

WHOLE AIR MAGAZINE

P.O. Box 144

Lookout Mtn., TN 37350

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SEPTEMBER — OCTOBER 1980





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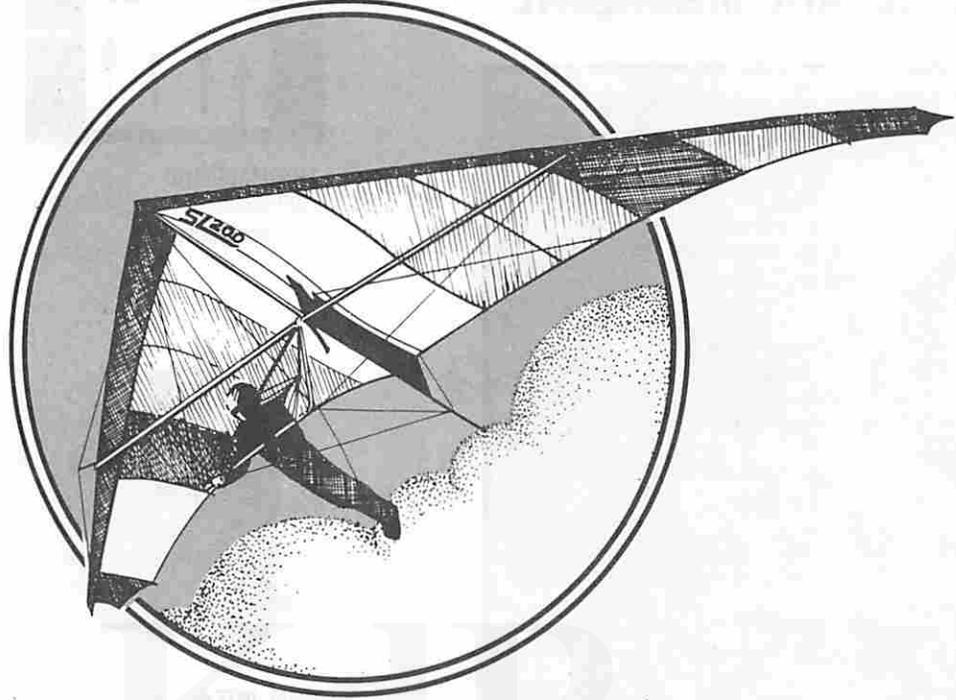
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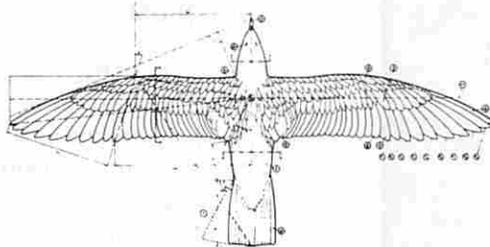
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WHOLE AIR MAGAZINE

Volume 3, No. 5, 1980

ISSUE NO. 15

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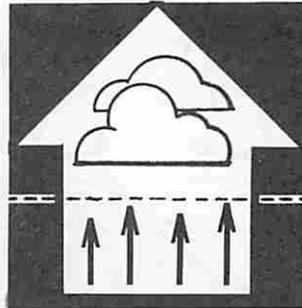
Advisory Panel

Mike Meier
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Chuck Slusarczyk
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More photo artistry from Leroy Grannis as San Francisco area pilot, Dan Raccanelli is seen banking at Westlake in his double-surfaced Stratus.

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A TREASURE OF THE PAST . . . GOOD READING FOR ONLY \$1.00 PLUS POSTAGE

(Numbers 1 thru 3 already Sold Out)



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JAN/FEB 80

Statistics of Injuries Part I. "Can America Compete?" by Tom Peghiny. Motorized Premier. "Getting Radical." Glider Reports: Falcon 8 and Maxi. Interview with Bill Bennett. Tow Premier. Florida Sites. Interview with Eagle Sarmont.



NO. 12
MAR/APR 80

Interview with Tom Price. Glider Reports: Firefly 2B and Lazor II. So. Cal. League pictorial by Bettina Gray. Tow Sites of N. Carolina. Regulation.



NO. 13
MAY/JUN 80

Safety Advisory. Tech Panel Premier. Editorials on Glider Reports. New Pilot Report: Raven. Dual Sites — Montana and New York. Winch Towing.



NO. 14
JUL/AUG 80

More Motorized. Thunderstorms. 1980 Nationals. WAM Interview: Pete Brock. Pilot Report: Sierra. Minibat sailplane kit. Sites: Bay Area (No. Cal.). Lookout Mtn. League

Henderson Photography

NO. 4
NOV/DEC 78

Special artwork cover. Statistics on injuries, chute, vario, and glider popularity. "There I was" at the 78 Great Race. Tree Topper Records.

NO. 6
MAR/APR 79

More Action Line. Hang Glider Art by Don Baker. "The Comeback" by Paul Burns. "Solar Powered Ultralights" by Hank Syjut. Parachute seminar at Crystal.

NO. 7
MAY/JUN 79

"Hang Glider Performance" by George Worthington. More Art by Baker. Government Regs. Premier of Forum. Bird Flight by Paul Burns. Safety Tips and more Product Lines.

NO. 8
JUL/AUG 79

More Action Line. Graphite article. "The Ravens of Grandfather." Premier Glider Report — Wills Omega. Supine advice. The pilot band "Flyer."

NO. 9
SEP/OCT 79

The Crestline Nationals. Interview — Rob Kells. Sites Premier — Tennessee. Glider Report: Seagull Seahawk. WAC Dealer Directory.

NO. 5
JAN/FEB 79

Statistics of gliders and models. Premier of Consumer Action Line. Heckman Interview. Parachute advice. All USHGA Directors addresses.

NO. 10
NOV/DEC 79

"You Can Learn About Flying From This. Euro Market Premier. Dual Glider Report: Lancer and Sirocco III. Sites — Michigan. "The American Cup."

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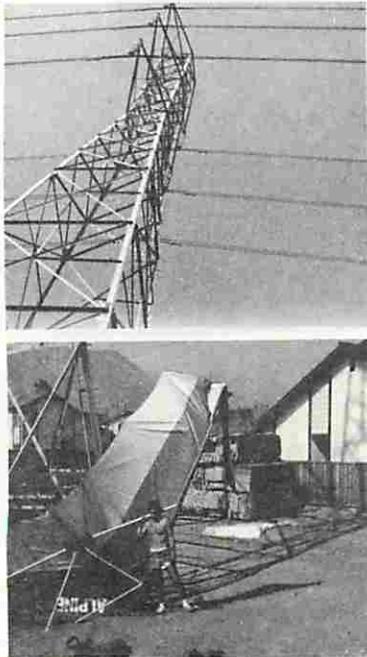
FORUM

MORE ACCIDENTAL DEPLOYMENTS

WAM;

July 28th, 1980. Had an accidental parachute deployment. Drifted into high power electric lines carrying 220,000 volts (see photo). Let go of control bar, disappointed that I would die. No shock, though! But, lots of noise. Glider fell from lines, parachute re-opened, had soft stand-up landing.

Patrick McCandless
California



(No chute brand mentioned, nor any reason for the accidental deployment. Patrick did provide his phone number, however. If anyone wishes to ask him, contact WAM.)

As suggested by Mike Degtoff, above, WAM strongly encourages everyone to pre-flight their chute as well as their glider and other suspension system. In Patrick's case, this could have easily been fatal!—Ed.)

Dear WAM;

Thought you may like to know about my last accident, which occurred Sunday. I had an accidental deployment. What happened was that the bungie holding the pin broke. I have an Odyssey parachute. Just the weight of the parachute caused it to fall out of the container. It opened very fast and descent was slow. Went into trees from 200-300 feet. No damage to glider or myself. But I learned a big lesson—preflight chute very well.

Mike Degtoff
Linville, NC
(Grandfather Mtn)

PILOT REPORT COMMENTARY

Love your magazine; wish it could be printed every month.

Thought your Pilot Report on the Sierra was the best new glider report I've seen.

Question—Why are new gliders suddenly costing big bucks?

James Monteith
Houston, TX

The price of a state-of-the-art glider in 1975 was \$750. Assuming realistic inflation at 20% per year since then, a glider priced at \$1500 is only "keeping up with the Joneses." Plus, if you then add in the cost of R & D and HGMA Certification costs, perhaps manufacturers are not so out-of-line.—Ed.

I enjoy the glider review. There are no dealers within 400 miles of me. Your review helps keep me up with the state-of-the-art. Thank you for caring.

Carl Wiseman
Amarillo, TX

Your magazine needs more flying information and less advertisement (Pilot Report).

P.S. More motorized.

Rich Clark
Clarklake, MI

POWER & TOW . . . OR NOT TOW

I think covering every aspect of ultralight flying is great. Especially looking forward to more on towing and motorized Rogallos.

Great mag. Keep up the good work!

Robert Lemons
Cleveland, TN

I'm not interested in motorized craft of any kind. As long as WAM does not make the majority of its articles about motorized, I'll be a subscriber. The three major hang gliding magazines all include motor gliders. I don't like it, but that is my opinion. Everyone has an opinion.

Mark Lippe
Muenster, TX

No one aspect of ultralight flight will be favored to the detriment of the other areas, Mark . . . not ever!—Ed.

I wholeheartedly approve of your notion to review new aircraft, not strictly of the hang glider category, as per the "Minibat." I'm particularly interested in home-building.

Serge Etienne
Valley Ford, CA

How many others of you would like more mix in aircrafts reviewed? Let's keep the chatter going, as WAM is positively structured by your thoughts.—Ed.

WHERE DID TECH-PANEL GO?

I missed your Tech-Panel feature this issue. I'm writing separately on a problem I had on proning out on take-off. Perhaps it would be worth comment for some of us less advanced pilots. Thunderstorms—Shear Generators very useful.

Bill Walter
Asheville, NC

Look for a new installment of Tech-Panel in the Nov/Dec WAM. We depend on some very busy people for the advice in Tech-Panel, which creates some delay in answering all the questions we have received. Please bear with us.—Ed.

A recent fatal tandem accident in the Olympic Mountains points out the need for much more care when pilots take on this form of flying.

I was involved in the search and rescue of this terrible accident. It was caused by ignorance and a desire to share the flight experience with a friend. We should be ten times more careful than when flying single.

Robert Farmer
Bremerton, WA

Always wear a flotation vest when flying over water. Just as important as a parachute.

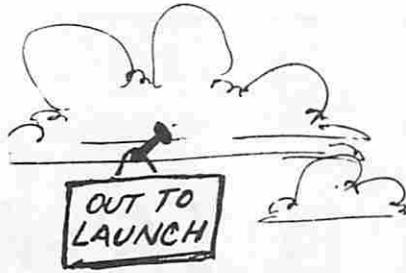
Ed Quirk
Sunflight of Florida
Orlando, FL

GENERAL

WAM is much more positive in approach. Minimum arguments, fears, problems compared to others. Reading WAM much more enjoyable—more relaxing.

WAM has more smiles per page—keep it up.

Richard Fortner
Akron, OH



Have you ever seen a sky . . . out?

Jerry Forburger
Heavener, OK

Once again, let me compliment WAM as the most comprehensive publication in the sport of ultralight aviation. Nice work!

Lester Washburn
Elsinore, CA

Why aren't harnesses tested and certified?

Christopher Wendling
Virginia Beach, VA

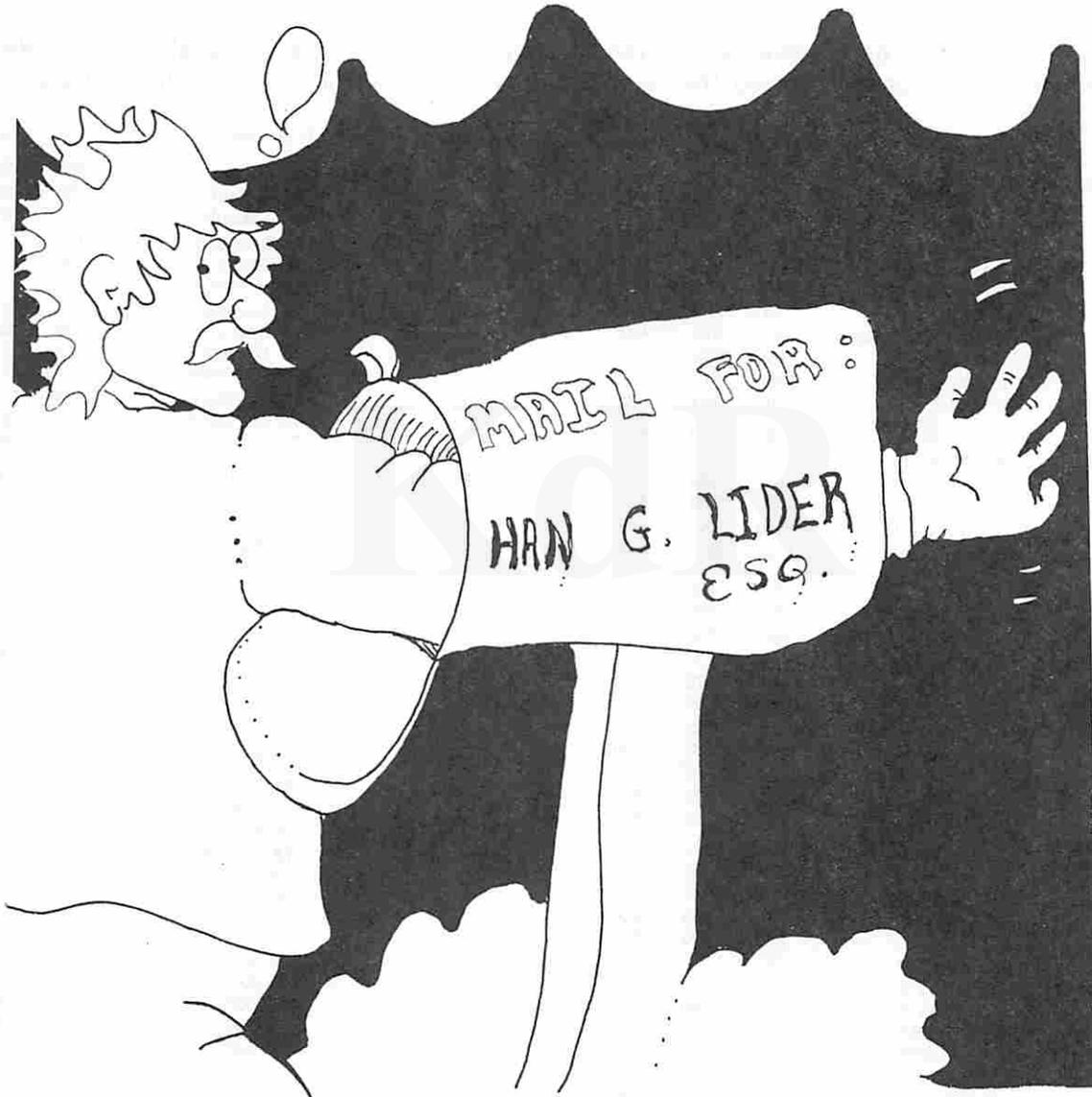
SUGGESTIONS

I'd like to see more "beginner" articles.

Mark Dodge
Houston, TX

Let your interviews get into a bit more depth.

Chris Norloff
Blacksburg, VA



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USED GLIDER BLUEBOOK

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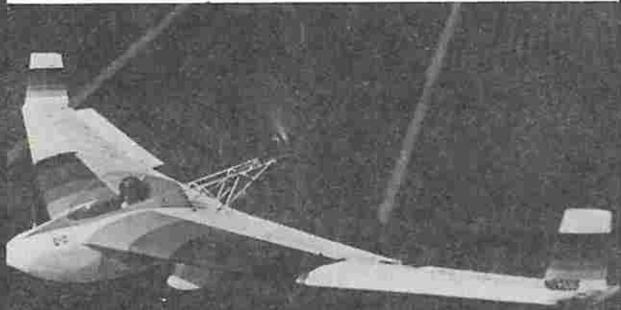
These prices are designed to be guidelines for evaluating your glider or one you wish to buy. We do not intend for these figures to be considered the final authority. Consult your local qualified dealer.

Manufacturer	Year	Model	Size	Clean Price	Avg. Price	Manufacturer	Year	Model	Size	Clean Price	Avg. Price
BENNETT DELTA WING	76	Phoenix 6B	Jr.	425	350	SEAGULL AIRCRAFT	75	Seagull III	220	325	250
	76	Phoenix 6B	Reg.	425	400		76	Seagull III	220	350	275
	76	Phoenix 8	Reg.	450	450		76	Seagull VII	174	600	350
	77	Phoenix 6C	Jr.	550	450		77	Seahawk	170	725	625
	77	Phoenix 6C	Sr.	425	400		77	Seahawk	190	700	600
	77	Phoenix 6C	Reg.	500	425		77	10.5 Meter	—	800	500
	77	Phoenix 8	Reg.	650	375		78	Seahawk	170	800	675
	78	Phoenix 8 Super	Reg.	675	450		78	Seahawk	190	800	600
	78	Phoenix 12	Reg.	650	525		78	10 Meter	—	975	875
	79	Phoenix 6D	185	875	775		78	10.5 Meter	—	900	800
CGS AIRCRAFT	79	Lazor	190	900	775	79	Seahawk	180	1000	875	
	76	Falcon V	225	550	450	79	10 Meter	—	975	850	
	76	Falcon V	185	575	400	79	11 Meter	—	950	875	
	77	Falcon V	185	650	500	SKY SPORTS	76	Kestrel A	185	500	350
	77	Falcon V	220	600	475		76	Kestrel A	220	525	425
78	Falcon 5½	Med.	750	625	76		Merlin	160	500	375	
79	Falcon 8	Med	900	800	77		Bobcat III	Lg	675	600	
75	Flexi II	240	400	200	77		Merlin	160	600	500	
EIPPER FORMANCE	75	Cumulus V	180	450	300	77	Sirocco I	156	600	475	
	76	Cumulus VB	180	450	375	77	Sirocco I	175	575	400	
	77	Flexi II	185	525	475	78	Osprey	175	800	675	
	77	Flexi III	185	575	500	78	Sirocco II	164	875	825	
	77	Cumulus 10	Med.	550	525	79	Eaglet	191	550	425	
	78	Flexi III	Lg.	700	600	79	Osprey 2	175	800	700	
	78	Cumulus 10	Med.	675	500	79	Sirocco III	189	1100	925	
	78	Antares	Med.	975	800	ULTRALITE PRODUCTS	76	Dragonfly Mk. II	174	575	375
	79	Antares	Med.	975	900		77	Firefly	174	650	500
79	Antares	Lg.	1000	900	77		Dragonfly Mk. II	196	700	550	
76	Nimbus	20-17	200	125	78		Firefly	154	800	700	
76	Cirrus	3	425	350	78		Spyder	176	850	675	
ELECTRA FLYER	76	Cirrus	2	425	350	78	Condor	178	900	825	
	77	Cirrus	3	600	400	79	Mosquito	166	1200	1075	
	77	Cirrus	2	500	300	WILLS WINGS	75	Swallowtail	20-20	350	150
	77	Olympus	160	575	525		75	Swallowtail	22-20	225	175
	78	Cirrus 5	C	700	600		76	SST	90	600	400
	78	Cirrus 5	A	700	575		76	SST	100A	625	450
	78	Olympus	160	700	625		76	SST	100B	600	475
	78	Olympus	180	675	550	77	SST	100C	750	575	
	79	Tralner	—	400	400	77	SST	100B	775	550	
	79	Cirrus 5	A	750	625	77	Universal	100A	650	500	
	79	Olympus	160	800	750	77	X-C	185	700	650	
	79	Floater	205	900	775	78	SST	100C	775	650	
79	Fledge	IIB	1200	1000	78	Alpha	185	875	775		
MANTA PRODUCTS	76	Mini	180	525	400	78	Alpha	215	950	800	
	76	Midi	220	625	575	78	X-C	215	900	775	
MOYES DELTA WING	76	Maxi I	200	650	550	79	Alpha	185	950	750	
	77	Maxi I	200	700	625	79	Alpha	215	1000	850	
	78	Maxi II	200	1000	800	79	Omega	220	1100	950	
	79	Maxi III	200	1150	1000	79	Omni	187	975	950	
	80	Maxi IV	200	1300	1300	79	Raven	209	1175	1075	
						80	Raven	229	1250	1200	

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.

Motorized

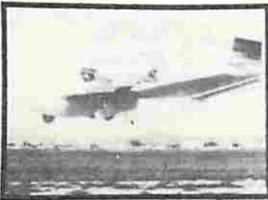
CGS POWERHAWK,



THE UNCOMMON DENOMINATOR.

1979—CGS POWERHAWK powered Easy Riser (Chuck Slusarczyk) wins "Best Ultralight" at Marion, Ohio.

1979—CGS POWERHAWK powered Easy Riser (Chuck Slusarczyk) wins "Best Engine Design" at World Championships in Minneapolis, Minnesota.



The new Mitchell Wing "LL-2" (shown) is now available... and we sell 'em! With a CGS Powerhawk, of course!



CGSAVIATION

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1979—CGS POWERHAWK powered Mitchell Wing wins "Grand Champion Best Design" at the EAA Meet in San Diego, CA.

1979—CGS POWERHAWK powered Mitchell Wing wins "Best In Class" at Porterville, CA.

1979—CGS POWERHAWK powered Mitchell Wing wins "Best In Class" at Bakersfield, CA.

1979—CGS POWERHAWK powered Mitchell Wing establishes official recorded altitude record.

1980—CGS POWERHAWK powered Easy Riser (Joel Mullens) wins "Safety Award" at Sun-n-Fun in Florida.

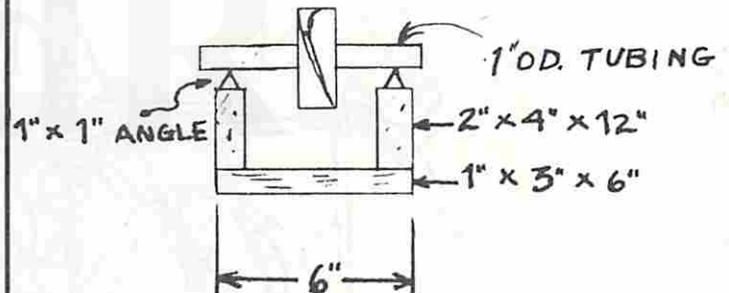
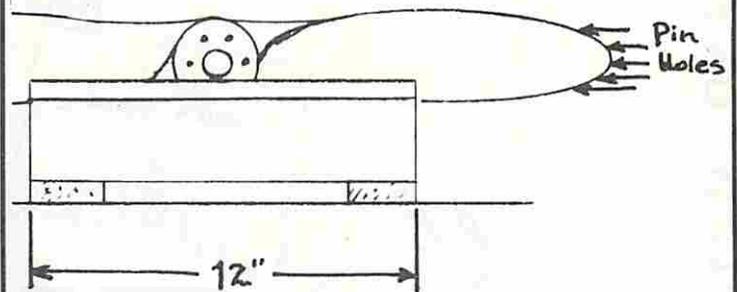
1980—CGS POWERHAWK powered Mitchell Wing (Dick Clawson) wins "Grand Champion" at Porterville, CA.

This is just a partial list of the awards given to ultralights with the one special uncommon denominator: the original recognized leader in powered ultralights, the **CGS POWERHAWK. THE BEST!**

For a complete information package, send \$5 to CGS Aviation.

This month we will balance the prop using a simple prop balancing device. It can be made out of any scraps of wood and the sizes are not too critical. You will need, however, some straight pieces of angle steel or aluminum for the balancing edge. Make sure that the pieces of angle material are parallel to each other, side to side and top to bottom.

To balance the prop, shove a short piece of tubing through the prop hub to act as an axle. It must be a snug fit. Our props have a one inch hole through the center, so we use a piece of one inch aluminum tubing. The tube must be long enough to bridge the gap across the tops of the angle. Place the prop on the balance after checking if the balancer is level by using a bubble level. Shim up the base of the balancer if necessary.



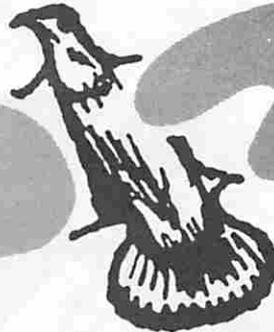
The heavy blade will go down. If you have plenty of resin on the heavy blade, sand it some more. If you have already sanded the resin pretty thin, then apply a coat of clear urethane varnish to the light blade. The side you just painted will normally act heavy until it dries.

After it dries, check for balance again. It may be necessary to paint a light blade a few times before it balances properly. If the prop is almost balanced, it is not necessary to paint the entire blade. Sometimes a coat of paint on the tip will be enough to true it up satisfactorily. When the prop will balance horizontally, it is balanced for flight.

One last thing I do is to take a needle or pin and poke about five or six tiny holes in the tips of both blades, through the resin. This is necessary for the wood to breathe and relieve itself of moisture as humidity changes from day to day.

Never fly with an out-of-balance prop or one that is damaged or cracked. If you have any questions about your prop's safety, contact your prop or engine supplier.

Chuck Slusarczyk



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flying the INCLINE

by Nathan Taylor



Photos by Cecil Pierce



As we flew over the top of Lookout Mountain in the Cessna 172 a smile came across my face. "What a monumental day," I thought. The first hang gliders would be carried up Lookout Mountain on the Incline Railway and launched from the East side. Special racks had been made to carry the gliders, and unloading ramps had been built at the top. I looked down at the tiny parking lot 4000 feet below. Leon Riche, sitting next to me, yelled, "Cut," to the pilot, and dove out the door. I watched him fall for a moment, then I skydived out thinking what an exciting day for hang gliding it was going to be. The first flights were to launch off the East side of Lookout Mountain with free lift service provided by the Incline.

My ram-air parachute opened as usual. I kept a watchful eye on the power lines and soon landed next to Leon right in front of the TV cameras. The commentator asked why we had skydived into the Incline parking lot. We answered, "To celebrate the opening of the new East launch site on Lookout Mountain." The pilots stood waiting, ready to make the first flights. We loaded the kites on the Incline Railcar and rode up the scenic mile. On the way up, the tourists became as excited as we were and

began asking questions concerning what it was like to hang glide. By the time we reached the top new friendships had been kindled between the riders and pilots. As we unloaded the gliders everyone's spirits were high including the tourists who had gathered on the observation deck to watch their new-found friends fly off Lookout Mountain. As the pilots assembled their kites, the maintenance crew, which had done an outstanding job in getting the site ready, cut down a few additional trees to assure safe launches. Neal Harris was first to launch with a Moyes Maxi II with a Gemini system. The excitement began to build as the engines were started. Neal ran off the edge and we all cheered his successful launch. It was an overcast day with mild winds. It was not a good day for thermals or ridge soaring. Warren Puckett and Dan Johnson launched next and, unable to catch any lift, took off to the landing site which was a 5 to 1 glide ratio on the other side of St. Elmo. John Mote and Chris Smith launched. After getting out from the ridge, the two began circling. The large parking lots below had created good thermals. Soon John and Chris were disappearing over the back side thousands of feet above and on their way to Crystal Flight Park four miles away.

The first flights took place on August 23, 1980. The following five days were flyable. Even though each day was overcast with mild winds, booming thermals coming off the pavement below allowed seven pilots to land at Crystal and 15 to fly to Crystal and back. Gary Englehart on three occasions got 5000 feet above.

The tourists riding the Incline loved to watch the gliders take off and crowded the observation deck each day. The media response was great. Every day hang gliding from the Incline site was in the newspaper or on television. All the employees at the Incline were enthusiastic, giving their full cooperation. The program was successful. There was no doubt that by next year thousands of additional tourists would ride the Incline to watch the hang gliders fly.

On the 29th the launch site land owner called to say the Mayor of Lookout, Nick Senter, had threatened to serve an injunction if the hang gliders did not stop launching from his back yard. A few of the local residents had complained their privacy was being jeopardized by the pilots who flew along the ridge. Apparently, the residents had no knowledge that it was the lifting air along the edge that kept the gliders aloft. The residents seemed to feel the gliders flew close to the ridge in order to intimidate them. According to statements made by Mayor Senter the residents complained the activity would increase business and tourism in the area. A city ordinance prevents any expansion of business in the Lookout community. So, sadly, we cancelled hang gliding from the Incline site.

In closing, the hang gliding community would like to thank the many people who made the flying on the East Side possible. Mr. and Mrs. Ralston Wells, who allowed us to launch from their back yard; Mr. Blaylock, the representative from CARTA, who gave his full support; the maintenance crew who built the ramps, cleared the launch site, and mounted the brackets on the railcars; Chattanooga City Commissioner Paul Clark and Mayor Pat Rose who gave their approval of the plan; Superintendent Jack Conner who gave his approval in regards to the landing site; Leon Riche, with High Adventure Sports, who met with all these people and made the Incline site a reality.

To the Mayor of Lookout and the residents who complained we would like to apologize for any inconvenience our flying created. Our desire was only to FLY one of the world's best sites, utilize the Incline Railway, and enjoy the FREEDOM OF FLIGHT.

Test Fly 1980's Most Popular Glider



WGLS
INC
 Santa Ana, Cal.

RAVEN SPECIFICATIONS

Model Number	229	209	179	149
Area	229 ft. ²	209 ft. ²	179 ft. ²	149 ft. ²
Span	36.2 ft.	34.5 ft.	31.5 ft.	28.3 ft.
Leading Edge	21 ft.	20 ft.	18.2 ft.	16.5 ft.
Pilot Weight	170 - 230 lbs.	150 - 210 lbs.	115 - 170 lbs.	90 - 140 lbs.
Glider Weight	62 lbs.	58 lbs.	49 lbs.	45 lbs.

All Ravens are available in prone, supine and novice configurations. Each is HGMA certified to 1980 standards.

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Lightweight "bare essentials" self tree rescue kit. Contains 100 feet 300 pound paracord to let yourself down or bring up a rope, and a finger saw to remove branches. Pouch velcros to wires or harness.

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More Inz and Outz from
Michael Jones

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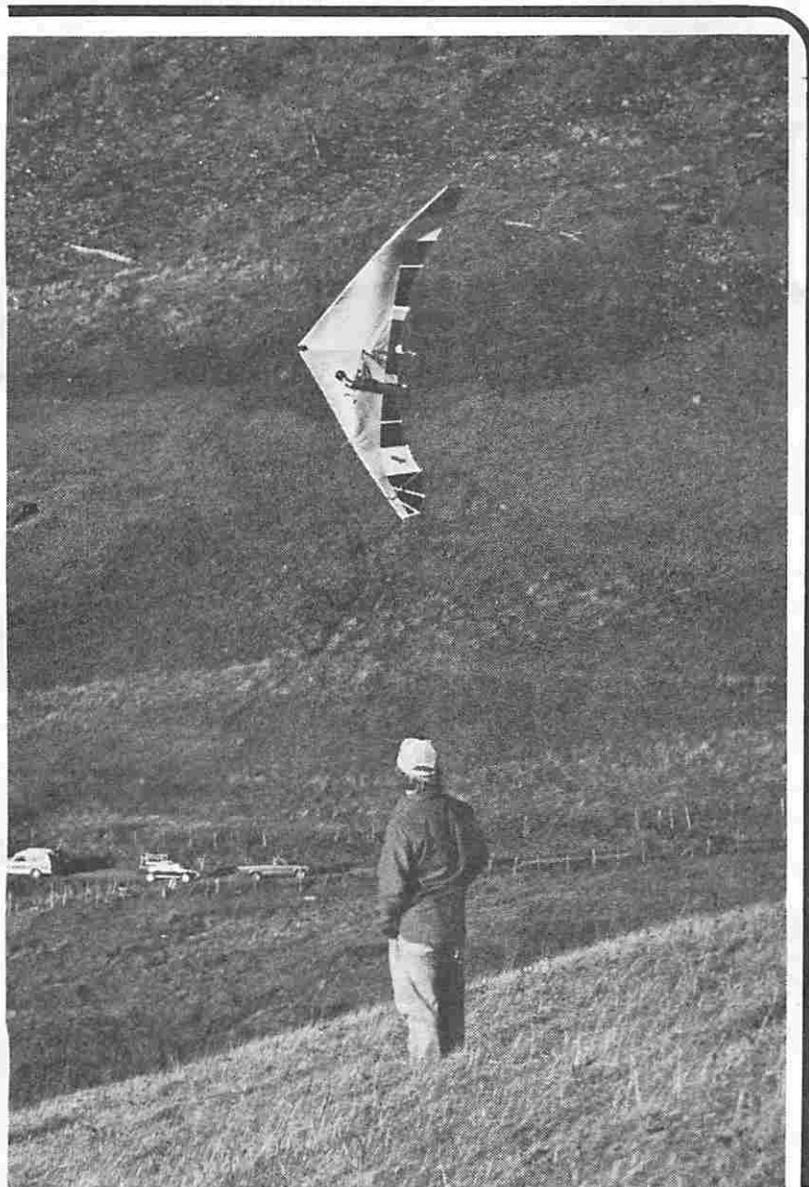
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SIROCCO III



WHY WAIT TILL NEXT YEAR TO GET THE HOTTEST GLIDER BUILT? TRY A **SIROCCO III** AND SEE WHY PILOTS FROM COAST TO COAST ARE RATING THIS GLIDER NUMBER ONE IN:

HANDLING

Due to the revolutionary dropped keel, freedom tips, and differential deflexors, the **Sirocco III** now handles like a hot little sport glider. Wait until you hook a thermal, or set up on a spot in this quick darting wing — you'll love it.

PERFORMANCE

No other glider can match the Sirocco's all around performance. Whether you want top end or slow speed, the **Sirocco III** does it all. The deep camber and new tip design yield a superb sink rate, yet the glider zips along to reach thermals while most other designs lag behind.

STABILITY

New cable defined tips plus our exclusive articulated battens provide damping and strong positive pitching for exceptional static and dynamic stability. Safety is our highest priority.

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We believe we have the strongest airframe in the industry. The **Sirocco III** passed the HGMA load testing easily. With a **Sirocco III**, you can stop worrying about the integrity of your glider and enjoy free flying.

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Quick set up, thanks to the breakdown control bar and sliding crossbar, which allows you to be at take off while your friends are still trying to find their wing nuts. You'll like the perfect balance on take off — no more tail heavy launches as with most other gliders.

SHOULDN'T YOU BE FLYING NEXT YEAR'S STATE-OF-THE-ART GLIDER? GET AHEAD WITH A **SIROCCO III!**

SPECIFICATIONS

Area	168	189
Nose Angle	120°	120°
Sail Billow	0°	0°
Stall Speed	18mph	18mph
Aspect Ratio	6.9	6.7
Span	34 ft.	35.5 ft.
Weight	61 lbs.	61 lbs.
Roor Chord	8.5 ft.	9 ft.
Pilot Weight (from)	125 lbs.	155 lbs.
(to)	175 lbs.	220 lbs.
Maximum Glide Angle	9 to 1	9 to 1
Breakdown	10.5 ft.	11.5 ft.

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Standard features on both Falcon models include: cover bag, negative deflexers, floating tips, quick set-up and CGS high quality hardware. Applied leading edges are standard on the Falcon 8. Breakdown frame and dual rigging are optional.

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With lightness in mind, the Falcon 8 has been developed for the pilot that wants an easy to fly, L/D ship. Using the same basic frame and large keel pocket from last year's Falcon 5.5, CGS has improved the sail and cambering technique. The result is, easy set-up launching and landing, light bar pressure, and performance that will put you ahead. The high speed ability combined with a beefier frame makes the Falcon 8 a much safer thermal or high wind ship that won't wear you out.

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FALCON 5 PLUS

The Falcon 5 "Plus" has many of the appealing characteristics of the original Falcon 5 ... with a plus. The "plus" is a raised keel pocket and floating tips for a positive attitude. The Falcon 5 "Plus" has a wide range of tuneability. A good beginner can fly safely while an advanced pilot will find the tighter profile gives easy, light handling with quick response. The Falcon 5 "Plus" has low stall speed for floating, but good penetration when needed, even under a light loading. A design that has proven successful for three years, proves better now. Falcon 5 "Plus."

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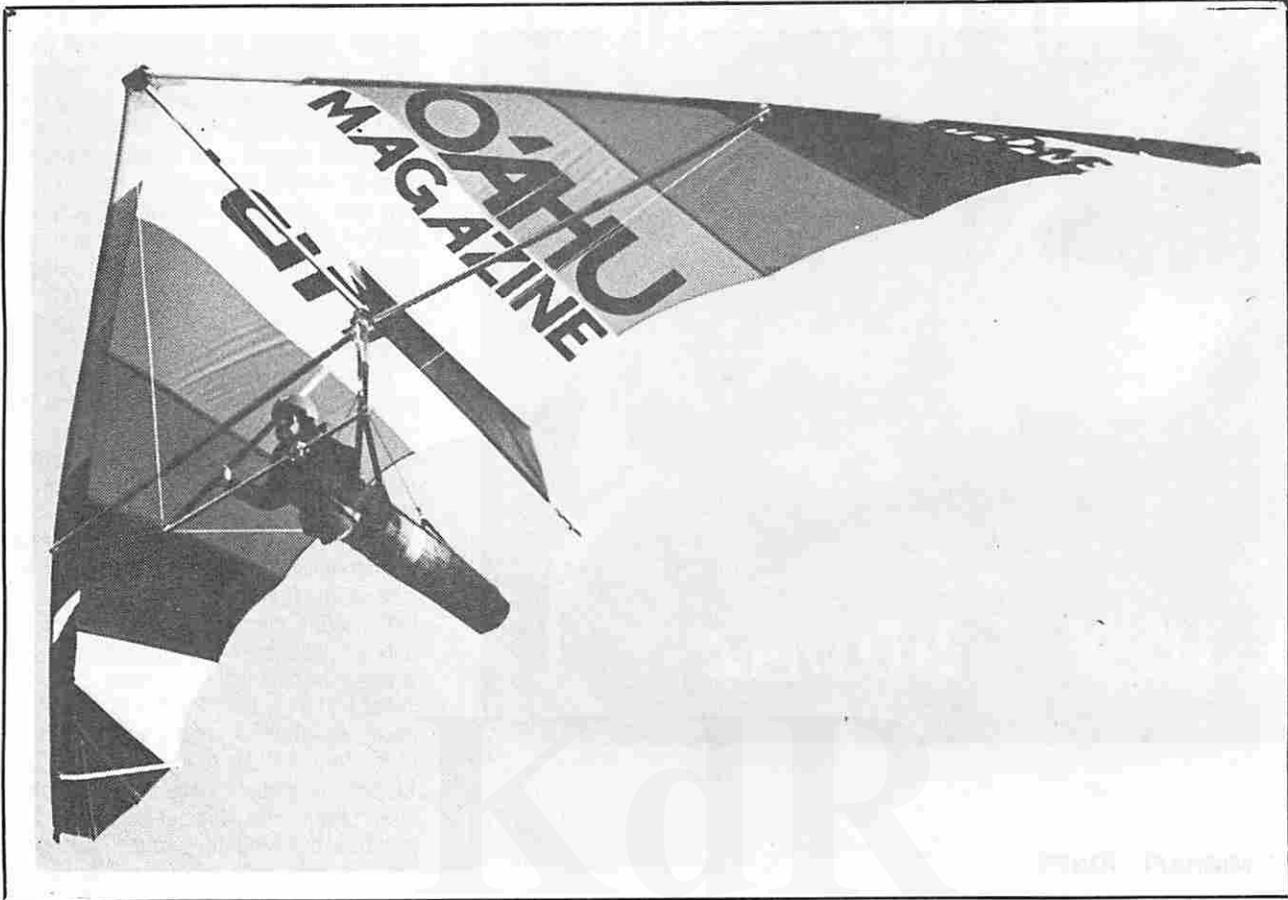
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UP Firefly 2B



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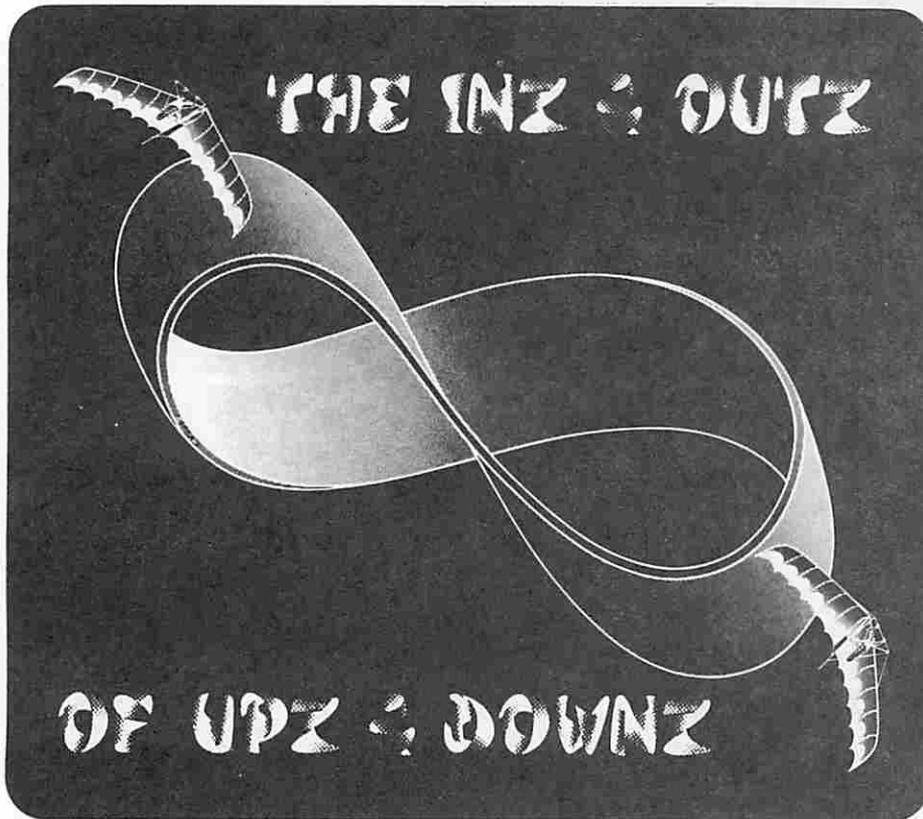
GLIDER: UP Firefly 2B-181

SITE: Makapuu, Hawaii

DATE: 4/30-5/1, 1980

	149	181	216
AREA	149 sq. ft. (13.84 m ²)	181 sq. ft. (16.815 m ²)	216 sq. ft. (20.07 m ²)
NOSE ANGLE	107	107	107
WING SPAN	28.6 ft. (8.72 m)	31.6 ft. (9.63 m)	34.5 ft. (10.52 m)
ASPECT RATIO	5.5	5.5	5.5
SPEED RANGE	17.42 mph (27.67 kph)	17.42 mph (27.67 kph)	17.42 mph (27.67 kph)
WEIGHT	46 lbs.	51 lbs.	56 lbs.
PILOT WT. RANGE	103-155 lbs. (47-70 kgs)	130-193 lbs. (59-87.5 kgs)	150-220 lbs. (72.5-99.8 kgs)

Illustration by Hank Syjut



BY MICHAEL JONES

Most pilots will admit that experience separates the good pilots from the not-so-good. I agree. Quite simply, the more hours marked in your logbook, the better your chances become of breaking into the upper echelon.

However, that's not the whole story. There is at least one other requirement often overlooked by many pilots—the ability to listen.

On the surface, it seems like a talent so basic that it would require no training whatsoever. Unfortunately, that does not seem to be the case. In fact, I would venture a guess that listening may be the most common stumbling block for the average hang gliding pilot.

In the past several years, many major corporations have recognized this problem and have instituted listening improvement programs for their top executives. For them, the program goals may be improved communications, increased profit margins, or reducing errors in corporate management. For us, the goal may be somewhat less complex, but the methods are extremely similar.

In flying, our personal experiences are the most direct and fundamental learning keys. Certainly, bent downtubes have done far more to increase worldwide hang gliding proficiency than any single article or book

could ever hope to accomplish. But, personal experience is not quite enough.

As president pro tem of "The Last Angry Man" association of competition pilots (Chris Price is Chairman of the Board), I'm not one to shove the idea of hang gliding competition down anyone's throat. With very few exceptions, the quality of competition hasn't dramatically improved in the four and a half years that I've been flying. On the other hand, if you can suck in your pride and endure the politics, rule changes, and mismanagement, competition is the best place for a listening pilot to learn. You don't even have to compete. Just open your ears to all of the free, expert advice being passed around. Listening to Steve Moyes and Keith Nichols discuss flying techniques is like receiving free soaring coupons redeemable during your next flight.

Competition demands fast thinking, appropriate reactions, and precision flying. And, it forces the competitor to be highly introspective about his or her own flying skills. Listen to them. Attach yourself like a lamprey to a shark and absorb that knowledge.

Of course, drawing the line between being inquisitive and obnoxious is a social skill not to be taken lightly. For the most part, however, the top pilots are more than

willing to help you with your flying. Remember, many of them depend on your patronage to support their hang gliding businesses.

Even if you can't attend one of the top competitions, there is undoubtedly a pilot in your area who flies better than all the rest. Cultivate that friendship. Listen and then research those ideas during your next soaring flight. Above all, don't nod your head vigorously in agreement when a gem of soaring knowledge is passed your way and then fail to experiment with that idea on your next flight. Overcome the fear of trying something new and perhaps having to land early. In the long run, those who never take a chance at going down, never go up—in ability.

Perhaps the most important asset of a good listener is the ability to separate the wheat from the chaff so to speak. For hang glider pilots, a more accurate statement would be to separate the hot air from the thermals.

Considering the inherent dangers of hang gliding, never take any advice without a size double D grain of salt. Learn to listen with a discriminating ear and then only attempt those flying techniques within your personal limitations.

For instance, Rich Pfeiffer is a cross-country pilot who I greatly admire. One of his contributions to my flying came in the form of a quote made during an interview. For others, it might be an exaggeration, but when Rich said, "As long as I'm high enough to make one 360, I'm high enough to get back up," I'm sure he meant it.

Since Pfeiffer made that statement, I can't recall just how many times that quote has popped into my mind while scratching for lift and supplied that extra, infinitesimal surge of adrenalin I needed to keep trying. Even if you are the self-motivating type, listen to Mr. Pfeiffer.

But, be forewarned. To Pfeiffer, that last 360 may be five miles downrange, in the back of a deep canyon, surrounded by 100 foot pine trees. For we lesser mortals, it is certainly wise to take the gist of Rich's philosophy and use it to our best advantage rather than following him up that canyon.

In addition to listening to others, listen to yourself. If you're not getting as high, going as far, or staying up as long as everyone else, more than likely you're doing something wrong. Blaming such misfortune on your glider, the conditions, bad luck, or the guy who ran you out of a thermal may be comforting to your psyche, but potentially detrimental to your growth as a pilot. Listen to that little voice that only you can hear; the one that whispers the truth.

A year or so ago, I was thermalling with Sterling Stoll over Pine Flats. It had been a frustrating afternoon for me as I was

forced to look up at Sterling during most of the flight. Time after time, he'd top out in the same thermal with me, but faster and with an extra hundred feet of altitude.

Whenever we got close in a thermal, Sterling could hear me shouting as I questioned the cultural heritage of my glider and instruments in no uncertain terms. Clearly, I had forgotten that a human being was controlling those inanimate objects.

After landing and regaining my composure, Sterling told me something that reaffirmed my belief in listening to expert pilot advice and questioning expert pilot opinion. There is a difference.

You see, at some point in my early development as a pilot, I had read somewhere that, when thermalling, maximizing the lift and minimizing one's bank angle went hand in hand. Today, I had been splitting the difference between the tiny, bullet-like cores of the thermals with the semi-strong lift on their perimeters. Sterling's simple lesson was: Go for the core, put the glider on end, and try to stay with it. Even if you're banked high and only going up 25 feet per minute faster than using the other method, you're still going up faster.

I listened and learned. Rules of thumb can get smashed by the cold, cruel hammer of reality. In general, theories are a good starting point—a point from which to add and adapt to your personal experience.

A case in point are those pilots who advocate using a 270 degree turn to enter strong thermals. Again and again, this method is reiterated in hang gliding journals as a useful tool in thermal flying. Personally, I have found it to be so much balderdash.

The contention is that when pushed away from a strong thermal, a pilot can use a 270 degree turn away from the thermal to re-enter the lift more easily. Bull. I have never found that to be an acceptable technique for several reasons.

First, the risk of becoming disoriented and losing a rapidly drifting thermal is too great. Secondly, the time and cost of altitude lost makes the maneuver a low percentage one in my book. And finally, I have never run into a thermal that I couldn't muscle my way into. Sure, I may have to slide off to one side and pick a better spot from which to enter, but at least I can keep a precise fix on the thermal's location.

Again, this belief is a product of listening to other pilots and my own experience. The bottom line is this: Listen and then find out for yourself.

In the convoluted logic of baseball's great philosopher, Yogi Berra, "You can observe a lot just by watching." And listening.

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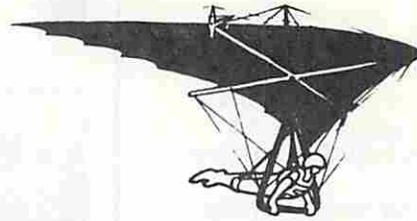
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HANG GLIDING STATISTICS



By Dan Johnson

STATISTICS OF INURIES, PART II

Our second presentation of injuries sustained by pilots was encouraged by Doug Hildreath, USHGA Safety Sub-Committee Chairman. The National Organization is interested in promoting greater safety through increased awareness. **WAM** will provide Doug and the USHGA with the results for their own analysis.

The **Whole Air Magazine** applauds this logical effort as a way to help make our enjoyment of flight more enjoyable. In the long run, it may also help us stay unregulated by the government, as it helps show our effort in increasing safety. For as we know more about how pilots get hurt, we may devise ways to reduce the frequency and severity of injuries. Though some of you may regard the presentation as morbid or unsettling, the necessity for knowledge is great, like having to swallow a bitter medicine to alleviate the effects of an ailment.

IMPORTANT!

Our next survey carries this effort further. Please continue to participate. **If you answered the last poll, please refrain this time.** If you passed it up last time, **please** do fill out the card in this issue. Notice we have slightly re-worded a couple questions to heighten clarity and increase reliability of the results. Thanks to those readers who suggested changes.

Here, you will find results from the last survey. As with most of our short term polls, we warn you against placing undue faith in the tabulations. We will indicate when the results confirm findings from our first injury survey (Jan/Feb '80 **WAM**).

Of all cards received, 153 answered "Yes" to the question, "Have you ever had a hang gliding accident?" Of those, 130 provided sufficient responses to follow through. The percentages displayed are based on this latter group.

65% indicated an injury was sustained.
76% indicated the glider was damaged.
45% indicated both had occurred.

Of those with injury(ies)

25% required First Aid
36% required Professional Care
25% required Hospitalization
14% required Surgery

18% indicated multiple injuries.

Of 111 responses to "Injured Area"

Head10%
Neck 3%
Chest 6%
Abdomen 3%
Pelvis (write-in) 2%
Back (write-in) 3%
Upper Extremity36%
Lower Extremity37%

This topic was a confirmation of our first survey, which showed lower extremities to be the most common, albeit only slightly more than upper extremities. Injury to the head was the same, and torso injuries were very low, as before.

Of 114 responses to the Type of flying

Free Flying89%
Powered Flight 5%
Towed Launch 6%

Of 118 responses of Flying Posture

Supine15%
Prone75%
Seated (write-in)10%

Of Mode of Flying descriptions

(some answered more than one)
Being Instructed 7%
Learning On Own32%
Fun Flying53%
Competing 8%

On wearing a helmet

2.4% sometimes do
0.8% usually do
96.8% always do

On doing a hang check

4.2% sometimes do
9.8% usually do
86.0% always do

On pre-flying carefully

1.4% sometimes do
11.1% usually do
87.5% always do

REMINDER!!

If you did **not** fill out the card last time, **please do so this time.** If you **did** last time, thank you, and please pass this time.

READER RESPONSE CARD

SEPTEMBER-OCTOBER
WHOLE AIR MAGAZINE
Expires Nov. 1, 1980

We read every card, carefully . . . anything you
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PILOT SURVEY FORM

Name _____

Address _____

_____ Zip _____

1. How many hang gliding accidents have you had?

1 2 3 4 more

Please detail the most serious accident of the above.

2. Minor injury, serious injury, minor damage to glider, serious damage, none

3. If injured, did you receive, First aid, Professional care, Hospitalization, Surgery?

4. Were you flying, Powerless, Power, Tow, Supine, Prone, Other _____

5. Injured area: Head, Neck, Chest, Abdomen, Upper extremity (hand, arm), Lower extremity (leg, foot)?

6. At the time, were you, being instructed, learning on your own, fun flying, competing, other _____

7. Date and Time of accident: _____ day, _____ month, _____ year, _____ time, no. of mos. ago _____



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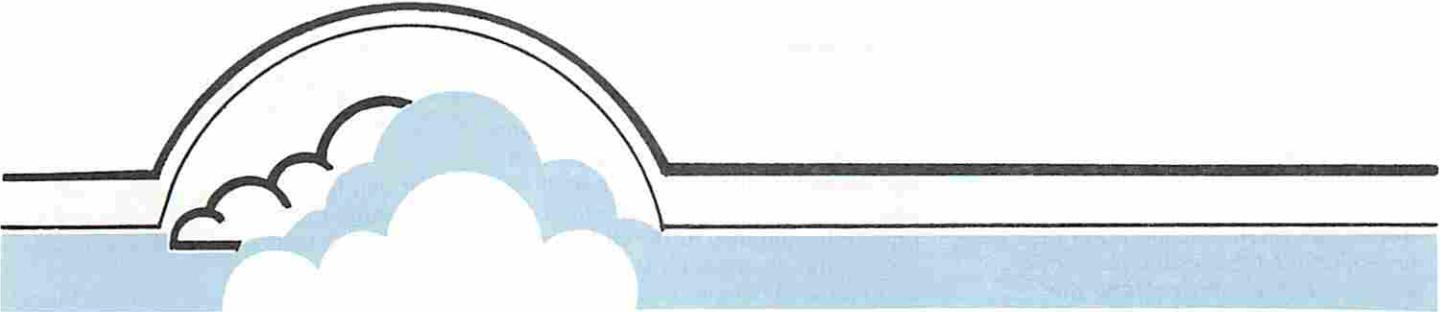
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- ★ Chest, waist, and weight



THERMALS & THERMALLING

by Paul Burns

As a boy, I recall watching Hawks soaring over Illinois cornfields. Turning slow, graceful circles, maintaining or gaining altitude, seemingly without effort. Enviously I wondered, "How do they do that? Wish I could do that!"

Soon I learned the Hawks were thermalling, or using thermal lift to sustain flight and altitude. Armed with my newfound knowledge that air moves up and down, as well as across the surface, the thought of soaring like a Hawk became more and more of an obsession. I lost many a free flight model airplane in thermals, and my knowledge of these rising currents expanded. As a youngster I dreamed of building a model big enough for me to ride in, so I could experience for myself, the thrill of rising on the power of the sun. To see the vast expanse of landscape from the Hawk's lofty vantage point.

Luckily I was born into the ultralight generation. When hang gliding started to emerge as sport, I jumped in with both feet. Performance of the early machines was a bit of a deterrent for soaring thermals in those early days. We were content to soar ridge lift over small hills. We loved it when the winds were 30 mph. In these wind speeds we could soar, stay up, even gain altitude!

The next spring found me visiting Chattanooga, Tennessee, where I saw Tom Peghiny soaring thermals on a Kestrel. With mouth hung open in awe, I watched as Tom skillfully worked the weak lift for a gain of several hundred feet. In my mind, a fleeting vision of Hawks was replaced by the now indelible image of Tom and his Kestrel in their aerial ballet.

When my own opportunity for a thermalling flight presented itself for the first time, I knew that thermals

were warm air, formed over an area on the surface which is readily heated by the sun. I knew that a field near our landing area, which was, at that time being plowed, would make a good thermal producer. I was sure this field was working because a fellow pilot was working moderate lift and gaining steadily. I launched into light winds, and flew directly over the field.

A bump of lift and I initiated a turn into the rising bubble. I found the glider to be sluggish handling, affected by the lift. Increasing my control pressure and airspeed, the glider began to roll. Just as I began thinking that I knew what I was doing, I reached the boundary layer of the thermal, and I got abruptly dumped. My grip on the control bar straightened as I turned a hard 180°. Some more turbulence and, pow!, back into lift. Again I started a shallow turn and began sinking in choppy air. Although I never successfully completed an entire 360 in lift, I managed to maintain my altitude for about ten minutes. At times, I thought the glider had been jolted out of tune, as it seemed to have a mind of its own. I landed, tired and confused, deciding that my knowledge of thermalling techniques was shallow at best.

Now, after logging hundreds of hours of airtime, I can say that I've learned a great deal about thermals. I'd like to take this opportunity to pass some of this knowledge along.

WHAT ARE THERMALS

Simply speaking, thermals are small parcels of warm air, formed on or near the surface. Let's take an area of exposed rock. As the sun heats the rock, the air around the rock is also warmed. When air is heated to

a point where it is warmer than the air above, it becomes bouyant, and separates from the surface to begin rising through the atmosphere. This warm air will continue to rise whenever the upper air is a cooler temperature than the warmed air within the thermal. Also, if upper levels are cooler the thermal will increase both in size and rate of ascent with altitude gained.

WHAT DO THEY LOOK LIKE?

The size and shape of thermals seems to be almost limitless. Most are columns or bubbles, circular in shape, ranging from only a few feet in diameter to a quarter mile or better.

Small thermals are, of course, harder to work successfully than large ones. Small, strong thermals can seem downright hostile at times.

In light winds, the column type thermal may present the opportunity for several pilots to work the same thermal at various altitudes.

Stronger winds may produce the bubble type thermal. In this condition, the lift may be shallow in vertical area. One pilot can be in lift, and another pilot only a few hundred feet above or below will find sink. The size and shape can be as varied as the daily weather.

Vertical speed or velocity of thermals is dependent on surface heating and temperature variation, or lapse rate. The greater the variance, the greater the instability, hence stronger thermal production.

WORKING THERMALS

To be effective, a pilot must fly the available lift efficiently. Turns must be well coordinated, and in lift rather than sink. To be effective the pilot must have confidence in the

THERMALS..

machine he or she is flying, and in their own ability; aware of the limitations of each.

Before launching, a pilot can first determine weather conditions that are favorable for thermal production, and furthermore, how strong the thermal activity may be. Note the temperature difference between the landing field and launch. On a good day, the temperature differential will be 3-5°F for each 1000 feet. Also, the size and velocity can be roughly determined. Standing at launch, the wind will cycle, increasing in speed as a thermal moves through the area. The size and speed can be determined by the highest velocity of wind and length of time the wind increases for each cycle.

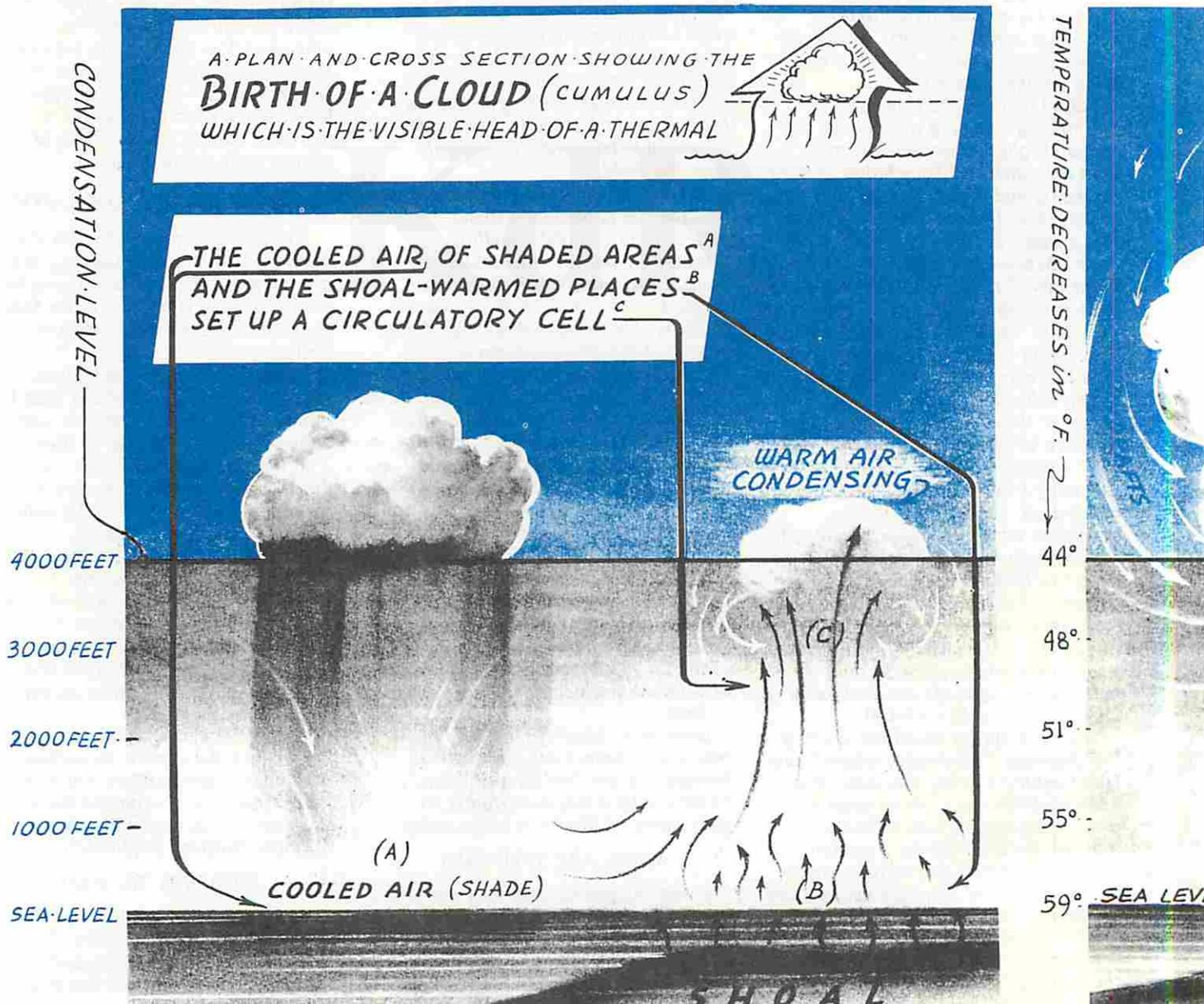
Timing of launch in synchronization with the cycles is an advantage, and can mean the difference between soaring and a sled ride. The best time to launch may differ with each flying site. Geographical configuration is a factor to consider when choosing your launch window.

Here in the Eastern part of the country, selection of launch time may be somewhat different than in the West. At sites like the ones in the Chattanooga (Tennessee) area, a pilot may find the best time to launch to be as the cycle commences and is building. The long ridges tend to compress the thermals, and a pilot can launch and soar thermal induced ridge lift to gain precious altitude. This can allow the pilot the possibility

of gaining enough altitude to last through the next down cycle and still be above launch when the up cycle starts.

Western pilots may want to launch between cycles. Using this technique the pilot launches and flies into the building thermal somewhere upwind of the launch site.

Thermals are many times illusive, and can be an exercise in frustration for the pilot. Use of a variometer can reduce the guesswork and confusion. This instrument will first indicate ascent or descent and also the rate of loss or gain. It is a very helpful tool in working the air for the most effective results.



“STAIRWAYS TO THE CLOUDS.”

Greatest efficiency will be realized when bank angles and airspeed are kept to a minimum. These two factors will be predetermined by the size of the thermal. The smaller the diameter of a given thermal, the tighter the turn needed to remain within lift. Consequently the higher the airspeed and sink rate will be, as well. Larger thermals are more easily worked, even when weaker due to lower bank angles and sink rate.

One of the greatest assets to a pilot in thermalling is persistence. If you are soaring in cycling conditions, and find yourself low, in danger of losing it, keep a close eye on your vario. Should it show an area of zero sink

or even 100-200 down per minute, you could be entering an area where a thermal is building. Hang in there! Even if this area ultimately does not develop into lift, you will be going down slower, extending your flight, to possibly out-last the down cycle.

CAUTIONS

The air moves as a fluid, everywhere there is air moving up, other air must be moving down to replace it. With this thought in mind, we can see how turbulence will be created around a thermal. This turbulence is

proportionate to the strength of the thermal activity. Increase your airspeed somewhat when encountering this turbulence. Do not overdo it, though. A pilot can fly too fast in turbulence. This will put higher stress loads on the glider. Fly fast enough to keep response crisp, yet slow enough to keep the effects of turbulence to a minimum.

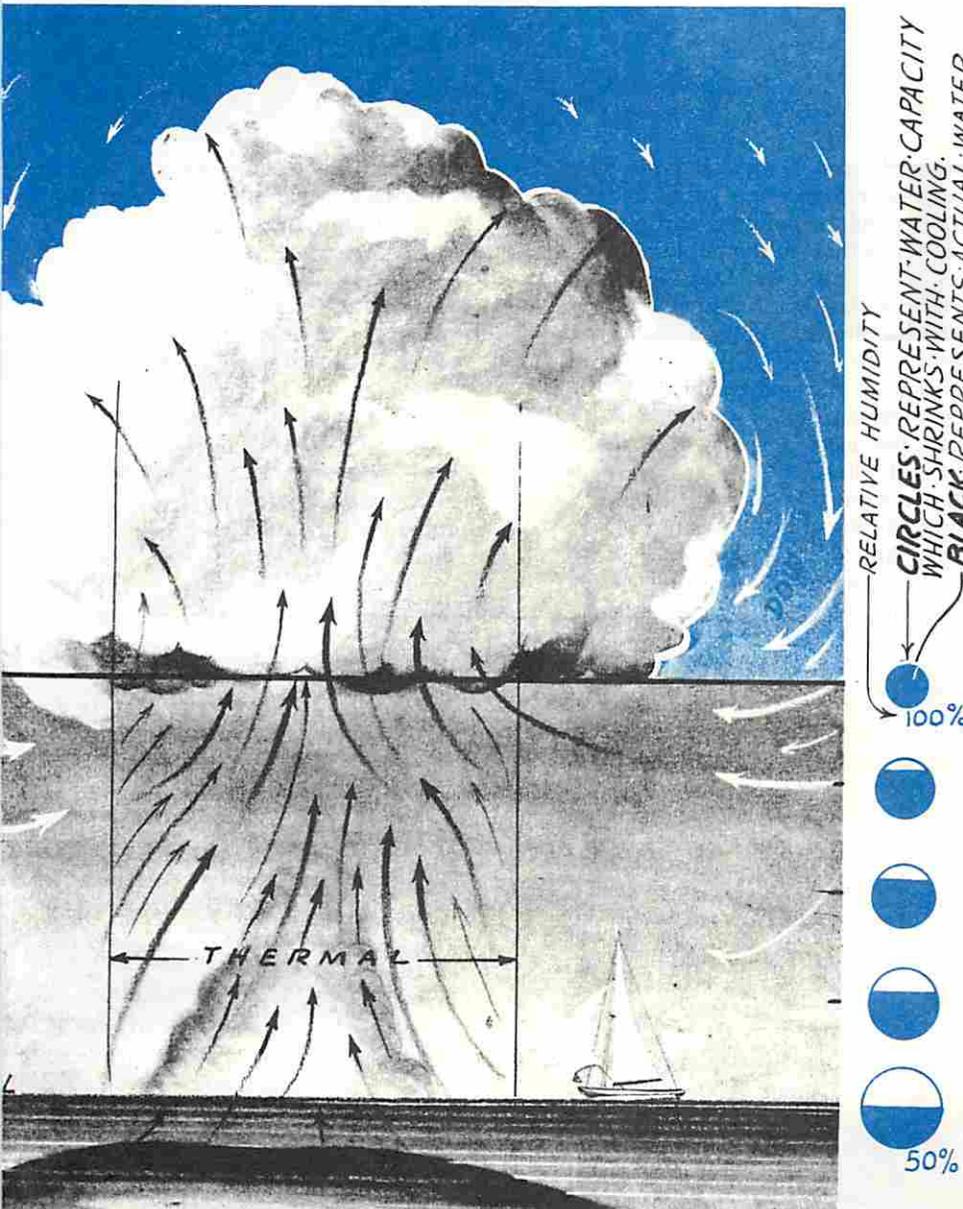
When working lift close to mountain ridges, be prepared for the effect of a gradient condition. At times the outboard wing (away from the ridge) can be in stronger lift than the inboard wing. This condition can be responsible for lifting the outboard wing, resulting in an unwanted and dangerous turn toward the ridge. Here, again, it is an advantage to fly a bit faster for quick response.

When reaching the top of the thermal, where lift turns to sink, the glider can be pitched down suddenly. Known as “over the falls,” the condition can sometimes be severe enough to induce a tumble or tuck condition. Proper reaction by the pilot in this situation is to pull in and gain airspeed. Some pilots erroneously push out to recover from the nosedown, or diving, attitude. This action will cause the situation to increase in severity.

When encountering traffic in soaring thermals, the first pilot in a given thermal sets the direction of the turn. All additional pilots should observe, and follow the direction established by the first pilot. Also the low pilot has the right-of-way. Should a lower glider do a job better of coring the lift and gaining altitude to the point of taking over another pilot, the higher pilot must yield.

When landing after a good thermalling flight, always suspect your landing area to be a good thermal generator. I prefer to set up close to the downwind perimeter of the landing area, should a thermal be working off the field. This way, a pilot will have a bit more area to work with on final approach, when the glide is extended by unexpected lift.

Thermals represent the stairways to the clouds. They open the door to cross-country flying. Complex and unpredictable, they present an everchanging challenge for the accomplished pilot. If variety is truly the spice of life, then thermalling is the spice of soaring.



“Eric Sloane’s Weather Book,” 1949 by Duell, Sloan & Pearce

Oshkosh '80



This article, and many of these pictures, resulted from the efforts of Dave Starbuck and Judy Hopkins. They scoured the 28th Annual EAA event all week long on behalf of the Whole Air Magazine.

Daily they prepared notes of occurrences, equipment seen, took photographs, attended forums, had conversations, and offered general insights. Judy delivered a talk on the "Women of EAA," and Dave flew with Dale Kjellsen (Motorized Gliders of Iowa, who, incidentally, completed the most foot-launches and landings of all the ultralights.)

This team compiled a massive folder of information on the "world's greatest aviation event." Dave and Judy forwarded 18 pages of notes. From this, I have paraphrased the words you read here. Without a doubt, I have omitted many important bits of information. However, one factor stands paramount to the future of ultralight aircraft . . . our continued freedom.

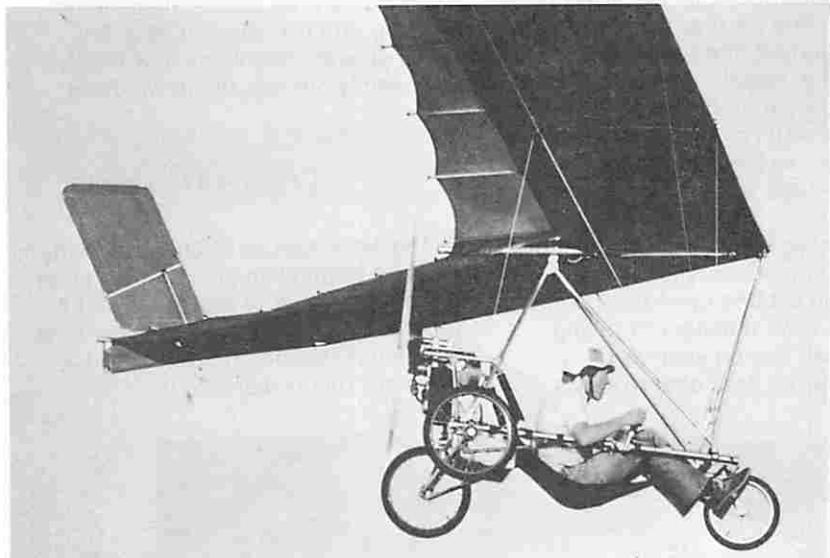
— Dan Johnson



REGULATION OR FREEDOM, 1981

It's plain as the gleam of a Yamaha engine that the FAA is in a dilemma over ultralights. The mushrooming growth of ULA's (ultralight aircraft) is partly responsible, but so is their use of airspace.

"Ultralights are becoming over-achievers," it is written, and "they are beginning to appear in densely trafficked airspace and over population concentrations such as stadiums."



(George Larsen, *Daily News*, 8-6-80)

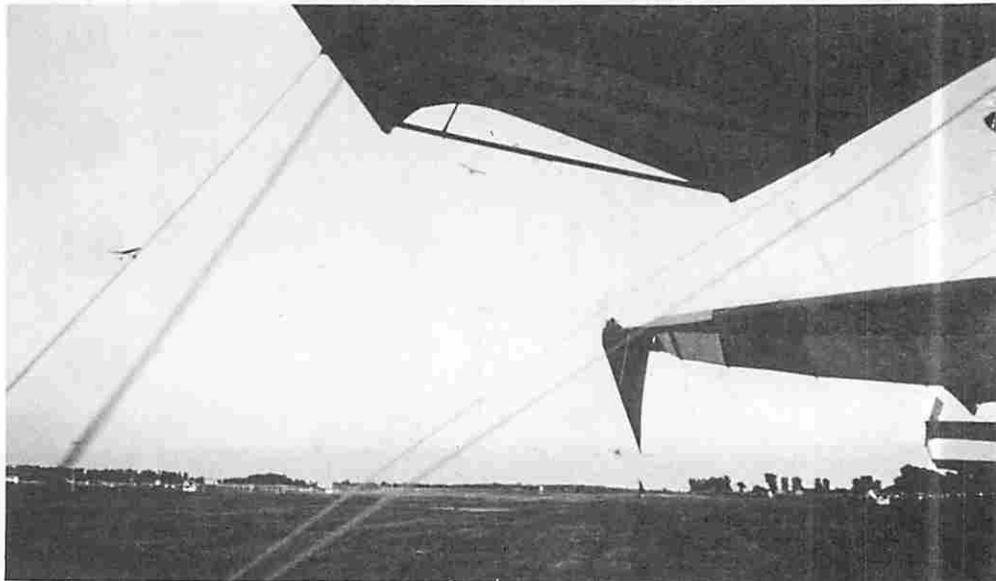
The primary concern of all of us ultralight pilots, powered and non-powered, is that, to the public and the FAA, we are all just "Hang Gliders."

Perhaps this signals a time for unity. While hundreds of thousands enjoyed Oshkosh, the USHGA Board of Directors met in Chicago. They have expressed concern too, and wish to collate the needs and desires of all ultralight pilots.

It turns out that not only is the EAA interested, but so is the Aircraft Owners and Pilots Association (AOPA), an even larger group. Thus, we ultralight'ers may have a position

from which to bargain. We may also be able to unify and keep our autonomy and distance, *if we try*. At a scheduled meeting to interface with the ultralight pilots on Thursday (8-7-80), the FAA failed to show. Is there still time? Yes. Can we get together? Can we stay un-regulated and free?

In 1976, a lone ultralight flew at Oshkosh. The next year, three. By '78, 24 arrived and demonstrated improving capabilities. Last year, the number swelled to 66, and this year 94 made the trek to Wisconsin. This growth rate is keel and kingpost above all the other EAA divisions. With the



"During the week of August 2 through August 9, Wittman Field will park more airplanes, and will experience more take off and landings than any other airport in the world—3½ times more than Chicago's O'Hare Field."
(28th Annual EAA Exhibition Program)



price and availability of gasoline being what it is, and the cost of homebuilt aircrafts even, let alone factory-built, no change is likely to retard increased participation.

One bit of discouraging news was a poor attitude of too many of the ultralight pilots. Paul Yarnall, of Finger Lakes Airports, used the phrase, "flagrant." Others agreed with this. Perhaps it was partly due to cautious acceptance by the EAA and spectators. Perhaps the specific flight patterns cramped the free style some ultralight pilots take for granted at home. It just seemed that several came for the audience and were quite disrespectful of spectators.

Bryan Allen, his crew, and the Gossamer Albatross were an immense hit. The true solar powered potential of successive MacCready efforts (Penquin and Challenger) excited anyone worried about fuel. Isn't that everyone? By mid-September, the plan remains to fly from San Diego to Los Angeles by solar power alone, a one-hundred mile flight.

Sixty mile-an-hour winds struck disaster on Thursday. Twelve UL's were totalled, several more damaged, due to a night thunderstorm. Changing, hostile winds produced stories of staying up all night, weeping, praying, swearing.

The best ideas for UL instruction were also a primary topic. Dave Starbuck met with Dennis Pagen and John Parrish on the subject. Many more logged hours of conversation on the best how-to's, when's, and why-not's.



"Ever since hang gliders became powered hang gliders—what we now call ultralight aircraft—the aircraft and the people who fly them have experienced a growth so explosive that nothing like it in the sport flying movement has ever happened before."
(EAA Daily News, by the publishers of Flying Magazine)

Something can be judged from a look at which models were best represented at Oshkosh. Of course, many are manufacturer-provided. Still, the assessment has validity.

1. Easy Riser24%
2. Fledge'12%
3. Quicksilver11%
4. Rotec (Quicksilver) ... 7%
- Weedhopper 7%
- Original Designs 7%
7. Lazair 5%
- All others27%

"All others" include the Hummer, Humbug, Mitchell Wing, Hi-Nuski (Quicksilver), Eagle, FLAC, Sojourn, Demoiselle, Goldwing, Gypsy, Kasperwing, Papillon, Sunfun, Scout, and two "rogallos," an Osprey and an Olympus.

It was a big success of interaction. As many as 20 UL's flew at one time. One can only wonder what the future holds before Oshkosh '81.



PILOT REPORT:

MOYES

MEGA

MK.2

by Dan Johnson

Some say the new Moyes Mega Mk. II is a copy of the Atlas. You could think so as the shape is very similar. But design history shows the Mega Mk. I to antedate the Atlas. Bill Moyes' record as the most innovative of hang glider designers strongly suggests that his Mega is truly an original creation.

Maxi pilots who have flown the Mega have stars in their eyes on landing, so similar, yet so state-of-the-art a design is the Mega. They will excitedly affirm that the Mega handles better, goes further and faster, sets up quicker, and in all ways, is more contemporary than the revered Maxi which it supplements.

The Michigan Moyes Boys, a group which now officially includes the old man himself, are already excited over early 1980 competition results on Megas. A virtual sweep of the World Tow Meet at Cypress Gardens confirms the Mega-over-Maxi superiority. The Mega has placed impressively in other contests as well.

The craft is an early entrant to the "Atlas market." This classification is rather inaccurate, as all the so-called "Atlas designs" followed the Seedwing Sensor, which displays characteristics qualifying it as the original predecessor. Now the Mega is joined by the American Sierra (Seagull), Comet (Ultralight Products), and Harrier (Wills) . . . a formidable crowd.

Let's set it up and look at it. The control

bar is comprised of all straight tubes which require only one bolt at a lower corner. Then, flip the glider over and remove the double zipper bag. Erect the kingpost—it takes some leverage on the keel—and undo all the ties. Standing the Mega on its nose, check to assure no tangles in the lower rigging. Clear the area above and to each side, raise the glider to straight up vertical, and hold just the keel above where the slider mechanism will stop. Take a breath and let it all go. Thanks to gravity, your Mega is now 75% completed, just like James Bond in "Moonraker." Don't forget to insert the quick pin, securing the slider.

Push the battens in gently, due to their camber. Close the velcro batten holds, not with a lot of pressure, install the keel pocket hold-up (plan to use some muscle), pop in the bungie drawn defined tips, and pre-flight. You are done.

Pick it up and you will discover a sweet static balance. You can imagine, correctly, that this quality and a statically inflated sail will offer a simple launch, at reasonably low speeds. That puts us in the air, so what can we expect next?

You should remember one important fact about flying the Mega. Let it tell you what it wants to do. Similar to other double surfaced gliders in this quality, the Mega does not take well to heavy handling. In fact, using too much control input in

pitch, primarily, you will find the glider opposing you, choosing to hold the best airspeed for the maneuver, lowering the nose or dropping a wing in compensation.

CONTROLLABILITY

The Mega handles very positively, as you might judge from the above sentence. Push out too far and the pressure directs which way the bar should be moved. Keeping the angle of attack lower than this amount will demonstrate very light pitch pressure. Roll pressures are also light during initiation, rolling in or out. During a turn, the roll is predetermined to an extent, and changing that will impose some roll pressure feedback.

EASE OF TURNING

Do as it wishes and turning is a light and simple affair. Resist, and you'll fight. In a thermalling turn, the best recommendation was to, 'bump it in, permit roll, half bump it out to contain a desired bank, relax pitch pressure, and plan on 'high-siding' the bar for in-turn control.' It doesn't get any simpler, really. But if you like to do a lot of controlling, you may not care for the Mega.

CONTROL PREDICTABILITY

Obviously, this quality is totally designed into the Mega. Straight ahead, at high or low speeds, the glider tracks beautifully. Just cruising downridge or cross-country in the Mega is a mellow, enjoyable exercise.

SINK RATE

I flew the Mega in a famed Chattanooga Wonder Wind. We achieved only 200 feet above, in very smooth air. My good friend, Denny Haldeman, flew a borrowed Maxi and we had a perfect chance to contrast the older Moyes with the new. Neither of us had any measurable experience-in-model advantage.

For an hour and a half, we traded off being ten feet higher, finally ending with the Mega showing a small superiority in sink rate. This qualifies the Mega as excellent in this category. My wing loading was 1.33 lbs/ft².

SPEED RANGE

The Mega illustrates a comfortably wide speed range, greater even than the improved Mk. III Maxi. Lowest speed handling losses still allow a crawling forward speed, going straight ahead, very useful on light ridge lift days.

Pull in on the bar to mid-abdomen (it usually is under your neck), and the Mega will move right out, exhibiting a very flat glide to 24-26 mph, I'd say.

TOP SPEED

When using maximum arm extension, the Mega accelerates smoothly with medium quickness to several miles an hour beyond the Maxi top end. From there, you can hunch over and gain another few notches. I did not measure these speeds, and hesitate to guesstimate the numbers.

The maximum speed range in the Mega will cause a noticeable decay in glide



Henderson Photography

angle. This means these speeds are useful for exiting lift, staying out of clouds, or rushing back to the ridge, but not for serious cross-country work.

PARACHUTEABILITY

The Mega will not parachute effectively, as with the similar designs of today. But this is a minor deterrent to good landings.

The glider has very mild landing characteristics, permitting either slow flare, or higher speed approaches with sudden flare, good for bull's eye shooting.

STALL CHARACTERISTICS

As usual, I ran through the whole selection of stalls; fast, slow, in turns, and with no recovery attempt. The latter resulted in a very mild nose down, followed by one mellow oscillation to secondary stall, then levelling to straight flight. This is impressive on a high performance ship. You can really relax on landing approach given this quality, and it proves again how pitch positive the Mega is.

GROUND HANDLING

Compared to the larger, more tail heavy wings to which I am lately accustomed, the Mega is an absolute pleasure to ground handle. The glider is not particularly lightweight, but balances so well, that weight is not a consideration.

SET UP

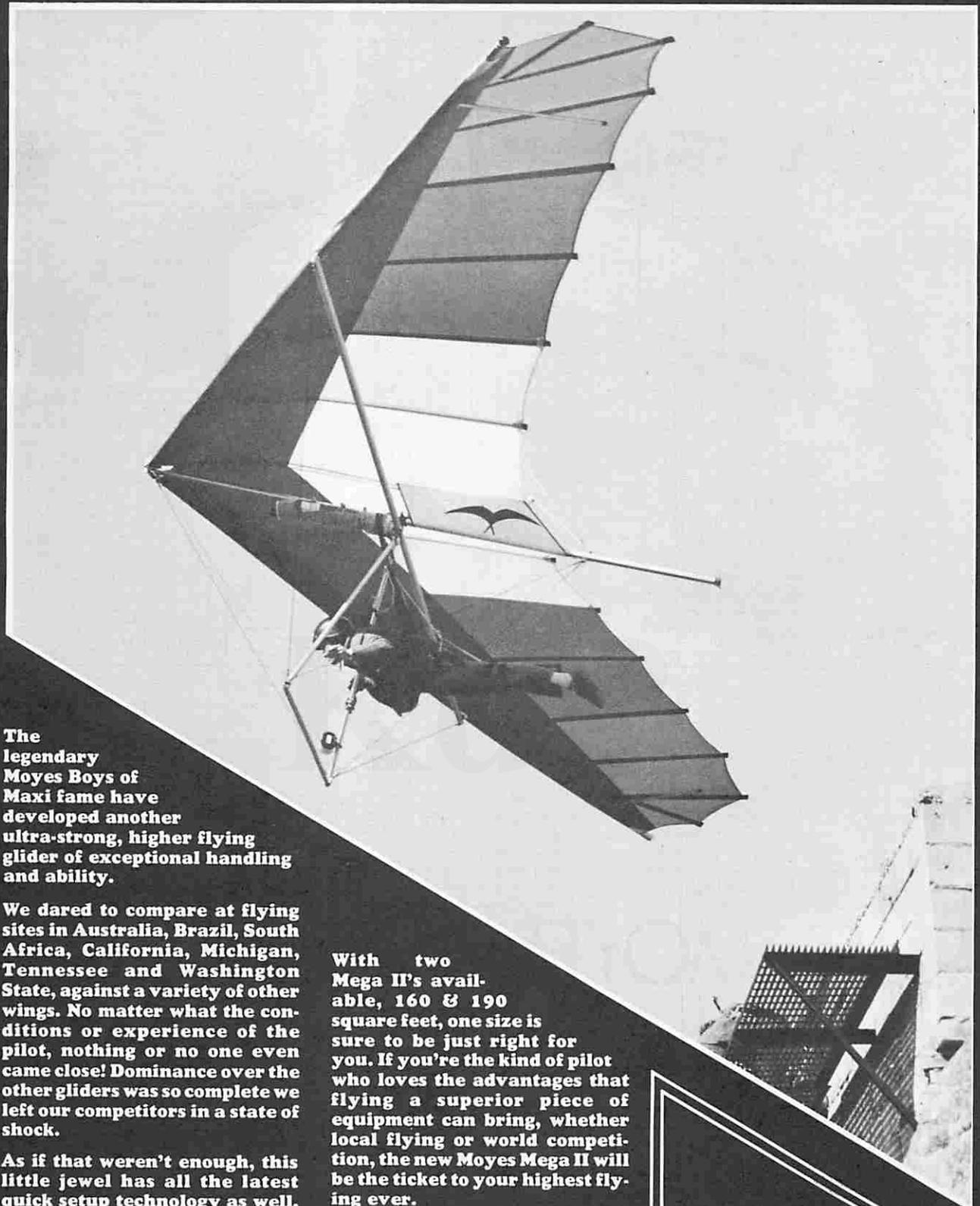
Partly described in the article's introduction, it suffices here to say set up is a model of modern achievement. I find a lone drawback. That is the need to collapse the Mega on the ground. If the take down area is grassy, this presents no problem, matter of fact, it will then be very easy. But land in a dusty area, and you will surely soil your two thousand dollar aircraft.

PURCHASE COST, LONGEVITY, and RESALEABILITY

The Mega was a trend-setter for high priced gliders. It carries a small dealer discount as well, which will keep the opportunity to deal at a minimum. The price is complete, and includes a very deluxe, padded and zippered glider bag, plus separate rib bag.

The Mega should be a top of the line design for several years, so plunking down two grand may be less difficult to swallow. Make sure it is what you want, however, for though its finish may justify that price tag, resale soon after purchase will probably carry a large penalty.

MEGA	172	192
Area	172 ft ²	192 ft ²
Span	33 ft.	33.5 ft.
Nose Angle	120°	120°
Aspect Ratio	6.33	6.2
Weight	63 lbs.	68 lbs.
Leading Edge	19 ft.	20 ft.
front and rear	1 7/8" x .058 — 6061-T6 Innersleeved with 1 3/4" x .058 — 6061-T6	
Keel (at sail)	8.25 ft.	9 ft.
tube length	12.5 ft.	12.5 ft.
	1 3/4" x .058 — 6061-T6	
Cross Spar	1 7/8" x .058 — 6061-T6	2" x .058 — 6061-T6
Control Bar		
height	58"	58"
width	58"	58"
base	1 1/8" x .065 — 6061-T6	
leg	1 1/8" x .083 — 6061-T6	
Wires	3/32" x 1/8" PVC Stainless Steel, 7 x 7 1/8" x 3/16" PVC Stainless Steel, 7 x 7 Upper: 3/32" uncoated Stainless, 1 x 19	
Pilot Weight Range	130-200 lbs.	150-230 lbs.
Batten/Ribs	7 of 1/2" x .035, pre-formed aluminum, 6061-T6	
Sail Cloth	5.3 oz. Howe and Bainbridge	
Deflexors	none	none
Defined Tip	3/4" x .049, 6061-T6, with bungie retainer and 7/8" sleeve with stainless steel nipple	



The legendary Moyes Boys of Maxi fame have developed another ultra-strong, higher flying glider of exceptional handling and ability.

We dared to compare at flying sites in Australia, Brazil, South Africa, California, Michigan, Tennessee and Washington State, against a variety of other wings. No matter what the conditions or experience of the pilot, nothing or no one even came close! Dominance over the other gliders was so complete we left our competitors in a state of shock.

As if that weren't enough, this little jewel has all the latest quick setup technology as well.

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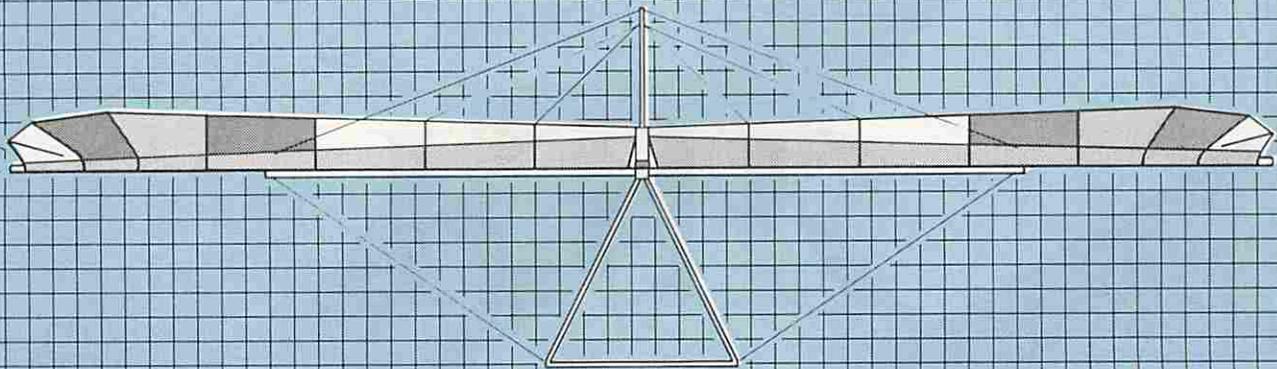
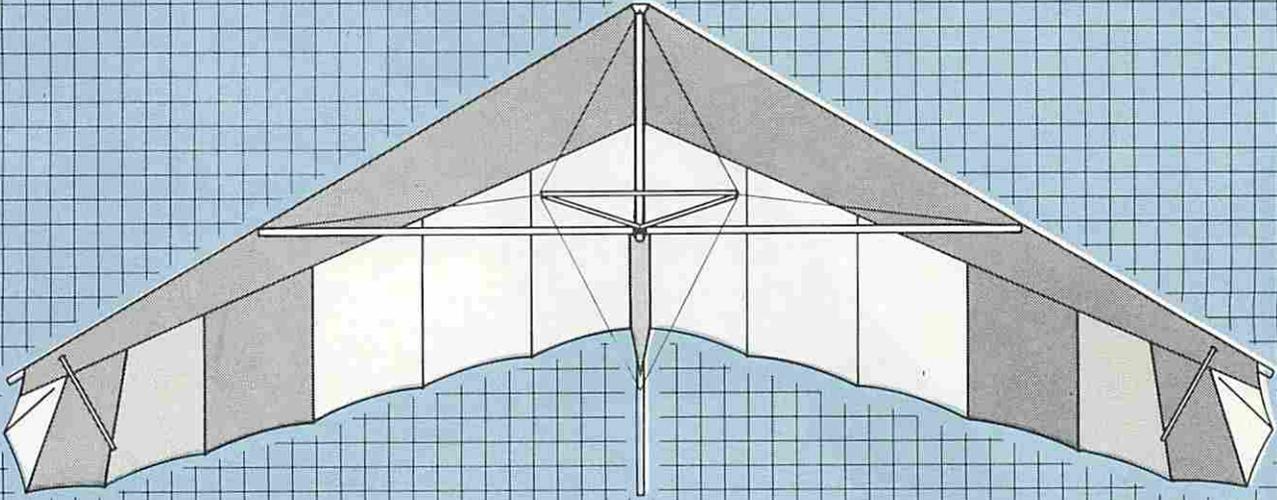
- Formed battens
- 30% double surface (approx.)
- 5.3 oz. sail cloth
- Quick tips
- Floating stinger post
- No deflexors
- Quick setup
- Break down control bar

With two Mega II's available, 160 & 190 square feet, one size is sure to be just right for you. If you're the kind of pilot who loves the advantages that flying a superior piece of equipment can bring, whether local flying or world competition, the new Moyes Mega II will be the ticket to your highest flying ever.

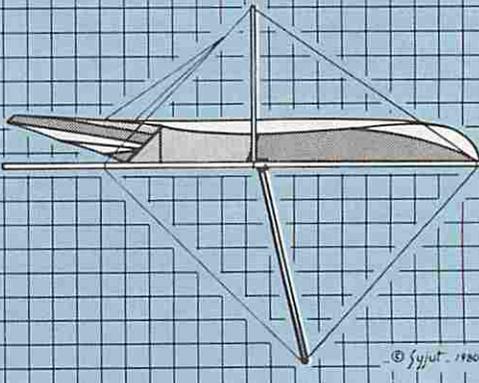
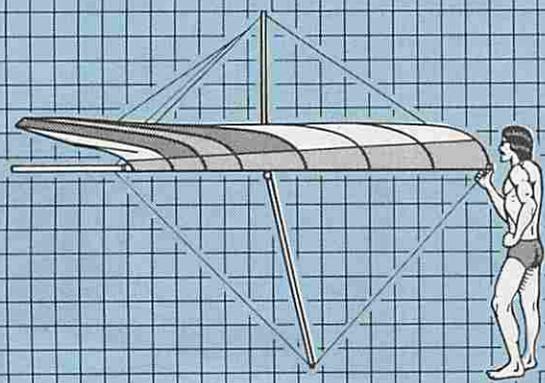
For more information, RUN — don't walk — to your Moyes dealer before the lines get too long.

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MOYES MEGA-2

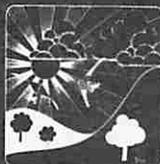


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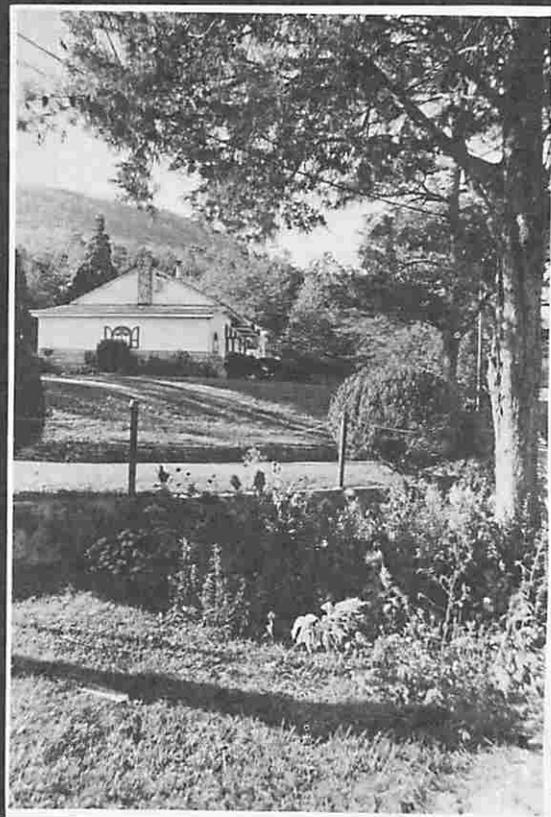
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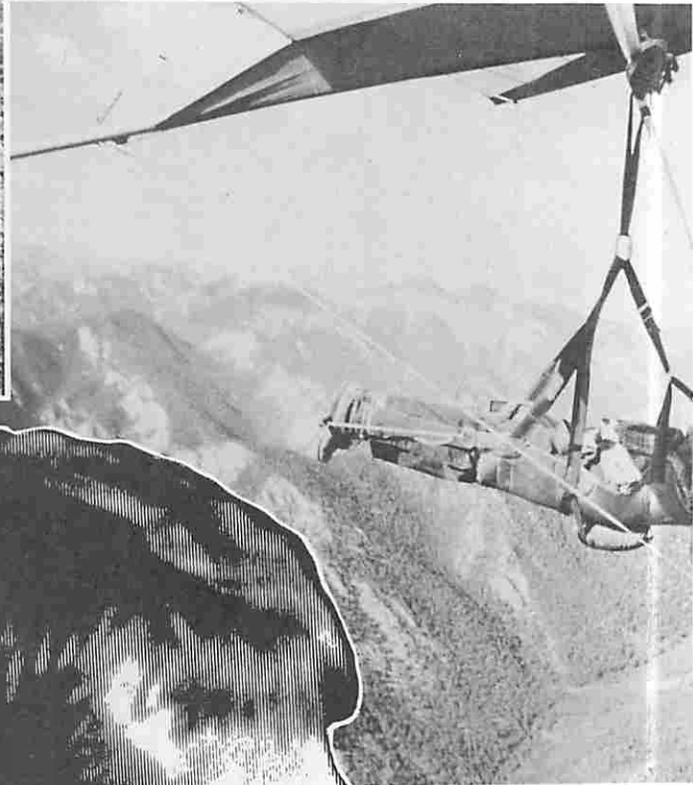
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Leroy Grannis



Henderson



Photo by Leroy Grannis

AN INTERVIEW WITH

don miller

by Starr Tays

I had planned on attending the Canadian Nationals this year, so I became curious about their competition system in general, part of which had been used here in Tennessee for our Regionals (pilot-judging-pilots). I decided to talk to Don about his country and hang gliding.

Fall in the Eastern U.S. is the season for competitions. The Masters is held at Grandfather Mountain, N.C., followed by the 1980 American Nationals in Ellenville, New York, and finally, before the onset of Winter, the American Cup, here in Chattanooga.

Fast becoming one of the more

prestigious international meets, the Cup will host five nations (so far committed) this year. One of these countries, returning for the third time, is Canada.

Their Nationals will be held at the end of August at Mt. St. Pierre, Quebec Province. The two top placers in this meet will go on to comprise part of the Canadian team, which will represent its country in international competition.

The man responsible for this and much of the competition structure in Canada is Don Miller, Canadian Competition Director, and the Canadian Team Coach at the last two American Cups. Don, 33, is a

practicing dentist and resides in Vancouver, British Columbia.

How did you become Canada's Competition Director?

That question is directly related to my first hang gliding instruction, which I started way up north in B.C.

Then I heard about Invermore and went there for five more days of training and ended up breaking my ankle. Right about this time the second annual Swansea Meet was about to take place, so I volunteered to help with the Meet. They accepted.

I ran that meet three years in a row and it became known as a good, successful meet. So I guess I was the logical choice when it came time to choose a B.C. Competition Director, and besides, I was the only one who wanted the position.

When the National Association for Hang Gliding was getting organized two and a half years ago, before the first American Cup, I ran for the office of Competition Director, and got it. I was the most experienced, and the only one who wanted it.

If there was no organization or association as such at the time of the first American Cup, how was the team selected?

I volunteered to help pick a team. At that time there was no official way of doing things, point system, etcetera. I just randomly picked the most reputable pilots.

This was too much my own opinion; I made a mistake doing the selecting this way. But I did put forth a good effort and learned a lot.

Transport (MOT, equivalent to your FAA) a couple of years ago to discuss some sort of regulations and advisories.

The suggestions were:

- no flying in controlled airspace,
- cannot fly over 200 feet (They were naive about hang gliding, so this was relaxed after we explained),
- tandem flights must be done through a school or with a certified instructor,
- mandatory licensing by the MOT to teach hang gliding,
- the MOT would have Examining Directors. They would be people in the industry, like Willie Mueller and Larry Croome, who would give and evaluate the certification exam.

They also suggested that we license our aircraft with them for a nominal fee. This would mean a placard on our crossbars with our name, license number, glider size, make, and so on. That way the RCMP could find and identify our gliders if they were stolen.

All this was paid for by the B.C. government, or rather by Sport B.C., a lottery-funded sports fund which will pay these officials to go to the meets.

Actually, Sport B.C. pays gas, room and board, and they donate their time.

This is getting the meets out here to where they are pretty consistent, so far as judging goes. The same official does the same thing at each meet, e.g., timing, scoring, etcetera.

This year the B.C. pilots who are going to the Nationals get \$200. Ten pilots are chosen from each province.

How will the pilots from other provinces get to the National?

Well, there are four major members in the Hang Gliding Association of Canada.

Quebec — I'm not sure if they are "funded"; probably they are.

Ontario — The same, I'm sure.

B.C. — Lotteries.

Alberta — Lotteries, and Larry Newman gave a lecture on the Double Eagle and donated the fee to the Alberta pilots so they could go to the Nationals.

Nova Scotia — They have just entered and have two pilots coming, so this year, there will be 42 pilots at the Nationals.

Were you the first to use the pilot-judging-pilot method in competition? And, will it be used in this year's Nationals?

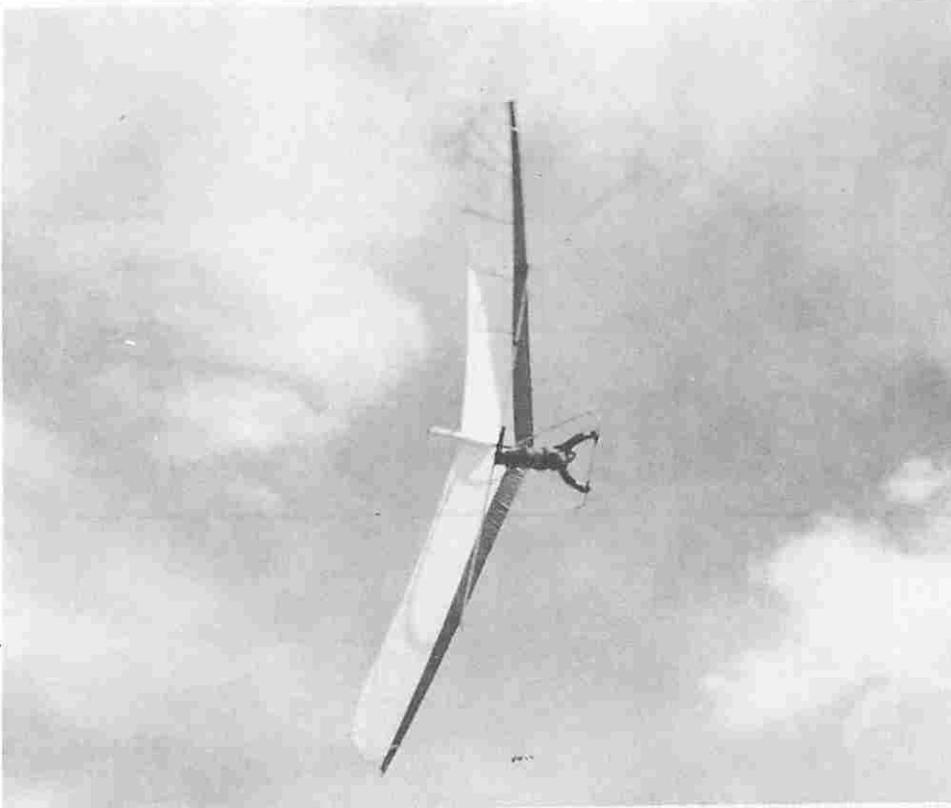
To the first question, yes, so far as I know. It was first used at last year's Nationals. We might go on to call it the Canadian System. Using this method you learn an awful lot about flying the tasks. You learn a lot just watching others fly the tasks. Foremost, though, you have a better understanding of how hard it actually is to judge a competition. This results in fewer squawks, fewer protests from the participants.

As far as what will be used this year at the Nationals, that is territorial. Quebec wants output on its own kind of meet. They asked us structuring details, but will decide format themselves. I don't think they have decided on the pilot-judging-pilot system, though.

I don't think you should be tied entirely to one system, though. At least, I don't think that way. Some say the point system is best; some want it put to the vote. It is going to take experimenting.

Sean Dever will be the next Meet Director for the Cup, but you, at one time, had been asked. What would you have done to better organize the meet?

First off, I would formalize the tasks and make them known well in advance, so there would be no changes during the meet. Secondly, I would try to see that there were no timing errors; they are most frustrating. And lastly, I would see to it that they secured a back-up site in advance.



How large a membership do you have in your Association and what is the cost for the pilots?

There are approximately 1,000 pilots nationwide, with each pilot paying \$10 to the Association and another \$10 for a million dollars worth of liability insurance.

Have you had government intervention or attempted regulation of hang gliding in Canada?

I was on the National Committee Board of Directors which met with the Ministry of

Does Canada, as a government, subsidize your competition pilots so you can attend meets such as the Nationals? We do not have it in America, but I have often wondered about other countries.

No, the "government" does not, but the "province" does. Let me explain further.

For instance, this year something new was implemented. Andrew Barber-Starkey, myself, and Harvey Blackmore, who runs the Grouse Meet, were paid to give a couple days of lecture to people in Vancouver, who were training to be officials at all the meets held in B.C.



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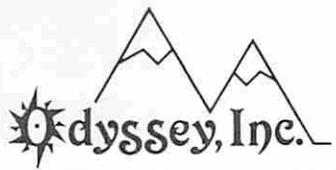
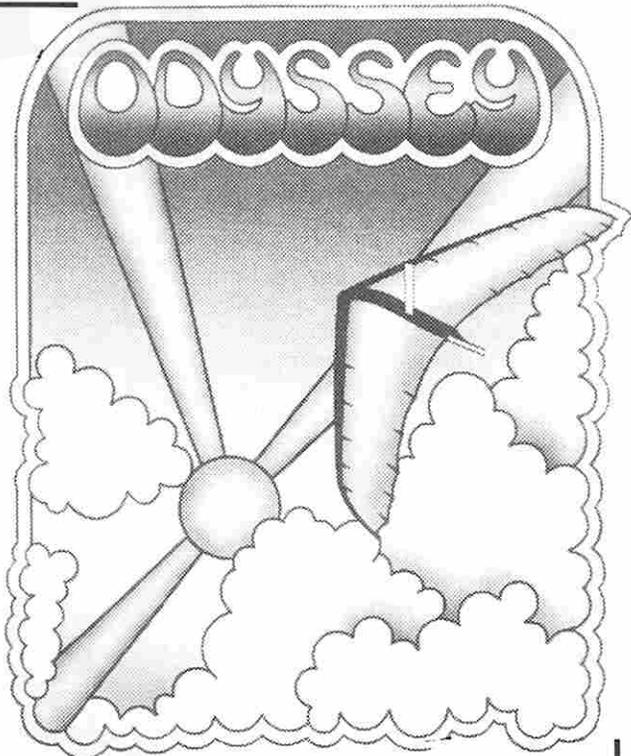
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Ultralight Aircraft



sky sports HUMBUG

by Dan Johnson

Motorized hang gliders? Microlights or Ultralights or Aerolights, even, what are they and what are they becoming? Many of us who fly on solar energy alone have been looking down our noseplates at all those aircraft with the angry bumblebee noise. But maybe it's appropriate for us to take a closer look.

The EAA is interested. See pages 26 and 27 of this issue. And, I believe that many other organizations or individuals may be interested, as well. Perhaps it is time the motorized community receives more than a turned shoulder from we fuel-less pilots.

Certainly manufacturers of these aircraft are feeling the swell of intrigue by many in the rest of the flying populace. Sales figures claim, "... fifteen per week ..." to "over one hundred units a month ..." from two of the larger producers with whom I have had conversations. And ultralight enthusiasts are indeed enthused!

With these thoughts in mind, the Whole Air Magazine initiates feature-length motorized information. Presented here is our Premier

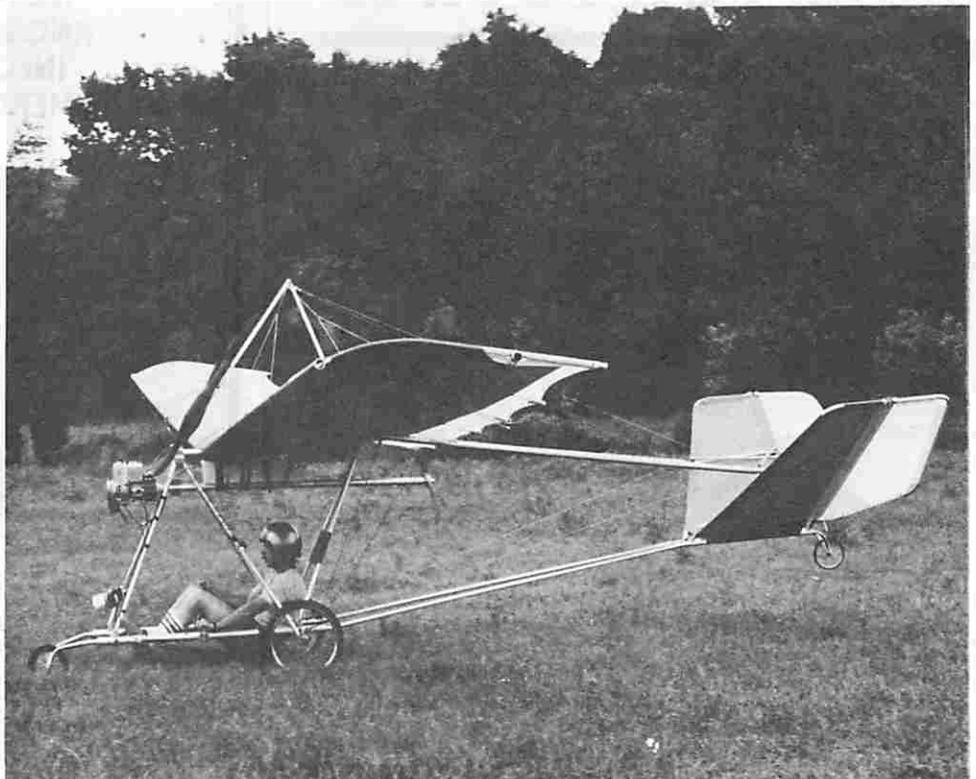
Ultralight Aircraft Report. The Sky Sports produced Humbug is one of several designs being built by reputable companies. Plans include an Eipper Formance Quicksilver report in the November/December WAM, and for 1981, the hangar door stands wide open for regular coverage.

Ed Vickery, president of Sky Sports, brought a production, red, white, and blue Humbug to Chattanooga for three days of evaluation in late July. The model he supplied was powered by the dual Soarmaster set up (two Chryslers to one prop) originally used on the Eagle. It also used 16 inch



Photos by Hank Syjut

Photos by Hank Syjut



wire spoke wheels for main gear. And unlike the float equipped model seen in many Sky Sports ads or promotional materials, no rudder pedals were employed. The engines gave ample, even surprising performance; the wheels were hopelessly over-stressed by our novice skills — we ruined two complete sets in as many days of flying; and rudder pedals were really not missed at all, especially as the Humbug uses purely aerodynamic influences for taxiing.

The Humbug is the last of the late Klauss Hill designs. Most will recall that Klauss' efforts included the Fledgeling wing, the Mountain Green Sailwing, the Hummer, and the unique Quadraplane. The Humbug is a 160 square foot Fledge-like wing basically, with extremely similar construction and set up. The "V" tail provides stability permitting the wing to be a totally lifting surface and the wing area is then adequate to support the gross weight.

The stick is a two control proposition, as stated, with no rudder coupling. Fore and aft stick movement operates the moveable tail surfaces in unison, as elevators. Side movements make the elevators into ruddervators and they move in opposition but still retain some unison movement for elevator control while turning. If the stick is deflected further, a spoiler flips up on the appropriate wing aiding in turn responsiveness.

It took six of us over an hour to set up the Humbug. That will probably

be common the first few times, but potential is certainly present to complete the job in twenty minutes, given an understanding assistant. In my mind, that's an excellent trade-off for hangar charges.

Preflight should also take some time to cover the many areas that need inspection. This deluxe little airplane is no 1980 hang glider. I preflighted poorly enough to miss the only half-connected fuel line. After a bit of taxiing, I lined up for take-off and had climbed out easily to twenty feet when the fuel line disconnected, shutting down both engines. The result: I settled in rather firmly and somewhat sideways, bending the wheel and cutting a cable with the prop. Unfortunately, this robbed us of one of the three days, while we effected repairs. However, the very hang-glider-like construction simplifies repairs greatly.

Taxiing the Humbug is a learning experience. Turning around meant either gunning the engines for a wind blast on the tail, or putting your feet down and physically lifting the airplane into the chosen heading. The air blast method worked quite well, assuring you of abundant take off direction control, but places a great sideways load on those too-spindly main gear. Stronger wheels will eliminate all difficulties in this area.

After my aborted first attempt, I elected to proceed more slowly on the next outing. I taxied the full runway length (3500 feet) four times to gain confidence in this mode. One word of warning should you try yourself. Do *not* put your feet down to brake the plane, especially on pavement! A simple brake could be added, but feet down can fold your legs up underneath you, most uncomfortable. Having discovered that, I merely planned large 180's on the grass beside the runway, at each end.

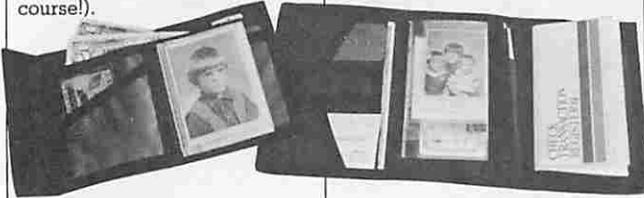
After taxiing, I used four more runs, upwind and downwind (in four mph winds), to feel the airborne characteristics while in ground effect. The Humbug lifts off very smoothly and predictably at your command. The joystick, while stiff, probably due to newness, gave positive control at all airspeeds. This ground effect flight offers a chance to get used to control response and coordination of throttle movement, very necessary. With the dual engine set up, these first four take-offs were done with just over half throttle.

Finally, I took off, again with less than full power, climbed out of ground effect, and completed a standard airport traffic pattern, but at only 400 feet AGL, once around and to a perfect landing.

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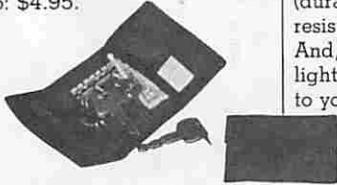
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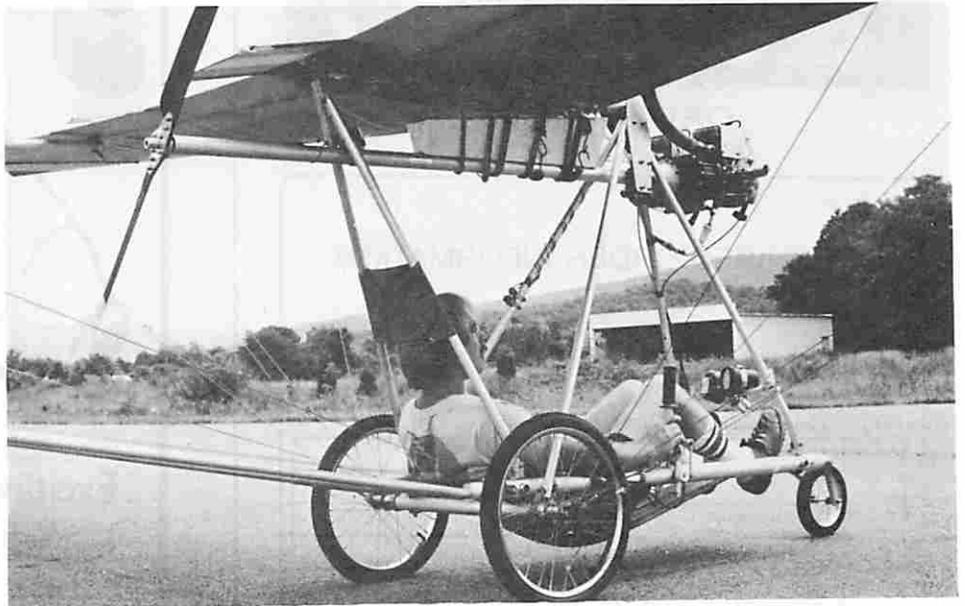
HUMBUG

After a break during which others taxied around some, I got back in for what was to be the first high flight, out of the airport traffic pattern. Climb out under full power, again with a half throttle lift-off, was really impressive. My apprehension over my novice experience in ultralights, and over my thoughts on engine reliability kept me from climbing more aggressively. Yet, with this fact, I still found myself at 1000 plus ground clearance in just a few minutes. This is substantially better than what I've seen from most ultralights.

Once I got up higher, I felt my way through control response envelopes. The Humbug is best in pitch, both in response and pressures. Roll is positive but stiff, with roll-out stiffer than roll-in. Same lag exists waiting for reversal in a 30° to 30° check. While a bit disconcerting, I got used to this following several 360's and 180's. Coupling of roll with pitch was quite satisfactory, the Vee tail working more effectively than I actually expected.

My stalls in the Humbug were extremely gentle, less of a test than that to which I will subject a modern glider. Still, the results were favorable — lower the nose slightly below the horizon, full power, and coordinated use of the controls for wings level, just like a conventional airplane.

Speed range was about 20 mph to 45 in my limited experience. Slow flight could be accomplished with the Hall meter disc hovering around 20. Cruise was most solid at 25 to 35 or more, and upper speeds seemed pleasing at 45 or more, perhaps to



Photos by Hank Syjut

50 mph. Personally, I like the slow range, as in my hang glider, so most of the flight was spent at 25, which felt fine.

The initial reaction to "cockpit" comfort is good, but after being airborne for twenty minutes, I missed better lumbar and back support. The headrest is fine, but not enough. And on long flights, more padding would be nice on the rear crossmember. I would also like to have my rear end elevated another few inches off the ground. It touched, though not painfully, when I bent that wheel on my first landing. Cockpit visibility, as expected, is excellent, except for directly overhead. However, that little shade goes a long way on hot, sunny days.



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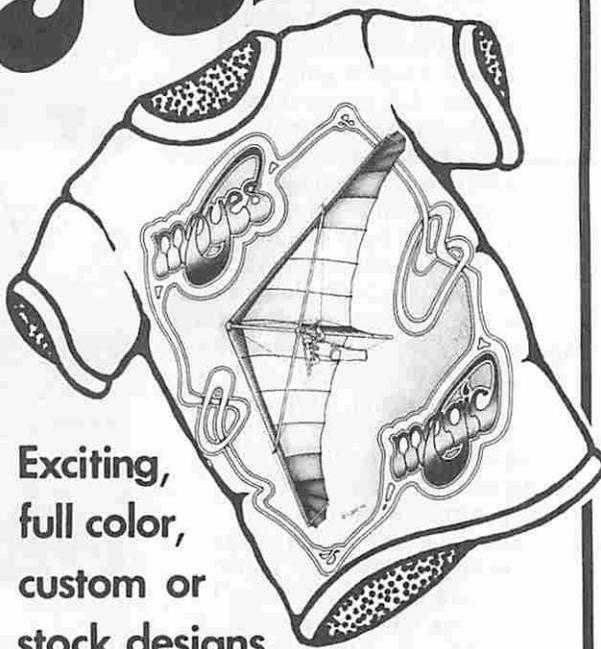
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HUMBUG

We did not refuel after all the taxiing prior to this high flight. A sputtering was followed by a temporary rise in rpm, abruptly followed by silence. I had kept the Humbug near the airport deliberately, and now felt very happy about that decision.

I turned immediately toward the runway, setting up on a long final downwind approach. After hitting both the kill switches, I slid forward slightly in the seat sling, being unsure of no-power flight characteristics. This was probably unnecessary, but made me feel better and I approached at 25 mph for an effortless "deadstick" landing, which came off lightly on the wheels as though power would never be needed on landing. All my prior landings had employed a touch of power to smoothen things out. Incidentally no in air re-start was possible on this configuration, though like brakes, it would be fairly simple to rig the Humbug powerplant for this

capability.

Late August pricing makes a Humbug in a ready-to-assemble (no extensive fabrication) kit with basic power for \$3885. A staged payment plan is also available — contact the factory. Deluxe, ready-to-fly, will cost \$4825 with performance power and quality covers.

I enjoy flying ultralights. It is another whole new dimension of flight, at familiar and satisfying hang glider speeds, but with a "reach" not always available to powerless machines. The Humbug is a deluxe airplane, beautifully finished. It should appeal to hang glider pilots and airplane pilots alike.



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CHANNEL ISLANDS
HANG GLIDING EMPORIUM
613 N. Milpas St.
Santa Barbara, CA 93103

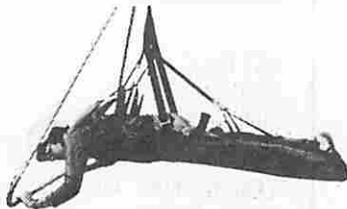
CANADA

ONTARIO GLIDERS
801 Woolwich Street
Guelph, Ontario
CANADA M1N 6J2

HIGH PERSPECTIVE
R.R. #2
Claremont, Ontario
CANADA L0H 1E0

Golden Sky Sails, Inc.

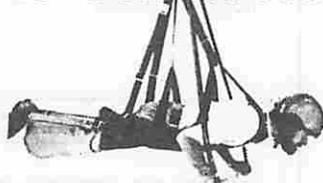
Introduces
The Golden Cocoon



- * 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

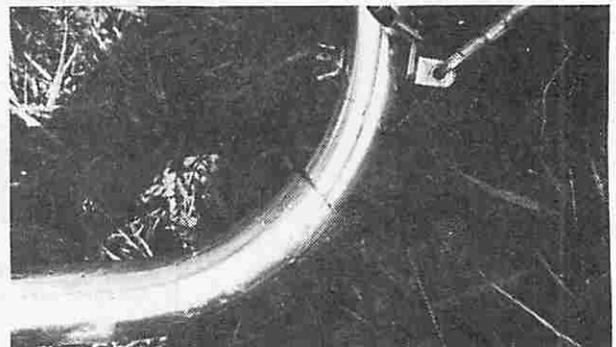
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**CRYSTAL
accessories**

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.

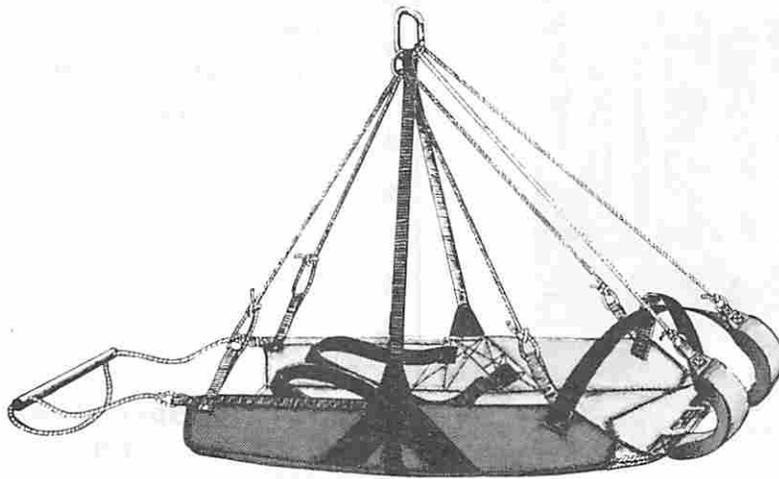
1 inch per foot \$ 1.50
1 1/8 inch per foot \$ 1.95



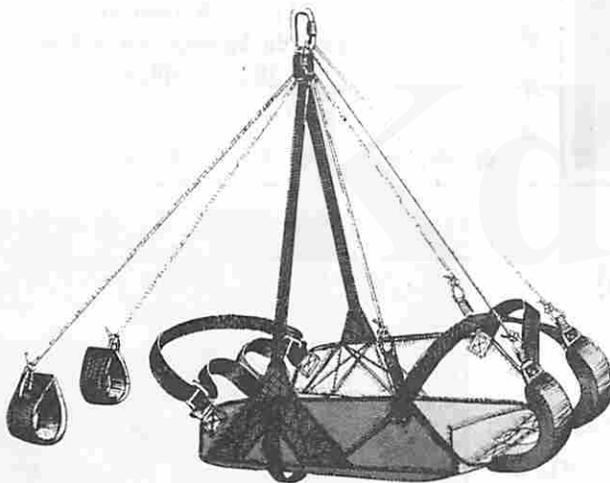
ORDER FORM ON PAGE 42

COMFORT FROM THE WEST

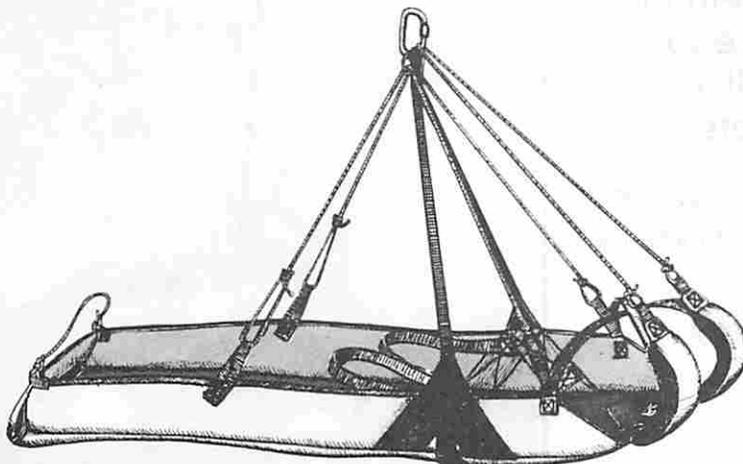
MANUFACTURED BY FLIGHT DESIGNS



STIRRUP



KNEE HANGER



COCOON

**ON SALE NOW
IN THE EAST**

EASTERN DISTRIBUTION BY
CRYSTAL AIR SPORTS

In stock now, the entire line of styles from Flight Designs, known for comfortable harnesses.

Isn't it also comforting to know they're all tested to 8 G's? With full wrap-around support.

Two color bibs, all reasonably priced at \$100, \$105, and \$139.

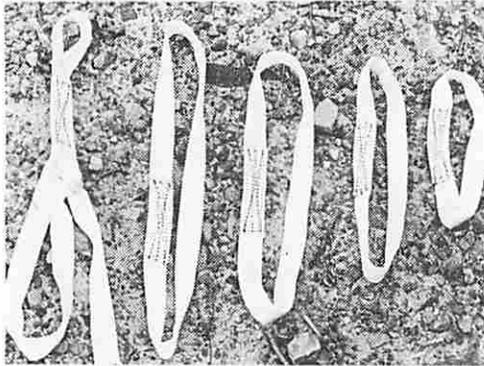
DEALERS!

Call, or write on your letterhead to Crystal Air Sports, Rt. 4, Cummings Highway, Chattanooga, TN 37409.

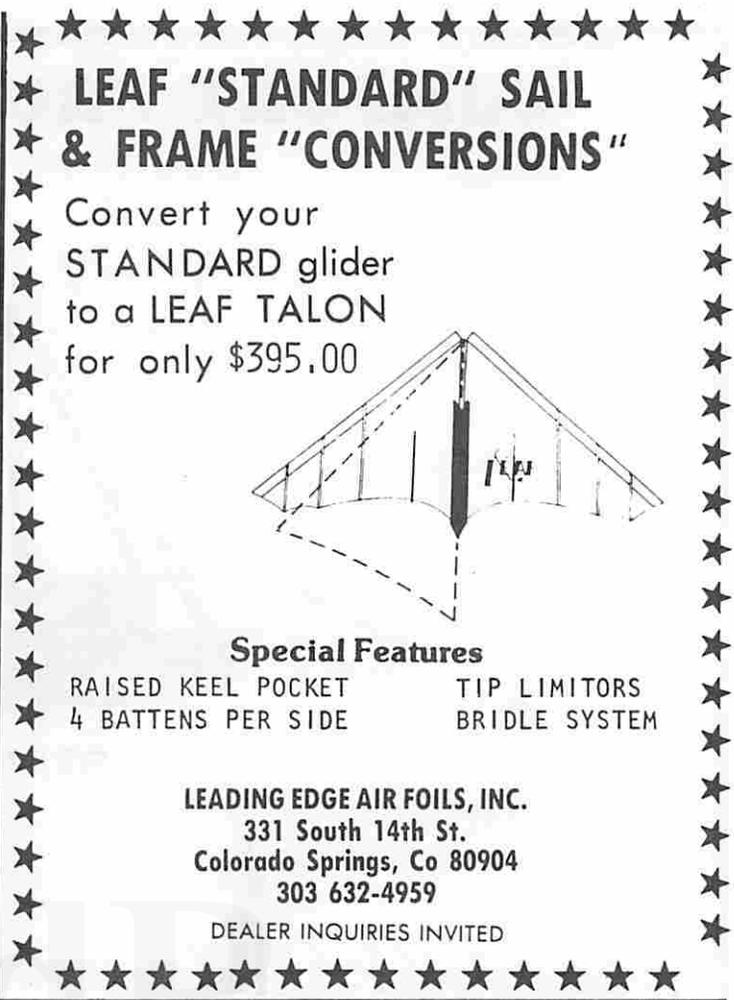
Receive customary dealer prices as when ordering from the factory, only receive them faster and at less cost.

SUSPENSION LOOPS

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.

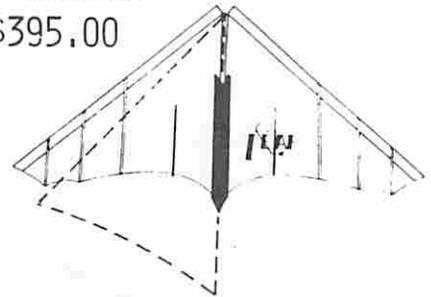


- A Deluxe Adjustable Loop \$ 7.00
- B 18 inch Standard Loop \$ 4.00
- C 15 inch Standard Loop \$ 3.75
- D 12 inch Standard Loop \$ 3.50
- E 9 inch Standard Loop \$ 3.00



LEAF "STANDARD" SAIL & FRAME "CONVERSIONS"

Convert your STANDARD glider to a LEAF TALON for only \$395.00



Special Features

- RAISED KEEL POCKET
- 4 BATTENS PER SIDE
- TIP LIMITORS
- BRIDLE SYSTEM

LEADING EDGE AIR FOILS, INC.
 331 South 14th St.
 Colorado Springs, Co 80904
 303 632-4959

DEALER INQUIRIES INVITED

Use ^{My} ~~Your~~ Imagination!

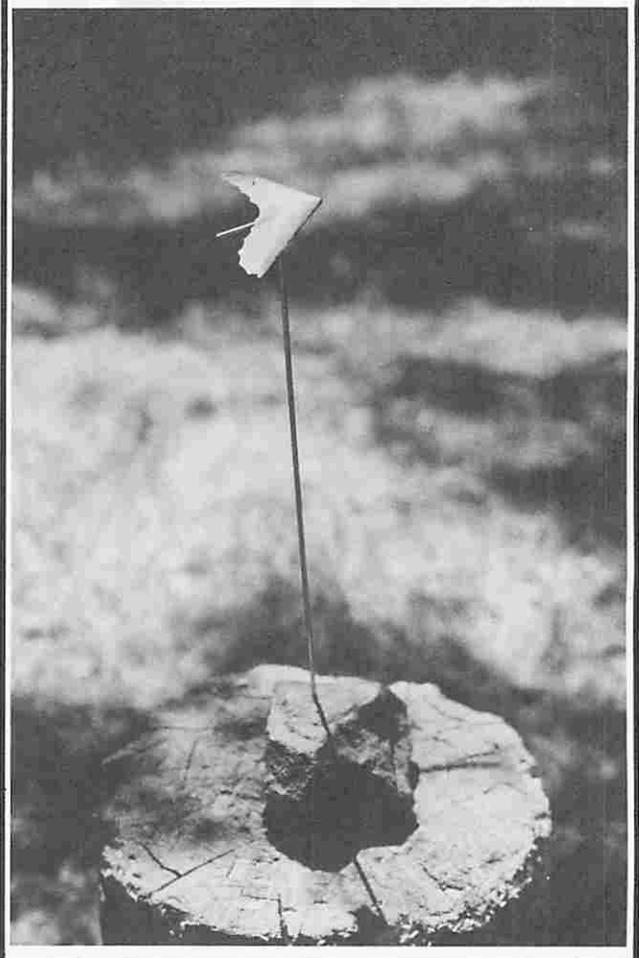
Your special event deserves a special award. Perhaps a limited edition of bronze sculptures or original etchings.

This gleaming bronze wing thermaling high over a rock peak captures the spirit of ultralight soaring and symbolizes the achievements of hang glider pilots.

Sculpted in limited edition, it was awarded to the top six pilots who emerged from the Utah regionals.

An ordinary trophy just wouldn't do!

Hank Syjut
 Rt. # 4, Cummings Rd.
 Chattanooga, TN 37419
 (615) 821-5183



Classified Advertising

WAM Classifieds offer the lowest cost per word in the industry. And they do bring results. In the very first two issues of **WAM Classifieds**, ten gliders were sold! Since about 19 were listed, this represents over 50 percent sales in just two issues!

Just for an example, a longer reading ad costs about \$7.9. If you wish to keep it short \$4.6 may sell your glider or equipment. Also, here's a way you can find something you need that another pilot wants to sell. Give **WAM Classifieds** a try.

- ✓ 20¢ per word.
- ✓ First order pre-paid. If multiple runs desired, indicate number of times; you will be billed for all insertions after the first.
- ✓ P.O. Boxes, phone numbers, prices, make and model, and each line of a mailing address considered one word.
- ✓ Zip codes free, minimum order \$3.00.
- ✓ Deadline is last day of month preceding cover date (Example: May/June **WAM** equals April 30th).
- ✓ Send to: **WAM Classifieds**
Box 144
Lookout Mountain, TN 37350

10 METER

Seagull 10 Meter. 1979 Hardware/1978 sail. Excellent condition. Great handling. Must sell. White sail, blue edges and "10"s. \$800 or best offer. 213/347-7664

OLYMPUS 160 / LAZOR II
Oly 160, 1978 Quick Tip, Clean, Two control bars. \$500
Lazor II 155, 1980 Model, New, \$1000.
Stewart Smith, 1173 South High St., Apt. C, Harrisonburg VA 22801 703/433-0837.

OMNI 187

Wills Wing Omni 187. Advanced pilot, weight to 190 pounds. All white sail with black-purple-black 1/3 splits on each wing. Box 131, Lookout Mtn., TN 37350. Michael Smith

RAVEN 229

Brand new Sept 80 Raven 229. White sail with Black and Brown accents. Fresh out of ship-tube, without the \$110. delivery cost. \$1425 or best offer. 404/820-9738 in the evenings.

ATLAS 172

1980 Atlas 172 sq. ft. Condition easily justifies the \$2195. list price of this imported supership. All white 5.3 oz. sail with orange tips and keel pocket. Low air time. Never damaged. Terrific savings at \$1495 (SAVE \$700!!). Call Chuck at 615/821-2546 or Dan at 615/825-1995 before it's gone!

STOCK RAVENS

IN-STOCK, CRYSTAL has Ravens on hand now. Raven 229; Raven 229 Novice; Raven 209; Raven 209 Novice; Raven 179. All available with FREE prep and delivery. They'll never last out the month. CALL RIGHT NOW... Crystal -- 615/825-1995 9am to 4pm Eastern Daylight Time.

Used hang glider multiple listing service. In search of a used glider or have one to sell? Contact HANG GLIDER REFERRAL SERVICE @ 213/436-4891. 619 Cerritos Ave. Long Beach CA 90802

GUITAR for GLIDER?

Ovation 12 string electric acoustic guitar, natural finish with case \$475. Olympus 180, Rainbow colored sail, extra clean, only \$650. Call Warren at 615/267-6287 or Tom at 615/825-1995

11 METER

1979 Seagull 11 Meter. Extra demo glider at dealership. Extremely low air time. Recently test flown and tuned by expert Meter pilot. 615/756-2323 days, ask for Bill.

FLEDGE '2 B

Good shape, never crashed. Pretty sail, flies high, gained 7,400 feet in Chattanooga. Never powered. Extra sleeving, with extra bracing on rudders. \$1050, call 404/820-9269

LAZOR I

1979 Bennett Lazor I -- 190 sq. ft. Demo only condition. Yellow with brown trim. Sacrifice at \$790. Call 615/756-2323 days and ask for Bill.

RAVEN 209

October '79 Raven 209. Built specially for factory Grandfather Masters pilot. Autumn colors (Brown, Orange, Yellow) 20 hrs. air time. Call 404/820-9738 evenings (Eastern time).

POSITIONS AVAILABLE

WANTED: Experienced publications person to assume editorial duties with national hang gliding publication. Send resume with references to: L. Emerson, Star Route, Stockett MT 59480

WANTED: Female glider pilot willing to relocate to Michigan. Manufacturer of kit built gliders has demo and related film and flight test work. Must have at least 100 hours of recent glider time. GLA, Inc. 341 Winslow Ct., Muskegon MI 49441 -- 616/780-4680



ATTENTION LADY FLYERS! APPLY NOW

Positions available now at Crystal's Job Corps at the Flyer's Hostel. Barter work for lodging. Good deal, great flying, fine friends. Check it out now! Write or call Shari at 615/821-2546; 4328 Cummings Hwy; Chattanooga TN 37409
AVAILABLE NOW
Sales Person (Clothing, Jewelry); Office Clerk; Lifeguard (Seasonal); Chamber Maid; Gardener/Groundskeeper, all at The Crystal Air Sport Motel.

SEAHAWK 170

1977 Seagull Seahawk 170. Low air time. Very Clean. \$750 with bag, new harness, and helmet. 305/843-8089

10.5 METER

1978 10½ Meter by Seagull. White-sail with orange and yellow trim. Has complete fairing set. Beautiful shape. Bargain-priced at \$895. Call 615/756-2323 days, ask for Bill.

'71 VW CAMPER VAN

1971 VW Camper in good condition. New re-built engine only 100 miles ago. Excellent hang glider pilot vehicle at very reasonable price of \$1500. Call Gary at 404/820-9269 or 615/825-1995.

SUB-DEALERSHIPS

Crystal Air Sports is now accepting inquiries for Sub-Dealerships in the states of Tennessee, Alabama, Georgia, Kentucky, and some other Southeastern areas. Call 615/825-1995, and ask for Dan Johnson, if you are serious about retailing Wills Wing, Seagull, Ultralight Products, plus powered ultralights, the GLA Minibat, and accessories from many companies including Crystal, Flight Designs, and others. We will be offering national advertising as part of the Sub-Dealership Program. Standard factory discounts and in-stock merchandise available. Genuine inquiries only, please.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

WANTED!!

Used Gliders

ANY MAKE

ANY CONDITION

80 Models	700.00
79 Models	600.00
78 Models	500.00
77 Models	400.00
76 Models	300.00
75 Models	200.00

As trade-ins on any New Phoenix, Lazor or New 6D.

———— Call Today ————

Mike Miller
Elsinore Valley Hang Gliders
(714) 678-2050
(714) 678-1598 AH
or
Robert Hillington
Santa Barbara
(805) 963-4790

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

PRODUCT LINES

Chattanooga, TN—Fall and the Eastern US competition scene are upon us. At least the nights are getting cooler as the "circuit" shifts toward the Atlantic. Coming up are two biggies, the **Masters and Nationals 80**. The **Great Race** is also in mid-October. It has apparently been re-scheduled during what had been the **American Cup** dates. Had been? Yep, the Cup is no more. Promoters "postponed" the event when they could not secure adequate sponsorship. See the Sept. **GR** for their explanations. Earlier in the month of October, the EAA brings its **Tullahoma 80** air show to Tennessee for the second year on Oct 1-5. Some industry big news is a report of a merger between **Seagull** and **Seedwings** (Sensor mfr.). This comes in the wake of a temporary door closing at Seagull. Prez' Don Whitmore called a month ago to say he's taking steps to bring Seagull ownership back to people who are into flying. This accounts for the closing, evidently. Meanwhile, merger in negotiation, Seagull Sierra designer, Tom Peghiny, flew a Sensor at the **So Cal Regionals**. That contest is described by locals there as, "a meet tougher than the Nationals," due to so many hot pilots participating. They even had a qualifier for the regionals. **Rich Grigsby** won in a **Comet** followed by a gaggle of **Comets** and **Harriers** which tied for several of the first five places, eleven pilots in all. The full list includes, in order: Grigsby, Blythe and Pfeiffer, Stoll and Haggard, Pearson, then Meier, Haddon, Peghiny, Greblo, and Tim Dunlap. Speaking of successes, the Santa Ana Wills folks have finally completed their new contest design, called the **Harrier**. Besides the military VTOL jet (by Hawker-Siddeley), the **Harriers** are also long-legged hawks. According to Mike Meier, **Comets** and **Harriers** really had no competition in the rough So Cal Regionals. And according to **Pete Brock**, **Comet** sales are rushing the 150 mark. This is nearly before the glider was released! Both the **Comet** and **Harrier** received certification. The **Harrier** is on a dealer trial, to complete small refinements, and will not be released until October. Prices remain very competitive on both crafts. A winter sale opportunity keeps the sophisticated **Comet** at \$1895. The **Harrier** will list for \$1675. Both are well under **Mega**, **Atlas**, **Sensor** prices, and near the \$1885 **Sierra**. Other western happenings include a **new official**

world record by **George** (Worthington) at 111 miles. Eric Raymond got to 126 miles with a barograph, but did not round up the rest of the paperwork. Congrat's **George** and **Eric**! More exciting news comes from **Bill Bennett** on the **Adventure Olympics**. Bill will act as consultant for the hang gliding portion of the Olympics, which will pit ten good men (women, too?) against each other in ten different high adventure sports, decathlon-style. The whole event is to be televised and Bennett says the prize money is to be "considerable." Those interested can contact Bill at **Delta Wing**. Also at **Delta Wing** is a new super fast deployment 'chute. Spec's say opening comes at 2.0 seconds at 30 mph, 1.7 at 50, and 1.5 at 100 mph. Last issue, we reported here that New Hampshire-based **Odyssey** was considering marketing the Australian **Bandit**. That deal is finalized; contact them as they are looking for dealers. While **Aerial Techniques** and the **SNYHGPA** ("Snigpa") keep the wheels grinding away for the Nat's, a couple lower-key events have been announced. The U. of Lowell HG Club has its 3rd annual **Morningside Intercollegiate Competition** in Claremont, NH on October 11-13. Call Jeff Nicolay at 603/542-4416. Back west a bit, the **Central Indiana HGA** has a powered fly-in set for Sept. 20, 21. Contact Dave Riggs at 317/436-2335. Final news is "all roads lead to **Crystal**," during the last week of August, as Chattanooga-based **High Adventure Sports** opens the **Incline** site, on the east brow of Lookout Mtn. See the report on page 12 for details. Some fifteen pilots have now flown cross-valley to land at **Crystal Flight Resort**. Altitude gains easily exceeded six grand, on days with lousy looking thermal activity. Not bad for the first week of operation, eh? **LAST MINUTE FLASH** — An early report from the 80 **Masters** shows Australian **Peter Brown** leading after taking First in his first five heats. Conditions were allowing 2-3 rounds per day with rain/fog chopping out the early afternoons. A possible new distance record for the state of Florida was set in early September. **Pete Bonifay** used lift preceding a thunderstorm to travel "30-40 nautical miles" logging an hour and forty minutes. Managing to stay ahead of the front, **Pete** only entered the clouds once for five minutes. Got news or opinions? Send 'em to Product Lines, Box 144, Lookout Mountain, TN 37350.

LAZOR II



Phoenix Lazor Fact Sheet 1980

Model	155	175	195
Leading Edge	17'3"	18'3"	19'
Root cord	7'8"	8'	8'9"
Tip cord	4'	4'3"	4'3"
Area	156 ft ²	173 ft ²	196 ft ²
Span	30'4"	32'2"	34'
Nose Angle	130	130	130
Recommended			
Pilot Weight	120-160	150-190	180-220

The Phoenix Lazor II was designed for the competition skill level pilots. Through its short deflexorless span and large radial tips, a remarkable level of sink rate, glide angle, and speed range is achieved.

Features: Quick set up, applied leading edge pocket, breakdown type III control bar, shipping size 12', fixed nose camber, internal droops, elliptical tips, floating cross bar

Write: 13620 SATICOY VAN NUYS, CALIFORNIA 91408

Call: (213) 787-6600 (213) 785-2474 TELEX 65-1425

WILLS WING INC. HARRIER



THE NEW HIGH PERFORMANCE GLIDER FROM WILLS WING

photo by Greg Holcomb

A new era is dawning in hang gliding; the era of the defined airfoil flex wing. One year ago, we began development of such a wing, and today that glider is ready to expand the horizons of serious cross country and competition pilots. Consider the following;

ENGINEERING: The HARRIER is lightweight (59 lbs.), has perfect static balance, sets up very quickly with minimum hassle, and is fully HGMA certified to 1980 standards.

PERFORMANCE: No flex wing you can buy has a better combination of sink rate, L/D, and penetration than the HARRIER, in fact, there is only one other that is even in the same performance class.

HANDLING: The HARRIER handles like a Wills Wing.

VALUE: The HARRIER will cost you \$1675 complete. That's \$200 to \$400 less than any other glider that even claims to have this level of performance. Furthermore, the HARRIER is the only high performance glider backed by the Wills Wing network of factory supported service centers.

If you are a serious expert level pilot interested in the highest performance available in a flex wing hang glider, FLY A HARRIER.

HARRIER SPECS:

Area 177 ft ²	Leading Edge 18'6"	Aspect Ratio 6.3	Glider Weight 59 lbs.
Span 33'4"	Nose Angle 130°	Pilot Weight 150 to 250 lbs.	Pilot Rating IV