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WHOLE AIR

The International Magazine for Sport Pilots

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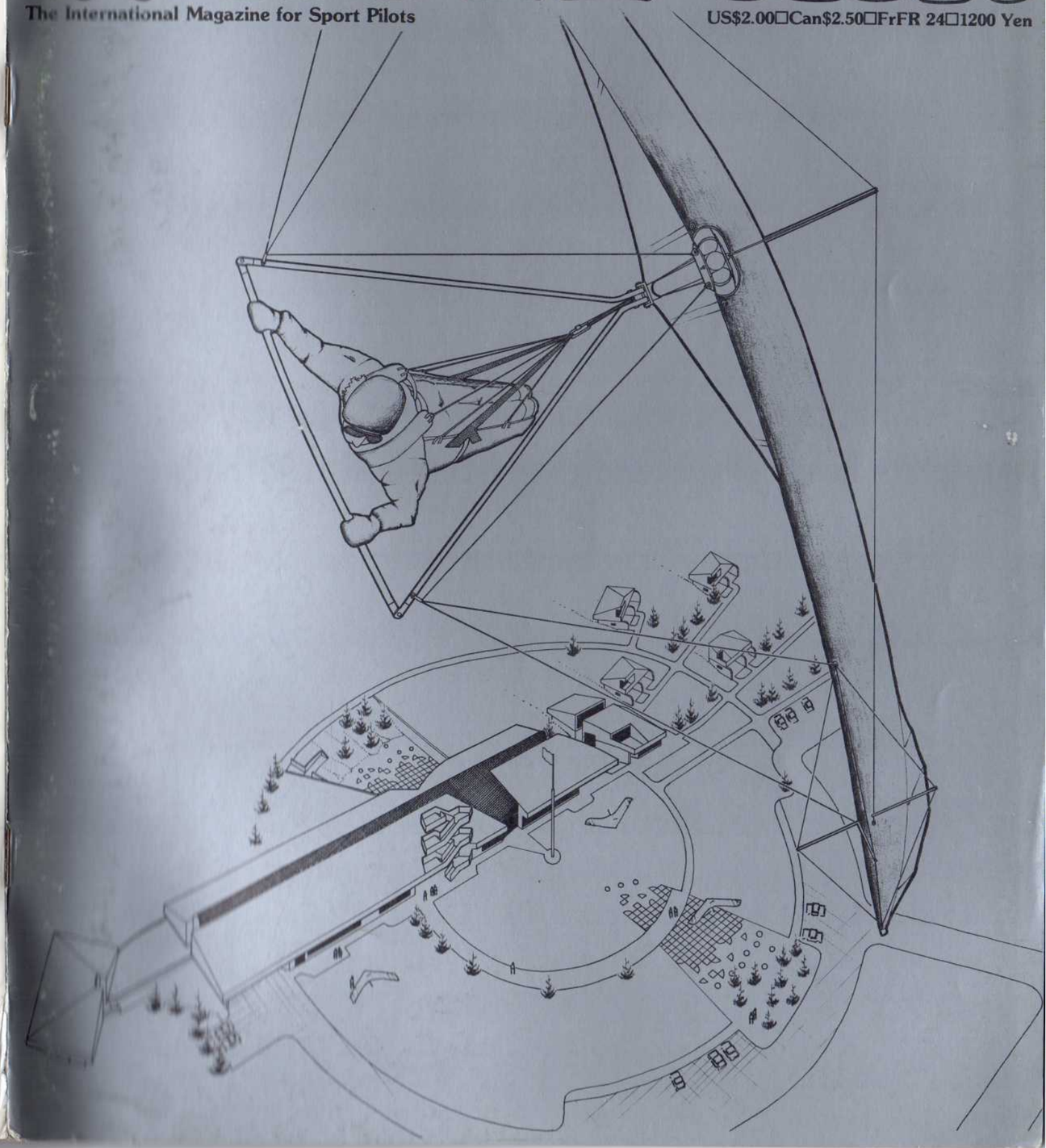


JAVELIN

SPECIFICATIONS

JAVELIN 168

Leading Edge	18 Feet
Keel	12 Feet
Span	31 Feet 8 Inches
Nose Angle	122 Degrees
Sail Area	168 Square Feet
Aspect Ratio	6.1
No. of Ribs Per Side	7
Sail Billow	0 Degrees
Pilot Weight Range	115-195 Pounds

JAVELIN 208

Leading Edge	18 Feet 4 Inches
Keel	12 Feet
Span	32 Feet 2 Inches
Nose Angle	122 Degrees
Sail Area	207 Square Feet
Aspect Ratio	5.2
No. of Ribs Per Side	7
Billow	0 Degrees
Pilot Weight Range	160-240 Pounds

JUST

WHEN YOU THOUGHT . . .

. . . that a glider couldn't be lighter — Flight Designs releases the JAVELIN. At 54 pounds flying weight, it is 14% lighter than the very popular Super Lancer series.

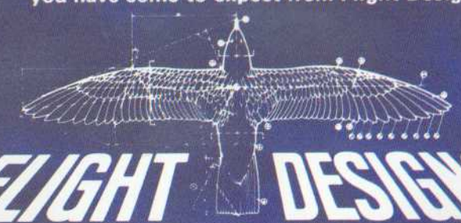
. . . that new gliders were getting too hard to land — Flight Designs presents the JAVELIN. State-of-the-art in every respect except one, it lands easily. Probably more so than your old intermediate does.

. . . that gliders got more complex as they developed — Flight Designs engineered the JAVELIN. Quick(est) set up going boasts an Easy-Slide, shifting crossbar, with all pip pins and no tensioners.

. . . that a glider which performed well could not also handle lightly — Flight Designs unveils the JAVELIN. Light as a hawk's feather, yet with a wide speed range. Optimized for sink rate performance, with its pre-formed ribs, 35% double surface, and spanwise sail cut, you'll just thermal and thermal and thermal.

. . . that new designs needed a few weeks to "get the bugs out," and even more time to reach stock levels — Flight Designs offers the JAVELIN, proven through the winter (at a number of our most professional dealers) and ready today for immediate delivery.

The JAVELIN is NOT just a cheaper version of the Flight Designs high performance glider. It IS a high performing glider that is deluxe in every way — like you have come to expect from Flight Designs.



FLIGHT DESIGNS

Wings for Man

FLIGHT DESIGNS, P.O. BOX 1503, Salinas California 93902

OUR PERFORMANCE & YOUR SKILLS

SENSOR 510

Will Give You A Definite Advantage

SUPER HIGH PERFORMANCE

The Sensor 510's maximum performance is ideal for Cross-Country racing and full-on competition. The 510's high top speed, very low sink rates and flat glide gives you a definite advantage. Super high performance and nimble handling gives you a glider that's impossible to beat.

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

INNOVATIVE DESIGN

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

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

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

HIGHEST QUALITY

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

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

Find out about having one built for you.

Call Bob Trampenau at Seedwings today.

HGMA Certified

Pilot: Bob Trampenau

SEEDWINGS

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SANTA BARBARA, CA
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WHOLE AIR ISSUE NO. 26, VOLUME NO. 5, No. 4, 1982

PILOT'S PERSPECTIVE

20 SUSPENSION SYSTEMS
Greg Shaw ends some common mysteries about karabiners, hang loops, and harnesses.

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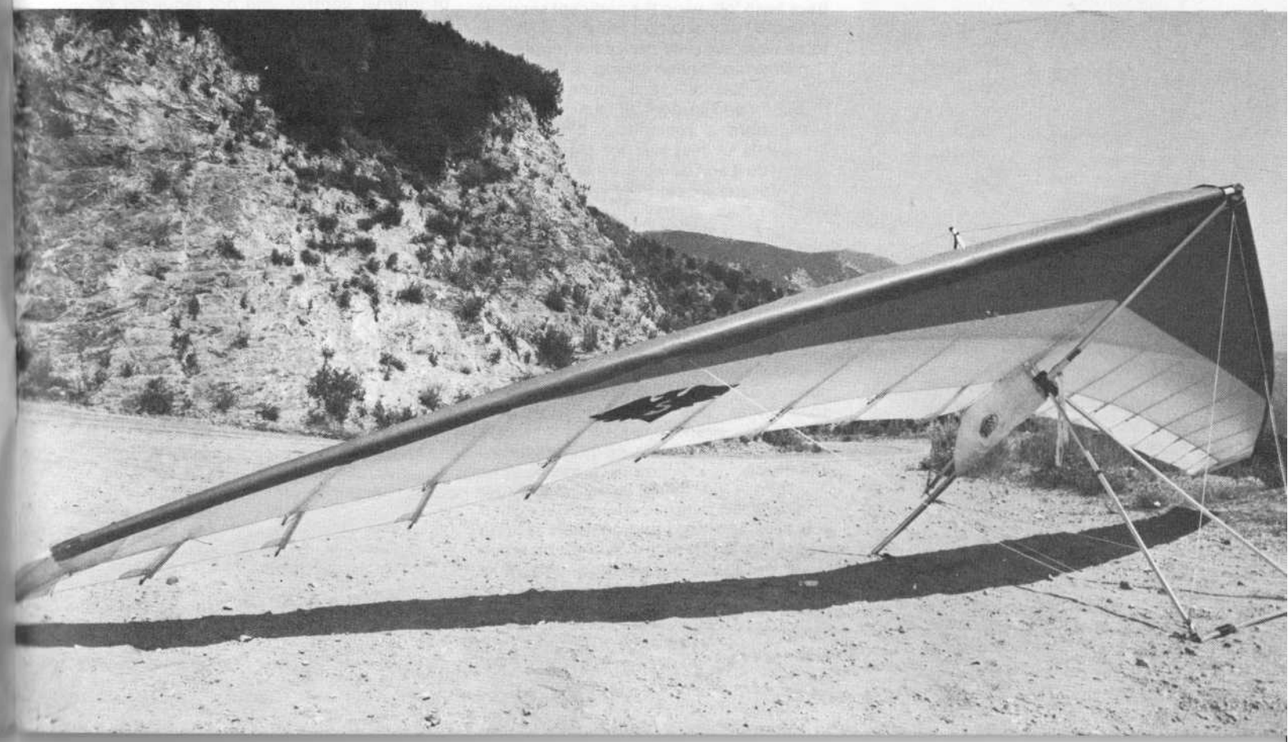

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ISSUE NO. 26

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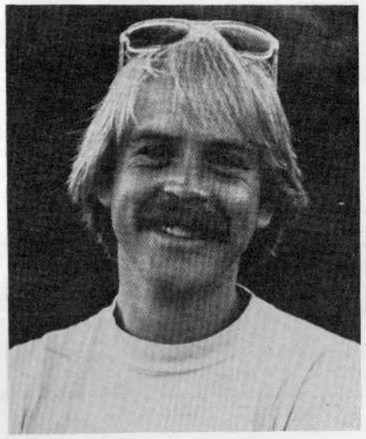
On The Cover;

The cover art is a pilot's point of view depicting a theoretical flight resort, Paradise Valley. The story starts on page 30, and the effort represents the culmination of a thesis done to earn the Bachelor's Degree in Architecture.

Publisher's Column



The new FAR is out and it means *YOU!* F.A.R. means Federal Aviation Regulation and the newly penned Part 103 covers not only ultralights but hang gliders as well.

Its intent does not change the way we soar too dramatically, especially in that we have been following the pertinent sections of Part 91 (Operating Limitations). But in three ways, we may notice the regulation.

First, no tandem flying is permitted. Whether on a sand dune between instructor and student, or launching with a friend from a precipitous cliff to soar thousands of feet just for pleasure, you cannot do it and be legal. What will happen if you do (and are caught)? Well, if you are a licensed pilot, it may affect your license through possible suspension or revocation. Licensed or not, a fine of up to $1,000 may be imposed.

Secondly, no flying is allowed within 500 feet of the base of the clouds. Most thermal soaring pilots agree that some of the best lift is right under the clouds, and this may really come into play on cross-country days with cloud streets. Also, in some areas, due to terrain height and controlled airspace, separations may require you to remain 1000 feet below cloudbase.

Thirdly, no flying is permitted after sunset, or 30 minutes after sunset even if you have approved anti-collision lighting visible for three miles. While not much flying has been done at this time, it is forbidden once Part 103 becomes the law. Penalties for items two and three are the same.

Of course you say, how will they know anyone is doing these things? They cannot police each and every site. Well, they do not even plan to try. They will leave this up to the industry, for the most part, but should they receive reports, or by other sources find we are not watching ourselves, they plan to step back in with more restrictive legislation. So it is up to us, and who will bet that no one will ever "spill the beans" should we transgress the laws?

However, we are fortunate, too. We have friends near the high places from which these rules have come.

USHGA President, Vic Powell, resides near our nation's capitol. He sees some opportunity for hang gliders to be removed from Part 103, even at this late hour. Vic intends to pursue these chances, and his other role as Director of AOPA's Ultralight Division may be of great help, considering AOPA's powerful lobbying abilities.

Powell explained that the FAA may face a struggle on this issue as they asked for public comment (which is required, of course), received a good many comments saying essentially, "Leave hang gliding out," then ignored this feedback. Why ask if you have no intention of listening? This is a poor posture in which the FAA may be seen. Also, this represents not-needed regulation. At a time when elections are arriving and less regulation and lower budgets are mandated by President Reagan, much pressure can be brought on the Federal Aviation Administration.

Further, USHGA's effort to keep all soaring pilots "in line" has been a quite successful one, so the record shows hang glider pilots to be a mature group, capable of internal control, and *not* requiring of federal government intervention.

We are glad of USHGA past success in this area, and fortunate to have a Washinton D.C. contact who knows the ways of government.

Maybe, just maybe, hang glider enthusiasts can remain "pilots of their own ships."

Thanks,
Dan Johnson

FORUM

(We here at WHOLE AIR would like to thank all of you many readers who responded to our request for input on what kind of reading you'd like. It is just this sort of involvement that has helped us become accepted as a quality information source in the industry. PLEASE, keep responding! —Staff)

Dear Editor;

Owner feedback is a great idea as is your proposed new products report, but I hope they will not deny us future first person evaluations like "Intermediates" in this (Jul/Aug '82) issue. I would like to see *one* pilot report on 2 or 3 gliders with evaluation of specific performance traits.

Jim Border

Dear Editor;

Regarding "Face-Off," I prefer to read several opinions on a glider. Also, *most important*, the reviewer must tell us how much experience he/she has. I'd like to see a return to the 3-view drawings, too.

Stewart Midwinter

Dear Editor;

I like the glider reports, but they'd be better if you didn't have different writers for each story. Can you find one "Old Pro" who's still unbiased and get a story that compares different gliders?

In the "Intermediates" article, there was no comparison of the three gliders. In the "Face-Off" (article) there was comparison, but everyone disagreed.

Anonymous

Dear Editor;

I haven't seen anything (like your "Face-Off" article) in another magazine that matched or beat it yet.

Bob Pobocik

Dear Editor;

There's no facing off. No comparisons. No quantitative data. Let's measure performance and report it.

Jerry Martin

Dear Editor;

An "Owner Survey" type article for glider evaluation is a good idea; it should be supplemented with an evaluation questionaire, and objectively answerable questions. The survey should not, however, be in lieu of flight tests by experienced pilots who are flying the test flights with the answers to *specific* flight *criteria* questions as a goal.

There now exists instruments designed for measuring performance characteristics (i.e., sink rate per air speed, with compensation for ambient kind of air mass, lift or sink). These instruments could greatly augment the performance part of glider evaluations/comparisons.

Scott Whittet

Dear Editor;

As long as airtime and conditions are mentioned, I think this is valuable information. Fly the ultralights this way too!

Great magazine. Thanks.

Ron Kenney

Dear Editor;

I like your glider reports. Very interesting and informative. *But*, why don't you stick to gliders and motors to put on them, re: Trikes? Personally, I'm not interested in ultralights.

Tim Wuest

(Our main thrust is addressing the soaring pilot. But ultralights and, as you indicate, Trikes especially are of great interest to our readers.

We will always pay greatest attention to soaring flight, but must also keep a close watch on ultralight aircraft, which may also offer soaring capabilities in the future — see "Convergence At Oshkosh," page 36. —Ed.)

Dear Editor;

Anytime I can read a glider report other than dealer "BS," it is informative, and helpful, and interesting.

Virgil Dahrens

Dear Editor;

Judging a new glider is much like judging a fine bottle of wine; it's easy to get all those judging to agree on the size and shape of the bottle as well as the color of the wine, but when it comes to the flavor and bouquet... Ah! That's when everyone's taste buds dance to a different tune.

Compromise seems to be the key word in hang glider technology. A good glider review must draw on many methods of rating different ships to get an unbiased opinion.

Carl Boddie

Dear Editor;

I feel that taking a stand or picking a direction in a publication takes guts. I will compare it to yelling clear on a wire launch... once you've said it, it's yours. Keep up the good work.

Ted Moorehead

Dear Editor;

Need to *compare* gliders, not just *give comments* on each.

I like the "Face-Off" format — Do it for power too, please.

Butch Gragard,
Ultralight Power Gliders

Dear Editor;

For those about to purchase gliders, opinions from other pilots are quite important.

Ernie Inn

Dear Editor;

The glider comparison is a *very* good idea, but objectivity seems a problem. Perhaps a site that offers unlimited ridge lift would help.

Lee Keller

(Point us to it! —Ed.)

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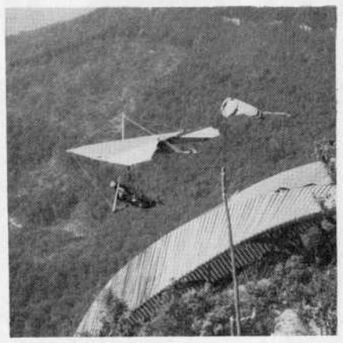


In the Fall issue of Whole Air, we'll give you a Pilot Report on the Pro-Air company's intermediate, the Breez, and articles on interesting major events... the Grandfather Mtn Masters of Hang Gliding, and a soaring contest for ultralights in the Owen's. We'll give you some warm views of soaring the island of Barbados, and a look at a remarkable effort of design and construction — the Tennessee Tree Toppers' new contoured launch ramp at Hensen Gap. Plus much more! Subscribe now... (see pg 25 for a subscription coupon).

CALENDAR ITEMS

SEPT 20-28 — Telluride World Invitation Aerobatic Hang Gliding Championships. P.O. Box 456, Telluride, CO., 81435

SEPT 25-26 — Hang III Mountain Rating Clinic. Contact Mark Airey, P.O. Box 340, Route 158 Bypass, Nag's Head, NC., 27959, 919/441-7575.

OCTOBER 2-3 — Second Annual California International Air Show. Featuring the Blue Angels, Eagles Aerobatic Team, Bob Hoover, Art Scholl, and more. Advance ticket information — California International Air Show, P.O. Box 1448, Salinas, CA., 93902.

OCTOBER 16 — Don Carson Air Fair, Bolton Field, Columbus, Ohio. Benefit Air Show with aerobatics, warbirds, mini-jets, wing walkers, military jet attack demonstrations, etc. Cash prize competition for ultralights, $25 entry fee. Contact: Fair Director, Rob Young, 20 S. Wayne Ave., Columbus, OH., 43204, 614/272-8249. (Proceeds to benefit League Against Child Abuse.)

OCTOBER 16-17 — Second Annual Great 1908 Air Fair, Helmsburg Airport, Brown County, Indiana. Sponsor: EAA Ultralight Chapter #15. Tie-downs, camping, and parking available. At least EAA Ultralight pilot certificate required to fly. Contact Stan Brehob, 317/787-8557 or 317/783-3233.

OCTOBER 16-17 — Mountain Fly-in. COntact Mark Airey, P.O. Box 340, Route 158 Bypass, Nag's Head, NC., 27959, 919/441-7575.

OCTOBER 23-24 — Orville Wright Fly-in. Orville set soaring record of 9 minutes, 45 seconds on October 23, 1911. First 10 minute flight of the day wins. Information: Kitty Hawk Kites, P.O. Box 340, Route 158 Bypass, Nag's Head, NC., 27959, 919/441-7575.

OCTOBER 16-17 — Blue Angels at Point Mugu Air Show. COntact: 805/982-8094.

OCTOBER 30 — Halloween Party, Kitty HAwk Kites (West), Marina, CA. Contact: KHK, P.O. Box 828, Marina, CA., 93933, 408/384-2622.

OCT 31- NOV 5 — 27th Annual AOPA Convention and Industry Exhibit, Las Vegas, NV. Aviation seminars, training programs, exhibits, entertainment. Contact: Janet Campbell, AOPA, 7315 Wisconsin Av., Bethesda, MD., 20814, 301/951-3947.

INDUSTRY NEWS

New Hang Glider Regs at Fort Funston

A new registration system for all hang glider pilots using the Fort Funston flying of the Golden Gate National Recreational Area will go into effect in September it was announced recently by District Ranger, Steve Gassano.

The registration system is being established to improve pilot safety and to protect Fort Funston's heavily used hang glider area, one of the more popular in Northern California.

The new system will be administered by the Fellow Feathers hang glider association. To register a pilot must pay a $7 annual fee and be a current member of the United States Hang Gliding Association.

Each pilot will then be issued a helmet sticker and a copy of the Fort Funston hang gliding regulations. Helmet stickers issued this year will be good for all of next year as well.

Hang glider pilots may register at hang glider shops in the Bay Area or with the Fellow Feathers office at Fort Funston.

All hang glider pilots must purchase a helmet sticker prior to September 1st to continue flying at Fort Funston this year, Gazzano reported. Further information is available at Bay Area hang glider shops or from the recreation area by calling 415/556-8371.

Yosemite Flying in Jeopardy

By this date the reservation book to fly from Glacier Point into Yosemite Valley is probably full. The reason is because our use has been restricted from 5 days a week to just weekends, for major construction at take-off.

The Hang Gliding Ranger has proposed for 3 years the allowing of flying in the evening from Sentinel Dome, always with a negative response from the Chief Ranger. This year he made the same proposal thinking it would be an excellent trial period to test the feasibility of evening launches from Sentinel Dome, at the same time appeasing the hang glider community. This time the Chief Ranger agreed, but the Park Superintendent denied the proposal, but agreed to allow 18, rather than 12, launches on weekends ONLY from Glacier Point.

We believe that if ever there was a time to push for evening (SOARABLE!) flights from Sentinel, this is the time. Think of it, 2 flights a day into magnificent Yosemite Valley. For those of you who have never flown there, it is a flight for the soul and special memories for a lifetime.

We are asking your help:

1- Make reservations now, for weekends and show up to fly. Our letters will carry no weight if all the 18 spots are not used up. For reservations, call 209/372-4306.

2- All clubs, dealers, manufacturers, shops, schools, Hang Four pilots, and all future Hang Four pilots, take the time to write a letter to:

Park Superintendent
Yosemite National Park,
California, 95389

Jean-Michel Bernasconi Starts New Company

With the assertion that, "There's always room for quality," Jean-Michel Bernasconi has announced the launching of his new hang glider manufacturing company, Pacific Windcraft, Ltd.

Based in Salinas, California, Pacific Windcraft, Ltd., will be geared towards developing and producing high quality, custom made, sail gliders and related equipment. A self established limited production enables Pacific Windcraft to offer an accurate and guaranteed delivery schedule.

Leading the Pacific Windcraft product line is a high performance glider called the Vision, designed by Jean-Michel Bernasconi, and introducing a new generation of sail cloth presently unavailable in this industry. Production of a limited edition of Visions will begin in September. Visions will be distributed nation-wide through Pacific Windcraft's professional network of 20 dealers noted for their competence and committment to the sport.

As inspired by Bernasconi's close friend, the late Marty Alameda, Pacific Windcraft will conduct business with an emphasis on personalized service and attention to dealer and customer needs.

Contact the company at 1100 Madison Lane, Salinas, Ca., 93907, or P.O. Box 4384, Salinas, Ca., 93912, or call 408/422-2299 or 455-2058.

New Jockey's Ridge Endurance Mark Set

On June 28th, Dan Skadal, a Kitty Hawk Kites instructor, set a new duration record for the 130 foot sand dune site. The Nag's Head, N.C., flight lasted 5 hours and 21 minutes in 15-25 mph winds. The previous record had been set by Pete Soule (4 hours and 52 minutes).

Since the ridge is only about 200 feet long, he really had to work at it. The glider Skadal flew was a Wills Harrier II 177. Dan had great praise for the machine.

For breaking the site record, Dan received a $100 check from John Harris, Kitty Hawk's president. The prize for breaking Skadal's record will be $200.

Delta Wing Offers FM Radios

Delta Wing now has FM radios with voice activated transmit (VOX). A long life battery is also optional. And a press-to-talk option makes these little units ideal for ultralights.

The units retail for only $89.95, and are available from Delta Wing or any of their dealers.

AERO MARKET PLACES

AERO MARKET PLACES

NEWS

"Sierra Flight" now available as poster

Due to overwhelming demand, "Sierra Flight" is now available as a high quality full color poster. This point of view shot, taken high over the Sierras by Eric Raymond in the summer of 1980, has been published in *Hang Gliding, Vol Libre, Outside,* and *Sportstyle* magazines. The poster is printed on the highest quality paper, using the best ink, with a layer of varnish to protect the finish.

The 23 X 37 inch poster comes in a heavy duty mailing tube, making it an excellent gift. The $6.95 price includes postage and handling.

Dealer and distributor inquiries are invited. Available from Ultralight Soaring Software, 33274 Baldwin Blvd., Lake Elsinore, Ca., 92330.

Spectra Aircraft Introduces the Sonic

Spectra Aircraft introduces the Sonic, a high performance competition or utility class refinement of the Aolus. With an internal cross tube, 95% effective double surface, and increased camber sail, the Sonic is not only a vast improvement of the Aolus, but a truly superior state of the art ultraship.

The Sonic uses an Aolus planform (150° nose angle) with a very loose internal floating cross tube assembly, a tight fully ribbed lower surface, cleaner leading edge, and internal lock-up tubes for improved high speed performance and overall glide. Low speed performance, sink rate, and landing characteristics were improved by increasing the camber and leading edge curvature throughout.

Handling was also improved by incorporating Spectra's split double surface. This unique concept (in development since 1979) allows for greater tortional flexibility without sacrificing a tight, flat sail for performance.

As with all Spectra gliders, the Sonic comes complete with king post fairing, nose fairing, undersurface fairing, and a new lighter weight storage bag. For further information, contact Spectra Aircraft at 2151 Arnold Industrial Hwy., Shop #5, Concord, CA., 94520 or phone 415/798-9993.

HGMA Reviews Streak and Breez

The HGMA Board reviewed and accepted documentation packages on the Delta Wing Streak 160 and the Progressive Aircraft Breez 180. The Streak is a new high performance glider from Delta Wing, while the Breez is an intermediate entry from ProAir.

The current members of the HGMA, according to the present HGMA records are:

Progressive Aircraft Co.
US Moyes
Flight Designs
George Dyer
Wills Wing
UP Sports
Sport Aviation Mfg.
Delta Wing

Mike Meier,
President, HGMA

Alan Levinson Died

Salinas, CA — Mr. Alan Levinson, President of Flight Designs, Inc., passed away on June 30, from an apparent heart attack.

Levinson, who was also President of Pioneer Sportaire, had been working on a number of special projects for Pioneer International Corporation, which owns Flight Designs. Concurently, he served as chairman of the Parachute Equipment Industry Association.

Before forming Pioneer Sportaire, he was president of G.Q. Security Parachutes, Inc., in San Leandro, California. He had also been president and chief executive officer of the Steinthal Corporation, a parachute manufacturer in Roxboro, North Carolina.

An ardent pilot as well as an expert sky diver, he logged more than 2,000 free fall jumps, 19 of which were started over 45,000 feet. He co-sponsored the World Sky Diving Championships in Sidney, Australia in 1977.

Mr. Levinson received a BA Degree at Cornell, an MBA Degree at Harvard, and a Law Degree at George Washinton University.

"Alan's death is a great loss," said Alan H. Greenstadt, a director of Pioneer Systems, Inc., which owns Pioneer International and Flight Designs. "His enthusiasm and vast talents are gone, but the dreams he had for ultralight aircraft are left with us as a challenge and a mission. We will carry them forward."

Bennett Releases Streak

Delta Wing introduces the Streak — the first certified production CFX (concealed, floating crossbar) glider in the US, with the maximum effective double and detached under surface. These unique features have combined to give significant advances in performance and handling, while landing characteristics have been greatly enhanced. A great feature of the Streak is the completely open sail system, which allows closeup inspection of *all* the airframe's internal structural components as easily as the external inspection.

With the special foam insert in the leading edge, the camber is smooth and crease-free, while the stepped leading edge construction allows optimum leading edge aerofoil radii.

Many of the innovative design features from the "X" have been maintained, such as strong webbing crossbar restraint, ½" X .035" aluminum and lexan battens, and no-stretch luff lines. The excellent standard of sail construction from the "X" is continued, revealed by protected wear spots. Available cloths include sandwich cloth and "hard" finishes. Also included, of course, are padded control bar bags and batten bags for extra protection.

CUMULATIVE RESULTS
1982 Owen's Valley X-C Classic

1	J. Lee	*Comet*	USA	58.75
2	L. Tudor	*Comet*	USA	72
3	R. Duncan	*Missile*	ASL	98
4	E. Raymond	*Arrow*	USA	99.75
5	P. Robinson	*Comet*	USA	105
6	R. Pfeiffer	*Duck*	USA	112
7	M. DeGlanville	*Comet*	FRA	129
8	G. Thevenot	*Azur*	FRA	134
9	E. Lothe	*Sensor 510*	NWY	136
10	M. Bennett	*Comet*	USA	150.75
11	Ken Baier	*Bullet*	WGR	163
12	S. Moyes	*Missile*	ASL	167
13	W. Woodruff	*Comet*	USA	168
14	E. Goss	*Comet*	USA	169
15	J. Burnett	*Comet*	USA	169.75
16	H. Denz	*Comet*	WGR	190
17	T. Zinke	*Comet*	USA	199
18	D. Gibson	*Comet*	USA	204
	K. Savier	*Comet*	USA	204
	R. Rawlings	*ProStar*	USA	204
21	C. Gremion	*Comet*	USA	219
22	J. Huey	*Sensor 510*	USA	230
23	R. Burton	*Comet*	USA	234
	J. P. Ohaco	*Comet*	CHL	234
25	S. Luna	*Comet*	USA	234.75
26	R. DeGroot	*Missile*	ASL	235
27	K. Kohmstedt	*Comet*	MON	242
	C. Bulger	*Demon*	USA	242
29	H. Olschewsky	*Flash*	WGR	256
30	S. Gilmour	*Missile*	ASL	272

NEWS

LEAF Announces new Harnesses, Instrument Deck, and Parts Catalog

Leading Edge Air Foils, one of America's leading manufacturers of hang glider and ultralight aircraft hardware and acces sories, is pleased to announce the addition of two new body harnesses to their product line.

The two new body harnesses, the LEAF Prone, and the LEAF Supine, are especially designed for pilots who take their flying seriously.

Both Body Harnesses feature: complete body support, fully adjustable shoulder pressure, 6,000 pound seat belt webbing, and high quality Nylon covering. They are designed and manufactured for the ultimate in comfort and minimum aerodynamic drag. Please specify pilot's height when ordering.

LEAF's newly designed instrument deck is easily installed on both hang gliders and ultralight aircraft. It will accept up to four 2¼" instruments or two 3⅛" plus 2 2¼" aircraft instruments.

The instrument deck's housing is constructed from high-impact fiberglass, and features an attractive hardwood faceplate. It is available in a standard white color, or for a nominal cost, can be painted to match your hang glider or ultralight.

It is available in the following convenient sizes: 12" long X 3" high X 7" deep, or 12" X 3" X 3", or 12" X 4" X 7".

LEAF's new catalog features a complete listing of all their parts, hardware, and accessories. The 8½" X 11" book is printed in two colors. In the new catalog are photographs, illustrations, diagrams, and detailed descriptions of most equipment the serious hang glider or ultralight pilot will need.

The cost is only $1.00 in the U.S. or $1.50 outside the U.S. Allow four to six weeks for delivery.

For additional information concerning this new catalog or any LEAF product, write LEAF, 331 S. 14th St., Dept. PR., Col. Springs, CO., 80904-4096, or phone 303/632-4959.

Oshkosh '82 Sets New Attendance Records

Hales Corners, WI (Aug 12, 1982) — The EAA said today that the 30th Annual EAA Convention was an "unprecedented success." EAA Oshkosh '82 broke all previous Convention records by attracting 750,000 participants and spectators. Approximately 14,000 aircraft of all types and description flew in to the eight-day event. The number of registered show planes also broke all records with a total of 1818, compared to 1600 last year. Additional records included 1,163 foreign visitors representing 56 countries, and a new record of 40,000 campers in the EAA Campgrounds.

Tom Poberezny, Convention Chairman, pointed out that the Convention's success was in spite of the worst storm in the history of Oshkosh. The storm, which lashed the site with winds up to 60 mph and torrential rains on the night of August 3rd, was also the worst weather that EAA has had to deal with in its 30 year history.

The Convention was marred by two tragic accidents. In one, a mid-air collision claimed the lives of three people. In a ground accident, a young woman was severly injured when an airplane pulled out its tie-down stakes. While expressing sorrow over both incidents, Paul Poberzny sought to put the accidents in perspective. "In both cases, the accidents were caused by human failure... human error. No amount of regulation, no number of rules can prevent that sort of accident."

Eipper Adds New Quicksilver E Model

Eipper has introduced its new Quick-E, weight shift ultralight aircraft featuring a 20 hp Cuyuna engine with 215 cc displacement, "trimvator" control and a new pilot harness system.

The addition of a trimvator to the ultralight gives it more pitch control. As the pilot moves fore or aft to change the aircraft's angle of attack, the trimvator is automatically activated to assist the maneuver. The trimvator measures four inches by 42 inches (each side), are spring loaded in the neutral position.

The larger powerplant on the "E" gives the ultralight a climb rate of 450 fpm with a service ceiling of 9,000 feet. The 195 pound aircraft cruises at 34 mph, with a top speed of 45 mph, and can cover 78 miles with its three gallon fuel capacity.

The newly designed harness on the Model "E" is more comfortable and has more padding that the weight shift ultralight pilot's harness. The model will sell for $3645.

New EAA Aviation Center Begun

Oshkosh, WI — Construction of the new EAA Aviation Center in Oshkosh has begun (June 1982), and according to President Paul Poberezny, "We fully expect to have the majority of the building completed in time for EAA's 1983 Fly-in Convention."

In addition to the EAA Foundation Air Museum and the EAA World Headquarters, the 120,000 square foot Aviation Center will house an International Conference Center, Aviation Library, Aviation Photography and Art Galleries, complete aircraft restoration facilities and several, fully-equipped mini-theaters.

Montana Ultralight Ban Overturned by FAA

A senior FAA official has overturned a ban on ultralight flying at Bozeman, Montana's Gallatin Field after a lower-level FAA office reaffirmed it, the Aircraft Owners and Pilots Association disclosed recently.

AOPA asked the FAA to look into the action announced in May by the Gallatin Airport Authority, and reaffirmed by the FAA's Helena Airports Field Office.

AOPA contended that because Gallatin Field received federal airport assistance it could not discriminate among users.

Regional official Robert Brown agreed with AOPA, overruled Helena official Charles Engdahl, and ordered the ban removed.

Eagle Production Increased

Albuquerque NM — Since expansion of the Eagle manufacturing facility culminated in February, production of Eagle ultralights has increased dramatically. With the capacity of producing 240 Eagles a month, half of the new addition is used for final assembly, as the Eagle comes completely assembled, not in kit form.

To improve part service to dealers, a large inventory section was organized in the 20,000 square foot addition. This new department with its computerized inventory system should enable American Aerolights to meet its goal of a 24-hour turnaround on parts orders.

CGS Hawk Continues to Be Evaluated by Factory

CGS Aviation's award winning ultralight, the CGS Hawk, has accumulated over 100 hours of flying time and has flown at 11,500 feet. These are the latest accomplishments in the performance of the world's most advanced ultralight.

The Hawk has accumulated over 100 hours of flying time. This is equivalent to 30,000,000 engine induced vibrations. No structural or fatigue problems have been evidenced.

One of the goals of the Hawk was to provide pilots with a top performing ultralight that would have outstanding structural integrity. To verify this goal, CGS will keep the original prototypes in the air. These Hawks will eventually be the highest time ultralights in the world, and their characteristics will be constantly monitored.

New NPRM May Greatly Increase Ultralight Training Costs

We in the ultralight industry se what could be a potential fly in the ointment regarding ultralight flight training. The PUMA has adopted, with the original help and blessing of the EAA, a minimum criteria for instruction by ultralight dealers for pilot qualifications. This program revolves around a ground school given by a Certificated Instructor covering F.A.R. Part 91 (basic rules of the sky), basic aerodynamics, basic meteorology, cross country navigation, and aircraft courtesy. Each manufacturer has then added the necessary flight training specific to their type of ultralight.

At present, there is a new regulation out for public comment on an air recreational vehicle pilot's license: Docket No. 22692. This is being forwarded as an answer to ultralight pilot standardized training. In our case (Ultralight Flight's Mirage and Phantom), where all of our aircraft are manufactured with conventional controls, most of the information and skills learned would be transferable. The cost to the customer, however, would be a major factor in keeping the less affluent pilots grounded. At present, most very successful ultralight training programs for the complete novice cost up to $500. This new program, if enacted, would range from $1,000 to $1,500, depending on the area in the U.S. one would go for training. How effective would training be if a student is forced to spend some 20 hours in a three axis control airplane, if that customer has purchased a weight shift ultralight aircraft?

It is my opinion that if this A.R.V. license is enacted with the provision that ultralight pilots must comply, that this will lead to the eventual registration of these aircraft that most ultralight pilots wish to avoid.

Frank J. Riley,
President,
Ultralight Flight, Inc.

Build Your Own Ultralight

The *Directory of Homebuilt Ultralight Aircraft* became available in July 1982.

This book is a source from which potential builders and flyers of ultralights can choose from over 20 aircraft that can be built from plans. Some of the aircraft listed can be bought in kits or kit components, but all have plans that can be purchased by the individual who wants the ultimate in financial savings plus control over the finished product.

From one publication comes information that would take considerable time, effort and money if it were all to be collected by the individual.

The Directory of Homebuilt Ultralight Aircraft, available from Haljan Publications, P.O. Box 291WA, LaMoille, IL., 61330, sells for $10 plus $1.50 shipping ($3.50 for overseas orders).

Legal Two Place Training

American Aerolights has developed a two-place ultralight training vehicle. The Eagle manufacturer has always recognized the benefits of a twoplace trainer, but concern for the future of the ultralight industry and strict adherence to the FARs prevented the company from selling one. FARs dictate: 1) twoplace, owner-built aircraft must be licensed as experimental; 2) experimental aircraft cannot be used for commercial purposes.

The American Aerolights two-seat trainer is a standard Eagle minus the engine, equipped with a second seat and a tow line. It is towed behind a vehicle, either land or water. The FAA states that a craft being towed behind a surface vehicle is not considered an aircraft, and therefore, not regulated.

Eipper Outsells Piper, Beech, and Cessna

San Marcos, CA — If Eipper Aircraft had sold one more ultralight aircraft in June, they would have tied the combined total sales of Piper, Beechcraft, and Cessna for one month. While major general aviation airframe manufacturers continue to produce at recession levels, ultralight leaders like Eipper continue to experience recordsetting monthly tallies.

Hunt Hops from Hiway Hang Gliders to Huntair Ultralights

Steve Hunt, co-founder with John levers of HiWay Hang Gliders left one of Europe's more successful glider manufacturers to establish his own new company, working exclusively on powered ultralight flight.

Huntair has established its own fully-equipped workshop, from which it has supplied engine units to both homebuilders and professional constructors.

Huntair has also completed its prototype Pathfinder ultralight, a highly functional machine of great rigidity and strength. The Pathfinder is easily folded for transport, and is now in full production.

For further information, contact Huntair Ltd., Truleigh Sands, Edburton Henfield, West Sussex, England BN5 9LL.

Labor Day at Tullahoma

At Tullahoma, Tennessee, over the Labor Day weekend, the Second Annual Old South Fly-in took place under bright autumn skies.

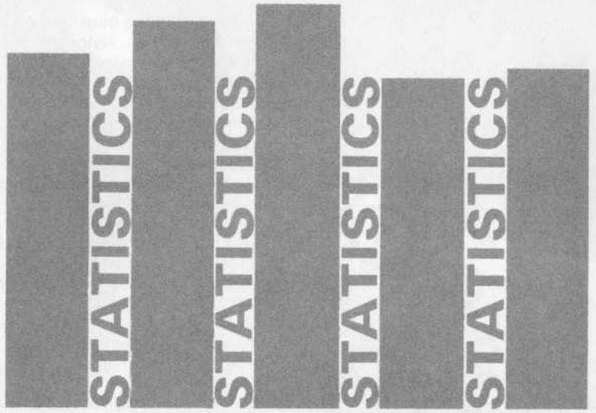
Fifty plus ultralights, representing 24 models from 17 manufacturers attended the event.

American Aerolights and Starflight Mfg., displayed their products along with sixteen dealers from all over the Southeast. The new Eagle XL was introduced by Larry Newman and Bryan Allen, a new design literally designed from the ground up. They also demonstrated the new two place version of the three axis control XL.

AOPA, under the leadership of Ultralight Division Director, Vic Powell, kicked off their pilot and instructor rating programs. Their staff presented the seminar to over 200 persons and gave written tests, which were successfully completed by some 80 instructors and 20 pilots.

Long time AOPA Air Safety Foundation Executive, John Sheehan, directed the seminars, and expressed satisfaction over their "nucleus construction" of a group of experienced pilots and instructors. They will continue this effort next at AOPA's 27th National Convention in Las Vegas at the beginning of November.

While public turn-out was considered "light" by some exhibitors, the event was well-organized, thoughtfully planned, and should continue to gather momentum for the Third Annual Fly-in over Labor Day, 1983.



We asked for your help and we got it! *Whole Air* takes pride in the quality and volume of contact with its readers... YOU. So without your response, the magazine would be less vibrant and responsive.

If *Whole Air* had 100,000 readers (we have about 15,000), it would be rather difficult to have such a close feeling for individual readers. Being smaller helps keep the quality in the area we regard as Priority No. One — Reader Contact.

You readers have told us, issue by issue through the free Reader Response Cards, what articles you have liked. You have said *why* you liked them and you have told us specifically what you did *not* like. We are not offended when we hear criticism; on the contrary, we are thrilled to have such involved feedback. It makes *both* readers and magazine better for the effort.

So after our new evaluation idea — "Face-Off" — was consumed by you readers, we asked, "What do you think... should we continue... and how about this (other) new idea?"

Usually we ask these survey questions in a short, easy-to-respond-to style of "check-the-boxes." But to get more subjective opinions, we asked you to write-in specific comments. In so doing, we knew the number of responses would decline — too much extra work for many readers. *Still*, we got well over 100 cards back in a month or so. That was more than we expected.

So many comments arrived that we are still categorizing and examining them. But the survey also had some numerical responses. These we did tally. And since most respondees, and other readers, like to see how the group results looked, we will present those tallies.

First of all, we asked what you thought of our proposed new glider/ultralight evaluation procedure. This idea calls for reviews of newly released craft *and* owner surveys of equipment with "use in the field." One is timely, the other thorough and less subject to bias. An overwhelming 94% said, "Good idea."

Then we got back to our "Face-Off" article (May/June '82). Ninety two percent read the article, a very large plurality. Of those readers, 61% rated the effort "Good" or "Very Good." The full table follows:

"Very Good" ----- 15% (Excellent)
"Good" ----- 46% (Above Average)
"Fair" ----- 26% (Average)
"Poor" ----- 8% (Below Average)
"Very Poor" ----- 5% (Unsatisfactory)

This is basically a reasonably good vote of confidence for a new idea, *but* one on which we can improve. Typical of the most common written statements was, " 'A' for Intent; 'D' for Content."

Then we wanted to know what you thought of our new proposed system, using the examples of the "Ultralight Owner Survey" and "Intermediates." These are similar to (tho not exactly like) what we plan to do. Nevertheless, it gave us some feel for your reaction. Of course, all readers are not interested in *both* power and soaring, and this must not be forgotten.

Sixty four percent read the Owner Survey and 99% read "Intermediates," which was also shorter, another factor. Sixty seven percent rated the "Survey" as "Good" or "Very Good." Sixty two percent rated "Intermediates," in the same categories. The tables follow:

"Owner Survey"

"Very Good" ----- 25% (Excellent)
"Good" ----- 42% (Above Average)
"Fair" ----- 21% (Average)
"Poor" ----- 6% (Below Average)
"Very Poor" ----- 6% (Unsatisfactory)

"Intermediates"

"Very Good" ----- 23% (Excellent)
"Good" ----- 39% (Above Average)
"Fair" ----- 26% (Average)
"Poor" ----- 7% (Below Average)
"Very Poor" ----- 5% (Unsatisfactory)

So, we see that by developing our new idea (using you many comments — 58% *did* write-in a thought or two), we can *really* serve the reader/buyer's interest with the kind of product information you want. We wonder if other magazine staff people feel that good. Again, *thanks*, it is because of you. And for you. §

SUSPENSION SYSTEMS

Text and Illustrations by Greg Shaw

We have had an unfortunate case of equipment failure a few months ago that cost a life. Divergent wing? A frayed wire? No, that "weak link" in our flying system, the Karabiner. I was hoping someone more qualified than myself would come forward with some solid information on hang glider suspension systems, but true to the old adage, "When you want something done, do it yourself." We are all due for a better introduction to the little beasties that tie us to our wings, such things as back-up loops with which too many pilots cannot be bothered these days.

Contrary to popular opinion, we do not hang on with our hands, though pilots have certainly tried on occasion. We are linked through a loop of webbing or rope (with back-up), a climber's karabiner (without back-up), and harness suspension ropes and webbing (usually plenty redundant). Each of these elements has its joys and problems and *definite limits*. Let us see just what we are dealing with here.

The karabiner has been adopted from mountain climbing as a quick, convenient way to temporarily connect the pilot to his/her ship. Like everything else, there are specialized varieties to choose among with different properties and strengths: oval and "D" shapes; locking and non-locking gates. (Figure 1) The oval is the climber's workhorse. Ropes center nicely and multiple ropes do not bind. But it is the weakest cousin. The gate carries only part of the load. The solid side of the karabiner carries the lion's share. Following that old law of the lever, as the load point is shifted away from the side doing the work, the greater the bending force is on that poor, overworked side. So most "ovals" are worth about 2500 pounds of static load.

To improve the load, where strength is more important than convenience, the "D" was invented. The assymetric shape forces the load to bear closer to the hardworking side, reducing the leverage. This ups the load to about 5000 pounds for a good brand.

In either case, leaving the gate open is a disaster, cutting the load to less than 1200 pounds for the oval, and 3000 pounds for the "D." And so the locking karabiner was developed. Not only does is assure that the gate stays closed, but it makes the gate link a little stronger.

Here is a few common varieties and their rating:

SMC Oval: 2800 pounds
SMC "D": 4500 pounds
SMC "D" locking: 5800 pounds
Bonaiti "D": 4500 pounds
Bonaiti "D" locking: 5000 pounds
Stubai Chrome Vanadium "D" locking: 11000 pounds

You might have noticed that the material makes a bit of difference. All but the Stubai are aluminum. Normally that is the choice, to save a great deal of weight. In our case, the extra margin might be attractive. Also note that locks help. Climbers are constantly moving karabiners and locks take time. They only use them where they want extra security. We need the security. We only need quick release near water, where we should not be landing anyway (the vario gets wet and cranky).

Now consider side load. A karabiner turned 90° so the load is on the gate and back will support less than 250 pounds, the worst case. So make sure all those suspension lines will only load the ends of the karabiner. Lash them together with a bit a bungie.

Buy a good locking karabiner. Does the lock work smoothly? If it is gritty now, it will not get better with dust and dirt in it. Ask for load ratings. Some outfits have done their own independent testing and are happy to share the figures. It is nice to see the best and worst figure as well as the optimistic average. And remember the old lever. Your wide hang loop is going to stress a "D" further from the back than rope, reducing its strength.

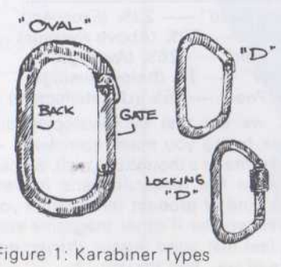


Figure 1: Karabiner Types

The rest of the pilot/glider link is rope and/or webbing. Nylon is the chosen material, mostly because climbers use it and it is available, but also because it is light, strong, chemically quite inert (it will not melt when you spill your coffee on it), elastic and fairly abrasion resistant (when not loaded). The rope type of choice tends to be Perlon or Kernmantle (two names, same rope). An outer braided shell (mantle) protects an inner load-bearing core (kern) of fibers that run the length of the rope. The outer shell can become fuzzy with abraided fibers without affecting the inner core, which carries the load. So the good news is that our suspension lines can look pretty ratty yet still retain most of their rated strength. Nylon is hard to cut limp, but has the unfortunate tendency to cut with ease under tension. An odd example is the taut climbing rope cut through (inside) by a falling rock without damaging the outside shell.

The bad news is that our parachute bridles (nylon) tend to be under tension when they hit wires, et cetera. So pilots are switching to Kevlar bridles, which happen to act in reverse. They do not cut easily under tension, but are a little softer when limp (but protected by the parachute container).

The shell also reduces the ultraviolet (sunlight) damage. Tests in Boulder, Colorado showed no loss of strength after a year of exposure. Goldline (an exposed fiber, "laid" rope) and by extrapolation, webbing, showed a 25-40% loss of strength after six months exposure. More on webbing below.

Rated loads are available where you buy your rope, but I will give you a short list for example:

5 mm Perlon: 1200 pounds
6 mm Perlon: 1650 pounds
7 mm Perlon: 2300 pounds
9 mm Perlon: 4300 pounds
11 mm Perlon: 5500 pounds
½ Webbing (flat): 1000 pounds
¾ Tubular: 2300 pounds
1 inch Webbing (flat): 6000 pounds
1 inch Tubular: 4000 pounds

These loads are for straight sections of material, without knots. Any bend reduces the rated strength. When the rope is bent the outer fibers are stretched tighter than the fibers toward the inside of the bend; they carry more than their share of the load and fail under a load that could be supported if everybody did their share. Where do we meet these bends? In knots and the point where the rope rounds our karabiners. A rope bent 180° around a bar with a diameter equal to the diameter of the rope loses 50% of its rated strength. No loss occurs when the bar has a diameter 10 times the rope. So our 9 mm hang loop which we thought was worth 8600 pounds (2 X 4300) is actually good for only 4300 pounds load. Ahhh, the fellow in the back there gets an extra ten points! We forgot about the knot. First let me mention

Continued on page 23

webbing. Then let me show you a few good knots to remember. Then I will tell you what a knot does to rated strength. Let me say here that it cuts a minimum of 25-30%.

WEBBING

Webbing can be stronger than rope, especially around bends because of the layout of the fibers. All in a row, they can bend almost equally around that test bar, or our karabiner. Any differential load across the width of the webbing will weaken it, though. There are drawbacks. Almost all the fibers are exposed to abrasion and sunlight. Webbing is generally weaker than it appears. It is also less elastic and cannot take shock loads as well. So be more conscientious about routinely replacing webbing hang loops.

KNOTS

Four knots are commonly used on harnesses and suspension loops. To end a suspension line in a loop, a Bowline is used. It locks the loop, is easy to untie for adjustment, and is strong. (Figure 2) Usually no one uses an overhand safety with this knot, for the same reason no one wears seatbelts, I suppose. When not under tension, **it can come undone** by itself. The Strong Bowline is a little stronger and comes with or without an alternate type of lock. (Figure 3)

The Double Fisherman's knot is the best for tying a loop of Perlon rope. (Figure 4) It is very strong and is self-locking (and hard to undo if you really yank it tight before getting the loop the right length).

When tying a loop of webbing, use the Water Knot. (Figure 5) This is just an overhand knot with the other end of the webbing tracing the knot backwards. It is strong, and does not come undone.

All knots bend rope, weakening its load capacity. Some knots are more gentle than others. All the knots I have mentioned are better than most:

Bowline: 65% rated strength

Strong Bowline: 70%

Double Fisherman's: 70%

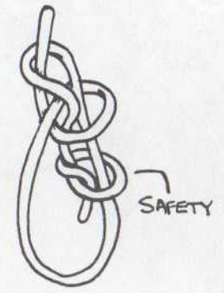
Water Knot: 65%

This means, in the case of the Bowline, that a rope with this knot in it will carry only 65% of the load that a straight section will (or 65% of the rated strength listed in your favorite backpacking catalog).

Let me end by noting one other "weak link." If your karabiner fails, and you fall free, you have also just been separated from your parachute, which uses the same karabiner. Answer: tie a small loop of Perlon through the bridle end loop and the main harness suspension loop. Tie that bridle to the top of your suspension, and bad karabiner or not your chute is still there to help. Ah, sweet redundancy.

Notable Reference: *Mountain Search and Rescue Techniques*, W.G. May, Rocky Mountain Rescue Group, Inc., Boulder, CO., 1973.

Figure 2: Bowline with Safety



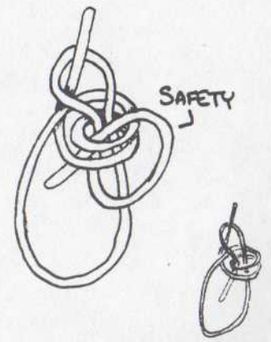


Figure 3: Strong Bowline

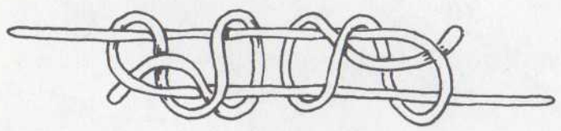
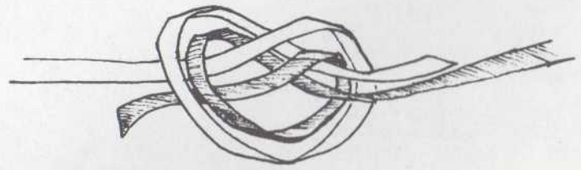


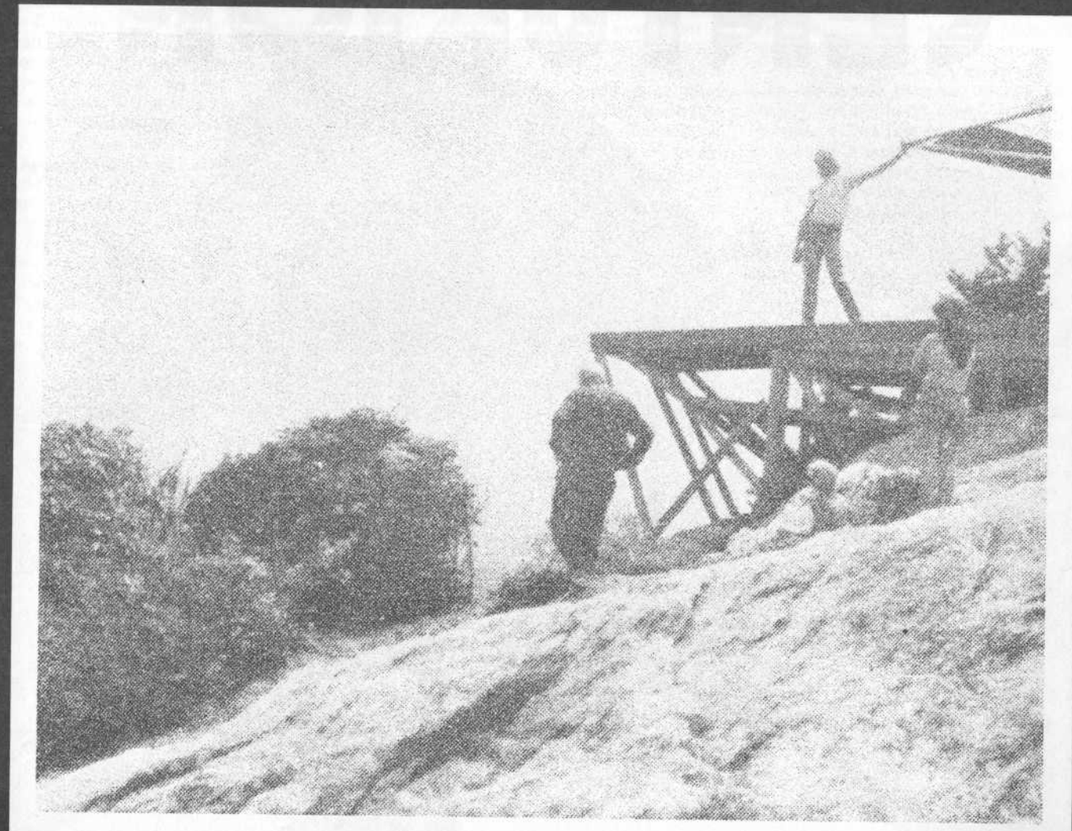
Figure 4: Double Fisherman's Knot

Figure 5: Water Knot



THE MAGAZINE OF TOMORROW

FOR THE PILOT OF TODAY



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CENTURION

by Neal Harris

The first Centurion I saw was being flown on a trike at the Phoenix Arizona Ultralight Air Race. The aircraft really caught my attention then, because it was obviously the fastest trike/glider there, with only a twin Chrysler Soarmaster unit powering it. I had asked other pilots about it and received the general opinion that the sailwork was great, but the hardware was not so great. At the time I did not get to inspect it because the Chrysler unit failed and the group with the Centurion was packed up before I had finished flying. I had liked the way it looked in the air, so when *Whole Air* asked me to do the evaluation of the glider, I quickly agreed.

My first impression of the glider came when I picked it up. The Centurion is noticeably lighter than other double surface ships. The second little surprise came when I pulled out the control bar. It assembles somewhat like a Raven, but none of the cables detach. Having never owned a Raven, I promptly tangled the cables and tubes. After a little practice, this was not a problem. The attach point of the control bar lets the rest of the frame flop to one side when the leading edges are together. Holding the frame upright and spreading both leading edges a little keeps everything upright. The wings then spread like any other floating crossbar ship. Then the kingpost is tensioned on an over-center lock, pinned by a clevis. The set up pattern then deviates a little bit in that only the first four ribs (from center out) are put in and tensioned. The tensioning is done by a velcro flap. The crossbar is then brought to the kingpost by reaching in the sail and pulling it down. Again, procedure is a little different, because the crossbar is held in place by a half inch diameter tube hinged at the nose and pivoting on a strap from the keel near the heartbolt. The sail closes with a zipper, velcro finishing up around the crossbar retaining strap. Then the remaining ribs are put in and tensioned. The last rib is bent down for the diffuser tip. This bent rib is a great conversation piece in the set up area. The winglets plug into the leading edge tips with a looped cord on the sail holding up the trailing edge of the winglet, then doubling as a defined (washout) tip. The completely assembled Centurion is definitely different, whether from close up or from a distance.

The majority of the hardware is stainless steel plate cut to shape and bent into channels and brackets. The arrangements are different but airworthy. Several of the nuts and bolts at various places in the frame are set up such that when the nuts are fully threaded on, the bolt shank is still loose in the frame. This lets the pieces shift as necessary. This seems satisfactory on a glider, but motorizing this frame would be a mess with vibration causing a lot of damage.

The ground handling was easy, the Centurion being light with good static balance. The control bar is large, so a small person might have some problems.

Launching was very easy, the balance and tight wires making it feel very solid. The Centurion took some familiarizing in order to be turned properly. Fans of trunk tip hang gliders will like it because that is what it felt like to me. A lot of movement is required to initiate turns, sometimes using all of the large bar, but the effort really is not any greater than required of other state-of-the-art gliders. The initial roll rate is slow, but the yaw really can come around quickly once started. In yanking the glider around, to experiment with various turning methods, I have never experienced any hesitation, adverse yaw, or other poor traits. The Centurion seems to need a roll input first, then a moderate push to bring it around. The control predictability is very good, as it rolled out of the turn a little easier than it goes into the turn. The very light pitch pressure alarmed me at first, but after talking with the designer, Chuck Stahl, and others having contacts in the HGMA, sorting out the rumors from facts, I rather enjoyed the lighter pressure.

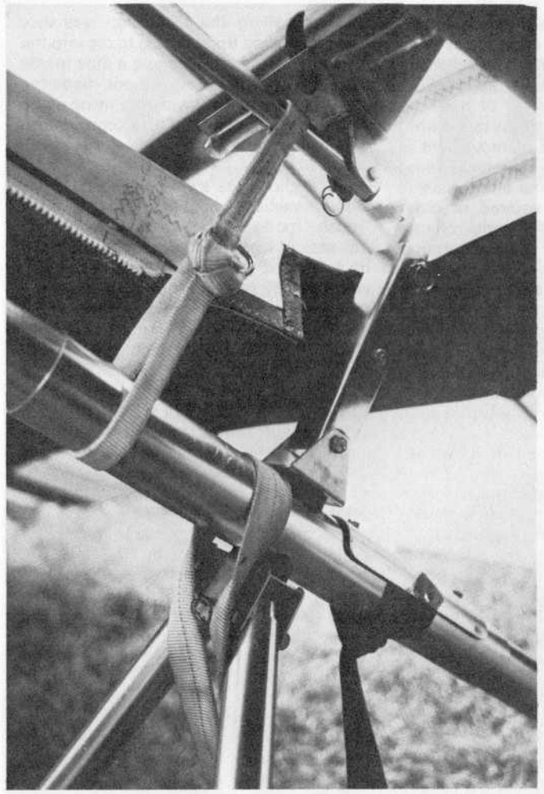
So far I have tried to be objective in this evaluation, but something in the performance of the Centurion amazed me. For all you sink rate enthusiasts, who like to sit on top in ridge lift, this aircraft might be The One. I am of the opinion that a properly trimmed Centurion with a pilot who is wired into it, will outsink a 185 Comet. The glide angle and speed range matched the Comet in side by side dives in some informal races. I would next like to match up against a Sensor 510.

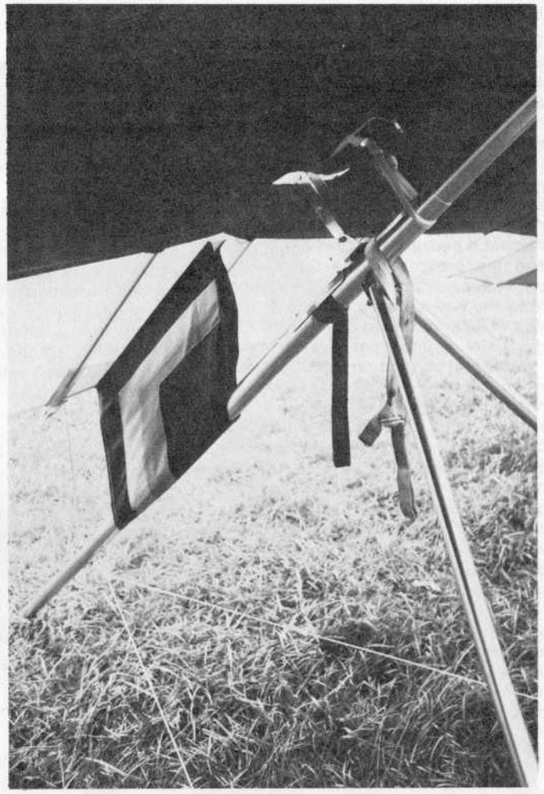
Thermalling the Centurion was very easy, the inside tip seeming to dig into the core and stay there. Staying a little inside the turn with moderte push out, made the glider stay in the 360 with no yawing of the bar needed. The ease of turn coordination plus the sink rate made the glider climb very quickly.

The glider has a very clean stall break with immediate recovery. It will hold a "mush mode" with only a moderate increase in sink rate before stall occurs. If in a bank, it will break towards the low wing, quickly yawing around into a straight mush, again with immediate recovery.

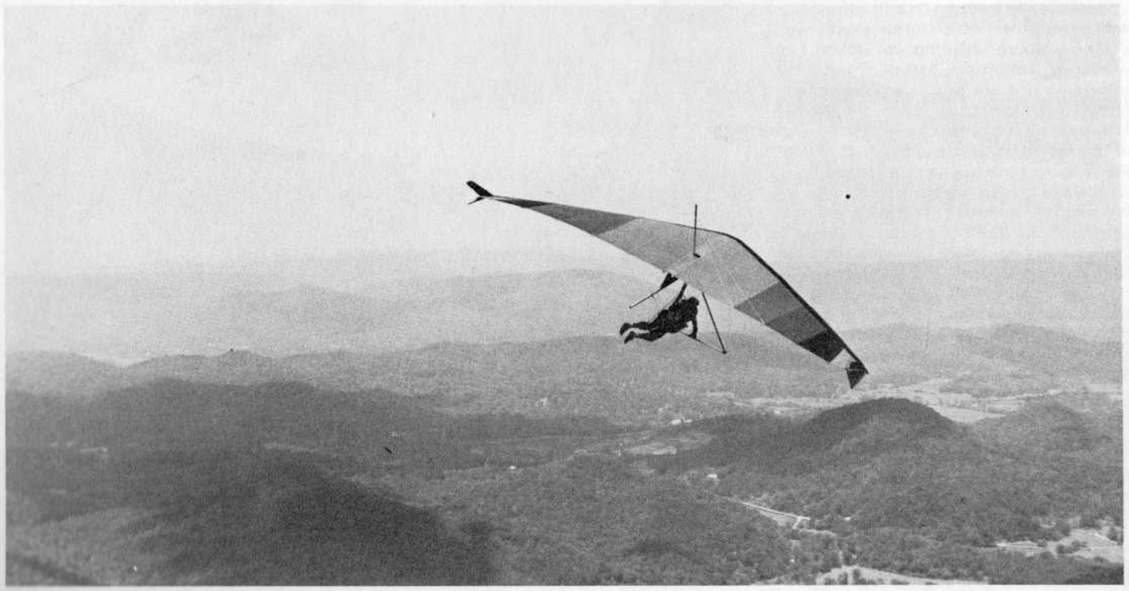
I am not known for my graceful landings in double surface ships. Yet I never dropped the Centurion. It does not seem to want to parachute, but the nose will stay up at a variety of speeds. Flaring a little soon just seems to stuff the keel a little harder. On my last landing before writing this, I came in too slow and ran out of everything at about ten feet above the grass. I flared hard and took a few steps just to keep myself upright because my forward speed stopped so abruptly. The nose still stayed up. Flaring at the correct speed and height in zero wind results in three to five steps with no part of the glider touching the ground.

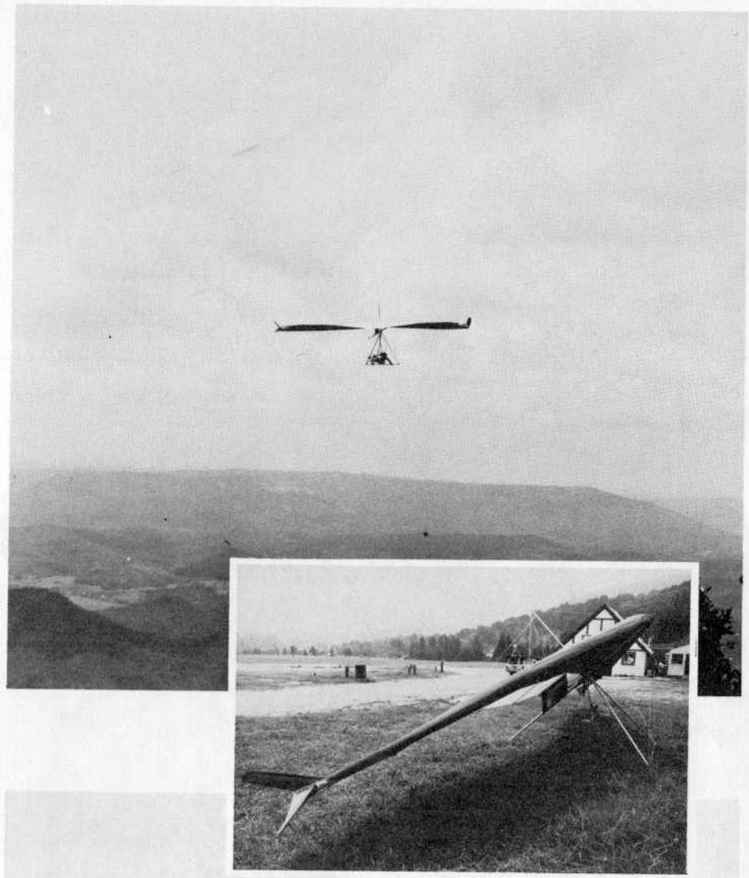
I would recommend the Centurion to an experienced pilot willing to be unconventional. This is fitting as I just learned a close friend (as unconventional as they come) is flying one in the Nationals. The Centurion should fly well in all normal situations. §

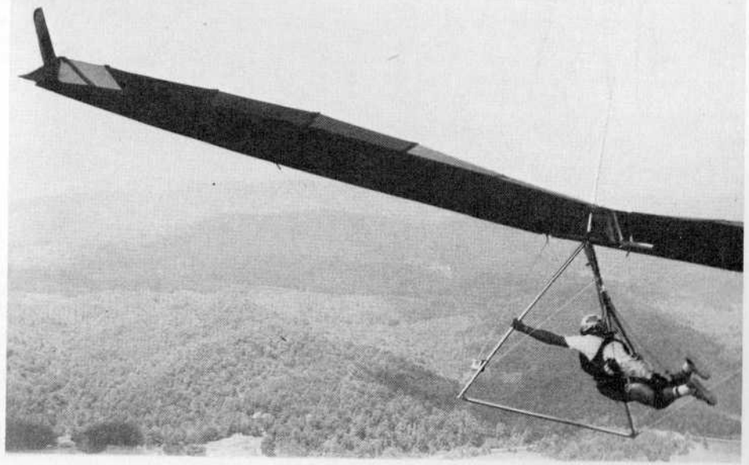




(This page) Center structure and crossbar attachment on this Centurion 165/BJ Schulte. Staff photographer BJ Schulte flies for the camera/Starr Tays. (Opposite page) Trailing edge and wingtip views of the unorthodox Centurion/Photography by BJ Schulte and Starr Tays.







The following communications were received in Whole Air *offices regarding the Centurion and HGMA action after its initial certification.*

(June 9, 1982) Minutes of HGMA Review Board Meeting.

The HGMA Board voted to declare a "question of compliance" on the Centurion 165.

This action followed a report from the European HGMA liason to the DHV (German certification board) that the Centurion had failed a European drop test.

The question of compliance action involves the verification of the accuracy of the record of compliance for the glider in question. The results of this process will be published upon completion of the question of compliance action.

The certification for the Centurion 165 will remain valid until and unless the HGMA Board finds that the record of compliance is inaccurate.

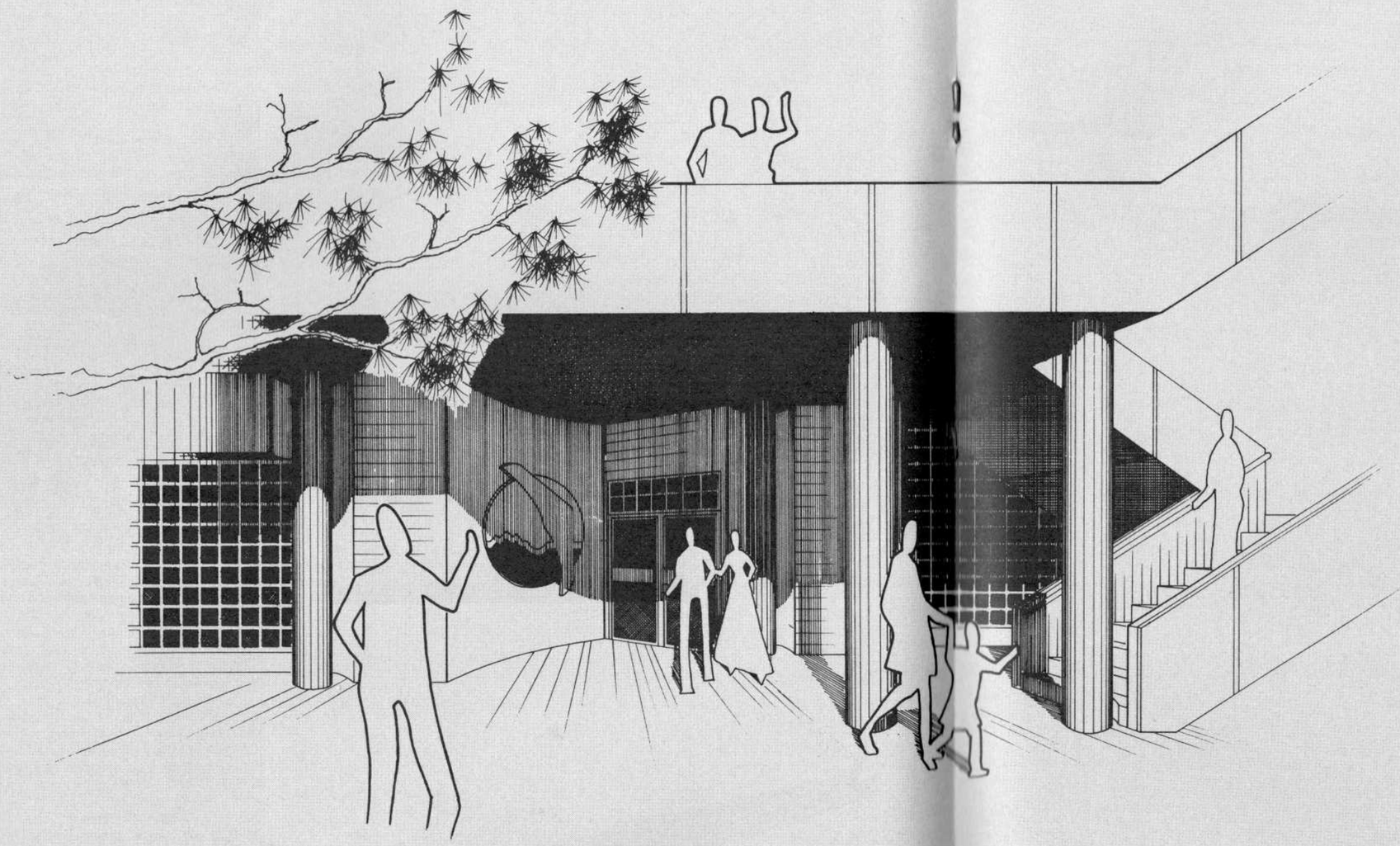
Mike Meier,

(August 25, 1982) HGMA Board of Directors Meeting Minutes.

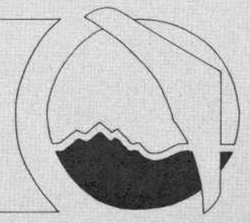
The HGMA Board of Directors has reviewed pitch data for the Centurion as part of the question of compliance procedure. These tests were performed by Dick Boone and Mark West on a Centurion supplied by Chuck Stahl of Sport Aviation. This glider was the originally certified configuration, (without bottom surface battens). This glider passed the current pitch test requirements in this configuration, and the Board voted to accept the test results as demonstrating that the Centurion, in its originally certified configuration, is a certified glider.

During the course of this investigation, the Board was made aware that Sport Aviation has been producing a Centurion with several modifications, including lower surface battens and larger winglets, and the Board has determined that an addendum will need to be filed for this configuration before it can be considered to be a certified glider. To date no addendum has been filed, and, as a result, the Centurion in the new configuration is not certified.

Chuck Stahl of Sport Aviation has also informed the Board that flattening of the camber in the ribs of the Centurion can lead to a loss of in-flight pitch pressure. The Board wishes to point out that a glider which does not exhibit a tendency in flight to return to a specific trim angle of attack and speed is not in a certifiable configuration.



paradise valley flight resort



Text and Renderings by Gary Braun

Students in the fifth year of architecture at Montana State University are required to pursue a thesis project. The thesis project, which spans two scholastic quarters, is independently carried through by the student and is more or less the essence of some idea or theme applied to architecture.

When considering the alternative topics for my thesis, I did not want just another conventional thesis with another conventional building type. I needed a topic that could really motivate me, a topic that was challenging, innovative, and different.

Approximately 30 miles from MSU is a beautiful place called Paradise Valley. Within this valley are six soarable sites located within a five mile radius. (See *Whole Air* magazine, June 1980, for a report on Montana's flying sites by Dan Gravage.) Having flown in Paradise Valley in the years prior to my thesis, I became convinced of this valley's potential as an attractive flying area. Some outstanding flights have been made and much of the area's potential remains untapped. The valley is becoming noted for its cross-country, four digit altitude gains, and smooth inland soaring. One local is determined to fly 200 miles this summer! I also noted the apparent success of Crystal Flight Resort, Kitty Hawk Kites, and other hang gliding schools becoming established throughout the country. So when the time came to choose a topic for my thesis, a flight resort in Paradise Valley seemed to be the best answer.

A small problem existed in convincing my advisors on the idea of a flight resort as

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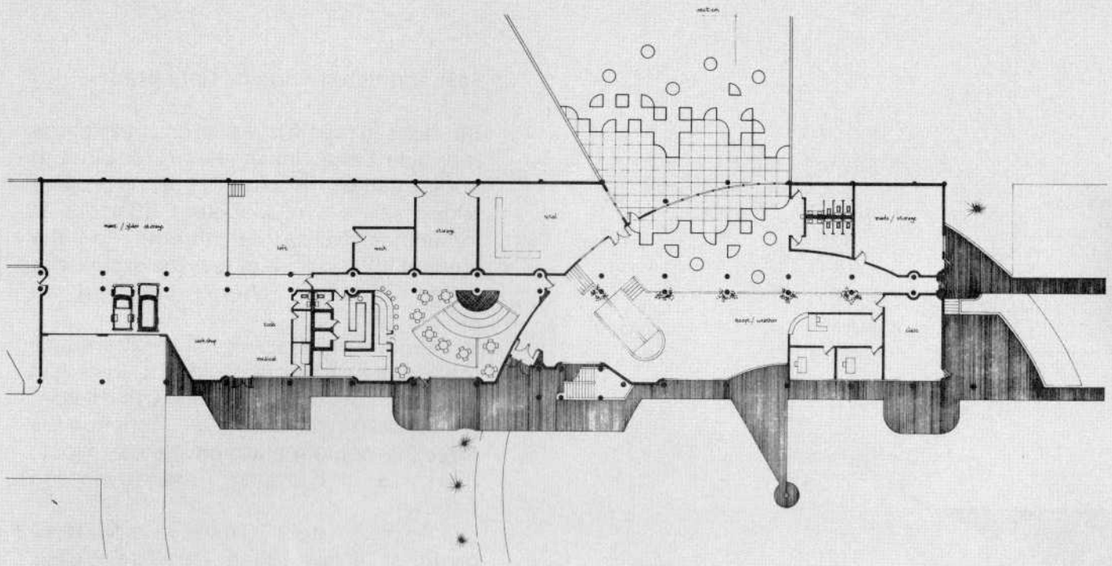

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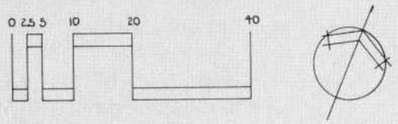

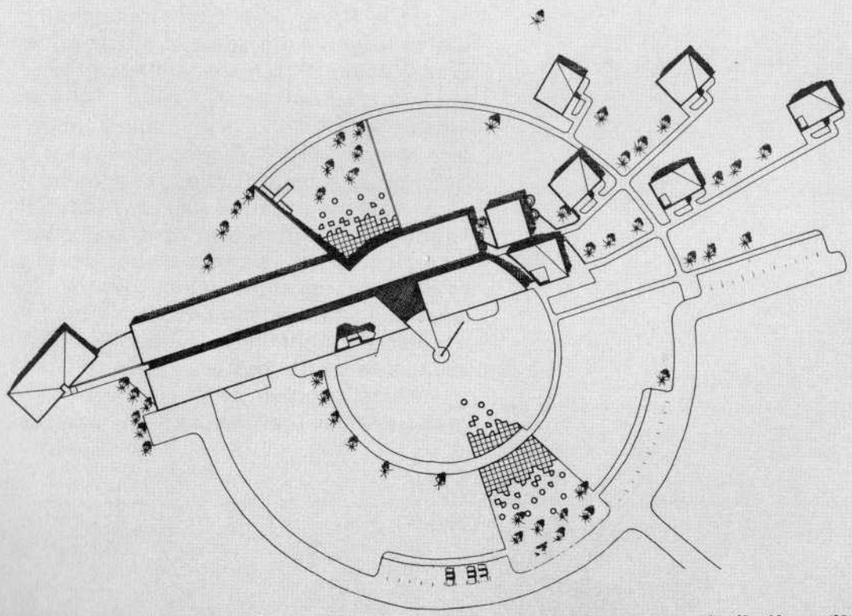

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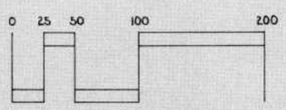

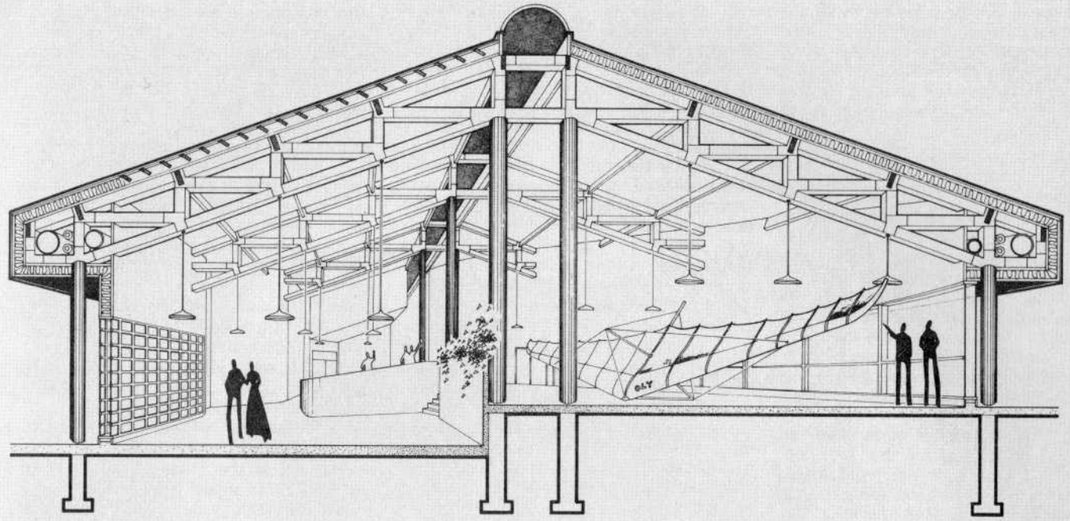

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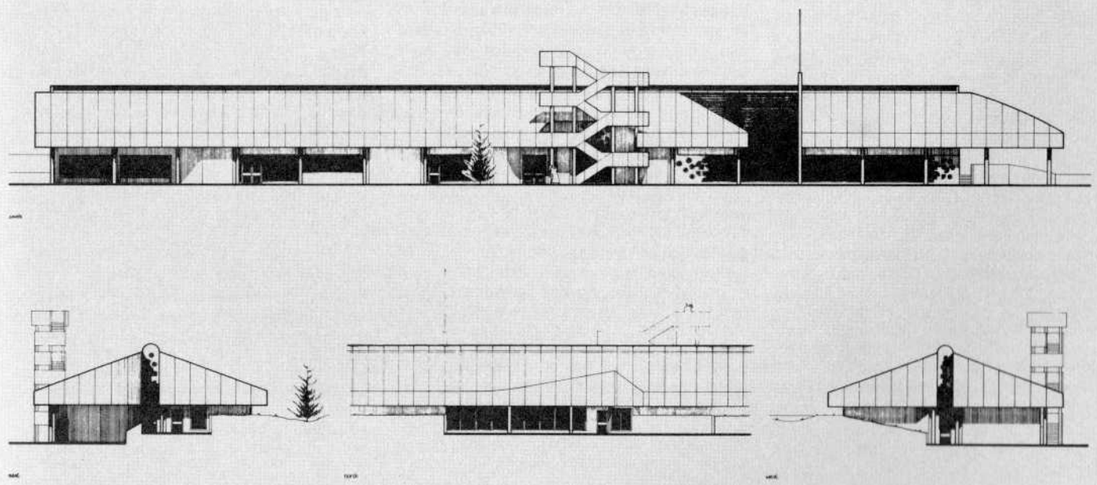

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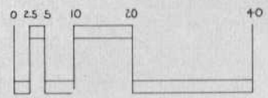


a potential thesis project. They were naturally reluctant because no reference material was available for the conception of a flight resort. The matter was eventually settled, with the agreement that I would also research the state of the art passive solar concepts and apply one of those concepts to my design.

After the go-ahead, I sent letters to various schools and facilities asking them to respond with their thoughts, feelings, and philosophies of what a flight resort for hang gliding should be. Some responses were more helpful than others, but it was a good starting point. While working on the project other students in the architecture studio would occasionally ask how my "bird house" was going, while my flying buddies referred to the thesis as a "diver ranch." Aside from this verbal abuse, the project went well and turned out to be a successful endeavor.

The thesis got a lot more than the words "hang gliding" in the Arts and Architecture Library. It also contains: a brief history of the sport, including events, philosophies, and facilities the sport has created; an up-date on Montana's tourist industry with a philosophical view point on tourism; a study on the history and regionalism of Paradise Valley; a study on the alternatives of passive solar systems; a complete climatological analysis of Paradise Valley; and the problem, needs, and programming agenda an architect might find useful for the development of a flight resort.

Before beginning to design the facility, I developed a program of required spaces. The spaces were analyzed with respect to their size, function, and relation to adjacent spaces. Certain architectural and design goals were also established for the facility. These goals were satisfied through design concepts which created the facility's image.

At this point, it should be mentioned that the paramount objective of architecture school is to develop the student's design concepts and theories. The economics of staying within a set budget is considered, but not to the extent of an actual commission in a real design firm. So if this project seems a little extravagant, it is because I was dealing with an open ended budget and, more importantly, the development of my design concepts.

The flight resort was planned to have four major services exist with it. These include: a school for learning and promoting hang gliding; a retail shop for parts and supplies, a restaurant with a small menu, and accomodations for lodging. The spaces housing these services are broken down into categories which include: *common spaces* -- lobby for arrival and exhibits, lounge for socializing, restaurant with bar area for special events and occasional parties, observation deck for spectators and restrooms; *pilot service spaces* -- retail shop, weather service, classroom for ground school, audiovisual, seminars and clinics, medical room, and workshop; *administrative spaces* -- offices for management, reception area, maintenance and storage, maid's area, kitchen, and garage for glider storage and access vehicles; *lodging spaces* -- bunkhouse tailored for the single pilot's budget, single and double private dwellings, an owner's dwelling, and a bathhouse with hot tubs and sauna.

Ideally, the resort will be completed in two phases. The first phase will include common, pilot service, and administrative spaces in a unified facility. This will allow the resort to operate and become recognized. In time, it will expand to the second phase which will simply be the addition of lodging spaces. Ultimately, the complete flight resort will be controlled by an owner who resides at the resort. The private dwellings and bunkhouse will furnish beds, storage, and bathrooms. Having the pilots assemble in the restaurant for certain regular meals will enable them to interact with other tourists as well as the owner. It is hoped this interaction will achieve a better quality of tourism at the resort.

A facility for hang gliding should present an expression of the sport. The built form should be perceived by its users as an enviroment that is exciting, safe, and efficient. The facility must be sensitive to the natural environment and communicate the spirit of hang gliding to those individuals who experience it.

In order to make the resort as feasible as possible, passive solar energy concerns must be recognized. With the cost of space heating on the increase, an energy self-supporting building is more attractive from an economical standpoint. The wasteful use of energy in our present day built environment should no longer be tolerated. There is existing and increasing knowledge of various methods of solar gain, insulation, materials, and orientation that can be combined for an energy efficient solution.

The resort acknowledged today's energy efficient concerns by being carefully located on the south facing slope of the Hogback ridge. The slope provides north-side berming and direct solar gain through south-oriented windows. The resort can be deemed "solar sensitive" in this respect. It keeps the simple and effective concepts of direct solar gain and avoids the complexity of active systems.

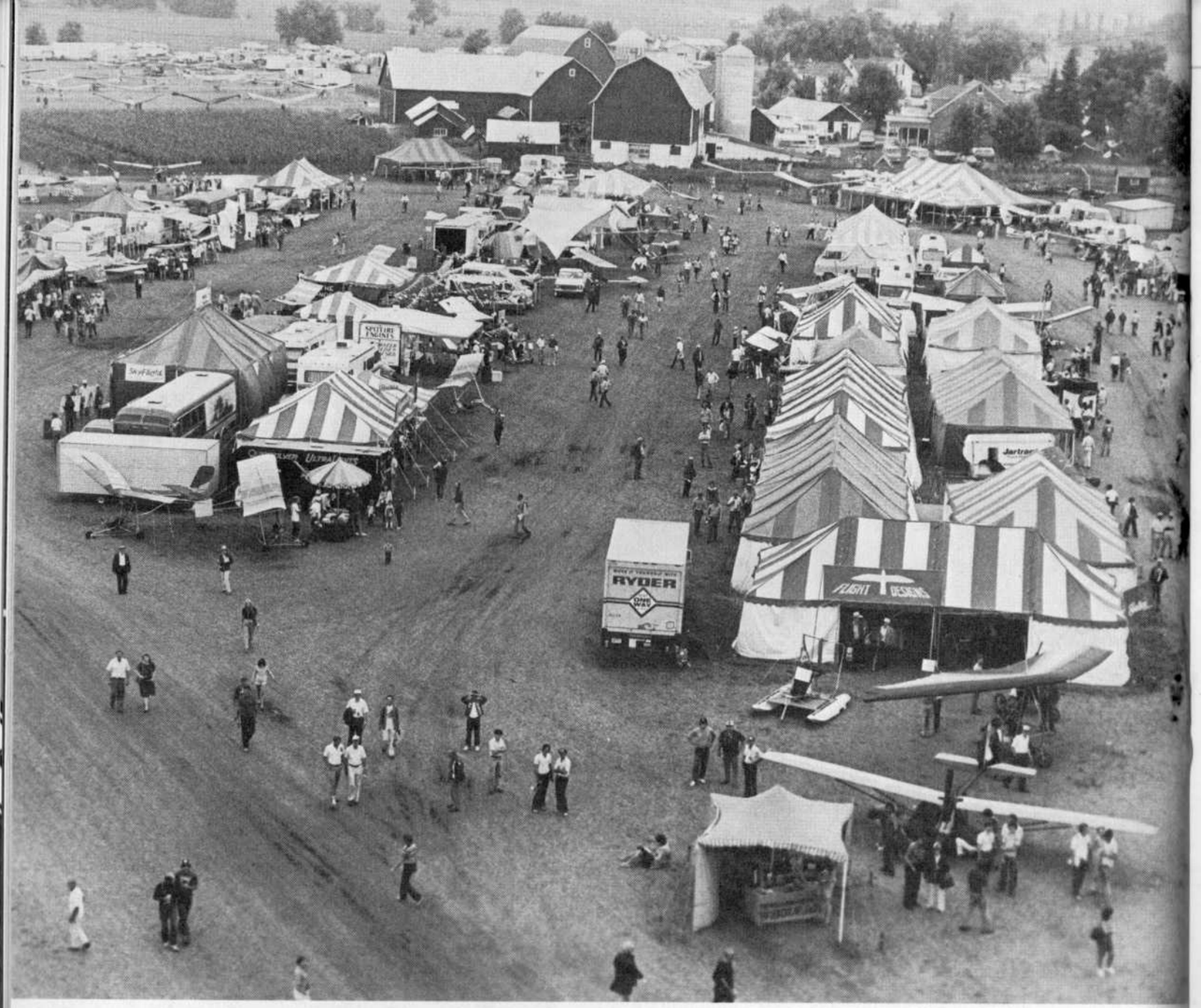
Because pilots soar above the Hogback and Paradise Valley, the flight resort would often be viewed from above. In theis case the aerial perception of the resort became an important design objective. The facility had to be visually pleasing from above, as well as from the ground.

This inspired having a wind indicator or flag pole as the focal point and ordering element of the site plan. The concentric circles around the focal point -- flag pole -- could be helpful for pilots in establishing their landing approach direction. The intersection of circular and rectilinear forms created a dynamic and interesting composition in plan. The actual buildings, landscaping, and paving within the radial plan are patterned in a progression, or more philosophically, an erosion of form. This relates to the existing fabric of the site's geology which consists of eroding rock and soil formations. Perceived from above the resort seems to be spinning centrifugally separating the built forms.

Another important consideration for the facility was its imagery to express the essence of flight. Incorporated into the design were various metaphores relating to the sport. For example, the main facility is surmounted with a "planform" truss system and gabled with a continuous skylight for a constant awareness of hang gliders skying out in Montana's big sky. The glider imagery also becomes apparent in east and west elevations. The bronze anodized metal batten roof helps accomplish the effect.

The question of a flight resort for Paradise Valley operating as a profitable investment is the most difficult part to justify. The strongest arguement for the resort's feasibility is the location of Paradise Valley. The Valley is located between Livingston and the north access to Yellowstone National Park. A constant flux of tourists travel through the valley to and from the park on U.S. Highway 89. Mountains, designated primitive wilderness area, border the Valley and Yellowstone River runs through it. It is truly Paradise. The valley offers a large variety of outdoor activities. Some of these include: year round fishing and floating on the Yellowstone River, hiking, horseback riding, cross country and helicopter skiing, snowmobiling, and Chico Hot Springs. These activities are not only attractive to the tourists, but also as an alternative activity(ies) for the pilot on non-flyable days. On flyable days, a 10 mile flight from the Hogback to Livingston happens often. I also feel "the reality" will become even more attractive in the future as hang gliding becomes more popular with safer teaching methods (Crystal's simulator, for example).

For now, the resort is only paper architecture and will probably never happen. The project was awarded and "A" and satisfied the requirements to receive my Bachelor of Architecture. If the resort becomes reality, my dream is that the pilot will be in a place among friends and not just another tourist. Also, that the tourist would desire to experience the flight resort as a dynamic built environment in which to stay and enjoy the Paradise Valley. It may sound contradictory, but my hope is that the flight resort will never become a reality and that the commercialism of the Valley is kept to a minimum, allowing the panoramic splendor of Paradise Valley to remain untouched forever. The Valley should always remain a very special place to fly as it has always been. This project for a flight resort is by no means an end in itself. The needs for developing this type of facility will perhaps evolve as dynamically as the sport of hang gliding itself. §



CONVERGENCE AT OSHKOSH

by Dan Johnson

Last year at EAA's gigantic Oshkosh convention records show 32 exhibitors displayed their wares in the ultralight section. This year the number was still rising as the 80th company arrived.

The obvious growth came from even more copies of existing designs. No one was surprised, but you had to wonder just how far the elastic would stretch. Some clever new designs were displayed by companies or individuals that few recognized. So, of course, speculations were voiced questioning the ability of these newcomers to survive in what has become aviation's most fiercely competitive marketplace.

Other persons attended as observers. In a few cases these fellows have known credentials, and the more perceptive of the ultralight veterans pondered their presence carefully.

But mainly, the group of participants already knew each other, at least from the Sun 'N Fun convention some 4½ months earlier. In this passage of time, not a great deal has changed.

Of course, the prime selling season also occupied this period, and new creations took a back seat to the stepping up of production, marketing, and problem-solving. But one factor definitely changed.

Perhaps the FAA feels that major airshows are good times to announce things like impending regulation. It seems FAA's German counterpart (the LBA) felt so, issuing their country's rules at the world-class Hanover event. When the FAA's Mike Sacrey, Art Jones, and Ken Peppard did so in a Forum tent, their "de-regulation" announcement was given to a Standing Room Only crowd.

Just how do the threads of FAA regulation, design changes, and new observers weave into a fabric which may affect the pilot community so dramatically?

Think about this. The regs, or de-regs, call for only five basic requirements to define an ultralight vehicle. It must weigh under 254 pounds, hold no more than 5 gallons of fuel, be single place, have a max stall speed of 24 knots, and a top speed (level flight, full power) of 55 knots. Pilot enclosures are acceptable and foot-launching has gone the way of the wringer washing machine.

So if a designer is allowed to build an extra clean machine, fairing in pilot, gear, and anything else he likes, YET the craft is limited to 63 miles an hour... what could possibly come of it? True *SOARABILITY*!

Having left out the new observers from this discourse, it is now more meaningful to say that two of the observers were from the two largest hang gliding manufacturers. Hmmmm...

Oh, it's true, two things are true, actually. One is that certain designs on the market today (Kasperwing, Nomad, JetWing, among others) have aimed at some genuine soaring potential, In strong enough lift, any ultralight, even some general aviation airplanes, can soar. But here we refer to more common soaring conditions, where one uses marginal lift. The second thing is that the majority of present ultralight pilots do not give a hoot about soaring potential. Hence, manufacturers have not tried to produce soarable designs. It is a smaller market.

Still, a clean design that has a speed limit, will be much more likely to possess soaring qualities. And still, some talented people from the existing hang glider soaring scene are looking at the explosion of interest in ultralight aircraft. Add to this that many ultralight manufacturers have the ability and physical plants to produce high quality machines. In fact, as we view it, a full sized convergence situation is building.

Add in one more fact. Towing of a soaring machine by an ultralight aircraft seems to be picking up energy. At last year's Oshkosh, all watched with interest as Pterodactyl's Jack McCornack towed up an engine-less Pfledge. A few had heard of this activity, but almost no one had seen it performed. Now, the list of machines exploring this air-towing includes Pterodactyl, Quicksilver, Eagle, Foxbat, and JetWing. We have learned of successful experimenting in Florida, California, Texas, and Michigan. The light remains bright green, with all efforts bringing positive results.

All the fanfare trumpets the dawning of yet another new period in aviation. The

Continued on page 39

BEST NEW DESIGN

Chuck Slusarczyk's Hawk took the Best New Design Award, again. CGS Aviation had this honor at this year's Sun 'N Fun as well, and they are tickled sky blue over this applause from judges. In fact their entry looked sufficiently slick to take Reserve Grand Champion as well.

Since we had the opportunity to fly the Hawk at nearby Fond Du Lac airport, we can see why the airplane pilot community is so enamored of this machine. "Gosh, it flies just like a little airplane!" And it should; it is one. Cruising at 50-60 indicated, we put it through its paces, turn coordination, stall, slips, and general behavior. Its stick and rudder pressures are nice and light, climb is authoritative yet controllable. It does a mean forward slip, as it, like most slow speed aircraft, is rudder-dominated, but you hardly need the slip as the flaps (yep, flaps!) aid glide path control neatly. A cockpit enclosure and a panel of instruments can make a lightplane pilot feel right at home. We are happy to see a veteran of hang gliding manufacture making such a hit... congratulations, Chuck!

TWO—SEAT TOWING

During periods when the ultralights sat grounded due to other flying, Larry Newman and his troupe gave endless two-seat, tow trainer rides in a de-engined Eagle with tandem harnesses. Newman uses this rather than a powered two-seater, and in so doing, stays on the right side of the law. For as many dealers have found, they can use a two-seat ultralight (licensed "Experimental"), but *not* commercially. Not legally, anyway, though some very clever ideas are used to circumvent the situation.

AEROBATICS

Eipper had MX's in more colors than a paint manufacturer, all special show designs commemorating their 10th year anniversay of Quicksilver flight. Of course, as any hang glider veteran recalls, most of those ten years were spent as a glider, nearly obsoleted till an engine was first bolted to its frame. Eipper remains the leader with their sharp little airplane, and their marketing effort at this Oshkosh alone took more dollars than are spent in months of magazine advertising by most major hang glider manufacturers combined.

Eipper president, Lyle Byrum, produced EAA's first ultralight aerobatic act, putting his all black MX-Super through a series of loops, barrel rolls, hammerhead stalls, and slow but sure snap rolls. Done with red smoke and at an approved low altitude, the crowd had an excellent view of the demonstration. Byrum had plans to compete in the International Aerobatic Club contest at Fond Du Lac directly following Oshkosh. Still, the company stresses pilots without aerobatic training do not attempt these maneuvers in their stock ultralight.

BALLISTIC CHUTE

Flight Designs designer, Tom Peghiny, drew attention to the company's new three axis machine, the Flight Star, by firing/deploying their soon available ballistic parachute system. A most impressive display, the enormous 29 foot canopy left its mortar tube launcher like a surface-to-air missile, literally exploding to a full deployment in something fast, like a second and a half. This all was more notable as the craft was on the ground traveling at 15-20 mph. We can only wonder at the speed of deployment at flying (or falling) speeds. The product is due for release this year and we will provide facts and specifications as they are available.

AG-PLANES

Several companies (Rotec, Mitchell, Lazair) had ag-plane versions of their models, fully outfitted with crop spraying hardware. The operational area has been given a provisional "OK" by the FAA so long as the farmer sprays his own crops with the craft.

AMPHIBIOUS

Amphibious operations were given more credibility as two firms displayed wares for land and water use. Sealord floats had a sophisticated hydraulic system which can be added to any ultralight. Their quality floats contained main gear in watertight compartments, with pump handle and valves in reach of the pilot. Interest was good and these should get on the market this year following final developments. Another amphib which got good attention was the XTC (Pronounced ecstasy). This machine is basically a flying boat which has retractable wheeled gear. While seemingly underpowered, the builder will now likely up the engine size as the new regulations permit more weight than designers anticipated.

TWO-SEATERS

Two-seaters were abundant, listing Eipper, American Aerolights (towed only), Tomcat, Mitchell (a homebuilt which the factory *closely* examined), Airmass' Sunburst, Lazair, Hummingbird, Wizard, and Rotec. The new regs, of course, still classify these as aircraft, but with pilots taking to ultralighting in good numbers, interest was great for two placers. It is easier to justify the expense and time investment if one can buy an ultralight which will allow a wife/girlfriend to go along as well.

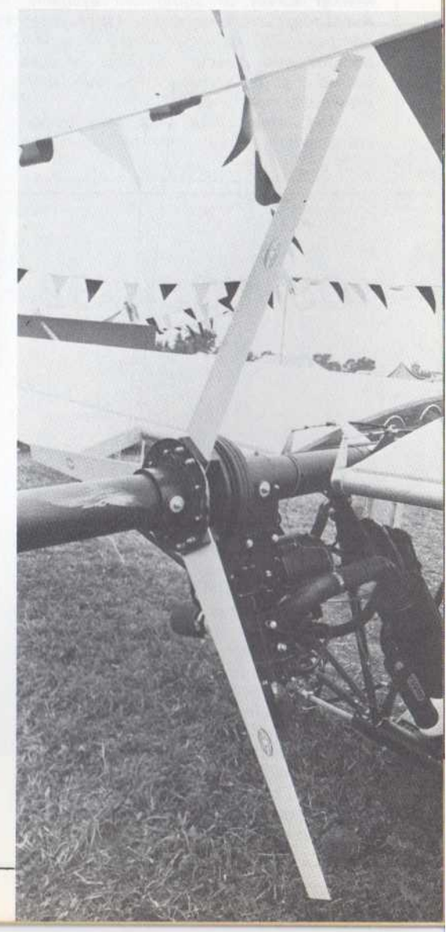
NEW DESIGNS

Several other designs presenting new ideas are worth mentioning. The Sadler Vampire is a ship with all metal flying surfaces, conventional controls, and clean lines. The Firebird Flyer has a unique shape and a sophisticated tail boom assembly with the propeller in-line, or rotating around the boom. Another was the XTC mentioned earlier. A new trike manufacturer was seen at LEAF's booth. An entry which crosses Foxbat looks with other trike ideas is available for any hang glider, using LEAF's quality craftsmanship and custom fittings. We will have more on this entry in a later issue.

There were, as expected, more copies of existing designs, the most common being those similar to the 10 year old Quicksilver, but one (Pegasus) like the Eagle. As has been said, imitation may be the most sincere form of flattery, but can a newcomer do better than the established original manufacturer? They can offer a price advantage, but overall, time will tell the story best.

OSHKOSH '82

(This page) Clockwise from top — Pilot enclosure on the Kasperwing, Teratorn TA (Three Axis), & LEAF trike. (Page 41) Clockwise from top — CGS Award-winning Hawk and test pilot Terry Fuller, Firebird's in-line drive system, Whole Air booth in the ultralight area.



Continued from page 37

ultralight sailplane is arriving! And the aerodrome featuring ultralights towing up ultralight sailplanes, a sort of miniaturized rendition of airplanes and "proper" sailplanes, is an intoxicating scenario for the soaring and ultralight enthusiast alike.

For you see, on one side, here comes the likes of the Arrow from UP Sports, a new ultralight sailplane from gifted designer, Roy Haggard (one of the observers heretofore mentioned). Roy and UP Sports are a strong force of innovation in design as witnessed in the on-going success of their Comet glider. Also, Sensor 510 designer, Bob Trampenau has an ultralight sailplane design. His dates to 1974 and was shelved for more portability, but can now be revived and enhanced using the skills learned in eight years of producing what many regard as the most aesthetically pleasing hang glider on the market. Assuredly not last is the Wills Wing design team of Meier and Pearson, active always with new projects. So, it is poignant to know that the other observer mentioned earlier was Rob Kells of Wills.

Another fact points to greater activity in designing/building ultralight sailplanes. The general aviation pilot community has been the target of most ultralight manufacturers' advertising for some time now. The plethora of three axis machines tells this most definitely. But even that seemingly vast audience (about 700,000 license holders) is a limited resource. One day marketing efforts will and must return to the general public. If the ultralight-towing-ultralight-sailplane facility was available, it could be one avenue to pursue the general public. Obviously, ultralight sailplanes will cost a good deal less than their powered cousins, construct and assemble more simply, and have much lower operational cost. When

Continued on page 42

THE DEREGULATION OF ULTRALIGHT AVIATION F.A.R. Part 103

It is a rule which is not a rule. Given legal status by not *regulating, the new Part 103 calls for five basic parameters which then qualify a flying machine as an ultralight vehicle.*

1- It must be single place and used for sporting purposes only.

2- Maximum weight must be 254 pounds.

3- The most fuel which can be carried aloft is 5 U.S. gallons.

4- Top speed is limited to 55 knots, or 63.29 miles per hour (or 102 kmph).

5- Maximum stall speed must be 24 knots (27.6 mph or 44 kmph).

The new rules were forecast to become published 16 days after the forum tent announcement on August 2nd.

The 254 pound (115.2 kilograms) weight limit is defined as dry (no fuel) weight, and safety equipment (parachute recovery systems) or floats do NOT *count in the total weight. They arrived at the weight, not by relating pounds to metric kilograms, as had been done earlier, but a market survey of equipment available. Averaging current weights and speaking to company officials about where their new designs were headed, distilled the 254 pound figure, a higher number than previously mentioned.*

The speed limit was said to be considered to be important by FAA Administrator Helms himself, as the recreational impact of ultralights indicate that high speeds are not needed.

HANG GLIDING

Hang gliding does *fall under the new Part 103, but in similar fashion, the rules define the craft (legal acknowledgement) yet do not truly regulate construction, design, licensing, or operation. So long as the craft is indeed non-powered, and weighs under the one-time figure of 70 kg (155 pounds), the vehicle is called a hang glider and not further encumbered with regulation. The positive self-regulatory effort of USHGA aided this decision and likely also helped secure the self-regulation opportunity for powered ultralights as well.*

An inspection of each vehicle, powered or not, is not *required, as the factory can deliver compliance information, much like the foot-launching documentation. But if the FAA uncovers violations, a program of spot checks will be imposed. The design criteria of an ultralight is not what is important, only that it fits the qualifications, so new ideas are not at all stifled. Further, no certification or registration of pilots, or FAA medicals, are required but this* must *be policed internally to assure safe operations.*

Beyond these highly simplified rules, just the adherence to Part 91 Operating Limitation rules are mandated, and most pilots have already used and followed these guidelines. A quick review follows:

1- Do not create a hazard to persons or property on the ground.

2- Daylight operations only, that is sunrise to sunset. A 30 minute extension before sunrise or 30 minutes after sunset will permit operations if *anti-collision (stobe) lights, visible for 3 miles, are installed, for uncontrolled airspace* only.

3- You must maintain vigilance of other aircraft with powered machines yielding to unpowered.

4- Do not fly over "congested areas," a phrase purposely left somewhat vague. This benefits ultralights, for example, "congested" to a 747 airliner may not be "congested" for an ultralight.

5- Do not fly over an open air assembly of people.

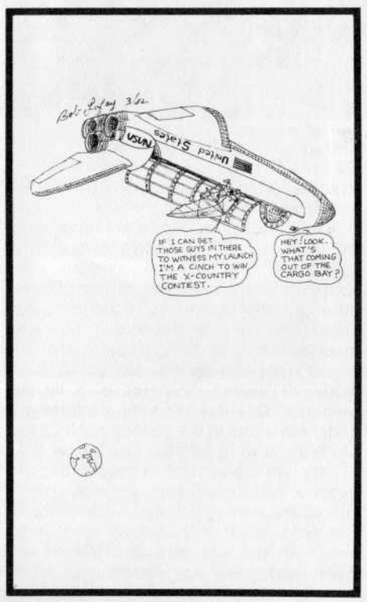
6- ATC (Air Traffic Control) authorization is required to enter, a) Airport Traffic Areas (ATA), b) Terminal Control Areas (TCA), or c) Positive Control Airspace (PCA).

7- Prohibited or Restricted Area operations require an OK from the controlling agency.

8- You must remain in visual contact with the surface.

9- You must follow standard visibility and cloud separation standards.

OSHKOSH '82



they evolve into two seaters (and the legal structure permits commercial operation), the industry may have the combination needed to appeal to the general public on a new plateau. Reviewing the German scene (see *Whole Air*, Jul/Aug '82), we see a good potential due solely to the fact that sailplanes cost less and operate more cheaply than engined aircraft. It represents a new starting point for what is frequently called "entry level aviation."

The designer talk at Oshkosh '82 was "...strut bracing.., fuller pilot enclosure.., wheel pants.., engine fairings.., more precise handling through new control surfaces.., and how to stay within those 55 knots of forward speed." All would seem to heighten soarability.

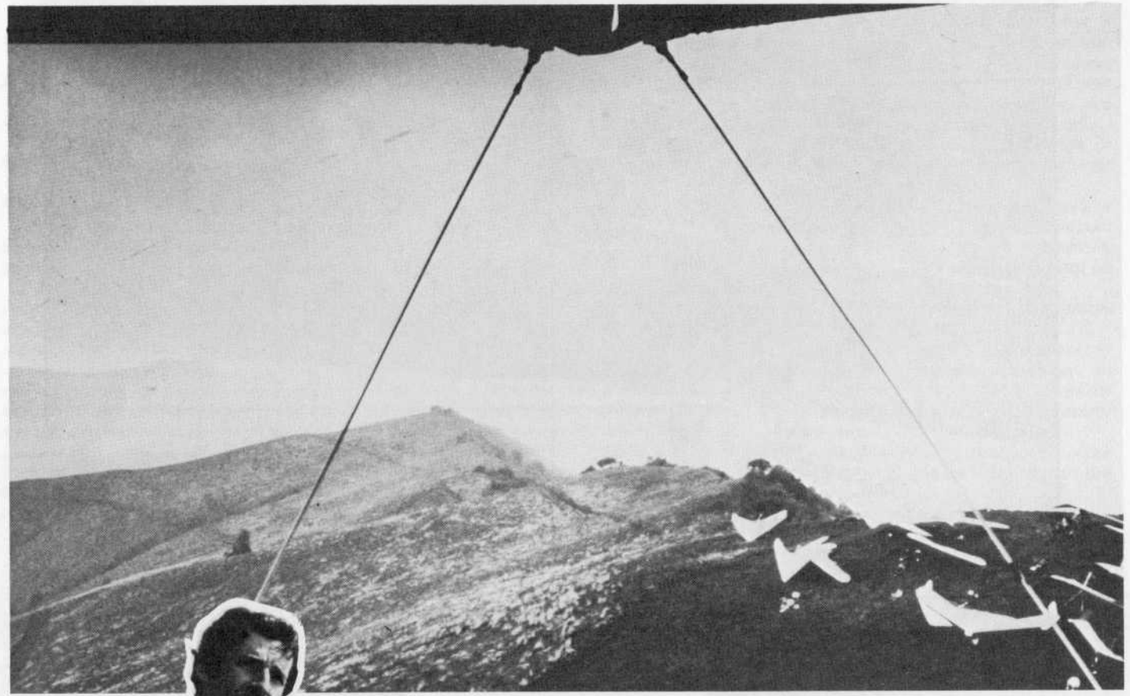
Some of the newer, cleaner ultralights could easily be altered to create a soaring model for addition to the product line. Remove the engine (and its attendant weight), simplify the cockpit to permit a center wheel foregoing the tricycle landing gear, continue the pilot fairing, and lighten the craft overall. Then, with the control system made more effective, voila!, you have the sailplane version.

You should not be mis-lead. Only a very few manufacturers are talking like this. Most are still building miniature Cessnas and Pipers. But back at the 1981 Oshkosh, we heard absolutely no one talking this way. One must glide before one can soar.

Here is one time it may not be bad to be caught in the middle. Between the UP Arrow, the converted ultralight-to-sailplane, the advancing interest from other glider manufacturers, and the changing regulations... an area exists which could easily evolve into a new region of very soarable craft. Whether foot-launchable or not; whether self-launchable under power, whether towed up by ground or air craft; whether from hang glider builders or ultralight manufacturers; the possibilities are better than ever for the soaring enthusiast. §

THE THIRD LARIANO TRIANGLE OPEN DISTANCE X-C COMPETITION

June 1-6, 1982, Como, ITALY



by Tony Masters

The Lariano Triangle open distance X-C competition in Italy has by now become a European classic. It is the most highly organized invitational competition in Europe and is proudly run by a group of friends from Delta Club Como.

In the past three editions with top cross country pilots from all over the world, high quality competition flying has always been paramount and even record breaking flights have been accomplished (Steve Moyes, 115 kilometers 1979; and Gerard Thevenot, 148 kilometers , 1982).

Geographically the Lariano Trianlge is a triangular peninsular between the two parts of the lake of Como in northern Italy. The Lake snakes around the mountains 1000 meters below and is the first obstacle one has to cross in order to reach the higher mountains of the Swiss Alps.

The take-off from Mt. Bollettone (1300 meters ASL) stands in the middle of the triangle, with the Val Padana plains stretching away to the South.

During the competition, the weather was exceptional — a pilot's dream — on the edge of a high pressure system we had consistent unstable conditions developing northwards, ideally suited for open distance flying.

Each day we had light southeast winds which meant most of the flying was straight north-northwest, into Switzerland. In fact everybody was obliged to fly with a passport and everyday there was a continuous flow of pick-up cars over the border.

Transport to the take-off was in four wheel drives up hair-raising mountainous track and usually took all morning. Then a pilots briefing with weather information preceeded the open window and the waiting game for who tookoff first. Most pilots would then rush to the bar on take-off for a quick snack commonly nicknamed as "spaghetti time."

The first day of the competition, pilots went in all directions and resulted in several flights over 50 kilometers by Angelo Crapanzano (I), Wolfgang Hartl (A), Jeff Scott (USA), Keith Cockcroft (GB), and Stefano Briccoli (I). But it was only an indication of what was yet to come.

On the second day the competition just exploded. Gerard Thevenot calls back late in the day after having accomplished a historic flight. It is the first complete crossing of the Swiss Alps in a hang glider from south to north — 148 kilometers to Walchwil, a village just 30 kilometers from Zurich. He said he just ran out of mountains, and landed on the plateau before the hills of Germany. Eight other pilots also flew 100 kilometers to the Rhone Valley in the middle of the Swiss Alps: Davide Manna (I) takes 2nd place with 105 kilometers, then comes Steve Moyes (AUS), Marc Burge (CH), Stefano Briccoli (I), Angelo Crapanzano (I), Sergio Magistri (CH), Walter Schoenaur (CH), and Wolfgang Hartl (A). The pick-up teams do an all-night shuttle to bring the pilots back to Italy.

The third day is a follow up of the second, a race to the Rhone Valley. Bob Bayer (D) flies to Laax, 107 kilometers, John Pendry (GB) 101 kilometers to Thrun, and Gerard Thevenot (F) to Sonvix, 100 kilometers .

The results so far stand with Thevenot streaking ahead with a 68 kilometer lead on Crapanzano, 2nd, and Hartl, 3rd.

The fourth day has some surprises. Thevenot is in great form, landing at Schlans, 102 kilometers (again) while Crapanzano and Hartl completely blow it (12 and 8 kilometers respectively), dropping out of the top positions. Stefano Briccoli with an 83 kilometer flight jumps into second place and Marc Burge is third with an 87 kilometer flight. Steve Moyes and Josef Guggenmos, after bad starts, are both working their way up to the top positions.

At this point Thevenot is AVERAGING 100 kilometers a day (four hours flying, four hours waiting and four or more driving back). The pick-up teams are doing all they can to cut the recovery times down to a minimum. The competition is now becoming an endurance test, almost everybody is praying for rain, and some are saying that it is tougher than Owen's Valley! Thevenot knows he must keep his lead, there are too many top competitors for him to take any chances.

The last day promises well and is won by Pendry (GB) who with an 81 kilometer flight to the Lukmanier Pass jumps into second place. Flying consistently, and averaging 74 kilometers a day, John quietly consolidated his victory.

Thevenot with a 23 kilometer flight is still the overall winner and we were only sorry to see his 100 kilometer average tumble. He was not; he was glad to get back early for once! Marc Burge (CH) with a 51 kilometer flight takes third place. The Italian team did extremely well with 3 pilots in the top ten: Briccoli (6th), Crapanzano (7th), and Manna (10th). In five days flying with 29 top pilots, more than 6,500 kilometers were flown all over the Alps, the distances driven by the pick-up teams is not known, but it took some organizing! Next year's Lariano Triangle we hope will be even bigger and better. §

FINAL RESULTS

THIRD LARIANO TRAINGLE CROSS COUNTRY COMPETITION

1	Thevenot	FR	*Azur*	420.5
2	Pendry	GB	*Magic Comet*	371.1
3	Buerge	CH	*Azur*	343.3
4	Baier	D	*Bullet*	334.8
5	Cockcroft	GB	*Typhoon*	317.6
6	Briccoli	I	*Azur*	310.2
7	Crapanzano	I	*Vampire II*	295.6
8	Moyes	AUS	*Missile*	294.0
9	Reichholf	A	*Demon*	288.2
10	Manna	I	*Comet*	286.3
11	Schoenauer	CH	*Firebird CX*	286.0
12	Hartl	A	*Flash*	256.2
13	Guggenmos	D	*Bullet*	233.9
14	Lorenzoni	A	*Duck*	225.9
15	Blenkensop	AUS	*Missile*	220.9
16	Magistri	CH	*Pirana*	213.6
17	Duncan	AUS	*Missile*	179.4
18	Gilmour	AUS	*Missile*	179.4
19	Scott, J.	USA	*Missile*	175.8
20	Sigal	USA	*Pirana*	171.2
21	Harrison	GB	*Magic Comet*	167.8
22	Masters	GB	*Comet*	165.8
23	Cirla	I	*Missile*	163.4
24	Strasser	A	*Comet*	146.2
25	Olschewshy	D	*Fledge (W.B.)*	108.8
26	Nicoli	I	*Azur*	105.8
27	Lark	GB	*Demon*	94.4
28	Pollard	GB	*Typhoon*	93.5
29	Porcher	A	*Flash*	62.7
			GRAND TOTAL	6,512.3

(Opposite page) Winner Gerard Thevenot, who averaged nearly 100 kilometers per day! — View from above 1300 meter ASL Mt. Bollettone. (Above) Jeeps were used for transportation to the launch point/All photography by Giuseppe Girola.

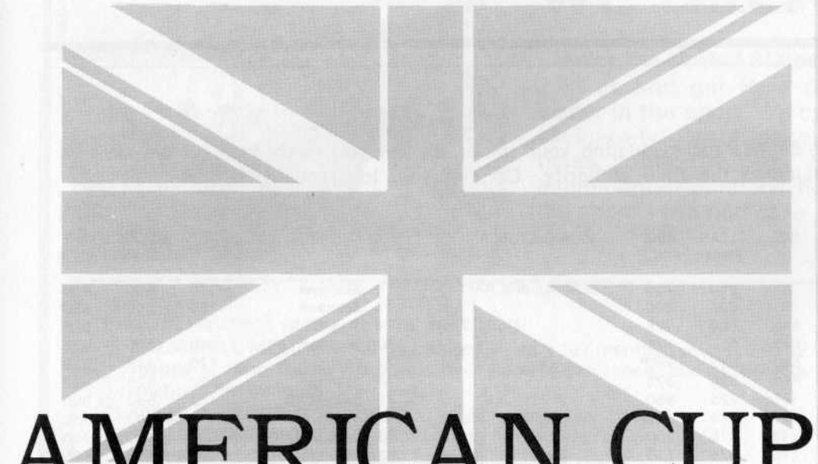
BLUEBOOK

EDITION NO. 26

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
BENNETT DELTA WING	77	Phoenix 6C	Jr.	550	450
	77	Phoenix 6C	Sr.	425	400
	77	Phoenix 6C	Reg.	500	425
	77	Phoenix 8	Reg.	650	375
	78	Phoenix 8 Super	Reg.	675	450
	78	Phoenix 12	Reg.	500	375
	79	Phoenix 6D	185	725	650
	79	Lazor I	190	775	625
	80	Phoenix 6D	215	875	700
	80	Lazor II	175	925	725
CGS AIRCRAFT	77	Falcon V	185	650	500
	77	Falcon V	220	600	475
	78	Falcon 5½	Med.	700	625
	79	Falcon 8	Med.	900	800
EIPPER FORMANCE	77	Flexi II	185	525	475
	77	Flexi III	185	575	500
	77	Cumulus 10	Med.	550	525
	78	Flexi III	Lg.	800	600
	78	Flexi III	Med.	750	600
	78	Cumulus 10	Med.	675	500
	78	Antares	Med.	775	600
	79	Antares	Med.	825	600
	79	Antares	Lg.	800	675
ELECTRA FLYER	77	Cirrus	3	600	400
	77	Olympus	160	575	525
	78	Cirrus 5	C	600	475
	78	Cirrus 5	B	750	450
	78	Cirrus 5	A	60	500
	78	Olympus	160	625	550
	78	Olympus	180	625	550
	79	Dove	A	700	575
	79	Trainer	---	400	300
	79	Cirrus 5	A	650	625
	79	Olympus	160	725	650
	79	Floater	205	775	675
	80	Spirit	200	1050	875
FLIGHT DESIGNS	79	Lancer	190	900	675
	80	Lancer	175	975	900
	80	Super Lancer	200	1025	925
	81	Super Lancer	175	1100	950
	81	Demon	175	1475	1300
HIGHSTER AIRCRAFT	80	Highster	205	1000	825
	80	Highster	190	925	825
MANTA PRODUCTS	79	Fledge	IIB	1200	1000
	80	Fledge	IIB	1525	1325
MOYES DELTA WING (U.S. MOYES)	77	Maxi I	200	700	625
	78	Maxi II	200	750	700
	79	Maxi III	200	875	700
	80	Stingray	200	725	725
	80	Maxi IV	200	825	725
	80	Mega II	172	1075	850
AMERICAN AEROLIGHTS	*80*	*Twin Eagle*	*---*	*3125*	*2875*
	81	*Eagle, Z-Drive*	*---*	*3475*	*3100*
PTERODACTYL INC	*80*	*Ptraveler*	*---*	*3425*	*3100*
SEAGULL AIRCRAFT	77	Seahawk	170	600	450
	77	Seahawk	190	550	450
	77	10.5 Meter	---	625	525
	78	Seahawk	140	675	625
	78	Seahawk	170	675	525
	78	Seahawk	190	675	450
	78	Seagull VII	162	550	500
	78	10 Meter	---	800	750
	78	10.5 Meter	---	800	750
	79	Seahawk	180	850	625
	79	10 Meter	---	825	700
	79	11 Meter	---	825	700
	80	11 Meter	---	925	850
SKY SPORTS	77	Bobcat III	Lg.	675	600
	77	Merlin	160	600	500
	77	Sirocco I	156	600	475
	77	Sirocco I	175	575	400
	78	Osprey	175	700	525
	78	Sirocco II	164	725	600
	79	Eaglet	191	550	425
	79	Osprey 2	175	625	550
	79	Sirocco III	189	850	725
UP SPORTS INC (ULTRALIGHT PRODUCTS)	77	Firefly	174	650	500
	77	Dragonfly Mk. II	196	700	550
	78	Firefly	154	800	600
	78	Spyder	176	850	625
	78	Condor	178	900	725
	79	Mosquito	166	800	650
	80	Firefly 2B	181	775	600
	80	Comet	165	1325	1175
	81	Comet	165	1575	1450
	81	Gemini	164	1450	1325
WILLS WING	77	SST	100C	500	400
	77	SST	100B	500	425
	77	Universal	100A	400	350
	77	X-C	185	525	450
	78	SST	100C	70½	650
	78	Alpha	185	825	700
	78	Alpha	215	825	725
	78	X-C	215	800	700
	79	Alpha	185	800	675
	79	Alpha	215	800	700
	79	Omega	220	950	825
	79	Omni	187	925	750
	79	Raven	209	1075	800
	80	Raven	209	1100	925
	80	Raven	229	1075	925
	80	Harrier	177	1375	1150
	81	Harrier	177	1450	1325
EIPPER MICROLIGHT	*80*	*Quicksilver*	*CM*	*3175*	*2850*
	81	*Quicksilver*	*MX*	*4100*	*3725*
WEEDHOPPER	*80*	*Weedhopper*	*B*	*3000*	*2675*

THE DALES



AMERICAN CUP

Text and Photography by Noel Whittall

That the British won back the American Cup by a narrow margin is now history. That the weather was typically un-obliging as far as hang gliding contests go, permitting flying on only five days out of eight is probably unremarkable. (In fact, if the meet had been scheduled one week later, not a single day could have been flown!) The main lesson of the week seems to be that the world's top pilots can adapt to different conditions very fast indeed.

The tasks were all variations on the cross country theme, either free distance or races to goal, and for various reasons no pilot actually achieved the goals when set. I write "for various reasons," rather than "because of conditions" because sometimes it appeared that cautious team tactics had the effect of keeping fliers on the ground when good cross country distances were possible.

The performance of the USA team during practice, with flights of 50+ miles from our little Yorkshire hills proved that Stu Smith and Co. had completely adapted to local flying. It seems a pity that they then permitted themselves to adhere slavishly to coach Brian Milton's extremely unsubtle one-on-one marking tactics. Maybe even more surprising was the way certain British fliers allowed themselves to be seen to be rattled by such marking.

The Scoring System

This followed the method proved in the British League, with a maximum of 300 points being available to a task winner. Of these points, 200 represent distance (or time, in a race task), and 100 relate to position. For example, in a contest with 100 competitors where the winner of a distance task flew 100 miles, and the second pilot managed 50 miles (see how I like to keep my sums simple?) the winner would score 200 + 100 = 300. The second man gets 100 distance points because he only went half as far, plus 99 position points equalling 199. Thus winning by the biggest possible margin brings a just reward. Obviously the sums never work out in nice round figures and a pocket calculator is a must, but in practice the systems works well and is popular with the pilots.

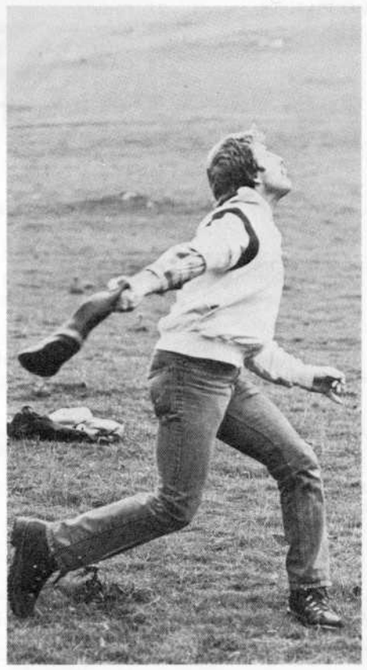
The Tasks

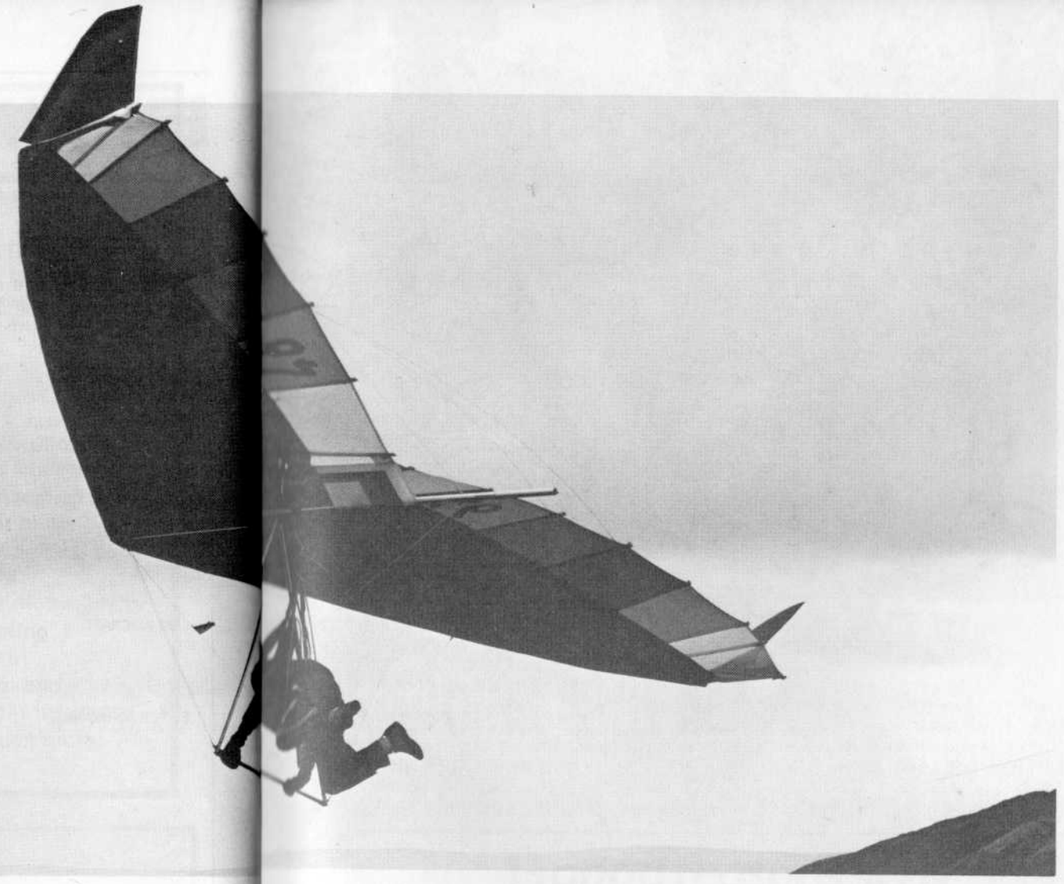
The Dales American Cup was conceived at the outset as a Cross Country Competition, with old fashioned "duration and spot" tasks available only to be used if there was no other way to decide a winner for lack of soaring days. In the event the first five days permitted cross country flights, and although goals were set twice, they were never attained, so the tasks always effectively ended up as "free distance."

Day One

The task was an elapsed time goal race to Masham, a distance of about 30 kilometers. The wind prevailing when meet director Derek Evans called the task made this a good choice, but with typical British weather perversity, the direction changed shortly after the window was opened. With the goal thus becoming unobtainable, scoring for the task reverted to free distance, with 10 kilometers being needed to qualify for any points at all. Most of the field scored, but individual World Champion Pepe Lopes from Brazil showed he was well on form with a clear win. The Swiss has made the error of arriving on the eve of the event and their lack of practice at low-level thermalling left them with a zero for all six members.

When all the scores were totalled the USA was well ahead with 1011 points to





Clockwise from top — Swiss Champion Walter Lussi launches his Centurion, Chief Marshall Jim Brown and Competition Director Derek Evans, USA's Doug Lawton straining to bring honor to his team during 'Wellie Hurling.'

GB's 868 and Brazil's 847. France had 518, and Canada was struggling with three non-scoring pilots and had a total of only 263.

Hero of the day was a lone telephone linesman working up a pole who suddenly found himself besieged by a mass of American and British hang glider pilots all demanding his signature on their landing cards. He was the only possible witness in an otherwise deserted landscape!

Day Two

The wind switch on day one presaged a change to Northerly — the only direction for which the Dales offer no cross country site. Fortunately the North Yorkshire Club permitted the use of their excellent hills some fifty miles away, and open distance was called from Busby Moor, overlooking Middlesborough.

Conditions were fair, but Bob Calvert's 30 kilometers were not particularly good for the site. However, it was good enough to beat all the others, and coupled with sound performances from Mike Macmillan and Graham Hobson, put Great Britian in the lead by 400 points. Canadians Don Miller, Lloyd Matthews and Dan Bossert all scored well, making up for zeros the previous day, but the Swiss were still struggling with three of the team still on nil.

Day Three

Northerly again, but with some East in the wind, so a climb was made up Cringle Moor, a launch point about a half mile away from that of Day Two. Free Distance once more, but conditions not even as promising as previously. Cold even for Northern England in June, the ridge remained soarable all day, but thermals were ragged and weak.

Close marking was very much in evidence, with the US team under orders not to let any of the Brits "get away."

That evening in the control center, the US supporters were looking very cheerful as they looked at the pegs on the giant wall map which showed that Chris Bulger and Stu Smith were well clear of the field, while the fancied British were way back with less than half the distance. Canada had also put in a solid performance, with Dean Kupchanko doing particularly well. Of the Brits only Tony Hughes was unaccounted for... then came the phone call the locals had been waiting for: Tony had landed at one of those little towns with long names so common in our country areas, Holme-on-Spalding-Moor. About 40 miles from take-off, and nearly twice as far as any other competitor. Not a huge distance by Cerro Gordo standards, but on a day when most pleasure fliers would not even have attempted to leave the ridge, it was a brilliant flight. This was pure downwind thermal soaring over basically flat land, on a day when the thermals were so weak and ragged that they were almost indistinguishable.

Day Four

Wind now Southeast, so back into the Dales, to launch from a fine hillside overlooking Semerwater Lake. Free cross

country once again. This was to be Brazil's day, with Carlos Neimeyer and Nobre putting in the top scores. Switzerland also caused some surprises with excellent flights from Knecht, Hermann, Guebli, and Lauer. What a pity they had not come to Yorkshire a week earlier so that they could have reached this sort of form on day one.

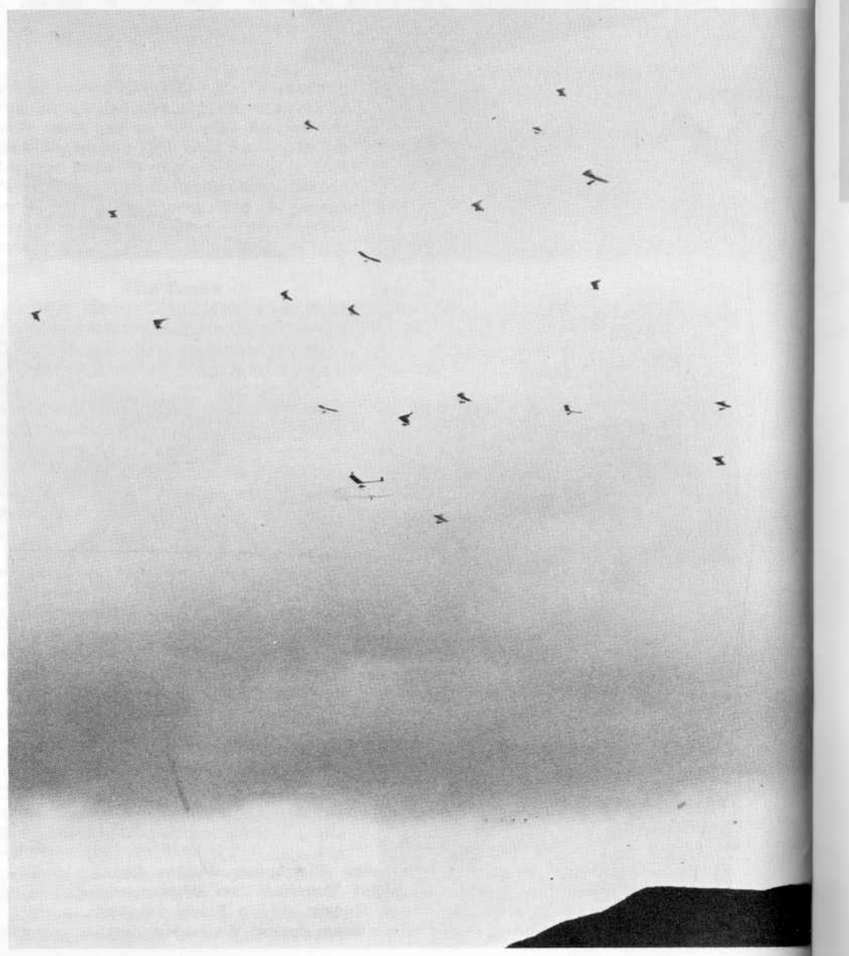
The day had been enlivened by Tony Hughes' performance in losing his American shadow, Mark Bennett. Top landing on the hill after an hour or so in the air, he rushed to the edge for a re-launch the second Bennett touched down. By the time Mark had managed to get off again after manhandling his glider forward throught the strong wind and rotors near the lip of the hill, Tony was clear away!

When the calculations were finished the day's scores were: Brazil 888, Switzerland 751, Britian 641, Canada 531, USA 449, and an off-form France trailing on 306 having previously lost Mike de Glanville with a back injury.

Day Five

The wind westerly, so Dales Club's "Wether Fell" site chosen. Same task as day one, goal to Masham. Conditions were light, but a fair bit of lift about, as demonstrated by Steve Moyes and Steve Gilmour who just happened to be "passing by" and acted as highly distinguished wind dummies. Steve Moyes in particular gave a virtuoso display of just how to fly the task, but as it was an elapsed time race, there was a tendency for all the teams to wait for the next really big thermal, rather than keeping one or two pilots in the air to set off to goal should the opportunity arise. As time went on and the lift lessened, the day was to be frequently interrupted by the dull thud of team managers kicking themselves for not despatching some of their pilots earlier. As is so often the case, the magic thermal never did arrive and the task turned into a very poor distance event with no particularly distinguished performances. It was heartbreaking to see so much talent being squandered because tactics had become more important than flying.

Canada did best on the day with 748 points, while Brazil's meager 102 were amassed by Felipe, their only scorer. By the closing of the window at 6:00 pm many lessons had been learned, but were unable to be applied. The weather was not going to cooperate any more, and although Chief Marshal Jim Brown and his gang of energetic helpers explored every possibility for the next three days, no more tasks were possible.



(Top) Bailey, Slater, Calvert, Hughes, and Hobson of Britain, (Bottom) a lone sailplane near the bottom of the stack at Cringle Moor.

(Top) Standing — Bulger, Bennett, Case, Lawton, Scott, Kneeling — Smith. Milton (coach) and Atkinson (manager). (Below) Harvey Blackmore of Canada caught savaging a dry stone wall with his reinforced foot.

The Scores:

Great Britain won the Cup back, with a 4178 point total. USA second with a highly creditable 3835 — enough that the Brits could never really relax. Next, Brazil with 3263 followed by a rapidly improving Canada on 3120. France never really got into the picture with 2577 while Switzerland simply never really got to grips with flying from such small hills.

Stu Smith, USA's Captain, won the Rogallo Award for the highest individual score with a superb 1020, with Britain's hard-flying Tony Hughes second with 919. Then came 3rd Calvert (GB) 883, 4th Burnett (USA) 877, 5th Miller (Canada) 815, 6th Lopes (Brazil) 813, 7th Kupchanko (Canada) 772, 8th Slater (GB) 726, 9th Cameron (Canada) 697, and 10th Bernard (France) 660.

The Gliders

With the exception of two Swiss Fledge-type "Flashes" and Walter Lussi's American "Centurion," all the machines were what we now think of as orthodox 5th generation Comet-type gliders. The event seemed to be much more a test of pilot skill than glider efficiency, and Azurs, Ducks, Comets, Magics, and Sensors looked very much alike in the sky. Certainly flying among the competitors during occasional free-flying, I noticed that my strictly production model enjoyed a minimum sink performance as good as any. No doubt the mylar coatings, fairings, speed bars, and other trick extras help put a mile or two onto top speed, but that probably is not too important to the average pilot.

Mike de Glanville was flying a Magic II with a cunning compound "French Connection" articulated hang point which gives a servo effect on control both in roll and pitch axes. I feel that we will see this sort of extra built into the next generation of glider.

All things considered the 1982 American Cup was a good competition but not a great one. Rather like a banquet with a salad, a sweet, but no main course — and that was nobody's fault except the weather.

§

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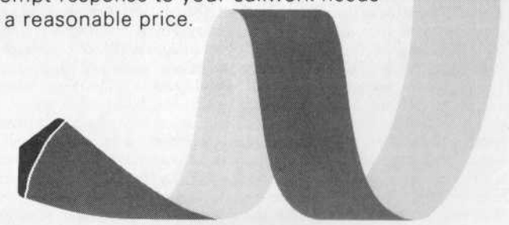

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PRODUCT LINES

CHATTANOOGA, TENN. — Well, flight folks, a lot has been goin' on since this column was written for our Jul/Aug issue. Oshkosh, the American Cup in England, the X-C Classic, the Nationals, the Texas Cup, Tullahoma, some folks leaving the business, and some entries. We'll have to skim the tops of the waves to cram it all in this quick reference news page, but then, that may be what continues to make *Product Lines* one of the consistently favorite parts of *Whole Air*. First off, tho, we've been alerted to some incorrect poop in last *Product Lines*, and as usual, we're glad someone spoke up so we can correct the errors. Thanks to **Mark Bennett** and **Pete Brock** of **UP Sports**, we can set the record straight for the SoCal League results. First, the winning UP **Comet Team** was flown by Gene Blythe, Eric Raymond, and Mark Bennett, where we said Kevin Kernahan in lieu of Mark. Sorry, Mark. He points out, tho, that Kevin won the individual award for being alone as undefeated. Kevin's team had Chris Price and Ron Young, and finished in the five-way tie for Third, along with Bennett X Glider Team. Mark further amplifies that *one-on-one* is the best format to decide a winner, but loses validity after First place, especially when insufficient rounds were flown. He finishes by saying that most participating pilots agreed that the **Windsports Team** (Greblo, Grigsby, Stoll) and the no. one **Sensor Team** (Trampenau, Huey, Burnett) flew very consistently and would've tied for First had it not been for losses in the final eighth round. Thanks, Mark, for helping us out with new *and* correct info. Also, we blew it in our wording by saying that **Jean-Michel Bernasconi's** leaving Flight Designs was related to their ill-fated Titan glider project. Sorry JMB, as the two were weeks apart, and *NOT* related. But, contrarily here a couple of months later, Jean-Michel is doin' swell with his new **Pacific Windcraft** company *and* Flight Designs is going to renew the **Titan** project after all, using their own designer, Tom Peghiny as well as consultation from Jean-Michel and Mark West. At **P. Windcraft**, organized in July '82, we have a new hang diver company, unusual at this time in the industry. Bernasconi has received support and backing for his own venture and will be delivering the new **Vision** by the time you read this. Matter of fact, PW is *guaranteeing* delivery times or your bucks back. Anyway the the Vision is a bona-fide double surface job (65%) weighing *under* 60 pounds. New hardware and sailmaking techniques are employed, so says the #1 Newsletter, with "highly stable minimal stretch" upper surface cloth and more flexible bottom to provide a "not stiff" high performance feel. A 3-way frame/sail set up permits loose/intermediate to tight/low-twist tuning, widening its versatility. Certification was nearly complete at this writing and expected to be OK'ed at the Sept HGMA meeting. PW also has a chute system using a **G.Q. Security** package employing Kevlar bridle lines and a 4-way deployment bag. It's called the S-26. Get more info by writing PW at Box 4384, Salinas, CA., 93912 and keep watchin' *Whole Air*. A couple more new wings are also catching hold. First is a new release from Bennett Delta Wing in their **Streak 160**. Following on the hot heels of Bennett's best new glider in years (the X-series) is this 97% double surface CFX (concealed floating crossbar) glider -- see news release, pg. 14 and photo on pg. 5. According to Uncle Bill, the Streak "lands like a standard," (about the only thing those old rags did well). Its generating good response. The Streak has some features unique to an American machine, fits pilots 130-230, will enter the market after the '82 Nationals and following a period of introductory pricing, will list for $2250. Watch future *Whole Airs* for more on the Streak and their intermediate, **Dream**. While the rumor mill grinds on about UP Sports new **Arrow**, the facts are that market entry is *not* yet planned, but the craft *does* represent the beginning of what **Pete Brock** calls, "...the ultralight sailplane market..." Brock goes on to say, "...(the Arrow) is capable of being foot launched, towed up by ultralight airplanes, car, motorcycle, or even an airplane if necessary. I think that it's going to open up the other 98% of the U.S. that's been unflyable till now. Should be an interesting couple of years." We agree; see *Convergence At Oshkosh*, pg. 36. Thanks for the encouraging forecast, Pete! Over at **Wills Wing**, they report the Duck 160s are finally in full production and flying great, with handling similar to the light touch Harrier 177. They're expecting it could be their most popular glider ever. But release date is still undecided for the 200 Duck. As of early September, deliveries were running 3-6 weeks, but 15-20% of production is for stock, so anxious pilots can be satisfied. Its part of continued maturity in hang gliding, we feel. Wills' harness deliveries are down to 3 weeks with Bulletman units at 6 weeks. Wills also has some spiffy new flight suits designed specifically for hang diving which will retail for $130. Further north at **Pro Aircraft**, the assembly line rumbles on. HGMA has Ok'ed certification on the ProStar 195, which is now added to the line-up. Reception has been excellent to their **Breez** (see next *Whole Air* for a report) and ProStars are selling well, they say. Rumors continue to zoom around this sport and we want to throw water on a couple "tumble/break" reports involving ProAirs. Both cases involve whipstalls (why do pilots persist in this!?). One in New Hampshire involved a ProAir 180 (not ProStar) going past vertical (120° dive) after the stall, with a too-rapid push-out resulting in a partial deformation, then a pitch up and flip over, failing negatively. The other case in Texas, another whipstall, resulted in a failure of the crossbar when the pilot's body struck the keel. Both survived, but fer cryin' out loud, guys... why whipstalls? Did someone say they were "fun?" At Tramp's **Seedwings**, they report their first successful year with the **Sensor 510**. Tickled with much improved sales, they've begun a long term marketing plan. The newest 510s feature variable in-flight twist adjustment, special sail cloth, and a 2 pound weight reduction of the 165 and (XC Racer) 158 by using a new different crossbar size. Bob is most pleased with the competition results on his beautiful craft, and also told us that Dave **Ledford**, Jeff **Burnett**, and American Cup high scorer, **Stu Smith**, will fly the **Masters** at Grandfather on 510s. That's some hot pilots; the results should be interesting at the event going on as these words are being printed. We'll tell you more in the Nov/Dec *Whole Air*. Up the California coast near Pacific Windcraft is Flight Designs. As we reported, the **Titan** (unattached lower surface) glider has had new life breathed into it by parent company upper management. They *will* continue to work on this design. In the meantime, their super production capability (via Pioneer's huge loft area) has them well-stocked on Demons and JetWings, so some attractive pricing has been passed on to their dealers for the fall/winter season. This should allow retail sales of the complete JetWing at about $3995 (*with* reduction drive; unit was $4989), and brand new Demons from $1795 and up, depending, of course, on each dealer's cost. Still, customers should consult their nearest Flight Designs dealer and maybe save a fistful before this inventory is depleted. Flight Designs lost president **Alan Levinson** in a heart attack (see pg. 14) thus continuing a management personnel metamorphosis. Recently hired Exec VP, **Tom Zimmerman** now fills the Prez' spot, with a very diversified and useful aviation and organizational background. **Tim Morely** left the company to pursue his own business ventures and Dennis Hibdon replaced Morely but has also departed. Now, longer time employee, **Steve Brockman** takes over the hang glider/JetWing operation as General Manager. All these management alterations have not greatly affected production personnel, though some changes are inevitable, especially when the bosses are playing musical chairs. FD offered their **Flight Star** (3-axis ultralight) at Oshkosh as "nearing completion," work on the deluxe craft directed by **Tom Peghiny**, and their ballistic parachute nears market entry with impressive demonstrations at the '82 EAA event. Our last west coast manufacturer stop runs up 100 more miles north to **Manta**, where **Foxbat** (trike on Fledge III) sales are roaring to life. See their new back cover ad featuring the several uses of the Foxbat, one of which is air-towing. Recently in the Owen's Valley, **Tom Vayda** piloted a Foxbat and towed up **Rex Miller** in a Fledge III. After release from 500 feet, Miller recorded a 4000 gain (to 8500 MSL) and notched up an 85 mile flight. Pretty hot, and by helping to set the air-towing stage, we congratulate Tom & Rex on this effort. A future *Whole Air* will produce a Pilot Report of the Foxbat package — watch for it. **Aerial Dynamics** of Chattanooga (see pg. 57) has just released a new super-quality gear bag. Named the **Air Craft Carrier** equipment bag, the article, crafted from Parapak, features "cylindrical baseball flap" construction to permit a wide-mouth opening. It's 28" long by 14" in diameter, boasting concealed zipper with webbing reinforcement at zipper terminals, all seams, and at the handles. It can be carried back-pack style, and will accomodate a mylar stiffener to help hold shape. Available for $39.95 in dark brown/rust, custom colors are 5 bucks more. Dealer inquiries are invited on a sharp Christmas gift item useful to any pilot. While still in Chattanooga, a popular event is coming again. The Crystal Air Sports gang is putting on their 3rd **Parachute** (Actual) **Deployment Seminar** over the Holloween weekend -- Oct. 30 & 31. Contact Randee at Crystal for details and registration (space *is* limited), 615/825-1995. Cost will be $20 for 2-3 deployments on the **Crystal Simulator**. Repack help and area will be available. To round up this *Product Lines*, we want to pass along some late-breaking contest results. First is an up-date on the **Utah X-C Odyssey** where Gary Larson continues to lead the A Class with a 70 miler from Cedar City to Mader Field. Mike Julius got another 70 in B Class, shoving Karen Thorpe back to 2nd. There are trophies for both classes, and $100 for 100 miles from Greg Duhon, plus prizes from Larry Hall, Wasatch Wings, Freedom Wings, Mike Circuit, andUP Sports. Mike Tingey *did* record a 100 miler, but he was not entered in the contest. More on that as it develops. The **'82 Nationals** are over. We'll have more info later, but want to report that **Rich Pfeiffer** repeated his National Championship victory, this time at Crestline. Pfeiffer, on a Duck 180, had a near-perfect 12 win-1 loss record, edging out a tough duo — **Eric Raymond** and **Chris Price**, who tied for Second, both on Comet 185s. Eric gave Pfeiffer his only loss, but Rich got vengence by winning two successive matches with Raymond. Congrats to Rich, Eric, and Chris for outstanding performances. At the 2nd Jack Grimm **Texas Cup**, 3 Steves took the money: Steve **Gilmour** (1st), Steve **Moyes** and Steve **Stackable** (tie for 2nd). The first two are Aussies, Stackable is a local Texan. Congrats to the Steves III. Got news or opinions? Send 'em to Product Lines, Box 144, Lookout Mtn., TN 37350-0144.