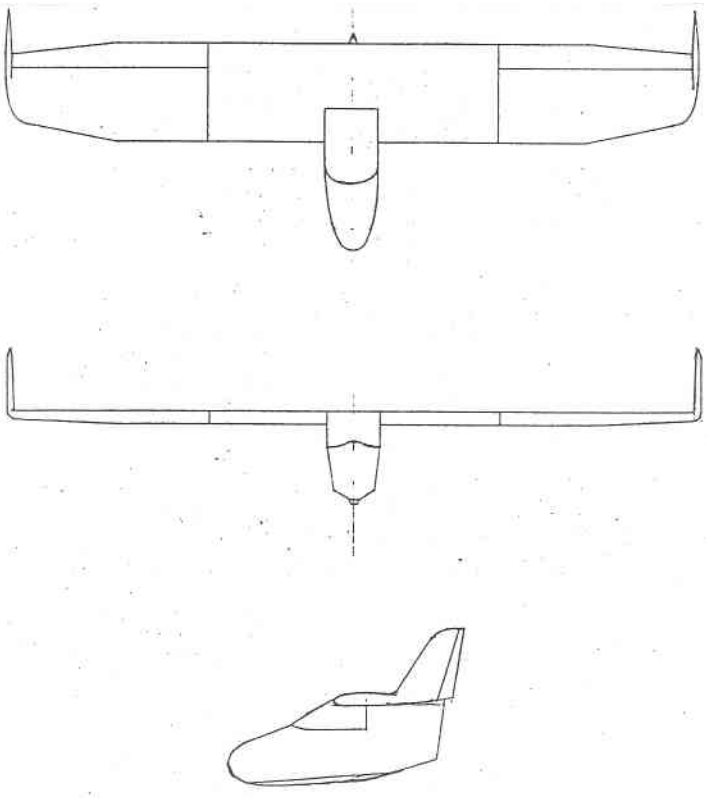
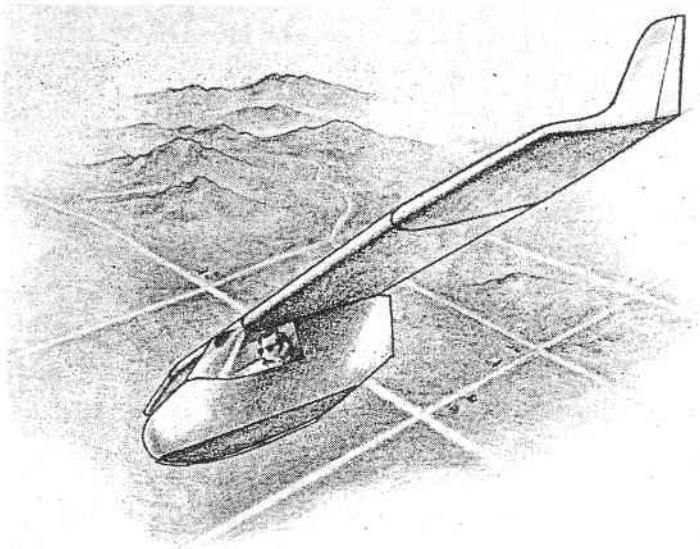
No. 91 JANUARY 1994

T.W.I.T.T. NEWSLETTER



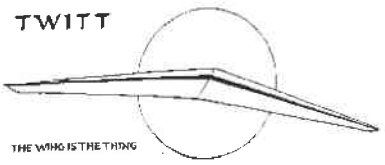


An 8^2 Backstrom Plank for the economizing twenties. It would have an 8m span and an $8m^2$ wing area as specs. As the only justification for these dimensions was to establish size and approximate wing loading, they neatly miss all the current designs that are close. Remember, the object is to explore ideas, not specific designs. Source: Soaring, June, 1980, page 21. Contibuted by Kevin Renshaw.

T.W.I.T.T.
(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., **9401** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, January 15, 1994, beginning at 1330 hrs at hanger A-4, Gillespie Field, El Cajon, Calif. (First hanger row on Joe Crosson Drive - East side of Gillespie.).



THE WING IS THE THING (T.W.I.T.T.)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation which is dedicated to furthering education and research in a variety of disciplines.

T.W.I.T.T. Officers:

President,	Andy Kecskes	(619) 589-1898
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Editor: Andy Kecskes

The **T.W.I.T.T.** office is located at Hanger A-4, Gillespie Field, El Cajon, California.

Mailing address:
P.O. Box 20430
El Cajon, CA 92021

(619) 596-2518 (10am-5:30pm, PST)
(619) 224-1497 (after 7pm, PST)

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Meetings are held on the third Saturday of every other month (beginning with January), at 1:30 PM, at Hanger A-4, Gillespie Field, El Cajon, California (first row of hangers on the south end of Joe Crosson Drive, east side of Gillespie). (619) 596-2518

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PRESIDENT'S CORNER

On behalf of TWITT I would like to wish everyone a Happy New Year, and hope that you are all looking forward to a enlightening year in the design and development of flying wings.

The first program of the year should prove to be a very good one, so I hope you have set aside that Saturday to come out and learn more about the legendary Waldo Waterman's Arrowbile (or Aerobile depending on which model you are looking at). Let's start the year out with a bang and have a good group for Chuck Sisto.

The new year has brought an addition to our communications capability. Bob has installed a telephone line at his hanger, since he spends much of his time there, so we now have the ability to take your calls during the day. **The new number is (619) 596-2518, and there will normally be someone there between 10am and 5:30pm every day except Fridays.** This should allow our members on the east coast and mid-west to call at a more convenient time for them. (This may allow us to finally hook up our FAX machine, but more on that later.)

As you can see from this newsletter, we are continuing to receive a lot of material. PLEASE KEEP IT UP. This is the only way we can get it distributed to the other members so they too can benefit. It is especially important since we have many who are strictly modelers and they can use almost any kind of idea and turn it into a test bed relatively quickly. And for those of you who are into the "real thing", a slight change in configuration found in a 3-view may be all you need to put the finishing touches on your design.

I will try one last time to enlist your support for an auction of flying and airplane construction equipment/material. If you have something you think someone else could possibly use, and are willing to donate it for auction, please let us know. This is meant to raise enough funds to replace that spent for the TV and chairs in 1993 to help provide a better meeting environment. We would appreciate any help.

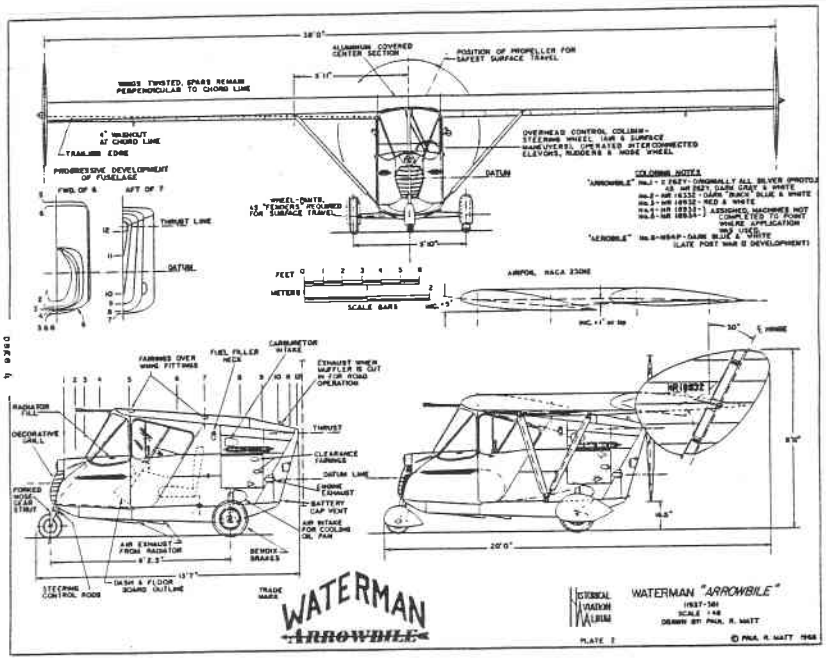
Hope you had a Happy New Year's celebration.

Andy

JANUARY 15th PROGRAM

This program should prove to be a very special one, with our speaker being **Chuck Sisto** who will tell us about Waldo Waterman's **ARROWBILE**. This was a successfully flown (1936), flying wing that could be converted into a car by removing the wing and disengaging the propeller so the road-drive mechanism would provide propulsion through the rear main gear. (Look back at last month's newsletter for a reminder of what this project was all about.)

Get out of your chair and mark you calendar right now so you won't forget that part of your Saturday, January 15, 1994, will be spent learning more about the successes and failures of one attempt to produce a viable flying wing aircraft.



LETTERS TO THE EDITOR

11/13/93

TWITT:

Please find enclosed my subscription renewal to the TWITT Newsletter, along with my apologies for such a long delay.

After I wrote you early in October, my city has been partially flooded by the overflowing Lake Maggiore (Northern Italy), because of exceptionally heavy rains.

Luckily my home remained dry, although we were confronted with some problems for some time.

It was a strange sight to see silent swans everywhere in the streets instead of noisy cars. Now*p25339

Sorry for the long delay. Keep up with the excellent work!

Regards,
Ferdinando Gale'

(Ed. Note: Welcome back to TWITT. We have missed your many and interesting contributions over the past months, and are glad to hear that all is well with you and your family after the flooding.

We are not sure how many newsletters you might have missed, so when you figure out which ones you need, we suggest you use the rate chart on page 1 to determine the cost and shipping charges.

Along with Ferdinando's letter he included several pictures and a description of a radio controlled version of the DeHavilland DH 108. This is reprinted starting on page 5. Our thanks for the material.)

11/12/93

TWITT:

I have been meaning to send some info on my Northrop flying wing project for some time. I built a 1:32 scale model of the XB-35 flying wing about 4 years ago (see photo). This was the first plane I had built in 30+ years and it has been sitting on my desk until I had enough confidence to fly it.

I started to learn to fly with an ordinary high wing airplane and then moved on to tailless electric and gliders as I have indicated before. Last month I felt I could wait no longer so I took the XB-35 out to the local flying club for a test.

The first flight was very disappointing, It got off the ground with up elevon but would not climb. It did not get high enough to risk a turn so I brought it down in the grass and weeds. No damage.

Back home I decided to move the CG further backward and close off the wing slots (with clear plastic tape). Rearranging the battery pack moved the CG 3/16" (I am approaching this SLOWLY). I took a day off work and went out to the field for another try. This time it

took off quickly and flew well. Turns were easy and very graceful looking. Control was easier than I had expected and no bad habits were noticed. After 2 or 2½ minutes I brought it in for a landing. I had never landed on a strip before and had a little trouble with it. I came in too steeply and the nose wheel hit first and broke. All in all very minor damage which has been repaired.

The model was built out of balsa in conventional style and covered with 1/32 balsa sheeting. Four Silver-Streak motors (from Peck Polymers) wired in parallel were used and powered by 7-1400 mah NiCd batteries. Current draw is 25+ amps giving the short flight times. Cox 5x3.5 3-bladed pusher propellers were used and connected via 9" to 12" extension shafts. The model weights 46 oz (11.4 oz/ft^2) and has fixed landing gear with steerable nose wheel. It is built primarily from photos and sketches and some of the dimensions were estimated. Subsequent information revealed I made pretty good guesses (I built-in 5° of twist while 4° would have been more scale like).

I am considering drawing up plans for this as time becomes available in the winter months. The motor mounts and extension shafts are the only tricky areas.

Best regards,

Clark A. Calkins
(510) 939-8153

(Ed. Note: Thanks for the picture and article on your project. This is the type of stuff we are looking for to spread the word to our other members. We hope you are having continued success in flying it and are now getting better landings (they are always the hard part of any flight!!).)

11/29/93

TWITT:

You haven't heard from us for a while, so it's time to bring you up to date on what's been happening.

We spent the entire month of October in Australia, traveling as far south as Hobart in Tasmania, and as far north as Cairns in Queensland. We had a wonderful time, and returned to over 50 pounds of mail! An apology goes out to those members who ordered books from us at the end of September; they had a wait of several weeks to receive their copies.

Of interest to TWITT members is the fact we took one of our models with us, a newly built version of the late Dave Jones' Blackbird 2M. This is the fourth version we've completed and flown, and it features Dave's CJ 25^2-09 airfoil rather than the CJ 3309 shown on the plans. This is the first two meter version we've built to have servos in the wing. The change in airfoil and the direct drive from servo to control surface has yielded a performance difference which is both noticeable and positive.

The fuselage of this ship is a bit more narrow than that shown on the plans, so the receiver sits in a vertical position instead of lying flat within the fuselage. This allowed each wing panel to be a bit longer while retaining the same root chord.

QANTAS stated their maximum dimension for luggage is 39", and the carrying box, of heavy duty corrugated cardboard, wound up being 38 15/16" long! We traveled economy class all the way to Australia and back, almost 25,000 miles total - while our sailplane rode in the first class closet and came through without damage.

We actually got quite a bit of flying accomplished while in Australia. We spent two weekends at the local club's field in Cessnock, NSW, and entered a contest (our first in over seven years) in Lismore, NSW. We flew to 3rd place in two meter in the most unique weather we've experienced. Temperatures ranged in the mid and upper 90s, with high humidity and very strong winds. It should be noted the Australian rules for two meter class are a bit different than here in the States. In Australia, two meter sailplanes are limited to two servos, allowing inexpensive equipment to be used. Conventional tailed sailplanes, therefore, rely upon rudder and elevator control. Since our Blackbird uses elevons only, and has just one servo for each control surface, we met the two servo criteria. With 1300 in^2, however, we were accused of flying a sun shade!

Orders for Tailless Tale and On the 'Wing...the book are arriving on a consistent basis. We very much appreciate the notices which have been appearing in the TWITT Newsletter. Structural Dimensioning of Radioguided Aeromodels is also selling well,

and Understanding Polar Diagrams Without Math is nearing completion.

We still have a foam core version of the Blackbird to complete. The wings are pretty much completed, but the fuselage has not yet been started. The servos are to be in the wings, so the fuselage will be made very narrow. When completed, this one will span 90". It uses one of the airfoils Michael Selig designed for "plank" planforms. Since these sections have very low positive pitching moments in an effort to reduce drag, we are quite eager to finish this ship and see how it performs. We are hoping the wing area more closely matches the power of our winch than the two meter version which imposes too little of a load, and the cross country version (2300 in^2) which stalls the winch motor. If it doesn't perform as expected, it will most likely appear as a slope racer!

We continue to look forward to each issue of the TWITT Newsletter. We recently spent some time going over past issues looking for information on the SB 13, and at the same time constructed an index of articles and items of interest to us. We were astounded at the amount and scope of the material presented. Now if we could just attend the meetings...

Sincerely,
Bill & Bunny (B^2) Kuhlman
TWITT, SFA, NFFS, FAC and FRI
Columnists, RCSD

(Ed. Note: Thanks for the update on your activities. It sounds as if you are keeping quite busy, but having a lot of fun in the process.

Once you have your index complete on the SB 13 project, would you consider sending a copy to Robert Marriott, P.O. Box 194, North Strathfield, Sydney 2137 Australia, since he is interested in the project and would like to order the newsletters that will provide him with this information.

I have also been trying to get up the "courage" to attack putting together an index of the material in the newsletters. However, so far it is remaining an idea and/or wish that may take some time to get into the implementation stage.

If you have a "little extra time" could you send a 3-view or some pictures of your Blackbird to show the members what you have done with the design. Thanks.)

11/29/93

TWITT:

Enclosed are two more items of interest. The first is the press release and drawing of the new Jim Marske/John Roncz sailplane project, the GENESIS I standard class sailplane. This aircraft is not really tailless, but does seem to have a reduced size horizontal tail compared to current state of the art designs. This drawing and the associated date have also appeared in last month's Sailplane Builder magazine and in this month's Sport Aviation magazine. Anyone who wants more data can contact the Genesis Group directly at the address included in the release.

The other item is from a quarterly magazine called American Heritage of Invention & Technology (Winter 94 issue). The article features the lifetime of invention of Jack Northrop culminating in the YB-49. Not much new data, but a good concise biography of Northrop and some nice pictures. It does provide a slight different analysis of the famous Northrop/Symington meetings that led to the cancellation of the wing. The article is probably too long to include in the newsletter, but you can add it to the archives.

Enjoy,
Kevin Renshaw

(Ed. Note: Thanks for the material. The Genesis project has been receiving a lot of press and I have received at least two phone calls from members who have, or will have, contact with Marske and will keep us appraised of the progress. For those of you who have not seen the design, I have reduced the release down somewhat to save space and placed it on page 11.

We will add the article to the library, and try to use some excerpts from it that haven't been seen before in the newsletter.

For Serge the full info on the article is: "The Dream of the Flying Wing," by T.A. Heppenheimer, American Heritage of Invention & Technology, Winter 1994, Volume 9/Number 3, pp. 54-63. Jack Northrop wanted to build an airplane that would be all wing, with no fuselage or tail. He came tantalizingly close, but eventually his failure broke him.)

While not a letter, Eugene Turner sent us a clipping from Sport Flyer titled "Name The Plane Contest" where they showed a aircraft's silhouette and asked their readers to identify it.

It turned out to be the Flexible-Wing Platz Glider of 1923 shown below. It was described as having only two rigid parts; the longitudinal beam where the pilot sat, and the main wing spar. With only two beams, the glider could be rolled up and easily transported. Control was initiated by holding the canard beams, moving them up and down for pitch, and opposite one another for left and right.

The April 1988 TWITT Newsletter has an artist's rendition of the Platz Glider on the cover, along with an English translation of a Germany article on the aircraft. The designer, Reinhold Platz (Anthony Fokker's chief engineer during WWI), wanted to provide

a light, cheap slope soaring machine for the impoverished amateur. The article from 1924 ended with the following observation: "Although the aerodynamic qualities of this sailplane are not the same as those of a "refined" sailplane, still in comparison the advantages mentioned earlier should carry a great deal of weight with the beginning glider pilot."

(Ed. Note: All this goes to show that the idea of flying wings/tailless aircraft still intrigues the average sport flyer. Now if we can only get some of them to put their talents into building better flying wings instead of Glasairs, etc., we would have real progress.)

De HAVILLAND DH 108

(The following was contributed by Ferdinando Gale', Baveno, Italy.)

An Italian modeler, Umberto Grazioli, has built an outstanding radioguided scale replica of the British DH 108 tailless interceptor.

Two versions (of the original aircraft) were built just after WWII; the TG-283 and the VW-120. The later disintegrated in flight during an attempt to exceed the speed of sound in 1976, killing the test pilot, Geoffrey De Havilland, son of Sir De Havilland, founder of the famous aircraft firm.

The model built by Umberto is powered by a Rossi 90 two stroke engine, which actuates a US built Byron ducted fan. Burning a 20% nitromethanol mixture, the Rossi engine turns the Byron fan at 20,400 rpm (static), which develops a static thrust of 14 pounds.

The air exit has a diameter of 100mm, which has a cross section equivalent to 50% of the fan swept area. The twin intakes have an area 30% larger than the fan's swept area. Two ¼ liter tanks, connected in series, are installed close to the center of gravity.

Basic statistics are as follows:

Wing span	160 cm
Length	98 cm
Take-off weight	4250 grams
Wing loading	49 g/sq.dm

The wing airfoil is thin and symmetrical, set at constant incidence, as in the original aircraft. Flight behavior and maneuverability are excellent.

Umberto is now building an improved version, which will incorporate leading edge slots, which help in landings, as well as, a 1.5° washout at the tips, since the elevons have to be set with a slight "up" attitude at all flight speeds.

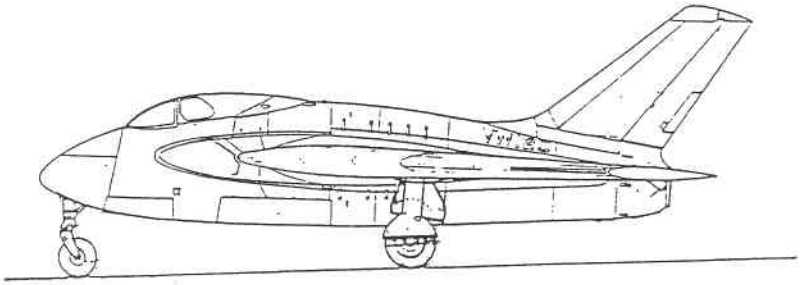
Umberto, who is also an excellent technical draftsman, has prepared the attached drawings of both the plane and the Rossi engine, as well as the pictures.

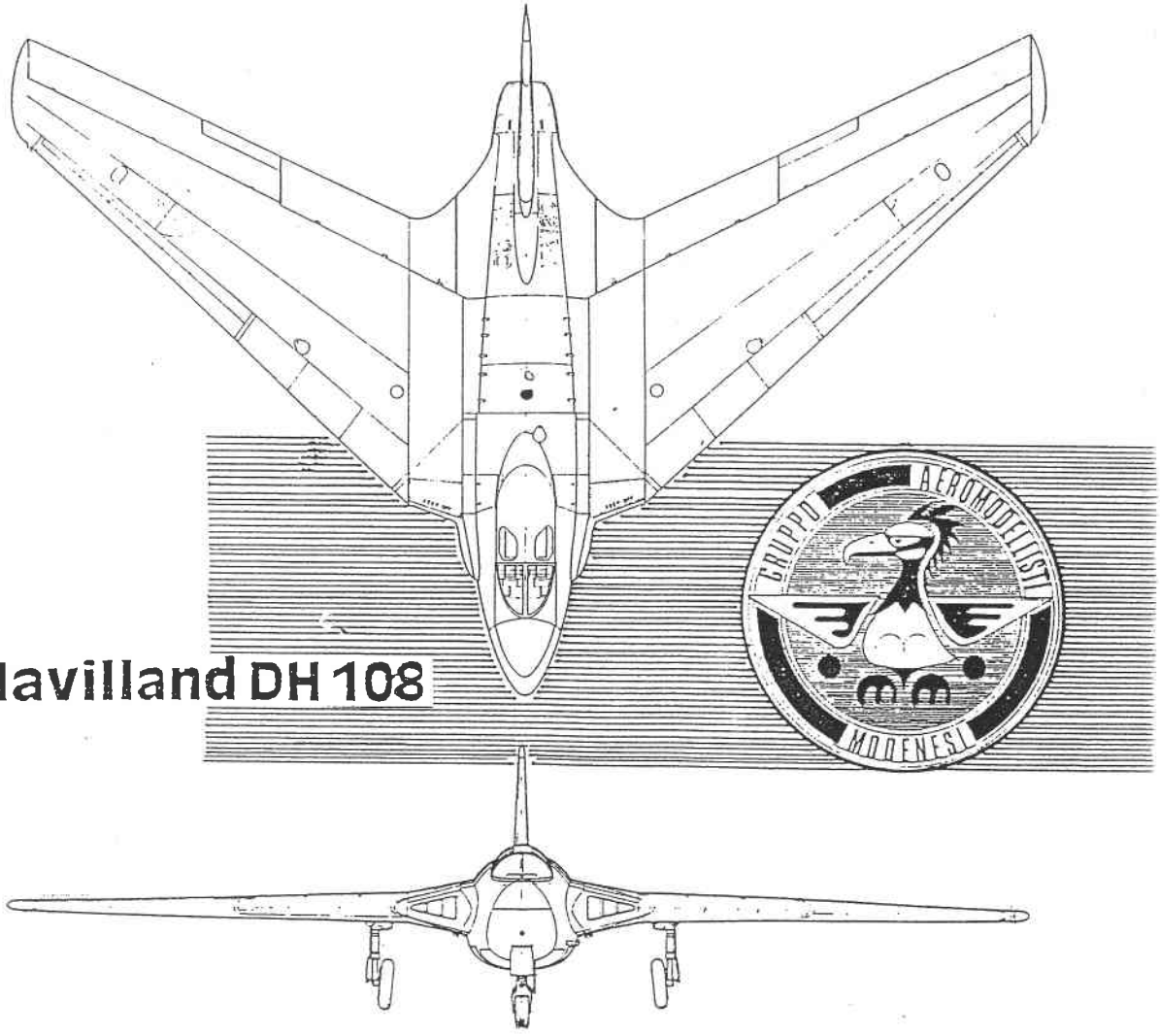
Here is his address, just in case some keen modeler would like to contact him:

Umberto Grazioli
Via Brescia 133
41100 Modena, Italy

A totally different subject: a **PUL-10** powered tailless (two seats abreast), designed by the late Dr. Horten, is now flying regularly in Italy, stirring quite a lot of interest among amateur builders of light aeroplanes. I hope to be able to send you pictures in the near future. *(Ed: One small picture from a magazine was published on page 11 of the December 1993 newsletter.)*

Grazioli Umberto MODENA





De Havilland DH 108

M. Grazioli '31-5-93

RIGID-WING READER UPDATE

Chuck McGill has taken a new direction with his newsletter, which is now the Rigid-Wing Reader & Ultralight Sailplane News (RWR&USN). His editorial comments that this is a "transition from a strictly hang-gliding oriented newsletter to a medium more inclusive of a sector of soaring previously referred to as the "gap." This area between the two more traditional soaring disciplines, a previously unorganized and currently somewhat chaotic sector of the sport-soaring kingdom, is destined to become an important soaring category, providing you are willing to make it so!"

He goes on to say that a new category of ultralight soaring has the potential to become a major factor in sport aviation. He envisions a formal organization along the lines of an Ultralight Soaring Association (discussed in his issue #6). In his opinion, the greatest contribution an organized ultralight soaring effort will make to aviation is in the numbers of people who will be attracted to soaring as tomorrow's committed pilots and entrepreneurs, men and women looking for good opportunities to fly and/or experience financial prosperity in a new and exciting ultralight sailplane category.

However, this transition could take its toll in the termination of Chuck's publishing of a newsletter. He is looking for support to either keep the publication strictly in the hang-gliding realm, or switch over to the ultralight soaring category. He is leaning more heavily toward the ultralight area, since recent decision within the hang-gliding industry have hurt the rigid-wing enthusiasts. His is also considering stopping publication altogether if he cannot expect to expand his reader base beyond 200 subscribers.

He is asking for your opinions in which direction his, and others, efforts should be focused. "Should I continue to try to establish rigid-wings strictly in hang-gliding, or should I try to organize ultralight soaring and ultralight sailplanes?"

If you have an opinion and/or see some benefit to yourself and others in your sport, please write Chuck and lend him your support. He can be contacted at:

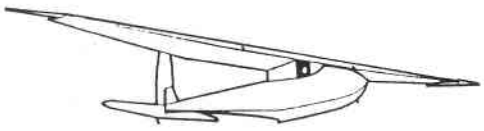
Chuck McGill
P.O. Box 464
Olympia, WA 98507

HISTORICAL MARKER

Bob Fronius and Don Hunsaker have announced that approval has been received from the Department of the Navy to mount a historical plaque at a site on Point Loma (San Diego) to commemorate early sailplane flights.

The wording for the plaque is being developed by the National Soaring Museum, and it appears there will be a donation of the bronze plaque and mounting stone in the near future.

The site will be a memorial to flights by Bud Perl, Hawley Bowlus, Charles and Ann Lindbergh, Forest Hiatt, and others in the No. 18 Bowlus (shown below).



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3rd Edition: An extensive collection of books, articles and other items related to the development of flying wing (tailless) aircraft design and construction.

Cost: $20
Order from: Serge Krauss
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Cleveland Hts., OH 44118

Tailless Tale, by Dr. Ing. Ferdinando Gale'

Consists of 268 pages filled with line drawings, tables and a corresponding English text. It is directed towards modelers, but contains information suitable for amateur full size builders. Price is $38, postage and handling included (also applies to Canada and Mexico).

You might also want to purchase his new book **Structural Dimensioning of Radioguided Aeromodels**, priced at $18.00.

On The Wing...the book, by Bill and Bunny Kuhlman (B^2) is a compilation of their monthly column that appears in RCSD. Many of the areas have been expanded and it includes coding for several computer programs to determine twist and stability. Priced at US$28.00.

All these are available from B^2 Streamlines, P.O. Box 976, Olalla, WA 98359-0976, or (206) 857-7249 after 4pm Pacific Time. Orders shipped elsewhere will be sent surface mail unless an additional $10 is included to cover air mail postage. Washington residents must add 7.5% sales tax.

THE RYAN X-13 VERTIJET

(The following material was provided by Pete Girard, the initial test pilot for the X-13 flight evaluation program. Pete was one of the first TWITT meeting attendees, along with Richard Miller, former Soaring editor and initial editor of the TWITT Newsletter.)

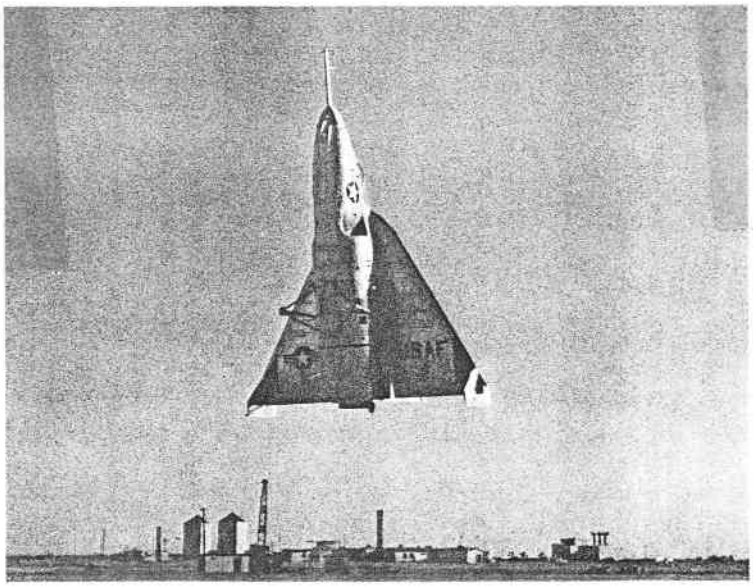
Description of the X-13 Aircraft

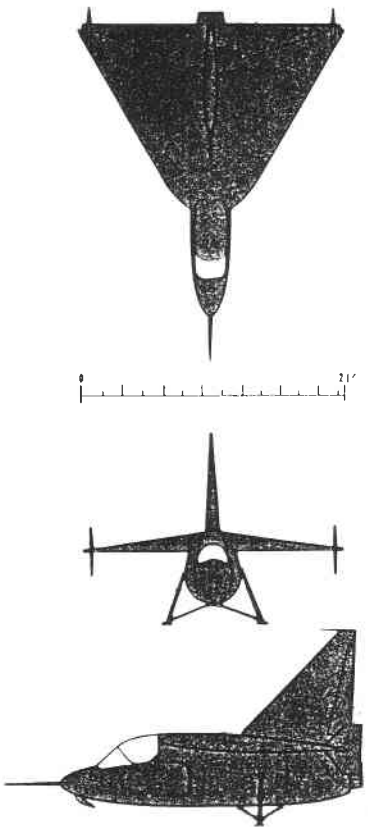
The X-13 airplane was capable of flying in any of three flight regimes: conventional flight (wing lift); vertical attitude (thrust lift); and transitional flight, the latter two heretofore never accomplished by a true turbojet aircraft.

Additionally, the airplane was capable of performing three different types of take-offs and landings - the conventional runway take-off and landing with temporary conventional tricycle landing gear, the VTOL with a temporary tailsitter type landing gear, and a hook suspension VTOL from a nose hook which engaged a short cable supported horizontally some distance above the ground by a ground support trailer (GST). **(cont. on page 9)**

1957 Ryan X-13 Vertijet®

The Ryan X-13 Vertijet . . . world's first jet VTOL airplane . . . was publicly introduced in 1957. The culmination of 10 years of VTOL research and design, the X-13 featured a delta wing and was powered by a Rolls-Royce engine of 10,000 lbs. thrust. Operating from a ground service trailer, the Ryan X-13 took off vertically, transitioned immediately into horizontal flight, then returned to vertical attitude for let-down and landing.





The X-13 was a single place, tailless, modified delta wing VTOL aircraft with a single triangular vertical fin and rudder, and wing tip endplate. It was powered by a single turbojet engine of slightly more than 10,000# SLST without afterburner. The VTOL landing gear consisted of a large hook on the underside of the fuselage near the nose and two fuselage bumpers located one on each side of the fuselage aft of the CG and projecting below the keel. The X-13 airplane very satisfactorily demonstrated on numerous occasions the capability of VTOL with transition to and from high speed conventional flight. Additionally, it repeatedly demonstrated that it was capable of performing this VTOL transition cycle in a very straightforward and precise manner under weather and terrain conditions quite removed from the ideal.

HEDGE HOPPING
by Peter F. Girard

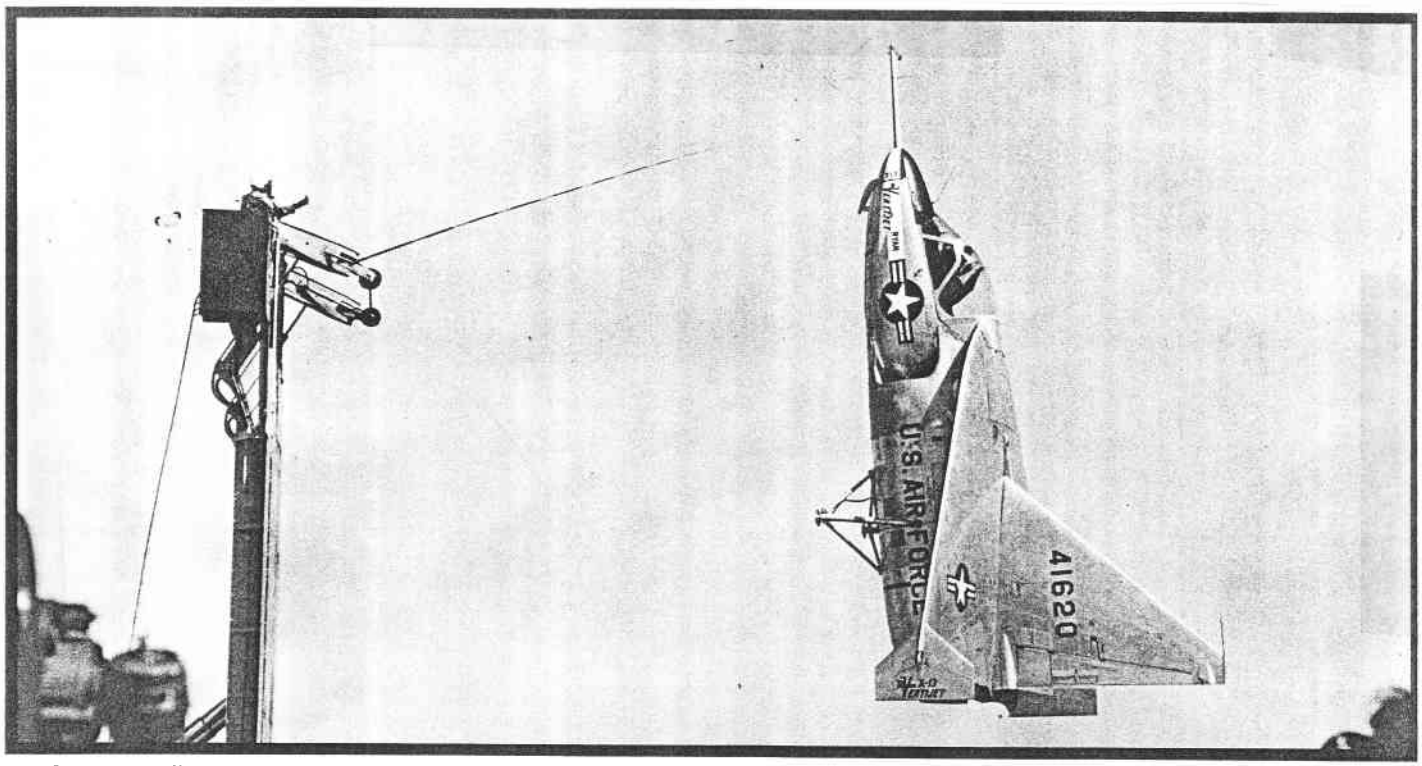
(Source: Air & Space, August/September 1993, pp. 18-19)

"**There** I was, at Maryland's Andrews AFB on a cool July dawn in 1957, sitting in the cockpit of world's first turbojet-powered vertical take-off and landing aircraft in which I was about to make the first jet flight to the Pentagon.

"The single-seat, tailless, delta wing aircraft was the first to successfully demonstrate conventional fixed-wing flight, vertical hovering, and shifting between these modes. The thrust of the turbojet supported the airplane in the hover mode. A gimballed tailpipe nozzle provided pitch and yaw control and wingtip nozzles enabled roll control. The pilot's seat rotated forward 45° for proper visibility during hovering.

"The X-13 had limited fuel capability - there was just enough on board to make the planned flight plus 45 seconds of reserve. Once I left Andrews and reached the Potomac I was committed to either land or eject.

"As the X-13 passed over a hedge (along a incline leading to the landing trailer), I headed toward the trailer, dodging the flagpoles at each end of the incline. I let down in a non-standard, nearly vertical final approach, inched forward to engage the hook on the cable, and completed the flight - and probably last - fixed-wing jet airplane landing at the Pentagon."

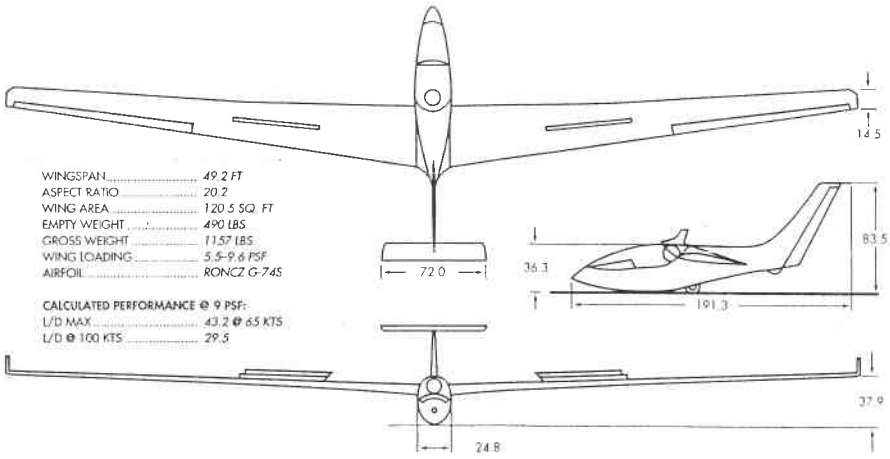


X-13 "Vertijet" Experimental VTOL 2 built, 1955

There were two X-13 built as a follow-on to successful experiments with a tethered and winged J-33 jet engine begun by Ryan in 1947. Fitted with a temporary fixed landing gear, X-13 (s/n 54-1619) flew for the first time Dec 10, 1955. The second X-13 (s/n 54-1620) flew for the first time Nov 28, 1956. First complete VTOL flight sequence (vertical take-off from its "support" trailer, transition to horizontal flight, vertical landing) in the world was accomplished on April 11, 1957 by X-13 54-1620. The relatively small X-13 had a span of 21 ft, length of 24 ft and height of 15 ft. Weight was about 7500 lb and providing sufficient thrust for the vertical maneuvers was a single Rolls-Royce Avon of 10,000 lb s.t. Built for the Air Force, both X-13 survive; 54-1619 at the National Air and Space Museum and 54-1620 at the Air Force Museum, Dayton, Ohio.

The *Genesis I* Standard Class Sailplane

GROUP GENESIS



The *Genesis I* is a high performance Standard Class sailplane constructed of high-temp prepreg composites designed by John Roncz and Jim Marske. This design was developed with emphasis on aerodynamic optimization through state-of-the-art computer modeling. A primary goal of this project is to create a reasonably priced kit sailplane with world-class performance.

The *Genesis I* will be supplied in kit form with all major assemblies completed by the factory. This includes wing halves assembled in factory alignment jigs. The builder will license the *Genesis I* as an experimental aircraft.

GENESIS I STANDARD CLASS SAILPLANE FEATURES:
Automatic Control Hookups and Adjustable Rudder Pedals • Water Ballast • Carbon Fiber Spars • Kevlar Reinforced Cockpit Structure • Large Cockpit for 6'4", 250 lb. Pilot • Stall Speed of 37 kts. at 5.5 psf Wing Loading • Rough Air Redline(Vb) 115 kts. / Vne 150 kts. • Ballistic Parachute Recovery System as Standard Equipment • Projected Build-Time Less than 300 Man Hours • Optional Genesis Factory Trailer

Collectively, the Group Genesis team has been involved in the design or construction of over 50 individual aircraft, with over a century of cumulative design/build experience.

FIRST FLIGHTS PROJECTED IN DECEMBER 1993

MARION MUNICIPAL AIRPORT • 1530 POLE LANE ROAD • MARION, OHIO 43302

PRIOR PAGE & BELOW: From "Wing Sense" - Contributed by Eugene Turner.

Reversed propellers give quick braking power in event of an engine failure during take-off.