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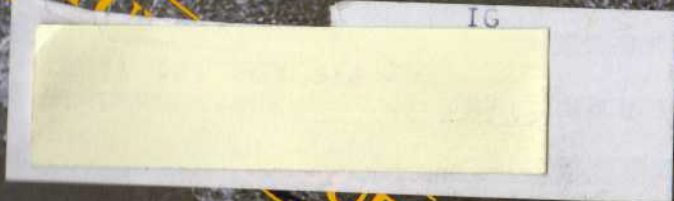
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WHOLE AIR

The International Magazine for Sport Pilots

US\$2.00 Can\$2.50 FrFR 24 1200 Yen



Buy any glider
you want...
But first fly a



Vision

So you're thinking about getting a new glider? You're faced with an important decision. There are a lot of fine gliders to choose from in today's hang gliding industry.

You've read all the manufacturers' ads, heard the pitches that tell how great the product is, but you know that the proof is in the flying.

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Listed below are some of the most professional and competent dealers you'll find in the world of hang gliding. They share our commitment to quality. They invite you to walk into their shop to demo the new VISION. We think you'll agree, you won't find a more enjoyable glider with such an exciting performance and handling envelope. Furthermore, take a look at the unique guarantees we designed to back up each VISION. It'll help you make a wise decision.

Just ask your dealer: he'll tell you about PACIFIC WINDCRAFT Ltd.'s full year guarantee on the VISION; he'll tell you about our free maintenance schedule and about our guaranteed shipping date; he'll tell you about the extensive testing and development program behind the VISION's sail and airframe concepts. And by the way, he'll also tell you about its surprisingly affordable price tag.

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The Sensor 510 has the best minimum sink, lowest overall sink rate and the best banked flight sink rates ever. It will climb faster, top-out higher and stay up easier in light, marginal thermals. The Sensor 510's noticeably better L/D will extend your range and open up new territory.

INNOVATIVE DESIGN

The Sensor 510's outstanding performance is due to its new, low drag, elliptical wingshape, low-swept geometry and low twist.

Sensor's original curved wingtips, an integral part of the elliptical planform, offers the lowest drag of any wingtip design. The low-swept (wide nose angle) geometry gives a broadened speed range, faster acceleration and more pitch control. The Sensor 510's high aspect ratio and low twist extends the lift producing low pressure over the entire span.

Increased lift and reduced drag results in a greater glide ratio (L/D). The sophisticated Sensor 510 is the most technically advanced hang glider in the world.

Pilot: Bob Trampenau

HIGHEST QUALITY

When it comes to gaining a performance advantage, attention to detail makes the difference. The Sensor 510's frame and sailwork results in a drum-tight wing with unsurpassed aero-dynamic cleanliness, the result is low drag and high lift. Precision craftsmanship in a high strength-to-weight ratio airframe gives you the extra confidence for maximum performance.

Seedwings, recognized world wide for design and manufacturing excellence, is proud to offer the Sensor 510. Expert craftsmanship, extraordinary attention to detail, impeccable sailwork and stringent quality control ensures that you will get durability and high performance.

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WHOLE AIR

ISSUE NO. 28, VOLUME NO. 6, NO. 1, 1983

PILOT'S PERSPECTIVE

- 21 GLIDER OWNER SURVEY
It has been done for ultralights,
but this is the first time *ever* for
hang gliders. Please do
participate.

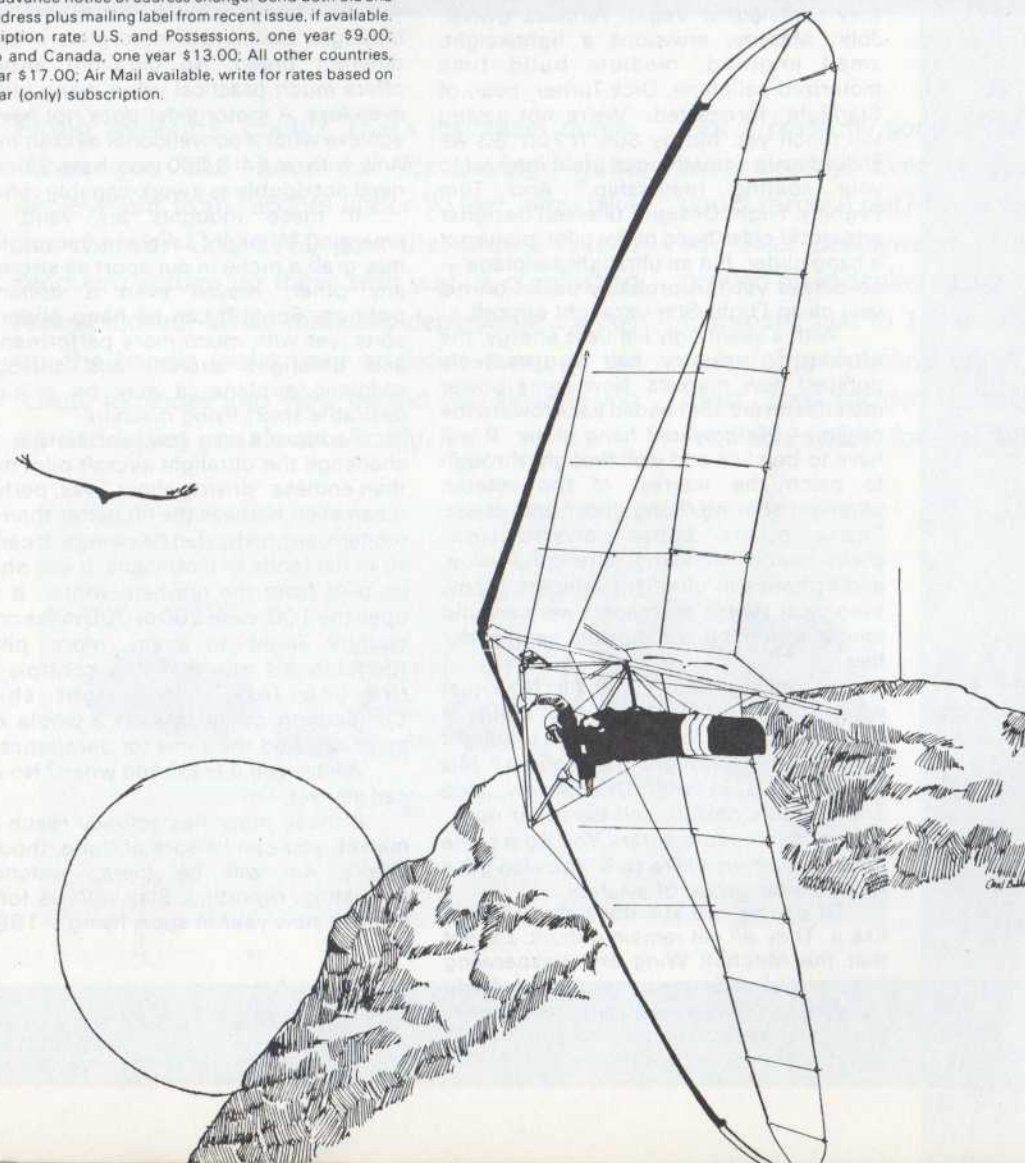
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FEATURES

- 25 MANUFACTURERS TOUR
Unprecedented look at seven
of the major and minor hang
glider manufacturers in the
United States today.

AERO TOPICS

- 8 FORUM
Reader Commentary
10 INDUSTRY NEWS
News and New Products
10 AERO MARKET PLACES
National Retailers Directory
53 DIRECTORY
Where to Buy What You Need
57 CLASSIFIEDS
For the Bargain Hunter
58 PRODUCT LINES
Consumer News





Volume 6, No. 1, 1983
ISSUE NO. 28

Publisher
Dan Johnson
Idea • Graphics

Editor
Starr Tays

British Editor
Noel Whittall

Owner Survey Editor
Glenn Brinks

Staff Photographer
BJ Schulte

Circulation Control
Kickoff Computer Service

Art/Photo Contributors
Starr Tays
Leroy Grannis
Eric Raymond
Bob Lafay
BJ Schulte
Carl Boddie

Editorial Contributors
Dan Johnson
Starr Tays
Glenn Brinks
Factory Correspondents

Advisory Panel
Mike Meier
Steve Pearson
Dick Boone
Tom Peghiny
Chuck Slusarczyk
Roy Haggard
J. C. Brown
John Lasko
Tom Price

Centerspread Photo
Eric Raymond

Cover Photo
Leroy Grannis

On The Cover:

Leroy's airborne camera this time captures Paul Whitehill "Streaking" by another aviator while they both soar the Pacific off the coast of San Francisco.

Publisher's Column

POWER TALKIN' SOARIN'

Yeah, I know it's hard to believe. But it's true. In Oshkosh, we uncovered and told you — why, we had even speculated earlier that — more manufacturers of powered ultralights were eyeing up the soaring scene.

Recently, at the AOPA National Convention in Las Vegas some three months later, we heard a determination to build a true soaring machine or ultralight motorglider. We heard this from four manufacturers. Mitchell Wing's Steve Patmont hopes to develop a *foot-launchable and foot-landable*, metal-skinned, ultralight sailplane, probably based on Mitchell's slick new A-10 which they revealed at Vegas. Airmass owner, John Massey, envisions a lightweight, small engine, medium build time motorized sailplane. Dick Turner, head of Starflight, forecasted, "We're not saying too much yet, but by Sun 'N Fun '83 we *should* have something of great interest to your soaring readership." And Tom Peghiny, Flight Designs' talented designer and world class hang glider pilot, plans not a hang glider, but an ultralight sailplane — no details yet but probably based on his very clean Flight Star ultralight aircraft.

With a seemingly limitless energy, the ultralight industry has aggressively pursued new markets. Now some power manufacturers are headed back toward the origin — the powered hang glider. It will have to be slick and well thought through to catch the interest of the veteran ultralight soaring/hang glider enthusiast. These pilots know construction, performance, handling, strength, value, and esthetics in ultralight vehicles. Many, even most *Whole Air* readers were around long before the *first* motorized hang glider flew.

Interesting, don't you think? Now, just what if the ultralight industry builds a better mousetrap, by way of a hot ultralight sailplane or ultralight motorglider? Mix that formula in with UP's Arrow, Bob Trampenau's design, and the other major hang glider manufacturers. You'll get some potent equation, we're sure. You also get a new splinter group of aviation.

Of course, we still don't know if we'll like it. They *all* yet remain unbuilt. Except that the Mitchell Wing and Kasperwing folks are already pursuing soaring flight (so are a few others) and Starflight's Turner (once a USHGA Director and still a hang glider pilot) *did* promise "...by Sun 'N Fun

'83..." And, as you know, UP Inc's Arrow is now in development.

In some recent conversations with General Aviation experts, it was observed that the ultralight industry now buys more magazine advertising space than even the giant Cessna/Piper/Beechcraft manufacturing group. That kind of expenditure, and the effort that accompanies it, will certainly achieve some success in beginning what essentially could be a whole new aerial arena.

The 50:1 sailplane community has only a few residents. The price dictates this, what with the "glass slipper" ships commanding upwards of \$40,000. Even this figure shrinks when compared to the really clean European motorglider, bringing over \$70,000 in the USA.

When in Germany this last spring, among the world's most active nation of sailplane soaring enthusiasts, I listened to many pilots refer to motorgliders as "bastard aircraft." They argued that the motorglider has neither the transportation potential of an airplane nor the efficiency of a top level sailplane. "Just for a lesser pilot, unsure that he can return to his home field without power," they would sneer. I found it hard to contest that attitude, in the airplane/sailplane category.

But hang gliders, ultralights, and ultralight sailplanes/motorgliders are a different breed. No ultralight airplane offers much practical value, hang gliders even less. A motorglider *does not* have to achieve what a conventional aircraft must. And with a \$4-8,000 purchase price, it need not double as a work-capable vehicle.

If these thoughts are valid, the emerging ultralight sailplane/motorglider may grab a niche in our sport as strong as any other, maybe even a dominant position. For if it can be hang glider (of sorts, yet with *much* more performance), and ultralight aircraft, and surrogate sailplane/airplane, it may be a highly desirable sport flying machine.

Perhaps it can tow, certainly it can challenge the ultralight aircraft pilot more than endless "driving about," yes, perhaps it can even harness the lift better than our modern, sophisticated flex wings. It can do so in flat lands or mountains. It can shield its pilot from the northern winter. It can open the 100, even 200 or 300 miles cross country flight to many more pilots. (Certainly it's true that stick controls will tire you less than weight shift.) Competition could take on a whole new meaning. And the same for aerobatics.

Where will it lead? And when? No one can say yet.

If these machines actually reach the market, you can be sure of thing, though. *Whole Air* will be there, watching, evaluating, reporting. Stay with us for an exciting new year in sport flying... 1983.

Thanks,
Dan Johnson

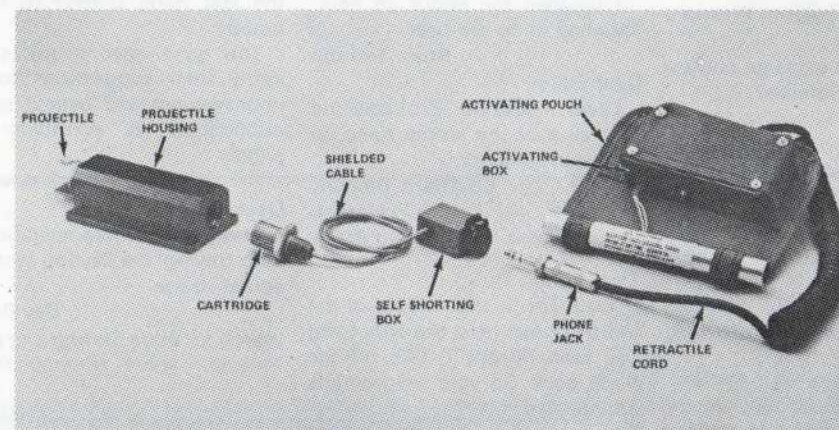
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FORUM

Dear Editor:

We've reached the point in hang gliding where we have to make a fundamental decision. Do we want to relentlessly pursue further reductions in drag? If so, we're headed toward the foot-launched sailplane. The foot-launchability of such craft will be poor, and many sites will be unsuitable for them. Thus towing, and aero-towing will predominate. And weight-shift will be abandoned (as on the Arrow) in favor of controls.

Or, do we accept as a basic principle of hang gliding that the pilot hangs in the breeze? In that case we develop streamlined harnesses, cantilevered wings, more variable geometry, better airfoils, and better handling.

We accept the limit on performance implied by an exposed pilot and concentrate on the joys of foot-launched flight.

That's what makes hang gliders different from other aircraft.

Hell, the hang gliding community has already re-invented the powered airplane; let's not re-invent the sailplane!

Dear Editor:

The ultralight enthusiasts have re-invented the airplane; it seems the hang glider companies are on their way to re-inventing the sailplane. So, it's close to the time for some of us to re-invent the hang glider!

Dear Editor:

I am a Private Pilot, with a few hours in sailplanes. Though I've

not yet flown a hang glider, it looks like the sport for me; much more fun than a stuffy cockpit.

Ultralight Sailplanes?

Dear Editor:

Yes, I'm very interested in the latest developments in ultralight motorgliders, or ARVs that can soar, i.e., Moni, etc.

Dear Editor:

"Convergence at Oshkosh" was great — made ultralights interesting — if they are soarable.

Dear Editor:

Many of us have been waiting a long time for development of ultralight sailplanes.

Please encourage and report (on them).

Dear Editor:

Why not have a design contest for ultralight sailplanes?

That's one of the better ideas we've heard in a while. Just give us a bit of time to analyze it, and we may well do it!

Dear Editor:

Since Kansas is so flat, we are quite interested in ultralight sailplanes with motorglider capabilities.

But the problem lies in the foot-launch aspect. In our area, vertical cliff launches are the rule, and (we have) no launch ramps. Launching an Arrow here would be outrageous at best.

Dear Editor:

Found your accounts of

Dear Editor:

More on *soarable* ultralights — not skybarges with motors.

Dear Editor:

Thanks for the continued effort to keep the magazine high quality and informative. I enjoyed the Nov/Dec issue very much. "Product Lines" continues to be fun and informative reading.

Also we (UFM) plan to have a new aircraft available in 1983.

Dear Editor:

I had something funny happen to me awhile back. I was going flying with a buddy and was driving on the tollway. When I stopped to pay the toll, the girl asked, "Isn't it illegal to have such a big gun on your car?"

I laughed for about an hour. That had to be the best.

Great magazine. Probably the best all over the world. Keep up the excellent work.

I would like more specifics on aero towing; the Skyting system's actual usage.

Well, I'm in the middle of the Indian Ocean, and the only thing I've seen fly are F-14's off the flight deck. So your magazine is appreciated!

Found your accounts of

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ADVERTISER'S INDEX

Airwise	12
AOPA (Ultralight Div.)	29
B & B Enterprises	17
Bennett Delta Wing 32, 59 (IBC)	
Ballistic Recovery System	7
Cloudbase	18
Crystal Flight Resort	16
Crystal Air Sport Motel	16
Flight Designs	4, 20
International Sailboards	12
Hurst Swiss Alp Safaris	17
Leading Edge Air Foils	52
Pacific Windcraft	2(IFC)
Progressive Aircraft	42
Eric Raymond	15
Rotec Engineering	14
Seahawk Ind. (Condor) ... Back	
Sealord Floats	56
Seedwings	3
SEPEX Parachutes	51
SSE Enterprises	14
Sport Aviation Mfg	52
Sportgraphics (shirts)	57
Tennessee Tree Toppers ...	13
Quicksilver: Glider Exchange	15
Ultralight Flyer	56
U.S.H.G.A.	9
UP Inc.	19
Whole Air	41
Wills Wing	9, 12

Aero Market Places	10, 11
Dealer Directory	53-55
Classifieds	57

Oshkosh & American Cup intriguingly different from other magazines.

Thanks, Jerry. That's exactly our goal with Whole Air.

Best issue yet, even bigger than the last *Hang Gliding* (& much better).

You guys listen to pilots and apply their suggestions to the improvement and benefit of the publication (& eventually the pilots).

I would like more specifics on aero towing; the Skyting system's actual usage.

Well, I'm in the middle of the Indian Ocean, and the only thing I've seen fly are F-14's off the flight deck. So your magazine is appreciated!

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photo by Bettina Gray



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September 6, 1982 Mike Schuster 83 Miles
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July 11, 1982 Scott Smith 103 Miles
 First Flight on a Duck 160

Aren't You Looking Forward
 To Your First Flight On A
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Wills Wing Inc. 1208H E. Walnut Santa Ana, CA 92701 (714) 547 1344/6366

Fledge III E.T. Released

Manta Products Inc. is introducing an E.T. (Extended Tip) version of their popular Fledge III hang glider. The larger version was the result of requests by many pilots in the 175-225 pound weight range for a rigid wing with more lifting surface. The E.T. has 177 square feet and a span of 35 feet. The standard version has 157 square feet and a span of 32.5 feet.

Test pilot Rex Miller claims, "Sink rate is improved significantly and the speed range remains unaffected." Somewhat surprising is the fact that the extended tips had no noticeable effect on roll rate performance.

Manta is currently doing powered flight testing on the

E.T. model with their Foxbat trike. Initial testing is progressing with no problems and Manta expects it to be available for the FoxBat at the conclusion of the flight test program.

HGMA to Decide 1983 Certification Standards Vision Package Accepted

At the November 10, 1982 HGMA Board of Directors meeting at Delta Wing, Board members Mike Meier, Dick Boone, Bob England, and Mark West were joined by Bill Bennett, Jean-Michel Berna-

sconi, and Bob Trampenau in the morning conference.

It was moved and passed to schedule the annual general body meeting for December 8th at 10:00 a.m. at the Delta Wing factory.

The HGMA will establish the 1983 Airworthiness Standards at this meeting, and also decide what recommendations, if any, to make to the USHGA on competition. We will also elect the 1983 Board of Directors. Members are asked to attend to express any opinions.

The documentation package for the Pacific Windcraft "Vision

18" was reviewed and accepted by the Board.

Whitehawks Enter Market

Craig Beck, President and Chief Test Pilot of the Whitehawk, announces the Whitehawk 185-A and its hybrid, elevon and dive brake equipped brother, the 185-B, are now available on a limited basis to the general flying community. Originally conceived as a limited production, ultra high technology sailglider, the first Whitehawks were built by Beck for himself and a select handful of Sierra Flyers who wanted the best that could be built. The first five units proved to be amply successful.

A new sail loft and 2,000 square foot carpeted sail-to-frame assembly area have

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Phone 203/938-9546

been recently completed. This will complement the 2,000 square foot machine shop and frame assembly plant at Tahoe.

The loft utilizes a number of modern concepts for advanced sail construction not available in the industry before. Also noteworthy is the extensive use of carbon-graphite in the glider and Beck intends to incorporate composites further in future designs. About 40-50 hours are put into each sail's construction. This compares to about 8-14 hours to sew the average double surface sail.

The leading edge has sewn into it a low pressure flap at each tip, which causes the size and shape of the camber in the outboard 20% of each wing to increase at low speeds, with resultant performance in-

creases (below 25 mph). The wing vents out at increased speeds, forming a more critical airfoil at higher speeds, all automatically.

The Whitehawk 185-B shares the A's planform, but has a set of winglets and elevons on each wing-tip. The elevons, operated separately, allow a person to flat spin back into a tight coring thermal and to maintain an extremely tight radius within that thermal, or if applied in level flight, they reduce the glide angle to a 4:1 parachute mode.

Contact Craig Beck Productions at P.O. Box 79W, Tahoe Vista, CA 95732, or call at 916/583-6136.

Dream Certified

The Delta Wing Dream was granted an HGMA Airworthi-

ness Certificate at the October 27th meeting of the HGMA Board of Directors.

For more information on the newest Intermediate entry from Bill Bennett, contact Delta Wing at P.O. Box 483-W, Van Nuys, CA 91408, or call 213/787-6600.

Wills Consumer Advisory

Wills Wing has begun some changes in construction and assembly on all their gliders. Pilots of 147, 177, and 187 Harrier models and all Duck models are requested to make these changes and note them in their owner/service manuals.

The assembly changes call for change-out of certain nuts and bolts on the nose plates of all models. A second area of change in the center bolt

structure, "...reduces the chance that improper set up of the glider will bend the AN4-21A bolt which secures the control bar "U" channel to the keel."

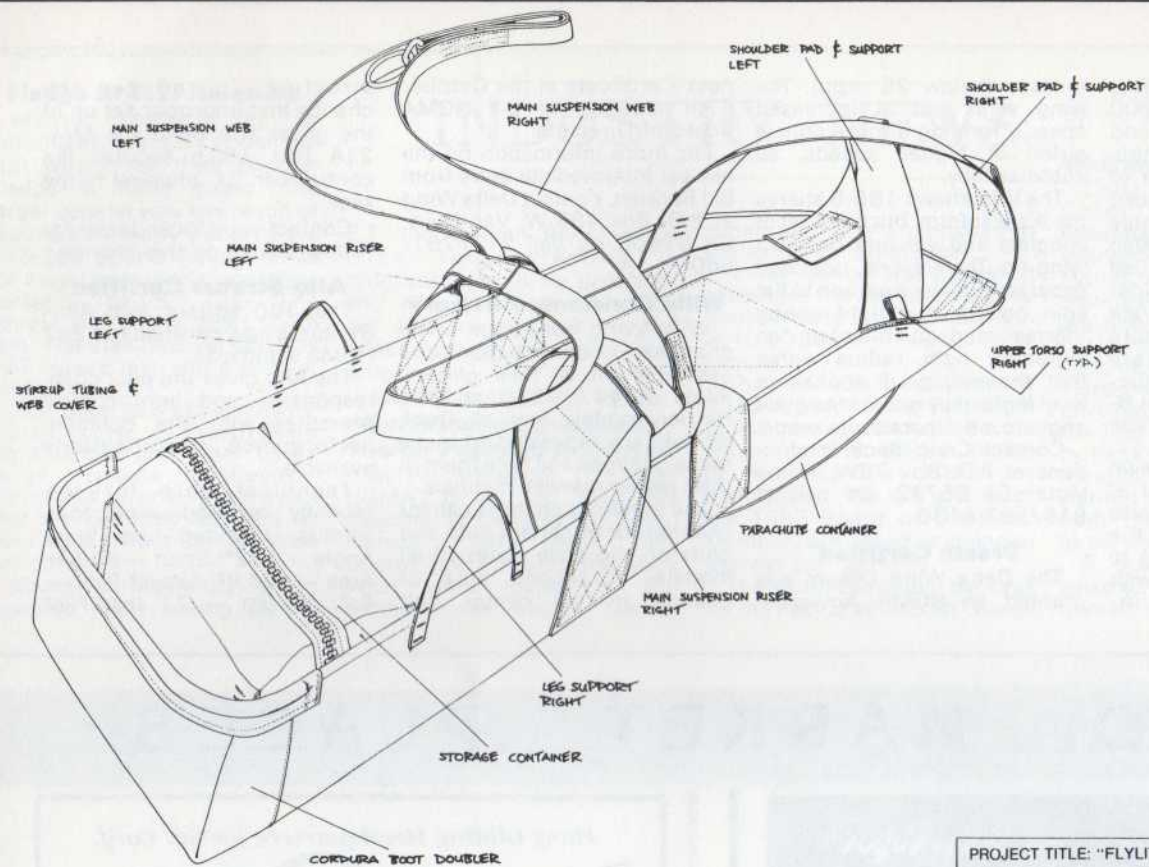
Contact your local dealer for further advice on this change.

Alto-Stratus Certified

The 160 square foot Alto-Stratus is now certified to 1982 HGMA standards.

The Alto gives the pilot crisp, responsive, and light control pressures with the optimum performance specifications available.

Technical data for the recently certified wing form Stratus Unlimited lists: Nose Angle -- 132°; Span -- 32.5 ft; Area -- 156 ft²; Aspect Ratio -- 6.7; Weight -- 71 lbs; Pilot



PROJECT TITLE: "FLYLITE"
 DESIGNER: R. PFEIFFER
 DRAWN BY: R. STAFFORD



1208H EAST WALNUT
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FLYLITE!

Rich Pfeiffer has combined a skydiving harness with a foamless cocoon shell to produce the FLYLITE, a light weight ultra-strong harness for competition and recreational soaring. The FLYLITE weighs less than 2½ pounds, and packs into an integral storage bag, along with your helmet and instruments, for easy transport. For strength, comfort, convenience, and economy . . . FLYLITE!

PRICES:

- Standard FLYLITE \$150
- FLYLITE with faired external chute container \$175

NEWS

Weight -- 150 to 250 lbs; Double Surface Area -- 71%; Ribs per Side -- 6; Lower Ribs per Side -- 2.

Contact Stratus Unlimited at their new address of 1137 Palomar Drive, Redwood City, CA 94062, or call president Tod Bomont at 415/591-1749.

Training Text in Seventh Revision

Dan Poynter's basic hang gliding manual recently went through the press for the seventh time for over 75,000 copies in print. Revised again, *Hang Gliding Manual with Log*, is the least expensive and most complete of any of the basic flying manuals on the market. It is used by flight schools worldwide.

The popular pocket-sized book contains essential basic review information for the novice Rogallo pilot; enough to enable him or her to achieve a passing score on the written exams for USHGA Pilot Proficiency Rating levels Beginner through Novice. A brief log in the back of the manual allows the new pilot to record his or her first month of flying.

Contact Para Publishing, P.O. Box 4232-W, Santa Barbara, CA 93103.

GEORGE WORTHINGTON Final Flight — A First Hand Observation

George Worthington took his last flight during our Ultralight Soaring Trials on September 10, 1982. Besides his earlier flying activities, he helped originate the concept of the Owens Valley X-C Classic, and more recently was the outspoken proponent of motorized ultralight soaring flight. Although he remained actively interested in the Classic, age and health problems prevented him from participating as a competitor for the past two years.

On the first Soaring Trials contest day, designer Mark Smith assembled and test flew the Wanderer in the early morning. George also successfully flew it later in the morning on a 30 mile gas consumption evaluation task. (This was his second total flight in the ship; the previous flight took place in April '82.) On the day's second task, he took off behind a Mitchell Wing by a couple minutes at about 3:30 p.m. He followed the Mitchell into a thermal approximately two miles from their departure point at the Bishop airport, with the Mitchell at 500 feet AGL, 100 feet above George in the Wanderer. Other nearby ultralights observed them in the thermal, and were approaching to join them.

Two of the nearby pilots witnessed the right wing of the Wanderer fail and fold near the root section, just after thermal entry, and the craft spun to the ground within a matter of a few seconds. No chute deployment was attempted, though the craft was equipped with a hand deployed model, and George died immediately upon impact. Pilots reported thermal conditions as moderate with wind conditions at the time being light and variable. Previously, there had been some wind gusts to 15 knots, and there was slight overdevelopment in the area.

A preliminary post-crash inspection by an experienced airframe and powerplant mechanic revealed that the main wing spar

had failed near the fuselage, approximately four to five inches inboard of the breakdown juncture.

On the day of George's previous test flight of the Wanderer, the designer accidentally spun the aircraft, and pulled a wing off in a hasty recovery attempt. A successful parachute deployment prevented serious injury. The structural failure was at the juncture of the wing fitting, which was redesigned after the accident. George co-wrote an article concerning his April test flight, and the subsequent accident, in the July '82 issue of *Soaring* magazine. He also wrote a similar article in the June '82 issue of *Glider Rider*. George had been aware that proofloading tests had not been made on the aircraft before both flights, and had been advised by a number of people that he was flying the aircraft in a test-pilot capacity.

George will be sorely missed by us all, and we intend to continue our efforts in the direction of his soaring interests. Although his final flight was unfortunate and untimely, we are certain that he would wish it no other way — flying.

His ashes were distributed over Torrey Pines on September 19, 1982. He is survived by his wife and daughter.

Don Partridge,
 Tom Kreyche,
 Mark Axen
 Owens Valley
 Hang Gliding Center

Flight Designs' FlightStar Flies for Wallstreeters

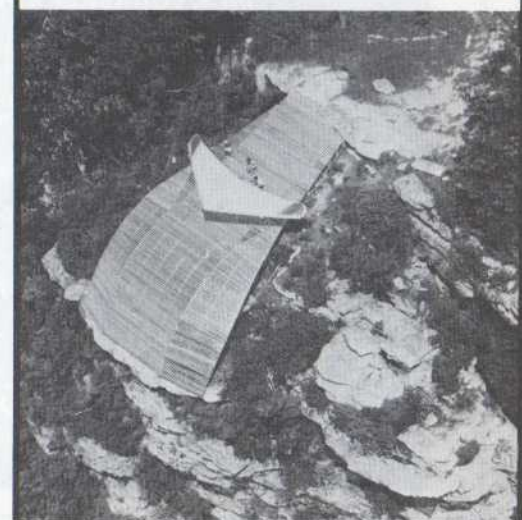


New York, NY (November 8, 1982) — Before October 22, Wall Street's stock watchers had to be told that an ultralight was not a low-calorie beer, but a sort of cross between a hang glider and a Piper Cub.

Since then, they know it's a real one-man airplane, thanks to one of the most heavily attended meetings ever of the New York Society of Security Analysts. On that Friday morning, more than 75 guests took a three-hour lunch for a special meeting and demonstration on Governors Island. The analysts, who evaluate stocks for investment, were guests of Pioneer Systems, Inc., the first publicly owned company in the ultralight field. That company is the parent of Pioneer International Corp., the aerospace subcontractor which acquired Flight Designs, Inc., of Salinas, CA., in June, 1981.

The demonstration included both the FlightStar, piloted by Tom Pehiny, and the earlier generation JetWing, piloted by Randy Hall, with considerable back-up assistance from Bruce Donnellan and Ron Clayton, and coordinator, Matt O'Gwynn.

WIN ONE GRAND CASH



IN THE TENNESSEE TREE TOPPERS OLDEST X-C CONTEST

Question: Who holds the oldest cross-country contest in the world?

Answer: The Tennessee Tree Toppers Club, Inc., (TTT) has been running a continuous contest since 1978, even before similar ones began in California and elsewhere.

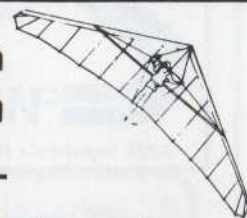
Now for 1983, the TTT is putting up *One Thousand Dollars* in great American green to the first pilot to wing by the 100 mile barrier after a launch from a TTT site (some of the very best in the world; see above!).

With contingency prizes (some are still pending), the winner *might* pick up a cool \$5 GRAND... or even more.

You'll have to be a year member, tho. Cost: \$30/year. And even if you don't win the big bucks, we'll *guarantee* you'll have some of the finest flying in the USA.

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- Prices subject to change without notice.

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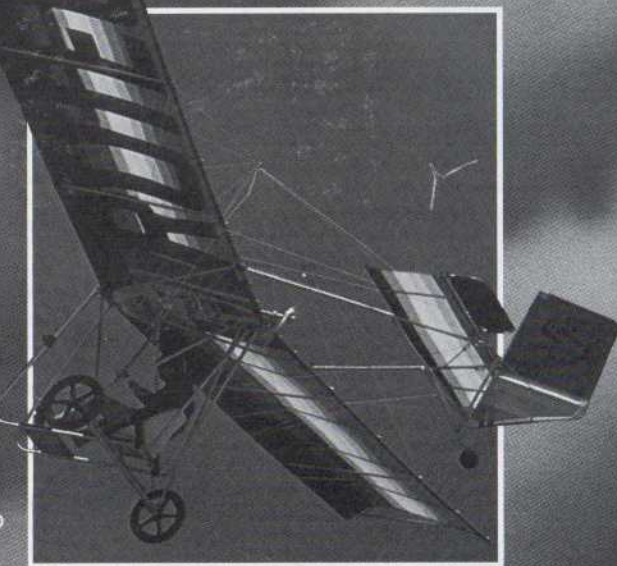
- * Pilot safety: Rigid cockpit, seat and belt, powerful engine mounted safely above the wing (not behind your head)
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NEWS

Wills Begins Marketing the Flylite Harness

Have you ever used your harness as a gear bag? ...or used your gear bag as a harness? Well, you can do both with the new Flylite Competition Harness from Wills Wing.

Designed by FAA Master Rigger and former National Skydiving Champion Rich Pfeiffer, the Flylite is an innovative cocoon-style harness which uses an integral skydiving harness for strength, support, and comfort, eliminat-

ing heavy, bulky foam, and increasing the strength of the harness dramatically.

A compact zippered pocket near the boot serves as glider storage bag in flight, and reverses to become a built-in gear bag with room for the harness, parachute, your helmet and instruments.

The Flylite offers an excellent combination of strength, comfort, safety, and convenience for both competition and recreational pilots. Contact your nearest Wills Wing dealer for further information.



WISCONSIN NORTHERN STATES

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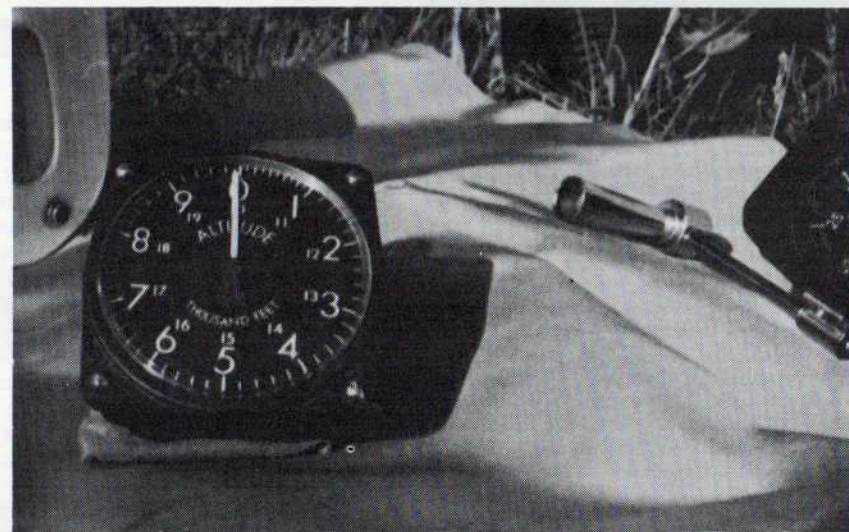


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1281

"Torpedo System" from Pacific Windcraft

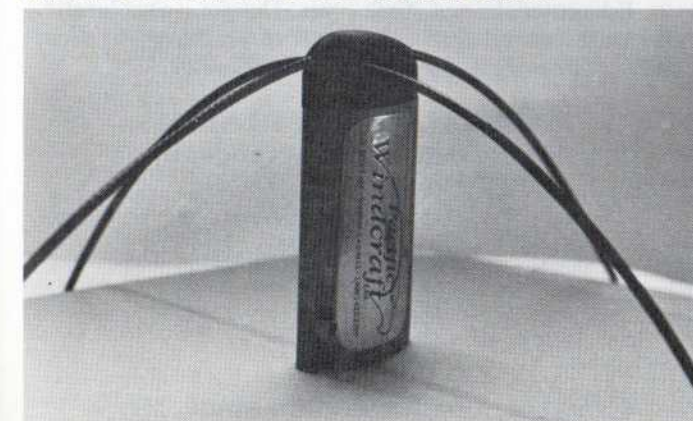
Pacific Windcraft announces the release of their new 1983 Torpedo kingpost strut system, crafted to offer excellent streamlining function and a proven low drag factor.

The system is light, strong, and possesses an inner cavity for a beehive-type geometry. This circular cavity can also be

used for sleeving purposes if desired.

This new system uses high density plastic for the base and top fittings which fully encloses all cable stops. The aircraft aluminum alloy is anodized in any color currently available on the market.

All 1983 Pacific Windcraft Vision gliders will be equipped with the Torpedo System as a standard feature.



SIERRA FLIGHT by Eric Raymond



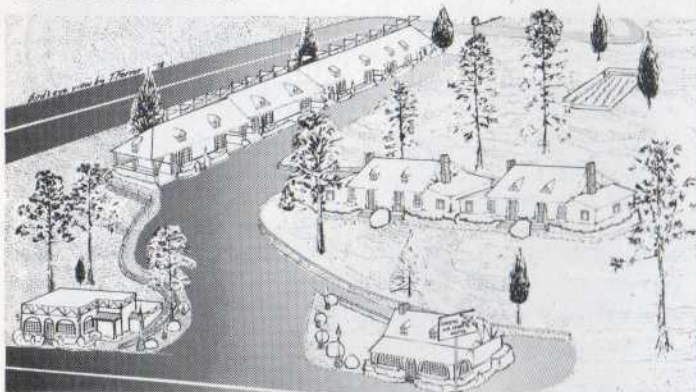
Now available as a high quality, full color poster, measuring 24 inches by 36 inches. Send \$6.95 to:

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Our gift shop and boutique is stocked with flying gear, lovely jewelry, posters, beautiful air brushed T-shirts, books, handcrafted stained glass, stationery, graphics, wall hangings... well, you'll be surprised!

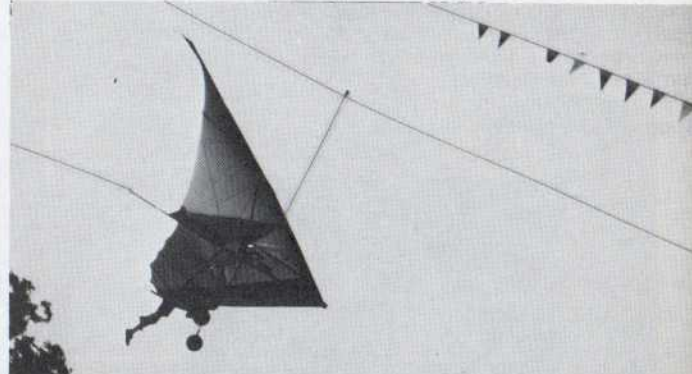
Special services for flyers include: discount rates; glider racks for protection against weather and theft; weather information and flying conditions at local sites; pick-up service from the airport or bus depot; and wake-up service for those soarable mornings!

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"Just for students," say you Sky-Gods? Not at all! Think for a second just how much **you** could learn if you could deploy your back-up chute, just for practice. Sound useful? Well, again only at **Crystal**, you can! Without a single exception, every pilot who has tried this special advanced form of training has felt much, much better about his or her back-up system after, shall we say, "...trying the real thing."

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NEWS

USHGA to Initiate Harness Standards and Testing

At the October 1982 USHGA Board of Directors meeting at Denver, Colorado, it was voted on and passed that a set of standards and simple testing

procedures for hang gliding harnesses and suspension systems should be drafted.

The first draft proposes:

—Any harness main support suspension design must be tested to a minimum of 4,000 pounds before resulting in a failure of the system, with the testing to be done in the direction of normal hanging position.

—Any body restraint system (leg straps, shoulder straps, back

retention straps) must be tested to a minimum of 2,000 pounds for each component before failure. This will be tested in the direction used in take-off for leg straps and the direction of forward exit in case of a crash for the shoulder straps.

—Any main suspension system or body restraint system must be sewn with either nylon or polyester thread meeting military specification 295 or greater.

—Any harness should have an adjustment, use, care, and life expectancy brochure included with each harness.

—Any hang loop or any and all parts of the pilot's support and suspension systems, either webbing or mechanical, be tested to a minimum of 4000 pounds before failure.

Ken Koerwitz,
USHGA Director,
P.O. Box 217-W,

Westminster, CO 80030



Tom Price Forecasts Good Motorized Sailplanes

San Marcos, CA — In these days when frontiers are endangered species, Tom Price has taken on a form of research and development that is as exciting as it is changeable. In fact, there are less than a half-dozen people in the whole world with whom he can converse on the fine points of his profession. Though there are thousands of aeronautical engineers in this country, Tom is one of the very few that have worked their way into forging and testing new ultralight aircraft designs.

A 1965 graduate of Embry-Riddle Aeronautical University, Price has the distinction of having engineered some of the world's heaviest and lightest aircraft. He spent five years at McDonald-Douglas working on flight loads and design criteria for stretch versions of the DC-8 and 9, and followed the DC-10 from conception to its first flight.

As hang gliding was developing as a national sport, Tom joined a new hang glider


company called Eipper-Performance, where he designed wing sails.

A year later he set up his own company, Albatross Sails, and proceeded to develop the sails for over 20 hang glider designs. Tom also became active with the HGMA, formulating airworthiness standards and setting up the first test programs for hang gliders and powered ultralights. By certifying 18 hang gliders, he became a world leader in the field.

This year he rejoined Eipper Aircraft and has finished the first complete design report on an ultralight aircraft — the Quicksilver MX. He serves as Eipper's Engineering Administrator. Over the years, Price has also earned his commercial, multi-engine, and instrument flight ratings.

Tom believes the FAA's new rule on ultralights will help stabilize the industry. He states, "We'll never have fast, cross-country machines with this ruling, but we can focus on developing good motorized sailplanes, aerobatic models, and fun flyers."

For complete documentation of our high adventure Swiss Alp Hang Gliding Safaris send \$ 5.00 to cover airmail postage to:
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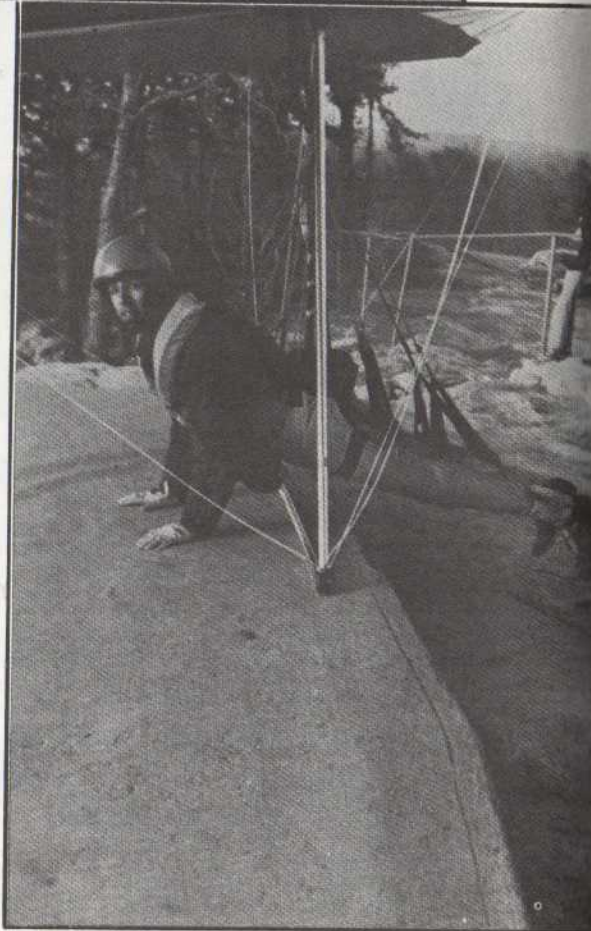
U.S. add \$4 shipping/packing for each instrument ordered; Foreign orders add \$10 shipping for each. Certified Check or Money Order. Please allow 3-4 weeks for delivery. Personal checks take 6-8 weeks for processing.

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Pilot: Dennis Owen

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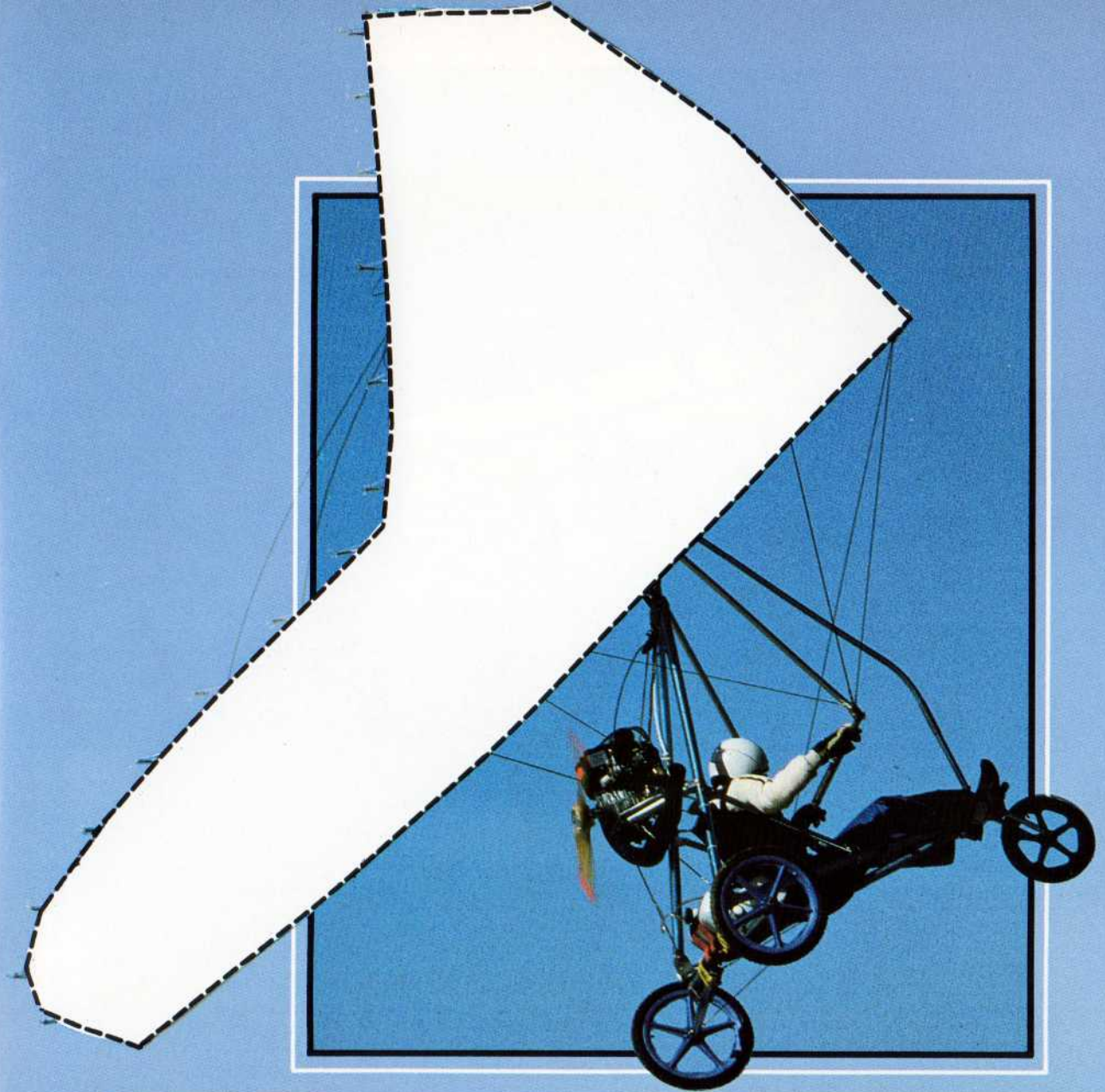
Comfort, Simplicity, Beauty, Reliability. From Beginners to Expert. Easy launch, no pilot distraction! All custom built (see measurements). Fully adjustable, with 20 suspension points. Individual leg movements. Floatation foam, locking karabiner, dual wrap-around security and top quality Perlon rope.

This is the most custom, deluxe harness you can buy. Only \$155, pre-paid or C.O.D. permitted.

Please add \$7 for shipping and handling. Specify first, second, and third color choices.

Options: Glove pockets, \$10
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Supply these measurements (bare feet): Floor to shoulder, to inseam, to kneecap (inches). Chest, waist, and weight.



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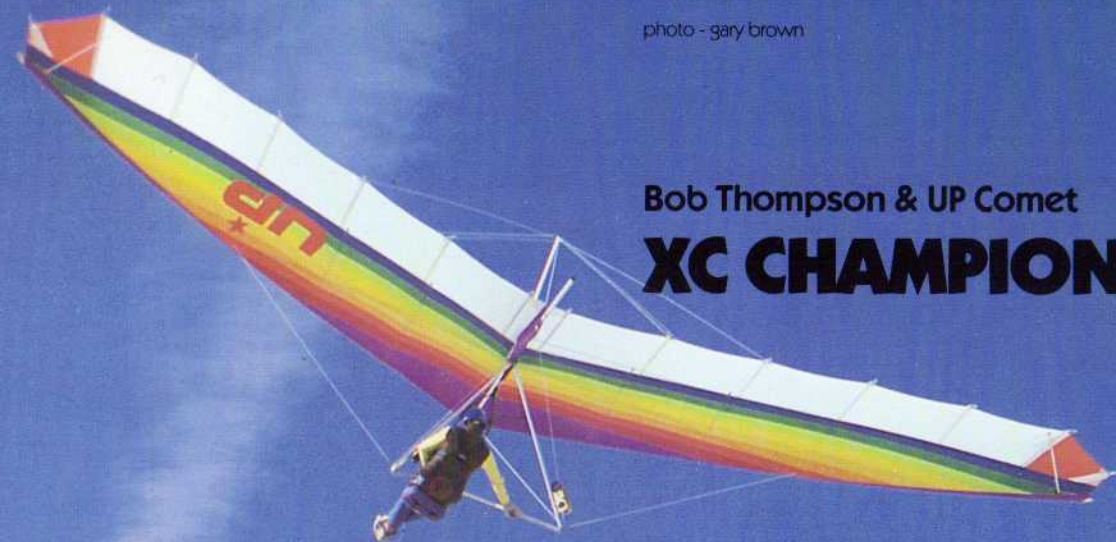
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photo - gary brown



Bob Thompson & UP Comet **XC CHAMPIONS!**

**UP Comets sweep "Arizona Open"
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| 3 | Bob Thompson — 40.0 miles | 165 UP Comet |
| 4 | Bob Thompson — 37.0 miles | 165 UP Comet |
| 5 | Dave Evans — 33.0 miles | 165 UP Comet |
| | Bob Thompson — 33.0 miles | 135 UP Comet |
| 6 | Gary Brown — 30.0 miles | 165 UP Comet |

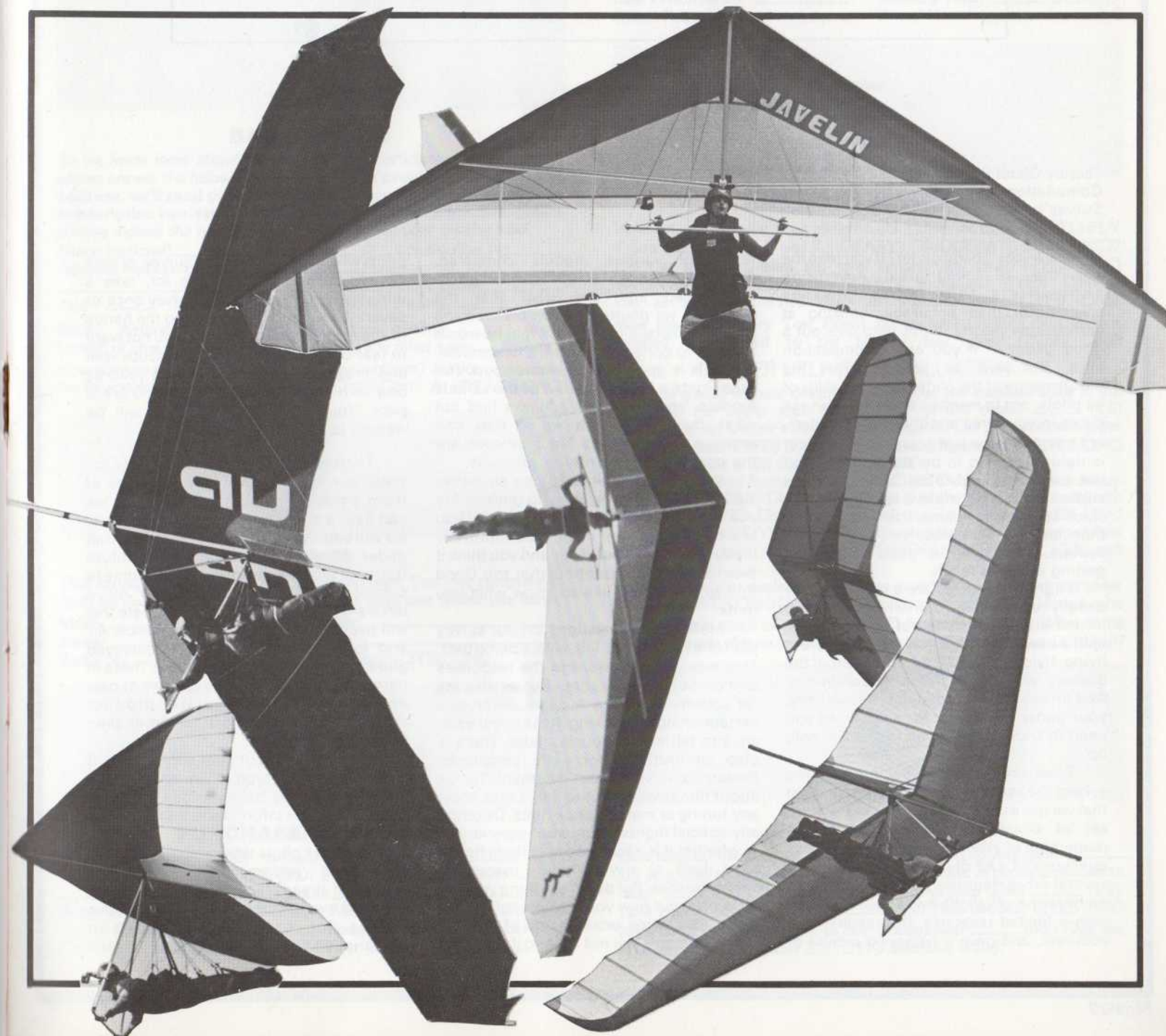


In a year long contest sponsored by USHGA Chapter 4 and the Arizona Hang Gliding Assoc. of Glendale, Arizona and open to all pilots and gliders, UP Comets again swept the field! UP Comets flew the five longest official distances of the event. Winning pilot, Bob Thompson, picked up \$250.00 in contingency money from UP Sports and a commitment from Ultralite Products to double the money for the 1982 event!

Note — UP Comets and Geminis are available for immediate delivery in all sizes and colors. Contact your UP Sports dealer today. For full information, specs, photos and price lists, send \$2.00 to UP Sports, P.O. Box 659, Temecula, CA 92390. 714-676-5652. All UP Comets and Geminis are HGMA certified.



The First Annual **WHOLE AIR GLIDER OWNER SURVEY**



**The First Annual
WHOLE AIR
GLIDER OWNER SURVEY**

This thorough, first-of-its-kind Glider Owner Survey offers the pilot a chance to "Speak and Be Heard..." by the manufacturers, by the rest of the pilot population, and by the world.

Text by Glenn Brinks
 Compilations and Reviews by Glenn Brinks
 Survey by Glenn Brinks and Dan Johnson

Is there a "best" hang glider? If you read the ads, they all sound great. Advertising copywriters tend more towards enthusiasm than accuracy. Looking at competition results might help pick out a good glider — if you are a competition pilot. But how do you separate the performance of the glider from the skills of its pilots, not to mention luck? You can ask pilots in your area about different gliders, but someone who just bought a new glider is naturally going to be stoked on it. And the pilot who just blew a landing and stuffed it or did not make it to the top of the stack is likely to blame the glider rather than himself. So unless you ask a lot of owners, you stand a good chance of getting a biased result.

Flight test articles are a help, but they usually represent the opinions of one pilot, in one area, under one set of conditions, with a new glider. You may have a different flying style and fly in a different part of the country with much different conditions. And unless you are independently wealthy, your glider has to last for a while, so you need to know how a given model will hold up.

Enter the owner survey. It is a lot like asking the opinions of other pilots, except that we use a carefully worked out standard set of questions, and by polling the readership of *Whole Air*, we can ask those questions of a lot of pilots. In concert with several other magazines, *Whole Air* helped pioneer the ultralight owner survey. Even with a limited response, the results were accurate, and gave a balanced picture of

how the various models compared. Significantly, none of the manufacturers complained and one said that the problems we pointed out on his machine were well known to him and that he would attempt to correct them in his next model.

This is good for the whole sport. The buyer gets a fair evaluation of the various models, and the manufacturers find out what their owners think, so they can improve their products. The only losers are the companies with inferior products.

We think it is time to use an owner survey to take a look at hang gliders. Are you satisfied with your glider? Even if you are, how do you think it could be improved? If you do not like your diver and you think it flies like a tent, tell us about that, too. Good or bad, we would like to know what you think.

Many of the questions on our survey ask for a rating from 1-5, with 5 being best. This way, we can average the responses and come up with a rating. But we also ask for comments — why a glider deserves a certain rating. By looking at the comments, we can tell more about a glider. There is also an invitation for extra comments. Please do, to your heart's content. Tell us about things we forgot to ask. Let us know any tuning or maintenance hints. Describe any special flights or unusual experiences — whether it is a hundred mile flight from a sand dune, or a wing failure over some sticker bushes. Put down anything you can think of about how you and your glider get along. Use some extra sheets of paper if your comments will not fit. And if you know

pilots who have not seen the survey, or who do not subscribe to *Whole Air*, take a minute and photocopy the survey once or several times and get them into the hands of these other pilots. (Should you not want to tear out the page, it will photocopy well and these will be considered as valid as one torn from the magazine.) You are a pilot. Your opinions count. We will be waiting to hear from you.

There is no real expiration date for these surveys. As sufficient quantities of them arrive for a particular model, so we can have a broad enough base of opinions, we will begin presenting the reports on that glider. More forms will appear in future issues of *Whole Air* and you are welcome to submit several forms, but each for a different glider, please. We anticipate this will become a regular feature of *Whole Air* and look forward to having a surveyed glider report in nearly every issue. These in harmony with our planned reviews of new equipment will complete product evaluations like our sport has never seen before.

Act today! Fill out your survey form. It will only take the typical owner about 25 minutes, and may help you buy your next glider with more information than you ever dreamed possible.

For those pilots who wish to give their name and address (and subscriber number, if already receiving *Whole Air*), we will send two complimentary issues as our thanks (or extend your existing subscription two issues longer).

BASIC SURVEY INSTRUCTIONS

We've tried to make the *Whole Air* Glider Owner Survey a semi-automatic answer developing system. By that we mean that most questions are a check-the-box type. Some, however, require a rating, done on a 1-5 scale, with the standard legend appearing on the upper right of each page so that you do not need to flip the pages back and forth just to see how to answer. A few ask for written comments, just notes will suffice, where your answer may represent a unique response.

Please follow the survey through in numerical order, categories 1 through 12. We estimate it will take the typical owner about 25 minutes to complete the form.

While we invite your name to qualify for the issue premiums, it is not mandatory. Those who do enter their name are assured of absolute confidentiality. These pilots will also receive the issue premium which applies to them.

Thank you — Ed.

1

BACKGROUND

So we know more about those of you who participated in our survey, please answer the following questions. **If you provide your name and address, we'll send you two complimentary issues or extend your subscription two issues beyond the present expiration. Subscribers please include the number on the upper left of your mailing label.**

Name (optional) _____ Subscriber No. _____
 Address (optional) _____

Age _____ Weight _____ USHGA Rating _____ (I-V)

Glider Airtime _____ (hrs.) All other airtime _____ (hrs.)
 Length of time flying... gliders _____ (yrs.) any other types _____ (yrs.)

How often do you fly per month? _____ (no. of times) Do you compete in the Regionals? YES NO Nationals? YES NO At all? YES NO

2

GLIDER

This survey pertains to any one glider you own. You may complete a form for each and any glider you own but **only one glider per form.**

Make _____ Year _____
 Model _____ Size _____
 Serial No. _____ Certified? YES NO

3

PURCHASE CONDITIONS

When was this glider bought? _____ (mo.) _____ (yr.)
 Was it bought NEW, or USED? If used, describe condition _____

Suggested Retail Price \$ _____ Your Purchase Price \$ _____ Trade In Value Received (if any) \$ _____ Bought from a DEALER, or PRIVATE, or FACTORY DIRECT, or OTHER _____

STANDARD SCALE LEGEND	
5 = Superior	3 = Average
4 = Good	2 = Fair
	1 = Poor

4

OWNER PRIORITIES

Using the legend below (**this question only**), value the following qualities of your glider by their order of importance to you:

(LEGEND -- 5 = Vitaly Important; 4 = Significant, but Not Vital; 3 = Average Importance; 2 = Low On Scale; 1 = Not a Priority At All)

Price _____	Set-Up Ease _____
Structural Integrity _____	Light Weight _____
Light Handling _____	Popularity _____
Quick Handling _____	Contest Successes _____
Mellow Handling _____	Uniqueness _____
Glide Performance _____	Innovative _____
Sink Performance _____	Delivery Time _____
Speed Range _____	Brand Name _____

5

DELIVERY PROCESS

How did you receive your glider? IN TUBE, or READY TO FLY
 If you built from tube, was it... EASY? MODERATE? or HARD?
 Did the assembly from the tube require any tools? YES NO
 Were all the disassembled parts included? YES NO
 Did all the un-attached parts fit together well? YES NO
 Was there a factory Test Flown By sticker? YES NO Was it initialed and dated by the factory test pilot? YES NO

DEALER DELIVERY EVALUATION

Rate the quality of your dealer's service (Use the standard scale in the legend in the upper right hand corner of this page.) _____ (1-5)
 Did you get an Owner's Manual? YES NO Did you receive a glider Service Manual? YES NO Did you get any Spare Parts? YES NO
 Did you receive a Rib Chart? YES NO
 Did the dealer test fly the glider? YES NO Did he demonstrate set-up to you? YES NO Did he generally go over the glider and manual with you? YES NO Did the factory ask you to respond? YES NO
 Did you respond? YES NO Using the standard scale in the upper right hand legend, rate the factory's WORKMANSHIP _____ (1-5) and MATERIALS _____ (1-5).

How close is your dealer _____ (miles away)? Is it a full-time hang glider business? YES NO Does it use a storefront? YES NO How good is your dealer's stock of parts? _____ (1-5 standard rating) What is the average length of time to receive parts not usually stocked _____ (days)?

6

FIELD ASSEMBLY

How long, on the average, does it take you to set up your glider? _____
 Do you have to have help? YES NO Number of persons needed to help? _____ (no.) Rate the set-up quality of your glider _____ (1-5).
 How long to break it down? _____ (min.) Help needed? YES NO
 Number of persons needed to help breakdown? _____ (no.) Rate the breakdown of your glider _____ (1-5 standard scale).

7

EASE OF USE

Rate the general, overall quality of flying your glider _____ (1-5).
Now do the same for these various individual areas:

- In Thermals _____
- In Ridge Lift _____
- In Turns _____
- To Coordinate Turns _____
- Pitch Trim _____
- Roll Trim _____
- Maintaining Hands-Off Flight _____
- To Set Up/Maintain Approach _____
- To Flare _____
- Generally, To Land _____
- To Ground Handle _____
- To Lift (weight) _____

8

FLYING FACTORS

Using the standard scale in the upper right legend, rate your glider's ability in the following areas. Use your opinion derived from flying in the company of others and in being able to achieve what you wish.

- Overall Strength _____
- Light Handling _____
- Quick Handling _____
- Mellow Handling _____
- Glide Performance _____
- Sink Performance _____
- Speed Range _____
- High Speed Stability _____
- Low Speed Stability _____
- Handling at High Speeds _____
- Handling at Low Speeds _____
- Straight Ahead Stall _____
- Turning Stall _____
- Accelerated (Speed) Stall _____

Does your glider seem to "prefer" any particular site, or type of site?
 YES NO Please Comment: _____

9

MAINTENANCE REQUIRED

Ever had to repair your glider from other than a crash? YES NO
Using the standard scale, rate the ease of maintenance _____ (1-5). Rate the ease of crash repairs, if any _____ (1-5). Did any parts fall off or break? YES NO
Ribs bend easily? YES NO
Are your downtubes STRONGER, or WEAKER than you expected, or ABOUT LIKE EARLIER GLIDERS. Rate your glider's overall workmanship _____ (1-5).
Was any wear noted early in your ownership? YES NO Please describe: _____

10

STANDARD SCALE LEGEND 3 = Average
5 = Superior 2 = Fair
4 = Good 1 = Poor

YOUR EQUIPMENT

Do you have or use:
Helmet YES NO
Parachute YES NO
Variometer YES NO
Altimeter YES NO
Airspeed Indicator YES NO
Compass YES NO
Ballast YES NO
Two-way radio YES NO
Strobelight YES NO
2nd Hang Strap YES NO
What strength is the karabiner you use? _____ (pounds)
What brand and model harness? _____
Special equipment or clothes used? _____

11

ADVERTISING RELIABILITY

Does the manufacturer of this glider advertise? YES NO
Were the ads a factor in your knowing about and/or buying the glider? YES NO.
Using the standard scale legend, rate the success of your manufacturer in being truthful about these areas of advertising message (No rating will signify that the ads did not address that particular area):

- Delivery Time _____
 - Performance _____
 - Handling _____
 - Set-up Ease _____
 - Weight _____
 - Materials Quality _____
 - Workmanship _____
 - Overall _____
- Other Comments: _____

CONCLUSION/SUMMARY

Using the standard scale, rate your glider overall _____ (1-5). Would you buy another glider from this manufacturer? YES NO
If NO, please comment: _____

Would you recommend another pilot buy this glider? YES NO
Would you recommend another pilot buy from this factory? YES NO
Was the glider worth the Suggested Retail Price? YES NO
Was the glider worth the price you paid for it? YES NO
Can your glider be sold for use by a Novice pilot? YES NO
(Refer to No. 8 -- FLYING FACTORS) Comment on why your glider deserved the ratings you assigned. _____

What are your glider's BEST FEATURES: _____

What are its WORST FEATURES: _____

Have you had any particular problems with your glider? YES NO
What are they: _____

Please make any additional comments you wish.

THANK YOU FOR RESPONDING!!

MANUFACTURERS TOUR



ather than give you another pilot/glider report this issue, we thought we would go for an entirely new approach, via the next twenty pages — appropriately titled "Manufacturers Tour."

Furthermore, we thought, by starting the New Year's issue off with this kind of feature, our future pilot/glider reports would be somewhat enhanced by this educational insight.



o, the next time you read about, see, or fly one of the gliders built by one of the seven manufacturers featured here, you will feel more akin. This feeling can only help you evaluate more knowingly, therefore hopefully more fairly, each of their products.

Also, each of the manufacturers included must be commended for their total cooperation with this endeavor. We admit we did not allow them much time for preparation, yet they still reciprocated, undaunted. For this alone they each receive our recommendation. You will also notice the absence of Ultralight Products, Inc. This was not an oversight; Pete Brock was in Japan at the Aerobatic Competition held there recently, and did not return to California in time to make our deadline. They will be featured in a forthcoming issue.

**Starr Tays,
Editor**



The newest Fledge III launches from a San Francisco beach cliff. (Below) Assembly area at Manta's factory.

In November of 1972 the city of Oakland, California issued a business license to a company called Manta Products. The three people that started this new company — Kent Trimble, Lee Wilson, and Alan Dimen — had several reasons for forming their own corporation. First, they all preferred self employment to working for others. Second, they saw the new sport of hang gliding as an ideal outlet for creative input. From the time they saw their first hang glider, they started thinking of ways to improve it. (It must be realized that at this time there were only two other manufacturers of hang gliders besides Manta — Bennett's Delta Wing and Eipper-Formance.) Third, besides creativity, they all shared another thing in common: a desire to fly. Finally, there was the general belief that there was a decent living to be made in the manufacturing of hang gliders.

In the first year the founders at Manta achieved three out of their four goals. They had become self employed, contributed to the advancement of the sport, and had all learned to fly. For eighteen months, fourteen to eighteen hour days were spent in research and development, production, and equally important, getting the message across to the public that this new sport called hang gliding existed. There was a general belief among the populace that those long objects on top of our VW's were large tents or something called "hand" gliders.

Manta introduced two of what were to be many "firsts" in the hang gliding industry. The first was a foldable control bar. The other was the "no-tool" set up. Although these do not seem like revolutionary ideas now, at the time they were enough to begin earning Manta a reputation as a "can-do" organization.

One of the major decisions to affect the long term goals of Manta Products was a decision to become as internally self-sufficient as possible. There were

MANTA

MANTA PRODUCTS, INC.

several reasons for this. One reason was that there would be more control over inventory and materials flow. Also, by manufacturing their own parts they would be assured of better quality control. Third, they felt that if the market for hang gliders was in fact substantial, they could sell the parts to other manufacturers at a competitive price.

As it turned out, this decision was the correct one. Manta invested all their profits back into the expensive machinery and tooling needed to manufacture parts of high quality and consistency. During the next several years the company grew slowly but consistently into the best equipped shop in the industry.

Though still somewhat below minimum wage, the founders were getting paid more or less on a regular basis and were getting satisfaction out of seeing their contributions help further the sport of hang gliding.

During the growth period the hang glider was slowly evolving into a more refined aircraft. Pilots demanded performance and handling that was not possible with the "standard rogallo." To the people at Manta (which now included Russell Thompson, Michael Bray and airframe maker extraordinaire, Richard Romero, among others), there were two ways of working around this problem. The first was to modify the rogallo to extract more performance. The initial attempts by some of the other companies (of which there were dozens at this time), had resulted in many crashes. Some knowledge was gained at a high price. The other solution was to take a radical departure from the rogallo and design performance into another type aircraft. The Icarus II and Icarus V were very popular and certainly had the performance. But they were far too impractical as hang gliders because they were not portable. In Utah, Klaus Hill, in conjunction with Dick Cheney, Larry Hall, and Tom Vayda (the test pilot), was

working on a foldable flying wing called the Fledgling.

Feeling that the only company capable of producing the Fledgling was Manta Products, Inc., Klaus traveled to Oakland to show off his design. Within a couple of months, Manta had built their own prototype.

The first Manta prototype flew in September of 1975. A much changed and improved production Fledgling went out the door in January of 1976. An interesting note here is that Manta was the first company to test a design by dropping it from a balloon with a pilot in it. Wayne Mulgrew did our first balloon test with the Fledge IA before it was offered to the public. It was very exciting watching Wayne spin and tail-slide the Fledgling in an attempt to break it. His descent was so rapid that the chase planes exceeded their flight envelopes trying to keep up (or down) with him. Wayne, of course, was wearing a specially built parachute, which may be a first also. Fortunately Wayne was unable to break the aircraft, though not for lack of trying, and Manta went into production with the world's first production, foldable rigid wing.

The success of the Fledge I was moderate for the first year or so. It had a strong following of almost fanatically loyal



Manta uses a very sophisticated test vehicle, employing computer stored and analyzed information. (Below) Manta's FoxBat combination of Fledge III on their own trike.

pilots, but there were not that many of them. Rumors circulated about how fast a pilot had to run for take-off and how difficult it was to land. Not all of these were totally without merit either. Pilots often expected it to fly like a rogallo... and that, it would not do. It was faster, and it certainly would spin if you forced it. These are characteristics inherent in a single surface wing. Many pilots learned to cope with these factors, and as a reward were treated to an extremely strong, stable, and high performance aircraft. Still, the Fledge I was not the hang glider for everyone. In the winter of 1977 Manta introduced the Fledge II, a double surfaced version of the Fledge I. The Fledge II had some significant advantages over its predecessor. Besides having overall performance increases, it offered a substantially lower take-off and landing speed and better low speed handling in general. This improved the thermalling abilities of the glider and gave pilots more confidence when taking off or landing.

At the 1979 National Hang Gliding championships, the Fledglings won first through fourth place. The press called the '79 Nationals "The Crestline Massacre." This was the first time any single glider had so completely dominated the Nationals. The Fledglings went on that year to win the World Title as well.

The ultralight industry was beginning to grow in 1978. In that year Manta built a "cage" for the Fledgling that would allow easy mounting of an engine. Pterodactly, at that time in Monterey, California, bolted an engine to this prototype and a whole new



line of development opened up for the fledglings. A Manta-built version of this first Pterodactyl with landing gear attached was flown by Manta pilot, Jack Peterson from Long Beach, California to Kitty Hawk, North Carolina. This flight had historical significance being the first trans-continental flight in an ultralight. This aircraft was donated to the National Air and Space Museum in Washington, D.C. It is now on loan to the Franklin Institute in Philadelphia, where it is on public display.

In 1980 World Champion pilot, Rex Miller, came to Manta to design the next generation Fledgling. This is a highly refined version of the Fledge II. In fact, it is actually a completely new aircraft that has a new airframe, new geometry, new control system, as well as a meticulously thorough "aerodynamic clean-up." For instance, the Fledge 3 incorporates a foam leading edge pocket, 95% double surface and gap covers to minimize drag. One of the first Fledge 3's again won the 1981 National Hang Gliding Championships.

Manta is also very proud to be the first company to build a computerized test vehicle. It is used to test aerodynamic and structural loads of the gliders at different angles of attack while the vehicle is driven at different speeds. Data is collected from

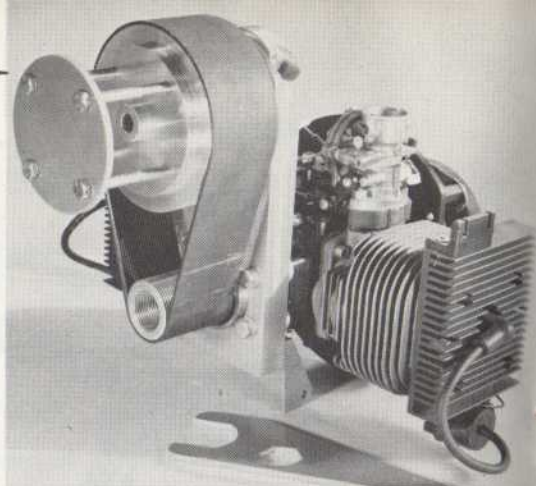
load cells as well as air speed and angle of attack, and saved in the computer. The data is extremely accurate and will show the results of any modifications to the glider.

Now enter the Foxbat. It is a very refined and rugged trike. The Foxbat was designed from the beginning as a cross-country touring machine. It incorporates a fiberglass rear suspension system and extremely durable structure which gives it the reliability to be used as a touring or training vehicle. It is also compatible with either the Fledge II or Fledge 3 gliders.

Manta also produces a landsailer, the Windjammer, which races both as Class 5 and as a one-design land yacht. These have been in production since 1974. There are over 2,000 Windjammers worldwide.

Another very successful product made by Manta is their Poly V Belt Redrives. These reduction drives are made for virtually every popular engine used on ultralights. They have recently become popular with airboat and hovercraft manufacturers and homebuilders as well.

In their ten years of business, Manta Products has carved a niche for itself, and it is apparent they intend to remain a leader in supplying quality aircraft components for many years to come. §



MANTA



Keeping the skies free and open for you has been the work of the Aircraft Owners and Pilots Association for 43 years. Things like protecting airspace, and keeping state and local authorities and the general public informed about the value and benefit of flying.

Now we're going one step further for the ultralight pilot—you! We're creating an Ultralight Division that offers benefits, services and aviation know-how only AOPA can offer:

- Exclusive Charter Member certificate
- Airmen certification and aircraft registration program developed by the AOPA Air Safety Foundation. Helps keep FAA regulations to a minimum
- Representation-AOPA lobby organization works for you with Congress, the FAA, and at the regional level
- Group (Ultralight only) Personal Accident Insurance policy for ultralight flying, plus additional optional coverage for ultralight pilots and aircraft, underwritten by AVEMCO Insurance Company
- Ultralight Pilot — bi-monthly magazine for ultralight enthusiasts. Pilot reports; technical assistance; full-color photos; fun features; and more
- National fly-in/competition — you can demonstrate your machine, skills, and have your fill of fun!

Get on board!

Fill out the application now and add your name to the growing Charter Member list of the Ultralight Division. Only \$29 per year gets you all the benefits, services and aviation know-how that hundreds of thousands of pilots have been enjoying for 43 years.



flying for the fun of it is back

and the AOPA ULTRALIGHT DIVISION will help keep it that way



MEMBERSHIP APPLICATION ULTRALIGHT DIVISION

Box 5800, Bethesda, MD 20814

I hereby apply for membership in the Aircraft Owners and Pilots Association Ultralight Division and authorize them to represent my interests in aviation matters. I certify that I have soloed or own/owned an ultralight or FAA certified aircraft.

I understand the membership dues are \$29 annually, of which \$15 is for my subscription to ULTRALIGHT PILOT magazine, \$3 for the AOPA Newsletter and \$11 as a contribution to the AOPA Air Safety Foundation. (Any member not desiring to support the aviation safety work of the Foundation may send \$28.50 in lieu of \$29.)

IMPORTANT: You will receive as part of member benefits, a \$700 Ultralight-only Flying-only Group Personal Accident Insurance* certificate which will increase in face amount by \$100 for each year of uninterrupted AOPA membership. Please designate a beneficiary (or if you wish to memorialize your name as the supporter of flight safety programs, you may name the AOPA Air Safety Foundation). *Underwritten by AVEMCO Insurance Company.

Please Print Name of Beneficiary: _____
Relationship: _____

THIS SPACE FOR USE BY AOPA REGISTRAR

CHARTER MEMBER APPLICATION

Name: _____

Address: _____ City: _____ State: _____ Zip: _____

Phone No: (Home) (area _____) _____ Date of Birth: _____

(Business) (area _____) _____ Sex: M F

I own aircraft and/or ultralight registration: N: _____ Make: _____ Model: _____

I first soloed in 19____ Total hrs: _____ (solo) _____ No _____ (Pilot Certificate)

Ultralight Student Private Commercial ATP Instrument Multi-Engine Instructor

Former member: Yes No AOPA No. (if known) _____

Already an AOPA member? You can join the Ultralight Division for only \$15 in addition to your basic dues. And if you are joining in the middle of your membership year, you may deduct \$1 for each month of membership which has already elapsed. I am a current AOPA member and wish to apply for membership in the Ultralight Division at the special member rate.
AOPA # _____ Renewal Date _____
Dues \$ _____ (\$15 less pro-rata credit, if applicable)

Enclosed is my: check or money order Visa charge MasterCard in the amount of \$ _____

Acct. No. _____ Exp Date _____

Signature: _____ (Certificate not valid without signature)

WA/1-3(423)

Membership and insurance privileges begin when SIGNED certificate has been received, approved and recorded by the AOPA Registrar.



1983

January	February	March	April	May	June	July	August	September	October	November	December
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WHOLE AIR 



PILOT: JOHN RYAN PHOTO/AD: J. ZURLINDEN

STREAK

IT'S A MAGIC COMBINATION THAT HAD TO HAPPEN! A DOUBLE SURFACE, HIGH PERFORMANCE GLIDER, THAT LANDS LIKE A TRAINER. ALL THE LIGHT HANDLING QUALITIES OF THE X-SERIES GLIDERS HAVE BEEN PRESERVED WITH AN OBVIOUS BOOST IN L/D AND THERMALING CAPABILITY. THE SAIL COMPLETELY OPENS FOR TOTAL VISUAL INSPECTION OF ALL GLIDER COMPONENTS. THE FLOATING CROSSBAR USES A SHOCK ABSORBING, SUPER STRONG WEBBING RESTRAINT STRAP. BATTENS ARE 1/2" DIAMETER ALUMINUM AND LEXAN FOR MAINTENANCE FREE LIFE. A SPECIAL FOAM INSERT IN THE LEADING EDGE OF THE SAIL MAKES THE CAMBER SMOOTH AND CREASE-FREE WHILE THE STEPPED LEADING EDGE CONSTRUCTION PRODUCES OPTIMUM AIRFOIL RADII. THE SAIL IS TIGHT AS A DRUM AND EXHIBITS THE FINEST WORKMANSHIP AND ATTENTION TO DETAIL YET TO APPEAR ON ANY OTHER GLIDER. SANDWICH AND HARD FINISH CLOTHS ARE AVAILABLE AS WELL AS THE POPULAR SPECTRUM AND RAINBOW PATTERNS. ALL WEAR POINTS HAVE BEEN COVERED, AND THE PADDED CONTROL BAR AND BATTEN BAGS GIVE EXTRA PROTECTION.

WITH EVERY THOUGHT FOR PERFORMANCE, HANDLING AND PILOT CONVENIENCE,

THE STREAK IS DEFINATELY "STATE OF THE ART" FOR 1983.

FULLY HGMA CERTIFIED.

DELTA WING KITES & GLIDERS (213) 787-6600 TELEX 65-1425 P.O. BOX 483, VAN NUYS, CA 91408



The Bennett loft lead the industry with sunken pits for seamstresses, allowing the more controlled movement of sailcloth during construction. (Below) The Delta Wing test vehicle putting an earlier model through the HGMA pitch and load tests.

Delta Wing, the oldest established hang glider manufacturer in the world, began as a hobby and back-yard operation in 1957, and has been in continuous operation since March 28th, 1969 in the U.S.A. During this time Delta Wing has produced more than 10,000 gliders. Growing from a one man operation in 1969 to a modern 14,000 square foot factory employing 35 people.

CERTIFICATION AND TEST EQUIPMENT
The Delta Wing certification program utilizes the latest equipment, including video in-flight cameras and computer analysis. This program is especially appreciated by their overseas dealers in 45 different countries, most of whom depend entirely on U.S. certification. Individual structural component testing is done with a special hydraulic cylinder operated test

bed which can exert thousands of pounds of compression and tension on any component when required. This is excellent for testing tubes, cables, fittings, suspensions, etc.

SAIL LOFT
The unique system of sunken seamstresses (machines in a pit) was another first for them. This simple system allows the loft floor to become the table and it is



not necessary to lift and drag the sails up from the floor and over the sewing machine, or to use pullers.

Their loft uses four machines in pits and nine specialty machines on stands for accessories, bags, straps, suspensions and harnesses.

Using Mylar patterns and span wise layout, and the new "Secret" foam which they are sure is going to be the next "standard" accepted by the rest of the industry, the Delta Wing sail loft produces sails that are like sheets of steel.

FACILITY

Situated in a modern brick self standing building, their facility is 13,000 square feet of factory area, with 3,000 square feet of loft area, 2,000 square feet of office space, and 25,000 square feet of parking for visitors and employees.

TEST FLYING SITES

All their gliders are test flown at the famous Sylmar flying site, using either the 700', 1400', or the 2200' launch sites. Only in inclement weather or "Santa Ana" conditions are they denied flying sites within twenty minutes drive of the factory.

COMPUTERS AND COMMUNICATIONS

Delta Wing uses the most up-to-date equipment, including an Olivetti and an Apple II Plus computer. These computers have a wide and varied range of programs for administration and design purposes.

Extensive use is also made of modern FM radios for certification and test flying operations. Rapid communications to domestic and overseas dealers is maintained with the Telex system.

MOTORIZED SECTION

Bill Bennett was the first to introduce



PARACHUTES (B.U.S.)

With the introduction of parachutes or back-up systems for hang gliders in 1977 by Delta Wing, the sport took on a new image of responsibility and many lives have been saved by these devices which were often scorned by some early pioneers—now few even dare fly without one.

FILM AND VIDEO FACILITIES

With a special film and conference room, the factory is used for an H.G.M.A. certification meeting place. The Delta Wing film, photo and video library is probably the most extensive of its kind in the world. These films, etc. are available for club and library use, and are continually shown on educational television programs.

MOVIES AND COMMERCIALS

Delta Wing has been involved in many feature movies and commercials. Some of

these include: James Bond's *Live and Let Die*, *Reckless* (not yet released), *Skyriders*, *Thrill Seekers*, *The Mike Douglas Show*, *What's My Line*, *The Ralph Story Show*, *CHiPs*, *Simon and Simon*, *Dukes of Hazzard*, *Captain America*, *The Donny and Marie Show*, Shaffers beer, Datsun, Dodge, Chrysler, Wrigleys and many German, French, English and Japanese commercials.

INVITATION

They extend an invitation for you to come visit them and see all of it for yourself. §

In a rare group shot, the Delta Wing crew poses for the camera. While these folks are not as visible as those "on the road" or in contests, they form the backbone of the company.



motors to hang gliders in 1972. Although great advancements have been made since, it was that crazy little "Back Pack" engine which started the ultralight revolution.

Some of the design ideas originated during the twenty five years of Delta Wing operations include: triangle control bar, king post, deflexors, lateral struts, foam leading edge inserts, anodised aluminum, protective coatings, tubular nylon restraint straps, cross bar front safety cables, and ball tips.

PROPELLERS

Using a special low speed category air foil section developed by Moises Salmun, a senior Aeronautical Engineer, Delta Wing has produced an extruded aluminum propeller made of 2024 alloy. The blades are replaceable, not affected by water (in float plane use), and are resistant to gravel rash and can be repaired easily if dinged by stones, etc.

The most exciting thing about these metal props though, is the replacement cost — less than half that of a wooden version. They will be available in two, three, and four blade configurations.





Pacific Windcraft has the good fortune to have Marina Beach nearby.

"Ultimately, a hang glider is an extension of its pilot," states Jean-Michel Bernasconi. "It should never be an off-the-shelf item." Such was the concept upon which Pacific Windcraft Ltd., was founded.

In August of 1982, after extensive planning and research, Pacific Windcraft Ltd., became a reality. One of the first things you notice when you walk into the shop, based in central California near Monterey Bay, is that the shop is, well... it's small. The second thing you notice is the high energy level throughout the shop.

The folks at PWC are particularly proud of the facility. "We've designed this shop to have all the necessary fixtures and area to comfortably produce one glider a day with 3,000 square feet," says company president, Bernasconi.

Jean-Michel, a former free-style skier, received his mechanical engineering degree from the University of Grenoble in 1976. A native of Chamonix, France, he has been designing and developing his own gliders for nine years.

Formally Vice-President and General Manager of Flight Designs, Jean-Michel gives much of the credit for his present position to his three-year involvement with his close friend, the late Marty Alameda, founder of Flight Designs.

In the last few years, Bernasconi developed a strong conviction that each glider should be crafted to reflect and feature the expectations and standards of its individual pilot.

On September 1, the first production glider, the Vision, was assembled. "The design and development of the Vision was a very rewarding experience for all of us," explains Jean-Michel. "The Vision turned out to be the most enjoyable and versatile glider we've ever worked on as a team."

According to Bernasconi, the first design criterion was to engineer a lightweight frame that would sustain all the load required for its HGMA certification. Many conventional fittings were therefore redesigned and are machined by Marty's brother, Daniel Alameda at his shop, Pacific Flight Engineering.

The second priority was in the

engineering and conception of a sail that would accept the loads as encountered by today's high-performance gliders without the aging and performance deterioration problems. The PWC Vision sails (along with the rest of the glider) are fully factory guaranteed for one year.

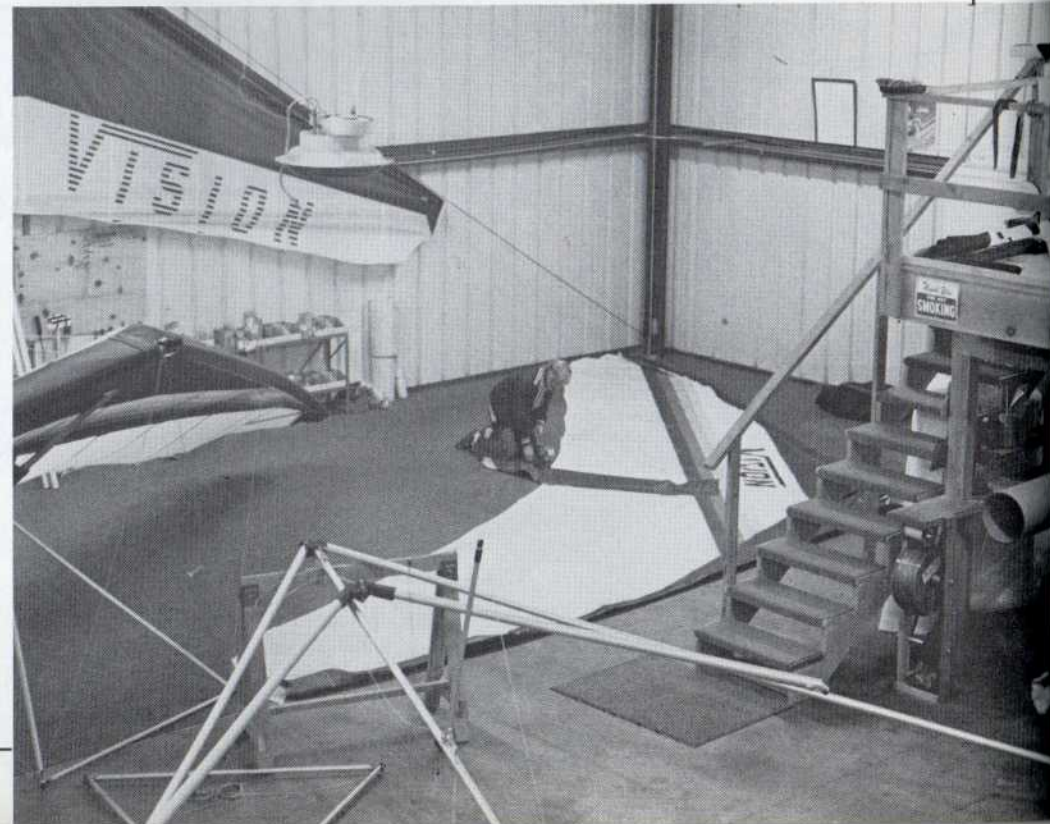
A very close relationship between the airframe variable geometry and its effect on the sail tension was achieved by controlling vertical sweep of the cable-supported cross-tubes. The glider offers three configurations — loose, medium, and tight. This allows the pilot to adapt the glider to the flying conditions or to his flying skills.

Several private flying sites along the Gabilan mountain range provide Pacific Windcraft with a perfect testing ground for all three configurations. "Flying in the Salinas Valley can be a very frustrating experience at times, if your glider cannot adapt itself to the wide range of conditions

in which you might fly. On certain days, thermals are drifting at a speed up to 30 mph," explains Jean-Michel, who insists on test-flying every customer's glider himself. And of course Marina Beach is "...the cheapest and most convenient wind tunnel any manufacturer can have, just nine miles away."

The development and production team behind each Vision is comprised of head sailmaker, John LaTorre, and Calvin Cox, airframe and rigging. Both have worked with Jean-Michel for the past three years on various designs, including the Demon, Javelin, and the Tital project. Between the three of them, they have 20 years combined experience in hang gliding.

"We are truly fortunate to have John and Calvin working with us," declares JMB. "Besides their involvement in the development and production of the Vision series, they have the experience and



John LaTorre (at right) and Calvin Cox (below) are valued "team members."

commitment to build ever customer glider as if it were their own. Also, John is truly knowledgeable as a sailmaker." Two additional employees round out the PWC team and help insure that all Visions meet their guaranteed shipping date — "...or your money back."

Another unique guarantee designed by PWC to back up every Vision is the year guarantee which includes two free semi-annual inspections to be performed by the authorized dealer. This is made possible through a close working relationship between Pacific Windcraft and its limited network of 20 dealers nationwide; a relationship based not just on glider sales, but in providing each school and dealer with a clearinghouse approach to new products (accessory line) and new ideas.

While "20" is not a magic number, it enables us to keep in close touch with everyone's satisfaction and needs. The Vision's reputation depends, in part, on the distribution and servicing methods behind it. It's the safest feeling in the world for me



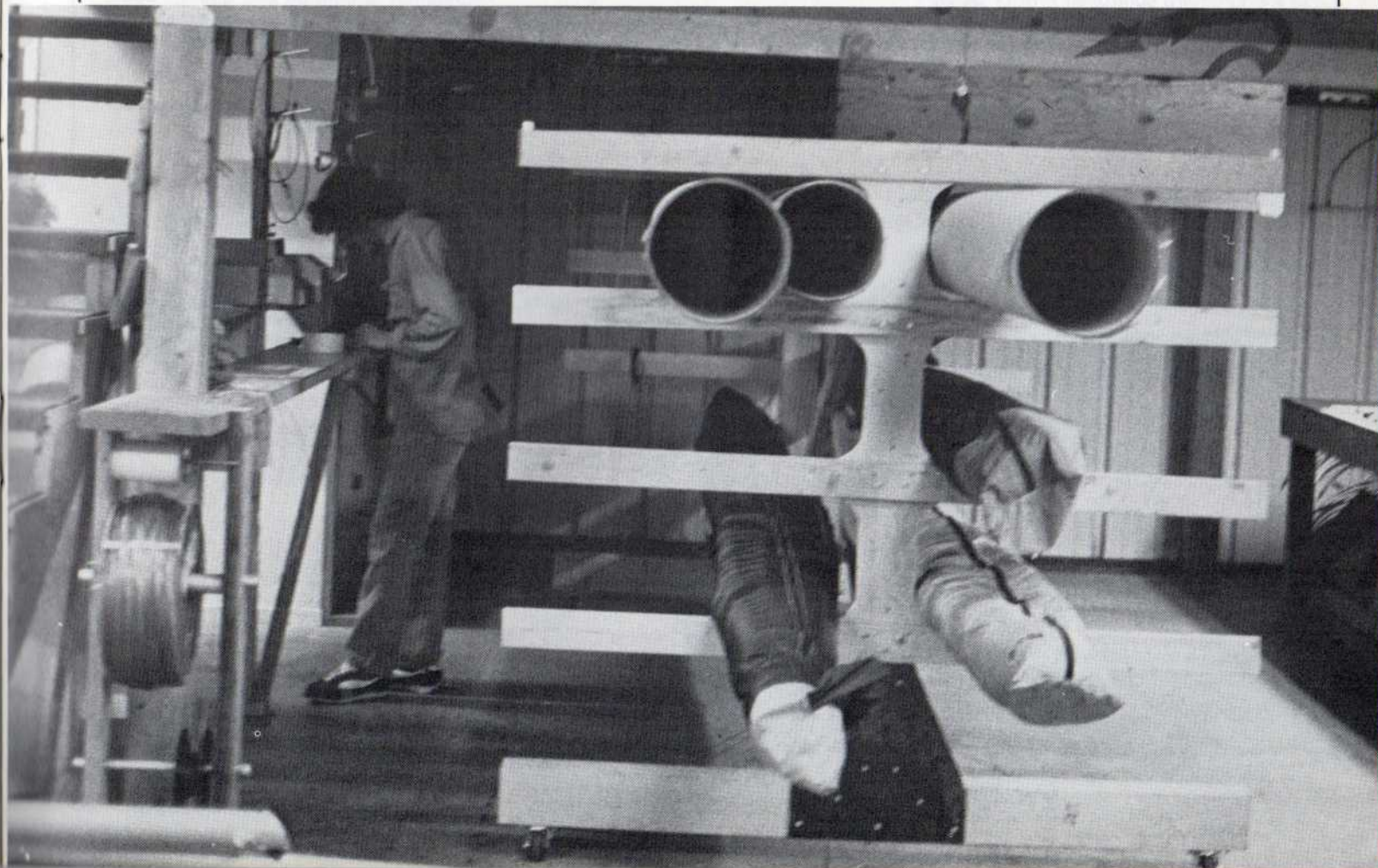
to know that each Vision we ship out our doors will be represented by a professional and committed network. Without doubt, we're working with the most competent people in the industry.

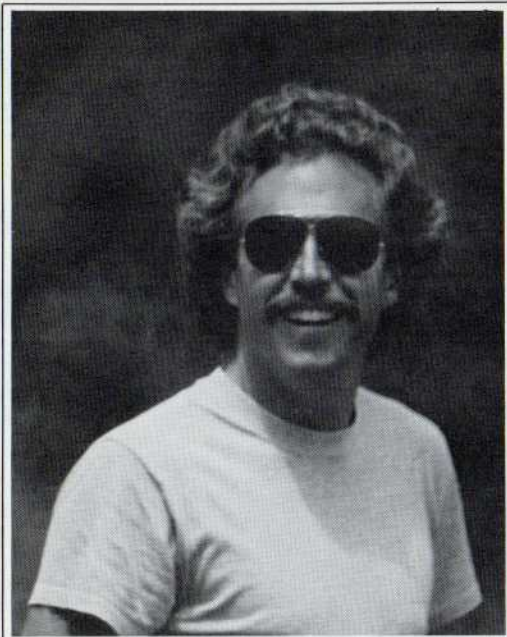
For Pacific Windcraft, the 1983 season will bring some serious changes in foot-launched sail-gliding. The company is currently working on several innovative

concepts that are, in their vision of things, the next logical evolution of the sport.

All pilots who are interested in receiving further information about Pacific Windcraft, or in visiting the shop, should feel free to contact them by calling

408/422-2299, or writing or stopping by 1100 Madison Lane, Salinas, CA., 93907. §





SEEDWINGS

1919 CASTILLO, SANTA BARBARA, CA 93101

(left) Designer Robert Trampenau; (below) The first glider — the Sunseed, circa 1976.

Trampenau is known in the industry for his design of the Sensor series soaring vehicles, a high quality competition vehicle. These high performance gliders were developed for pilots of high ability, and the firm is directed toward the custom development, manufacture, and distribution of the current line of the Sensor 510 model, and the certification of every model established.

Linked with this firm in the manufacture of custom sails of top quality is the carefully controlled firm of Susan Wiegand, Sailmaker. It is a custom firm of high reputation which has earned its ability level through years of growth in the areas of planning, management, and quality custom control and attention to detail that every firm needs, yet rarely achieves.

Whole Air: Early in your career, what were your first designs?
 Trampenau: My first designs in 1973 were flying wings. From these early beginnings I moved to a period of experimenting with sailplane design and other areas.

My sunseed, the design I began the firm with, was a serious version of my idea of hang gliding needs. This was in 1975, and it was originally conceived and built in upstate New York.

Whole Air: Bob, I would like to mention your Sensor models. Could you describe them briefly?

Trampenau: The Sensor 510 model series, known for competition level performance in area regionals as well as

national meets, includes the certified 180 and 165 sizes, with a smaller model around the 150 area size in the series, planned for the near future.

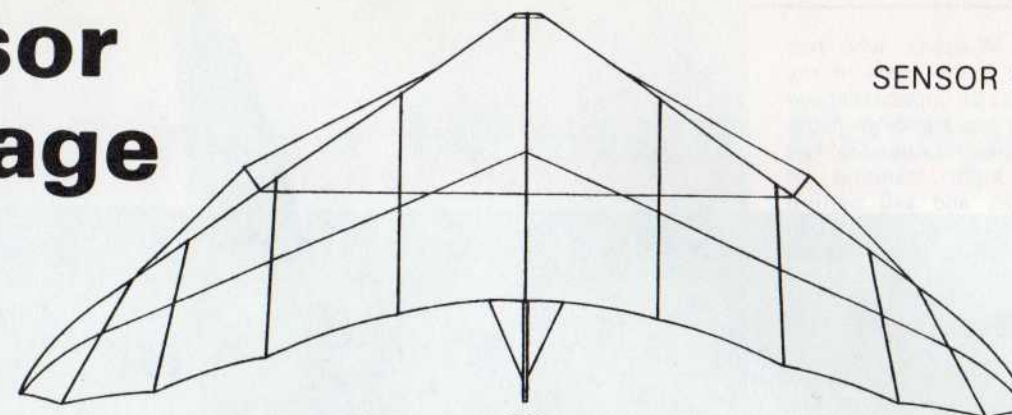
High performance is our key here, and our European market especially believes in this ability as they value performance advantage and are particularly interested in the Sensor's styling.

Whole Air: Bob, your market is carefully directed to custom manufacturing. Your reputation is built on fine quality. Could you possibly tell us how your excellently-teamed link with the business firm of Wiegand Sailmakers helps you in the performance areas of top flight professional sailmaking as directed to your own assembly process?

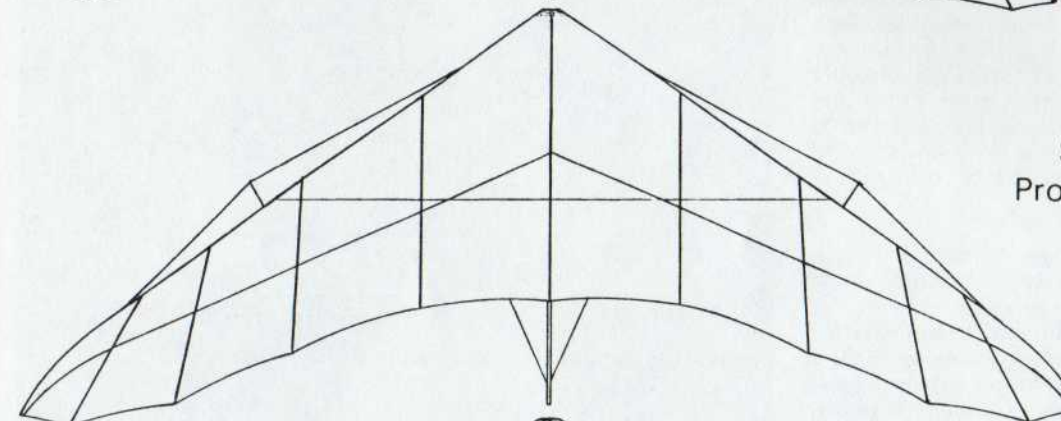


Sensor Lineage

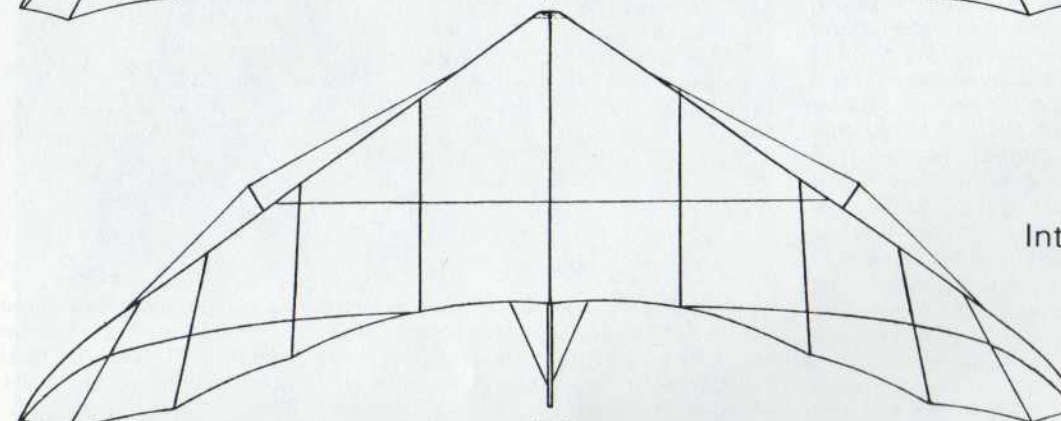
Serial No. 1
 SENSOR 210 PROTOTYPE
 Spring of 1976



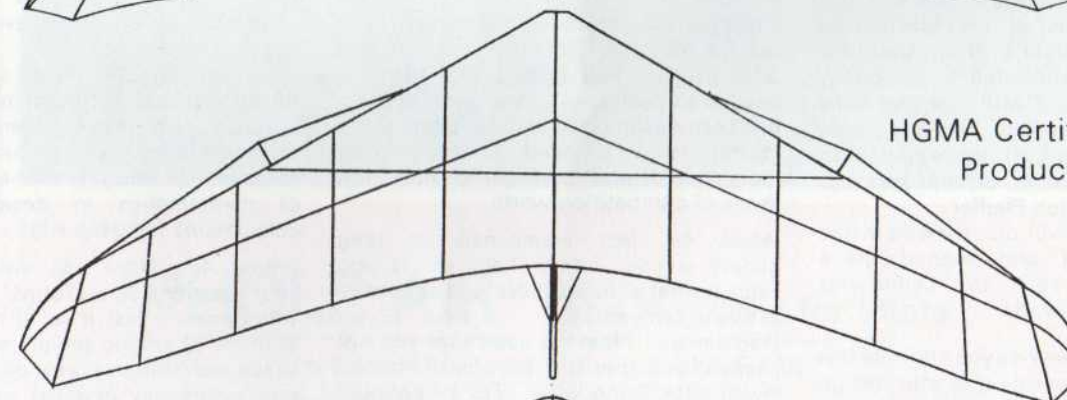
Serial No. 2
 SENSOR 210B
 Production model
 1976



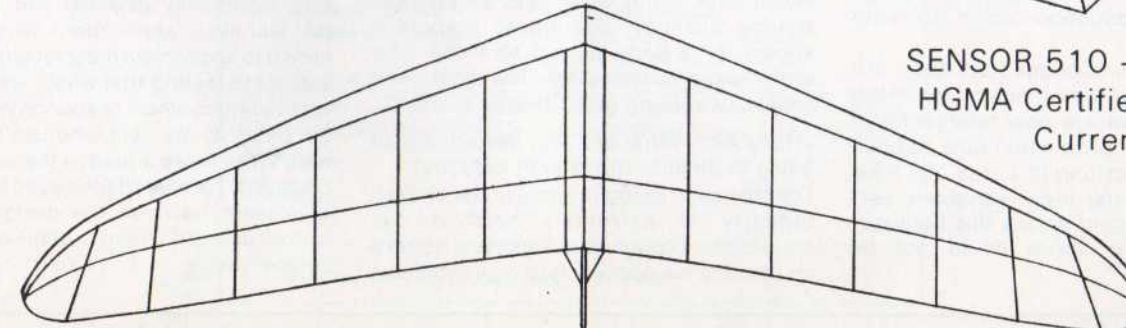
Serial No. 3
 SENSOR 210B
 Internal Crossbar
 Spring 1976



SENSOR 210E
 HGMA Certified — Aug '79
 Produced 1979-1980



SENSOR 510 -- 180 & 165
 HGMA Certified — Aug '81
 Current Production



Trampenau: Susan Wiegand, who has shared with me for many years in my assembly process, has an impeccable eye for detail and has a top standing in the quality control area, which I value highly. I feel Susie's top flight standing in production processes and sail pattern development have been very helpful in creating and maintaining the Sensor quality and performance.

Whole Air: Bob, what does your assembly process involve?

Trampenau: I work with a staff which controls our production to HGMA certification level, in all areas of standard model production, including but not limited to all areas of design, manufacture with the exception of sailmaking only, and our skill in workmanship standards is directed towards quality, aesthetics, and aircraft integrity at high levels of skill at the production level.

Whole Air: Your area competition record easily matches any top worth larger firm in the industry. Could you explain this?

Trampenau: Our firm has been known for high quality staff level production of hang gliders at the professional quality level since we began design of the 510 series. Top flight professional pilots of first and second seed competition ranking do need this to develop their skill level to its finest pitch. I would say, in the past year I have sponsored these fine pilot in area regional meets: Dennis Pagen, whose fine achievements in the Central Northeast Regionals easily earned him first in those East Coast trials; Dave Ledford and Stu Smith who matched this with first and second place wins in the Southeast Regionals; Stu also received a remarkable record at the American Cup in England with a first place pilot award trophy.

Very recently, the pilots we sponsored earned very fine records in the first and second place area at the Masters at Grandfather Mountain in North Carolina, and these were attributed to nationally ranked Dave Ledford with first and Mike Degtoff who took second. This was a plus as our Sensor models with these pilots won over the all time winner, Steve Moyes and the hard-to-beat Rich Pfeiffer.

At the design level, our first wins in this series were first and second place achievements in 1981 by Pfeiffer and Burnett in Reno, Nevada.

Whole Air: Bob, how do you attribute this level of competition rating to your design ability and production worth to your company?

Trampenau: Our designs have been our heaviest area of development for many years, though we are now retargeting to commit to larger production runs, to build our company worth in this area. We have gone through many design variations, yet I feel, and our record shows this I believe, that the Sensor series could not be equalled easily.



I like the styling of the 510 because of its low cost of production especially, and yet I feel we have built from past experiences in the design series of worth we have done before, with each series easily equalling the one previous to it. Each feature has been incorporated into the 510, as I do feel that love of flying is needed to design well, and each of them has been designed to instill in pilots at the master level a need to feel freely independent and perform to their top levels of competition worth.

Whole Air: Bob Trampenau, as hang gliding is your career field, could you explain what a "hang glider" will appear as in five to ten years?

Trampenau: I feel the basic look will not change, and this is a high performance swept back flying wing, with exceptional soaring qualities. Soaring as a sport is known for a wide appeal to those who prefer ease of handling, low cost, and simplicity in hang glider design.

Whole Air: What are your feelings about being original in the aircraft industry?

Trampenau: Being original in the aircraft industry is extremely hard if not impossible, though it is important to take an imaginative approach to new problems

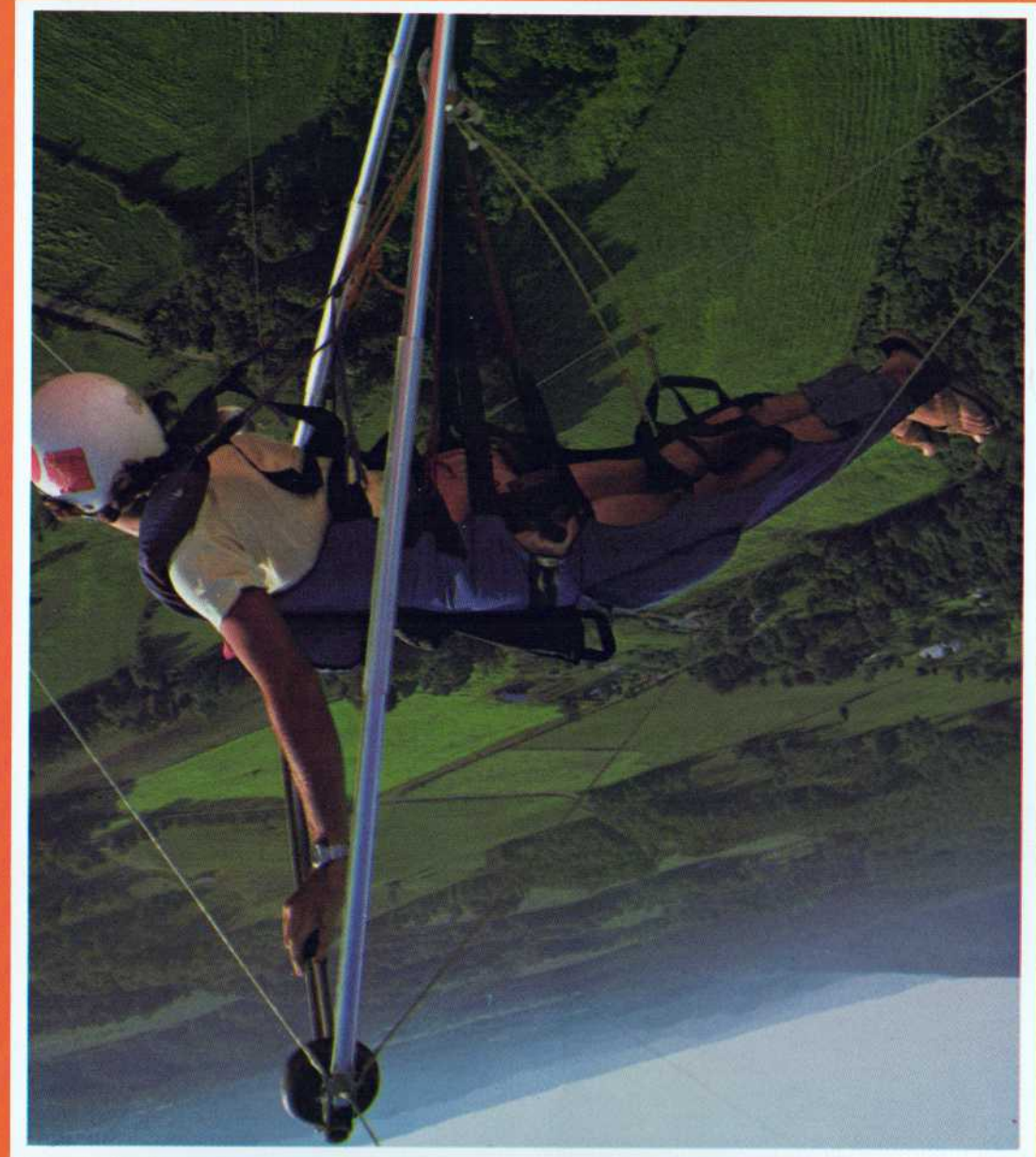
as well as apply older proven techniques and deciding as to which will work here to achieve our new designs with a combination of aesthetics and creative judgement for these new combinations often do enable us to achieve very original design concepts.

In my work, I do much comparison in the aircraft industry in looking over what is possible and proven there, and I do incorporate science techniques in other areas of technology in all the proven areas of mathematics in design such as calculations for wing edge versions.

Whole Air: Have you ever considered your creations as art forms?

Trampenau: Yes! It is, to me, a flowing example of kinetic sculpture. I appreciate shape and form to a great degree, and I am also technically oriented and appreciate the technical applications of art. I have grown to appreciate most recently, in other areas, the feeling that what I am doing is a very caring method of sharing with others, the pilots in my field who use these craft well. When I see a pilot in the air flying my creations, I dream of their success with me as a team between the designer of the aircraft and their need to achieve victory in competition. §

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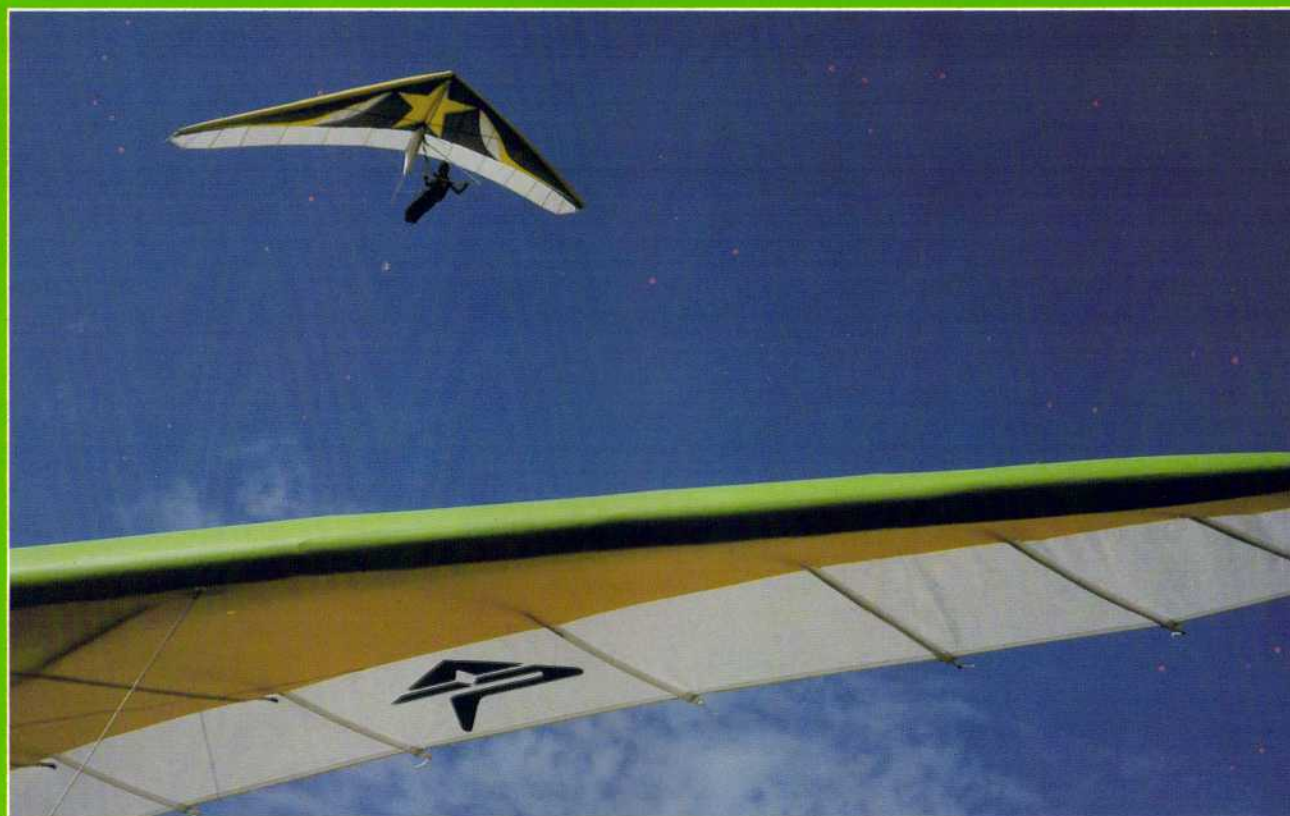
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QUALITY ASSURANCE



At Progressive Aircraft, quality is the primary concern of every function. We make one glider at a time. We make every part of every glider to our own rigid specifications. We use only the finest aircraft materials and expensive Delrin plastics. The technicians that sew the sails, machine the hardware,

and assemble the gliders are experienced pilots themselves. Then we test fly every glider we make, tune it up, and test it again. Quality assurance to exceed the demands of the sport itself. To know — Fly One.



Progressive Aircraft Company of Simi Valley, California. Makers of the Breez, ProStar, and ProAir hang gliders.



The well-organized and neatly kept Pro Air factory turns out gliders that reflect this attention to small detail.

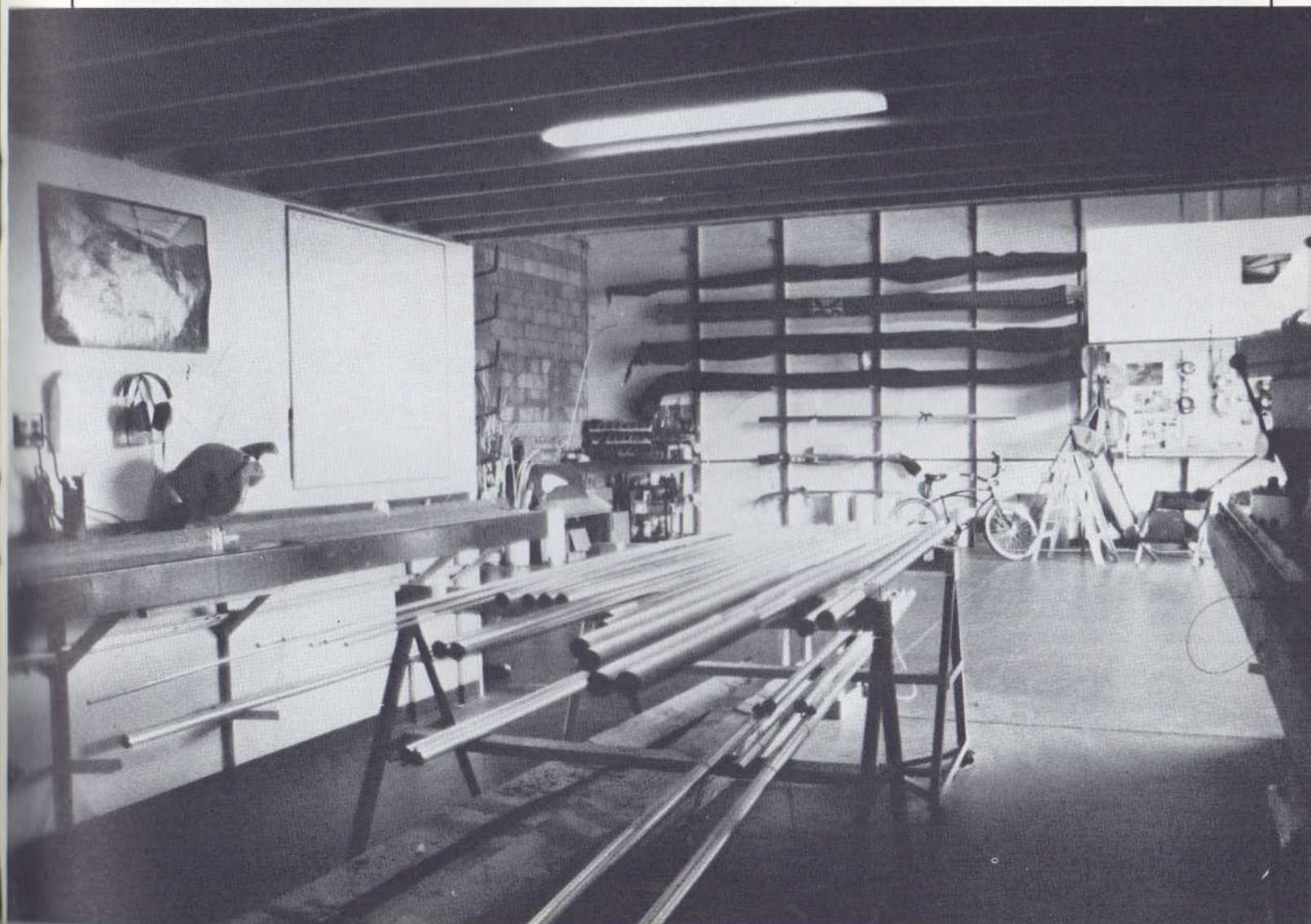
It seems amazing that a new company can start up in this highly competitive industry and achieve what Progressive Aircraft has in the last two and a half years. The original introduction of the ProAir glider with its unique hardware and with the follow-up of the Breez, the ProStar I, and the new ProStar II, Progressive Aircraft has found themselves one of the major manufacturers in the hang gliding industry. This rapid growth can be

attributed to the professional attitude of those who have shaped the company's policies on quality, product support, distribution network, and marketing. All those who have come in contact with this company realize that the Progressive Aircraft company will remain a major influence in the hang gliding industry.

Pro Air's factory is based in Simi Valley, California, just outside of Los Angeles. The Pro Air crew finds themselves

in the middle of the hang gliding community; with all the flying sites from San Diego to San Francisco available to them for testing, comparing, and perfecting.

But the company has grown from a limited production, marketed factory-direct, to a worldwide dealer distribution network, with sales outlets in Europe, Central America, South America, and Australia.



Progressive Aircraft has taken an additional step beyond all other manufacturers by establishing a complete product support system. The system is aimed not only at the established dealers but also directly to the customer who deserves the knowledge, testing, and confidence that can be given by those who are responsible for manufacturing the gliders. Customers are always welcome to call or contact the Pro Air factory directly. The company has also initiated a glider update program where customers are kept informed of all possible improvements that can be made on performance, handling, or safety. The knowledge gained from the continued testing and developing will insure that a glider will remain a fine state-of-the-art product.

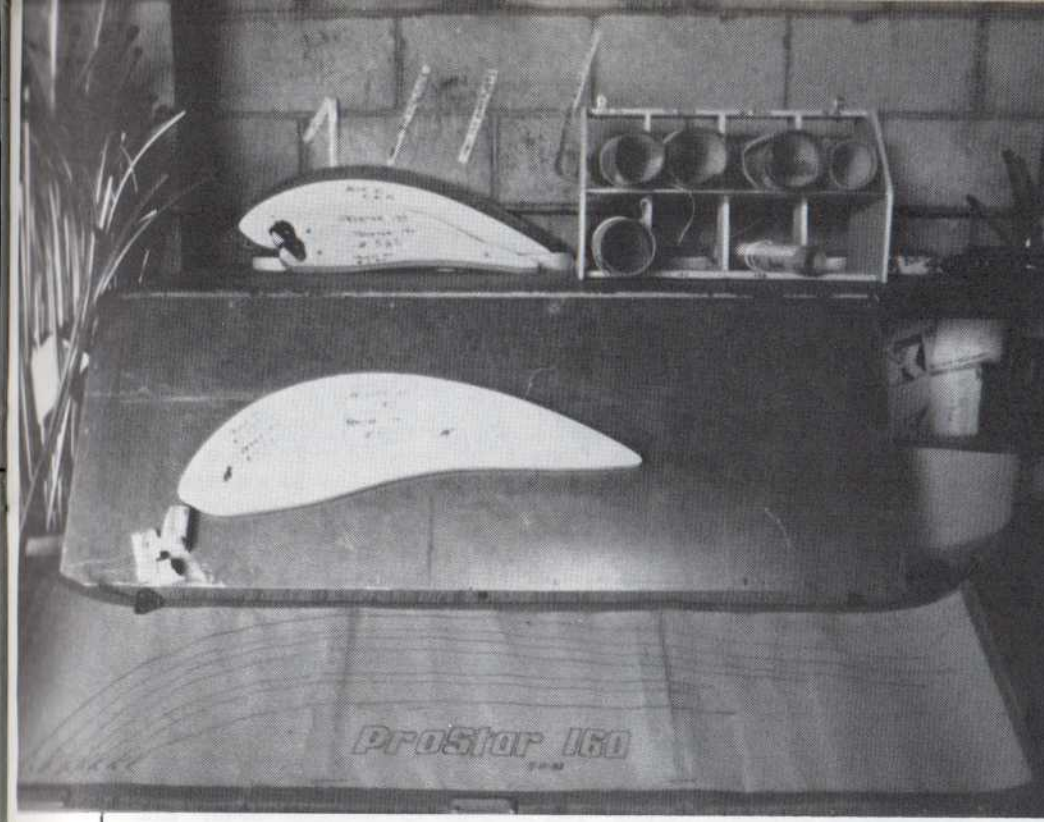
Pro Air is a corporation, not owned or controlled by just one individual. Dick Boone serves as the President and Chief Engineer. His background is in mechanical and aeronautical engineering, and he has worked in Aeronautical Laboratories with projects involving most major aircraft companies. In 1974 Boone began working for Delta Wing Kites and Gliders in Van Nuys, California. Within a short time he became Vice President of this company heading its Research and Development Department. Dick has contributed greatly to the design and development of today's



hang glider. The floating cross bars and radial battens that can be found on essentially all modern gliders are just a few of his many contributions. He now

spearheads the aggressive development and testing programs at Pro Air.

When you have a chance to meet and talk to the rest of the Pro Air crew, you soon



features which allow the glider to "grow" with the pilot as his skills improve. The ProAir has been the flagship of the fleet. This is an enclosed cross bar, double surface glider which excels in handling and performance for the recreational pilot. Its sail construction, like all Pro Air gliders, consumes more time, assuring proper camber and shape for their entire flying lives. The ProStar II is the highest performing of all the ProAir ships. Designed for the expert and competition pilot, it uses a higher aspect ratio, lower twist sail than the ProAir, employing an 80% double surface sail with a fully battened unattached lower surface for better handling and performance. This newest entry from ProAir is available in three sizes to meet the exact wing loading demands of the competition pilot.

All Pro Air gliders use interchangeable frames for easier service. The Breez 180, ProAir 180 and ProStar II 160 use exactly the same leading edges, keels, and cross bars. This also holds true for the Breez 140, ProAir 140, and the ProStar II 130. This feature makes it easier for your local dealer to have the spare parts needed to prevent those often lengthy repairs.

The Pro Air crew has complete testing facilities that include a load test vehicle, a pitch test vehicle, cameras, and airspeed indicators. Additionally, the crew has seven years of experience on the HGMA Board (one year as president and three years as secretary) which goes into every package presented.

They also handle a complete line of accessories. This includes the Prolite Harness, Prolite Parachute, T-Shirts, hats, varrios, and stickers with the Pro Air logo.

It is well worth your time to come to the Progressive Aircraft Company's factory for a tour and to meet all of the individuals building these fine gliders. §

discover that they are all hang glider specialists interested in making the hang gliding industry their lasting profession. They are all in agreement with the shop theme of making only gliders and products that they themselves would be proud to own. Pride is the feeling in the Pro Air factory. Pride in the fact that the company's gliders are among the finest produced in the world today.

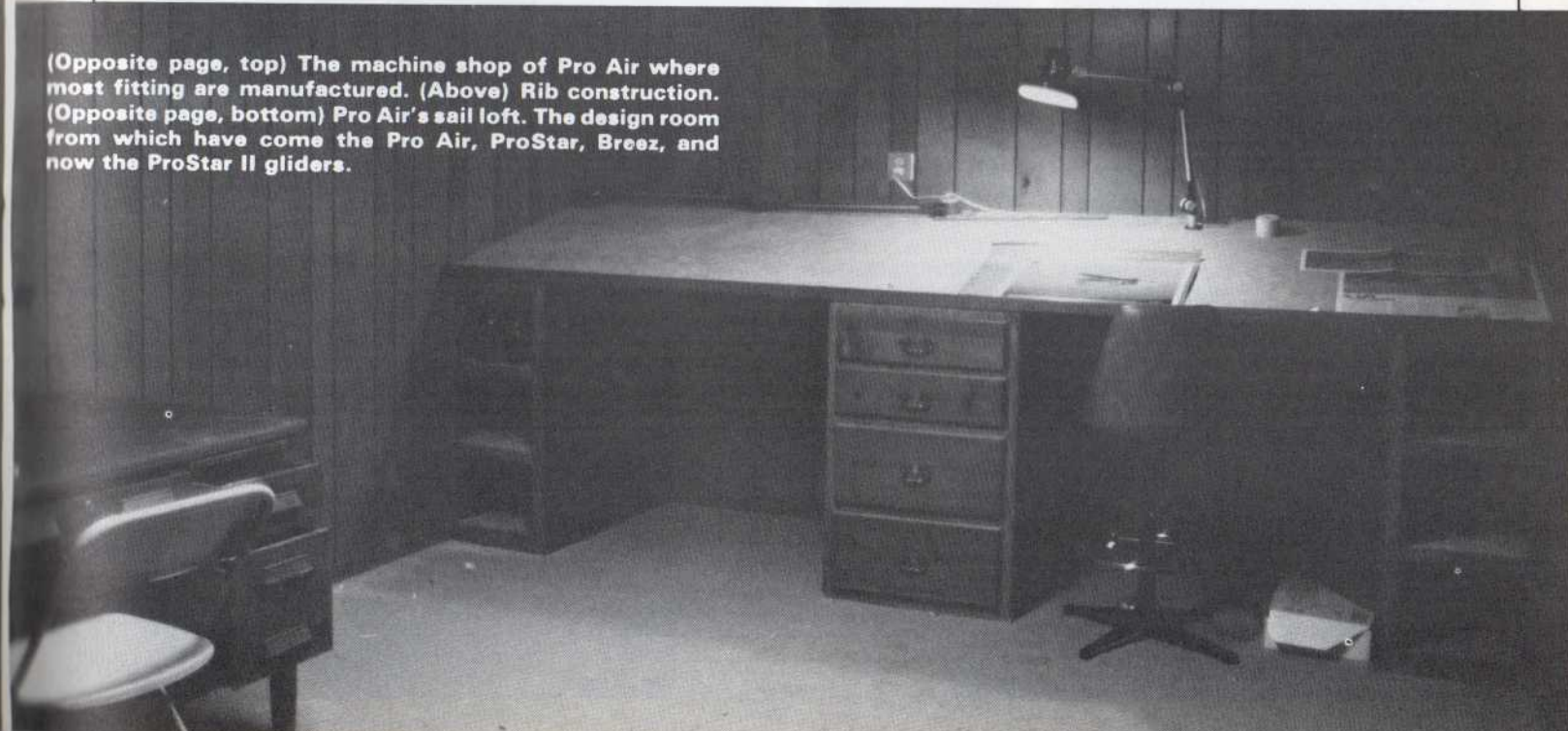
The custom made factory houses a complete facility needed to produce quality gliders. This includes two sail lofts and their own machine shop where all of their parts are expertly machined to a design carefully engineered for optimum performance. There is a complete design

room and separate areas for the frame construction, wire fabrication, batten shaping, and a general assembly area where it all comes together for the finished product. The last remaining area is left for storage and shipping. This all makes for a complete hang gliding facility with experts in charge of each area checking every step of construction.

They offer a complete product line of gliders for the beginning Hang II pilot through the pilot with the Hang V Master rating. The Breez offers the advantage of tight sail, fixed air foil performance while retaining the ease and forgiveness of the beginning glider. It comes in two sizes to fit all pilot weight ranges, and has special



(Opposite page, top) The machine shop of Pro Air where most fittings are manufactured. (Above) Rib construction. (Opposite page, bottom) Pro Air's sail loft. The design room from which have come the Pro Air, ProStar, Breez, and now the ProStar II gliders.





Jon Clausen and Judy Farnsworth



WILLS WING

Wills Wing was one of the original four Southern California hang glider manufacturers which started business in 1972. Brothers Bob and Chris Wills, friend Chris Price, and the rest of the Wills family formed a company called Sport Kites, Inc., to produce the "Wills Wing," a version of the standard rogallo. Under the design leadership of Bob Wills, and the management of his brother Chris and their mother Muralys, Sport Kites acquired a reputation for producing gliders with excellent handling qualities, and reliable soaring performance. Chris, Bob, and Chris were pioneers of early soaring,

setting many of the first duration and cross country distance records, and winning national championships in 1973, 1974, and 1975.

In 1976, Chris Wills left the company to attend medical school, and in 1977, Bob Wills was killed in a tragic accident while filming a television commercial. During the next year, the management and majority ownership of the company was transferred, in equal shares, to Rob Kells, Steve Pearson, Mike Meier, and Linda Meier, all of whom had been working for Wills Wing in one capacity or another.

In the intervening years, Wills Wing

has worked to increase safety and professionalism in the hang gliding industry. In 1980, factory test flying of each production unit became an HGMA requirement, following an extensive campaign by Wills Wing to make factory test flying the standard industry practice. Since 1977, Wills Wing has obtained airworthiness certificates for 29 gliders, more than any other manufacturer. In 1980, Wills Wing became the first manufacturer to establish a policy of withholding the release of all new production gliders until the certification of that model had been approved by the



Michele Larsen

"Steve Pearson carries out a structural analysis on the Wills Wing engineering computer."



"Linda Meier processes the payroll on the Wills Wing business computer."

"Rod Stafford, forced back to the drawing board once again."



HGMA.

In the area of customer service, Wills Wing established a policy requiring all Wills Wing dealerships to employ a USHGA certified instructor, and to be equipped to offer service and training on all Wills Wing gliders. Through the use of illustrated owner/service manuals, dealer bulletins, and airworthiness directives, the company provides a continuous flow of service and technical information to the dealer service network.

Today, the four owners continue to share the responsibility for the overall management of Wills Wing, while each also works within several specific areas of responsibility.

The owners, and the rest of the people you are about to meet, are Wills Wing. Through the dedicated efforts of all of these people, the company continues to enjoy a reputation for producing high quality gliders with excellent handling characteristics and reliable soaring performance. Wills' plans and goals for the future are to continue to serve the needs of the aviation community by providing a wide spectrum of products designed for safe, affordable, and enjoyable flying.

PRE-HANG GLIDING

Before moving to California in 1973, Mike Meier taught physics and chemistry at the high school level in Maine. Mike started flying hang gliders in 1974, and first went to work for Wills Wing in 1976, as production manager. Following the death of company founder Bob Wills in 1977, Mike became involved with test flying, glider design, technical writing, and advertising.

After graduating college in 1973, Linda Meier came west with Mike and held an assortment of jobs before going to work for Wills in 1976. Linda's current responsibilities include day to day management of cash flow and accounting, order processing, production authorization, and coordination of glider, parts, and accessories shipping.

Steve Pearson began flying in 1974, and built his first glider himself. In 1977 he acquired his first Wills Wing, an XC 220, and started flying with Bob Wills. Steve worked as a soils engineer during this time, but began working with Mike on glider design in 1978. Since then he has gradually assumed the primary responsibility for the development of new designs. In addition to research and development work, Steve also manages the sail loft.

Prior to getting into hang gliding in 1976, Rob was heavily involved in professional free style skiing. He went to work for Wills Wing in the spring of 1977 in sales and production management. Rob was instrumental in negotiating the ownership and management transfer of Wills Wing after the death of Bob Wills in 1977. His current responsibilities include sales, and the development and administration of the Wills Wing dealer program.



Roger McCracken



Rick Zimbelman



Donna Hendrickson

DEPARTMENT MANAGERS

Roger McCracken is the Production Manager, directing the metal shop and assembly departments, and coordinating the overall flow of shop production. As Chief Production Test Pilot, he administers the test fly program. A former professional "funny-car" driver, Roger also draws driver duty when it is time to go to the track and get the test vehicle airborne during HGMA load tests.

Rick Zimbelman handles the acquisition of materials for production, supervises shipping and receiving, and maintains the company computerized inventory system.

Rich Pfeiffer manages the accessory department, supervising the production of harnesses, glider bags, and gear bags, and also designs and develops new harnesses. His recent Bulletman and Flylite harnesses have proven to be exceptionally popular.



Martha Wagner



Guy Shepard



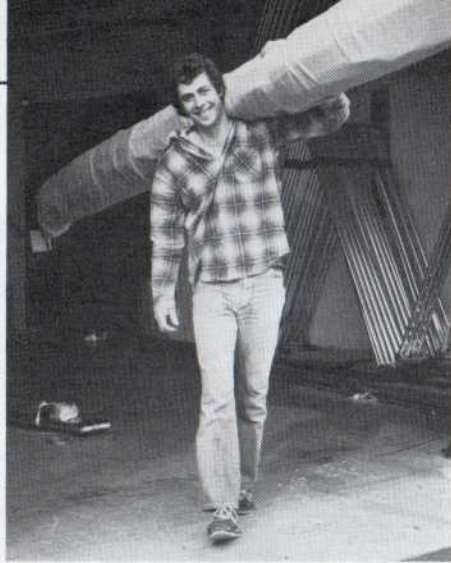
Gary Simpson

Rich is a certified FAA Master Rigger, and has been national champion in both sky diving and hang gliding.

Office, Sales, and Advertising
Jim Shaw has spent the summer on the road, visiting Wills Wing dealers, conducting "Demo Days," and tuning up dealers on the latest service information and procedures.

Michelle Larsen is the first person you are likely to talk to if you call Wills Wing on the phone, and the first person you see when you come in the front door. In addition to her job as receptionist and secretary, Michelle handles many of the office bookkeeping tasks.

Rodney Stafford is responsible for graphic art production, and for keeping us from getting too serious about anything. Rod handles layout and artwork for advertising, and also does artwork for design projects, owner/service manuals, and airworthiness directives.



Dave Koller



Tom Blaty



Anne Cox



Mitch McAleer



Gary Applegate and Tillie Ledesma



Mariana Alvarez



Pat Hawkins



Rich Brune



Brian Snyder

Production

Frame and cable fabrication are the responsibility of the metal shop. Tom Blaty and Rich Brune take care of airframe component fabrication and airframe assembly. Patrick Hawkins is responsible for cable sets, and Brian Snyder handles batten production.

In the sail loft, Gary Simpson and Guy Shepard do the first layout on all sails. After the body components are cut and assembled, the sail halves go to the seamstresses for the first sewing operation. Martha Wagner, who has worked for Wills Wing longer than any other production person, is the company's most experienced seamstress. Martha, and Lien Tran, Mariana Alvarez, and Tillie Ledesma all make sure that each sail is sewn with the required degree of precision.

After the first sewing operation, the sail halves go to Rich Collins for second layout and assembly. Following this, and a second trip to the seamstresses, the sails are joined and finished by Mitch McAleer. After a final pass across the seamstress tables, the finished sails go downstairs to final assembly.

Dave Koller puts airframe and sail together to create the finished glider. After the post-assembly inspection, the glider is bagged, tagged, and placed on the test fly trailer to await test flying. Once a week the trailer goes out to the test site, where each glider undergoes its final inspection and test flight by either Roger McCracken, Dave Koller, Mike Meier, Steve Pearson, or Rob Kells.

After test flying, Jon Clausen packages each glider with an owner's manual, batten diagram, spare parts kit, and Wills Wing Team Cap, and puts it into a heavy cardboard tube for shipping.

The accessory department produces harnesses, primarily the responsibility of Judy Farnsworth, and glider bags and gear bags, done mostly by Donna Hendrickson and Anne Cox.

Parts orders are handled by Gary Applegate, who processes incoming orders, coordinates backorders, and makes sure the finished parts orders get shipped. §



Rich Collins



FLIGHT DESIGNS

Wings for Man

Flight Designs, Incorporated, a Division of Pioneer International, began in 1979 under the leadership of Mr. Marty Alameda. He had been a long time pioneer in the sport aviation industry, and after working for Seagull Aircraft, decided to start out on his own. He formed the company Flight Designs, with a hang glider and accessories distributorship. Due to the increasing demands for new products, Marty became an import distributor, importing Lancer IV sails and framing the sails on HGMA certified airframes. Flight Designs had initially been manufacturing harnesses and sport bags which fit perfectly into this new construction effort. Under Alameda's supervision, Flight Designs carried a full line of after-market items such as airspeed indicators, variometers, altimeters, parachutes, and a variety of other sport accessories.

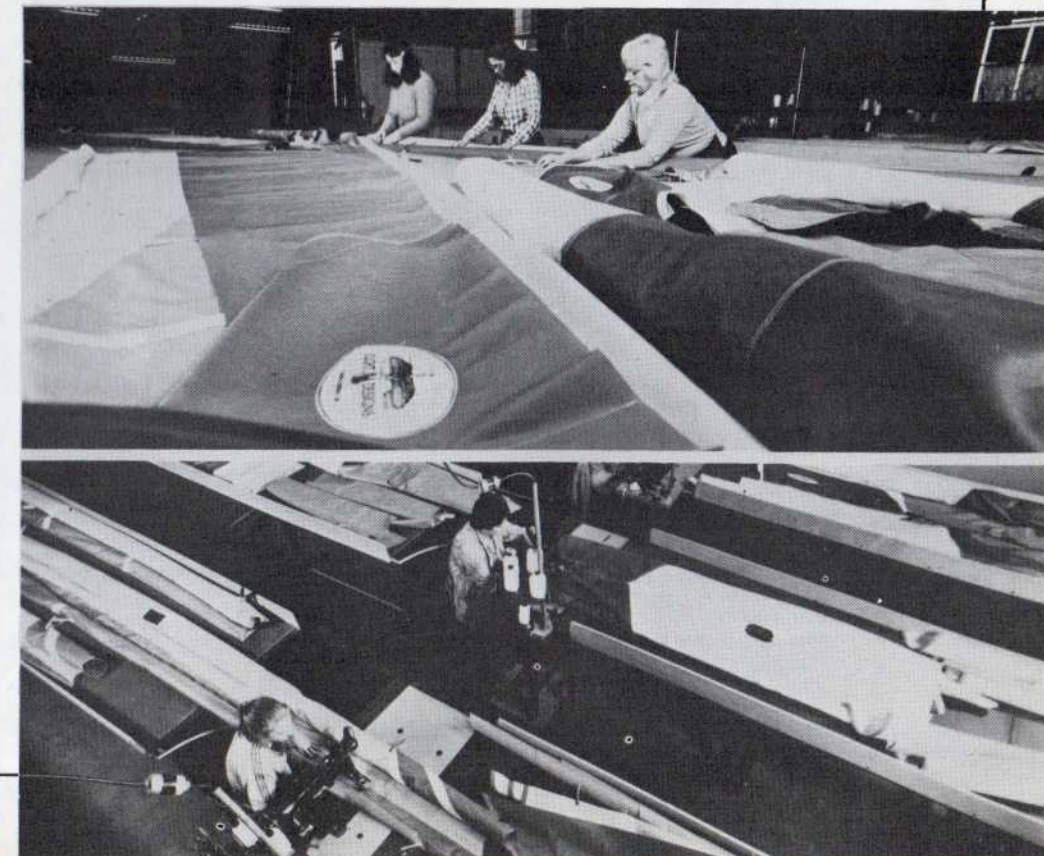
Game Bird, of Flight Sails in New Zealand, came to Flight Designs in mid-1979 to assist in the production assembly of products. In early 1980, Bird and Jean-Michel Bernasconi developed the Super Lancer for the company. This glider featured a quick set-up, which was to become a new standard in the industry. The Super Lancer series placed Flight Designs near the top in the hang glider manufacturer's pyramid. With this solid status in the sport, the company began to develop a complete product line. The Sabre was introduced in January 1981 as a trainer glider for use in schools, and is still one of the most popular first-day trainers in use.

In January of 1981, Flight Designs

entered the high-performance market with the Demon 175. The initial design of the Demon was produced by HiWay Hang Gliders of England. It was then commissioned by Flight Designs for sale in the United States. The company adapted the Demon for certification according to HGMA airworthiness standards, and then began building the Demon 175 at its

Salinas factory.

In 1981, Pioneer International, manufacturers of sport parachutes and carrier of several contracts with the US Military and NASA, saw the benefit of purchasing Flight Designs with its newly acquired growth potential. In June of 1981, Pioneer International purchased Flight Designs and provided strong



financial and engineering back-up support.

During the winter quarter of 1981-1982, the Javelin 168 and 208 were developed and introduced to the hang gliding public as an all-around recreational glider. Schools and flight centers around the country praise the Javelin for its use as a trainer and for intermediate to advanced pilot handling range.

During this same time period, Bernasconi and the Flight Designs' crew worked on the development of the Titan series. The Titan was constructed with an 80% double-surface wing and included other features, such as a detached bottom surface and an articulating keel. The Titan proved to be extremely fast, but further development was needed. The Titan has become a source of information for use in development of future gliders.

Flight Designs entered the ultralight market initially with the well-received ATV-trike/JetWing. The rugged, polished design and far superior quality of the ATV-trike proved to be attractive to the seasoned hang gliding pilot and the general public. An added feature of the Flight Designs ATV-trike is the ability to adapt various other HGMA certified gliders to the trike unit.

The next product to enter the ultralight market was the FlightStar. This craft truly leads the way to new standards for safety, quality of construction, and performance. The FlightStar offers strut-braced rigid wings and a structure designed for +6, -4 capability. The new plane can also be equipped with Flight Designs advanced Ballistic Parachute System.

Steve Brockman is General Manager

and Chief Test Pilot and has been the driving force for new glider development and testing. Steve has been a member of Flight Designs' team for over two years. The production staff is under the guidance and leadership of Don Martin (including final assembly and airframes) and Patty Butler provides her expertise as supervisor of the Sail Loft. Both have been employed by the company for two years and are avid sport fans. Diana Cummins, Operations Manager, is in charge of all orders, shipping, and customer service. She has been part of the team since August, 1981. Ken Brown, newly appointed Sales Representative, has been employed with Flight Designs for three years. Before entering the sales department, Ken worked in the main assembly shop. This spring, Ken will be on the road showing new products and meeting dealers. In the meantime, Ken will be setting up new dealerships in various areas. The harness loft is kept at peak efficiency by two team members, Nancy Cruz and Ron Hess. Nancy has been the number one harness seamstress since Flight Designs started in harness marketing. Ron has provided many hang glider enthusiasts with his own manufacturing of spaghetti harnesses, Hess fairing, and other software hang glider accessories.

Tom Peghiny, recognized for his design accomplishments in both the hang glider and ultralight fields, is heading up the development of the FlightStar ultralight project and related ultralight developments.

Flight Designs uses modern technology in the development of its new products. Through extensive test-flight procedures, the company is able to provide

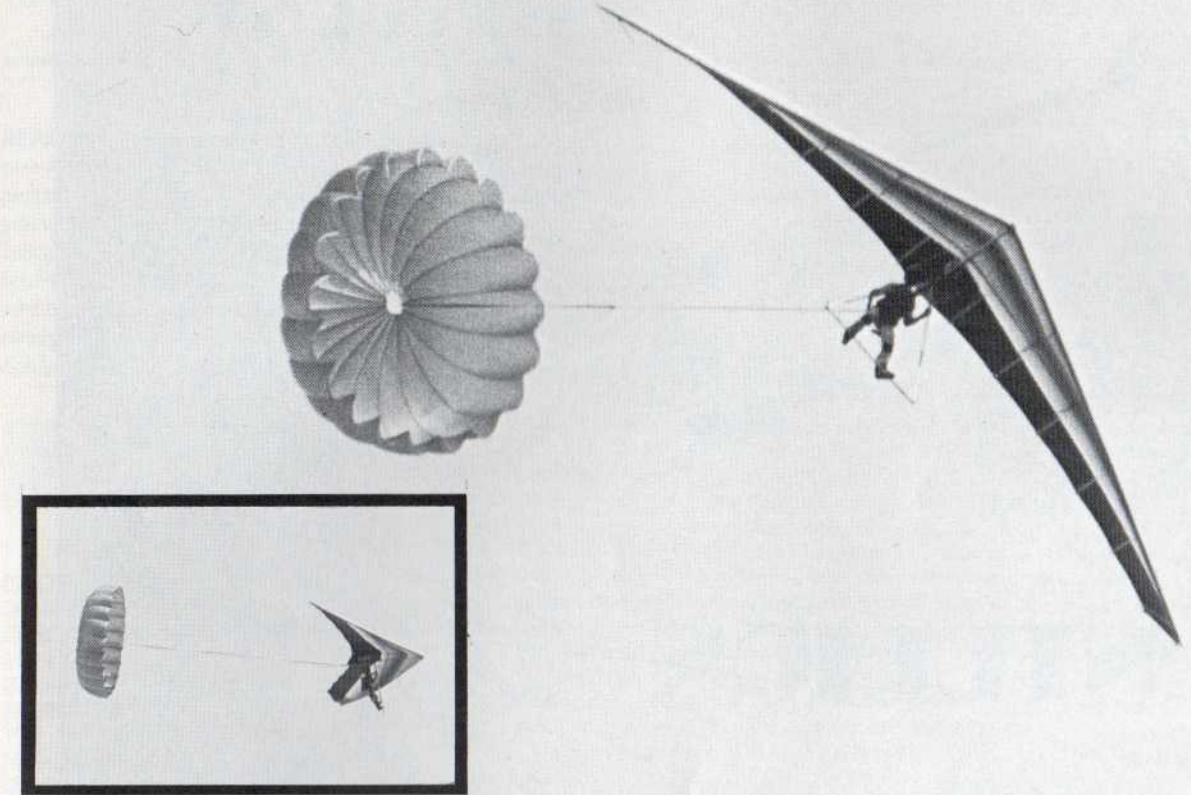
maximum safety-tested equipment. Safety is the number one goal as they continue to develop new gliders, ultralights, and various other products. Design research, product testing, and accurate recordkeeping enables Flight Designs to obtain a total flight telemetry package for its products.

Production and prototype test flying is performed at a variety of sites throughout California, including beaches, mountains, and the use of a taxiway at the local airport. All test flying is done by qualified, full-time employees who soar the skies as much as possible. The company has also recently acquired use of a full-scale wind tunnel for testing purposes. Before production models are introduced, a complete flight telemetry package is prepared and certification is required. As a result of this documentation, production models are completely performance and safety checked before leaving the factory.

Flight Designs' goals for the future are to provide the consumer with a complete line of sport aviation products including ultralights, hang gliders, and a full line of accessories. The hang gliders are for each level of ability for individual pilots ranging from training gliders to high competition gliders.

Currently, the firm provides three various designs with new designs in the making. Flight Designs offers a weight-shift ultralight, the JetWing, and soon will have its new three-axis ultralight, the FlightStar, ready for shipments. As the storeroom expands, Flight Designs carries several hang gliding and ultralight accessories for all pilots. New products and techniques are always being produced here. §

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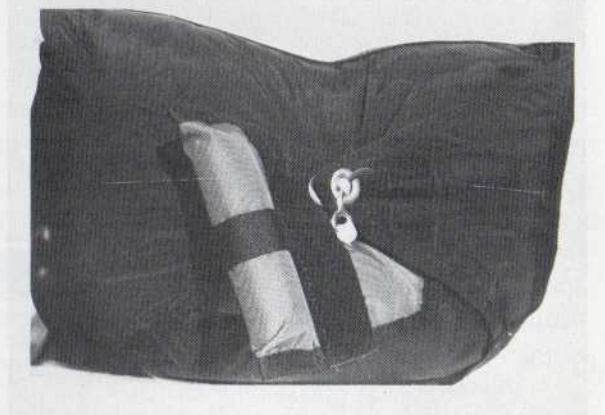


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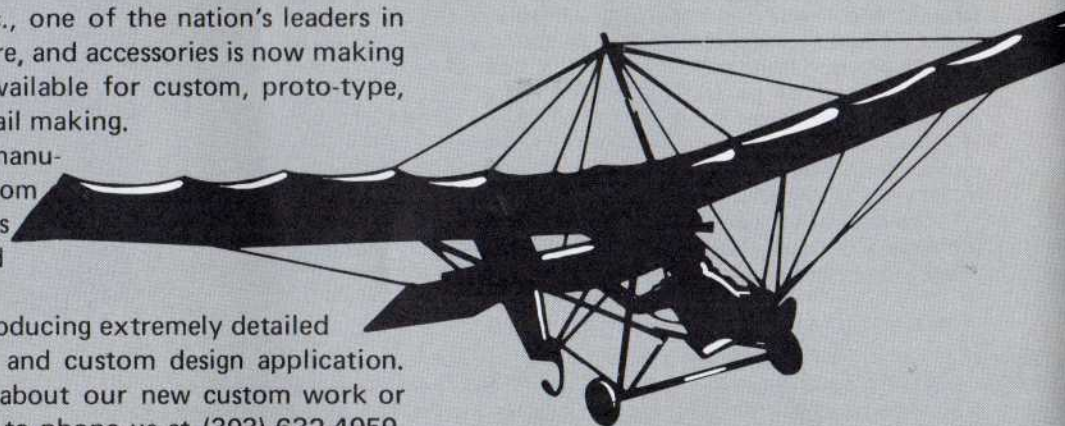
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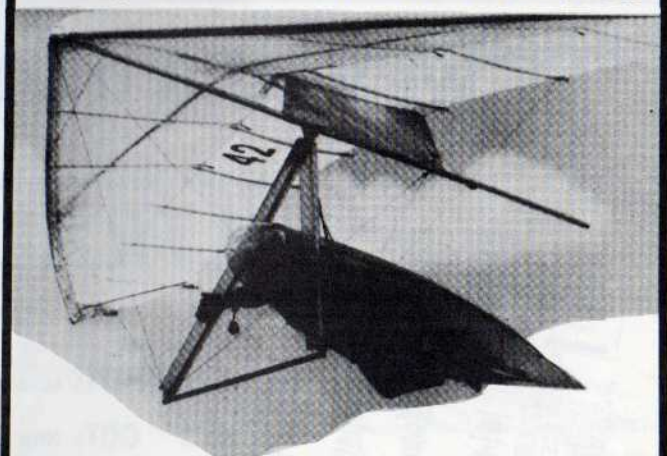
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PRODUCT LINES

CHATTANOOGA, TENN. — Well, let's start off this "Product Lines" with a pilot's "There-I-Was..." as this issue is full of manufacturer descriptive articles. This tale comes to *Whole Air* via our Florida towin'/soarin' correspondent, **Ray Foley**. Now ya just can't ever forget those Florida flat-landers can do some pretty amazing flying down there in the sunny south. The yarn begins with pilot **Rick Whitlock** towing up in late September last year, and soaring up to **6,500 AGL!** Now, like Ray, these veterans don't even bother with winches or long lines. They've become so proficient at their boat tow techniques that they generally use 500-1000 feet of "solid" line (i.e., no tension control), and jump off the line at the first thermal, frequently as low as 400 AGL. Anyway, this day Rick left the security of the tow line at 800, so his gain registers an admirable 5,700 feet on the Florida stairway-to-heaven-scale. It was not all cozy thermalling, tho. Whitlock was sucked into a Cumulo-nimbus (anvil-shaped thunderhead... spells d-a-n-g-e-r). He found himself spinning around fast and "in the soup," so he had no idea where he was or how far he might've traveled. He had no chute, so had to ride it out like a rodeo star. Finally, he was thrown outside, everything intact and lots higher, though undoubtedly, his wits had gotten scrambled a bit. Actually, he was only in the Cnb for five minutes but recorded a handsome two hour entry in his logbook. He'd hung on for 45 minutes before penetrating the cell. Still, with Florida slipping into sink holes, Whitlock must've imagined himself enroute to the Happy Soaring Skies of Thermal Heaven when he got to 6500 feet. Congrats Rick! (But get yerself a chute, lad; that could'a come out a lot worse!) The same bubbly weekend, Ray ticked off four hour-long flights, and on one traveled seven miles upwind to a friend's house, dawdled around there nearly an hour, finally flying back to the launch point, at times dropping to only 600 AGL. Ray's an impressive pilot — you ought'a see him tear up the skies over the mountains of Chattanooga. Thanx for the tale, Ray. In another different topic area, Region 10 Director, and USHGA President-Elect, **Dick Heckman**, is starting a marketing campaign for his new firm of International Sailboards. Open to hang gliding or sailboard dealers across America, Dick is the exclusive distributor for a line of quality Dutch boards brand named **Mystere**. They're adding two new models to their existing all-round'er, a new Funboard for intermediate to advanced and a Jumpboard for the expert. The new general purpose job is said to have a "Displacement Hull" offering well-rounded performance, which is fast, for racing. Heckman states, "Mystere is a top quality, state-of-the-art board for a good price, with an attractive discount structure." You dealers and users alike are invited to contact him at 113 Beirne Av; Huntsville, AL 35801. Getting back to things that fly horizontally now, we're caught by a new development being explored simultaneously by two relatively newer, smaller outfits. See the news release on page 10 from Craig Beck to discover his use of control surfaces on his Whitehawk 185-B. The other inventor/designer is **Chuck Stahl** of Centurion fame. He and Jeff Magnan have been working on a control surface for their glider, but which could likely be sold as an after-market item for any double surfaced diver. They call it the **Magnan Flap**, a sort of mid-chord (60%) split flap. For those unfamiliar with a split flap, this is a surface only on the bottom of a wing (as opposed to the Fowler flap at a wing's trailing edge, comprising a rear section of the wing itself). Common on some military and older twin engined aircraft, the split flap is essentially a pure drag device which does not purposely change the cambering of the wing. Now check Chuck/Jeff's Magnan Flap, apparently similar to Beck's "elevon," which cuts glide to about 4:1, useful for steep approaches to small, tight fields, and enhancing flare, like that accomplished by **Bennett's Streak** or **Boone's ProStar II**. What's interesting here, tho, is that the Magnan Flap could be added to any double surface glider at reasonable expense, thereby up-dating the glider to the benefit of its landing qualities. When the flap is deployed (it goes down to 90° down), it lowers the nose, as on any airplane using flaps. This changes the pilot's mass to control bar distance relationship, thus seemingly lengthening the pilot's arms. It increases not decreases stability, Stahl claims, and while it reduces in-flight stall speed (perhaps more than 1-2 mph), it mainly increases the descent angle. The Magnan Flap is constructed of 3.8 ounce dacron, 8 feet by 8 inches, with a 3/8 inch aluminum tube on the trailing edge (of the flap). It is located at the 60% rearward chord point, running from the center juncture to the quarter-span position (mid-span of one wing half). It's an intriguing idea from **Sport Aviation Mfg.** Write 'em at P.O. Box 3875; San Clemente, CA 92672 to inquire further, or call Chuck at 714/661-6153. **Sal DeFrancesco** of Airwise, Inc. in Connecticut called, reporting great north eastern acceptance to Jean-Michel Bernasconi's **Vision** from Pacific Windcraft. Besides clean sail and hardware construction, the glider offers modern double surface advantages in what Sal feels is basically the newest-of-all breed of super-intermediates (not

too dissimilar to our thoughts about the Flight Designs' Demon, see the Sep/Oct 81 *Whole Air*). If pre-paid, the dealer discount is generous enough that a retailer can pass on a savings to a good student sufficient to down-price the \$1850 Vision with the other intermediates (Harrier II, Gemini, Javelin, Breez, and Dream). Speaking of new divers, **Wills** has a new **140 Duckling**. Well, before we get our webbed feet in our duckbill, we should amplify that to say that the factory reports the 140 was, "...just born in our sail loft." To continue, "...when it grows up, we project: area of 140ft²; span of 29ft; nose at 130"; weight range of 110-210; 50 pound weight; and a III rating requirement." They caution that it's only a prototype which has not even been flown yet. No production/release date was forecasted as of late November 82. Will has changed their **Dealer Seminar** to February 11-14 (to aid those Vegas-bound **Eipper** dealers who will already be "in the neighborhood"). In the land of the giants, **Ultralight Products (UP) Inc** (the glider and sailboard company, vs. UP Sports, the sportswear company) has had "an unusually busy late season," so they're quoting deliveries at late January (due partly, of course, to their recent Christmas closing). Like most major manufacturers, they've stock "open" units, so don't despair if you can't wait till late Jan 83 to be Comet-ized or Gemini-ed. Besides participating in aerobatic meets and the organization thereof, and besides building two new craft — the OVR 2 and the Arrow — they've "decided to stay with the current configuration of the Comet because we felt through the performance tests and competition results that our glider was still leading the industry." So, based on info gleaned from OVR 2 research, many subtle planform changes and some hardware, setup modifications will be incorporated into the **Comet 2**. They're projecting a mid- to late-March date to commence Comet 2 production, following the re-certification process on three sizes. UP additionally reports (as *Whole Air* also hears) an intense interest in their **Arrow**. They are planning lots of R & D to offer the best airplane of its type. Currently, they're working with some talented engine design people as they are, "...planning to incorporate an engine specifically designed for this ultralight sailplane. Engine R & D takes even longer than aircraft, so don't expect a **powered Arrow** before 1984. We have not yet set a firm production date on the sailplane as there is a large amount of hardware design and additional field testing to be done. There is a good possibility that we will not have them in full production until 1984 but at this point we are planning on building a few in 1983 and will fly them in the Cross Country Classic." A last note from UP to those writing, is to please use P.O. Box number **659 not 582**. Up at **Flight Designs**, we understand president (since June 82) Tom Zimmerman has vacated the top position. No new names have been announced, but concerned pilots are advised this change mainly affects their powered ultralight division, not the hang glider end. General Manager, **Steve Brockman** and crew remain at "full steam ahead" for their new **Shadow** (see page 4). Actually, it'll just be an upper management re-shuffle to replace Zimmerman (they're certainly getting used to it!). It should hardly be noticeable to the consumer, as Flight Designs has succeeded in attracting some good names to their effort, and those folks are staying — names like **Tom Peghiny**, **Steve Thieson**, and (once Sky Sports owner, then Vector man) **Ed Vickery**, who re-joined Pioneer after many years away. Gosh, they've had a tough time with presidential longevity ever since the tragic loss of founder Marty Alameda. But their **FlightStar** — strutted and slicked ultralight airplane, developed by Peghiny and crew — is almost production-ready and a two seater is now mocked up and will also be available in early spring. In other industry leaders, **Delta Wing** and **Pro Air Co.** are not pouring out news, likely 'cause both are happily building their unattached lower surfaced, easy-landers, **Streak** and **ProStar II**. We'll have more on both these gliders in the very near future, a mini-feature for **Uncle Bill's** thrill due in the next March/April edition. Watch for 'em both, gang. We'll also be looking for "Product Lines" news when we're out west this winter from: **Seedwings**, **Stratus**, and maybe **Moyes**. On a closing note, we'd like to pass on a thing or two about **losing your hang rating**. Yep, USHGA has an October 82 policy which states, "Instructors and rated pilots can lose ratings for flying so as to harm themselves, other persons, or the image of the sport." It's pointed out that **maturity** is a primary pre-requisite in hang gliding, so littering or flying under the influence can be reason for loss of rating or certification. These actions are at the discretion of the Observer or local Examiner. Of course, this can all be appealed to one's Regional Director and, in fact, Instructor ratings must be pulled by that Director. While some could interpret this as negative sounding, we think it should be thoughtfully considered. Maybe, with mature effort, 1983 can be lots safer than 82, which was a pretty tough year for all levels of aviation, especially ultralighting. Got news or opinions? Send 'em to Product Lines; Box 144; Lookout Mtn, TN 37350-0144.



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