

This file is a compilation of scans from various aviation oriented publications provided by my friend in Australia, Garry Court.

Garry is a fan of Klaus Hill, designer of the Humbug ultralight and inspiration for many follow-on designs.

Relevant words from Garry:

“Klaus Hill was a brilliant ultralight designer...Fledgling, Hummer, Humbug and Voyager are but 4. The Fledgling went on to become the Pterodactyl Fledgling and was then named the Ascender.”

It had been hoped that Bryan Allen would be able to proffer the ultimate raspberry in the direction of the Middle East by pedalling the Gossamer Albatross around the Convention grounds but, alas, it was not to be. Shortly before opening day it was learned that the famous craft was still in a crate on a pier in Scotland rather than on one in Galveston where it was supposed to be. Bryan and several other members of the Albatross crew were at Oshkosh, however, and were extremely capable representatives for the historic channel crossing effort.

On Monday the Lowers-Baker-Falck 500 was run with a total of \$7500 in prize money awaiting the winners. Last year's champ, Steve Wittman, took the Lowers segment at 197.70 mph. Jerry Coughlin the Baker at an adjusted speed of 206.06 mph in his Cassutt and B. C. Roemer turned the fast lap (Falck prize) at 207.22 mph in his T-18. 9 aircraft competed in the second running of the event.

The Custom Built Class of the EAA/AC Flight Rally was won by Allen Amsden of St. Paul, MN in his Midget Mustang and the Vintage Class by Mike Nallick of Minneapolis in his Navion. Another large field — 24 homebuilts and 29 vintage factory built — competed for \$900 in cash prizes and the fun of a great post-rally party.

Winners of the annual beauty pageant were: Miss EAA — Martha Thompson of Massillon, Ohio and Mrs. EAA — Marie Goss of Des Moines, Iowa.

This year Canadians walked away with two of the Grand Champion trophies — for the top homebuilt and rotorcraft. Major awards winners were:

Custom Grand Champion — VariEze C-GVEZ — Norm Ross and Gerry Finnigan of Victoria, British Columbia.

Rotorcraft Grand Champion — Glanville Skymaster C-GRKV — Kemp Glanville of St. Thomas, Ontario.

Antique Grand Champion — Howard DGA-15P NC-22416 — Dick Martin of Green Bay, Wisconsin.

Classic Grand Champion — Luscombe 8E N2132B — Tim and Barbara Bowers of Woodland, California.

Warbird Grand Champion — Grumman (GM) FM-2 Wildcat N18P — Louis Gallo of Hillside, Illinois.

Sylkie I by Wayne Barton of Northglenn, Colorado was voted the Outstanding New Design for 1979 and Gale Ables of Boulder, Colorado was presented the Outstanding Workmanship award for his AT-19 (which you will see elsewhere in this issue).

Oshkosh '79 was a very interesting year for those who enjoy seeing a lot of new designs and new restorations. There were plenty of both . . . George Mead's

Adventure, Larry Haig's Minibat, Burt Rutan's Defiant and LongEZ, Louie Langhurst's 1/2 scale Stuka, Len Niemi's Sprinter, Murphy's Mouse, the AT-19, Micro-IMP — as well as the "production" version of the Polliwagen, the first 1/2 scale Corsair to fly at Oshkosh — by Fred Bauer — the initial appearance of the Christen Eagle 1's, the first kit built Quickies (2 of them), the Sorrell Guppy, the first plans built Hugo Craft and several others.

Vintage enthusiasts savored full scale replicas of the Gee Bee Z, Travel Air Mystery S, Star Cavalier and Bristol F2B; an honest-to-gosh Stinson Model A trimotor fresh out of the shop; a very rare Fw 44J; the little known Piper PT, a pristine Travel Air 12Q, several rare Wacos, a Curtiss Falcon, the oldest Staggerwing flying today, a 1933 Salmson powered Corben Baby Ace, a D.H. 80A Puss Moth, a big Fairchild 45 most didn't dream still existed, a Lincoln PTW, one of only 11 Stearman 4E Junior Speedmails built . . . and, of course, a bewildering array of gorgeous Classics.

Warbird fans rushed to photograph a now rare line up of the principal U. S. heavies of World War II — a B-17, B-24 and a B-29. The trainers in which their pilots got their wings and the fighters that escorted them were in their usual abundance.

Perhaps the big excitement at Oshkosh '79 was the Ultralight turn out — 64 of them as opposed to 28 last year. In addition to hordes of Easy Risers, Fledglings and Quicksilvers, new designs included Klaus Hill's Humbug, the Mitchell U-2 Super Wing, the re-engined Lazair, F.L.A.C. and Jim Theis' really wild Night Hawk. We even had an Australian ultralight — the dainty little Skycraft Scout which was air freighted in for the Convention.

Grabbing much of the Ultralight attention were Jack McCornack and Keith Nicely who flew from Monterey, California in their Pterodactyl Fledglings. Their epic journey resumed after the show when they headed out towards Kitty Hawk, NC burning straight alcohol, courtesy **Mother Earth News**.

And still there was more — new engines, exotic propellers, the return of the Big X, the Snowbirds, the Harrier . . . and on and on. Next month we will get down to our usual schedule of indepth coverage of the World's Greatest Aviation Event . . . spotlighting the homebuilts in October, the vintage birds in November and the heavy iron in December.

Stay tuned . . .

— Jack Cox

(Photo by Randy Bennett)

Grand Champion Antique — A newly restored Howard DGA-15P by Dick Martin of Green Bay, Wisconsin.



SPORT AVIATION SEPT 79



HUMBUG
DEBUT AT OSHKOSH 1979



Designer/builder/test pilot Klaus Hill assumes the position for flying with the wheels. The narrow seat sling also allows foot launching. Oshkosh ultralight rules required 15 hours of pilot time in the aircraft to be flown there . . . so Klaus, who had about 40 minutes of test time on the Humbug, had to sit it out during Oshkosh '79. Last year he was in the air constantly with the Hummer.



HUMBUG!

Article and Photos by Jack Cox

EXACTLY ONE YEAR ago this month I introduced you to Klaus Hill's Hummer, the ultralight sensation of Oshkosh '78. Over the succeeding 12 months many of you have written and called wanting to know what had happened to the design . . . when it would be available as a kit . . . if plans were to be made available and if so, when . . . and what was Klaus up to these days?

Well, finally, "all can be revealed", as they say in the funny papers.

During the past year Klaus has methodically sifted through a stack of offers to produce the Hummer and has now come up with a person he thinks not only has the desire and capability to get the job done, but equally as important in Klaus' mind, has the proper philosophical approach to the business. Dennis Franklin of Glen Rock, Pennsylvania has been designated the principal manufacturer of Hummer kits. He will market a 100% complete package through his Franklin Manufacturing Corporation of R. D. 2, Glen Rock, PA 17327 (717/235-5512) and will also provide kit parts for two other dealers: Mountain Green West, 1219 South 23rd St., Phoenix, AZ 85034 (602/275-7708) and Wasatch Wings, Inc., 13275 S. Frontage Rd., Draper, UT 84020 (801/

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571-4044). J. S. Mechanical Company, P. O. Box 1286, North Bay, Ont., P18 8K5 will be the Canadian outlet.

Dennis had a Hummer at Oshkosh this year, but it had just been completed and thus did not comply with the Ultralight Committee's 15 hour requirement to allow it to be flown there.

Klaus has also had a great number of inquiries from people who want Hummer plans — folks who want to build every part themselves rather than buying a kit. Klaus is sympathetic to this . . . he likes to do the same thing, himself . . . so, he has drawn up plans and now has them available (Klaus Hill, Box 666, Morgan, UT 84050).

So there . . . my obligation to all you Hummer fans has been discharged. Now it's in your court — see you and your Hummers at Sun 'N Fun/Chino/Oshkosh/Tullahoma next year.

That still leaves the final question unanswered, however . . . "What's Klaus up to these days?" Well, about 50 or 60 feet so far — in his new design, the Humbug. Incredible as it may seem, Klaus started cutting metal on this ultralight **3 WEEKS** before leaving his home in Utah to drive to Oshkosh! Not only did he complete it,

SPORT AVIATION

he managed to get in 4 test flights, each of about 10 minutes duration. How does he do it? Klaus says he designs his aircraft in his head . . . which sometimes takes months . . . but once he has it all figured out, the actual building time is measured in days.

Of course, the rest of us have to move back from this a few steps and view it objectively. SUCCESSFUL ultralights are not THAT simple . . . and just because Klaus can accomplish such miracles is no assurance the rest of us can. We have to recognize the element of genius at work here, plus years of hands-on experience in building and flying such craft.

In one sense the FAA had a hand in the design of the Humbug. It was really what Klaus set out to build when he started the Hummer — a foot launchable, fold-up, minimum airplane.

He decided to go to wheels, however, because they were obviously safer than using one's legs. He was certain FAA was about to change its ultralight criteria to some combination of wing loading, gross weight or whatever and allow wheels for safety sake . . . but this has not happened. Shortly after Oshkosh last year, Klaus was notified by FAA he would have to get an N number on the Hummer . . . which spelled out pretty clearly to him that a footlauncher might still be in his

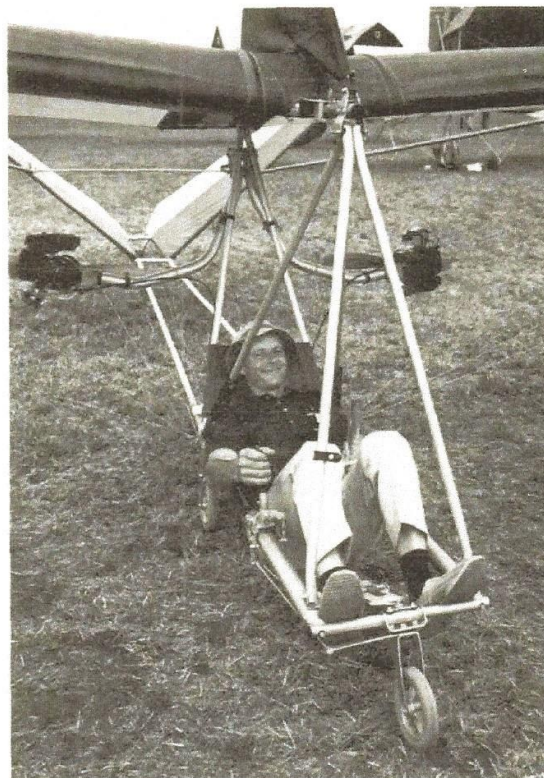


Opening up the wings. The entire machine is wire braced — using aircraft cable.

future. He "started thinking about it" as he modestly describes the mental design process and eventually built the machine, as we have already related. Thus, Humbug is the son of Hummer . . . or, as one wag has suggested, the name may well be Klaus' reaction to FAA's use of footlaunchability as the dividing line between regulation and non-regulation in the world of ultralights.

I asked Klaus what he thought of the new Australian ultralight category in which aircraft with gross weights of under 400 pounds are unregulated as long as they stay below 300 feet AGL and away from built up areas. His answer was that he thought the rules were "far too restrictive for what I would like to see in a free country. If we accept such a set of conditions, we are no freer than they are . . . and I believe we should be freer in the U. S. than anywhere else."

I wanted to know what his criteria would be to determine what is regulated and not regulated, if he were in a position to make FAA's decision. "There is a very simple solution," he said. "One that would solve all FAA's problems regarding destructive potential in the event of a crash — no matter what the size of the air-



Designer/builder/test pilot Klaus Hill assumes the position for flying with the wheels. The narrow seat sling also allows foot launching. Oshkosh ultralight rules required 15 hours of pilot time in the aircraft to be flown there . . . so Klaus, who had about 40 minutes of test time on the Humbug, had to sit it out during Oshkosh '79. Last year he was in the air constantly with the Hummer.

craft. All that is required is to say that machines with a wing loading greater than 2.5 pounds per square foot are airplanes and shall be regulated; those with wing loadings of 2.5 pounds or lower are ultralights and are not regulated."

Such lightly loaded aircraft (the ultralights), he maintained, would fly so slowly that factors such as wheels, gross weight, etc. would be immaterial. We didn't get into **where** ultralights should be able to fly, but I surmise from his strong feelings on personal freedom that he wouldn't want much less than the space in which any no-radio aircraft can presently fly.

But . . . back to the Humbug. As you can see in the pictures, the general configuration is the same as the Hummer — an inverted V-tail with ruddervators, high wing with no lateral control devices, etc. Missing, obviously, is the big tubular fuselage. In its place is a fuselage of small aluminum tubes hinged so as to allow folding of the entire airframe into a very compact bundle. The "cockpit" area is a tubular rectangle of sorts inside of which is mounted a sling seat. The pilot can extend his legs through the bottom to foot launch . . . or he can use the seat and take-off and land using the wheels.

The wing construction is perhaps the greatest departure from the Hummer. The latter's wings simply swing back to rest on a crossover bar between the V-tail, but Humbug's wings collapse like those of a flexwing. Hummer's wings are quite simple in construction with the tubular "spars" serving also as the leading and trailing edges. Humbug's wing is very similar to the

Pterodactyl Fledgling's — having a leading edge tubular spar, another at about 60 or 75% chord and a wire-in-tension trailing edge. Between the two spars are two-piece, hinged compression tubes that join, push "over center" and spread the spars to put the proper tension on the sail. A reverse operation breaks down the wing for storage. The compression tubes are reached through zippered openings in the sail.

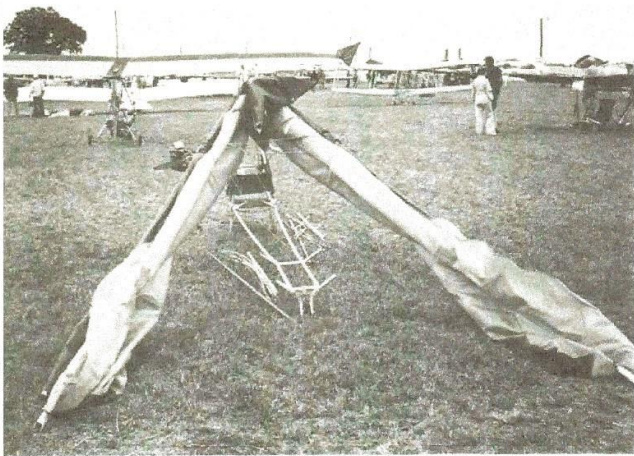
The wing is one of the question marks at this point, according to Klaus. It will be more complex (and expensive) to build than a Hummer wing, so he will have to evaluate its ease of folding in actual field use to determine if the complexity can be justified. Also, theory has it that somewhat better performance is available from a thin trailing edge than from a blunt one such as the Hummer's. Klaus is not entirely convinced the difference is significant — at least in the speed range of ultralights, so he'll be taking a close look at that, also.

The Humbug is powered by one of Ed Sweeney's Gemini units, a pair of modified Swedish chainsaw engines mounted on a large diameter cross tube that doubles as the fuel tank. The unit is attached under the wing just behind the pilot. Originally, a single pusher engine was contemplated, mounted on the "stinger" just aft of the wing center section. The mounting plate for the remote fuel tank was, in fact, still in place at Oshkosh. Klaus indicated that the Gemini unit does a good job on the Humbug. It is not presently fitted with the excellent factory mufflers so the noise level is too high, but should be down in the Lazair range when they are put back on.

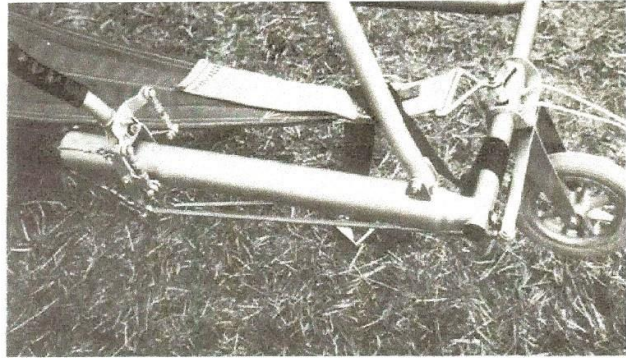
Interestingly, Klaus does not design his aircraft with any particular engine in mind. He designs the airframe and later adapts whatever engines are available to him. He wants to test all the variables to see what is best and, for him, the powerplant is a variable.

Humbug has a span of 34' 6" and weighs 120 pounds empty — that's 50 pounds less than the Hummer. With so little test time under his belt, Klaus was hesitant to give out performance figures, but said cruise appeared to be about 30 mph, landings at about 25.

From the limited test flying to date, Klaus has determined that the Humbug has better penetration than the Hummer — in other words, it's faster. But this may also mean it will take off and land faster — which is not desirable in a foot launcher. To get around this, Klaus plans to experiment with a variable camber — by pul-



The Humbug partially folded for transport. The wings fold back until they are parallel to the lower longerons of the "fuselage". The ruddervators plug into the four stub tubes at the aft end of the longerons. Note how the rear stubs curve around to become the tailwheel mounting.



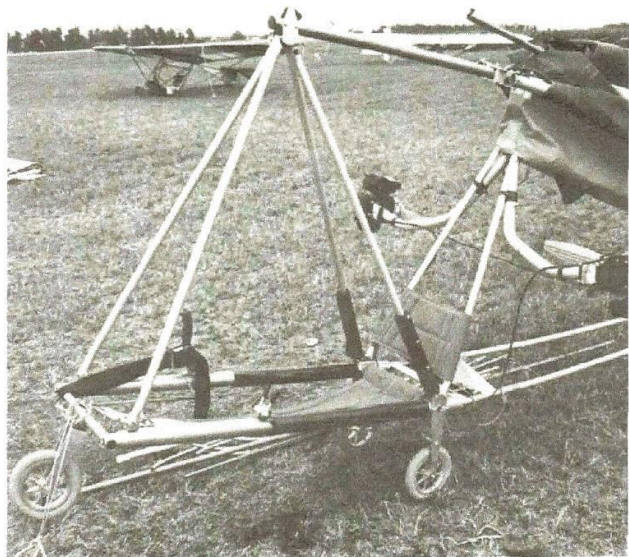
Humbug control system detail. The stick's mixer actuates the ruddervators and nose wheel steering. Note the seat sling is adjustable.

ling down the flexible trailing edge of the wing like a flap.

If the Humbug works out to Klaus' satisfaction (and we're certain it will, based on his past track record), it will also be produced by Dennis Franklin.

Klaus Hill is one of the ultralight world's most prolific designers — he shows up at Oshkosh with something new almost every year — so, what can we expect for 1980? Well, it's kinda hard to call the shots on a guy who can whip out a new plane in just three weeks . . . think about that — by Oshkosh '80 he **could** have 17 new designs! Frightening, eh? We do know, nevertheless, that he and Brian Porter are already at work on a new flying wing.

Hang in there, troops. This sport aviation just keeps getting more and more interesting.

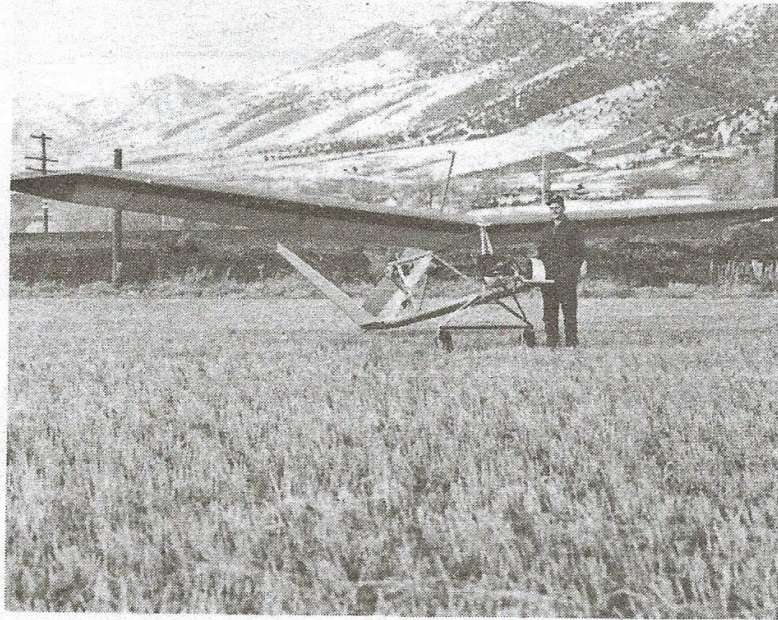


"Cockpit" area detail. Really just an aluminum tube pyramid, as you can see. Support tubes for the engines double as fuel tanks. The curved tubes on the ground are wing ribs . . . they simply slide into pockets sewn into the 3.8 ounce stabilized Dacron sail. Recognize those wheels? They're from wheel chairs!

Ultralight Pioneer

GLIDER RIBER
NOV 79

Klaus Hill Killed



Hill with the Hummer, a recent design

Klaus Hill, one of the preeminent designers and thinkers in Ultralight Aviation, was killed October 10 in Morgan, Utah while test flying a new design.

Hill, 45, was testing a model he called the Voyager, similar to the Fledgling he designed in the early 70s. Made specially for a 250-lb. pilot, the Voyager has a 40' wingspan and, at the time of the accident, was powered by a snowmobile engine mounted to the noseplate. Hill, who weighed only 140, had difficulty controlling the craft while trying to correct stability problems.

According to observers, the craft porpoised three times at low altitude and then suddenly dove into the ground at an estimated 50 mph. Hill was killed instantly. The propeller stopped on impact, said observers, and played no part in the accident.

Hill was widely respected as a designer and innovator, and had built man-powered aircraft and sailplanes, in addition to rigid wing hang gliders. In recent years his interests had shifted to motorized ultralights and he conceived the original Weedhopper, the Humbug and the Hummer.

"He designed the Humbug in his head in three months," recalled colleague Ed Sweeney of Gemini International. "Then he built the craft in three weeks. Perhaps that's the best epitaph. It gives you an idea of the creative mind that was Klaus Hill."

Hill was born in Germany, where he began his aviation career with primary gliders. He came to the United States at the age of 20 and settled in Northern Utah.

Hill is survived by his wife, Elaine, and three children.



5 (Photo by Jack Cox)
Ed Sweeney pushes a Humbug into its parking spot. Three of the new production versions were brought to Sun 'N Fun by Sky Sports International, the new company that will market the design. Ed's 15 year old son, Sean, flew one of the Humbugs regularly and did a fine job. He has been flying ultralights since he was 12.

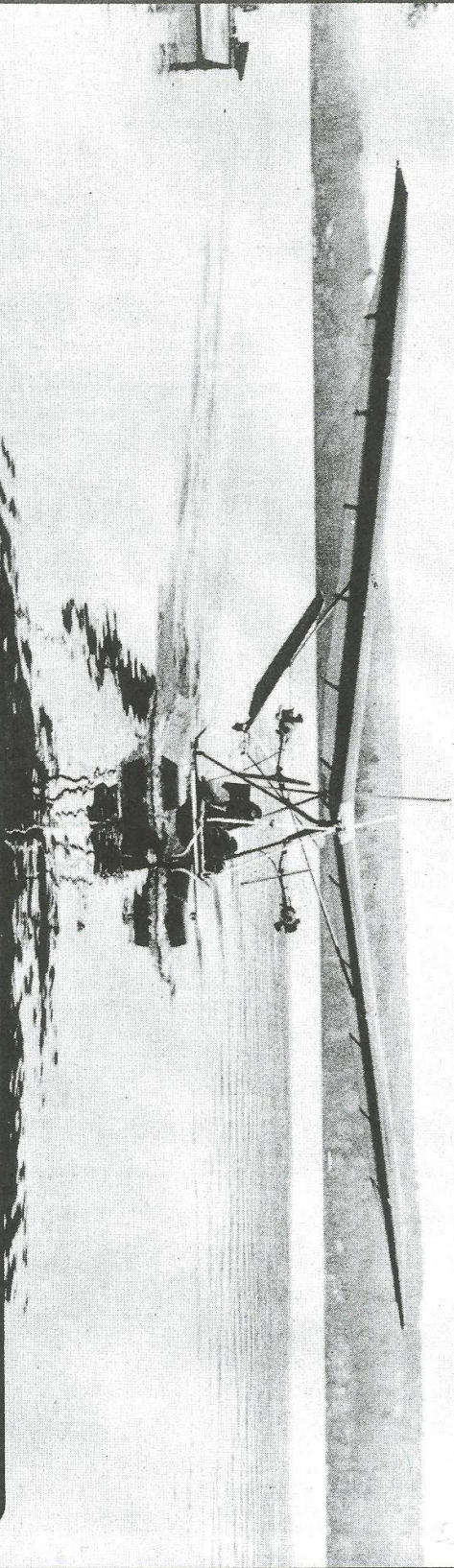
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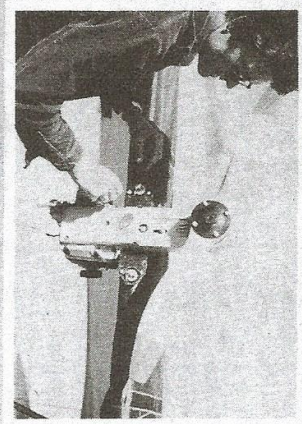
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Glider Rider

DEC 1980

SUBER RIDER



(Photo by Jack Cox)

8 Getting a late evening inspection by spectators is this beautiful VariEze by Byron McKean (EAA 113483) of Rt. 4, Box 338, Sequin, TX 78155.

9 Larry Newman's new canard ultralight, the Eagle. (Photo by Jack Cox)

built with very small amounts of foam, glass and epoxy. A lot of EAAers still have a small Continental salted away . . . securely hidden from the ravenous wolfpacks of VariEze builders that are out scouring the countryside . . . and with it and the special deal on the materials kit, can come up with a high performance homebuilt for less than even some of the ultralight kits are selling for these days. In these inflationary times, that's certainly something to crow about.

THE OLD STANDARDS

There also was, of course, a good representation of the old standards — some really sharp T-18s, Mustang IIs, Pitts, Skybolts, Starduster Toos, BD-4s, Sonerai's and the like. We are featuring some of these in our photographs, so refer to the captions for info. The Grand Champion Homebuilt was a participant in every Sun 'N Fun fly-in held to date — Val Bernhardt's BD-4. Built in the early 1970's, the airplane has been to

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Oshkosh and fly-ins all over the country but, amazingly still looks as fresh and new as when it really was. It's heartwarming to see a fine airplane kept up this way, and it was most deserving of its award.

HOMEBUILT AWARDS

The complete list of Homebuilt awards consists of the following:

Grand Champion — Val Bernhardt of Ft. Lauderdale for his BD-4, N464VB.

Best High Wing — E. K. Morice of Delray Beach, FL for his Anderson Kingfisher, N2EK.

Best Low Wing — Gerry Boudreau of Ontario, Canada for his conventional geared TRI-Z CH 300 TD, C-FEHB.

Best Biplane — Sam Pilgrim of Savannah, GA for his Skybolt, N21SP.

Best Mid Wing — Steve Darlington of Anderson, Indiana for his VariEze, N36SD.

Best All Metal — Glenn M. Lawler of Auburn, AL for his Thorp T-18, N46806.

Best All Wood — Jackie D. Yoder of Midland, MI for his Barracuda, N159JY.

Best Interior — Val Bernhardt of Ft. Lauderdale for his BD-4, N464VB.

Best Finish — Bob Alleva of Lakeland, FL for his Starduster Too, N688.

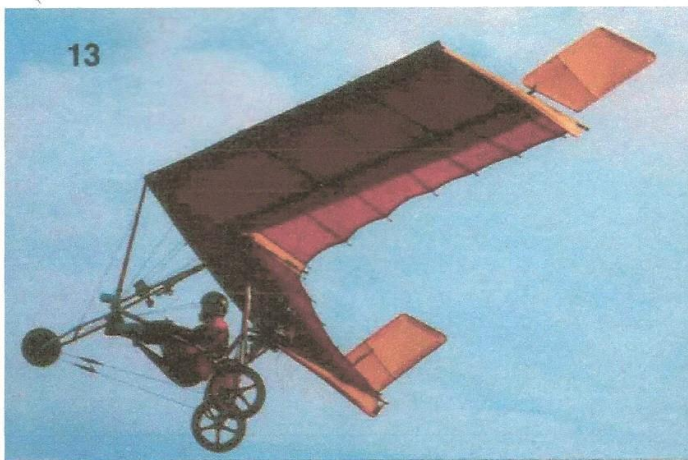
Ladies' Choice — Steve Walton of Marietta, GA for his Starduster Too, N84SW.

Best of Type — Ralph Moore of Titusville, FL for his Shoestring, N540.

THE ULTRALIGHTS

Sun 'N Fun is always a major outing for the ultralights, and the tradition was carried on this year. Larry Newman and company were out in force to make the EAA fly-in debut of his Eagle, the Hummer and Humbug were being introduced as commercial products, a bunch of new engines and power packages were being introduced and the latest version of Craig Catto's Goldwing was flying . . . but when the smoke cleared, the Lazair had won its lebben-de-lebbenth consecutive Grand Champion award!

SPORT AVIATION "SUN 'N FUN" 1980 INCOMPLETE - ONLY ULTRALIGHTS



13



14



15

(Photo by Jack Cox)
14 Best Custom Classic under 100 hp was this Luscombe 8E restored by Bill Morgan of Whitesburg, GA.

(Photo by Jack Cox)

15 U. S. Aerobatic Champion Henry Haigh of Howell, Michigan gets a prop for his Super Star. Henry will lead the U. S. team at World Aerobatics '80 in August.

him should be seriously considered in every machine, regardless of how it is shaped. The market place will ultimately demand it.

Dennis went on to fly his second Hummer for the remainder of the week without incident . . . but heeding the decal on the side of it that admonished one not to attempt flight in winds greater than 10 miles per hour!

HUMBUG

Last October we printed an article on what was to be Klaus Hill's last design, the Humbug. Completed just a few weeks prior to Oshkosh, it had been flown only about 40 minutes prior to being brought east to Wisconsin, so was not eligible to be flown there. Klaus told me that like any totally new design, it needed some debugging, but that he felt the basis was there for a docile, good performing ultralight. He planned to take it back to Utah and complete his tests, then decide whether it should go on the market. He was fatally injured on October 10 in the crash of a special, one-off version of his

Voyager . . . and for a time the Humbug appeared doomed also. Fortunately, however, Ed Sweeney of Gemini International, Inc. of Reno (who had supplied the engines for the prototype) and Sky Sports, Inc. of Ellington, Connecticut, a major hang glider manufacturer, managed to obtain the rights to the design from Klaus' estate and over the winter have succeeded in developing a production version. They formed a new company, Sky Sports International, to manufacture and market the Humbug — beginning about the time you are reading this.

Sky Sports International has made a number of minor changes to the airframe to (1) make it more suitable for volume production and (2) to improve handling, particularly on rough fields. One major aerodynamic change has been made.

The most obvious changes are in the landing gear. Klaus had used little solid tired wheels normally used on the front of wheelchairs. His steerable nose gear was tied into the ruddervator linkage, responding to left/right movement of the control stick. A small, fixed tailwheel was mounted at the rear. Flight tests

quickly revealed the main wheels to be too small to handle anything other than pavement or turf almost as smooth as a putting green. The steerable nosewheel was too fragile for any surface. So, in the Sky Sports version, large plastic-spoked minibike wheels were fitted to the main gear and the nose gear was made non-steerable. It was found that almost as soon as the throttles were opened, the Humbug was riding on its main gear only and steering was easily accomplished with rudder . . . or even differential use of the two engine throttles (take THAT, Beech 18 jocks!)

At Oshkosh last summer, the Gemini engines were mounted as pushers on the rear cabanes behind the pilot. Now, they are turned around to function as tractors and are mounted ahead of the pilot on the middle set of cabanes. This necessitates the installation of propeller guards as the plane of the blades is about in line with the pilot's knees.

Not so obvious are the many fittings and components that have been simplified for ease of manufacture . . . but they are there and, of course, are quite significant to the effort to put the

Humbug on the market.

The major change is the addition of a form of aileron. Klaus Hill did not incorporate ailerons in his designs because he did not think they were necessary so long as the pilot limited his flying to times when the wind was blowing less than 10 miles per hour. Sky Sports realized, however, that customers were apt to be less cautious . . . so the decision was made to provide them with better control. Their very clever solution was to place a universal joint in one of the sail battens . . . wing ribs in aviation lingo . . . so that a portion of the outboard trailing edge could be bent up and down — an aileron without a gap or hinges. The aileron cables are tied into the rudder cables to create an Ercoupe-like two-control system — resulting in nicely coordinated turns and the ability to operate in somewhat windier conditions than the aileronless prototype could safely handle. The controls cannot be crossed, however.

A significant feature of the Humbug is that it knocks down and folds up in a package that can be cartopped like a flexwing hang glider (you'll have to stuff the engines in the trunk, however). At home it can be suspended in the ceiling of your garage — or stored in the basement, if an outside entrance is available.

The Humbug is, of course, foot launchable and thus need not be licensed or be flown by a licensed pilot, under current FAA regulations. It will be sold as a ready to fly aircraft **that has been test flown at the factory before delivery to the customer** . . . for \$3995.00.

One of the three Humbugs displayed at Sun 'N Fun was fitted with floats. Taken to a nearby lake late in the week, the combination was flown briefly — but more testing was said to be in order before floats would be sold.

ENGINES

The big ultralight engine sensation was a tiny three cylinder radial built in Germany by König Motor. Paul Yarnall, who will market it through his Yarnall Techtonics, Inc., had one mounted on his Pterodactyl Fledgling and ran it frequently to the delight and amazement of all. The little engine is a three cylinder, air cooled two-cycle radial displacing 433ccs. It develops 26 to 30 horsepower in the 4000 to 4500 rpm range. A sophisticated little dude, it comes fitted with a 12 volt 4 hp Bosch electric starter, three independent CDI magnetos wired so as to allow the engine to continue running even if two of them fail, a motor driven fuel injection system that provides equal fuel distribution to each cylinder, a rotary valve intake and an exhaust system that includes a simple but very effective muffler. Equipped with a two-bladed wooden propeller 43.3 inches in diameter and with a 19 inch pitch, the little jewel bats out 141 pounds of thrust at 4000 rpm — direct drive. The main bearings are designed to carry thrust either fore or aft, so the engine can be mounted as a pusher or a tractor. The engine, starter, CDI ignition, muffler, fuel injection and propeller weigh 34.5 pounds. König is well known for its outboard racing engines and obviously put a lot of know-

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how into this smooth running ultralight engine. Unfortunately, such sophistication does not come cheap — but for those who want nothing less than the best pulling (or pushing) their soft pink bobs aloft, this little three hanger appears to fill the bill. You can call Paul Yarnall at 716/377-2854 for additional details.

Once past the König, the big deal in ultralight engines at Sun 'N Fun seemed to be twins . . . or as Molt Taylor would call them, "twinned" engine packages. By this I mean two engines geared to a single prop, as opposed to the Gemini power pack or the Lazair's two leading edge mounted engines. Larry Newman's Eagle had a Soarmaster unit consisting of two West Bends geared to the usual long prop shaft (and, incidentally, very sophisticated mufflers . . . stainless steel cocktail shakers!) and Aero Sports Products of Altamone Springs, Florida had a somewhat similar set-up. Hi-Nuski had still another variation on the theme — two West Bends mounted in tandem driving a prop shaft that ran under them and back to the pusher prop. Centrifugal clutches in the belt drives allow single engine operation.

Why go to the complexities of these twin rigs . . . why not just go to one larger, more powerful engine? The answer I get involves cost and availability of the big engines. The West Bends (or Chryslers as they are now properly called) are cheap and are readily available. The larger jobs are more expensive, naturally, but the big problem is a reliable supply. Most are foreign made and currently the only stocks available are spare engines for snowmobiles, bankrupt dealer's inventories, etc. So, the little West Bend/Chrysler "twinned" power packs seem a matter of ingeniously making the best one can out of what is available. With Zenoh coming into the market with their 242cc G25A-A and John Chotia getting production of his 460 up to the point where he can sell to other than his Weedhopper customers, the situation will get more complex . . . but, boy, what we would give to have such a variety of engines available in the world of "real" airplanes!

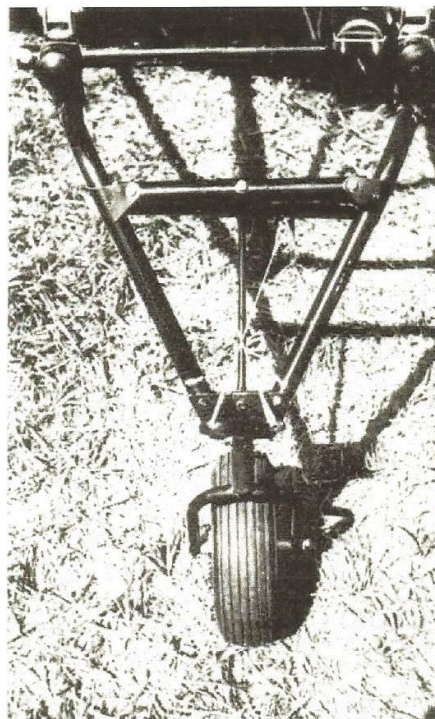
There was still more, actually. Chuck Slusarczyk was flying his Zenoh 150 Power Hawk equipped Easy Riser with a 48 inch propeller! On the Riser it looked like a refugee from a J-3. Chuck gets 150 pounds of static thrust from this brute.

Several Weedhoppers turned up with the new dual ignition set-up — two plugs mounted very close together in the top center of the head. In addition to the safety aspects of dual ignition, John Chotia reports that in his engine, pulling one plug wire results in a noticeable decrease in power.

There were a lot of interesting things going on in the ultralight area, but rather than dwelling on additional technical detail, let me elaborate briefly on the human side. I heard time after time after time such statements as:

"Well, with avgas in a headlong plunge towards two bucks a gallon, I guess all of us are gonna be flying these things soon."

"I'm just waiting for one of these fellers to come out with one with regular controls (meaning 3-axis control) — and then I'm gonna git me one" . . . and . . .



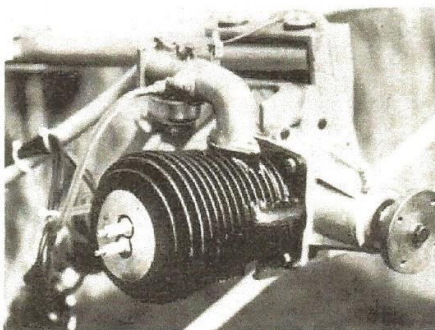
(Photo by Jack Cox)

Chuck Slusarczyk's (CGS Aviation) ultralight landing gears have "push right/go right" nose wheel steering. It's so simple — just a couple of crossed cables.

"The first ultralight manufacturer who offers an aircraft with a fixed seat, a stick in one hand and a throttle in the other, and rudder pedals that turn the plane right when you push right . . . is going to make a whole lot of money — in a big hurry!"

"It's nice to know there's still a way to fly if you lose your physical."

These people were almost exclusively "real" airplane types, as opposed to hang glider or non-pilot types. The universal complaint is with the "non-standard" controls — weight shift, lack of full 3-axis control, "backwards" rudder pedals, twist grips, etc. Otherwise, they like



(Photo by Golda Cox)

Dual ignition on the Chotia 460.

Kits For Klaus Hill's Humbug And Hummer Are Now Available

HOME BUILT AIRCRAFT
SEPT 1980

TWO NEW ULTRALIGHT HUMDINGERS!

By David Gustafson

THIS SUMMER, two new opportunities in sport flying have generated a great amount of excitement. The designs are already well-known to most homebuilders, but the availability of kits for the two — the Humbug and the Hummer — has only materialized in the past few months.

Both airplanes were created by Klaus Hill, who was actively seeking variations on a theme of fun flyers. His success was outstanding. Though signi-

ficantly different in their structural features, the Humbug and Hummer reach a common objective in the end: an adventure in ultralighting.

There are some qualities about both concepts which show they're off the same drafting board: Each has a "V" tail ruddervator system, a 34-foot wing with a beefy airfoil that develops high lift, and a high level of structural integrity. From that point, they part company

THE HUMBUG

Klaus brought the Humbug into the world of sport aviation last summer. He debuted the design at Oshkosh '79, where it won immediate attention and admiration. Although he'd spent several months *thinking* about the Humbug, he had spent less than three weeks actually building it. When he arrived at Oshkosh, he'd only logged 40 minutes, and consequently spent the convention sitting on the ground.

What could be more fun than flying a Humbug on floats off some quiet lake, after a day of fishing from cockpit?



(Ultralight pilots must have flown a minimum of 15 hours in their machine to be able to fly at Oshkosh). But that didn't diminish the enthusiastic response to the design; the energy was there. The static model spoke for itself.

Klaus had built up a powered hang glider that's foot-launchable, foot-recoverable, and free of all federal aviation regulations (FARs). There's no paperwork, no "N" number, no license — the feds could care less.

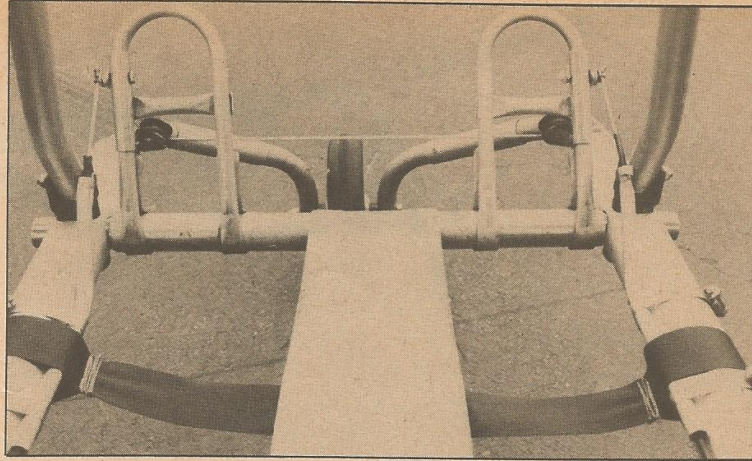
Naturally, the Humbug does have "auxiliary" wheels for those who want a little roll in their takeoffs and landings. If you'd like some variety on the theme, you can purchase optional floats, skis, ice skates or dune buggy tires (remove the wings and tail group for this sport).

Since the Humbug was turned over to Ed Vickery at Sky Sports in Ellington, Connecticut for manufacturing, the convenient mixer stick has been modified from two to three-axis controls. Research has also gone into separating rudder and elevator activity by adding rudder pedals to the footrest bar in front. *Voila!* Standard aircraft controls in an ultralight. It's a feature that gives this little airplane and its sister ship tremendous appeal to pilots who've had conventional training and never cared much for weight shifting.

Humbug construction, for the most part, consists of aluminum tubes and channel fittings, plastic end caps, nylon cable eyes, stainless cables and 3.8-ounce Dacron envelopes for the tail and wings (sewn by a sailmaker).

Power for the Humbug can come from several options; the most popular to this point is a twin-engine unit. Ed Sweeney is providing Gemini power systems that use Partner — Swedish Chain Saw — engines, which can be modified to develop from five to nine hp. Chrysler engines are also available, which are rated at 10 hp each. Because the engines are so close set, it's possible to extend a glide path significantly with one engine, if the other fails.

Assembling the Humbug for flight is a quick affair, requiring 20 minutes. Switching over to floats would take another 20, and an extra pair of hands. Preflighting is easy since all components are open to visual inspection and handling. Then, with two snaps, you've got a pair of buzzing power sources that'll quickly put you into the sky.



ABOVE: Design simplicity of Humbug shows up in this photo of "cockpit" area. Notice bent-tub foot pedals, nosewheel in view.



LEFT: More comfy than a flying carpet is this pilot seat, where you can lie back and enjoy the scenery as you buzz off!

BELOW: Off to the local flying field with your Humbug rolled up on the roof of your van is easy way to travel.

What overwhelms most pilots is the absolute simplicity associated with flying a Humbug. It's as much an act of will as a sleight of hand. Gracefully and unhurried, it overcomes its static inertia on the ground, rolling into a forward motion that imperceptibly smooths off into flight with very little rotation. Riding in the sling seat is like being car-



In the good old Hummer Time, this pilot has a bird's eye view of the world as he skims along a country road, alone.



ried aloft in a chaise lounge. The comfort is as surprising as the simplicity. It's very Mary Poppins. Certainly the imagination that went into Disneyland is reflected in the Humbug.

Again, as with the Hummer, landing's an exercise in relaxation and waiting. Line it up, level it off, throttle back and ride her through. It stops quickly on a sod strip, and taxiing is a gentle affair.

On water, the process is similar, but somehow a lot more exciting. A surge of power will bring the floats up on the step briefly before breaking the surface. Landing's a matter of virtually flying it back onto the water. And yes, you get wet along the way. But what an exciting puddle hopper and tree hopper!

The Humbug is available from manufacturer Ed Vickery at Sky Sports in Ellington, Connecticut (P.O. Box 507, zip: 06029, phone (203) 872-7317). As a finished, test flown airplane it costs \$4,290 F.O.B. If you're the kind of person who enjoys playing with tinkertoys, there'll soon be a Humbug kit which you can put together with simple hand



The Hummer is a genuine airplane, complete with landing gear, wings, engine, and a Certificate of Airworthiness to prove it.

tools. It's going to be complete — all you need add is labor and flying skills. You can call the factory for the price, which had not yet been determined at this writing. There's an advantage to building your own: It gives you a clearer understanding of what goes into the airframe and should help you as a pilot.

THE HUMMER

A quick visual check reveals that the Hummer is a single-engine pusher that's built up around a 5-inch irrigation pipe "fuselage." Power comes from a 16-hp Xenoah engine, and the air screw is 33 inches diameter by 16 inches pitch. The 34-foot wing covers 128 sq.ft., and it takes loads of 2.5 to 3.0 pounds/sq.ft. Empty weight is 170 pounds; gross can be pushed toward 400 pounds if rate of climb doesn't mean much to you. It is definitely *not* foot-launchable. This means that the F.A.A. recognizes the Hummer as an airplane, the genuine item. Therefore, the pilot/owner has to build 51 percent of the airframe — an enjoyable task

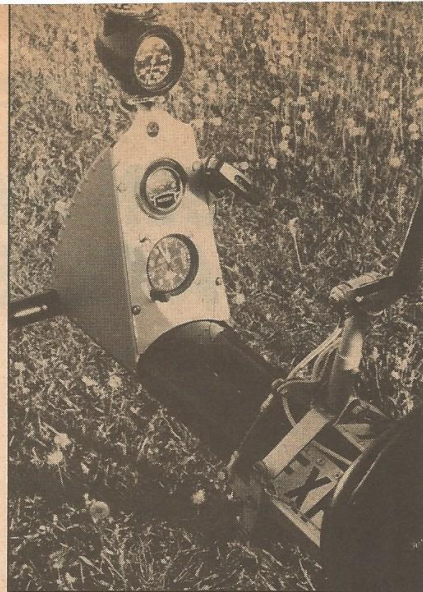
that's easily accomplished in 85 to 150 hours (depending on your dexterity with pop rivets). It's also necessary to have the plane inspected before flying it. In addition, you'd need a pocket for an airworthiness certificate, and the plane has to sport its own N number. If you build the plane, you can perform the required annual inspection yourself and simply note it in the airplane's log (no muss, no fuss).

Your final encounter with the FARs will involve your status as a pilot. If you have never taken formal flying lessons, you'll need at least a student pilot's ticket. That can be as simple as getting a third-class medical exam and locating a certified flying instructor who will sign you off for solo flying on your Hummer. It isn't required, but it would probably be a wise (and thrilling) experience to get up to solo capability in conventional aircraft. *What you stand to learn would always be useful, regardless of your choice of ultralights.*

Though the strange encounters with the FAA may sound like a big hassle, they aren't. All the steps will be clearly defined at your friendly F.A.A. General Aviation District Office. Or, you can write for a document that spells out the *total* process. It was prepared by Ron Wojnar, an Experimental Aircraft Association member who's also head of Milwaukee's GADO. For a free copy write to: Chief, Engineering and Manufacturing Branch, Federal Aviation Administration, 2300 East Devon Avenue, Des Plaines, IL 60018. The title of the document is: *Amateur Builder Advisory on Airworthiness Certification*. What you get on the other side of the paperwork is well worth the effort.

A Hummer's the stuff fantasies are made of; it's a backpack of energy that'll lift you gently through a new sense of freedom into the total impact of flight. No other airplane has put a pilot closer to the wind with such incredible visibility. The sense of release is unparalleled. Your mind will pop off like a fistful of Roman candles.

And there's really nothing to beat a Hummer for ease of handling. Sliding the throttle forward brings immediate thrust and motion. The steerable tailwheel is amazingly responsive (compared to larger aircraft); takeoff roll develops quickly. On the way to flight, there's a narrow envelop of fishtailing that'll wake you up the first time, but it requires patience, not controlling. The Hummer doesn't really rotate, it levitates. When it's ready to fly, you go



A 5-inch irrigation pipe of plastic is used for the Hummer's fuselage; it's both light weight and strong.

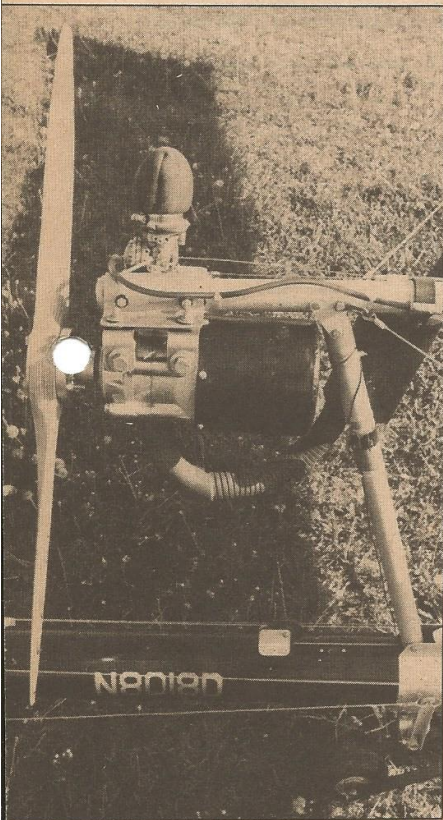
along for the ride. Being airborne is an exquisite adventure.

As with any ultralight, response to altitude or roll input is slow but reliable and easy to master. Landing, according to the late Klaus Hill, is a matter of sitting there like a "sack of potatoes" and letting the plane do all the work. It settles slowly, without surprises, and rolls out gracefully.

As of this writing, Dennis Franklin, president of Maxair Sports in Glen Rock, Pennsylvania (Rd. #2, zip: 17327; Phone: (717) 235-5512), was refining a set of flapperons and a float kit that would extend the range of thrills already available to Hummer owners.

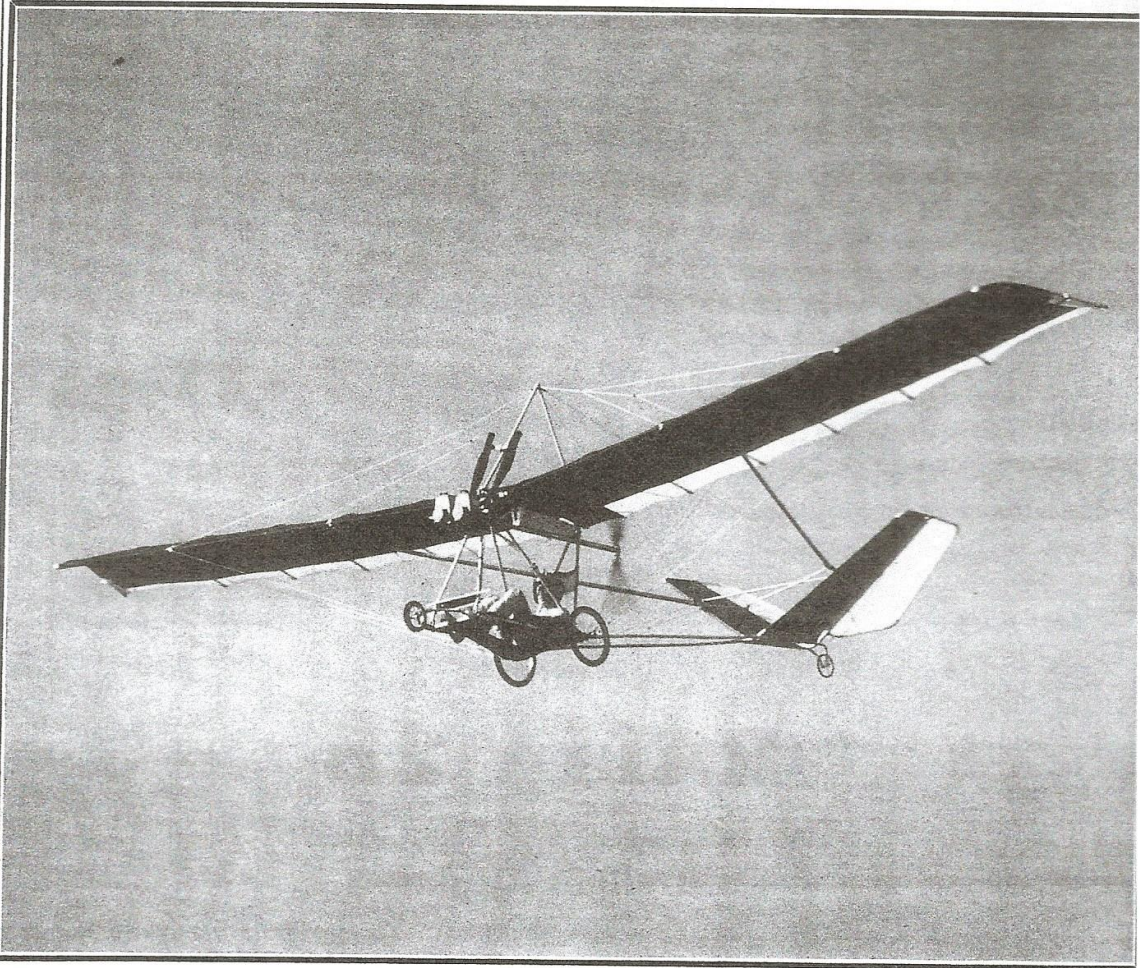
A complete kit for the Hummer sells for \$3,200 F.O.B. It comes with everything you need to get into the air, including directions for the FAA paperwork. If you want to fabricate your own parts, you can buy a set of plans for \$75. It's unlikely, however, that you'll be able to match the quality and smooth edges that typify all of the components in both the Hummer and the Humbug.

How do the Hummer and Humbug compare as flying machines? It depends on whether you like to do it sitting up or lying down; whether you enjoy putting it all behind you or having some kind of framework around you. They both take off, cruise and land at about the same speed. Their response to control is similar, and their potential for delivering fun is virtually unlimited.



Sixteen-hp Xenoah engine from Japan, mounted pusher-style near the V-tail, supplies the motivation for Hummer.

Sky Sports HUMBUG



The Ultimate Ultralight

"The Humbug", the newest design by Klaus Hill, winner of the Joe Diamond award at Oshkosh 1980. Klaus was named as the man who has done more for the advancement of ultralight aviation than any other. The Humbug will, for the first time, be available in kit form as well as ready to fly. The Humbug has been load tested to six G's positive and three G's negative. You have full three-axis controls on the Humbug and this is accomplished through the use of a V-tail ruddervator and spoilers on the top of our large 160 square foot, double-surfaced wings. The sail is made of pre-sewn 3.8 ounce Dacron. The Humbug's main structure is made from 6061-T6 aircraft aluminum tubing which is anodized, prebent, and drilled for rapid bolt-together assembly. All bolts, hardware, and rigging are made to aircraft specifications. The new power systems used on the Humbugs incorporate a single gear

reduced, 50" pusher propeller, utilizing a single or twin engine. The Humbug has options which include a custom landing gear, the ultrafloat pack for water takeoffs and landings, a cover bag to protect your Humbug during transportation, and a long line of instrumentation.

Assembly time from box to flight readiness is approximately 20 hours, as easy as assembling an erector set. Once kit assembly is completed, it will take you only 30-45 minutes to fold or reassemble the Humbug. Completely folded, the Humbug can be transported on most any car top and stored on the wall in your garage or basement.

The Humbug is manufactured by Sky Sports Inc. of Ellington, Connecticut. Sky Sports is a world-renowned hang glider manufacturer which has been in business since 1972. Since its conception, Sky Sports has been a leader in their field and has

developed many new concepts in aircraft construction now widely used throughout the industry.

Sky Sports, in keeping with their tradition of firsts, has made the Humbug kit available with either of two modes of payment. First is the traditional advance payment for quick delivery, or a five to six part installment method. Prices start at \$2690.00 for the ready assemble Humbug kit, less power system. The standard 110 lb thrust power system is \$1195.00 and our large 135 lb thrust high performance system is \$1495.00. Contact Sky Sports for more information on the Humbug kit, installment plans, and Humbug dealers in your area.

In Europe Contact Para-Fun International
Juan Garcia Kalkbraenderhaeusg.22.DK-2100 Copenhagen O, Denmark

Sky Sports
Incorporated
P.O. Box 507
Ellington, CT 06029
U.S.A.

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— Vol Libre Magazine

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— Vol Libre Magazine



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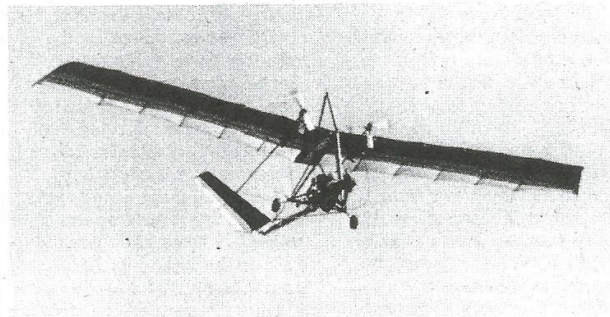
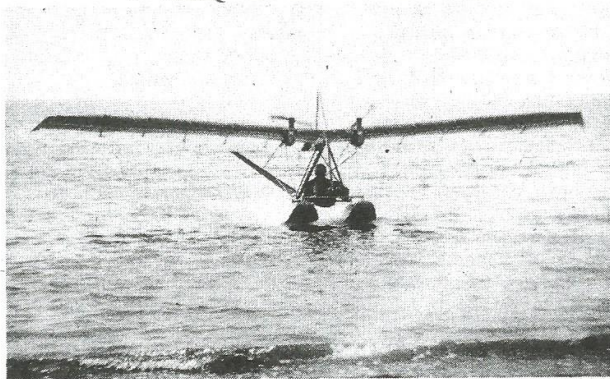
Mitchell Aircraft news release

Keeping An Eye On Industry

GLIDER RIDER

Gemini International Produces Hummingbird

GLIDER RIDER DEC 1980



Gemini International has moved to Sparks, Nevada, where they are producing the Hummingbird, a three-axis, aerodynamically controlled ultralight with independent flight

controls. The control stick initiates roll and pitch, while the rudder bar controls yaw and the steerable nose wheel. The Hummingbird is powered by twin Gemini/Partner K-1200

power units designed, developed and manufactured by Gemini. Each engine is controlled by separate throttle levers, with a single master switch.

The wing is fully double-surfaced with stabilizer/elevons. The tricycle landing gear has spring steel suspension on all three wheels (either go-kart wide-tread wheels or 20" diameter plastic bicycle wheels).

Stall speed (power off) is listed as 18 mph or (power on) 15 mph, with a top speed in level flight of over 50 mph. Hands-off cruise is at 35 mph.

Gemini says "the Hummingbird is a genuine, pick-it-up and run-with-it foot-launchable and foot-landable ultralight. One person (the pilot) can foot launch without assistance in a six mph headwind under full control." The Hummingbird can be folded for car top transporting, and requires no FAA licensing for either pilot or craft.

Options include: cover bags for the wing, tail surfaces, ribs and engines; tuned exhaust silencers, soft fairings, and floats. Weighing 145 pounds with a 250-pound payload capacity, the Hummingbird sells ready-to-fly from either dealers or the factory. Each ultralight is photographed in the air on its test flight. The engines are warranted for 100 hours, with service available around the world backed by Partner (which developed the engine for chain saws).

LaFayette Aviation Introduces "Huski"

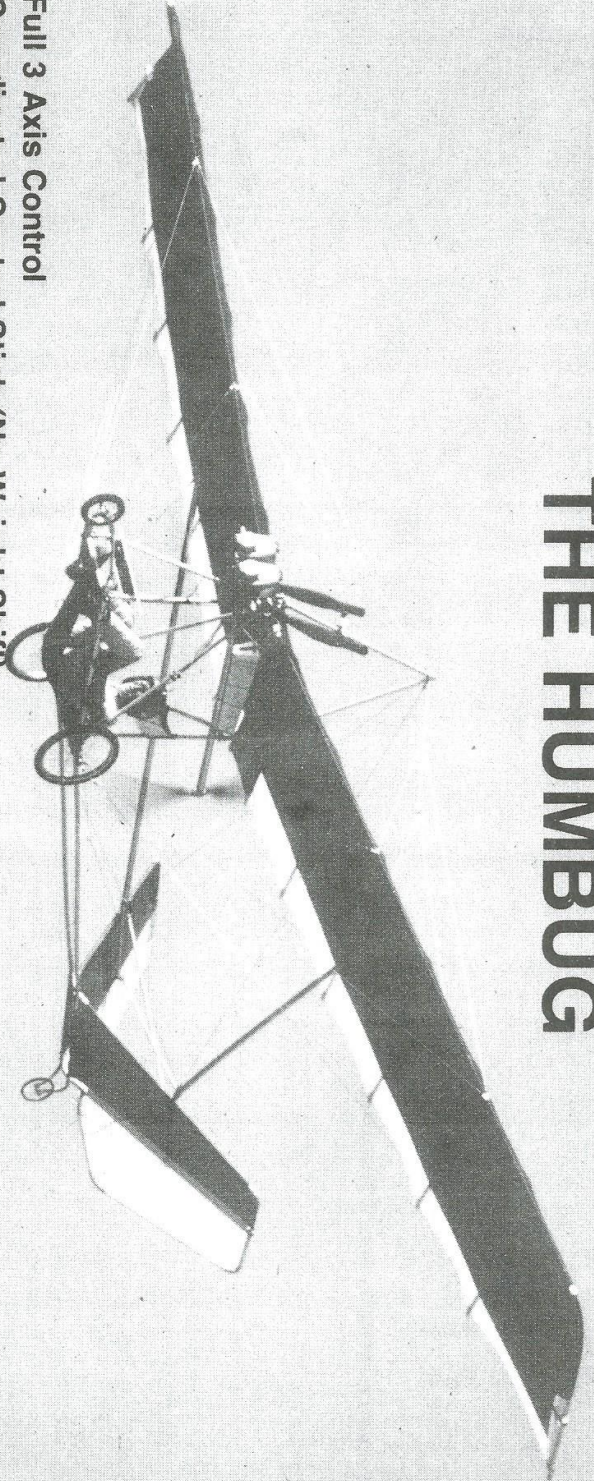
LaFayette Aviation and Aircraft, manufacturer of the Hi-Nuski ultralight, has announced the development of the "Hi-

Nuski Huski". The ultralight features a new engine, a two-cylinder, two-cycle direct drive power unit with 30 hp and a 430

cc displacement.

Designed for longer life, smoother operation and reduced engine noise, the engine provides a cruise speed listed at 40 mph. The new 1981 Hi-Nuski airframe has been strengthened for the higher speed and stress load of the new engine.

The Ultimate Ultralight THE HUMBUG



- Full 3 Axis Control
- Coordinated Control Stick (No Weight Shift)
- Double Surface Wing
- Fully Foldable, Cartopable (No Need For A Trailer)
- 2 Power Systems, 110 lbs and 135 lbs of Thrust
- Kit or Factory Prebuilt
- 100 - 280 lb Pilot Weight Range
- Floats, Snow Skis, Cockpit Enclosure
- 6 Part Installation Plan on Humbug Kit

GLIDER RIDER DEC '80

**Sky Sports**
Incorporated
P.O. Box 507
Ellington, CT 06029
U.S.A.
(203) 872-7317

When the exhaust fumes had dissipated, however, a lil' 'ol Fairchild PT-19 was judged Grand Champion Warbird. Owned by Frank and Michael Mock of Tampa, it was a beauty.

But, now, let's get back to those fiesty utlralights. In sheer numbers and in activity, they were, unquestionably, the prime attraction at Sun 'N fun '81. On the mornings and late evenings they were able to fly, it appeared the entire fly-in crowd had trudged over to the ultralight area.

A quick walk-through of the ultralight grounds left me with three broad-brush impressions: (1) I sure wish I had had a chunk of Cuyuna stock prior to Sun 'N Fun, (2) I sure wish I had had a chunk of Ultra-Floats stock prior to Sun 'N Fun and (seriously), (3) Klaus Hill's influence on the ultralight movement has actually increased since his untimely death a year and a half ago.

No question about it, the Cuyuna engine was the hot set-up at Sun 'N Fun '81. Producing 30 hp at 5500 rpm, it was kicking the Quicksilvers, Hi-Nuskis and, of course, Pterodactyls upstairs like they were rocket-assisted. Some were belt reduced and some were straight drive, the latter becoming a little too noisy on take-off as the prop tips began cracking the sound barrier. The effect of all this power is interesting from an operational standpoint. As it is with all sorts of aircraft, you don't really gain all that much in top speed by increasing power — but the climb rate really improves. When ultralights came on the scene a few years ago, many were advertised as capable of flying "out of your backyard." They were always capable of **landing** in a very small area but with the 10 and 12 horsepower engines favored in the early days, certainly couldn't fly back out . . . at least not if there were any obstacles above clothesline height anywhere close around. (I still wince recalling John Moody dodging trees and fences as he clawed for altitude in his original direct drive MAC-101 powered Icarus III!) Now, however, with all the power, the belt drives and prop discs almost as big as those of J-3 Cubs, many of the current crop of ultralights literally **can** fly out of a good sized backyard . . . or parking lot . . . or the top of a large building (like autogiros in the '30s) . . . or ??? Now all this get up an' go is fun to watch and must be exhilarating for the pilots . . . but I find myself compelled to join the responsible voices in aviation in urging that this capability be used with a dash or two of common sense. Dropping in for a touch and go on the 50 yard line during a Super Bowl game might do wonders for the warped egos of a nerd or two . . . but it will also bring down the regulatory wrath of the FAA with the speed of summer lightning. You unlicensed ultralight pilots have the sweetest deal going in all the world of aviation . . . so unless you just can't stand waiting a moment longer to get in on all the fun of forty bucks per hour dual instruction, FAA check rides, biennial flight reviews, FAA physicals, etc., etc., ad nauseam, then you might do yourself and everyone else a favor by flying **where** you know you should fly and **how** you know you should fly.

On the positive side, the power of current ultralights also makes float flying feasible. We obviously didn't see any at the Lakeland airport, but Eipper's video tape of their Quicksilvers operating off floats was really impressive. It takes little imagination to realize the whole new dimension water flying adds to ultralighting . . . especially in a place like Florida. Really looks like fun.

I spent a lot of time in the ultralight area at Sun 'N Fun and I couldn't help being reminded over and again of the legacy of Klaus Hill. Everywhere I turned, there were his designs . . . or evolutions of them: the Fledgling-based Pterodactyls, Dennis Franklin's Hummers and a raft of "new" aircraft that are actually developments

of the Humbug. The latter are popping out so fast you need a scorecard to keep up.

Just before his death, Klaus had worked out a deal with Sky Sports in Connecticut to produce the Humbug. Within a year, however, the two principals had split up and were building their own versions of the ultralight. And since Oshkosh '80 one of these groups has split again . . . and now there are three — none of which is called the Humbug today.

● The Hummingbird is Ed Sweeney's Humbug derivative and is powered by his Gemini/Partner reduction drive engines. His Gemini International of Sparks, Nevada sells the machine as a finished, test flown aircraft. I is **not** a kit. The Hummingbird has 3-axis control, a spring leaf main gear and steerable nose wheel. It is a legitimate foot launcher and is car topplable.

● The Vector 600 is advertised as having full 3-axis control — but the rudder and spoilers are interconnected. Control is via a side mounted stick as on the original Humbug. Powered by a twin Soarmaster power pack, the car-topplable Vector appears to be the least modified of the three. It is produced by Vector Aircraft Corporation of Ellington, Connecticut.

● The Mirage is the most extensively altered version of the Humbug. It has a completely different "fuselage" and has conventional tail surfaces. With full 3-axis controls, throttle in one hand, stick in the other, the Mirage is aimed at pilots who want something less expensive to fly, yet similar in operation to what they are accustomed to. The engine is a unique twin Yamaha (15 hp each) arrangement driving a shaft-mounted pusher prop. It is mounted to a sturdy looking oval-sectioned aluminum extrusion that, upon examination, turns out to be a piece of sailboat mast! Despite the changes, the Mirage is still car-topplable. It was awarded the Outstanding New Design award at Sun 'N Fun '81. The

(Photo by Jack Cox)

13. The Vector 600, a development of Klaus Hill's Humbug.

(Photo by Jack Cox)

14. Winner of the Best Custom Classic — Over 165 hp award was this 1950 Beech BE-35 Bonanza, polished like a new dime by owners Don and George McDonough of Palos Hills, IL.

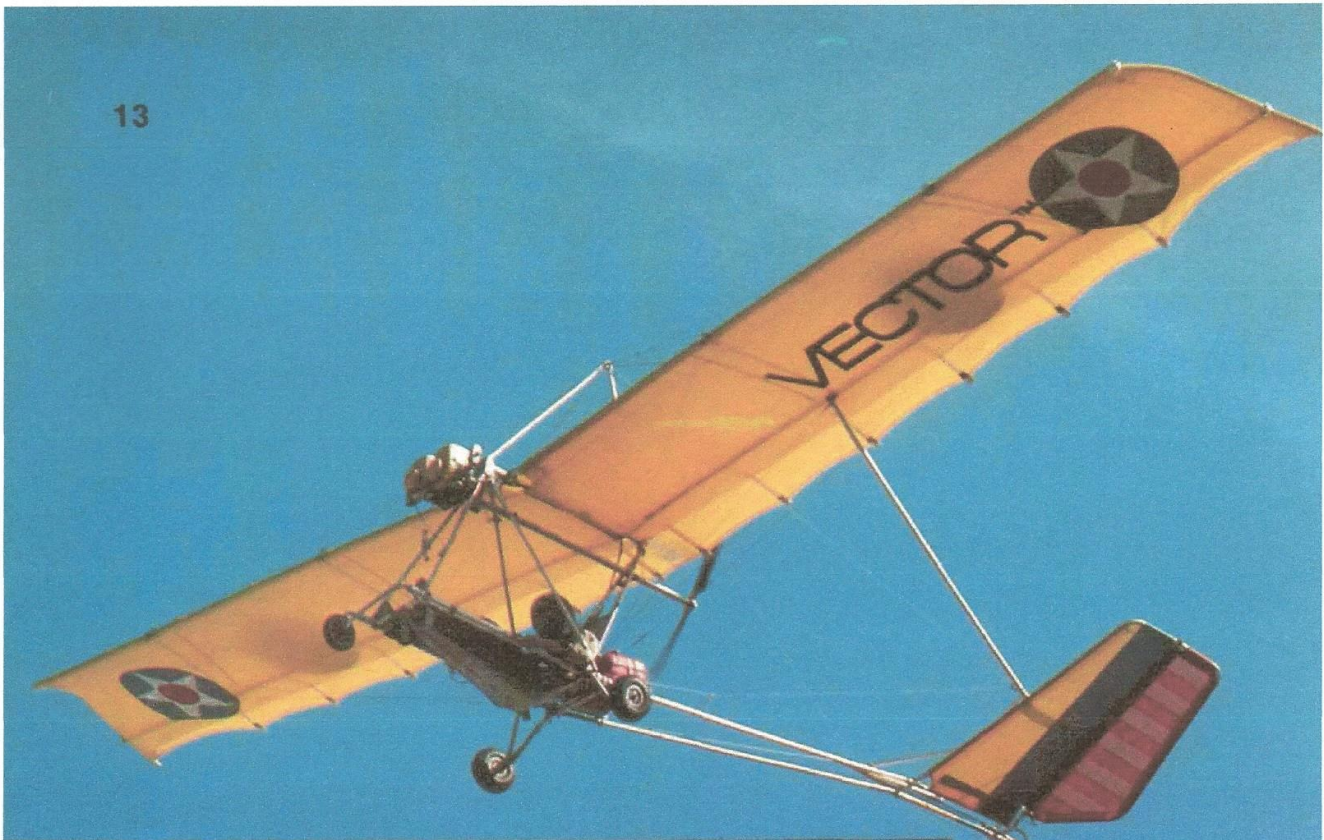
(Photo by Jack Cox)

15. The Sizzler by Myral Ethington of 4615 Walker Lake Rd., Bartow, FL 33830. There's obviously some Weedhopper influence here, but fittings and other details are different. The wing is scaled up from a model airplane — also called the Sizzler. Having no previous flying experience other than RC models, Myral taught himself to fly his ultralight and did a competent, responsible job in the fly-by pattern at Lakeland. Powered by a Cuyuna engine.

(Photo by Jack Cox, © Sportsman Pilot)

16. An original gyroplane by Lloyd Poston of Plant City, FL. Powered by a converted Lycoming GPU (125 hp), N5479 utilizes run-out Hughes 269 helicopter blades. A two-place tandem machine weighing 625 pounds empty, it grosses out at 825 pounds. Top speed is 100 mph and it will slow fly at 30 mph. Rate of climb is 1200 fpm. Over 400 persons have been given rides in the gyroplane and a woman parachutist once jumped from it. Note the pre-rotator unit mounted atop the engine. The lower end of an outboard motor drive is used to pick up torque from the engine and direct it upward to the rotor blades.

13



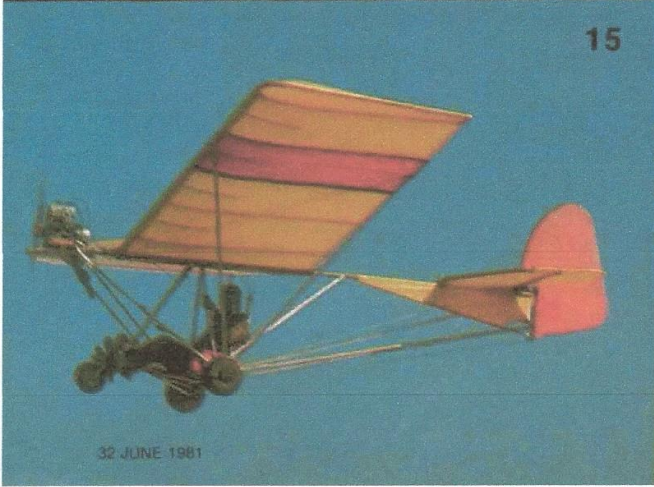
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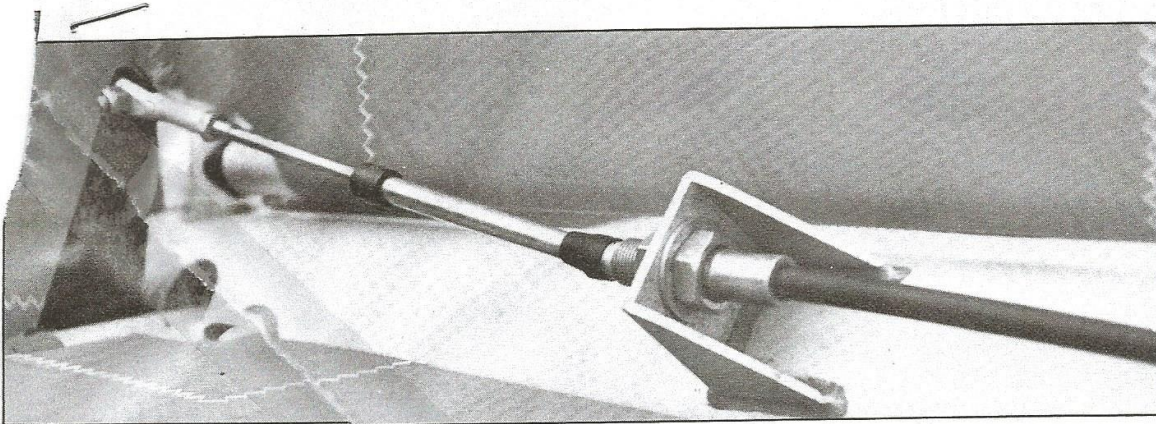


15



32 JUNE 1981

SPORT AVIATION



The elevator is operated by Teleflex cable; note the nice welding on the bracket.

The Connecticut firm of Ultralight Flight, Inc., is one of those that's become relatively prominent in the ultralight market only after the initial boom had subsided—or at least been consolidated. Thus, UF never entered the marketplace with what we'd now consider a "basic" (i.e., single-surface, two-control) Ultralight, electing instead to hold off until they could introduce a three-control double-surface design.

That design was (and is—it's still very much in production) the Mirage. Like many others, including the Vector, the Hummingbird, the Snoop, the Swallow, and the Sunburst, it owes a great deal to the legacy of the late Klaus Hill—specifically, to one of his designs called the "Humbug," which created a great stir at its initial appearance at Oshkosh in 1979.

From here, the picture becomes somewhat clouded, as a whole spate of Humbug derivatives appeared during the next few months. To complicate matters even further, there was a certain "reshuffling" of personnel among various of the manufacturers, particularly those in the Northeast. Thus, there was a certain amount of what an electrical engineer might call "crosstalk" between, among others, Gemini, Vector, and Ultralight Flight; in fact, one of the designers of the Mirage, Chet Fudge, later pressed on further with the same design philosophy and developed the Swallow.

Meanwhile, back at Ultralight Flight, the Mirage enjoyed a modicum of success, particularly among those pilots who were enamored of such airplane-like features as discrete three-axis control. It also became fairly well known overseas; in fact, during a recent trip to New Zealand, I was startled to find an entire hangar full of Mirages at one of the small country airfields I had a chance to visit.

Meanwhile, though, back at Windsor, Connecticut, plans were already afoot for an aircraft that would be even more "airplane-like" than the Mirage. The result—the Phantom—first appeared at last year's Sun 'n' Fun Fly-In, where it garnered considerable attention as well as an award. It has taken a while since then to get large-scale production and distribution cranked up, but it's happened; as with the Mirage, I expect that overseas sales will be considerable. At the same hangar in New Zealand where all the Mirages roost, a group of enthusiasts plan to build an initial batch of ten Phantoms, using locally-available materials to the greatest possible extent in order to avoid New Zealand's staggering forty percent import duty on aircraft components.

Of course, here in the States we're not plagued with that particular problem; you can get a Phantom ready-made from your Friendly Neighborhood Ultralight Flight dealer, and it was through the courtesy of one such dealer, Freedom Flight of Tacoma, Washington, that I was finally able to catch up with a flying Phantom long enough for an evaluation. Freedom Flight is the Ultralight Flight distributor for the Pacific Northwest, and sales manager Gary Prichard told me that interest in the Phantom has been at least equal to, if not more than, that in the Mirage.

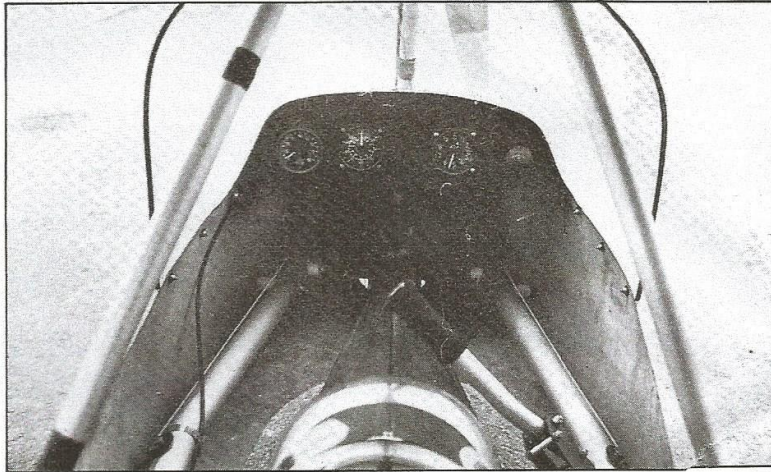
One reason for this may be the performance of which the Phantom has been considered capable; as we go to press, we learn that the team of Jim Campbell and Patty Trusty has switched brands for their planned around-the-world flight, changing from Pterodactyls to Phantoms. How much of this is based on politics and money and how much is based on the actual relative merits of the two designs, I don't know. At any rate, Phantom advertisements set great store by the fact that the machine is capable of at least mild aerobatics—although they seem to alternate between a full-on pitch—"it's fully aerobic and a real challenge for the pilot who 'wants it all'"—to a somewhat more restrained posture, in which the machine is merely described as "aerobatically tested," which can be interpreted as meaning like, "our test pilot can get away with aerobatics—but that doesn't necessarily mean that you can." Without meaning to cast any aspersions on the Phantom, I tend to agree more with the latter interpretation; while the Phantom appears to be very stoutly built, and has a redline of 100 mph, I tend to cast a rather jaundiced eye on the aerobic prowess of most Ultralight pilots unless they've had a fair amount of dual instruction from a competent aerobic instructor in an appropriate airplane.

Let's drop that particular subject for the moment, though, and consider the Phantom purely on its own merits. Freedom Flight's machine was placed at my disposal on a nice afternoon—meaning that it was only raining gently, and not even all the time—at Pierce County Airport near Tacoma. This little aerodrome, also called Thun Field, has long been the local home-builder and EAAer hangout, together with a couple of others north of Seattle; the overall amount of experimental and sport aviation in the Puget Sound area is astonishing until you remember that Seattle might also be called "Boeingville."

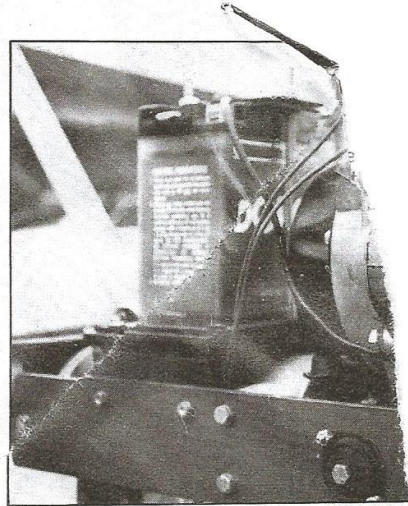
With the Phantom, Ultralight Flight has moved away

Air Progress ULTRALIGHTS 29

YEAR?



A pilot's-eye view; the stick is just to the left of its slanted "neutral" position in this picture.



The Phantom engine offers a luxury option: electric start! (note battery behind "air" filter).

from the true "Klaus Hill look," but the discriminating eye can still discern definite "Hilloid" touches, among them the "ladder frame" structure of the wing and the modified parallelogram that forms the cockpit. Unlike earlier Hill designs, however, this particular parallelogram is not designed to fold for car-topping; instead, it's augmented by a further downtube in front of the pilot. The aft fuselage is composed of a single large-diameter boom, a feature that's becoming vogue in a number of designs including the new Flight Designs' FlightStar, evaluated elsewhere in this issue. Like the FlightStar, the Phantom uses the 440cc Kawasaki two-cylinder engine with a reduction drive swinging a tractor propeller in front of the cockpit.

Also like the FlightStar, the Phantom is characterized by a pilot fairing and a big windshield, and for the same reason: without it, the propeller blast is probably enough to turn your eyelids inside out. Much of the rest of the layout is also quite similar, including the bungee springing of the main gear, although the Phantom's gear legs are aluminum rather than the steel of the FlightStar.

The major difference is in the wing. Not only is the wing of the Phantom a bit smaller than that of the FlightStar (in fact, it's fairly small by almost any standards, having—for example—some ten square feet less area than the lighter Quicksilver MXL), it's also wire-braced rather than having rigid struts. While this may be a bit "draggier," especially since it requires a kingpost and landing wires as well as flying wires, it's also apparently considerably cheaper: the Phantom lists in the \$6,000 class, some \$1,500 less than the FlightStar.

The wing uses both upper and lower surface ribs or battens; both sets are put in through small openings in the lower surface of the wing. The rear end of each upper rib is held in position by a small plastic "saddle" that pushes against the front of the rear spar tube when the rib is installed; this not only keeps it up out of the way of the lower rib, but also puts it under a certain amount of tension, and the Phantom's sail is certainly among the tightest and smoothest I've encountered. The ailerons extend over the full wingspan, and are secured to the trailing edge by a full-length fabric hinge that's Velcroed in place. Normally, the Phantom will be trailered with the wings simply folded

aft alongside the fuselage, but if complete disassembly is required, it involves only pulling out the ribs and reaching in through two zippered openings on each wing to collapse the compression struts, at which point the entire wing can be bundled up into a package less than a foot across.

The tail is reminiscent in shape of that of the Mirage, although without the latter ship's external braces. The elevator is operated by a single Teleflex cable, secured at its aft end to a very neatly-welded bracket and emerging at its forward end from the back of the stick assembly. Conventional cables and pulleys operate the rudder; with no one in the cockpit and fairly weak springs on the rudder pedals, they hang slack in a rather alarming fashion, but tighten up whenever there are feet on the rudder pedals. All their pulleys are fitted with appropriate "keepers" to keep the cables from coming off when they're slack. Aileron operation is also via cables, although it's a closed-circuit system without any slack.

Gary's Phantom offered a further optional luxury in the form of electric starting, with a hefty battery mounted just behind the engine. I wonder what kind of weight penalty this exacts; Gary must place considerable faith in the starter, battery, and associated wiring and switching, since he's disconnected the standard pull starter on his ship.

This raises an interesting question: if the pull starter were still connected, so that it could be considered the "primary starting method," would it be possible to consider an optional electric starter a "nonessential aftermarket accessory?" If so, it might make inclusion of electric start possible even on those aircraft that are already close to the 254-lb weight limit without it.

I'm hardly noted for the fluid grace of my movements; when people say, "Lert moves like a cat," it's usually the D-9 diesel tractor they have in mind. Even so, I found my entry into the Phantom's cockpit more than usually klutzy; there's a diagonal brace on either side, squarely in your way. An initial attempt to worm my way in behind it suggested that future attempts should be made ahead of it, which worked quite a bit better—but still took a bit of squirming around, during which the ship tried to roll out from under me on the asphalted ramp. Once ensconced in the sling-type seat,

TWO-AXIS



Alain-Yves Berger

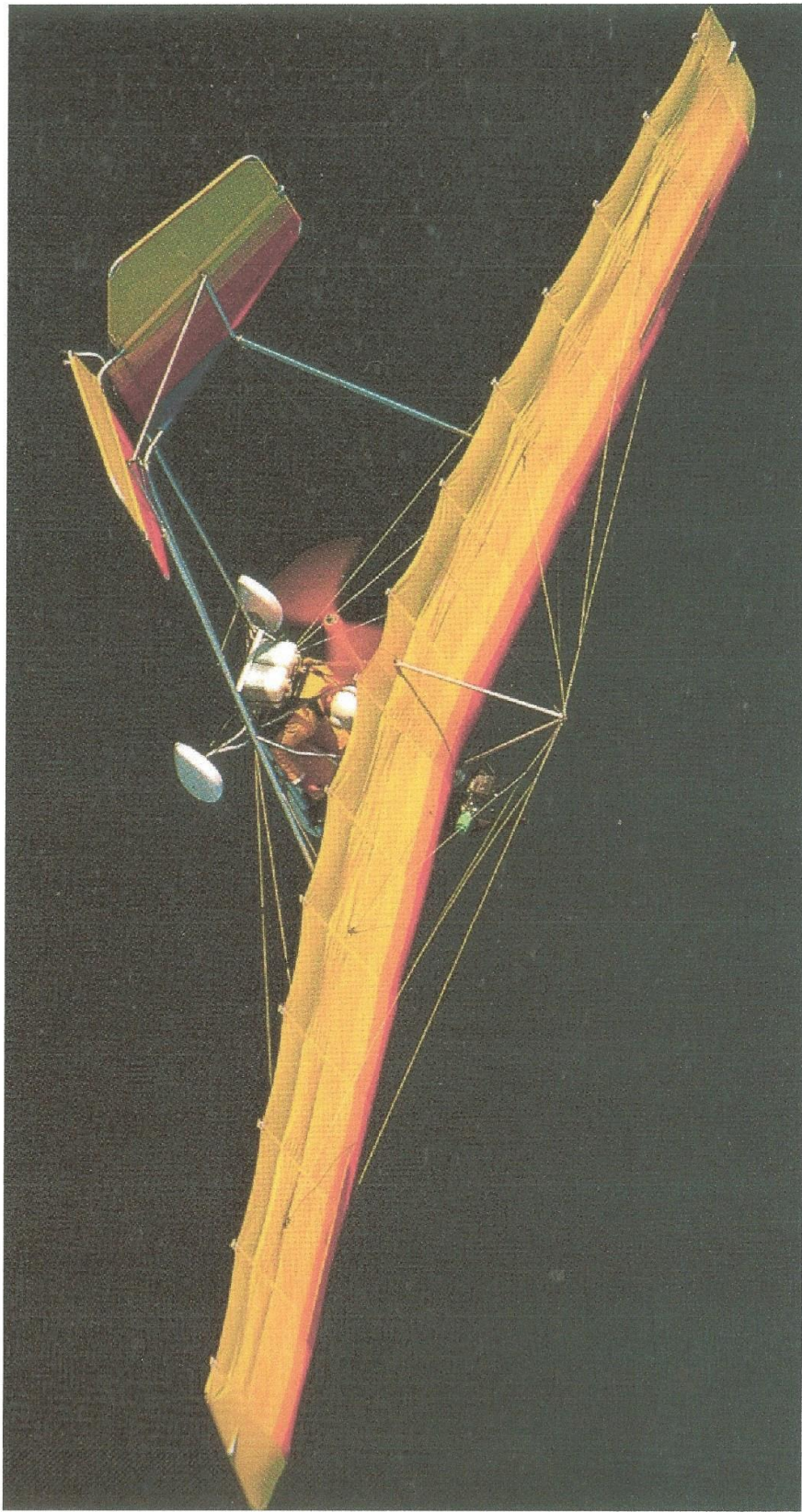
Two-axis aircraft vary from the very simple to the relatively sophisticated. Below opposite we have the daddy of them all, the Ron Wheeler *Scout*, an Australian design shown here in *Mk2* form. Aircraft don't come much simpler than this. Above it is a newer design which follows the same 'minimum aircraft' philosophy, the Paup *P-Craft* from American manufacturer Paup Aircraft. Both can also be had in three-axis form.

At the other end of the two-axis scale are heavier, faster aircraft like the *Vector 600* above (see Aerodyne) and the *Hummer* below, made by Maxair Sports. It is no accident that both these American aircraft have V-tails, as elevons lend themselves to two-axis control.



BOTH AEROPLANES ARE KLAUS HILL DESIGNS

1983 BERGER-BURR 'ULTRALIGHT & MICROLIGHT AIRCRAFT OF THE WORLD' ISBN 0 85429390 6 29





VECTOR

