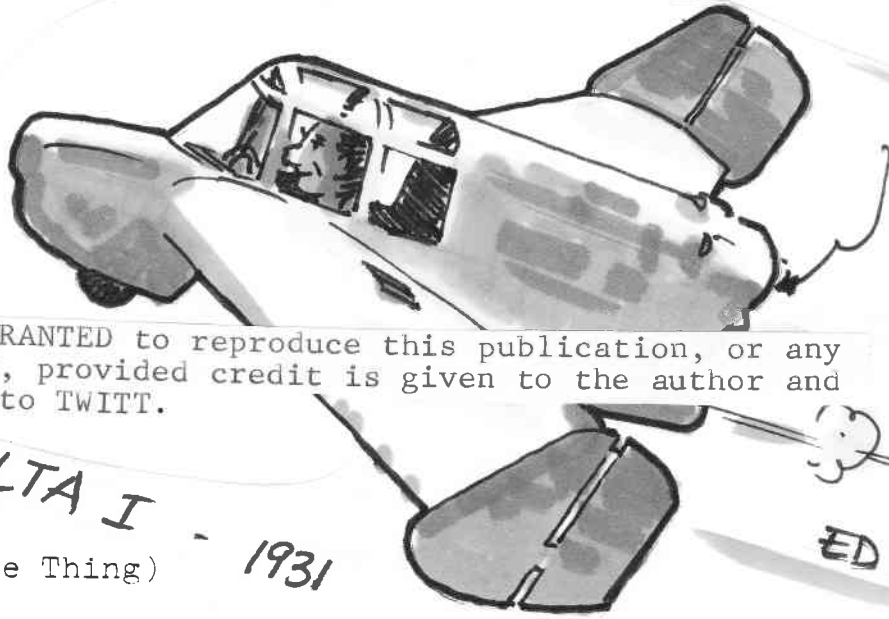


TWITT NEWSLETTER

F. Marc de Piolenc, Editor and Publisher

No. 11, May 1987



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DELTA I - 1931

ED LEISER 1987

TWITT
(The Wing Is The Thing)
PO Box 20430
El Cajon, CA 92021

NEXT MEETING: Saturday,
16 May 1987, 1330 hrs,
Hangar A-4, Gillespie Fld.

Telephone: (619) 224-1497 before 10 AM or after 10 PM

MINUTES OF 18 APRIL 1987 MEETING

TWITT's eleventh monthly meeting convened in Bob Fronius' hangar at 1:30 pm, 18 April 1987. Bob opened the meeting by thanking Ed Lockhart for providing the SB-13 drawing that graced the cover of Newsletter #10. He also thanked those who have helped TWITT financially, noting that the Newsletter is too costly for him to carry without paid subscriptions, thanked your Editor for providing articles, translations and so forth [my pleasure, Bob!], and June Wiberg for printing, collating and mailing the Newsletter. June's job keeps getting bigger as interest in our activities increases...Finally, Bob thanked the many people who have helped by providing their knowledge and valuable technical and historical documents, and by addressing our meetings. Bob then asked guests to introduce themselves. Once the introductions were over, he announced the date of our next meeting, 16 May, and announced that there will be a guided tour of the San Diego Aerospace Museum's basement workshop on 13 June, arranged by Experimental Aircraft Association Chapter 14 [details elsewhere in this issue]. Marc de Piolenc, Phil Burgers and Ed Lockhart then discussed a series of lectures on Aerodynamics given at San Diego State University on 2 April: one by R. T. Jones of NASA-Ames on his concept of a skewed flying wing SST for transpacific service, one by William Sears on the history of unsteady aerodynamics, and a lecture and film on insect flight. Marc and Phil provided most of the details of R.T. Jones' talk while Ed Lockhart discussed the insect flight lecture, augmenting it with his considerable personal knowledge. Phil took the unsteady aerodynamics exposition alone because your friendly Editor had left his notes at home. A break ensued, after which Bob again introduced Marc de Piolenc, who summarized from a design engineer's standpoint the information in Dr. Karl Nickel's paper "Minimal Drag for Wings with Prescribed Lift, Roll Moment and Yaw Moment, or How to Fight Adverse Yaw." By the time your Editor ran out of material, the crowd was noticeably thinner, but the survivors kept Marc busy with questions for some time and lively discussion continued after the meeting was over.

ERRATUM

In his article in issue #10 on the Rohr 2-175, your Editor mistakenly wrote that Bob Fronius and crew had molded the polycarbonate canopies for the prototypes. That feat was actually the work of Chuck Ball, a tooling engineer, and an attorney by the name of Don Herbst. Sorry, gentlemen.

NEXT MEETING

Our next meeting takes place at 1:30 pm, 16 May 1987 and features Bruce Carmichael, whose topic will be "A Light Approach to Convenient, Economical Sport Soaring." Bruce will also discuss his recent trip to Australia, during which he saw two tailless gliders, one of them a 2-place Plank!

TWITT BULLETIN BOARD

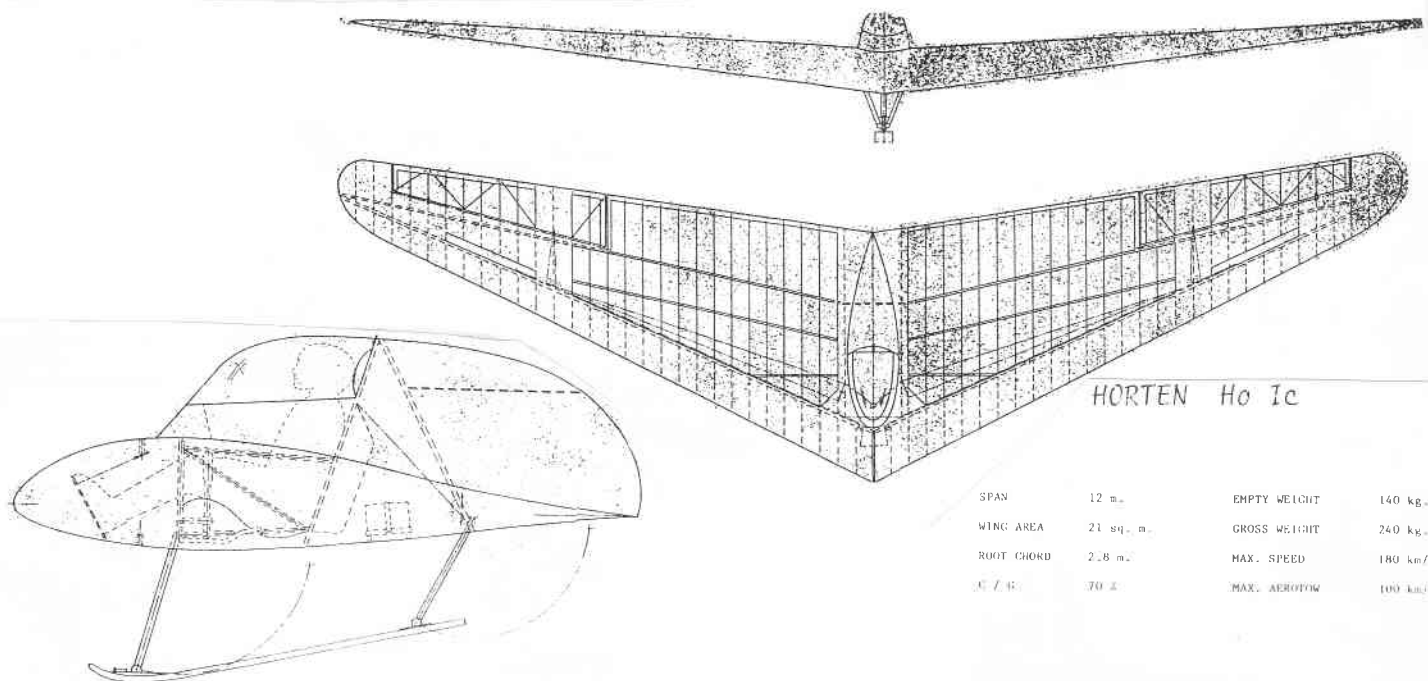
TWITT needs an overhead projector. If you have one to donate or can provide one as a long-term loan, let us hear from you. The machine will be well cared for.

The program of EAA Chapter 14's 21 May meeting features Ray Crowell, Master Model Builder for the San Diego Aerospace Museum. Don Westergren of General Dynamics will exhibit and describe the flight performance of his scale models of the Space Shuttle Orbiter. Phil Burgers will discuss the origins of TWITT and where we are going. Clairemont Lutheran Church, 4271 Chairemont Mesa Boulevard, 7:30 pm Thursday, 21 May 1987.

On 13 June at 9 am there will be a tour, arranged by EAA Chapter 14, of the San Diego Aerospace Museum's basement workshop. Tim Cunningham, Curator in charge of the Volunteer Workers Program, will conduct the tour. The workshop is closed to the general public.

Jan Scott, President of the Vintage Sailplane Association, provided us the following announcement:

"WANTED: Someone to build a Horten flying wing sailplane. I have just received a for all practical purposes full set of good quality construction drawings for the Horten Ic sailplane. The c model is an improved version of the b model, which flew without a mishap for 25 years in Argentina. It is a good looking flying wing of 12 meter span, with enclosed cockpit and retractable landing skid. It will accomodate pilots up to 210 lbs, and has a glide ratio of 18:1. The text on the drawings is in Spanish, which I am having translated, and all dimensions are metric. In keeping with Dr. Horten's policy, no copies of these drawings are available until the aircraft has been tested. I would like to get in touch with a home builder with ample facilities and proven performance record, who will build two prototype aircraft from these drawings; one for himself, and one for me. I will pay the cost of my aircraft. If any of the readers are interested, write to me and state particulars and requirements (no phone calls, please)."



SPAN	12 m.	EMPTY WEIGHT	140 kg.
WING AREA	21 sq. m.	GROSS WEIGHT	240 kg.
ROOT CHORD	2.8 m.	MAX. SPEED	180 km/h.
WING TAPER	70 %	MAX. AEROTOW	100 km/h.

SUPERSONIC FLYING WINGS...NEXT CHALLENGE FOR THE TWITT GROUP?

by Phillip Burgers

Some TWITTs recently had the pleasure of attending a heteroclite but highly interesting colloquium on aerodynamics held at San Diego State University. These talks were graced by the presence of Marc de Piolenc, Ed Lockhart and myself... as part of the audience. The knowledge to be imparted was in the possession of some other people, to wit Tony Maxworthy, the legendary R.T. Jones and Bill Sears, Jack Northrop's aerodynamicist in the Flying Wing days. Each of these distinguished men had a great deal of information to offer us; I will try to pass on some ideas that R.T. Jones told us regarding a flying wing that he has been studying for quite a while.

Twenty-nine years ago, R.T. Jones gave a presentation entitled "Aerodynamic Design for Supersonic Speeds" at the International Congress of the Aeronautical Sciences in Madrid, Spain. The main idea concerned a wing that would fly supersonically at a skew angle with respect to the fuselage. Since that time Mr. Jones has studied the idea of an oblique flying wing that would fly across the Pacific at Mach 2 and over land at transonic speeds below the sonic boom limit with high efficiency. The flying wing that he has in mind can easily achieve a lift to drag ratio of 20 at low speed, thus eliminating the noisy afterburner takeoff and most of the excess fuel needed for low-speed maneuvering that makes the Concorde so uneconomical^{as} a result of its L/D of 4 at low speeds.

Mr. Jones, through calculation, concluded that at supersonic speeds the optimum wing shape is the same as that for subsonic speeds and that minimum drag is best achieved by a narrow elliptical wing at an angle to the direction of flow.

Now come the challenges for the "let's do it" guys: if the wing is to contain passengers comfortably, it must have a depth of about seven feet. If we assume a thickness/chord ratio of 14%, the wing needs a 50 foot chord. For a slenderness ratio of 8, the wing needs a span of...400 feet, twice that of a 747! In spite of its large span, the wing would have about the same internal volume as a 747.

Clearly, if Mr. Jones is serious about this project, he should join TWITT. He would really be an asset to us, don't you agree?

FROM ONE TWITT TO ANOTHER

Mr. R. J. Whybray, of Omagh, County Tyrone, Northern Ireland writes:

I read in the March 1987 issue of Model Builder about TWITT, the club for the promotion of flying wings. As a long-time builder of model flying wings, from indoor rubber models up to radio controlled thermal soarers, this naturally stimulated my interest. Since I would like to know more about your activities I enclose an addressed envelope and two International Reply Coupons. I have also enclosed photocopies of an article which anticipates some of your ideas. It was originally written in the February 1981 issue of the British Gliding Association journal, "Soaring," and I found it in the White Sheet, Sean Wallbank's newsheet, which publishes an occasional Flying Wing special. [The article, "Flying the Altostratus I," is a science-fantasy story that also appeared in the Soaring Society of America's magazine.]

Rt. 5, Box 156 B
Louisa, VA 23093

April 27, 1987

Marc de Piolet
P.O. Box 20430
El Cajon, CA 92021

Dear Marc,

Sorry for taking so long getting this bibliography to you. Family life uber alles, you know.

The newsletter is great! Most of the names are familiar..some real heavyweights in the aero world.

Most of the aircraft are familiar, except the Rohr Two-175. Can't help on the two low AR designs in number five either.

Would love to read something on the Akaflieg forward swept wing on the cover of issue number one. Saw the same picture in an old SOARING, but never found anything written about it. Seems to be an almost total lack of material on Akaflieg projects (particularly tailless) in U.S. publications, except a few updates on the SB-13. Hopefully our German member will remedy that. Wish U.S. school system had such an institutional design program.

One or both chords must be wrong in the new Mitchell project specs in issue number nine.

New member Wainwright would be particularly interested in the Ed Harris articles listed in the bibliography.

I appear to be missing the first page of issue number three with most of the minutes of the meeting.

I didn't include articles in the bibliography which have already appeared in the newsletter. Also excluded anything on flex wing aircraft as they do not specifically relate to the TWITT project and would at least double the size of the bibliography.

My library also contains many articles and books on aerodynamics not specific to tailless design. However, I suspect most of these are known to our illustrious membership.

The decision to go with active stabilization has me really excited about the TWITT project! Frankly, without it the TWITT project would have been just one more of the dozens, if not hundreds, of tailless designs over the years which, if lucky, turned out as good as, but no better than a typical tailed design.

Northrop proposed active stabilization as the answer to the tailless aircraft's shortcomings in his address to the Royal Aeronautical Society in 1947. The cost and size of the technology is finally practical for the private builder.

I must admit to being drawn to the variable sweep option for esthetics and because soaring birds do it. However, my practical side demands more. Birds don't have the option of cranking their guts back and forth. Has the group done a detailed comparison of the two alternatives?

Forward sweep may allow for a clean nose and laminar flow over the forward part of the fuselage. However, I have seen just the opposite case argued. This argument says that a wing/fuselage intersection behind the high point (thickest portion) of the fuselage, in that less energetic flow, will trip the flow ahead of it causing early separation of the flow over the nose. This argument suggests putting the wing right up front on the rising portion of the nose, in the more energetic positive pressure gradient.

Even if laminar flow could be maintained over the forward part of the fuselage, leaks around the wing pivots will eat up any drag savings. Making a smoothly fared and tight seal at this critical junction should prove very difficult.

The added weight and complexity of the variable sweep mechanism, as opposed to the simpler and more reliable sliding of pilot and/or gear must be justified by superior aerodynamics.

I know forward sweep can delay tip stall, which would be nice for thermaling, but this could also be accomplished by varying the control surface angle along the span. I also recall reading of drag reduction with moderate amounts of sweepback. However, I would feel more comfortable seeing a careful analysis done by some of our member professionals.

Lacking clear proof of advantage for the variable sweep option, I would opt for the simpler sliding CG option on this first ship. Why take a chance of jeopardizing the success of the project by introducing too many untried systems at once?

On another topic, it sounds like Nickel may be able to make a case for Horten's bell-shaped lift distribution for a given lift, roll moment and yaw moment if span is not a facture. However, given a fixed span, I know his distribution would lose to Prandtl's on L/D and there are types of ailerons and spoilers which can deal with the adverse yaw problem in turns without incurring the bell-shaped lift distribution's drag penalty in the glide.

I anxiously await the next issue of TWITT.

Sincerely,



Warren A. Berger

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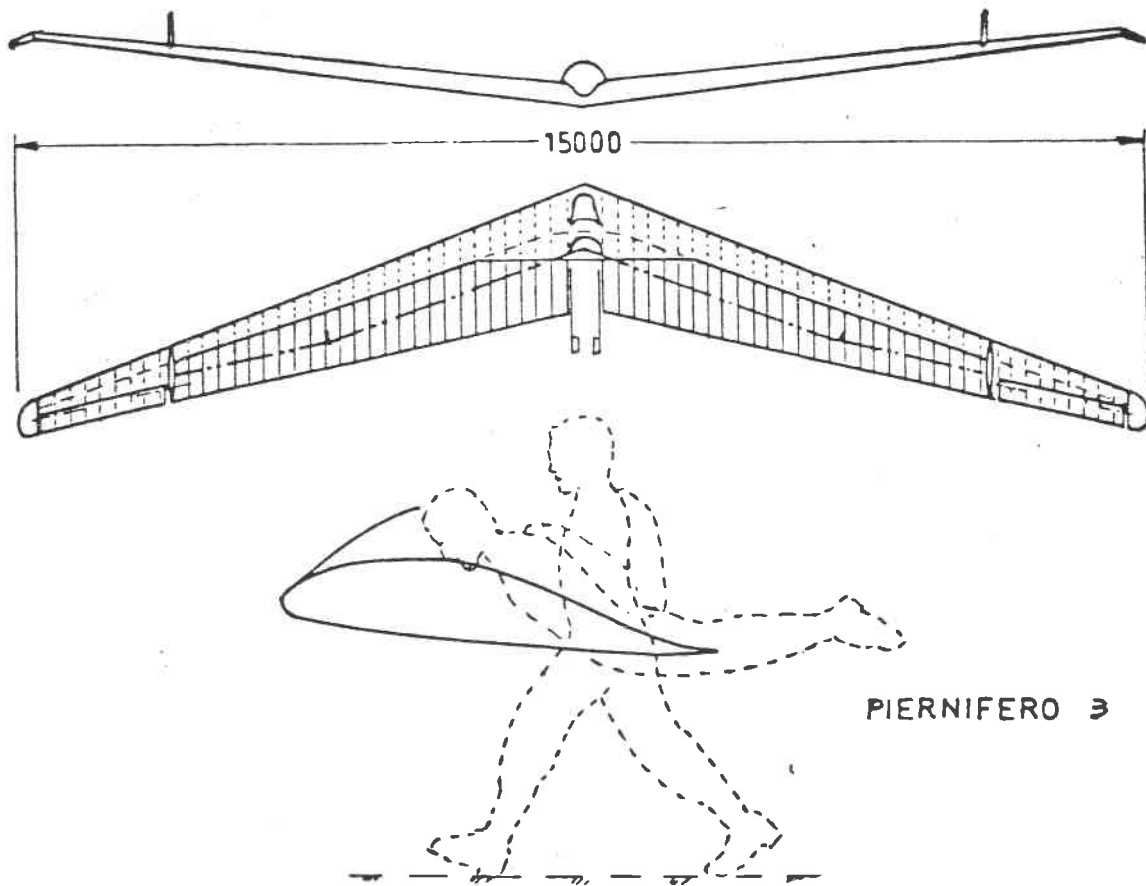
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PIERNIFERO 3

Skizze der H X c mit 15 Meter Spannweite. (Zeichnung Jan Scott)

A L B E R T - L U D W I G S - U N I V E R S I T Ä T

INSTITUT FÜR ANGEWANDTE MATHEMATIK

Prof. Dr. Karl Nickel

D-7800 Freiburg i.Br., 18.2.1987

Hermann-Herder-Straße 10
Tel. (0761) 203-3062

Mr. Philipp Burgers

TWITT

PO Box 20430

El Cajon, CA 92021

USA

Dear Mr. Burgers!

My very good friend P.F. Selinger gave me your address and copies of the first TWITT-newsletters. I was delighted to hear of the activities of your group and take, hence, the liberty of writing to you.

May I introduce myself? I am of age 63 and a mathematician of profession. During the (hopefully) last world war I stayed with the Horten brothers. At that time I was able to fly the famous Horten II, III and IV. After the war I spent 4 years with Dr. Reimar Horten in Argentina. My flying activities at the moment are restricted to ultralight flying.

Some years ago I wrote a paper in Madison/Wisc. on the problem of "adverse yaw" (with special emphasis to tailless airplanes). Under separate cover you will get a copy of it. This paper has later been extended by a pupil of mine as a Ph.D.-thesis. If it is of interest to you I can send you a copy, too.

Sincerely yours

Karl Nickel

10 April, 1987

Phillip Burgers,
TWITT
P.O. Box 20430
El Cajon, CA, 92021
U.S.A.


Prof. Dr. Karl Nickel
INSTITUT FÜR ANGEWANDTE MATHEMATIK
D-7800 Freiburg i.Br
Hermann-Herder-Straße 10

Dear Prof. Dr. Karl Nickel:

We were gladly surprised when we received your letter and paper. It was for us always a desire to contact you because of your important participation in the research of flying wings. But before going further with this letter let me introduce myself: I was born in Argentina and while studying aeronautical engineering in La Plata, I went several times to visit Doctor Horten, who is retired from the Fabrica Militar de Aviones as you probably know, in Cordoba. It has been very enlightening the conversations that I had with him over the years. Of course you were mentioned several times as responsible of mathematical calculations and important results on the bell-shaped distribution. After coming to the United States I was glad to see Bob Fronius create the TWITT group, that has grown ever since. As you probably know, americans love acronyms and this one means "The Wing Is The Thing".

Coming back to your paper, we were very glad to receive it and our technical staff which I'm part of, is studying it. We are very impressed with your ideas. I would like to ask you if by any chance you still have some of the work you did for Horten during the war and continued in Argentina while working on his flying wings. I think that this information would be of great interest ~~to~~ the group. And if you are so kind to send this information, please tell us in advance, so we can send you the amount of money required to copy this information and be sent to us. We would highly appreciate this information.

In separate cover we'll send you some of our newsletters and a flyer telling you what TWITT is and what we are working on. We are happy to announce you that we have named you a TWITT member without the necessity of you paying the membership. We are very glad and honoured to have you with us in our group.

Please, give our regards to  Mr. Peter Selinger and we hope to hear from you soon.

Thank you.

Phillip Burgers





FLIGHT ENGINEERING AND DEVELOPMENTS
P. O. BOX 667
DALLAS, GEORGIA 30132
(404) 445-1365

DEAR MARC,

4/28/87

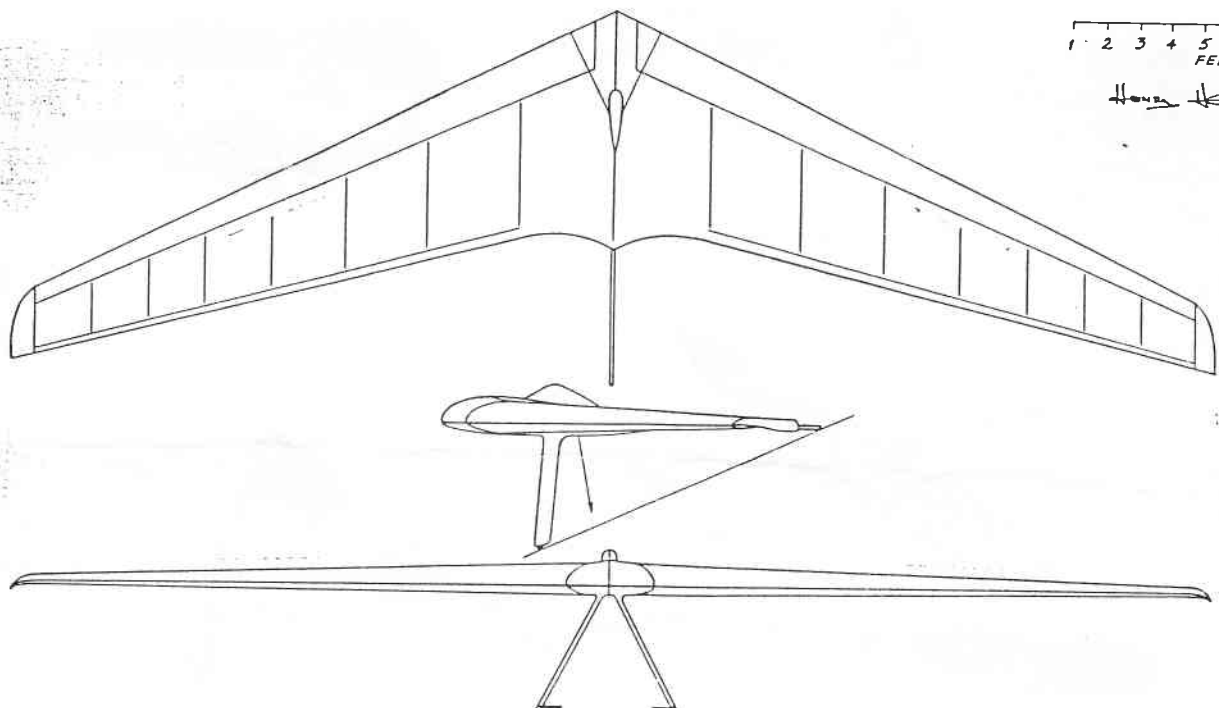
I AM VERY INTERESTED IN BECOMING A T.W.I.T. MEMBER. ENCLOSED YOU WILL FIND A S.A.S.E. AS REQUESTED IN "MODEL BUILDER" MAGAZINE FOR INFORMATION.

WE ARE CURRENTLY CONSTRUCTING A HIGH-PERFORMANCE ULTRAUGHT SAILPLANE FOR THE HANG GLIDER MARKET. THE PROTOTYPE IS EXPECTED TO FLY BY THE END OF THIS YEAR. (SEE 3-VIEW) I ALSO HAVE A GOOD BIT OF INFORMATION ON FLYING WINGS IVE COLLECTED WHILE RESEARCHING OUR DESIGN, NACA REPORTS, MAGAZINE ARTICLES, WARTIME REPORTS ETC. WE ARE CURRENTLY SELLING AN ORIGINAL 21 SHEET PLAN SET OF THE HORTEN H II FOR \$2500 ON 18x24" BLUELINE. OF COURSE THIS SET IS UNCOMPLETE BUT IS ALL THAT IS KNOWN TO EXIST.

LOOKING FORWARD TO YOUR REPLY.

THERMALLY

HENRY HORTEN



F.E.D. MODEL # 9

1 2 3 4 5 6 7 8 9 10
FEET

HENRY HORTEN 12/12/86 RSH