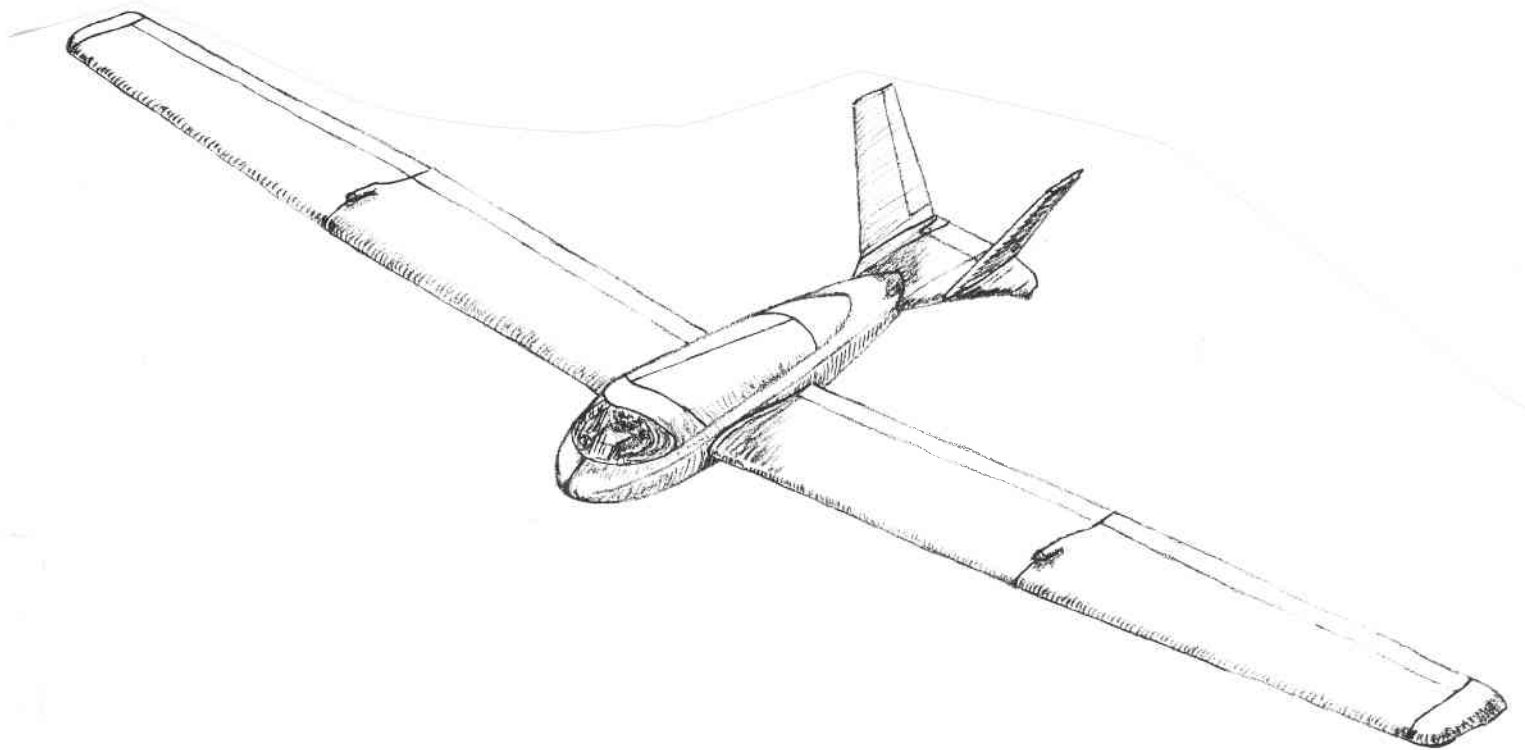


No. 60

JUNE 1991

T.W.I.T.T. NEWSLETTER



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., 9106 means this is your last issue unless renewed.

**Next TWITT meeting: Saturday, June 15, 1991
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 types of tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is an affiliate of 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
 Vice Pres., Dave Pio (619) 789-1650
 Secretary, Phillip Burgers (619) 563-5465
 Treasurer, Bob Pronius (619) 224-1497

Editor (Acting), 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) 224-1497

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60oz/60	21.75	30.25	21.75

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Meetings are held on the third Saturday of each month, 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).

PRESIDENT'S CORNER

I hope you are all ready for the summer flying season with new or refurbished airplanes and those newly completed kit or scratch built models. For those of you who did some of these things over the winter months, please send us some pictures and a short story on what you have been doing, especially if it a wing project. Your experiences may go a long way in helping someone else avoid making any of the mistakes you encountered while building.

We didn't see many TWITTERS at the Vintage Sailplane Association's gathering at Hemet-Ryan airport. There were three Baby Bowlus' for you conventional fans, two of which were in flyable condition. There was also a Super Bowlus which was just starting the renovation process and will be ready for the 1994 meet.

Bruce Carmichael is moving along with plans for the Sailplane Homebuilders Association's annual western get together at Tehachapi over the Labor Day weekend. TWITT will play a role in it this year, including having a regular meeting and putting on some presentations.

I haven't finished the coordination yet, but hopefully we will start exchanging monthly advertising with RC Soaring Digest, SHApTalk, and Bungee Cord. This will give TWITT greater exposure throughout the aviation community while helping them in the same way. I would like to thank B² for letting me know RCSD was also trying to arrange this and our paths just weren't crossing right.

The TWITT computer is now in place at the hanger, and we are getting ready to start putting in the library. If anyone would like to help with sorting the material or doing some of the computer work, let Bob or myself know. I will show you how to use the computer program, which is about as simple as I can make it for the novice user.

We haven't heard from anyone with a used VCR or TV to contribute for the meetings, so I have been pricing some units with DOW here in El Cajon. As usual, financing such a purchase will be the main problem, since the cheapest VCR will cost about \$215, and a 25" TV about \$355. Donations earmarked for either would be appreciated if anyone can spare it during these trying times.

Well, that's about all I have to pitch this month. Don't forget the anniversary party this month. See the announcement elsewhere in this issue. I am sure everyone will have a good time.

Andy

JUNE PROGRAM

**COME JOIN US
AT THE
5th ANNUAL
BIRTHDAY
CELEBRATION**

There will be lots of cake, ice cream, sodas, coffee, etc.

Bring your favorite videos, albums, or models.

Along with the anniversary party, this month's program will include a presentation by Phillip Burgers on his meeting with Dr. Reimar Horten in Argentina. This will supplement his written comments published below in this issue. This was one of Phillip's many meetings with Dr. Horten, and it seems he was able to find out a great deal more this time around.

Bob has arranged for Burt Quakenbush to demonstrate his new line of semi-scale powered and glider models. These are extravagant foam versions of the old balsa kind you used to throw around as a kid. We will be using these for a flying contest so you won't have to build your own this year. This type of program is always a lot of fun, so don't miss it.

A VISIT WITH DR. REIMAR HORTEN

by Phillip Burgers

I had an unexpected opportunity to travel to Argentina in March. While there, my son Francisco and I had some time to take the twelve hour bus trip to visit with Dr. Reimar Horten in Corboda. This visit, contrary to the five or six prior visits, was just a social reunion and to exchange information about my experiences in the U.S. and find out how Dr. Horten was doing. I also briefed Dr. Horten on TWITT's activities, and expressed to him the admiration of many TWITT members in his work.

Some of the important things I have to report are that Dr. Horten is in very good health, and again very active in designing and helping people design flying wings all over the world: one in Germany; another in Italy; and still another (a 10 metere Piernifero!!!)

in Australia.

I offered Dr. Horten the use of my vortex lattice program that I have developed and is giving satisfactory results. This program handles a very wide variety of flying wings as well as conventional and canard configurations. The program accepts various forms of aerodynamic and geometric non-linear twist, but to get deeper into this program is the matter of another article.

Dr. Horten receives lots of letters from all over the world asking his advice from the aerodynamic design point of view. Every now and then he does receive a copy of a doctoral thesis of somebody who chose one of his flying wings as a study subject.

I had to honor of going through his personal photograph collection and discovered many unpublished photos that made me drool. For me it was a very inspiring visit, and I promise to give TWITT some photos of my visit once I have the time to get the five rolls of film developed.

The hospitality of the Horten's was enhanced by the exquisite meals his wife prepared. I am looking forward to abusing Dr. Horten and his wife's hospitality again in the future.

MINUTES OF THE MAY 18, 1991 MEETING

Andy opened the meeting by thanking everyone for being there to enjoy a good program. We had a number of visitors, among them, Rik Keller, Trig Lovsto, John Barker, Frank Wozniak, Bud Meneley and, Don and Gary Westergren, all from the local area. Andy mentioned the supply of magazines was on the back table, free for the taking or exchanging. He also reminded the group we still had some TWITT hats, priced at \$8.00. The raffle prizes for the day would be an three outlet extension cord adapter and a TWITT hat.

With no other business to conduct, Andy introduced our featured speaker, Bill Chana, who would tell us about Rohr's Two-175 program undertaken in 1974. (Ed. Note: As I went to transcribe the minutes I found the tape recorder had malfunctioned so none of Bill's talk was preserved. What follows is a reconstruction from memory and through use of an excellent article by Marc de Piolenc published in the April 1987 Newsletter.)

Bill opened by explaining a little about how this project came about in 1974. Rohr's Chairman, Burt Raynes, tasked Walt Mooney to come up with a quantum leap in light aircraft

by Charles Lindbergh

technology to put Rohr into the light airplane business. Raynes wanted an aircraft that had better performance, greater safety, accessibility and comfort, greater economy, and lower production costs than any competitor.

Walt then hired Bill to come to Rohr and act as an Engineer and Project Administrator. The team totalled about six or seven people and produced three airframes (two flying prototypes and a static test article). They also constructed two scale models (1/10 and 1/2) for scale speed testing of the water takeoff and landing feasibility testing. The concept was to have an aircraft capable of operating from land, water and snow without having to change anything on the plane.

The Two-175 was a low wing delta of stressed skin, fiber-reinforced plastic (FRP) construction, propelled by a buried pusher engine driving a shrouded propeller. (See the diagram at the end of the minutes.) The nose-wheel fairing doubled as a "rhino rudder" since the vertical fin on the final production model wouldn't have a rudder. Both the wings and the vertical tail folded for easy transport and storage in the average home garage.

Seating was side-by-side with access to the cockpit through two gullwing type polycarbonate panels on either side. The single stick was centrally mounted for access by both pilots. The landing gear was fixed and rigid, and the skis were planned for mounting just inside the main gear, retracted up against the wing bottom when not needed. There were also plans for retractable main gear.

The planform for the aircraft was mainly driven by the need to store it in a standard garage. The delta shape kept the wing loading and structural loads within reason, and with the tips folded at the main gear line it fit into a normal car slot. The short moment arm of the delta dictated the placement of a high aspect ratio vertical tail on top of the shroud rather than a fuselage mounted tail. The final choice also reduced wetted area, and was hinged to fit under a garage door.

Composite construction was chosen to reduce the parts count and the number of manufacturing operations. The combination of adhesive bonding and molding major sub-assemblies in one piece kept parts count down to a minuscule fraction of that of a conventional two seat airplane.

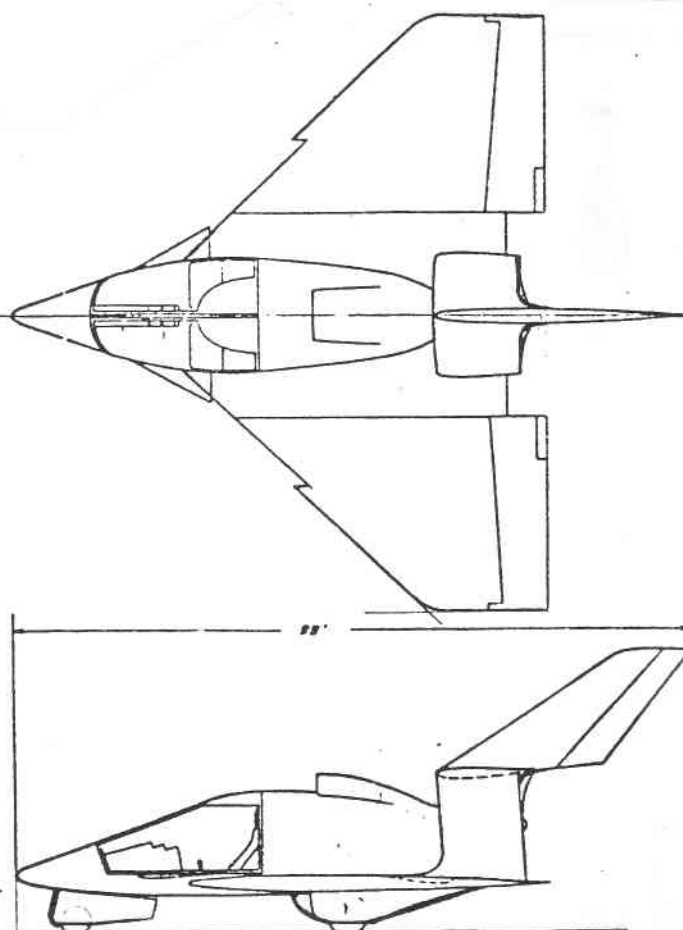
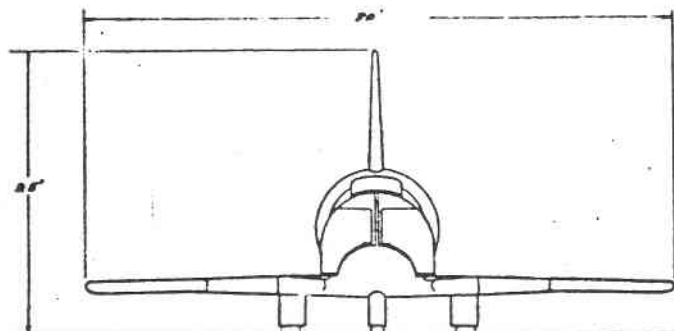
GENERAL DATA:

AREAS

BASIC FORM (INCLUDING SURFACES)	180 SQ. FT.
VERTICAL TAIL	16 SQ. FT.
ELEVONS	22.8 SQ. FT.
DELTA SLAT EXPOSED	9.4 SQ. FT.

GROSS WEIGHT

1450 LBS.



The wing formed the aircraft's primary structure, and was built in clamshell molds. First, polystyrene beads would be expanded within the mold using steam. This core would be removed and fiberglass prepreg laid up on the surfaces. Next, the core would be reinserted into the mold which was then closed to compress the core slightly, ensuring even pressure on the laminate. Heat would then be applied in the usual manner to cure the assembly. The process was simple, repeatable, and cheap.

The large glass area of the cockpit required something harder and stronger than plexiglass, so polycarbonate was chosen. Bob Fronius (our founding TWITTER) and his team were able to mold three sets for the prototypes, although some experts indicated it couldn't be done.

In order to achieve the high static thrust needed for takeoff with reasonable horsepower and propeller diameter called for using a shrouded propturning at 4400 rpm. Lycoming happen to have two special high speed engines from another contract that fell through, so Rohr was able to get them cheap. They had special cam profiles, developing 150 hp at 4,400 rpm, but were otherwise conventional.

The next problem was cooling it inside the rear fuselage area. A large dorsal scoop and an exhaust-driven ejector nozzle did the trick. This combination worked extremely well, even in the 108 degree heat of the test sight.

Mike Voydisch designed the four bladed prop, which ran inside a shroud with six fixed stators. The first test flight was without the stators and had a climb rate of about 250 to 300 fpm. A later flight with the stators in place yielded climb rates of about 1250 fpm.

The wing and fuselage underbody formed the chassis of the aircraft; the rest (except for the duct and tail) were just fairings. The engine mount attached to this structural pan instead of the firewall bulkhead.

Fatigue tests showed the FRP structure to be extremely strong, with a metal hinge giving way before the structure holding it. The static tests also showed it was well over designed, since it was reaching 120% of design loads. The tests also showed that a structure that could resist a specified static load had an indefinite life under alternating loads. NASA spent a lot of money some years later to find out the same thing.

The outboard leading-edge droop/extension was added to correct a pitch-up tendency at high angles of attack. The airfoil section was a symmetrical french curve specially laid

out by Walt according to the criteria of "if it looks right, use it." There was no spar, and the joints were made up of two FRP piano hinges adhesive bonded to the skins. Torsional loads were transmitted by trunconic bosses molded into the root of the outboard panel near the leading and trailing edges. These fit neatly into recesses in the center section. This technique was also used on the folding vertical fin.

Don Westergren was the test pilot and reported that the aircraft had a normal feel despite the unusual layout. Since the wing was outside his field of vision, the instrument panel became his attitude reference. The delta shape meant approaches had to be flown at a constant attitude and the plane allowed to flare itself in ground effect. Hauling back on the stick would have buried the tail. Power off performance was good as Don found out on the second flight when the drive coupling sheared several bolts and started vibrating.

Bill showed some good video coverage of the initial ground run and flight testing. Performance runs were made using a Cessna 182 as a companion, and the Two-175 was able to out perform it in several areas. The film also showed the dynamic testing of various water ski combinations, including takeoffs and landings. The plane floated on its sealed, foam-filled wing until forward motion started it up onto the skies.

Unfortunately for the team, Rohr made an economic decision not to continue the project. Reusable equipment was salvaged from the three airframes, and they were then destroyed along with all the technical documentation. All that remains are Bill's slides and video, along with some other limited material in Walt's estate.

After a short question and answer period, Andy conducted the raffle. Budd Love won the extension cord adapter, and Trig Lovsto won the TWITT hat. With the business of the day completed, Andy adjourned the meeting.

ODDS AND ENDS

The following quote has been attributed to Charles Lindbergh concerning the act of parachuting.

"I would have no pay in money for hurling my body into space. There would be no crowd to watch and applaud my landing. Nor was there any scientific objective to be gained. No, there was a deeper reason for wanting to jump, a desire I could not explain. It was a love

of the air and sky, the lure of adventure, the appreciation of beauty. It lay beyond the descriptive words of men - where immortality is touched through danger; where life meets death on equal plane; where man is more than man, and existence both supreme and valueless at the same instant."

Harold Faucett, who was a visitor to our April meeting, sent us a picture of a West Virginia highway historical marker for the town of Flemington. It announces that Col. Johnson C. Fleming made a demonstration flight of the "glider" in about 1867. Harold was going to look into it further and let us know what the real "story" is about this early glider flight. If any of you have any information about the area around Fleming, West Virginia, drop us a line. Move over Montgomery, there may be more skeletons in the closet.

One of our members had asked for any information on the Schweizer 1-30 power plane, since he was building a kit model of it. Bob found a photo of one towing a 2-22 in the American Soaring Handbook, published by the SSA in 1962. We have tried to reproduce the part with the 1-30 for him, but are not sure how well it will come through. If you still need more information, please let us know again and we will publish the letter and see if any of our new members can help you.

organization and we all owe you (Bob) a lot for creating it and keeping it going. Also very grateful for all the good work Andy is doing.

Our reunion in Starkville was a dandy. So good to see old timers like Guy Storer, Glen Bryant, Al Backstrom, and John Karlovic. I wrote it up for Bungee Cord, but haven't heard yet if they will publish it.

I am still cutting out bulkheads for my sailplane. Hope to start assembly of the fuselage in June.

Bruce (Carmichael)

May 12, 1991

TWITT

Please find my check for two years subscription to the TWITT Newsletter.

I would like to write an article for you about Don Mitchell. We are partners in the company WING RPV. If I also send you pictures will you please return them to me when you are finished with them?

Thanks,

WING RPV
Richard Avalon
892 Jenevein Avenue
San Bruno, CA 94066
(415) 952-4123



LETTERS TO THE EDITOR



May 13, 1991

TWITT

Enclosed find my dues for another glorious year. Sure enjoy this

(Ed. Note: Welcome to TWITT, Dick. We hope you enjoy our newsletter over the next two years. In answer to your question about an article on Don Mitchell, it would be most welcomed. He has been a member since the early period of TWITT, and has done so much in the area of flying wings, it would be interesting to know more about him. We can take it either hand written, or if

you are using a computer send us a 3 1/2" or 5 1/4" floppy. The newsletter is done with Wordperfect, which will also accept an ASCII file from WordStar. We will be looking forward to publishing your article.)

May 6, 1991

TWITT

I am enclosing my check for back issues (#58 backwards) of TWITT's newsletter, plus postage for as many as it will buy.

I am particularly interested in the JOINED WING CONCEPT developed by Dr. Julian Wolkovitch and NASA back in 1986-88. He is dead and I haven't been able to contact anyone else who was involved in developing joined wing aircraft. I'd appreciate your including any newsletters that contain information about JW aircraft or any sources you might know.

The JW concept seems to have great potential for developing a fairly small two place sailplane (40' span) with an L/D of 30 plus.

I enjoyed my first issue of the newsletter very much.

Thanks for any help you can give me.

Cordially,
Jim Loyd
1829 Mohawk
Pueblo, CO 81001

(Ed. Note: We can't recall any articles being published on JW aircraft or concepts. Perhaps there are other TWITT members who have the same interest and have gathered more information than you currently have, so I included your address for direct contact. How about it guys, can anyone help Jim with his research?

You will be receiving 27 back issues for your \$20, since the \$.75 includes postage. We have corrected the masthead data to reflect this so there won't be any future confusion.)

(For Larry James, who also included enough to cover postage, we will be sending you 27 issues starting with #18 instead of #21. We hope this meets with your approval.)

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

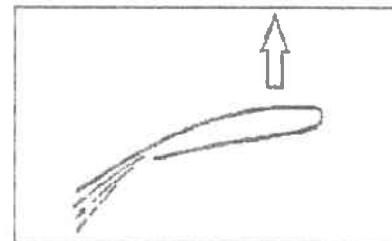
FLYING WING SAILPLANE PLANS AND KITS: Two time-proven, 13m homebuilt designs suitable for the novice pilot. Build either the MONARCH "F" ULTRALIGHT (19 to 1), or the PIONEER II-D (35 to 1) sailplane.

Info packs \$8 each, or \$15 for both.

Marske Aircraft Corp.
130 Crestwood Drive
Michigan City, IN 46360

For those of you who would be interested in assisting Budd Love with some aspect of his High Inertial Air Mass (HIAM) project, he would be glad to hear from you. This concept has great potential for the future of inner-city airports.

Contact: AIRLOVE, LTD.
6423 Campina Place
La Jolla CA 92037
(619) 459-1489



THE HIAM AIRPLANE NEEDS
YOUR HELP

TWITT LOGO SUBMISSIONS

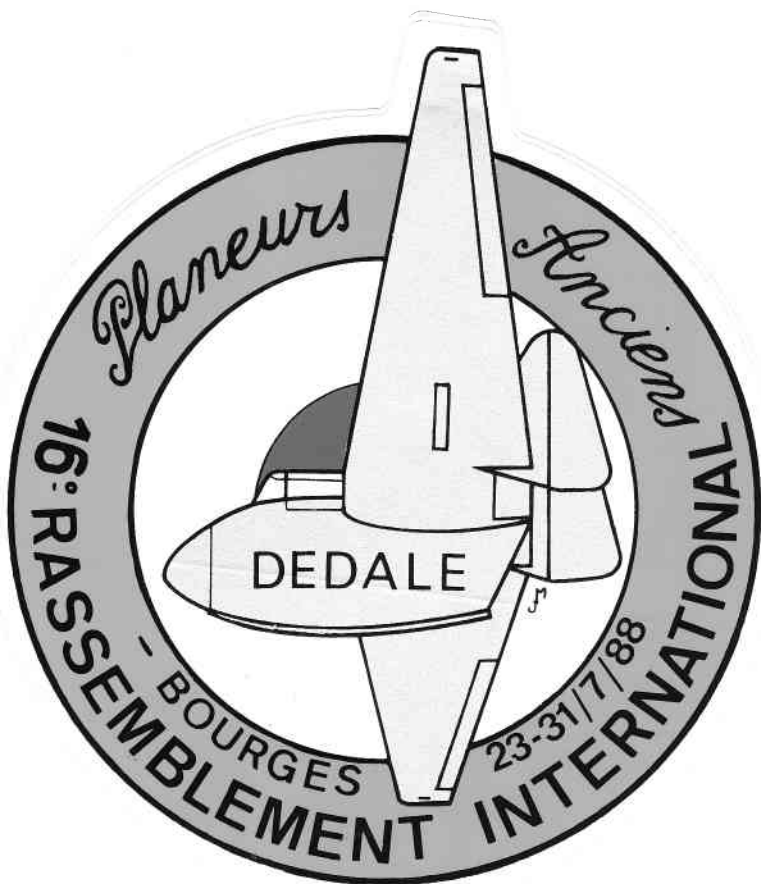
Presented on this page, and others in this issue as space permits, are the logos that have been submitted by the members. We have also included a French decal given to us as an example of what can be done once a final logo is decided on.

We hope these might inspire some of you to

contribute your version of a logo. As you can see they are not all "professionally" drawn, but represent a member's efforts to express an idea. It is never too late to submit your concept for a logo, since it will probably take some time to hear from the members and we can print them as they come in each month for the next several months.

We would appreciate hearing from the membership on which one, or ones, they like. Things to consider are their artistic appeal, representation of TWITT as an organization, and ease of conversion into a decal or cloth patch. If you like more than one, give each a ranking in order of preference.

Once we get enough votes to feel that a representative number of members has decided on a logo, we will publish the final results. Then the fun starts in seeing how much it will cost to get either decals or patches. Hopefully, the price will be reasonable and everyone will want at least one for their favorite jacket or hat.



MODEL WINGS

The cover of the July 1991 issue of RCModeler features a flying wing called the "Stealthbat" offered by Wing Manufacturer. There was no price listed, but they can be contacted at:

306 E. Simmons
Galesburg IL 61401
(309) 342-3009
Catalog: \$4.00

Omni Models carries the Future Flight Klingberg Wing kit for \$39.99 (item #FTF4000). They can be contacted at:

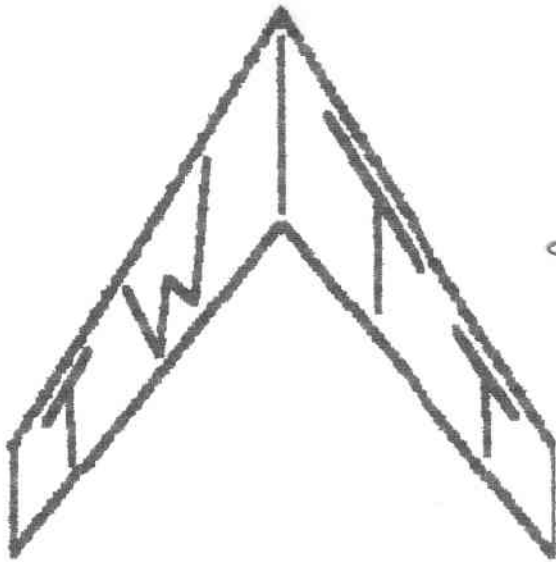
P.O. Box 1601
Bloomington IL 61702
1-800-747-6664 or (309) 663-5798
Shipping: \$5.00



Nurflügel-Flugzeug Horten II mit HM 60 Motor

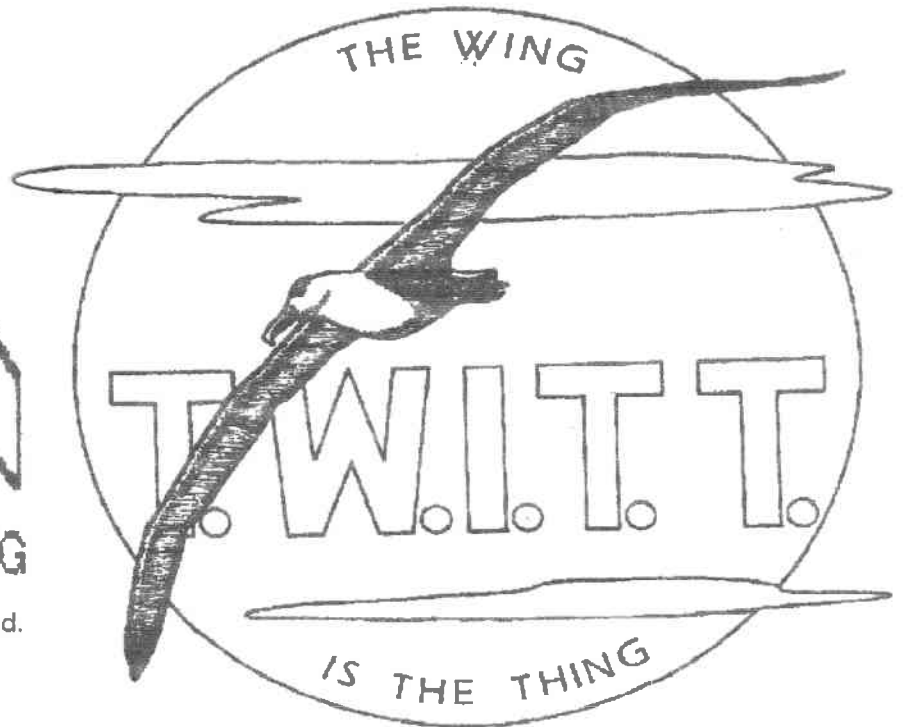
*Greetings to Bob Fronius
from Reinmar Horten
Arola 27 March 1991.*

A gift from Dr. Horten to Bob Fronius,
Co-Founder of TWITT.

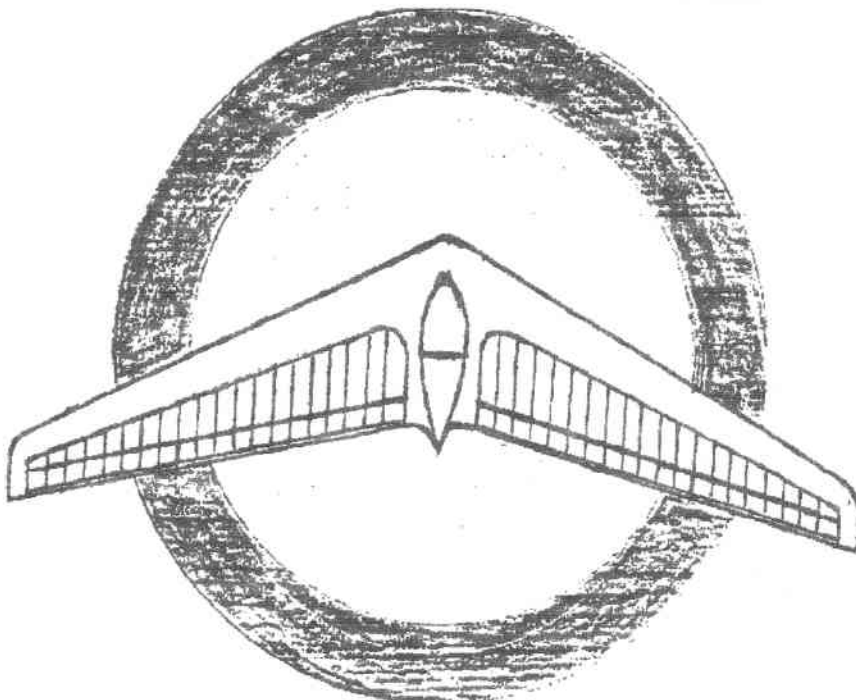


THE WING IS THE THING

Contributed by Thomas Bircher of Switzerland.



Contributed by Harald Buettner of San Diego, CA.



Contributed by Gill Metcalf of Gardenville, NV.



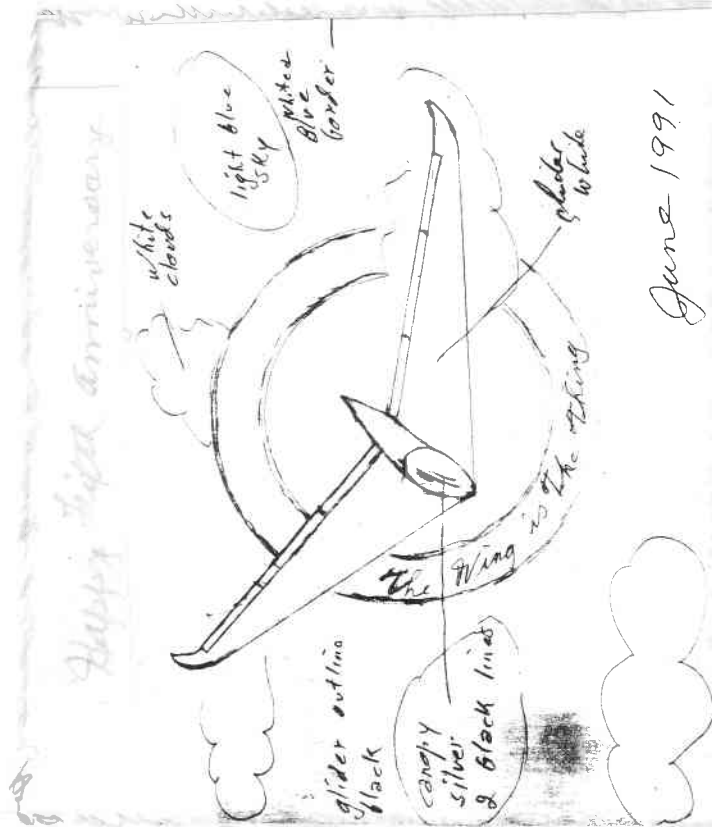
Contributed by Ed Lockhart of San Diego.



The "zona" seed as the symbol. A "W" in three colors red, white, & blue. Two wide deltas and a narrow delta. The word "WINGS" not TWITT.

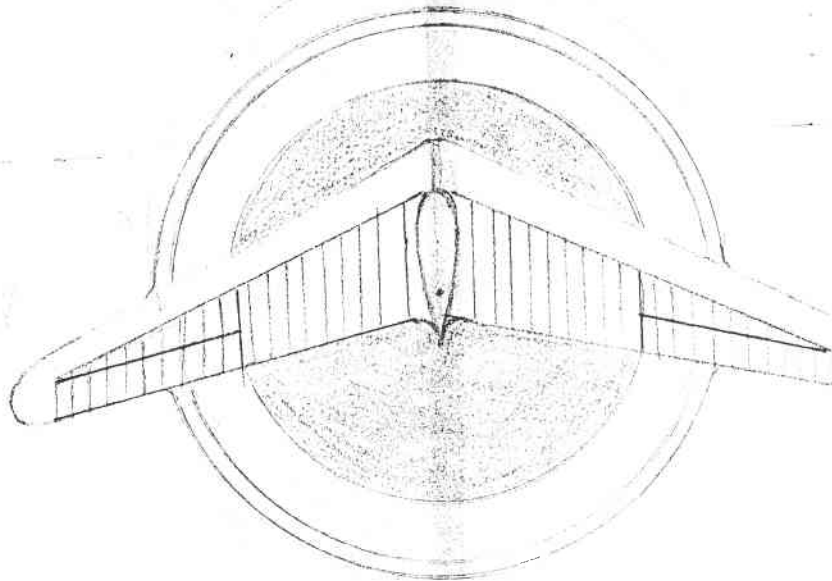
Contributed by Eugene Turner

(our apologies to Gene in trying to recreate his logo so it could be printed in the newsletter. I know we have not done it justice.)



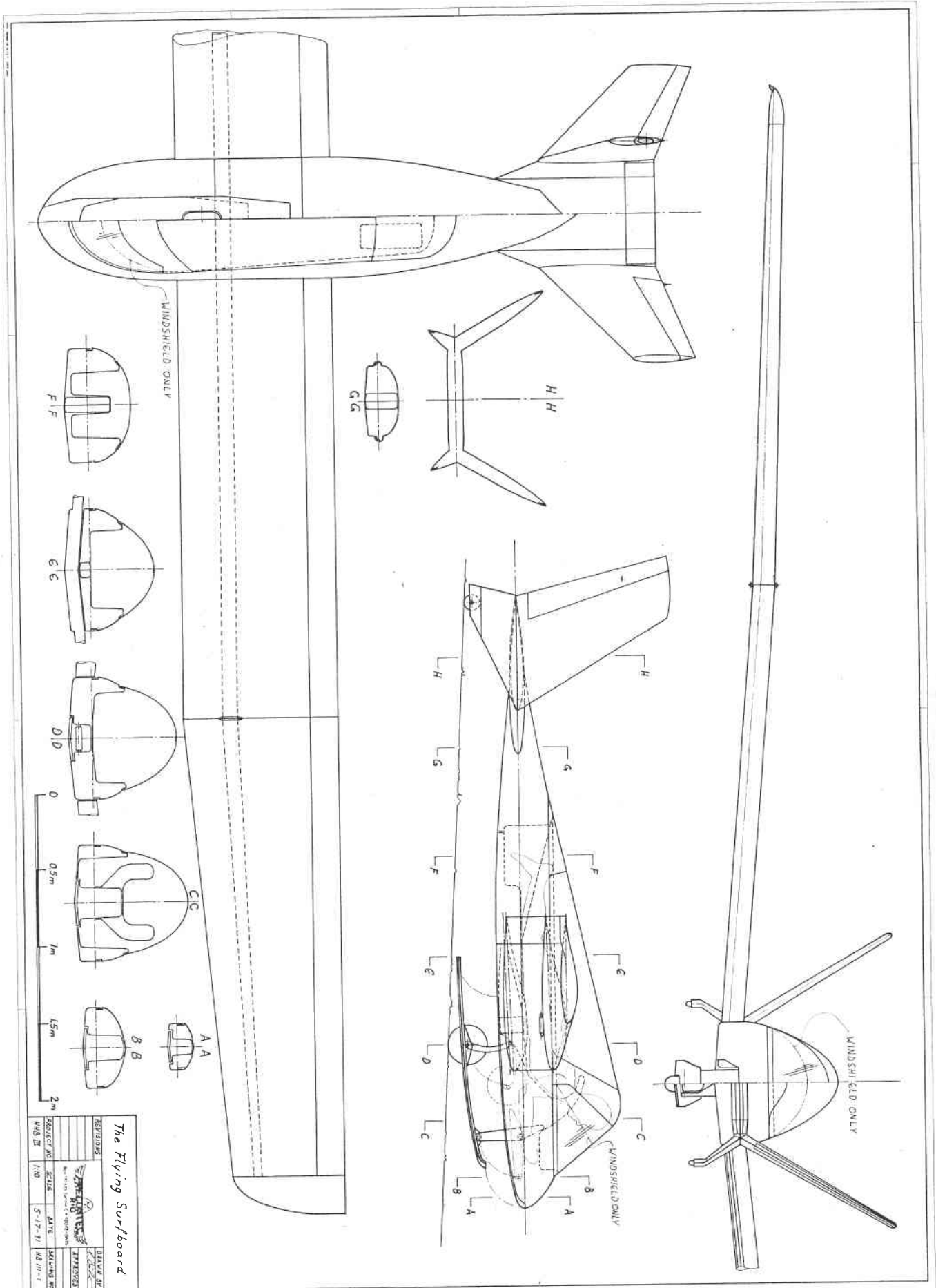
June 1991

Our Birthday Cake



A slightly different version of Gill Metcalf's.

Iwould have no pay in money for hurling my body into space. There would be no crowd to watch and applaud my landing. Nor was there any scientific objective to be gained. No, there was a deeper reason for wanting to jump, a desire I could not explain. It was a love of the air and sky, the lure of adventure, the appreciation of beauty. It lay beyond the descriptive words of men — where immortality is touched through danger, where life meets death on equal plane; where man is more than man, and existence both supreme and valueless at the same instant."



The Flying Surfboard

REVISED	DATE	BY
PROJECT NO.	SCALE	DATE
1/10	5'-12"-11"	10/11/71
DATE	SCALE	BY
10/11/71	5'-12"-11"	10/11/71