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INSIDE
Flying with Grafspars
The Ravens of Grandfather Mountain
WAC Glider Report, and
a new service, the WAC Directory.

Idea•Graphics, publisher
WHOLE AIR CATALOG
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Exclusive WAC Interview: Rob Kells

Setting Our Sites High,

WAC begins an on-going review of flying sites.

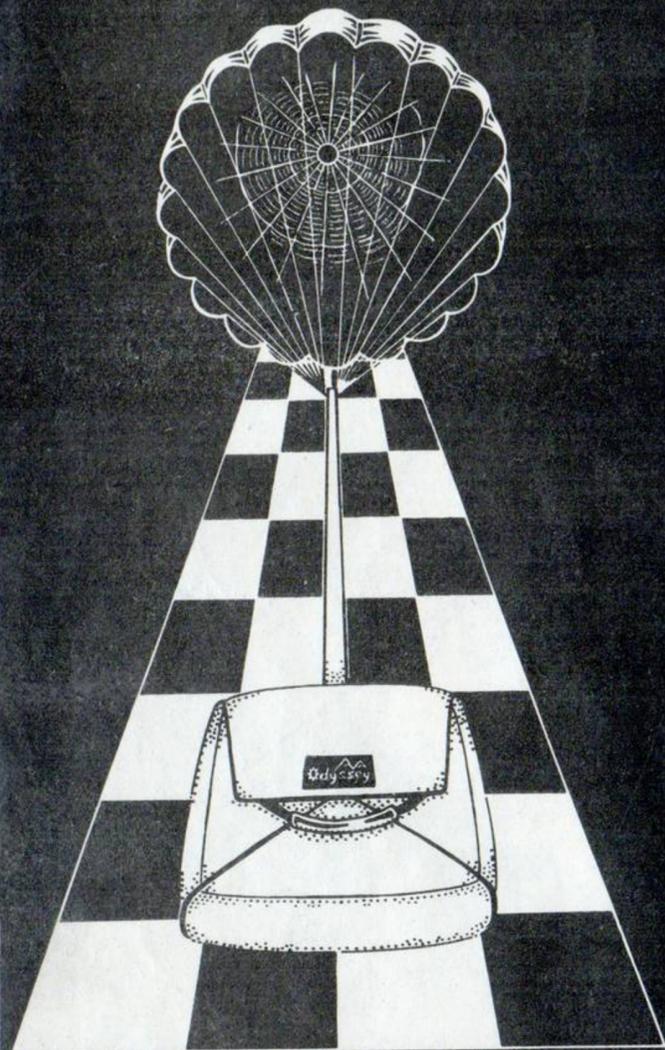
WAC Glider Report: Seagull Seahawk

Going Up!

A look at the popularity of Variometers.



photo by Tim Cocker



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quality and proven
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The Odyssey Emergency Parachute System is designed for fast, easy deployment and the fastest possible opening time. The quality and strength of our materials and construction is unsurpassed. It is available from most local dealers and distributors.

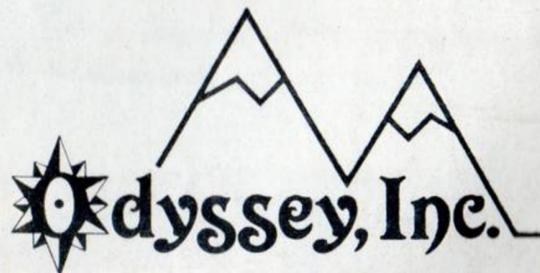
24' nominal diameter
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20 gores 20 V-tabbed lines
radial and circumferential
stress bands

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26' nominal diameter
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Write for our colorful new Odyssey Product Portfolio featuring a new line of harnesses, instruments, and accessories. (Please include \$1.00—refunded on order.) **Charge it!** We accept Visa and MasterCard, of course!



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• DEALER INQUIRIES INVITED •

Reader Inquiry Card No. 1

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If you're a serious pilot, you owe it to yourself to find out why . . .

This summer, six of the ten pilots on the U.S. Team will fly SEAGULL Ten or Eleven Meters at the F.A.I. Hang Gliding World Championships in Grenoble, France.

The 1979 Meter Series reflects SEAGULL's tradition of excellent craftsmanship and strong construction techniques with these refinements:

- * Larger lower twist airfoils for lower sink rates
- * A new camber distribution and keel pocket with a new method for applying the leading edge
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Reader Inquiry Card No. 2



SEAGULL AIRCRAFT

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WHOLE AIR CATALOG

Volume 2, Number 4, 1979

CATALOG NO. 8

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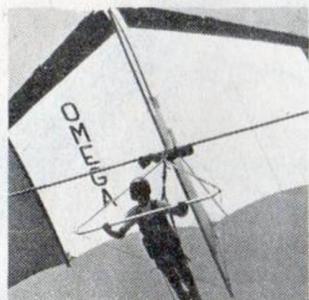
FEATURES



"THE TRANSFORMATION
OF A GLIDER PILOT"
by Larry Whitney
of Grafspan 14



"THE RAVENS AT
GRANDFATHER
MOUNTAIN"
by Don Baker and
Starr Tays 20



"WAC GLIDER REPORT"
The Wills Wing
Omega
by Dan Johnson 24

"FLYER,
A FLYING BAND"
by Starr Tays 30



DEPARTMENTS

FORUM	
Reader Commentary	6
HANG GLIDING STATISTICS	
Surveying	8
USED GLIDER BLUEBOOK	
Used Purchase Guide	10
CONSUMER ACTION LINE	
Help for Pilots	12
SAFETY TIPS	
Supine Flying	26
WAC DIRECTORY	
Where to Buy Source	36
PRODUCT LINES	
Consumer News	38

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Photo by PAUL WILLENBORG; Pilot RON FOSS

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OUT
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FORUM

It is now Forum II. Response was predictably good as pilots around the globe enjoyed reading opinions and thoughts of their fellow-airmen (air-persons).

By and large, pilots are a group interested in "hard" information, a group not deeply involved with "fanciful" writing. We are glad you

pilots take your flying so seriously as this must surely continue our improvements in safety. WAC will further its efforts to satisfy these desires.

But pilots are also caught by flight humor, and show a large measure of interest to the commentary of other aviators.

So, FORUM becomes a WAC regular department, offering that place to be heard. Use your Reader Inquiry Card and its space for comments. Below appears the best from our First Anniversary, May-June issue.

I am somewhat dissatisfied that you will have to charge for your magazine in the future, but I can hardly blame you. I like the short, newsy articles and consumer info.
R. Longley
Slingerlands, NY

Look forward to receiving your magazine — keep up the good work. There's too few hang gliding magazines like yours around . . . thanks.
T. Kutter
Springfield, OH

Please try to devote more space to articles concerning intermediate pilots. The May-June "Safety Tips" column is a good example.
W. Baker
Beckley, WV

If I push out — will I soar?



J. Forburger
Heavener, OK

More counterpoints on regulation. Not enough said against regulation; regulation is a way of life unbecoming to Americans.
R. Tone
Prescott, AZ

How about an article on drag chutes, chap flaps, etc. (glide angle control devices).
C. Hiatt
Albany, OR

Site educators instead of site directors. Think about it. Keep us advised on the latest FAA flight rules.
Thanks for the WAC.
D. Thursby
Thornton, WA

WAC is not wacky.
G. Littlefield
Santa Margreta, CA

I am 100% against government regulation of non-motorized hang gliding.
J. Pratt
Yuma, AZ

Your rag is still primo. Keep up the good work and keep listening to us non-professionals. How about accurate investigation of accidents?
G. Servant
Wheaton, MD

I strongly agree with Heckman's point of view.
N. McLeod
Sierra Vista, AZ

Excellent mag. It's time we had another publication with different views.
D. Dirks
Pacific City, OR

I am most interested in towing and safety. Can we (also) have articles about accidents — how they occurred and therefore could be avoided?
L. Fischer
Colorado Springs, CO

I don't like all this talk of government regulation!
J. Darland
Durkee, OR

You've got a great magazine! Glad to see an objective alternative to the other two publications, although both are good, too.
D. Lindberg
Snohomish, WA

Definitely against FAA involvement in the sport (except for powered hang gliders). If it comes to pass, (I) will probably become (an) "outlaw" flyer.
C. Staedler
Oakland, CA

Your type of magazine is needed in our sport. The surveys allow for good information distribution.
J. Shepherd
Aptos, CA

This latest WAC is much improved . . . it taught me, entertained me, informed me; a great balance of material. You have my support.
E. Lefson
Ann Arbor, MI

If you are interested in...

- STRUCTURAL INTEGRITY
- LIGHT, EASY HANDLING
- A PITCH POSITIVE DESIGN
- OUTSTANDING OVERALL PERFORMANCE

then take a closer look



RUGGED AIRFRAME

1 3/4 and 2" tubing!

NO CROSSBAR

Eliminates extra weight and drag.

STRONG CONTROL BAR

No bends, 1-1/8" downtubes, folds into bag in 5 seconds.

REINFORCED KING POST

Adjusts to tension rigging.

NO COST EXTRAS:

- Twist fastener coverbag
- Breakdown option
- Folding control bar
- Custom colors and over 8 years of Eipperformance quality built in!

ANTARES!

EACH GLIDER IS TEST-FLOWN BEFORE DELIVERY

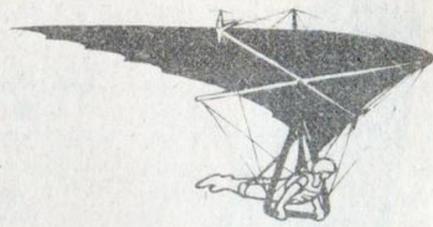
Reader Inquiry Card No. 3

EIPPER
PERFORMANCE

1070 Linda Vista Dr.
San Marcos, CA 920
(714) 744-1514

HANG GLIDING STATISTICS

By Dan Johnson



WHO'S THE BIG DEAL?

Our search is on for America's larger dealers of hang gliders. We found after our first survey into this topic that even more dealers exist than do models of hang gliders. This means that our first poll will not be very representative of the actual situation, but that in reality, it may take several polls for reliability (of figures) to develop.

In our first review, we counted 97 dealers. If you think about this for a few moments, you can draw out a couple points. First, most dealers do not sell many units per season. Secondly, this must cut into sales by full-time businesses. The initial conclusion is that it may be some time before the market solidifies enough to find the biggest dealer at all. And it will probably be longer still before all full-time shops are selling the majority of all new units. To some dealerships, this must be rather discouraging.

We will continue this survey, and present our findings as we go. For this issue of WAC, however, we will merely list the dealerships which showed the most activity after a single survey. Please, keep in mind that these results are hardly conclusive. Also, consider that we did not count sales direct from manufacturers.

Kitty Hawk Kites (NC)
Aerial Techniques (NY)
So. Cal. School of H/G (CA)
Sport Flight (MD)
Crystal Air Sports (TN)
Eco-Flight (MI)
American Wings (CA)
Hang Flight Systems (CA)
Windhaven (CA)
Monarch Sky Sails (CA)
LEAF (CO) dealt brands only
U.S. Hang Gliders (AZ)

These are the larger names at present. But also be advised that

nearly a third (32%) of all sales were transacted privately, and that one third of all cards received indicated no glider, or did not answer the question, or bought factory direct. Again, let's recall the survey needs much more input.

BRAND SURVEY

Your favorite statistical topic continues to be somewhat controversial. Some manufacturers who find their plants busy cannot understand how another firm could be "ahead." We have explained this before, but repeat that every used glider that is still being flown, is counted. So, present build rates are not solely the source of figures, tho, of course, they remain a large factor. What you readers report as your latest purchase, or present craft, is the brand and model which enters the survey. Trends in pilot "tastes," a subjective quality, do significantly affect the market shares in the short term. Witness, for example, the current movement to floaters. The sampling is utterly random and widely dispersed geographically.

But, to approach greater accuracy, we will now be dropping the results of the single (last) issue survey. Shown below is only the cumulative results, which are now well into their second year. This represents thousands of pilot questionnaires, and must be quite reliable.

GLIDER BRAND Cumulative Market Shares				
Rank	MFR	Last % Share	Now % Share	Change
1	Electra	15.5	15.9	+
2	Seagull	13.0	13.4	+
3	Wills	11.2	10.9	-
4	Sky Sports	8.0	8.0	=
5	Bennett	8.2	7.8	-
6	Eipper	7.1	7.1	=
7	U.P.	4.3	5.3	+

8	UFM	3.5	3.3	-
9	Manta	3.3	3.2	-
10	CGS	2.4	2.3	-
11	Moyes	2.0	2.2	+
All other brands		23.5	22.8	-

MOST POPULAR MODEL

1	Seagull Seahawk
2	Seagull Ten Meter
3	Electra Olympus
4	Electra Cirrus 5
5	Wills Alpha
6	Wills SST
7	Electra Cirrus 2/3
8	U.P. Condor
9	Bennett Phoenix 8
10	UFM Easy Riser

As with the glider brands, we are now going to give cumulative results only, for chute brand shares. In addition, we list a percentage for pilots who currently report owning back-up systems.

CHUTE BRANDS Cumulative Results

Rank	MFR	% Share
1	Advanced Air Sports	32.4
2	Bennett Delta Wing	26.8
3	Windhaven	21.4
4	Odyssey	15.7
	All other brands	3.3

Based on Number of Pilots Now Owning Chutes53%

Lastly, we again want to tell you how you and your fellow readers voted in determining the most popular articles from our First Anniversary Issue.

1	Hang Gliding Performance (Worthington)
2	Hang Gliding Statistics (column, Johnson)
3	Safety Tips (column, Smith)
4	Bird Flight (Burns)
5	Product Lines (column)

Next edition of H/G Statistics, we will feature a report on variometers — which brands are most purchased, how many pilots now own them.

GRAPHITE SPARS FOR GLIDERS THE HARD FACTS

The pure and simple truth is that nearly every glider manufactured in the last two years can benefit from Grafspan's Retrofit Program in these ways:

- 1) Stiffness** Guaranteed 100% increases to the certified strength of your leading edges, crossbar, downtubes, and/or king post are now being offered.
- 2) Performance** Leading edges that: 1) stay straight; and 2) have less tip weight will keep on performing better for almost all gliders.
- 3) Durability** Claw hammers have a hard time getting through our tubes, so hard landings, careless people, and transports are less likely to be a problem. Even instructors can go for that!
- 4) Participation** U.S.H.G.A. Safety Directors Region 3 and 2 agree that this product does not disqualify your retrofitted glider from competition.
- 5) Accuracy** Every design currently listed has been made available directly from the blueprints provided by the participating manufacturers. For you, we will even provide a set of detailed, concise instructions!
- 6) Simplicity** Grafspars are designed to incorporate today's fittings and hardware. Likewise special tooling isn't necessary to complete your retrofit conversion. The assistance of a qualified Hang Glider Dealer for miscellaneous parts and service is a good idea.
- 7) Price** The next legitimate generation of gliders will make extensive highly efficient use of graphite for the best price possible. *Right Now* a set of leading edge Grafspars for a popular example will cost:
Oly 160=\$199.75; Seagull 10 meter=\$182.50; Highster 170=\$206.00 (Price subject to increases in the cost of aluminum)
Included for your money will be a spec sheet on your glider listing the over/inner sleeves in aluminum for those of you who need to balance the strength of the crossbar or downtubes an appropriate amount.

Graphite design has come a *long way* in two years, and now— You Can Have It Safely, Cheaply and Immediately! Grafspan invites your order and your inquiry. We have more facts available in our brochure, "Designing and Building with Graphite Tubing". So for \$2 you can get more of the complete story while applying it to the purchase of your first graphite glider.

Dealers: We invite your request to participate as a qualified service merchant of graphite products. Your inquiry will be answered with the information necessary to conduct a successful program of education, sales and service. Strength, durability and performance are the key words describing Grafspars—just ask us.

Grafspan
incorporated

3365 Axford Road Santa Cruz, CA 95062 (408) 462-3737

CAREERFREE FLIGHT

USED GLIDER BLUEBOOK

EDITION NO. 8

NOTE: DEALERS! Write to us to participate in the Used Glider Bluebook. We would like to get your input on prices, to better represent all parts of the U.S.

MANUFACTURER	YEAR	MODEL	SIZE	CLEAN PRICE	AVG. PRICE	MANUFACTURER	YEAR	MODEL	SIZE	CLEAN PRICE	AVG. PRICE
ALBATROSS SAIL GLIDERS	76	ASG 20	C	550	300	MANTA PRODUCTS	77	Mirage	175	700	550
	76	ASG-21	C	575	400		MOYES DELTA WING	76	Mini	180	525
BENNETT DELTA WING	76	Phoenix 6B	Jr.	425	350	76		Midi	220	625	575
	76	Phoenix 6B	Reg.	425	400	76		Maxi I	200	650	550
	76	Phoenix 8	Reg.	450	450	77		Maxi I	200	700	625
	77	Phoenix 6C	Sr.	400	425	78		Maxi II	200	825	750
	77	Phoenix 6C	Reg.	500	425	SEAGULL AIRCRAFT	75	Seagull III	220	325	250
	77	Phoenix 8	Reg.	650	375		76	Seagull III	220	350	275
78	Phoenix 8 Super	Reg.	675	450	76		Seagull VII	174	600	350	
CGS AIRCRAFT	76	Falcon V	225	550	450		77	Seahawk	170	650	550
	76	Falcon V	185	575	400		77	Seahawk	190	675	600
	77	Falcon V	185	650	500		77	10.5 Meter	—	950	750
	78	Falcon 5½	Med	800	625	78	Seahawk	170	825	600	
EIPPLER FORMANCE	75	Flexi II	240	400	200	78	Seahawk	190	800	600	
	75	Cumulus V	180	400	300	78	10 Meter	—	1000	900	
	76	Cumulus VB	180	450	375	SKY SPORTS	76	Kestrel A	185	450	350
	77	Flexi III	185	675	500		76	Kestrel A	220	525	425
	77	Cumulus 10	Med.	595	525		76	Merlin	160	500	375
	78	Flexi III	Lg.	700	550		77	Bobcat III	Lg.	775	600
78	Cumulus 10	Med.	775	675	77		Sirocco I	156	775	500	
78	Antares	Med.	950	875	77		Sirocco I	175	700	525	
ELECTRA FLYER	76	Nimbus	20-17	200	125	78	Osprey	175	800	775	
	76	Cirrus	3	425	350	78	Sirocco II	164	950	850	
	76	Cirrus	2	425	350	ULTRALIGHT FLYING MACHINES	76	Easy Riser	Compl.	1125	850
	77	Cirrus	3	450	350		ULTRALITE PRODUCTS	76	Dragonfly Mk II	174	575
	77	Cirrus	2	450	300	77		Firefly	174	650	500
	77	Olympus	160	575	525	77		Dragonfly Mk. II	196	700	550
78	Cirrus 5	C	800	650	78	Sovder		176	850	675	
78	Cirrus 5	A	750	625	78	Condor	178	1000	825		
78	Olympus	160	775	700	WILLS WINGS	75	Swallowtail	22-20	225	175	
78	Olympus	180	725	600		76	SST	90	600	400	
						76	SST	100A	625	450	
						76	SST	100B	600	475	
						77	SST	100B	750	550	
						77	X-C	185	800	650	
					78	Alpha	185	975	775		
					78	Alpha	215	1000	800		
					78	X-C	215	950	775		

AT CGS AVIATION, WE'D RATHER OUR CUSTOMERS DID THE TALKING.

TERRY FINGER, MICHIGAN

"Needless to say, but I'll say it anyway, your reduction unit is great! It's nice to know you have the power to take off clean and climb, even with the poor airfoil on my wing..." "I'm looking forward to many enjoyable flights, thanks to my CGS Power System."

TOM CANFIELD

"After a slow start, only one word can describe your West-Bend engine package's performance: EXCELLENT!" "I have a couple of buddies who have a -----, and a ----- (belt driven) engine systems. My engine out performs them like crazy! I can outclimb both of them like anything! No comparison!"

NORTHERN SUN HANG GLIDERS, ST. PAUL, MINN.

"After selling more than sixteen CGS Power Paks, it has come to our customers and my conclusion that the CGS unit is the best all around power package available on the market today..."

JAY SAMPLE, FT. PIERCE, FLA.

"Your MAC 101 reduction drive power unit is an engineering masterpiece. I became airborne very quickly in my "Easy Riser" even though I weigh nearly 200 lbs. I have just ordered a new CGS power unit for my new Mitchell Wing..." "After seeing another beautifully crafted "Easy Riser" barely get airborne with another power unit, it is truly a relief to have power to spare."

THESE PEOPLE AND HUNDREDS MORE HAVE ONE COMMON DENOMINATOR TO THEIR SUCCESS...

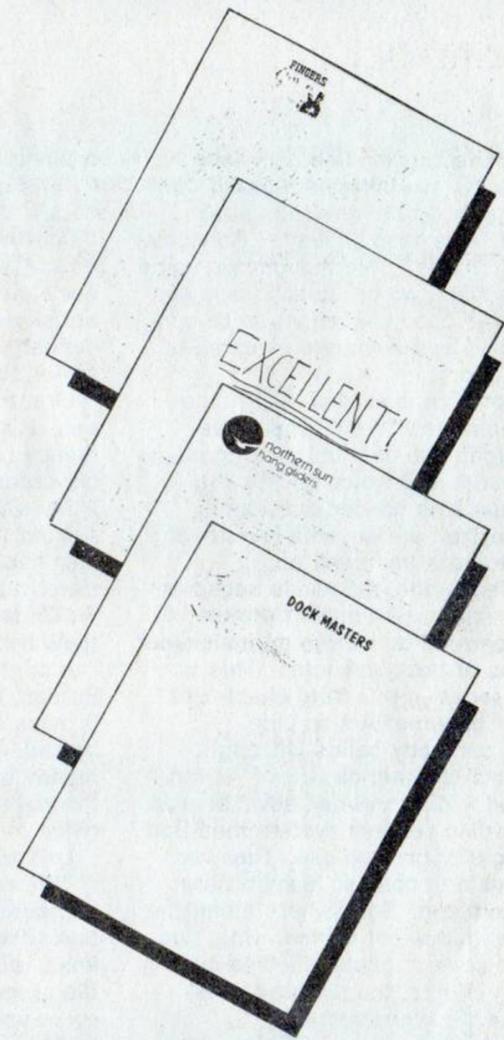
CGS POWERHAWK

★ ★ ★ LATE NEWS FLASH ★ ★ ★

Dick Clauson set an official altitude gain record for powered hang gliders of 11,700 ft. He did it at the Mitchell Wing Meet in Porterville, California and he did it with a CGS Powerhawk unit, of course.

CGSAVIATION

4252 PEARL RD., CLEVELAND, OH. 44109 (216) 398-5272



CONSUMER ACTION LINE

In the January-February issue of WAC, we initiated a brand new program, and a new column as well. It is hang gliding's "Consumer Action Line." We thought we could help since we have such large and regular communications with consumers and suppliers involved in the sport.

Some time passed . . . and no complaints. "Well, great," we thought. No one feels wronged. Unusual, but welcome. So the Action Line handed out some motorized advice, as a few unwary customers had been stung.

Meanwhile, the winds began to carry news of a major problem concerning deliveries on mail order sales of back-up chutes. This is our focus in this third chapter of the Consumer Action Line.

A company called Ultralight Sports of America (US of A) ran an ad in *Glider Rider*, advertising a Guardian reserve system modified for glider back-up use. They ran the sale at cost, so many orders were taken. Somewhere along the path, things got behind. One, two, then several pilots failed to get their chutes, tho full payments (\$214.63) were sent.

One consumer, Mr. Grant Harris, wrote WAC's Action Line. He also wrote *Glider Rider* and *Hang Gliding* plus the postal insepctor handling mail fraud. Another, Mr. G. A. Wiley ran a notice in *Glider Rider*. Both appealed for help. WAC corresponded with each, Mr. Harris first. Then we wrote Blaise LeWark, manager of US of A. WAC had a home address which the customers did not have. LeWark wrote back promptly,

"We've sent Grant his refund check . . ."

They did so, it bounced, and subsequently renewed it via a

cashiers check.

"His original check did come back but our bank failed to send us notification of same, so we had no way of knowing till we noticed our check hadn't come back in our statement. Our bank missed a deposit at another branch and fouled us up to no end."

Grant Harris confirmed that indeed he had finally gotten his money back, eleven months after his order was sent.

Mr. G. A. Wiley sent money in August of 1978. By May '79, he also had no chute and no money. He writes,

"*Glider Rider* has refused his (LeWark's) ads and written a letter. I've contacted Better Business Bureau, U.S. Postal Inspector, Dave Broyles of USHGA, and all have helped — but I still don't have money or chute. As for LeWark, I've called three times and written twice . . ."

LeWark responded,

"We ran one year with chutes at 'our cost' and it was more of a task to administer than we imagined. We lost (money) on the program; Oh well . . ."

. . . and later on in the letter, "We've not been hiding; we just moved to newer and nicer quarters, new address and phone number."

A last bit of news in this saga is good. Caryl Syjut, circulation manager of *Glider Rider*, had been following up on this problem for G. A. Wiley. She reported to me in early July on Wiley's request saying he informed her that his money was finally returned. Wiley knew of others evidently put off by US of A, and they also have been compensated.

The conclusion thus appears satisfactory. US of A has made amends for delinquent service, late

perhaps, but positively. At least, so far as we know. All's well that ends well, correct?

LeWark's letter was up-tempo, overall.

"We think you're doing the sport a great service with this 'Action Line'! We appreciate your attitude as to 'hearing our side of the story.' Keep up the good work. We just got your new *Catalog* — looks great!"

Thanks LeWark. For the complimentary remarks, but more importantly for doing the right thing.

Now, the postal service finally delivered a letter which has been in the mails for what looks like months. It's a note from Dave Nelson of Michigan Manta, Frankfort, Michigan. Seems Dave lost some money sent to Peregrine Aviation for four harnesses. He got two and then heard nothing.

Also rumor reports some San Diego pilot fees were missing with Mr. Chuck Persons, once-proprietor of Peregrine.

Our attempts to contact anyone affiliated with Peregrine have been complete flops. Even a visit to his old residence was fruitless. Can any readers help in this dilemma?

A WAC reader sent an order to Denis Dubanevich for a hang glider mobile advertised in the November-December WAC. So far, no mobile. We wrote our one-time advertiser. He has also gotten us, as half his ad bill remains outstanding. No word. We'll keep trying, but meanwhile, be advised against an order placed with this individual. (The ad appeared on page 28 of WAC issue No. 4.)

WILLS WING ALPHA!



SAFETY, PERFORMANCE, QUALITY YOU CAN DEPEND ON.

"The **ALPHA'S** handling inspires **total** confidence. Within seconds after launch on my first flight in the **ALPHA 215 I knew** I had the control to safely turn back into the ridge to follow the first marginal thermal that came along. So I did."

- Chris Price

"I'm **totally** impressed with the **ALPHA**. Its combination of easy handling, stability in unusual attitudes, and excellent sink rate makes it an exceptional thermalling glider. The quality of the workmanship and hardware is unsurpassed."

- Dick Stern "Old Man of the Mountain"

"The **ALPHA** is a true **supership**...it feels utterly stable regardless of the bank or pitch angles...this may make the **ALPHA** the best thermalling glider I've written about in this series."

- Dan Johnson, *Glider Rider*

NEW FOR 1979!

Wider leading edge/porkel
Expanded upper speed range
Improved sail design
Velcro batten retainers
Durable fiberglass/foam battens

SPECIFICATIONS

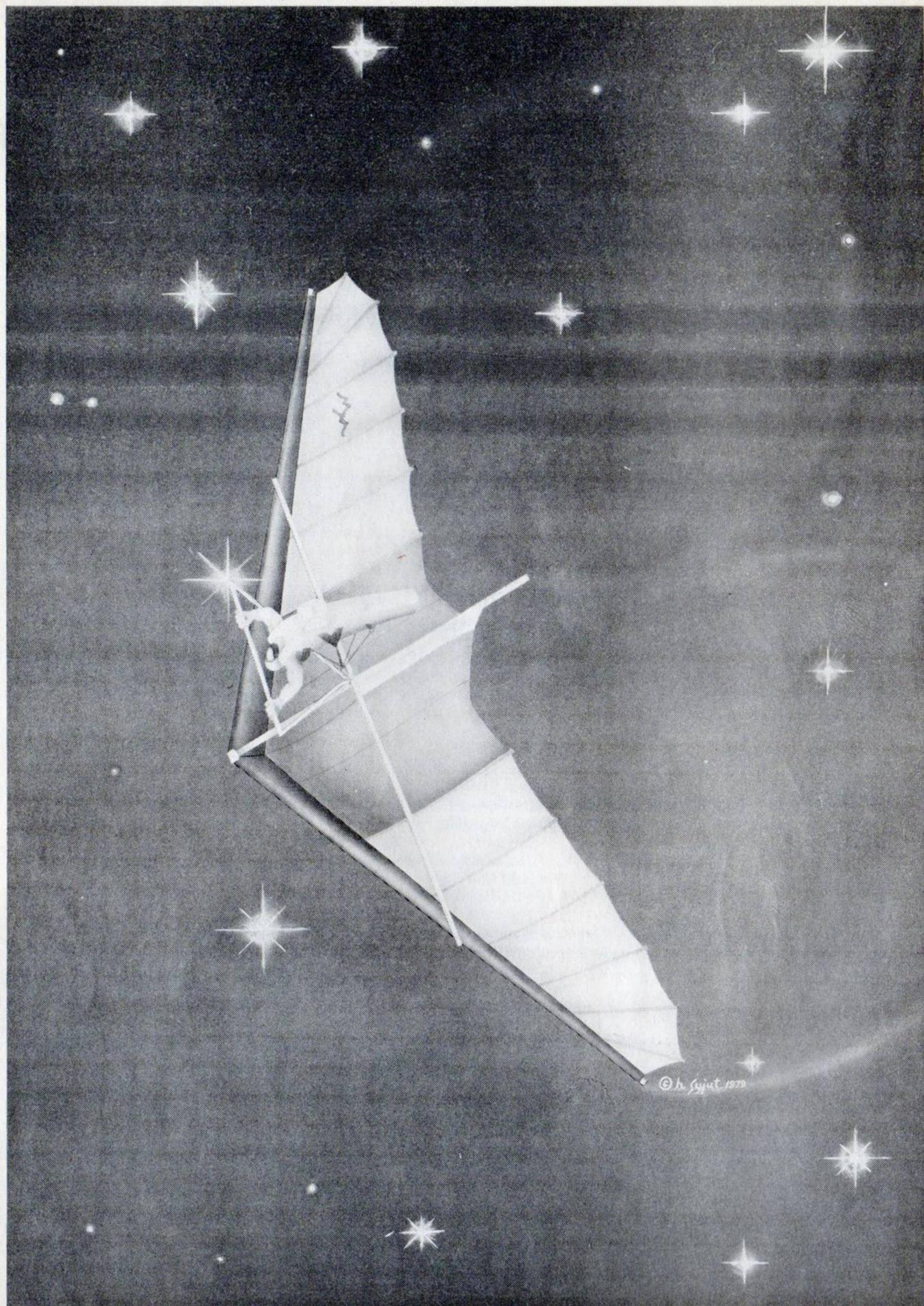
AREA	245 ft ²	215 ft ²	185 ft ²	155 ft ²
SPAN	37'	34.5'	31.9'	29.3'
PILOT (FLYING) WGT.	190-250 lbs.	165-205 lbs.	140-175 lbs.	110-145 lbs.
GLIDER WEIGHT	56 lbs.	49 lbs.	46 lbs.	43 lbs.

AFTER ONE FULL YEAR OF PRODUCTION, NOT A SINGLE ALPHA HAS EXPERIENCED A STRUCTURAL FAILURE OR PITCHOVER.

Reader Inquiry Card No. 6

WILLS WING, INC.

1208-H E. Walnut
Santa Ana, CA 92701
(714) 547-1344



The Transformation Of A Glider Pilot

by Larry Whitney

I remember the days when my flights were about not exceeding my glider's limitations. Take the idea of hooking into a bamboo bomber to give yourself an idea of the change that is Hang Gliding today. The sport has come a long way when you consider that one of our concerns is being spit out of a thermal at 15,000 feet! For me, the thrill and the joy of flying has taken a quantum leap — many thanks to Grafspars. Now my concern is directed with full attention to the freedom of mastering and expanding my own limitations. What is a Grafspar?

What do they have to do with flying ability?

Grafspar is the trade name for a product by Grafspan, Inc.; specifically, it is a graphite-reinforced aluminum tube. It is literally a space-age product. When I replaced my aluminum tubing with Grafspars, my glider doubled its strength *and* dropped four pounds. What that did for me was to eliminate my fear that my glider could break. When I did realize that my fear was gone, that the problem of my glider breaking was handled once and for all, the only thing left to face was me. After all, now that I know my glider is a reliable tool, my fear for expanding my flying ability suddenly comes up as an artificial barrier limiting my experience.

Every time I prepare to launch or explain my hang gliding experience, I always address the part about judgment, micrometeorology, and the thrill of being justly rewarded. Your experience is just like mine; you address the questions, you participate, and reap the self-satisfaction of putting yourself and your equipment to the test.

Several weeks ago at the Northern California Regionals, I approached my flying from a different perspective. My glider became an extension of myself. I distinctly recall pushing away the barriers and simply going for the gusto! There were a lot of firsts for me that week; my first sanctioned competition, my first tandem flight (with 2500 feet of vertical airspace and a 1.8 pounds-per-square-foot wing loading). You should have seen and heard that

beaming, beautiful expression of aliveness that my pretty tandem-copilot gave everyone at the landing zone! Then there was an altitude gain the next day of 5500 feet — over a mile — to 9700 ASL! The task specified giving maximum points for 120 minute duration. Passing that two-hour minimum, and then going for the spot after two and a half hours sure pushed away a lot of cobwebs. Just being at the meet was a reward; but the best was meeting new friends, and sharing meals and the "secrets" for maxing out the competition site. Naturally, not every flight was a competition flight. One of my other firsts was under a full moon at midnight. All that clear, crisp air gave me the opportunity to dominate to smithereens a pylon I had missed that afternoon and to finish with enough altitude to power-run a series of past-vertical wingovers above a beautifully-reflected, white rock landing area. I slept so good that night!

Throughout that entire week I noticed to amazement how pleasurable it was flying a glider that performed like it was super-tuned. I have flown my early-production Alpha 215 for more than a year; and, although I applaud Wills Wing for an excellent, highly-stable design, *there is a difference*. I have been aware of a little bit of tip flutter that always becomes more dramatic approaching 45-50 miles per hour. With the extra stiffness of my Grafspar-equipped leading edges, my speed range has literally gone off the scale! The extra sail billow that normally occurs with airframe flexure near

top speed was significantly reduced and delayed. I am going to have to get one of those new Hall airspeed indicators to discover my new top speed. It was especially exhilarating when Walt Nielson, Third Place Regional Qualifier, slapped me on the shoulder following the third day's speed task and said, "You really got down fast!" I loved it! Finished 24th, too!

No doubt about it, I cannot hide my Grafspar-equipped glider. Those glassy, dark blue crossbars invite lots of questions and a careful examination. Most people start by locating the Grafspars in my leading edges, then they ask about bending load distributions, leading edge flexibility, sail shaping, and weight loss. I love answering those questions; they're easy! Especially when I can feel the difference in the air. Consider the weight-reduction aspect: Each of my leading edges dropped one and a half pounds with the loss distribution increasing towards the tips. Now, recall that super-tuned feeling I mentioned before . . . the loss of tip weight has quickened the roll response just so. My tried and true glider still has that characteristic handling response, and what I know is that I am not working as hard as I used to when I initiated a control movement.

Just one of the great things about Grafspars is having my glider and my piloting transformed. Go ahead and ask Bill Boyum, Don Whitmore, Tom Price, Graeme Bird, Miles Potter, and Al Kramarz. They will give you a great story about Grafspars from their own experience.

WHAT ARE GRAFSPARS?

A **Grafspar** is an aluminum tube specially reinforced with Graphite fiber in a process developed by Grafspan. The finished product is a spar which has the advantageous characteristics of aluminum with the strength of graphite.

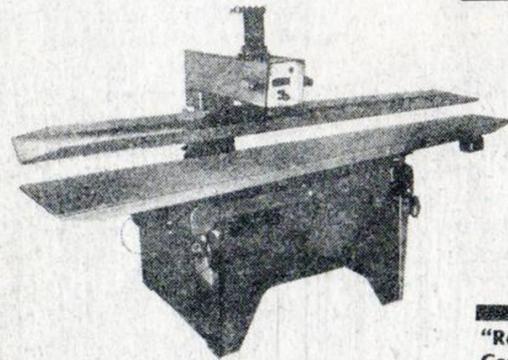
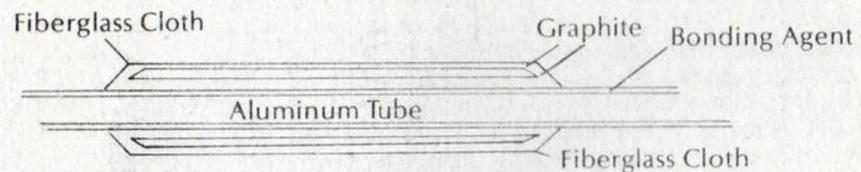
COMPOSITION OF GRAFSPARS

Current composition of a **Grafspar** is aluminum, fiberglass cloth (used as a corrosion insulator), uni-directional graphite fibers and a fiberglass shell.

The graphite fiber used in **Grafspars** (1048 AE) is a heat treated, complex hydrocarbon developed by Union Carbide. It was originally utilized by NASA for projects requiring a material of light weight, high material strength, and low response to temperature variations. A variety of tensile strengths and elasticities may be obtained from raw graphite fiber by varying the amount of heat treatment and the type of epoxy resins used. This particular Epoxy Pre-impregnated Graphite System (1048 AE) was chosen for use in **Grafspars** for its balance in modulus, tensile strength, and low cure temperature.

The special fiberglass epoxy shell provides a product that minimizes maintenance costs, and can endure abuse which simple aluminum spars could not withstand. (For more information, send for our report "Damage Assessment"). As a result of this durability, use of Grafspars should result in less down time from the replacement and retuning of bent tubes.

GRAFSPAR

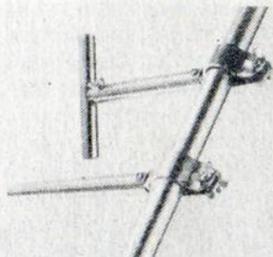


"Rolling Table" by Century Design, Inc.

Grafspars are made by first sanding the outside surface of the aluminum tube. Next comes the application of the inner layer of glass which is bonded to the aluminum with an additional layer of special metal to glass epoxy. This inner layer plus all subsequent layers of graphite and glass are rolled onto the tube by a device called a Rolling Table. The Rolling Table works on a principle similar to that of rolling a pencil between the palms of your hands. This combination of materials is then cured under controlled temperature, time, and pressure, according to a special Grafspan process. The end result is a product with a deep blue, smooth glassy surface.

Each **Grafspar** is durable, spliceable, drillable and repairable, and has a strength of predetermined value. By selecting from a variety of aluminum tube diameters and wall thicknesses, the amount of required graphite can be adjusted so as to achieve a desired strength while maintaining a degree of control over the weight, cost, and finished outside diameter of the tube. The result is a versatile, strong **Grafspar** that can be used without special tooling.

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Reader Inquiry Card No. 7

Pictured here, FRANCIS ROGALLO, age 67, flying his SEAHAWK by SEAGULL AIRCRAFT.



"The State of the Art"

Over the years, people have told us that they believe the SEAGULL leading edge shape was a trademark or gimmick. This could not be further from the truth. Much care goes into the intricate curves of the SEAGULL semi cylindrical/anedral leading edge. The price of such an airframe is not inexpensive, considering the specially trained fabricators, custom bending machinery and jigs. So why is the SEAGULL shape superior?

First, when discussing sail glider design, an accepted fact is that the lower the aerodynamic twist of the wing (keeping the camber and planform the same), the better the glide angle and the lower the sink rate will be.

There are two methods used for achieving low twist on a flex-wing sail glider. On a glider with straight leading edges, one can only tighten the sail to reduce aerodynamic twist. This pulls the trailing edge of the sail/wing down toward the theoretical minimum, a flat twistless trailing edge. This method of twist reduction has been used on many gliders, from short-keeled standards, to the "super ship class" of today.

Gliders using this method of twist reduction have several drawbacks. Simply tightening the sail reduces the overall flexibility of the glider. This slows the roll rate and increases the pressure considerably. The decreased flexibility hurts the stall/spin characteristic by not allowing the sail to shift to the side that needs more twist. This would help prevent a tip stall from occurring. The structural drawback is simple. The sail glider with the tighter sail will put an increased load on the airframe making heavy reinforcements necessary to retain adequate strength.

The SEAGULL method using the semi cylindrical/anedral leading edge shape, reduces aerodynamic twist without flattening the sail. This is done by raising the front of the sail, (curving the leading edges to a cylindrical shape), to produce a sail leading edge curve that matches the trailing edge shape. So . . . instead of pulling the trailing edge down to produce low twist, the SEAGULL technique is to raise the leading edge. This allows a low twist wing on a relatively slack sail. SEAGULL gliders have always had very low twist, compared with all other gliders on the market, yet their handling and safety have always been superior.

TOM PEGHINY



Photo by Scott

SEAHAWK
155 180 200

SEAGULL
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CALL OR WRITE TODAY: SEAGULL AIRCRAFT, 1160 MARK AVENUE, CARPINTERIA, CA 93013 (805) 684-8331 OR CONTACT YOUR LOCAL SAIL GLIDER DEALER.

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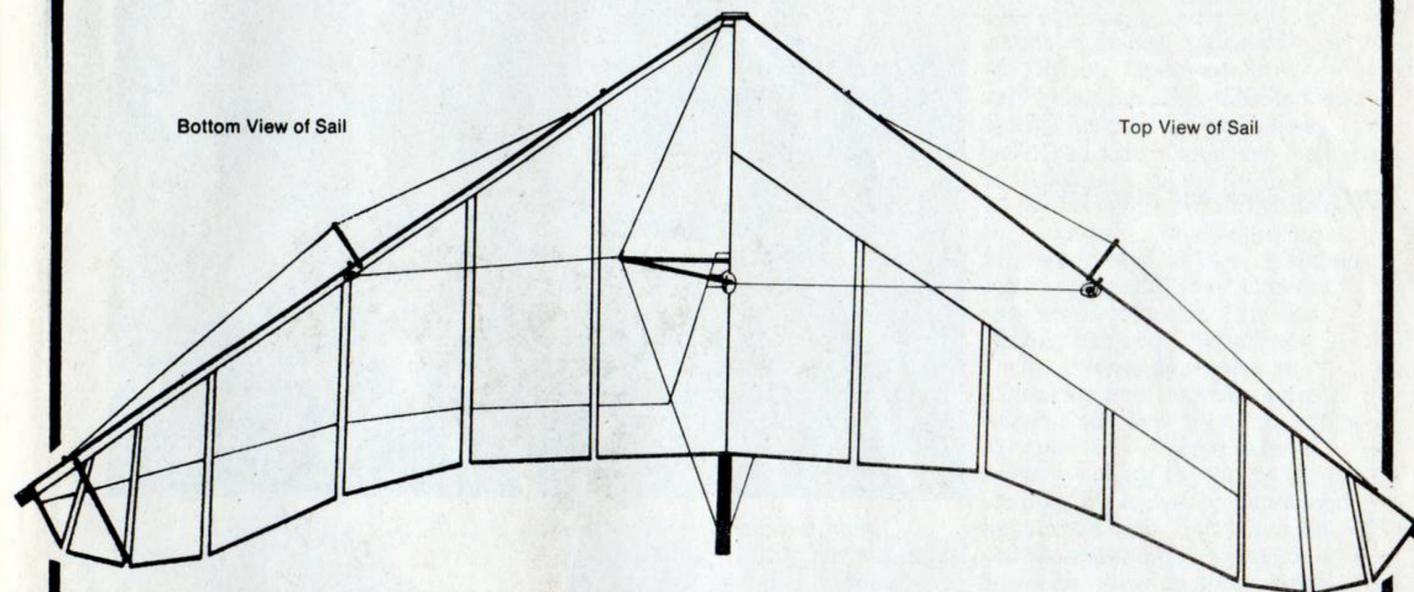
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More Reasons for Owning a Highster — The ALL SEASON GLIDER !!

Most gliders excell at something; there are gliders designed for marginal days, for ridge flying, for thermal flights . . . which is fine — if you're a "one-condition" pilot. Most flyers aren't.

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If you have fun flying, and don't want to miss a day because your glider's limits don't fit the conditions, then you'll have more fun — on the **Highster!!!**

HIGHSTER SPECIFICATIONS

MODEL	150	170	190
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Area	152 sq. ft.	168 sq. ft.	188 sq. ft.
Leading Edge Length	18'	19'	20'
Aspect Ratio	6	6.02	6.1
Root Chord	9'8"	9'11"	10'2"
Nose Angle	110°	110°	110°
Empty Weight	50 lbs.	52 lbs.	54 lbs.
Pilot Weight Range	105-155 lbs	150-180 lbs	170 lbs +
PRICE	\$1,395	\$1,425	\$1,455

Fully ribbed 90% double-surface sail
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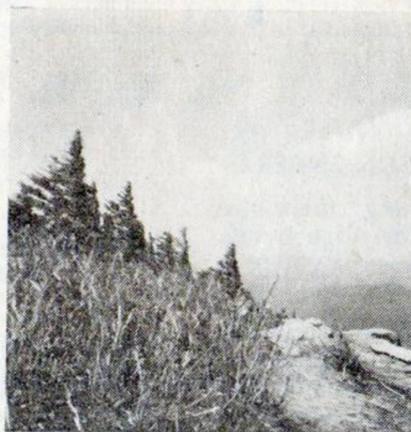
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Reader Inquiry Card No. 11

The Ravens at Grandfather

by Don Baker and Starr Tays



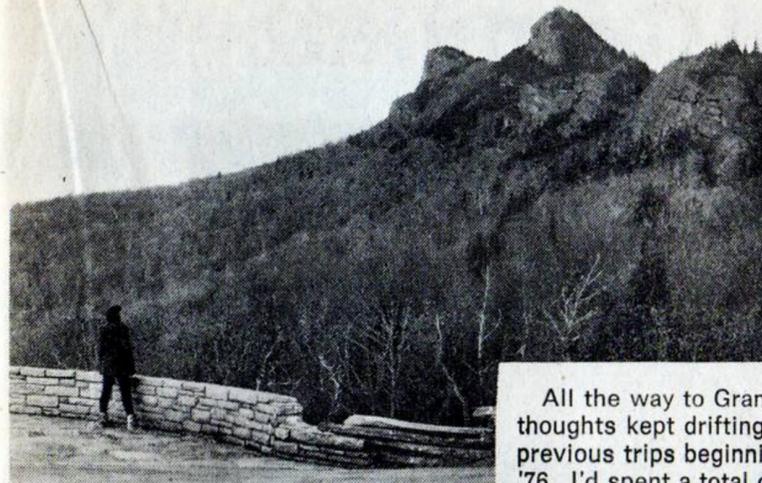
Just by looking at Grandfather Mountain for the first time, you begin to understand. It fit none of my preconceived notions about the way the Southeastern mountains are supposed to look. The launch is 6,000 feet above sea level, the landing field is 1,500 feet below and over a mile away. More exposed rock juts above its neighboring elevations than elsewhere in the Southeast, making it appear as an alienated refugee from the mighty Rockies. Grandfather holds a lofty ominous presence over the other green rolling mountain nearby.

This feeling is further enhanced when you arrive on top and notice that the fir and scrub pines on the side of Grandfather are permanently windswept. They seem almost Bon Sai in design; the trees are so wind inclined that even the light and variable days maintain an illusion of strong, constant winds. This, however, is more real than deceptive, as winds have been recorded up to 167 mph!

Like many others, I had my own imaginary conception of Grandfather Mountain before I arrived. Undoubtedly, these were born after hearing countless pilots relate their attempts to soar this "Hang IV Only" site. Their goal: to qualify for the coveted "Order of the Raven" award. *Qualifications for presentation demand that recipients must have soared for more than one hour of continuous, powerless flight in a glider launched from the 6,000 foot peaks of Grandfather Mountain.* Most pilots return grumbling about not making it, not even coming close. Some come back without even setting up their glider.

One hour in the air is all you need to qualify. Out of 200 awards

to be given away since its inauguration, only 87 pilots have succeeded. Why is soaring this mountain so difficult. I just couldn't relate to this being so elusive a feat. After all, flights in the Chattanooga area are frequently this long; even longer for the more experienced pilot. Until I got the chance to go personally, to watch for myself, I remained perplexed. Then a friend, Don Baker, attempted what so many have tried and failed . . . to earn his "Raven."



All the way to Grandfather, my thoughts kept drifting to my three previous trips beginning in May of '76. I'd spent a total of 13 days with 5 sled runs and one soaring flight of 25 minutes logged, but I felt optimistic of my chances. I had 7 days to do nothing but try and earn my "Raven." Little did I realize how short and frustrating a week could be.

Tuesday — Arrive Grandfather 2:30 p.m. One flight off of back side. Small weak thermals, barely able to make a full pass. Missed first landing field, had to land at lake.

Wednesday — Winds 40 mph. Watched Hugh Morton's "Masters of Hang Gliding" film 3 times.



Grandfather Mountain, Linville, N.C., will host the 4th Annual Masters of Hang Gliding Championship, Sept. 11-16, 1979. Be sure to attend!

Thursday — Winds out of the S.E. again. Launched at 1:30 into 10 mph winds. Caught several small thermals, gained 600 feet. Clouds began forming all around, lots of cloud suck, severe turbulence. Landed at McCrea Meadows. Strong ground winds, difficult landing, slightly bent downtube. Total flight duration: 25 minutes, disappointing.

Friday — Generally same conditions as Thursday. Didn't fly, needed a day to rethink Thursday's flight.

Saturday — Rain, rain, rain, movie.
Sunday — Rain, 45 mph winds, rain, movie.

Monday — Blown out. Converted old standard into roof racks while waiting. Movie.

Tuesday — Last day. Pending disappointment beginning to show. 11:30 winds N.W. 25 to 30, complete cloud cover 400 above. Jeff Burnett launched, soared over an hour in and around clouds. Decided not to take my 180 Oly into higher winds, tho very tempting. Over-development, storms for over an hour and a half. 2:30 p.m. Cloudbase cleared to 10,000 feet, winds North 8 to 12. Wind dummied, turned wrong way on ridge. Immediately lost lift, had to land at lake. Watched Joe Foster and Robert Crowell soar for 45 minutes. Felt like walking back to Chattanooga. 5 p.m. Frontal passage, clear blue skies and thermal cycles. Hopes rise. Arrive on top, winds 35 to 40 mph. Decide to set up anyway, hoping for the cycles to mellow. 6 p.m. winds decreased to 25 to 30 mph. Jeff launched and thermalled quickly to 1,000 above and flew to McCrea Peak. 6:15 — launched into 20 mph winds. Worked to 400 above but not enough to get to McCrea where Jeff is 1,000 above me. 6:30 — Low cycle, back to 100 feet above ridge level, worked and waited for next cycle. 6:40 p.m. — Finally, lift enough to get 500 above and try for the peak. 6:45 p.m. — Bad timing, lost 800 feet, can no longer see launch or landing on the other side of the point. Hopped between front ridge and bowl on back ridge for 5 minutes looking for lift. 6:50 p.m. — see Jeff coming 1/2 mile downridge and going up. Remembered he said before launch to follow him if possible. Low, but decide for last ditch attempt. Arrived 800 feet below Jeff and right in the middle of a large 250 fpm thermal. Climb to 1000 above where Jeff left me to finish on my own. 7:10 — Sudden realization I'd been flying for 55 minutes. Hard to believe a three and a half year dream was only 5 minutes away, and the lift was getting better and smoother. 7:30 p.m. — A perfect landing at McCrea Meadows and the moment you become one of only 87 to see, feel, and dream the "Order of the Raven."

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If you've never ordered from the ODYSSEY PRODUCT PORTFOLIO you're probably wasting gas and time shopping for your hang gliding needs. You may even be paying more than you have to! Besides, getting packages in the mail is fun!

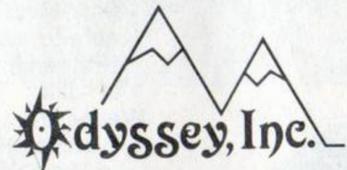
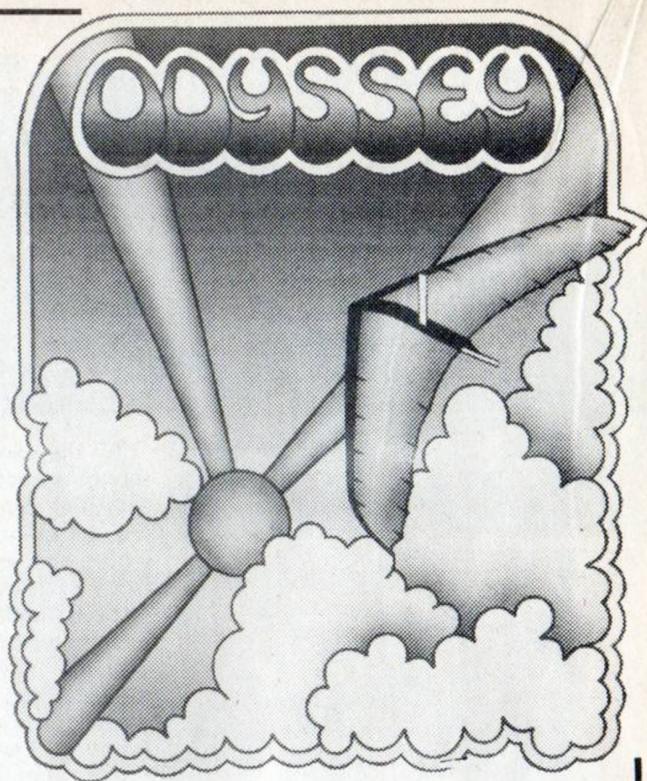
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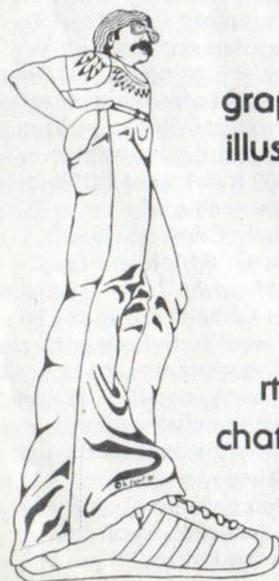
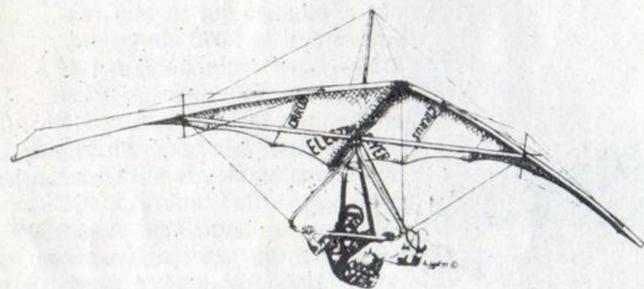
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**THE HALL
WIND METER**

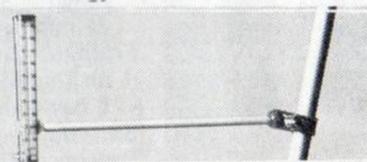
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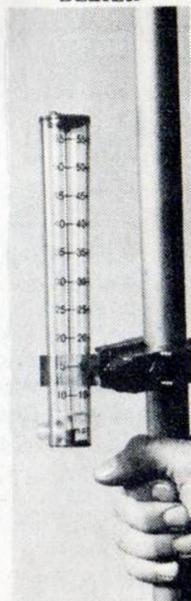
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**WILLS WING
OMEGA**

**A NEW DIMENSION IN SOARING
PERFORMANCE**

PURE PERFORMANCE

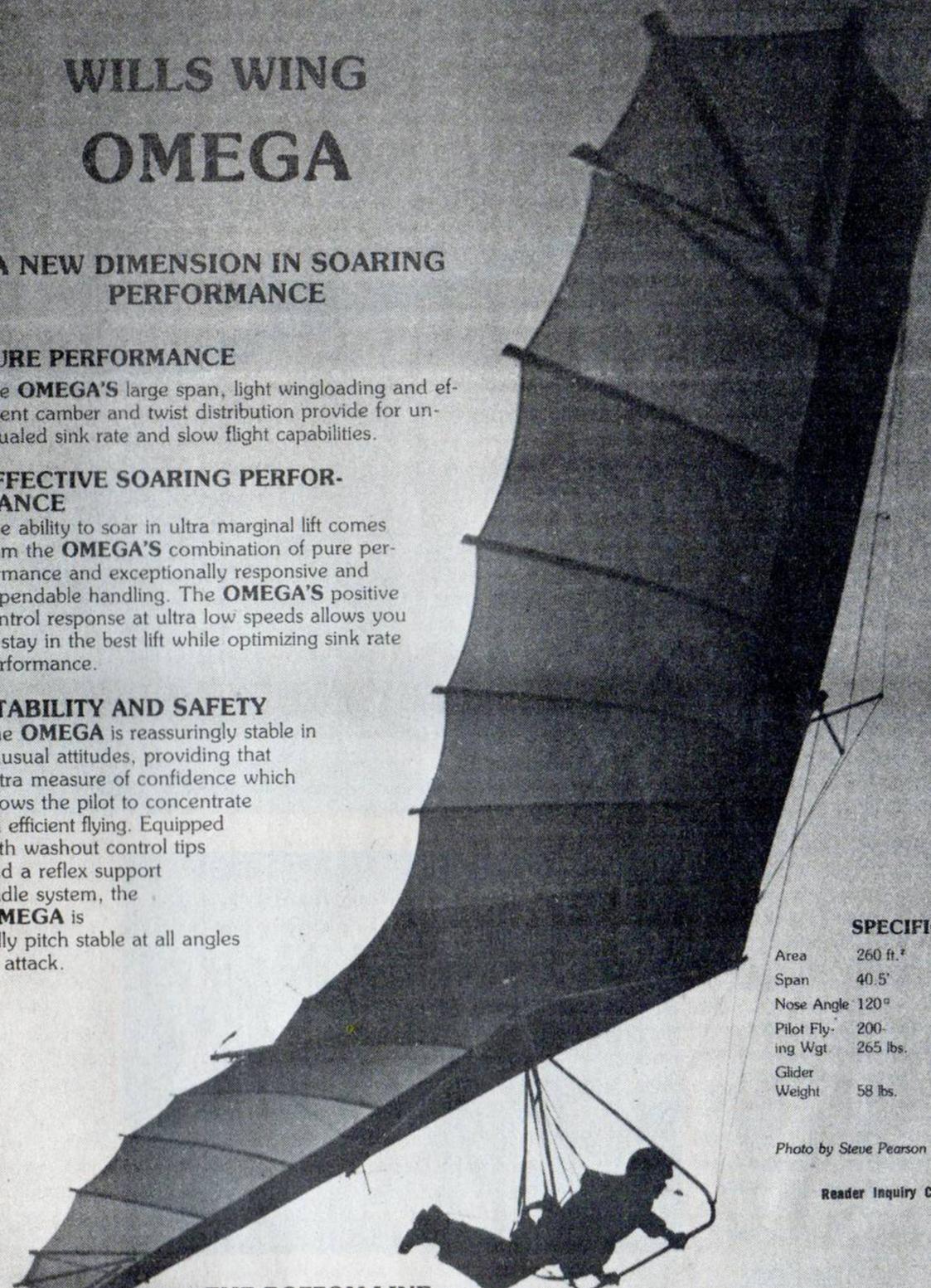
The **OMEGA'S** large span, light wingloading and efficient camber and twist distribution provide for unequaled sink rate and slow flight capabilities.

EFFECTIVE SOARING PERFORMANCE

The ability to soar in ultra marginal lift comes from the **OMEGA'S** combination of pure performance and exceptionally responsive and dependable handling. The **OMEGA'S** positive control response at ultra low speeds allows you to stay in the best lift while optimizing sink rate performance.

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The **OMEGA** is reassuringly stable in unusual attitudes, providing that extra measure of confidence which allows the pilot to concentrate on efficient flying. Equipped with washout control tips and a reflex support bridle system, the **OMEGA** is fully pitch stable at all angles of attack.



SPECIFICATIONS

Area	260 ft. ²	220 ft. ²	180 ft. ²
Span	40.5'	38'	35.5'
Nose Angle	120°	120°	120°
Pilot Flying Wgt.	200-	165-	130-
Glider Weight	265 lbs.	220 lbs.	175 lbs.

Photo by Steve Pearson

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THE BOTTOM LINE

The proof is in the flying. We could go on forever about the **OMEGA'S** extraordinary capabilities, but nothing we could say will impress you as much as your first flight on the **OMEGA**. You owe it to yourself to check out this extraordinary new soaring machine. See your dealer today for a test flight on the new **WILLS WING OMEGA**.

WILLS WING INC.

1208 E. East Walnut
Santa Ana, CA 92701
(714) 547-1344

Glider evaluations. They are an integral part of hang glider writing. And with site listings, they also rank as Most Requested. My own writing background began with glider reviews. In the early issues of Glider Rider, "New Horizons" covered many designs for the first articles in this area.

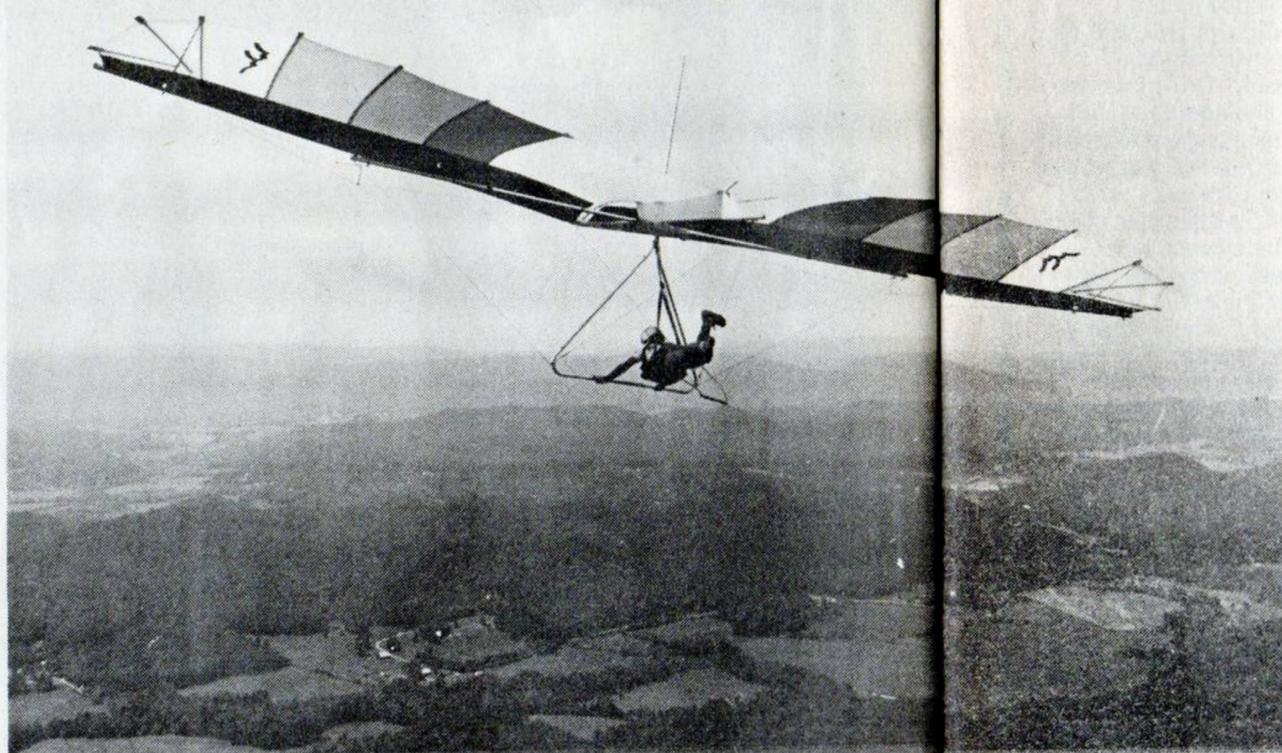
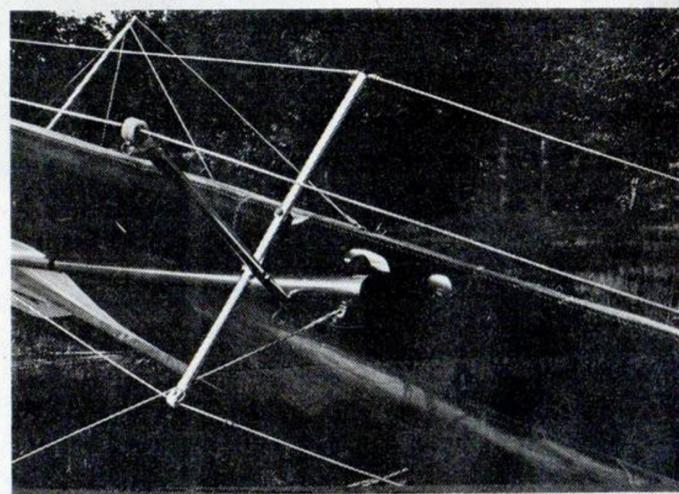
Through the years, the style has changed, as have the designs. One thing remains the same. Everyone wants to know how the New Ones fly. Since few pilots get to fly all the wings they are considering, glider reviews act as a prime mover in the purchase selection process.

For this reason, and our pleasure to provide this sort of information, the Whole Air Catalog will commence the "WAC Glider Report." Several gliders are already on the list for comparison, including the Seahawk, the Antares, the Falcon 8, the Lancer IV, among others. Your feedback will aid our attempts to give you what you want.

THE WILLS WING OMEGA SUPER FLOATER

One quality of hang gliders has always been associated with Wills Wing. It is handling. More than any other characteristic, all Wills offer superior handling. To those who fly them, they are the benchmark by which all other brands are evaluated. Do not overvalue that statement, however. Many other gliders have nice control. And other floaters can offer excellent response, but they will still have to aim their sights at the Omega.

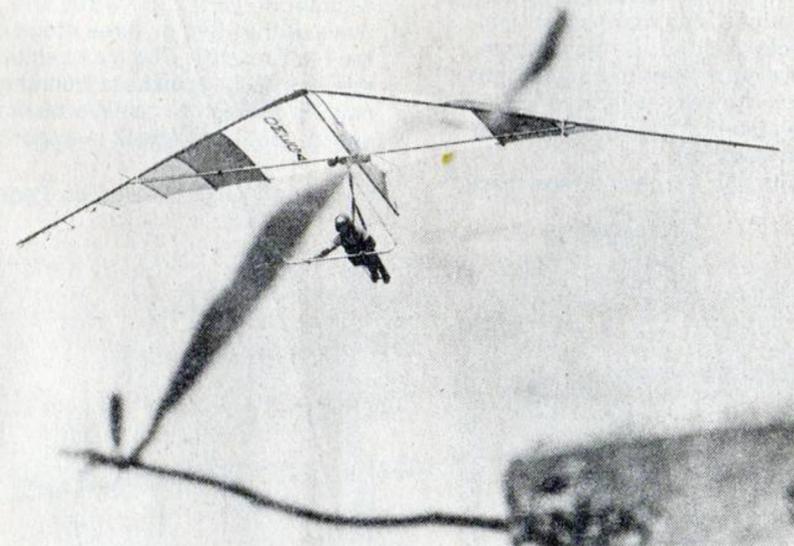
I used to think I liked only fast (forward) gliders. Somewhere in the last year, ultra-slow speeds began to intrigue me more. UP's Condor was the first entry, and optimized a very low speed range, even under that of the Maxi. The Omega takes this a step further. Not that it will go slower than the Condor, for I don't know. But it will handle every bit as well at the slowest speeds I could operate at, right down to stall. In fact, while logging several hours on the craft, I have developed a new turning style. This is to push out first, then initiating roll. Hardly the way most gliders are turned. My recent flight on the faster X-C verifies that this floater capability does not work on all machines.



What does this say about the stall though? Too much push out in turns normally causes you to be close to an accelerated stall. The Omega is so mild in stall that I have stuck with my unorthodox style. When it does stall, it merely drops a few feet and starts flying again.

The result of this ultra-slow speed range is that in any kind of lift (wave possibly excepted), the Omega shines. Push out, slow to amazing speeds, and 180. No real need exists to 360 in thermals as the glider can better optimize into the wind, without any chance of backside fallout. In ridge air, anything, even 50 fpm down, makes it worth staying slow. No matter what, the roll response is very light, the action quite fast.

I flew a 220 Omega at about 165 pounds, ready to fly. This calculates to a wing loading of 1.0 exactly. Never have I felt I lacked adequate control response. Lighter yet pilots (125 lbs.) report similar feelings. While the 38 feet of span, and 55 pounds of weight (which is a bit tail heavy) do make the Omega a couple handfuls on the ground, the rest is just smooth lift. It seems like all you must do is push out — the more you do, the greater "up" your vario reads. All the while, control is a joy, never a problem. This is also true on take-off and landing. In fact, its landing



is better than any other Wills I've flown. We here in Chattanooga have jokingly commented that when the ground arrives, "All you do is push out and start walking." Obviously this is an oversimplification, but the landing on this high performing ship is decidedly mellow. The same can be said for launch. The Omega uses a filled sail launch and does so easily, even at a trotting take-off run.

Alright, what about penetration? Everyone ponders this question when watching the Omega fly at 12-15 mph, nose held very high. In sink . . . in crossing horizontal air, the Omega has penetration problems. I out-landed once due to the latter situation, and had to deal with a highly irate farmer. But reviewing the flight proved to me that the quality of the air was the principle culprit. Several fast gliders, with good pilots, were behind me, waiting to launch. After seeing my flight, each one broke down and went home. If I can avoid it, and I believe I can, I will not fly in such conditions, even on a glider that zooms. I will say this. While I was being thrashed about in the crossing, choppy air, I never felt near being upset. The Omega is quite stable, rated by the factory at Hang 2. The result is that if you are not a ridge runner, or an X-C Contest entrant et cetera, penetration need not be a negative. You will have to exercise good judgment. You will have to work carefully at interpreting weather conditions. And you will have to turn down a few soaring opportunities. But if you are a good pilot, and cautious like myself, you will want to do these things anyway.

In summary, the Omega is a success in the floater category. Barring high wind, high speed flight, you could not ask more of a glider and expect to get it. Plus that great Wills handling, done better than ever before. It matches the overall quality and factory support. Here's what I say, "Fly an Omega, and push out!"





SIT ON IT:

Advice to Supine/Suprone flyers

by Paul Burns

(Editor's Note) A quiet revolution may be underway. A growing number of flyers are taking another look at the supine position. Interest seems to be building for "Suprone." This is supine-inside-the-bar. WAC is fortunate to have Paul Burns available to write on supine technique. With his hundreds of supine hours, Burns represents a wealth of knowledge to ease the transition from prone to "sitting on it."

SET UP

Many supine harnesses can be mounted directly to the control bar, prior to bolting the bar to the glider. Mounting the harness as the first step of the set up procedure makes an unhooked seated take-off a remote unlikelihood.

Some glider designs incorporate teller bars. For those, the addition of a hang strap may be required. The seat should hang below the base tube between 8 and 10 inches. This adjustment could change for different sized pilots, and with the addition of bulkier cold weather clothing. Should the use of a hang strap be needed to obtain proper adjustment, always use a secondary strap.

Should the harness be adjusted too long, pitch control will be less effective. Experiment with a static adjustment prior to actual flying. In a garage, basement, or tree, hang up your control bar, harness, and stirrup. Properly adjusted, full roll control will be available with the pilot's feet in the stirrup. The foot stirrup should support the pilot's legs horizontally or slightly lower. Should the stirrup be adjusted too short, the pilot's legs will inhibit control bar movement in roll. Also, poor circulation will be a by-product, and the pilot's legs will have a tendency to fall asleep.

Make absolutely certain the glider you intend to fly is indeed set up for seated flying. Include

in your pre-flight a look at the control bar position.

LAUNCHING

The supine foot launch has a reputation for being tricky. Indeed the launch is possibly the most demanding facet of flying in this position. Proper launch technique is determined by wind velocity and geography of the launch site. In instances of identical wind speeds, for example, a running launch may be possible on a hill; whereas, at a mountain bluff or cliff launch, a full wire crew may be in order.

In low or no wind take-offs the loose strap method seems to be most effective. Stand well back on the available take-off ramp or clearing, and assume the position of a prone pilot ready to launch. Place both hands on the downtubes, with the apex of the control bar well above the shoulders. The glider's weight should be supported by the pilot's hands and forearms; the pilot's shoulders should be directly behind the downtubes, affording a point of contact into which the pilot will drive for speed. This also provides a fulcrum for pitch control.

With the harness straps slack,

begin the take-off run slowly, increasing speed with each step, a kind of locomotion effect. The objective is to achieve full running speed as quickly as possible, while maintaining control of the glider. Within a few steps, the sail will inflate and the machine will be flying. Do not be fooled. Do not jump on the glider at this time, as a stall will result. Instead, as the glider begins to lift, tighten your hand grip on the downtubes. Physically hold down pressure to prevent the control bar from changing position. Drive into the bar with your shoulders for additional speed. Ideally the pilot should generate enough speed that holding the glider down with slack straps will be difficult. At this point the glider should be allowed to fly up until the harness straps are tight. This loading of the glider with the pilot's full weight should occur on the last step of the run. The transition should occupy the shortest possible time, for it is in this transition that the pilot is momentarily without pitch control.

Should the wind increase in velocity, making the loose strap method awkward, a tight strap running take-off may be in order. Although this type of take-off does not require the exacting execution of the loose strap method, the pilot may find it more difficult to maintain control over the glider. When using this launch the wind speed may be 5 to 8 mph on a cliff or bluff, and 10-15 mph on a hill or slope launch. Enlist some assistance from a friend. Position your assistant on your front wires and move within two or three steps of the bluff or cliff. The idea behind this launch is quickness, running only far enough to achieve take-off speed. Angle of attack is important

Continued on Page 28

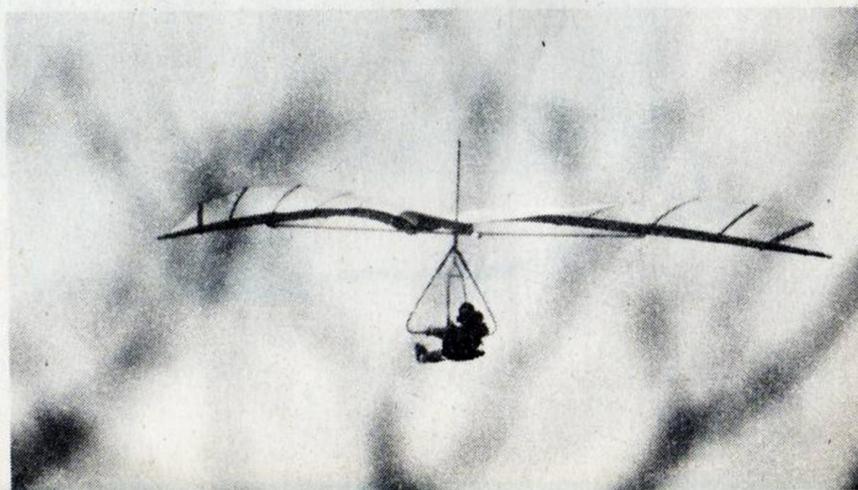


Photo by Paul Willenborg

AERIAL TECHNIQUES

SUMMER HOURS: Open seven days a week; 9:00 to 5:00

GLIDERS IN STOCK:

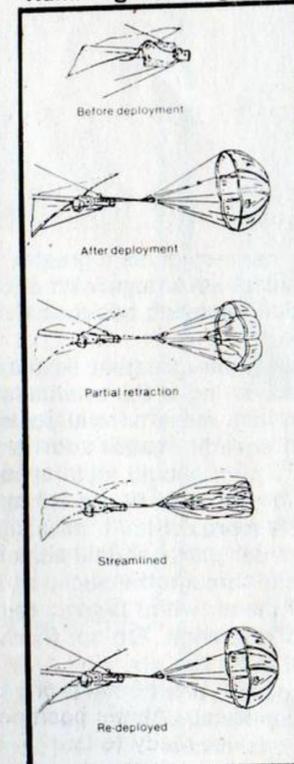
Moyes Redtail	1,000 (D)
ASG-21 180 & 160	500.00 (U)
Easy Riser Comp	900.00 (U)
SST 110G	1,195.00 (N)
Phoenix 12	900.00 (N)
Condor 178	1,200.00 (N)
Firefly 174	1,100.00 (N)
Phoenix 6C 162	1000.00 (D)
Seagull 4	500.00 (U)
Phoenix 8jr	600.00 (U)
Phoenix 8	700.00 (U)
Phoenix 6C 180	750.00 (U)
Seagull 3Z	500.00 (U)
Electra Flyer Floater (205)	1,350.00 (N)
Flexi III 185	600.00 (U)
Scirocco I	900.00 (U)
Phoenix 6D 185	1,140.00 (N)
Firefly	700.00 (U)
Merlin 160	550.00 (U)
Merlin 180	550.00 (U)
Alpha (3) 185's	1,295.00 (N)

GLIDERS ON ORDER:

Seagull 11M (4)	1,445.00 (N)
Seagull 10M (2)	1,445.00 (N)
Seahawk (2) 180	1,135.00 (N)
Seahawk (2) 200	1,135.00 (N)
Moyes Maxi III (3)	1,395.00 (N)

(N) — New (U) — Used (D) — Demonstrators

Hummingbird Drag Chute



ACCESSORIES:

Hummingbird Drag Chutes	\$ 45.00
Bennett Drag Chute	19.95
Windhaven Drag Chute	17.95
Bennett Mark II Chute	359.50
Odyssey Chute	325.00
Up Chute	349.00
Windhaven Chute	346.00
Up Cloud Harness	93.00
Price Prone Harness	94.50
Skysports Prone Harness	84.00
Manta Prone Harness	95.00
Bennett Comfort Harness	85.00
Bennett Enduro Mesh	65.00
Sunbird Supine Harness	109.50
Sunbird Prone	94.50
Bell Helmets	54.95
Car Top Carrier Brackets	20.50
Control Bar Wheels (High)	12.95
Control Bar Wheels (Frank)	20.00
Astraltune Stereo Pack	195.00
Up Flight Bags	27.95
Hang Loops (12" & 18")	3-4.00
Log Books	4.00
Velcro Tie Straps (18", 24", 30")	2.50-3.00
Sterling Silver Necklaces (H.G.)	16.50
Hang Gliding Sweatshirts	10.00
Velcro Wallets	7.50
Soarmaster Unit	750.00
Dennis Pagen's H.G. Books	5.95
UP Cocoon Harness	\$150.00
UP Pro Bags	29.95
Bennett Fairings	29.00

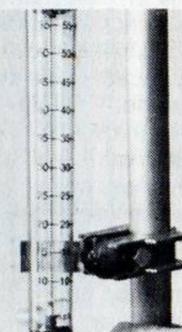
(Prices Subject to Change Without Notice — New York residents add 7 percent sales tax.)

Reader Inquiry Card No. 17



INSTRUMENTS:

Aircraft Altimeters	\$130.00
Thommen Altimeters	119.00
Chad Avt Units	495.00
Colver Varios	209.00
Litek Varios	145.00
Paragon Varios	155.00
Theotek Varios	170.00
Ball Varios	275.00
Dwyer Windmeters	8.95
Hall Airspeed Ind	18.50
Hall Brackets	5.50



ORDER COUPON

Dear Aerial Techniques:
Please send me _____ (description)
priced as shown above \$_____. I enclose full payment
\$_____ plus 5% for handling/shipping. (New York residents, add
sales tax.)

Send to:

AERIAL TECHNIQUES
ROUTE 209, SOUTH
ELLENVILLE, NY 12428

SAFETY TIPS

to the success of the launch. Have your wire assistant release and stand clear only when the angle of attack is neutral; or in a steady breeze, slightly negative, and wing tips level. Once your assistant is clear, go for it without hesitation. It may prove useful to practice this procedure several times prior to a real experience. At first, you may find this difficult, as you must support 50 pounds of glider straight overhead, run at a fast speed, and maintain control of the glider. Consider it a demanding task — it is.

The all-out wire launch seems easiest for the seated form. On a cliff launch, the seated pilot has an advantage over his prone counterpart. The extra length of his harness straps allows greater elevation of the glider. Greater distance between ground and glider keeps the glider in cleaner air, out of those funny little rotors nearer the surface and more in the vertical air. Many pilots switching from prone to supine have wired off into soarable conditions for their familiarization flight. Once accustomed to the supine orientation, learning the running type take-offs is simplified.

IN FLIGHT

Some gliders will trim out a bit differently when changed from prone to seated, frequently a bit faster in pitch. Trimmed properly, the glider should achieve minimum sink speed with the pilot in the full supine position, arms fully extended, as well as hands and fingers. Pilots should have to sit up some to effect a stall. Ideally, the best L/D speed will occur as the pilot closes his hands to a fist on the base tube. Proper pitch speed adjustment will assure full control movement for the broadest possible speed range.

In flight some subtle differences between prone and supine exist. Roll control is less effort physically, although more movement is required. The length of the harness straps is responsible. The longer

supine harness gives a greater mechanical advantage with a longer pendulum moment between C/G and pilot.

Possibly the greatest advantage in supine flying is the orientation. The upright, more natural position affords several bonuses. When flying, a pilot should look forward, in the direction of flight. Doing so prone is more difficult, physically. Hang glider pilots should adjust air speed through the sound and feel of the air while flying, not by ground reference. Do not fly the ground — fly the air.

The supine position is not only more comfortable, but also improves visual references. With a clear view of the horizon, while looking straight ahead, the glider still remains within the pilot's peripheral vision. This provides a visual contact with the horizon and bank angle not possible in the prone position without some contortion. Thus many pilots may be more comfortable thermalling in the supine position.

In thermalling, or when steep bank turns are necessary, the pilot may have to leave the full supine position. Because of limited pitch control it may be necessary to sit more upright to apply sufficient pitch. This problem is greatly reduced with the newer, more sensitive glider models.

LANDING

The supine flyer should be extremely cautious on landing. With the pilot hanging below the base tube, the possibility of injury is obvious. Injuries to seated and supine flyers are of the most serious nature. For this reason, the supine position may be a safer undertaking for the intermediate or advanced pilot rather than a beginner.



EFFICIENCY

Most prone pilots position themselves shoulder high when flying. Theoretically, a glider is descending or sinking at all times in normal flight.

In order to match the glide path to achieve the least possible drag, the prone pilot would then need to hang head low, feet high. On the other hand the supine pilot comes closer to matching the glide path, hence lower drag.

See figures A and B.

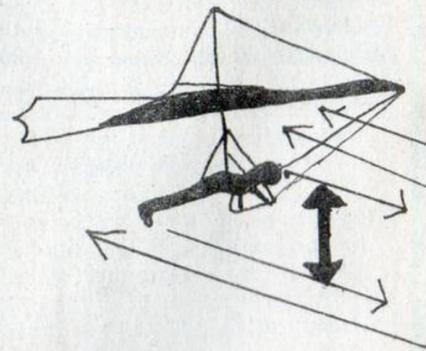


Figure A

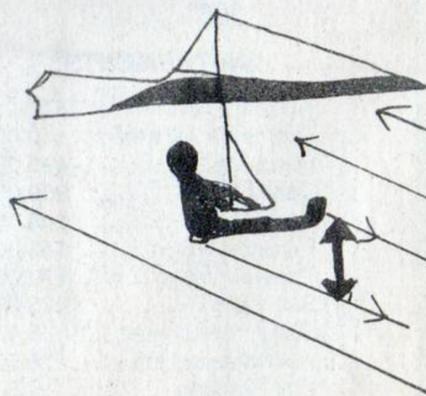
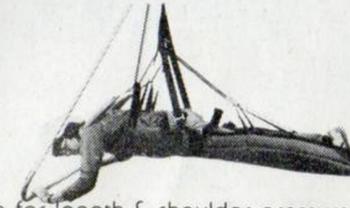


Figure B

Golden Sky Sails, Inc.

Introduces

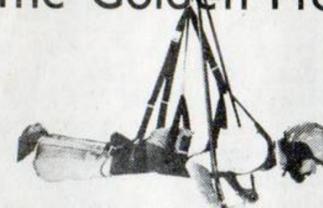
The Golden Cocoon



- * Adjustable for length & shoulder pressure.
- * Spreader Bars to eliminate hip & foot pressure.
- * Positive retention back & thigh straps.

The Golden Cocoon \$135⁰⁰

The Golden Prone



- * Tested to 6,000 lbs.
- * Super simple.
- * Comfortable.

The Golden Prone \$75⁰⁰

ORDER FROM:
Golden Sky Sails, Inc.

572 Orchard Street
Golden, Colorado
80401

DEALER
INFORMATION
UPON
REQUEST

Reader Inquiry Card No. 18

Scott's Marine, Inc.

In business 4 years specializing in towing and footlaunch. Tow and winch lessons.

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Charlotte, N.C. 28203
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Ultralight Flying Equipment

Page 28

Reader Inquiry Card No. 19

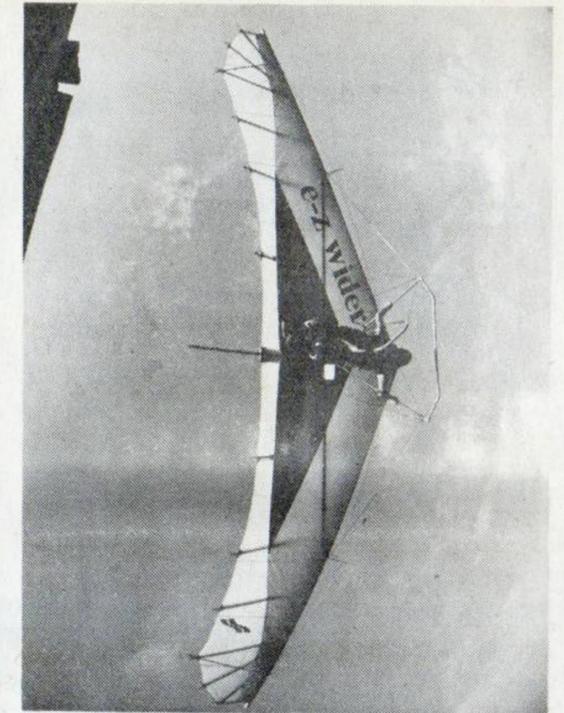


Photo by Albia Miller

Sky Sports offers the experienced pilot the most efficient, computer optimized double surface sail wing available. The inherent stability of the double surface makes the Sirocco 2 a ship that intermediate pilots can climb into and float away with too. Compare the quality workmanship and clean, wind cheating planform of the Sirocco 2. Match the L/D and handling.

Quality and experience: A Sky Sports trademark that produces the best gliders on the market. Easy to launch, easy to land and fun to fly! Treat yourself to a Sirocco 2!

Sirocco 1 & 2 HGMA Certified

SPECIFICATIONS	165	185
Nose Angle	120 °	120 °
Sail Billow	0 °	0 °
Max. L/D	9 to 1	9 to 1
Stall Speed	18 mph	18 mph
Area	164.7	185
Pilot Weight	125-175 lbs.	155-220 lbs.
Glider Weight	51 lbs.	54 lbs.
Span	33.5 ft.	35 ft.
Leading Edge	19 ft.	20 ft.
Root Chord	8'6"	9 ft.
Breakdown	10'6"	11'6"
Price	\$1170.00	\$1190.00

Sky Sports
Inc.
P.O. Box 507
Ellington, Conn. 06029

In Europe Contact:

Para-Fun International
Norbrogade 148, 2200
Copenhagen N Denmark 01 83 8586

Reader Inquiry Card No. 20

(Crystal Flight Resort, Tenn.) Contractual negotiations are now completed for Chattanooga's only Hang 2 mountain. The Flight Resort will continue to offer the famed tramcar transportation system. But Crystal will cease being the operating firm.

The function of maintaining-operator will now be handled by a new corporation not affiliated with Crystal Flight Resort, Inc.

No service to pilots will be sacrificed by this change and all pilots must still register at Crystal's

flight office in the landing field. In fact, a clearance card will be required to purchase tram tickets from the new corporation, which will be housed in the Raccoon Mountain Caverns Gift Shop.

No price increase for tram tickets is anticipated at this time. All tickets purchased by pilots prior to the changeover date of June 1, 1979 will be honored. A change will be noticed in clearance fees and some basic safety rules.

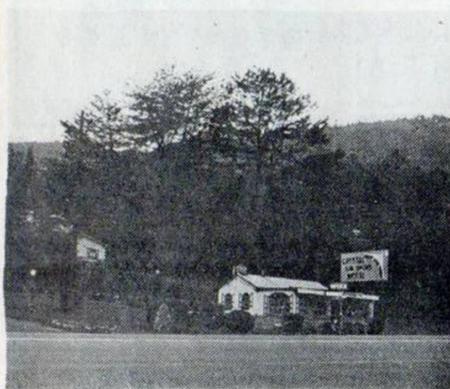
Clearance permits will now be issued for 3 days (\$2.00), 10 days

(\$5.00), or 3 months (\$12.00). The same requirements as before will be used to clear for mountain top privileges. New policy calls for a minimum of two pilots to ride the tram, for tree rescue purposes. Last, no pilots below Hang 4 will be permitted to ride the tram up if Crystal personnel are not present to regulate flying activities.

Training, Sales, and Repair operations will go on as usual. In fact, an increase in efficiency should result as manpower and money are freed from the costly burden of the tram system.

FLIGHT '79

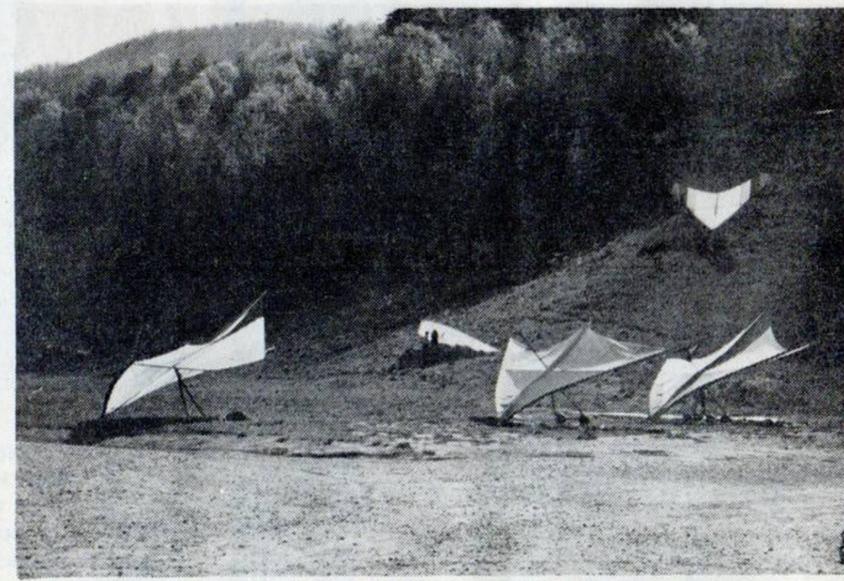
SUMMER CHANGES FOR CRYSTAL



(Crystal Air Sport Motel, Tenn.) At the Motel, the pool will open in June, for the Summer/Fall season. Please register for pool privileges in advance unless staying as a Motel guest. For 1979, the Motel has expanded facilities, as Units No. 11 and 12 become available to visitors. Chuck and Shari, with Derek and 'Crystal,' are now

permanently established in their new house, totally renovated from the once hang glider shop of Crystal Air Sports.

Pilots are encouraged to register for motel rooms well in advance during this busy '79 season. Also, don't miss the stock of hang glider gifts and T-shirts at the Motel Gift Shop.

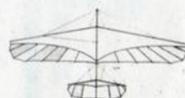


**CRYSTAL
FLIGHT
RESORT**

Resort - Rt. 4, Cummings Hwy., Chattanooga, TN 37409,
Phone 615/825-1995 9-2 daily



Reader Inquiry Card No. 25

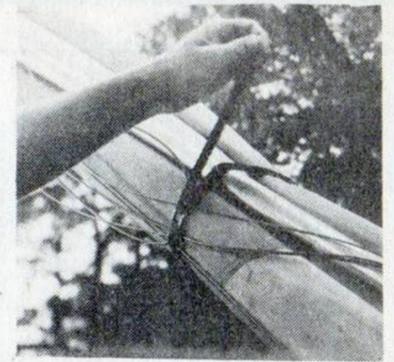
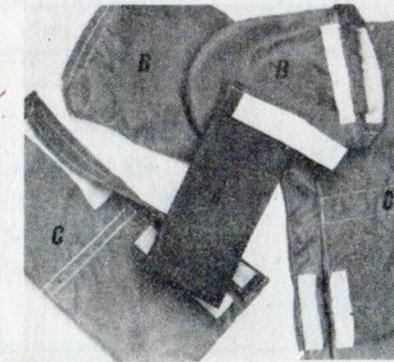
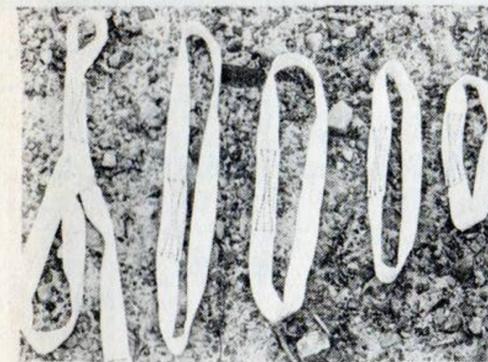


**CRYSTAL
AIR SPORT
MOTEL**

Motel - 4328 Cummings Hwy., Chattanooga, TN 37409,
Phone 615/821-2546 daily

Page 32

CRYSTAL accessories '79



SUSPENSION LOOPS

Reader Inquiry Card No. 26

Crystal's deluxe line, all tested to 20 G's! Will fit all bar/harness combinations. Adjustaloop—9" to 22" hang range tested to 4,000 pounds. 9", 12", 15", 18" fixed length loops tested to 5000 pounds.

COVER BAGS

Reader Inquiry Card No. 27

Protect your sail and spars from tears and dings with Crystal's small bag line. Single pouch for small coils (Seagull). Dual pouch holds all lower wires (Wills, Electra). Kingpost or Tensioner bags keep rough nicos and sharp fittings covered. All use velcro closures.

VELSTRAPS

Reader Inquiry Card No. 28

The finest in hang glider tie straps. Strong. Long Life. 24 inches long by 3/4 inch width. Metal clinch ring. From Velcro Corp. Minimum order of five earns the lowest price anywhere.

PRONE HARNESS

Reader Inquiry Card No. 29

Deluxe knee hanger harness, with foot stirrup, and locking carabiner. Adjustable leg straps tighten snug for a secure launch, then loosen in flight. One size fits all up to Extra-large. Padded throughout with full floatation foam. Very popular harness, with continuous main strap.

STROBALITE

Reader Inquiry Card No. 30

Inexpensive, powerful strobe light. Visible for miles in all directions. Floats in water. Seven hour average battery life on 2 "C" cells.

LOCKING CARABINER

Reader Inquiry Card No. 31

Mail order special price. 2000 kilogram (5500 pound) capacity, with friction-hold locking gate. Tested, aluminum. Was \$7.95.

MAKIKI VARIOMETER

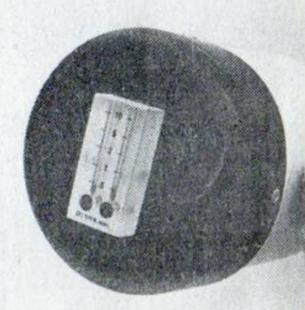
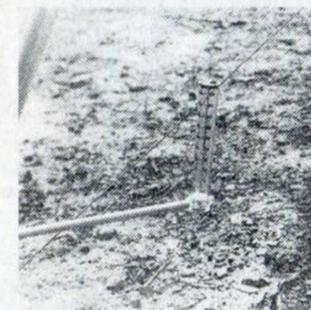
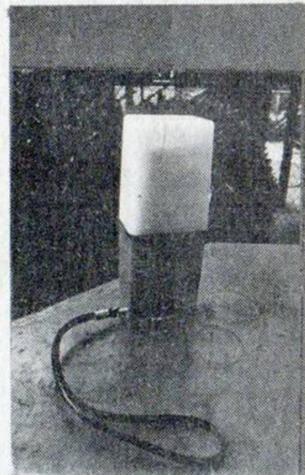
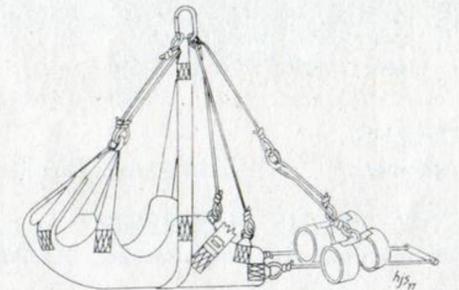
Reader Inquiry Card No. 32

Pellet vario. Very durable. No batteries ever needed. Very sensitive and easy-to-read. One quarter the price of electronic varios.

HALL WIND/AIR SPEED METER

Reader Inquiry Card No. 33

Accurate, easy-to-read meter. Very durable. Disc-on-shaft indicator resists dirt jamming. Prone bracket 15 inches long fits all bars easily; rises for landing.



See order form, next page.

photos by Paul Willenborg

Page 33

CRYSTAL accessories '79

SUSPENSION LOOPS

- ___ A Deluxe Adjustable Loop \$ 7.00
- ___ B 18 inch Standard Loop \$ 4.00
- ___ C 15 inch Standard Loop \$ 3.75
- ___ D 12 inch Standard Loop \$ 3.50
- ___ E 9 inch Standard Loop \$ 3.00

BAGS

- ___ A Kingpost/Tensioner \$ 2.00
- ___ B Lower Cable (Single Pouch) \$ 3.00
- ___ C Lower Cable (Dual Pouch) \$ 4.00
- ___ New Crystal Flight Bag, Std. \$35.00
- ___ X-L \$39.50

VELSTRAPS

___ Number of _____ x \$0.99 each (Min. Order — 5)

CRYSTAL PRONE HARNESS

___ Both Stirrup, and Knee Hangers, DELUXE \$89.00

CRYSTAL SUPINE

___ With Foot Stirrup \$79.00

CARABINER

___ Aluminum, 2000 kg, with locking gate \$ 5.95
 Mail Order Only Price \$ 4.97

STROBALITE

___ Complete (batteries not included) \$20.00

BACK-UP PARACHUTE

___ 24 foot, warehouse stocked \$319.00
 ___ 26 foot, warehouse stocked \$329.00
 (National Brand — Drop Shipped Direct, COD;
 Send 50% deposit; Add no extra shipping charges.)

HALL WIND/AIRSPPEED METER AND MAKIKI VARIOMETERS

___ Hall Meter, with spinning disc \$18.50
 ___ Hall Meter Prone Bracket \$ 5.50
 ___ Hall Meter Seated Bracket \$ 4.50
 ___ Complete, self-contained, pellet variometers,
 with mounting hardware \$55.00

CONTROL BAR "SUPERGRIP"

___ (feet) Plastic Oversleeving
 1 inch per foot \$ 1.50
 1 1/8 inch per foot \$ 1.95

REQUIRED ORDER INFORMATION

Name _____
 Address _____
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Please indicate method of payment:
 ___ Check, or Money Order, or Bank Draft, in US Dollars,
 enclosed.

Make checks pay to: "CRYSTAL".
 ___ or charge to VISA/BankAmericard, or
 charge to ___ Master Charge.

Account number: (list all digits) _____

Expiration Date _____

Signature _____
 New Crystal Flight Bag

*Colors available (all have black
 webbing and white zipper):
 Red, blue, black, orange.
 Allow 3 to 4 weeks for delivery.*

Special Instructions: _____

Merchandise total _____

Tennessee residents,
 add 6.25% sales tax _____

Handling/Shipping
 95c minimum, or
 5% of total order _____

Allowed Discount, less _____

TOTAL _____

Amount Enclosed _____

COD _____

(COD orders will involve COD charges)

MAKE SURE FUNDS WILL NOT FALL OUT!

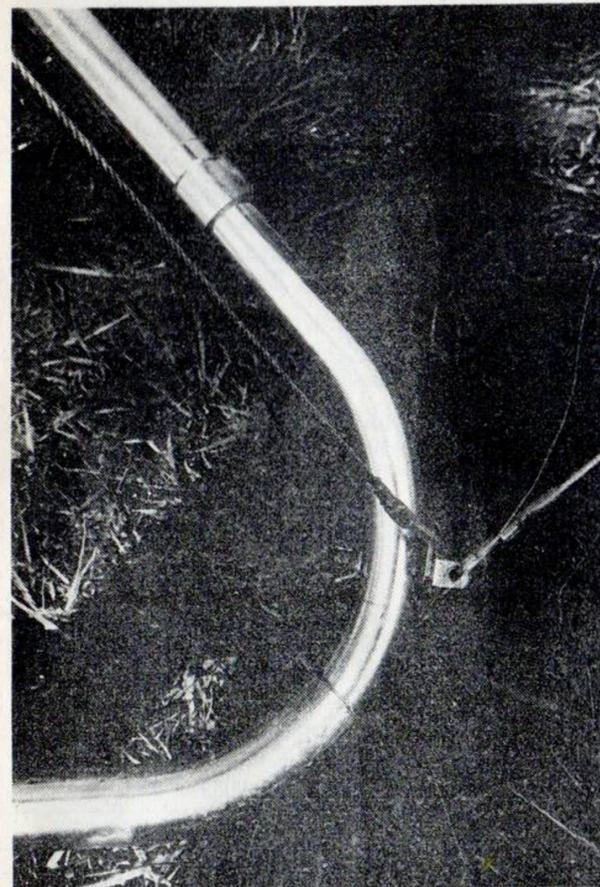
CRYSTAL accessories '79

FLIGHT EQUIPMENT BAG

Deluxe, carry-all equipment bag. Three inch main support and padded handles. Adjustable shoulder strap. Padded bottom. Inside pocket with velcro closure. Standard size adequate for most pilots. Those with cocoon harnesses or extra gear can use the Extra Large size. Colorful.



Reader Inquiry Card No. 34



Reader Inquiry Card No. 35

CONTROL BAR "SUPERGRIP"

Tough, clear, plastic cover for control bar base tubes. Protects bar completely from scarring on rock or rough set-up areas. Insulates hands from cold. Offers excellent grip with larger diameter. One inch I.D. in stock regularly. Special 1 1/8 inch I.D. size available now, but on an intermittent basis. Now lower price.

BACK-UP PARACHUTE

Special, limited-supply price on two nationally advertised brands (Odyssey and Advanced Air). Send 50% deposit for COD balance. Sent direct from warehouse stock; one week delivery customary.



Reader Inquiry Card No. 36

Send order form to: CRYSTAL, Box 144, Lookout Mtn., TN 37350 — No phone orders, please.

CRYSTAL

PRODUCT LINES with calendar items

Chattanooga, TN — It's summer, Skylab just hit, and another season is hot and heavy. Competition is getting into swing, too. Same for glider delays. Seems every year, a familiar line begins, "I've been waiting 12 weeks..." Nothing new, but we wanted to know. **SEAGULL prez' Don Whitmore** called to answer a few questions. First is, **Link 1979**, a problem blown up to outlandish proportions regarding a side link failure on Paul Burns' 10 Meter. In early June, Paul was two seconds into a normal flight when his left seated to prone dummy link failed. Very fortunately for Paul (and those of us who know him) he smacked into trees 150 feet below and survived. His chute comment, "By the time I got my hand to the handle, I was in the trees." So the questions have flowed in to Seagull. No, no other failures have ever occurred. Yes, we have Tom Peghiny and Tom Hadden working on it. Dealers have just received the factory letter on the subject, so consult your local shop. But **their solution is**, 1) to discontinue the prone to seated wire set (now you order one way or the other only; most didn't use the switch capability and Seagull never liked the configuration anyway... not clean), and 2) to make an at-cost replacement offer (you send your old entire set — they want 'em and for \$26.50 they issue a whole new set). We used to say you should replace your lower rigging each season anyway; this is a most reasonable cost to do so. To quote Don W, "Seagull wants to do what is fair, square, and honest." OK, **how about deliveries?** As **WAC** reported last time, Seagull can still deliver in four to six weeks on orders received today. A major problem (for Seagull and nearly everyone) is custom sails. They are deeply backlogged, but now have full supplies. Sales ran way ahead of production capability, but they're building 'em fast now. The Santa Monica plant max'ed at only 2½ units per day, whereas in Carpinteria, they can make 6-7 a day. Another **NO HOOKUP** flight brought sadness to a wonderful flying family from Birmingham, Alabama. Son-in-law, Sam White, launched from Steele Mountain without hooking in... the accident fatal. Our condolences to the Lyell Easley family. This has happened to some great pilots as well. Some survived, some did not. Why? If your own pre-flight check doesn't include being certain of this vital connection, perhaps you need help. A system is available; tho some scorn it as "extra garbage," it could save a soul. See page 18. On a happier note, **Kitty Hawk Kites** has made a huge concerted effort to save Jockey's Ridge for flying on the weekends. Politics nearly lost this influential site, but John Harris and his gang, with mighty assistance from friends in the community,

overturned this unfortunate decision. **Sky Out**, a new book offering, gives pilots a novel to check out on those rainy days. Pete Osborne relates many interesting tales, with the pen help of Mom, Shirley. See their ad, page 31. **Wills Wing** and prez' Rob Kells will arrive in Chattanooga for a **Tandem Clinic** at Crystal on August 1st. Depending on weather, one day near then will also be used for a keg party highlighting certification films. As Rob will bring a bunch of gliders, once again it's Wills Demo Days, too. Don't miss the excitement; arrive by July 30th to be sure. But still speaking of tandem, our editor Starr and Crystal instructor Tim Dunlap set a new **Eastern altitude gain** mark. The duo thermalled to 2300' above Chattanooga's 1500 foot Hensen Gap NW site. Their glider, (look proud Rob) an Alpha 245. Then Rob will head for Kitty Hawk around August 2nd. **LEAF** in Colorado continues to be successful with their standard modifications, tho we once suspected that market would dry up. Probably spurred on as the prices on new gliders climb. See their new ad, page 37. **Odyssey, Inc.** now has a wide ranging product portfolio (in color yet!) to compliment their popular chute. Check it out on page 22. And on new products, look at Crystal's ad for "Supergrip," a new item to protect your control bar (pg. 35). **Aerial Techniques** in New York is beginning a new tradition, the Ellenville Annual Balloon Festival. But more than balloons (which are fun themselves), the event will be heavily hang glider oriented. They have info to send; contact Coordinator, Ken Marchuk at Box 227; Ellenville, NY 12428. **Sky Sports** just sent out their spec' sheet on the new Sirocco 3 — looks good, write 'em for your own, or better yet, go to your own local S.S. dealer. If they've done with it what we've heard, oh boy! **WELCOME** to all our dealers (of the **WAC**). We started our **WAC Directory**, and have 33 of the best shops around listed. Plus some (10) are primary outlets for goods of all kinds; you'll easily tell them apart. Welcome to all... we hope you readers find this reference useful. A couple upcoming **clinics**, one at Kitty Hawk, one at Crystal. Jim Johns will conduct a towing clinic in Nags Head on August 4 and 5. Crystal will have a Maintenance and Tuning Clinic, directed by Paul Burns. This will happen August 10 and 11. Contact both places for reservations and details. Last word is the **Flight Designs** Seagull Fly-In, Sept. 8 & 9. Catch some picnic grub, low-key flying, and meet the Seagull folks at beautiful Big Sur. Contact Flight Designs for more details at 408/758-6896. **GOT NEWS OR OPINIONS?** Send 'em to Product Lines, Box 144, Lookout Mtn., TN 37350.

Use your **WAC Directory**.
Dealers — contact us at Box 144,
Lookout Mtn., TN 37350.

IN STOCK

FOR IMMEDIATE DELIVERY

Call (919) 441-6247 (Open everyday but Wednesday)

Seahawk 180s	r, o, g	\$1135.00
	y, r, w.	1135.00
	bl, y, o, r	1135.00
	w, lb, db, p	1135.00
	o, r, o, g, y	1135.00
	lb, o, r, g, y	1135.00
	lg, db	1135.00
	w, r, w	1135.00
	lb, db, p, w	1135.00
	lg, dg, g, o, r	1135.00
	g, lb, g	1135.00
	w, lb, dg, w	1135.00
Seahawk 200s	dg, lg	1135.00
	bl, r, g, w	1135.00
10 Meter, 79 demo	w, p, custom	1345.00
11 Meter, 79 demo	w, db custom	1345.00
Alpha 185	br, g, y	1295.00
Alpha 215	y, g, o, r	1295.00
Omega 220	br, g, w	1375.00
Phoenix 6D 190	lb, silver, bl	1045.00
Fledgeling IIB	br, g, w	1595.00
(Soarmaster & landing gear in stock)		
Sunbird Nova 190	o, r, p, db	1150.00
Easy Riser kit	white	900.00
Super Seahawk 140	w, w, g, y, g	965.00
Kestrel A 185		450.00
Shearwater		400.00
Seagull III	excellent condition	375.00
Flexi II	20 foot	550.00
Flexi II		550.00
Merlin 180		550.00

New Gliders

Used Gliders

Accessories

Helmets	
Bell	54.95
Javelin	19.90
Harnesses	
Bennett w/stirrup	\$85.00
Eipper w/stirrup	99.00
Flight Design w/knee hangers	92.00
Sunbird w/knee hangers	96.50
Sunbird Supine	111.50
Parachutes	
Bennett Mark IIA	\$315.00
Adv. Air Sports 24 ft.	346.00
Adv. Air Sports 26 ft.	362.00
Instruments	
Theotek Variometer	\$120.00
Makiki Variometer	55.00
Hall Wind Meter	17.95
Thommen Altimeter	119.00
Dwyer Wind Meter	7.95
Flight Design Variometer	149.95

WANTED: USED SEAHAWKS!

Qty	Description	Price	Total



P.O. Box 386
Nags Head, N.C. 27959

N.C. residents add 4% sales tax
Total Amount

Payment enclosed (money order or certified check for immediate shipment)

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

Reader Inquiry Card No. 38