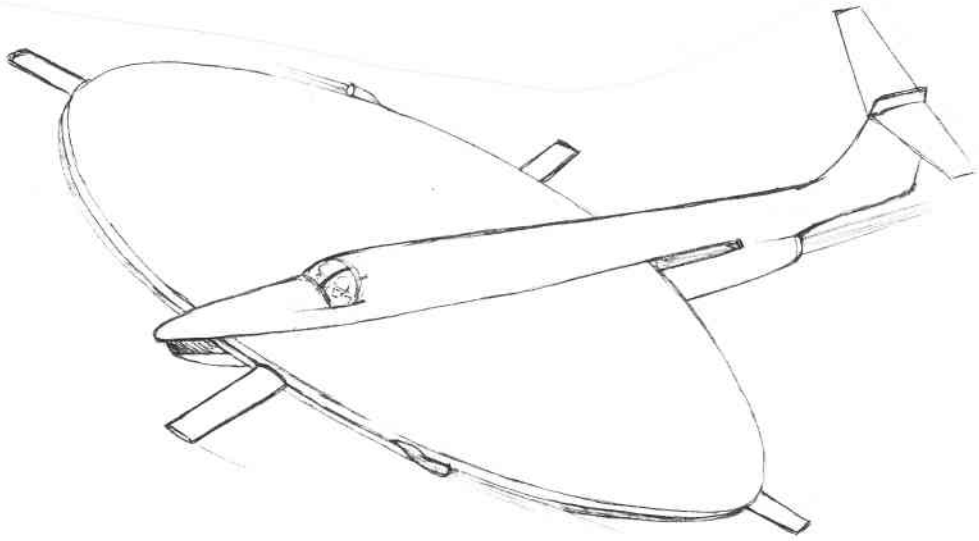
NO. 36

JUNE 1989

TWITT
NEWSLETTER



TWITT
(THE WING IS THE THING)
PO BOX 20430
EL CAJON, CA 92021
USA

The numbers to the right of your name indicate the last issue of your current subscription, e.g. 8906 means this is your last issue.

NEXT TWITT MEETING: Saturday, June 17, 1989, beginning at 1330 hours. The location is Hanger A-4, Gillespie Field, El Cajon, Calif., in the first row of hangers on Joe Crosson Drive.

TWITT'S

3rd ANNIVERSARY PARTY

& MEETING

June 17, 1989 at 1:30 P.M.

Hanger A-4 (the usual place)

There will be a short business meeting for:
voting on new Bylaws
nominating a slate of officers & board members
voting for the nominees
any other minor business necessary

After the business meeting will be the PARTY

Cake & Ice Cream

Refreshments

Lots of hanger flying

Soaring videos

Wander Skid Row & sight see

Just a plain GOOD OLD TIME

PLEASE COME - WE NEED A BIG TURNOUT FOR THIS ONE

NOTE: We can still use the donation of the cake and refreshments.

VTOL DISK on cover

Ken Coward, designer of the "Wee Bee", contributed an article on his concept of a VTOL Disk to the TWITT library.

The aircraft consists of a disk, having a desirable aerodynamic shape in cross-section. Mounted on this disk, through a bearing, is the fixed portion of the aircraft containing the crew, power plant, etc. The disk is caused to rotate by the tip jet action of the jet engine exhaust, thereby introducing no torque between the rotating disk and the fixed "fuselage". The power plant consists of one or more jet engines arranged in such a way as to exhaust either directly aft for forward propulsion, or exhaust to ducting to the disk tip jet nozzles. A labyrinth seal could be used for transmission of the gasses from the fixed to the moveable parts. At the periphery of the disk are located rotor blades which, when extended, provide the VTOL capability. These retract radially into the disk in forward flight. Control moments are provided by ducting part of the engine exhaust to nozzles located on the fixed part of the aircraft remotely from the C.G.

Vic Millman supplied the perspective from the three view--Vic is a retired aerodynamicist and propulsion engineer and is an active pilot.

Hi TWITT folks, May 30, 1989

I was pleased to see both PANDORA and the Zimmer'son Six exposed to the world via Number 35, May 1989 and I send my thanks to Mr. Leiser for his contribution. But, to have the ancestors, the V-173 and XF5U-1, so well represented by Mr. Lockhart was another treat. I was particularly taken by his sensitivity to the shame of what happened to the program in the late '40s. Yes Ed, I can muster a tear or two if it will help the situation.

Ed Lockhart, knowingly or not, put some interesting twists to what I thought I knew about the technicalities associated with the Zimmerman brainchildren. His comment about there being more "wingtip" length than leading edge is a fascinating thought, one that never occurred to me. By the same token, there can't be much trailing edge either. Imagine a wing that is only a pair of tips kissing each other, nothing in between. Old Clsquared and PiAR have got to do some extra thinking about such an oddity when it comes their turn to answer muster as far as induced drag is concerned.

In 1932, Mr. Zimmerman, an NACA engineer, ran a series of tests in the Langley wind tunnel. He looked at the characteristics of wings with low aspect ratios, ones that ranged from 3.0, on down to 0.50. Tip shape seemed to have a major bearing on the lift capabilities that could be generated before stall set in. The wing with an aspect ratio of 1.27 was of most interest to him & it so happened that this particular wing had semi-circular tips. Put more bluntly, the wing was round. In effect, the concept of the V-173 was born, or at least documented in May of '32. Over a decade passed before his concept took wings and it was, of course, the Chance Vought built, Navy sponsored V-173 Flying Pancake. The planform was not circular as was used in the earlier tests since he wished to have all quarter chord points on a plane "normal to the line of thrust." The wing 'looks' like a pair of ellipses where the major axis of the forward ellipse becomes the minor axis of the other, giving the pumpkinseed appearance that Ed Lockhart suggested. The airfoil of the early tests, the old reliable Clark Y was changed to a symmetrical NACA 0016 section, the thickness selected to allow the flat Continentals to be within contour. The heavier and more powerful XF5U-1 followed the proto shape and cross section although the larger P & W engines required some cosmetic nacelle type fairings. For those that might wish to dig deeper into the 1932 wind tunnel tests, Report No. 431, Characteristics of Clark Y Airfoils of Small Aspect Ratios is quite fascinating. It might be mentioned that PANDORA, our Aerial Robot with a square planform and subsequent AR of one was also born in 1932....though we didn't discover her till '84.

As far as the classical problems with low A.R. and high induced drag are concerned, at least with regard to the Pancakes, I think the argument has been over-emphasized. It was the Zimmerman idea that propeller rotation direction might reduce the drag penalty that could be associated with short span tip vortices. Made sense to this wide eyed believer. One of the most valuable acquisitions through our love affair with the Zimmerman machines has been the wind tunnel report that resulted from placing a full size V-173 in the Langely tunnel. To our surprise, the official summary was that it didn't really matter which way the props turned. In fact, it was determined that by turning the windmills opposite to what Mr. Zimmerman wanted, longitudinal stability would be improved and any reduction in induced drag "...is credited to the propellers as an increase in thrust and to the airplane-propeller combination as an increase in propulsive efficiency." Hmm...it has taken me a long time to find comfort in such things, things written in 1942. Conversation with Mr. Zimmerman a few years ago indicated that he also was confused by the published results and he felt that there had been some massaging of data to make it sound as they wished. I am much more comfortable with something that came from a Bell paper having to do with the tilt-rotor. In our opinion that machine is in itself a unique bag of worms that is due a comment, shortly, but an interesting point can be made with a particular quote. Mr. Jan M. Drees, a former V.P. at Bell, did a paper presented at the 43rd Annual Forum of the American Helicopter Society, St. Louis, Mo., May 18-20 1987. He speaks of an upwash created by the rotors (propellers) if they turn in the proper direction...the one suggested by Mr. Zimmerman so long ago...which will tilt the winglift vector forward, thus reducing the wing drag. He stated that "This upwash is of the same order of magnitude as the induced downwash due to wing aspect ratio. It is even conceivable that the two are made to be equal, which would mean that the effective wing aspect ratio of this tiltrotor will be infinite." He acknowledged that this neat trick had been explored by Mr. Zimmerman many years ago with his "Flying Pancake" aircraft. Phooey to prop efficiency and 1942 reports.

Let us dwell on tilt-rotors and such for a few moments. I find it very easy to join the camp that suggests what some old Jack in the Box drive through eatery commercials suggested some time back. For those that may not have had the thrill of driving up to an oversize jack-in-the-box to order hamburgers, let it be said that the chain decided to do away with the poor fellow. They solicited the opinions of their customers and featured a TV commercial where a little old lady said "Waste the Clown" and the poor thing went up in smoke. I say "Waste the clown, the V-22" Oh, go ahead and flight test the close to $2 billion creatures but don't proceed to throw the other 24 billion or so at service quantities. Ok, I am biased on two counts. I am rather pleased to have been part of the gang that produced the Vought (Hiller & Ryan) XC-142A of the mid '60s. This VSTOL, five of them, used the tilt-wing concept rather that the tilt-rotor technique. All the good words about commercial possibilities were passed around a quarter century ago and in spite of pretty successful demos, the

project went nowhere. Call it what you wish, the trick was to alter the direction of thrust and darned if the rest of the machine didn't follow that direction. The XC-142A was a four engine machine but another tilt-wing, the Canadair CL-84 was doing the same VSTOL stunts with a two engine bird. Closer, I would think, to the XV-15 and V-22 since the larger prop diameter made the pounds of thrust per horsepower look better that the smaller props on the Vought machine. The Cl-84 flew a bunch too and worked quite well. The fate was the same for both tilt-wings however....nowhere.

I have heard pro and con arguments for both thrust direction schemes but the real kicker has come recently with some of our public servants rushing to protect the big bucks being channeled to their voters. Some "Aviation Experts (?)" believe that the tilt-rotor, the V-22, is the most important contribution to aviation since the introduction of the jet engine. Wow, that is pretty heavy stuff isn't it? It also points out an interesting paradox that, believe it or not, gets us right back to the Zimmerman discoveries of the '40s. One of the reasons for the sad destruction of the beautifully clean and simple XF5U-1 was that the introduction of the jet engine was sure to render the archaic propeller obsolete. The very way that the pancakes demonstrated their propulsion efficiency was through the use of large diameter and slow turning propellers. Now for a mere 25 or 30 BILLION $, we can have something as great as the jet engine. How about that for progress airplane fans? To add spice to the story, listen to those that tell us how the so-called un-ducted fans are going to revolutionize commercial air transportation. Maybe Don Quixote was actually paid by the yet to emerge jet lobby to do away with the big blade whirlys.

One final...I promise...stab at the situation. The Zimmerman birds were believed to have growth potential that not only included vertical take-off capabilities, but a top speed that is still to be realized over four decades later. We believe that the Zimmer'son Six has record breaking speed capabilities that only takes advantage of what was in the Zimmerman vision. But, a few serious thoughts will satisfy one that given the very engines and cross shafting having been used with the Bell XV-15s (a roughly 15,000 pound VTO) one could build a modern Pancake for much less weight than the 14,500 pound XF5U-1 with its big round I.C. pwr. plants, and with far less risk than was accepted with the expensive V-22, the worlds fastest propeller driven VTOL would be ours, much cheaper than a tilt-rotor or a tilt-wing. Mechanical complexity, cost, and reliability are not Achilles heels that need to be lofted if we really want the best aircraft configuration for the task. Wouldn't it be nice if the leaders, past and present, looked for quality in the product they sponsor? The LHX will probably soon join the controversy enjoyed by the turkeys that seem to be aimed at the sky today, the B-1s, the B-2s and the V-22s since it seems to be not a turkey but a camel fresh from the design committee. Gosh, why not a fresh version of the 'Zimmer Skimmer' of days gone by.

Thanks for listening. Look between the lines and you will see why PANDORA should be the aerial robot of choice....but won't be.

As a matter of no particular importance, I do know the famous Dick Johnson, our paths having crossed a couple of times. For the trivia buffs, Dick Johnson, Dick Johnson, AND Al Backstrom once used the same Chance Vought parking lot during the same era. I might also add that good friend Backstrom keeps me out of most aerodynamic problems. In my mind, aerodynamic, chemistry, and black magic solutions come from the same cauldron and I need a lot of help with the ladle.

Sincerely,

Dick Johnson

Dare I P.S.? Why not? Might someone be able to tell me how to contact John Elliot, the Navy historian mentioned by Ed Lockhart?

End, honest injun. For now anyway.

The proceeds of the raffle will be used to help pay the cost of the anniversary party. The raffle prizes will be a book,"Peanuts and Pistachios" donated by Bill Hannan and a framed and mounted Norman Rockwell reproduction.

Jim Gray of R/C Soaring Digest is now on TWITT mailing list. TWITT is trading publications, hence the R/C Digest if now part of the TWITT library,

Editorial Policy: Material published in TWITT Newsletter is freely contributed by the members and others. The accuracy of the data and the validity of the opinions expressed in these pages are the responsibility of the contributor. Permission for reproduction of the material printed herein is granted, but credit is requested.

MINUTES OF TWITT MEETING, MAY 20, 1989

Bob Fronius opened the meeting with announcement of coming events and news notes, including: copies of new Bylaws are in the hands of the temporary officers, Bill Curry of AeroTech parts store again donated a T-shirt and cap for raffel prizes, Newletters were available from June with the rest to be mailed after the meeting, and the June meeting will not have a speaker since it will be the 3rd Anniversary party and election of officers/Bylaws. He told us that Rod Schapel, designer of Schapel flying wing, has offered the tooling and forms to TWITT at no cost except to pick it up at Stead Airport near Reno, Nevada. He asked if anyone could perform this task along with providing storage space for these items, since TWITT has no space left at Gillespie. If a TWITT member in Nevada or N. Calif. could help with this project it would sure would be appreciated. Bob introduced Ron Podhajsky who gave a brief description of the RP-3 project at Rensler Polytechnic Institute in Troy, New York. This project has been funded by NASA to look into composite construction and technologies. The three view he passed around was of a preliminary design and he felt there would be several configuration changes before a final one is selected. One interesting fact about the craft and construction technics was that the paint comprised about 25% of the total weight. They used female molds for the exterior surfaces and vacuum bagging to achieve some of their results.

Andy Kecskes then gave a brief overview of the proposed Bylaws and explained why we were incorporating; in order to be able to solicit tax-free donations of funds and equipment, and provide a basic structure for TWITT to continue beyond those currently running it. Nominations for officers and board members were requested from the floor with Ron Podhajsky and Maurice Brockington being nominated and declining the nominations. There was a nomintion from the floor that the temporary officers continue as permanent, which will have to be decided at the June meeting. Bob Fronius declined his portion of the nomination. It was pointed out that the majority of those present at the June meeting will decide on the new board and officers and put the Bylaws in place. Andy then introduced the meeting's speaker, Klaus Savier, who was going to discuss the SB-13 and show pictures from his trip to Germany last year.

Klaus explained the various aspects of the SB-13 project represented in the slides. This was a repeat performance of his talk last year, so it will not be given in detail here, since minutes for the August 1988 TWITT Newsletter contain this information. Klaus then went on to talk about his experience in isolating airflow disturbances and boundary layer control on the VariEze and then redesigning the areas to provide improved flow and, greater speed and efficiency.

Klaus has spent about 6-7000 hours over the last 10 years trying through actual trial and error to increase performance. He started with the inherent problems in the orginal design of the VariEze's canard airfoil and the affects of rain on boundary layer control, a problem partially solved through placing wheel pants over the exposed main gear. (Sorry, I am not an engineer and can't give you all that fancy technical mumbo jumbo about the hows and whys.) He went on to explain his modifications and their effects on canard performance. His new canard has flush internal hinges and is 17% thick, a 5%

reduction over standard. He still has several more modifications to try that he feels will improve boundary control.

Klaus used the wild blue yonder as his wind tunnel, by applying a mixture of carbon, oil, kerosene and soap solution to the various parts of the airplane and then immediately flying it to spread the fluid via the current flow lines. He then has analysed the flow lines and then made modifications to the area and tried the procedure again. He has done this for every critical area from the front to the back of the aircraft. He has included the wheel legs, wheel pants, lower engine cowling, exhaust exit points, hinge lines, fillets between surfaces, etc., etc. For your VariEze and LongEze owners, you may want to get with Klaus and learn from his experiences.

The raffle was held and Harald Buettner won the AeroTech T-Shirt and an anonamous party won the hat (tape wasn't on to document all this fun).

Bob Fronius then adjourned the meeting, at which time a small group formed around Maurice Brockington to discuss his latest set of gear train drawings for the Mazda powerplant.

(Editors Note: These minutes have been kept brief for the sake of getting the Newletter out early and due to my lack of technical knowledge. If there is anyone who would like to volunteer to translate the meeting tapes in either hand or typewritten form for the next severl months it would be greatly appreciated. It would also provide the members unable to attend with a better recap of important information which may otherwise be lost as the tapes are reused. Thanks.)

LETTERS

We received a letter from Lewis Dewart through Al Cleave along with 6 slides of his model, and letter directly from Lewis. He also sent along a contribution for the TWITT library. Marc covered his flying plank last month.) Excerpts from his letters follow:

14 May 1989 - "The endeavor to design a build (for home production) a high performance, wing sailplane has certainly received a lot of serious study, and effort by all the long time "twitters." Knowing how hard all have worked toward just one design I hesitate to put forth the following suggestion, but will anyway.

"If the "twitters" could pursue two avenues of approach, one toward a high performance, state of the art, wing, soaring machine, and a second avenue toward a simpler, less expensive wing at the low end of the soaring spectrum it would seem that more, potential, and active, gliding pilots could enjoy the sport.

"From what I have read, studied, and done I feel the Backstrom Plank is the best solution for this second approach. Your present goal should be pursued with full gusto.

"If your organization should grow to the point where some areas of study could be considered, I would be most interested in donating my time toward further development of the plank as an easily manufactured flying wing. Lots of luck with your present project."

30 Apr 89 - "Thought you might like to have a look at the enclosed slides. The model I call the EPB-1D since some changes have been made over the "C" configuration. First the fin spar bulkhead, where the fuselage finally ended on the "C" has been widened to cut down the rapid curvature. The span has been clipped to 24" (scale si 1" = 1').

"The curvature is the mean line of Backstrom's airfoil. Slide #4 shows that I retained the flat bottom fuselage, and the tiny ribs used to maintain the curvature for the first 75% of chord. The last inch of chord are the inboard elevators and outboard ailerons.

"The last two slides show the model flying quite well with about 1" of fin removed. Beyond this the ship lost fixed directional stablility. I returned the fin and rudder to full size and really enjoy showing folks how a plane can fly without a horizontal tail (c.g. @ 20%c)"

Yours truly,
Lewis Dewart
29 Fairway Drive
Selinsgrove, PA 17870

From Chuck McGill -

Dear Mr. Fronius:

Thanks for sending me issue #33. Please start my subscription with issue #34.

I don't think there's much I can do for TWITT. I'm not an engineer, just an A&P mechanic who wants to build a foot-launch rigid wing. Don Mitchell showed me a copy of TWITT and I thought it might be useful. It has - the comments on the S-H-12 were interesting in that I didn't know I'd have adverse hinge moments on the elevons.

Oddly enough, you'd be surprised how much my ship resembles the drawing on the cover of #33. My winglets are a little different and the pod is larger in relation to the illustration, but the similarity is there. Don Mitchell gave me the impression I'm on the right track and it was a pleasure to be able to visit him and his wife in Mariposa.

I was a member of SHA, but never seemed to be able to get to their workshops and their internal politicking seemed to detract from their efforts, so I let my membership go last year.

Thanks,
Chuck McGill
Box 304
Mercer Island, WA 98040

The letter from Jim Gray of *R/C Soaring Digest* is printed in its entirety. His support of TWITT in the Digest has produced an influx of subscriptions from radio control buffs interested in flying wings. It would appear this relationship will be beneficial for the entire TWITT movement. Thanks Jim.

The pictures on pages 11 and 12 were taken by Klaus Savier on his trip to Germany. Klaus used slides to illustrate his talk at the May TWITT meeting.

R C Soaring Digest
P.O. Box 1079
Payson
Arizona 85547

May 24, 1989

Dear Bob:

I was delighted to receive the back issues of TWITT newsletter, and/especially interested in your letter - which I feel compelled to answer immediately.

First, I want to return the favor and send copies of all the available back issues of RCSD for your library. Should I send them to you or to Marc?

My own background in soaring goes back only until about 1957 or so when I lived in Painted Post (near Corning) and about 11 miles from Harris Hill. I joined the EASC (now HHSC) and soon bought one of the three existing Schweizer 1-20's (after checking out in our TG-3). I got my five hours and altitiude for the "C" in her, but narrowly missed the distance - which I got a bit later in my Cherokee II. The Gold Distance and Diamond Goal legs came in the 1-23D I owned (it used to be Bernie Paiwonsky's ship). I boughtthe LK-10 A that Ted Pfeifer owned, and it subsequently went to Texas, where it's still flying! Then, there came a BG-12BD (after I got an alle rgic reaction to the epoxy and other stuff on the one I was building). I finally sold that one in '73 and got out of soaring soon after, as I had discovered the R/C variety and went into that pretty hot and heavy. I didn't begin RCSD until January 1984 -- and should have started a year earlier!

We're in 15 countries and all but one state, as I recall, and growing nicely. One of the reasons I am so interested in flying wings is that I flew the Harris Hill ridge in company with the Montreal club's Fauvel AV-36, back in the fall of '57 or '58 I think it was. They had brought it down for our annual Snowbird Meet...and it fascinated me. It DID have the "kangaroo" or jack-rabbit tendency often mentioned when landing too hot and bouncing...but it was lovely to see in the air, and of course I wanted one tout de suite! In fact, I still have some AV-36 literature around (I hope) and, wonder if you would like it for the TWITT archives?

Of course, I've known the Fronius name for many years, and read about Screamin' Wiener being donated by you to the museum. In fact, I knew Doug's name which came to mind quite readily when I first saw yours. Back in the 50's I used to correspond with Gus Raspet, and even received some of the original papers written by Al Backstrom while he was there. I've got these, and would donate the one on the EPB-1 if it would be of any interest.

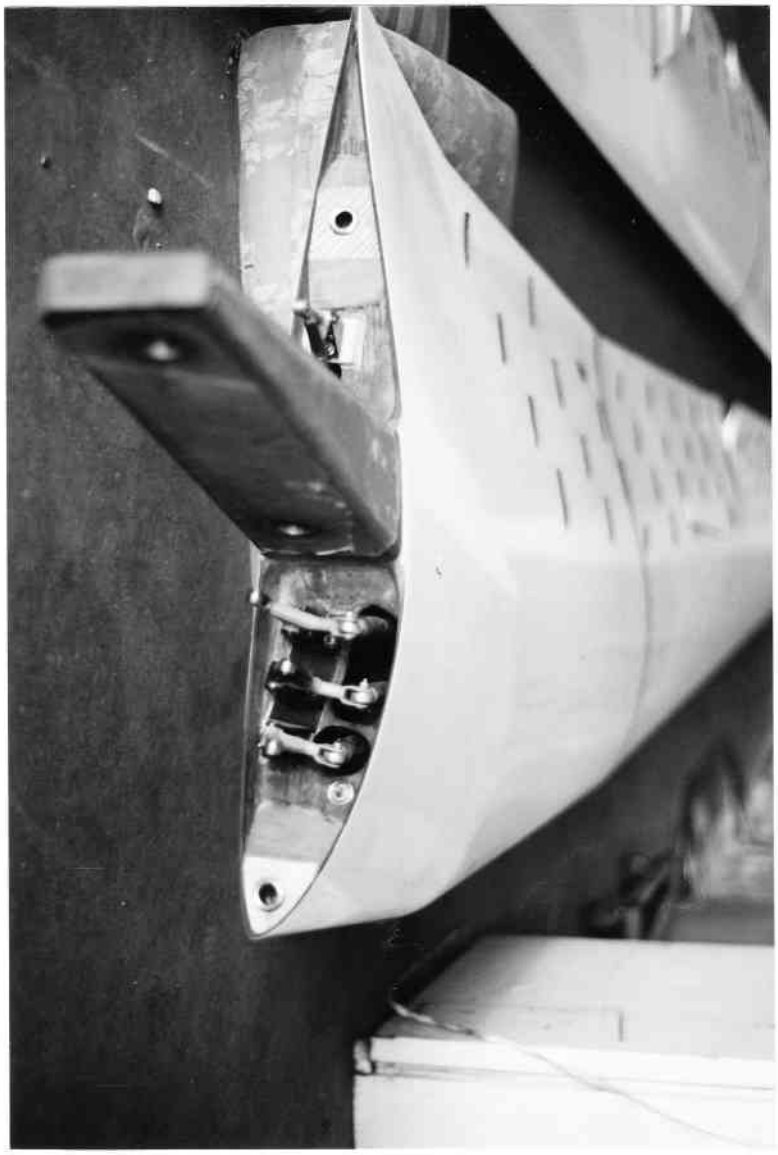
Howie Burr was the one who, more than any other, persuaded me to join EASC -- and I remember him very well, along with his late wife Carolyn and the kids Chipper, Peter and ----oops, I forget the third one.

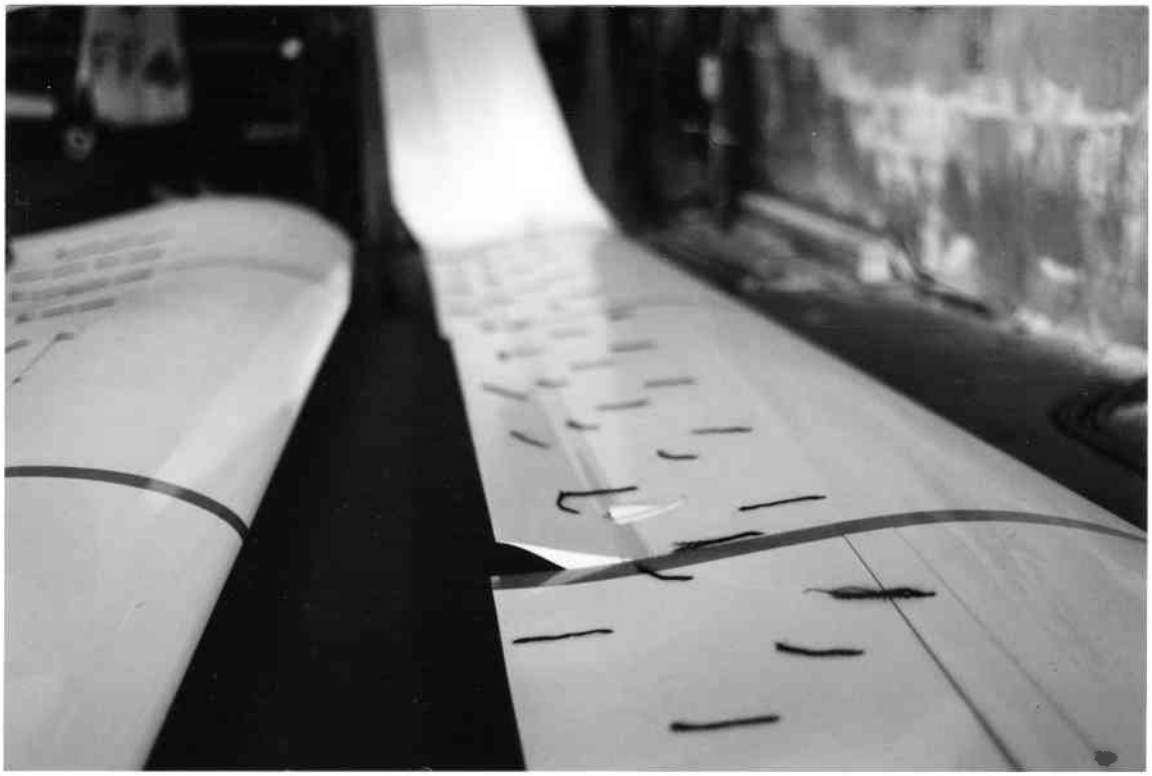
I'm a member of the VSA, and wrote a story for them on my 1-20 a few years back. Gosh, it's wonderful to reminisce, and I'd like to keep the dialogue alive.

Happy soaring,

Jim Gray

Kindest regards to all those
who regularly meet in the hangar!






BS-CW 106