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WHOLE AIR

The International Magazine for Sport Pilots

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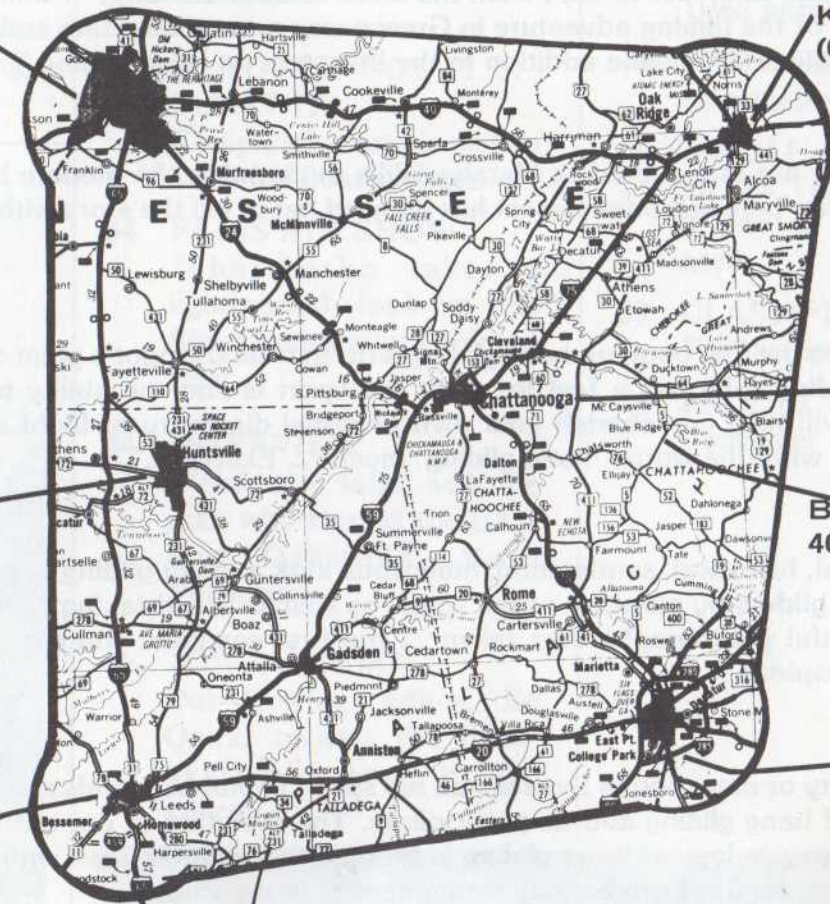
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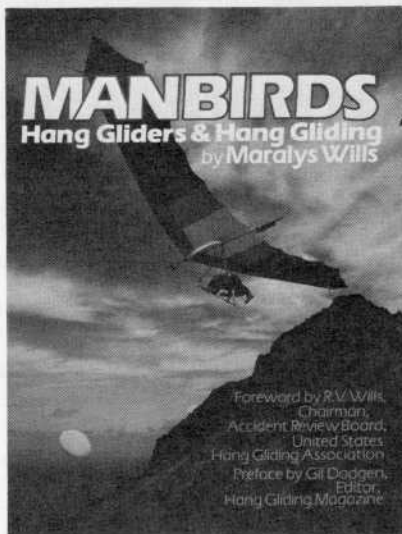
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From Prentice-Hall:
MANBIRDS: Hang Gliders & Hang Gliding

BY MARALYS WILLS

A fast paced, entertaining new book, written with humor, insight, and a rare appreciation of individual achievements. *Manbirds* takes the reader from hang gliding's exhilarating, fumbling past to its soaring present.

- ★ 8 pages of color, 150 black-and-white photographs
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- ★ 40-page appendix, including world-wide flying sites

"Maralys Wills said, 'above all, I want the book to be interesting.' It was that and more ... Chris Wills' story of the filming adventure in Greece was more interesting and exciting to us than the finished movie ... a valuable addition to the literature on hang gliding."

Francis M. Rogallo

"Few people are as qualified as Maralys Wills to chronicle the modern history of foot-launched aviation ... her personal involvement has allowed her to tell the story with rare insight and understanding."

Mike Meier

"Manbirds is the first book on hang gliding written from the pilot's point of view. Maralys Wills is of hang gliding. She has a feel for what the sport is and the ability to write it down well ... Manbirds will help you cherish your own personal discovery of flight and will help non-flyers understand what the words 'hang gliding' mean. ... Excellent."

Chris Price

"A technical, historical, sentimental, humorous look at hang gliding ... amazing shots of fragile, homemade gliders by pioneers of the sport, as well as breathtaking color plates of some of the most beautiful photographs ever taken ... the first complete compilation of world-wide hang gliding champions."

Dean Tanji

"Of the thirty or more books I've read on my sport, *Manbirds* stands alone as a true and accurate reflection of hang gliding and its participants. The evolution of our attitudes and techniques as well as the psychology of hang gliding is brought out by interviews with all the sport's greats ... very contemporary ... I will happily recommend it to my students."

Ken DeRussy

"A must for everyone interested in hang gliding ... gives the history and flavor of the sport, as well as authoritative tips and instructions on equipment and flying. But it deserves a far wider audience, because it is a wonderful, true adventure story of pioneering — presented in a fast-paced, very readable style ... Maralys Wills was uniquely involved in the incubation of hang gliding and in the subsequent developments. No outsider could have captured so well the essence of this great period when man joined the soaring birds almost as equals instead of as interlopers ... a sensitive and exciting book that you cannot put down — and which later you will find continually resurfacing in your mind."

Paul MacCready

Available in book stores and your local hang glider shops

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Volume 4, No. 4, 1981
ISSUE NO. 20

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John Lasko

ON THE COVER:

John Lasko, flying one of two Quicksilver MXs, photographs Eipper Team pilot, Tina Trefethen, while they participated in the Paris Air Show.

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Publisher's Column



Fire can be a very destructive force. Water can also be very destructive.

The company which has always provided WHOLE AIR with typesetting was destroyed by these two destructive agents. Fire and smoke damage is obvious to delicate equipment. But water (resulting in rust) is equally damaging to intricate metal parts. They will close the doors forever in mid-July.

But fortunately, we had been investigating the purchase of our own equipment, and were ready to buy when this crisis struck. While we did get delayed for one week, we are now using our own \$20,000 computerized phototypesetter. The purchase commitment alone will keep us on our toes to serve and prosper within the hang glider/ultralight/tow community

For our advertisers, this means new services with hastened delivery. For you readers it means better magazine arrival timetables, and some new appearances of our printed word. This issue it means several different typestyles as we "changed boats in the middle of the river."

Preliminary figures are in on the ultralight design changes survey we conducted last issue. Not enough cards had arrived to do a full analysis; we know it was a more complicated survey than we usually attempt. But some very clear trends were developing that bear early mention. [Note: These results are not conclusive.]

Of the 26 areas in which you readers desired change on current ultralight aircrafts, the top item was a surprize to ourselves and other consulted industry leaders. Far and away the leader was No. 7,

"Increased engine-off soaring capability." Of course, WHOLE AIR has a heavy hang glider readership which may help explain this desire for engine-off performance. Fifty One percent will buy a new glider this year. But we have also got many motorized pilots, again with 51% now owning or foreseeing purchase soon. We believe this survey will be primarily answered by those interested in flying ultralights. Were the 51% the same pilots? Under a quarter were the same responding individuals.

After only a small number of the total votes expected, other areas ranking very high were: "Less liklihood of FAA regulations; More positive and negative G-load capacity; Lower noise; Greater crash surviveability, and; Better air restart capability." Watch *Statistics* next issue for final reports. WHOLE AIR is trying to learn the most about our pilot/readers. [Please see the reader card this time, too.] We also want to give you some subscriber information to assure you see each issue.

The two digit number in the lower right or left of your mailing label signifies the issue number of the last copy you will receive. Always renew more than one issue away. You will be receiving a Renewal Notice, but could still miss an issue. Do not let us be the "thermal that got away."

If you fail to get any issue you have subscribed for, let us know right away and we will get a replacement copy right out. Please allow always-too-long for the Postal Service to deliver them; it can vary widely, and this issue Canadian subscribers may not be getting theirs at all, due to the mail strike in Canada.

If you end up with two magazines, give one to a flying friend.

Thanks,
Dan Johnson

HIGH



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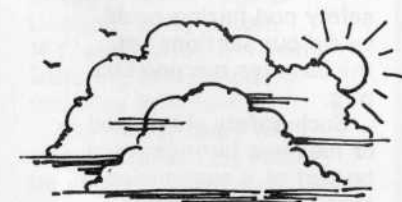
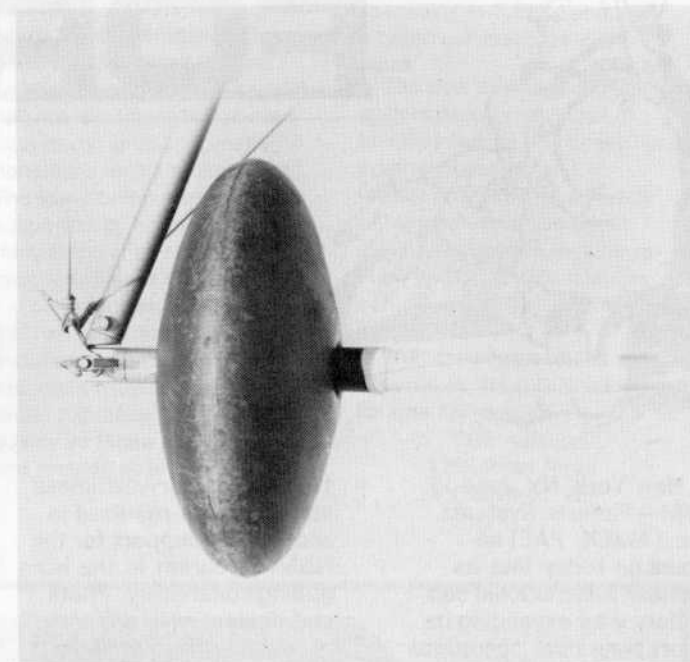
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FORUM

New York, NY, June 15, 1981—Pioneer Systems, Inc. (AMEX: PAE) announced today that its Pioneer International subsidiary was expanding its sport parachute operations into the field of hang gliders and ultralight aircraft through the acquisition of Flight Designs, Inc., a privately held California corporation. Flight Designs will continue under the direction of its President, Marty Alameda.

Pioneer International, which is the world's leading developer and manufacturer of parachutes and recovery systems, plans to produce and market its new hang gliders and ultralight aircraft in conjunction with its wide range of sport chutes.

Miles L. Rubin, President of Pioneer Systems, stated that the Company anticipated that its new activities would grow over the next few years to represent a major portion of the Company's sales.

Miles L. Rubin
New York, NY

Dear Editor:

The recently improved aerodynamic and structural safety record of gliders certified to 1979 through

1981 HGMA airworthiness standards has resulted in widespread support for the HGMA program in the hang gliding community. Pilots and dealers now shy away from uncertified designs, and place great faith in the safety and airworthiness of certified designs.

There is a potential danger in this situation. There are three things that pilots need to keep in mind about the HGMA airworthiness standards:

1. The standards themselves are simply a "best guess" as to how to test for airworthiness in a hang glider. They seem to be a good guess, but there is no guarantee that a design which passes all of these tests is *completely* safe and airworthy. It is much more likely to be airworthy than a glider which will not pass these tests.

2. The HGMA does not verify the compliance of a design when it issues a certificate. It essentially reviews a documentation package, submitted by a manufacturer, for completeness and proper format. The certificate states that the glider "has, by declaration of the manufacturer, been found to comply with HGMA Part 1 Airworthiness Standards, utility ultralight

gliders."

3. The actual airworthiness of a certified design will depend on the skill and experience of the designer in performing and interpreting the tests required by the HGMA standards, and on the skill and experience of the manufacturer in duplicating the one tested glider in the manufacturing process.

Pilots should understand that while the tests required by the HGMA standards will, when skillfully performed and interpreted, yield valuable information about a glider's airworthiness, the possession of a certificate of compliance by a glider is not a guarantee of the airworthiness of that design.

Board of Directors
HGMA
Van Nuys, CA

In what the experts say about the TRIKE, they were very informative, honest, well thought out answers. I will try to fly one the first chance I get. I watched them and even loaned my Quicksilver (it's not silver and it's not quick) to Mike Quinn so his friend could take pictures of him for this

month's cover of *WHOLE AIR* hoping to get a little publicity for the American Cancer Society and United Ostomy Association.

I've been in the UNITED STATES PARACHUTE ASSOCIATION (USPA) since 1965 and in the USHGA since 1974 and believe me without these two great ASSOCIATIONS, if it wasn't for them, my jumping and flying would not have been as safe, enjoyable, as free and maybe eliminated. Think about it AIR PEOPLE, support *WHOLE AIR*, USHGA and tell them what you want.

To some of the people in other states that aren't around Ultra Lites as much as people in Southern California, there are quite a few models out here and my opinion is the Quick

Silver is one of the safest, dependable (except for engine failure, which is no big deal, you just land it without power, I have, five percent of my flights) easy to fly and impressive to the WHUFFO's. The rest of the ultra lites look good to me but I haven't flown any of them. The TRIKE's best feature, you can fly your own hang glider, is good but I believe most people who start flying power quit flying regular hang gliders. Of course don't take my word for it, check it out.

THANKS TO THE STAFF OF *WHOLE AIR*, KEEP UP THE GOOD WORK.

R. E. Kidwell
(Rosko Goose)
Rialto, CA

Dear Editor:

Safety pod fairings that could give head to butt or head to foot protective covering; the head to foot safety pod fairing could be cut out sections* at the base for running take offs.

Such safety shield pod or fuselage fairings could be part of a suspension system in foot launch

gliders; or could have wings attached and from a running start would launch belly flopper style, like starting a sled down a hill.

High speed human powered vehicles with built in safety packaging fairing could have wings, etc. attached and with an addendum circle added to the side rims of a bike drive wheel, could provide a place for a power take off to a propeller for brief altitude gains. Such H.P.V.'s with wings attached; for a drive wheel, plus propeller take off, have potential as soaring machines.

R and D on non-conventional propeller systems.

Updated research on early single and multi-wing gliders designs, and large surface area wings for soaring.

Also infra red or other scan devices, as thermal soar direction finders for locating thermals.

Ski slopes in warm weather could be used for short glider hops down a hill or mountain side, and for glider launch ramps, including swivel, face into the wind ramps. Also possible ski jumps and catapult launch units for gliders.

*Also cut out sections for arm motion for all safety pod fairings.

Best of Lift!
Edward G. Sword

Dear Editor:

Winter Haven, Fla.—The legendary Franklin aircraft engines are back in production.

The "new" Franklin engines are manufactured by PZL (Pezetel), the Polish aviation concern, who purchased the assets of the Franklin Engine Company of Syracuse, N.Y. and moved the manufacturing to its modern facilities in Poland.

Marketing, sales and distribution of PZL/Franklin engines, parts and technical support services

will be handled by The Camber Corporation, of Winter Haven, Fla., and its authorized outlets throughout the world.

For more information contact The Canbar Corporation, P. O. Box 9472, Winter Haven, Fla. 33880
Angel Matos
Winter Haven, FL

Dear Editor:

I don't see anything wrong with Ultra Lites in the service. Sky Divers owe the military quite a bit for the experimentation done on parachutes. I jumped a surplus military chute for 13 years. We call them a cheapo but they're famous for reliability. So take a second look Mr. Mike Potvin. (FORUM: March April 81 issue of *WHOLE AIR*.)

Dear Editor:

C.G.S. Aviation of Cleveland, Ohio, has introduced their 1981 Powerhawk 152 ultralight aircraft power system. The heart of the Powerhawk 12 is an in-line, twin-cylinder, 20 horsepower, two-cycle engine, which has been time-and performance-tested with an engine life expected to exceed 450 hours without major overhaul (given proper operating conditions and adequate care). The low-vibration engine is supported by eight shock-dampening rubber mounts to reduce airframe vibrations.

The reduction drive of the 152 has been improved to include a new cast aluminum reduction mount. The bearings in the reduction are the same quality as those in the engine and provide improved reliabil-

ity and long life. The computer-designed propeller and reduction ratio provide the maximum static and dynamic thrust available from the engine. In stock configuration, the engine generates 150 lbs. of static thrust, according to C.G.S., and with a tuned exhaust pipe even more.

The new engine mounting system permits standard or inverted and tractor or pusher engine mounting, and is readily adaptable to a variety of ultralight and homebuilt airframes. Options include remote choke, remote mixture control, and full engine instrumentation.

The Powerhawk 152 is covered by the C.G.S. warranty for one full year.

CGS Aviation
4252 Pearl Road
Cleveland, OH



Dear Editor:

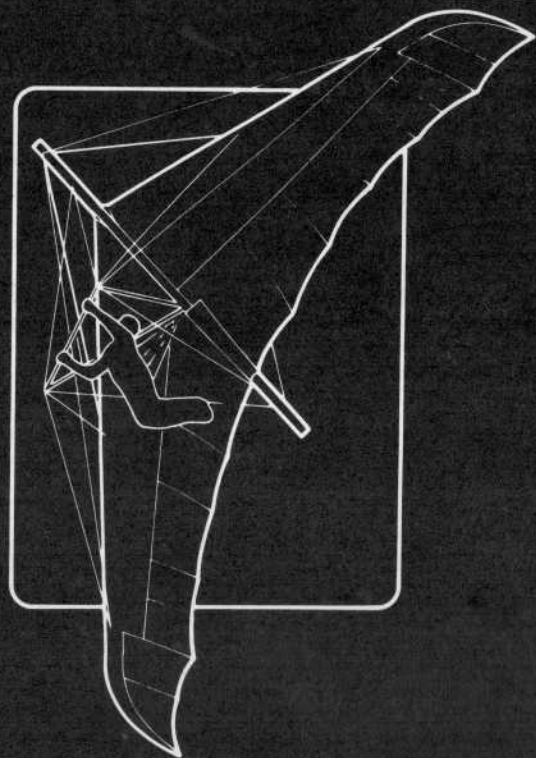
DKG Trike

Doc's Kites and Gliders of Ohio is entering production on their Yamaha powered trike. Featuring a light weight carriage modified from several successful British designs, the DKG Trike also offers optional brakes and Cylinder Head Temperature gauge (CHT).

The unit will sell factory-direct for about \$1500.00 and should be available with the popular 98 cc 15 hp Yamaha engine by mid-summer. It does not exhibit the yaw tendency found on many trike configurations.

The DKG Trike was successfully flown against Quicksilvers and Pterodactyls in the recent Sequatchie Valley "Four Legged Ultralight Race" in Tennessee powered by the tiny MAC101.

For more information, write or call:
Doc's Kites and Gliders
305 S. Maple
Marysville, OH 43040
513/644-4588 after 10 pm till 1 am



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FORUM



ONE ON ONE

Eipper, the leader in ultralight manufacturers, is now gaining mass media exposure under the wing of the world's No. One Recognized Logo, Coca Cola. These shots were taken at the second Mello Yello Sky Show, in Chattanooga, Tennessee. The series has also been to San Antonio, Birmingham, Philadelphia, and is going to three cities in the Carolinas before the end of August. Crowds viewing the

ultralight pylon race range from 20,000 to 80,000 in Pennsylvania. A great deal of radio, TV, and newspaper coverage plus store displays and Coke truck advertisements present the Eipper name to a hungry public (or should we say thirsty?). The shows utilize Quicksilvers exclusively and a pair of Cuyuna powered DoubleQuicks fly the Coca Cola logo as well as Mello Yello colors and logo.

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COMING NEXT ISSUE

Whole Air Reader Statement

"Statistics" reports the full results of our May/June survey on what you reader/pilots desire in changes for ultralight aircrafts.

The Pilot's Point
of View
at EAA's Oshkosh 81
convention.

Deployment Seminar
A real environment deployment seminar using the cable flight simulator at Crystal Flight Resort. Figures and narrative from Director, Chuck Toth.

Air-to-air
Our preliminary how-to report on the newest ultralight elevator.

Pilot Report
Whole Air flies and evaluates the Flight Designs Demon.

and much more.

Don't miss the
September/October
WHOLE AIR

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Order form on page 38 or use free reply mail Reader Response Card. [Also fill out the survey seen on the Reader Card.]

FORUM



Dear Editor:

I'd love to do a sites article for you, but, all the areas where we fly are unsanctioned with just enough permission to fly. Because there are so few of us no one has pitched a bitch yet. We've been banned from landing on one public beach already.

There are only two of us flying on St. Thomas, two on Tortola, B.V.I., maybe five on St. Croix and two on St. John.

We have some good and bad sites on all of these islands, the best is Peter Island, B.V.I., a mile long 500 ft. ridge facing directly into the prevailing easterlies. Almost all landings are on beaches and all take offs are from remote woods and brush on mountains and hilltops.

Mountain Top, on St. Thomas is a 1,450 ft. take off, the highest, and one to three hour flights are common at several sites. Very little thermaling and

mostly all ridge lift is the norm because ridges usually border water.

Most all of us are flying new equipment such as a Sensor, Ravens, a Sir-roco, a Harrier, a guy in St. Croix just ordered a Comet, and there are a couple of Condors with a 78 Bennett Marriah still around. Chutes, double hang loops, helmets and protective clothing everyone wears with three to ten years experience.

There is an USHGA instructor, observer on St. John, four Hang 4's, two Hang 3's with a few beginners, Hang 1 and 2.

Shipping equipment and parts down is a frustration and it's an expensive place to stay, but for flying hang gliders the Virgin Islands are for the most part very much virgins. Most of the natives still think it's magic.

Jack N. Walter
St. Thomas, U.S.V.I.
P.S. Yes, it is beautiful.

THE METEOR

FROM US MOYES: A NEW STAR ON THE HORIZON



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at Mt. Buffalo XC

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Photos by Hank Syjut

BLUEBOOK

These prices are designed to be guidelines for evaluating your glider or one you wish to buy. We do not intend for these figures to be considered the final authority. Consult your local qualified dealer.

Manufacturer	Year Model	Size	Clean Price	Avg. Price	Manufacturer	Year Model	Size	Clean Price	Avg. Price				
BENNETT DELTA WING	77 Phoenix 6C	Jr.	550	450	SEAGULL AIRCRAFT	77 Seahawk	170	550	450				
	77 Phoenix 6C	Sr.	425	400		77 Seahawk	190	550	450				
	77 Phoenix 6C	Reg.	500	425		77 10.5 Meter	—	625	525				
	77 Phoenix 8	Reg.	650	375		78 Seahawk	170	675	525				
	78 Phoenix 8 Super	Reg.	675	450		78 Seahawk	190	675	525				
	78 Phoenix 12	Reg.	650	525		78 10 Meter	—	825	750				
	79 Phoenix 6D	185	800	650		78 10.5 Meter	—	825	750				
	79 Lazor	190	900	775		79 Seahawk	180	950	625				
	80 Phoenix 6D	215	1075	775		79 10 Meter	—	975	700				
	80 Lazor II	175	1075	875		79 11 Meter	—	975	700				
OGS AIRCRAFT	77 Falcon V	185	650	500	80 11 Meter	—	1000	850	SKY SPORTS	77 Bobcat III	Lg	675	600
	77 Falcon V	220	600	475	77 Merlin	160	600	500		77 Sirocco I	156	600	475
	78 Falcon 5½	Med.	750	625	77 Sirocco I	175	575	400		78 Osprey	175	700	525
	79 Falcon 8	Med	900	800	78 Sirocco II	164	257	600		79 Eaglet	191	550	425
EIPPER FORMANCE	77 Flexi II	185	525	475	79 Osprey 2	175	625	550	79 Sirocco III	189	950	725	
	77 Flexi III	185	575	500	ULTRALITE PRODUCTS	77 Firefly	174	650	500				
	77 Cumulus 10	Med.	550	525		77 Dragonfly Mk. II	196	700	550				
	78 Flexi III	Lg.	700	600		78 Firefly	154	800	700				
	78 Cumulus 10	Med.	675	500		78 Spyder	176	850	675				
	78 Antares	Med.	875	600		78 Condor	178	900	775				
	79 Antares	Med.	875	600		79 Mosquito	166	1200	850				
79 Antares	Lg.	925	675	80 Firefly 2B		181	975	700					
ELECTRA FLYER	77 Cirrus	3	600	400	WILLS WINGS	77 SST	100C	625	575				
	77 Cirrus	2	500	300		77 SST	100B	625	550				
	77 Olympus	160	575	525		77 Universal	100A	525	500				
	78 Cirrus 5	C	600	475		77 X-C	185	600	550				
	78 Cirrus 5	A	600	500		78 SST	100C	700	650				
	78 Olympus	160	625	555		78 Alpha	185	825	775				
	78 Olympus	180	625	550		78 Alpha	215	825	775				
	79 Dove	A	800	575		78 X-C	215	800	775				
	79 Trainer	—	400	400		79 Alpha	185	950	750				
	79 Cirrus 5	A	650	625		79 Alpha	215	1000	850				
79 Olympus	160	725	650	79 Omega	220	1000	875						
79 Floater	205	900	675	79 Omni	187	975	825						
FLIGHT DESIGNS	79 Lancer	190	900	675	79 Raven	209	1075	875					
	80 Lancer	175	1000	900	80 Raven	209	1225	975					
MANTA PRODUCTS	79 Fledge	IIB	1200	1000	80 Raven	229	1200	975					
MOYES DELTA WING	77 Maxi I	200	700	625	AMERICAN AEROLIGHT	80 Twin Eagle	—	3400	3100				
	78 Maxi II	200	925	775		EIPPER MICROLIGHT	80 Quicksilver	CM	3450	3125			
	79 Maxi III	200	975	850									
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Photo: Tim Finnigan
Pilot: Chris Smith



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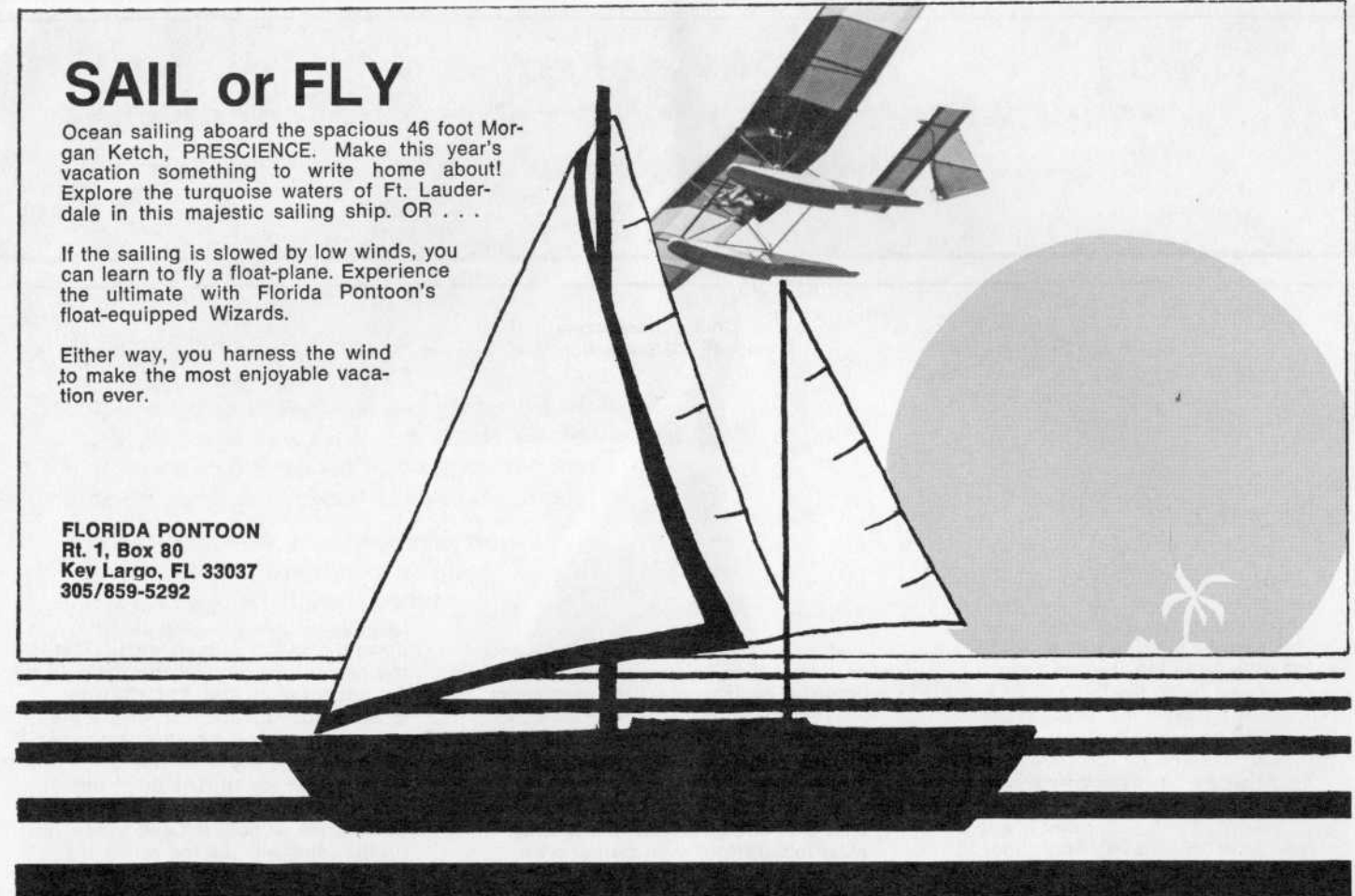
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MOTORIZED

Chuck Slusarczyk
President, CGS Aviation, Inc.

This month I'm going to deal with some of the little tricks I've learned about building and flying the EASY RISER. Since it is probably the most popular of the build-it-yourself ultralights these hints can save time and trouble.

As far as the basic airframe is concerned, the "Easy" is very strong. However, you must remember that it was originally designed as a hang glider. With the addition of power plants, landing gear, etc., a few little changes won't hurt.

One of the things we do here at C.G.S. Aviation Inc. is to install additional compression ribs outboard of the two original ribs. These provide additional drag, anti-drag strength. Since many of us are flying at higher cruise speeds the drag forces are increased. I first noticed it on my "Easy" by a slight wrinkling of my fabric at speeds over 45 mph. In flight the drag forces are trying to sweep the wing backwards (drag) in landings and roll-outs the inertia tries to bend the wing forward (anti-drag). We also add a 3' sleeve to the lower wing trailing edge at the hang cage. This spreads the landing loads and taxi loads (especially on rough terrain) over a larger area. While taxiing on rough ground the wing flexes up and down. The gussets at the hang cage are very stiff. The trailing edge will want to bend at the point where it emerges from the hang tube gussets. By sleeving this area a more gradual transition of section occurs. The sleeving MUST go under the gussets and extend to the bend. If you butt the sleeve next to the gusset a very dangerous condition will exist. We also use 3/32" cable for landing wires and heavy duty brackets for the inner struts. The 1/16" cables are more than sufficient for flight loads. But since more people are using landing gear now the bouncing around on the ground can cause the 1/16" cables to stretch. Wrap some black tape around the landing and flying wires where they cross. Vibration will not cause them to rub against each other and possibly wear.

More people are painting their Risers now more than before because of more powerful engines and increased thrust. But remember when adding paint that most of the wing area is aft of the C.G. therefore, the more paint you add the further aft will be the C.G., that is the ship will be tail heavy. If you are a light pilot with a large engine and a fancy paint job, it might even be necessary to add some ballast to the nose in order to establish the proper C. G. One fellow filled his nose wheel with water to do this and it worked well. If you have an aft C.G. or tail heavy condition don't try to remedy it by using engine thrust. Although you can achieve a trim condition under certain power settings however, when you reduce the power to idle you will still have an out of trim C.G. Therefore adjust an aft C.G. with **weight**. Do this by moving your seat forward or adding some ballast to the nose. Adjust power induced trim changes by raising or lowering the engine and/or changing the tilt of the thrust line. An aft C.G. is a dangerous situation on any flying machine. It makes no difference if it's a Boeing 747 or an Easy Riser.

Be sure to rib stitch your fabric to your wings, it doesn't take long to do and it is cheap insurance. If you don't know how to do it UFM of California has rib stitch kits complete with instructions. If you see an Easy Riser that does not have rib stitching, do us and the owner a favor. Inform the owner of the importance of this procedure.

If while flying, your Easy Riser has a tendency to turn left or right and you must continually correct for it, trim adjustments are in order. This turning can be caused by many things. For example, washout being different on the wings; rudders not adjusted properly; more paint on one set of wings; fabric tighter on one side. To check washout without a jig, walk about 30-40' in front of your wing. Raise or lower your head so your line of sight is

down the middle of both wings. That is, the center line from front to back. Check the bottom wing, then the top. Now looking straight back you will see the under surface of the bottom wing near the hang cage and a portion of the upper surface near the tip. The point where this transition occurs should be in the same place on both left and right wings. Do the same with the top wings. If a discrepancy is present this can be the cause of the plane turning. This difference can be taken out by rerigging some cables. Another method is to lengthen or shorten the out board diagonal struts, to increase or decrease the washout angle slightly. If one wing has more washout than the other. The best rule of thumb is to increase the washout on the side that is lacking rather than removing washout from the wing with more. If the washout is OK and the ship still turns you may have to adjust the control cable leading to the draggers. If the wing turns right for example tighten the left dragger cable slightly to correct. While flying, note position of twist grip and amount of control required to fly straight. Then after landing have someone hold twist grip in that position and observe amount of dragger deflection. If not an excessive amount, adjust control cable to hold that amount when twist grip is in a neutral position and against stop. If the amount of deflection is excessive it is best to find out why. Usually it's the washout.

One quick note when doping the conventional dacron fabric: The first coat should be very wet. That is use a lot of thinner per amount of dope. Usually 75% thinner. Dacron is very smooth and the dope must penetrate the fabric thoroughly in order to obtain a good grip. If the dope settles just on the top of the cloth it will eventually peel off.

Guess that about does it for this issue, if you have any suggestions for a topic, just let me know. So 'til next time, Fly Safe

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MANBIRDS

MANBIRDS is a new book. To say it was ten years in the making could be in error by eight to eighty or more years.

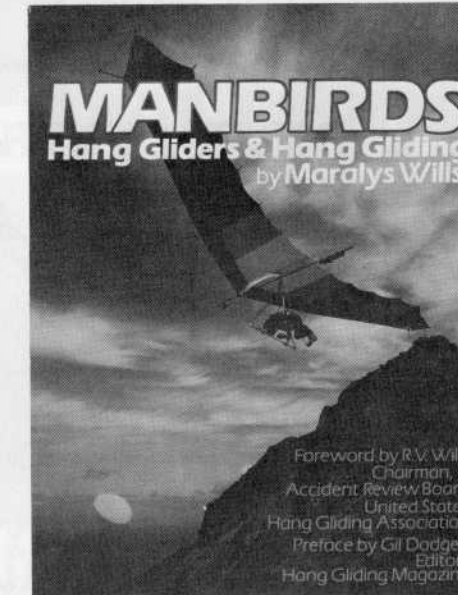
Maralys Wills has been busy with MANBIRDS for better than two years. But that is the actual collecting of notes, and the writing of completed sections. Calling the newest book on hang gliding a ten year project is really quite precise as it thoroughly covers those formative years of the sport. For as husband R.V. Wills put it in his foreward, "...hang gliding has come of age in less than a decade. Anything prior was essentially experimentation and adventure."

Actually MANBIRDS is organized in three sections. The first 148 pages is a review of the ultralight sport from the earliest notions of flight far pre-dating da Vinci to the newest gliders of the 1980's.

If you are familiar with hang glider history, you **should** find yourself saying, "I know him," or "I was there when that happened." Maralys includes it all and leaves out virtually no one in her coverage of the more modern history. Even if you are a veteran, it is **likely** that you will ponder, "So that's how that turned out..." MANBIRDS is the hands-down, triumphant winner of the Complete History Award.

Not only is the written word presented completely, but the style (*even the typeface*) is pleasant to read, the sections broken by high quality pictures and catchy sub-titles. Nine beautiful color photographs enhance the effort. A **textbook it is not**. Again, to those familiar, some vintage shots of early craft will revive a flood of memories.

Why deliberate on what the old-timer thinks? Well, the sport has stunning appeal to the recently converted enthusiast. All writing is scoured thoroughly, and this book will do much better than satisfy that unsatiable novice appetite. When a new hang gliding book can hold the "veteran," however, it has passed an acid test indeed. So, if you know-it-all, you can



revel in this fresh new presentation of the many bits and pieces. If you are new, a learning experience awaits you.

This is especially so in Book Two, the second section written by the author's son, Chris Wills. Titled "The Education of a Hang Glider Pilot," this forty-four page compilation is a quite inclusive learn-to-fly section. Chris Wills has rather a way with the pen, as proven by his humorous description of an experience — the making of the "Sky Rider" film.

If you did not see the serialization of this fascinating bit of writing in HANG GLIDING magazine, you have a second chance; look at pages 83-95.

Chris uses his able writing technique in the flight lesson section. While it is certainly no substitute for professional instructions, the beginning enthusiast may find a very helpful resource here.

The final section or Book is entitled, "The Hang Glider Pilot's Baedeker." What's a Baedeker? The dictionary defines it loosely as "a guidebook." The

listing represents the single most comprehensive collection of hang glider contest results ever written. Review by veteran or novice will prove an interesting endeavor. Official World Records are also detailed forming a salient recognition of many efforts by George Worthington, and two marks held by Page Pfeiffer.

Next in Book Three you will be given a top reference list for all hang gliding books, publications, associations, USHGA chapter clubs, plus retailing dealers and flight schools, manufacturers, and flying sites.

In these last two sections you will also find what represent the shortcomings of MANBIRDS.

Artwork for the learn-to-fly section is disappointingly below par. Attempts by artist Joe Linton are adequately descriptive, but are not nearly what might have been created by many talented people within the sport. We wonder if it was not a last minute project; unfortunately, that is how it looks.

Another task which is less than perfect is a very difficult one. The list of schools and dealerships changes daily or oftener, and can very likely **not ever** be listed both fully and accurately. The compilation in MANBIRDS comes from the one seen in HANG GLIDING. The new enthusiast looking for a place to buy or learn will find all the main shops but may perhaps be led astray by many businesses which have long since gone.

All in all, MANBIRDS justifies its \$17.95 price. It is available only in hardbound, but it such a fine achievement, both in writing and recording history, that every veteran and novice should have it proudly displayed on the living room bookshelf.

Thank you Maralys for toil and tears in making this book a reality. MANBIRDS is worth owning, reading and re-reading.

—Dan Johnson



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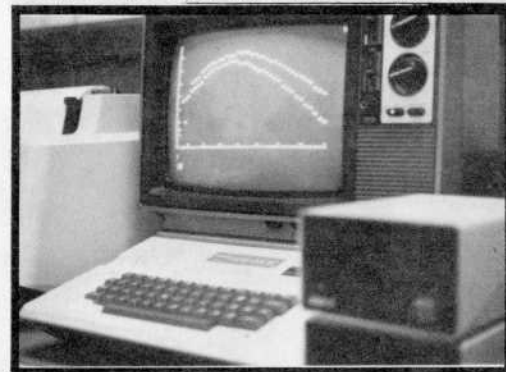
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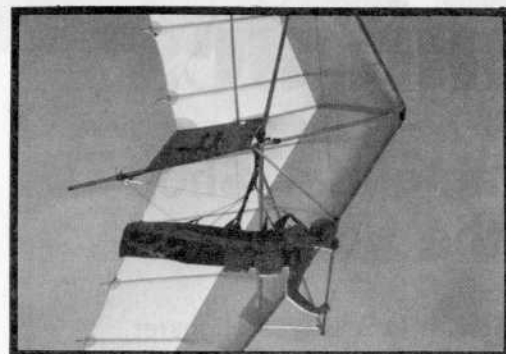
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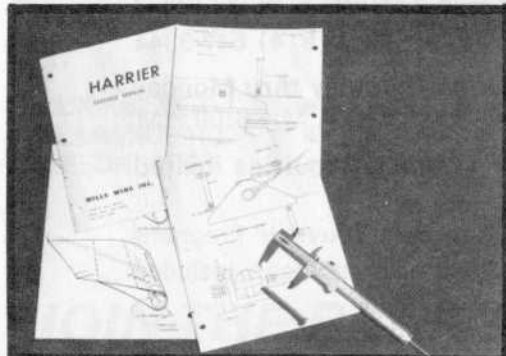
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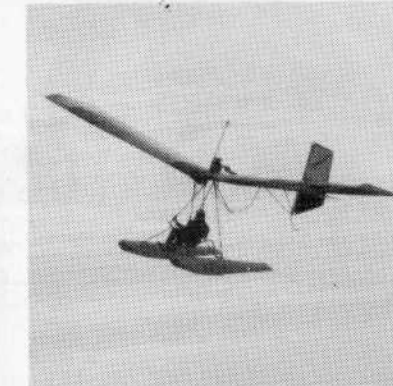
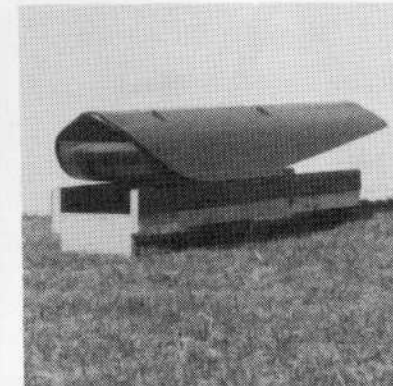
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1981 NATIONALS

SLIDE MTN., NV

by Gary Wood
Photos by Gary Wood

Despite Jim Lee's incredible 168 mile flight in New Mexico, the 100 miler still remains a magic mark in the minds of cross country pilots. Until this year, the only flights that far have originated in the Owens Valley. Lately, however, it is the firm conviction of pilots all over the country that this magic mark can be achieved closed to home.

Northeastern fliers are looking to their end of Striedeck's ridge through Pennsylvania where Carl Striedeck went 1000 miles in a sailplane. Pilots around Chattanooga feel that the Sequatchie Valley holds promise. Chris Price proved the potential of the Steens Mountains in Oregon years ago. Pilots competing in the 1st Southern California Cross-Country competition are convinced they'll see more than one.

Another area in the country could be the site of several 100 mile flights this summer, Slide Mountain, Nevada, site of this year's Blue Stratos/USHGA Nationals hang gliding championships.

Located on the east side of the Sierra Nevadas, Slide Mountain heats up pretty early in the day, allowing pilots all day to get up and go. Local pilots have been logging 50+ miles and feel that with proper preparation they could have gone much, much further.

Slide's elevation is 8200 ASL with a vertical descent of 3200 feet to the primary landing area which is about 5000 ASL. With a distance of 2.5 miles to the primary landing area, and a 5:1 glide, there is rarely any difficulty reaching it. The difficulty is which way to go at 14,000 ASL.

The road to the top is a paved highway and the normal landing area is a tromped down sagebrush field right next to Highway 395. Associated with any good lift is turbulence, and Slide Mountain has its share. Although Slide is not a regulated site, I would say one should be a Hang III or the equivalent to fly here in good conditions. Usually the west wind comes up every afternoon in the summer, but this hasn't seemed to bother Keith Nichols, USHGA Competition Co-ordinator. With a punc-

tually run meet and launches starting around 9:00 AM, Slide should produce the best Nationals yet.

Good flying isn't all the Reno/Carson City, Lake Tahoe areas to offer. Typically, casinos and entertainment abound all in a tight little rectangle of cities. Twenty-four hours of wining, dining and gambling and the most popular, just watching other people.

For those not into city lights, the area is where the mountains meet the desert. Spectacular sunrises and sunsets, hot springs, mountain trails, etc. For Slide Mountain pilots, there is Davis Creek Park camp ground, an excellent facility available on a first come, first serve basis, 3 day maximum. It's within walking distance from the Slide Mountain landing area.

For those into traveling a little, Reno is only 3-4 hours from the Owens Valley and Yosemite Park.

The Nevada National Guard has offered a medivac helicopter and commode accommodations, students and pilots from High Sierra Hang Gliders have offered any and all help as far as wind dummies, concessions, parking cars, whatever. Opening day, there will be aerobatic pilot demonstrations, parachuting, parachuting from hot air balloons, and possibly a fighter squadron flying over from the Nevada Air Guard.

So thanks to the major sponsorship of Blue Stratos men fragrances we expect a well-run, well-planned National Championship in an exciting area. Washoe County, which includes Slide Mountain, is working very hard to provide permits and clearances. The Chamber of Commerces of both Reno and Carson City are planning to publicize it heavily.

The owners of both the launch and landing areas have given the green light, and to top it all off, it looks like NBC's Sportsworld will cover the Championships.

Plan your vacation and come to Reno August 22 thru the 30th. Watch the top pilots compete for the crown of National Champion and a berth on the U.S. team headed for Japan. Contact the Nationals committee, High Sierra Hang Gliders, Box 865, Carson City Nevada 89701 for more information.

See you there!

"IF YOU'VE GOT IT..FLOAT IT!"

by Dan Johnson

Continuing in the WHOLE AIR tradition of reviewing hardware we look at ultralight floatation equipment in this issue.

A phrase caught me over a year ago when floats for ultralights really began to pick up energy. "There are 150 lakes for every airport in this country," Jack Hutchinson claimed. And while most airports are not suitable for ultralights due to traffic or the need for radios, et cetera, most lakes are wide open for floatplane flying.

Wide open is such a fitting description, that many areas of America can substitute lakes or wide rivers for the open land areas more common in the west. This makes lakes or rivers excellent for training purposes. That's important.

To the accomplished ultralight pilot for whom huge uncluttered areas are no longer mandatory, floats offer a superb way to vent summer's heat. Since we put floats on our Quicksilvers in Chattanooga, we have not reinstalled the wheels once.

The appeal is powerful, indeed. A frustrating late spring-early summer, insofar as good hang glider soaring, has brought out many pilots to floatplane flight. Those who have not yet flown see the simplicity of water-borne training. I think it is one of the most attractive things to occur in ultralighting. The number of float ads appearing in the media is threatening to catch the number of crafts being presented.

All right, let's say you are swayed by the sales pitch, or were already turned on by floatation equipment, what product would you buy? All floats are not created equally.

WHOLE AIR looked into the two basic styles, marketed by the two original leaders of ultralight float equipment. Among the several other firms jumping on the band wagon, basically you find variations of the products from Ultralite—the Ultrafloats, and from Florida Pontoon—the glass floats. Which is best for you?

General Characteristics

Ultrafloats — Florida Pontoons

1. Are virtually unsinkable, so long as you remain in the pilot's seat.
2. Can hold an adult sitting astride each float, plus pilot, and can still taxi.
3. Offer training safety factors.
4. Usable in great many places as there are 150 lakes per U.S. airport.
5. Presents a wonderful, natural way to beat summer heat.
6. More stable in air, slowing the roll rate only slightly.
7. Possess weather-vaning tendency which is very strong; helps determine exact take-off direction.
8. Landings are so easy, you must practice an accurate touchdown so as not to be lulled into complacency.
9. Once back on water, braking action is fast and automatic, but very smooth.
10. Can create a "euphoria" which generally invites carelessness. Must be deliberately overcome. It's almost too easy, but that is a rare problem.



ULTRAFLOATS

Ultimate Ultralites is the oldest continuing manufacturer of the ultralight float system. Based in Orlando, Florida, they now have a continuous backlog of orders. They have also worked out many problems and treat their enterprise as a real business. Three weeks before I needed the Ultrafloats, I requested they be in Chattanooga by June 1st. They came June 2nd. Packed properly, the literature which accompanied them was well composed and very informative. The hardware adapted perfectly thereby offering an instant option. Company president, Don Roberson, was as helpful as his firm's approach was professional.

The Ultrafloats are carved from a solid block of styrofoam (just like drinking cups) covered in lamination by a polyethylene skin. The bottoms are further protected and made slippery by a very thin aluminum plate. They are 9 feet 7 inches long, 23 inches at the widest point, and weigh 21 and a half pounds each without hardware. Their profile shape is as shown in their logo. (See ad, page 25). The bottoms are flat, and with 170 pound pilot in a Yamaha powered Quicksilver, drew less than two inches of water (displacement). Each float is capable of floating 700 pounds!

The Ultimate Ultralite floats are extremely easy to use in calm to mildly active water. Technique for take off involves full power, push back (or back stick) to maximum tail down till the craft begins to climb "on step" (very simply, the forward half of the float, which has the greatest depth, thereby removing most of the float from the water). Once on step, which is easily ascertained by the forward movement of what I will call the "splash point" on the floats, pull forward (stick forward) to gain rotation speed. After this point, use normal take-off technique.

Landings are accomplished pretty much like conventional wheeled efforts except the need for a full flare is not so essential. Braking in the water is dramatic in its effectiveness.

Taxiing, while different, is also very straight-forward. One tip is that to make the tightest turn at low taxi speeds, you can suck both feet in the water on the float side to which you are turning. A last thought is that in stronger winds (over 10 mph), downwind taxi turns require a great deal of rudder blast, if in fact, this works at all.

In rough water (one foot waves or more) or in strong, especially laminar air, the Ultrafloats are not comfortable. Most pilots follow a low-wind rule for all ultralight activity and, if so, this weakness will never be a problem.



FLORIDA PONTOONS

Donn Noble is the head man of this Key Largo, Florida based company. He advertises the first ultralight seaplane base anywhere (see his ads, pages 17 and 33). He also operates a marina, and is thereby well experienced and equipped to be in the float and floatplane business. Noble's literature is non-existent but in our case he admirably made up for that by traveling to Chattanooga to deliver his float set, to make the installation himself, and to teach us how to fly the floats. Further he remained very objective in the effort of evaluating his floats with those from Ultimate Ultralites.

We used a set of Florida Pontoon's fiberglass floats, but mid-summer production will switch to Kevlar, the tough ballistic cloth from DuPont. This fabric is dense enough to resist an impact of a .357 magnum shell at point blank range, it is said. This exterior, or the fiberglass bring much less handling damage than the Ultrafloats. (Note: the Ultrafloats have never shown any damage while in the water, taking abuse only in transport and handling).

Noble makes his hull shapes in two molded pieces. The upper half looks as you might expect (see photos), but the lower half illustrates a distinct hull-shape. Donn calls it a cathedral hull with chines. While that may sound like a Sunday morning church, the action in the water is very boat-like and much different than the Ultrafloats.

Once the fiberglass/Kevlar hulls are formed, they are glued at the joint, which is then concealed by a mylar-coated

chromium trim. Each molded half is a complimentary color and the exterior has a gel coat to protect it from ultraviolet rays. Finally the 11-foot-long floats are filled with urethane foam via a port at the rear. When expansion has occurred and the bonding process finished, the heavier urethane will absorb only 1/10% by volume (compared to 17% for styrofoam which weighs half as much). Florida Pontoons weigh 27 3/4 pounds each, without mounting hardware. They measure 17 inches at the widest point, giving a smaller frontal area than the Ultrafloats, which decreases drag significantly. Noble claims as much as 16 miles an hour more top speed with his floats mounted on a Hummingbird.

Taking off in the Florida Pontoon glass floats is virtually identical to the Ultrafloats, except that it takes longer due to the greater draw of this system (deeper in water). So landings are about the same as well, except braking is even greater.

Taxiing also mirrors the technique employed with the Ultrafloats, but at higher taxi speeds, more differences are evident. The Florida Pontoon floats track significantly better than the flat-bottomed Ultrafloats. In fact, when airborne with only one float in the water, you can still maintain a constant heading, or you can turn, while feeling totally in control.

COMPARISON

What looked like very different floats at first later became very similar. But as more time was accumulated, differences once again became more evident.

For a pilot with a few hours experience who will largely fly his seaplane on inland

lakes or rivers in generally mild conditions, the Ultrafloats will make the best choice. You will have to handle the floats very gingerly once they are out of the water (not flying) as they can sustain abrasive or puncturing damage easily. But if you want to fly out of the water easily, the extra high flotation capability and flat hulls of the Ultrafloats will give superior performance.

If you are just learning on floats, or if you are in training, or giving training, we found the Florida Pontoon Co. floats to be better as they leave the water more slowly and smoothly. They also track better in crosswinds, deal with a single-float-in-the-water situation better, and are more resistant to user handling abuse. That they offer more speed and look more like boats and hulls, may give them more appeal to some intermediate/advanced pilots. Commercial users (like schools) are recommended to use glass floats so they are not taken out of service due to damage.

The Ultrafloats are less expensive (\$700, plus \$100 for hardware) than the Florida Pontoon floats (\$985, complete) and install much more quickly. Their lighter weight makes foot launching (?) more accessible, though we never got any desire to attempt it. Delivery time is frequently very important to an expectant pilot and, if so, the Ultrafloat people can probably deliver sooner, as their construction is simpler and more established.

The glass floats will offer much greater success in rougher water (up to 2 1/2 foot waves Noble says) and stronger winds (15 mph is no problem, in or out of the water). Rocky beaches, in-water obstructions, and

handling abuses will not deleteriously affect the Florida Pontoon Co. floats. Their delivery is rather sluggish but will improve dramatically once the Kevlar is introduced, due to multiple molds.

SUMMARY

Both companies are to be commended for presenting fine float systems which reflect the environments of each firm. Both have invested a great deal of research and development not to mention money and perspiration. Neither is a copy of anyone else's floats, but more likely, the imitated products. As an option, \$1000, or so is a lot to add to an ultralight retailing for \$3500. to \$4500. But the attraction of a floatplane is nearly unforgetable once an hour of skimming, splashing, take-off and landing, and overall fun is registered in your logbook. Cross-country flights via rivers or other waterways is a notion with terrific potential for enjoyment. I know those of us involved with this evaluation are star-struck with float-appeal and we think it is a very contagious feeling. We invite you to contact either company and "do it in the water!"

Ultimate Ultralites and Float Corporation
4700 Parkway Commerce Blvd.
Orlando, FL 32804
305/298-5010
Don Roberson

Florida Pontoon Co. and
Ultralight Seaplane Base
Route 1, Box 80
Key Largo, FL 33037
305/852-9183
Donn Noble

QUICK REFERENCE COMPARISON CHART

ADVANTAGES

Florida Pontons

- Less problem in winds for beginners
- Aesthetically more pleasing
- Faster airspeeds/ less drag
- Tighter feel due to stronger hardware
- Much tougher exterior
- Hardly affected by "chop"
- More expensive but probably worth it

Better directional stability

Ultrafloats

- On step easier
- Simpler, less hardware
- Faster installation
- Good delivery time
- Out of water faster and easier
- Lighter weight
- Less roll interference (faster response)
- Nicely prepared literature

DISADVANTAGES

Florida Pontons

- Slower lifting off
- Heavier pilot needs more power
- Longer production time (delivery lag)
- More hardware employed
- Nose strut connection is "dirty"
- No literature at present

Ultrafloats

- Hardware feels looser, sloppier
- Slide sideways in water, edge can catch
- Damage more easily
- Polyethylene skins can delaminate
- Slightly cheaper and seem so
- Will generally wear faster

AND THEY SAID IT COULDN'T BE DONE!



Since the beginning of the powered ultralight (hang glider) aviation movement, one voice has been consistent in its conviction to produce efficient and innovative power units for ultralight aircraft. That voice is from CGS Aviation.

Through the past five years, Chuck Slusarczyk, founder and chairman of CGS Aviation, has proclaimed reduction units as the most efficient system to get the ultralight industry off its feet and into the air... fast. He endured considerable opposition at first, but as the industry grew and flourished, more and more manufacturers turned to reduction for their power. Now, nearly 90% of all ultralights utilize this form of power system.

Chuck's educated intuition in design and engineering is second only to his perceptive view of the blossoming ultralight

industry. After three years of patient persistence, patent No. 4262863 has been granted to Chuck. This patent reflects the effective utilization of a reduction unit mounted on an ultralight (hang glider) aircraft. Everyone said it couldn't be done. But it was.

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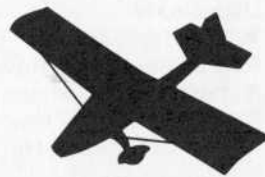
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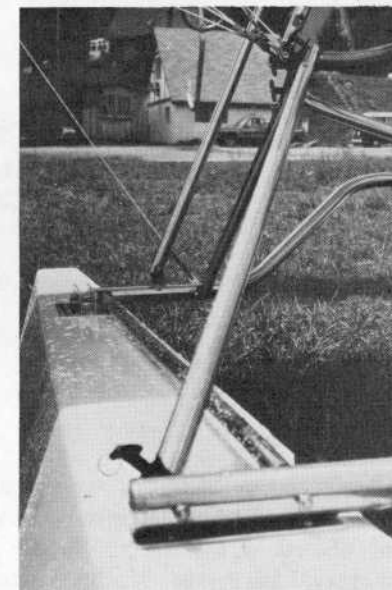
meaning rough jagged beaches, winds over ten mph and choppy water conditions (up to 2½ foot waves), then you need all the benefits that have been built into the Florida Pontoon Company floats. They were designed to give exceptional stability due to the deep keel, cathedral hull, full chines and a venturi section behind the step, which make them very stable even in cross wind conditions. The features allow for more favorable and forgiving control on take-off and landing, and are particularly needed by amateur sea-plane pilots.

Having been designed for these adverse conditions, they perform well in calm water and still air also. Amateur and expert alike will find the Florida Pontoon Company floats to offer superior performance. In actual practice, the expert will enjoy a much wider usable speed range from the Florida Pontoon Company floats.

Upon evaluating your own conditions, and finding that you need a sturdy, strong floatation system, be assured that the Florida Pontoon Company offers the finest floats available to the ultralight aircraft industry. Because of our continuing development program, some future innovations will include "bullet proof" DuPont Kevlar™, one of the strongest fibers in the world and an amphibious system, to give more versatility to your ultralight flying pleasures.

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PARIS AIR SHOW

By John Lasko

Paris, the city of lights, a place where you can get lost in the massive cobwebs of ancient architecture, history and fantasy. I ask myself, "Is this for real?" I mean me, an old hang glider pilot turned microlight pilot, here with fellow Eipper Formance colleagues, Tina Trefethen and Larry Cook, mingling with the big time, heavy hitters of aviation? Here we are demonstrating our Quicksilvers right alongside the latest in military and commercial aircraft from Rockwell, Northrop, General Dynamics, McDonnell-Douglas, Aerospatiale, Messerschmidt, and Fokker, among others, stirring up as much excitement as any of the hotshot pilots from these other companies.

It all started last November when I contacted the Department of Commerce in Washington, D.C. for Eipper Formance to have a display in the U.S. Pavillion at the Paris Air Show. When I described our product to them, they thought I was joking. A dozen phone calls later, they realized we were for real and helped us make the arrangements for our exhibit.

As time passed and communications between Eipper and the Department of Commerce increased, they became more and more interested in our Quicksilvers. This led to an invitation to give a talk about microlight aviation at a major press conference for the Paris show at the U.S. Embassy in Paris during April. They requested I bring a Quicksilver to display at the press conference. There were four other people scheduled to speak, one of whom was Mr. B. J. Long of Rockwell International to lecture on the space



As you might expect, I was a little nervous speaking in front of various diplomats and radio, television and print journalists. My butterflies were compounded by a delayed flight which caused me to arrive at the embassy just as they were announcing that I would not make it. Before I had time to catch my breath, we discovered the soundtrack on my videotape would not play on their machine. At that point, I trashed my specially prepared speech and "winged it." It went over so well and the reporters asked so many questions, that the embassy staff interrupted so Mr. Long could give his talk about the space shuttle. From then on, the going got easier with my next stop being the 1981 Paris Air Show!

When you first arrive at Le Bourget Airport in Paris, you might think you are driving down embassy row. Countries from around the globe are here displaying their wares inside brightly painted buildings. One street was lined with flags from every country.

After setting up our booth inside the U.S. Pavillion (Eipper was the only microlight manufacturer to have a display there) we joined the microlight manufacturers at the outside display area. Eipper also had the privilege of putting a Quicksilver MX in front of the main entrance of the U.S. Pavillion next to a three story photo mural of the space shuttle blasting off. The regular microlight display was located in aircraft parking area, surrounded by various commercial airliners.

During the course of the show, there were 15 to 20 microlights on display and most very anxious to perform. For the first three days of the show, we were allowed to fly only after the main air show was over. It was the first time microlights had flown at Paris and I guess the air show officials wanted to observe us while there were not many spectators around.

With the help of my dynamic partner, Tina Trefethen, and Eipper's Chairman of the Board, Larry Cook, we persuaded Air Show Director, Francis Plassier to let us fly in the regularly scheduled Air Show. Fortunately, we had brought our radio gear as we were required to stay in contact with the tower just as any other pilot.

Here I was at last -- on the taxi way,

engine revving, waiting for final clearance to go. As an F-18 Hornet landed, we got our go ahead. My heart rate climbed faster than my Quicksilver MX as we took off in front of 50,000 people for a four minute formation routine. For the first 30 seconds, it was great -- climbing out over the field and looking over all the people and planes. The next 3½ minutes was clouded (literally) as a rainstorm swept in on us. We managed to complete our show and the Air Show Director was so impressed, he gave us another time slot in the show later that day. He also requested permission to fly our Quicksilver MX that evening after the Show.

"Hold all air traffic for 15 minutes," was the call (Air Show Director) Mr. Plassier radioed when he was ready to fly. It was an impressive show of authority. The entire airport shut down for his impending flight.

"Oui, oui, everything is A-OK," was all we heard over our radios. I think he enjoyed himself (flying the microlight).

"Hold all air traffic for 15 minutes," was the call Mr. Plassier radioed when he was ready to fly. It was an impressive show of authority. The entire airport shut down for his impending flight. We hooked him up with our radio gear and after five minutes ground instruction, he was off. He was just supposed to taxi since a 10-12 knot breeze was blowing. Unfortunately, as he was a very experienced pilot, he decided to put the 'pedal to the metal' and go for it. Our hearts cringed as he blasted off. "Oui,

oui, everything is A-OK," was all we heard over our radios. I think he enjoyed himself.

From this point on, things could not have been more exciting. We were given great time slots in the main show every day as well as flying with the other microlights at the end of the day. Larry, Tina, Lucky Campbell and I were guests at a \$150.00 a plate luncheon in Mr. Plassier's private chalet.

As the show progressed, we got to know many of the top pilots and officials from some companies as Rockwell, McDonnell-Douglas and General Dynamics, to name a few, and did not need the required invitations to enter their private chalets. Tina was interviewed by CBS radio with space shuttle astronauts, Robert Crippen and John Young. Crippen said he would like to fly a Quick but Young preferred to stick with more substantial airplanes. Boy, does he realize what he is missing? Senator Barry Goldwater stopped by our booth for 15 minutes before being led away by his entourage.

The most exciting part of the show was the last two days when the crowds were the largest. Official estimate placed the crowd at about 250,000 each day with most of them packed along the flight area. All the microlights were allowed to fly in an afternoon slot on these days and we were preceded by a parachute team of approximately 50 jumpers and the launching of about 10 balloons.

Here we were -- Tina and I, flying in front of more people than I have ever seen in one place in my life (more than at any football game or rock concert I have attended). At that point, my mind was drifting off faster than my smoke trail. I was taken aback by the sheer beauty of the day. Bright, clear sunshine with balloons lazily floating here and there and enjoying the best possible view of Paris. After we landed and my adrenalin stopped flowing, I realized that the show was over. I wish it could have lasted longer. It had been a perfect show, great conditions (most of the time), a fantastic audience and a chance to visit the magnificent city of Paris. This was the first time I had been at a major air show and was not burned out after the first day. Now I cannot wait for even bigger and better things at the next Paris Air Show in 1983.

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CONCEPTS

DESIGNED BY MARIO MANZA

BOWSPAR

Short flight from 250 foot training hill, showing new wider control surfaces.
Photo by Charles Bowdle



By Mario Manza

Naturally, I built my new wing with the idea of devising the ultimate hang glider. The most important consideration was performance. High speed and penetration are very important performance features of a wing, so I decided I would build a rigid form. I also felt it was about time someone should expand on the basic Fledge design. If the "Standard" can become a Harrier, why can't a Fledge become a 14:1 super ship?

I have been familiar with the Fledge construction particulars since before Manta produced any of the wings from Klaus Hill's plans. I built and flew a Valkyrie, from Bill Wolf's plans, in 1975. Based on this experience, and being so impressed by the performance of the Mitchell Wing, I set about designing a foldable rigid wing. As usual, I began by drawing a basic plan form. A 36' span for a tremendous glide, and a 6' center chord for high area, "float."

The taper ratio came naturally and matched the one I had put into my flex wing prototype the year before. I kept the sweep very slight, and it consists of the tapering angle of the leading edges only, 7 degrees per side. I felt that the Valkyrie, no sweep, and the Mitchell Wing, quarter chord sweep only, adequately demonstrate that sweep is not absolutely necessary for pitch stability. Good static balance is also a desirable characteristic in a wing and the Fledge is terribly tail heavy.

My design is based on intuition; I have no formal engineering or aerodynamics schooling. I have known for some time, that the ultimate sailing rigs use a bowed mast. Knowing that cambered surfaces meeting air are for lifting and having a genuine appreciation for smooth curving lines, led me to the idea to bow the spars. Straight jagged lines must produce drag.

The leading edge on this wing is bowed back by the internal rigging, sweep and anti-sweep wires. The lead spar and rear spars are not preformed, but assume their shape upon assembly. The initial rearward bends also produce upward arcs when the dihedral is rigged in. A feature of this bowed spar configuration, is a certain amount of "springiness." By eliminating

Span: 36'
Area: 156 sq. ft.
Aspect Ratio: 8.3
Nose Angle: 166 degrees
Center chord: 6'
Tip chord: 3.5'

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No. 19

CONCEPTS

the outboard rear rigging wire and by special mechanical arrangement and attachment of the outboard compression strut, I attempted to have a "flexible" rear tip area. I think that this feature will allow me to carve some nice slow turns.

The trickiest part of the design was continuing the curves at the tips. The elliptical tip area consists of a preformed leading edge tube, in two sections for disassembly, while the rear portion of the tip area is completed by a doped fabric control surface. This "spoileron" forms part of the tip area when not deployed. The outboard compression strut is an integral part of this tip area. It pivots against the end of the rear spar where it is attached, and it meets the front spar at a ninety degree angle, this permits the rear spar to flex upward, a tendency which is enhanced by the bowed spar configuration. An upper rigging wire holds in a certain amount of washout, but flight loads, flaring, banking, can push more washout in. The doped fabric control surface was necessary to complete the rear section of the elliptical tip area, otherwise the wing is like the Fledge, foldable.

The basic configuration of this wing is like the Fledge. It has two spars in each wing, it has a double surface air foil, a triangle bar, and folds in a similar fashion. Differences include: bowed spars, elliptical tips with integral control surfaces, cantilevered outboard rear spar segments, more wing taper and a thicker airfoil, and quarterchord sweep only.

I decided to make the control surfaces part of the tip area for the sake of performance. When the original Mitchell Wing came out, it had no tip rudders and was a 17-18 to 1 wing. When the tip rudders were added later, it became a 15-16 to 1 wing. Flights I've made so far indicate the wing will function well without the tip rudders. I did have one incident here in Ohio, where I was gusted into a side slip. I launched the wing from a wooded site in cycling crosswind conditions. It may have also resulted from releasing the windward side of the triangle to get into my stirrup. At any rate this caused me to remake the control surfaces, which are now generally improved and offer 35% more frontal area when deployed. This wing however, does not have any vertical surfaces, a

possible disadvantage of not using tip rudders. I am hopeful that the relatively high dihedral position of my tips, will produce the necessary tracking ability that is needed.

I completed the wing in late May of 1980. The first attempts to fly it were a total failure. The hook up point was too far back, and I had rigged in so much washout, the wing would not nose down and fly. I rerigged the wing. I swept the bottom of the triangle 6" further forward and carefully reset the washout angles, to 5½ degrees at the tip compression strut and 1½ degrees at the midspan strut. The next time I went to the training hill, I flew!! The last flight that day, I made a measured 10 to 1 glide, felt like Superman! During the Summer I practiced launching and basic control at the small local sites, and gained confidence in the wing's feel. In the Fall, about thirty flights later, I felt I was ready to fly in mild conditions from the Tennessee mountain sites.

I was very nervous on the ramp for the first mountain flight. I kept trying to reassure myself by remembering how well

Light wind running launch from ramp at Whitwell, Tennessee in mid October, 1981. Photo by Greg Dewenter

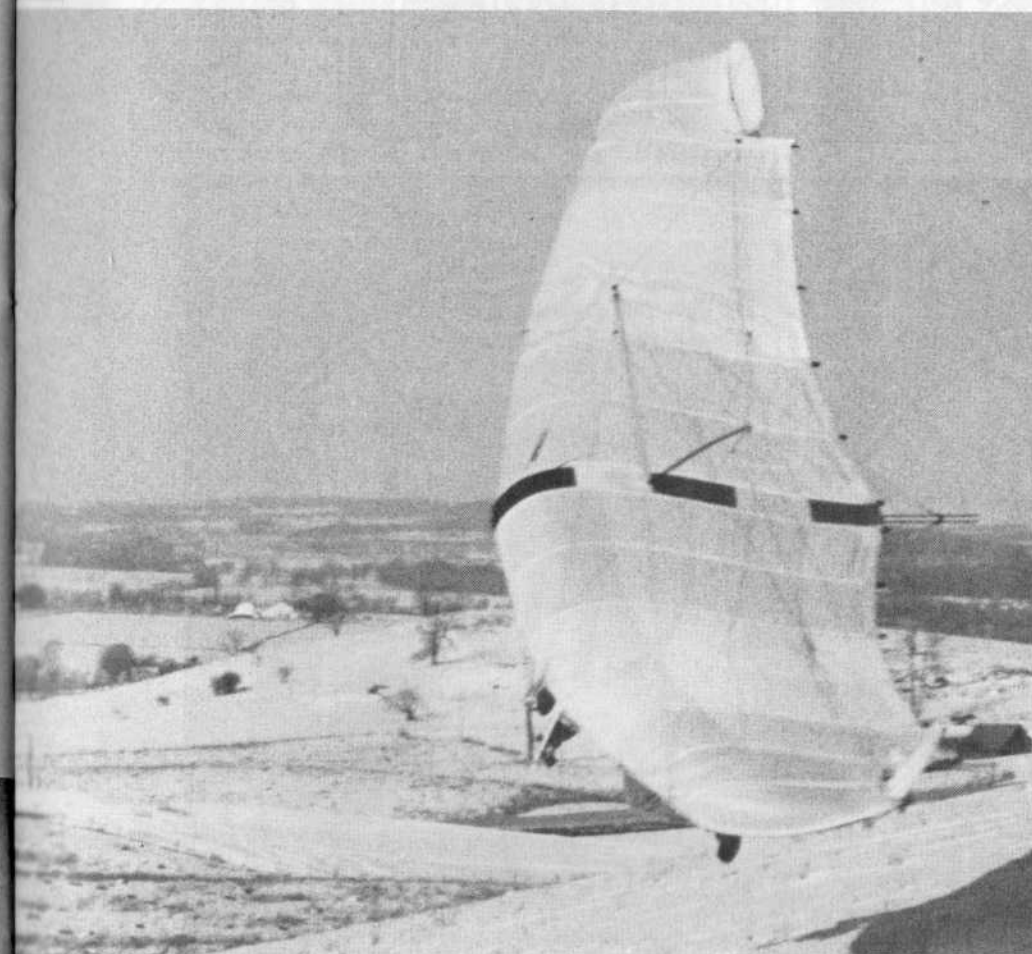


the wing lifted me on the running slope launches I had made back in Ohio, and kept thinking of the reflex I had in my modified Icarus V airfoil. My friends and others at the Henson's NW ramp were all holding their breath, wondering if the "potato chip" would fly. There was little or no wind, so it was five steps and a leap into space. I instinctively held the bar lightly out during the moments it took the pressures of flight to build. Gliding flight came quickly and automatically. The feel from the wing was very proper and the next four launches got increasingly better. The launch in the photograph, made at Whitwell, was my best, with no dropping at all. The air was very light, but I was gliding from the moment I left the edge of the ramp. I made these first mountain flights in mid October. I had a week of vacation and it was the week before the World Cup. When the soaring conditions mellowed one afternoon at Whitwell, I felt it was a good time to launch into some smooth lift, and try soaring.

It was a flawless launch. Two men assist, no nose man. Two steps and I lifted from the end of the ramp. Within minutes I floated smoothly up and above the other pilots, many flying Atlas wings. Steve Moyes

stayed a couple of hundred feet above me flying the new large Mega. But I didn't stay near launch for long, the lift was smooth, my craft felt solid, I headed SW down the ridge. I easily made the six mile trip and back. When I returned to the vicinity of the launch area. I was about 400' above cruising effortlessly. A couple of hundred feet below me, two French pilots, flying Atlases, headed SW down the ridge. They had just seen me coming back with a good margin of altitude, they must of figured it would be no problem. A couple of minutes later they were back, barely even with the top, scratching to maintain. I'm sure they did some head scratching later, and I later realized that the performance I was after was there.

At this point, performance is the least of my worries. The nagging doubts about the wing's over-all stability will be with me for a long time. I've almost exclusively flown my own wings since '74 when I learned to fly. The only way to solve the doubts, for me, is air-time. Unless I am fortunate enough to get a manufacturer interested enough in my prototype to test it on a vehicle. Though I have not flown the wing enough yet and haven't encountered much turbulence, it feels very



Shaky launch at 80 foot training hill, site used for first ever flights on my wing. This was the first of several flights made by my friend John Alden, a local hang 4 pilot and Fledge II owner. He did well considering it was his first experience with the wing, and has been the only person to fly this wing other than myself. Photo by Mario Manzo

stable. Ground handling and launching a wing can tell a person a lot about its pitch stability. When I am again able to fly the wing, I will do maneuvers and other practical flight attitude tests. So far I have done a few stalls and they are quite mild and need to be provoked. I have not pulled the nose down and really gotten the wing absolutely screaming, but pulling in brings the proper reaction. The wing is nicely roll neutral, a nice feel after flying the new flex-wings. I did a series of two 360's, low over the landing field at Henson's. Not only did the wing hold its bank angle, but it held onto almost all its altitude. These were the nicest turns I've ever made.

By the time I have two good legs again, I will also have "Bowspar" reassembled, I still have to complete the modifications to the lower sail. I've reworked my rigging, got things more equal and reduced the washout to 4 degrees at the tip strut, 1 degree at the midspan strut. I'm hoping to be above the traffic again this Fall. I am also hoping to be at Telluride during the "Invitational," sure would like to meet up with someone with a test vehicle there.

Thanks Dan, for the opportunity to tell the Hang Gliding community about my rigid wing. It is a lonely world as a "home builder." I firmly believe there is a need for the individual designer in our sport. The joy and excitement of powerless foot launched flight will provide the energy and desire to further master performance. Too closely aligning our goals to marketing potential is a burnout.

Brothers and sisters of the sky, I look forward to seeing you eye to eye among the clouds.

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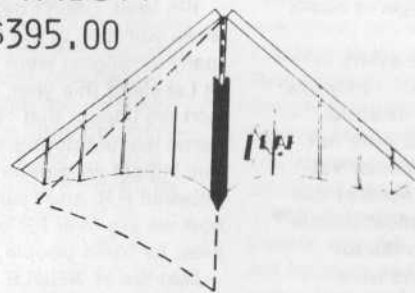
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INTERVIEW

In 1937, when he was fifteen, a high school teacher gave him a battered Waco Primary Glider. He restored it, taught himself to fly it, and had logged nearly 2,800 flights before abandoning the glider for powered aircraft.

Introducing Paul Poberezny may seem like one of those situations where the commentator says, "... and he needs no introduction..." But to the hang glider/ultralight/tow community, Poberezny may not exactly be a household word. WHOLE AIR felt an interview with the dynamic founder and president of the E.A.A. would shed some light on an aviator who may help the growth of ultralights more than we can now imagine.

Poberezny speaks with knowledge and authority on many points of concern to we ultralight glider and aircraft pilots. With pleasure, WHOLE AIR presents:

Paul H. Poberezny

PRESIDENT/FOUNDER
EXPERIMENTAL AIRCRAFT ASSOCIATION
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multitude of skills—pilot, aircraft designer and builder, administrator, publisher, writer, speaker, air show performer, and coordinator of the world's largest aviation event — now Oshkosh '81.

WA: Oshkosh is coming for the 29th time. Tell us some facts and figures about the convention.

PP: Well, the success of the event, in reality, falls on the shoulders of a very few people, guiding, leading, coordinating. During the event, however, if it were not for many thousands of EAA member volunteers handling many tasks, none of this would be possible nor would most people be willing to pay a registration fee for what it would cost if all persons were salaried.

WA: How many visitors do you expect at Oshkosh '81?

PP: That's a difficult projection, but well over 400,000. This year motel/hotel rooms filled up at least two months ahead of last year.

WA: Are all rooms taken already? (Taped July 3rd)

PP: Yes, within 60-70 miles. Many take their airplanes to Green Bay, even Milwaukee to find accommodations.

WA: How many aircraft flew to Oshkosh in 1980?

PP: Last year, in and out of Wittman Field, we counted over 10,000 aircraft.

WA: How explosive is the entrance of ultralights?

PP: Well, I don't call it explosive, really, when you look at the total number. While many ultralights were present last year, and at Lakeland this year, it really can't support the impact that "Explosive" implies. Some manufacturers would like us to see this impact as greater. There's a difference between P.R. and reality. And I think right now we are over PR'ed in the ultralight area, by some people, but not by all.

WA: We at WHOLE AIR have had an idea this year, that ultralight sales were not as high as publicity men might lead us to believe. What do you think about that?

PP: This was very similar when the Bensen gyro-copter became part of our amateur-built movement. The skies would be crowded. Montgomery Wards would be selling them. Everyone got excited. FAA got excited. But the complexity of the machines, the lack of better engine reliability, and the need to teach oneself to fly it... it never did really get off the

ground. I see some definite parallels to ultralighting.

WA: With regard to the "ultralight NPRM", what is in the future considering the stance of the Reagan administration on decreasing regulation of the citizen and reducing the cost (budget) of government?

PP: It is still expected to come out. It has not been dropped or rejected. I've written the Reagan administration encouraging them to bring it forth, because if they don't, you are going to find a bad situation by knowledgeable people. For example, various of the state aeronautics commissions are considering enacting rules at the state level. We need one simple federal rule to offset what could be more restrictive legislation. FAA does not want to get involved in it, like some prior situations. They have been pushed into regulation by the concerned citizen who writes his/her congressman demanding action. The congressman says, "You better do it!" The FAA doesn't have the manpower and become placed in an awkward position.

WA: Aren't these commissions "shooting from the hip" though, in seeing a real need for rules? What evidence of problems truly exists?

PP: I've written various of the officials asking for facts. No one has any evidence, how safe or unsafe, fatalities, injuries. Right now it's heresy. Many of the "facts" stem from newspaper reports which seem to point toward greater problems. Add to this, over-zealousness on the part of some state officials, and you see how things can get out of hand.

WA: Do you see sport flying as growing due to ultralights, and if so, will the growth be new (not present pilots) or pilots from other forms of flying?

PP: I would say that many of the people who are involved with flying are dropping out or their flying is greatly reduced. A small portion will drop into the amateur-built category. Within the ultralight movement, non-aviation people say "It costs too much; four to five thousand dollars for a kit?" Something that is peculiar to aviation is that people think the air is free. They don't understand conquering the air costs money. The problem with all airplanes, and ultralights are no different, is use-ability for the investment you have in it. Winds prevent using ultralights in many situations. Folks don't want to break them down, so they're buying hangar space. Noise continues to discourage some. While they are not noisier than, say, a Boeing 747, they are usually closer and seem more offensive.

WA: Cessna, Beechcraft, and Piper have moved away from fun flying ships toward business aircraft. What does this mean?

PP: Well, the profits on one turbine or jet airplane may be the same as that on forty or fifty 150's (Cessna two-seater). Consider the reduced personnel/union/supplier hassles resulting from that one turbine sale, and you see why. Airline deregulation (serving less airports) and taxation credits bring more corporations to buy their own planes with no loss of money in the president's pocket. Many in the aviation industry have not realized the great potential for pleasure. In this country, more money is spent on pleasure every year than on our national defense budget! The costs of flying though, are greater like the amount of space needed at a community airport, for say 20 planes, compared to the area needed for 20 automobiles. Transportation alone may not justify the expense to the community. If the factor of pleasure in flying was considered, it might seem more reasonable, as the local citizens find enjoyment. Aviation has greatly overlooked the fact

"I think we can keep the movement as free as possible from government regulations with the innovation of hand and mind."

that pleasure is big business.

What I would like to see out of this new surge of interest is some really nice machines; (ultralights) which fall into the classification which I call ARV, or Aviation Recreational Vehicle, to bring new life to the general aviation industry. I've talked to several FBO's (Fixed Base Operators, i.e., airport owner/operators) who are taking ultralight dealerships.

WA: It seems to us that many of the people who are interested in ultralights are not builders and tinkerers. They would rather buy ready-to-fly crafts. How does that fit into your general view of its development?

PP: I would say that's a very true statement. One of the things we are going to run into, though, is the renewal of the foot-launched requirement. The FAA will remain very firm on the 51% ownerbuilt rule, at this time, for those ships which cannot be foot-launched.

We are working to keep FAA involvement down for pleasure flying. Why should FAA be involved in certification of ma-

chines under 3,000 pounds? Why does a man or woman have to obtain a medical to fly privately for pleasure or transportation? If I drive a motorcycle or a boat or a car, even a horse, anything, I don't need a physical. What is so magical about an airplane?

WA: Do we have a real or imagined problem in ultralight aviation, relative to safety?

PP: I'd say, right now, that we have an imagined one.

WA: What evidence is had regarding what safety needs are most present in ultralighting?

PP: To my knowledge there are not many real statistics regarding injuries or fatalities. Noise is a problem. Low flying. The ultralight is an attractive object for the average person to watch. It is easier to identify with, thus the problem can be more obvious.

I see the ultralight category moving into the Experimental Ultralight field, enclosures, two place, more power, the A.R.V. They've got a real good spot going for them. We'll need more evidence of knowledge of F.A.R.'s (Federal Aviation Regulations) though to develop this field, endorsements by Flight Instructors and so on. If designers would avail themselves of the wealth of information available today, they could come up with some wonderful, safe designs. I certainly hope that we can keep the movement as free as possible from government regulations with the innovation of hand and mind. For growth to continue, manufacturers must look at each other cooperatively. They can be their own worst enemy.

WA: We'd like to ask you, with your editorial background and years of expertise in aviation, what you think of WHOLE AIR.

PP: Well, looking your publication over, the quality, the layout, I wish I had you on my staff. I think it is well-formed, well-balanced. After 19 years of being editor of SPORT AVIATION, it doesn't take me very long to see an excellent publication.

WA: Thank you. Any last comments, Paul?

PP: One of the things I wanted to add is that many people, who put out publications, such as yourself, oftentimes feel that they are not a part of aviation. I look at a publication the same way as an FBO, a manufacturer of an airplane, and the publisher is a very important part of the preservation of aviation. They are in the airplane business, not on the perimeter, and I am very supportive because we're all in the same boat. We've all got to encourage and promote aviation as best we know how.

WA: Thank you, Paul.

PP: You're very welcome. I'll look forward to seeing you at Oshkosh.

TOW SYSTEMS

I thought with this issue we'd look at several of the tow bridle systems on the market today. The three bridle systems we reviewed are Yarnall's, Bill Bennett's and the Emerson-Bailey. The tow bridle is a different way of setting a glider up for towing and is used instead of the conventional tow bar. Since the bridle is a relatively new idea let's compare it with a typical tow bar so we have some common ground to work from.

Cost of tow equipment is one factor that discourages many pilots from considering towing a way to fly. Tow bars cost around \$350 to \$550 depending on the type of release system used and composition of the bar. A tow bridle in turn costs between \$65 to \$325. Difference in price depends largely how you tow (i.e., static or winch, land or water), and how often. Right here you can see a good reason to consider a bridle system.

Perhaps the most important difference between a tow bar and a bridle is the control bar. A bridle uses the glider's soaring bar, instead of replacing it with a beefed up tow bar. By use of cables or tubing, a bridle attaches to the glider's flying wires control bar shackles or tangs. Under tow, the bridle distributes the majority of the tow force through the flying wires, not the control bar. Much of the tow force is cancelled out by the flying loads of the glider so you don't need a stronger control bar.

In previous articles we've discussed the fact that the most important part of any tow system are the releases. A tow bridle like the tow bar uses some form of release. Quality and reliability varied greatly between bridle systems as we'll note later. Basically what is most important is a system that functions smoothly. This is especially true when it is in the loaded or pulling mode.



If I had to say what one thing I like the most about bridles over tow bars, it would be simplicity. If you've purchased a glider in the last few years with a folding control bar, you know how nice it is to just put the bar in the bag with the glider and forget it. Tow bars like the older soaring bars have to be handled separately. The beauty of a bridle is that you can leave it on the folding control bar and pack it with the

glider. It also removes easily if you wish to do some foot launching. Another benefit for those of you who change gliders frequently is the feature of using the same bridle on different gliders with little or no modification.

The question comes up frequently if a bridle offers any additional control of the glider as opposed to a tow bar. This is a hard question to answer. Many tow pilots believe there is little or no change or advantage. One in-flight advantage of bridles with flexible bridle lines (Yarnall and Bennett), is the fact the bottom release tracks with the tow line. In other words, if the rope is pulling from the side, as it would in a lockout, the bridle lines will allow the release to pivot towards the towing line. This will allow for a cleaner and faster release opening. The Emerson-Bailey bridle which has fixed bridle tubes, uses a release arm that can swivel when opened.

This overview is not meant as a means to put one system against another, but rather give you an idea what each has to offer. In an effort to be as unbiased as possible I've sought out pilots who regularly use a particular system and asked for their feedback. Each system is broken out to show type of releases used, ease and type of mounting and the highlights of each. If you have a particular question about one of the systems the manufacturer's address is also given.

YARNALL TECHTONICS TOW BRIDLE

Manufacturer: Yarnall Techtonics Inc.,
2440 Brickyard Rd., Canandaigua,
NY 14424
Cost: \$65.00
Release system: Single release, ejection, spring loaded which is mounted

on the base of the bridle assembly. Constructed of aluminum.

Mounting: Bridle lines are 1/4 inch polypropylene rope attached to the flying wires with quick-links. Top bridle line is tied to the keel or control bar yoke and cannot be released.

Considerations: Lowest in cost of the three bridles tested. Is recommended for light or occasional towing. Uses one release to disconnect from the towing line. Since a two stage release cannot be done it is impossible to top out the glider on the towing line by flying just on the bottom release. The manufacturer recommends use only with a tension limiting device, such as their Skyhook winch, which will not exceed more than 200 pounds of pull on the towing line. The release cannot be reached if a malfunction should occur which would require the pilot to release the line manually. If the release is operated when the tow line is tight (i.e., lockout), it is possible for the release to "sling shot" back towards the pilot. During landings the bridle lines can drag under foot. Easily changes over to other gliders with no modification.

BILL BENNETT TOW BRIDLE

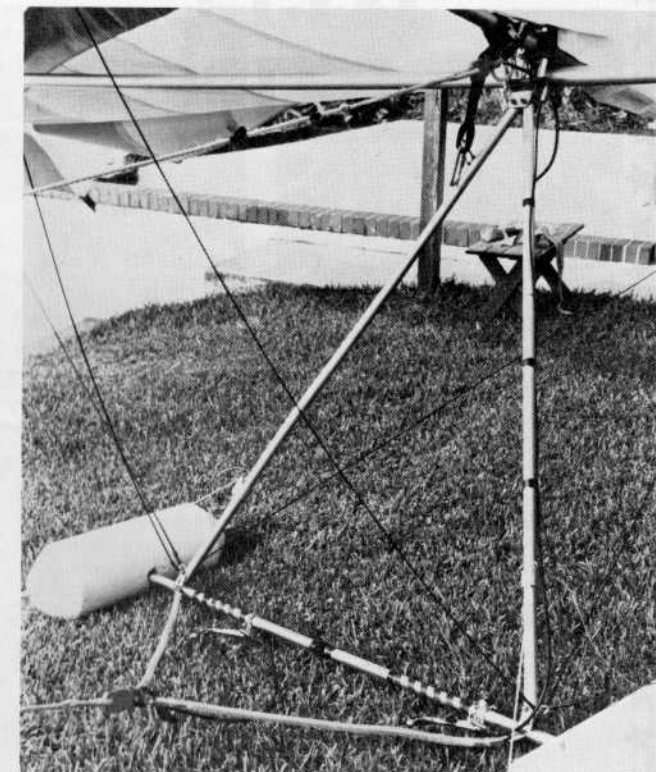
Manufacturer: Delta Wing, 13620
Saticoy, Van Nuys, CA 91408
Cost: \$245.00

Release system: Uses upper and lower releases. Type of release is a British sailplane release which uses the spring loaded ejection principle. A very positive release. Made of highgrade steel.



Mounting: Bottom bridle is 1/8 inch aircraft cable with tangs which attach to the base tube bracket bolts. Top release uses 1 inch tubular webbing slipped over the control bar yoke or keel tube.

Considerations: Mounts quickly to most any glider with the popular folding control feature. Will fit bars with base tubes of 45 to 60 inches long with no modification. Although it is not provided by the manufacturer, a reinforced base tube is recommended, especially for static line towing. Bottom bridle cables use Never-Kinks and cable is covered with heavy gauge surgical tubing. This tubing absorbs much of the release shock during tight line releases, reducing the potential of the bridle hitting the pilot. The bridle can be velcro'ed to the base tube during launch and landing, keeping it from under foot.



EMERSON-BAILEY TOW BRIDLE

Manufacturer: Florida Wings, Rt. Box
X-403, Avon Park FL 33825
Cost: \$325.00 Includes floats and sleeved base tube stock.

Release system: Uses upper and lower releases with a Bailey Swivel release on the bottom bridle. Constructed of stainless steel with AN mounting hardware.

Mounting: The bottom bridle attaches to the base tube bar by means of a swivel bracket and heavy gauge aluminum tubing. Top release has a stainless steel mounting plate that universally fits control bar channels.

Considerations: Designed to handle the higher stress loads of static line towing. Overall quality is excellent. Highest cost of all three. Has an excessively long delivery time. Unique feature of a bungee mounted tang to keep the bridle up out of your way. Lower bridle tubes will keep the bridle from lashing back at the pilot on tight releases. Includes heavy gauge base tube stock to replace stock base tube. Requires "in-shop" modification to convert to a different glider.

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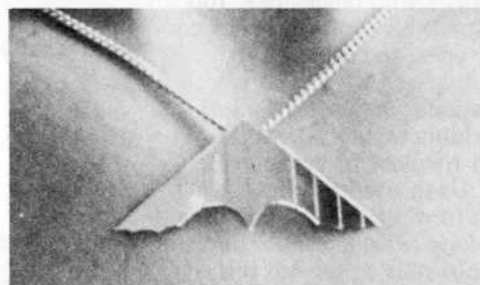
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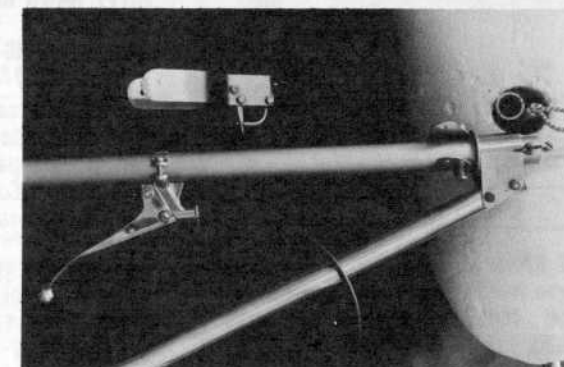
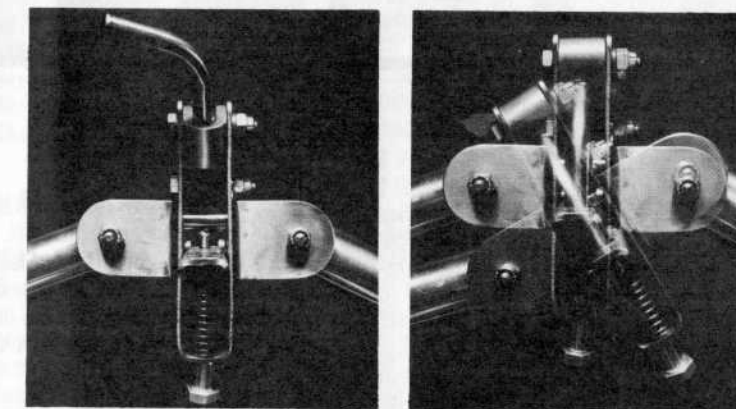


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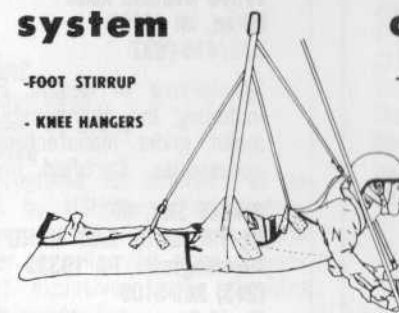
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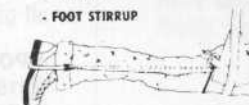
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↑ See cover of May/June WHOLE AIR.

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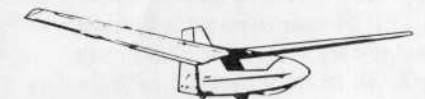
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PRODUCT LINES

CHATTANOOGA, TENN — First news is an overwhelming response to our **ultralights-towing-hang gliders** editorial. Besides a flurry of remarks from flyers in many parts of the country, we have heard various industry rumblings, too. Word is that the August **Glider Rider** will have a photo of this newest activity on its cover. According to the grapevine, the shot depicts Jack McCornack towing a glider behind one of his Pterodactyl P-Travelers. We hope it's true, as we're excited to the max over this newest way to elevate ourselves. Next is an offer for complete information from two prominent industry leaders. **Key men**, one from a top hang glider manufacturer and one from a top ultralight builder will begin explorations into the how, where, and when of air-to-air towing. The first flight was to leave the ground July 15th or so, as the July/August **WHOLE AIR** goes to the printer. We are planning a detailed report with from the air photography which will probably appear in our November/December 81 issue. Between now and then, we're expecting photos and info from a south Florida group who plans to check it all out. We've had other promises, too, and we'll print anything on the subject that's worthwhile. So that's exciting. What else is new? Well, it's summer and activity is high. **Ric Lee** (not 168 miler Jim Lee) told us his first impressions to the **Flight Designs Demon 175**. Ric claims it flies better than the Comet, specifically in that it handles more cooperatively. The Comet is the international standard for comparison in buried cross-tube designs. Maybe we should obtain a report from **Jeff Scott**. He flew one in the demanding **So Cal Regionals** and did quite well, placing fifth. Matter of fact, he and **Mike Meler** (on a Harrier of course) were the only challengers in an exclusive club of Comets placing in that meet. **Joe Greblo**, a common name in top competition pilots, added another First to his trophy collection. And Joe has also set a very high target for contenders in his and biz partner **Rich Grigsby's** So Cal X-C contest. Joe eclipsed the 100 mile mark in a year long contest. The long flight could win it all and we're curious if Joe can win his own prizes. Back to the Demon and Flight Designs tho, as we consider a recent business deal involving the Salinas outfit to be the hottest news of the summer. Think about this. An established organization and event with international flavor like the **American Cup** takes it place with the has beens as no sponsor could be obtained. **Blue Stratos**, while helping the sport with cold cash, only does so very indirectly, as a vehicle to glamorize their men's fragrance line. **Coca Cola** and **Budweiser** also are spending money in ultralighting, but expectedly on promoting their products. Nothing unusual there, but in **Flight Designs'** case, owner **Marty Alameda** talked himself into an acquisition by a major company. **Pioneer Systems**, a subsidiary of Pioneer Int'l, "acquired" an undisclosed amount of Flight Designs stock. Pioneer is the major supplier of military parachutes in the free world, and contracts to NASA for Space Shuttle program descent systems. Impressive to the tune of 18 million Dollars in 1980 sales, their desire and action to buy a hang glider manufacturer can only mean significant new investment, which Pioneer officials indeed confirmed. Flight Designs could be ranked in the Big Four of hang glider producers, an exclusive clique of survivors that lists **Wills, UP, and Moyes**. **Odyssey** is coming on with lots of activity but lagging deliveries of their first Vampyr's questions their entrance to the glider manufacturer's club. **Stratus** is alive and well and enjoying the economics of summer. **Seedwings** and **Spectra** round out the healthy batch. Whoops, here come another, tho. Or rather it's the return of **King Horizon** as Sport Aviation Mfrs with

Chuck Stahl at the helm by himself this time. The former money man was in the race car business and was reportedly robbed of \$300,000 worth of speed stuff — lost his desire and yanked the rug out from under **Horizon**. Boom. But now the **Centurion** will once again be marketed. This sequel to the **Herron** uses new technology, specifically upward semi-articulating winglets. "Vortex modifiers," Chuck called them; they pivot with billow shift, a sort of supplemental weight shift. For pilots weighing 140-200, the 165 square footer weighs 59 pounds, has 0° billow, with foam supported leading edges. They have been flying it with their own "Air Cycle." Using an 8 hp MAC101, it'll go 45 mph. With a dual Chrysler 20 hp set up, 50 mph is attainable. And it can be foot launched and landed, boasts the factory. Stahl's "piece de resistance" is a quote he claims Mr. Aerobatic, **Dan Racannelli** allowed him to use, "It's a Comet with Harrier handling." He flew it at San Francisco's Showcase making the comparison to the Top Two. We hope to fly the glider and see for ourselves. For now, you can get a spec sheet on the \$1695 Centurion, by writing: Sport Aviation Mfrs; P.O. Box 3975; San Clemente CA 92672; Att'n: Chuck Stahl. Nice to have them back, at least for now slowing the glider company exodus. Recall the departure of CGS, Electra Flyer, Seagull, Eipper, Mitchell Wing, and Waspair. Of great interest to dealers is the problem of insurance. "Exciting News," is the way Holmbeck and Associates begins their announcement of a total insurance package. See their ad in the Classified Section (page 53). Owner/Developer, Glenn Meuhlstedt, can provide, for the first time ever in the ultralight sports: student medical and life insurance, student liability insurance, instructor liability, shop owner liability for lessons, shop, and site(s). Now the catch....none folks, it's not even too expensive for full-time businesses. This whole package comes from the same people as does the theft and physical damage glider/ultralight policy, which comes from the same people as does USHGA's liability insurance which covers all members nation-wide. **Meuhlstedt** knows his way around aviation insurances. We hope his success continues, so our opportunities are preserved. Banks and other institutions with money to give ultralighting demand insurance for everything. In ultralight airplanes, CGS Aviation will swim upstream by not attending **Oshkosh 81**. Chuck and Pixie are up to their ears in patent work, and trying to ready their new **Hawk** aircraft for production. They've so much activity they will not have time to do the **EAA Big Event** on August 1-8. **WHOLE AIR** will be there, however, looking for stories from the pilot's point of view. Much new equipment will be on display at this preview of the next year's hardware. Having paid a recent, too-short trip to California this July, we can pass on new happenings from **Eipper**. The San Marcos manufacturer has so many orders that production can't keep up. Dealers are getting answers and much more service due to **John Lasko** being promoted to V.P. This issue's Cover photographer is putting in long hours keeping the sales force as satisfied as 7 week delivery allows. They are getting out 200 units a month and are gearing up for 500 a month by the end of the year. **Eipper** is adding a whole new building and still looking for more. They are working on the **Eipper Cub** but will not show it at **Oshkosh 81** as production efficiency takes a priority in personnel right now. A Michigan **Eipper** dealer, **Sport Flying Unlimited** flew a Quicksilver as the first ultralight permitted in the Detroit Air Show. Good flying, **Doug Dinkel**. Got news or opinions? Send 'em to Product Lines, Box 144, Lookout Mtn., TN., 37350.

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