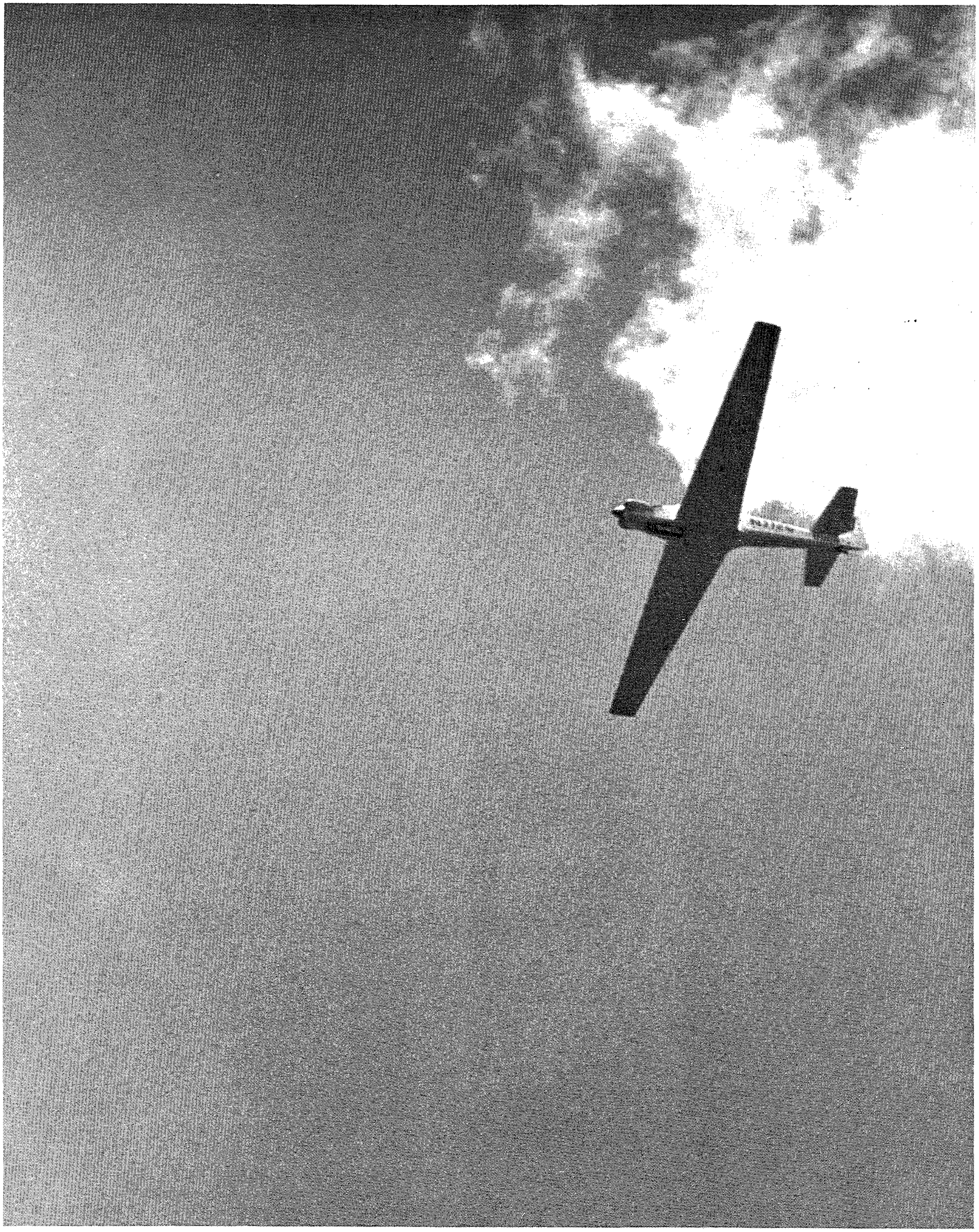
MOTORGLIDING

MARCH 1974
50 CENTS



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MOTORGLIDING

Donald P. Monroe, Editor

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Circulation of the February 1974 issue was 870. This issue was mailed in July 1974.

MOTORGLIDERS WITH GO-KART ENGINES

by Sandy Hudson, Jr.

The writer is fully aware that "motorglider" means vastly different things to *Motorgliding* readers. To some it means a fold-away engine and L/D of 30. Others might be less exotic and tolerate a L/D of 20 to 25. This article relates to motorgliders with L/D below 20, non-retracting engines, direct-drive fixed pitch wooden propellers from 24 to 27 inches long and turning from 3700 to 6400 rpm static; and West Bend go-kart engines weighing only 15 pounds each, complete with engine mount, prop hub and prop.

My first "motorglider" came in 1934, when I converted a secondary (also called *utility*) glider, designed and built in 1932 by yours truly. It barely had an L/D of 10 with a 45-cubic inch Indian V-twin motorcycle engine and a 4½-foot prop on the nose. But with a gross weight of 510 pounds and gross horsepower of barely 9.0, it would make *unassisted* takeoffs in still air from a dirt airstrip and climb 40 feet per minute! Had go-kart engines been around in 1934, I could have *reduced* the gross weight 60 pounds, and increased the climb to 150 feet per minute, using just two of the earlier 7½ hp (@ 7000 rpm) kart engines.

My actual experience with kart engines and small direct drive props dates from 1961. In addition to many hours of testing on test stand (see photo 1) much more testing was done via *air-drive* go-kart runs, mainly on unopened interstate highways. By towing this kart with a tension scale at the end of a tow line, I could pinpoint the thrust required for various airspeeds and by this tell what thrust the engines-props gave at certain airspeeds. After much testing, I found a minimum of 3/4 the static thrust when the airspeed is one-half the static prop slipstream velocity. Assume engine-prop gives 40 pounds static thrust and 75.0 mph slipstream velocity. Then you could expect 30 pounds thrust at 37.5 mph forward speed.

Photo 2 shows a Schweizer 1-19 glider flown at the Marion, North Carolina airport with two 7½ hp West Bend kart engines. Since the props were three inches too long, the hp was a total of less than 12.0. Auto tow assists were needed and the gross was 635 pounds. In 1963 it was flown at EAA Fly-In at Rockford, Ill. with a third engine on top of the fuselage. With 17 gross hp (props still too long for engines) the static thrust was a total of 100 pounds, takeoffs in 600 feet and climb 160 feet per minute. More information on the 1-19 motorglider is on page 71 Feb-March 1964 *Air Progress*.

Photo 3 shows the Cherokee II motorglider of Ken Flaglor flown at Rockford in 1964 and 1965. I assisted Ken in this project with the design of prop hubs and props (props superbly made by Troyer out of birch, 24" long x 12" pitch) plus many hours of engines testing on the stand shown in Photo 1.

For more information on this splendid motorglider see page 18 of the January 1965 issue of *Sport Aviation* and page 14 of the February 1965 *Soaring*.

Photo 4 shows a unique all-metal flush-riveted biplane motorglider designed and built by Stan Corcoran—the *same* Stan Corcoran that designed the *Cinema I* and *II* sailplanes in the early 1940s. This motorglider has *not* been covered in a magazine article before, although it flew at Rockford in both 1966 and 1967. This biplane motorglider had two 8.2 cubic inch West Bend (later Chrysler) engines and Troyer props like the *Cherokee II*. Both had about the same climb and top speed, plus takeoff and gross.

Photo 5 shows a *low*-aspect-ratio ultra-light designed and built by Wilbur Staib and flown at Rockford in 1966, also on two West Bends. Merle Replogle also flew his ultra-light *Gold Bug* on three West Bends in 1963. Then, let's not forget Bob Hovey's *Whing Ding* that flies on one McCullough kart engine!

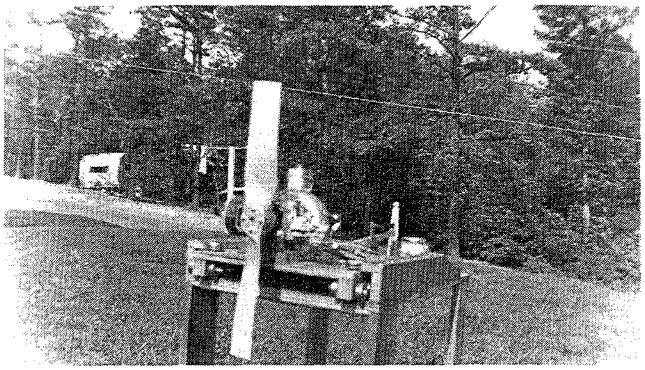


Photo 1—Test stand built by the author in 1961, with ball bearing cradle to test static thrust of various small engines and props. Also was mounted on front of station wagon to get thrust readings at various airspeeds. This engine and prop shown was, in 1962 and 1963, the left engine on the Schweizer 1-19 motorglider shown in photo 2.

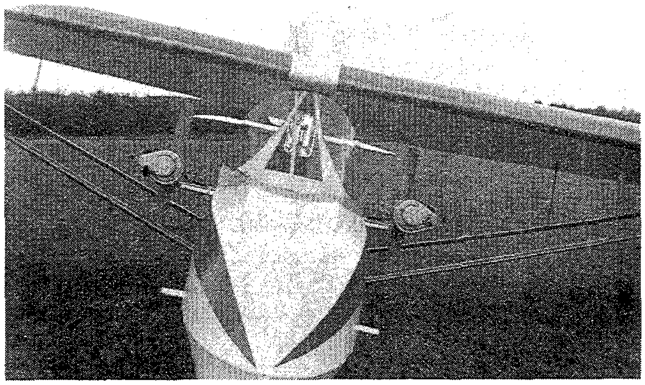


Photo 2—1-19 motorglider with one right and one left West Bend 7 cubic inch go-kart engines. Total static thrust 70 pounds. Thrust at 40 mph about 50 pounds. Would hold 1500 feet altitude in still, stable, normal air. On one engine had about twice as flat gliding angle as with both engines off (about 21 to 1).

Photo 3—Ken Flaglor and his *Cherokee II* motorglider at the EAA Fly-In, Rockford, Illinois, August 1964. One right and one left 8.2-cubic inch West Bends with about 17 total hp at climbing airspeed. Top speed about 80 mph at 7200 rpm. (Rated hp is 10 hp each @ 8000 rpm.) L/D with both engines stopped around 18. Static thrust 100 pounds total. In climb 70 pounds. Flown and soared many hours in 1964 and 1965.

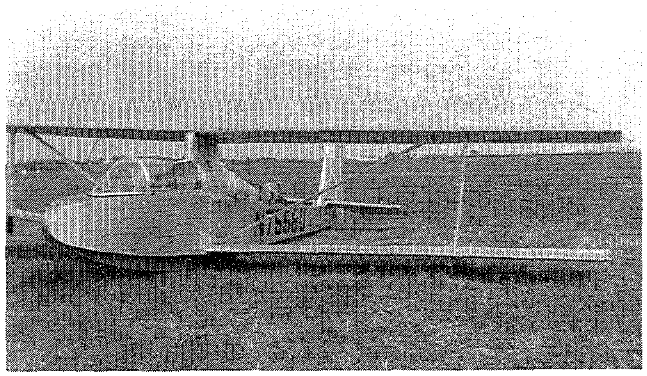


Photo 4—Stan Corcoran's original biplane motorglider at the EAA Fly-In, Rockford, Illinois, August 1966. Span 25 feet, aspect ratio 12.5, gross weight about 600 pounds. L/D with both engines stopped also about 18. Static rpm about 6100. Cockpit operated recoil starters. Flown extensively in 1966 and 1967, including cross-country ferry in nonsoaring weather. Still airworthy, but semi-retired, in Illinois.

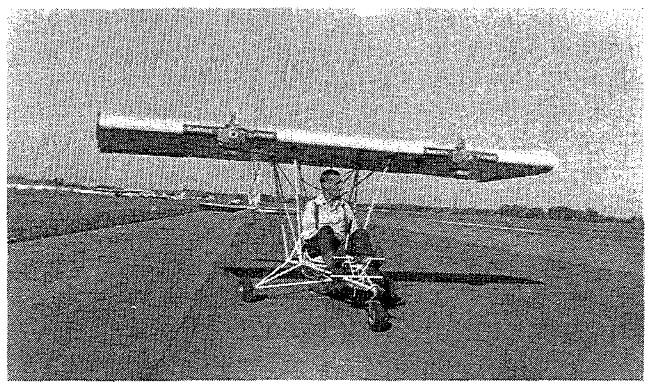


Photo 5—N11V—a true single-place *Breezy, Jr.* with only 14-foot wingspan and gross weight of 340 pounds, (with semi-fly-weight pilot-designer-builder, Wilbur Staib). Two 8.2-cubic inch (Chrysler) West Bends and Troyer 24-12 props, these being tractors instead of pushers. With near 100 pounds static thrust would get off rather quickly on hard surface. EAA Fly-In, Rockford, Illinois, August 1966.

THE *MONARCH* AS AN ULTRALIGHT MOTORGLIDER

by Dick Henderson

The design of the *Monarch* sailplane seems to lend itself to one more launch method other than those suggested by the designer, Jim Marske. The advantages of such a "fun plane" with self-launching and air-start capabilities are obvious; at the same time the weight addition would be no disadvantage, except in the case of the near maximum pilot weight.

A number of small two-cycle industrail engines have possibilities. The Chrysler 820 (10 hp) will turn a 24-inch propeller and produce 50 pounds static thrust—props and hubs for this engine are available from commercial sources. Weight of this installation is only about 20 pounds. Several other options are the use of JLO industrial engines from 12.5 hp to 24.5 hp, advantages of power and disadvantage of weight being considered.

Ingenuity will provide various methods of mounting the engine and cowling this area for the least drag. To compensate for some of the drag created by the engine installation, a pilot's windscreen or canopy may be installed.

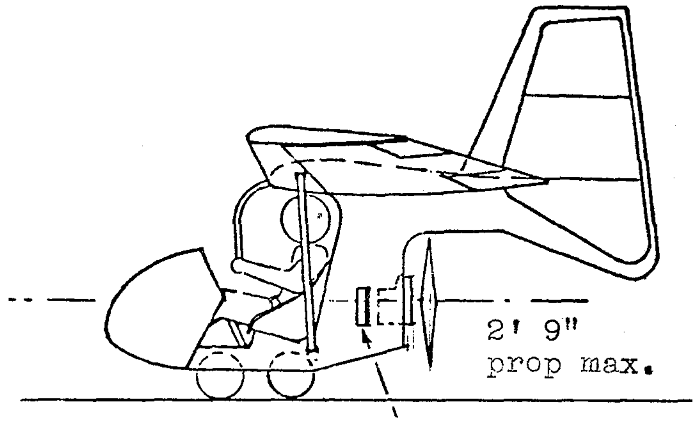
Installation of 36-inch prop is absolute maximum. Will allow engines from 10 to 24 hp. Engine weight 13 to 50 lb; about 50 to 100 lb static thrust.

Prop stops vertical to soar—move to horizontal to land with engine start rope in cockpit.

Specs of engines that possibly could be used:

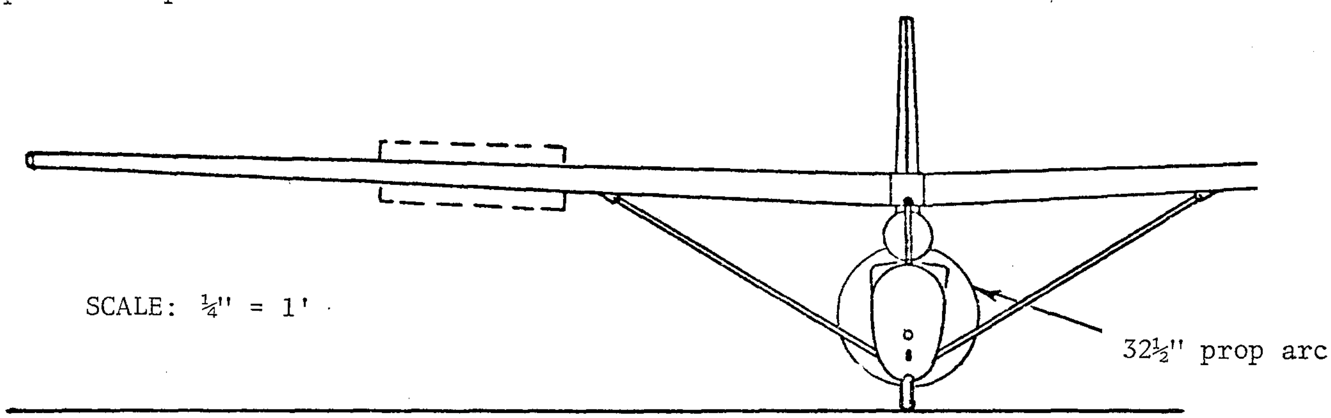
	Chrysler 820	JLO			
hp	8-10	15	21.5	23.5	24.5
rpm	4/7000	6000	6000	6000	5500
Width	7.5"	N/A*	N/A	N/A	N/A
Weight	13½	29	47	48	58
Start	Recoil	R/E**	R/E	R/E	R/E

* Not Available
** Recoil/Elec.
Note: Other engines in the same specification range are available.



Intake door for engine-open/close manually.

Tandem gear to facilitate ground stability and permit takeoff with limited power.



WHAT—A *LAPS?*

by AMTECH SERVICES*

That's right, a *LAPS*—Light Auxiliary-Powered Sailplane. With never ending spirals in performance and cost of today's sailplanes (fiberglass or metal) the "average" person who wants to get started in soaring is hopelessly pushed aside. The same also applies to many stranded soaring pilots as well as our "estranged" younger generation. The days of building a simple sailplane with a reasonable performance appear to be gone with the wind—never to return again.

Well, something should be done to bring the old good days of soaring back to all those enthusiasts who want to enjoy soaring without setting any records or looking for help to get off the ground.

Recognizing this situation for some time we first designed the *Jenko APS II*, the highest performing standard class, all-metal auxiliary-powered sailplane (see Jan./Feb. 1972 *Motorgliding*, p. 15). The construction of the prototype finally got underway after the much needed financial support was secured.

Now comes the *Jenko LAPS*, filling the need at the opposite end of the sailplane spectrum—a simple, wooden APS suitable as a building project for individuals, soaring clubs, high school students—even purists (please continue, even if reading behind a bush!) or power boys and girls.

Both designs feature new construction methods which were developed to ease the building efforts without sacrificing structural integrity. At the same time closeness of airfoil contours and surface quality can be markedly improved, thus increasing the performance, at discretion of the builder.

Actually, it all started in 1972 when the *ELAN* family of performing, all-metal sailplanes—*ELAN 13* (meter) and *ELAN 15* (meter)—of which the *Jenko APS II* is a version, was established. Then a similar objective was formulated: to develop a family of Ultra Light Sailplanes (ULS) including a ULAPS and even a MPA (Man-Powered Aircraft). The outgrowth of these efforts is the *Jenko LAPS*.

Preliminary design is completed. Substantial efforts were made to keep the weight down and the overall design suitable for an inexperienced homebuilder. Numerous design configurations, materials, ways of construction and cost were investigated and analyzed. Some were accepted, others were replaced by new concepts.

The final design, as shown in the illustration, is a braced, high-wing configuration with a pusher (folding) propeller. Materials used are selected fir wood, plywood, plastic foam and fabric. Most of hardware has no welding, the remaining few pieces can be welded by a qualified aircraft mechanic.

To accommodate well built pilots (up to 6.5 ft height) the cockpit was designed accordingly.

Aerodynamic Design

To facilitate building efforts, promote the surface quality and keep the Reynolds Number as high as possible, a constant-chord wing was designed. The selection of the airfoil, NACA63-615, was made on basis of many design requirements. Ailerons deflect differentially to reduce adverse yaw. There are no dive brakes; spoilers on the wing top surface provide glide path control. Hoerner type wing tips are used.

Fuselage ahead of the wing is of a rounded design with transition to a rectangular boom. A less experienced builder may build either a rectangular or polygonal bottom front portion at a slight decrease in performance. Canopy is a two-piece plexiglass sheet requiring no forming, yet causing no adverse air flow conditions.

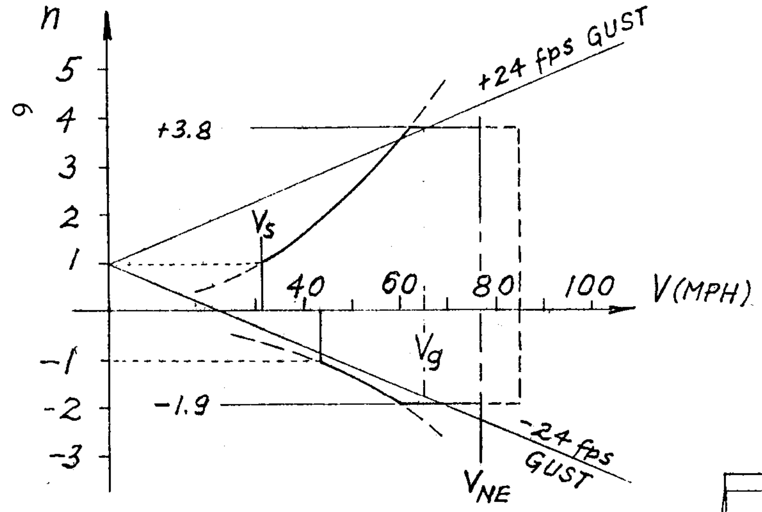
The NACA all movable horizontal tail with a geared trim tab and the vertical tail were taken from the *ELAN* family of sailplanes.

All component junctions have simple fairings, including the landing gear. The outriggers are retractable, if desired.

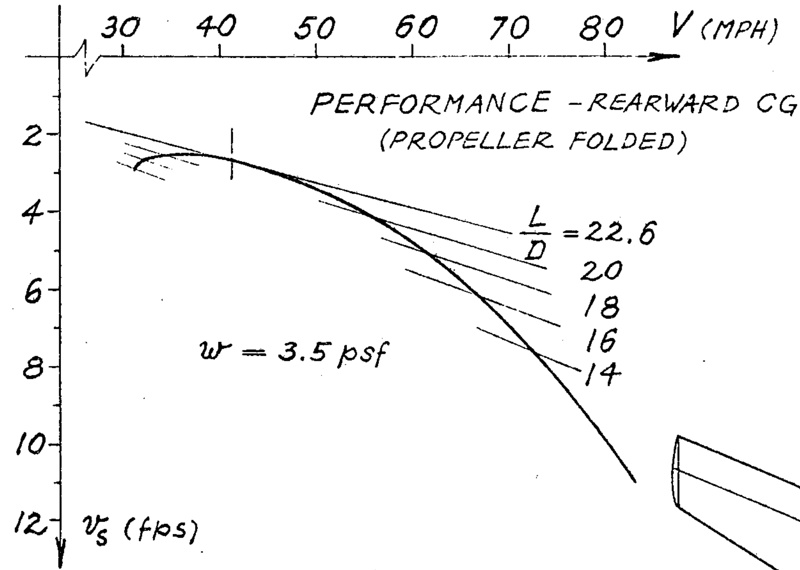
Structural Design

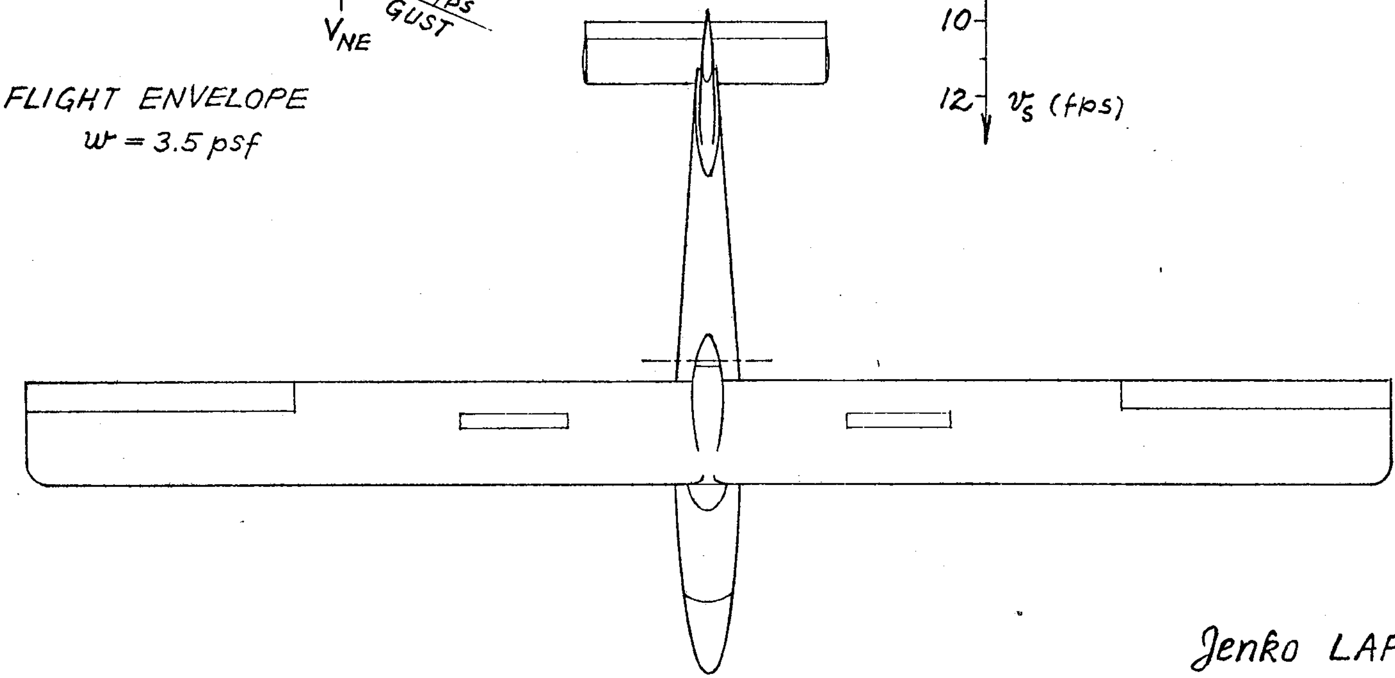
One braced main spar in each wing panel carries the bending loads, the plywood D-tube takes care of the torsion. The plywood cover on the wing top surface

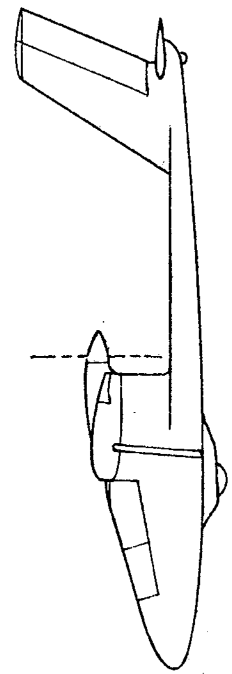
* Aero-Mechanical TECHnology SERVICES



FLIGHT ENVELOPE
$w = 3.5$ psf







Jenko LAPS
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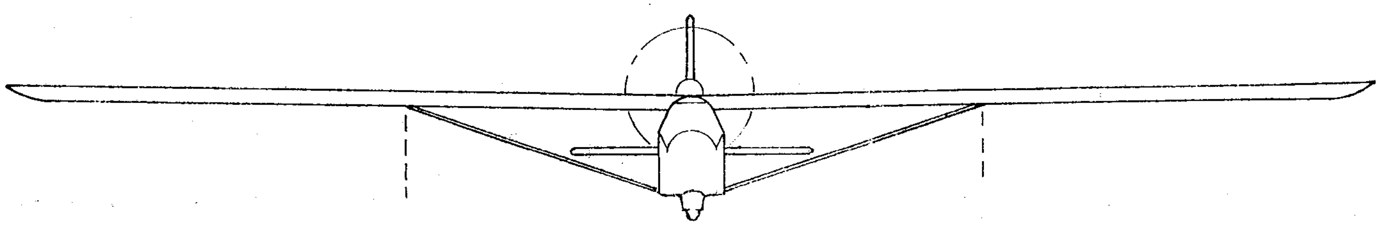


extends (chordwise) to the spoilers in order to facilitate good airflow conditions. A new method of rib construction was developed which is a notable improvement over the past and present time-consuming ways of building ribs. The rest of the wing is covered with (synthetic) fabric.

Fuselage is mostly plywood covered. Basically, it consists of a bottom part which is the boom on which the nose portion (cockpit) and the wing support, including the engine compartment, are mounted. The tail end of the fuselage is extended upward into vertical fin to provide the support for the horizontal tail.

The structural design requirements presented considerable problems. As time went on, sailplanes and power planes became faster and more performing. Thus the FAA design requirements were increased over the years to the present status which have no provisions left for slow-flying, low wing-loading planes, including ultralights.* For this reason we looked up the old (1944) sailplane design requirements of the Swiss Federal Aviation Office which at that time had a reputation of being quite stringent. We reacquainted ourselves with the fact that in those days, we well as before, pilots (including this writer) did all the soaring very safely with sailplanes designed for a gust limit load factor, n = 3.0, whereby the fully aerobatic sailplanes approved for cloud flying had to meet a n = 5.0 requirement, compared to the present limit load factor of close to 6.0 or more (FAA), or at least 6.5 according to OSTIV.

After making some calculations we found that the present FAA design requirements could be used if the velocity (V) axis of the flight envelope is compressed, thus performing a time regression. Since the present FAA design requirements for powered planes have a Normal Category with a limit load factor, n = 3.8, the decision was made to design our *LAPS* in this category without taking any undue safety risks. Thus the flight envelope (V - n diagram), as shown, was calculated. Additional calculations are needed to confirm the suitability of this solution to keep the weight down without sacrificing the strength.

* Discussed in detail in one of our papers (unpublished), to be presented at 1974 Spring Symposium on Ultralight Soaring, Harris Hill, N.Y.

Power Package

The power package consists of a standard, single-cylinder, two-cycle snowmobile engine, a reduction drive and a pusher propeller. The engine of 292 cc develops 27 hp at 6500 rpm and is blower cooled—no modifications are required for the installation. The maximum power will be limited to 26 hp at 6000 rpm.

In order to reduce the drag, a home-built folding propeller may be used instead of a fixed-pitch propeller. Or, a feathering propeller can be purchased at a substantial cost.

Performance

To provide a complete independence on the ground two outriggers are provided.

The flying performance presented in the polar diagram and shown in the illustration was realistically calculated on basis of excellent workmanship and the effects of changing Reynolds Number with the velocity. No "padding" or other non-professional gimmicks were used. It indicates a "slow sailplane", well suited for thermals—the very purpose for which it was designed in first place, including the fact that cross-country flights are not on the top of the list. The basic idea was to provide a sailplane to be used either within the local area in moderate conditions or for ridge soaring. The calculated performance is based on a wing loading, w = 3.5 psf and a (FAA) pilot with parachute weight of 190 pounds.

Design and Performance Data of *Jenko LAPS*

Wing span	42.66	ft (13 m)
Wing area	138.5	sq ft
Aspect ratio	13.1	
Empty weight	290	lb
Payload—normal	194	lb
maximum	224	lb
Gross weight (normal)	484	lb
Wing loading (normal)	3.5	psf
Best glide ratio	22.6	
at	41.7	mph
Min. sink	2.54	ft/sec
at	35.2	mph
Stalling speed	32	mph
V_{NE}	77	mph

It is human nature to compare features of a product, concept or creation. A sailplane performance is a much discussed subject among the pilots. Thus we selected a well-known sailplane of similar physical dimensions, the *Schweizer 1-26* (an early model) for which the flight test data were published by P. Bikle in Jan. 1972 *Technical Soaring*. Since the test *1-26* sailplane had a wing loading of w = 3.7 psf the polar diagram was recalculated for a wing loading equal to our *LAPS*, i.e., 3.5 psf. Here are the results:

	1-26	*LAPS*
Best glide ratio	21.5	22.6
at	46.9 mph	41.7 mph
Min. sink	2.67ft/sec	2.54ft/sec
at	36.3 mph	35.2 mph

Although the *LAPS* has a slightly better performance the *1-26* has better penetration (cross-country flying), noticeable above 50 mph: eg at 75 mph the difference in the rate of sink is 1.2 fps.

Of further interest might be the influence of stopped propeller on performance. If a fixed pitch propeller is used instead of a folding one then a decrease in performance during soaring flight will be noticed. The following table provides the calculated decrease in performance due to the propeller used and its stopped position.

Propeller	Best glide ratio
Folding	22.6
Fixed	
Vert. position	19.7
Horiz. position	18.5
Feathering	
Vert. position	22.0
Horiz. position	21.5

Another interesting performance information is the top speed in level flight and the best rate of climb. A detailed calculation shows a top speed of 98 mph and the best rate of climb of 840 ft/min at 57 mph, both based on assumption that 23 hp are available at the propeller shaft (the remaining 3 hp are used up for cooling, air intake and muffler, and reduction drive). This top speed should never be reached since the sailplane is red-lined at V_{NE} = 77 mph, see the flight envelope!

The maximum airspeed in rough air (gusts up to $\pm$ 24 fps) V_g = 65 mph is also shown in the flight envelope diagram.

The glide path control is achieved by spoilers reducing the glide ratio to 11.

Since we strongly believe that the performance of an aircraft is not incidental but a result of careful design considerations and extensive calculations, we feel that our basic objectives were reached. They should provide the enjoyment to many who seek fun in the blue yonder—without pushing for any speed records.

Our description wouldn't be complete if two other design versions were not mentioned: (1) The purists can build this design without an engine and do their thing—their way, (2) Power boys and girls can reduce the span from 42.66 ft to about 24 ft and enjoy a performing, little plane.

So, if you do not mind of being somewhat slow, but nevertheless want to fly high, this might be the APS you were dreaming of.

A designer is often tempted to improve his creation. We are no different. As time goes on we'll try to do our best to reach the initial aims which provided the stimulus in this intriguing design project.

Plans will be made available to the general public—after the prototype is built, in order to eliminate any possible building problems. In the meantime, if there are any homebuilders who have the experience and resources to build their own prototype we would be glad to provide free plans. In order to facilitate personal contact during construction the prospective builder should live in Ohio or adjacent areas. If you qualify, please write to: AMTECH SERVICES, RD 8, Mansfield, Ohio 44904.

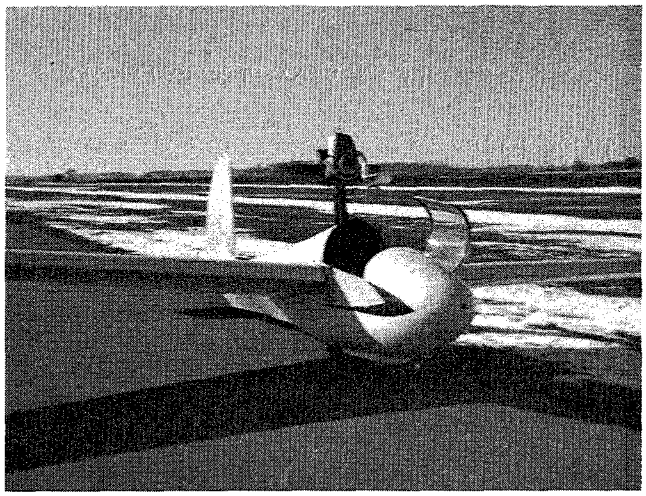
SLS 1-26

by Ken Decker

I had written to you sometime back and you asked, "How about an article for *Motorgliding*"? I am very sorry I haven't written sooner, but now I can say my SLS 1-26 will take off without any assistance. After all the hours, well 1½ years in the developing, it was well worth it. But as you know, there will always be need for future development in this kind of project. I will try to explain some details and facts about my SLS 1-26. First, after running all over the country trying to locate a dependable, lightweight engine, I ended up with a one-cylinder, because of the weight savings. The one-cylinder weight is 48.5 pounds including all accessories, except modified muffler. It turns out 28 hp at 6500 rpm and also has a built-in alternator. Also the crankshaft is very heavy where I fasten the stainless steel prop hub. The vibration from a one-cylinder is more disturbing than a two-cylinder would be, but like I said before, weight is kept at a minimum.

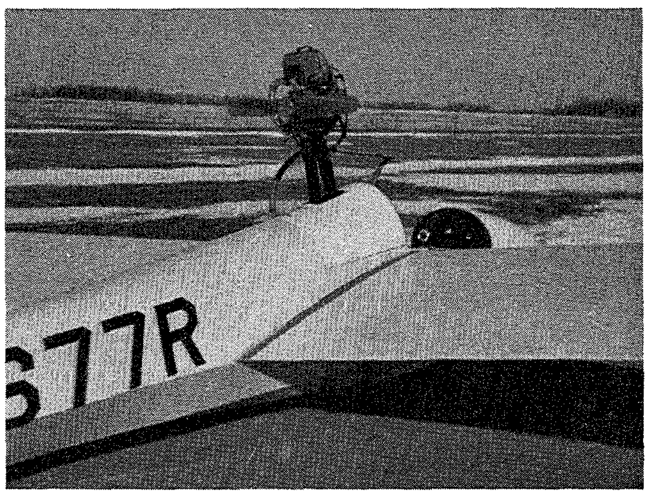
Spending some time at the EAA fly-in, I studied some of the two-cylinder mountings in various aircraft. Believe me, this was very helpful, but I needed something different. Especially for my one-cylinder. Believe me, a 28-hp one-cylinder, if not mounted in a correct way, can destroy your instruments. As of now I have no vibration only when shut down, which is very little.

I wrote to another *Motorgliding* subscriber and EAA'er, Sandy Hudson, Jr. of North Carolina, whom you all know powered a 1-19. Without his help, my 1-26 wouldn't perform as well as she does. I sent along home with Sandy my prop, hub, and motor for testing on a test stand. The prop was purchased from Banks and Maxwell, also the hub, which we didn't use because it wasn't airworthy. So a new hub was machined from stainless steel. The prop, of 36" x 16" pitch of 14 laminations, is, I must say, a fine looking piece of workmanship. Also it's made of Canadian beech hardwood. But the stock 36" x 16" pitch wouldn't let the engine perform like it should, and after six-seven modifications, by Sandy Hudson,



he achieved at wide open, 5000 rpm and 110 pounds plus of static thrust and a slipstream of 90 mph or better. This left us 1500 rpm from the maximum, which will enable longer life, and will also be safer. At 5000 rpm, 23 hp is all we're getting. A stock 36" x 16" pitch was tried, and flown. Rpm only 4000 at 16 hp. I had in the back of my head using reduction drive, but with the added weight and complication, it isn't worth it. And you can't really say safer, either, because the more complications, the more can go wrong. With the direct drive configuration, we have less weight. This static thrust is tested at various temperatures, and at different altitudes, like about 2400 feet ASL, and arrived with this 110 pounds plus. Like Sandy Hudson would say: this is fact, not fiction.

After a lot of testing, the engine was ready for mounting, which I was ready and very anxious to complete. A special thanks to Mr. John J. Trey, FAA Inspector, of Dayton, Ohio. The airworthiness



certificate, which is in the Experimental, Research and Development Category, allows only testing of small engines, a test bed only. Our first test flight was done on February 15, 1974, on a hard-surface runway, which Mr. Hudson drove some 700 miles to witness, also to fly. Another good friend, Mr. D. Evans, a fulltime pilot with a CFI rating turned out to be the first pilot to fly the SLS 1-26, and also gave much of his time in my SLS 1-26. We spent two full days of test flying, and everything is performing beautifully. Also, the flight characteristics were very good. This is my assessment after flying. The engine is set up to restart in mid-air, if preferred, by pulling a recoil starter, but I have some modifications on this part.

Mounting was kept very simple. The engine is mounted 33 percent aft of the leading edge of the wing, on a pedestal above the fuselage. I wanted to be able to remove or detach this setup, so as to put back into normal configuration in a matter of minutes. I didn't cut or weld any tubing, for I clamped on rubber. The engine, mounting, bolts, hub, prop, muffler weighs 65-70 pounds, plus 2½ gallons of gas is less than 90 pounds.

Here are some of results of first testing. Temperature at 35°, winds light. We were in the influence of a high pressure, which helped. First prop, stock 36" x 16", at 4000 rpm, 16 hp. Takeoff roll 500-700 feet, climb 200 fpm at 50 mph. Second prop a highly modified prop by Sandy Hudson. Same as first prop, but cut down. Takeoff roll 350-400 feet with 190-pound pilot. Climb at 300-350 fpm at an altitude of 2500 ft, and did maintain altitude in very little lift, after engine was switched off. So you can bet Ken Decker, the author, and owner and builder of this SLS 1-26 will get more soaring done this summer, and won't miss the good soaring days here in Ohio, which you know is often. So until then I can't give any more detail in soaring capabilities, except that the L/D is still better than a 2-22. I know there are quite a few 1-26 owners who would like a SLS 1-26, so I will let readers know the results of future testing of my SLS 1-26. I would be glad to help in answering questions.

FOREIGN SCENE

by S. O. Jenko,, Dipl. Ing. ETH—AMTECH SERVICES

When this column first appeared in *Motorgliding* (Oct. 1973) it carried an account of the 1973 German Motorglider Contest at Burg Feuerstein. Two promising auxiliary-powered sailplanes were expected but did not show up—they couldn't be completed on time. The first was the Polish *Ogar*, described here in December 1973 issue. The second was the German *Kora I*. The October 1973 issue of *Luftsport* and the November 1973 issue of *Aerokurier* carried articles about this new auxiliary-powered, two-place sailplane. It is a rather unusual story, like that saying about ...strange bedfellows..., or the little poem:

"The witches assembled to start anew
to mix a potion, a better brew.
Loosed were lightning and thunder blasts
strange was the product, their dreams surpassed." *(Anon.)*

The translation of the *Aerokurier* article is presented here:

The German city of Solingen has a long standing worldwide reputation for its steel products, especially cuttlery and umbrella frames. Now a new product will be added: an auxiliary-powered, two-place sailplane to be produced by the 118-year-old, family-held company of Kortenbach & Rauch which is a leading manufacturer and exporter of umbrella and garden (patio) umbrella frames, and welded precision steel tubing.

The desire to include aviation products for the purpose of diversification was strengthened by existing circumstances: a division already manufacturing molded plastic parts and the soaring background of three managers (T. Schultes —Development Dept., J. Seidel—Design Dept. and R. Putz—Shop). During 1970 the trio with some helpers began the first feasibility studies of a two-place performing auxiliary-powered sailplane. This work resulted in a conclusion to carry out the project because it was felt that there were many possibilities for improvement in this field; also the management held the view that the never ending airspace limitations favor this kind of aircraft. The highly developed design procedures and features of the current performing sailplanes served as a base for development and design work. Fiberglass structure was selected for reasons of almost unlimited formability, close tolerances and good weathering—all important factors which influence laminar flow.

In spite of these features there were many difficult design problems to be solved in order to obtain a lightweight structure. The design consultants were Prof. Wortmann, D. Muhlen and the late Dr. Eschenbach.

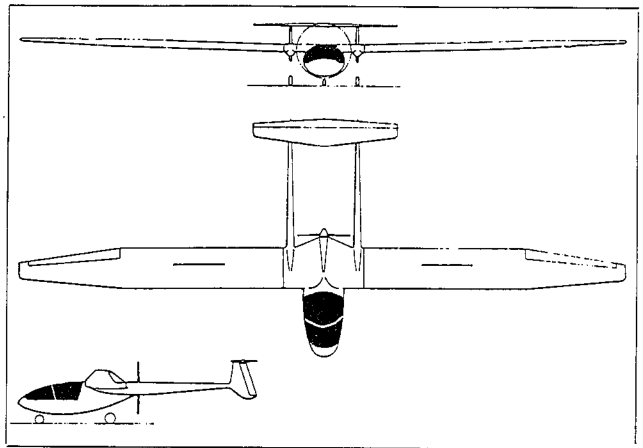
Kora I should fulfill the following requirements: (1) a good soaring performance, comparable to Ka-6, in order to pursue cross-country soaring,(2) good and docile flying characteristics which would permit its use in the beginners' flying courses, (3) good takeoff and climbing performance under power, (4) good ground handling, and (5) an attractive price.

Kora I has a pod-twin-boom fuselage and a pusher propeller. This configuration was selected on basis of following considerations:

The flow over the forward portion of the fuselage is undisturbed, like a sailplane—thus making possible the retention of laminar flow at least to the hinged portion of the canopy. The drag of the stopped propeller is small because the three-position propeller (climb, cruise and feather) by Hoffmann is located in the wakes of wings and fuselage. No aircraft components are exposed to the propeller slipstream, thus a good overall propulsion efficiency is possible. In addition, the two booms provide an excellent protection on the ground against the rotating propeller. The air resistance of the two booms is not larger than that of an ordinary fuselage due to their small cross section, resulting in a small wetted area. Much wind tunnel testing of the wing-fuselage junction was carried out by Prof. Wortmann; the best results were obtained with a high-wing configuration.

The proven Wortmann airfoils were selected for the wing: FX 66S-196 (root) and FX 66S-161 (tip).

Although the seats are placed side-by-side, there is sufficient room (fuselage width: 47.3 inches). A well-built tricycle landing gear (retractable) should provide easy handling on the ground.



Propulsion is provided by a (VW) Limbach SL-1700 EA engine with forced air cooling and a battery ignition (62 hp at 3000 rpm).

The powered flight performance is unexpectedly good due to the high quality of the surfaces. This would make *Kora I* also a fast, comfortable and economic touring aircraft. However, the manufacturer emphasizes its performance as a sailplane rather than a powered aircraft.

Preparations for production are under way. First prototype flew on September 13, 1973. A second prototype is being built. According to the program, five pre-production planes are to be built. The production preparations are under way. According to Schultes there is a substantial interest shown for *Kora I* and marketing prospects appear to be very good.

This would be no surprise to the manufacturer since they brought to success another similar project in boat production: *Sigma* - an outrigger yacht, employing a new design concept which combines the advantages of a catamaran and a keel boat. This new yacht is now in production.

(P.S. If there is a quality wine or sausage maker among the readers of *Motorgliding*, looking for diversification and eager to enter into the production of an all-metal, performing single place APS, we have one—see Jan./Feb. 1972 *Motorgliding*, p. 15. Please, no inquiries from umbrella makers, we already have one, a Swiss-made with a folding frame, of course!)

DESIGN DATA OF *Kora I*

Wing span	59.2	ft (18m)
Wing area	209	sq ft
Aspect ratio	16.67	
Length	23	ft
Empty weight	1035	lb
Payload	506	lb
Gross weight	1541	lb
Wing loading	7.36	psf
Max. airspeed	127	mph
Cruising speed*	109	mph
Rate of climb	590	fpm
Best glide ratio	31.4	
at	60	mph
Min. sink	2.5	fps
at	49.6	mph

* 65% rated power

A YEAR IN RETROSPECT

by Tasso Proppe

The Experimental Airworthiness Certificate for the *Crow* N11224 is expiring and for the purpose of the renewal application, I added up what it has flown during the past year.

Here are the figures: on eight weekends, I have flown at Hemet, Warner Springs, Elsinore (three times), Torrey Pines (twice), Ocotillo Wells, and Laguna Salada (Mexicali)—22 flights with a total of 50 hr, 13 min. The "ignition-on" timer was "ON" for 21 hr, 32 min. That includes all ground runs for warm-up, checkout, but it also includes carburetor and generator adapter developments.

Of the 22 flights, 4 are 4½ hr duration and another 5 over 3½ hr. Total engine time represents 41% of total flight time. I have no precise record on how much true engine time accounts for actual flights; not until recently do I have a barograph fixed up with an engine-on trace to prove it to myself that the engine-on time during flights is more like 30%.

This average includes some flights with no thermal activity at all—just milling around in cold and misty weather looking for carburetor ice (I found it, too) but it also includes some flights of up to 4½ hr with only 2 and 3% engine time.

More important: I relied on 72 engine air restarts to overcome lulls in lift, to hop from one mountain ridge to another to cover more territory, and to make it back home after I got stuck in the outfield with no more lift.

I restricted cross-country flights to touch-and-goes from Hemet to Elsinore, Warner Springs to Ramona and Hemet, from Torrey Pines to Palomar/Carlsbad, and from Elsinore to Hemet). To stop for a little chat cuts too much into the most valuable thermal time of the day.

The tower operator at Palomar airport had the crash crew out when he saw me approach with a dead propeller and the landing gear stuck up... He complained over the telephone later about me kicking the engine back on for a pull-out after touch-down—they wanted to take a closer look at the strange thing—and would I please come back some time.

For statistical survey of the motorglider activities in the U.S., it would be quite useful to have a yearly excerpt like this reported by the active pilots and published in some form. This may not only serve as a comparison of activities between the members of this small community, but also as a basis of discussion with the FAA to more strongly define what the nature of a motorglider really is.

Before I prepare a form for easier reporting, I would like some inputs from the active members—I am sure that their operation differs in a number of respects from mine. Maybe we have to distinguish between ferry/travel flights to get from here to there and actual emphasis on soaring where the success is measured in engine-time per flight-time, or gasoline-per-distance.

In other words: What would you report as the more significant achievements or summaries you would be proud of (including little stories of typical motorglider happenings)?

Contest winning performance at a reasonable price, plus docile handling characteristics and a worthwhile range under power (about 280 miles) mark the Tandem Falke as today's best value in self-launching sailplanes. The 60 hp Limbach engine with a Hoffman feathering propeller provides plenty of power to operate from regular airfields.

Engine-on Performance

Takeoff run	500/650 ft.
Rate of climb (sea level)	430 ft./min.
Maximum speed (sea level)	106 mph
Cruising speed	81-93 mph
Endurance (cruise)	3 hours
Fuel capacity	7½ gallons

Gliding Performance

Maximum glide ratio	26/27 to 1 at 53 mph
Minimum sinking speed	2.95 ft./sec. at 43 mph

The Tandem Falke's outrigger wheels and steerable tailwheel allow completely independent operation. With its outrigger wheels removed the Tandem Falke may be conveniently hangared with other sailplanes.

A side-by-side version is available for pilots who prefer this arrangement. Similar performance, but slightly lower rate of climb and glide ratio. Order the SF-25CS "Falke."

Prices include flight test, German certificate of airworthiness, flight and engine instruments, electric starter, feathering propeller, cabin heater, upholstered cockpit, two-tone paint, packing, sea crate, and shipping to the port of Hamburg:

Scheibe SF-28A Tandem Falke ...... DM 49,800
FOB Hamburg

Scheibe SF-25CS Falke .... DM 49,000
FOB Hamburg

Delivery, approximately five months from order.

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LETTER

Editor:

Two at a time! April 24th was a beautiful postfrontal day at Sky Sailing Airport near San Francisco and what did I find but a very large cargo container with two brand new Scheibe SF-28A motorgliders recently arrived by boat from Germany. Graham Thomson had one, Dr. Currin, his wife Irene, and son Hugh had the other. Christian Gad, Scheibe's son-in-law ferried one to Santa Monica Thursday and Chuck Burden ferried the other to Klamath Falls Friday for the Currins. Were we ever envious.

Somebody get that VW Limbach conversion certificated so we can begin the real glider movement at long last. The FAA work was apparently relatively painless on this occasion.

It was a pleasure to meet these fine people associated with the motorglider movement.

The -28 retained all the fine slow-circling performance of the -25 which it was my pleasure to fly many years ago at Lasham with Derek Piggott as my instructor. I hope the demonstrator returns so I can fly it also.

The Caproni is advertising dual flights out of Minden this summer in the May issue of *Soaring* with Makula as copilot. You're first after me.

Our local enthusiast Bill Richards has been exploring the coast range south of San Francisco with his RF-5B and writing up the results in the April and May issues of *West Wind* (send $3.75 to Jane Herold, 966 Astoria Dr., Sunnyvale, California 94087 for an April to December subscription). This is an invaluable aid to our Soaring Meteorology Handbook project since these coastal ranges are unavailable to sailplanes.

Recently I had the pleasure of a discussion with Ted Nelson. He has been mining diamond altitudes so long from Mt. Diablo that he is transponder-equipped and oxygen-equipped and is on a first name basis with local traffic control personnel. I hope he starts keeping the meteorological data to contribute to our Soaring Forecasting Handbook. He claims the temperature distribution is extremely important to wave formation. He has found waves at extremely low wind speeds (10 mph). Who has a thermometer in his ship?

The outfit that bought his motor manufacturing rights have not done justice to the name that is a pioneer in the field of motorgliding. I had my first ride in a *Bumblebee* at Palmdale Airport in 1946!

The big problems are licensing and costs.

Emil Kissel
Saratoga, California

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