to be using when the tow pilot wants to let the sailplane pilot know that something is wrong. Accidents have been caused when spoilers come out during the initial part of the tow. There is no way for the tow pilot to signal the sailplane that something is wrong. Usually the first word that the sailplane pilot gets is a wave-off from the tow plane, and that can be at a very low altitude.

Last summer the situation became a little more complicated when it was found that a major German manufacturer recommended that spoilers be extended during a launch in crosswind conditions. The theory is that disturbed airflow over the spoiler will give better aileron control. So now the problem is compounded for the pilot of the towplane.

In my opinion, it is not a good idea to tow anyone if the spoilers are extended. If the crosswind is so strong that control is questionable, it's time to change runways or put the bird back in the box.

Prior to making the procedure official, we would like comment from fellow pilots and especially tow pilots. How do you feel?

— Robert Gaines
1110 Misty Forest Drive
Marietta, Georgia 30067

I understand that Fench tow pilots have begun to use a waggle of the towplane's rudder during aerotow as a signal that there is something wrong with the glider — most often the dive brakes are open. This signal is usually reserved to say, "I can't release either," after the sailplane signals that he can't release. Under the French system the signal would be used for both occasions.

I suggest that we adopt this new procedure.

— Tom Knauff

SSA Convention

(Continued from page 10)

together to see what could be learned from one another.

This meeting was an outgrowth of the European Coaches Conferences which have been held frequently since 1972. Under the direction of chairman Bill Scull of the UK, this group heard a presentation by SSA's Flight Training and Safety Board Chairman, **Gene Hammond,** on flight training and pilot certification in the U.S. Assisting Gene in the presentation of this material were **Tom Render,** SSA Flight Training Chairman, **Marilyn Schumacher,** an FAA-designated examiner and active glider pilot in the northern California area, and **John Dezzutti,** SSA Executive Director. Following this review the coaches from all countries began to compare notes on pilot certification and to present how their own systems contrasted with the U.S. system. One surprising result of this interchange was the discovery of how easy we have it in the U.S. compared to the much more restrictive standards imposed in other countries.

In addition, the group discussed instructor liability and the potential exposures that flight instructors and national soaring organizations, like the SSA, encounter when they undertake pilot certification in their countries. The U.S. representatives also got an opportunity to learn how extensively motorgliders are used for cross-country and off-field landing instruction in other countries. The U.S. representatives indicated that they were hopeful that the expanded availability of type certificated motorgliders in the United States would enable us to reduce our accident statistics in the area of cross-country and especially off-field landings.

On the whole, this conference proved to be an extremely valuable exchange of information among national aero clubs. It provided the SSA's Flight Training and Safety Board with a wealth of ideas and possibilities for enhancing the level of flight instruction and increasing the level of safety over the coming years. You will certainly be hearing more about this from the Flight Training and Safety Board in the future.

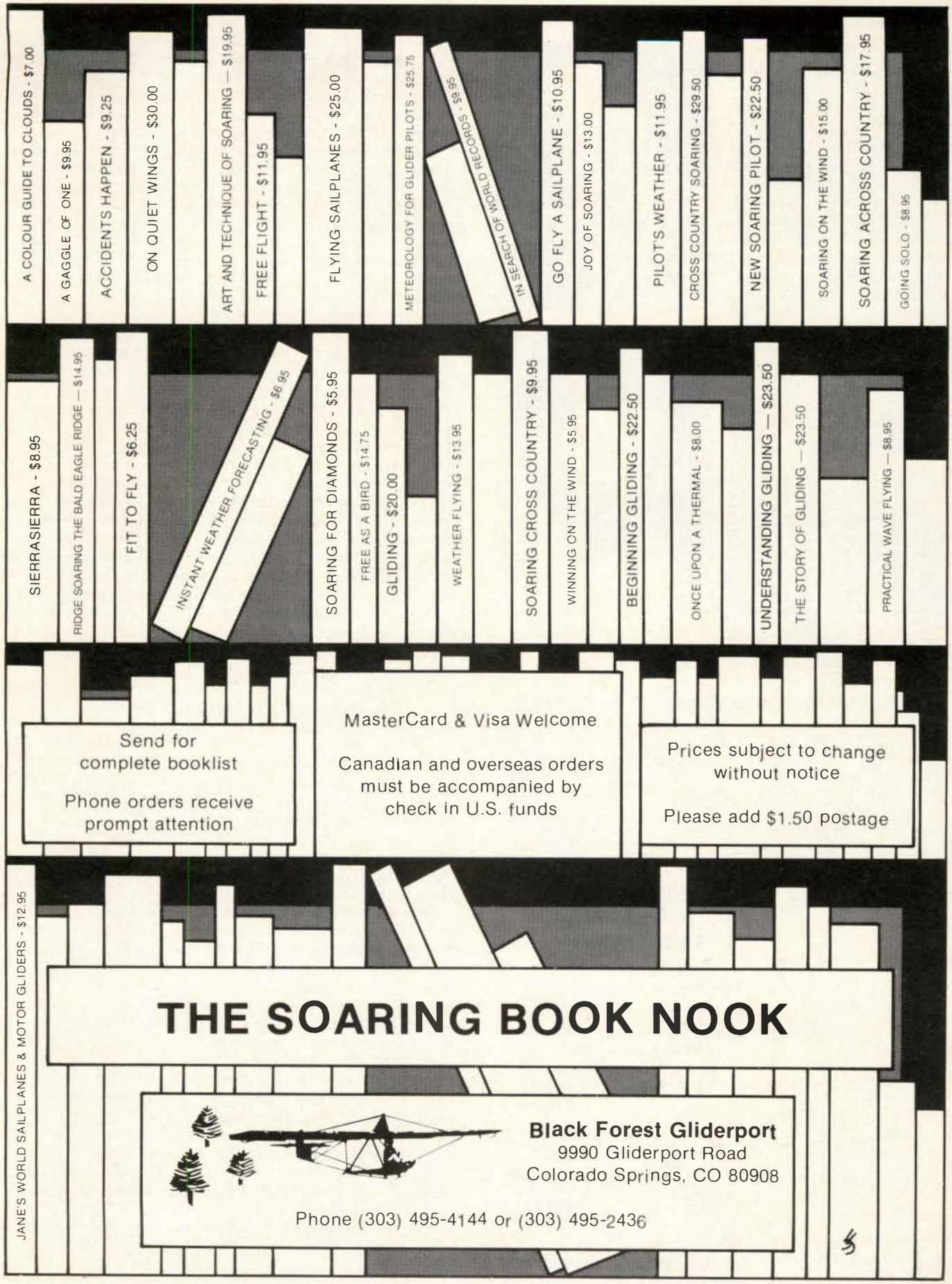
Top left: Roger Brogren addressing the State Governors' Breakfast. Below left: Women's Breakfast audience heard an address by Norma Faulkner. These and other special breakfasts were unusually well attended. At right are Sonner Greenspan, top, vice president of AirSailing, and Gary Kemp, president of PASCO, the organizations sharing sponsorship of the convention.

INSTRUCTORS CLINIC

Professionalism is the key word to describe the SSA's 1983 Certified Flight Instructor Revalidation Clinic held in conjunction with the Reno Convention. For the three days before the convention started, 41 instructors and 4 commercial pilots studied the fine art of soaring instruction.

Marilyn Schumacher emphasized the professional aspects of instruction and the responsibility of the instructor to his/her students in the first session of the clinic on Monday at 8 a.m. Although many had arrived late the night before because of the bad weather conditions, participants listened attentively while reviewing in their own minds the standards they set for themselves as instructors. Participants then listened to **Bill Scull** of the BGA discuss accident statistics and the need for stall/spin training and heard **Dr.**

(Continued on page 48)



BUSINESS MEMBER





From top, left: Tom Render, Bill Scull, Doug Armstrong. Right: Ed Seymour, Dr. Chuck Fisher. Each took part in Instructors Clinic.

Chuck Fisher expound on the medical aspects of soaring flight with an eye to student instruction.

Unfortunately, **Fred Weinholtz** of West Germany was not able to participate in the clinic as originally planned when his flight was held up in Europe due to the weather. **Derek Piggott,** who had dropped in to see what was going on, agreed on a moment's notice to present an hour on cross-country training. As chief instructor of the Lasham Gliding Center in England, Derek has many, many hours in cross-country instruction, and is also author of a number of books on the subject. Even without preparation time, Derek's experience and enthusiasm with soaring instruction more than filled the hour's session.

In between the many meetings attending to official SSA business, SSA President **Carl Herold** shared his insights on glider control during ground roll at the clinic. Based on his years of observation during competition launches, Carl discussed the forces involved in controlling the glider during the first moments of ground roll and the need for careful training in this area. Although this type of knowledge may at first seem esoteric, Carl revealed the critical nature of understanding the phenomenon involved when a student transitions to a higher performance sailplane. **John Dezzutti,** SSA Executive Director, also found time to present participants with some accident statistics and discuss problem areas to be addressed during the Biennial Flight Review.

Other SSA Members lent their expertise to the clinic, including: SSA State Governor for New York and Director of the Glider Pilots Ground School **Ed Seymour,** Director of Services for the AOPA Air Safety Foundation **Steve Brown,** meteorologist **Doug Armstrong,** SSA Flight Training Chairman **Tom Render,** and **Bill Stansbeary.** Accident Prevention Specialist **Carl Borchers** of the local GADO also presented a session qualifying participants for the FAA's Pilot Proficiency Program.

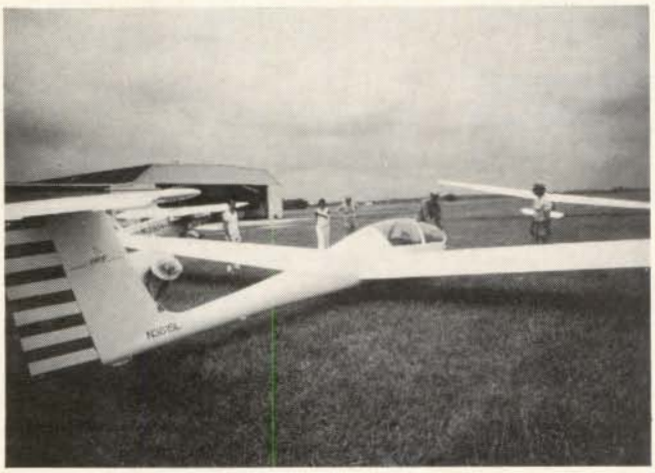
On Tuesday and Wednesday the roles were reversed when the participants were required to prepare sessions of their own. Broken into small discussion groups, each participant studied one aspect of thermal/ridge/wave flying and launch procedures in order to present that topic to the full group. This homework assignment was the catalyst for perhaps the most important and fruitful aspect of the clinic; as a result, participants were heard to be discussing different techniques for teaching thermal flying during their breaks, lunch and in the evenings. It was clear that this was a group of dedicated instructors intent on improving their skills to the best of their ability.

Don Slotten, chief instructor for the Revalidation Clinic, served as part of a panel during a joint meeting of the International Coaches, Commercial Operators and CFI Clinic participants. A major theme of discussion centered around the use of higher performance sailplanes for training. International coaches reported on the move to the use of fiberglass sailplanes in basic and advanced training in Europe and Australia. Some concerns voiced at the meeting regarded the maintenance of the sailplanes and the progress of students. Coaches reported that even though maintenance of a fiberglass sailplane is more critical and that training may in some instances take longer, the overall result of training in higher performance sailplanes was very positive. The coaches felt that the use of higher performance sailplanes encouraged students to attempt cross-country soaring and experience the true thrill of motorless flight. With the trends spotted abroad and in the United States, it appears that the use of higher performance sailplanes in instruction will become more widespread in the years to come.

ACCENT ON CLUBS

MICHELLE SILVER

Random gusts: From coast to coast the wind is blowing, thermals are popping and soaring clubs are flying, despite an exceptionally erratic winter. The St. Louis Soaring Association has joined the ranks of many clubs with fiberglass



fever with the purchase of a Grob 103 . . . The Orange County Soaring Association will be providing an incentive to the Line Chief of the day to completely fill out *all* the paperwork and record all data on the checklist for the day. It is easy to forget to record a time here, a payment there, but with the award of a free tow ticket for a properly completed checklist, the OCSA Line Chief will probably be paying a little more attention . . . Speaking of free tows, the Texas Soaring Association (hosts of the 1983 1-26 Championships) will give a free tow to any non-contest flight which results in a badge flight or record.

The Kent State University Flying Club is just beginning to roll and is looking for a 2-33. They are a group of eager students, but don't have much money; anyone who might be able to help them out should contact Roger Quinn, 4020 Kent Road, Stow, Ohio 44224 . . . Ray Galloway, SSA State Governor for North Carolina, reports that the North Carolina State University Soaring Club is moving right along with the purchase of a Ka-6. Right now the club is recovering the ship and plans to have it available for cross-country work this summer. A new club has just been established in North Carolina, as well. The Western Carolina Soaring Club is operating out of Hendersonville under the direction of President Harry Senn. The club has a 2-22, a 1-26 and a Piper PA-18/150 for towing. For more information on the club contact Larry Johnston, 109 Whisperwood Circle, Hendersonville, North Carolina 28739.

Georgia State Governor Jim Culp awarded the Governor's Golden Griffin award for December to Jerry Miller of the Mid-Georgia Soaring Association. The Golden Griffin is awarded at the Governor's discretion for outstanding flights across Georgia airspace or by Georgia pilots. Jerry's flight was a Silver and Gold Duration flight made while hugging the ridge in fairly weak conditions, with cloudbase just at the top of the hills . . . John Campbell of the Napolean Soaring Club reports that their 1982 Cross-County Contest was successful in generating flying activity. The club as a whole flew 5500 miles in everything from a 1-26 to a Jantar 2. Notable flights included a Diamond Goal flight by Dick Hausman, a state record for Robert Keyes and Silver Distances for Joe Domeier, Tom Hellner and Mike Stimac. John also reports that the club is looking to buy its own site, and anyone who can give them "how-to" information which would be helpful in providing guidelines can contact him at 701 W. Liberty, Ann Arbor, Michigan 48103.

The Yucca Stamp Club is preparing a postal cachet honoring the 18th World Soaring Championships. For information write 3415 Central Avenue, Hobbs, New Mexico 88240 . . . Many SSA Chapters took advantage of the opportunity to participate in the 18th World Soaring Championships Sweepstakes as a Chapter and many have wholeheartedly supported the contest with some sizeable donations. These include contributions from the **Texas Soaring Association,** the **Chicago Glider Club,** the **Caesar Creek Soaring Club,** and the **Northern Colorado Soaring Club.** All contributions, however great or small, are truly appreciated.

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CLASSIFIED ADVERTISING

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The rate for classified advertising is 50¢ per word or group of characters. (An area code and phone number is counted as one word.) The minimum charge for ads is $6.00. Insertions made by telephone are subject to a $1.00 service charge and must be charged against a VISA or MasterCard account. A fee of $9.00 is charged for each photograph (subsequent insertions of the same illustration — $7.00).

Advertisements are accepted up to the 20th of the month for the second cover date following. Should the 20th occur on a weekend or holiday the insertion deadline will be the last business day prior to the 20th. Thus the deadline would be May 20 for the July issue.

Please send ad, photo (color or B&W prints only) and payment (payable to SSA) to:

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PHOEBUS B-1, excellent condition, two varios, new airspeed, instruments, enclosed metal trailer. $10,500 or best offer. (209) 267-0716.

PHOEBUS C, very nice cross-country high-performer. Mentor radio, oxygen, multirange BSW with Schuemann, audio, compensated Winter Sollfahrtgeber, covers, enclosed metal trailer, drogue chute. $10,900. (603) 424-5821 evenings.

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PIK-20B, factory trailer, oxygen, Bertea radio, Schuemann box. Make offer. Chip, (904) 893-0764 anytime.

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DIAMANT, 17-meter, second owner. Glossy white finish with red trim. Complete with PZL, Ball, audio, total energy, Bertea 100-channel radio, gel/cells, parachute. Also includes custom canopy and tail covers, handling equipment with enclosed trailer. All this can be yours for $10,000. Call Jim, (615) 894-9183.

GLASER-DIRKS SAILPLANES. DG-101, Standard, $15,200. DG-300, new racing Standard Class, $17,500. DG-202, 15-Meter, $18,600. DG-400, powered sailplane, $30,100. Distributor: Oliver Dyer-Bennet. Contact: Glaser-Dirks West, Oliver Dyer-Bennet, Box 7282, Berkeley, California 94707, (707) 942-5727. Glaser-Dirks East, Robert Gaines, 1110 Mitsy Forest Drive, Marietta, Georgia 30067, (404) 973-1414.

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DG-200, competition ready. Bohli compass/vario, Cambridge director, Endurox oxygen, parachute, barograph, Radair, extras. Custom trailer. Never damaged. $22,500. (403) 271-2933.

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H-301 LIBELLE — excellent, always covered, current annual, all A.D.'s done. Smiley water ballast, oxygen, camera mounts, contoured wings, reinforced tail section, Bayside radio, and Sollfahrtgeber plus PZL varios. Factory trailer, spare parts. Super performer. $15,000. No reasonable offer refused. J. Simons, (713) 483-4240 days, (713) 480-5194 eves. Texas.

H-301 LIBELLE, Schuemannized, top condition, oxygen, Bertea 200-channel radio, Cambridge and Ball varios, full instruments, water ballast. New $4000 Minden one-man-assembly trailer. $17,500. Call (805) 964-3016 eves. or (805) 966-5057.

LIBELLE H-301B, Bertea 360, Rico, Schuemann box. Oxygen, water, factory trailer, chute. Regionals winner. $15,500. George, (303) 495-4144.

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BG-12A, instruments, radio, oxygen, trailer. Excellent condition. A complete package for learning cross-country flight. $3600. Call (512) 345-7332.

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STANDARD CIRRUS. Instruments, Alpha/100 radio, Endurox oxygen, Eberle trailer. (303) 482-9838.

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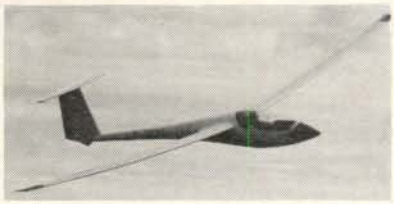

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AS-W 15, trailer, instruments, radio, parachute. Asking $15,000. Make offer. (619) 440-1938.

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AS-W 15, metal trailer, instruments, two Ball varios, netto, cruise, audio, 100-channel radio. Free delivery eastern U.S., May only. $14,300. (313) 453-6874.

AS-W 17, U.S. RECORD HOLDER. Instruments, radio, Schreder trailer, profiled wings, covers, 15-Meter tips. For sale at $19,900. Creative financing possible. G. Green, (703) 830-3237 or (202) 676-0610 business.

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AS-W 19 and trailer. With or without instruments, radio, etc. (314) 962-6964.

AS-W 19B. Factory water ballast, tinted canopy, Alpha/100 radio, Schuemann vario/compensator. Schreder trailer. (607) 754-5076, (607) 755-3356.

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AS-W 20 and trailer. Half interest for sale, Austin, Texas, area. Willing to share alternate weekends or alternate days on any given weekend. Call (512) 454-4797 ext. 5729 days, (512) 345-7332 evenings at home.

AS-W 20 and trailer. Low time, excellent condition. $23,500. Call (512) 454-4797 evenings.

TEXAS DEALER FOR SCHLEICHER Sailplanes — AS-W 20B's, AS-W 19's, AS-W 22's. Place your order now. 1304 Parker, Odessa, Texas 79761.

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AS-W 20, MK IV, Sage, Schuemann compensator, Smiley tanks, tinted canopy. Sealed, no damage, Komet trailer. (815) 467-4185.

1-26A, #219. Well equipped. Trailer. $7000. Bob Griffen, (919) 735-3192.

1-26A, #271. Winter and Cambridge with audio and netto. RST transceiver, oxygen, recovered 1980, Schweizer trailer. $6750. (419) 756-1203 evenings. Ohio.

1-26B, #216. New Ceconite, basic instruments, open trailer. Excellent condition. $7500. (703) 354-4992 evenings.

1-26B. Rebuilt 4/82. Open trailer (needs work). Replogle barograph. For more information call Stan, (206) 392-9282.

1-26B, licensed to Dec. 1983, nice. $4950 firm. Trailer available. (216) 234-2069.

1-26B, #356. Basic instruments with Piep, Radair 10, chute, Ni-Cad w/charger, trailer. $7000. Massachusetts. (617) 369-1162.

1-26C, #284. Basic instruments plus Winter and dual range Cambridge w/audio. Total energy, Genave radio, 8-day clock, new paint 1983. Excellent. Factory trailer. $8000. (915) 367-7259 evenings.

1-26C, #304. Basic instruments, with Rico. Radio, new canopy, fresh annual, A-8A oxygen. $6600. (714) 732-4550 days, (714) 821-8026 evenings.

SCHWEIZER 1-26C, N1149S, 35 hrs. T.T. Forward and cg-hook, instruments, radio, covered Gehrlein trailer. Featured in movie "The Soldier." Beautiful condition. $7500. (716) 741-3598.

1-26D, always hangared, basic instruments. $6250. (615) 266-1767.

1-26D. Excellent condition, basic instruments. Asking $6000. (319) 338-4738 evenings.

1-26D, 1969. White with blue trim. Three varios, many extras, trailer. $8500. (817) 430-1398.

1-26E, #620. Cambridge with audio. Schuemann T.E., oxygen, Radair 10S, two gel/cells, barograph, trailer. $8000. (216) 331-5116 or (216) 273-3564 evenings.

1-26E, #623. New paint, Cambridge electric vario with audio, Gehrlein trailer. $8400. (213) 431-0456 or (213) 493-1431.

1-26E, #665, N777SK. Rico vario, Genave 10, oxygen. Interests available. Hemet-Ryan based. Good condition. Phil Davy, (714) 641-8595 or (714) 839-7821.

1-26E, #668, 1977. Piep audio. Always hangared. Good buy at $8500. (703) 496-4835.

SCHWEIZER 1-34, basic instruments, new paint, always hangared. $14,000. Harris Hill Soaring Corp., (607) 734-3128, or Monty Sullivan, (607) 739-3219.

1-35C, #43. Beautiful to look at and fly. Three Diamond flights. Send for photos and specifications. (812) 526-5823.

1-35 CLUB, #70. Specially prepared by Schweizer for Tucson convention. All club options at time. One owner, never dinged. Good instruments, Cambridge, and radio. No trailer. White with red striping. The ideal machine for transitioning to higher performance soaring. Price reduced. Call Ed (504) 283-2595 days or 394-7140 nights.

SGS 1-35C, serial #77, N2817H, 395 hrs. T.T. Canopy retrofit, Ball audio, Winter vario, oxygen, airspeed, altimeter. Push-to-talk on stick, wired headphone/microphone, covered trailer. (RST 2-channel radio available, $225.) Well-maintained, current annual to purchaser. $16,000. Terms available. Tom Dixon, (208) 939-8241 weekdays, (208) 376-6718 other times.

1-35C, serial #91, basic instruments. Located California, leaseback available. Best offer. (215) 348-8048 evenings.

1-35C, oxygen, radio, Cambridge electric vario. Priced to sell. (214) 521-8921 days or 522-8035 nights.

1-35 RETRACTABLE. Filled wings, enclosed aluminum trailer, fully instrumented. Single owner, lavished T.L.C. Top condition, always kept in trailer. Photos, references available. Fresh annual. Call nights (214) 867-6869 (after April 3).

SGS 1-36 SPRITE, #32. Winter vario, Braunschweig, nose skid. Excellent leaseback available at Montague Aviation. $19,500. (916) 459-3457.

SGS 1-36, new annual, 180 hrs. T.T. Always hangared, never trailered. Compensated vario, radio. $14,500 firm. Bob Tisdale, Peach State Gliderport. (404) 227-8282.

SLINGSBY SKYLARK 2, 15-meter, good condition. Enclosed trailer, parachute. $5270 U.S. firm. Call (519) 681-0533.

KESTREL, QUIET, EASY assembly, large comfortable cockpit, trailer, tinted sealed canopy. Tested equal to Ventus. Instruments optional. $18,500. (613) 731-6997.

JANTAR STANDARD. Instruments including Rico vario, T&B, artificial horizon, radio. Excellent condition, includes trailer. Ron Clarke, (317) 823-4313.

JANTAR STANDARD, EXCELLENT condition, standard instruments. $12,900. Trailer available. (213) 371-1893 or (814) 692-8104.

JANTAR STANDARD 2, PZL vario, Rico VACS, Endurox oxygen, Minden Fabrication trailer, full covers, Security chute, radio. Top of the line package. $17,500. (213) 867-3780. (805) 733-3094.

JANTAR STANDARD 2, C-GEMF, T.T. 103 hrs. Complete with basic instruments, Edo-Aire 360-channel, heavy duty trailer. $17,000 U.S. or $22,000 CDN. E. Fischer, (604) 925-1907. Telephone 24 hours.

JANTAR STANDARD 2. Competition ready. Easy to fly. All instruments, two radios, trailer. Will trade. (912) 824-7788.

JANTAR 2A. FAST, competition ready. With basic instruments and spare parts, plus a Minden Fabrication one-man trailer. $25,000. Radio, Rico, high-altitude oxygen system available. (808) 922-3540.

OPEN CLASS JANTAR 2A, $23,000. Complete, low time. (602) 954-7133 daytime.

JANTAR 2B with custom trailer and rigging equipment. Must sell for best offer. Radio, oxygen, instruments available. (805) 499-7068 eves.

DUSTER, NEW PAINT 1982. Mechanical and electric varios. Outperforms 1-26. New enclosed trailer. $4500. (615) 899-9311.

DUSTER, serial #63, painted recently. Instruments, radio, trailer w/fabric cover. Very good condition. $5000. (213) 322-2101.

TWO-PLACE FOR SALE

1972 BLANIK. Basic instruments, very good condition. $12,500. (703) 354-4992 evenings.

'73 BLANIK. Standard instruments, tailwheel, new canopy, open trailer included. $12,000. (714) 651-1322.

1974 L-13 BLANIK, custom Imron paint, excellent interior. Sale includes fresh annual. $12,000 firm. Days (805) 947-5831, 8:00 a.m. to 3:00 p.m.

BLANIK. Completely refurbished with new fabric and beautiful Imron paint. New plexiglass. (912) 824-7788.

BLANIK L-13 for sale with basic instruments and trailer. $11,500. Box 88191, Seattle, Washington 98188. (206) 244-5396 evenings.

BLANIK FACTORY SPARE PARTS are available exclusively from Blanik Parts Co., P.O. Box 1001, Tehachapi, Calif. 93561. (805) 822-6355.

LARK I.S.-28B2, trailer and instruments. $20,000. (619) 440-1938.

'78 LARK I.S.-28B2, full panel, oxygen, Imron, trailer, chute, ATC'd, 720-ch. Edo-Aire. (916) 583-6364 or 587-1785.

JANUS B, serial #75. Complete with radio, instruments, and trailer. Wes Morris. (602) 947-0362 or (602) 946-8356.

JANUS C, with Komet trailer, dual oxygen, Edo-Aire 360. Beautiful accent striping by Alex Aldott. $49,500. J.R. Crisp, 3502 22nd Street, Lubbock, Texas 79410. (806) 792-6153 days, (806) 795-1836 nights.

SCHEMPP-HIRTH LEADS THE FIELD in high-performance two-seaters with the JANUS C. Contact Cambridge Aero Instruments for more information on this 40:1 sailplane for two. 300 Sweetwater Avenue, Bedford, Mass. 01730. (617) 275-0889.

SCHLEICHER Ka-7, enclosed trailer, Ball vario, Radair. Ron Miller, P.O. Box 1367, Pennsauken, New Jersey 08109. (609) 665-1350.

2-22. EXCELLENT CONDITION, fresh annual. Great trainer for half the price of a 2-33. (904) 388-1741.

2-22, with new annual, trailer. Willing to trade for 2-33. $4950. (817) 430-1398.

1964 2-22E, very nice, with open trailer. $5995. D. Barber, Box 17420, Arcadia, Ohio 44804. (419) 894-6446.

2-22E. EXCELLENT condition. Ceconite, sealed ailerons, Winter vario. $4500. Sell with fresh annual. W. Ellenberger, (804) 846-7371 days, (804) 929-5452 eves.

SGS 2-32, three-place, N65973, 1974. Low time, great shape. Minimum instruments. First $20,000 takes it. (215) 527-0501.

SGS 2-32, white with red, three-place, oxygen, trailer, 1900 hrs. T.T. $18,900. Call (303) 426-5011.

SGS 2-32, #35, 1400 hrs. T.T. Clean ship, no damage history. Annualled through 10/83. Cambridge audio netto, oxygen, Bayside 990, trailer. (215) 294-9653, after 9:00 p.m.

SCHWEIZER 2-32, 365 hrs. T.T. Trailer available. Will consider leasing. $21,000. (703) 822-5504.

SCHWEIZER 2-33, basic instruments, always hangared. $14,000. Harris Hill Soaring Corp., (607) 734-3128, or Monty Sullivan, (607) 739-3219.

SGS 2-33, 1970, new Ceconite 1978. $9000 or offer. (215) 644-9632 evenings. Pennsylvania.

'73 SGS 2-33A, #306. Standard instruments, new fabric and paint June 1980. $10,000. (714) 651-1322.

2-33A, 1974, #326, 570 hrs. T.T. Side trim, leaseback available. $10,500. (602) 996-3904.

2-33A, #509, EXCELLENT. Warbird paint scheme, Schuemann, Cambridge, Winter, Radair 10S, spring tailwheel, open trailer with fittings for all Schweizers, hangared. $13,995. (303) 444-8136.

SLINGSBY CAPSTAN, two-place side-by-side, 30:1 L/D. Minor damage horizontal stabilizer. With trailer. $8500. (501) 664-9135 days, 225-1938 evenings.

SELF-LAUNCHING AND MOTORGLIDERS

AMERICAN EAGLET, McCulloch engine, covered trailer. Approximately one-third complete. Make offer. Tom, (512) 680-7476, (713) 668-8848.

AMERICAN EAGLET, signed off and test flown as glider. You must paint. MC-101 engine installed plus propeller kit. Enclosed trailer. $4200 firm. Bill, (601) 956-8537.

LARK, two-place, side-by-side, 30% under replacement cost. Photos, specifications. Box 7211, Menlo Park, Calif. 94025.

LARK I.S.-28M2, two-place, side-by-side, all-metal motorglider. Limbach 60-hp engine, Hoffman three-position prop., Cambridge dual range total energy vario, Edo-Aire RT56A 720 Nav-Com. Extras, including two Security chutes. $34,000. Call Jerry Wenger, (507) 451-7929 or (507) 451-3010 days.

RF-5B, 255 hrs. tach time, high canopy, three-position prop. Barograph, Genave 1½, Bendix transponder, electric T&B, early Sage. $20,000. (207) 872-5555.

GROB G-109, fully equipped, 80 hrs. T.T. Always hangared, like new. Substantial savings from new price. Call (607) 243-7568.

MITCHELL U-2 KIT, motor. 1-26 performance, self-launching. $1800. California delivery. (408) 335-7781.

MONERAI with instruments and trailer. $4500. Power pod complete with controls, $875. (313) 939-6208.

SCHEIBE SF-27M. Self-launch, retract engine. T.T. 45 hrs., 34:1, 2.3 fps. Like new. Radio, enclosed trailer. $18,500 negotiable. (815) 469-4695 or (312) 490-1125.

SCHEIBE SF-33, BMW 1000-cc engine, Hoffman full feathering prop. L/D 28:1, cruise 95-mph on 1.7 gph. Low time, always hangared, with factory trailer. $19,500. (815) 385-5645.

SCHEIBE SUPER FALKE motorglider. Side-by-side, folding wings, three-position propeller. Nav/Comm, E.L.T., dual oxygen. Low time and beautiful. $22,500 or offer w/new annual. (619) 756-3365.

SCHEMPP'S JANUS CM overpowers the rest. For the true soaring motorglider, contact Cambridge Aero Instruments for more information on this superb 40:1 self-launching motorglider for two. 300 Sweetwater Avenue. Bedford, Mass. 01730. (617) 275-0889.

AS-K 14, excellent condition. Trailer, Security 150, full instruments, gyro horizon, radio. $14,200. (716) 223-4161.

NICE SCHLEICHER AS-K 14, electric start, faired wingtip wheels, tailwheel, 1982 Ceconite, concealed custom gas tank. David, (814) 676-2791.

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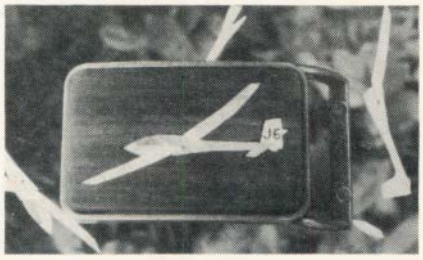

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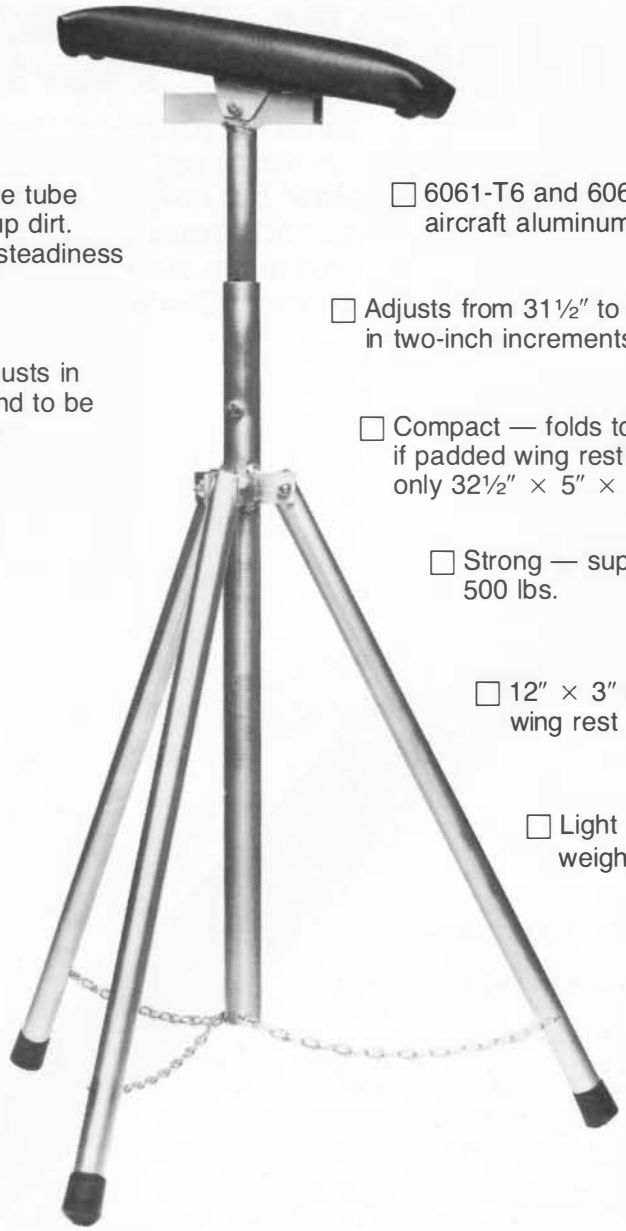

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