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photos by Bill Bennett

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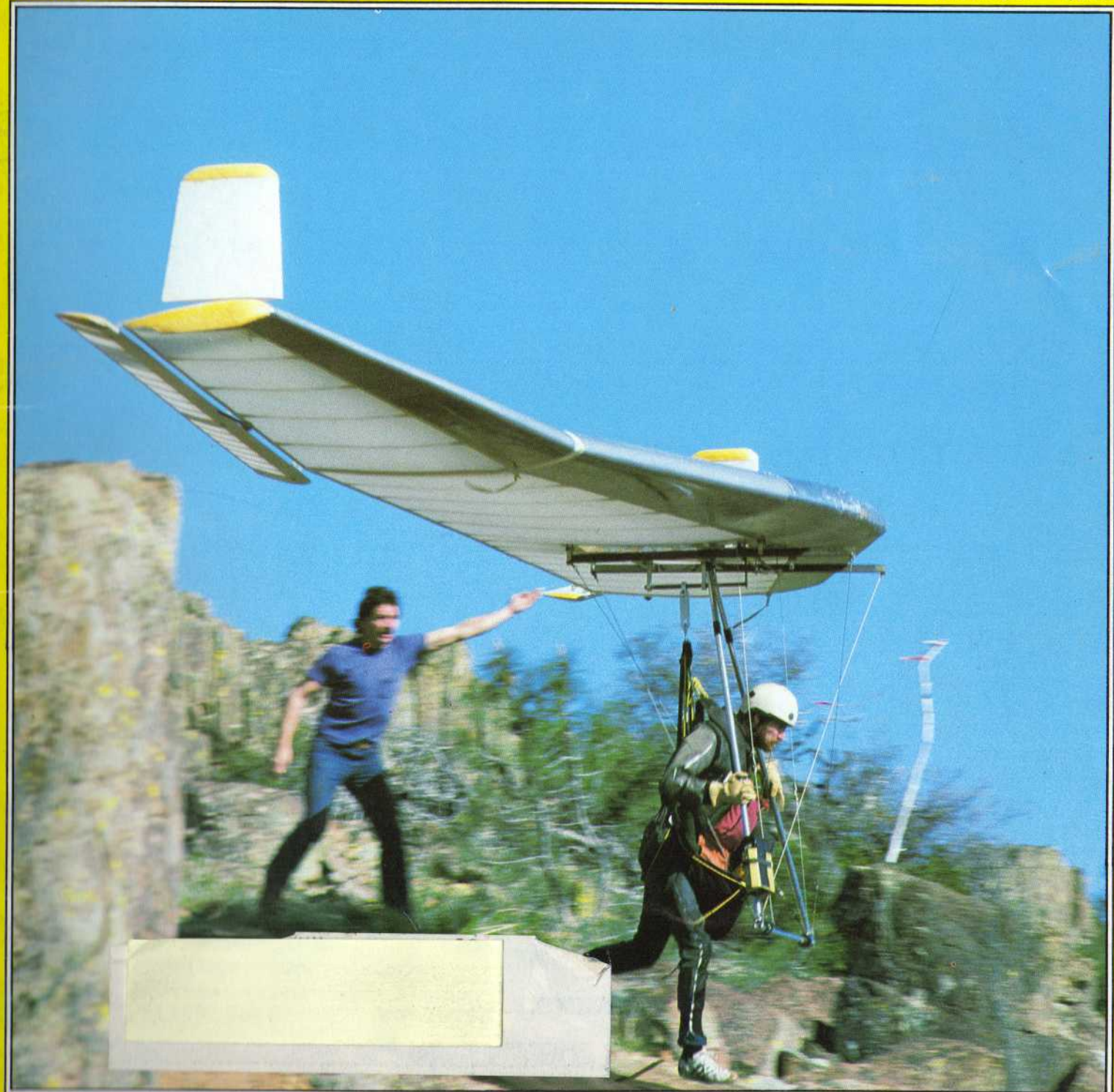
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GALA SPRING GLIDER REPORT ISSUE!
BREEZ — LIGHT DREAM — & THE NEW DAWN
OWNER SURVEY ON THE SENSOR 510 & 210

WHOLE AIR

The Magazine of Hang Gliding and Ultralight Soaring

MAY 1984 — \$2.50



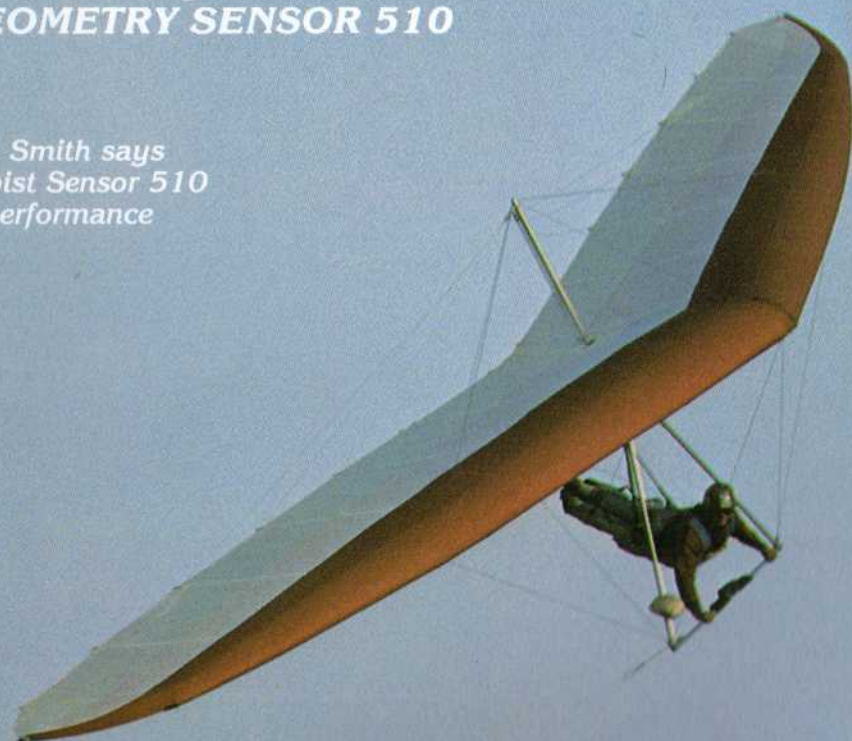
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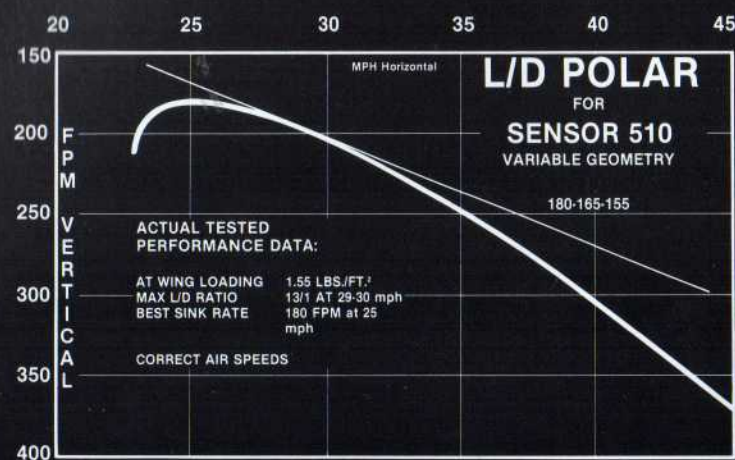
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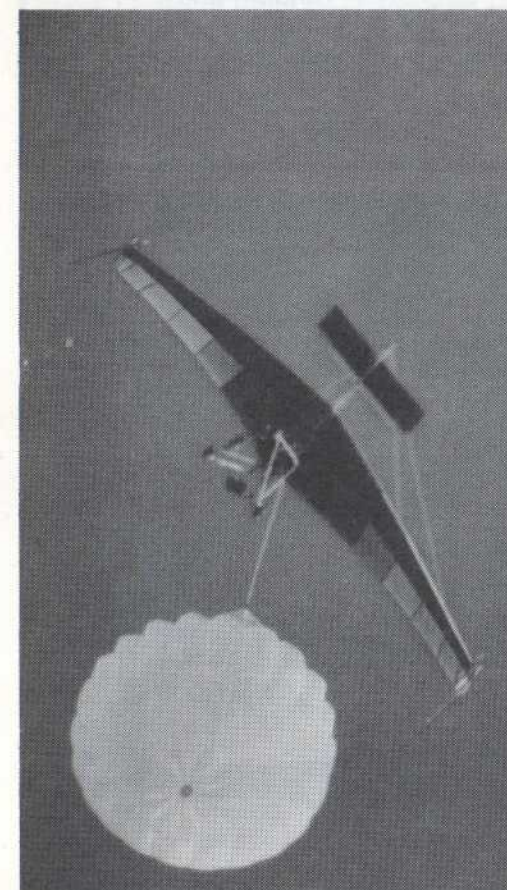


'RETURN' customers do the talking ...

Dear BRS;
I thought I'd write you and tell you how well your BRS-2 worked for me over the jungles of Ecuador...at about 500'AGL I pulled the handle and the charge very quickly deployed the chute..It deployed fast..real fast!..Having used your system in an emergency situation, I am totally sold on the concept of a ballistically deployed parachute..I now see it as a must for every ultralight I own and I hope that the rest of the industry will "catch the vision".

Sincerely,

Jon Lindskog
Jon Lindskog
Ft. Collins, CO



Dear BRS,

I recently had the opportunity to test your parachute system. To my relief it worked perfectly.

I was flying an ultralight about four hundred feet up over a woods when I lost my power... I decided to pull the chute when I was only about sixty feet over the treetops... the chute opened up within a second or two which reduced my airspeed in half before I hit the trees... I walked away without a scratch and had only minor damage to the aircraft. Needless to say I will be using the ballistic parachute on a regular basis when flying ultralights in the future.

Sincerely yours,
John Peterson
John Peterson
Blooming Prairie, Mn.

Dear BRS,

Thank you, thank you, thank you -- I can't tell you how much I valued the BRS when I needed it Sunday - It might sound very melodramatic but when I climbed out of the wreckage and saw my wife and 3 year old daughter running to me from across the field, I could have cried -- I absolutely wouldn't have ever seen them again if it hadn't been for your BRS -- I'm going to be the best salesman you've ever had.

Forever Thankful,

Jay Tipton
Jay Tipton

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photo by Bettina Gray



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WHOLE AIR

ISSUE NO. 35, VOLUME NO. 7, NO. 2, 1984

PILOT'S PERSPECTIVE

- 12 BACK TO BASICS
England's Noel Whittall describes the Pixie trike as a soaring pilot's machine with extra low weight, and claiming a 240 fpm sink rate, engine off.
- 30 LAND TOWING GEAR
Butch Pritchett has a pneumatic cylinder and gauge allowing land towing in much greater safety by controlling the line tension.

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Number Three in the popular series of owner surveys this time takes us around Seedwing's impressive 510 210 models.

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ISSUE NO. 35

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Cover Photo
Daryl Wein

On The Cover:

A determined Tim Morley launches the prototype for the new Mitchell/Morley U-2 Superwing from Mt. Bullion, some 30 miles west of Yosemite.

Publisher's Column

ON DECEMBER 20, 1983, USHGA was sent a letter from Director, Hardy Snyman for Bob Fisher and Donnell Hewett. The letter was a request for an Action Item regarding ultralight towing of hang gliders.

On February 14, 1984, Mark Airey of Skylines met in Washington D.C. with Dennis Pagen, John Ballantyne (of AOPA's Air Safety Foundation), and several FAA Officials. They departed the meeting all better informed about aero towing. FAA had given Pagen explicit instructions on precisely how and in what language to formally file a request for exemption to pursue this flight activity.

On March 5, 1984, a "Petition for Exemption from F.A.R. [Part] 91.17," was sent to the FAA. The six page document requests an amendment to that part of the current regulations which call for requirements that are inappropriate to aero towing of hang gliders by any form of ultralight, but especially if the aero tug is a trike.

I personally am amazed at the rapid turn-around of action since Snyman's letter was first penned. I am also proud that Pagen, Hawkhurst, and generally the USHGA, could and did act so expeditiously to support the activity of aero towing.

Now let's look into the request and the accompanying towing standards which were submitted. While no decision has been reached as of very early April, I feel the chances are very good that the exemption will be granted as it has been prepared.

Firstly, from what are we seeking exempted status? FAR (Federal Aviation Regulation) Part 91.17 Towing: Gliders states that no person may operate a civil aircraft towing a glider unless: (1) the pilot holds a private pilot license or better, that he has received instruction from an authorized [sailplane] glider instructor, and that he has fulfilled the aeronautical experience requirements of FAR Part 61.69... (2) the equipment used in towing meets Part 91.17... (3) that before conducting operations near controlled areas, that the appropriate agency has been notified... and (4) that a course of action and signals has been agreed upon by both pilots.

By definition, a "civil aircraft" is NOT an "ultralight [vehicle]." That requirement and the need for a conventional pilot's license are two areas covered by the exemption request. Most hang glider pilots recognize the difference in operating airplanes versus hang gliders, and further see that airplanes are not acceptable for our aero towing needs. Neither then is the airplane pilot license valuable. But that is not quite all.

The other problem relates to hang glider flying being covered under FAR Part 103. I assume all hang glider pilots are familiar with the brief but important Part 103. If you are not, and you want to aero tow, you had better do some fast studying, or you may jeopardize the whole development. This is especially true as the Cosmos aero tug being marketed by Skylines is a 2-seat ultralight, for which operation very specific (alho simple) requirements apply.

The exemption request continues by demonstrating in several ways why the activity should be permitted — USHGA's excellent self regulation track record; no jeopardy to "unwary passengers;" agreement with the sport and recreational use portion of Part 103; protection of the "public's interest;" the value of instructional aspects of towing; proper equipment rules; and the existence of towing standards (which were sent with the exemption). In the space left me here, I wish to highlight those standards briefly.

To be the tug pilot, USHGA will issue a certificate if one has 50 logged powered ultralight hours and 10 logged flights, or an Advanced rating and 25 logged tow flights. You must have the "Advanced" rating, or at least have passed those tests to assure knowledge in certain vital areas. Then, you must demonstrate 5 successful tows to a USHGA Inspector. Inspector? An Inspector is a USHGA Observer or Instructor with at least five successful tows.

For the pilot being towed — glider pilot — the special air-to-air rating will be issued to an "Intermediate" rated pilot upon completion of 5 successful tows under the supervision of a Certified Instructor qualified to teach towing. Students with a "Novice" rating can tow any time under supervision from the same instructor.

To be an Instructor, one must be USHGA Certified as such, and complete 10 successful tows before an Inspector (see above). Though desirable it is not mandatory that such an instructor also be qualified as a tug pilot.

The Equipment Standards list eight criteria for safe towing. Rather than listing them or the three points for Operational Standards, it can suffice to say that BEFORE YOU TOW or TUG, you should write USHGA for the Towing Standards reprint. If/when the FAA approves the exemption, we need to be ready to run with this newest opportunity. The wise pilot who wants to be a part of this exciting development will bring him or herself up to the standards!

Thanks,
Dan Johnson

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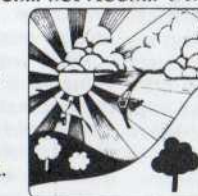
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CARL RODDIE

FORUM

cover both. The more types of launch, the better, yes? —Ed.

Dear Editor:

I, along with many of the pilots I talk with, are very enthusiastic about air-to-air towing. I attended the Skylines clinic at Kitty Hawk, and wahoo!! What a system!

This was done very safely, and is the most convenient way ever to get airborne. Please write all you can about air-to-air towing, and keep readers informed of the equipment being used.

Thanks for a great magazine.
William Hensley
Cary, NC

Shoot Out at Horseshoe Meadows

Dear Editor:

To all persons interested in the preservation of Horseshoe Meadow Road as a free flying site:

We at the Lone Pine Hang Gliding Club have met with Charlie Robinson of the Forest Service and discussed the essence of the problem. The solutions seem relatively simple. Despite its recent "revelation," Horseshoe and Walt's Point have been consistently flown for over nine years without any problems at all.

Now comes the glory seeking "record" pilots. These yahoos seem to have hypoxia before launch. Their lack of common courtesy may have cost us all a beautiful free flying site. There were pilots setting up right on the roadway, parking in the way of traffic, and blocking the road with set-up gliders. Most of this came about because the Classic competitors and their entourage. This site cannot handle that quantity of activity without causing problems.

There is easily enough room for everybody, if a few things are done. The Forest Service has made a couple of very valid suggestions. First, they would like us to off-load our gear and gliders and re-park at the large turnout about one-third of a mile farther up the road. Also, the road paving operations will be happening this spring, and the road may be closed for a period of time. Just following a few common rules of courtesy and not blocking or interfering with the road will make things a lot better for all concerned. This was the major problem.

The L.P.H.G.C. is here to help all the visiting pilots. If you would like more information about Horseshoe, send a self-addressed, stamped envelope to Eagle, P. O. Box 540, Lone Pine, CA 93545, attention: Rod Schmidt

Glad you wrote, Rodger, as we are quite sure others reacted similarly.

The words in "Towing Mentality" do not really describe sailplane operations, for two important reasons. One, licenses are required to fly sailplanes. Lesson costs can run \$800 to \$2,000 just so you have the right to fly them. Second, the sailplane itself will cost \$5,000 (very used) up to \$50,000 or more (for a sleek glass ship), not to include a sturdy tow airplane. In fact, all costs are substantially higher.

For those of us who live in the mountainous areas of the U. S. (under 35% of the country), mountain launch does offer the most bird-like sensation. We will never lose that. But for would-be pilots in the rest of the country, mountain launch could become a "specialty skill," at which all of us present-day skydogs will remain expert. But even in mountainous area, aero towing may generate more airtime. Is airtime the goal, or is it the launch itself that we all love so much?

While your comments are most valuable and well-taken, Rodger, do not risk short changing the future and those many flatland pilots, by disregarding the impact of aero towing.

But, in the last analysis, you are right, too, Rodger. We certainly can accommodate both types of launch. And Whole Air will always

Unbiased Indeed . . . (?)

Dear Editor:

In regard to your "unbiased" Owners Survey of the Comet and Harrier, do you really think that owners who are unhappy with their gliders will admit such, when they are probably trying to, or thinking of, selling that turkey?

Also, both of these models are last year's models, so, rather than talk about old, why not have a few independent, unbiased pilots test fly today's latest models, and compare each model within their own class. For example, Sensor to Comet 2 to Streak to Duck, and Gemini to Skyhawk to Dream.

Bob Schwartz
San Diego, CA

Great idea, Bob, really. But name all the "independent, unbiased" pilots you know. Then eliminate all the ones with insufficient time, money, or incentive to do this, and again subtract all the ones who cannot or will not write up their findings. We do not think you will end up with too long a list.

And Now, a Word from HGMA's President

Dear Editor:

In the past, the HGMA has asked both manufacturers and the industry publications to support a policy of prohibiting, in manufacturer advertising, any reference to HGMA Certification testing or standards other than to state that the specific glider being advertised is HGMA certified. The policy includes a provision that if more than one size of a specific model is offered, and not all sizes

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are certified, the ad must state specifically which model is certified. The policy prohibits comparative or superlative references to the HGMA standards such as, "strongest glider ever certified," or "best pitching moment ever certified." It also prohibits statements such as, "fully tested to HGMA standards," in an ad for a glider which has not, in fact, received an HGMA Airworthiness Certificate.

A primary reason behind this policy is that all HGMA glider certification is by *manufacturer declaration*. In other words, the HGMA makes no attempt to verify, at the time a glider is certified, the accuracy of the testing data and documentation. It is therefore improper for a manufacturer to imply, in his advertising, that his testing data is affirmed, attested to, or supported by the HGMA.

Another important reason for this policy is that if a manufacturer can make references to HGMA certification testing in advertising a glider which is not, in fact, certified, he can obtain the promotional benefits of the certification program in selling an uncertified glider. This situation is unfair to the other manufacturers, and not in the best interests of the pilots.

Two advertisements in the March issue of *Whole Air* made references to HGMA standards or requirements which violate the spirit of this policy. An ad for the Delta Wing Light Dream stated, "... load tested to the same rigorous HGMA standards that are applied to the big, heavy wings of yesteryear." An ad for the Skylines Trike stated, "... tested in Germany to 3 times greater than HGMA requirements for a single place flex wing glider."

For the record, neither the Light Dream nor the Skylines Trike has received an HGMA Airworthiness certificate as of the date this letter is written (March 15th, 1984), nor has a package been submitted for either aircraft. Further, the statement about testing to "3 times greater than HGMA requirements" is absurd. It is not uncommon for many gliders to exceed the specific HGMA requirement by a substantial margin on an individual test. To imply, however, that a glider has exceeded all HGMA requirements by a factor of three is both seriously misleading and completely ridiculous.

The HGMA has no authority nor means to enforce the above stated policy. It asks for the cooperation of the hang gliding media and the manufacturers in supporting a policy the intent of which is to avoid confusion and misrepresentation among hang gliding consumers.

Reply from Skylines, Ltd.

A round of applause is in order for Mr. Mike Meier's outstanding job as our industry's "policeman," for blowing his whistle so often on the inappropriate statements of some manufacturers, and for indefatigably pointing out to the public "seriously misleading and completely ridiculous" ad copy! One wonders where our sport, hang gliding, would be today if Mr. Meier was not on the constant lookout for careless comparative and superlative references to the HGMA standards.

The Skylines two-seat advertising copy in the last issue of *Whole Air* contains such a misleading statement and it is my duty to publicly make amends and correct the information.

The ad copy should have read that the Skylines glider was *load tested* in Germany to 3 times greater than HGMA requirements for a single-place flex wing hang glider." The Skylines system's hang glider, the Azur 19, was in fact tested to positive loads up to 3,700 pounds without suffering structural failure or permanent deformation (200 pound pilot, 250 pound passenger, and 200 pounds of trike times 6 G's). Negative load tests were successfully performed using the same factors. That is what we intended this ad copy to read. Certainly, no one here at Skylines had any intention of printing that any glider could perform and exceed all of HGMA requirements by a factor of three, and once again, I would like to apologize for such "seriously misleading and completely ridiculous" information.

Furthermore, I would like to point out that the load testing on the Azur was performed and certified by the German Certification committee, whose standards are recognized by HGMA. The Skylines ad statement is verified by a body whose authority is recognized by HGMA. Although I can certainly appreciate Mr. Meier's zeal in disabusing the public of seriously misleading and completely ridiculous information, being the conscientious "watch tower" (no pun intended) that he is, I cannot help but wonder if it would not have been just as effective to give me a call or write me a letter to find that the apparent heresy in the ad was in fact a wording or typing error, and was certainly not intended to affect the credibility of the HGMA nor to "obtain promotional benefits" of the HGMA certification program.

As it stands, I learned of Mr. Meier's objections indirectly, through his letter to the media. This does not say much about the

working relationship of a manufacturers association of seven members!

Lastly, I wish to affirm my personal full support for the HGMA program as being the best in the world, and the most accessible to any manufacturer, big or small. I hope Mr. Meier will accept my personal apologies for having violated, albeit unwittingly, the spirit of any HGMA policy.

(signed)
Jean-Michel Bernasconi,
President, Skylines, Ltd.

Reply from Delta Wing

In answer to Mike Meier's letter I must begin by saying, Mike, that I am on your side. Everything you said is correct and everything our ad said is also correct. The Light Dream *is* load tested to the same rigorous HGMA standards as with all the heavy certified gliders.

The Dream 161 was first

certified on October 27th, 1982. The subsequent development of the Light Dream only required the appropriate addendum which, due to a misunderstanding by Mark West, would have been presented on March 14th, well in time for the last issue of *Whole Air* but is now due to be presented on April 11th and with God's and your blessing will be passed.

Sorry for any screw up Mike, and thank you for being our (the HGMA and USHGA) policeman — a most uneveivable job at any time.

(signed)
Bill Bennett,
President, Delta Wing Kites
& Gliders, Inc.

INDUSTRY NEWS

Wills Scores Two Contest Successes

Wills Wing Customer Service Representative, Jim Shaw, flying a Wills Wing Attack Duck 180, won the Christian Care Cup Arizona X-C Race, sponsored by the Arizona Hang Gliding Association, turning in a 54 minute time for the 25 mile course.

Shaw turned back noted Arizona XC Champion, Bob Thompson and World Team Pilot, Mark Bennett to win the event.

REGION 10

Tom Phillips, flying a stock Wills Wing 180 Attack Duck, finished 2nd in the just completed part I (of IV) Region 10 Regional Championship Series. Phillips lost out only to FAI World Championship Silver Medalist, Stew Smith, in the demanding cross country contest.

Phillips was the highest placing pilot to fly the meet in a production HGMA Certified glider.

Wills Wing congratulates Jim Shaw and Tom Phillips!

Wills Announces 1984 Demo Tour

The Wills Wing Demo Tour is on the road again for the 1984 season. Hosted by local dealerships, the Wills Wing Demo Tour provides pilots with an opportunity to test fly new gliders, compete in fun type flying contests, and attend tuning, service, and informational clinics. Pilots wishing to participate in a Wills Wing Demo Day should

contact their closest Wills Wing dealer. Pilots unsure of the location of their closest dealership may contact the factory at 714/547-1344, or 714/547-6366.

Wills Offers Flylite Deluxe Harness Model

Wills reports very high sales of their new Flylite Deluxe foam cocoon harness.

The harness features an externally faired ballast container that reverses to form a comfortable back pack gear bag. Additional features include three external zipper access pockets for maps, gloves, glasses, wallet, and so forth.

Other notable features of the new harness model are the Wills Wing parachute safety lock system, integral webbing sky diving harness, and color accent stripes.

Retail price of the harness in stock colors with back pack and externally faired chute container is \$235.00. Custom color choice is a \$30 option. Contact your local authorized Wills Wing dealer for additional information, and to order.

HGMA Certifies Skyhawks

At the February 29th, 1984 meeting of the HGMA Board of Directors, documentation packages were presented and accepted for the Wills Wing Skyhawk 168 and Skyhawk 188.

A complete list of presently certified gliders will be published in a future issue of *Whole Air*.

Ups and Downs of Towing

Dear Editor:

Towing may be a great boon to hang gliding (and thus the USHGA), but should the "Towing Mentality" replace the "Mountain Mentality?" Never!

The potential future of our sport as described in "The Towing Mentality" (March '84, pg. 24) is a perfect description of sailplane operations, with heavier, higher aspect, non-foldable, permanently based, club-owned gliders. If I wanted to fly a sailplane, I would! I got interested in flight due to the naturalness and simplicity of hang gliding. It is inarguable that mountain launching is the most bird-like way of getting airborne that is available to us. I would hate to see my favorite mountain sites suffer neglect because towing replaced foot launching. Why ask us to switch from mountain mentality to towing mentality — cannot we accommodate both?

I am fortunate to live in a mountainous state. For me, foot launching from a mountaintop is still the cheapest, simplest, and most natural way of taking off. Please, *Whole Air*, do not get such a "Towing Mentality" that you neglect foot-launched flight in your magazine. You may alienate as many pilots as you gain.

Rodger Hoyt
Rogue River, OR

tions. Final selection is limited to 40 pilots.

The entry fee is \$250, and membership in the Cross Country Pilots Ass'n will be required of all contestants. The event is sanctioned by the USHGA.

Pilots are invited to submit resumes to the Cross Country Pilots Ass'n, c/o Competition Coordinator, P. O. Box 458, Independence, CA 93526 USA.

INDUSTRY NEWS

especially for use with the popular Radio Shack five watt and forty channel C.B. radio.

The headset is supplied with plug-in jacks installed for this radio and no modifications or special wiring are required. A push-to-talk switch and coil cord are standard. The Headset will attach to any over-the-ear helmet by drilling a single hole. The attached headset will quickly disconnect from the helmet by means of a ball joint or will flip out for easy helmet removal.

The Mark V headset is an economical solution to reliable C.B. communications for cross country hang gliding, glider towing, and ultralight aircraft. Price for the unit is \$125.00.

Also offered is a complete line of Skyting hardware for the hang glider enthusiast. A free Skyting catalog is available upon request from Midwest Motor Glider Supplies, 2638 Roberts, Waukegan, IL 60087, or phone 312/244-0529 after 6:00 PM CST.



New Headset Available for C.B. Radio Users

Midwest Motor Glider Supplies announces availability of the new Mark V C.B. Headset designed

Vedder Mountain Competition Announced

The Vancouver Fraser Valley Hang Gliding Club (VFVHGC) is pleased to announce that the Annual Vedder Mountain Hang Gliding Competition for level IV pilots will take place this year on May 19-21 in Yarrow, British Columbia. The Club would like to extend an invitation to American pilots and welcome their participation in this contest.

Vedder, approximately 2,600 feet MSL, with a northwest exposure overlooking the beautiful Fraser Valley, is an exciting mountain to fly. A camp ground, with complete facilities, is located three miles from the landing field. Camping sites will be provided free to those who need it.

For further information and entry forms (maps included), send a self address stamped envelope (SASE) to David Pope, 203-1065 Pacific St., Vancouver, B.C., Canada V6E 1S9

7th Annual Rock 94 Festival

On September 1-3, 1984, the Seventh Annual 94Rock/Free Spirit Flight Hang Gliding Festival will take place, at Draht Hill in Elmira, New York.

A \$1,000 purse plus trophies are offered for both Team and Open classes, and Beginner to Advanced pilots are welcome. The Festival will feature ultralight flying demonstrations, plus towing and aerobatic demonstrations.

Nearby camping facilities are available. For more information, contact Free Spirit Flight HGCI at P. O. Box 13, Elmira, NY 14902.

Fort Funston Race Date Set for Early May

The increasingly established Fort Funston Air Race World Invitational Hang Gliding Championships have set the dates for the 1984 event. Beginning May 3rd, and lasting through May 6, 1984, the Race lists prizes of \$1,000 cash to the winner, and trophies awarded through 10th place.

The entry fee was \$75.00 for early entries, but is now \$100.00. Upon receipt of the fee, pilots will receive a registration packet with complete information, rules, and other items of importance concerning the Race. Those who did not respond in time for the

1984 event can obtain information for successive years by writing Meet Director, Walt Nielsen at San Francisco Windsports, P. O. Box 16142, San Francisco, CA 94116, or by calling 415/731-7766.

Kitty Hawk — West Releases '84 Calendar

Events at Kitty Hawk Kites — West in Monterey, California are scheduled as follows:

MAY 12 & 13 — Demo days; with Pacific Windcraft, Wills Wing, Delta Wing -- gliders and representatives available.

MAY 12 — Aerobatic Seminar with Rob Kells.

JUNE 9 — Parachute Clinic
JUNE 16 — Mountain Clinic
AUGUST 18 — Parachute Clinic
AUGUST 25 — Mountain Clinic
SEPTEMBER 5-9 — Owens Valley Guided Tour

DECEMBER 29-31 — Southern California Guided Tour
Contact Jim Johns of Kitty Hawk Kites — West by calling 408/384-2622.

12th Annual Cochrane Meet Scheduled

Organizers at Muller Kites, Ltd., have scheduled the 12th Annual Cochrane Meet for June 22 through 24, 1984. The Level II through V meet offers trophies, a Friday night (June 22nd) parachute packing seminar, and three days of cross country flying.

The presentation of the Seagram's Cup will occur at the Awards Ceremony. Included in the entry fee is a roast beef dinner.

For further information, contact Willi Muller at 5-1303-44th Avenue NE, Calgary, Alberta, Canada T2E 6L5, or phone 403/250-2343.

Oops On Photo Credit

On the December issue of *Whole Air*, a beautiful Yosemite shot adorned the cover. But due to a very late selection of this photograph, inadequate credit and explanations were offered.

Greg Shaw, in a third glider, snapped the captivating scene of Pat Denevan (of Mission Soaring) on the Demon Eyes Team Demon in the foreground, and Mark Andersen in the blue Comet at the left of the page.

The view is over Cathedral Spire, looking up-valley toward Yosemite Falls. The trio launched from Sentinal Dome (legal only that summer), which is the only flying access to the Spire — one cannot get there from Glacier Point — so the well-liked cover photo is indeed a rare shot.

Whole Air would again like to thank Greg for his beautiful, and rare, contribution!

Hang Gliding to be Represented at Atlanta Ultralight Exposition

In response to requests from ultralight aircraft manufacturers for a major ultralight business event in the southeast, H. L. Marketing Services, Ltd., have announced the scheduling of the International Ultralight Aircraft Exposition/Atlanta.

The Atlanta Show has been confirmed for May 4, 5, and 6 at the Atlanta Civic Center. Atlanta was chosen for the event because it is a booming city with an immediate market base of two million people, and is well known as a "convention city" with an abundance of quality hotels, restaurants, activities, and a major international airport directly linked to dozens of cities worldwide. Atlanta is also with comfortable driving distance (300 miles) of such major areas as Jacksonville, Birmingham, Nashville, Memphis, New Orleans, and other cities.

With the recent successes of both the Toronto and Los Angeles Expositions now proven, the Atlanta Exposition will follow in the footsteps of its predecessors. The show shall provide a professional business environment in an indoor setting, creating a credible industry image to thousands of serious buying prospects.

The Atlanta Civic Center will accommodate 53 ultralight aircraft exhibits along with 30 suppliers to the industry.

The organizers have also provided, complimentary, a booth to the hang gliding industry. The space will be manned by staffers from *Whole Air* magazine. A generic promotion will be mounted in the continuing effort to revitalize the ultralight soaring community. Hang Glider dealers are encouraged to visit the Show, and can come by the HANG GLIDING/*Whole Air* booth to hear more about the Hang Gliding Dealers Ass'n and the benefits it offers.

Organizers will be emphasizing a strong, positive image for ultralights in their trade and public advertising, to help off-set the bad press the industry has received of late. "The theme for the Atlanta Show is 'Get the Inside Story,' to encourage persons to visit the Expo and hear the other side of the story," says Roland Boily, one of the organizers.

Another plan designed to reinforce the credibility of the industry is to feature a well recognized, high-image speaker, such as Col. Jim Irwin. The former astronaut is an ultralight pilot, who is acknowledged as being extremely safety conscious.

The organizers have opened the door to including hang gliding at other of their image-building series of Expositions for 1984. For further information on the

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show, contact H. L. Marketing Services, 253-375 York Av., Winnipeg, Manitoba, Canada R3C 3J3, or call 204/944-1464.

Denny Pimentel Now With Progressive Aircraft

Denny Pimentel came to Progressive Aircraft Company in early 1983, bringing with him over ten years of manufacturing experience, beginning with Phantom Wing Company.

For the last seven years, his company, Aerial Designs, made sails for companies such as Manta and Stratus. He is currently Sail Loft Manager for Pro Air.

Pimentel is actively involved with the new high aspect ratio, strutted Dawn, which is scheduled for release in early spring.

N.C.H.G.A. to Produce Site Directory

In order to provide a handy reference for Carolina hang glider pilots, as well as an informative booklet which would help to promote the sport of hang gliding in the Carolinas, a directory of pilots and flying sites is currently being compiled.

So far, the name and address listing is nearly complete. Site questionnaires have been sent out to pilots located near the region's many favored flying sites.

Currently, 86 pilots are members of the NCHGA, and with the 20 or more members of the South Carolina HGA, these flyers will automatically receive copies of the Directory. Considering that many of these pilots also fly the Tennessee Tree Toppers' sites quite often, we are considering including information from that area as well. Consequently, this Directory may well be of interest to many of the pilots from the Chattanooga area.

The NCHGA also intends to print enough extra Directories to make them available to new and visiting pilots. It can also be helpful to distribute to site landowners, newpeople, or other parties interested in better understanding the sport of hang gliding.

By supporting the project with advertising, suppliers can spread the word about goods and services offered, and help promote the sport as a whole. Interested businesses are invited to contact organizer Gretchen Niver at 701 Northhampton Dr., Cary NC 27511, or phone 919/467-5262.

1984 Region 1 Regionals Announced

Details of the 1984 Region 1 Regional Competition were announced at a meeting at Shakeys Pizza on March 5th. The contest will be held at Chelan Butte, July 13 through 15, 1984. The entry fee will be \$25.00 prior to July 6; \$50.00 after July 6th.

The contest format will be two tasks, to be decided by a vote of a "pilot representative" committee each morning. Task A will be a one hour open launch (9:00 to 10:00 AM) duration; Task B will be a three hour open launch (Noon to 3:00 PM) race to a declared goal. Elapsed time/standard CPS scoring will be used.

Requirements for competition are USHGA membership and an Advanced (Hang III) rating, however, unrated pilots or those with I or II ratings may see Mike Daily for petitioning.

For more information contact Joe Bulger, Meet Director and Organizer, at 232-1822.

Delta Wing Sales Up 35% Over 1982

Delta Wing is happy to announce that 1983 glider sales were up 35% over the previous year. Delta Wing wishes to thank its dealers, and most of all, the pilots flying our equipment, for their support.

Delta Wing's goals for 1984 are to continue this growth pattern and improve manufacturer/retailer relationships through effective vehicles of communication such as dealer newsletters, glider tuning guides, a travelling support team, and regional maintenance and tuning seminars.

For the dates of these seminars, contact your local Delta Wing dealer.

Dates Announced for 1984 Grouse Mtn Contest

It is time for another Grouse Mountain contest. The competition starts with a mandatory pilots' meeting on July 17, 1984, and the competition flying is from July 18 through to July 22, 1984. Practice flying will commence July 14th.

It is well known that the Grouse Mountain Championship is one of the preeminent contests in the international world of hang gliding, and with good reason. The mountain itself is a rugged 4,000 feet (1200 meter) peak. It is one of the dominant features of

the Vancouver skyline offering breathtaking views of the surrounding mountains, Pacific Ocean, and of the city of Vancouver. The thermal lift is usually stratchy, especially around the ascending pylon course. The pilots come by invitation only and are the best in the world. There are the Australians, including Steve Moyes, the only two-time winner; the British — we look forward to a rematch between Bob Calvert and Steve; the Americans, perhaps the best pilots in the world, are looking for their first victory here since Rob Kells won in 1980; the Canadians — the Canucks are always tough competitors; and we expect a number of newcomers, particularly the Brazilians. The tight landing field is legendary, and probably the less said about it the better.

The competition is being organized by the same people that you have come to depend on... the Blackmore brothers and the Grouse Mtn Flying Team. This is your guarantee that there will be a superbly organized contest, and at the end, the winners will receive their share of the minimum guaranteed prize money of \$5,000.

Remember, you do not have to be a competitor to enjoy the flying at Grouse Mountain. Approved guest pilots are welcome to fly the mountain, particularly on weekends (except during the contest itself).

For more information about the contest or guest flying, please contact the Grouse Mountain Flying Team at 17679 - 57th Av., Surrey, B. C. Canada V3S 4P6, or call 604/574-7431.

1984 Owens Valley World Championships Scheduled

The Cross Country Pilots Association will sponsor the 1984 Owens Valley Cross Country World Championships, scheduled to be held June 30 through July 11, 1984.

Tasks will be out-and-return racing to a specified goal, with an open distance task reserved for July 11th.

Scoring will be the Total Elapsed Time (TET) system devised by sailplane pilot, Bill Feldbaumer, in which the fastest pilot overall wins.

Eligibility will be determined by cross country soaring accomplishments, national and international competition performance, and the recommendations of national organizations. Final selection is limited to 40 pilots, with the entry fee set at \$250. Membership in the C.C.P.A. will be required of all entrants.

LEAF has the best selection of Anodized Aluminum Tubing available in the nation.



BACK TO BASICS

With the imported advent of the successful trike aero tug, more interest in trikes may follow. Here's a review of a super-light trike, aimed directly at the soaring pilot, with 240 fpm sink rate/Story and Photo by British Correspondent, Noel Whittall

FIRST CAME THE hang glider.

Then came the powered hang glider.

Then came the ultralight aircraft ("Microlight" in Britain).

Then came *Controls and Regulations*.

In Britain, some of these controls were sensible, some very necessary, and some ludicrous. In many cases they have been introduced with more haste than intelligence, and certainly the growth of the sport has been greatly stifled as a result of them.

Fortunately, concessions were made right down at the bottom of the market, in that aircraft with a gross weight of 70 kilograms (154 pounds) exclusive of pilot are less regulated than most — particularly in the area of airworthiness inspection and certification. Until recently that did not mean much, because there were virtually no such aircraft in use. But the scene is changing rapidly.

One of the first to make an "ultralight microlight" to come in under the 70 kilogram rule is Len Gabriels of Skyhook Sailwings in Lancashire. A true pioneer of British hang gliding, Len has always been in at the start of any new trend. His most spectacular recent design has been the "Orion" foot-launched sailplane (pictured in the May/June 1983 *Whole Air*). Alas, the U. K. trading recession has left the Orion project chronically short of development funds, and the prototype now languishes in Len's factory, having flown but once. Meanwhile Len applies himself to aircraft likely to show a more prompt commercial return.

One such is his sub-70 kg "Pixie" trike. This is simply a monopole trike reduced to essentials so that it weighs just 81 pounds (36¾ kg). As the photos show, it is by no means skimmed to arrive at that figure, and a further few pounds may yet be shed before production is finalized.

Power comes from 210 cc's of two cycle engine, drawing a 50" by 30 (pitch) prop via a 2.4:1 reduction drive. The solo engine is very well silenced, and in a mild



state of tune. Unlike many other British-designed, it is mounted with the cylinder vertical and upward. This is to ensure a clean sparkplug for mid-air re-starts, because the little Pixie mated with a high performance wing delivers quite an acceptable engine-off performance. Len

claims a minimum sink rate of 240 feet per minute, and my own impression is that such a figure is close to the truth. The 1 in 9 glide seems about right also. The conception of powering to altitude and then switching off to soar thermals has always featured more in advertisements

than real life, and the Pixie could be the first model to bridge the gap between theory and practice.

The example I flew one recent winter evening was most pleasant both in the air and on the ground. Len's local testing field is less than ideal, being surrounded by rock

fences, power wires, a caravan site, and a reservoir. The surface is far from smooth, and slopes rather steeply towards the caravans. Oh yes, it is also very small!

I was distinctly nervous as I ran the engine up before take-off, because I have had problems getting aircraft with larger

engines out of more spacious fields, but need not have worried. The little trike leaped off the ground after at most 50 yards of run across the slope and into an 8 mph breeze, and climbed away beautifully. Two hundred fifty feet were gained in the first minute, after which I felt confident enough to throttle back considerably while the aircraft continued to climb steadily.

In the air the outfit was an absolute delight to fly. Control inputs were so light as to be almost imperceptible, and coordination of control seemed automatic. The wing to which the trike was attached was the Skyhook "Zeus." This is a fairly orthodox CFX (concealed floating crossbar) glider, but through very careful selection of tube and bolt sections, it weighs around 10 pounds less than its run-of-the-mill competitors. Naturally strength has not been sacrificed, and the whole combination rates at +6G.

Since trikes first appeared, little over three years ago, they have turned into a clearly identifiable sub-species of aeroplane. They have become increasingly powerful, heavy, and specialised. They have demanded special wings, often no longer flyable as hang gliders, and in the most extreme cases, have acquired bullet-resistant seats and arm racks for military use. How pleasant therefore that Len Gabriels has seen fit to go back to the beginning with this lightweight, soarable, inexpensive add-on unit.

As the pictures show, some more work is necessary before the final production version is ready for public consumption: the front mudguard is a temporary mylar strip, and because of the ruggedness of Len's flying sites, the wheels are more substantial than will usually be needed. At the end of my trial flight I was glad about the tough wheels, because the wind direction was such that an into-the-wind approach also meant that the slightest overshoot would end in a rapid downhill run into the caravans. Impeccable judgement and great precision on the throttle control were essential. However, not only have I previously established on various occasions that my judgement is not always impeccable, but the throttle level had become unscrewed halfway through my first landing approach. The requirement to handle the aircraft one-handed while holding the throttle together with the other was sufficient to convince me that my chances of collecting a rock fence or a camping trailer at one end of the landing or the other were greater than I fancied. In the end I settled for paraphrasing Billy Joel, and becoming a "Downwind, Uphill Guy." The little trike handled this very fast touchdown onto the rough pasture without protest, but I was thankful that narrower tires were not standard equipment!

The basic formula is about right, and with the detail work tidied up a little, I am sure that many hang glider pilots who, like me, had become rather disenchanted with the power race will consider coming back into powered sport via miniatures like the Pixie. §

BREEZ * DAWN * Light DREAM

With negligible "billow", tip-oriented sail shift, and no pre-loaded leading edges . . . thus much lower trailing edge tension . . . and lighter weight in a greater span, earning reasonable handling . . . Pro Air's new Dawn holds both surprises and promise/Article and ground photos by Dan Johnson/Factory Statement and air photos from Progressive Aircraft Company.

THE DAWN

JUST HOW MUCH difference can one see in Progressive Aircraft's newest model, the Dawn? How much of truly new thinking is involved? Can it compete? Will it sell? These are all engaging questions. No one has spent more time pondering them than designer, Dick Boone.

REFLECTIONS

It has not been an easy decade so far for U. S. hang gliding. Besides the well publicized dilemmas of shrinking Association membership and struggle-to-survive combat fought by nearly every retailer and most of the sports' remaining six U. S. manufacturers . . . a problem receiving lesser attention, but perhaps of even greater gravity is the lack of new product development of a sort which has really arrested the hang gliding community.

Progress has been marked most saliently by refinement. The double surface superships or bladewings which trailed UP's introduction of the Comet have received such precise attention to detail and structural integrity that many conclude this indicates the end of the rope has been reached for flex wing design. Without a doubt, every manufacturer would resist this allegation. Not only may such a concept be incorrect, but aggressive marketing simply cannot permit this complacent attitude.

Certainly, Delta Wing, via the Streak's impact, has increased its once disproportionately small market share.

Pacific Windcraft entered the foray so recently that its success cannot be positively assessed, with what might be called "the first intermediate double surface craft (the Vision)."



Seedwings considerable progress with their Sensor 510VG (Variable Geometry) is a phenomenon with which front-runners Wills and UP must reckon. Trampenau's as yet uncertified VG was reportedly back-ordered some thirty five units in March. With a \$2,800 price tag, this obviously must please the company whose 1983 unit sales totalled about 125.

As the majors — Wills, UP, and Bennett — rush to answer the retailer's cry for state-of-the-art intermediates (also read "trainers"), the custom builders stand ready to approach the improving 1984 market with an intriguing array of different ideas. Seedwings can be expected to pursue the 510VG's attraction with vigor, and certainly Trampenau's Santa Barbara company *does* now advertise as much or more than the Big Three. They also have plans to introduce a Hang 3 "intermediate Sensor 510." Once their new headquarters is fully organized, we can probably expect more promotion along this line.

Pacific Windcraft has just achieved what may be correctly labeled a "coup d'etat" by linking up with world leader La Mouette to introduce America to aero towing with the reverberations of a nuclear detonation. All manufacturers, retailers, and pilots can expect beneficial results from this effort. Even by itself, this move, certainly not their only one, should likely vault Bernasconi's firm into permanent national prominence. It certainly is an unusual occurrence when one manufacturer earns *both* magazine covers in the same month, for extraordinary achievement, like 221 miles on a Comet.

Mention must also be given to a new firm, developer of the control-bar-fitted Mitchell/Morely U-2 Superwing. Please refer to page 21 for further information on this newest of entrants.

AND NOW, FOR SOMETHING COMPLETELY DIFFERENT

Progressive Aircraft, a firm many industry observers perceive as a relative "sleeper" of late, is ready to unleash an entirely new approach to flex wings on the largely unsuspecting hang glider community. In concert with the newest offerings from every other manufacturer in the USA (and some surprisingly strong contention from foreign suppliers, like Airwave), Dick Boone's Pro Air is preparing the release of their new Dawn, following almost five years of research and development. The performance-attuned reader/pilot would do well to pore over the photos accompanying this article and to thoughtfully ponder what changes are really present. Jumping to unfounded conclusions will only serve to confuse the evaluator.

WHAT'S IT ALL ABOUT? A LAYMAN'S VIEW

Let us begin with the airframe. Though sail technology is also somewhat different in the Dawn, the more salient departures can be witnessed in the frame design.

Probably the most striking change is the elimination of side wire bracing, top and bottom. But not only are struts doing this duty, their length is much shorter than when this alteration has been tried on earlier models.

In the current configuration — others have been used over the four years of development, but abandoned — cables *do* brace the control bar, fore and aft, as well as tension this plane of support. However, when you examine the photos, you see no top wires. A clever arrangement uses a kingpost which stands no taller than the keel pocket, thus concealing it, but also the erection of the kingpost occurs simultaneously with the rearward movement (tensioning) of the crossbar (read "cross-spar" for more accuracy).

Another obvious omission is that of luff lines, and the way-inboard location of the washout strut or defined tip. At a point

FEATURES of the Dawn

- 1— Production Dawns are designed to be equipped with faired side struts and no top rigging.
- 2— The Pro-Dawn uses an inboard washout strut and has no bridle lines.
- 3— The tip is a combination of a curved aluminum tube to provide washout and a fiberglass rod for flexibility.
- 4— The crossbar (wing-spar in the case of the Pro-Dawn) is designed to support 75% of the designed flight loads, while most of the leading edge is under only tension loads. This innovative design feature makes the Pro-Dawn light while keeping the sail twist low.
- 5— Two mylar insert pockets per side.
- 6— Lexan/aluminum battens using three different sizes of tubing for ideal weight and strength.
- 7— Enclosed keel pocket, completely hiding all set-up hardware.
- 8— Unattached lower surface at tips.

we would guess to be just outboard of mid-span, you will discover a long, stout member which serves as the primary pitch stabilizer. A most interesting down-stream concept could employ this same component as a control surface lever arm (more on this in a later issue).

But the main change about which all others hinge is the use of the crossbar as the main flight load support. Hmmm? Most unusual? Let's look at the idea.

Though it may seem inappropriate in a discussion of a new *glider*, let us look first at common (powered) ultralight construction. Perhaps the most similar, or

copied, airframe design resembles the Eipper Quicksilver line. A leading edge tube is separated from a trailing edge tube by a series of compression struts. The leading edge carries the main flight loads, but the trailing edge comes in to sharp use when G load increases. The increased pull upward on the sail at the maximum camber point tugs forward on the sail's trailing edge, increasing load on that trailing edge. But no support member is positioned chordwise under the wing's center of lift. The resultant forces cause the need for adequately strong compression struts, with frequent usage of drag/anti-drag bracing. Ah, but hang gliders have no trailing edge member, you say?

True enough. And the lack of such a spar (except in the likes of fixed wing designs as the Fledgling, Easy Riser, or Mitchells) causes another whole range of problems.

Since the initial rogallo concept led us to triangulated airframes, the leading edge — as with the Quicksilver layout — is the main flight load support. The crossbar holds the leading edges at the proper angle and tensions the sail's otherwise unsupported trailing edge. What results is amazingly tight sails, pulled taut along the trailing edge by intense leading edge rigidity. This offers reduced twist (washing out) so that performance is enhanced. The leading edge, however stout (and correspondingly heavy), bows under this application, thus requiring complex sail design, construction, and fitting. While sailmaking has been honed to an artform by leading manufacturers, one very undesirable situation develops.

The tight-as-a-drum sail of modern gliders does not flex as well as on earlier models (more billow-y designs). Hence, handling suffers relatively in proportion to the effort which reduces twist (to heighten performance).

Various mechanisms have been employed to benefit handling, like tall control bars which give the pilot's weight shift more authority, floating crossbars (actually a floating keel), and shifting sails via tall keel pockets, which produce effective anhedral. Much experimentation with cloths — both "soft" and "hard" — has also played a role, as have several inventions to vary billow in flight.

AIRPLANES ARE NOT SO CONSTRUCTED

To my knowledge (almost) every conventional airplane manufacturer uses another system to support in-flight loads. Very simply this is called a wing spar, but that term is not so very descriptive relative to this article. What *is* more informative is to say such flight load bearing spars run the span of the wing at a point within the wing directly under the center of lift.

But your average Beechcraft, Cessna,

or Piper does not rely on weight shift, so no flexibility is required of its wing. Here, our modern sailgliders differ. And here is where the British Hiway Explorer got the conventional construction idea wrong. [See Explorer photo.] They too ran the all important cross-spar under the wing's center of lift. But in so doing, they sacrificed tip flex and inhibited sail shift. They were thus forced to add tip rudders to turn the Explorer, losing the simplicity of pure weight shift.

In Pro Air's Dawn, Boone has run the cross-spar from the same general point at the keel (root), but to a point forward of the center of lift at the tip. The cross-spar is bolted to the leading edge at approximately three quarters of the way to the tip. What happens there is that the tip then is set free of flexibility restraints imposed by a full length cross-spar (as on the Explorer). So the best aspect of weight shift works in harmony with this sensible-sounding idea of a cross-spar for flight load support.

NOW TO THE SAIL

In conventional (rogallo-type) configurations, when increased in-flight loads are imposed, the sail pulls forward from the trailing edge (as on the Quicksilver) because the support spar (leading edge) is forward of the center of lift. The resultant distortion causes more billow, or perhaps more correctly, increased twist. This increase in twist defeats performance, and is thereby undesirable. To combat this loss, high

tensions are imposed on the trailing edge to restrict most of the twist. But two disadvantages reveal themselves.

Firstly, the airframe structure must handle the trailing edge tension, which necessitates heavier components. The trailing edge tension is transmitted to the leading edge — which bends rearward under the load — and in turn the leading edges cause a significant increase of column load on the crossbar. Another by-product of this first disadvantage is the extra effort needed to design and craft a sail to precisely fit such compound curves. Secondly, because of the great tension on the trailing edge, tip flexibility and sail shift are reduced, which stiffens handling.

Since the Dawn's sail is supported right below the center of lift, billow or twist distortion is demonstrably lower. And because of all this, greater span relative to sail area — or higher aspect ratio — can be used, usually credited with offering greater performance.

CONCLUSIONS

The Dawn is too new to know, absolutely, if performance is greater than other top performers of today. Comparative testing plans are underway, employing aero tugs pulling up two gliders to high altitudes in neutral air for long straight runs. This may help quantify values gained in the breakthrough inherent with construction used in the Dawn.

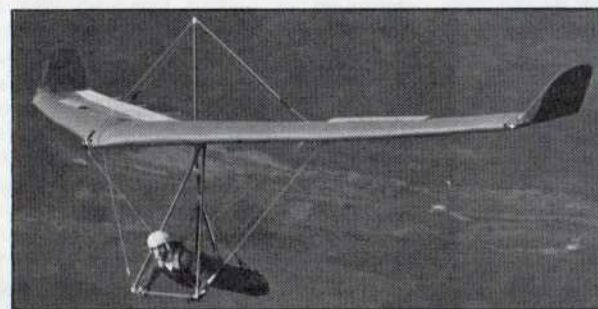
But certainly we can see new technology here. Boone's design may be able to suggest much greater increases in

span, while holding weight down. The pilot might be moved closer to the wing, which may enhance performance. Sails will not be under such stress and may last longer. Augmented weight shift control using moveable washout struts could bring unheard-of controllability. And cleanliness of the overall package may accompany the reduction in aircraft weight to produce the wings of tomorrow.

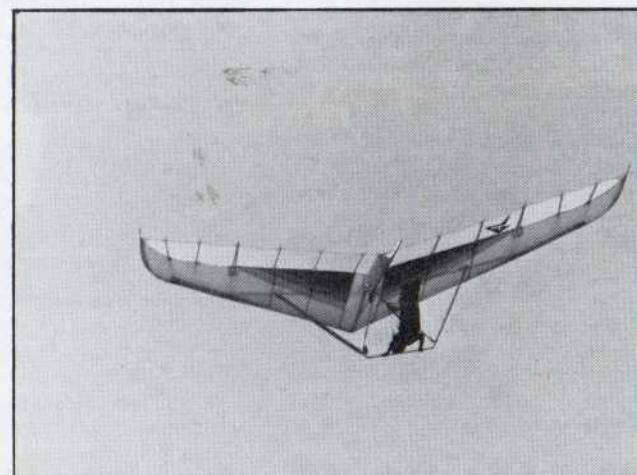
Is this the beginning of "Good Bye" to the faithful rogallo? As the first rays of a new summer soaring season begin to light up the day, we can see a whole new Dawn out there.



(Left) The Hiway Explorer, discontinued from production when Hiway collapsed. (Right) The new Dawn from Progressive Aircraft.



In looking at the above wings, little similarity is obvious, yet more is present than initially meets the eye. Both craft use "wing spars" to bear in-flight loads. The primary difference, and the one causing Hiway to employ the rudders you see, relates to the positioning of the wing spar. By having it forward of the center of lift line at the tip, Pro Air's Dawn retains weight shift control simplicity.



SPECIFICATIONS

Leading Edge	Primary 16' 8"	Tip 4'
Keel Length	7 feet	
Nose Angle	130°	
Sail Area	155 square feet	
Wing Span	34½ feet	
Aspect Ratio	7.68:1	
Weight	53 pounds (ready to fly)	
Pilot Weight Range	150-240 pounds (hook in)	
<i>NOTE: Because of its light weight, to achieve your desired wing loading, less glider area is required. A 150 pound pilot would have the same wing loading as in a 172 ft² glider weighing 74 pounds.</i>		
Battens per Side	6 upper	3 lower
Set-up Time	10 minutes	
Price	\$2,395	
Introductory Pricing	\$2,095	



PROGRESSIVE AIRCRAFT FACTORY STATEMENT ON THE DAWN DESIGN

THERE WILL BE a new glider on the market this spring. Designed and manufactured by Progressive Aircraft Company, the Dawn represents a totally new concept in hang glider design. This concept may very well lead the industry into a new era.

With its completely new blend of aerodynamics and structure, the Dawn is not just a new generation of contemporary design, but rather a new family of design in a class all its own. Compared to rogallo glider design and to rigid wing glider designs, the Dawn is strikingly new and different.

Francis Rogallo's twin lobed weight shift design — two leading edges, crossbar, and keel — is the basic concept in use by 95% of modern hang gliders. Progressing step-by-step, today's gliders, although refined, has a structure almost identical to that of the original standard, with the exception of much higher loads. Current designs have made compromises of performance/handling and weight/complexity. Presently the limitations of this basic design (rogallo) is shown in high performance gliders of today which have all met a similar performance barrier.

The advantage of the rogallo design is weight shift control, which is achieved through the interaction of forces present during flight. On the given airfoil of a glider, total upward force (lift) is located behind its support point, the leading edge, making the rear of the sail rotate up when loads are increased. This upward rotation is called washout or twist. Washout at the tips is needed to prevent tip stalling in

turns. In the center of the glider it could mean a loss of lift and an increase in drag. Washout (or twist) is controlled by tensioning the sail along the trailing edge. This creates substantial loading on the leading edges and cross-bar resulting in a heavier structure.

In comparison, wing spar construction is used in almost every modern airplane. Flying load support points (spars) are balanced around the total lift force of the wing. In this design the wing will want to lift uniformly, preventing the washing or twisting up of the wing. This construction prevents excess trailing edge tension, but does not allow for weight shift roll control. The Fledgling, Easy Riser, and Quicksilvers are some examples.

The concept behind the development of the Dawn is one of selecting the best points of both structures. The majority of the flight loads are supported by the Dawn's cross-spar (crossbar), so very little twisting is present. With little twisting load, excess sail tension is not needed to control the washout. Without this additional trailing edge load, the structure can be made lighter. This same location of the cross spar will prevent the sail from blowing down at low angles of attack. This is nearly the same function that normal bridle lines of conventional weight shift gliders, in supporting the center trailing edge of the glider for pitch stability.

The outboard areas of the Dawn operate much like the normal weight shift hang glider. Measured on the trailing edge, the length of the tip on the Dawn which must be supported from excessive twist is about 60% less than normal weight shift gliders. This means that loads, other than flight loads, are much lower. Thus again,

the structure can be made lighter.

NOTE: Though in the photographs a significant amount of twist can be seen, the effect is a visual illusion. On "conventional" state-of-the-art gliders, effective anhedral at the leading edge gives the trailing edge a very flat look. On the Dawn, with effective dihedral, the trailing edge appears to have more twist. However, on both configurations, if one examines the tip angles contrasted to root angle of attack, one sees the twist on the Dawn is held very low.

Turning weight shift gliders is complicated. A major contributor to this is the twisting (billowing) of the sail when it is asymmetrically loaded. This twisting of the sail is made less effective by the load created by high sail tension needed for low sail twist.

The Dawn "billows" more with less pilot input, due to its lower trailing edge sail tension. With the center section of the glider structurally supporting the twist, the Dawn will tend to twist up much further out towards the wing tips. Being that the twist (drag) is further out toward the tip, less drag is needed to start the turn. This will result in a glider that has the benefit of lower structural weight and low sail twisting, yet is very easily weight shift controlled. The Dawn is such a glider.

Another difference is the location of the side support (usually side wires). It is placed on the cross-spar since this is the load bearing member. This places the support in from the leading edges.

This point, along with the fact that bridle lines are not needed (described in earlier paragraph) led to the use of side struts, thus eliminating the need for a

Continued.

GLIDER REVIEW

Beginning a New Excellence in Aerodynamics & Structure



kingpost. The strut is much shorter, lighter, and stronger than ever before possible. The overall frontal drag of the front side struts are not necessarily less than that of the kingpost, top wires, and lower side wires, but there is additional lift loss and drag gain from the disturbance of the airflow caused by the wires being close to the sail and leading edge. There is even more loss of lift and gain of drag located behind the kingpost and created by the kingpost hole. All of these additional performance losses are not found on the strutted Dawn.

There is almost no bending on the leading edges of the frame, so no curved sail cut is needed. This makes an exceptionally clean glider. Two mylar pockets are used. The one located around

the leading edge is stiffened with additional foam to supply an exacting leading edge radius. The second is above the first and supplies additional support to the sail camber along the leading edges.

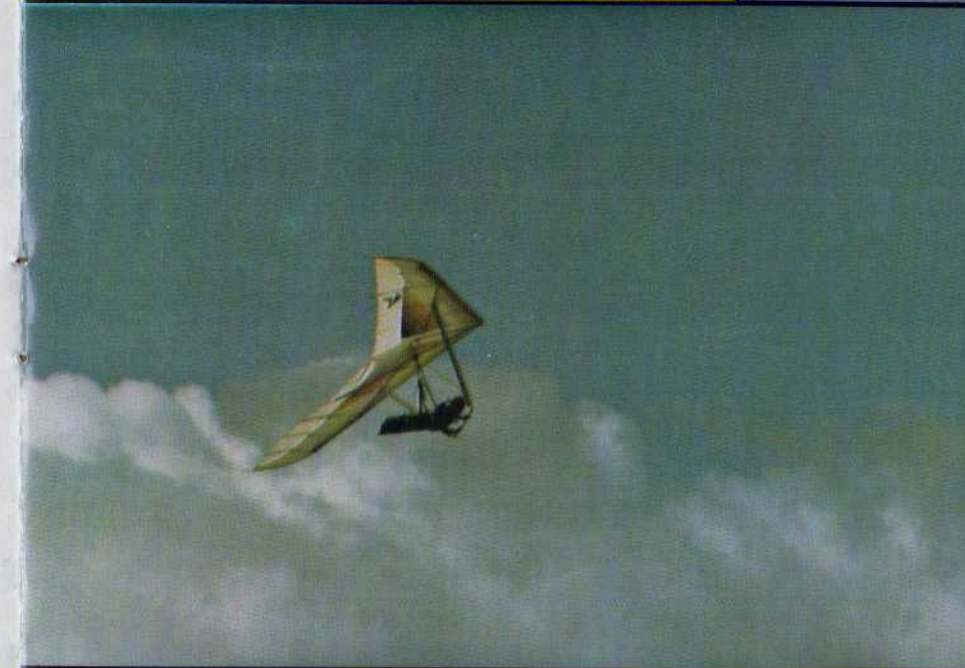
A mid span washout strut is located to support maximum area for additional stability. This is inserted into a pocket and then located into place. This position supports the greatest amount of sail area. It is allowed to float up with the sail, and locks into a set angle in the negative direction.

The Dawn is designed with a very high span ratio for its given area. This is very desirable for performance, but is normally very hard to achieve in conventional gliders. The Dawn's structure allows greater span, *without excessive weight*

gains. Usually a larger span on normal gliders means more trailing edge sail tension, causing heavier frame weights.

To finish off the glider, fiberglass round tips were chosen to provide a cleaner air flow and flexibility. The tips are drilled at a set positive angle of attack, providing even more pitch stability.

The Dawn represents a breakthrough into a new era in hang glider design. This glider represents years of work by many individuals at Progressive Aircraft Company. We are proud to present this glider into your world of flying enjoyment. Hopefully the future will bring such advancements as cantilevered wings and enclosed pilot pods, yet the simplicity of breakdown and transportation. §



IN A CLASS OF ITS OWN

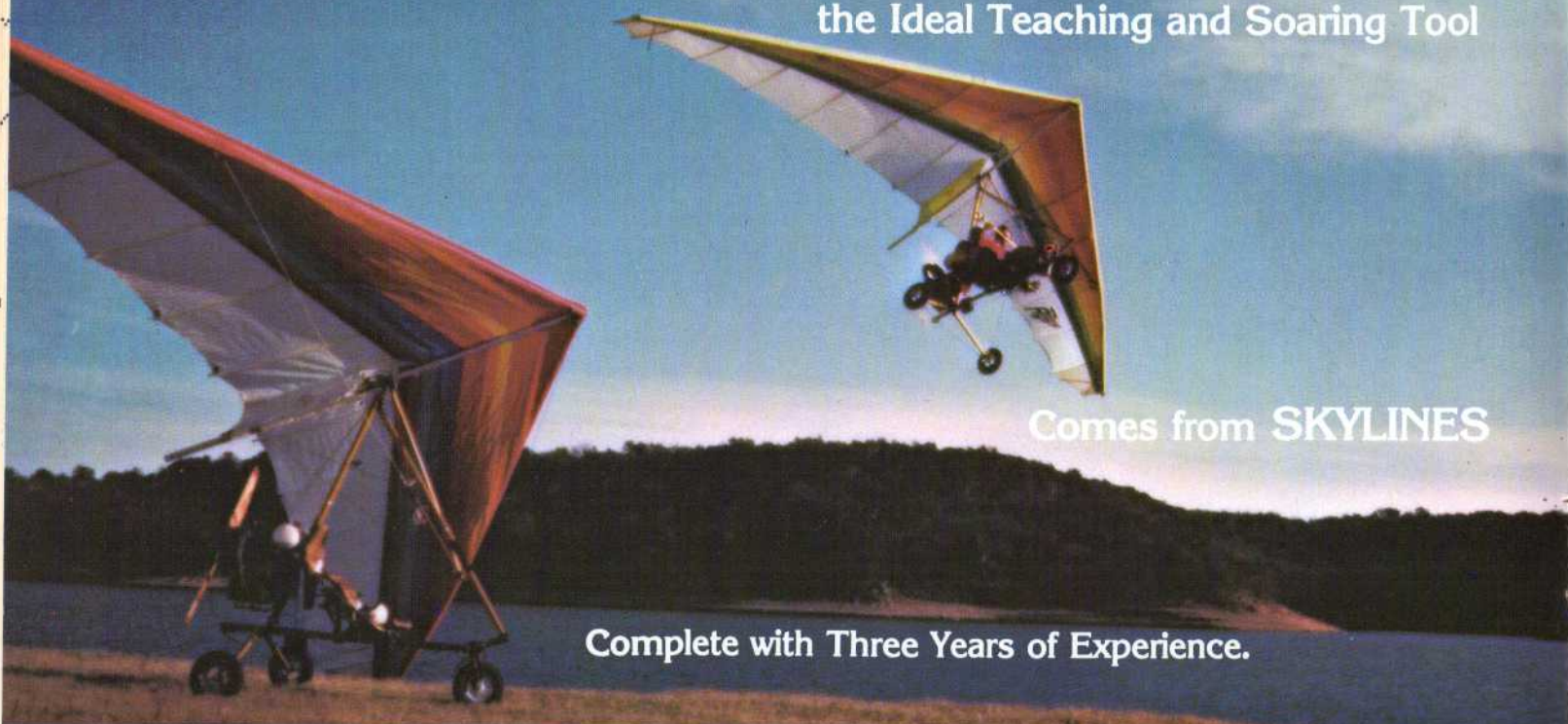
FLY A **PRO-DAWN**



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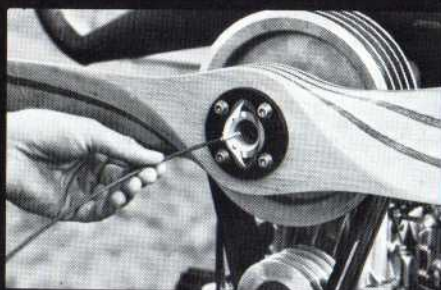
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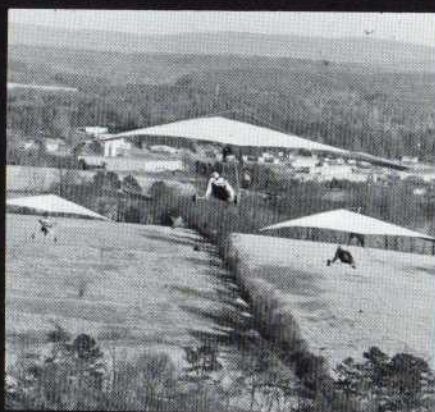


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THE U-2

Don Mitchell's Superwing first appeared in the 1976 Hang Ten contest at Escape Country, flown by Howard Long. Now, a genuine production effort is underway, with some new looks and features/Story and photos provided by Tim Morley



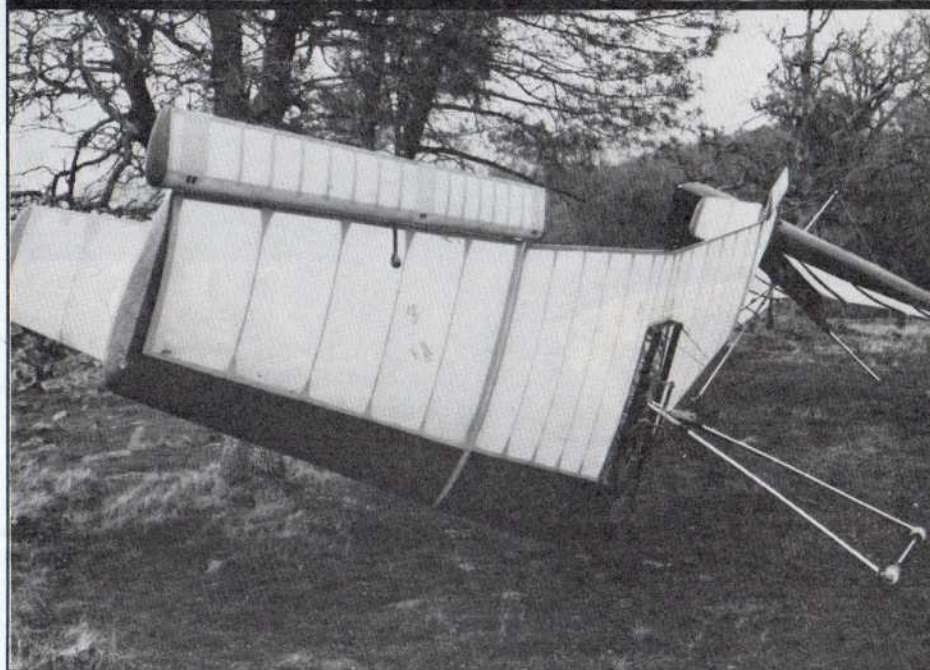
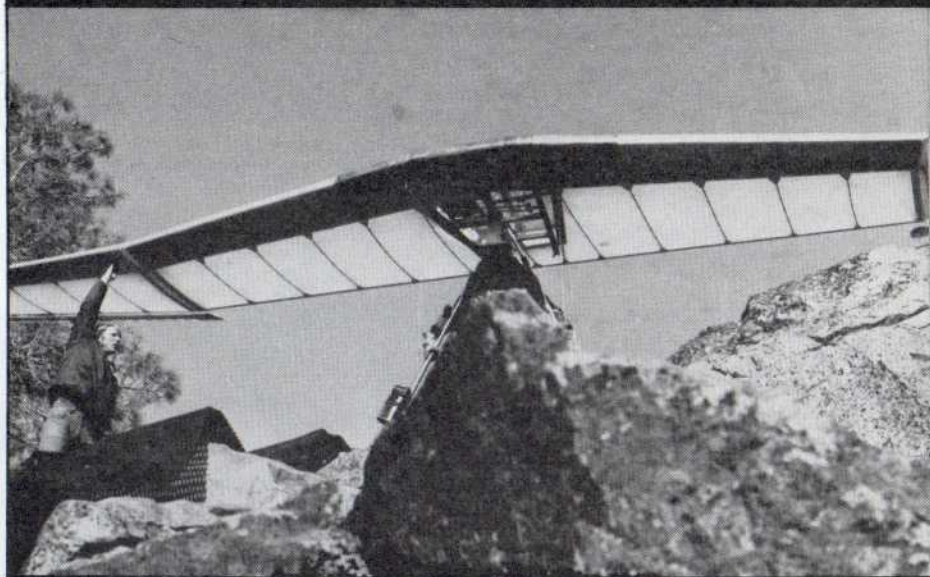
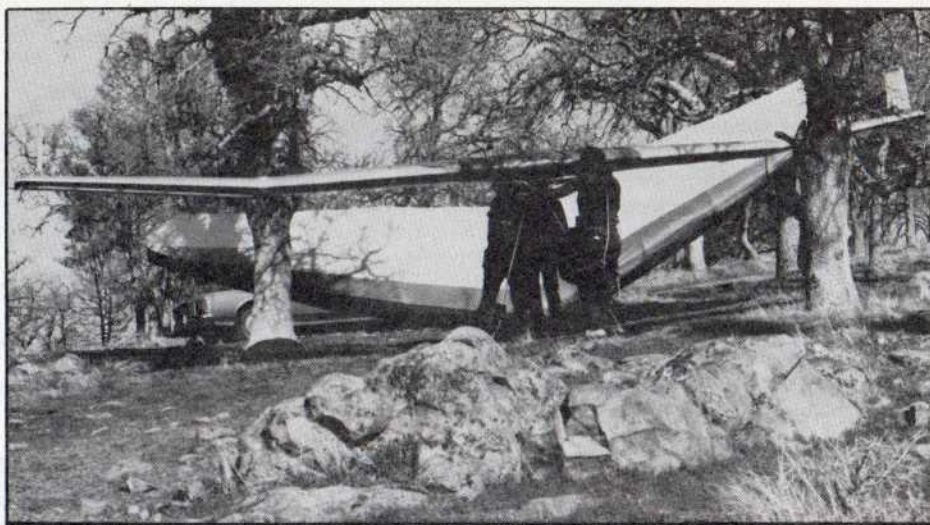
EVER SINCE 1976 when I watched Steve Patmont fly a Mitchell Wing at Fort Funston, I have wanted an aircraft with the performance that it offered. About a year ago, I finally met Don Mitchell and talked to him about building a Wing. The conversation led to Mac Powell and myself constructing a B-10 with some modifications to it. During the construction of the glider, I was able to purchase an almost finished B-10. Completing the glider over the course of the summer . . . in December I started taking it out to the training hill to learn to fly it. It was set up in the conventional Mitchell Wing configuration with a hang cage and control stick like a conventional aircraft.

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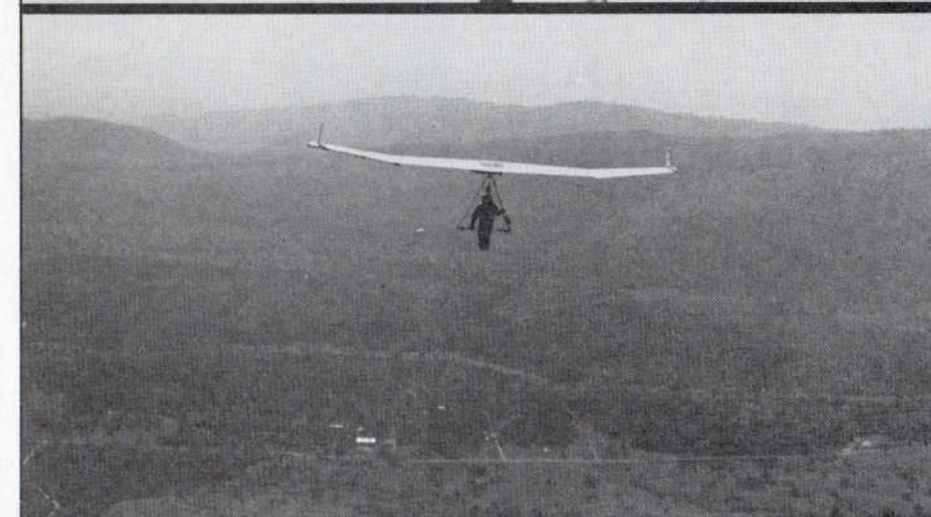
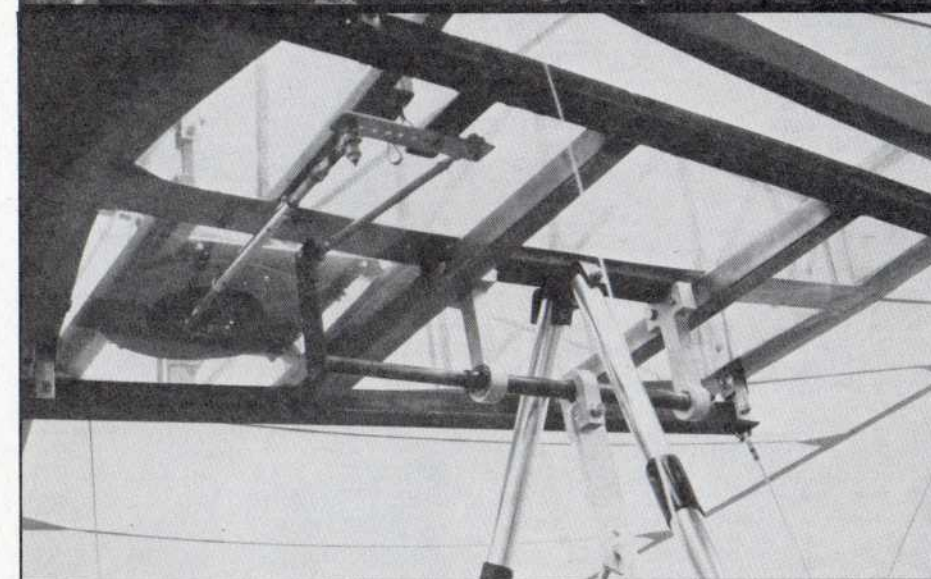
As my logbook shows in excess of 1,000 hours in weight shift rogallos, and with little airtime at conventional airplane controls, I had some difficulty reversing the control inputs in my mind. Having a tendency to push out when taking off — which in reality would cause the nose of the glider to pitch down, cutting my flight short — I started thinking more and more about putting a conventional control bar on it and attempting to fly it in that configuration. I requested a friend of mine — who is a very experienced airplane and hang gliding pilot — to attempt to fly the glider in that hang cage set-up. He did the same control reversal errors that I did, so I became convinced that the way to go was the conventional control bar configuration. At that early stage, I really had not fully considered the marketing implications of introducing a craft rigged in the way with which experienced hang glider pilots were already accustomed. I was not sure that it would work because my major concern centered around the pitch sensitivity on a tail-less aircraft with such a short chord length. After discussing the notion with Don Mitchell, he felt I would encounter no problems, and I proceeded to make up an assembly that would attach to the current attachment points (on the Mitchell Wings), so that if it did not work properly, I could go back to the original hang cage.

Finally the day arrived when I could take it out and try it on the training hill! I flew it in about six to eight mile an hour winds, and off a one hundred foot training hill. I found the control satisfactory. The only problem I had was that I dropped the nose on landing and broke the leading edge spar also poking a hole in the one millimeter plywood leading edge skin. After repairing the damage and adding a layer of fiberglass, I decided the best way to find out if it really flew was to take it up to the highest mountain I had available, and get some altitude.

March 8, 1984, I took it to Mt. Bullion, which is approximately thirty miles west of Yosemite National Park, virtually in the backyard of Don Mitchell. The mountain is 2,000 feet from launch to landing with a rudimentary launch ramp. When my accompanying friends and I arrived on launch, the wind was coming in at about five to ten miles an hour. It looked like ideal conditions to test fly. We assembled the glider, did a thorough pre-flight check, and prepared to launch. One of the problems I found in ground handling the glider in wind was that there were no side cables with which helpers could hold on to the glider. I solved that problem by attaching a short piece of half-inch webbing to the lower hinge pin on each wing . . . affording the wire crew something onto which they could hold. The launch was uneventful, with the glider lifting off as readily as my 180 Duck. I stepped into my cocoon and flew away from the hill proceeding to find out how it handled. I flew straight for about a hundred yards to make sure that I had



After assembly, reportedly not very time consuming, webbing straps had to be added to afford "wire crew" members a place to hold. (Bottom) Note full flying elevons, not a part of the wing itself. Their chord will soon be increased.



(Top) Elevons are controlled by the pilot's lateral weight shift, with the mechanism visible in the (Center) photo. (Bottom) The B-10 ... soon to be U-2 ... shows clean lines as it leaves the launch point. Take-off is said to be completely conventional.

plenty of altitude and clearance from the mountain. The linkage system that I had devised causes the elevon (a combined elevator and aileron) to roll the glider when shifting your weight laterally as in a conventional hang glider. Pitch control is achieved solely by weight shift, and twist grips (like those on the Fledglings) actuate the rudders. I had intentionally set up the controls to be slow to respond, I hoped, so that I would not over-control and 'wang' it into the mountain.

The glider turned as expected and I flew down parallel to the mountain. I encountered a thermal of about 200 fpm, and felt comfortable enough to attempt to circle, so I banked the glider and started to circle, gaining about one hundred feet. Getting greedy, I pushed out on the control bar a little bit more and the bank angle increased slightly. I quit climbing, suddenly realizing that I was in a spin. Immediately I shifted my weight to the high side, pulled in the bar, and recovered from the spin. I did a total of a 270° spin and lost about two hundred feet. Obviously, I gained respect for attempting to fly too slowly. From then on, I let the glider trim out at an estimated 30 mph.

I flew back into the thermal and gained back the altitude I had lost, plus another three hundred feet, which put me a couple hundred feet above launch. I flew back over the launch, but as I had only been in the air maybe five minutes, I was still getting used to the glider, so I did not want to work too close to the hill. I continued soaring around the mountain getting a feel for the glider and making mental notes about what I wanted to do to make the glider respond more quickly.

After about twenty minutes, I decided to fly over to the landing area — which is about six miles away. My sensory systems were overloaded and I needed a rest, so a landing was in order. I flew about halfway over and was absolutely amazed at the speed and glide that I achieved in doing so. I encountered a thermal and gained a couple hundred feet and then decided I would go on to the landing area. Flying on toward the landing area at probably 35 mph, I was surprised to note I still had a thousand feet of altitude. Traveling on past the landing area by approximately three quarters of a mile, I turned around into the wind, which was blowing about ten miles an hour. I began my final glide. The landing area is across the road from an airport.

I realized that I was going to come in way high, so I thought I would find out how fast I could dive. I pulled in the bar slowly, and as I did so, the speed increased to where, if I tilted my head up and looked forward, I could not see because the windspeed was too great. I tipped my head down slightly so my helmet protected my eyes and then turned my head to look out to the left and saw a Cessna 182 on its final glide. The airplane was directly even with me, perhaps two hundred yards to my left. As I continued to pull the bar in, I gained

Continued

speed like I have never experienced in flew wings and watched the plane beside me. My landing area was at the near end of the runway, and as I landed, the plane was maybe two hundred feet ahead of me. I am not sure what approach speed the Cessna 182 pilot used, but it is a whole lot faster than any rogallo I ever flew. [Approach speed on a Cessna 182 is listed in the owners manual at 80 to 90 mph.] I landed on the lee side of a little hill, and as I did, a very small rotor hit my wing, causing the glider to turn about twenty degrees off the wind. I did a no-step landing, but dropped the nose.

I unhooked and just stood there marveling at the performance the Mitchell Wing has to offer. I was saying to myself the same thing that another Mitchell Wing pilot, Chuck Rhodes says to himself when he lands . . . "What a wing, what a wing!"

I realize that the rear cables that brace the control bar are so short coupled that they interfere with my arms when I flare. That is why I dropped the nose. I am going to remove the rear wires and replace the front ones with struts. Also, at the same time, I am going to shorten the control bar to three and a half feet from the current standard 180 Duck (five foot) control bar installed in the configuration pictured in this article. I am also going to increase my mechanical advantage on the elevons so that I only need to move a maximum of one foot for full deflection, and also going to increase the sensitivity of the twist grip rudder controls to where it only takes a quarter turn for full deflection.

After talking to Don Mitchell that night, he suggested that I might want to put on elevons with a twelve inch chord length instead of the standard nine inch chord length. He said that would greatly increase the roll response.

Now for the good news. I have been bugging Don for the last year to design a new flying wing with even more performance. He has done that and by the time you read this, the prototype will be flying. It will have a thirty six foot wing span, with a new airfoil that will improve the sink rate even more and also provide better glide and a wider speed range. Whereas the original B-10 does not have any twist in the wings, the new [U-2] wing will have twist built into the outer panels, and slots [non-moving low speed flow modifications] on the leading edge to prevent tip stalls and decrease the take-off and landing speeds. The leading edge D-tube section will be made of foam fiberglass with Ceconite trailing edge. We expect the glider to weigh in at 75 pounds. It will have the standard hang glider control bar with no struts or cable bracing, and the only difference about flying it from a conventional rogallo is that will have twist grips for the rudder.

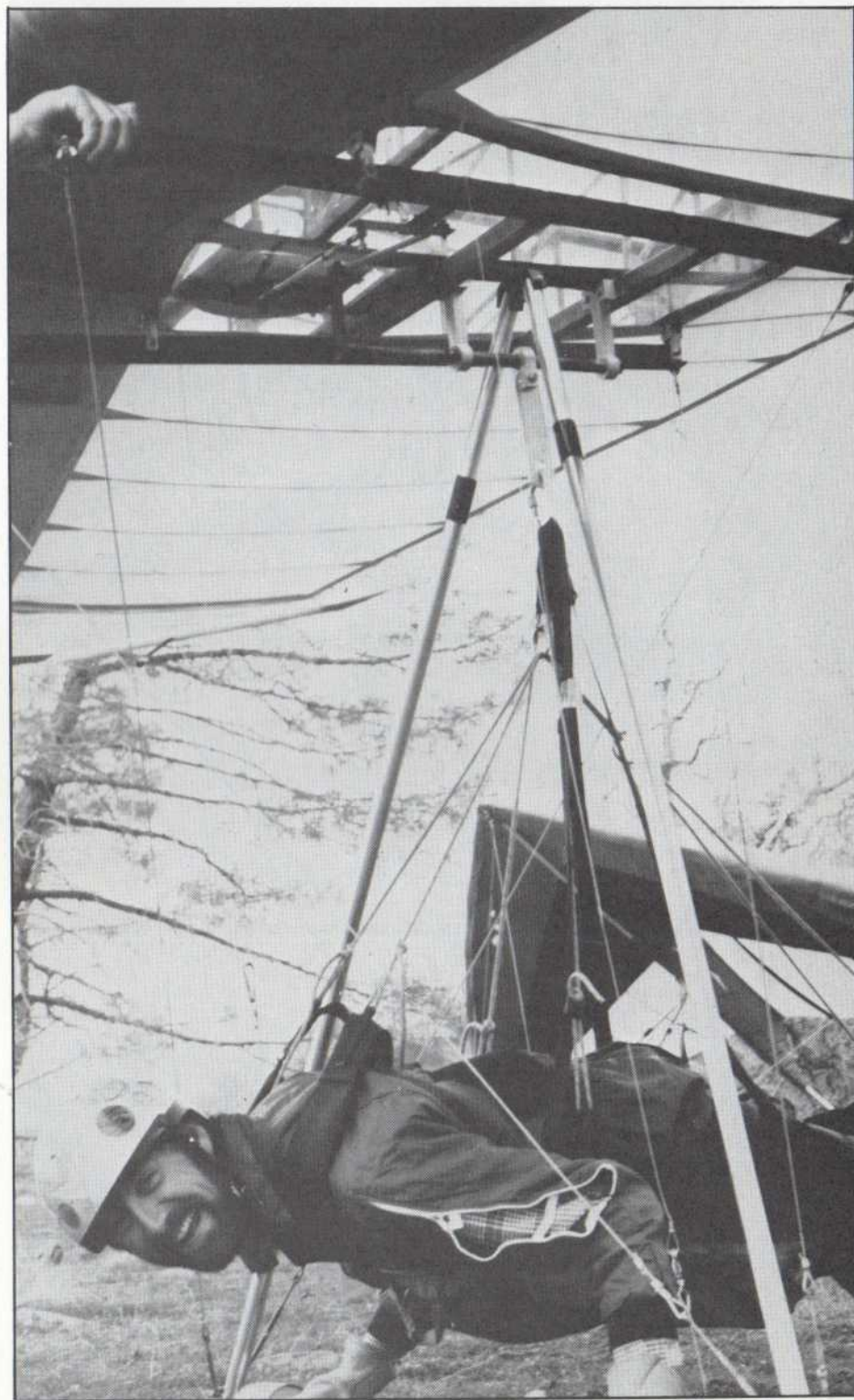
If all goes as expected, we will be putting this glider into production and a whole new ball game will be started in hang gliding. The hang glider should adapt itself extremely well to tow launching, as well as

the regular foot launch style of flying. The new glider will be capable of one person assembly in no more time than it now takes to set-up one of the conventional high performance rogallos. The only perceived disadvantage is the portability of the glider, in that you cannot stack ten on top of a car and go up the mountain. What we plan to

do is to stack four gliders in their boxes on a trailer. With this transport system they can be trailered up the mountain or to the landing field, where they will be towed up like conventional sailplanes [or flex wings in the new aero tug method which is emerging].

Get your goggles, gang!

§



U-2 Superwing developer, Tim Morley, prepares to launch the impressive machine on an early mountain flight evaluation. Morley has been working closely with Don Mitchell for nearly two years on this project.

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In a new style of reporting, Michael Helms begins a review of Delta Wing's new Light Dream. The factory presents statements on their design goals for the craft, and finally, instructors from three schools give their feelings/photos by Michael Helms, Bill Bennett, and Luigi Chiarani

THE LIGHT DREAM

★★★★★★★★★★

by Michael Helms

FIRST IMPRESSION

THE FIRST THING one notices about Delta Wing's new glider is what it is not... *heavy*. At under fifty (50) pounds, it is easily one of the lightest, if not *the* lightest glider flying.

APPEARANCE

First impressions out of the bag are positive. The sail is clean and sewn straight. Pads are provided where wear points are possible. The set up of the Light Dream is easy for anyone, whether student or pro. The idea of shrink tubing over some of the hardware (thimbles and tangs) is an idea I like, but I am not fond of the yellow color. The Light Dream has a new quick connection device on the nose plate that I liked very much. It seemed small, strong, lightweight, and quick to fasten. The way it works seems almost foolproof.

A new crossbar bracket provides swiveling and non-swiveling selections for the beginner or intermediate settings which are possible. I opted for the non-swiveling mode for my test flights.

STATIC BALANCE

The Light Dream's static balance, quite simply, is excellent. I launched in winds that were crossing and a little gusty with no difficulty.

LAUNCH

Considering the circumstances just described, I think I would have needed assistance with my own glider. The balance and light weight of the new Dream made the conditions much more manageable.

TRIM

Once I got away from the mountain, where the conditions were thrashing me about, I found trim to be hands-off perfect.

GOOD NEWS/BAD NEWS

First the bad news... this is not the glider you want for the Owens Valley Invitational. As a beginner to intermediate glider, the Dream is excellent. But if you want to go real fast and work out your biceps while thermalling, the Dream is the wrong choice.

The good news is, you can stay at your home site and sit on top of the pack. The Dream surprised me with its desire to climb. Couple this excellent sink rate with the best handling I have experienced for some time, and, in my opinion, you have a Dream come true.

Perhaps my adulation seems a bit intense, but in light of the market that this glider is produced to please, I think it deserves some attention. The reader should keep in mind that the author — who



PILOT: JOHN RYAN PHOTO/AD: J. ZURLINDEN

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STREAK

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GLIDER REVIEW

flies a Harrier — flew the Dream in its non-swiveling crossbar configuration. I felt I still overcontrolled it for awhile, but once I settled in to its racy response, it was great. I found it extremely easy to thermal.

STALL

Harry Martin says he flew around maintaining control with the bar stuck out at arm's length. I think Harry has short arms. I tried that and stalled. No problem . . . gentle, straightforward . . . no tendency to drop a tip that I noticed.

SPIN

I stalled a right and left turn and never went around more than ninety degrees before the glider leveled. The reader may want to know that I did not attempt this at a radical bank angle, though, so someone else will have to check that possibility. The point is, I did not notice any tendency to "wrap up" in a spin; quite the opposite. I found it returned to level flight, hands off.

LANDING

Cake . . . but not a mush. The Light Dream needs to have that aggressive push out.

SUMMARY

For its projected market, I feel the Dream will be a success. The recent trend of manufacturers attempting to bring the fun (and thus the growth) back into hang gliding is admirable. I wish them all success. And I believe gliders like the Delta Wing Light Dream are a step in the right direction.

The new Dream is light, easy to ground handle, statically balanced, has incredible handling in the air, and an excellent sink rate. It is easy to launch and land — so what more could you want? High speed glide? Well . . . Bill says, "Buy a Streak."

FACTORY STATEMENTS

Goals for the Light Dream

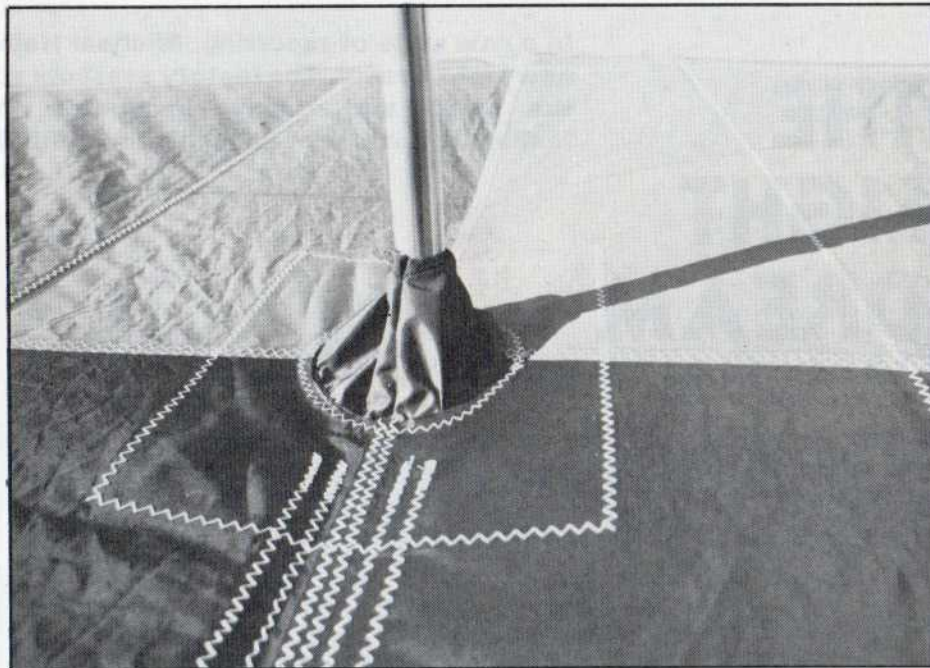
THE GOAL OF a professional hang gliding school is to guide a new student through the training program, continue onto soaring flight, all the while providing pleasant experiences and positive reinforcement along the way. The more effective the school is, the better all aspects of the sport will become.

To help meet the above goals, Delta Wing has created the new Light Dream. The new model is a direct descendant of the original Dream certified in 1983.

We have now met our design goal: a lightweight glider with modern, up-to-date soaring performance, ease of launching and landing, and all the good low speed handling characteristics necessary for an entry level glider.

With such a glider, the schools will be more successful in guiding their students through to the enjoyable conclusion of the training program.

Future equipment refinements will be the direct result of the sport's growth as



represented by an increase in new student pilots. We can say then, that the single most important element in securing the future of the sport industry is none other than the first day student.

The evolved Dream better meets the student pilot's needs, due largely to the reduction in its weight — down a whopping twelve (12) pounds — accomplished by the following changes:

Ribs are now 3/8" — formerly 1/2"; keel tube now 1 1/2" x .049" 6061T6 with 1 5/8" oversleeve — formerly 1 5/8" with 1 1/2" innersleeving; leading edges progressively reducing in diameter from 1 7/8" to 1 3/4" and finally to 1 1/2" inch. This manufacturing technique also helped save weight.

The sail is Howe and Bainbridge 3.9 ounce dacron, available in twelve colors plus the popular Spectrum and Rainbow patterns are available. The spanwise sail layout technique is used throughout. Foam leading edge inserts are optional at extra

cost.

The Light Dream retails for \$1,550.00 complete, including cover, rib and control bar bags, rib chart, owner's manual, spare parts kit, and a couple of extra goodies.

OTHER INPUT

The following pilots volunteered reports in writing on the Delta Wing Dream. The criteria used was: to first analyze its feasible applicability as an entry level glider suitable for first day training; and secondly, with no less importance, was to analyze its soaring capabilities. The pilots reporting are all USHGA Certified Instructors, and are presently, or have been, teaching at America's major professional hang gliding centers. Weegie McAdams is from Chandelle San Francisco; Jeff Mott is the owner of Hang Gliders West, and Doug Gordon, owner/operator of Arizona Windsports.

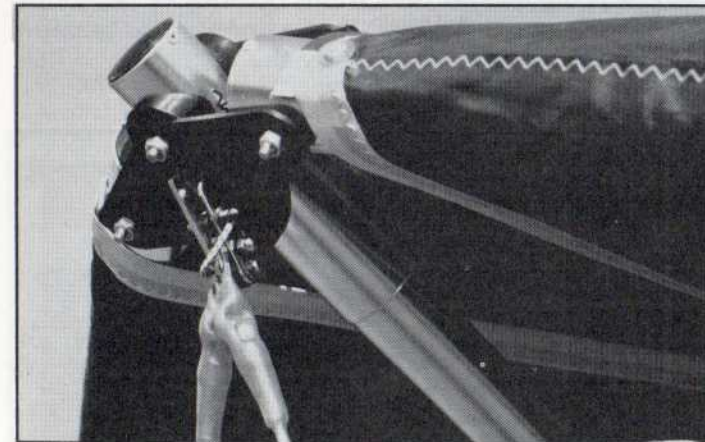
We invite you to read on, as they present to you . . . Delta Wing's Light Dream . . .

DELTA WING LIGHT DREAM SPECIFICATIONS

Model Size	165
Optimum Pilot Weight	160 pounds
Area in Square Feet	170 feet ²
Aspect Ratio	6.0:1
Nose Angle	124°
Weight	50 pounds
Battens (upper surface) per Side	7
Wing Span	31 feet, 4 inches
Pilot Weight Range	130-200 pounds

Continued.

GLIDER REVIEW



HERE ARE SOME impressions of the Dream, with special regard to its use as a training glider.

Statically, the Dream is very well balanced, and surprisingly light in weight, which, of course, makes for easy ground handling and carrying. In taking off, after starting with a few slow steps — as we teach our students to do — the glider easily floats up off the pilot's shoulders without a tendency to pitch up (or increase the nose angle) as the control bar leaves the pilot's shoulders and starts to tighten the harness straps.

Once in the air, the handling is light, responsive, and pleasant. The glider feels very much like it wants to stay flying at trim, that is, it lets you know that you are pulling in or — especially — pushing out by giving a lot of feedback without any excess in pitch pressure.

In regard to stall characteristics, as the stall is impending, the glider starts to buffet or porpoise slightly in the center section rather than simply get slower and slower and more and more quiet. In other words, it is especially easy to feel the stall approaching and happening through the bar. It is sort of like the glider is "choking" for more airspeed. After doing several straight-ahead stalls, I started to see how much I could slow the glider down and still get a response when initiating a turn. I discovered what I think is the most significant characteristic of the glider in regard to training. Even after the glider was slow enough to start its mild buffeting, the roll control was still light and responsive! Student-proof, maybe? Well, I guess nothing is *really* student-proof, but good handling at excessively slow speeds is very important for a training glider. Naturally, I found also that I could put the glider into a shallow bank, again slow it down to approach stall, and still get a surprising amount of responsiveness in roll reversal.

In landing a Dream, when coming in on final approach, the wings remain level with a feeling of stability, and the flare timing is straight forward with a reasonable amount of leeway for flaring too early or too late, though the flare itself seems to require a fair amount of effort and push.

In terms of performance, the Dream I flew felt tuned for handling rather than performance, and, ideally, I would like more airtime on the glider before making a comparison. The impression I have though — based on flying alongside other trainers during my flight at Ed Levin Park — is that a decreased sink rate put together with the other forgiving characteristics of the Dream, already mentioned, would make an excellent beginner glider.

Weegie McAdams,
Chandelle San Francisco

STATIC BALANCE IS excellent, the best I have seen in a long time. The way the Dream settles on your shoulders is exactly the way that you launch it. You just point it, add some fast feet, and the glider does the rest.

It is very light in weight, compared to other modern gliders. The set-up is easy and straight forward, with no hidden hassles.

With the new sail cut and lack of fixed washout tubes, it is an aesthetically pleasing design.

It has — much to my relief — extremely forgiving launch characteristics. It reminds me of the 6-D in that respect. This is extremely important, because beginner pilots often are not swift in their take-off techniques. In a slow launch, the Dream very gently levels out its nose, and kind of wafts out from the hill, with no tendency to drop a tip.

The slow speed handling is very good, with no yaw problems, right up to the stall point. Stall recovery is gentle and straight forward.

Glide performance is good at higher speeds, but I did not have enough time or room to really stuff the bar.

One thing I really appreciated was the way that the Dream tracks in a turn. Once initiated, the glider feels like it is on a monorail, and maintains the proper pitch and roll through the entire maneuver, all by itself. Roll-out is a piece of cake.

Landing was encouraging, also. While the Dream requires a definite flare, as do all cambered rib gliders, it does not need as much force as a glider that has a sail as tight as a piece of plywood. The Dream exhibits no dropping tendencies.

I have always liked "convertible gliders." The locking swivel is hot stuff (and a great sales tool, too). I thought that it would not handle very well with the swivel in the locked position, but it handled just fine, thanks to the rotating tips.

To summarize, the Dream is to-date the best attempt I have seen to re-introduce the "entry level" glider to the beginner, with low weight, mild flight characteristics, and a low price.

Jeff Mott,
Hang Gliders West

THE NEW STYLE Dream is the kind of glider I have been waiting for for three years. Finally, Delta Wing has come out with a glider which not only has tight side flying wires — which my students love — but which also handles like the name given it.

After setting it up for the first time, I was absolutely amazed to find as I lifted it, that it was lighter than one of my [Seagull] Seahawk trainers! Imagine, a cambered batten glider that is lighter than a Seahawk.

A beginner can learn on it and become comfortable with it and then continue to use it through his or her advanced level, as it has a sink rate comparable to any modern glider.

Douglas J. Gordon,
Windsports Hang Gliders



HI - TOWING

Land towing has always been regarded with great trepidation, not without good reason. A factor of consideration has been over-pulling the glider. Here, Butch Pritchett, developer of a pneumatic tension cylinder and gauge, gives us a view of a typical day of flatland towing/photos by the author

THE DAY STARTS with everyone meeting at the flying site. In this case, this is an old Air Force Base, or Rock Road. After the gliders are set up, I put out the line. The first pilot to fly is yours truly... I always get to be wind dummy.

The car is then rigged with the pneumatic cylinder and gauge. While I perform the obligatory hang check, the tow car heads off to the other end of the line. About half way to that point, I check the radio. Since I will be leaving my radio keyed to the "on" position, the driver simply opens the door to verify a good radio check. As I hook the leader to the release on my end and affirm its correct operation, the car also hooks up to the line, and then proceeds to take up the slack with my instruction. By doing this the driver puts about fifty (50) pounds on the gauge.

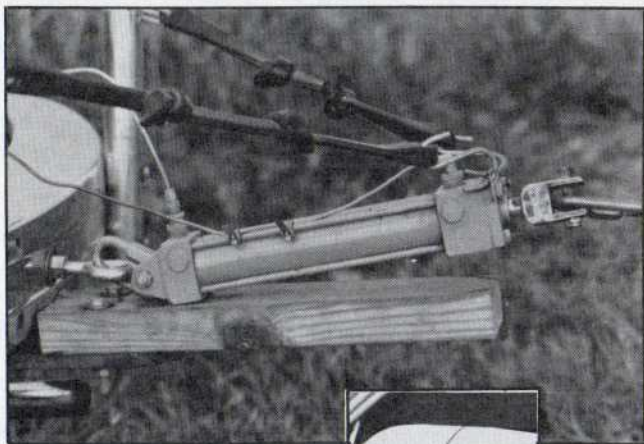
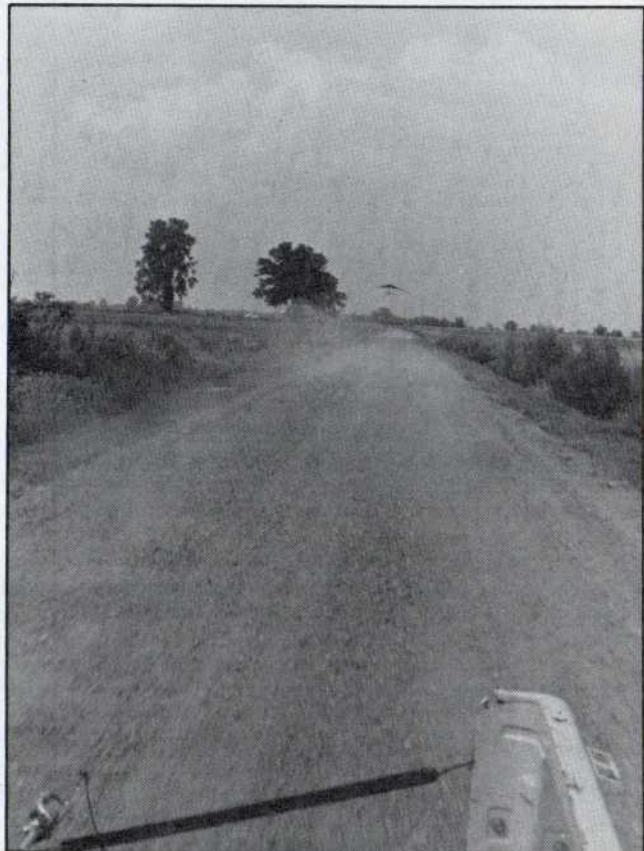
Our system calls for the pilot to stand with the glider in launch position, and when ready to yell, "Go, go, go!" Meanwhile, the driver is watching to see that the glider is up and level. When he hears the "go" signal through the radio, he takes off as fast as possible with our Volkswagen tow vehicle. Holding back against the pull of the line as long as possible, the pilot will then expect only about two steps to become airborne. By observing through the mirror, the driver sees the glider lift off the ground. At this time he will maintain whatever pressure appearing on the gauge. This reading is held till the glider gets 75 to 100 feet of altitude. The glider will climb at this time on some of the line stretch from the launch phase.

I hold the climb angle down until I get to that 75 to 100 foot level. Here, I let the glider go to its trim position with the skyting style bridle system. Then the car accelerates to the preset pressure to give me a climb rate of 500 feet per minute (fpm). On a 164 Gemini, this is 140 pounds, at my hook in weight of 200 pounds. In a 185 Comet 2, this pressure is 130 pounds. I use a single release at the apex of the skyting bridle.

As I start to climb at 500 fpm, I watch to see that the glider does not yaw. I am being towed on 2,000 feet of eighth inch line. When I get to five hundred feet above the ground, I start to look for that thermal that the car will break off. As the glider gets to the top of the tow, the car will have to slow his speed to keep the pressure at the preset point. On top, I tell the driver to stop. As he stops, I fly forward to relieve line pressure, then releasing.

The car has towed the glider up the line without breaking the weak link, or putting undue stress on the pilot or glider, because the glider has not been pulled by more than one G force at any time during the flight. If I fly through a thermal, the driver will know by an increase in the gauge reading. Also, if I fly through sink, the driver will also know because the gauge pressure will start to drop. This pneumatic cylinder and gauge gives the driver the correct line pressure throughout the flight.

Today, I towed six or eight times, and drove the car for three other pilots who also got as many flights. Now the sun is going down, and it is time to roll up the line and take down the gliders till another day of towing.



(Top) From the vehicle, this time a pickup truck, the glider lifts off at the end of 1,500 feet of line. Pritchett's group also uses 3,000 feet of polypro line for greater altitude gains. (Center) The cylinder which transmits the line tension to, (Bottom) the calibrated gauge, which is easily visible to the driver.

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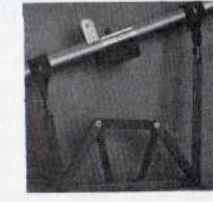
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THE BREEZ

★★★★★★★★

BOX SCORES

[1 = Poor; 2 = Fair; 3 = Good; 4 = Very Good; 5 = Excellent]

GENERAL CHARACTERISTICS

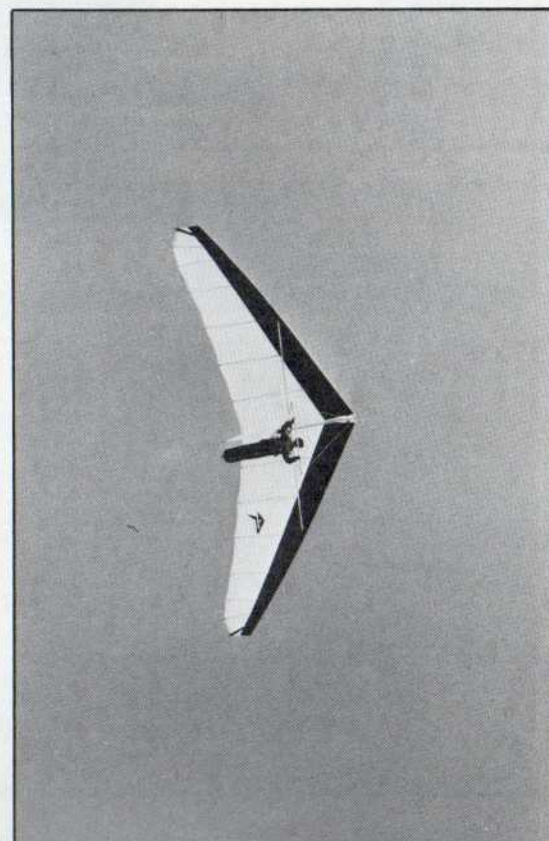
Set-up Time/Ease	5
Ground Handling	5
Static Balance	5
Frame Hardware/Finish	4
Sail Quality/Craftsmanship	4
Sail Cleanliness	4

FLIGHT CHARACTERISTICS

Handling — Low Air Speeds	5
Handling — High Air Speeds	4
Bar Pressure — Roll	4
Bar Pressure — Pitch	5
Roll Control Initiation (Novice Setting)	4
Roll Control Initiation (Advanced Setting)	5
Roll Reversal (45° to 45°)	5
Yaw Stability	4
Turn Coordination	5
Speed Range	3
Sink Rate Performance	4
Glide Angle Performance	3

LANDING CHARACTERISTICS

Flare Authority	4
Parachuteability	3
Directional Control at Mush Speed	3



(Above) Author Paul Burns flies the Pro Air Breez 220 for Ken Bier's camera. (Opposite page) A view from the nose plate illustrates construction details of the Breez/photo by Paul Burns.

Story and Photos by Paul Burns

Progressive Aircraft's "Breez" Pilot Report kicks off this series of "utility class" glider evaluations. The idea is to evaluate each design in as many sizes, and pilot weight combinations, as possible, in both training and fun flying situations, and in varying weather conditions. My personal goal is to fly each design a minimum of fifteen hours. The flying impressions will be my own, with input from other pilots, whose skills vary from beginning to advanced ratings, at flying sites ranging from "bunny hills" to ridge and thermal soaring.

THE BREEZ WAS designed to provide the intermediate pilot with the advantage of tighter sail, fixed airfoil performance, yet

offer the easy, forgiving handling of a trainer. This twenty percent, double surface design features a free floating crossbar, shaped aluminum/lexan ribs, enclosed washout struts, shipping/storage breakdown, glider and rib storage bags, and leading edge pockets, all standard. Mylar leading edge inserts and sail inlay work are extra cost options. Hardware is simple, lightweight, and clean in appearance. All cables are vinyl coated.

The sail is the conventional chordwise layout, rather than the spanwise layout some companies are employing. It is a bit more time consuming and expensive, but may result in a cleaner sail due to more even stretching over the life of the glider. I found the sail to be free of wrinkles on all the gliders I have flown throughout the

speed range. Overall, the Breez exhibits high quality craftsmanship.

Glider set up is fairly conventional, with equal length downtubes and base tube on the folding control bar. The Breez can be easily set up by one person in about ten minutes. In stronger winds, the glider can be laid down flat on the ground after assembly. Ground handling is easy with its moderate weight, excellent static balance, short span, and tight rigging providing a "solid feel." These qualities carry through on launch; a low stall speed [see charts] enables quick take-offs even in marginal conditions.

Personally, I found the handling qualities quite pleasant. Pitch control is quick and bar pressure light at soaring speeds, increasing dramatically as speed



is accelerated. Additional bar pressure at mush and stall speeds provides ample "warning" feedback.

Roll control is quick and predictable with light to moderate bar pressure, the difference in these pressures depending on whether the control bar is set in the novice or advanced position. Novice setting provides a more roll stable machine for the beginner. On the inside setting the Breez becomes noticeably quicker and lighter in handling, allowing growing room for the advancing pilot. Coordination of turns is easy and requires only slight pitch input. Reversals are quick and easy. Air speed maintenance through these maneuvers requires a minimum of pilot input.

The Breez seems comfortably yaw unstable at soaring speeds resulting in quick handling and therefore, a feeling of confidence in thermally and rough air conditions. At higher speeds the glider seems to fly as though it were "on rails," and becomes very yaw stable, yet controllable. The Breez remains directionally manageable at very low airspeeds (mush range) and has little tendency to drop a tip. Stall produces a mild "break" as the nose falls through and a fast recovery ensues. Altitude loss in these mild stall is minimal.

Landings can be accomplished consistently at or near zero ground speed, even in marginal conditions. With some extra speed on final approach with a strong flare to achieve the best landing touch-downs. Should you flare a bit too early, the Breez's "mush" and parachuting ability will generally enable you to set it down safely even if your timing is not perfect.

The Breez is available in three sizes: 140, 180 and 220 square foot sizes. Hooking into the 140 glider puts me at the top of the pilot weight range (175 pounds), yet I was able to soar the small model in moderate to light ridge lift conditions, and the landing was no problem.

Flying the Breez at Torrey Pines, I compared pure sink rate with other single surface gliders, as well as the *cream* of the double surface superships. I found the Breez to be comparable to other intermediates, and depending on wing loading, competitive with some enclosed crossbar models.

I have experienced my most enjoyable flights on the 180 Breez, while flying in thermal conditions at mountain sites like Elsinore and Crestline, California. Time and again I have been pleasantly surprised with the thermal soaring capabilities of this design. Low stall speed, quick roll control response, tight turning radius, and outstanding roll authority (pilot dominance over control application) combine to achieve soaring performance rivaling some double surface models. Although the Breez will not out-glide the Comets and Sensors, the L/D ratio is respectable.

The 220 Breez is one of the few large gliders available, and in my way of thinking, offers some versatility of operation. I hook in to this size Breez at the very bottom of the weight range, yet I find the handling light with more than adequate control authority. In the mountains, no wind take-offs were easy, and soaring even in small, light thermals was no problem. In light ridge lift at my wing loading, the sink rate was very impressive. "And what about when the wind picks up," you ask? Grab a friend and

go for it! Even with over 400 pounds of gross weight (1.8 wing loading) this glider performs well, and still retains its low stall speed (18 mph indicated) and light handling qualities.

On the question of training applicability, I have employed the Breez in the *Windgypsy* flight school for the past year, with very good success. Students gain confidence and advance quickly. As the Breez takes them from first lesson to thermal soaring, providing a sense of familiarity when changing sites. Some comments from other advanced pilots after flying the Breez were: "Easy to fly, and fun." One San Diego-based instructor upon landing after his first flight on the Breez, commented, "There's no way anybody could be unhappy with a glider like this." Personally I think he was a bit hard up for airtime, but he was serious, too!

The Breez is a state-of-the-art trainer. For the student it is simple, stable, and easy to fly. For the advancing or recreational pilot, the Breez offers easy handling and good performance, at a price considerably lower than the more difficult-to-fly (and -land) double surfaced designs. When you give one test flight, you'll find it's a Breez.

ABOUT THE AUTHOR

As *Whole Air's* newest staff writer, Paul Burns is a former *East Coast Editor* for *Hang Gliding* magazine, has written several feature pieces for *Whole Air*, and had his compelling "The Comeback" story (about a handicapped pilot's return to flight) reproduced in two "major circulation" magazines.

A Master rated hang glider pilot with ten years experience, today Burns is the owner/operator of the *Windgypsy* flight school, and he was, for four years, the co-owner of *Crystal Air Sports* in *Chattanooga, Tennessee*.

Burns has been teaching for eight years, has flown 55 different glider models at 40 different sites in continental U. S., Hawaii, and Australia. He also claims the unofficial world tandem cross country record of 25 miles, set in 1976. §

BREEZ 140

Sail Area	142 ft ²
Wing Span	28.6 feet
Leading Edge	16 feet
Keel Length	7.75 feet
Aspect Ratio	5.75:1
Nose Angle	124°
Billow	0°
Glider Weight	54 pounds
Pilot Weight Range	100-175 lbs.
HGMA Certified	

Price \$1,695.00

BREEZ 180

Sail Area	185 ft ²
Wing Span	31.2 feet
Leading Edge	17.5 feet
Keel Length	8.75 feet
Aspect Ratio	5.26:1
Nose Angle	124°
Billow	0°
Glider Weight	60 pounds
Pilot Weight Range	160-220 lbs.
HGMA Certified	

Price \$1,695.00

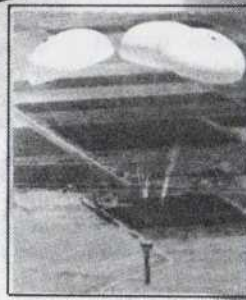
BREEZ 220

Sail Area	219 ft ²
Wing Span	34.0 feet
Leading Edge	19.5 feet
Keel Length	10.0 feet
Aspect Ratio	5.3:1
Nose Angle	124°
Billow	0°
Glider Weight	70 pounds
Pilot Weight Range	175-250 lbs.
This model is not HGMA Certified. However, the 220 frame is the same as the 195 ProStar II, which is Certified.	
Price	\$1,850.00

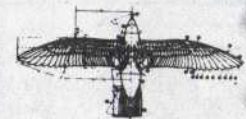
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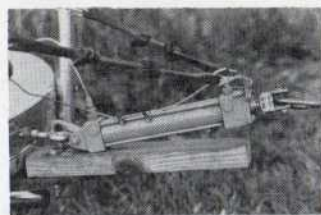
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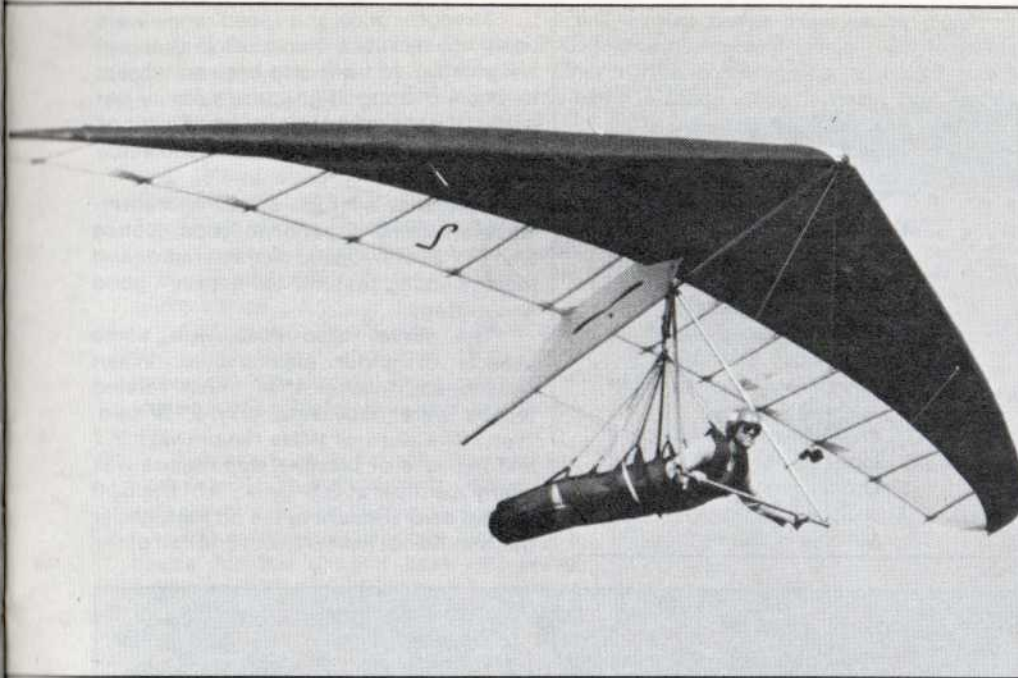
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OWNERS SURVEY #3 SENSOR

Continuing to offer information of the most un-biased nature, **Whole Air** presents **No. Three** in our exclusive series of **Owner Survey** features. This unique collection of articles this time reviews the **Sensor 510 and 210 models**/Story by **Bruce Wolfe, Owner Survey Editor**

THIS ISSUE'S **WHOLE AIR** Glider Owners Survey is on the **Sensor 510 and 210** produced by Seedwings of Santa Barbara, California. As before, the survey results are presented in three separate sections: the Pilots, the Glider itself, and the Manufacturer and its Dealers.

Since the **Sensor 510 and 210** are very different gliders, I thought it unfair to consider them as one machine. So, they are dealt with separately under the glider section of this report, however, in the other two categories, the data is presented collectively except where significant differences were noted.

This report is a summary of surveys returned by fifteen **Sensor 510** pilots and six **210** pilots, comprising information formed from the over 3,100 answers developed.

THE PILOTS

The physical statistics of this survey group are: Average age is 29 years old, with a range of 22 years to 41 years old; a

weight range of 130 pounds to 190 pounds and an average of 164 pounds. These figures are within two years and four pounds of the averages for the **Harrier** pilots reported previously (March 1984 *Whole Air*).

The experience levels of these pilots are rather impressive. Fifty three percent are **Hang 4's**, 41% are **Hang 3's**, and one pilot gave his rating as a **Hang 1**, although he had 100 hours of glider airtime. The average glider airtime figure was 233 hours, with said figures ranging from 1,000 hours to 8 hours. The low figure was for a **210** pilot, but the low for a **510** pilot was 26 hours. The number of years flying **hang gliders** was from one to ten years, with a mean of 6.4 years. Flights per month varied from two to twenty times, and the average was eight flights per month. Fifty seven percent of the **Sensor** pilots had an average of 128 hours of airtime (other than in *hang gliders*) accumulated over a mean

of 3.6 years.

Although the statistics for the **210** pilots and the **510** pilots showed little variation on the figures considered above, there is a major difference when considering competition participation. In short, not one of the **210** pilots listed any competition activity, whereas 53% of the **510** pilots flew in their Regionals, and 27% flew in the Nationals. That means about half of the **510** pilots who participated in their Regionals made it to the Nationals.

The survey asked owners to rate how important sixteen qualities of their glider were to them. I believe this is one of the most important questions in the survey because it gives the reader (and writer) an insight as to the criteria used to evaluate the glider in question. The scale used to rate these qualities was: 5 = Vitally Important; 4 = Significant, but not Vital; 3 = Average Importance; 2 = Low on Scale; and 1 = Not a Priority at All. Listed below are those qualities in order of their importance with the mean value of each.

- 4.9 Structural Integrity
- Glide Performance
- Sink Performance
- 4.6 Speed Range
- 3.9 Innovative (Design)
- 3.8 Light Handling
- 3.7 Quick Handling
- Uniqueness
- 3.6 Set-up Ease
- 3.5 Light Weight
- 3.3 Contest Successes
- 3.1 Price
- 2.8 Delivery Time (Delay)
- 2.7 Mellow Handling
- 2.5 Brand Name
- 2.0 Popularity

The qualities set-up ease, light weight, price and delivery time are about the same as the **Harrier** pilots rated these qualities in the March 1984 *Whole Air*.

However, it is the difference in the rating of these qualities that is really significant. The profile for **Harrier** pilots was that of a moderately experienced recreational pilot with an emphasis on handling rather than performance. The **Sensor 510** pilot is nearly the opposite; being a very experienced pilot, much more competitively oriented and emphasizing performance more than handling.

Bear in mind, both the **Harrier** and, as we will see, the **Sensors** are rated highly by the pilots who fly them. However, if these two groups of pilots were to fly the other's glider, the resulting evaluation would probably not be as favorable. In short, the better matched the pilots are with their wing, the more satisfied they will be.

The final item in this first section is the equipment these pilots use. Pilots were asked about their use of the ten pieces of equipment listed in the survey. In order of popularity these items are listed below with the percentages of **Sensor** pilots who use them.

Continued.

Helmet	100%
Parachute	100%
Second Hang Strap	95%
Variometer	81%
Altimeter	76%
Two-Way Radio	57%
Compass	33%
Airspeed Indicator .	19%
Ballast	14%
Strobelight	5%

Comparing this again to the Harrier pilots of the previous survey, Sensor pilots used two-way radios, compasses, and ballast 7% to 20% more and airspeed indicators 6% less. The other equipment items were used in about the same percentages by both pilot groups. I believe this emphasizes the more serious nature of the Sensor pilot's flying.

THE GLIDER

As mentioned earlier, the 510 and 210 will be dealt with separately here. However, the emphasis will be on the Sensor 510 due to its greater number of survey returns.

SENSOR 510

The model year for the Sensor 510's are as follows: 41% were 1981 gliders, 53% were '82 models, and 7% were '83 gliders; For size, 40% were 165's, and the rest were 180's.

Eighty percent of the 510's were purchased new at an average price of \$1,891.00, while the remaining 20% were bought used at an average of \$1,433.00.

Factory direct sales accounted for 40% of sales, dealers sold 47%, and the rest were purchased from private sources.

A standard rating scale was used to evaluate the glider in a number of areas. In the scale, the same numerical values were used as above (5 = Superior; 1 = Poor).

The average 510 pilot took 18 minutes to set his or her glider up and rated this procedure at 3.9. Two people reported needing help to set up, the rest needed no help. Breakdown was a little quicker at 15 minutes average, and was rated the same as set-up. One person needed help to break the glider down.

Survey participants were asked to rate the overall quality of flying their glider and rate the glider on the quality of twelve separate characteristics. The overall quality of flying the Sensor 510 was 4.6.

Listed below are the twelve characteristics in order of decreasing values:

- 5.0 Pitch Trim
- 4.9 In Thermals
- 4.6 In Ridge Lift
- 4.4 Roll Trim
- 4.2 To Coordinate Turns
- 4.1 In Turns
 - To Ground Handle
- 4.0 To Lift (Weight)
 - To Set Up/Maintain Approach
- 3.9 Maintaining Hands Off Flight
- 3.7 To Flare
- 3.5 Generally, To Land

Next, pilots were asked to rate the ability of their glider in fourteen specific areas. Based on comparisons with other gliders and whether pilots could achieve what they wanted.

- 5.0 Overall Strength
 - Glide Performance
 - Sink Performance
 - Speed Range
- 4.9 High Speed Stability
- 4.5 Straight Ahead Stall
- 4.3 High Speed Handling
- 4.2 Accelerated (Speed) Stall
- 4.1 Turning Stall
- 3.7 Low Speed Stall
- 3.5 Light Handling
- 3.4 Quick Handling
 - Low Speed Handling
- 3.1 Mellow Handling

Strength, glide and speed range were unanimously rated "superior" (5.0 score) and sink would have also been so, except for one 4.5 rating. High speed stability just missed the top rating by two "good" ratings (4.0 score) which reduced its mean value by one tenth.

Note that all high speed characteristics are rated superior to good. Notice also that all slow speed characteristics and most handling features fall between good and average.

The survey also dealt with some aspects of glider maintenance. When questioned if other than crash related repairs were necessary, only 21% said, "Yes." The ease of these repairs was 3.7 and the ease of crash-related repairs was nearly identical at 3.8. Only 7% of the 510 owners said something fell off their glider that should not have. Almost one half of the



pilots noticed wear early in their ownership and had trouble with ribs bending.

The most common additional complaint about both the 510 and 210 was the large tips wearing on the ground and getting dirty, as well as the usual complaint of bag wear during transport. Two pilots also complained of wear on the lower surface caused by the crosstube, and one pilot suffered mylar kinks on his glider's nose.

Concerning downtubes, 73% found the downtubes stronger than they expected, 20% thought them weaker, and the remaining 7% felt they were like earlier gliders.

Owners were apparently very pleased with the 510's construction quality as they rated overall workmanship at 4.9.

The survey questionnaire had a blank space for the glider's best and worst features. The 510 owners almost universally cited the glider's performance and often the workmanship as its best features. Worst feature comments were less consistent, but the most common were items related to handling. "Sticky tips," stiff handling, and trouble turning in rough air are some examples of the commentary. Two people said the glider "walked" at high speeds, a few did not like putting the tips in, and others cited landings as the glider's worst feature.

SENSOR 210

Half of the 210's were 1980 models, 33% were '79's, and the rest 1977 models. The same percentages apply to the sizes: 183 ft², 165 ft², and 210 ft² respectively.

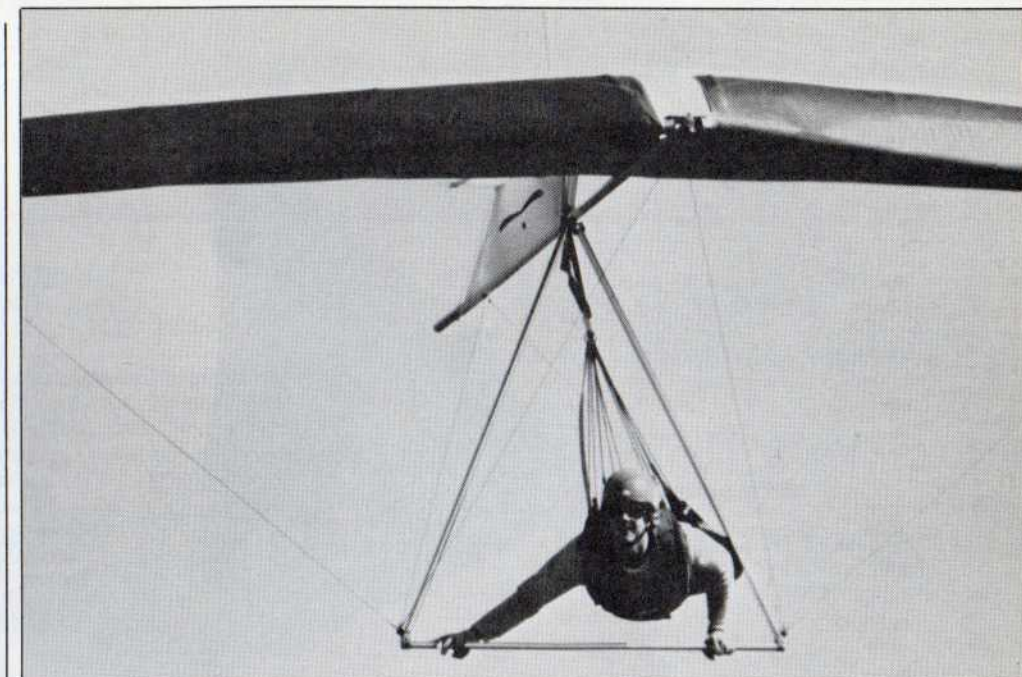
Sixty seven percent were used wings bought at an average price of \$750.00. Only one wing was bought new, at \$1,000.00, and a new kit at a price of \$750.00. To my knowledge, Seedwings was the last supplier of hang glider kits. One half of the gliders were purchased from dealers, 33% factory direct, and the rest from private sources.

The set-up and breakdown times were respectively a minute quicker and three minutes longer than the 510, and the rating was average (3.0) for both procedures.

The overall quality of flying the 210 was rated the same as the 510, at 4.6 score.

The ratings for the quality of the same twelve characteristics as those listed for the 510 are as follows:

- 5.0 In Turns
 - Roll Trim
- 4.8 To Coordinate Turns
 - In Thermals
- 4.7 Pitch Trim
 - To set-up/Maintain Approach
- 4.4 Maintaining Hands-Off Flight
 - To Ground Handle
 - In Ridge Lift
- 4.2 To Flare
- 4.0 Generally, To Land
- 3.8 To Lift (Weight)



The 210's ability in the following areas is listed below:

- 4.8 Overall Strength
- 4.6 Quick Handling
- 4.5 High Speed Handling
- 4.4 Light Handling
 - High Speed Stability
- 4.2 Speed Range
 - Straight Ahead Stall
- 4.0 Speed Stall
 - Glide Performance
- 3.8 Low Speed Handling
- 3.7 Turning Stall
- 3.6 Mellow Handling
 - Sink Performance
- 3.4 Low Speed Stability

- 4.4 Overall
- 3.6 Handling
- 3.5 Delivery

Fill-in-the-blank comments about the factory were split almost 50/50 on the plus/minus side. Those who made comments either liked their contact with the factory, or really disliked it.

Factory-direct sales accounted for 40% of the Sensor 510 sales while dealers sold 47 percent. Fifty seven percent of the owners received their glider ready-to-fly. Thirty eight percent got their wing in a shipping tube, and 5% in kit form. Those who assembled their glider from tubes found the process easy and requiring no tools. Everyone had all the required parts and everything fit together properly.

More than half of the gliders, 58%, lacked the HGMA Certification Sticker, but those who had the stickers found them properly dated and signed by the test pilot.

Seventy one percent of the Sensor dealers were full time businesses, but only 9% operated out of store fronts. Those who bought factory direct may have considered the factory as their dealer. Since the factory is not (presumably) operating out of a storefront, per se, this may help account for low percentages of store front dealers.

The average distance between the dealer and his customer was 23 miles. The average dealer's stock of parts was rated at 3.2, with a fourteen day delivery time on non-stocked parts. Overall rating on dealer service was 3.7 score.

Concerning service-related items, 30% received an owner's manual, 11% a service manual, while 15% said they received some spare parts, and 90% got a rib chart. Three quarters of the pilots had the dealers test fly their glider, while 86% of the dealers demonstrated the Sensor's set-up procedure, and 46% went over the

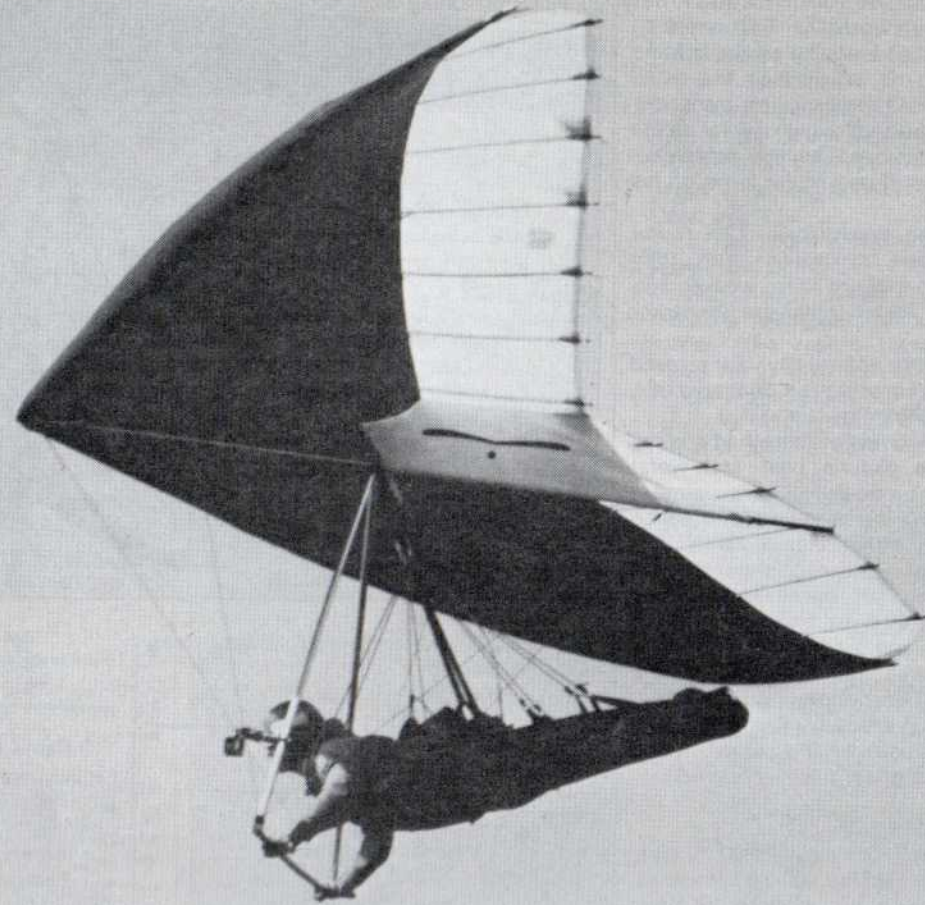
Continued

MANUFACTURERS AND DEALERS

The first item under this section addresses the advertising reliability of the manufacturer. Owners rated Seedwings' level of truthfulness in seven areas which appear below, highest rating to lowest.

- 4.9 Workmanship
- 4.8 Materials Quality
- 4.6 Weight
- 4.5 Performance

DIRECTORY



glider in general with their customer. One third of the survey respondents said the factory asked about their glider purchase. Everyone who was contacted replied to the factory.

As mentioned before, Sensor pilots are very pleased with the quality of their gliders and rated the factory workmanship and materials at 4.9 (superior).

CONCLUSION

The survey concluded with some questions concerning recommendations from the knowing to the unknowing.

The 510 pilots gave their glider an overall 4.7 rating, and the 210 was rated at 4.4 overall. Ninety five percent of all the pilots said they would buy another glider from Seedwings; the same percentage said they would recommend another pilot buy the Sensor 510 and 210. Asked if they would recommend another pilot buy from Seedwings, 90% said, "Yes."

"Was it worth the money?" is always a good question to ask in determining buyer satisfaction. The average retail price for the Sensor 510 is \$2,213.00. One third of the 510 pilots thought that was too much. However, 95% thought the 510 was worth the price they actually paid. Average new and used prices are provided in the "Glider" section of this report.

The last recommendation by Sensor pilots provides an idea of the skill level required for the two gliders. One hundred percent of the Sensor 510 pilots said the 510 should not be sold for use by a novice pilot; but 80% of the 210 pilots felt the 210 could be used by a novice pilot.

This concludes this issue's Glider Owners Survey. Next issue's survey will be on Progressive Aircraft's ProStar.



ABOUT THE AUTHOR:

Bruce Wolfe, Whole Air's Owner Survey Editor, has been flying hang gliders over seven years. While living in the Chattanooga area, he worked periodically at the local hang gliding businesses and publications in a variety of capacities.

Now, back in his native northern Ohio, Wolfe is Founder and President of Wolfe Aviation, which produces the WAT, a light weight accessory power unit of the trike persuasion.

Wolfe will not only write on the Harrier (March '84), Sensor (May '84), and the ProStar (June '84), but will be reviewing the Gemini, Duck, Demon, and Raven, all products of Whole Air's very successful 1983 Glider Owners Survey. Whole Air is pleased to have Bruce's analytical abilities at work on the immense sum of answers generated from that project.

§

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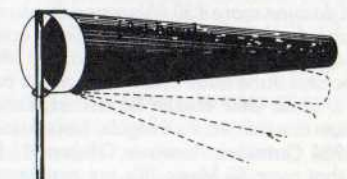


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PRODUCT LINES

CHATTANOOGA, TENN. — Lots of "turn up" (not turnip) reported as we flow from a late-breaking spring weather season to summer '84. Boy, are we glad to say that. As everyone must know by now, 1983 was a bummer. But it distilled one very good result. The industry looked the problem right between the eyes and resolved to do something about it. We can see the effects already, and feel the pay-off will certainly follow. So, we hope, we can jump the gap and head from *bummer* year to *bumper* year. Though USHGA is still fighting the battle — adjustments tend to be long term propositions for associations and magazines — Prez' Hawkhurst says things are turning around, and past bills are getting paid. Much hooray must go to Carol Velderrain who has the undesirable task of doing more with less people in smaller quarters on a tighter budget with little thanks. Phew! But the industry itself seems on an upswing. UP's dealer newsletter is chock full, always a good sign. Wills reports rising sales of gliders and accessories, another good sign. Delta Wing is simply ecstatic over dealer reception to their Light Dream. Seedwings is too busy playing "big time ball" with their high-demand 510VG to keep us informed on late-breaking news. ProAir is well reported in this issue; they're feeling good. Up coast in Salinas, Pacific Windcraft has much going on with Skylines' tug operations and glider sales. And Airwave is indeed making inroads perhaps better than "experts" expected, at least so soon. Here at Whole Air, we're real tickled to report the newsstand growth program we announced last issue is finally underway. Our magazine rack count is up to over 250 locations, and we are fully expecting to hit 700 by year end. This is lots and lots of new outreach for our sport, and gives a healthy boost to our paid circulation... and is targeted to just the folks we need. Lastly, Whole Air has also recently made arrangements with another new major bookstore chain. Perhaps we can exceed 1,000 outlets by spring 1985! We'll keep you posted. On a similar positive note, we've seen an advance copy of the Outside magazine Almanac special. In it appears an ad for hang gliding (pg. 45), which includes sixteen of the nation's major businesses. Dealership/schools represented include (Northern Calif.) Chandelle San Francisco, Hang Gliders West, Kitty Hawk Kites - West, Mission Soaring Center, and San Francisco Windsports; (Southern Calif.) Hang Flight Systems, Hang Glider Emporium, and Windsports Int'l; (Northeastern U.S.) Mountain Wings; (Southeastern U.S.) Crystal Air Sports, Kitty Hawk Kites - East, and Lookout Mtn Flight Park; (Manufacturers) Delta Wing, Pacific Windcraft, and Ultralite Products; (Publication) Whole Air. We're proud indeed to be part of such a progressive group. We feel this kind of outreach is nearly priceless for the hang gliding community. Perhaps more businesses will join as time marches on; certainly we could do even more if 30-40 businesses were helping. A second ad will run in the regular June issue of Outside. Total costs — about \$5,000, even with several significant price breaks earned. But with over 450,000 paid circulation (Almanac and June issue combined), and a pass-on readership of way over a million, a great deal should be accomplished this way. Since the above consortium contracted for 4 regular issue runs, you can expect to see 3 more ads in 1984 Outsides. Airwave Gliders U.S. has reported through Chris Bulger that over 40 Magic III's are arriving in American, as a result of the British company's efforts over the past six months. Director, Rory Carter is due to visit the USA as this is being written (early April). They are 5-6 weeks backordered. Plus, they will be introducing the Airwave Wizard soon, as their Intermediate ship. And probably in late spring or early summer, Bulger and Ken Brown are to hit the road, demo-ing Magics and doing some aero towing on the Mainair trike tug. Speaking of aero towing, Jean-Michel Bernasconi reports the newly enfranchised Skylines—West school is open and operating now, and doing very well already. JMB has hired English trike expert, Dave Garrison to run the school. Dave probably has taught more dual (tandem) trike students than anyone in the USA, and makes a great choice for the position. He was a member of the '79 American Cup British Team as well. Wills has announced changes in pricing for their Skyhawks and Ducks. The newest intermediate from the Santa Ana builder is now tagged at \$1795 plus

100 bucks for custom colors. And yet, Duck prices are DOWN, yup, standard Ducks will now retail for only \$1895 with the popular Attack Duck at \$2095, plus 200 bucks for custom colors on either. That makes the standard Duck one of the best values in any high performance diver. The WWers are also experiencing high sales on the slick new version of the Flylite harness (see news release, pg. 9). An item we should pass along to Duck drivers is a kingpost sleeve modification. "Slam-dunk" Duck landings have caused a few cases of kingpost failure (on the ground only, obviously). As the failures are not something that could be encountered while flying — the Duck's in-flight structural safety record is perfect, with what Wills calculates to be over 60,000 Duck air hours — the mod' kit just offers "additional protection against glider damage in a hard landing or other ground related mishap." See your local dealer for details. As we mentioned earlier here, UP has got a whole bunch of new developments, as reported in their mid-February and mid-March newsletters. Most interesting perhaps is Pete Brock's announcement of a \$10,000 prize! For the first pilot to fly 300 miles in a foot-launched production glider, the big prize is available with only two contingencies — (1) the flight must be in a production UP glider, and (2) the flight must be accepted by the F.A.I. Foreign pilots are allowed to compete as well, but UP advises it (UP) is NOT the verification office. Best of luck, you UP pilots. The Temecula company has finally got those elusive fairings in and shipments are being made. But they don't have the "chameleon cloth" anymore. Another new item, tho, is the 135 Comet 2. Yep, the UP R&D staff was finalizing details in mid-March, and by the time you read this the littlest Comet 2 may be certified. Check with the factory for a production schedule on the model, which will be priced at \$2196, just like its two bigger brothers. Still, the list goes on as UP offers "Speed Bars." The bars "are rubber-coated like the stock C-2 basetube and may be ordered with the glider instead of the regular straight tube." A certification addendum is in the works for the new bar. Price for replacement bars is set at \$70 retail, or \$25 retail when ordered with the glider. UP calls it the Half Rib Option — tho Duck dealers will likely refer to it humorously as an Attack Comet — when you choose the new option "allowing slightly better slow speed control, which in turn allows for a slightly improved climb/sink rate." They say the option does not appear to help with the top end of the performance envelope. Cost is \$100 retail on the 135 & 165, or \$75 on the 185. Last news we liked was UP's enclosure for a co-op ad program, which includes a camera-ready ad with space available for UP dealers to add their business card. It's a progressive idea that we'd bet many dealers can use for ads in local newsletters or what have you. As we speak of America's front-runners, we'd like to once again pass on some info permitting us to compare hang gliding with general aviation. Eipper Aircraft reports, "Last year [1983], all the general aviation manufacturers combined sold a total of 2,691 aircraft." Eipper claims to have done nearly that themselves, and it again causes us to wonder how U.S. hang gliding manufacturers compare. As a composite number is almost impossible to obtain, we'll probably never know for sure, but wouldn't be surprised to discover a similar number of hang glider sales for the year by the whole industry. A couple events not mentioned elsewhere will close up this "Product Lines." Joe Foster wrote to let us know dates for the 1984 Grandfather Masters of Hang Gliding competition. The prestigious event will be held August 21st to 29th, and we certainly hope schedule conflicts will not arise this year. An airport near Lakeland where the EAA's Sun 'N Fun Fly-in takes place is called "Circle X" by almost everyone. And as can sometimes be the case, "everyone is wrong." Circle X — tho quick and easy to say — is actually South Lakeland Airpark. Its owner, Roy Dawson, permits operations that cannot be done at Sun 'N Fun, which this year included a bunch of aero towing, and 2-seat trike introductory flight lessons. The mile-long, smooth-as-billiard-table grass strip was a pleasure to work on, as a good group of Florida Flyers got their introduction to the Skylines aero tow system. We'd like to thank Roy for his accommodating attitude, and hope his 1985 project for a mini-Sun 'N Fun of his own, works out well. Got news or opinions? Send 'em to Product Lines, Box 144, Lookout Mtn, TN 37350.

WE INVENTED THE THE ONLY TRUE TEST OF PERFORMANCE AND QUALITY COMPETITION IS THE CONSISTENT WINNING OF MAJOR EVENTS YEAR AFTER YEAR THE UP COMET IS THE MOST SUCCESSFUL GLIDER DESIGN IN THE HISTORY OF THE SPORT



If you really want to know what the competition will be doing in the future you can look to the new C-2 and pick out the details that others will copy in the coming seasons.



An articulated kingpost for fast, smooth, effortless control; self-aligning structural fairings of aluminum and polycarbonate construction for improved high speed glide, keyset infinitely adjustable tip tensioners for perfect tuning in a matter of seconds.

A three-ply dacron/mylar trailing edge for better washout distribution and improved high speed glide (and most important, resistance to stretching and wear).



A composite coated base bar for better control with less effort and improved insulation for comfort at high altitudes (it also protects the bar on rocky or abrasive surfaces). An improved taper ratio for improved mid-range performance and handling; a faired mylar nose cone for better penetration and improved speed and lift at high speed; plus a new generation of UP hardware that is lighter, stronger and simpler to rig — everything you would expect from the leaders in the industry. Ultralite Products.

In fact, if it were not for the UP Comet we would not have any competition. Other manufacturers would probably still be designing their own gliders, but three years of being second best has convinced a lot of factories to follow the UP design success story. Competition has proven there is only one type of serious competition hang glider on the market today; the floating crossbar, double surface, high aspect wing. Every major manufacturer in the world builds some variation of this concept. UP introduced it with the Comet, and most importantly, made it work. The UP Comet is the most successful glider design in the history of the sport. The Comet won its first XC Classic four years ago, and Comets have dominated this major event ever since. Comets or Comet clones have won every single major hang gliding event in the world! A UP Comet is the only glider in the world to have exceeded 200 miles in cross-country flight!

There are less than half a dozen manufacturers in the world today building state-of-the-art gliders. In addition to those few, there are literally dozens who claim to have the "fastest," "best handling," "best L/D and sink rate," etc. — simple statements, yes, but relatively unprovable. These people therefore feel safe to make these deceptive claims. There is one way to compare though. Competition. Consistent winning performance year after year, meet after meet cannot be inferred. It is the only true test of performance and quality. The marketplace determines success or failure of any product. It is no chance fact that UP is the number one glider company in the world today.

It is interesting to note that two manufacturers are on their third generation of "Comet clones" and both claim their new gliders are "better," "faster," etc., etc. But none of these so-called "superships" has yet to win a major event. One wonders why do these manufacturers need to keep changing a design that claims to be so obviously superior? Only because they know that advertising "Hype" for a new design sells gliders. They know that most pilots really want a new, better performing glider. They also know that these same pilots would rather believe the fairy tales rather than look at the factual data in making their decision. The UP Comet has remained relatively unchanged for three years because it was a superior design to start with (a result of a careful R & D program over a period of months, not days). Detail refinements have kept the UP Comet series in the forefront of hang glider competition for four years. Over 2,500 have been produced, a number probably exceeding the total of all the other serious competitors put together!

Now UP has introduced the Comet 2 — Another trend-setting wing that is already outperforming the original Comet design by a substantial margin. The new Comet 2 is not a "revolutionary breakthrough," but the result of a carefully planned evolutionary development program designed to give you confidence in the air; safe, enjoyable flying in the state-of-the-art recreational glider that will stay competitive for more than a season.

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