

NEW for 1984



photos by Bill Bennett

Light **DREAM**

For a new year, dacron meets aluminum "lightly" . . . in the amazing new 1984 Light **DREAM**.

The same handling response, coordination of pitch and roll, soaring grace and esthetic beauty are now elegantly crafted in a Light **DREAM** that is significantly lighter than previous models (the 165 size is a mere 49¾ pounds without standard coverbag).

More predictable static balance, renewed ease of ground handling, launching simplicity, improved in-flight handling, and landings you'll barely notice are all desirable benefits brought by the new reduced weight.

But load tested to the same rigorous HGMA standards that are applied to the big, heavy wings of yesteryear . . . you can feel confident and fresh in your new Delta Wing glider.

Call your Delta Wing dealer today, and Light **DREAM** on . . .



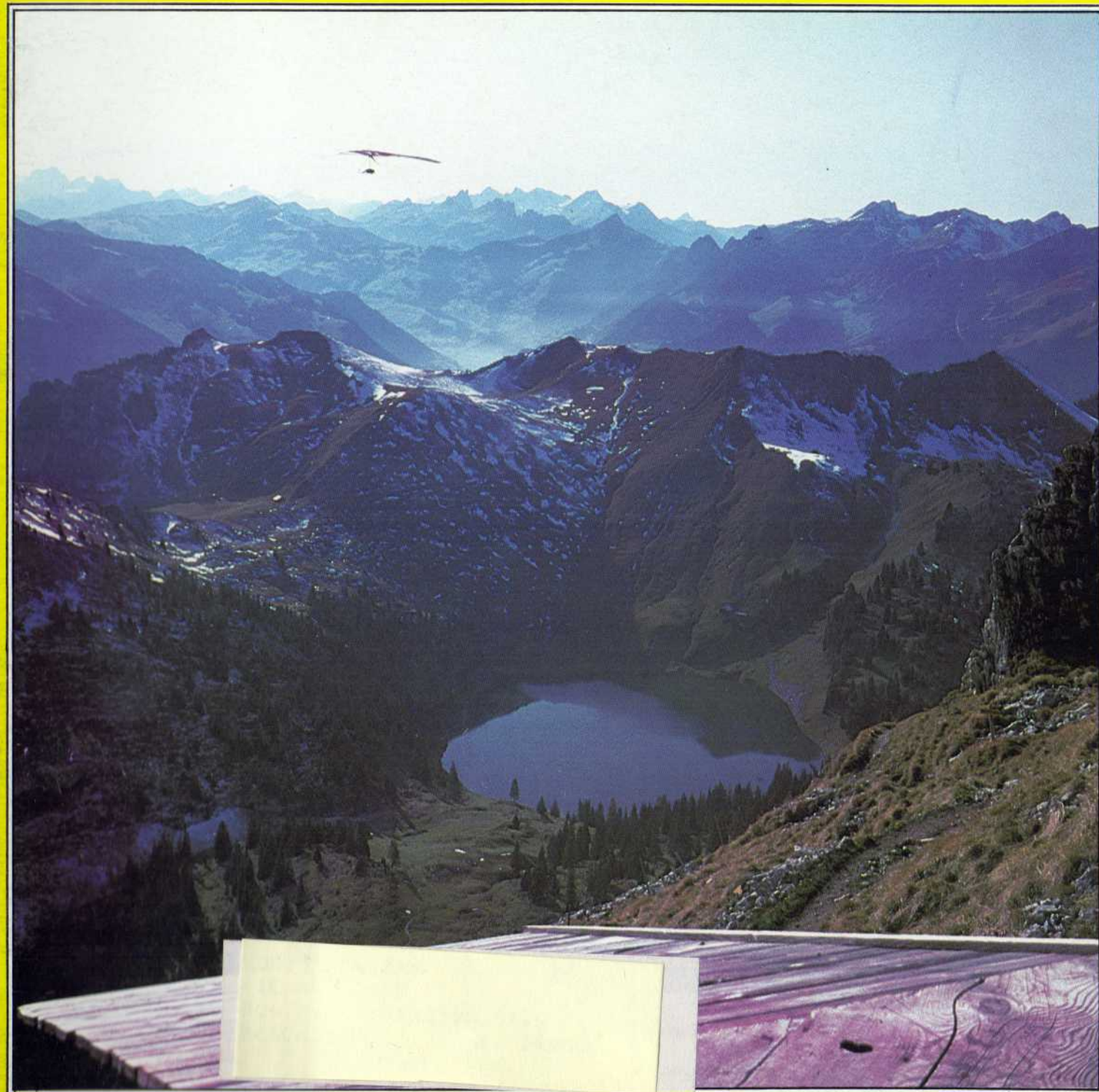
Delta Wing Gliders • P. O. Box 483 • Van Nuys, CA 91408 • Telephone (818) 787-6600 • Telex No. 65-1425

HORTEN'S FOOT-LAUNCHED FLYING WINGS PILOT REPORT & SURVEY ON UP'S GEMINI HANG GLIDING IN GERMANY

WHOLE AIR

The Magazine of Hang Gliding and Ultralight Soaring

June and JULY 1984 — \$2.50 (Can. \$3.25)



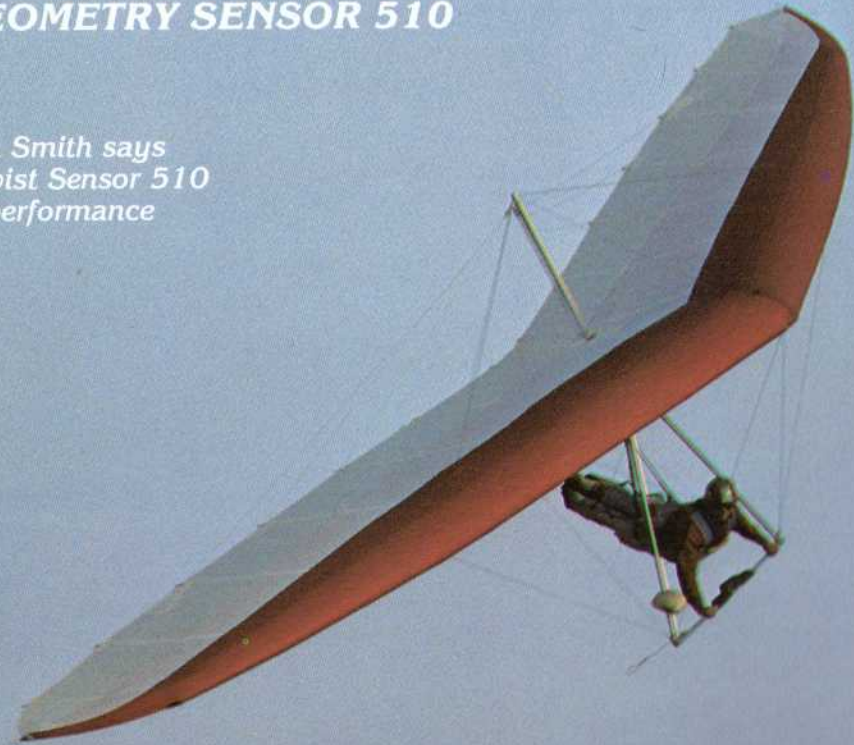
U. S. Postage PAID
Bk Rte Permit No. 7
Box 144
Lookout Mtn TN 37350
Address Correction Requested

100 MILES IN THE EAST! 6th ANNIVERSARY ISSUE

BREAKTHROUGH IN HANG GLIDER PERFORMANCE

Introducing the new in-flight VARIABLE GEOMETRY SENSOR 510

Champion pilot Stu Smith says
the new variable twist Sensor 510
offers world class performance
for glider pilots
world-wide.



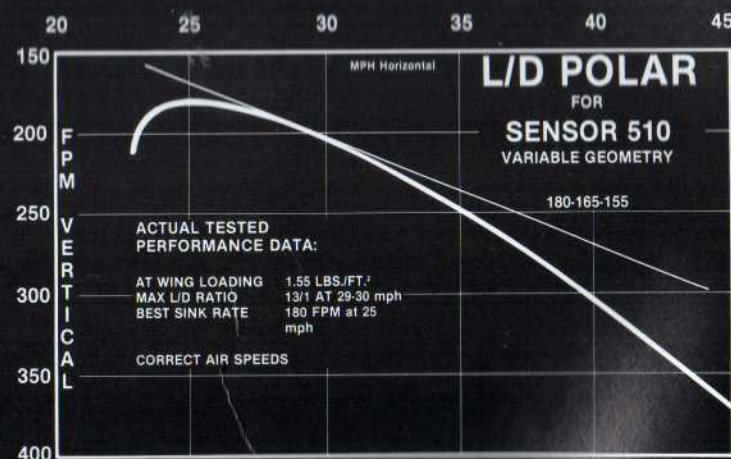
Significant improvements in performance and handling are available now on the in-flight variable twist Sensor 510. Seedwings knows that the most important aspect of hang glider performance today is drag elimination and low twist. In-flight variable twist, improved wingtip camber, mylar trailing edge cloth and additional ribs in the airfoil combine to produce a significant performance gain over other high performance gliders.

The variable geometry system allows Sensor pilots to change from easy handling to super performance with low twist. Once the pilot has cleared launch he can steadily tighten sail tension to improve performance in thermal climb as well as intra-thermal straight-line gliding.

The highly evolved Sensor has been developed, flight and vehicle tested by Seedwings for over a year. The Variable Geometry Sensor 510 is ready for you. It's the best ever made.

Prices start at \$2295. Call for the Sensor representative nearest you. Dealer inquiries are invited.

MAX L/D = 13/1 Measured



Seedwings, 5760 Thornwood Drive #3 • Santa Barbara, CA 93117 • (805) 967-4848

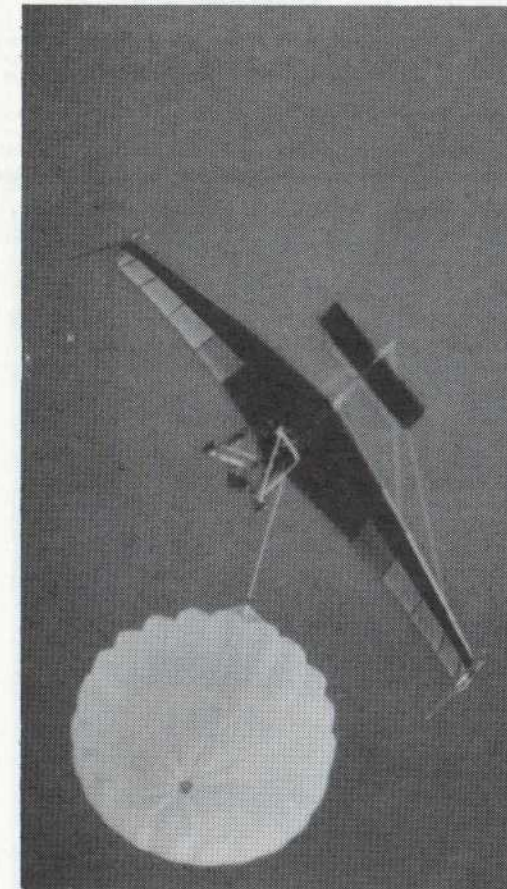
BRS

'RETURN' customers do the talking ...

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

Sincerely,

Jon Lindskog
Jon Lindskog
Ft. Collins, CO



Dear BRS,

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

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

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

Dear BRS,

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

Forever Thankful,

Jay Tipton
Jay Tipton

BALLISTIC RECOVERY SYSTEMS

9242 HUDSON ROAD • LAKE ELMO, MN 55042 (612) 731-1311

photo by Bettina Gray



WE HELP YOU FLY!

We're the United States Hang Gliding Association. Join us and get *Hang Gliding* magazine, the world's leader in the sport. We cover foot-launch hang gliding exclusively! Beautiful color photography, technical articles, contest results, feature stories, new products, equipment evaluations, how-to articles — all written by the sport's top names — fill our pages.

I include my check or money order as follows:

- \$29.50 FULL MEMBER (\$32.50 foreign) — as a full member you receive 12 issues of *Hang Gliding* magazine, pilot liability insurance, USHGA membership benefits.
- \$22.50 SUBSCRIPTION (\$25.50 foreign) for one year.
- \$40.00 SUBSCRIPTION (\$46.00 foreign) for two years.
- \$57.50 SUBSCRIPTION (\$66.50 foreign) for three years.

Name _____ Phone _____
 Address _____ Age _____
 City _____ State _____ Zip _____

Send check or money order to:
 USHGA, Box 66306, Los Angeles, CA 90066

- \$500,000 pilot liability insurance
- Site insurance for chapter clubs
- Local, regional and national competition
- Pilot rating program
- Tandem and ultralight insurance
- and much more!

START FLYING IN 1984 AT 1975 PRICES!

\$1499.00 (ATV Trike)
 \$699.00 (Demon wing)
FACTORY DIRECT SALE
 While Supply Lasts

Complete ready-to-assemble
 ATV trike and
 Demon hang glider.

Here is a high performance ultralight aircraft at an un-heard-of low price. Powered by the popular Kawasaki 440A, with lift by Flight Designs' well-proven, competition-tested Demon wing (thousands sold and still flying), mated to the industry's stoutest trike carriage.

The most prevalent ultralight aircraft configuration in Europe is American-built and can be yours now!
 Act today... this exceptional offer is available only while the supply lasts!!



FLIGHT DESIGNS, INC.
 P. O. Box 631
 Manchester, CT 06040
 203/644-1581



WHOLE AIR

ISSUE NO. 36, VOLUME NO. 7, NO. 3, 1984

PILOT'S PERSPECTIVE

- 21 GARY'S 100 MILES!
Finally, the East of the Mississippi Gang can celebrate a One Hundred Miler. Tennessee Tree Topper President, Gary Engelhardt tells you how he managed it.
- 34 THE FAA AND AERO TOWING
Our newest Correspondent, Dave Higdon, poked around the Federal Bureaucracy to find out what the FAA is doing with USHGA's petition for aero towing exemption.

WHOLE AIR Magazine is published bi-monthly by Idea-Graphics, P.O. Box 144, Lookout Mtn, TN 37350-0144. ©1984 by Idea Graphics. All rights reserved. Nothing in whole or in part may be reproduced without written permission of the publisher. Publisher assumes no responsibility for unsolicited material. All photos, artwork, and manuscripts must be accompanied by a stamped, self-addressed return envelope. **Change of Address & Subscription Inquiries** — Send to *WHOLE AIR*, P.O. Box 144, Lookout Mtn, TN 37350-0144. Expiration date marked on mailing label in a four digit sequence, followed by two letters. The first two numbers are the month; the second two are the year of subscription expiration. Please give six to eight weeks advance notice of address change. Send both old and new address plus mailing label from recent issue, if available. Subscription rate: U.S. and Possessions, one year \$12.00; Mexico and Canada, one year \$16.00; All other countries, one year \$20.00; Air Mail available, write for rates based on one year (only) subscription.

FEATURES

- 14 HORTEN'S FLYING WINGS, & EUROPEAN FLIGHT LINE
As interest in "wings" thunders down the valley, new German Correspondent, Gib Eggen gives us a wealth of information on the amazing flying wings of Reimar Horten. Special-Use Archive photos help tell the story of the wings of the 1950's. Eggen also uses his new column, *European Flight Lines*, to give a closer look at hang gliding in Germany.
- 24 THE NOMAD PRONE TRIKE
From England comes an odd-looking rig aimed right at the soaring pilot. See if it strikes your fancy. (First of two parts on prone trike ideas from Europe.)
- 26 GEMINI PILOT REPORT
In his second installment, Paul Burns puts the 1984 Ultralite Products Gemini through the paces.
- 31 OWNER SURVEY — GEMINI
Coordinating with a Pilot Report this issue, Bruce Wolfe tells you how the owners of Geminis answered over 2,000 questions.

AERO TOPICS

- 6 PUBLISHER'S COLUMN
Editorial
- 8 FORUM
Reader Commentary
- 10 INDUSTRY NEWS
News and New Products
- 36 DIRECTORY
Where to Buy What You Need
- 37 CLASSIFIEDS
For the Bargain Hunter
- 38 PRODUCT LINES
Consumer News



WHAT THE HEY! IT BEATS DRIVIN'
 OVER TO "SCAREY GORDO" WHEN
 IT BLOWS DOWN.



Volume 7, No. 3, 1984
ISSUE NO. 36

Publisher
Dan Johnson

Editor
Starr Tays

British Correspondent
Noel Whittall

German Correspondent
Gib Eggen

French Correspondent
Jean-Michel Bernasconi

Owner Survey Editor
Bruce Wolfe

Towing Section
Tom Phillips
Donnell Hewett

Staff Photographers
BJ Schulte
Cliff Whitney

Staff Writer
Paul Burns

Art/Photo Contributors
Paul Burns
Rob McKenzie
Starr Tays
Dave Higdon
Julian Machie
Dan Johnson
Chris Voith
Pete Brock
with special help from
the Stuttgart Aviation Archives

Editorial Contributors
Gary Engelhardt

Paul Burns
Bruce Wolfe
Dan Johnson
Dave Higdon
Gib Eggen

Horten material with special
permission of Drachenflieger

Cover Photo
Furnished by Gib Eggen

On The Cover:

Thermalling high above
the spectacular Stockhorn
Mountain launch in Switzer-
land.

Publisher's Column

I recently participated in a meeting of AOPA's Air Safety Foundation where the subjects included powered ultralight accident reports, data base information, and the use of such information when interfacing with the FAA, the public, and entities like insurance companies. While the total sum of information is still growing, the Foundation has closed a grip on such facts within its powered ultralight community.

USHGA, and the good work done by Doug Hildreath (and those who preceded him), have compiled valuable information on accidents and fatalities for hang gliding. The Air Safety Foundation and other groups point to these facts in making their own assessments. It gave me just one more reason to be proud of our sport and the efforts of its Association.

But we still have a deficiency. I should like to address this, in my other role as the Board of Directors Chairman of the Insurance Committee. For in trying to do my small part in aiding the Association's severe financial problems, insurance and its cost are quite important. General usefulness to the industry and the sport will also be realized.

The deficiency is in the area of hang glider pilots (Airmen) and gliders (Vehicles), specifically, how many of them are active. Before our accident information can increase its value, we need knowledge on how many airmen are flying how many hours/flights, and how many vehicles are active.

Look at it this way. Suppose our accident/incident figures are 100% perfect and complete (which no one would claim they are, or perhaps, even could be). Presenting the reports which R. V. Wills used to, and as Doug Hildreath now does so well, we tell the rest of the world about what happened to some airmen and their vehicles.

But we cannot say (other than in highly questionable speculation) what percentages of all flights have accidents, incidents, or fatalities. Nor can we say so by what percentage of airmen, or in what percentage of what aircraft. We also do not have facts about total airtime, number of launches per pilot per year, or at how many sites.

We are operating in an information void, or partial void. As such we lose credibility when interacting with government, investors, and insurance companies.

Other countries may not have such a void. For example, elsewhere in this issue

you can read that Germany has 7000 (or so) pilots. From a country with one quarter the population of the USA, that more Germans are called active than are members of our national association seems most disproportionate. But, in Germany, the imperative is greater (a legal one) to become duly registered. So, while German figures may show 7000 to our 6500, it is certain that not all American pilots are members. But *how many* are not?

However, here again, the problem arises. Germany, like general aviation, may *know* the pilot population, whereas here in American hang gliding, we can only speculate. One rather important trade-off is our atmosphere of self-regulation to Germany's law, and the licensing of general aviation's airmen and vehicles.

Pure numbers such as pilot population are just one area for which we need more information. Also, we need number of flights per pilot per year, number of hours per pilot, number of units sold, number retired, geographical location of pilot density (better known at present than most of the above), and other facts in pilot demographics, vehicle exposure data, and the collation of all data.

Without this and other data, how can we expect to obtain better insurance rates and coverage? How can we demonstrate to FAA that we are righteously and successfully self-regulating? Why would any investor offer anyone in hang gliding a source of funds if we do not even know how many craft are sold each year?

So assuming I've shed some light on *why* we need this information . . . *how* do we get it?

USHGA, through member renewal surveys, can certainly help, *if* the right questions are asked. I will begin compiling some of these inquiries, especially as to how such figures may be used in my director job regarding insurance (which is one of USHGA's *highest* costs).

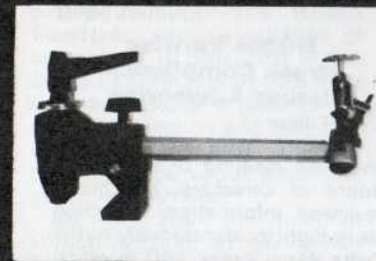
Whole Air will continue our regular surveying of our readership, and that can help. Others can also generate responses, for example, via the many excellent regional newsletters.

But in vehicle sales/deliveries, and for other goods sold, we probably need some "non-affiliated" committee or group. Manufacturers are understandably jealous of their sales figures. Even so, one manufacturer can guess quite accurately about his competitors. Thus, we can certainly achieve some level of validity just by tubing and dacron purchases, et cetera. But we need more reliable data, and an investigating committee might do the job.

Any volunteers? Any other suggestions or opinions? SPEAK UP!

Thanks,
Dan Johnson

PHOTOGRAPHY CAN BE FUN AND SIMPLE WITH THE SUPER•CLAMP and KONICA FT-1 35mm CAMERA



Complete SUPER•CLAMP
Assembly - with Clamp and
Extension arm - \$59.95.
The Swivel Clamp Only -
\$26.50 (makes a great base
for counter weights)

KONICA FT-1

Camera Has Interchangeable Lenses
Built-in Auto Winder (Full Auto Exposure)

FT-1 - Body \$180.00
FT-1 - Body & 50 mm 1.7 Lens \$209.95
FT-1 - Body & 28 mm Wide Angle \$249.95
16 foot Electronic Cable Release - \$32.00

Contact me for full line of camera & video

C. W. PHOTOGRAPHICS

Cliff Whitney
Work: 615-875-9003
Home: 615-265-1539
700 Colville Street
Chattanooga, TN 37415



ALSO DEALERS FOR BALL VARIOS WHEN ONLY THE BEST WILL DO

ITS HERE

Dr. REIMAR HORTEN'S Book

"FLYING WING"

Nurflügel

330 ILLUSTRATIONS.



..... THE COMPLETE STORY
of the fabulous HORTEN aircraft, from
ultralights to supersonic jets, in both
German and English language.

\$ 35 PP

SCOTT AIRPARK, LOVETTSVILLE, VA. 22080 Sole U.S. Distributor.

Professionals Since 1974

CRYSTAL
AIR
SPORTS



7 REASONS WHY YOU SHOULD DO BUSINESS WITH "CRYSTAL"

- NO. 1
Crystal is centrally located to the finest flying in the eastern USA.
- NO. 2
Crystal stocks all the winningest gliders ... the Wills Wing Attack Duck; the Delta Wing Streak; and now, the Airwave Magic III.
- NO. 3
Crystal maintains a full line of accessories.
- NO. 4
Crystal offers nearby Motel, Flyer's Bunkhouse, and Pool facilities (at the Crystal Air Sport Motel) that is run by and caters to pilots ... including in-house hang gliding movies.
- NO. 5
Crystal is the leader in the Aero Towing movement ... Two-Seat Cosmos aero tug on-hand NOW!
- NO. 6
Crystal is the home of the famous full environment "SIMULATOR," where you can introduce your friends and loved ones to the thrill of hang gliding ... SAFELY!
- NO. 7
Crystal is celebrating its 10th Anniversary in 1984. For all those years, Crystal has been a leading innovator in delivering flight and gear to pilots and student pilots. Don't you want to fly with a leader?

Call TOM today!
Phone 615/825-1995
seven days a week till 2 PM
(or later, if conditions permit)
or write

Rt. 4, Cummings Hwy., Chattanooga, TN 37409



FORUM

Fun Flying Through Whole Air

Dear Editor:
The May issue of *Whole Air* has to be one of the finest Idea*Graphics has put together. With the burden of operating a small business, it is hard to find time to daydream, however, yesterday was certainly an exception. The publication gives one a feeling of participation in the sport of foot launch while your feet are still firmly on the ground. It was great fun flying through it.

BRUCE HAWK,
Hawk Airsports

America's First Aero Tow Incident

Dear Editor:
During an aero towing session at Salinas recently the following incident occurred, fortunately with only minor injury as the result. However, we feel the lessons learned from the incident are important and that all operators of Skylines towing systems should be made aware of the details and take note of the conclusions reached.

DESCRIPTION OF INCIDENT

At approximately 1200 feet the tug and glider pilots were practicing 360 degree turns on tow in smooth conditions. On completion of a left hand

360 degree, a right turn was initiated by the tug pilot. The glider pilot (making his third tow) was slow to respond and began a lock out to the left.

The tug pilot began the normal correction of turning left, reducing line tension and attempting to get back in front of the glider.

This maneuver coincided with the glider pilot pulling in and attempting to roll to the right to correct the lock out. This had the effect of accelerating the glider rapidly, and the glider gained on the tug very quickly before going into a second lock out to the left. This combination allowed a situation, momentarily, where there was sufficient line slack and the relative positions were such that the tug was able to turn into the line and hook it on the left wing.

The line almost immediately went taught again as the glider went into the second lock out which developed very rapidly. The increasing line tension pulled the tug's left wing down, tearing the sail from the trailing edge to the leading edge at batten number five, and causing the tug to invert. Subsequent investigation showed that on inversion the trike fell into the wing, the left hand upper wire failed at the kingpost, and the wings folded negatively. The tug then went into a rapid spin to the ground. As the tug pilot, I sustained a broken wrist and

bruising.

The glider pilot released at the point of the tug's inversion and made a normal landing.

CAUSES ANALYSIS

As is usually the case a combination of factors were involved. Had any of these been removed the accident would not have occurred.

1— Subsequent testing of the weak links being used at the time showed that under certain conditions (e. g., with a gradually increasing lead combined with the tow line's elasticity) they could reach up to one and a half times their correct breaking load.

2— Misjudgement was made by the tug pilot in trying to correct a lock out situation that was developing too rapidly and the glider should have been released.

3— Misjudgement was made by the glider pilot in not releasing before the lock out became too radical. From his statements afterwards it also became apparent that he was placing too much reliance on the weak link breaking rather than making his own decision to release.

4— In general, the very flexibility of the system allowed a measure of overconfidence in the ability to correct almost any situation and remain on tow to develop. This, combined with a reluctance to drop tows unnecessarily, thereby wasting time, undoubtedly led to unacceptable narrowing of safety margins.

REMEDIES

1— A new method of testing weak links has been devised to simulate the elasticity of the tow line and gradually applied load. DO NOT use a weak link stronger than 180 pounds.

2— In situations where the glider gets off line laterally, the glider pilot should release BEFORE and not WHEN he/she reaches the limit of his control authority. He/she should NOT assume that the weak link will do this job for him.

3— The tug pilot, if he observes the glider pilot reaching the above situation and not releasing, should do so without delay.

4— The technique of turning the tug, to reduce line tension and get back in front of the glider should be used with discretion, i.e., only where the glider is mildly off line, and NOT to recover a radical lock out.

5— A wide margin should be left between what is POSSIBLE with the system and what is PRACTICED. Considerations of convenience and/or productivity (getting more tows done while pilots are waiting anxiously, or not wishing to release because of the time delays involved) must not be

allowed to influence in any way decision affecting the safety margin.

In short, if in doubt, release!

(signed)
DAVE GARRISON,
Operations Manager,
Skylines, West

HGMA Verifies Streak Compliance, Issues Advisories

Dear Editor:

On April 11th, at a regularly scheduled meeting of the HGMA Board of Directors, the board reviewed information regarding six in-flight incidents involving the Delta Wing Streak 160 in which the gliders entered inverted attitudes.

It was determined that there were improper pilot actions involved in each of the incidents. It was also determined that there were mitigating weather or meteorological circumstances involved in at least five of the incidents. Two incidents involved pilots flying in the lee of terrain over which strong winds were blowing. Two other incidents involved pilots flying along a ridge in the presence of crosswinds and turbulence. In one of these incidents the pilot was flying slower than he feels was appropriate to the circumstances, and in the other the pilot was reportedly doing a series of severe stall and dive maneuvers. One pilot was executing severe stalls in an attempt to spin the glider. One pilot was thermalling, and according to a witness on the ground, pushed the bar out hard in a steep bank while already flying more slowly than was appropriate.

ADVERTISER'S INDEX

| | |
|---------------------------------------|-------------|
| Airwave Gliders U.S. | 39 (IBC) |
| Ballistic Recovery System | 3 |
| BP Hi-Tow (accessory) | 13 |
| C W Photographics | 7 |
| Cross Country Pilots Ass'n | 23 |
| Crystal Air Sports (school) | 7 |
| Delta Wing | 12, 40 (BC) |
| Flight Designs | 4 |
| Leading Edge Air Foils | 10 |
| Northern Sun Gliders | 13 |
| Pacific Windcraft | 23 |
| Progressive Aircraft Co. | 11 |
| Raccoon Mtn. Flight Resort | 7 |
| Scott Airpark (Horten book) | 7 |
| Seedwings | 2 (IFC) |
| Skylines, Ltd. | 30 |
| Ultralite Products | 29 |
| U.S.H.G.A. | 4 |
| Whole Air Magazine | 23 |
| Windgypsy (flight school) | 10 |
| Wolfe Aviation Co. | 35 |

| | |
|----------------------------|----|
| Classified Ads | 37 |
| Dealer Directory | 36 |

Despite the mitigating circumstances and improper pilot actions, and because of the statistically significant number of incidents, Bill Bennett of Delta Wing volunteered to call a formal HGMA Question of Compliance on the Streak 160. Under the procedures in the HGMA Standards, when a question of compliance is called the HGMA Board of Directors obtains from the manufacturer a glider of the model in question and tests it to verify the accuracy of the record of compliance under which the glider was certified.

On April 28th, the Board of Directors met at Whiteman Airport to conduct the necessary tests. In light of the nature of the incidents, it was determined that pitching moment tests and a negative 150 degree limit load test should be conducted. The results of these tests confirmed the accuracy of the test data submitted with the certification record of compliance for the Streak 160.

During the testing it was noted that the Streak 160 uses a continuous bridle line system in which each reflex bridle can slide through a fitting at the kingpost from one side to the other. It was further noticed that the Streak exhibits a severe yaw instability in the test vehicle in a range of negative angles of attack. Tying off the bridles at the center was shown to reduce this yaw instability substantially. While there is nothing in the certification standards which prohibits such yaw instability, and while some degree of such instability is common to most modern gliders, it is the opinion of the board that there are some theoretical considerations that suggest that a laterally free-sliding bridle system and/or a severe yaw instability at negative angles of attack may contribute to an increased probability of a glider becoming inverted in turbulence or as a result of unusual pilot induced maneuvers. Delta Wing has agreed to design a modification to the Streak bridle system to make the bridles laterally discrete.

The HGMA is unable at this time to determine the specific cause or causes of these incidents. The directors of the HGMA would like to remind pilots of the following: 1— Gliders certified to HGMA Standards are tested in a particular configuration. It is important that pilots maintain their gliders in that configuration if the glider is to have the level of airworthiness for which it was designed and tested. Certain adjustments, particularly those of the reflex support bridles, are critical, and small deviations from the proper adjustments can lead to substantial loss of glider stability. Such a loss in stability

typically occurs in the angle of attack range outside the normal operating range, and while it thus cannot be felt by a pilot while flying the glider, it may contribute to a significantly increased probability that the glider will invert in turbulence or as a result of an improper maneuver. Pilots are advised to consult their owner's manual, or their manufacturer for the proper method of achieving the correct bridle adjustment.

2— Certain maneuvers, particularly severe stalls, and particularly while the glider is banked, will greatly increase the probability of an inversion.

3— Flying in severe turbulence, particularly flying on the downwind side of terrain in strong winds, in any hang glider, is an invitation to disaster.

Quintessential Parachute

Dear Editor:

This is a true account about a chute deployment. I wrote the account on the facts of (1) which side of the glider I was on; (2) damage caused to the sail; (3) what I saw, and (4) what the people on the ground saw. Combining these four sources produces the account from my vantage point.

April 10, 1984 was the day I had to throw my parachute. This deployment from what I gather from people's reactions, was amazing. For one, it happened on a 300 foot ridge in Cochrane Alberta, Canada. The unfortunate thing is, no one seems to have seen the whole incident from start to finish. So from what I gather, I am writing the way I *think* it happened.

It was not a bad day to try and catch a thermal. The conditions were unstable and the thermals were cycling almost straight up the hill. That day I had had two previous flights. The air was not all that turbulent.

My third flight of the day was something else. Jamie Vanleruwen had launched first. He had made a couple of passes, then started to climb. Then John Jousen launched. Both pilots were now climbing like crazy. I launched myself not even five minutes behind them, flying towards town (Cochrane). My vario was screaming 1200 feet plus per minute up. I figured the whole town was releasing a thermal.

I hit some sink, then the control bar was ripped out of my hands. The nose of the glider pitched upwards. It would not have made any difference how hard I held onto that bar. What I had hit was strong. It is kind of hard to explain the strength. I could feel my

harness pulling real tight against my body, moreso than usual. All I could see was blue sky. At that moment, I tried looking for the control bar, but all I could see were wires going to one point, kingpost and luff lines. I was laying on my back on the glider. I did not know at the time, but I think the glider was upright, flying position, and I was laying on top of the glider (kingpost side). I could feel myself leafing downwards.

Thinking about my chute for a split second, I reached for it and threw it into the sky.

Still lying on my back, I was looking up at the chute unravelling, wondering if it would open or not. It was two years ago less a month since I had had the chute repacked. The chute seemed to be waving in the sky trying to catch some air. From the time I threw the chute to the time it popped open, everything seemed to be moving in slow motion. Next came the pull of my chute rolling me off the sail. Now I could see the ground only 15 to 20 feet below. The same wind that helped deploy my chute was now blowing me into the hill at about fifteen miles an hour. All I could think of at this point was that I was going to break an arm or leg or all four. I balled up for the impact.

After a small bump into the hill, I was being dragged back up to the top of the hill by the chute.

It seemed a long time before someone came to my aid. But within a second and a half, Al Prevost met me thirty feet down the hill; he had hold of my chute line. Both of us were now getting pulled up the hill. Then two more guys helped to collapse the chute! I walked away without a scratch. Lucky me!

After a few moments on the ground trying to figure what had happened, Willie Muller said he had seen a dust devil passing along the ground after the incident. I had flown right into the dust devil not even 100 feet above the hill and only fifteen seconds into the flight.

I was lucky, between the lift and wind, it helped to slow down my fall and helped to deploy my chute within 100 feet of air. It is hard to believe, but it happened.

Now, one of the reasons why I would be on top of the glider was my fault. A few months ago, one of the grommets from the number one batten had pulled loose leaving a small tear in the sail between the first and second battens on my Comet 165. Well, when the nose of the glider pitched up my feet went through the trailing edge, ripping the sail all the way up to the crossbar. At that point the glider continued to loop over and came around to flying position with me now on top. From eye witnesses on the ground, they said I was lying on

my glider on what I believe was the top surface. One of my reasons is when the chute pulled tight, I was lying on top of the glider (kingpost side), and when I threw my chute, I could see all these lines going to one point, the kingpost.

After getting my glider fixed (a ripped sail, broken keel, five battens, and chute repacked), I went flying two days later. Then on Friday the 13th, I flew 22 miles, my longest cross country flight.

Now, I am going to write about the fools. You know, the ones that fly without a chute like Jamie who launched three or four minutes before me. It could have happened to him, without a chute. Yes, I also hear from guys with and without chutes, who feel that in ridge soaring conditions, you would never be able to deploy your chute before you hit the ground, or that it would never open in time. I do not believe that anymore, though I used to think that myself.

A chute is an essential piece of equipment. It should have been considered while buying your first glider. A chute is also a good investment, unlike the glider. A chute does not change in design. They will always be made the same, and you should not have any problem selling it when/if you quit flying. In other words, a chute is the only piece of equipment that you would never have to change, or risk losing your money.

Special thanks to all the boys on the hill at Cochrane that day.

Name Withheld by Request

Eleventh Annual Telluride Festival

The Telluride Air Force is proud to announce the eleventh annual Telluride Hang Gliding Festival '84.

The Telluride Festival, scheduled for the week of September 10 through 16, is an internationally acclaimed event attracting pilots from around the world. The non-competitive, air-show program features a wide variety of activities, many included for the spectators, who will also see up to 150 different pilots launching from 12,250 foot Gold Hill. Certainly the Festival ranks as an event pilots will want to mark on their calendar, and spectators should plan to witness.

The first 150 pilots will be admitted for \$50 (pre-registration) or \$70 (late). Transportation is available for a nominal fee, and volunteers are always needed. So, if you want to work off the fee, or just for more information on the Festival in positively gorgeous Telluride, Colorado, contact Jack Carey, President of the Telluride Air Force, at Box 456, Telluride, CO 81435. Include a self-addressed, stamped envelope.

Need Prizes for Your Regional Contests?

Whole Air is pleased to announce the new availability of magazine subscriptions for use in rewarding successful pilots at competitions or fun fly-in meets.

The use of such a prize carries other benefits than a trophy, piece of equipment, or cash. One size fits all pilots and he or she can enjoy it equally. It can even be passed around. The prize is awarded by certificate at your ceremony, but the fun and excitement arrive right in the house six times a year, which can help keep winners conscious of your next annual event. Whole Air's are safe and have no liability risk (it's hard to get hurt reading Whole Air.) The Tennessee Tree Toppers club has been making good use of Whole Air subscriptions as prizes for three years. Why not your club?

Send Whole Air your request and the dates for which you will need prize certificates. The magazine will authorize an appropriate number of subscriptions for prize use. Plus Whole Air will also help publicize your event if you give us enough lead time. (For the remainder of 1984, issue deadlines are AUG 84 — June 25; OCT 84 — August 20; and DEC 84 — October 29, 1984.)

Write to Whole Air Prizes Dept., Box 144, Lookout Mtn., TN 37350. Please, no phone call requests.

BRS Cartridge Advisory

Ballistic Recovery Systems wants to remind any BRS owners of a specific batch of old style, single electric cartridges that are under a RECALL notice. If your serial number is between #164 to #486, or has the metallic housing surrounding the wire (versus epoxy or plastic housing), or if your single cartridge has a black colored wire, you have one of the cartridges in question.

This recall does not affect any of the BRS-2 systems.

This recall only affects the single system.

INDUSTRY NEWS

Please contact BRS, Inc at 9242 Hudson Blvd., Lake Elmo, MN 55042, or phone 612/731-1311 if you have one of the cartridges in question. You will be supplied with a FREE exchange cartridge, or can update to the new Dual System for a fee.

Cascade Grand Prix

Cascade Aero Dynamics is pleased to announce The Cascade Grand Prix, Region 1 Qualifier for the U. S. Hang Gliding Championships. The meet will be held July 13-15, 1984 in Chelan, Washington (state).

Featuring three days of cross country racing from Cascade to declared goals in eastern Washington, winners will carry off trophies to the top three places, and can earn 300+ CPS points. Entry fees are set at \$25 prior to July 7, and \$50 after July 6, 1984.

Special attention should be paid to the Cascade Grand Prix for those Region 1 pilots who are on their way to the Nationals, or for World Class pilots enroute to the Grouse Mtn contest (see May 84 Whole Air).

For information and registration, contact Beth Little at 481-5828, Steve Alford at 823-5913, or Joe Bulger at 232-1822.

Kitty Hawk -- East Calendar

JUNE 16, 17 — Towing Clinic/Fly in.

JULY 21, 22 — Mountain Fly-in.

AUGUST 4, 5 — Towing Clinic/Fly-in.

SEPT 8, 9 — Hang III Rating Clinic.

OCT 20, 21 — Hang Rating Clinic.

NOV 3, 4 — Towing Clinic/Fly-in.

For further information on these or other Kitty Hawk Kites — East

calendar items, contact Hang Gliding Dept. Mgr., Steve Wendt, at 919/441-6247.

1984 U. S. Nationals Scheduled

Following a partial vote by the members of the Board of Directors, the U. S. Nationals are scheduled for September 1 through 9 at the Crestline-Pine Flats-Marshall Mountain complex. Sponsorship is by the Crestline Soaring Society, and will feature an out-and-return type task from an open window launch. Entry fees will be based on the distance pilots must travel.

The total number of pilots to be invited will be limited to 75: 50 World Class pilots and 25 Sporting Class. Pilots pre-qualified to compete in the World Class include:

Rick Rawlings
Chris Bulger
John Pendry
Lee Fischer*
Rich Pfeiffer
Stew Smith
Mark Bennett
Kevin Kernohan
Gene Blythe
Jeff Burnett
Jeff Huey
Mike Meier
Greg DeWolf
Steve Pearson

In Sporting Class two pilots are pre-qualified:

Lee Fischer*
Paul Robinson

* Sporting Class Champion may choose to defend his title or compete in the World Class.

RMHGA Colorado X-C Contest Off and Running

The Rocky Mtn Hang Gliding Ass'n sponsors the Colorado X-C contest, and is announcing that it is off and running again this year.

Last year's winners were: Ed Goss, flying an UP Comet — 89 miles, First Place, Class A (over 20 miles); and Chris Melle, 36 miles flying a Sensor 510, Class B (pilots who have not flown over 20 miles previously).

Goss cleaned up with \$93.75 prize money and a beautiful trophy courtesy of John West. Melle really made out with \$68.75 prize money, a new Fly-Lite harness from Wills Wing, and another beautiful trophy.

This year, these pilots either have to take First Place again, or the trophies go to the new winners.

STEVE SWEAT,
President, RMHGA

HGMA Elects Officers, Certifies 6 Packages

At the April 11, 1984 meeting of the HGMA, officers were elected for 1984. It was decided to combine the offices of Vice President and Secretary/Treasurer, Roy Haggard was elected to this office. Mike Meier was re-elected to the office of president.

Also at the meeting addendums were submitted and accepted for the Delta Wing Light Dream 161, for the UP Comet II 135, for the UP speed bar/woggle bar basetube, and for the UP Comet II 135, 165, and 185 with additional top surface "half battens."

Mitchell U-2 to be Shown On Short Tour Soon

From Modesto, CA, developer, Tim Morley has announced plans for a very brief tour of the preproduction Mitchell/Morley U-2 Superwing.

The tour of select sites will include Albuquerque, Texas, Chattanooga, and Colorado. As production is still in the planning stages, the mini-tour will not attempt a more comprehensive showing of the advanced aircraft's capabilities.

Morley relates interest is very high, and that calls due to the magazine articles (May 84 Whole Air) have been dramatic.

Beginning a New Excellence in Aerodynamics & Structure



IN A CLASS OF ITS OWN

FLY A PRO-DAWN



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

LEADING EDGE AIR FOILS

331 South 14th Street
Colorado Springs, Colorado 80904-4096
Phone (303) 632-4959



Boris Popov
Northern Sun, Inc.

612/731-1311

9242 Hudson Road
Lake Elmo, MN 55042

the success . . .



continues!

Must be 15/1 by comparison????

■ Exclusive, high density foam L.E. insert guarantees precise air foil definition.

■ Unique, midchord interfaced velcro system / an industry first.

■ Functionally advanced detached sail surfaces.

■ Spectrum and rainbow patterned dacrons, and the new Surfcode now in 5 colors, are available.

DELTA WING
P. O. Box 483
Van Nuys, CA 91408
(213) 787-6600

Photo John Heiny — Design Andrew Harper

What's up at UP?

"It's pretty obvious that hang gliders have reached a design performance barrier. There have not been any major changes since 1982," says Peter Brock, President of UP. "Every serious glider manufacturer in the world is currently producing some variation of our enclosed crossbar Comet. This emulation of the Comet has gone on for so long that newer pilots often forget that before Comet designer, Roy Haggard introduced the Comet at Owens Valley in 1981, that there was quite a variety of glider designs and different design directions," pointed out Brock.

It does not take much technical sophistication to know that the main problems facing the hang glider designers of today is the pilot. The pilot and structural hardware account for more than 70% of the drag on a modern glider! Even if it were possible to build a wing that would offer a 100% improvement over today's state-of-the-art gliders, the overall improvement in performance would probably be less than ten percent. When one realizes the performance limitations created by the laws of physics, the absurdity of some current advertising claims becomes very clear. Hang glider designers now are working on features that give almost imperceptible gains in performance. "There simply are not any more major design breakthroughs on weight shift controlled gliders," claims Brock. "It takes a lot of small changes combined to show up positively in the test runs. The only answer at this time seems to be attention to detail and reduction of the offending drag created by the pilot and airframe," continued Brock.

UP Comet 2's offer fairings on the kingpost and downtubes that swivel in the airflow to minimize drag when the glider yaws in flight. Testing at UP has proved that fixed fairing often create more drag than exposed round tubing! The real interest, however, has been Pete Brock's continuing

INDUSTRY NEWS



experimentation with pilot enclosures to minimize drag. Three years ago the UP team used mylar body "pods" in the Owens Valley, but the results were not as astounding as the initial performance tests indicated. The "pods" were cumbersome, awkward to launch, and difficult to transport. They were unreliable and fragile for continued use and sometime uncomfortable to fly inside. That did not mean, however, that the potential value was not worth pursuing.

Jim Lee, of Taos, New Mexico, was one of the UP team pilots who experimented with early mylar pods. Jim's experience fabricating sailplanes in the Albuquerque

convinced him that he could build a better pod. (See *Whole Air Buyer's Guide* — May/June 1983.) The result is his "Taos Concha." A super streamlined, rigid fiberglass body pod that has been attracting a lot of attention in the Southern California area since Lee, J. C. Brown, Ed Goss and Woody Woodruff tested them at the Owens in 1983. In the fall of 1983, Pete Brock added a canopy to Paul Robinson's "Taos Concha" and the results have been pretty impressive.

"About the only method a modern competition pilot can use to reduce his drag is to learn how to fly in a rigid shell," says Brock.

who continued, explaining. "Learning to fly with a shell is a lot easier than it looks, but pilots are generally a conservative lot by nature, and it takes a brave and persistent pilot like Paul Robinson to subject himself to days of test flying that are not necessarily pleasurable and only result in minuscule improvements in performance." However, the improvements have been coming and Robinson now has well over 50 hours flying the proto-shell with a full faired Comet 2. The target is Owens Valley 1984. Several pilots are scheduled to fly "Taos Conchas" in the Owens this year and we may see the biggest performance improvement to date. Many of the pilots are moving all their instrumentation inboard to minimize drag. "Those pilots who are interested in flying in this type of competition had best become familiar with the new equipment early on as it is not the type of thing that one can step into and learn in a few hours of flight," advises Brock.

Learning to fly with a shell is like learning to fly all over again. The advantages, once you overcome the initial apprehension, are considerable. Surprisingly, the total weight difference between a standard harness and pilot's gear for cross country flight, and the rigid shell is not too much. Most pilots in the Owens are used to flying with a complete extra set of clothing to keep them warm at high altitude. The fiberglass shell's insulating qualities allow the pilot to fly in much lighter clothing and, of course, stay cooler at the launch point before taking off. This is no inconsiderable advantage as pilots often wait two to three hours in the sweltering heat waiting for the conditions to optimize. All of the glider's instrumentation can be enclosed within the pod instead of hanging off the downtubes of the control bar, further eliminating drag. It is the attention to detail that is going to make the difference for gliders of the future. UP is working on them now and you will see more of it in the months to come. §

WINDGYPSY
PROFESSIONAL HANG GLIDING
INSTRUCTION, SALES, SERVICE
U.S.H.G.A. CERTIFIED

PAUL BURNS (714) 678-5418

KNOW YOUR LINE TENSION WITH

BP HI-TOW

PNEUMATIC TENSION CYLINDER & GAUGE TOW LINE

BUTCH PRITCHETT
BOX 299
FINLEY, TN 38030
901-285-9490

Join us in welcoming our newest Correspondent, Gib Eggen, as he presents an overview of European hang gliding. Following this introductory report, Eggen delivers a fascinating historical perspective on the amazing Horten flying wings, with a little help from some friends and Drachenflieger magazine

European Flight Line

AS AN AMERICAN PILOT now living in Europe, I can remember wondering, before I got here, what it would be like. I really had no idea. Rex Miller had told me, "Don't worry, they love Americans with an American kite." Having a USHGA "license" here does make it easier for you in some ways, and the pilots are interested in what it is like in the USA; but that was about all the foreknowledge I had. So, this series, "The European Flight Line," is designed to improve on that situation. I'll try, as time and my other responsibilities permit, to give the *Whole Air* reader a flavor of what flying in Europe is like, and to keep you abreast of new concepts and products as they develop here.

Let us start by relating a true situation to you about a small town in Bavaria (southern Germany) — although not true in all locales, it illustrates that hang gliding is more popular here with the populace in general than in the USA, and is growing rather than dissipating, as may be the case in America . . .

Stadtsteinach is a small town in Bavaria with about 8,000 people and a club (North Bavarian Hang Gliding Club) from the same area. Flying started there in 1974; and from the very start, the town itself spent a lot of money to support flying — e.g. they donated the landing field, built the launch ramp, and added another mountain with permission to saw down some trees for a launch. Last year (1983) the local pilots found a bigger mountain with better thermal potential, so the flying activity at Stadtsteinach decreased. The mayor and several members of the town council got "up in arms" over this, and demanded that the local club have at least one competition there, and that students must be trained there this year also! A local re-election campaign plank for the mayor now consists of getting the pilots back. Local pub owners complained because pilots were not frequenting their pubs!

Wouldn't it be nice if it were always like that? A nice pipe dream indeed. Well, let's talk about some more consistent realities . . .

Many sites in Europe, especially in Germany, Austria, and Switzerland, are more tightly controlled and regulated than in the States. All sites must be cleared with

the *Luftfahrtamt* (flying service, like the FAA), if pilots will be flying more than 150 meters (500 feet) above the site.

All insurance for people and companies in air sports and businesses comes through the "Airpool," which is a separate company set up by other firms to handle such matters. Every individual pilot must have liability insurance also — 1,000,000 Deutsche Marks (\$400,000) — against damage to persons or property.

One negative (among others?) result of so much regulation is inter-club bickering on sites. If you are not a member of the club sponsoring a particular site, you cannot fly there without their permission! This is where a USHGA "license" helps — it crosses boundaries. However, your insurance through USHGA is not good in Europe. Living here, I have bought liability insurance like all the other German pilots. Some very popular places such as Tegelberg (1983 World Championships site) must see your insurance before you fly. Insurance costs about \$40 per year.

Concerning regulation, each country in Europe has its own schools and licensing system. For example, the German system has license A, license B (intermediate to expert), and license C for cross country, which requires a separate test and course. They also have a towing license for use with a winch — you must be able to operate a winch to fly with one, with at least 30 winch operations and flights for the license.

Another point . . . all kites, harnesses, and parachutes must pass a quality test by the DHV, whereafter they are given the *Gutesiegel* (seal of quality). Products will not sell without this (your insurance is not good without it). If a product is qualified to fly in the U.S., it is qualified to fly in Germany. Reciprocity is not necessarily similar between other countries and Germany.

The DHV (Deutscher Hangegleiter Verband) is the German equivalent of the USHGA. The DeAC (Deutscher Aero Club) is a parent organization of groups of air sport enthusiasts — sky divers, sailplane pilots, hang gliders et cetera. The DHV is for hang gliders only, and also belongs as a group to the DeAC. As an individual, you



can belong to either. About half of the pilots I know think the DHV is okay, and the other half think it is just a rip-off organization, providing money to its bureaucrats for too much regulation. In the "early days," the DeAC got a bad reputation with the hang glider pilots because they considered us to be crazies jumping off the cliffs with a rag and aluminum tubing craft (sound familiar?); however, the DeAC is now seen as giving hang gliding the same respect as they do other air sports. Because of this, and the fact that the DeAC is more powerful with more money and more clout to get things done, more pilots are now shifting to the DeAC. The club distribution is now about 50/50 DeAC/DHV.

The number of pilots flying somewhat regularly in Germany is 7,000. Rougher estimates for other countries are as follows: Austria — 3,000; Switzerland — 3,000; France — 4,000; and Italy — 3,000. I have no good idea of the number in Spain and the Netherlands.

NOTE: For curiosity and perspective, 7,000 pilots represents about 1 pilot per 9,000 citizens of Germany's total population. In the United States, if we assume 12,500 pilots — a possible maximum these days — the relationship is about 1 pilot per 18,000 Americans, for a "density" of only half that of Germany. Of course, all such figures are suspect, as no firm count has ever been achievable in the USA.

With regard to pilot attitudes, I can only speak at this point with some reliability about the Germans and Austrians. Most of these pilots are weekend flyers with steady jobs, according to my local friend, Friedhelm Lotte, who

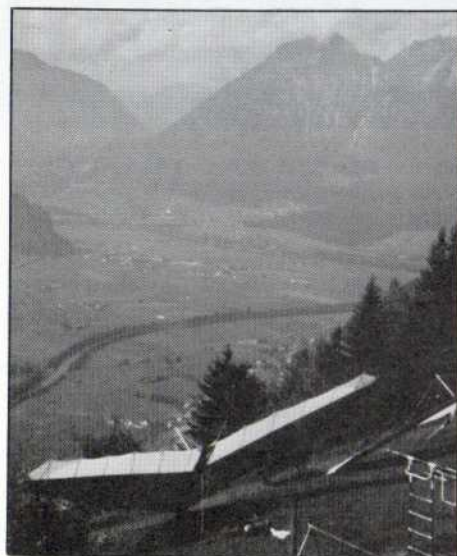
was flying daily in the USA and Mexico from 1979 to 1982. In Lotte's opinion, there is a much larger number of hang gliding "freaks" or "bums" in the USA who work for only enough money to enable them to continue their flying.

The interest in having the best possible glider is perhaps greater than in the USA. These best pilots are also placed on higher pedestals here, consistent with a more "chauvinistic" society in general, with the "macho" image or appearance of strength being very important.

Germans and Austrians tend to do things in groups, and flying is no exception. You will invariably find the pilots (and Frauleins) from a local site, sitting at their favorite *Gasthaus* (guesthouse, bar) after a day's flying, stocking up on the local beer and food. Practically every town from small (as in "Walkersdorf") to large, brews their own beer of 8 to 16% alcohol, so you can imagine how many different good beers there are in Germany. Once you have tasted a few of them, you will never drink American beer again. (I am planning on writing more articles for *Whole Air* in the future — if you do not see any, either I have been dropped after the first one, or I received an unscheduled visitor with "greetings" from *Budweiser*.)

What about the attitude of the local populace toward the pilots? I have already mentioned that flying here is more popular with the general public, who respect the pilots but feel sorry for their families! It is special because not everyone dares to do it; many commercials, especially billboard posters, include hang gliders with their products, particularly cigarette and sometimes car companies. You could postulate, as Rike Markmann has stated, that the public here feels hang glider pilots like their sport more than their lives.

Now a word about ultralights and foot-launchable power sources. There is about a 40/60 split (like/do not like) for ultralights among pilots in Germany. There is more interest in towing with ultralights, but it is not allowed here yet, although



Gerard Thevenot is towing two kites up at once with a trike in France (see March 1984 *Whole Air*).

The local town-folk are possibly more hostile toward ultralights because of the noise. For instance, Manfred Strossenreuter, European biplane aerobatic champion, got permission from the *Luftfahrtamt* to place 3 ultralights on his own school's flying strip. Within one week after he got them, the surrounding villages had three articles in the newspapers complaining about the "flying lawn mowers" damaging their health and interrupting their recuperation over the weekend for the next week's work.

Every ultralight must launch and land from an airport. If you land out, you have to be picked up; you cannot take off from that spot.

Some very promising foot-launchable power sources are developing here. I flew one last week, a 19 horsepower single cylinder engine that attached to the kite and your harness in about ten minutes. It had a climb rate of 2 m/sec (400 fpm), and increased the sink rate of the kite by 50%, weighing 22 kg (49 lbs). It will fly for 2-4 hours on 10 liters (2½ gallons) of gas/oil mix. This machine can therefore be flown power off, in thermals. Its developer, Wilfried Bleidiesel, has a European patent on it. I had never flown any power before and was pleasantly surprised by this unit. My next article will include a full report on this system as well as a new one I am hearing about that is smaller, weighs about half as much, and has a climb rate of about 1 m/sec (200 fpm).

There is also strong interest here in Europe in developing a new generation of (non-powered) foot-launchable gliders. The most popular current concept seems to be that of the Horten wings that Reimar Horten began designing and successfully building in 1933. Mentions have been made of an expensive book on the Horten wings. You can purchase it in bookstores in Europe, so I have got one already, of course. You can obtain it in the USA through Jan Scott, Scott Airpark, Lovettsville, VA 22080. It is titled: "Nurflugel — die Geschichte der Horten-Flugzeuge 1933-1960" by Horten/Selinger. Some of the chapters are also written in English, less than forty percent. Because much of it is in German, I had a

local pilot, Hans Bausenwein, translate an article from the German magazine, *Drachenflieger* which extracted parts of the book most applicable to hang gliding development today.

A local friend states he wrote Reimar Horten, currently in Argentina, for help in building a "Piernifero 3" (for plans, etc.) with a 15 meter span and a 30:1 glider ratio. Reimar apparently cannot get him the plans because the government of Argentina has them, but will not return them to him. He was very interested, however, and supportive.

The translation follows on successive pages, with a few corrections of my own — enjoy . . .

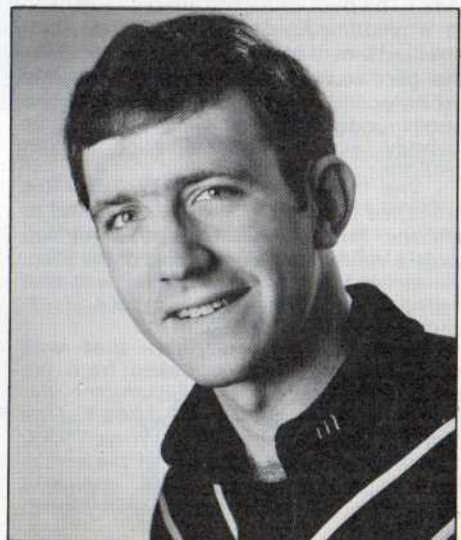
ABOUT THE AUTHOR:

Gib Eggen is a 30 year old, single, active duty Army psychiatrist, Chief of Outpatient Psychiatry and the Mental Hygiene Consultation Service at the U.S. Army Hospital in Nurnberg, West Germany, where he has been for 18 months. Mr. Eggen's main hobbies are flying and skiing, and he reports being able to manage to do one or the other all year round in Europe.

Gib started flying hang gliders in the fall of 1974 in Albuquerque, New Mexico. By the spring of '75, he was flying a *Sun Standard* off of Sandia Crest — about which he says, "Thank God I didn't go 'over the falls' in a thermal." He has been flying steadily ever since, and has flown at many sites in most areas of the country, although medical school and residency programs put a big bite in air time.

1981 was essentially the only year that Eggen spent much time in hang gliding competition, competing in the U.S. Nationals (from Region II, California), and the Owens Valley X-C Open.

Eggen reveals his primary interests are in cross country distance flying and aerobatics. Alpine sites are three hours from his door; but it looks like he will be doing a lot of towing in Germany, seeking cloudstreets, and hopefully thus, fly instead to the Alps! §



The Flying Wings of Reimar Horten

THE INCREASE OF PERFORMANCE in hang glider design has reached a certain limit. Now the designers have to deliberate by which means the state-of-the-art hang glider concept could be still improved. Some of them are now trying to hide the pilot inside the wing and to replace all rigging and struts through a fully cantilevered spar.

If one would try to position the pilot inside the wing, weight shift control would have to be — at least partially — replaced by aerodynamic control via control surfaces. The foot-launchable American rigid wing, the Mitchell Wing, is such a study (see May '84 *Whole Air*) — but with the pilot positioned outside the wing. Its L/D is [reportedly] about 14.

But the idea of such a foot-launchable flying wing is not new. In the early fifties, Reimar Horten, one of the German fathers of the flying wing idea, designed a foot-launchable flying wing, that he called "HX" in Argentina. The "little wing" ("Alita"), how he lovingly called it, reached a span of only 7.5 meters (24.6 feet) with 38 kg (83.7 pounds) "portable" weight, and a measured L/D of 18. This is about twice as much as our "state-of-the-art" hang gliders, and approximately equals the performance of older trainer sailplanes.

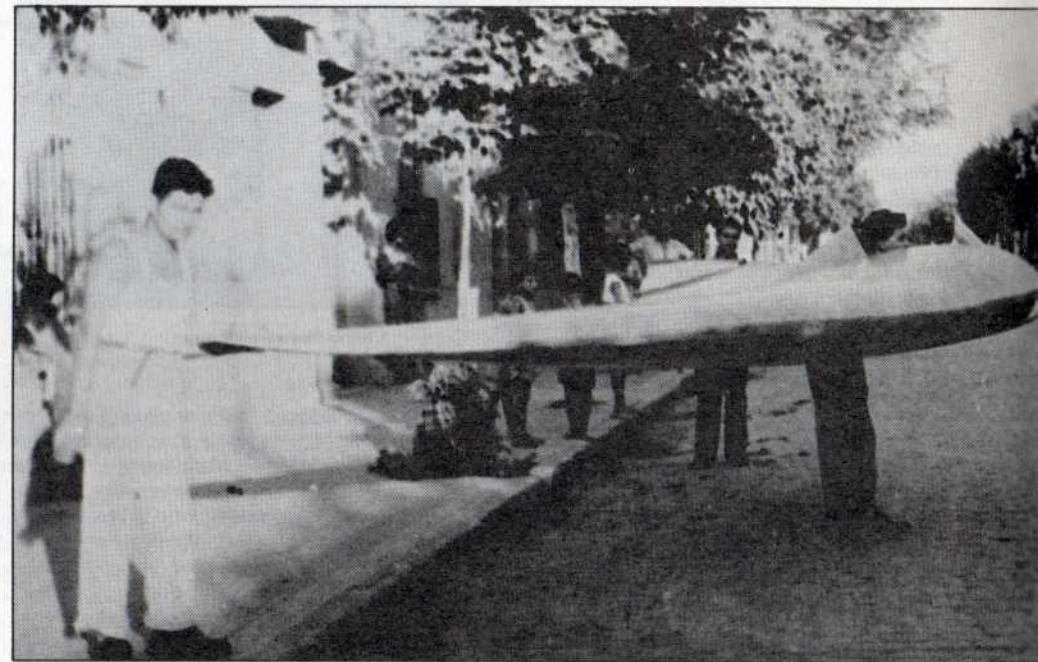
The "HX" shows the incredible performance which could be achieved by a small foot-launchable flying wing, if one avoids the useless drag of a pilot and all the rigging, and when the section and washout are optimized.

The "little wing" shows us a possible way into the future of our sport of hang gliding, provided somebody succeeds in designing a breakdown system for this rigid wing, similar to that of our hang gliders.

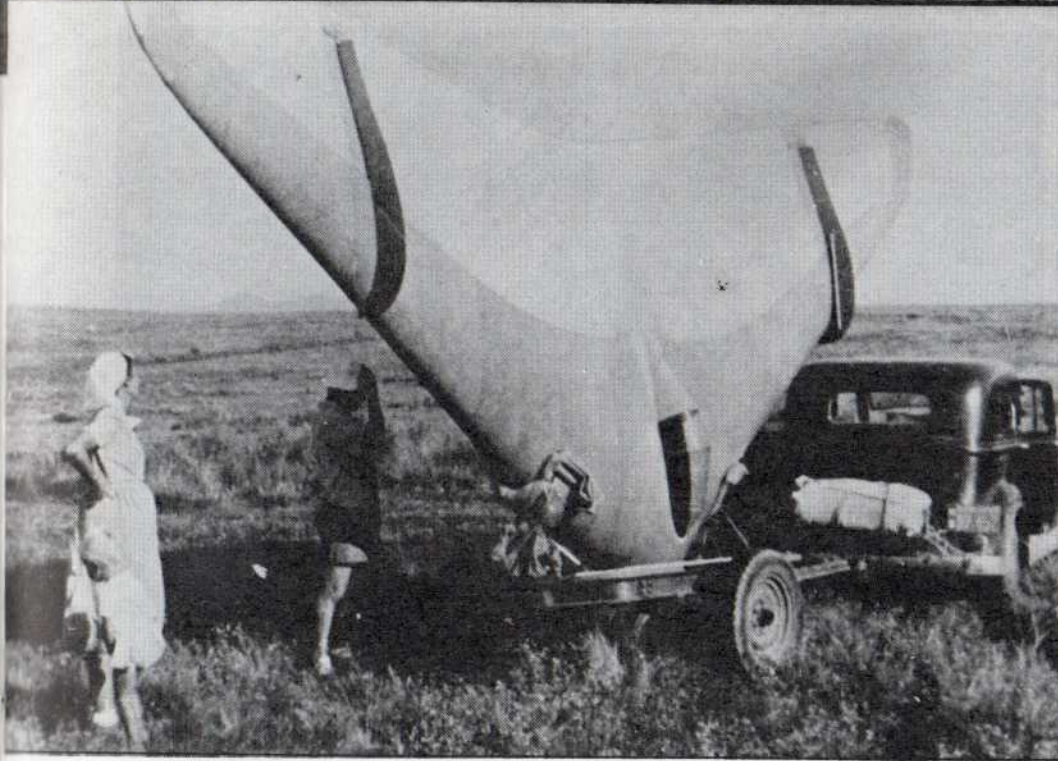
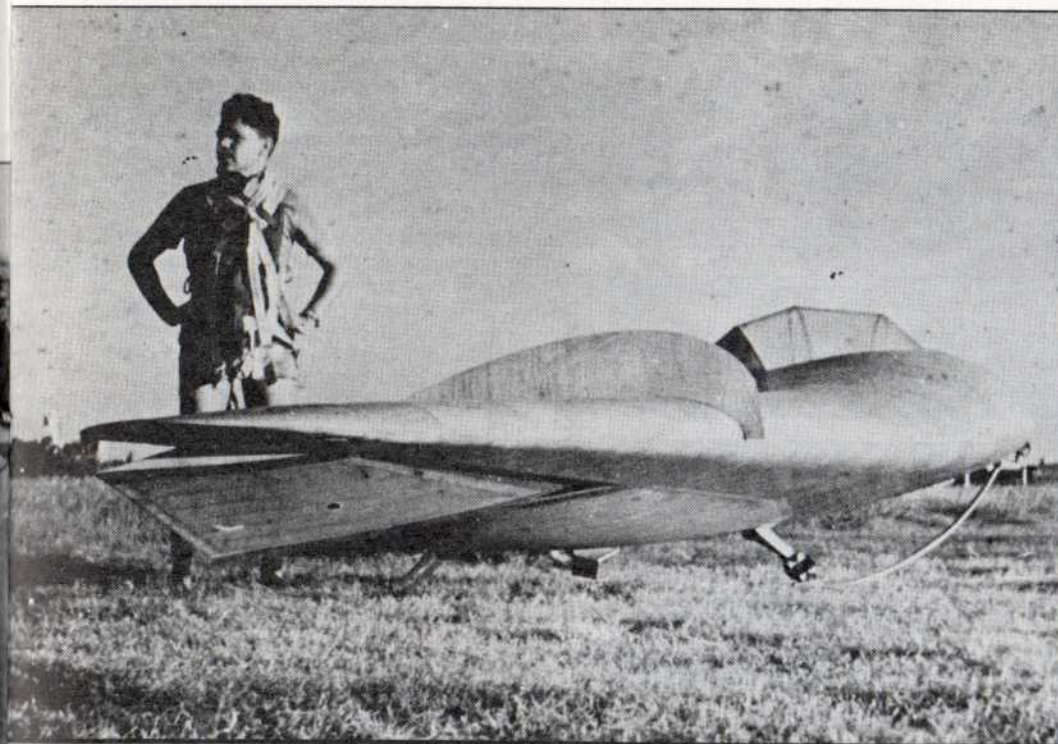
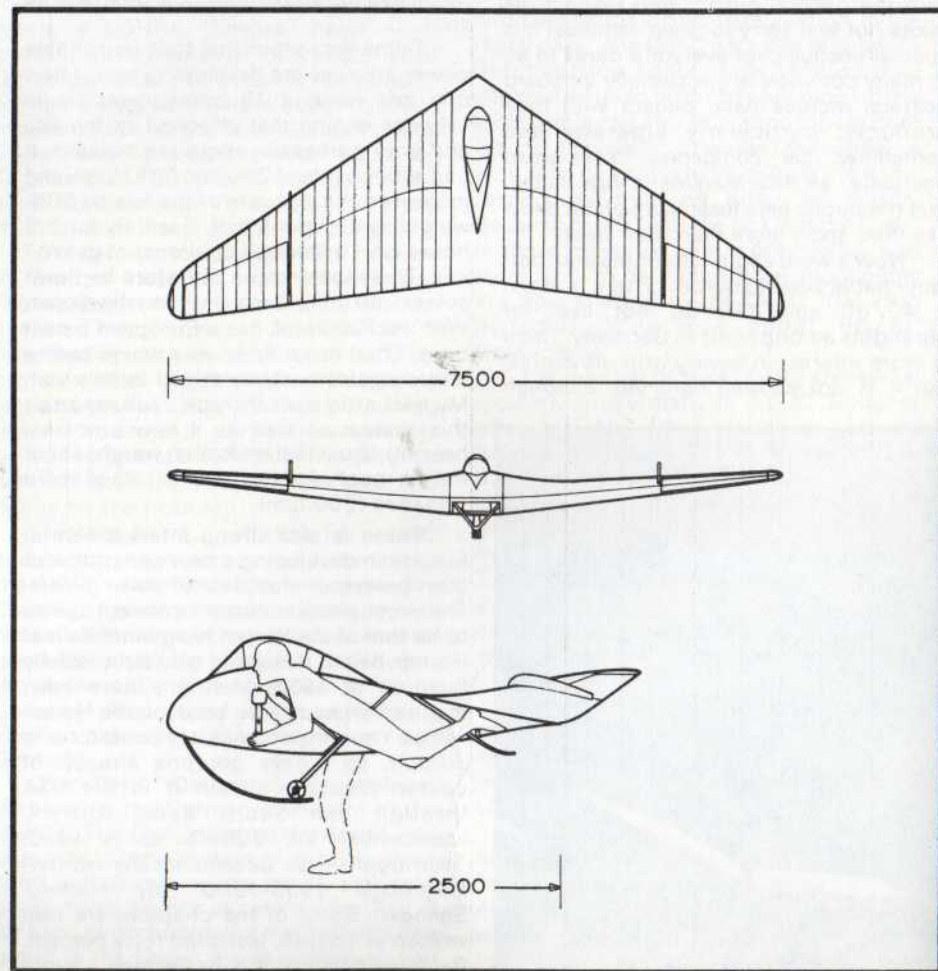
The fully cantilevered delta wing "HX" with its filigrane plywood ribs was designed for 400 kp positive/negative maximum load (elsewhere: 10 G-load max.) The pilot was in prone position fixed to a pivoting rigid support harness, that enabled him to foot launch the glider. After the pilot launched the wing, he got into prone position and stuck his feet into two hooks underneath the wing; at the time nobody was wearing a knee hanger harness.

The "little wing" was also tow launched behind a car and aero towed to altitude. The "HX" was controlled by two large elevons on the outer part of the wing. It was landed on a skid. "Alita" was also called "Piernifero," which means "foot-launchable glider" in Spanish.

The following report, that was shortened slightly, was taken from the book "Nurflugel — die Geschichte der Horten Flugzeuge 1933-1960" (*The History of the Horten Flying Wings 1933-1960*) with the permission of the editor: Horten/Selinger 1982. The important chapters of the book are written in English and German.



(Above) The "Alita," designed by Horten in 1949, was finally finished on June 30, 1952. (Below) Sketches, with centimeter figures, show the popular three-view illustrations of Horten's Piernifero I, or "Alita."



(Above) The Horten HXa with test pilot, Bertolini, on January 9, 1954 in Cordoba, Argentina. (Below) Transporting the Alita to its maiden flight on February 7, 1953. (Illustrations below) Evolution of the flying wing and its natural model.

Rogelio Bertolini, the test pilot of the "HX," wrote an article in *Vuelo Silencioso*, the Argentinian soaring magazine that was printed in March of 1954. [Text follows]

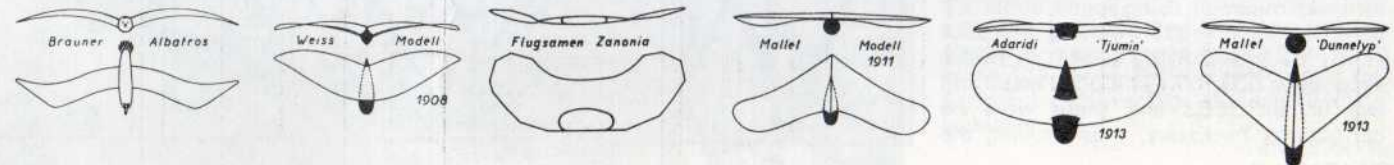
"Everything takes its time and on January 5, 1954 we continued with our test flights. On this day I made flights of five, ten, twenty, and thirty meters altitude [16, 32, 65, and 100 feet]. In the last flight I made some flight path corrections. It was the first time that I tried to use the control surfaces to fly turns. I did not encounter any problems. I was flying in prone position, which was very comfortable. The view was perfect.

"On the next test flying day I made a straight glide, just to see if everything was okay. It was a marvelous flight. The elevons worked gently and sufficiently. Before I made my final approach, I pushed the stick slightly forward and was accelerating to 100 km/h (62 mph) in almost no time. The turns were initiated normally. When I was changing from a left turn to a right turn or vice versa, the wing was first skidding a little bit, but following the impulse without delay. Control is obtained only by elevons, which are a combination of elevator and ailerons. There are no spoilers or rudder. Moving the stick to the left results in an upward movement of the elevon on the same side of the wing.

"The following flights have been made with aero tow: I 'dressed' myself with the 'little wing' and signaled to be ready for launch. The towing line tightened and the wing was sliding on its skid. I was accelerating and the controls worked very soon. I was airborne. A little later the towplane, a 'Fleet,' was airborne too.

"... I could not resist doing a loop... but on top of the loop, the 'little wing' moved too fast around its pitch axis..."

"From this moment on until I released the towline, there is not much to say. This aero tow, as all others that were made later, was completely normal, compared to the ones in a 'Grunau Baby.' The main difference was the prone position in which I was flying the 'Alita,' also the climb rate was considerably higher than in a 'Grunau Baby.' The controls worked very well and I could choose my position behind the towplane where ever I wanted. A little movement of the stick was sufficient to change my position from left to right or up or down. (There is no rudder on the 'Alita.') The airspeed during the tow was between 80 km/h and 90 km/h [50 to 56 mph]. The prone position was quite comfortable, despite the fact that the chin support was



HORTEN WINGS (HXa, HXb, HXc) SPECIFICATIONS

| TYPE | HXa "ALITA" Metric | | HXb Metric | | HXc Metric | |
|----------------------------|------------------------|--------------------------|------------------------|--------------------------|---------------------------------|-------------------------|
| | English | | English | | English | |
| Efficiency | hang glider | | hang glider | | hang glider high performance | |
| Material, Wing Center | wood | | wood | | wood | |
| Pilot | 1 (foot launchable) | | 1 (foot launchable) | | 1 (foot launchable) | |
| Span | 7.5 m | 24.6 ft | 10 m | 32.8 ft | 15 m | 49.2 ft |
| Nose Angle | 113° | | 127° | | 132° | |
| Root Thickness, Percentage | 20 | | 20 | | 18 | |
| Depth of Root | 2.5 m | 8.2 ft | 3.0 m | 9.8 ft | 1.6 m | 5.2 ft |
| Distance Between Ribs | 0.2 m | 8 in | 0.2 m | 8 in | 0.3 m | 12 in |
| Area | 11.2 m ² | 121 ft ² | 17.5 m ² | 188 ft ² | 15.0 m ² | 161 ft ² |
| Aspect Ratio | 5.0 | | 5.7 | | 15.0 (!) | |
| Pilot Position | prone | | prone | | standing up/prone | |
| Width of Cockpit | 0.8 m | 2.6 ft | 0.8 m | 2.6 ft | 0.6 m | 2 ft |
| Height of Cockpit | 0.5 m | 1.6 ft | 0.5 m | 1.6 ft | --- | --- |
| Empty Weight | 38 kg | 84 lbs | 38 kg | 84 lbs | 42 kg | 93 lbs |
| Pilot Weight | 80 kg | 176 lbs | 80 kg | 176 lbs | 90 kg | 198 lbs |
| Maximum Gross Weight | 112 kg | 247 lbs | 112 kg | 247 lbs | 132 kg | 291 lbs |
| Wing Loading | 10 kg/m ² | 2.05 lbs/ft ² | 6.4 kg/m ² | 1.31 lbs/ft ² | 8.8 kg/m ² | 1.8 lbs/ft ² |
| Stall Speed | 42 km/h | 26 mph | 35 km/h | 22 mph | 39 km/h | 24 mph |
| Minimum Sink Rate | 0.8 m/sec | 157 fpm | 0.7 m/sec | 137 fpm | 0.4 m/sec | 79 fpm |
| (Min. Sink) at | 50 km/h | 31 mph | 45 km/h | 28 mph | 42 km/h | 26 mph |
| Maximum Glide Angle | 18 | | 20 | | 30 | |
| (Max. Glide) at | 78 km/h | 48 mph | 60 km/h | 37 mph | 50 km/h | 31 mph |
| Maximum Speed | 170 km/h | 106 mph | 150 km/h | 93 mph | 150 km/h | 93 mph |

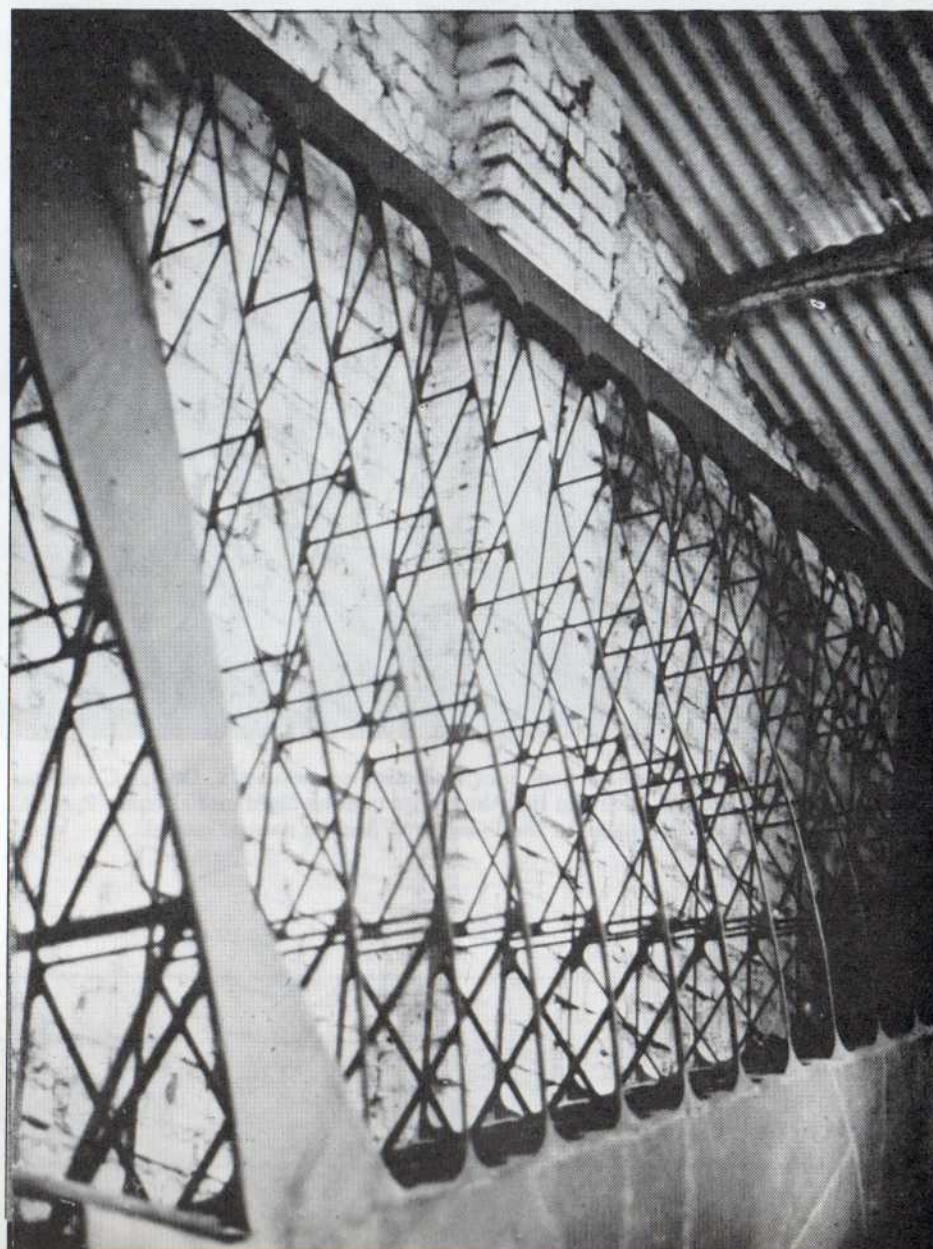
(Left) Specification table for the Horten foot-launchable wings I, II, and III — also called the Piernifero series. Figures are provided in both metric and english measurements. Performance is calculated. (Below) A wing's inner framework hangs on a hangar wall, and illustrates the detailed structure of the very light Horten designs.

too soft and I could not see the towplane without lifting my head. I released at 800 meters AGL [2625 feet], after I signaled to the towplane pilot that I was ready to release.

"I was first flying straight with speeds between 50 and 100 km/h [31 to 62 mph]. The glider reacted to the elevons without delay, control forces were low. There was no tendency of the aircraft to spin or skid. Then I was flying turns with various bank angles. This was very easy; I had only to turn to and 'Alita' was initiating a coordinated turn without any delay. The coupling of roll and yaw movements worked very nicely and there was no need to change anything until today.

"In rapid turn direction changes 'Alita' delays for a very short moment, and then starts to turn to the opposite side.

"In our second aero tow, I increased the angle of bank in the turns. I did not notice any problems. The chin support was a little higher now and I could see the towplane without lifting my head. The view to the ground through the bottom window was unobstructed. I released again at 800 meters AGL; then I pushed the 'little wing' to 120 km/h [75 mph]. I did not notice any vibrations — not in the wing nor in the controls. I tried to fly as slow as possible and moved the stick all the way back, with the ASI [Airspeed Indicator] showing 50 km/h [31 mph]. It should be possible to fly even slower, since I did not feel any signs of stall. The upward position of the elevons should be even higher. Then I was trying to turn with minimum flying speed, about 30° bank, elevons neutral, pulling the stick slowly back and flying a 360 in twelve seconds at 60 km/h [37 mph]. I was flying five or six 360's and there were no corrections necessary, thus proving the



good turn coordination of 'Alita.' Because everything worked out so nicely, I could not resist doing a loop (yeah . . . do it man!). I pushed the 'little wing' to 110 km/h [68 mph] and then pulled the stick slowly back, too slow, the loop got a little too tight on top, but I still had enough airspeed to continue all the way through.

"But on top of the loop the 'little wing' moved too fast around its pitch axis. When the nose was pointing down vertical again, I stopped the pitch movement of the wing again and put it into a vertical dive. When the ASI was reading 120 km/h, I pulled the stick back again. This time the wing continued through the loop a little faster, but the loop was still a little too tight on top. I was trying to fly as soft as possible to avoid unnecessary g-loads. Then I was burning down the rest of the altitude while practicing turns. On the final approach I was oscillating the wing from one side to the other instead of skidding or using airbrakes, as on a conventional sailplane. This way it was quite easy to lose altitude. I was not banking it more than thirty degrees.

"Then I made several comparison flights with Rodriguez, piloting a 'Grunau Baby.' We were towed in a tandem tow by the same plane to an altitude of 1,000 meters AGL [3280 feet], and started our comparison with 50 km/h and continued



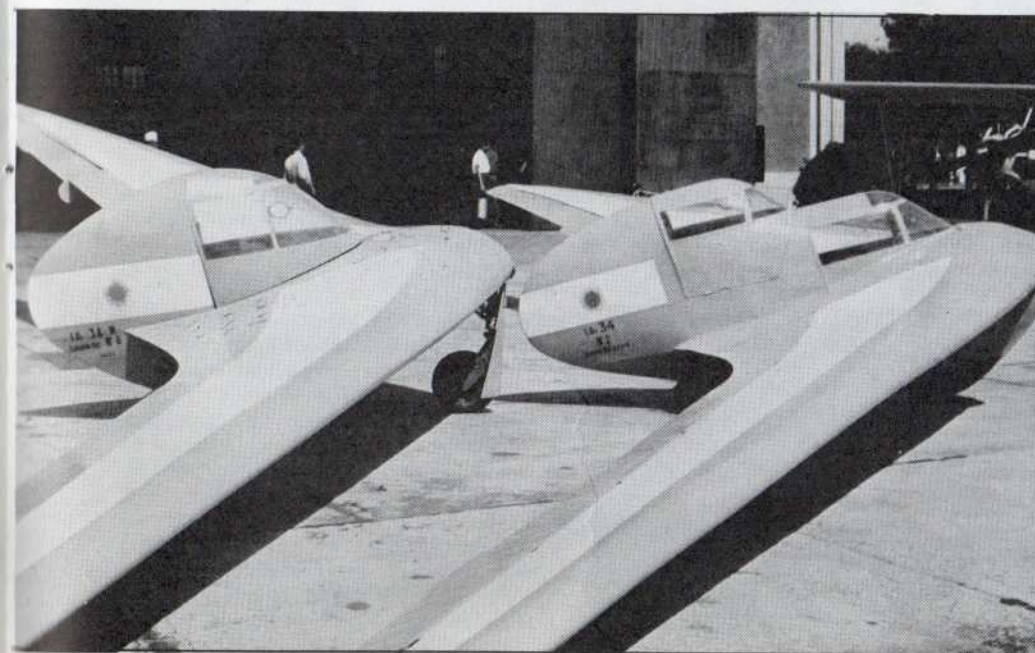
(Above) The Horten brothers in Argentina try on the double seater. (Bottom) The HXV sailplane from 1951: the single seater with collapsible wheels is on the left, featuring 30:1 performance at 83 km/h [52 mph], V min of 58 km/h [36 mph], and V max of 250 km/h [155 mph]; on the right is the double seater.

Horten "HXa" Alita SPECIFICATIONS

| | |
|--------------------------|--|
| Span | 7.5 m (24.6 ft) |
| Root Chord | 2.5 m (8.2 ft) |
| Tip Chord | 0.5 m (1.6 ft) |
| Area | 11.2 m ² (121 ft ²) |
| Aspect Ratio | 5 |
| Weight | 37 kg (81.6 lbs) |
| Weight with Pilot | 112 kg (247 lbs) |
| Wing Loading | 10 kg/m ² (2.05 lbs/ft ²) |
| Maximum Break Load | 10 G |

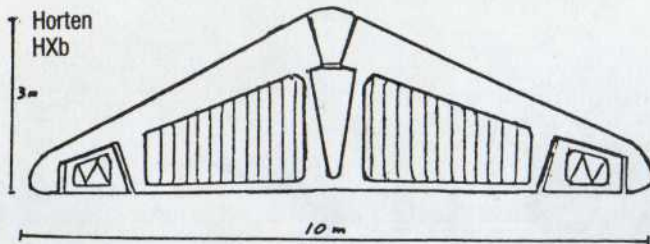
Calculated Performance
(partially verified by flight tests)

| | |
|--------------------------------------|--------------------|
| Best Glide at 72 km/h (45 mph) | 18 |
| Min. Sink @ 56 km/h (35 mph) | 0.8 m (157 fpm) |
| Min. Sink @ 72 km/h | 1.11 m (219 fpm) |
| Min. Sink @ 100 km/h (62 mph) | 1.9 m (374 fpm) |
| Min. Sink @ 150 km/h | 5.25 m (1033 fpm) |
| Maximum Speed | 170 km/h (106 mph) |
| Landing Speed | 36 km/h (22 mph) |



to 140 km/h [87 mph], raising our airspeed in steps of 10 km/h. Even at 140 km/h the 'Alita' flew with no signs of flutter, completely noiseless. The performance of 'Alita' was equal to or a little higher than the performance of the 'Grunau Baby.' We found out that at speeds below 80 km/h, the sinkrate of the 'Baby' was a little lower than Alita's sinkrate. Between 80 km/h and 100 km/h, performance was equal. Beyond 100 km/h the 'little wing' had a slight performance advantage. Without any doubt the polar of the 'HX' is flatter than the one of the 'Grunau Baby.'

"This result was interesting for the following reasons: In the bottom of the wing root there is an opening of about 60 cm by 110 cm [24" x 43"], through which the pilots 'enter' the wing. With the elimination of this turbulence creator, the performance of the 'little wing' will increase even further. The two gliders should have equal performance then at 70 km/h [43 mph], beyond that speed the performance advantage of the 'HX' will be increased.



"On December 17, 1954, I made a thermal flight of more than one hour with the 'Alita.' I released at 500 meters AGL [1640 feet] and climbed up to 1200 meters AGL [3937 feet].

There is nothing to add to this lively report. This Horten X of the fifties had a second name: "Piernifero," which in Spanish means "foot-launchable glider." The great success with only 7.5 meters of span in a flying wing encouraged Reimar Horten, the designer, to work on further developments. "Piernifero 2" was designed with a span of 10 meters [32.8 feet] and to break down in two halfwings. Heinz Scheidhauer began to build it but the incorrect filigrane structure of the wing is today (1982) still hanging on the wall of the hangar of the glider port in Cordoba.

"Piernifero 3" with a 15 meter span [49 feet] and even higher aspect ratio, was designed to reach an L/D of 30. Thirty years have passed since the report of Bartolini. The idea of a foot-launchable glider has been realized for production in the form of our modern hang gliders.

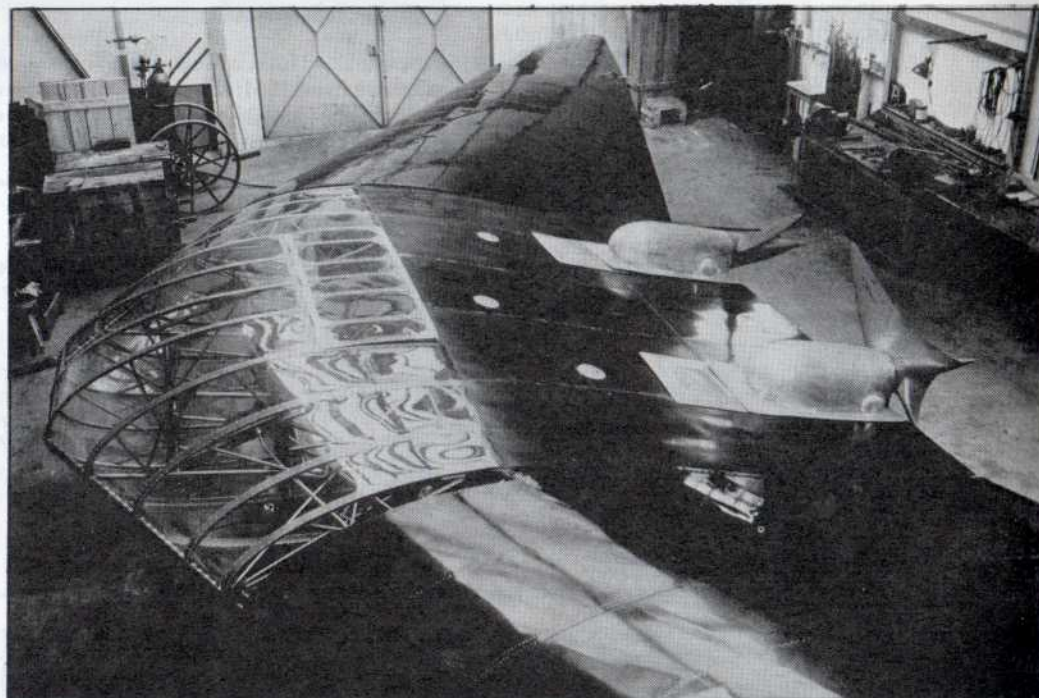
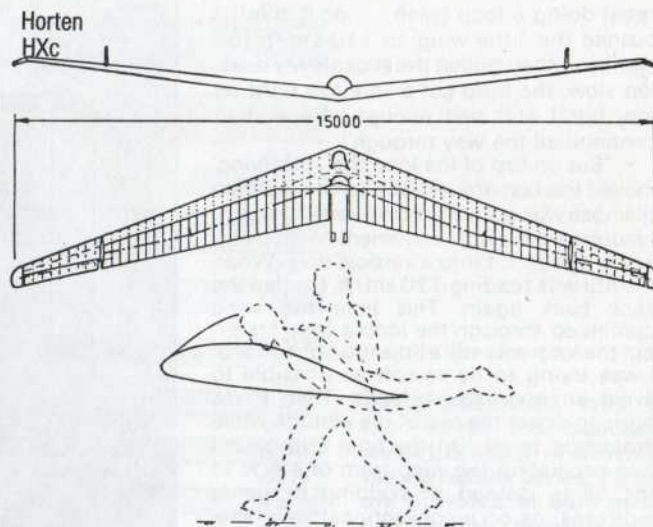
For Argentina of the fifties as an agricultural country, the construction of this glider was a remarkable success, but nobody could expect the continuation of these experiments.

It is a pity that the next step, "Piernifero 2," a wing with a span of 10 meters and breakdown construction for easier transportation, was not finished. With only a $7\text{kg}/\text{m}^2$ [1.4 lbs/ft²] wing loading, take off and landing speeds are so slow that no skid is necessary anymore. Minimum sink would be a lot lower and the capability to soar would have been by far better than with the "Piernifero 1."

It would even be possible to make the next step in a way that the pilot in the "Piernifero 3" is supported in a harness that swivels around the center of gravity, such making it possible for the pilot to be in an upright position during take off and landing. Minimum sink would be somewhere close to 30 cm/sec [59 ft/min]! With the high aspect ratio wing, a glide ratio of 30:1 would be possible. A completely new type of high performance glider would be established for cross country flying.

The risk of flying would be considerably lower than in modern sailplanes, because the parachute could be deployed at any moment without the need for the pilot to leave the wing. He would land together with the wing, hanging from the parachute. The production cost of such a "high performance" hang glider would be a lot higher than the production of an ordinary hang glider, even if modern techniques and materials would lower the costs of a serial-production considerably.

(Above drawings) The Piernifero II and III in 10 and 15 meter spans. (Below) The HVa, a world premier: the two-engine flying wing was the first full plastic airplane.



Reprinted with Permission from *DRACHENFLIEGER Magazine* Translation from German by Hans Bausenwein Edited and Submitted by German Correspondent, Gib Eggen Original Reimar Photographs Obtained Compliments of the Aviation Archives in Stuttgart, Germany for Special, Limited Use in *Whole Air* Granted and Arranged by Archive Director, Mr. Peter F. Sellinger. *Whole Air* is most grateful for this generous opportunity to use such rare and original photographs.



(Note from Correspondent Eggen)

In closing the *Drachenflieger* magazine article on the Horten projects, I would like to thank Hans Bausenwein and Rike Markmann for translations and typing, and Friedhelm Lotte for other help with information contained in the article. Wilhelm Markmann drew the European Flight Line title for me in Old German letters, dating from the 1400's in Schwabach, Germany. I would also like to thank *Drachenflieger* magazine for permission to use some of their material.

AUF WIEDERSEHEN!

§

GARY!

It's been a long time coming — the FIRST over 100 mile flight east of the Mississippi. And to a lot of folks, it couldn't have been done by a nicer or more deserving pilot/Account by Tennessee Tree Topper President, Gary Engelhardt/photo by Chris Voith



THE DAY BEGAN clear and bright with a 15-20 MPH wind from the west as most of the good days this spring have provided. Something was different today though — there was a certain energy present, something unexplained and vibrant. Cumulus development started quite early, about 9:30 AM, and for while we pondered if it would overdevelop by noon. By 11:00 AM we were heading up to launch.

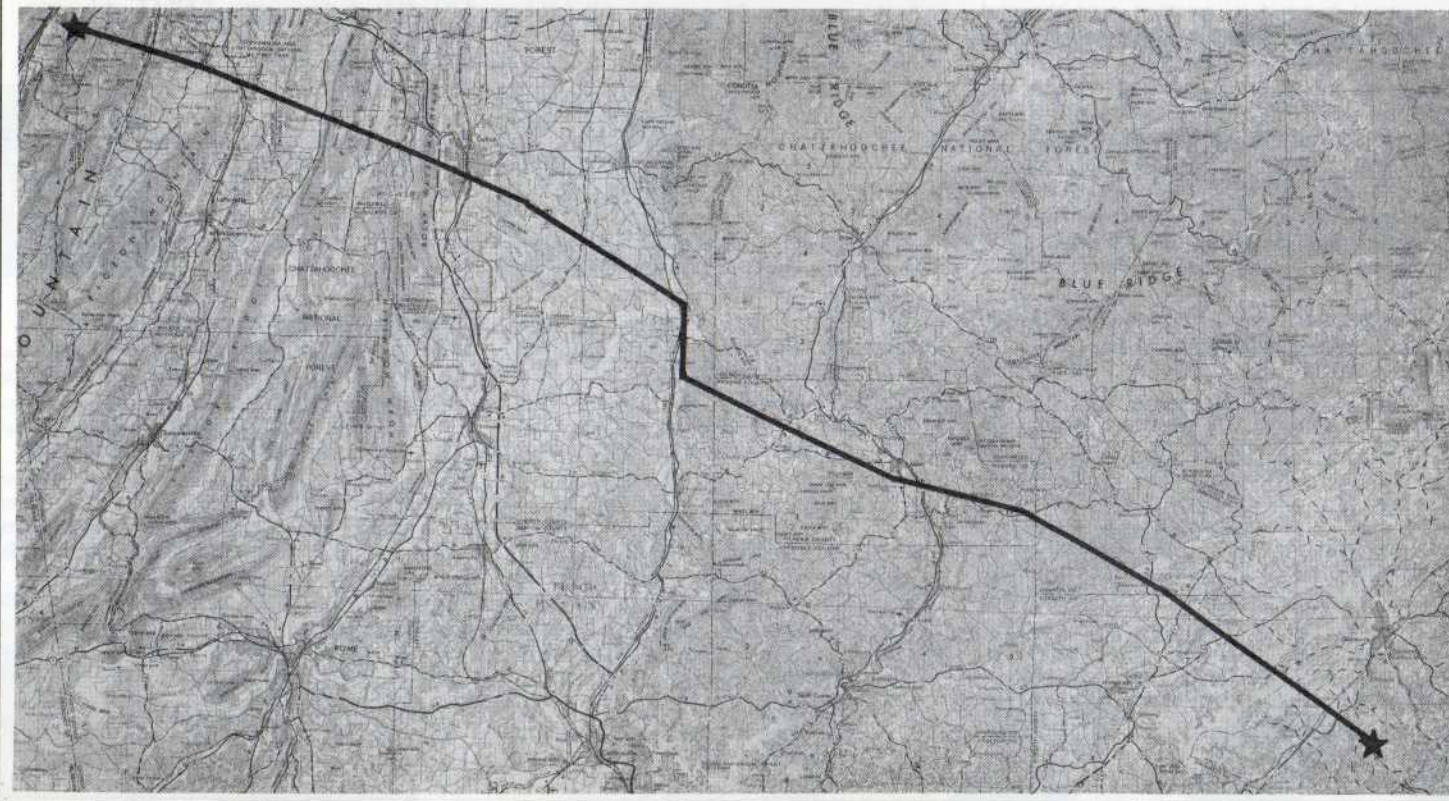
Arriving about 11:30, I found Chris Starbuck ready to go and harping at me about "being late," and "look at those clouds," and "you're gonna miss it!"

I set up quickly, gave Chris a keel

launch, and got into the air. I told Chris I would be heading west, on the Lookout Mountain ridge, to gain altitude before crossing over the back, so as to avoid crossing near Lovell Field [Chattanooga metro airport] controlled airspace. Immediately after launch I hit a thermal that got me to two thousand over launch (or 4,000 MSL), then another to four thousand above (6,000 MSL) and two miles behind the ridge. I radioed to launch that I was gone as I reached 4,200 over and just below cloudbase. Rich Hill was in the same lift as I but had tried to penetrate back to the ridge after gaining 2,000 feet. He had to high tail it over the back low, making

the four mile glide with a few hundred feet to spare. I felt quite comfortable with about 5,500 feet AGL and felt relieved for Rich as he crossed the backside and began thermalling again. I headed downwind toward Taylor's Ridge.

The glide to Taylor's Ridge is about twenty miles from launch and another thermal was due about half way there. At 2,000 AGL, it was starting to look bleak being in 500 down air and seeing Rich Hill climbing out several miles upwind from me. The at 1,000 AGL, as if on cue, I ran into some 500 to 700 FPM lift that took me back to 4,500 over launch (6,500 MSL). Passing Taylor's Ridge in that thermal I



took a slight Southeast track toward Rocky Face Mountain and the city of Dalton Georgia. I reached Rock Face about 1,000 over the top and cruised the ridge waiting for a big thermal to get me across the city. After five minutes of fighting to stay in front of the ridge (I figured that the wind had picked up), a monster blast came through and carried me to 4,000 over and into cloud hopping territory. In the mean time, Tom Phillips having launched ten minutes behind me, was making up time and distance in his 180 Attack Duck. He radioed that he was about five miles from Rocky Face. My next glide was again to the southeast, with the main intention of reaching the south end of the Blue Ridge Mountains where their size and intimidation factor diminishes.

Passing comfortably over Dalton airport at about 4,300 MSL, I found myself entering a blue hole in the cloud pattern. I tracked southeast again figuring I might intercept more westerly drifting thermals that I was ready to use again. After wallowing around in the fringes of a weak thermal, I finally centered into the best thermal and gain of my flight. With 700 FPM up I went to 5,200 over (7,200 MSL) and approached the rising cloudbase. At this time I radioed to Tom that it looked like I could get across the edge of the Blue Ridge. He said, "Go for it," but my second look did not show many fields that were favorable. I opted to head almost due south to remain on the windward side of the smaller foothills. What a mistake! I lost all of that 5,200 foot gain, and then some, for about three miles of distance across Carter's Dam and spillway. Things were not looking good, but I did make it over an acceptable field with about 700 feet AGL. I then flew a 180° "search" pattern and right when I needed it, another nice thermal came along. After gaining about 1,000 feet, I turned and tracked south again. Guess I did not learn anything from my last south track, but I felt okay above the foot hills. Off to the east I could make out several clear cut fields that looked reasonably serviceable for landing and beyond were even better looking fields. I made a decision that if I hit another good thermal, I was going to drift with it and go. I hit it!

Centering in 500 FPM up, I forgot about the ground and concentrated on my vario. The lift stayed solid and I was back to 5,000 AGL, lining up for a jump to the next cloud downwind. Off in the distance I could make out some huge white tanks (Gainesville, Georgia), and I said, "That's where I'm headed." The cloud cover had reduced but excellent lift was still under almost every stepping stone across the sky. Being in unfamiliar territory and passing well above another airfield, I used channel 9 on my radio to find out where I was. A powerful base station responded that I was over Jasper, Georgia. About the same time I scanned the horizon to the south and could distinguish the Cartersville, Georgia power plant, the skyline of Atlanta, Stone

Mountain, Georgia, and Lake Sidney Lanier. I knew I was about 50 or 60 miles out and I was starting to think, "Hey, I'm gonna make it!" I was sure hoping so!

After Jasper, I worked several fragmented areas of lift for about ten miles and did not really gain much. I was getting low again, and flying a search pattern across the wind. The clouds were gone and I was not as sure about making the goal as I had been. Well, somebody heard me asking for lift, and I got kicked back up to about 5,000 AGL by a nice 500 to 700 FPM thermal. This thermal was more docile than the earlier lift, so I pulled myself upright in my Cloudbase Spaghetti harness and relaxed my neck and shoulders. I had been in the air about four hours. Ahead of me I could see Sawnee Mountain, where the Atlanta pilots soar, and Lake Lanier sprawling some 25 miles long ahead of me. I again tracked to the southeast, in case I was low upon arrival at the lake. Also, Sawnee Mountain might help me with another thermal. I recalled that two years ago, Chris Smith had flown his Harrier 81 miles and landed near Sawnee. I was already that far, still had 5,000 AGL and three hours of light left. Mark "Curly" Dunn's flight of 83 miles, as a record, was about to fall. My glide from the last thermal took me close to ten miles in zero sink to 100 FPM down. I thought it might be a "wonder wind," and I was in "Oz." Mental fatigue was knocking at the door.

About ten miles from the lake I ran into another late afternoon thermal that granted me another gain to around 5,000 AGL. The terrain had changed from mountain foot hills to more rolling hills and fields. Ahead I planned for the crossing of the lake and gave myself a chance at fields on both sides as well as a bail-out field on a peninsula extending half-way out. I headed directly east across the 25 mile lake, and entered a thermal instead. I again gained back to 5,000 AGL approximately, just before the west shore line drew near below me. It could not have happened at a better time, having the security of altitude to cross that big, deep lake.

Losing only 500 feet of so, I recognized a small ridge about two miles from the east shore line. Heading for it I found the sink that I had expected when crossing the lake. It was not long before I was floundering along this ridge with about 700 feet AGL. I had had good luck through the flight heading downwind to find lift. I gave it a shot to no avail, but did find out the ground winds were blowing 15-20 and from the west-southwest. I headed toward a landable field and prepared to land when a decent blast of lift inspired me to continue onward. I really want to continue! I tried 180's at first, then noticed a hawk doing real well with figure 8's. I was so involved with trying to work that small drifting thermal, that I failed to notice leaving my intended landing field without another in mind. Mental fatigue was about to reach panic. Realizing, "I'm

too low to be doing this!" I looked downwind for something landable. I saw a small pee wee baseball field and at a quarter mile away a field that looked better. Travelling in a direction between the two fields I opted for the large pasture-looking field and headed toward it. As I approached it I found downhill on the area I thought was acceptable, with a fence line on the crest of the hill.

The other side of the fence had three foot terraces and was uphill. The uphill looked to be the best choice at this point, as I one-eighty-ed to come into the wind. Having made many quick decisions on where to land I had failed to take account of the hills on each side of this field. On completion of my 180, my trusty old Duck stopped moving forward and sunk about fifty feet over one of the two trees between me and my lovely terraced landing zone. The phrase "Oh Shit!" somehow stands out in my mind as I realized I was in not just a venturi, but one with a nice wind gradient, too!

"Oh Shit!" Some buffeting of the air and I moved forward over my last leafy obstacle while looking quickly behind me to perhaps drop back into another smaller field. Quiet, and I dropped again and had a glimpse of "tree rush" before my Duck waddled out in front of the last tree. I remember saying, "I just want to live, just let me live," as I rushed over that tree. I made it. I was through the gradient and into ground effect. I flared too soon, took a couple of steps, and "bonked" in the nose. I just stood there shaking for a minute, talking to my now almost delirious, panicked, adrenaline-pumped self, saying, "I made it. I made it, yahoo, I made it!!" I was lucky. I thought I was gonna die crossing those trees. Whew!

Two young boys, Scott and Tim Bagwell, had seen me cross over their house and figured I would land nearby. They arrived shortly and became my landing witnesses. I had them get a camera to document what I believed to be a new unofficial record. I had landed in a place called Chestnut Mountain, Georgia, which is approximately ten miles south of Gainesville, Georgia. I met Susan Bagwell, the boy's mother, as well as Mr. and Mrs. Conley Brown, the grandparents, who helped me back to earth with food, drink, and calming conversation. I was really losing a grip on myself — too much adrenaline! I had a three day high!

The flight lasted approximately five and a half hours and covered 104 miles as I have measured on Tennessee Valley Authority topographic maps.

I would like to thank my friend, Chris Voith, for his excellent retrieval service and enthusiasm over my flight. He was right there when I needed him. Also, many thanks to all the Tennessee Tree Toppers and friends who welcomed me home with a wonderful reception. It was overwhelming — I have never felt so special in my whole life. Lastly, let me thank my wife, Patti, who let me be this big boy with the flying toy. §

Founding Members • LARRY TUDOR • WILLI MULLER • BOB TRAMPENAU • STEVE MOVES

IF YOU EVER HOPE TO FLY FROM HORSESHOE MEADOWS



JOIN THE XC PILOTS ASSOCIATION NOW !!

Horseshoe Meadows, the world's foremost footlaunched XC site, is threatened with closure unless a responsible organization provides regulation during the summer of 1984.

The primary objective of the Cross Country Pilots Association is to secure the great XC launches of the Owens Valley and keep them available to pilots of every nationality.

FULL MEMBERSHIP: \$12.50
FOUNDING MEMBERSHIP: \$25.00

President: Rick Masters
Secretary/Treasurer: Steve Gray

CROSS COUNTRY PILOTS ASSOCIATION
Box 458, Independence, CA 93526

ERIC RAYMOND • BILL BENNETT • RAINER SCHOLL • DON PARTIDGE • BOB HELLS • BILL MOVES • ROY HAGGARD • JOHN HUDSON • JUDY LEDEN • DENNIS YEOMANS • KLAUS KOHMSTEDT • JOHN PENRY • JEFF BURNETT • RICH PFEIFFER • RICK MASTERS • SCOTT SMITH • STEVE GRAY • MIKE KING • WOODY WOODRUFF

The Pacific Windcraft/Skylines Ltd. FRENCH CONNECTION

In 1984, you shouldn't have to go cross-country without it . . .



Pitch, and Pitch and Roll (double) available for immediate delivery



On the pitch axis, it is now proven that a properly installed French Connection can significantly increase the performance envelope of your glider. How? . . . by reducing its high speed bar pressures and by decreasing the pilot's frontal area by up to 20 percent (documentation of testing available on request).

On the roll axis the French Connection can give you the best of both worlds: Now you can have a tight, low twist, high efficiency glider with handling and bar pressures allowing you to thermal in the most demanding conditions for hours on end. And . . . feeling up to a few extra miles.

The Pacific Windcraft/Skylines French Connection comes standard with all the hardware necessary for its proper installation, and with complete mounting instructions. The Pacific Windcraft/Skylines French Connection is restricted only to gliders with HGMA Certification from 1979 onward.

For ordering, please contact your nearest Pacific Windcraft or Skylines dealer, or call 408/422-2299 or 422-2781.

P.O. Box 4384 • Salinas, CA 93912

WARNING!

THIS SPECIAL OFFER EXPIRES...

EXPIRES WITH 500th ORDER

Now, today, you can sign up for two years (12 info packed issues) of **WHOLE AIR** for ONLY \$14.97!!

Yes . . . you can save **OVER 50% OFF** the newsstand price for two years of **WHOLE AIR**, widely acclaimed to be the most innovative American hang gliding magazine. **WHOLE AIR** also serves 41 foreign countries and carries more international articles than any english-speaking magazine. But the best evidence is from our current readers. When 93% keep their back issues . . . when each reader passes his or her copy on to an average of 3 other pilots . . . when over 64% of one-year subscribers renew for 2 or 3 years . . . or when readers just write to applaud **WHOLE AIR's** approach . . . you'll see why this **OVER 50% OFF SPECIAL** is a chance you should quickly accept. Don't wait till another issue passes you by . . .

SUBSCRIBE TODAY!

WHOLE AIR

The Magazine of Hang Gliding and Ultralight Soaring

YES, I know a good deal when I see it . . . Sign me up for 2 years (12 issues) of **WHOLE AIR** for just \$14.97 . . . **OVER 50% OFF** newsstand cost.

I am a present subscriber; add these 2 years to my current subscription (Sub # _____ — see mailing label)

Name _____

Address _____

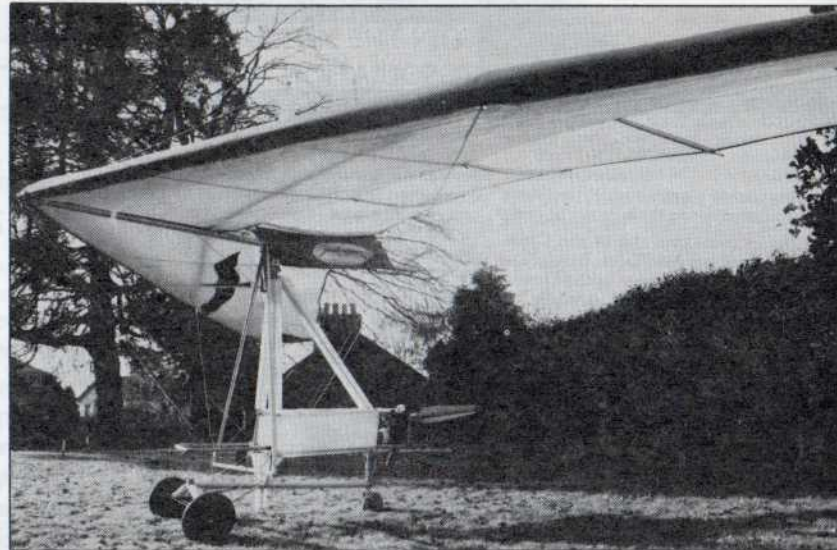
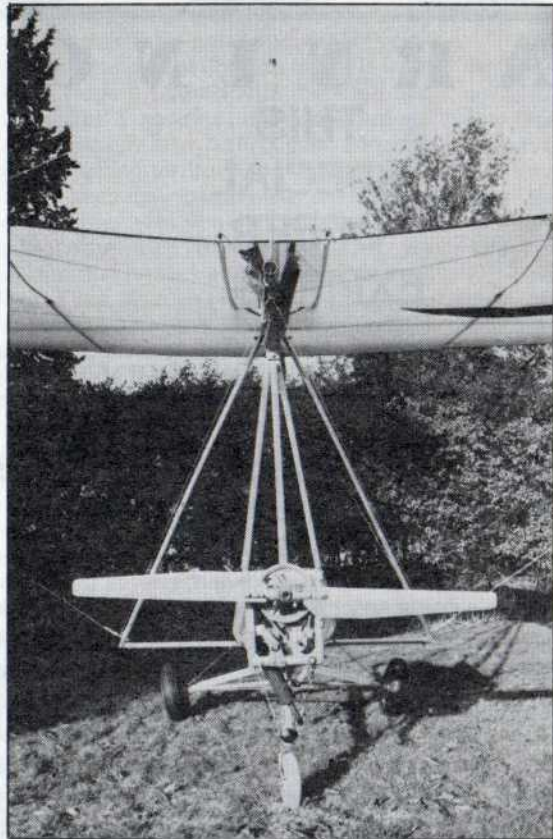
Zipcode _____

FOREIGN SUBSCRIBERS

Canada — Add \$4/year . . . All Other Countries — Add \$8/year
Write for Air Mail Rates. All funds U.S. Money only.

Mail to: Box 144, Lookout Mtn., TN 37350

THE NOMAD



What's new from Europe this month? It's a question worth asking after french connections, aero tugs, and motorized soaring units. This time, read the first of two parts about reinventing the powered, soaring hang glider. Here's Rupert's Prone Trike/photos by Julian Machie

HERE AT *WHOLE AIR*, we see a great many ideas and developments from England, France, Germany, Italy, and Canada. It is most enlightening, made even moreso now that we are aware (since late 1983) that all of hang gliding *does not* revolve around the USA, or even Southern California. Since the rest of the world combined has several times the American hang gliding census, and since many participants elsewhere on the globe are perhaps a more elitist group, the push for certain product development indeed *does not* parallel that of the United States.

Overall, this fact can be demonstrated by the wide disparity which surrounds the use of trikes. While they remain very popular in Europe, the American flyer seems to have largely rejected the idea... at least until very recently. Even in Europe, though, the aviators using trikes primarily tend to be hang glider pilots. So the push for further trike development has never

completely lost sight of the desire for soaring qualities.

Oh, its very true, that as the (powered) ultralight movement bloomed, say 1980 to early 1983, the producers of trikes geared themselves toward this perceived windfall. The trikes got heavier. The wings were purpose-built, and could not be foot launched. Two seaters, badly needed for training, were pressed into production, bringing a new upward limit to weight and complexity.

Then, the group in France — under La Mouette chief, Gerard Thevenot's direction — developed a two seater into an aero tug. This has been well documented recently (see March 1984 *Whole Air*). The effect on Americans seems to be powerfully motivating for pilots to re-think their negative opinions about trikes (or power) in general.

Meanwhile, progressing along elsewhere in Europe, new strides have been achieved. What looks like a return to Soarmaster's ill-fated PP-106 strap-on power pack, is really new ideas born of relatively extensive trike building knowledge.

Enter the prone trike.

Two efforts have brought two rather

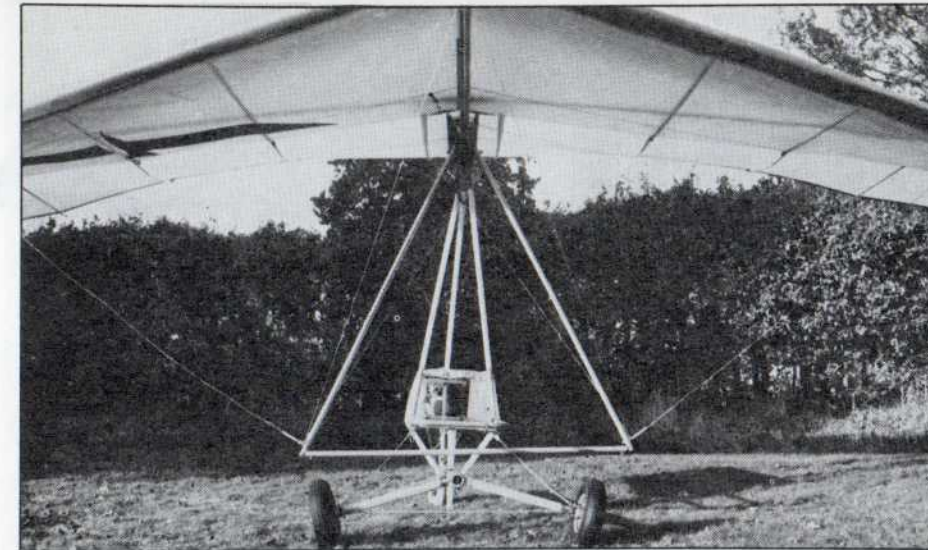
different systems. In the August '84 issue of *Whole Air*, German Correspondent Gib Eggen brings us a user report on the "Minimum," a German prone trike of very simple yet unique specifications (see photo).

In this issue, we will look into the Nomad prone trike from English designer, Rupert Escott. What follows is a paraphrasing of information received from Flight Research, Rupert's company and the producer of this configuration.

LIKE MOST PILOTS, Rupert Sweet Escott was attracted to power. The ability to power up from a flat field, find a thermal, and switch the power off, was often on Escott's mind (especially when faced with the walk up the local hay bluff).

Such a unit was available, but it involved pitch stability problems, claims Flight Research. Other units, while being pitch stable, had very poor power-off capabilities. And, with a mind to producing a safe and high performance power unit, work began in November of 1981.

Thrust line and engine placement were vital considerations in the design, and after lengthy research on the subject, it was decided to mount the engine clear of the

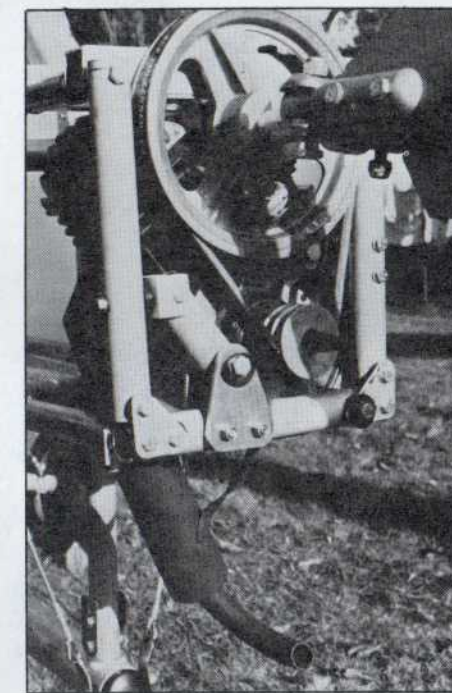


pilot's feet and, therefore, in his or her slipstream. This in turn produced a thrust line exactly through the center of mass. The engine placement also meant that there was not need for any heavy prop shaft, such as were common with the earlier units.

Then there came the problem of supporting the motor. A tricycle undercarriage (as on the production Nomad) was not originally employed. Instead, a single rear wheel was fitted. This prototype was successfully test flown, but was found to be practicable only in soaring conditions — precisely when you did not need a power pack! It had to be three wheels; a variety of different configurations were developed including a system that telescopically retracted, but this involved considerable control frame modifications. Finally, a cable-braced structure was chosen, allowing full portability and proven strength.

Rigidity of the pilot to the frame was accomplished by the pilot hoop (see photo).

Test flying the Nomad was surprisingly easy. It was found to be very pitch stable, while still obtaining a remarkably good sink



SPECIFICATIONS

Dry Weight — 53 pounds (approx.)
140 Solo Power Pack
3.5:1 Reduction Ratio
51" Folding Propeller
Faired Airframe
Gold Anodized Exposed Tubing
Plain Anodized Enclosed Tubing
Black Anodized Fittings
Steerable Rear Wheel
Take-off Run — 120 Yards
Power Off Sink Rate — 200 fpm
(in enclosed crossbar design glider)
Drawn Seamless HT30 TS Tubing
50 kg (110 pounds) Thrust
Double Swaged Cables
HT Bolts

All information derived from factory literature.

rate. The glide of the earlier Nomads was dramatically improved using the new style undercarriage arrangement (see photos), and developments such as the self-centering wheel post fairings improved it still further.

Now in full production, the Nomad is available as a pre-drilled unit. All parts are finished and ready for assembly, with only minor adjustments for the pilot size required. Any normal cocoon or stirrup-style harness may be adapted for use on the Nomad.

1984 FACTORY UP-DATE

POPULAR DEMAND HAS led us to introduce a complete range of trikes for 1984. For the home builder conscious of rising prices we can now offer the complete unit including integral fuel tank but without engine. The top of the range is the new dual [two-seat] unit which comes with electric start as standard on the KFM-powered model.

In single-place machines, the range now includes the superb light weight, high powered JPX 212 engine. The reduced weight over the solo unit gives an even better power-off sink rate than before. With the option of electric start, this unit becomes even more versatile.

For the true purist, the solo 140 with folding prop represents state-of-the-art in weight-shift sustainers. Coupled with V-belt reduction and centrifugal clutch, this unit boasts the best power-off glide of any trike in the world.

For added climb rate the single Nomad may be fitted with the KFM 107 or JPX 425 units.

Flight Research caters to every pilots' needs and by offering the complete unit, minus engine, customers can minimize the cost. Plenty of Chrysler and McCulloch units are available on the second hand market, and we can supply any necessary hardware for their fixture.

All Solo units come with standard fully faired airframe, with all holes drilled and assembly only is left to the customer. We can supply ready assembled units for a modest price increase.

TRAINERS

Probably one of the most important contributions to the training of free-flight hang glider pilots, the Nomad Tribe is the natural follow on from the single unit. A beefed up version with a simplified geometry, the unit is highly robust and reliable, and has been designed to take the general wear and tear of everyday use.

CONTACT ADDRESS

For more information on the Nomad lines from Flight Research, readers may write directly to:

FLIGHT RESEARCH
Rochester House,
Ashfield Crescent,
Ross-on-Wye,
Herefordshire,
ENGLAND HR9 5PH
Att'n: Rupert Escott

GEMINI

Our second PiRep (Pilot Report) takes us up in the air with Ultralite Products' Gemini series/photos from Rob McKenzie and Paul Burns

ULTRALITE PRODUCTS OF TEMECULA, California has been manufacturing the Gemini line since May of 1981. To date, over 600 units have been produced, evidencing the strong popularity of this design. Prior to this evaluation, I had little experience with the Gemini, having flown this design on small training hills only. I pessimistically speculated being disappointed with the performance, handling, or both. I kept thinking that such an "old" design could hardly keep pace with "new" glider designs.

My schedule prevented me from picking up the Gemini 184 which UP made available for evaluation, but a friend, Debbie Renshaw, informed me that she was to pick up a Comet at the factory that day, and would be happy to deliver the 184 to me. As it turned out, Debbie only picked up one glider, the Gemini. Conditions looked very good upon her arrival in Elsinore, and Debbie graciously offered to "test fly" the Gemini for me. I laughed, loaded my double-surface glider alongside the 184, and we drove up to the "E" launch.

While setting up, Debbie felt compelled to comment on everything that caught her attention. The new cover bag material is brightly colored and shiny — very eye appealing. A padded receptacle protects the sail from control bar, and an attached pad is provided to protect the sail from defined tip abrasion.

Having finished her set-up and pre-flight in about the same amount of time it took for me to install the ribs in my glider, Debbie asked me to keep an eye on the Gemini while she collected the remainder of her equipment. I took this opportunity to inspect the Gemini's hardware and overall finish. On her return, Debbie smiled and asked, "Isn't it beautiful?" I nodded in agreement. Still a bit pessimistic about the Gemini's performance, I answered, "Looks good on the ground!" Debbie being the competitive type, immediately accepted the unspoken challenge of a contest.

I was first to launch and found the air to be moderately turbulent with small, punchy thermals. I found myself working more than a little bit to core in my double-surface glider. My rate of climb was slow and inconsistent. Debbie launched when I was about 300 feet above take off. At this point, I began to encounter smoother, more reliable lift. Noticing Debbie circling below, I concentrated on my sink rate. I was about 1500 feet above launch when Debbie first climbed above me. For the next two hours, I watched the Gemini's cross tubes gleaming in the sun above me.



On final approach, I experienced the usual Elsinore landing zone turbulence, but with some muscular effort, managed to pull off a safe landing. Some twenty minutes later I watched as Debbie flew in on her approach. Conditions were basically unchanged, but the Gemini appeared to be unaffected by turbulence. Debbie's flight terminated with one of the lightest landings you would ever want to see. I concluded that Debbie and the Gemini had the best sink rate performance on the hill this day, and glide seemed not much of a handicap. I was impressed with the Gemini, in spite of my losing our one-to-one contest.

The next day I was enthusiastic over the opportunity to fly the 184 myself. This day, conditions had deteriorated to a hazy, lazy spring day, with small, light thermals and an inversion at 5500 feet MSL. After fifteen minutes of "scratching," I found a small, 100 foot per minute thermal, which eventually spread out to a comfortable diameter and 300 feet per minute strength.

I climbed easily to the top of the inversion, at an altitude of about 2500 above take-off. The Gemini's excellent sink rate enabled me to stay high for the remainder of the flight, even while gliding upwind for miles. The landing approach was comfortable and touchdown felt to be a rival to Debbie's landing on the previous day. The entry in my log book for this two hour flight simply reads, "Fun."

Uncooperative weather set in for the next week. I swapped the 184 model for a 164 after only the one flight. The remainder of my 16.5 hours of air time (evaluating these Gemini models) would be flown in the 164 exclusively. My hook-in weight is over the limit for the 134 model.

My third flight on the 164 was memorable. Shortly after launching from

ULTRALITE PRODUCTS GEMINI

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

GENERAL CHARACTERISTICS

| | |
|-----------------------------|---|
| Set-up Time/Ease | 4 |
| Ground Handling | 4 |
| Static Balance | 4 |
| Frame Hardware/Finish | 4 |
| Sail In-Flight | 4 |

FLIGHT CHARACTERISTICS

| | |
|--|---|
| Handling — Low Air Speeds | 5 |
| Handling — High Air Speeds | 4 |
| Bar Pressure — Roll | 5 |
| Bar Pressure — Pitch: Low Speed | 5 |
| Bar Pressure — Pitch: High Speed | 4 |
| Roll Control Initiation | 5 |
| Roll Reversal (45° to 45°) | 5 |

BOX SCORES

| | |
|-------------------------------|---|
| Yaw Stability | 5 |
| Turn Coordination | 5 |
| Speed Range | 3 |
| Sink rate Performance | 5 |
| Glide Angle Performance | 3 |

LANDING CHARACTERISTICS

| | |
|---|---|
| Flare Authority | 4 |
| Parachuteability | 5 |
| Directional Control at Mush Speed | 5 |

GEMINI SPEED RANGES

| | |
|---|------------------|
| Gemini 164 (164 ft ²) — 175 lb pilot = 1.4 lbs/ft ² wingloading: | |
| Stall Speed | 17 MPH Indicated |
| Top Speed | 33 MPH Indicated |
| Gemini 184 (184 ft ²): | |
| No Data Obtained | |

the "E." I found myself sinking rapidly. I was at 800 feet above the landing zone when I found some zero sink air in which I circled for a few minutes, hoping for a low save. Noticing a turkey buzzard circling not far away, I glided over to join it (and share the lift). The buzzard bailed out sometime before I topped out this thermal at about 7,000 feet MSL. The buzzard's thermal took me to the edge of a convergence in which I climbed to 10,000 MSL. From this point on, I was unable to locate any more thermals. Basically gliding, I was able to complete a 25 mile flight in light winds.

My fourth flight on the 164 was one of the most beautiful and fun flights I have experienced in Southern California. Mother Nature dealt out a warm, spring day with unusually clear air quality affording visibility from the ocean islands to the deserts. The launch at Lake Elsinore was barely visible from my landing point near Hemet, California, some thirty miles distance. It was not the longest flight for the day, but certainly not the shortest, either. And, it was the only cross country flight completed that day on an "intermediate" glider.

A visiting pilot, Reni, from Norway, had landed an hour earlier a short distance away. Having already packed up and phoned in his location for retrieval, he was passing time when I landed. Joining me, Reni and I discussed and compared our flights. I learned that Reni had flown for about three hours, and had landed feeling arm-weary. He displayed small blisters on his hands from pushing his double-surface model around the sometimes turbulent air.

After flying the Gemini for four hours, my arms felt fine, with no signs of blisters, or soreness, in my hands. Admittedly though, physical evidence from my flight was plainly visible, as I was unable to get rid of the smile on my face for several hours:

SET-UP

The Gemini shares construction materials and hardware with the Comet models. In fact, the Gemini sail is made on

the same loft pattern as the Comet of comparable size. Viewed from above, the Comet and Gemini are almost indistinguishable. The now (since July '82) standard Gemini "M" models feature mylar-backed leading edges resulting in a more well defined air foil, and better stall characteristics. Handling is simplified by a mechanically assisted, swiveling crossbar, and shifting keel pocket.

Anyone who has set up a UP glider manufactured in the past three years, will be immediately familiar with the Gemini. The 134 model has 6 ribs per side, while the 164 and 184 have 7 ribs per side; 1/2" composite (for reflex) inside, 3/8" outboard to tip, and all but the tip are preformed. Any



questions regarding the set-up procedure should be answered by reading through the informative and thorough owner's manual. The Gemini can be set up by one person in under fifteen minutes. In high winds, the glider can be set up flat on the ground. With some practice, I found attaching the assembled wing to the control bar was fast and easy. Always follow set-up with a complete preflight inspection, as per the owner's manual.

LAUNCH

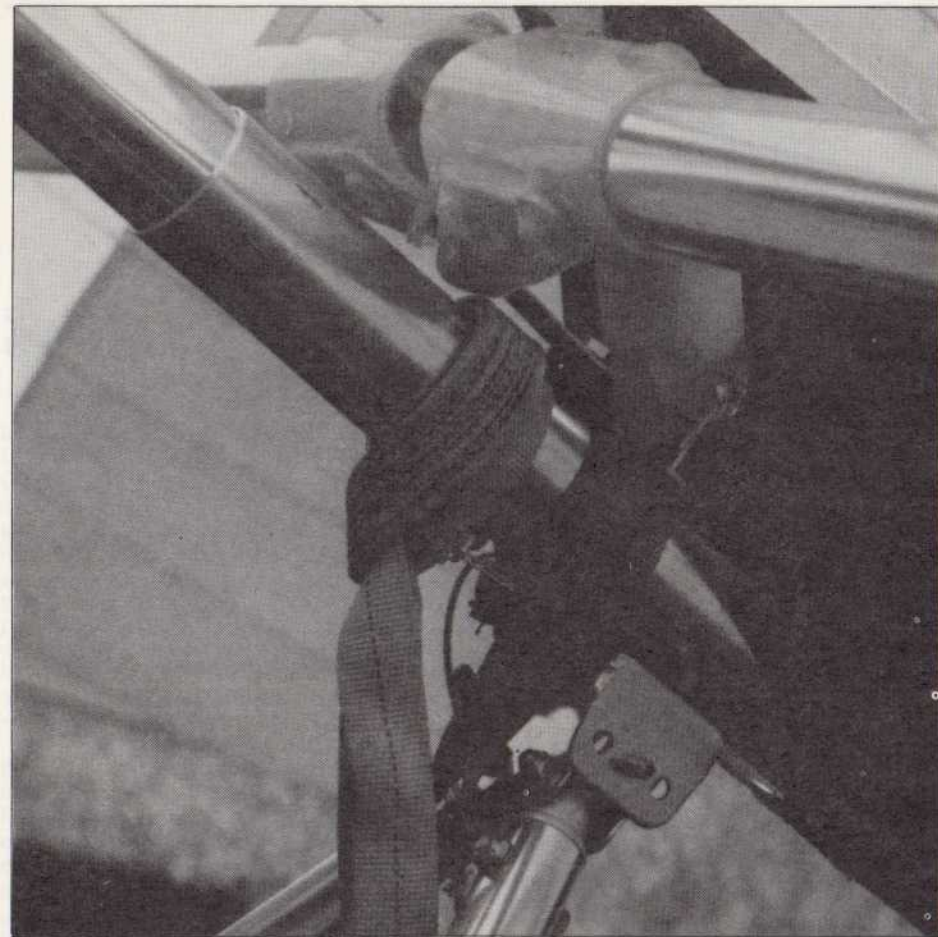
The Gemini's static balance is slightly tail heavy in no wind. However, in the slightest bit of headwind, the Gemini balances perfectly, making pitch control easy to maintain. Low stall speed provides comfortable take-offs in light wind conditions. I found the Gemini easy to launch with no tendency to yaw during take-off run, or to drop a tip... qualities that inspire confidence.

FLIGHT CHARACTERISTICS

All of my flights on the Gemini were at mountain sites at Elsinore, Marshall, and Crestline. Although I never compared "pure sink rate" under ridge soaring conditions, performance in thermals indicated an excellent sink rate. Flying the 164 at a 1.4 wing loading, I often found myself out-climbing double-surface models flown at comparable wing loadings.

Thermalling the Gemini is great fun. Light control pressures in both pitch and roll make for near effortless flying. Even in turbulent conditions, this glider displays outstanding stability and easy maintenance of speed and directional control. Never was I close to being "spit out" of a thermal while flying the Gemini. I also had the opportunity to enjoy the scenery often, since once in a thermal, the Gemini requires very little control input to remain in the core. Superior yaw/roll coupling is in evidence here.

Experimentation with varying air speeds showed increasing bar pressure at



speeds both faster and slower than normal soaring airspeed. At "mush" speed, the Gemini remained amazingly yaw/roll stable and maintenance of straight line flight was easy. I found that I had to use

some effort in overcoming the opposing bar pressure to push the Gemini into a full stall. Plenty of "warning feedback" is apparent at these slow speeds, while the glider retains impressive roll authority.

LANDING

The landing procedure is straight forward: Swing to upright position, hands about halfway up on the downtubes. Heading into the wind at an airspeed slightly above normal flying speed on final approach, ground skim to target and give a full flare. The Gemini has an abundant parachuting ability should you push out too soon, affording a comfortable margin for error. Even on steep mush speed approaches and crosswing landings, the Gemini has little tendency to drop a tip; a big advantage for smaller landing areas.

SUMMARY

For the past three years, the Gemini has set the pace in the utility category. Proving itself as a superior trainer, this glider has been employed by schools around the world. But the fact is, the Gemini doubles as a high performance recreational soaring machine, capable of impressive altitude gains, and even cross country performance. The truth is, some Gemini pilots can claim cross country distances that might make many a "high performance glider" pilot blush.

My opinion of the Gemini has changed considerably over the past few weeks. I now realize that I had categorized the Gemini as a "trainer" whose operation should be limited to student pilots. I had assumed the Gemini was somehow below my ability, an attitude formed by hearsay and my own vanity. Now I see the Gemini as a quality soaring machine which can rival the double-surfaced models, while offering an ease of operation and a price tag that is easy to handle. §

ULTRALITE PRODUCTS — GEMINI

SPECIFICATIONS

| | | | |
|---------------------------|---------------------|---------------------|---------------------|
| Area | 134 ft ² | 164 ft ² | 184 ft ² |
| Leading Edge Length | 17' 1½" | 19' 2¾" | 20' 4¼" |
| Keel Length | 7' 2" | 8' 2" | 8' 7" |
| Nose Angle | 118° | 118° | 118° |
| Billow | 1° | 1° | 1° |
| Glider Weight | 48 lbs | 57 lbs | 71 lbs |
| Battens | 6 per side | 7 per side | 7 per side |
| Wing Span | 28.8 ft | 32.5 ft | 34.4 ft |
| Aspect Ratio | 6.2 | 6.4 | 6.5 |
| Pilot Weight Range * | 95-165 lbs | 125-200 lbs | 150-230 lbs |
| Glide Ratio | 8.5:1 | 8.5:1 | 8.5:1 |
| Minimum Sink Rate | 210 fpm | 210 fpm | 210 fpm |
| Speed Range | 14-45 mph | 14-45 mph | 14-45 mph |
| Stall Speed (Indicated) † | 14 mph | 14 mph | 14 mph |
| Price ‡ | \$1,595 | \$1,595 | \$1,695 |

* Includes all flying gear: Harness, Helmet, Variometer, Parachute, et cetera

† Actual stall speed approximately 6 mph faster.

‡ Price subject to change without notice.

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



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

There are less than half a dozen manufacturers in the world today building state-of-the-art gliders. In addition to those few, there are literally dozens who claim to have the "fastest," "best handling," "best L/D and sink rate," etc.—simple statements, yes, but relatively unprovable. These people therefore feel safe to make these deceptive claims.

There is one way to compare though. Competition. Consistent winning performance year after year, meet after meet cannot be inferred. It is the only true test of performance and quality. The marketplace determines success or failure of any product. It is no chance fact that **UP** is the number one glider company in the world today.

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

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

UP SPORTS

SEND \$2.00 FOR COMPLETE INFORMATION
ULTRALITE PRODUCTS
P.O. BOX 659
TEMECULA, CA 92390 U.S.A.

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



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

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

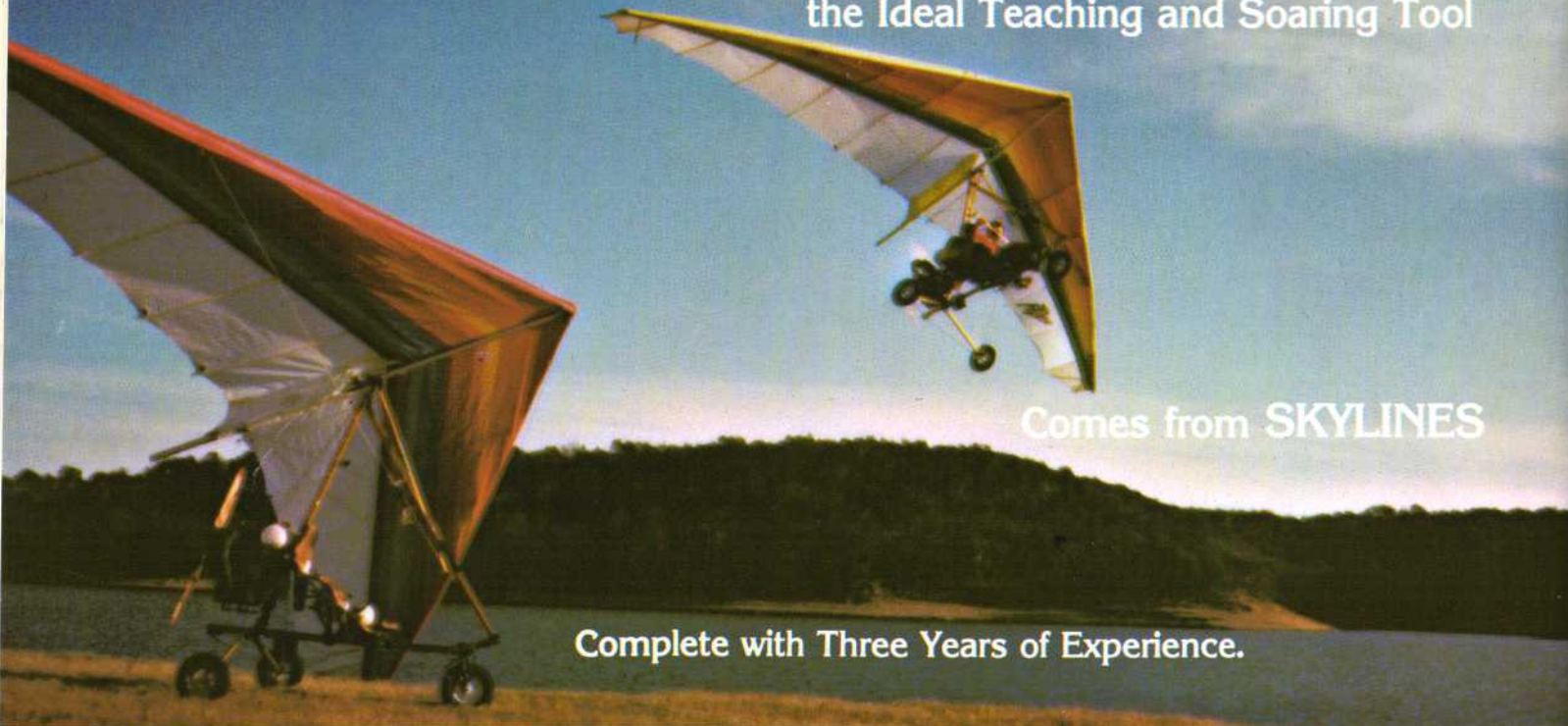


A composite coated base bar for better control with less effort and improved insulation for comfort at high altitudes (it also protects the bar on rocky or abrasive surfaces).

An improved taper ratio for improved mid-range performance and handling; a faired mylar nose cone for better penetration and improved speed and lift at high speed; plus a new generation of **UP** hardware that is lighter, stronger and simpler to rig—everything you would expect from the leaders in the industry. Ultralite Products.

For the Professional of the Sport,

the Ideal Teaching and Soaring Tool



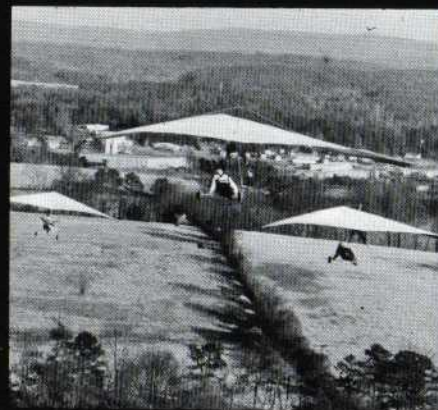
Comes from SKYLINES

Complete with Three Years of Experience.



GLIDER FEATURES

- 211 square feet, tested in Germany to 3700 pounds positive load.
- A quick, simple set-up procedure.
- Deformation-free hard-alloy 7075 preformed ribs.
- Mylar-faired nose section.
- 40% lower drag, due to the Torpedo kingpost system.
- All nyloc nuts secured with Locktite.
- Mylar/sandwich cloth sail tip section.



To insure the safe introduction to the American pilot, SKYLINES is requiring attendance at a factory-sanctioned training clinic. The factory currently offers training and service centers on both east and west coasts. For further information, contact:



SKYLINES — CALIFORNIA
 P. O. BOX 4384
 SALINAS, CA 93912
 408/422-2781

SKYLINES — EUROPE
 LA MOUETTE
 -33- (80) 56-66-47
 Telex #350-053

WARNING

U. S. Patent Number 8219419, issued November 18, 1982 will be strictly enforced



TRIKE FEATURES

- Rugged but comfortable two-seat trike.
- Folds down to trunk size in just seconds.
- Vibration-free (Lord mounts) for engine mounting, and glider-to-trike connection (also offers yaw dampening).
- 440 cc/50 hp powerplant, developing 330 pounds of thrust.
- Two throttle controls — foot pedal for precision flying and over-ride hand-operated "cruise control" throttle for safe and effective back seat instruction.
- Both electric and pull starters.
- Front wheel brake.
- Front wheel suspension.
- All nyloc nuts either safety wired or secured by Locktite.



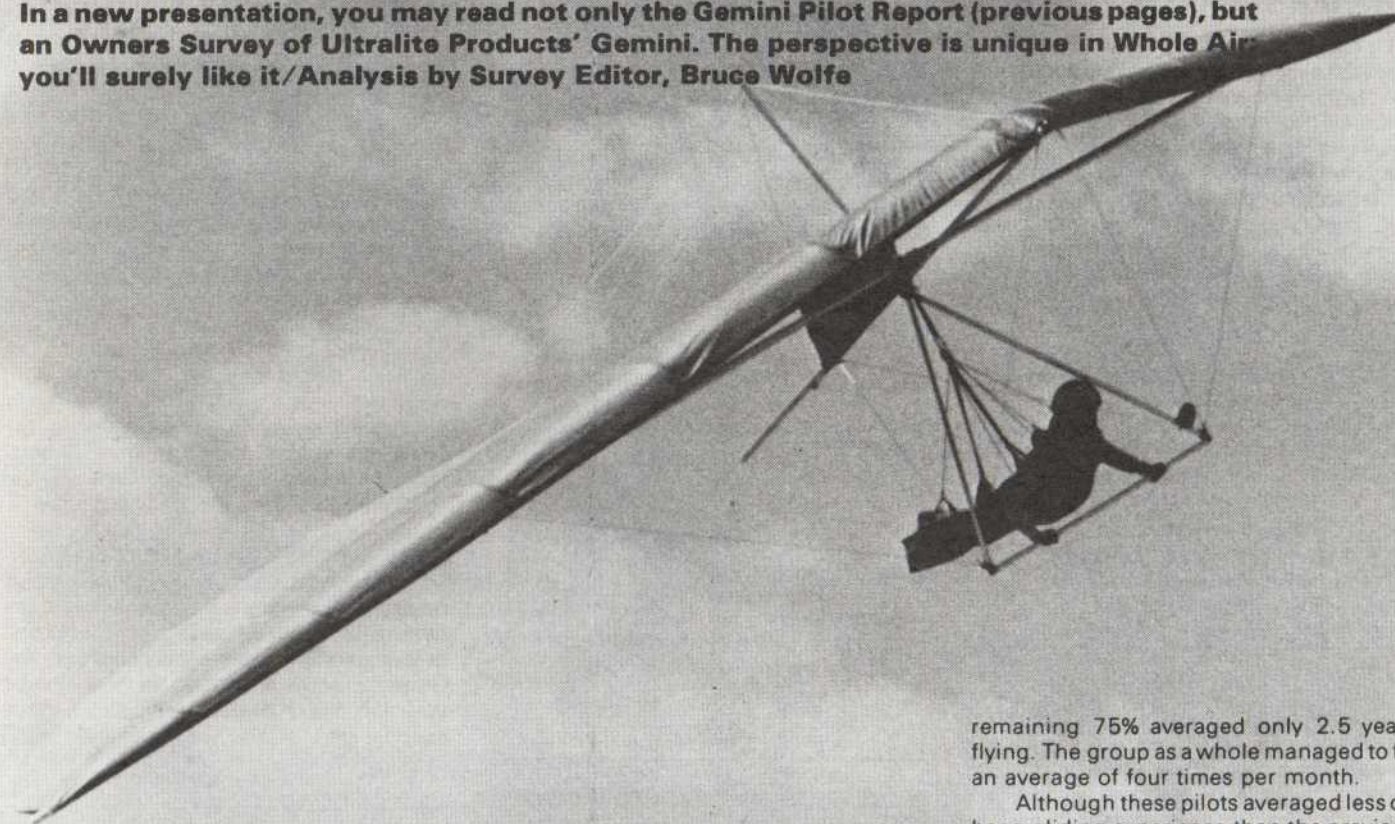
With an engineering design and finish you can be proud of — over three years of trike manufacturing went into designing the most reliable and affordable two-seat training and aero towing system available in the world today.

During the past 1983 season, literally thousands of European pilots of all skill levels got introduced to and adopted an entirely new way to reach cloudbase and go cross-country . . . the SKYLINES aero towing system. Its safety record? . . . 100% perfect.

This 1984 season in America, the introduction of this proven and complete soaring tool is without a doubt creating the beginning of a new era for our sport, hang gliding.

OWNERS SURVEY/GEMINI

In a new presentation, you may read not only the Gemini Pilot Report (previous pages), but an Owners Survey of Ultralite Products' Gemini. The perspective is unique in *Whole Air* you'll surely like it/Analysis by Survey Editor, Bruce Wolfe



THE PILOTS

This is the oldest group of pilots so far from 25 to 61 years old. Their weight, however, is very typical at 159½ pound average; the lightest was 105 pounds and the heaviest was 195 pounds.

The hang ratings breakdown are Hang I -- 5%; Hang II -- 33% (the most of any group so far); Hang III -- 48%; and Hang IV -- 14%.

This group also had the lowest average airtime figures to date with only 34 hours with a range of one hour to 150 hours. However, not reflected in these figures is that only 25% of the pilots (three Hang IV and two Hang III's) accounted for nearly 80% of all the airtime! This means that 75% of the pilots had an average airtime figure of a little under 10 hours, whereas the remaining 25% average 108 hours.

The total average time flying hang gliders was 3.7 years, very close to the average for Harrier pilots (but Harrier pilots had an average airtime figure twice that of these Gemini pilots). The division among the Gemini pilots noted in the average airtime figures is reflected, as one would expect, by the number of years flying gliders. The same 25% of the pilots who average over 100 hours airtime accounted for half of the total number of years flying hang gliders. This subgroup had an average of 7.3 years flying, while the

remaining 75% averaged only 2.5 years flying. The group as a whole managed to fly an average of four times per month.

Although these pilots averaged less on hang gliding experience than the previous pilots considered, they had the most experience with other type of aircraft. Forty three percent of all the Gemini pilots had some type of airtime other than hang gliders, although what type was not specified. Those who did have non-hang gliding time averaged 228 hours over an eight year period. That is more hours and a longer time than any group so far.

Competition-wise, only 9% participated in their Regionals, none in the Nationals and 19% said that they involved themselves in some sort of competition, most likely local fly-in type activities.

Pilots were asked to rate sixteen qualities in order of importance using the following scale: 5 = Vitally Important; 4 = Significant, but not Vital; 3 = Average Importance; 2 = Low On Scale; 1 = Not a Priority at all. Those qualities, listed in order of importance (most to least), appear below with the averaged value assigned them by this group of pilots.

- 4.9 Structural Integrity
- 4.0 Glide Performance
- Sink Rate Performance
- 3.9 Light Handling
- 3.8 Quick Handling
- Speed Range
- 3.7 Mellow Handling
- Set-up Ease

- 3.5 Price
- 3.4 Light Weight
- 3.1 Delivery Time
- 2.7 Brand Name
- 2.1 Popularity
- Innovation
- 1.9 Contest Success
- 1.7 Uniqueness

As usual, structural integrity tops the list with almost the highest rating possible.

What is unique about this priority list is that all the performance and handling qualities are grouped within the very narrow range of 4.0 to 3.7, only 0.3 points difference for six qualities.

Pilots were also asked what equipment they used. Listed below, in decreasing order of use, are those items along with the percentage of Gemini pilots who used them.

- 100% Helmets
- Second Hang Strap
- 86% Parachute
- 67% Altimeter
- 57% Variometer
- 33% Two-way Radio
- 20% Air Speed Indicator
- 19% Compass
- 5% Strobe Light
- 0% Ballast

Eighty six percent is the lowest percentage of chutes being used in the surveys so far, but does not necessarily mean this group is less safety conscious. The 100% use of helmets and second hang straps indicate otherwise. (For those who can remember when helmets were not standard hang gliding equipment, it should be interesting to note that to-date, 100% of pilots answering the survey use helmets.) It is quite possible that many of the pilots may not have graduated to sites where parachutes are positive assets.

Characteristics which seem to define this group of pilots can be listed briefly as: (1) grouped into two experience levels, the larger of the divisions being near the low end of the experience scale, and the smaller group situated near the middle of the scale; (2) an older group of pilots with more other airtime experience (non-hang gliding airtime); and (3) a group with a rather non-specialized set of pilot priorities.

THE GLIDER

The statistics on the Gemini's are as follows: 62% were 1982 gliders; 29% were 1981 and the remainder equally divided between '80 and '83; size-wise, over one-half (58%) were 164's and there were twice as many 184's as 134's; according to owners, all the Gemini's were certified; only 14% were purchased second hand and 90% of all sales were by dealers.

The average suggested retail prices were \$1731 for '81's and \$1671 for '82's. The average purchase prices are listed below:

1981 new \$1587

1982 new \$1470
average used price \$1603
Yes, the average used price was actually *more* than new purchase prices!

The average Gemini pilot spent 18.5 minutes setting his/her glider up and two people reported needing the help of one other person to complete set-up. Breakdown was a little faster at 16.3 minutes and only one person out of 21 required help with this procedure. Both set-up and breakdown averaged a 3.9 rating (4 = Good).

Using the standard rating scale of 5 = Superior; 4 = Good; 3 = Average; 2 = Fair; and 1 = Poor, pilots were asked to evaluate the overall quality of flying their glider and then rate the quality in twelve specific individual areas. Gemini pilots gave an average value of 4.6 for the overall flying quality of their wing. The average rating for the other items are listed below in descending order.

- 4.4 Roll Trim
- Pitch Trim
- 4.3 In Thermals
- In Ridge Lift
- In Turns
- To Coordinate Turns
- 4.0 To set-up/hold approach
- 3.9 Maintaining Hands Off Flight
- To Ground Handle
- 3.8 Generally, To Land
- 3.7 To Flare
- 3.3 To Lift (Weight)



Pilots were also asked to evaluate the ability of their glider to perform in fourteen areas. The scale is the same as above.

- 4.4 Overall strength
- 4.2 Light Handling
- Quick Handling
- 4.1 Mellow Handling
- Low Speed Stability
- Low Speed Handling
- Straight Ahead Stall
- Turning Stall
- 4.0 Sink Rate Performance
- 3.8 High Speed Stability
- High Speed Handling
- Accelerated Stall
- Glide Performance
- 3.4 Speed Range

Note the narrow range of the ratings for all the items here. This "averaging out" of these performance abilities may be due in part to the lack of experience on, or with, other gliders (if such a lack exists). Remember the average airtime figures mentioned earlier.

Maintenance considerations are the last items considered in this section.

One fourth of the Gemini pilots reported having to make non-crash related repairs and rated the ease of those repairs at 3.9 (4 = Good). The ease of crash related repairs was listed similarly at 3.8. Twenty six percent said they had something fall off their wing that should have stayed on, and 61% had trouble with ribs bending easily. Forty percent noticed some type of wear early in their ownership, although most appear to have been the usual wear while transporting.

Fifty eight percent thought the Gemini's downtubes were stronger than expected with the remainder evenly divided in believing the downtubes the same or weaker than previous gliders. Overall, the workmanship on the Gemini was rated at 4.3 on the standard scale.

THE MANUFACTURER AND DEALERS

The manufacturer's advertising reliability is the first item considered in the next to last section of this article. Listed below are eight items pilots rated with the standard scale according to how honest they felt the manufacturer was in those specific areas. As usual, the items are listed in descending value.

- 4.2 Handling
- Materials Quality
- Workmanship
- Overall
- 4.1 Set-up Ease
- Weight
- 4.0 Performance
- 3.9 Delivery

Once again, note the very narrow range of the ratings.

Well over half of the pilots, 57%, said that UP's advertising was a factor in knowing about and/or buying the Gemini.

When owners did receive their Gemini's, 86% got them ready to fly; the rest had to assemble them from the shipping tube. Those who did assemble their gliders reported needing no tools, had all their parts, and everything fit together properly. The only comment on the assembly process was one "moderately hard" rating.

Eighty three percent of the Gemini's had a factory test-flown sticker, the rest did not. Each unit which had a sticker, though, was signed off by the pilot.

Other statistics related to UP and the Gemini are as follows: 81% of all the owners got an Owner's Manual; one third received a Service Manual; 14% had some spare parts included; and 90% had rib charts. None of the owners were contacted by UP concerning their purchase. The factory received a 4.4 rating on



workmanship and 4.5 for the quality of materials used in the Gemini.

Gemini dealers received an average rating of 3.8 on the standard scale. Seventy one percent of the dealers test flew the glider for their customers, 95% went over the set-up procedure, and two thirds generally went over the glider and manuals with the owner.

Two thirds of the dealers were full time operations and 70% of all dealers has a store front. The dealer's parts stock was rated at 3.3 (3 = Average) and parts not in stock took about 16 days to arrive. Customers lived an average of 103 miles from their dealer.

CONCLUSIONS

A series of concluding questions were put to the Gemini owners. Here is how those questions were answered.

The Gemini received an overall rating of 4.5, halfway between Good and Superior, and 100% said they would buy another glider from UP, with the exception

of one pilot who said "Maybe." All of the pilots (100%) said, "Yes," they would recommend another pilot buy a Gemini and buy from this manufacturer. Owner unanimously agreed the Gemini was worth both its suggested retail and actual purchase price.

Paradoxically, three out of twenty one pilots (14%) did not think the Gemini was suitable for a novice pilot. Two of the three held advanced rating and had considerable airtime, while the third was a novice himself. However, recall that 75% of Gemini pilots averaged less than 10 hours airtime.

Fortunately, it is the purpose of this article to report, and not explain underlying cause and effect relationships.

When asked if they had any particular problems with their gliders, 45% of the pilots replied affirmatively. Problems listed were common complaints such as sail flutter, breaking battens, weight, and a wrong center of gravity. Some of the complaints were repeated, but most were

mentioned only once. There was no one common complaint or any tendency for a pattern to develop.

This completes the Gemini Owner's Survey. Future Survey articles will encompass the Pro Air ProStar, and the Wills Raven and Duck. Following these efforts, a summary of information will compare and contrast results on the seven gliders. Owner Survey Editor, Bruce Wolfe, will also compile some demographics on the over 500 pilots involved in *Whole Air's* Surveys, and finally the Survey series will end with a general compilation and analysis of the miscellaneous other gliders, which received small response number for each model.

This will take us all the way into 1985, and it is hoped the enthusiasm shown thus far will be maintained by reports generated from the one-of-a-kind survey efforts. §



Story and photos by
Dave Higdon

IT'S 9:00 A. M. IN THE NATION'S capitol, and at 800 Independence Avenue, hundreds upon hundreds of workers flow into the building in an almost-endless stream.

Engaged in disparate tasks, all contribute to a common arena of American life — transportation.

And in this particular Department of Transportation building, one type of transportation dominates all activity.

Perhaps the most regulated activity in the tapestry of our lifestyles, flying crosses all boundaries of human endeavor and from all-business military craft to airliners and down through the spectrum to high-dollar winged limosines and conventional planes, to the sky's sports machines.

Some people enjoy building and restoring as much as flying. For still others, the social aspects of aviation prevail.

Today, on a drab Monday in May, a handful of the FAA's thousands plan to deal with a request from some sport flying enthusiasts, people who wish only to advance their ability to indulge their recreation habit.

They are the nation's hang glider pilots, heard by the FAA through the voice of USHGA.

Weeks ago, USHGA submitted a petition to the FAA requesting a waiver from FAR Part 103, the rule governing ultralight [and hang glider] activity in the United States.

The petition requests the FAA allow aero towing of hang gliders by ultralights under Part 103, an activity currently deemed illegal under a summary ruling by FAA staff involved with monitoring the movement.

"There are a number of questions which arise when you consider this so-called aero towing," explained Michael Sacrey, a manager in the agency's General Aviation Division.

"Among the questions which must receive attention are 'What safe guards are needed to protect the glider,' and 'How do tow pilots qualify' or 'How do glider pilots qualify.'" Sacrey asked rhetorically.

But uppermost in the minds of FAA staff is whether aero towing is allowable under the precepts of 103.

Does the definition of "Sport and recreation" fit into Part 103 as applied to towing gliders aloft with ultralights?

The staff responsible for FAA's summary decision rendering such activity illegal did not think so. "Towing gliders aloft is no different than crop spraying or banner towing," explained Gary Perkins, now of the agency's Southern Region.

More basic to the determination, commented one FAA staffer, was the involvement of a second person in the same flying activity. The official, who wished to remain anonymous, explained, "Fundamental to Part 103 from the start was the premise that only the participant really suffered risk exposure, so towing, which involves a second party, had to be declared outside the realm of the rule. Otherwise, all of ultralight's critics would have new ammunition with which to attack the rule."

The same attitudes applied to two-place training waivers, although differences do exist.

"In the case of towing, both parties are obviously involved in the activity," commented John Ballantyne, a hang glider and ultralight enthusiast now working as Director of the AOPA Air Safety Foundation's Ultralight Programs at AOPA headquarters.

"When you discuss towing gliders with ultralights, the innocent-party concept simply doesn't apply," Ballantyne stressed.

But Ballantyne, Perkins, Sacrey and others in and out of government seem to agree on the importance of using the waiver process to legitimize aero towing. Their collective comments — only by protecting the concept which allows Part 103 to exist at all can its future remain viable.

"The (FAA's) decision to not regulate the sport more stringently still generates its share of internal controversy, as well as outright external opposition," the FAA source detailed.

So enter the waiver process, a vehicle USHGA successfully employed to secure

two-passenger flight for its hang-glider pilot population.

The process itself is relatively simple. Any person or organization may apply to the FAA for an exemption from a specific regulation by writing a letter to the Administrator detailing what the exemption would be, why it is needed, what the applicant's interest and experience is in the field of aviation.

If the agency decides the waiver request meets its prerequisites for consideration, it is scheduled for publication in the first available edition of the Federal Register. Should there exist problems in the language of the request, the agency can return it to the applicant for resubmission.

But assuming the application came in suitable form — as it did in the case of USHGA's recent petition — the petition and its details will appear in the Register along with a "docket number" and a closing date for the docket to receive public comments.

That "docket number" identifies the document open for public comment. While the docket is open for such comment, any person or organization can send written comments concerning any aspect of the proposed waiver, much like the process used during the formation period Part 103 experienced.

During that open comment time and after the docket closes, FAA officials involved with the rule earmarked for possible change regularly review the comments. They may identify trends, alternate suggestions, while they simultaneously gauge public support or lack of for the petition. The docket is also open to public inspection.

But the process is not a popularity contest. The side with the most muscle is always the FAA, but public comments can help them gain a feel for the potential impact changing or not changing a rule may have.

At any rate, after weighing all pertinent factors, the staff reaches a determination and renders a decision.

Just like the waiver request, that

decision officially reaches the public sector through publication in the Federal Register.

If granted, the process of establishing a mechanism for handling the granted waiver begins, a mechanism which must satisfy FAA's specific exemption language.

Most likely, such requirements would cater on assuring minimum knowledge and skill on the part of both pilots involved in aero towing, a process simplified because of USHGA's long history of documenting degrees of pilot competency through the Pilot Proficiency Rating System. The same system, one FAA official maintains, helped USHGA with its last waiver request and is also a factor in this latest association effort.

"The hang glider association has one of flying's better systems of documenting pilot skill and controlling flying sites through the use of that system," the anonymous FAA staffer said. This official could not speak publicly because of restrictions against commenting on rule changes or waivers under consideration.

The Administration Procedures Act, which establishes the process of obtaining rule changes, also restricts the ability of involved officials to comment on those proposals, a move to reduce potential abuse by civil servants.

But within and without the agency, optimism exists for the future of aero towing. "I believe USHGA may have another winner on its hands, particularly

with its past track record," came the anonymous official's final comment.

AOPA's Ballantyne said, "This waiver could mean a great deal to the growth and health of hang gliding while also enhancing the position of powered ultralight flying. Towing is the one area where the two sports overlap."

A number of dealers involved in both types of flying also perceive a great deal of potential for training hang glider pilots through towing. "A student can learn so much more, quicker, through dual training whether the craft is powered or not," stressed Bob Defenbaugh, of Maryland's Sport Flight.

"We use a two-seat Quicksilver now with some of our advanced hang gliding students to help them get a feel for flying at higher altitudes and to teach them approaches they cannot learn on training hills," Defenbaugh explained.

Other visionaries predict towing to be the method for teaching hang glider student pilots the basics, from their first day. "Teaching foot-launch could be easier after the student can handle the glider confidently in flight," Defenbaugh commented.

Most FAA officials contacted refused to speak on the record because of the pending petition. But most agreed that aero towing holds great potential for hang gliding's future by opening up flying on days when mountain sites are unflyable, as well as opening up new parts of the country

to hang gliding.

When none could predict, however, is the potential impact of a new FAA Administrator and continued opposition to the status quo ultralight aviation currently enjoys.

"The sport is not out of the woods yet," FAA's Sacrey stressed. "There remains plenty of opposition to Part 103, a resistance unaffected by the fact that the movement has performed pretty well under Part 103."

That unabated resistance to the ultralight movement provides the one wild card to an otherwise-stable regulatory environment.

These opponents — such as the Air Line Pilots Association, National Business Aircraft Association, Air Transport Association, and the bulk of the military establishment — take regular potshots at ultralight aviation, usually citing hypothetical, "what-if" scenarios of aerial disaster.

But as AOPA Senior Vice President for Government and Public Affairs puts it, "They cite their own nightmares."

Says Robert T. Warner, "They can't talk about real problems because there haven't been any, except in their imagination." Both AOPA and EAA remain ultralight supporters.

Hopefully, by the time *Whole Air's* August 1984 issue goes to print the report on aero towing can concentrate on how to use USHGA's latest waiver.

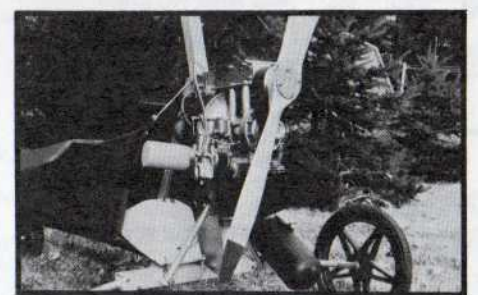
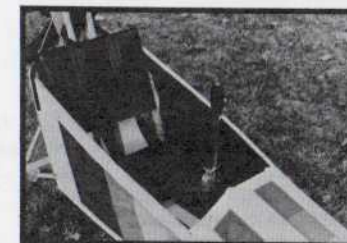
AMERICA'S MOST PURPOSE-BUILT SOARING TRIKE . . . the WAT-SS1



WOLFE AVIATION's WAT-SS1 has received closer attention to engine-off soaring performance than any other American-built trike!

Big statement? We don't think so. And we think the photographs speak the message loud and clear. But let's give you some real-time facts to add to your close inspection of the photos.

Weight for the Yamaha engine WAT is a mere 105 pounds (only 25 pounds more for the popular Rotax engine). Plus, *standard* equipment includes Pod, Back-up Hang Strap, Throttle and Kill Switch on the trike's airframe (see photo).



Please send \$2 for further information. You'll be pleased!

WOLFE AVIATION COMPANY • P.O. Box 59 • Elyria, OH 44036

DIRECTORY

MOUNTAIN WINGS
Box 1022/Main Street
Kerhonkson, NY 12446
914/626-5555

Ellenville area's newest and largest shop, just off Route 209. Product line: Delta Wing, Manta, Seedwings, ProAir, Pacific Windcraft, UP, Ultralight Flight, Kasperwing, Lazair. Comprehensive instruction programs with audio visual aids.

AIRWISE, INC.
15 Long Ridge Road
West Redding, CT 06896
203/938-9546

Stormville (NY): 919/226-6712
Hang gliding equipment by UP, Manta, Pacific Windcraft, Delta Wing, Moyes. Ultralight line: Mitchell A-10, Kasperwing, FoxBat, Phantom. Quality service, certified instruction.

MORNINGSIDE FLIGHT PARK
Rt. 12, RFD #2
Claremont, NH 03743
603/542-4416

Complete flight facility with camping and swimming. Top notch instruction, USHGA Certified. Precision repairs for airframe and sail. Glider & Accessories in stock. Dealer for Bennett, Moyes, UP, Wills, Wizard. Powered ultralight instruction available.

SOUTH EASTERN

KITTY HAWK KITES (EAST)
P. O. Box 386
Nags Head, NC 27959
919/441-4124 (in N.C.)
800/334-4777 (outside N.C.)

Learn to fly safely over soft sand dunes through gentle Atlantic breezes. Beginner, Novice packages and rating available daily. Complete inventory of new glider, accessories, and parts in stock.

CRYSTAL AIR SPORTS RACCOON MTN FLIGHT RESORT
Rt. 4, Cummings Hwy.,
Chattanooga, TN 37409
615/825-1995

Flight instruction on the World's Only Full Flying SIMULATOR. Completely safe for ages 5-81, thousands served already. Crystal offers the finest brands, with large accessory stock. Two-seat powered ultralight training, on-site. Bankcards OK. Since 1974!

LUBON ULTRALIGHT AIRCRAFT
Rt. 8, Enoree Hill Circle, #17
Greer, SC 29651
803/244-5886

Sales, Service, Instructions for entire line of UP products, featuring the Comet and the Gemini. Serving the Greenville,

Spartanburg, and Piedmont area of South Carolina.

NORTH CENTRAL

SIMPSON MID-WEST ULTRALIGHTS
Rt. 1, Box 114WA
Fisk, MO 63940

314/686-3578 or 785-9236
Plans for SIMPSON'S LITTLE BI — ultralight bi-plane; Easy Riser accessories; aircraft tubing, hardware. Dealer for Weed-hopper. Brochures, send \$5.00.

NORTH MOUNTAIN

GOLDEN SKY SAILS
15912 W. 5th
Golden, CO 80401
303/278-9566

USHGA Certified school including power and towing. Complete airframe and sail repair facilities, custom fabrication. Distributors for Wills and Golden Prone Harness.

WASATCH WINGS, INC.
700 East 12300 South
Draper, UT 84020 (near SLC)
801/571-4044

Hang gliding instruction beginning through mountain flight. Motorized ultralight pilot check-outs and instruction. Dealers for the Quicksilver MX. Custom harness manufacture and repairs.

AERO-SPORT ULTRALIGHT GLIDERS, INC.
898 South 900 East
Salt Lake City, UT 84102
801/364-5508

Utah's experts in both hang gliding and ultralight flight. Certified instructors since 1974. Dealers for American Aircraft and other quality aircraft. Instruction, sales, service, & rentals.

HIGH SIERRA SPORTS
1807 North Carson
Carson City, NV 89701
702/885-1891

Northern Nevada's complete hang gliding, windsurfing, and ultralight shop. All major brands available. USHGA Certified Instructor, Observer, and Region 2 Examiner. Sales, Service, Rentals, and Lessons.

EUROPE

NOVA-AIR AERO SPORT SYSTEMS
Am Bahnhof
8531 Illesheim
WEST GERMANY
Tel: 09841-8883

We sell and service all models of equipment. School instructor is special-rated by USHGA (I-IV) and is German Instructor/Observer.

RON HURST HANG GLIDING SAFARIS
Kurfurstenstr. 61
CH-8002, Zurich,
SWITZERLAND

Tel: 01/201 32 93 (in Switzerland)
0041 1 201 32 93 (outside Switz.)
Visit Switzerland and encounter the rapture of flying the Swiss Alps.

The following businesses carry *WHOLE AIR* in their shops, and are listed as additional outlets for hang gliding goods and services.

SOUTH EASTERN

LOOKOUT MTN FLT PARK
Rt. 2, Box 215H
Rising Fawn, GA 30738

HAWK AIRSPORTS
3743 Martin Mill Pike
Knoxville, TN 37920

NORTH CENTRAL

NORTHERN SUN GLIDERS
9242 Hudson Blvd.
Lake Elmo, MN 55042

SOUTH CENTRAL

GLIDERS & GADGETS, INC.
Liberty Landing Airport
Route #3, Box 197
Liberty, MO 64068

LONESTAR HANG GLIDERS
2200 "C" S. Smithbarry Rd.
Arlington, TX 76013

AUSTIN AIR SPORTS
5508 Parkcrest
Austin, TX 78731

NORTH PACIFIC

HANG GLIDER EQ. CO.
SAN FRANCISCO WINDSPORTS
3620 Wawona
San Francisco, CA 94116

CHANDELLE SAN FRANCISCO
198 Los Banos Avenue
Daly City, CA 94014

KITTY HAWK KITES (WEST)
P. O. Box 828
Marina, CA 93933

MISSION SOARING CENTER
43551 Mission Blvd.
Fremont, CA 90405

AEROSAILS
800 Mercer
Seattle, WA 98109

HANG GLIDERS WEST
20-A Pamaron Way
Ignacio, CA 94947

SOUTH PACIFIC

HANG FLIGHT SYSTEMS
1202-M East Walnut Street
Santa Ana, CA 92701

WINDSPORTS INTERNATIONAL, INC.
16145 Victory Blvd.
Van Nuys, CA 91406

HANG GLIDING EMPORIUM
613 North Milpas Street
Santa Barbara, CA 93103

WILLS WING
1208-H East Walnut Street
Santa Ana, CA 92701

ORIENT

JAPAN SURFING PROMOTIONS
3-1-4 Tsujido Nishikaigan
Fujisawa City, Kanagawa,
JAPAN

EUROPE/Scandinavia

WINJE & COMPANY
Postboks 462
Lillehammer
NORWAY

CARNET SKY SYSTEMS
143 Loder Road
Brighton, BN1-6PN
ENGLAND

CANADA

VOL LIBRE OUTAOUAIS
135 Louis Hebert Street
Hull, Quebec
CANADA J8Y-3S7

MULLER KITES, LTD.
5-1303-44th Avenue NE
Calgary, Alberta
CANADA T2E-6L5

AVIA SPORT
1655 Ave Lise
Granby, Quebec J2G-8C8
400 Racine est
Chicoutimi, Quebec G7H-1T4
CANADA

PRAIRIE WIND FLIGHT SCHOOL
978 Lindsay Street
Winnipeg, Manitoba
CANADA R3N-1H9

HIGH PERSPECTIVE RR #3,
Claremont, Ontario
CANADA L0H-1E0

CLASSIFIEDS

BUSINESS OPPORTUNITIES

CRYSTAL AIR SPORT MOTEL — Male/Female HELP WANTED: 15 hrs./wk. Exchange for lodging in Original Flyers Bunkhaus. Call or write Chuck or Shari, 4328 Cummings Hwy., Chattanooga, TN 37409, 615/821-2546. Home of SKY GEAR, Apparel & Accessories. Also, vacationing? Private Rustic Rooms. Waterbeds, Video Movies, Color TV, Pool.

35B, MXB/TFN [10/20]

MONEY MAKER

An Excellent Club "Money Maker." 1981 Yarnell Skyhook, Hydraulic Tow Winch, perfect condition, 4,000 foot rope capacity, works great with Hewlett-type bridle. Owner moving west. Fly and thermal safely without a hill. Great training unit. Operator can maintain glider altitude and speed over entire length of field from 5 feet for beginners to 1,800 feet for intermediate flyers. Cost \$4,300 new. Will sacrifice for \$1,900 (spend your money flying, not driving to a hill). Call 313/791-0614.

36

ADVANCED AIR PARACHUTE

Advanced Air Parachute — 2 years old. Never used. Will ship. Only \$150! Call 503/297-2835.

35

IMPORTANT NOTICE INSTRUCTOR CERTIFICATION PROGRAM

On August 9, 10, and 11, Crystal Air Sports will sponsor a Wills Wing Instructor Certification Program. A minimum of six (6) persons is required to actually have the program presented. Those interested are requested to send a \$50 deposit (total cost \$100) PRIOR TO July 15th, 1984. If 6 do not send deposits, any \$50 deposit which is sent will be refunded in full, and the program will be cancelled. After July 15th, if 6 do indeed sign up, no further refund will be sent, and as such, any NO—SHOWS at the program will forfeit their \$50 deposit. To schedule, write Tom Phillips at Rt. 4, Cummings Hwy., Chattanooga, TN 37409, or call 615/825-1995 seven days a week from 9 AM till 2 PM. Visa and Mastercard will be accepted, with the newly permitted surcharge fee.

Spcl 35

Aerial Dynamics

P.O. Box 151, Wildwood, GA 30757, 404/820-1962

SAIL REPAIR

Custom sewing and manufacture of stitched products are two of the services available from Aerial Dynamics.

But it's sail repair and construction to which that name owes its increasing familiarity. Aerial Dynamics performs this integral function on a small shop basis. Less bother that dealer networks and more personal than distant manufacturers. By direct contact of customer to craftsman, Aerial Dynamics can provide a prompt response to your sailwork needs at a reasonable price.

27B, MXB/TFN

WHOLE AIR CLASSIFIED ORDER FORM

20 cents per word (standard face), \$3.00 minimum.
phone numbers — 2 words; P.O. Box — 1 word; prices — 1 word;
make/brand/model/size — 1 word each; zipcode — 1 word.

Photos — \$5 (will be reduced to 1" height); Logos/other artwork — \$5 (will be reduced to 1" height); Larger photos and artwork, available at \$5 per column inch; CAPITALIZED words — 25¢ each; Bold words — 30¢ each.

Please enter my classified order as follows (exactly):



ALPHA AIRCRAFT — FLIGHTSTAR

Exclusive Central Indiana FlightStar dealer. Ground school with orientation flights available. Certified training free with purchase. Dealer for the Shadow ultralight, UP hang gliders and accessories. Write 145 E. 14th St., Indianapolis, IN 46202, or phone 317/636-4891 or 317/291-6406.

33B, MXB(12/20)/TFN

MOYES MAXI 200

Moyes Maxi 200. Excellent tow glider with tow bar and floats. \$675. Call 318/981-8372.

35, 36



Glued and sewn 1/4" Neoprene. One year guarantee on all seams. Solids — \$25.00. Customs — \$35.00. Call for colors. Ozark Mountain Hang Gliding Supplies, P. O. Box 5091, Little Rock, AR 72205, or call 501/224-2186 or 501/851-4359. Dealer inquiries on letterhead.

35 - 36B, 37B [12/70]

SAN FRANCISCO SCHOOL OF HANG GLIDING

Private and Group Instruction by Certified Instructors. Call 415/731-7766 or 992-6020.

22B, MXB

MOYES MEGA II

Moyes Mega II, excellent condition, \$700.00 or Best Offer. Call Jon Dietch at 312/674-3171.

33, 34B, 35B, & 36B

BRIGHT STAR HANG GLIDERS

Bright Star Hang Gliders, 3715 Santa Rosa Ave., Santa Rosa, CA 95401, call 707/584-7088.

30, MXB/TFN

MOVIES/VIDEO TAPES

AOLI, COMET CLONES, & POD PEOPLE — Award winning film of Owens Valley hang gliding, 60 minutes: \$64.95 **THE SKY BLUE MOVIE** — Epic quest for true flight, 100 minutes: \$74.95 postpaid. VHS/Beta, PAL or foreign, add \$5.00. C.O.D. call 619/878-2255. Rick Masters, P.O. Box 478, Independence, CA 93526.

MXB/TFN

HANG GLIDER EQUIPMENT COMPANY
For All Your Hang Gliding Needs. 3520 Wawona; San Francisco, CA 94116. 415/992-6020.

22B, MXB

HANG GLIDING BUCKLES

Photoengraved, solid brass, depicting soaring birds of prey. Exceptional quality. Send for free brochure! Massachusetts Motorized, P.O. Box 542-W, Cotuit, MA 02635.

31, MXB/TFN

MUST SELL

Must sell (1) 1979 Eagle ultralight and (2) 1981 Phoenix Model 168. Phone: 701/663-9334 (night), or 701/259-5901 (day), or write: 4421 Crown Point Road, Mandan, ND 58554.

36B(5/20)

LANCER 190

Lancer 190 with UP knee hanger. Excellent first glider and harness. Great condition. \$775. Will deliver Tennessee, Kentucky, or Alabama. Call 615/789-4058.

36



HIGH PERSPECTIVE LEADERS IN HANG GLIDING AND MICROLIGHT AIRCRAFT

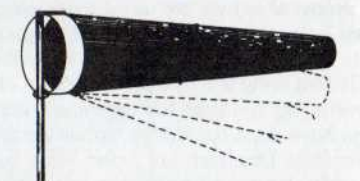
12 year, full-time professionals. Developers of the Chart of Reliability method of instruction. Sales and service of most major brands.

High Perspective, Inc.
RR #3, Claremont, Ontario
CANADA L0H-1E0

Toronto phones: 416/294-2536 or 294-9665

26, MXB/TFN

THE CALIBRATED WINDSOCK



015 WS — Indicated 0-15 mph; \$27.50
325 WS — Indicates 3-25 mph; \$33.00

Dacron and mylar professionally sewn into handsome 4' windsocks. Portable; attaches to any tube. All hardware, instructions, and calibrated chart included. Check or C.O.D. Shipping paid on pre-paid orders. Dealer pricing available. Carolina Ultralight, Rt. 6, Box 473B, Boone, NC 28607, or call 704/264-9351.

31, MXB/TFN

(You must pre-pay your first run. Subsequent issues will be billed. Be sure to include your full address, area code, and phone number even if they are used in your ad.)

Begin with _____ 19___ issue and run for _____ consecutive issue(s). My check or money order or bank card (enclosed legibly written bank card number and expiration date) is enclosed, covering the amount of \$ _____

Send To: P.O. Box 144, Lookout Mtn. TN 37350-0144, Att'n: Classifieds.

PRODUCT LINES

CHATTANOOGA, TENN. — The spring to summer transition has arrived, with the expected hour added to the end of the day(light), but with the unexpected addition of a whole new movement — wings, superwings, slickwings — call 'em whacha will. It's not really new, of course, as Dr. Horten's work back into the '30's proves. And Don Mitchell would also agree the newness of flying wings. But *new* is a relative word. For us in modern hang gliding, slickwings are new, and they're a-coming! Aero towing may have helped the renewed acceptance. Any readers with knowledge of wings under construction are encouraged to write this publication, so we can cover all that's happening. While we're on new wings, let's tell you about some flack we caught over our Pro-Dawn piece last issue. The unhappiness of one company involves our positive comments on a glider that is not certified, and not fully tested. Well, let's set the record straight! We do care about certification and structural testing. This is why we printed HGMA Prez Mike Meier's letter on complaints that body has with Skylines and Delta Wing (over their usage of the HGMA program before their equipment was actually approved by HGMA). Not only did we print that letter — which pointed to this publication's printing of such improper language — but we obtained replies from both "guilty" firms, and we deleted the use of "HGMA" from Skylines ad, plus verified the approval of Delta Wing's Light Dream before we ran that ad again. BUT, we do not feel any need for restriction whatsoever in the vein of interesting reading material. The Dawn struck us as being a very progressive-looking idea, changes in airframe structure mainly. It made a lot of sense in several areas to our layman-like minds, and we were sure you readers would enjoy it. You did! We've heard a lot of good comment on the story. We did not, however, say, "Go buy a Pro-Dawn!" We even disclaimed knowledge of how well it's capable of flying. But if we waited for certification by HGMA before we printed an article about new craft, we think *Whole Air* would be a lot less vibrant, and what our readership wants it to be. Considering we feel part of our responsibility to this industry involves helping to maintain enthusiasm, we aim to continue reports on new wing developments just as long as we can. Which length of time is only as long as support still comes from advertisers and subscribers. 'Nuf of this dribble. The good news! *Whole Air* is most tickled to announce even more development in our newsstand/bookstore program. As we climb over 2,000 copies each issue sent to bookstores and newsstands across America, we have eclipsed the lead *Hang Gliding* has always (in the past!) held over *Whole Air*. No more! *Whole Air* now sells more "on the newsstand" than does *HG*. In one case where *WA* shares a common distributor with *HG*, that distributor reports 40% more orders for *WA* than *HG*. The differences are evidently telling. And all that is without our newest outlet. A Canadian company has agreed to distribute another 500 copies all across western Canada. We'll have more on that story later. Next, we envision sales in Europe, as we gain momentum AND interested parties in Europe who've promised to help get us on the bookstands on the Continent. We'll obviously keep you posted on further progress of carrying the fun of hang gliding to "the man in the street." As we write this, the **Himalayan World Hang Gliding Rally** is scheduled to begin in 10 days (May 26 to June 10). But after several mailings from the organizers, correspondence and information seems to have dried up. We've written American contact, **Keith Nichols** (Also the Rally Director), but never heard back from him, tho we offered valuable editorial space if he kept us informed. And what of the \$15,000 total prize purse??? Nichols supposedly was flown to India to check the site and verify prize money. An earlier note said he (Nichols) wouldn't attach his name to something that looked weak. Yet...? Keith's a reliable name all right; what's the problem? We hope the same fate doesn't befall **Rick Masters 1984 Owens Valley X-C World Championships**. The Owens Valley event is soon coming — June 30 to July 11 — and we're expecting to get you a *Whole Air* view of the action. Masters has sent out a complete-looking brochure on the event with details and responsibilities thoroughly spelled out for all the rules and personnel. They'll be employing a sailplane contest orientation which will accommodate new performance ideas like **Ultralite Products** podded C2's (see news item and photo on page 10). The UP gang seems to be preparing quite a push for this year's Owens meet, undoubtedly hoping to keep Comet sales rolling along with continued success at Owens. Seems logical. Time will tell. Other projects may show as well. **Tim Morley's U-2 Superwing** should be in the pre-production prototype stage by then. We'll have more on that hopefully in our next (AUG 84) issue. But another project has reached our newsdesk. Seems Streak designer and former Delta Wing employee, **Bob England** has stepped out on his own. He's rented space with Pacific Windcraft and the purpose is reportedly a "wing" project about which it is said Bob will not speak at present. Will it show at Owens? Again, time will tell. At **Pacific Windcraft** itself, the activity level is said to be smooth and steady with glider

deliveries scheduled into July (as of mid-May). JMB's little company claims to have been steadily building 7 units a week, practically since Day One. That's a most reasonable performance, and if it is indeed steady — a vital factor in manufacturing — it's no wonder the company is on solid financial footing. Seventeen quality dealers are said to be supplying the orders, while representing a manageable size. Of course, as we've reported just recently, the Skylines business housed at Pacific Windcraft is complimenting glider production and no doubt is keeping everybody jumpin-to-beat-the-band up there in Salinas. Down south in Santa Barbara, **Seedwings** issued a similar report when we spoke to **Bob Trampenau** in mid-May. Bob happily says he's up to 95 Sensor sales for the year (many in various delivery stages). Considering the year is only 38% gone, Trampenau thought he could reach 250 units for '84. That would certainly take Seedwings out of the "small, custom builder" level and up toward the "big boys." Seedwings record in recent history is about like this: 1980 — 40 units; 1981 — 60; 1982 — 90; 1983 — 125; 1984 — 250 (?!?). All figures rough approximations (not directly quoted). More dealers are a primary reason for this year's growth. It's swell performance for a tenacious guy. **Dick Boone** also reports good response to his **Dawn** with over 40 units on order. His tests of the design are nearing the final stage, after which deliveries will begin, reports Boone. Pro Air will be sending a unit to *Whole Air* to be evaluated in planned comparative performance tests scheduled to begin in June. In these evaluations, two Cosmos aero tugs will pull two gliders to 3,000 feet for a side-by-side, wingtip-to-wingtip release. In smooth, stable air, long straight runs are planned with similarly sized pilots flying at the same speeds, as close to one another as safety allows. Should be interesting — watch future issues! Before moving into Southern California, the other glider supplier in the USA, **Airwave Glider U.S.** is reportedly receiving **Magic III's** in lots of twenty. They are said to be selling briskly. A "new" model, the **Magic Racer**, is also available, coming with minor tip changes in the sail, a Surf-Coat leading edge fabric with Tri-Ply trailing edge, standard faired down tubes, and the high quality workmanship implied by a "custom-built" sail. It seems a single person at Airwave's factory does all the work on the Racers to achieve the greatest precision. More on this (and hopefully on their intermediate **Magic Wizard**) later. Closing up in SoCal now, **Delta Wing** received — as they expected — a certification approved for their **Light Dream**. The intermediate is showing itself to be a big success and has kept them humming in Van Nuys. Evidently work is progressing normally on the 185; they expect to have it ready in 4-6 weeks. The Delta Wingers had a couple recent contest treats, picking up a First (Dave Snyder) and Second (Ted Smissen) at the Mt. Wilson Air Races (an 10 mile course, we were told). As of May 23, they had a Streak in Second at the San Diego function. Dave Snyder made a new local site record, 65-mile flight from Wilson to Yucaipa. Also see the *Stop Press Flash* at the rear of this column to catch Bennett's big news. Delta Wing has received their British-imported aero tug trike, but no pictures have been forthcoming yet. We've mentioned UP's directions already so we'll move to Santa Ana to see how Mikey and Stevey are doing. They say, "The **Skyhawks** are rolling off the production line, and they're coming out great! We have been particularly impressed with the 'cleanliness' of the sails and with the performance. We knew the Skyhawk had very respectable sink rate and soaring performance, but recent performance tests have indicated a substantially better glide ratio than we expected." No word of a "new" project at **Wills**, but we did hear Steve Pearson called to chat with Tim Morley about his U-2 project. More interesting than it sounds, the call from Steve is quite rare, as the Santa Ana Boys usually have Rob Kells do the telephoning. 'Course Steve's just 'keepin' informed,' we're sure. We didn't hear how successful Wills' 30-second TV commercial was, when it was to air on "Look to the Sky," the Recreation Network's aviation special. The fascinating-sounding production, in which Wills Wing was "heavily involved," could be seen in 40 cities from April 14 to June 2 (other cities have not had dates set yet). We'll wait for a report. That's it for now. Got news or opinions? Send 'em to: "Product Lines," Box 144, Lookout Mtn., TN 37350.

STOP PRESS FLASH — Within only days of Gary Engelhardt's record-breaking 104 mile Duck flight in the east-of-the-Mississippi Chattanooga area (see pg. 23), **Mark Bourbonnais** of Mississauga, Ontario, Canada — now, there's a mouthful! — flew his Streak 160 for 107 miles from a New York site to Harrisburg, PA or thereabouts! We're working on the full story, of course, but congrats are in order to Mark. He launched from a small 670 foot hill, achieved a max gain of 7300 feet, flying 5 hours nearly due south in the north winds fueled by a Canadian cold front. Apparently over the May 19/20 weekend (as we said, the *whole* story is still coming), it's ironic how close were the two 100 mile plus flights, both the first flights over 100 miles east of the *Mississippi*.

AIRWAVE
GLIDERS

NOW HERE TO SERVE YOU AIRWAVE GLIDERS U.S.

U. S. Certification In Progress

P. O. Box 1153 ■ Mercer Island, Washington 98040
206/232-7466