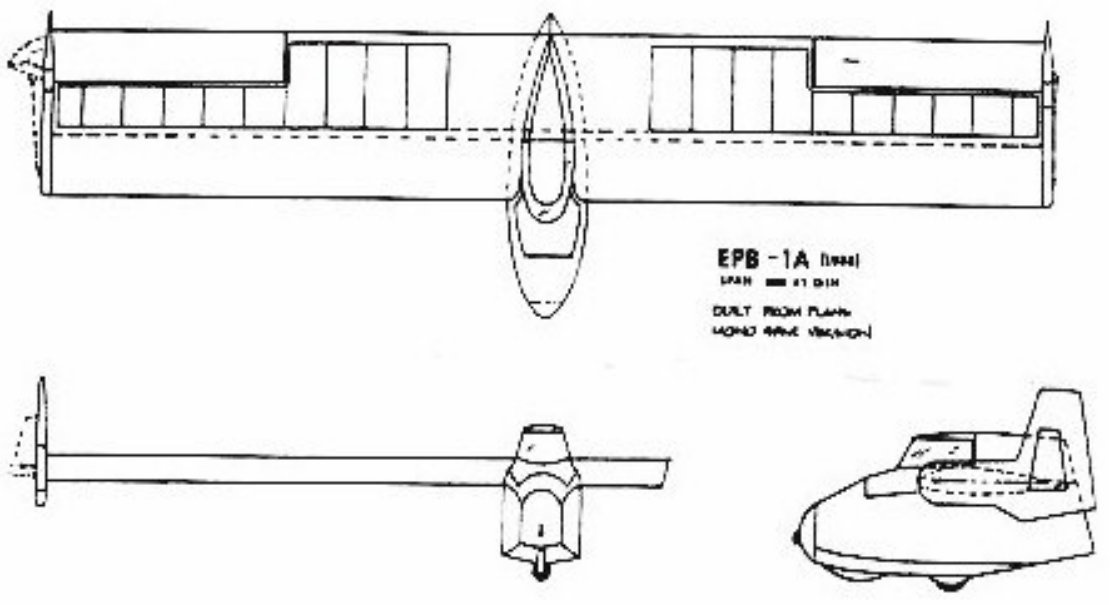
No. 276 JUNE 2009

T.W.I.T.T. NEWSLETTER

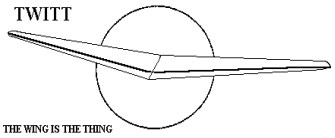


Three-view of Al Backstrom's EPB-1A flying wing plank. See more on this and other Backstrom designs starting on page 7 of this issue.

T.W.I.T.T.
The Wing Is The Thing
P.O. Box 20430
El Cajon, CA 92021

The number after your name indicates the ending year and month of your current subscription, i.e., **0906** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, July 18, 2009, beginning at 1:30 pm at hanger A-4, Gillespie Field, El Cajon, CA (first hanger row on Joe Crosson Drive - Southeast 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:

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Wt/#Issues	FRG	AUSTRALIA	AFRICA
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48oz/48	40.00	42.00	30.00
60oz/60	50.00	53.00	37.00

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 (#1720), east side of Gillespie or Skid Row for those flying in).

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PRESIDENT'S CORNER

This month represents our 23rd year as a formal association of flying wing enthusiasts. I am also glad to report that we are growing again, which is a welcomed situation. The more members, the better the interchange of questions and ideas between everyone. Messages from our newer members indicate they have a wide variety of interests so hopefully we will be able to fulfill their desires and stimulate additional discussions.

While I thought we had published most of Al Backstrom's plank material, I was wrong since this issue includes one of his earlier articles. You will see in one of the letters were it came from and if I can find an original Sailplane Builder issue were it was scanned I will try to make a better version. I am hoping Jan Armstrong in Tehachapi might have this issue and I will be able to get it at the Western Workshop in September.

This article also got us out of the model world for a while with a more balanced issue on both subject areas. My thanks to Al for providing it as part of his ongoing discussions with other enthusiasts.

Don't forget the Labor Day ESA Western Workshop at Tehachapi, CA. The program line up includes such topics as breaking news on electric motor developments, low cost soaring, airfoil geometry, perpetual sailplane progress and, the solar powered altitude record. There is a FBO with rental sailplanes so if you don't want to listen to all the presentations, you can always go flying. So mark you calendar now and make motel reservations early.

Andy

LETTERS TO THE EDITOR

April 25, 2009

Please find my subscription for 2009 and 2010. I apologize for the delay but it took me more time than I expected to get the US dollars since there are not many institutes in my area that offer foreign currency.

Unfortunately my Internet connection does not work at the moment (my provider closed) so I couldn't give you a warning of the delay in time. I am working on another solution, hopefully keeping the e-mail address.

Thank you for your great contribution to the fling wing idea with running TWITT.

The picture below shows the main elements of the Ho 229 V3 (note the single side rudder). I made it for a presentation in 2002 and found it when reworking my files. I am still a flying wing enthusiast.

Reinhold Stadler
Karlsfeld, Germany

(ed. – Thanks for the two year renewal and the blown out diagram. I will ask the obvious question and that is where in the diagram is the single side rudder. I am not sure if it is the two items out behind the center section or whether it is buried somewhere else and I am just not seeing it.

It also gives me a chance to remind everyone that you can renew electronically with a credit card or through a PayPal transfer if you have an account with them. When another member tried to renew electronically for multiple years, he found there wasn't an option for selection more than one year, so I will have to find some new control coding that will allow for this option. Hopefully, I will have it up and running in the next several weeks.)

May 4, 2009

I have meant to joint TWITT for years, and never got around to it. I tried a few years ago and there was something wrong with the website when trying to give you money.

I've belonged to the Nurflugel site for years. Used to go to the SHA meetings in Tehachapi. I like all airplanes, worked on the B-2 back in the 80's, currently work at Piper. I used to think flying wings were crazy, but happened to see the N9M fly at an air show in SoCal and fell in love. It was the neatest thing I'd ever seen! No project, unfortunately nothing to share at this point.

I know how tough it is to publish a newsletter like this, so keep up the great work!!!

Dennis Olcott
<dennisolcott@hotmail.com>

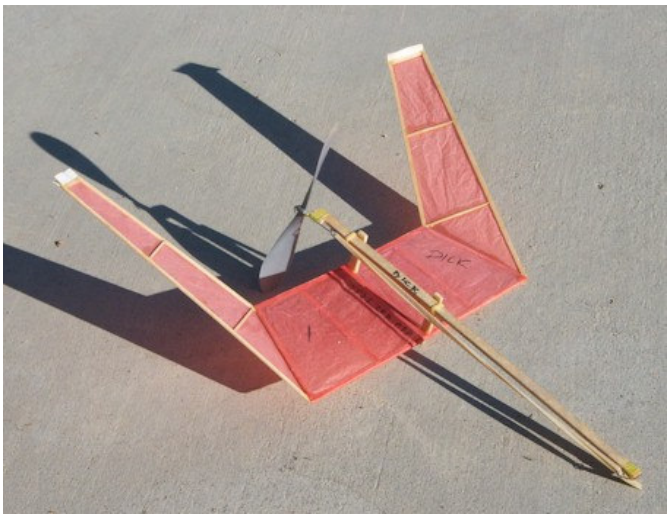
(ed. – This was in answer to my usual question to new members on how they heard about TWITT and what interests they have. You will see more from him below.)

May 7, 2009

I see that you are publishing quite a few model flying wings. Here is one I have been flying for years. Easy to build and fly but maybe a little off the usual path. Anyway, if you are interested I have attached PDF Cad drawing of a flying wing you can build in an hour or two, is easy to fly, climbs like a bat... but glides like a stone so you don't need a DT or have to build new ones all the time. The plan is for about a 15" wingspan and will be full size if printed to just fill an 11x17 sheet of paper, like a cheap centerfold.

Dick Baxter
<dbaxter554@cox.net>

(ed. – Here is the EWing that Dick mentioned above. If you would like a copy of the PDF file to build one of these, please send me an e-mail and I will send it back.)



May 9, 2009

A Flying Plank Sailplane For Today

Hey Al *(Backstrom)*. Nicholas Cafarelli here. Lincoln Ross let me know that you wanted a copy of your article. You generously mailed me a hard copy. Thanks again for that. I will post the article to my Yahoo Groups - Soar1k and Soar1ktalk.

My tools are in Houston but I am threatening to start sawing here in Michigan once I get some of my Father's tools whipped into shape. He is a veteran modeler - building for about 70 years now. Mainly RC.

Although I paid for plans for the EPB1-C the VSA still has not produced them. Raul, their "librarian" first dropped the ball, then something happened during shipping, months later. I got a damaged package with a steel telescoping rod inside. My Father set the package aside and a great deal of time passed before I found out about the switcheroo. I guess I better contact them again and see if I will ever get my set! I gave up trying last year. I realize now that I need to persist.

Thanks again Al, I hope to see another Plank flying soon.

Nicholas Carafelli

(ed. – A short note from Al read: Andy I have forwarded a copy of the article I did on an updated plank design that no one seemed to be able to find. I just read it and I might elaborate on some points but the basic ideas are what I would start with today. The article in included later in this issue.)

May 11, 2009

Hard to visualize you out of CO, Dennis *(Olcott)*. I saw your note in the TWITT NL on the plank drawing. Of course I can't do the details of the control mixing but I can do a simple schematic for you. It is the classic all cable system with a floating pulley that I believe was also used in the V-tailed Beech 35s. Let me know if this will help you. I think a recent Bungee Cord said the drawings had been digitized to clean them up.

I miss getting together with you at Moriarty NM, don't get around much anymore.

Al Backstrom
<albackstrom@austin.rr.com>

Dennis Olcott wrote:

Good to hear from you. I wasn't sure what you were talking about since I wrote several groups years ago asking for this information. Maybe since I just joined TWITT it now shows up in the newsletter. I didn't know my e-mails would show up in print.

Anyway, perhaps this will be in the next newsletter and some good TWITT will go through their copy of the Plank drawings and find that they have a wonderful copy of the sheet in question. All of the photocopied sheets look excellent except for the "Wing Details" page, sheet 21550-7. You signed the drawings a little over 54 years ago, so it should still be fresh in your mind, right?

The area in question is right below the wing contour, and right above the "Wing Skin Diagram". There appears to be 3 or 4 detail views that must have been added in very light pencil. I'm guessing they include details on the control system mixer after reviewing the remainder of the drawings.

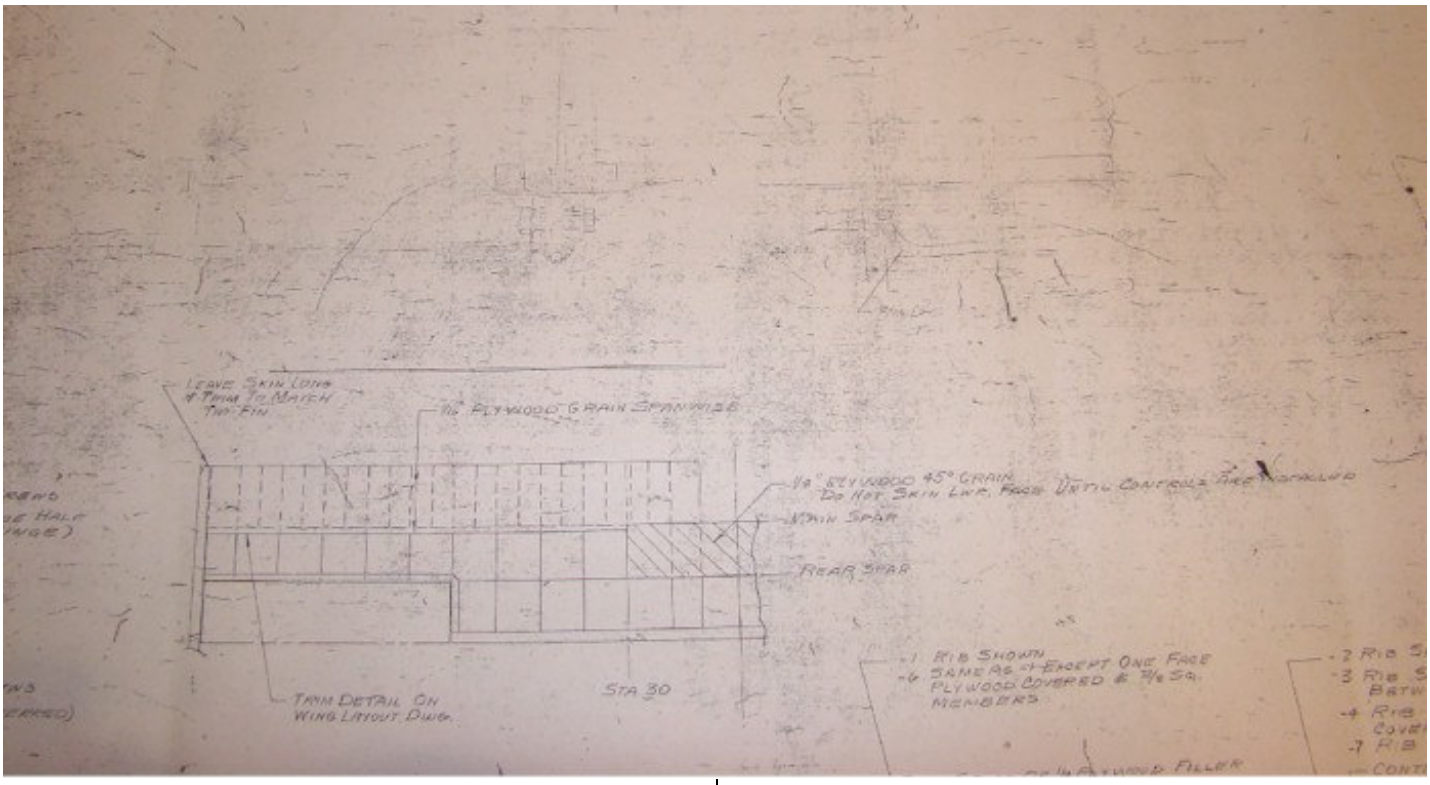
I spent last Friday completely rearranging (can one rearrange if they haven't arranged first?) my garage and now I can find all of my woodworking tools, composite tools, drawings, engineering books, etc. So I quickly went to my stack of drawings and pulled out the EPB-1 drawing stack. Photos of the whole drawing are attached, along with a zoomed in photo of the area in question. Any help would be appreciated.

Glad to hear from you again. Any chance you'll be at the Western Workshop? I'm considering flying out.

PS - I've often told your story about building the first plank in record time. Can you confirm for me how many days it was? Wasn't it something crazy fast, like 45 or 60 days?

PPS - It sounds like someone else in the newsletter wanted your thoughts on things you'd change if you were to build another Plank. I know I too would be very interested. Center fin or tip fins? Drag plates at the tips for yaw, or clamshell elevons? Add some twist or not? It would be great to hear some of your comments. Your work still amazes me, especially without pocket calculators or computers! Then again, maybe without all of those distractions you had nothing else to do but just start building!

(ed. – I have included the best version of the page Dennis referenced on top of the next page.)



May 11, 2009

Chris Strachan in the UK just sent me a set of peanut scale model plans (see the two attached PDF files) of the Horten IIId motorglider. He got it from his friend Bill Brown, a fellow model builder/flyer, and the plans were drawn by Bob Marchese in the USA.

Chris Strachan has tried a rubber-powered propeller, a Gasparin G24 CO2 motor, and Rapier model jet propulsion motors in his Horten IIId model, all with varying levels of success. His best results so far have been with a Brown A23 (I don't know if that is a CO2 motor or an electric motor, but I believe it is the latter).

I hope this material will be helpful, especially to other modelers who, like me, prefer smaller F/F (Free Flight) scale models over R/C models for reasons of cost, building space, and storage space.

Jason Wentworth
<blackshire@acsalaska.net>

(ed. – I will put images in the next issue.)

May 25, 2009

Many thanks! I found TWITT while doing a search on the Horten flying wings. My current interests are RC flying wing models and their application to aerial photography. I am also interested in control problems (yaw, tip stalling) associated with flying wings and how to avoid these, for obvious reasons!

Thanks,

Terry L. Davis
<tldavis341@sbcglobal.net>

(ed. – Thanks for joining our group of flying wing nuts. I think you will find some useful information on flying wing models in many of the newsletters available through the members only section of the web site. Let us know if you find and built something that meets your needs.)

May 27, 2009

Thanks for the quick response on my signup. Since Sunday I have been reading all the back issues of the newsletter and just finished. Lots of good items in them...

Please be advised that the file for Feb. 94 seems to be damaged and cannot be downloaded.

I have been aware of TWITT for several years and read some of the newsletter samples. And I have attended the last two ESA Sept. gatherings in Tehachapi.

My interests are pretty general. I built and test flew Martin Hollmann's Stallion in '05 and have been dabbling with a new design. I am a member of EAA Chapter 723 in Camarillo.

Blue skies,

Tom Nalevanko
<tom@omniupdate.com>

(ed. – Tom sent along a picture of him standing next to the Stallion. I did some testing and couldn't find any problem with opening the Feb '94 issue in several different browser types, so if anyone else has had difficulty, please let me know.)

AVAILABLE PLANS & REFERENCE MATERIAL

Coming Soon: Tailless Aircraft Bibliography Edition 1-g

Edition 1-f, which is sold out, contained over 5600 annotated tailless aircraft and related listings: reports, papers, books, articles, patents, etc. of 1867 - present, listed chronologically and supported by introductory material, 3 Appendices, and other helpful information. Historical overview. Information on sources, location and acquisition of material. Alphabetical listing of 370 creators of tailless and related aircraft, including dates and configurations. More. Only a limited number printed. Not cross referenced: 342 pages. It was spiral bound in plain black vinyl. By far the largest ever of its kind - a unique source of hardcore information.

But don't despair, Edition 1-g is in the works and will be bigger and better than ever. It will also include a very extensive listing of the relevant U.S. patents, which may be the most comprehensive one ever put together. A publication date has not been set yet, so check back here once in a while.

Prices: To Be Announced

Serge Krauss, Jr. skrauss@earthlink.net
3114 Edgehill Road
Cleveland Hts., OH 44118 (216) 321-5743

Books by Bruce Carmichael:

Personal Aircraft Drag Reduction: $30 pp + $17 postage outside USA: Low drag R&D history, laminar aircraft design, 300 mph on 100 hp.

Ultralight & Light Self Launching Sailplanes: $20 pp: 23 ultralights, 16 lights, 18 sustainer engines, 56 self launch engines, history, safety, prop drag reduction, performance.

Collected Sailplane Articles & Soaring Mishaps: $30 pp: 72 articles incl. 6 misadventures, future predictions, ULSP, dynamic soaring, 20 years SHA workshop.

Collected Aircraft Performance Improvements: $30 pp: 14 articles, 7 lectures, Oshkosh Appraisal, AR-5 and VMAX Probe Drag Analysis, fuselage drag & propeller location studies.

Bruce Carmichael brucehcarmichael@aol.com
34795 Camino Capistrano
Capistrano Beach, CA 92624 (949) 496-5191

VIDEOS AND AUDIO TAPES

(ed. – These videos are also now available on DVD, at the buyer's choice.)

VHS tape containing First Flights "Flying Wings," Discovery Channel's The Wing Will Fly, and ME-163, SWIFT flight footage, Paragliding, and other miscellaneous items (approximately 3½+ hours of material).

Cost: $8.00 postage paid
Add: $2.00 for foreign postage

VHS tape of Al Bowers' September 19, 1998 presentation on "The Horten H X Series: Ultra Light Flying Wing Sailplanes." The package includes Al's 20 pages of slides so you won't have to squint at the TV screen trying to read what he is explaining. This was an excellent presentation covering Horten history and an analysis of bell and elliptical lift distributions.

Cost: $10.00 postage paid
Add: $ 2.00 for foreign postage

VHS tape of July 15, 2000 presentation by Stefanie Brochocki on the design history of the BKB-1 (Brochocki,Kasper,Bodek) as related by her father Stefan. The second part of this program was conducted by Henry Jex on the design and flights of the radio controlled Quetzalcoatlus northropi (pterodactyl) used in the Smithsonian IMAX film. This was an Aerovironment project led by Dr. Paul MacCready.

Cost: $8.00 postage paid
Add: $2.00 for foreign postage

An Overview of Composite Design Properties, by Alex Kozloff, as presented at the TWITT Meeting 3/19/94. Includes pamphlet of charts and graphs on composite characteristics, and audio cassette tape of Alex's presentation explaining the material.

Cost: $5.00 postage paid
Add: $1.50 for foreign postage

VHS of Paul MacCready's presentation on March 21,1998, covering his experiences with flying wings and how flying wings occur in nature. Tape includes Aerovironment's "Doing More With Much Less", and the presentations by Rudy Opitz, Dez George-Falvy and Jim Marske at the 1997 Flying Wing Symposiums at Harris Hill, plus some other miscellaneous "stuff".

Cost: $8.00 postage paid in US
Add: $2.00 for foreign postage

VHS of Robert Hoey's presentation on November 20, 1999, covering his group's experimentation with radio controlled bird models being used to explore the control and performance parameters of birds. Tape comes with a complete set of the overhead slides used in the presentation.

Cost : $10.00 postage paid in US
$15.00 foreign orders

A Flying Plank Sailplane *For Today?*
By Al Backstrom

What? An issue with main articles by Backstrom, Carmichael, Hall and Sunderland? Four of our favorites! Thanks to all of you! Here's Al's contribution:

In the early 50s I initiated design studies that became the EPB-1 Flying Plank. The intended performance criterion was to be equivalent to the WWII surplus two-place sailplanes that were common at the time. A simple easily built machine was desired. Others were pursuing similar thoughts in small sailplane designs. The Schweizer 1-26 and Stan Hall's Cherokee II are the best known and largely built of this thinking. The configuration of the prototype and plans versions of my Planks is shown in Figure 1.

The EPB-1 met the basic design requirements but never achieved the popularity of the 1-26 or Cherokee II, although several were built around the world. There were probably more built in Australia than any other country. Unfortunately, Australia had a change of policy on certification of homebuilt designs before any were finished and approved for flying. The untimely death of Fred Hoinville, who spearheaded the Australian activity, effectively ended work on the ships down under. A two-place Plank built by Reg Todhunter was certificated as a standard sailplane in Australia. It is still in existence in a museum there.

I am often questioned about the use of the plank configuration for a contemporary design. I feel that a small simple sailplane of acceptable performance can be designed using the plank layout, but not by copying the original closely. To start thinking of what to do on a new Plank, we should look at what mistakes were made on the earlier version. I think the primary errors were made in (1) using a wing span that was too low (25 feet on the drawings) and (2) building the machine in one piece. The short span made the span loading higher than desirable and produced a minimum sink rate that is not acceptable today. The one piece construction limited the areas that could be used for construction and made for very awkward trailering. The trailering was aggravated by the wing tip fins producing high drag that hindered trailering speed and reduced the mileage of the tow vehicle.

Secondary problems included inadequate approach control and a small cockpit. Approach control was by opening both drag rudders. This was not too effective and nervous pilots would fly around with both rudders extended. The general handling characteristics and control were very good. The prototype was flown in aerobatic demonstrations at air shows by Ted Janczarek with the most complex maneuver being eight point rolls.

Performance flight tests conducted at Mississippi State College showed a lower minimum drag coefficient and a lower span efficiency factor than the design estimates. The former allowed good high speed L/D (for 1954) and the latter adversely affected the minimum sink rate (See Soaring, January-February 1957).

In designing a Plank for general soaring today, I would start by using a span of about 33 feet (10 meters). An empty weight of 150-200 pounds (68-91 kilograms) should be targeted – the 150 pounds for possible use as an uncertificated ultralight glider in the United States, and the higher weight for a more robust general purpose machine. In order to obtain low minimum speeds, a wing loading of about 4 pounds/square foot (psf) (20 kg/square meters) is reasonable. The structure should be designed for a weight higher than anticipated normal flying weight. Using an assumed maximum weight of 500 pounds, a wing area of 125 square feet will be required.

To simplify construction, the ship would be designed in three sections, i.e. the pod and two wing panels. With the wing panels of about 15 feet (4.5 meters) length, the ground handling will be crew friendly. The pod section would incorporate a fixed wheel for takeoff and landing plus ease ground handling.

The departures from the previous designs are numerous but the primary are described below;

Airfoils are not covered here as there are many sections to choose from for Plank type tailless designs, or a special section could be designed for the Reynolds number range of the design.

The wing structure would use a constant chord geometry but the aerodynamic chord would be extended in the elevon area. The exact amount of increase would be determined by the airfoil selected and necessary spar depth for elevon structure. The increase of chord in the elevon area will produce better lift distribution at higher Cl in addition to reducing the required deflection angles for a given Cl. These two factors will tend to provide improved lift distribution at higher Cls and lower minimum sink values than that of the pure constant chord wing.

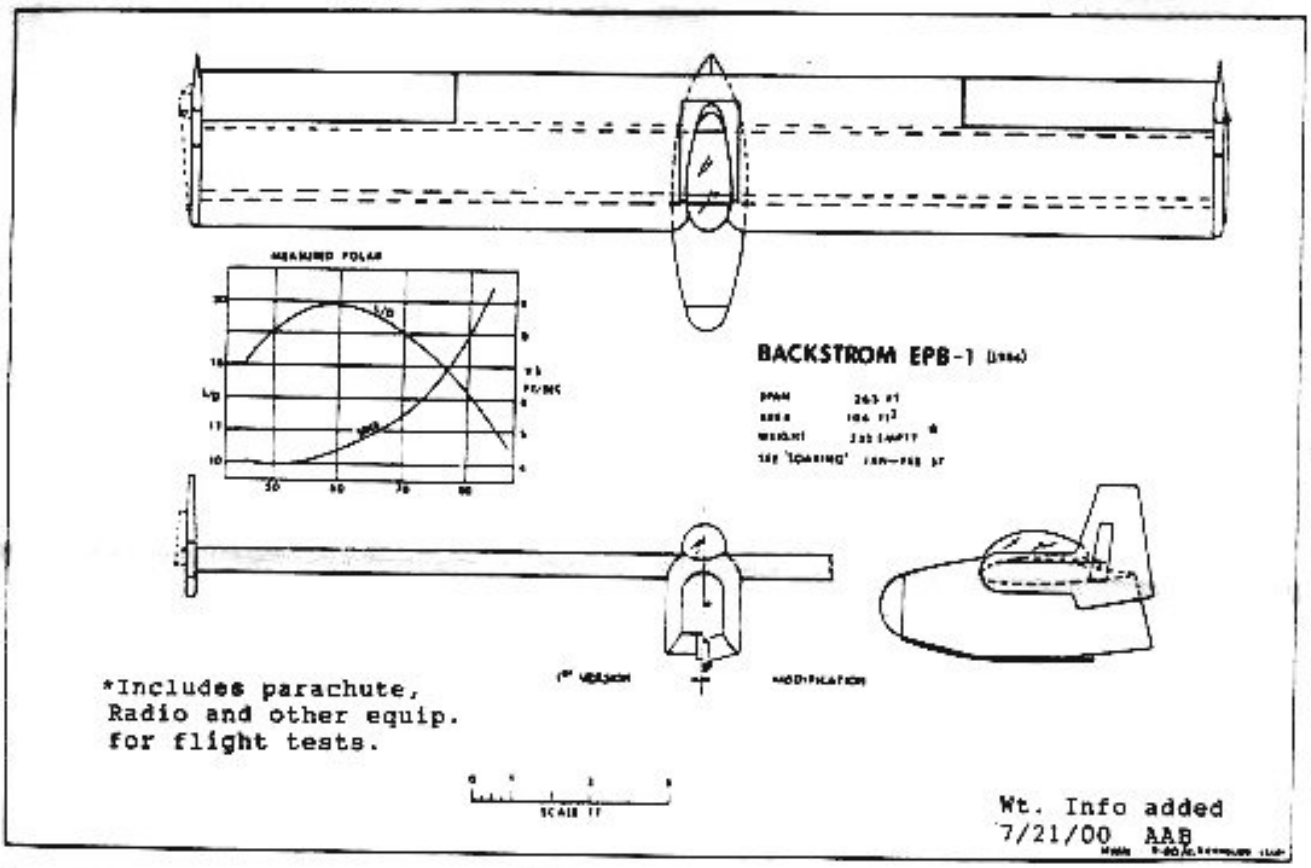
Instead of a pure cantilever wing, I would use a "semi-strut braced" arrangement. This would consist of a short strut that has about a 45-degree angle with the horizontal. A small drag penalty would result but this provides a very significant reduction in the maximum wing bending moments and allows a light simple carry-through structure in the pod.

Yaw control would be via drag rudders at the wing tip. These would be plate sections on the upper surface only. Deflection of a rudder would produce a yaw force and in addition a small proverse rolling moment and some nose up pitching moment. The rolling and nose up moments are both in the direction desired to coordinate the turn. Both rudders could be deflected together to assist approach control but would need a spring interconnect system so they would not both be deployed inadvertently as noted on the original machines.

To obtain directional stability, a central fin would be used. The upper section of the fin can be designed to split to and provide drag for approach control. This drag force will produce a nose moment that can serve to reduce minimum flying speed but will require pilot awareness to prevent unwanted arrivals. A lower mounted drag flap arrangement would provide approach control and probably not reduce the minimum airspeed.

Selection of the vertical wing locations is a problem particularly if the lightest weight is desired. If you try to get the pilot's head above the wing for visibility, the spar always seems to be in just the wrong position. The best solution for a minimum weight design would be to place the pilot below the wing even though it restricts visibility. A design for higher empty weights would allow a pilot position in front of the main spar but will result in larger movement of CG due to different pilot weights.

Figure 2 illustrates most of the generalities discussed above. I have not included any discussion of detail structure as this would require starting on an actual design project. There are many structural options today and persons skilled in specific materials and processes would want to work with their own favorites.


BACKSTROM EPB-1
*Includes parachute,
Radio and other equip.
for flight tests.
Wt. Info added
7/21/00 AAB

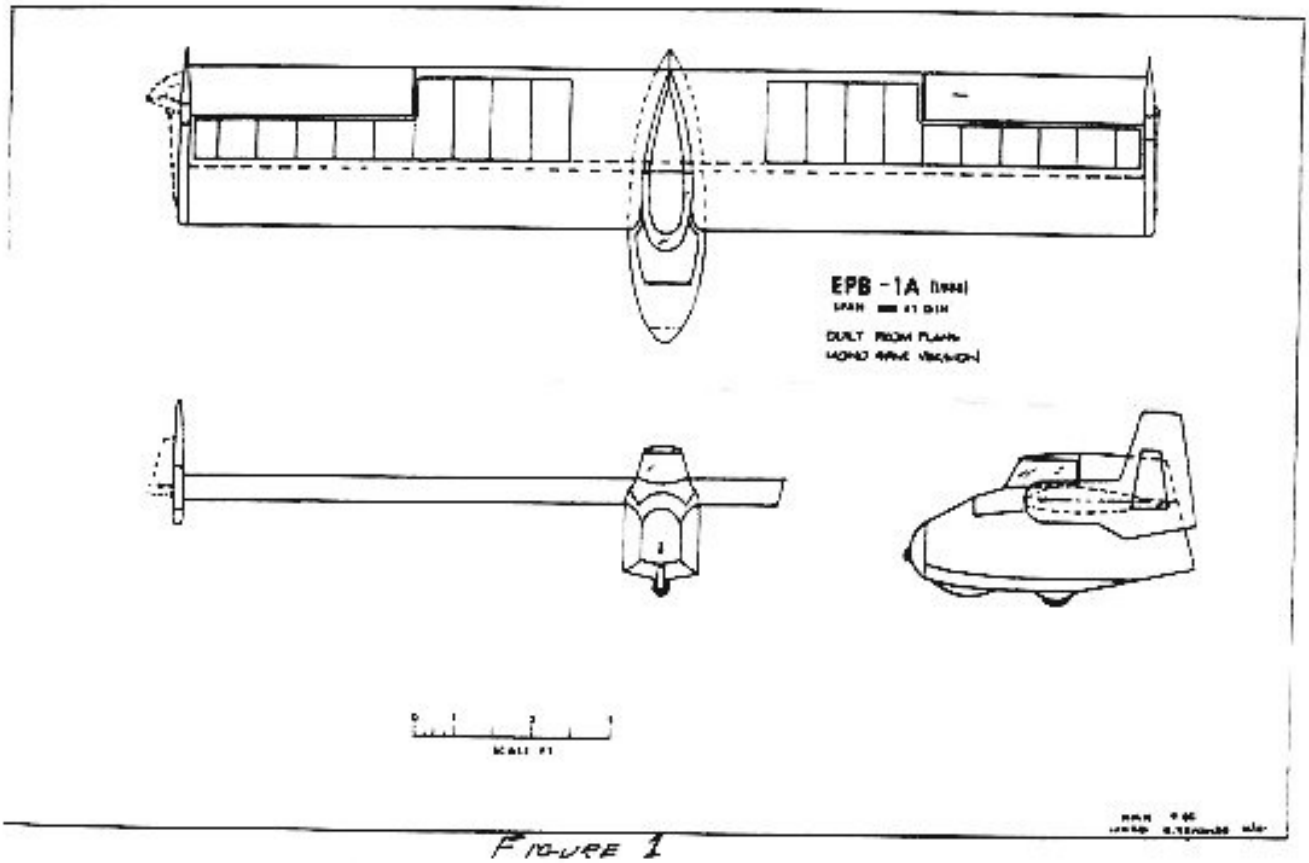

EPB-1A

FIGURE 1

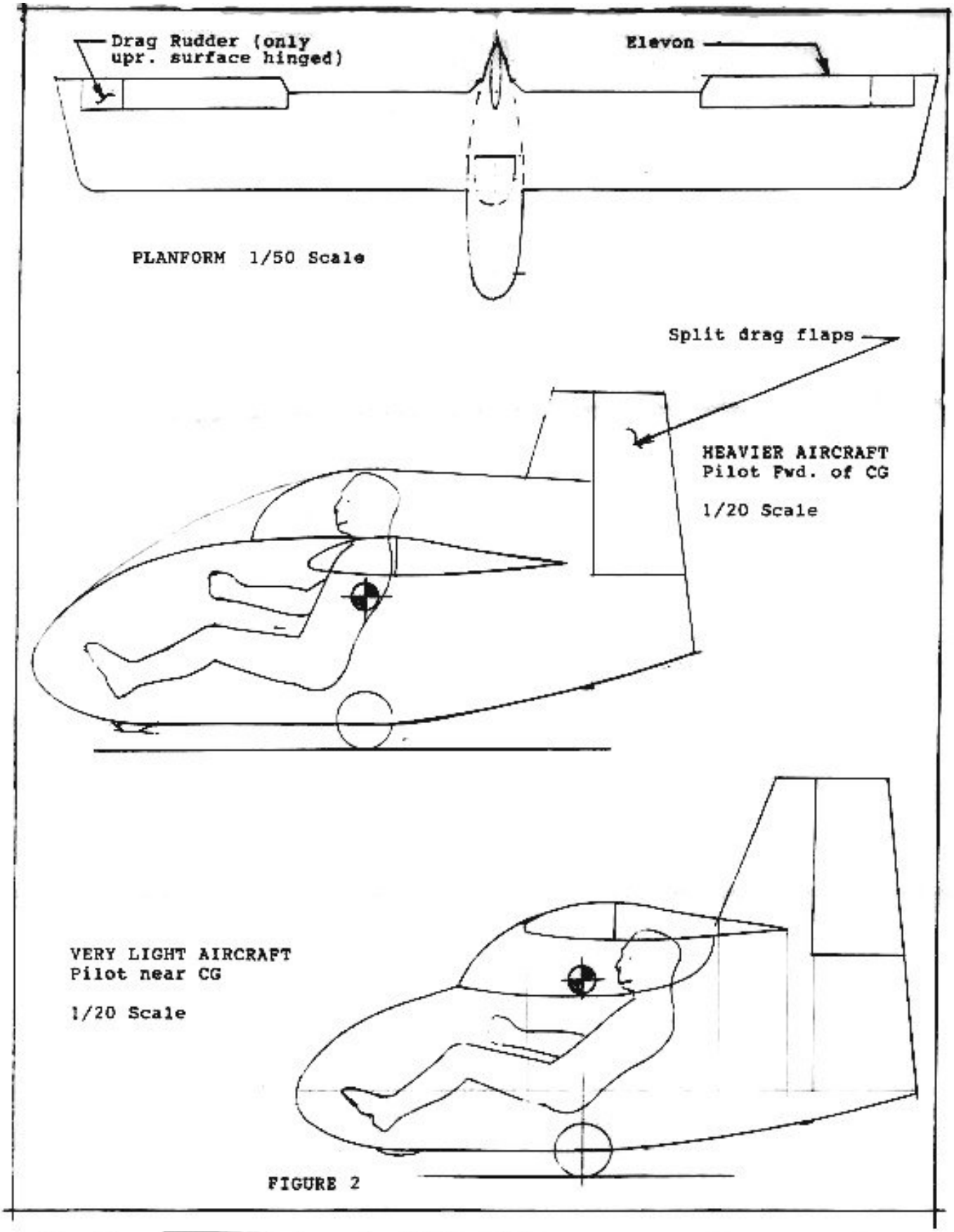

Drag Rudder (only upr. surface hinged)
Elevon
PLANFORM 1/50 Scale
Split drag flaps
HEAVIER AIRCRAFT
Pilot Fwd. of CG
1/20 Scale
VERY LIGHT AIRCRAFT
Pilot near CG
1/20 Scale

FIGURE 2

Mitchell U-2 Bulletin Board Threads

Check out this site. Here is the electrical stuff you need to make the B10 an electric flyer.

http://www.electraflyer.com/

I am thinking it would be an interesting project to convert my B10 to electric power. 18-20 hp is just enough for the B10 and the weight of the electric motor and other equipment including the battery pack should just about equal the weight of my Koenig engine and a full tank of petrol (I have 21 litres = 14 kilos = 30 pounds).

The trick is to place all the batteries so that you get the CG right.

Carl Hyllander in Stockholm
<carl.hyllander@bredband.net>

(ed. Here is an example of a converted trike from the web site. There are also other types of aircraft like an electric Moni motor glider with about 1.5 hours of powered endurance.)

Yes, I should have mentioned that I'm thoroughly familiar with the Electraflyer net site. Talked about an hour with Randall Fishman (owner) at Airventure '08 in Oshkosh. He was disappointingly not forthcoming, answering no questions on his parts sourcing or any of his engineering strategies in developing his electric power system. It took me about 15 minutes to find his motor (Perm 132), and probable controller (anyone selling the Perm 132 has perhaps 5 choices of appropriate controller, all the same shape and color as in his airplane, etc.). I haven't been able to find any industrial LiPos suitable for the purpose, but Randall has. He wouldn't discuss them. He does sell them. Last night I googled "Tesla battery" to see what they're using in their sports car. It was very informative and pertinent in many ways for an aviation application.

Lloyd Schultz
<lsefly05@gmail.com>

Lloyd,

The electric bicycle and electric motorcycle forums will have the latest and greatest on high performance batteries.

http://endless-sphere.com/forums/

Red
<red@xmission.com>

Guys, check this out:

http://www.purilend.ee/node/3413

Andrey.

Peep Lauk (the creator) and his flying wing

(ed. – This is a must see. It is powered by two retractable motors that tuck in very neatly on either side of the centerline. It will be interesting to see if it ever gets to the point of having plans.)

I received a set of U2 plans and the associated book of instruction. As I was going through the book I noticed that the pages skip from 23 to 34. I see on the front cover that pages 30,31,32 & 33 are not needed, but I am concerned with 24 though 29.

Does anyone have a copy of those pages that I could get or let me know what the content of this pages are?

Thank you

Dan
<l17navion@yahoo.com>

(ed. – I have included this item and the ones below to relate that it appears Richard Avalon has passed away from his on-going health problems. While understandable, it is apparent that his wife Carol has been unable to cope with the continuation of Richard's business of supporting the Don Mitchell designs. I haven't had any contact with her so don't know if she has any desires to sell the business, which I assume would include some parts stock, but it might be something to think about if you are retired and looking for an aviation related project. The e-mail address and phone number are in the Blueprints ad below.)

Dan, when did you get your plans??? I've had a paid set on order since Mar 23, after receiving payment instructions, but can't get a response on shipping.

Dave B
<crusader6c@comcast.net>

No Contact with Carol Avalon

I am in a similar situation. I have a set of U-2 plans and B-10 wing kit on order since 1 March. Part of the delay was trying to arrange delivery of the large box for the wing kit, but recently I have not heard from Carol.

My prayers are with Carol at the loss of Richard. I hope she is able to keep the Mitchell Wing going.

Roger Gerrard
<riang1954@yahoo.com>

After 38 months, I have a completed wing and am undergoing extensive ground work. I have a schedule for next week with a DAR for that most important piece of paper, called an airworthiness certificate. Wish me luck. I have 2 photos now and will be adding more when airborne.

(ed. – Here are the two pictures the builder referenced. He didn't include his name or location. Great visibility from that wrap around canopy.)