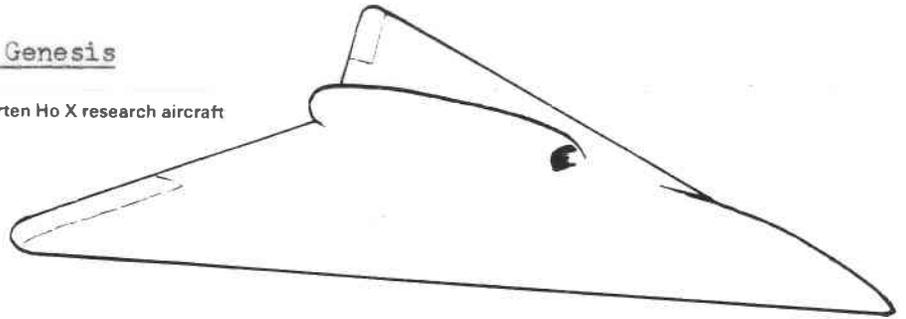


T.W.I.T.T. NEWSLETTER

From: David Master's German Jet Genesis

Contributed by: Kevin Renshaw²Horten Ho X research aircraft



Horten Ho X

The Horten brothers had long been building all-wing sailplanes, and they turned naturally to jet-powered tailless aircraft during the Second World War. Parts of their Ho X high-speed flying-wing glider were found after the war, though all the drawings and calculations had disappeared. Arrowhead-shaped and weighing 882lb (400kg), it had a very small fin, tricycle undercarriage, nose elevons and wingtip spoilers.

A further development powered by an As 10C pusher piston engine was intended to be followed eventually by an HeS 011-powered research aircraft. Only a sketch of the latter survives, though a post-war Royal Aircraft Establishment report describes it as weighing 13,500-15,000lb (6,120-6,800kg) and having a wing span of 30ft 2½in (9.20m) and a length of 32ft 9½in (10.0m). A

very clean design, it had no vertical control surfaces. The wings were sharply swept and the dorsally mounted turbojet exhausted above the wing trailing edge. Maximum speed was estimated at 743mph (1,195km/hr).

Later information refers to a similar aircraft under the same designation but intended to enter service as a fighter in 1946. Like the previous design it was to have a smoothly faired nose and cockpit canopy, and no vertical control surfaces. The turbojet was mounted similarly but with air intakes on either side of the cockpit, rather than the single central intake feeding straight into the engine, of the earlier design. Wing span was significantly increased and the fuselage shortened, and the wings were less sharply swept.

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., 9108 means this is your last issue unless renewed.

**Next TWITT meeting: Saturday, August 17, 1991
beginning at 1330 hrs at hanger A-4, Gillespie
Field, El Cajon, Calif. (First hanger row on Joe
Grosson 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 Fronius (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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\$15 per year (US)
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 Postage Paid

Foreign mailings: \$0.50 each plus postage

Wt/#Issues	FRG	AUSTRALIA	AFRICA
1oz/1	1.00	1.00	1.00
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36oz/36	14.00	19.50	14.00
48oz/48	16.75	23.00	16.75
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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 missed the July meeting due to prior vacation committments, but it appears everyone enjoyed the presentation by Budd Love and the videos. I would like to thank Budd for the loan of a 19" television, which I understand worked very well with the VCR we received from Bill Hinote. This setup will alleviate the need for Bob to keep bringing in this own equipment each meeting. Many thanks to both Budd and Bill.

We received some new logo submissions and I will publish them as we have room. I think you will find some of them very interesting, with some novel approaches to the subject. We will let this run a while longer since the response seems to be picking up, and then ask for a vote by the members if there hasn't been a previously overwhelming indication as to which one everyone likes.

Don't forget about Tehachapi this coming Labor Day weekend. See the announcement later in the newsletter.

Bob has some good programs lined up for the next several months, so keep an eye out for each announcement. They include the CG-4 Troop Glider, hot air balloning, RC blimps, and tentatively some information on the SR-71. He has really knocked himself out contacting people, and we all owe him a big thank you for the hard work he has done over the years.

Speaking of busy, Bob has also been spending a lot of time at the printers keeping up with the requests for back issues. We have had a number of new members ask for copies, and while this creates some work, but also provides a little income for us to provide other services.

We would like to build a bigger video tape library. You could help if you have any VHS tapes of flying wing activity, model or full size, personally filmed or copied from the TV or someone else's work (as long as it is properly identified). We will be publishing a list of what's in the library. If you are interested in any of it, send us a blank tape or the money for a tape and postage, and we will get it to you.

As you will see from the letter column, we have received some interesting mail this month. Please keep it coming, since it is the interchange of ideas and information that make TWITT work. If you seen any interesting articles, please send them along so they can be shared.

That's it for this month.

Andy

AUGUST PROGRAM

This month's program will feature aerodynamist Danny Howell, who will tell us about the design and construction of the composite flying wing hang glider shown in the photos below.

Danny's specialty is applied two and three dimensional fluid dynamics for low speed wing design and analytical methods for advanced composite wing structural design. He has been president of Glider Sport International, a

rigid wing hang glider company. Between 1983 and 1985 he assisted Jim Maupin and Irv Culver in the fabrication and design analysis of the "Carbon Dragon," fully flapped, foot launched sailplane.

Some of you may have seen the subject hang glider at the hanger about a year ago during its initial rigging. The wing came out considerably overweight, which will be part of what Danny will be discussing, along with ways to avoid this type of problem.

We will also be opening the floor to discuss Jim Loyd's design concept published elsewhere in this issue. (See the letter column for his comments on construction and power plants.) This always proves to be an interesting exchange of ideas and helpful hints. Jim is looking for some good input here so jot down your thoughts and bring them with you.

It sounds like a very interesting program, and I am sure there will be a lot of questions asked of Danny since he has the technical expertise to answer them. Be sure you don't miss this one.

MINUTES OF THE JULY 20, 1991 MEETING

The meeting was opened by Bob, standing in for Andy who was on vacation somewhere in New Mexico. He made the usual announcements concerning magazines, hats, refreshments, and the raffle prizes.

After a couple of short videos, there were some questions from the floor on how TWITT is doing financially, and inquiring into just how we were running the store. Since this part of the program did not end up on the audio tape, due to a malfunction in the recorder or its operator, the following information is provided based on current operations.

As to the financial status of TWITT, we have included a copy of the Income Statement and Balance Sheet provided to the Hunsaker Foundation as of June 30, 1991. The cash on hand represents what



is needed to meet our newsletter publishing committment based on the current expiration dates of the members. There is a small amount of excess that has been accumulated through donations over the past few years, and was used to things like the birthday party, purchasing audio and video tapes, etc.

The amount shown for inventory represents the assumed value at the time of donation or purchase of things like the VCR, chairs, overhead viewer, microphones & speakers, computer, FAX machine, etc. If TWITT should cease to exist, these items would revert to the Hunsaker Foundation, as our parent organization, for its use or sale.

The expenses of TWITT are relatively simple. The annual membership fees are used to publish and mail the monthly newsletter, with the cost just about equalling the income. Raffle prizes are planned to at least pay for themselves, which is not always possible if there is a small turnout. We do not pay rent on the hanger space, as this is provided free of charge by Bob and Doug Fronius. We do reimburse Bob for a portion of his post office box which is also used as the TWITT box to keep costs down.

As treasurer, Bob is responsible for handling the daily financial needs of TWITT. This works well, since he also takes care of getting all the printing and mailing done. As president, Andy performs a semi-annual audit of the books, prepares the financial statements, and provides them to the Hunsaker Foundation to satisfy its IRS reporting requirements.

The Income Statement and Balance Sheet forwarded to the Hunsaker Foundation are:

TWITT

Income Statement

For Period Ending June 30, 1991

Membership Income	\$ 859.81	
Raffle Income	135.00	
Miscellaneous Income	<u>248.31</u>	1,243.12
Mailing Expense	347.14	
Newsletter Expense	401.87	
Raffle Expense	119.53	
Miscellaneous Expense	<u>266.28</u>	<u>1,134.82</u>
NET INCOME		<u>\$ 108.30</u>

TWITT

Balance Sheet

As Of June 30, 1991

ASSETS

Current Assets	
Cash	\$ 415.06
Accounts Receivable	60.00
Inventory	<u>264.40</u>
Total Current Assets	739.46
Fixed Assets	
Material & Equipment	<u>1,554.25</u>
TOTAL ASSETS	<u>\$2,293.71</u>

EQUITY

	<u>\$2,293.71</u>
TOTAL EQUITY	<u>\$2,293.71</u>

We hope this answers any questions our members might have as to how their annual membership fees are being spent. We run on a relatively small cash margin, and take care in retaining sufficient funds to meet our publishing liability.

Bob then gave the floor to Budd Love, who had requested some time to present his theories for the members present to analyze and offer their comments. The first part of Budd's presentation was on the blank tape, so some of the following is a synopsis of what Budd covered until another tape was placed in the recorder that worked.

The HIAM (High Internal Air Mass) concept of lift and propulsion offers a means of operating moderate size passenger transport aircraft out of small inter-city airports. It involves the use of a series of large jet pumps buried in each wing to produce a propulsive force along the entire trailing edge of the wing, while moving high speed air over the flaps and controlling the boundary layer attachment. The aircraft engines would provide the high volumes of air necessary to operate the jet pumps, while at the same time provide some residual forward thrust. Details of the mechanical side of Budd's concept have been covered in other newsletters, so today he shared with the members his aerodynamic theories upon which he is basing his conclusions.

After the tape replacement, Budd talked about the fundamental aerodynamics of the HIAM airplane. There are three lift forces on the wing; circulation, super circulation, and minimum reaction. Most regular wings do not achieve full circulation flow due to separation

brought on by high angles of attack. Budd commented that the lift and blowing momentum coefficients are synonymous. He has a computer program for analyzing lift, but it always gives the results in blowing momentum coefficients.

Budd went on to discuss how his HIAM wing can achieve lift coefficients, at least 12, which can be accomplished by just circulation, without taking into account super circulation. Super circulation allows the HIAM wing to go beyond the traditional "knee of the lift curve." He had several curve diagrams to illustrate his point that they HIAM theory will give the needed lift coefficients for short field operations.

The base line airplane currently being planned will have an approximate wing loading of 40, which is significantly less than most commercial airliners. This represents a compromise between runway length and cruising drag requirements. Budd indicated this loading may not represent the final answer, since the analysis work has not been completed in this area.

Boundary layer control was the next area covered. Most STOL aircraft that use some type of boundary layer control talk about blown momentum coefficients of .10. HIAM will bring this up to a minimum of 1.0, with some test data showing it can achieve figures of 2.0 to 3.0 for the base line airplane. This takes a lot of power to produce the compressed air necessary to get these levels of blown momentum coefficients.

Budd showed a viewgraph of a proposed test wing panel that will prove (or disprove) the lift and propulsion theory of HIAM. This requires about \$25M to build, so has become a constraint at this time due to the lack of funds. If you think you might be interested in getting in on this type of project, get in touch with Budd, since he can use all the help he can get at this point. (See his ad elsewhere in this issue.)

After Budd's talk, Bob talked a little about an upcoming CG-4 troop glider restoration project he is becoming involved in with several other people. He has already transported a number of parts to the hanger, and is looking forward to seeing the project begun so he will be around to see its finish (in maybe ten years).

Bob then conducted the raffle which was won by Ralph Wilcox, who received a waterproof flashlight, and John Chalmers, who won a 4 ton jack. And with that bit of business finished, Bob concluded the meeting.

SHA WORKSHOP

DON'T FORGET THAT LABOR DAY WEEKEND IS THE SAILPLANE HOMEBUILDERS ASSOCIATION'S ANNUAL WORKSHOP. SATURDAY NIGHT'S MEETING IN THE AIRPORT HANGER WILL BE SPONSORED BY T.W.I.T.T. WITH DON MITCHELL TALKING ABOUT HIS FLYING WING DESIGNS ALONG WITH SOME INFORMATION OF BOWLUS SAILPLANES. HARALD BUETTNER WILL DISCUSS HIS FLYING SURFBOARD DESIGN, WHICH WILL BE INCLUDED AS AN ENTRY IN THE SHA DESIGN CONTEST. THIS IS A GOOD OPPORTUNITY FOR OUR NORTHERN CALIFORNIA MEMBERS TO GET TOGETHER WITH THEIR SOUTHERN TWITTERS FOR ONE GREAT MEETING. PLEASE MAKE IT A POINT TO COME TO TEHACHAPI ON SATURDAY, AUGUST 31, AND JOIN IN ON THE VARIOUS SYMPOSIUMS, LOOK OVER THE HOMEBUILT AIRCRAFT, AND ATTEND THE EVENING MEETING.

LETTERS TO THE EDITOR

July 11, 1991



To Whom:

I'm building the Mitchell B-10 flying wing. Don Mitchell got me in touch with Gil Metcalf who told me to

contact TWITT. If someone told me to jump off a cliff I'd probably do it.

Please advise me on club information or wing information and assure me that I am not a twit for falling for this if it is just a joke.

Gary Sperline
19 N. Lyle
Kennewick, WA 99336
(509) 586-8991

(Ed. Note: Well, by now Gary knows TWITT is not a joke and that Gil put him on the right track for flying wing information. Bob has sent him an information package, so hopefully we will be seeing a new member shortly. Word of mouth advertising is the best kind around, as I am sure many of our members can attest.)

Mr. TWITT-ists(ers?):

I'd like to become a member as well as obtaining back issues (all available).

As a designer & constructor of RC flying wings I can attest to the need to share all knowledge concerning all wing aircraft.

Thank you,

Pat Mitchel
289 Molino Avenue
Long Beach, CA 90803-5727

(Ed. Note: We would like to welcome Pat to our group, and hope that he will share some of the design and construction information he has accumulated while building flying wing models. If Pat was not already aware, we would like him to know that a good number of TWITT members are also modelers interested in building better flying wings.)

July 18, 1991

Dear TWITTfolks:

Enclosed rough idea for a TWITTLOGO occurred accidentally in a doodle. It's strange, I know, but perhaps it might inspire someone who knows better to do something along this line. Hope it doesn't offend anyone?

Also enclosed is \$15 for another fun year of TWITT NEWSLETTER.

David Jones
2703 Lincolnwood Drive
Evanston, IL 60201

(Ed. Note: Here's your logo for everyone to see and comment on. We appreciate your effort and the work put into making it look great. It will be interesting to see if it does inspire anyone to some type of variation. You are the first TWITT I can recall that has called the Newsletter fun, but we are glad you are enjoying the material presented each month.)

July 5, 1991

TWITT:

Enclosed is a bunch of stuff. First: there are some sketches of designs you might consider for the TWITT patch. Do whatever you want with them as they are just idea sketches. If you want to combine, go right ahead. I put meaningless dates on Number 1 and 2 to balance the designs. Feel free to substitute anything else you feel appropriate. "Semper Explorans" for instance which means "Always Searching." This was contributed by my wife who is a Latin scholar.

Thanks for sending me the back issues of TWITT. I noticed that you asked for designs

to be analysed at the meetings in several issues so I am submitting a design for the members to consider. I have built a couple of homebuilts and been a partner in a couple more, and a couple of truths I have discovered are that parts take time to make and have weight. The fewer the parts the quicker the project gets done and omitted parts make it lighter and usually more efficient. That's why I am convinced a flying wing configuration is the best way to produce a small efficient airplane. The fiberglass manufacturers have solved the parts problem but increased the cost of their airframes way beyond most of us.

This design should take less fabrication space than a KR-2. It will be constructed of Douglas fir and blue foam primarily so material should be fairly cheap and available.

I have selected a 90 hp Suzuki snowmobile engine to power this design. A local BD-5 builder has developed it into a reliable power package. I plan to set it up to limit RPM to about 7000 to further increase its reliability. The Rotax 582 would probably work well in this design too.

I am having a 1/5th scale RC model constructed to test the aerodynamics and I am working on a full size steel tube mockup of the fuselage.

So sink the local members onto it and let the feathers fly!!! I hope everyone enjoys playing with this design.

I've enjoyed reading the past TWITT newsletters, so I am enclosing a check for issues 11 thru 31. Thanks again for your cooperation and efforts to help us TWITT's.

Cordially,
Jim Loyd
1829 Mohawk Road
Pueblo, CO 81001

(Ed. Note: First, thanks for the logo designs. I will publish one this month and the other as space permits in months to come. Unfortunately, the colors will not come out, but I will try to mark what the primary colors should be. Secondly, thanks for the design concept. I would hope we will get some response from more than just the local members, so that is why I included Jim's address. For those of you that do write Jim, please send us a copy of the letter so we can pass any comments not also covered in the meeting on to the rest of the membership. Jim, please keep us informed of your progress with the RC model testing and send pictures of your mockup when you are satisfied with it.)

July 17, 1991

TWITT:

I like the logo idea. As much as I like Horten designs, and sailplanes, e.g. Gil Metcalf's submissions, my sense of history causes me to turn to Northrop.

There is a Northrop logo for the YB-49 that may be suitable. It's on the first page of Pilot's Handbook - The Flying Wings of Northrop, from Aviation Publication, Appleton WI.

The enclosed drawing is a little crude, but I think you can see the general idea.

Peter King
4200 Loch Highland Pkwy.
Rosell, GA 30075

(Ed. Note: Thanks for the logo submission. I have published elsewhere in this issue, along with some of the others sent in this month. I am not sure how well it will photocopy, so hope it comes out good enough for everyone to get a general feel for its style.)

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

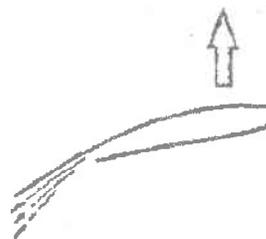
Cost: \$5 per year for US/\$7.50 foreign

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



THE HIAM AIRPLANE
NEEDS YOUR HELP

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

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

A Monthly Publication for the
R/C Sailplane Enthusiast

A reader-written publication about
R/C soaring, dedicated to sharing
technical and educational information
from theory to practical application.

\$19 Bulk/Third Class, or \$26 First Class
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R/C Soaring Digest
P.O. Box 6680
Concord, CA
94524

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 #FTP4000). They can be contacted at:

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

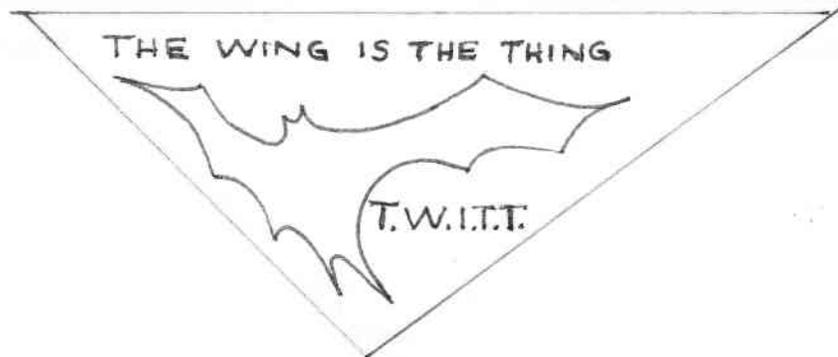
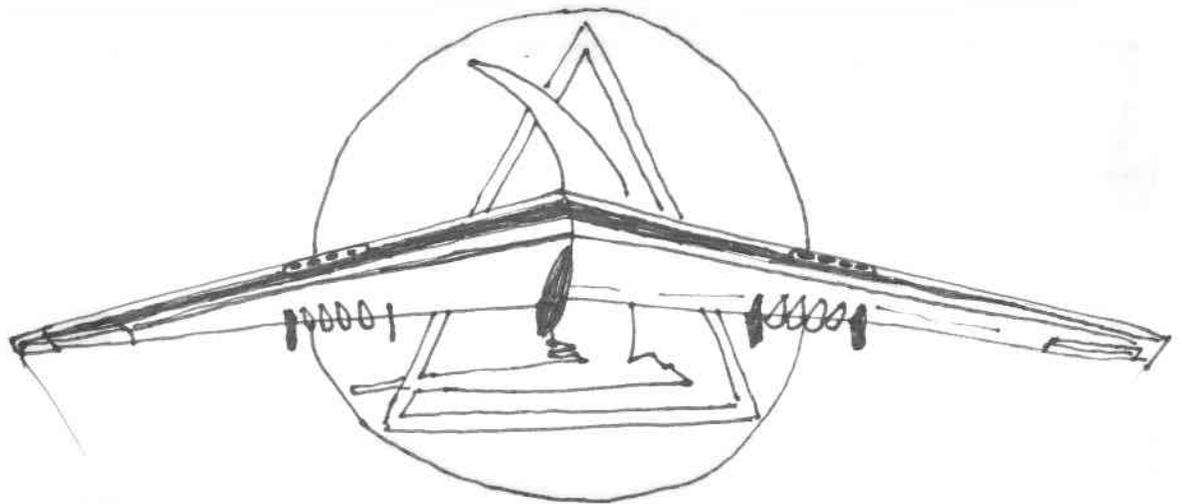


LOGO SUBMITTED BY:

DAVID JONES OF EVANSTON, IL

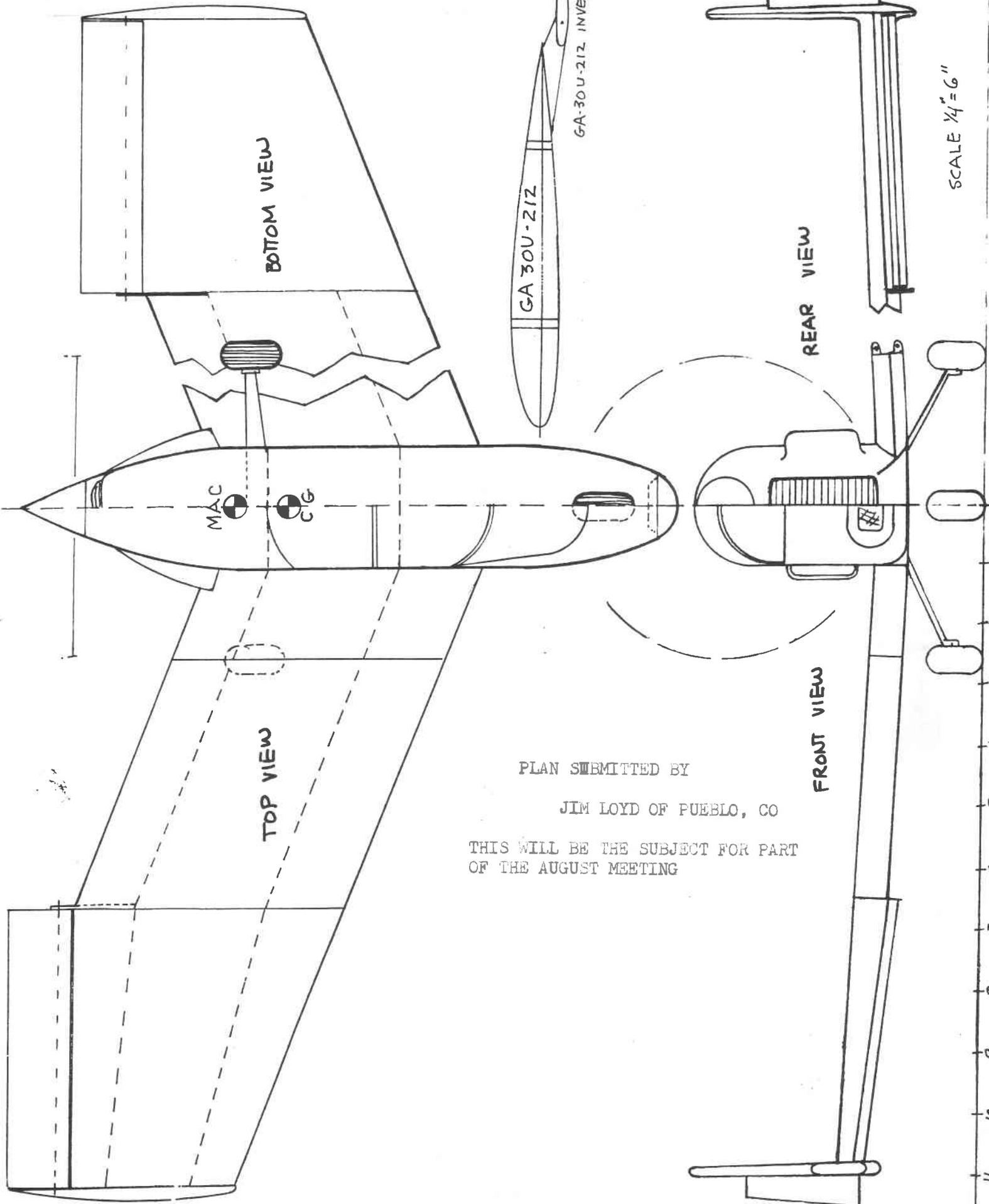
LOGO SUBMITTED BY:

PETER KING OF
ROSELL, GA



LOGO SUBMITTED BY:

CHUCK MCGILL OF
MERCER ISLAND, WA



SCALE 1/4"=6"

PLAN SUBMITTED BY

JIM LOYD OF PUEBLO, CO

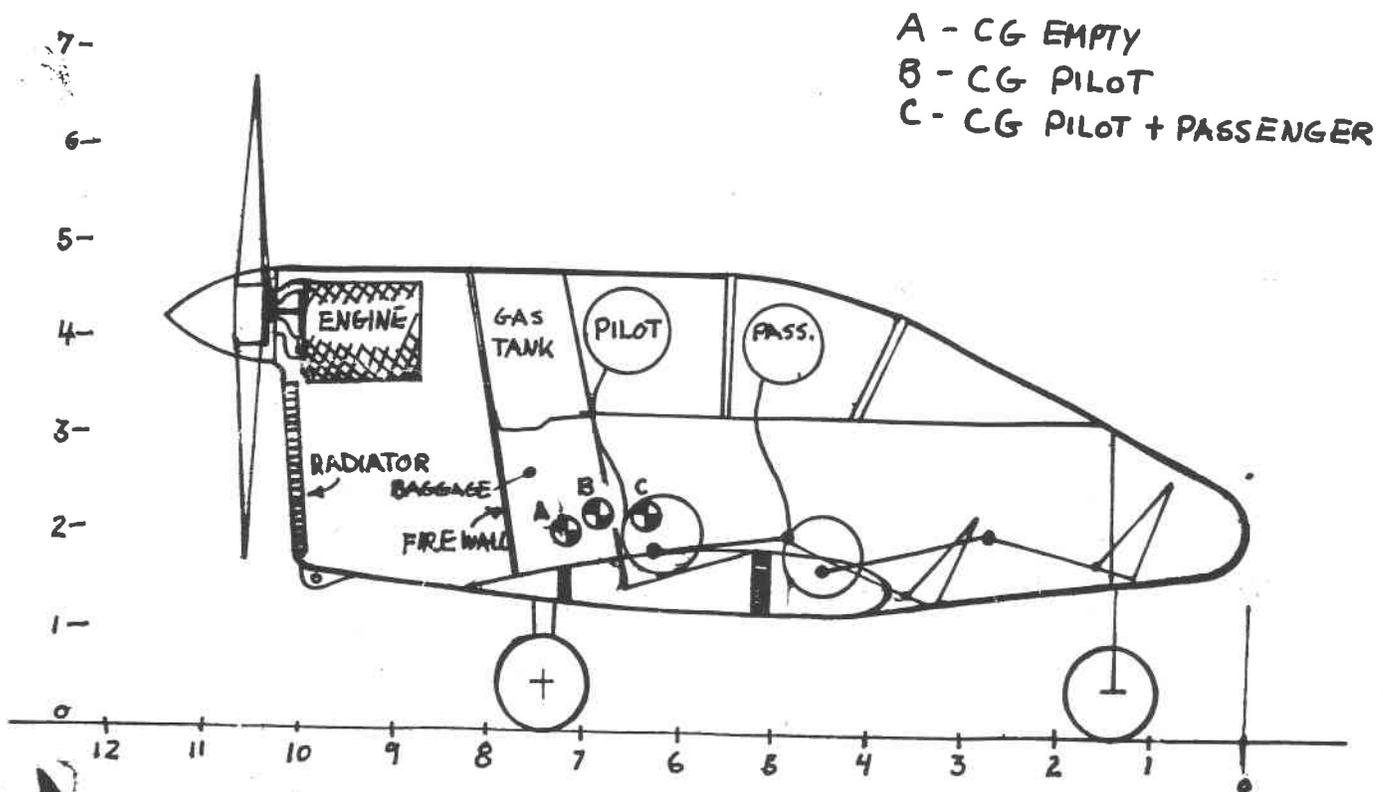
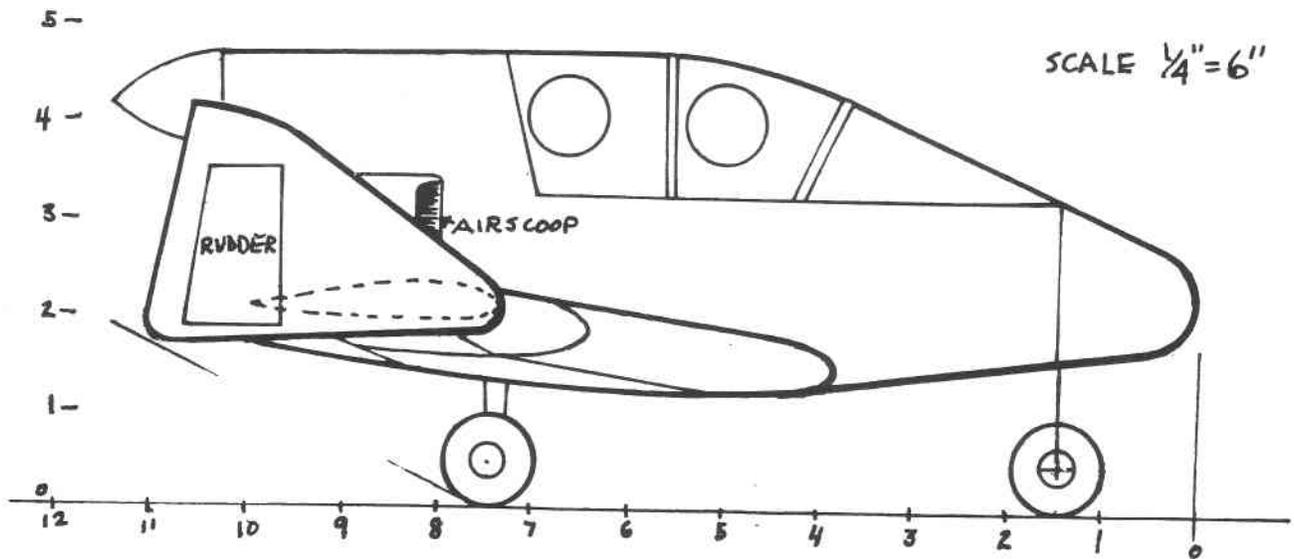
THIS WILL BE THE SUBJECT FOR PART OF THE AUGUST MEETING

-5
-4
-3
-2
-1

SPECIFICATIONS - BOOMERANG

LENGTH - 12'
 WING SPN - 22'
 WING AREA - 81.6 SQ FT
 ELEVONS AREA - 9 SQ. FT
 EMPTY WT - 414 LBS
 GROSS WT - 834 LBS
 WING LOAD G.W. - 10.2 LBS/SQ FT

 POWER - 90 HP SUZUKI S.M. ENG
 POWER LOAD - 9.2 LBS/HP



TWO OF THE LOGOS
SUBMITTED BY:
JIM LOYD OF
PUEBLO, CO



RED

POWDER BLUE

DARK BLUE

WHITE

POWDER BLUE

WHITE

RED

