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DEC. 1975-JAN. 1976
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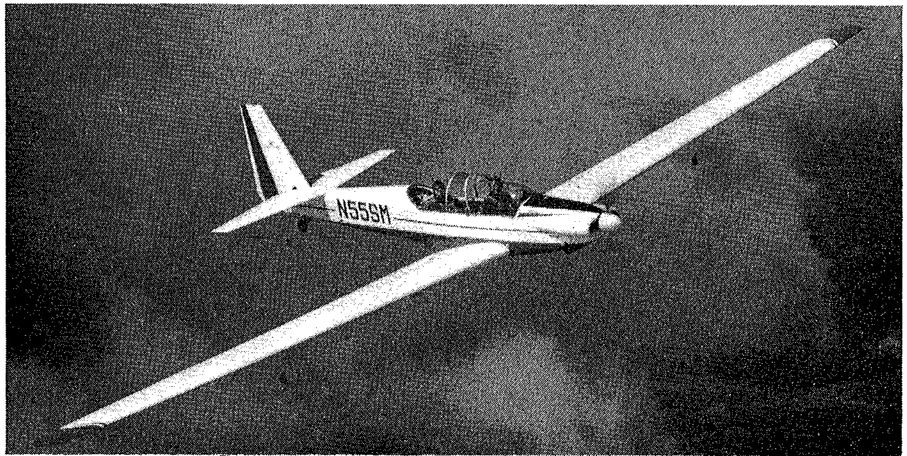

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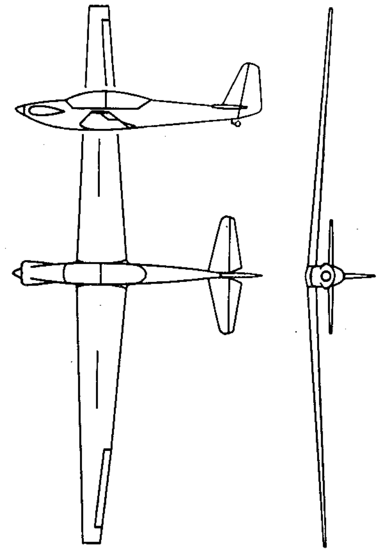

SPECIFICATIONS:

Engine:	LIMBACH SL-1700-E (68 HP at 3600 RPM)
Propeller:	Hoffman Vari-Pitch III (Climb, Cruise, Full Feath.)
Seating:	Aerodynamic TANDEM (2)
Wing span:	56 FT (36.8 FOLDED)
Wing area:	204.50 SQ. FT.
Wing loading:	7.3 LB/FT. SQ.
Fuselage length:	25.3 FT.
Maximum height:	6.43 FT.
Empty weight:	1000 LB.
Useful load:	500 LB.
Gross weight:	1500 LB.
Fuel capacity:	10 GAL.

Standard cost Wooster, Ohio, $26,800

PERFORMANCE (motorflight)

Max (level) speed:	118 MPH
Rated cruise speed:	112 MPH
Take-off roll:	640 FT.
Landing roll:	550 FT.
Climb rate:	690 FPM
Stall speed:	39 MPH
Fuel consumption:	2.9 GAL/HR at 106 MPH
Range:	300SM/480KM
Ceiling:	17000 FT.

SOARING PERFORMANCE

Max speed:	140 MPH
Stall speed:	42 MPH
Min sink rate:	(48MPH) 174FPM
Glide ratio:	29 :1

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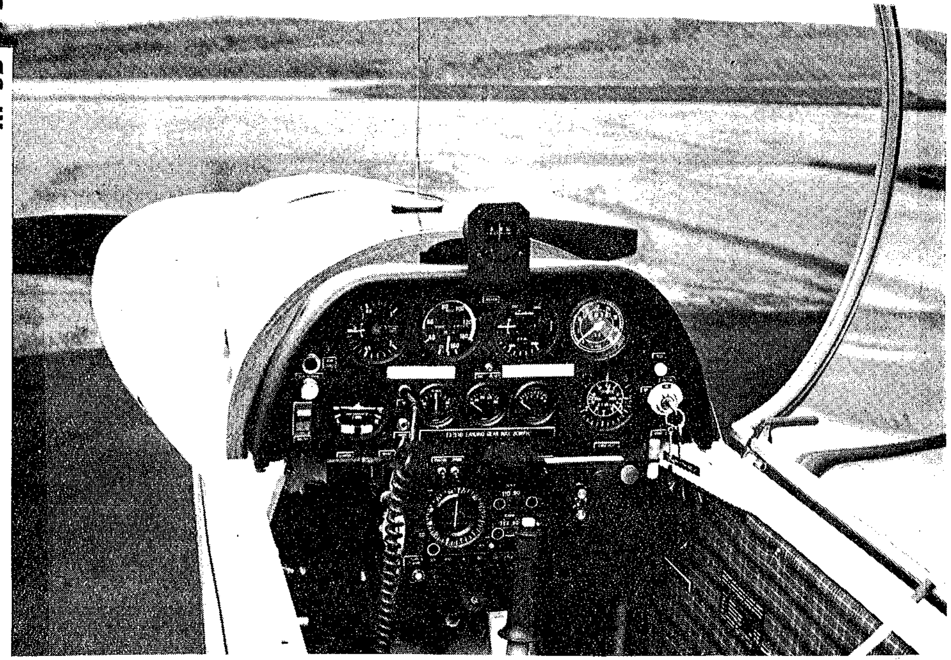
RF-5B SPERBER



MOTORGLIDING

Donald P. Monroe, Editor

Vol. 5, No. 3 Published by The Soaring Society of America, Inc. Dec. '75-Jan. '76

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Cover: Charlie Webber's RF-4D, by George Uveges

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Circulation of the Oct.-Nov. issue was 1080. This issue was mailed in December 1975.

FALL MOTORGLIDER MEET

by Robert W. Tawse

Late October provided some beautiful weather for a meeting of motorgliders from the eastern part of the country which was held at the famous Bald Eagle Ridge, near State College, Pennsylvania. Attempts were made to contact all of the enthusiasts in the east and the turnout was the best yet. A total of eight motorgliders appeared during the week; including three AS-K 14's, four RF-5B *Sperbers* and one Scheibe SF-27M, coming from as far as Maine and Michigan.

The weather on the initial weekend left much to be desired—with clouds down on the ridges and accompanied by drizzle which made life miserable for the incoming *Sperbers*. Bob Carver flew a grand total of thirty miles on one day on his trip down from Ohio. The sun did come out for the rest of the week and the temperature went up to shirt-sleeve weather. The wind was moderately strong but unfortunately it remained parellel to the ridge for most of the time. On one day it would be soarable on the front of the ridge and the next day on the backside. Thermals coming off the ridge crest were scattered but could be counted on for an occasional save. No badge flights were attempted however everyone flew every day and excellent ridge practice was accomplished. The motorgliders were capable of many more hours of soaring than the 1-26's and 1-35's which were held to local soaring only and many days didn't even come out of their boxes. On the other hand, everyone made Altoona on occasion and the best flight was Nelson Riley's down to Blue Knob below Altoona on the east side of the Philipsburg ridge without a restart.

Walter Buhl was able to introduce motorgliding to Tom Knauff of Ridge Soaring and Karl Striedieck with his K 14. As to be expected, they handled the machine like the experts they are and enjoyed the experience although no one expected them to trade immediately. They flew with confidence because they knew they could get an engine save in the marginal conditions. Similarly this meet would have been a failure for sailplanes but was interesting and profitable as we had time to explore and test new areas and slopes. Therein lies the glory of motorgliding.

To liven the days, impromptu events were formed with the 1-26's and the motorgliders; the loser having to buy the evening's beer. The first was a short triangle of State College, Penns Cave and home, which was won by a K 14—the only planeto reach the first turnpoint. A bomb drop netted some close scores, the worst being accomplished by the author whose bomb they never did find. The motorgliders did fall flat on their faces in the spot landing event, being no match at all for the 1-26s. The competition was fierce and there was some hint of the "purists" adding water to our "ballast"

Ridge Soaring has grown considerably this past summer with a tremendous improvement in the field and its facilities, all due to Tom and Doris. Even after a weekend of rain the field was firm and usable.

The office and lounge now sport comfortable furniture, adequate heating appropriate beverages, electronic oven for hot lunches and above all, indoor plumbing. Tom is known for his ability to get others involved and an example of this was one morning after everyone had arrived at the field a load of gravel was dumped on the only entrace to the field at the railroad crossing. In no way was anyone going to get out without that pile being leveled. Shovels appeared and all hands dug in. One of the older members of the group took considerable pleasure in demonstrating to the younger ones how gravel should be shoveled. The following morning his wife had to tie his shoes and needless to say, not one bit of sympathy did he get from the group, or his wife.

While the afternoons were spent flying, the evenings were spent talking and new ideas discussed and old problems rehashed. The popularity of the motorglider was brought up frequently and the consensus was that its appeal is limited to those whose time and isolation make ordinary soaring quite inconvenient due to the lack of a ground crew. The appeal for its increased growth should be made to those men who each year become disenchanted with soaring because of these problems and it was felt that the approach to them should be made through *Soaring* magazine and not through *Motorgliding* where we are merely talking to ourselves.

It was a pleasant week and hopefully it can be repeated once or twice a year, suggestions are requested for future sites and dates.

SOME ELABORATIONS ON DESIGN OF AUXILIARY-POWERED SAILPLANES

by AMTECH SERVICES*

Part II - Auxiliary-Powered Sailplane J-APS II

Although the previously elaborated design considerations were developed in the fall of 1969 for J-APS I they were also used in the design of the ultimate performance APS in standard class, the J-APS II.

It is our strong conviction that *when laminar flow is desired appropriate design elements must be provided* to achieve this aim. To use old and obsolete methods and then hope that laminar flow would be maintained is quite ridiculous.

We were well aware of this important fact when the invitation was received in December 1970 to participate in the 13-m Australian Sailplane Design Competition (ASDC). The aforementioned detailed parametric study indicated that a high performance 13-m sailplane can be designed by utilizing most of the components of the then-proposed J-APS II (standard class).

Thus, the second design family of sailplanes came into existence:

- a single-place 13-m sailplane, J-*Elan 13*
- a single-place 15-m sailplane, J-*Elan 15*
- a single-place 15-m APS, J-APS II

The J-APS II is essentially the J-*Elan 15* with a slightly stretched nose portion of the fuselage in addition to the "Power Package" of the J-APS I.

The difference between J-*Elan 13* and J-*Elan 15* is only in the span of the wing. Due to the fact that J-*Elan 15* does not contain the power package of J-APS II considerable water ballast can be carried if desired; this is also possible in J-*Elan 13*.

Thus, the purists as well as realists (APS enthusiasts) should find their desires satisfied.

(a) General Description

The all-metal sailplanes exhibit a constant-chord wing, a swept-back vertical tail and an all-movable horizontal tail. The builder has a choice of a fixed or a retractable landing wheel.

*Aero-Mechanical TECHnology Services.

In order to facilitate amateur building and to attain surface quality required for laminar flow a constant chord wing was chosen. It has a laminar airfoil and the previously-mentioned design features make it possible to bring out the benefits of this airfoil. Speed-limiting dive brakes are of spoiler-flap design and are located on top and bottom surfaces. When used, this arrangement should reduce the loss of lift and the required consequent increase in airspeed. The ailerons are fully-balanced and deflect differentially.

The wing structure, covered with Alclad 0.020" and 0.025" skin, is of conventional design having one main spar with front and rear auxiliary spars to facilitate construction. They also provide attachments at the root rib to carry the wing shear loads into the fuselage side walls.

The fuselage has a pear-shaped section which results in a rather roomy cockpit due to stringent ASDC requirements to which J-*Elan 13* had to be designed in order to accommodate pilots up to 220 pounds in weight and 6.5 feet in height. Otherwise the fuselage structure is of conventional design, consisting of frames, bulkheads, and stringers and covered with 0.020" and 0.025" Alclad skin. It also has a keel to increase the strength of the front section and for pilot protection.

The plexiglass canopy can be built of three sections if desired.

The swivel tail wheel is sprung. To provide complete independence on the ground the J-APS II has retractable outriggers.

The swept back vertical tail should provide an inexperienced amateur builder ample opportunity to learn the few basic principles of building a metal plane and also acquire the necessary good workmanship at a minimal expense.

The horizontal tail is an all-movable surface with a geared trim tab. The short span of 7.5 feet makes it possible, if desired, to leave the horizontal tail assembled with the fuselage during transportation. It is fully balanced.

In accordance with the ASDC rules the J-*Elan 13* was designed to comply with OSTIV requirements, Normal Category. The J-*Elan 15* and J-APS II are designed to meet FAA requirements for high performance sailplanes and APS, respectively.

(b) Power Package

The heart of the J-APS II is the Power Package shown in Figure 2; originally developed for J-APS I it has a more powerful engine mentioned previously. Considerable time was spent to explore various design concepts suitable for the amateur builder although the design of Hirth in his Hi-20 *Mose* (1941) was the starting point. Our final design bears hardly any resemblance.

While the propeller remains at the top of a pylon the engine was moved from the inside fuselage to slightly above the pivoting point of the pylon. Thus the engine cylinders are exposed to the propeller slipstream when the propeller is fully extended and rotating. This arrangement eliminates the necessity of cooling air ducts and doors as well as possible overheating.

Instead of using a power drive shaft with bevel gears and a torsional vibration dampener a *synchronous belt drive is used*. It also reduced the rotational speed of the engine to one-half at the propeller shaft.

The retractable part of the power package is hinged on rubber mounts to provide isolation. Positioning the engine very close to the pivoting point the pilot's effort to extend the propeller and engine is markedly reduced as compared to other designs where the engine is located on the top of the pylon. The small imbalance is taken care of by torsional springs.

A special wooden tractor propeller was designed although a standard propeller used on amateur-built powerplanes equipped with VW engine may also be installed. When the propeller is fully retracted or extended the doors close automatically.

(3) Performance

While there is no end to inflated performance figures we believe that calculated performance should be within about 3% of actual values (approximately 1 point in glide ratio, standard class). No fancy computers, digital or analog, are required. Realistic understanding of aerodynamic parameters involved, a slide rule, some paper, pencil and long hours are needed to make these calculations.

The performance of the various designs presented in this article were calculated on this basis.

Design data and performances of the second design family are presented in the following table (rearward CG location):

		J-Elan 13	*J-Elan 15*	J-APS II
Span	(ft)	42.66	49.2	49.2
Wing area	(sq. ft)	115	132.7	132.7
gross weight	(lb)	661**	650*	780*
Normal				
wing loading	(psf)	5.75	4.9	5.88
gross weight	(lb)	776***	830***	830
Maximum				
wing loading	(psf)	6.75	6.26	6.26
Best glide ratio		28.05	31	31
(NGW) at	(mph)	57.3		57
Minimum sinking speed	(ft/sec)	2.64		2.47
(NGW) at	(mph)	44.3		47

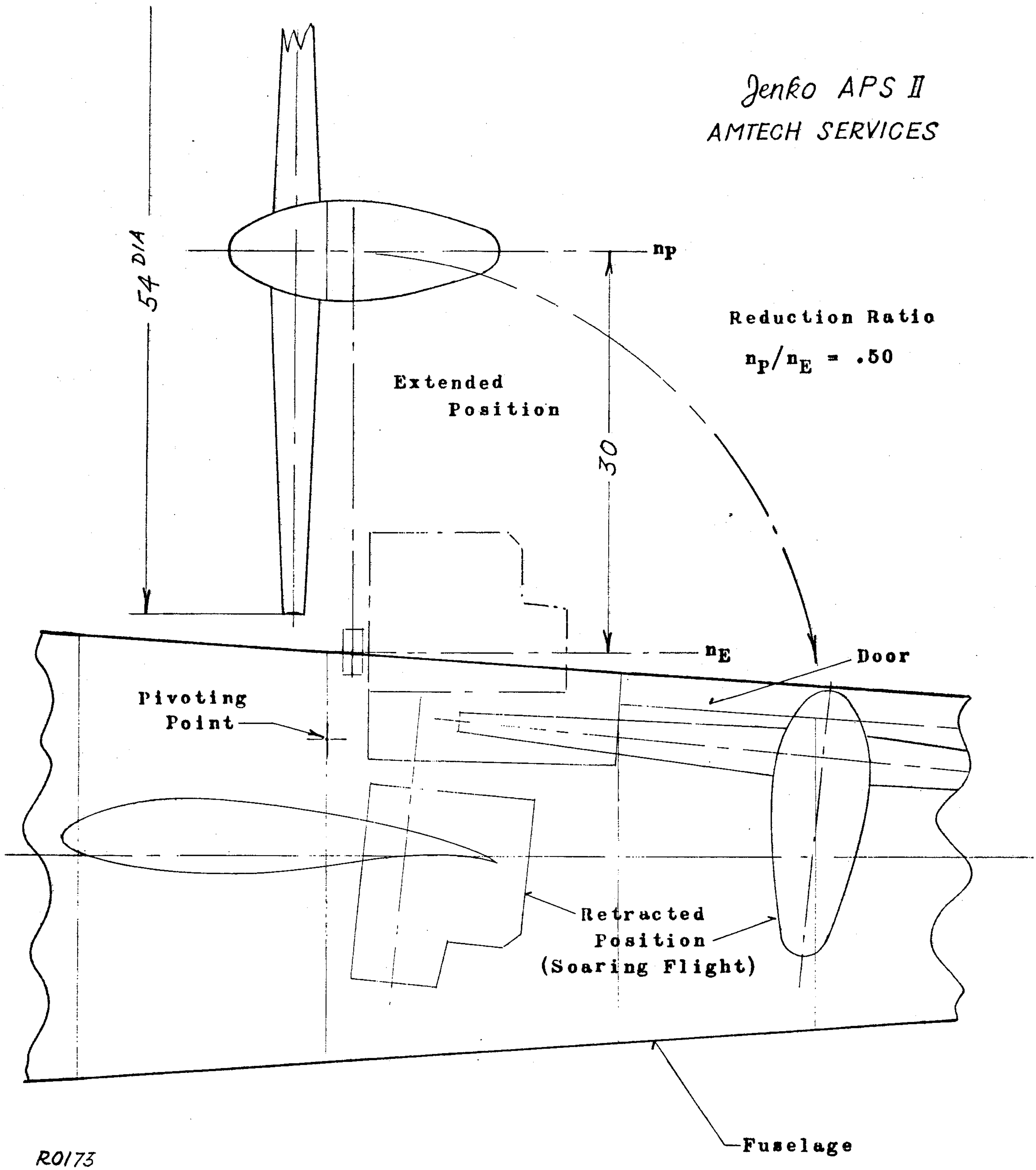
* based on pilot (with parachute) weight of 190 lb (FAA)

** based on pilot (with parachute) weight of 190 lb and full equipment (including oxygen)

***including water ballast

To achieve the stated performance excellent workmanship is required. The configuration of J-APS II is shown in Fig. 3.

While many readers will be quite disappointed with the glide ratio of 31 for J-APS II they should realize that some



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POWER PACKAGE J – APS II

Figure 2

essential compromises made are responsible for this non-exotic figure. They are:

(a) Relatively high weight of power package (130 pounds, including fuel) in spite of the lightest engine available,

(b) Larger wing area due to (a) in order to keep the wing loading within reasonable, specified limits,

(c) Larger cross-sectional area of the fuselage (35-inch high, 24-inch wide cockpit) to accommodate larger pilots and to house the retractable engine.

The rectangular planform of wing, chosen to facilitate the construction as well as the attainment of the required acrodynamic quality of the surface, has also some influence. Due to the fact that the stall of a rectangular wing begins at the root rather than at the outer portion like on a tapered wing, no twist is needed to maintain lateral control.

However, by twisting (using wash out) the rectangular wing the induced drag could be reduced almost to the magnitude of an elliptical, untwisted wing which has the minimum induced drag of all planforms.

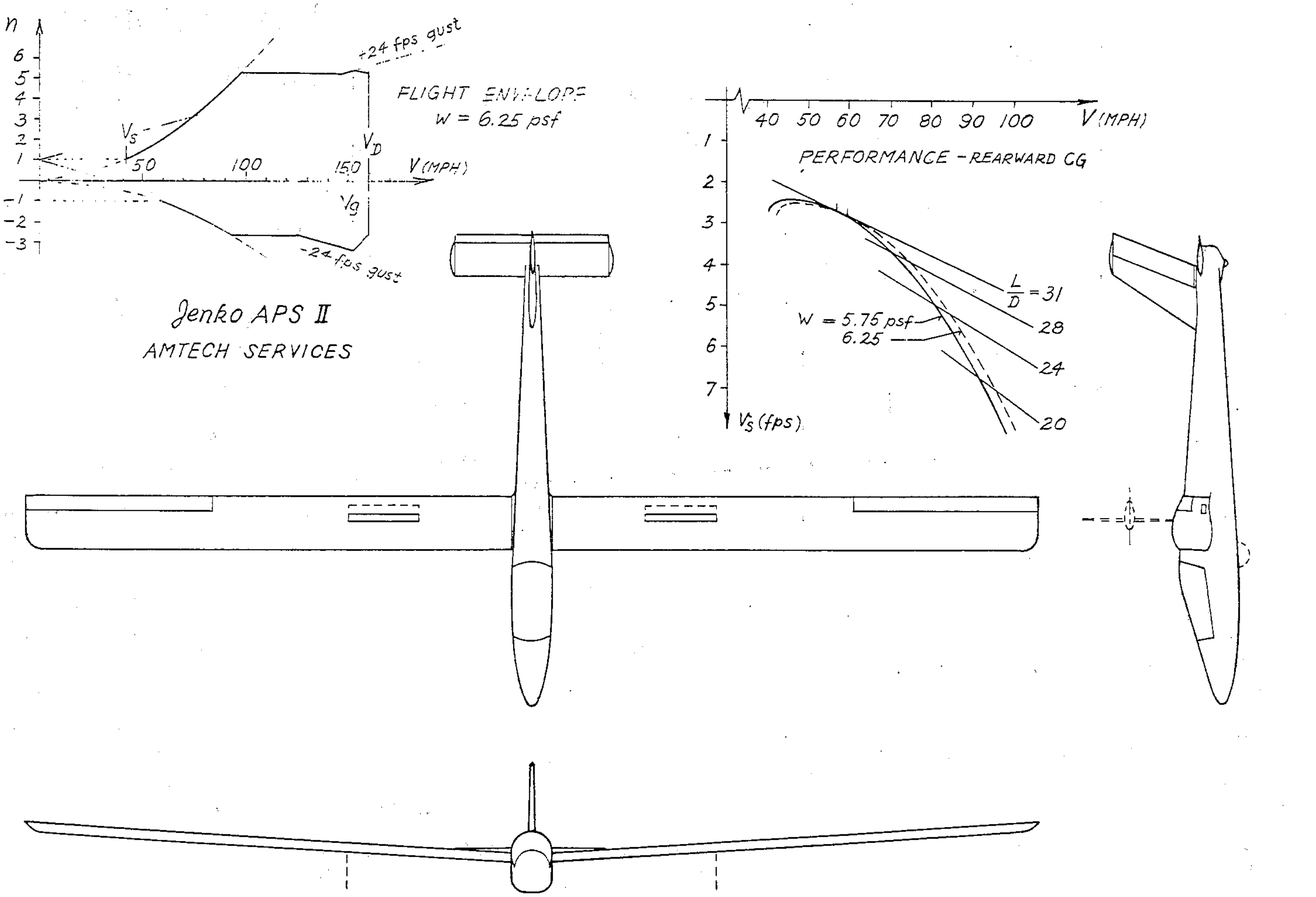

Figure 3

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(While the minimum induced drag of an untwisted elliptical wing extends over the entire useful operational range, the minimum induced drag of a twisted, rectangular wing is limited to one chosen angle of attack, e.g. at the best glide ratio, selected by the designer).

If the J-APS II would have an elliptical, untwisted wing the glide ratio would be increased to the best possible value of 32.95, based on our calculations whereby the Reynolds Number effects on the outer portion of the wing panel were disregarded, although they are included in the original performance calculations. To build such a wing would be quite a problem even if the quality of surface is disregarded.

To incorporate a twist in the rectangular wing panel of J-APS II would make construction considerably more difficult. A partial twist over the outer portion of the wing panel might be possible; the glide ratio would be increased to about 32.5, depending on the magnitude and length of the twist.

Other aerodynamic design variations of the wing, established since the early days of soaring, are mentioned for comparison:

- A multi-tapered wing, or a combination of a rectangular and tapered planform, twisted, and having a straight leading edge.

- An untwisted tapered wing with a taper ratio of 2. Such a wing would produce an increase in glide ratio to 32.35, disregarding again the Reynolds Number effects. Taking them into account the glide ratio would be further reduced, most likely to about 32 or even less which is an estimate only.

(For an untwisted wing of aspect ratio 18 the optimum taper ratio is 2.8, excluding RN effects.)

Since the J-APS II has a glide ratio of 31 (reynolds Number effects included) the possible gain of at most 1.5 points is certainly not worth the additional work of making 39 different ribs per wing panel (every rib requires its own forming block) instead of just one (constant chord wing). Also, a tapered wing will hardly every have the same aerodynamic surface quality as a constant-chord wing.

It should be noted that Bikle (Reference 2) measured glide ratios of 31.3 for the Schweizer 1-34 and 31 for the Laister LP-49 (both standard class, metal wing) and the best glass sailplanes' measured performances range from 34.5 *(Libelle)* to 35.2 *(Standard Cirrus)*, all in standard class.

Thus our calculated performance for J-APS II looks quite realistic although it does not reach the best possible performance of the glass sailplanes in standard class. Obviously, the difference of at most 4 points is the price for the opportunity of building his or her own APS thus acquiring independence and convenience of unassisted taxiing and takeoff, span blue holes without sweat and fly back to the airport, under own power if necessary.

To the purists this may sound like dirty pornograph ("... patently offensive ... utterly without redeeming *soaring* importance."), to realists it is the sweetest song of blue yonder full of thermals and soaring at its best.

Auxiliary-Powered Sailplane: What Performance?

Now you know.

(d) Status of J-APS II

While detailed design of the second family of sailplanes is mostly completed and a few stress calculations remain to be carried out, excellent drawings are being prepared from which our prototype will be built. This will eliminate any possible errors which might otherwise be included in the drawings.

These same drawings will be made available to builders when our prototype is completed.

There are no plans to produce material kits or to manufacture these sailplanes.

As this material is being released for publication (June 1975) in *Motorgliding* the efforts are being made to find a replacement engine for the Hirth 279 P. 5. The Hirth Motoren KG declared bankruptcy last fall (see "Foreign Scene", June 1974 *Motorgliding*). When this problem is solved the prototype work will resume.

Some time ago, a design change was made to eliminate a splice in the main spar of the wing panel. Instead of a two-panel wing shown in Figure 3 there will be a three-panel wing; the central section is a straight 12-foot removable panel.

Most likely trailing edge dive brakes may replace those described earlier in text and shown in Figure 3.

Reference 2: *Soaring*, June 1970.

OPERATIONAL EXPERIENCE WITH THE SFS-31

by Landon H. Cullum, Jr.

Last year about this time I reported on a year's experience here in North Texas with my Sportavia RF-4D used primarily for learning and enjoying soaring. I mentioned that I had also recently purchased a Sportavia SFS-31 (the RF-4D's big brother with 15-meter wing).

Thought perhaps some readers might like a follow-up with data concerning my experience with the SFS-31 in the past year. The one I purchased was practically new and is equipped with the Hoffman propeller that has the feathered position as well as cruise-climb position. As with all Sportavia products I have seen, it is beautifully made and, like the RF-4D, has been amazingly trouble-free. With the high-aspect-ratio wing it is a much more capable glider than the RF-4D but still retains the complete capability of one-man operation that makes the motorgliders so practical for me. I keep it assembled in the hangar rather than on the trailer so it is always ready to go. I simply drive up, roll it out, preflight, taxi out and go—about a five- or six-minute project.

The long wings change the flight characteristics (compared to the RF-4D) quite a bit. It's responsiveness and roll rate are much less and it is harder to fly well. However, it is a far more efficient sailplane, climbing better and with vastly improved penetration capability. My measurements for performance curves (uncorrected for density) indicate a minimum sink of 200 ft/min @ 53 mph compared to the RF-4D's 360 @ 50. Best L/D is 26 to 1 at 66 mph compared to the RF-4D's 17 to 1 @ 60. However, at 90 IAS the SFS-31 sinks @ 470 ft/min and is still 17 to 1 while the RF-4D is 710 ft/min at 11 to 1.

The performance also shows up in gas used per hour of flight—in spite of the fact that this has been a wet year with below-average soaring. From July 30, 1974 to July 30, 1975 I flew the SFS-31 61½ hours and used 38½ gallons of gas (15.6 hours tach time and 45.9 hours gliding). As indicated below much of the flying was through late fall, winter, and early spring which is really not soarable much of the time. The following will give an idea of how the year went:

July 1974: (30, 31) Excellent conditions, two flights, 700 ft/min climbs, 3500 and 6800-feet altitude gains. Power used 0.2 hours, glided 3.4 hours, no air starts needed.

Aug. 1974: Good soaring, seven flights, 1.1 hours power, 11.7 hours gliding, 400-600 ft/min climbs, one 8,000-foot altitude gain but mostly 3,000-5,000 feet, no air starts needed. Two successful X-C out-and-returns of 35 and 62 miles.

Sept. 1974: Poor soaring, six flights, 3.5 hours engine time, 4.9 hours gliding, 100-400 ft/min climb rates, 3,000 feet maximum gain one flight, six air starts used.

Oct. 1974: Very poor soaring, two flights, o.6 hours engine time, 1.4 hours gliding, 200 ft/min or less climb rate, 2,000-foot altitude gain once. Restarts required each flight.

Nov. 1974: No flights (prop removed from SFS-31 to test on RF-4D).

Dec. 1974: Four flights, 0.8 hours engine time, 0.8 hours gliding—no soaring.

Jan. 1975: Three flights, 1.1 hours engine time, 0.8 hours gliding—no soaring.

Feb. 1975: Three flights, 3.1 hours engine time, 0.6 hours gliding, one day had brief period of 200 ft/min climb and 1,000-foot gain. (Two flights traveling, engine on.)

Mar. 1975: Two flights, 0.7 hours engine time, 0.7 gliding, one flight had 200 ft/min climb for 1,000-foot gain—restarts still needed to stay up.

April 1975: Two flights, 0.4 engine, 0.5 gliding, slight gains possible, still having to restart to stay up.

May 1975: Five flights, 1.3 engine, 3.3 gliding. Much improved 200-500 ft/min climbs toward end of month, gains to 6,000 feet. Staying up easily.

June 1975: Seven flights, 1.9 engine, 9.4 gliding. Able to stay up on half of flights (used four restarts), attempted 62-mile X-C but failed, 150-450 ft/min climb, altitude gains 1,000 to 4,000 feet. Unusually frequent rainy weather.

July 1975: Six flights, 1.8 engine,

8.8 gliding, good soaring in spite of continued frequent showers. Climbs 300 to 700 ft/min, altitude gains 3,000 to 5,000 feet. Stayed up easily except one day after rain (one restart).

My feelings about the two airplanes are that both are fine, trouble-free machines that give one complete one-man operational freedom. Both are very efficient cross-country machines, if one wanted to use them that way, and if one doesn't have a requirement for a passenger or baggage. The RF-4D is more fun to fly, but the SFS-31 is by far the more capable glider. The '31 can be disassembled and trailered for storage or travel but not as easily as most sailplanes. Hangaring it during soaring season is much more practical. As I don't really need both, I expect to sell the '31 and keep the RF-4. If there were other sailplanes based near here to fly with occasionally, my choice would probably be the other way.

FOREIGN SCENE

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

Kuffner WK-1

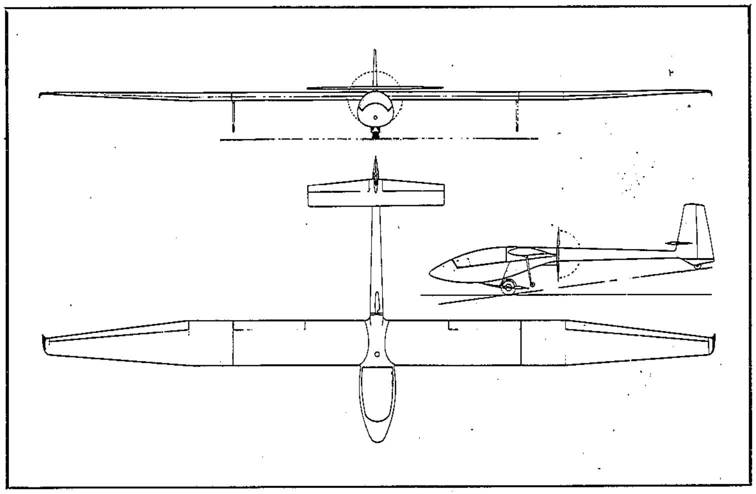
The January 1975 issue of the German *Aerokurier* contains an article about a new, ambitious APS design project, WK-1. One feature, the propeller's location and operation, is quite similar if not identical to the C 10 design (1940) by Wuenscher (University Soaring Group of Chemnitz). The wing planform resembles the one of the Pilatus B-4, or their projected 2-place auxiliary-powered sailplane (APS), the PC-XM. (See the October-November 1975 issue of *Motorgliding*.)

The designer, Werner Kuffner, worked as an airframe mechanic on many projects, including the B-4 prototype. Later on he took part in preparations for the B-4 production. Currently he has his own shop for maintenance-repair and construction of sailplanes. Apparently he doesn't give up after the daily working hours: the WK-1 project appears to be his hobby and he is also a flight instructor.

The following summary is taken from the article:

The layout of the WK-1 is that of performing two-place sailplane. In order to narrow the fuselage the two side-by-side seats are staggered. The wheel and the outriggers are retractable. In order to provide sufficient ground clearance for the propeller the undercarriage has to be longer. A fender type piece of sheet metal protects the propeller during the ground run. The tailwheel is connected flexibly with the rudder.

The fuselage consists of three parts: the fiberglass cockpit portion also containing the retractable undercarriage; the welded steel tubing middle section which provides the wing-fuselage attachments as well as the mounting of the blower-cooled engine with propeller drive; and the aluminum sheetmetal tail-tube featuring a quick-attachment design.



WK-1

The three blades of the propeller fold backwards when the engine is not in use in order to reduce the drag. Engine starting brings them into the extended position thus eliminating the usual extension and retraction procedure. A patent has been applied for. During landing the engine should not be used.

The wing span of nearly 19 m (61.7 ft) consists of a center 8 m panel of constant chord and two tapered outer panels of 5.4 m which feature a tongue and fork assembly. The wing has Wortmann airfoils and is of all-metal design. Part of the center section is used as the fuel tank. Because of its location, gravity feed is planned.

The engine location, being at the CG, makes it possible to build this design also as a pure sailplane. Complete power package would be omitted and the propeller ring slot would be covered with a sheetmetal strip. Thus the many training modes would become available.

The question remains if and when this project will leave the present "paper plane" stage. While Kuffner's shop is equipped for prototype work he cannot handle any production. For this reason he is looking for one or more partners.

In view of the current state of this project no price can be quoted although it is expected to be competitive with other two-place APSs.

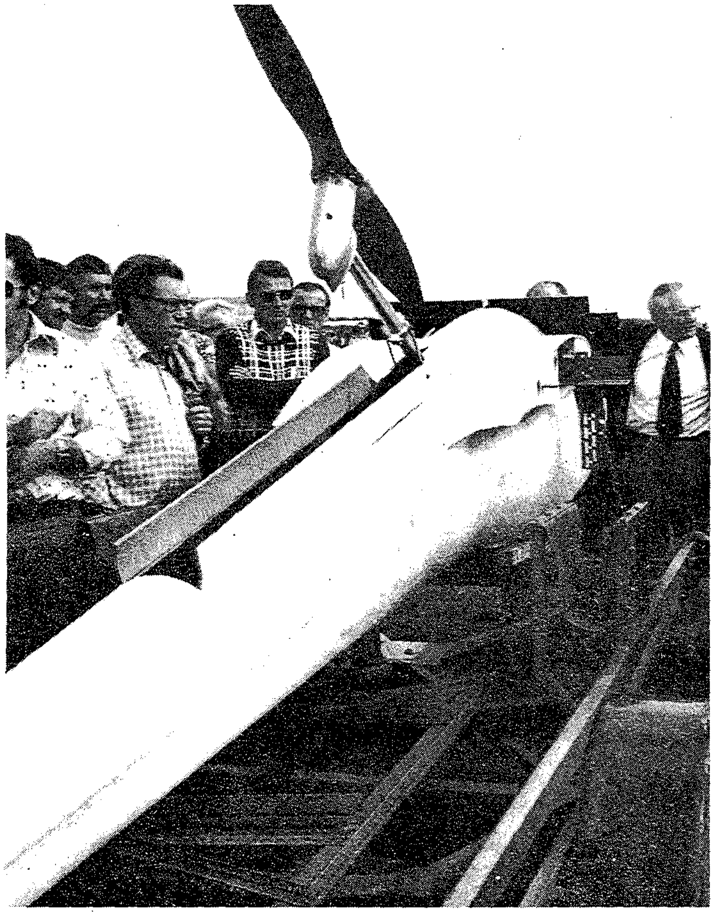
Technical Data

Wing span	61.7	ft
Wing area	214	sq. ft
Aspect ratio	17.8	
Empty weight	945	lb
Gross weight	1450	lb
Wing loading	6.7	psf
Glide ratio (2-P1.)	33.2	
at	59	mph
Minimum sink	2.3	fps
at	51	mph
Rate of climb	670	fpm
Engine BMW (900cc)	67	hp

A New Retractable Propeller Design

While the basic design of the retractable propeller has been established for about three decades, numerous variations are possible. Based on theoretical considerations, a large, slowly rotating propeller is highly desired. Quite often, due to airframe and stability considerations, compromises must be made resulting in departure from the original aim.

A brief description of a new design variation is presented in an article in the August 1975 *Aerokurier*. According to this article, the Flying Group of Kornwestheim, under the direction of Dipl. Ing. Krauss and Joerg Elzenbeck, devel-



oped in a very short time a new retractable power package for auxiliary-powered sailplanes. It was installed in a crack-up *Phoebus* fuselage for demonstration purposes.

A slowly rotating propeller of large diameter in a proper location will produce sufficient thrust even at low engine-power levels. In addition, such a combination will also result in lower noise levels (note the following story about the *C-Falke!*). The engine itself, being installed in the fuselage, also contributes its share.

A small engine with generator and starter, having a low fuel consumption, can be used in such a design. The firewall was made of a special plastic sandwich material. The extension and retraction is accomplished with an electric drive.

The diameter of the Hoffmann Composite Propeller is 67 inches; the static rpm is 1600. The reduction drive (in oilbath) was designed to transmit a maximum power of 75 hp. The engine used in this demonstration set-up was a Lloyd LM 400 of 18 hp at 4000 rpm. The fuel consumption was approximately from 1 to 1.7 gallons per hour. (One wonders how did they solve the perenial torsional vibration problem of the shaft reduction drive and keeping the weight low.)

The "Whisper" *C-Falke*

For some time substantial publicity has been given in foreign aviation magazines to the lowering of aircraft noise. One also reads of airports, used by sport fliers, being closed down because of excessive noise levels. According to a very informative article in the June 1975 EAA *Sport Aviation* by A. Bingelis ("The Designee Corner") the Swiss government began enforcing their noise regulations in January 1974, ranging from motorbikes to trucks, to .... airplanes, including some commerically-built models. In order to fly again the Swiss homebuilders developed in a hurry a very efficient and simple muffler....

The much-promoted but stupid contention that a fast airplane must be thundering across the sky is finally being buried—at least in Europe. One wonders how much longer are we, here, going to be burdened with this nonsense.

Thus it should be no surprise that the Scheibe Aircraft Co. came out with a improved model of their two-place auxiliary-powered sailplane, the *C-Falke*. According to an article in the April 1975 *Aerokurier* the development work results in a much quieter *C-Falke*, bringing the noise level to below 60 dB(A) which is substantially below the noise limit level of 68 dB(A).

(Since the noise level scale is logarithmic the approximately 10 dB(A) reduction is indeed substantial.)

Thus the *C-Falke* is only slightly more noisy in level flight than a pure sailplane. According to noise regulations, the measurements are to be made at a cruising speed at 300 m (approximately 1000 ft) above the ground. This improvement was made possible by a slower rotating propeller and an improved muffler design—without any sacrifice in performance!

What about the cost? Only DM 600—about 8% of the purchase price—being a worthwhile investment for the benefit of the pilot's well-being as well as that of the people on the ground.

The article also mentions a few comparison values: the noise level of a city street is approximately 70 to 80 dB(A) experienced by a person on a sidewalk; approximately 60 dB(A) and above for a highway at a distance of from 328 to 656 ft.

LETTERS

OPEN LETTER TO BURT RUTAN

Dear Burt:

Sport Aviation and *Air Progress* magazines have told us about your fantastic *VariEze* aircraft which is capable of beating all the present world records of aircraft below 500 kg gross weight including the distance record in straight line held by my teacher and friend Mr. Kaarlo Heinonen with his HK-1 aircraft for so many years. I was fortunate enough to see the *VariEze* flying during the Fly-in week in Oshkosh this year and I must congratulate you on the design of one of the most significant aircraft ever evolved from the EAA movement.

I don't know whether you have ever been interested in soaring but if not, you should. Especially I hope you would try out the art of motorgliding which combines the beauty of soaring and the east of powered flight. (There are some two-place motorgliders in California, e.g. a Sheibe *Tandem Falke*, L/D 27, and Caproni Vizzola *Calif* A-21J, L/ D 43.)

The reason I am telling all this is that as a motorglider owner and pilot a strange idea has been turning in my head after I left Oshkosh: "Which kind of motorglider the *VariEze* could make if equipped with a fully retractable landing gear, automatically folding propeller and with a wing of double the span it now has?" Judging from the published figures the *VariEze* is so light and aerodynamically so effective it would probably make possible (with the above modifications) a very *high performance two-place motorglider within the weights and dimensions of a present day single-seater*. To help you comment on this idea I have drawn a rough sketch of what this aircraft would look like. We could call it as a *Vari-SLS* (Self-Launching sailplane).

In *Sport Aviation* you have compared the existing world records with *VariEze* capabilities. How about the following comparison of some existing motorgliders and the proposed *Vari-SLS:*

	VariEze	*Vari-SLS*	AS-K 14	*Tandem Falke*
Number of seats	2	2	1	2
Wing span	22 ft	49 ft	47 ft	53.5 ft
Wing Area	36 sq. ft	120 sq. ft	136.5 sq. ft	197.5 sq. ft.
Empty Weight	390 lb	550 lb	550 lb	880 lb
Gross Weight	890 lb	1000 lb	800 lb	1300 lb
Glide Ratio L/D	?	40	28	27
Minimum Sink Rate power off	?	2 ft/sec	2.5 ft/sec	3 ft/sec
Engine Power	68 hp	68 hp	26 hp	68 hp
Practical Cruising Speed power on	185 mph	130 mph	80 mph	100 mph

Well, AS-K 14 and *Tandem Falke* do not represent any more the best state of the art. Schempp-Hirth *Motor Nimbus* and Caproni Vizzola *Calif* A-21J (two-place) are the two extremes which offer glide ratios of 43-47 at the expense of an unpractically long span (67 ft).

Anyway, let's go to my questions now: Is it possible to achieve such a soaring performance with the proposed *Vari-SLS* with given dimensions and weights and which kind of control system and air brakes this aircraft should be equipped with? Since I am not at all familiar with canard airplanes and the associated problems it would be interesting to hear your comments on these ideas. I am looking forward to see your reply on the pages of *Motorgliding*.

Jukka Tervamaki, EAA 14944
Helsinki, Finland

BURT RUTAN'S REPLY

Editor:

As you can see from the enclosures, Mr. Tervamaki has mailed you an open letter to me. Should you see fit to publish his material and desire my comment I have included the following information. Excuse my brevity, as I'm currently quite busy with the *VariEze* program.

The information given in his table on the *VariEze* is incomplete. The following are data based on the current homebuilt *VariEze* program, including performance with the 100-hp Continental, the largest recommended engine installation.

		Cont.	V.W.
Seats		2	2
Span	(ft)	23	23
Area	(sq. ft)	67.1	67.1
Empty Weight	(lb)	490	430
Gross Weight	(lb)	990	890
L/D		18.8	18.8
Min. Sink		6.5	6
Power	(hp)	100	64
Cruise	(mph)	210	180
Climb S/L	(fpm)	2300	1200

Complete details on this program are available through our $5 information kit, Rutan Aircraft, Box 656, Mojave, Ca. 93501.

An aircraft to fill the mission of the SLS is on the list of designs I hope to develop over the next few years. Its general configuration is similar to the *VariEze* but is quite different from Mr. Tervamaki's sketch *(not shown here.—Ed)*. I cannot release further details yet. While I do not like to release performance estimates before flight tests are conducted I feel obliged to comment on the numbers he has produced: First, a fold-able prop is not required— a feathered prop in the direct wing wake results in negligible drag.

At a wing span of 49 ft the L/D would be in the 28 to 34 range, not 40 as he suggests. Empty weight should be in the 460-480 lb range with gross about 920 lb. Minimum sink rate would be at least 25% greater than his estimate of 2 ft/sec. Cruise speed at 75% power using the 68-hp engine would be between 140 and 145 mph.

Please do not write to me concerning this aircraft at this time. It will not be an active program for at least a year. We can answer inquiries only on active programs.

Burt Rutan
Mojave, California

Editor:

Many of your readers have approached me wishing to own a Fournier RF-4. It seems that the relatively few imported into this country have finally found happy homes and accordingly will rarely appear for sale. I spent a few months in Europe this summer where a great many of these aircraft exist. As I expected as a result of the quantity, the European magazines revealed a few for sale at an approximate asking price of from six to seven thousand dollars. It occured to me that a practical way to manage the distance problem would be for those concerned to advertise in European magazines (such as *Aviasport*, B.P. 26, 93190 Livry-Gargan, France; *Der Flieger*, 8031 Steinebach, Worthsee, Germany; *Deutscher Aerokurier*, Ebertplatz 2, D-5 Koln 1, West Germany; and *Luftsport*, Overhoffstr. 5, 463 Bochum, West Germany), their desire to purchase an RF-4. The price agreed upon should include flying the aircraft to the German factory where the aircraft would be brought up to German standards for airworthiness. The new owner would negotiate with the factory to have the aircraft disassembled and shipped over here. Because of the one-piece wing, this should be done only by the factory. Considerable economy might be possible if the factory could delay shipping until the opportunity arose to share the cost of a shipping container. I will be glad to assist to a limited extent as an information clearing house by being informed of any individuals activities and progress.

Other readers have contacted me because of the solar-cell battery charger presently in use with my RF-4. An equivalent unit is available from Edmund Scientific Company. The associated circuitry is simple but must be appropriate to the type of battery chosen. Any starving electronic engineer can provide the guidance for a steak dinner. A "2-watt" unit suitable for a 12-volt system will deliver 100 ma. at peak sunshine into a 12-volt system. This is more than enough for only a Bayside and limited trivia. Shadows must not fall upon any portion of the cell array, and while the array must be protected, every window layer does absorb significant light energy.

Those readers using VW engines in addition to thermals will be interested to know that a 12-volt, 20-ampere alternator has been located that can be installed so as to utilize the volume surrounding the magneto impulse mechanism and thus does not foul up existing space or cowlings. Parts will be available in the near future from Revmaster.

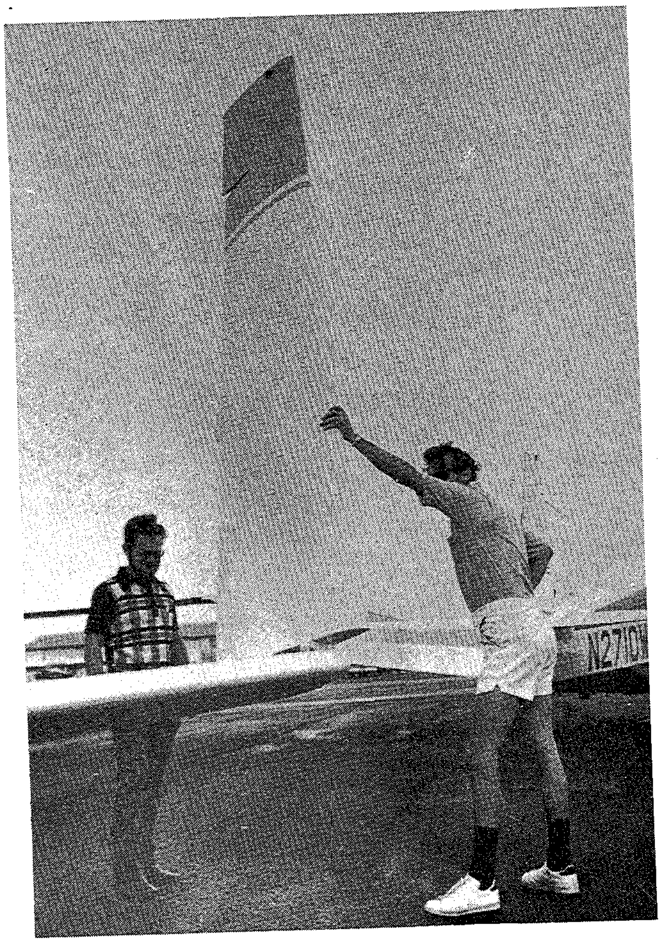
Another item of interest is that Pilatus is making their superb B-4 wings available to the homebuilder, and is preparing the necessary data in a form suitable for such applications. I suggested that Pilatus do this since there are many people who have whatever it takes to design and construct an exceptional fuselage, but had best avoid flexible, high-aspect-ratio wing design.

Another item of general interest to non-metal aircraft owners; my RF-4 benefited from radar guidance when the Merced airport visability deteriorated. My altitude had to lower to only a couple hundred feet, and the radar was at Castle AFB.

Charles Webber
4130 Mennes Street
Riverside, California 92509

Editor:

I would like to thank you for publishing my previous letter in the August 1974 issue in which I fully endorsed the idea of power gliding but felt that the costs of such aircraft were prohibitive. You may be interested to know that I received a positive response from Mr. Bert Buytendyk, of Sport-Aviation Inc. When he read my letter in your journal, he phoned me from Wooster, Ohio, saying that he agreed with the contents of my letter and then was very kind to invite myself and my friend to Wooster to try out the RF-5B *Sperber*. Six weeks later, Bert treated me to excellent hospitality in Wooster and kept his promise of a ride in the *Sperber*. Enclosed are two photographs, one which demonstrates Bert putting the *Sperber* wing together which only took 23 seconds, and the other is Bert and I in the RF-5B just before takeoff. (Bert is in the front seat).



Bert impressed us not only with his kindness and hospitality, but also his excellent business approach and fine flying ability. My opinion is that what I have read about the *Sperber* before flying has now been confirmed and is correct, and I would like to add that the comfort and quietness of the *Sperber* is only excelled by the excellent workmanship of the aircraft. After the flight we felt rather badly having to leave Wooster and proceed on to Elmira, New York, where we picked up our new Schweizer 1-35.

John Bachynski
Edmonton, Alberta, Canada

Editor:

The October/November 1975 issue of *Motorgliding* contains our article "Some Elaborations on Design of Auxiliary-Powered Sailplanes"—Part I (p. 4). In the first paragraph it was indicated that a paper, "2nd Generation Ultralight Sailplanes" by S. O. Jenko, was published by the National Soaring Museum last May and a price of $1.00 was mentioned.

Since the publication of this article in *Motorgliding* we were informed by the National Soaring Museum that the final price was set at $1.50, including postage and handling.

Even at this price the paper is a give-away and those interested in *high-performance ultralight* sailplanes, including auxiliary-powered, as well as Man-Powered Aircraft will find interesting material and useful suggestions pertaining to future developments.

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I certify that the statements made by me above are correct and complete.

Signed by: DONALD P. MONROE
Editor

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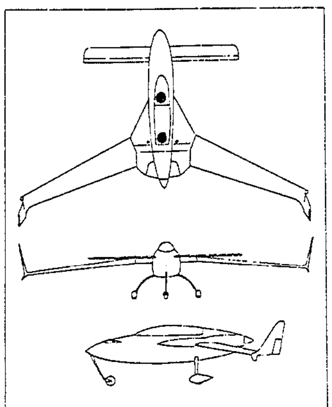
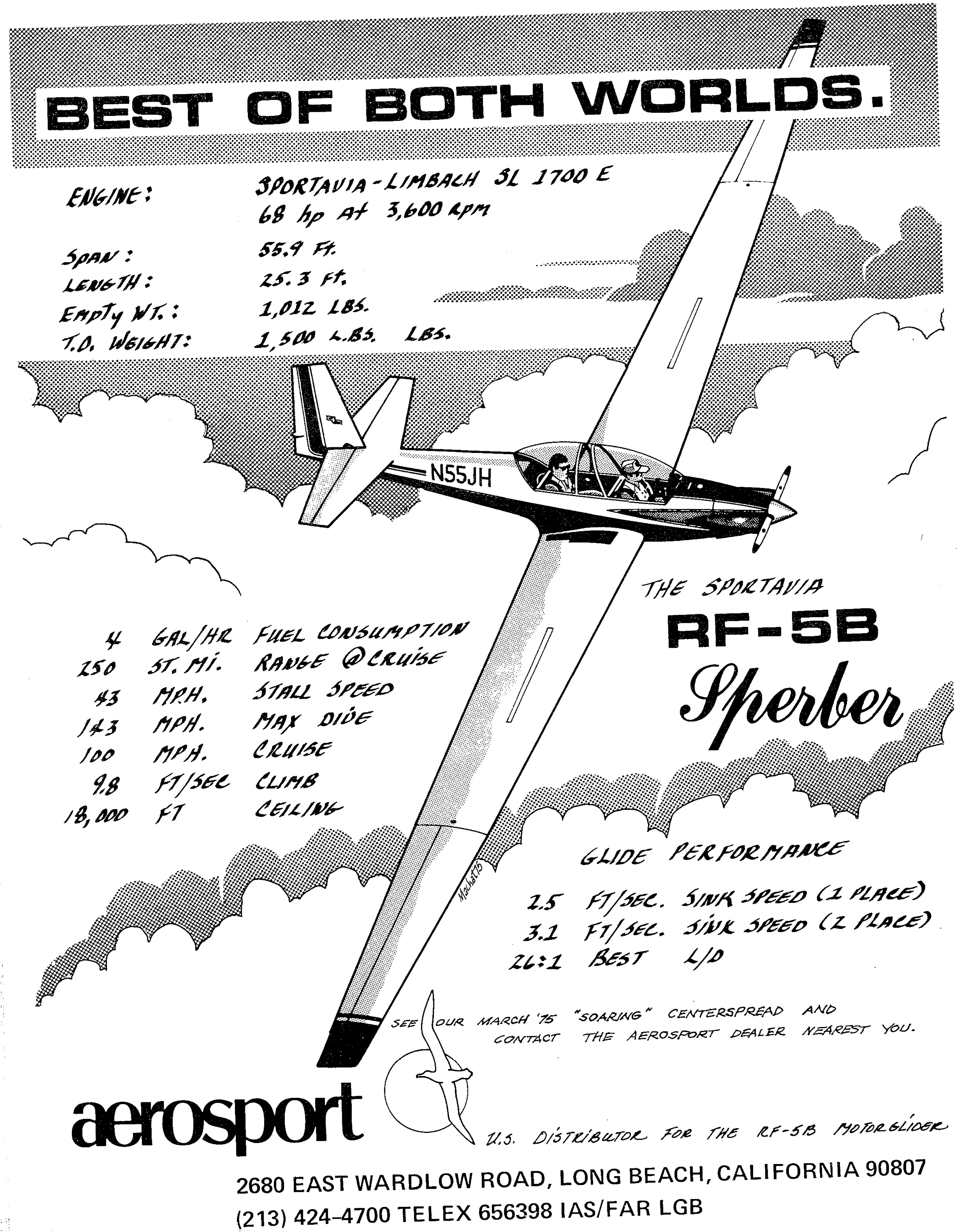


Burt Rutan's *VariEze* from *Sport Aviation*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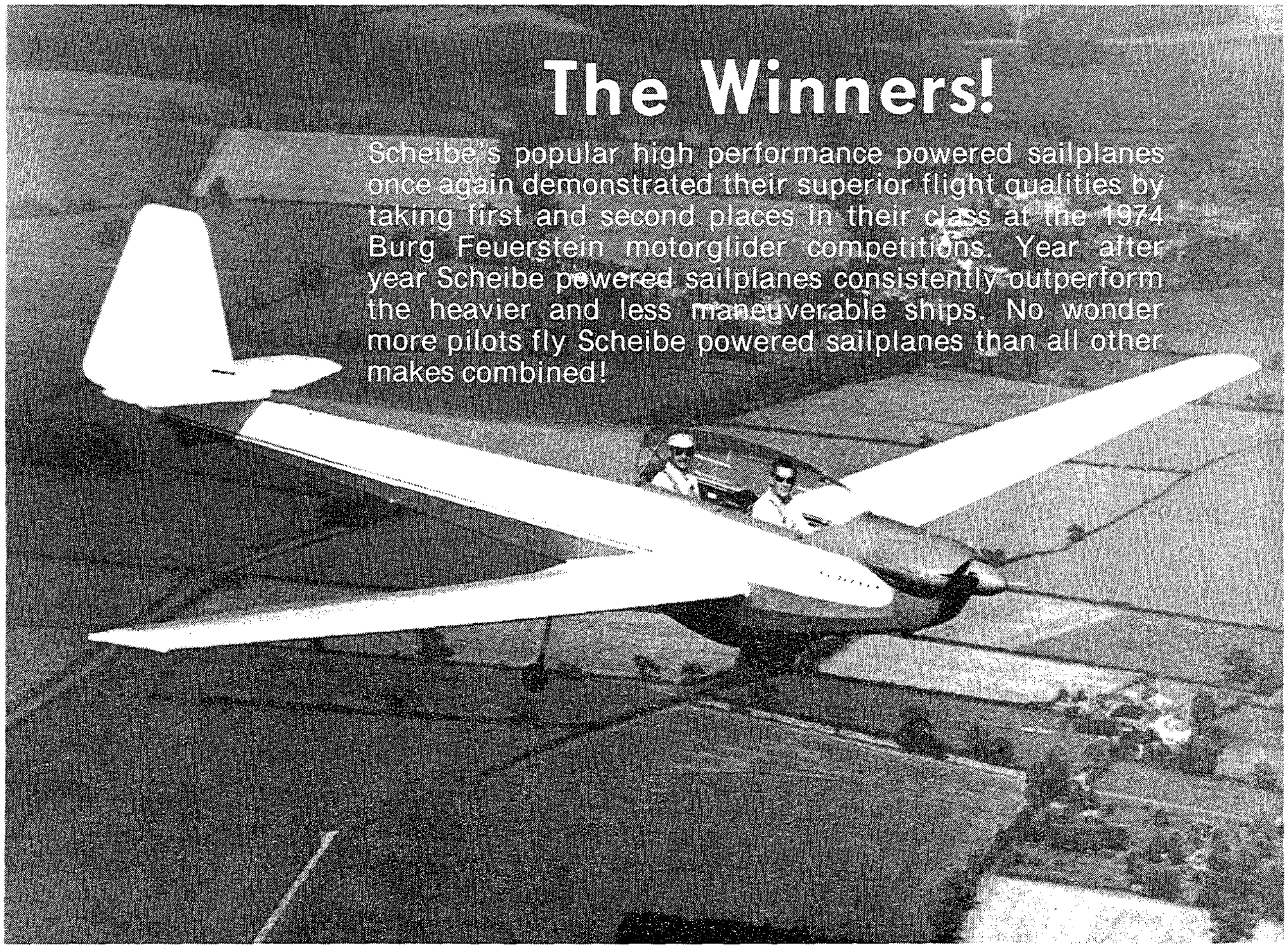

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