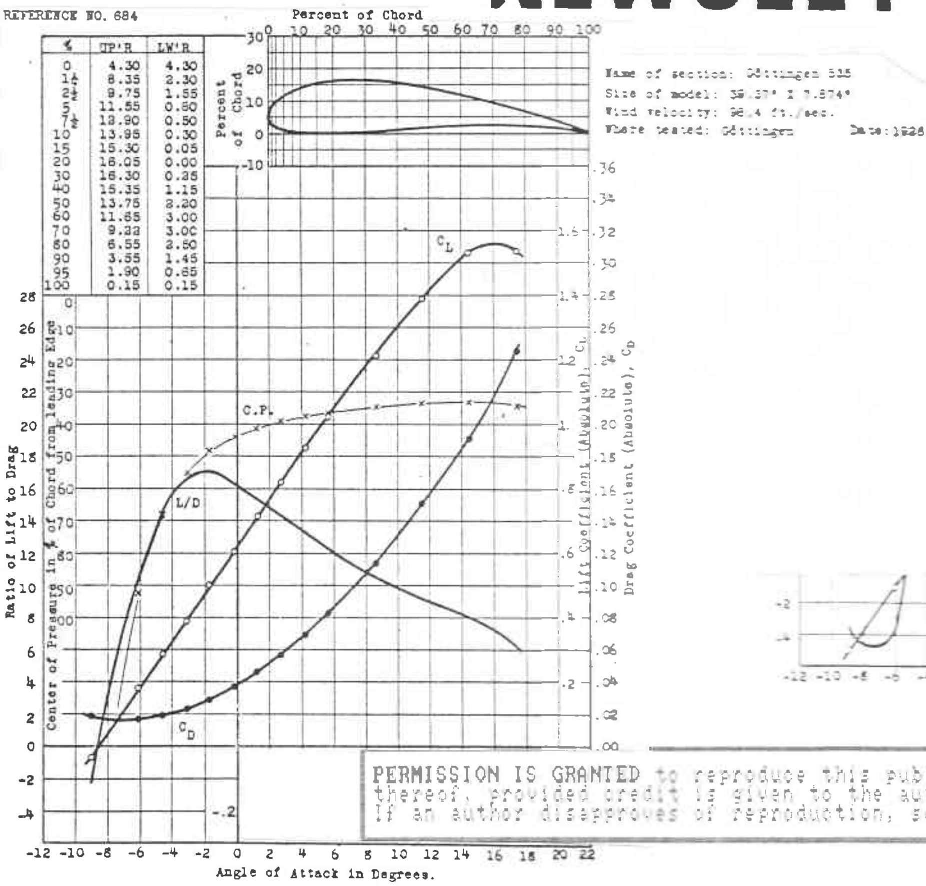
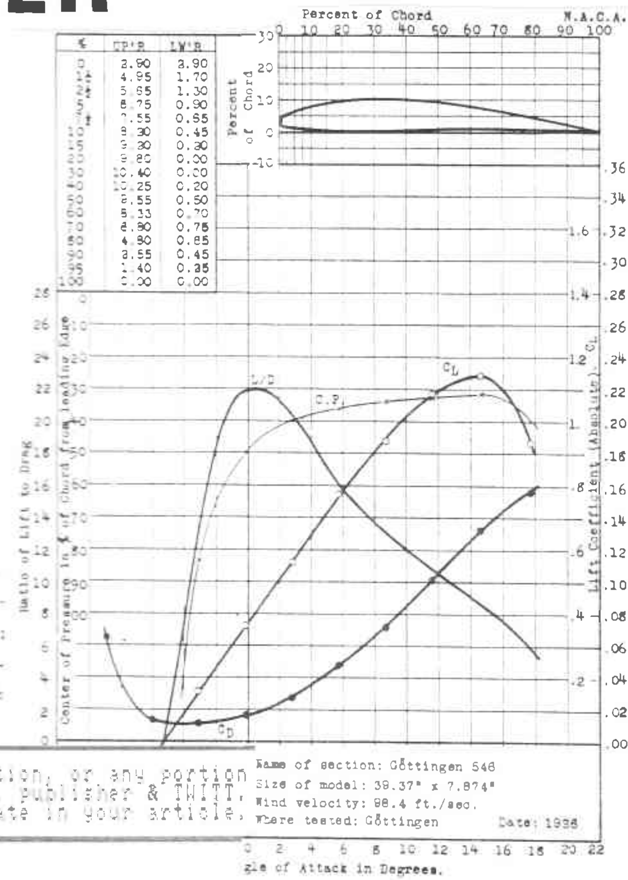
No. 51

TWITT NEWSLETTER

SEPTEMBER 1990



%	UP'R	LW'R
0	4.30	4.30
1¼	8.35	2.30
2½	9.75	1.55
5	11.55	0.80
7½	13.90	0.50
10	13.95	0.30
15	15.30	0.05
20	16.05	0.00
30	16.30	0.25
40	15.35	1.15
50	13.75	2.20
60	11.65	3.00
70	9.22	3.00
80	6.55	2.50
90	3.55	1.45
95	1.90	0.65
100	0.15	0.15



%	UP'R	LW'R
0	2.90	2.90
1¼	4.95	1.70
2½	5.65	1.30
5	6.75	0.90
7½	7.55	0.55
10	9.30	0.45
15	9.30	0.30
20	9.80	0.00
30	10.40	0.00
40	10.25	0.20
50	8.55	0.50
60	8.33	0.70
70	6.90	0.75
80	4.80	0.65
90	2.55	0.45
95	1.40	0.35
100	0.00	0.00

TWITT
(The Wing Is The Thing)
P. O. Box 20430
El Cajon, CA 92021

The number to the right of your name indicates the last issue of your current subscription, e.g., 9009 means this is your last issue unless renewed.

Subscription rates are $15 per year for U.S. mailings and $19 per year for foreign mailings due to higher postage rates.

Next TWITT meeting: Saturday, September 15, 1990 beginning at 1330 hrs at hanger A-4, Gillespie Field, El Cajon, Calif. (First hanger row on Joe Crosson Dr.)

PRESIDENT'S CORNER

There is not a lot to say this month. For those of you who couldn't or didn't attend the August meeting you missed an opportunity to look at some interesting engines, especially the Tesla turbojet. Jim Newman commented that the 50# thrust version probably would be just right for launching the size flying wing we are looking to design.

I would like to apologize to Bernie Gross for not mentioning that he had taken his Pioneer flying wing back east and had gotten a car tow from Jim Marske in Ohio. Bernie indicated it was not a very good tow and he didn't get enough altitude to do any real flying. He also commented before leaving the meeting that engines in gliders aren't any good (there's a true glider purest) since they are just dead weight once you begin soaring. He has a good point, however, for those pilots that don't have access to a tow plane on a regular basis, the weight penalty for powered self-launching must be accepted.

I also forgot to mention that Doug Fronius had gone to France on business re-cently. While there he had the opportunity to visit some glider sites and found that some only do winch or auto tows, and other do nothing but aero tows. I know the glider field in Germany I visited only did winch tows using a dual drum winch. Motorgliders operated from the field to provide some initial training before the pilots went on there first glider flight.

I hope the September meeting will see the number of members back to its pre-summer levels so we can finally conduct an election of officers. As you can see from the pro- gram announcement it will be very good. Bob has been working hard to put this one together.

That's it for this month. We will report on any significant happenings from the Tehachapi gathering in next month's issue, since there won't be enough time (and probably room) to get it in before this hits the press.

Andy

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SEPTEMBER'S PROGRAM

The entire program will be devoted to a history of the Bowlus Baby Albatross and will include Dick Benbough, a recognized authority on Hawley Bowlus sailplanes, as the principal speaker.

Wayne Spani will have his fully restored Baby at the meeting. This is the only known registered and flying glider of this type today. Wayne bought the glider in 1989 from Marty Hoyer who had kept it in a hermetical- ly sealed room in Twenty-Nine Palms, Calif- ornia, since its last refurbishment in late 1975. Wayne has returned it to its original beautiful, clear varnished wood and trans- lucent fabric.

The airfoil on this glider is the Gottin- gen 535 with lots of undercamber, leading to high drag. It specifically selected for cliff flying like that found at Torrey Pines or other well known ridge soaring areas of the era (1950s). If you hadn't noticed, some of the wings on the meeting hanger's walls are from Baby Bowlus', so you will be able to see some of the internal construc- tion.

There will be slide show on the Baby and other pieces of memorabilia associated with this series of aircraft. This should be a very interesting program for the older and younger generations of TWITTers. Tell your friends so they can also come out and see a piece of aviation history and enjoy the hanger flying that is sure to occur as some of Southern California's old timers are sure to get together.

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MINUTES OF THE AUGUST 18, 1990 MEETING

Andy opened the meeting by announcing that the elections would again be postponed due to a low attendence of active members. He mentioned the the magazines on the table were free for the taking and that they could kept or returned. The raffle prize will be a book on the TESLA concept engine, which will be one of the subjects for the day's program. Bruce Carmichael introduced Bud Mears, an accomplished competition glider pilot, modeler, and engineer. Bruce also briefed the group on the upcoming gathering at Tehachapi which will include morning hands-on demonstrations and afternoon lectures on a variety of topics.

Andy then introduced Fortunato Figueroa (Tuto) for the day's first presentation. Tuto, an internal aerodynamicist, discussed some of the difficulties which develop when external (EXT) and internal (INT) engineers try to solve each other problems. He led off with a brief recap of his prior presentation on development of nacelle and lip shapes, and airframe mounting. These were covered in detail in a previous newsletter's minutes so won't be repeated here.

(The following highlights the presentation since most of it was accompanied by diagrams and charts to graphically demonstrate his point of view. The tape will be saved so anyone interested in hearing the details can send us a blank cassette plus return postage or $3 for us to provide and tape with packaging and postage.)

Tuto began the new part of his presentation by defining the fundamental requirements for selection and installation of an engine. These are: minimum fuel consumption per unit of weight of the engine; maximum thrust per unit of weight; and maximum thrust per unit of engine frontal area. These three figures divided one into the other gives you the specific fuel consumption for the engine. The maximization of these factors is what leads to the conflict between the INT and EXT aerodynamicists.

Engine installation is supposed be to taken care of by the EXT while the INTs handle the inlet and exhaust portions. The analytical EXTs usually come up with a cowling shape which is a blend from the front of an ellipsoid and the rear of a paraboloid, resulting in a new shape called a teardrop. They then calculate all the required pressure distributions, form drag, frictional drag, and moments to see how the shape will work on the airframe. However, they have disregarded the effects of internal airflow which impact these other factors. The EXTs feel that simply putting straight pipes out the front and back will provide sufficient data on internal flows, much to the concern of the INTs.

The INTs then have to convince the EXTs that all the air will not flow straight through the engine and that the spill over around the lip needs to be calculated into the final drag factors. Modern computers do a good job at simulating this flow and pro- vide the theorical data necessary to perform the final calculations.

Tuto went on to talk about what happens to the airflow around the cowling as its drag begins to significantly increase and it reaches the critical Mach number. A plot- ting of the thickness ratio, maximum dia- meter divided by total length, shows that the Mcr occurs at lower speeds for parabo- loids than for the ellipsoid all the time. There is also a point at which the air again reaches a smooth flow, and this called diversification.

The spillage around the cowling is also caused by the difference between the aircraft's mach number and that of the air entering the engine. The in-flow ratio, which is the ratio of the areas of the same flow, can be controlled by the installation of difussers inside the engine inlet. The proper shaped diffusser can give an inflow ratio of 1. By attaining a ratio of 1, cowling installation can be dramatically reduced in size which produces obvious savings in weight and additive drag. Using a set of drawings, Tuto explained a little about additive drag, indicating it related to the pressure differentials between airspeed at the aircraft inlet air and the air mass reaching the engine itself.

Since installation is often governed by the size of the engine, compromises have to be made to reach the optimum inflow ratio. Using NACA data, the engineer selects an induction system that has similar performance, including Mcr (critical mach), to that needed for the new installation. What maybe an acceptable inlet system to the EXT, slen- der and efficiently fit within the airframe, may not be suitable for the

INT since it does not allow for the proper changes in airflow speed and mass and allow good engine operation.

Tuto concluded his presentation by showing test results which demonstrated that proper cowling and inlet design can actually produce negative drag (thrust) within the airflow spilling out around the inlet lip. This also helped to prove his point that there are design areas for both the external and internal aerodynamicist, and that each should better understand the other's respon- sibilities so more efficient designs can be achieved.

Bob asked Tuto if the principles he described were also applicable to things like ducted fans. Tuto explained that with proper lip design on the duct a certain amount of thrust could be produced by the airflow around the outer surfaces. Andy asked if these theories could also be applied to the low airspeed regime for things like engine cooling inlets, etc. Tuto indicated the ratios and formulas would work at any speed. This would lead one to believe that a little extra effort in plan- ning the various inlets on the airframe could not only reduce drag but help produce some small amounts of thrust.

Andy then introduced Lee Klaus who would tell the group about the current status and new things coming from the Rotax engine builders. Ed also introduced Ed Fitzgibbons and Roger Allen who had brought in Rotax powered aircraft for the hands-on portion of the program. Lee also handed out a couple of charts which showed performance figures for several models of the Rotax.

He briefly discussed the factor of manufacturing liability being one of the reasons why the engine is not sold directly in the U.S. In California it is called the particular product rule which puts the creator of an item at risk no matter how his product is used.

Rotax engines are made in Austria and marketed into the U.S. through Canada. There is a disclaimer boldly printed on the instructions indicating the engine is subject to unpredictable sudden stoppage and when installed in an aircraft do not fly over populated areas, etc. The Austrian and Canadian court systems are also quite dif- ferent then the U.S. courts so nuisance suits are much more difficult to persue.

The two cycle engine has fewer moving parts than the conventional four cycle models and produces power on each revolution of the piston. Although you get more power per pound the fuel economy is not as good. This is due to the poorer fuel mixture and the lack of proper overlap between intake and exhaust.

Lee went on to discribe the differences between the 582 and 532 model engines. The 582 is an upgraded version of the 532, having a fatter piston, dual ignition system and an oil injection system. This later part provides for introducing the oil into the mixing chamber as a separate operation instead of mixing the oil into the fuel. The fuel/oil mixture provides all the necessary lubrication for the bearings, pistons, etc.

This engine has a circular valve which is perdendicular to the crankshaft that ports the inlet stream which has improved the specific fuel consumption figures quite a bit. Fuel consumption is now about equiv- ilant to a 1930s Franklin air cooled engine in the cruise configuration.

The dual ignition also helps the fuel figures while providing an added safety factor. The two plugs give a better flame pattern which allows for the bigger piston in the 582. Although the 65 hp of the original has not increased, according to the manufacturer, Lee feels the engine is developing more than advertised.

Lee pointed out the difference in the power curves in the charts. The 582 hp curve is higher in the low range but about the same at the normal hp measurement point. The dramatic difference shows in the torque curve when it shifts significantly in the low rpm range. This new engine allows the Pulsar to acheive its designed ground run capabilities, while giving it a 132 mph cruise speed at 60% of hp with a fixed pitched propeller.

The fuel consumption curve shows a definite dip in the normal straight line values and at the point where cruise power is normally attained. Although the curves are somewhat suspect due to the ways in which they were derived, Lee felt that the 582 would get better fuel milege.

Lee went on to discuss what may have caused some of the problems with operating reliability on the 582 engine. The manufac- turer has recommended disconnecting the oil pump, since if it stops operating the engine will not have the proper lubrication. Lee feels the pump is not the problem, so much as the operators not ensuring that the oil bottle is properly filled before each flight. These engines have been used pri- marily by ultra-light pilots, some of whom do not always accomplish a thorough pre- flight inspection of the engine systems as do conventional aircraft pilots. (This is his opinion as to why there have been failures.)

Lee has made a modification to his Pulsair to include two fuel tanks. One will have just gasoline and the other will have the proper fuel/oil mixture to use in case of pump failure. Now all he has to do is design a detection system so he will know when the oil system has failed.

After his discussion on the engines the group went outside to look at the 582 engine Lee had on the tailgate of his truck, a 377 with a two-to-one gearbox in Ed Fitzgibbons' Mini Max, and a 477 in Lee's and Roger Allen's L-2.

After about twenty minutes of everyone asking questions about the airplanes and engines, Andy gathered the group together to introduced Jim Newman of Infinity Aerospace, Inc. in El Cajon. Jim was there to talk with us about the bladeless turbine engine based on the work of Nicola Tesla in the early 1900s. Since then Jake Purcel has carried on the work and produced a number of different applications, including generators and pumps. (See a copy of the handout elsewhere in this issue.)

The engine uses the concept of boundary layer vortex to accomplish a 6:1 compression ratio without stators and vanes. The blades are a series of very smooth flat plates that form a cone within the compressor housing. The compressed air then goes through the burner cans and a diffuser before being pushed through the turbine section which is similar to the compressor. The hot section has a 700 hour inspection cycle, with the entire engine having about a 3000 hour TBO. It produces about 1200 pounds of thrust, which equates to about 400 hp. There are also 600 and 50 pound thrust versions. It has an accessory section which will allow attaching all the normal pumps, generators, etc. Specific fuel consumption is in the area of .5 to .7.

The engines sell for about $5000 (50#) up to $45,000 for the 1200# version. It uses ceramic bearing but he was not sure what material was being used for the hot section. He said they are 125% quieter since there are no blades to create sub/supersonic noise. According to Jim it sounds more like a big air compressor being used to spray paint.

Jim went on to talk briefly about his upcoming Infinity I aircraft. (See specs and drawings elsewhere in this issue.) He inidicated there is alot of interest in it by both commercial and military users since it has a wide range of speeds and manueverability.

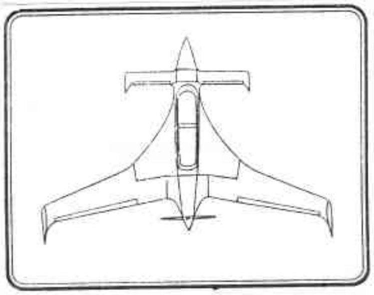
Jim also showed us his new fighter style stick grip that he has designed to replace the old military grip which was heavy and hard to wire. It has many functions, is much lighter and can be adapted to a variety of stick diameters. He is also getting ready to make one that can be placed on the throttle and provide multiple functions.

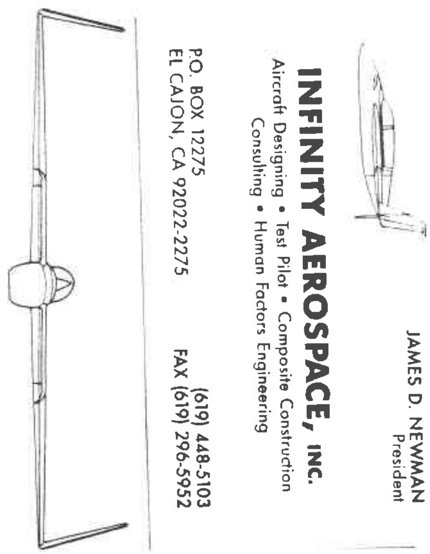
Andy conducted the raffle, which was a copy of the book Boundary Layer Breakthrough - The Bladeless Tesla Turbine, compiled by Jeffrey A. Hayes. Our first speaker, Tuto, was the winner.

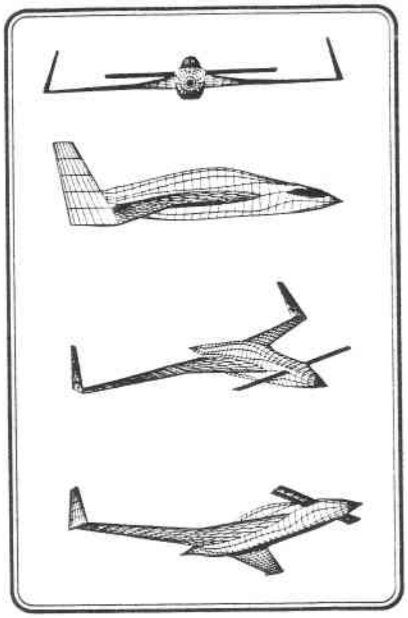
With the business for the day concluded Andy adjourned the meeting and everyone went back to asking questions of the various speakers and looking at the engines, which included a mockup of the Tesla engine that Jim brought along.

Mike Lachowski's .10 powered delta flying wing (See letter on page 7.)

Infinity Aerospace, Inc.
P.O. Box 12275
El Cajon, CA 92022-2275







Infinity I

Kit Aircraft

Fast *Inexpensive*
Versatile *Safe*
Maneuverable *Fun*

Infinity Aerospace, Inc.

Infinity I Kit Aircraft Specifications

CALCULATED PERFORMANCE:

Velocity, never exceed	460 mph
Cruise @ 85% Power (10,000 ft)	285 mph
Glide Ratio	18:1
Service Ceiling	30,000+ ft
Range	1130-1710 sm
Fuel Consumption	8-13+ gph

	Sea Level (SL)	10,000 ft
Max Level Speed (IO-360)	272 mph	257 mph
Max Rng. Speed (IO-360)	258 mph	245 mph

	1170 lb (SL-10K)	2000lb (SL-10K)
Climb Speed	69-81 mph	91-106 mph
Rate Of Climb (fpm)	3600	2000-1900
Climb Angle	36-30 deg	14-12 deg
Engine Out Glide Speed	95-110 mph	124-144 mph
Canard Stall Speed	50-58 mph	65-76 mph

	1170 lb/SL	2000lb/SL	2000lb/5K ft
T/O Ground Roll	560 ft	949 ft	1205 ft
T/O Over 50' Obstacle	700 ft	1387 ft	1706 ft
Landing Ground Roll	550 ft	930 ft	
Landing Over 50' Obstacle	1200 ft	1745 ft	

FAA Field Length 2900 ft

WEIGHTS AND LOADINGS:

Gross Weight	2000 lbs
Empty Weight	900 lbs
Useful Load	1100 lbs
Wing Loading	16.863 lbs/ sq ft
Power Loading	9.52 lbs/ hp
Fuel	360 lbs (60 gal)

PROPELLER:
3 blade, constant speed, computer controlled, reversible

LANDING GEAR TYPE:
Electric/hydraulic retractable tricycle gear

Wheel Track	99.50 in
Wheel Base	109.42 in

ENGINE TYPE:
TIO-360 210 HP Lycoming

STORAGE AREAS:

Baggage Pods	5 cu ft
Strakes/Cockpit	20 cu ft

DIMENSIONS:

Wing Span	26.10 ft
Wing Area	105.6 sq ft
Canard Span	12.00 ft
Canard Area	13.00 sq ft
Total Wing Area	118.6 sq ft
Overall Length	212.16 in
Overall Height	92.40 in
Cockpit Width: Front	26.00 in
Cockpit Width: Rear	24.00 in
Cockpit Height: Front	36.00 in
Cockpit Height: Rear	35.00 in
Cockpit Length: Front	78.00 in
Cockpit Length: Rear	62.00 in
Seats	2-3

RDT & E:
1000 lb. Thrust Jet — Turbo Props
225 HP Mazda Wankel/Rotary — Ducted Fans
Government Interests

LETTERS TO THE EDITOR

June 20, 1990

TWITT

Please renew my subscription for TWITT. My last issue received was for June 1990, so please begin with July so I don't miss an issue.

Enclosed is my check, along with a VHS taped video of three flying wings I have built in the last year. One is the "Clovis Point", which appeared in a previous issue of TWITT, with some minor changes that follow: 20 degree angle of sweep of tip panels not 15; the use of the Elina airfoil in various thickness distributions instead of Eppler 228.

A second plane with similar plan form and area was built for thermal work. Differ- ences were: 8.5 oz wing loading instead of 16 oz; a flat bottom Pheonix airfoil; and moved fins to wing tips.

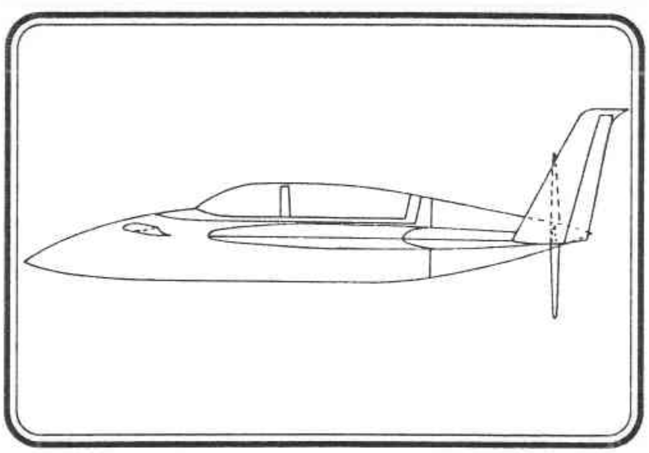
Third was a new, larger 106" span wing using an SD8020 symetrical airfoil, 17% thickness! I think 10% would be better. Also included on the tape is some footage of 727 airshow work, F-14 and F-18 Blue Angels.

Sincerely,

Alan Halleck

P.S. Any info on full size flying wing airfoils (coordinates)?

(Ed. Note: The September 1989 #39 issue has a plan view and spefications on Alan's Clovis Point. The April 1989 #34 issue has an extensive article by the Kuhlmans on airfoils along with coordinates of the S4061-096-84, NACA 43012Ax.833-75 (P2DTip Section), NACA 43012A-75/24112-75 (P2DRoot Section), S4062, S4063, and SD7032. Back issues are available for $.75 each.)



August 5, 1990

TWITT

Some time ago, there was a note that cited issue #33, which note I wrote on a slip of paper, for future look up. This is the future, now, and I find that I do not have an issue #33, and therefore I cannot read pages 8 to 11.

As I'm sure your records will show, I should have received all issues of TWITT, and as each has arrived, it has been included in the proper binder. The fact that #33 is missing tells me that you failed to send me this issue. If you feel otherwise, please bill me, but no matter what, please get issue #33 to me, so that I may read these great words of wisdom.

And again, thanks for the great job you are doing.

Sincerely,

Syd Hall

(Ed. Note: By the time Syd read this he should have his copy of issue #33. We are sorry for the inconvenience and delay in getting this issue to him. The article he is interested in reading was "Let's Consider Airfoils for Flying Wings" by Barnaby Wainfan. The article did not include any coordinate information but provided a good general discussion of types and characteristics. Back issues are available for $.75 each.)

August 23, 1990

TWITT

I am enclosing my $15 check for subscription renewal. The newsletter has improved a lot lately, Keep up the good work.

Thanks,
Ed Gabriel
Blue Springs, MO

(Ed. Note: Ed, your renewal has been taken care of, and we want to thank you for noticing what we have been trying to do with the newsletter. Hopefully, future issues will include more technical material that has been accumulated in the library and is screaming to get out to you guys.)

August 20, 1990

TWITT

Enclosed is a check for my annual TWITT membership. I am also enclosing a few pictures of my projects, a .10 powered delta and; what you do if there is nothing else around, build a Stringless Wonder. The current project in the works is a Peck Polymers Genesis hand-launched R/C sailplane.

I am interested in obtaining copies of some of the recent additions to the TWITT library as documentation for planned future projects. One is the Granger Archaeopteryx mentioned in the July issue. I already have several photos and the **Antique & Classic Airplanes** reference. Any additional information would be helpful. I would like to build an electric powered version of this ship. The other reference is on the Fauvel AV.361 noted in May. I have pictures and a very small 3-view. Some larger drawings would make life easier in scaling up the dimensions for a sport-scale sailplane model. A second check is enclosed to cover any costs related to mailing this informa- tion. Any extra funds can be used to assist in running TWITT.

Keep up the good work on the newsletter. I always find something interesting which is more than I can say for some of the catalog magazines I subscribe to.

Sincerely,
Michael Lachowski
253 Bloomsbury-Pittstown Rd.
Milford, NJ 08848

(Ed. Note: The pictures wouldn't reproduce very well, but the delta looks like a scaled down, modified Holy Smoke which has a similar planform with a single dorsel fin and no rudder. Its extrememly maneuverable, but hard to see on a cloudy day.

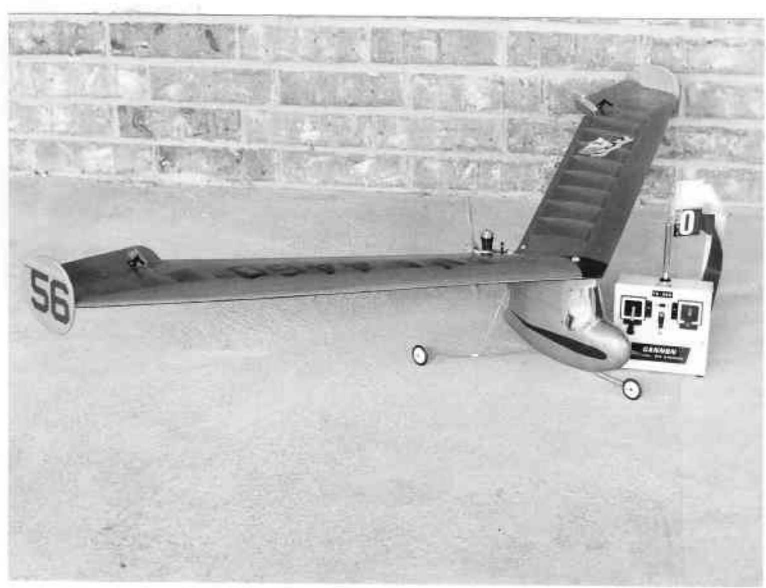
Bob will go to work and try to find what he can in the files on the AV.361 and Archaeopteryx. If anyone out there has some of the information Mike is looking for please send him copies if you can. In the mean time we offer this bit of technical data from an unknown, undated publication that is not of reproduceable quality.

'SURVOL'-CHARLES FAUVEL
Head Office:
72 Boulevard Camot, 06400-Cannes AM
Telphone: 39.83.32 and 39.55.21

FAUVEL AV.361 - It is known that a total of well over 100 AV.36 and AV.361 sailplanes are flying in 17 countries. Plans are available in French and English, and construction by amateurs continues, especially in the USA and Spain. Details of this single-seat general-purpose sailplane may be found in the 1970-71 **Janes**. The standard F2 section wing can, at builder's option, be replaced in the AV.361 by one with a Wortmann FX-66-11-159 laminar-flow section, which increases the best glide ratio to 30 at a speed of 46 knots (53 mph). The following particulars apply to an AV.361 completed by the Escuela de Aeromodelismo at Alicante, Spain:

Span	41' 1 1/2"
Length	10' 7 1/2"
Area	157.15 sq ft
Empty Wt	275.5 lbs
Max TO Wt	568 lbs
L/D @ 44 kts	26
Min Sink	2.43 ft/sec
Max Speed Smooth	136.5 mph

If you don't already have the material from Jane's, hopefully you will find it at your local library. I trust the memberbership will respond to your request for information, since many of them are looking for others to help them with some pet project. Good luck in building your scale aircraft.)



Lil Misery Flying Wing designed by Dan Walton. Cox .049 powered, 50" span, 300 sq" area, 16 oz weight. Controls are through elevons on a sliding servo mixer.

AVAILABLE PLANS/REFERENCE MATERIAL

Tailless Aircraft Bibliography
by Serge Krauss
Cost: $20
Order from: Serge Krauss
3114 Edgehill Road
Cleveland Hts., OH 44118

Horten H1c construction drawings with full size airfoil layout. 30 sheets 24" x 36" with specification manual. Price: $115.

Horten Newsletter
Cost: $5 per year for US/$7.50 foreign
Order from:

Flight Engineering and Developments
2453 Liberty Church Road
Temple, GA 30179
(404) 562-3512

WANTED

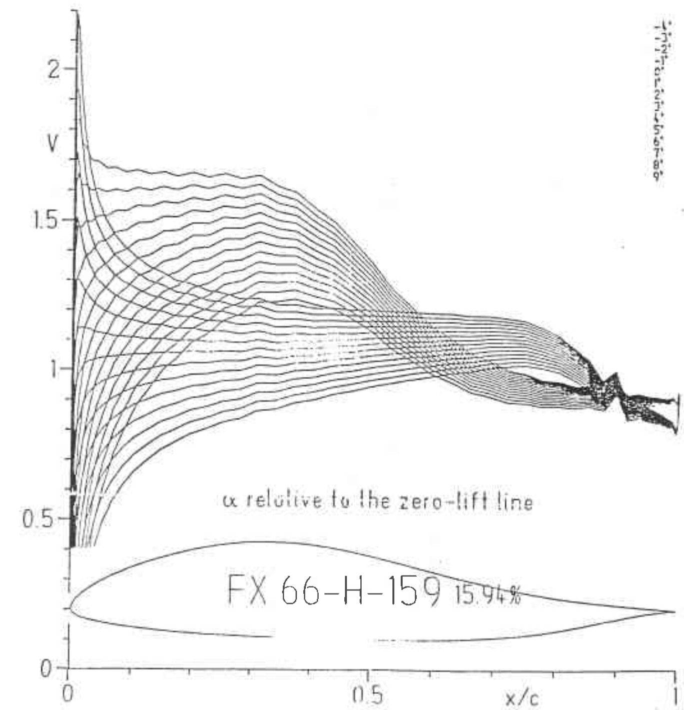
MITCHELL WING or other powered glider or truely soarable ultra-light, perferable with trailer.

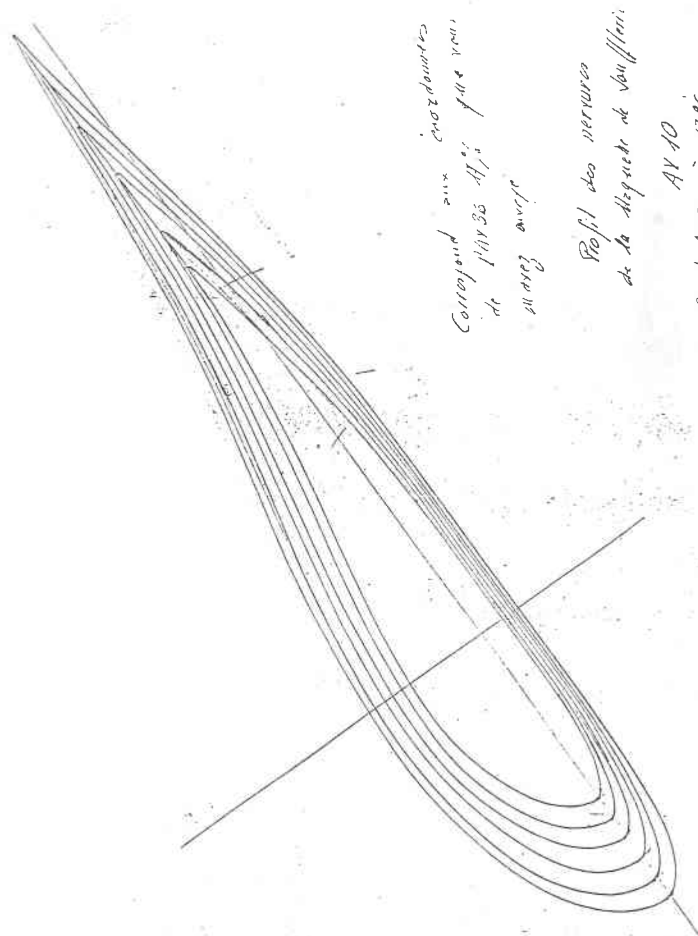
Have cash or will trade for high performance (L/D 34:1) sailplane with enclosed trailer, oxygen, and instruments

Call Chuck at (619) 447-2519 (San Diego)

The following was found in the ***Los Angeles Times*** *newspaper on about May 4th or 5th. Hopefully someone from TWITT will be able to provide some help.*

RESTORING '40s Northrop N9MB Flying Wing, need experienced volunteer woodworkers. Saturday work only. Call David Murray at (818) 369-8056 for details.





THE TWO-SEATER PLANE "A.V. 10"

This plane, which was built by Mr. and Mrs. Coltel after they had witnessed the conclusive flight of the glider, was exhibited (still unfinished) at the last Airshow.

At the beginning of this year it successfully completed its flying tests at the "C.E.M.A" at Villacoublay, after it had easily obtained the International Certificate of Airworthiness (passed for the first time in France by a "tail-less" plane).

Examination of the flying qualities by the official authorities confirmed the excellent longitudinal stability of the plane, whereas many conventional planes do not in their attempt successfully pass this test which, in France, is known for its renowned and very justified strictness.

This examination also recorded that at stalling speed, the design not only prevents spiral dive but stalling as well, and the ailerons always respond.

The "A.V. 10" has not been conceived to obtain a minimal trail from the aerodynamic advantages of the formula, but primarily to be able to demonstrate its flying qualities together with its simplicity of construction. This is why this plane does not have a retractable landing gear, has a side by side closed cockpit with simple forms and a radial engine which was not intended in the original design and is difficult to fit.

Despite these facts and thanks to the very formula which allows for the greater part of the cockpit to be located in the thickness of the wing, the 100C.(r min) is only 2.35 (with the engine originally intended). This figure has never before been arrived at by any side by side two-seater closed cockpit plane of the classic formula.

This figure, however small, is definitely further improved on the two-seater standard private plane "A.V.14" which succeeds the "A.V.10". A complete model of this plane has been made, equipped with the same wing (slightly thinned down) and a side by side cockpit more spacious than the original on "A.V.10", with a "Coucy-Coltel" four cylinder flat-twin engine exactly represented and a non - retractable landing gear with fairing. In the Saint-Cyr Laboratories, this model has just reached the extremely reduced 100C.(r min) of 1.83. Without the landing gear, 100C.(r min) = 1.7 can be reached. The net result is that with 60 HP only the standard plane will be definitely faster than the 75 HP prototype.

A one-seater "A.V.15" is on the drawing board that will fly faster than 190 km/h with a 40 HP engine and a new wing.

Construction is of wood and fabric, with the main longeron and longerons/spars with control couplings attached, tightly linked to the leading edge box spar. The wing profile is the same as on the "A.V.3" glider and was designed by the author by interpolating both "S.T.Aé.Abrial" profiles which, as designed, were not suitable.

The ailerons take up the classic position. Altitude is controlled by the central elevator flaps. The rudder is at the rear of the central part in a single aligned component. In this way, while running on the ground the propeller blows on the rudder; it blows as well on the elevators to easily test the engine at "point fixe" and swifly lifts the tail skid during take off despite the great clearance angle. The standard landing gear is of a "three struts" design, with "Messier" shock absorbers and balloon tyre wheels.

The first run on a straight course at a brisk speed showed, by the reaction on the hands and the elevators position index, a significant "diving" tendency, owing to the engine fairing ring. With the ring removed, the "diving effect" almost completely disappeared and the elevators position became normal. What remained to be done was to make the originally too flexible flaps stiffer and provide them with a "Flettner" fixed adjustment.

In order to improve manoeuvrability at low speed the rudder was enlarged. Ground clearance was first mismanaged by a swivelling tail skid which was too free and not far enough from the landing gear where clearance is important in view of installing brakes.

As on any conventional plane but without the amplification of the reactions which are in this regard encountered on many of them, the plane will nose up when stepping on gas and down when reducing; there is however no noticeable difference in the incidence of balance when centring is modified. Flying is identical to that of a conventional plane without the pilot finding any difference whatsoever.

Despite a propeller which is really still not suitable (neither in power nor quality), a landing gear without fairing, wheels without spats and a 75 HP radial engine difficult to fit, the performances on the airworthiness certificate (allowances made for a two-seater load) were however :

- Basic speed (engine at 310 rpm below normal speed) . . . . 165 km/h.
- Take off. . . . . 210 m.
- Ascent to 360 m . . . . 1.55 min.
- Clearing at 600 m . . . . 48 m.
- Landing without brakes . . . . 130 m.

With a landing gear entirely streamlined and an engine definitely suitable, the maximum speed will stand out at 180 km/h, at the same time improving take off, ascent and clearance as well. With brakes, landing will be reduced by 40 %.

Flying tests of the "A.V.3" and the "A.V.10" showed that the ailerons never cease to respond even with the joystick fully tilted. This in our case positively refutes certain opinion based on hasty conclusions and recent inadequate English tests referring to a trapezoidal wing as compared to a rectangular wing and an elliptical wing (these tests concluded that tapered wings further spiral dives and that at great angles the ailerons do not respond anymore). Charles FAUVEL.

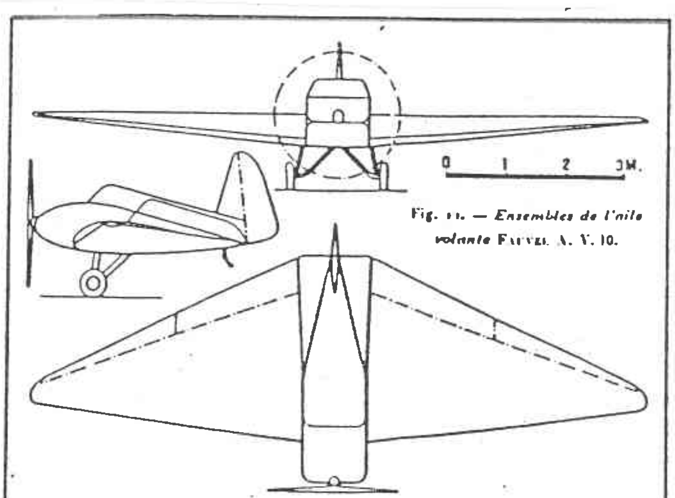


Fig. 11. — Ensembles de l'aile volante FAUVEL A. V. 10.

Caractéristique. — Envergure (sans les arrondis d'extrémité) 10m; longueur, [illegible]; surface portante (sans compter ni les arrondis d'extrémité, ni la partie du fuselage

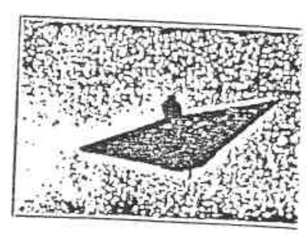
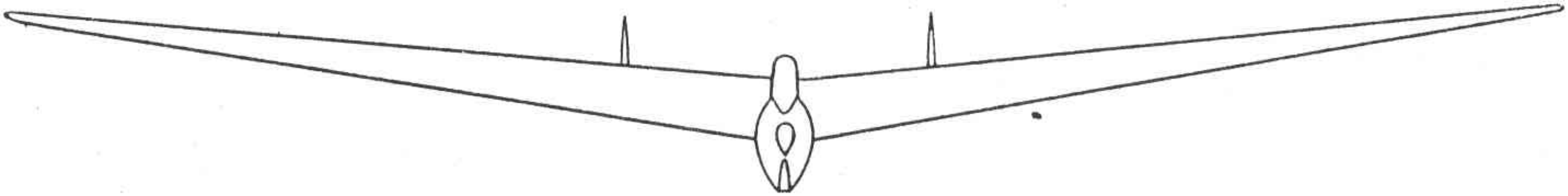


Fig. 16. — L'aile volante FAUVEL A. à moteur Pobjoy 75 HP.



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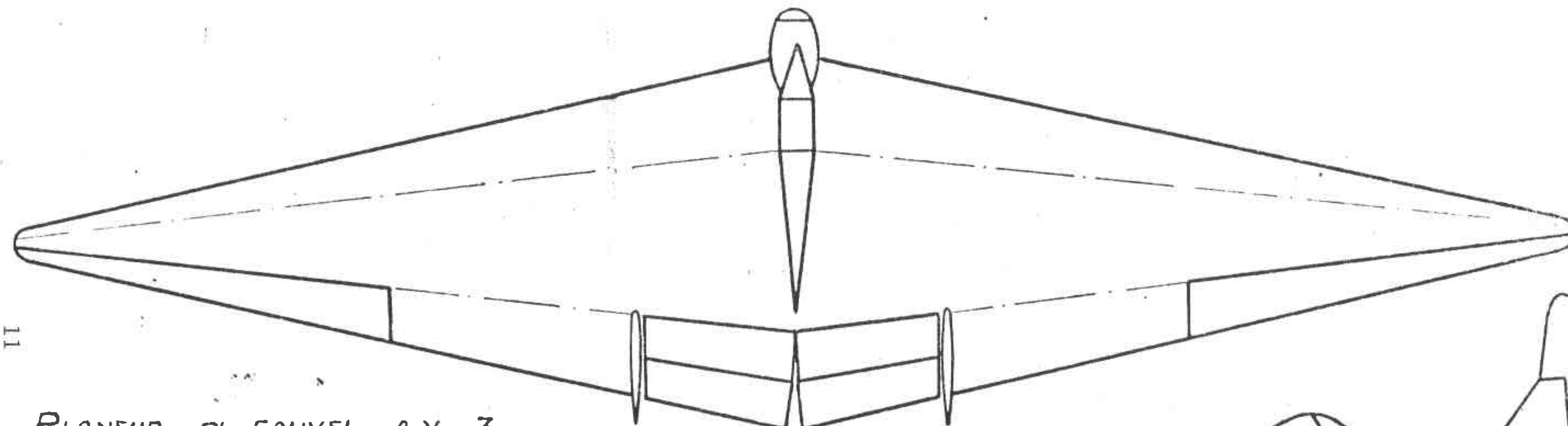
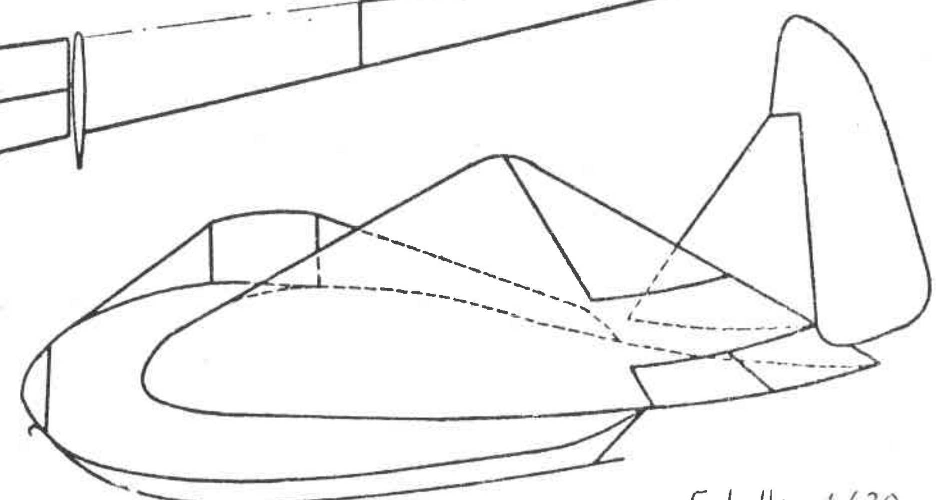


PLANEUR Ch. FAUVEL A.V. 3

1933

Surface	_ 20 m²	Poids total	_ 185 Kg
Allongement	_ 8	Finesse max	_ 19
Poids à vide (equipé)	_ 110 Kg	P/S	_ 9,25 Kg
Descente min	_ 0,80 m		



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