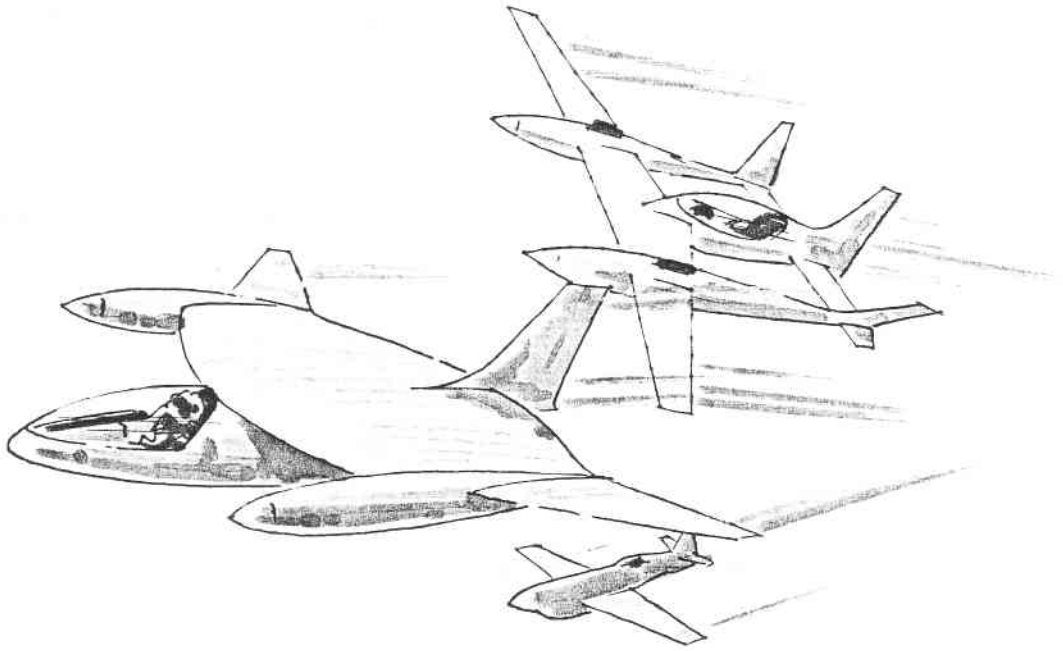
TWITT NEWSLETTER

F. Marc de Piolenc, Editor and Publisher



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. 8905 means this is your last issue.

NEXT TWITT MEETING: Saturday, 20 May 1989, beginning at 1330 hours. The location is Hangar A-4, Gillespie Field, El Cajon, California, in the first row of hangars on Joe Crosson Drive.

CONTENTS

THE MOST BEAUTIFUL/UNGAINLY AIRCRAFT EVER FLOWN

by Ed Lockhart

November 23, 1942 occurred in Stratford, Connecticut on the same day Vought Aircraft's chief test pilot, Boone T. Guyton, flew a radical all-wing "flying flapjack" for the first time. Designed by Charles T. Zimmerman, it was designated V-173. In this case, radical means **RADICAL**.

Pilot position: prone (changed to a more conventional seated position later in the program). Planview: like a pumpkin seed (long edge forward), but slightly D–shaped on leading edge end. Two small rudders about 6 feet apart appeared topside near the trailing edge, and two small horizontal control surfaces grew out of the wing just ahead of the rudders, functioning a both elevators and ailerons.

Propeller shaft extensions faired smoothly form the wing's front "corners," mounting a pair of enormous (18 ft diameter), three–bladed wooden propellers. These turned outward, in opposite rotation, to counter the sizeable wingtip vortices inevitable with more "wingtip" length than leading edge.

Buried within the wing, two overworked little Continental 90 hp flat fours powered those forward"facing windmills. The wing's aspect ratio of noticeably less than one, coupled with the need for wheels on stilts to function as landing gear, caused this bizarre machine to resemble a praying mantis on the ground.

Now that we have poked fun at its ungainly appearance, it was in fact the cleanest, neatest collection of curves that could possibly comprise such a configuration. Even its storklike landing gear was faired with finesse.

NASM

Although it was underpowered, the V-173 made nearly 200 test flights.

After its 13 minute maiden flight, Guyton said "It was the most interesting flight I've made in my career as a professional pilot." No doubt. Also, that he "felt exalted and had the foolish urge to yell 'Charlie, she flies!'"

Not only did Zimmerman's brainchild fly, but so well that it was airborne in 200 feet, landed at less than 50 mph and was controllable at a 45¿ angle of attack. Throughout its 131 hour, two hundred flight career, the V-173 could not be made to stall or spin. Its only drawback was in being so underpowered that its maximum speed was 139 mph. Considering its ton and a half weight, its performance was phenomenal.

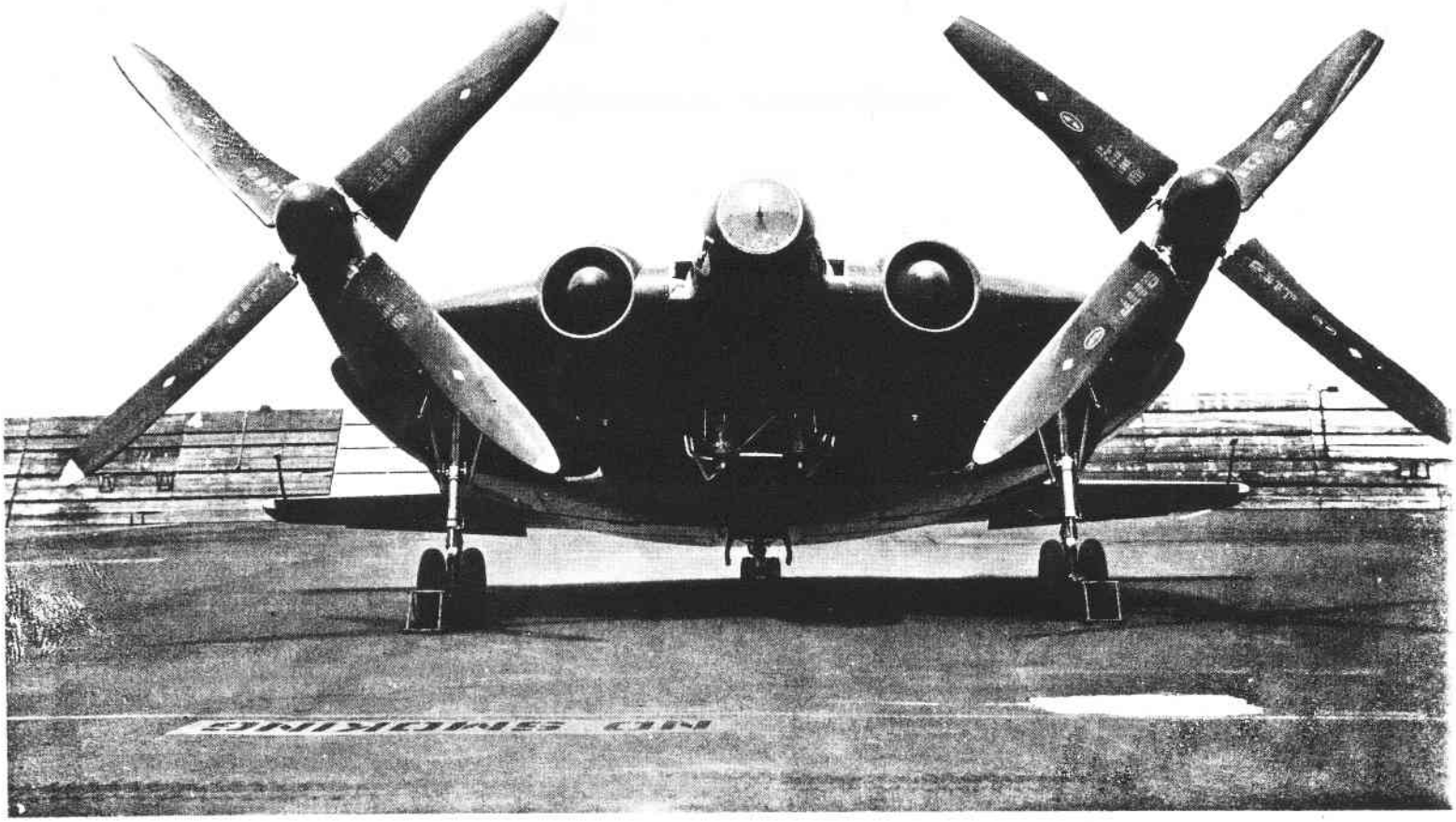
The Navy agreed to go all-out with a new version, powered by two 1,350 hp Pratt and Whitney Twin Wasp radials. Performance was projected to be 500 mph maximum speed, yet the machine would be able to hover and climb vertically. Configured essentially the same as the V-173, but with 4-blade propellers and retractable landing gear, there was ample reason to believe the new XF5U–1 would outperform by far anything flying through 1945 air.

Taxi tests completed, the magnificent machine was en route to Muroc Dry Lake [now part of Edwards Air Force Base—Ed.] for flight tests, when a telegram stopped progress dead. Navy brass swivel-chair pilots unbelievably picked this moment to decide an all-jet future for Navy aircraft. The XF5U-1 was to be destroyed at once!

Navy historian John Elliot writes "the reason for this order is a mystery. I have never found anything that explains why the "pancake" was destroyed."

Another case of bureaucracy gone berserk, like slicing Northrop's flying wings into scrap. It makes one want to cry on the dotted line.....

NASM



Vought XF5U–1

ABOUT OUR COVER

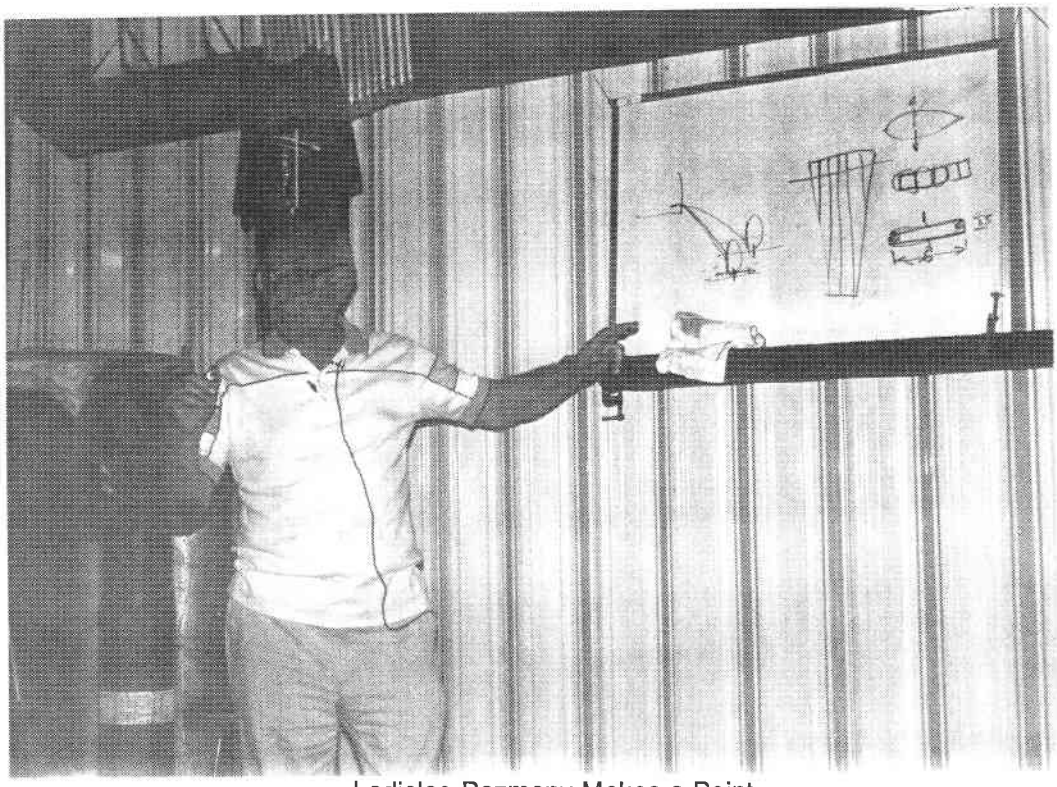
Dick Johnson (see LETTERS) enclosed a color photo of a model of a wing designed for unlimited racing, and based on the work of Charles Zimmerman of Flying Flapjack fame. Ed Leiser incorporated it into his cover drawing, along with two worthy competitors, *Tsunami* (below) and Rutan's Pond Racer (above). When he isn't providing TWITT with classic cover art, Ed Leiser is Curator of the San Diego Aerospace Museum.

MINUTES OF TWITT MEETING, 15 APRIL 1989

Bob Fronius opened the meeting with some announcements of upcoming events, including a hangar dance at Gillespie Field, the EAA Chapter 14 get-together at Ocotillo Wells and the second VSA meet at Hemet (see NEWS). The raffle prizes—a tee-shirt and a hat—were donated by Aero-Tech. He also announced the names of the *pro tempore* Board of TWITTs [sorry, I couldn't resist that—Ed.] and stated that their job would be consideration of the bylaws and auditing the finances of TWITT. Bob noted that those finances were in fairly good shape; nearly all new subscribers to our Newsletter are ordering back issues as well. We have a good inventory of back issues and some money in the bank. The tentative bylaws submitted by **Andy Kecskes** were available for inspection. Bob then showed a videotape containing footage of soaring from various sources, much of it old and rare.

Then **Jerry Blumenthal** took the floor to make a point-by-point comparison of tailless versus conventional sailplanes, which was instantly challenged by **Ladislao ("Paz") Pazmany**. The thrust of Jerry's comments was that wing types had the potential to achieve higher performance than conventionals, particularly with stability augmentation. Paz' comment was "why haven't we seen any wings in competition?" or words to that effect. Bob chimed in by reminding everybody of **Rudi Opitz**' success in the Fifties with a Horten

IV. **Bruce Carmichael** pointed out that the biggest engineering problem with wings was their lower trimmed lift coefficient, leading to lower wing loading and consequently to lower cross-country speeds. After the break, **Phil Burgers** rose to apologize for having forgotten to arrange for a viewgraph projector for Paz' talk. Then **Steve Bennett** rose...to donate one to TWITT! Unfortunately it was not immediately available, but it will simplify TWITT logistics immensely. Thanks, Steve. Because of the lack of visual aids, Paz changed the subject of his talk from reminiscences of forty years of aircraft design to landing gear design considerations, with special emphasis on the design of the PL-8 surveillance airplane he is working on. He noted parenthetically, however, that the FAA now requires crash-resistant seats in all new aircraft certified under Part 23 or Part 25, Federal Aviation Regulations (FAR). This means the seats must absorb energy by plastic deformation, saving the pilot's body. NASA has come up with a design using aluminum torque tubes as the distorting member. Despite the fact that the design was developed at taxpayers' expense, it has been patented and anyone who cares to use it must pay royalties! Returning to his subject, he noted that Volume II of his landing gear book is in preparation. Paz originally wanted to use a fiberglass-laminate main gear on the PL-8, but more careful consideration of cost drove him back to a more conventional oleo-pneumatic arrangement. For a given energy absorbtion, the oleo has a shorter stroke. It also requires less additional structure in the fuselage. The cost of producing it is less than for a laminated spring gear. Damping is much improved, and landing gear geometry (camber angle especially) is better. The oleo itself is heavier than the fiberglass spring gear, but when extra structure is taken into account, its overall weight is slightly more than half that of the fiberglass gear plus associated reinforcement of the fuselage! HERE ENDETH THE TAPE.



Ladislao Pazmany Makes a Point

NEWS

This new column is intended for short news items of interest to TWITTs. If you know of upcoming events of interest to TWITTs worldwide, or have news that does not justify a full–blown article, please send it in.

Nomination of TWITT Officers at May Meeting

TWITT is organizing as planned. We will have a firm set of bylaws ready for the May meeting, and nominations of officers and board members will be entertained. The election will take place during our meeting in June, but there will be an opportunity for further nominations at the June meeting for those who cannot attend in May.

Subscription Swap with RCSD

Jim Gray, editor of the excellent *R/C Soaring Digest,* has offered to swap publications with TWITT. We have hastened to accept. There seems to be a lot of tailless and flying wing activity in R/C soaring circles, and this will allow us to follow it more closely. For our readers who are not yet RCSD subscribers, their address is:

- RCSD
  PO Box 1079

Payson, AZ 85547
USA

Second Annual VSA Gathering at Hemet

The 2nd annual Vintage Sailplane Gathering will take place at Hemet, California on 27 and 28 May 1989.

MAY MEETING ANNOUNCEMENT

TWITTS will again convene at 1:30 pm (that's 1330 aviation time) at Hangar A-4, Gillespie Field on Saturday 20 May 1989. Our featured speaker will be **Klaus Savier**, noted airplane builder and winner of the CAFE efficiency race in his highly modified LongEze. Klaus recently returned from Germany, where he saw— among other things— the Akaflieg Braunschweig's SB-13 tailless sailplane. The SB-13 will be his main topic. Most of you know that the SB-13 has flown successfully and that it incorporates some important advances in structures, fabrication and pilot protection. Find out more from Klaus.

The meeting agenda also includes nomination of officers for an election scheduled for our June meeting.

Raffle prizes will again be one T-shirt and one cap donated by Aero-Tech Aviation Hardware.

LIBRARY ADDITIONS AND CORRECTIONS

Our copy of the *Stuttgarter Profilkatalog I*, by D. Althaus, is incomplete. We discovered this while researching a question about the Wortmann FX05–H–126 sent in by William Heijn and published in Newsletter # 34. The page numbers skip from 2 to 122! Anybody who has a complete copy would oblige all TWITTs by copying pp 3–121 (at Librarian Marc de Piolenc's expense) and mailing the copies to us. We're also looking for any subsequent volumes...

Bill Hannan sent us a set of sketches of rubber-powered flying wing models by Helmut Winkler, Serge Mollet and Frank Zaic. They appear to be reproduced from various newsletters.

Also from Bill Hannan, *International Peanuts and Pistachios,*, Volume 4, a publication devoted to small scale flying models and compiled by...Bill Hannan. This may have been intended as a raffle prize.

"TRD Snow Summarizes TG-3A Boundary Layer Control Report", published in the Newsletter of the Soaring Society of Dayton, Vol 57-11, November 7, 1957. Summarizes a Mississippi State University (MSU) report by A. Raspet, J.J. Cornish III and C.D. Bryant, entitled "Delay of the Stall by Suction through Distributed Perforations." Donated by John Baur.

"Boundary Layer Control Applications to Man–Powered Flight," by Dr. J.J. Cornish III and W.G. Wells of MSU. Donated by John Baur.

"VTOL Disk," by Ken Coward. Disclosure of Mr. Coward's original concept VTOL aircraft with a disk wing/rotor. Mr. Coward is the designer of the Wee Bee miniature airplane. Contributed by Ken Coward.

LETTERS

Australian Ultralight Wing, *Facet Opal*

Alan Lewis of Paddington, NSW, Australia writes:

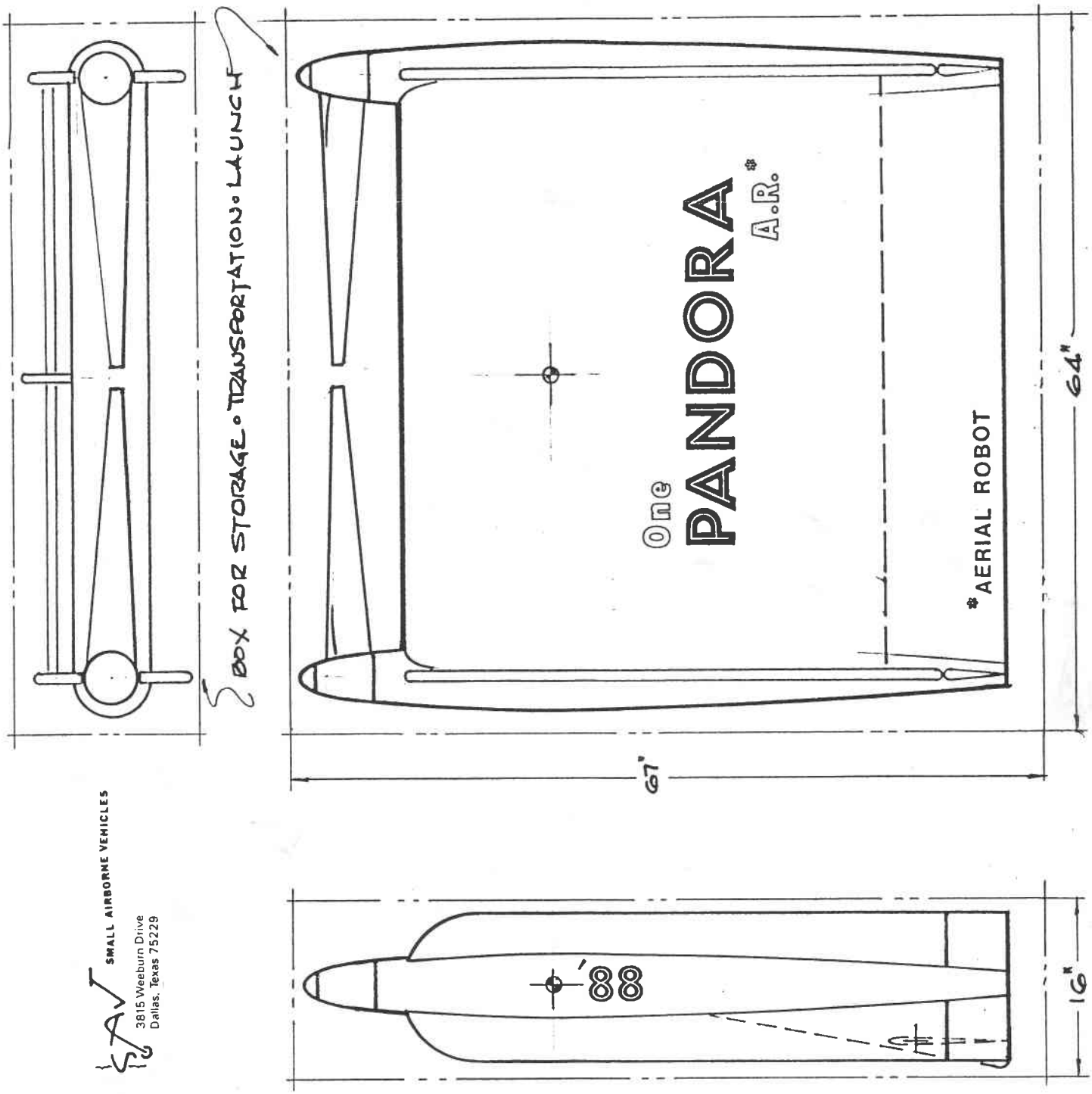
I enclose this which may interest you. Scott is Col. Winton's son and designer of the Rotax powered aerobatic machine being sold in your country.

Maybe Scott is flying the dreams we had and a good deal simpler than our data was. He upgraded the aerofoils, otherwise rather a simple Charles Fauvel.

Alan Lewis, EAA 1634

["This" is an article from *Australian Ultralights*, issue #33 by Alan Essery, entitled "Facet Opal Claims Two World Records." It consists of a page and a half of hyperbole, unattributed comments and bombast of the "poor local boy beats NASA" variety. There are no drawings, and no technical information is provided other than that the machine is powered by a Rotax 447, weighs 101 kg and has a wing area of 10.121 m^2. Mr. Winton has set two new records, according to the article: World Microlight Time to Climb to 3000 meters (6 min, 47 sec) and World Microlight Altitude (30,100 feet). He has his eye on Distance (Non–Stop, Non–Refuel), and plans to set a speed record for ultralights as soon as criteria are established. FAI certification is not mentioned. Mr. Lewis also enclosed a photocopy of the cover photos of *Facet Opal* on display and in flight, but these will not reproduce well, so I will attempt to describe the machine.

It is a shoulder-wing, pusher monoplane with a roughly circular–section fuselage having its maximum diameter at about 10% of wing chord. The wing chord extends from the tail of the fuselage about 2/3 of the way to the nose. Chord is constant except for a slight forward trailing edge sweep near the tip and a slight rounding of the



SAV
SMALL AIRBORNE VEHICLES
3815 Weeburn Drive
Dallas, Texas 75229

leading edge, also at the tip. Two trapezoidal vertical fins extend upward from the wing at about 1/4 semispan. The propeller is located at the aft end of the fuselage pod; chord line and thrust line appear to coincide. The machine appears to have tricycle gear retracting into the fuselage. The pilot reclines under a conformal cockpit canopy with side extensions. Engine induction and cooling–air intakes are presumably on the underside of the fuselage, since none are visible on top.

Final comment: The poor quality of the article should not be allowed to detract from the merit of the project. The workmanship appears to be excellent and the appearance of the ship is very pleasing. The records, when certified, will leave no room for doubt about its merits. TWITT needs more information, including 3-view drawings, of this ship. Can someone oblige?—Ed.]

Boundary Layer Control

John Baur of San Diego, California writes:

Dear Bob—

You may be interested in the subject matter of the enclosures which we touched on so briefly last Sunday.

The one titled "Boundary Layer Control Applications to Man Powered Flight" I gleaned from the 1963 February issue of *Canadian Aeronautics and Space Journal*. This article is particularly interesting in that it investigates the practical application of the theory on aircraft flying in the low Reynolds Number spectrum.

The brief Technical Note summarizing B/L control on a TG-3A may also be of interest.

Before Xerox was a trade name in the early 30's I laboriously hand copied NACA TM #395 and TN #286. These 50 year old copies have dimmed and yellowed with age—even the typing (performed by my young bride) is so affected. Some of the charts and graphs are just faintly visible. I believe I would need to go over much of these to make them legible.

TM 395 is titled "Removing Boundary Layer by Suction," by J. Ackeret. TN 286 is titled "Preliminary Investigation on Boundary Layer Control by Means of Suction and Pressure with the WSA 27 Airfoil. The thinking in these two reports covers aircraft operating at higher Reynolds Numbers than soaring planes, but much can still be gleaned if the material were to be modified to a specific application.

Thanks for listening. See you again sometime. You may keep the enclosures.

Johnnie Baur

A company called Updata has laboriously microfilmed every NACA report, RM, TM, TN, CB, MR, ACR and miscellaneous publication that they could get their hands on. The resulting microfiche collection is much too expensive for individuals, but many libraries, including San Diego State University's, have it. Thank you, Mr. Baur, for contributing to the TWITT library.

Zimmerman/Vought Enthusiast Working on RPV, Unlimited Racer

Here's a letter from Dick Johnson of Small Airborne Vehicles in Dallas, Texas. This is ***not*** *the Dick Johnson of soaring fame, although both live in the Dallas area and both are involved with aircraft. Our cover is based on Mr. Johnson's unlimited racer concept.*

Bill Hannan was good enough to introduce me to your offering and I must subscribe. I attach my check for $15.

As Bill knows, my passion has been the Zimmerman/Vought Flying Pancakes of the '40s. I spent the better part of 20 years as a control systems designer with Chance Vought here in Dallas. Of course, this was after the V–173/XF5U–1 efforts. The Cutlass, F7U–1 and –3 were the wings in style at the time. Interesting memories reside from those early '50s.

Sometimes I question which way time marches as far as progress is concerned. I attach a sketch of our Aerial Robot, *PANDORA*. She is a clone of the Zimmerman efforts of years past, except we took some planform liberties for fabrication reasons. *PANDORA* first took to the air in December of 1984, a three foot span sub-scale version, R/C naturally. **The very first flight was VTO out of her storage/shipping container.** No quarter million dollar catapult to limit launch flexibility and no tennis net capture on return. The low aspect ratio configuration allows high angle of attack, low speed flight as well as steep descent, short landing. Cost reduction possibilities abound.

Then there is the Zimmer'son Six [shown in cartoon form on our cover—Ed.] and it is not hard to identify its roots. Mr. Zimmerman anticipated the possibility of 550 MPH flight capabilities long, long ago. We are sure of that, and then some with a modern thin wing version, complete with a pair of race car engines. Reno 19XX, we hope.

Finally, we are serious fans of the Burnelli Lifting Body aircraft. I guess TFITT would be a bet-

ter acronym although the spirit of the wing efficiency is pretty much the same. Chalmers H. Goodlin, X-1 pilot to be the first to light the fires on the Bell X-1, is the spark plug behind current efforts to get the Burnelli birds flying again. Resistance is fierce and it seems that nobody, including the insurance underwriters, have the least interest in providing the public with less expensive and much safer airborne transportation. My support to "Slick" Goodlin is mostly moral but I join him in trying to accomplish the task.

So I look forward to being what I didn't even know I was, a TWITTER.

Dick Johnson, Director

Fauvel Corrections

The #34 TWITT, page 2, contains a misstatement, due to ignorance, that, for the sake of other readers, should be corrected. M. Fauvel was a very early TWITT type, and based all his many aircraft on a series of sections that (to the best of my knowledge) had an excessive reflex, and thus tended to fly at design speed. One could force them to go faster by weight shift or stick pressure, or slower by the reverse. An excellent coverage of this point is to be found in Jim Marske's *Experiment in Flying Wing Sailplanes,* (which should be every TWITT's Bible) pages 21 to 24. Mr. Lambie, in his typical style, writes well but without too much of a grasp on facts, and fails to understand that this is inherent in the design of the aircraft and is typical of all AV-36 wings. It is for this reason that I prefer the Marske Pioneer II, which is neutrally stable and will stay where you put it without fighting back. Fred Jukich, who did all the metal work on the AV-36, and I, who did all the wood work, received permission from M. Fauvel to use 1/16 inch American plywood instead of the lighter French metric equivalent, and upon completion of the weight and balance received a commendation from M. Fauvel for the accuracy of our work. Any knowledgeable person will tell you why weight only increases speed, [sink rate, too—Ed.] but not other handling qualities, and I will not take Lambie to task for this ignorance. I do fault him, however, for the takeoff dolly accident. No such dolly was designed for by M. Fauvel, so this is an add-on, and should have been secured by a pin actuated by a control in the cockpit, and dropped only at altitude. As for ground-looping, one should have a bit of flying skill before attempting any new bird, but this never gave either of us any trouble. It did, however, go right back up if landed too fast, since the skid then took over and the wing went back to work. Much like a jack rabbit. Standard landings should (for all planes) be to bring them close to the ground and hold them off 'til they quit. The AV-36 was an early wing, and the Pioneer was built with greater knowledge, by a better designer.

Syd Hall

More Corrections

I am writing so you may correct a mistake. I attended the March 18, '89 meeting and mentioned that I buit and flew an Icarus II[?] and V hang–glider and worked for UAL airline as an electroplater mechanic. Your Newsletter No. 34, page 2 states that I owned an electroplating business! I wish I did; I'd be retired by now! Also, I wonder if you would mail my Newsletter a day earlier, as I always receive it on the Monday after the Sat. meetings. I miss the guest speaker's agenda and then unable to possibly attend.

Bill Rickson

Sorry about the error. As for what passes for a publication schedule around here: it stinks, I know it, and there's very little I can do about it. I am a full-time student with a very heavy course-load and a lot of extracurricular commitments, including but not limited to TWITT. I make my living (sort of) with translation work, by running a reprint service and by taking in odd consulting jobs. I am also a non-commissioned officer in the Army Reserve. I know people with heavier schedules than mine, who nevertheless manage to keep up; I hate those people!

Wing Modeller S.O.S.

I have been reading about you in Jim Gray's RCSD [*R/C Soaring Digest*—Ed.] for some time now and couldn't resist any longer. I have been flying sailplanes for about five years now. My first wing was a "Scorpion" which I bought from Maddie Weiss at Wilshire Models. I think that I started my "Wing" career a bit too aggressively. No problem. I am working on a Klingberg wing next. Specifically I need to know how I am going to Hi-start the thing. It looks like it may need some form of lateral stabilizing. How do I do this? HELP!

Thanks in advance.

Nick Trubov

PENNSYLVANIA PLANK

by F. Marc de Piolenc

Lewis Dewart, a lecturer and lab coordinator in Bucknell University's Department of Mechanical Engineering, has built and successfully flown an all-metal, powered tailless airplane based loosely on Al Backstrom's "plank"designs. [For non-US readers: Bucknell is a small private university with a very good academic reputation.] The following was pieced together from letters to TWITT and to Al Backstrom.

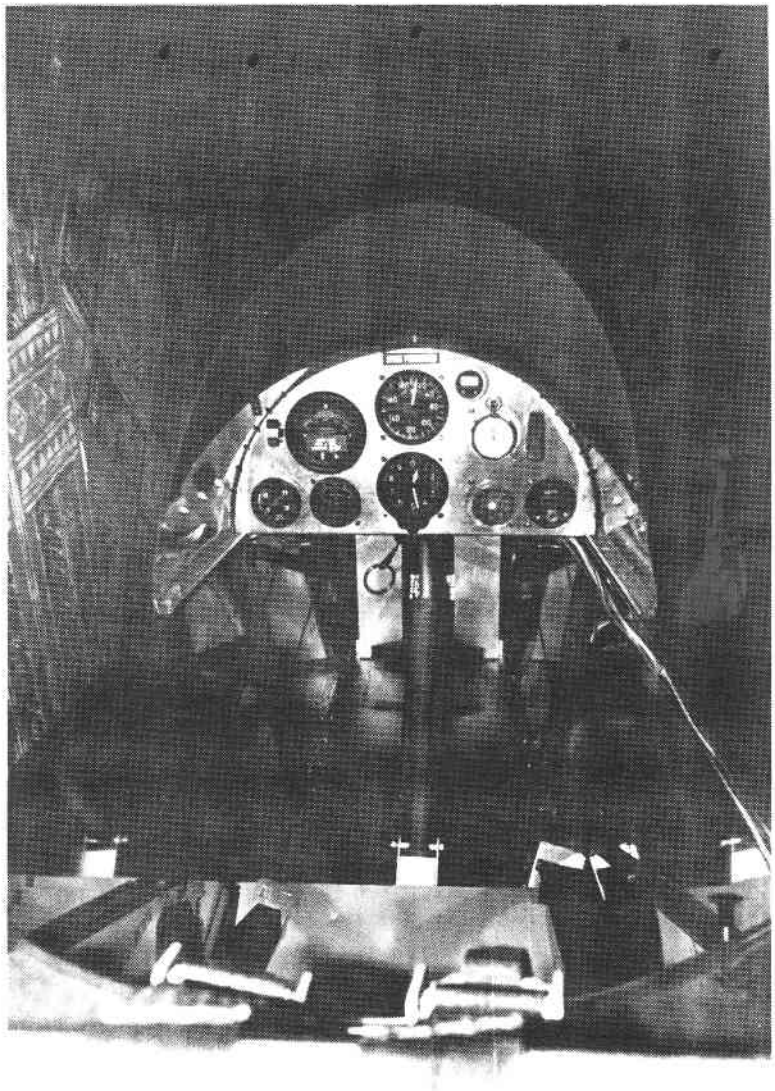
Work began two and a half years ago on an all metal wing, designated DAW-1, to be constructed in the ultralight category. The idea of building the flying wing was to have an ongoing supply of problems and projects for use in the Mechanical Engineering Department, and at the same time satisfy Mr. Dewart's need to build a flying machine. Mr. Dewart had contacted Al Backstrom some years earlier to obtain information about Al's flying wings, so it is clear that not just any flying machine would do. He wants "to see a *simple*, pure wing sailplane become a reality." Specs are as follows:

- **Configuration**: Tailless Motor Glider with constant chord wing
- **Materials**: Metal, fabric elevons
- **Empty Weight:** 227 lb.
- **Span:** 24.5 feet
- **Chord:** 4 feet
- **Airfoil Section:** Modified NACA M–6, 12% t/c
- **Power:** Rockwell L252; 9.1 hp @ 4250 rpm
- **Fuel Capacity:** 1.3 US gallons
- **Propeller:** Sensenich 33/21 inches
- **Static Thrust:** 62 lb. @ 3900 rpm (full throttle)
- **Max Speed** (8 hp): 43 mph
- **Rotation Speed:** 35 mph
- **Landing Speed:** appx. 30 mph

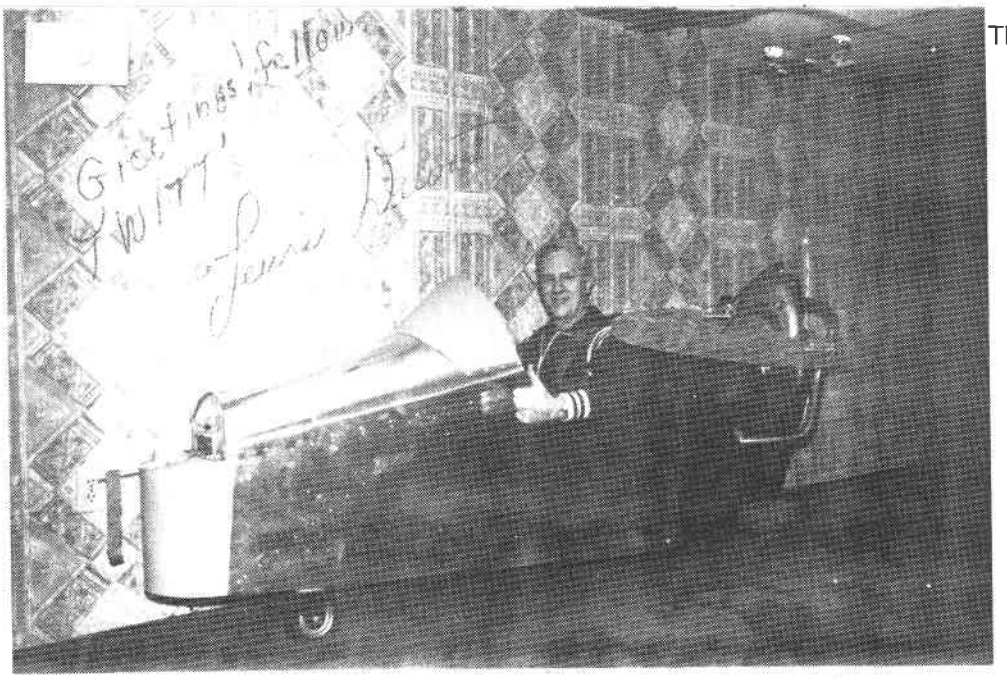
Note that at full throttle, the engine delivers only 8.5 hp. due to propeller mismatch. The propeller efficiency is 55–60% in the present installation. The machine is equipped with a tow hook in addition to its self–launch capability.

Designer Dewart has suffered more than his fair share of tribulation, due primarily to the weather (which consists of rain, snow or wind on his days off) and difficulty in procuring materials. His first landing gear (centerline bicycle with outriggers) failed because the proper spring steel for the outriggers was not available. That's all right, though—the main wheel was 1-1/2 inches too far aft to allow rotation, anyway. The machine is currently flying with a temporary external gear pending redesign and construction of new gear. Still, it **is** flying, as the following photos will attest.

Congratulations, Mr. Dewart, for persevering in the face of adversity. Please keep us apprised of your progress.

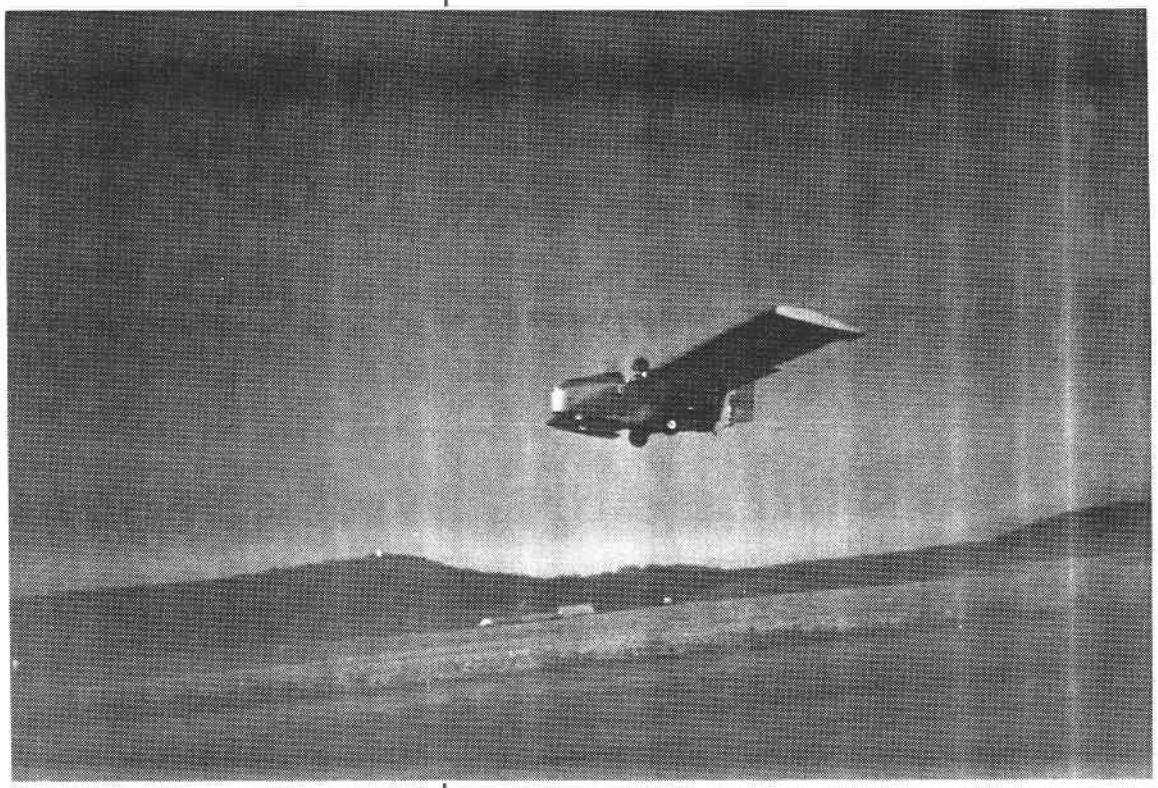


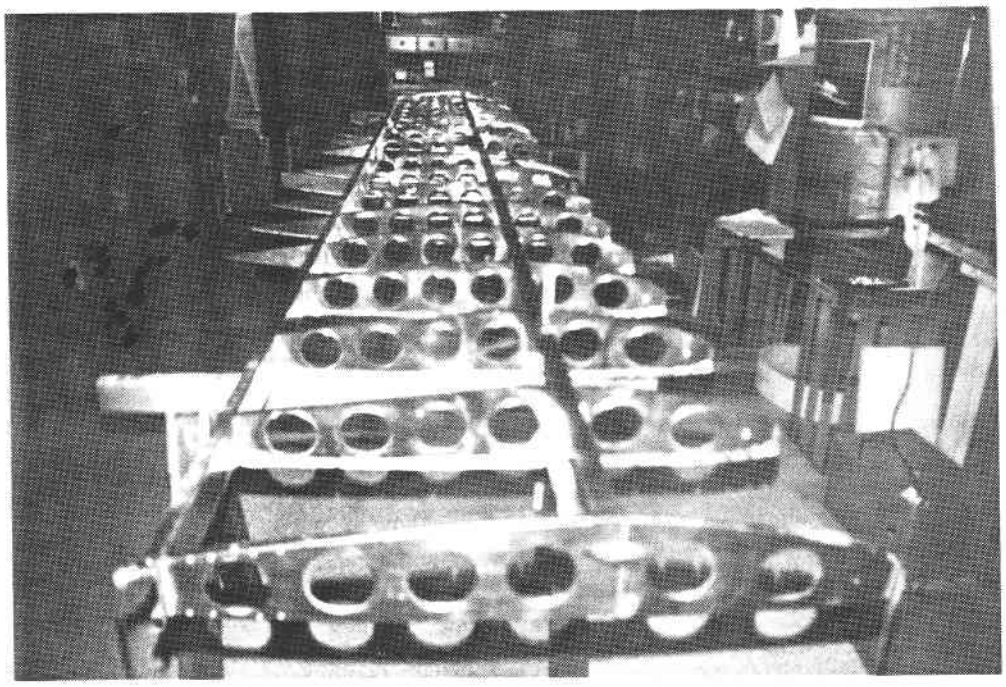
DAW-1 Cockpit. Note CGT/EGT, Towline Release



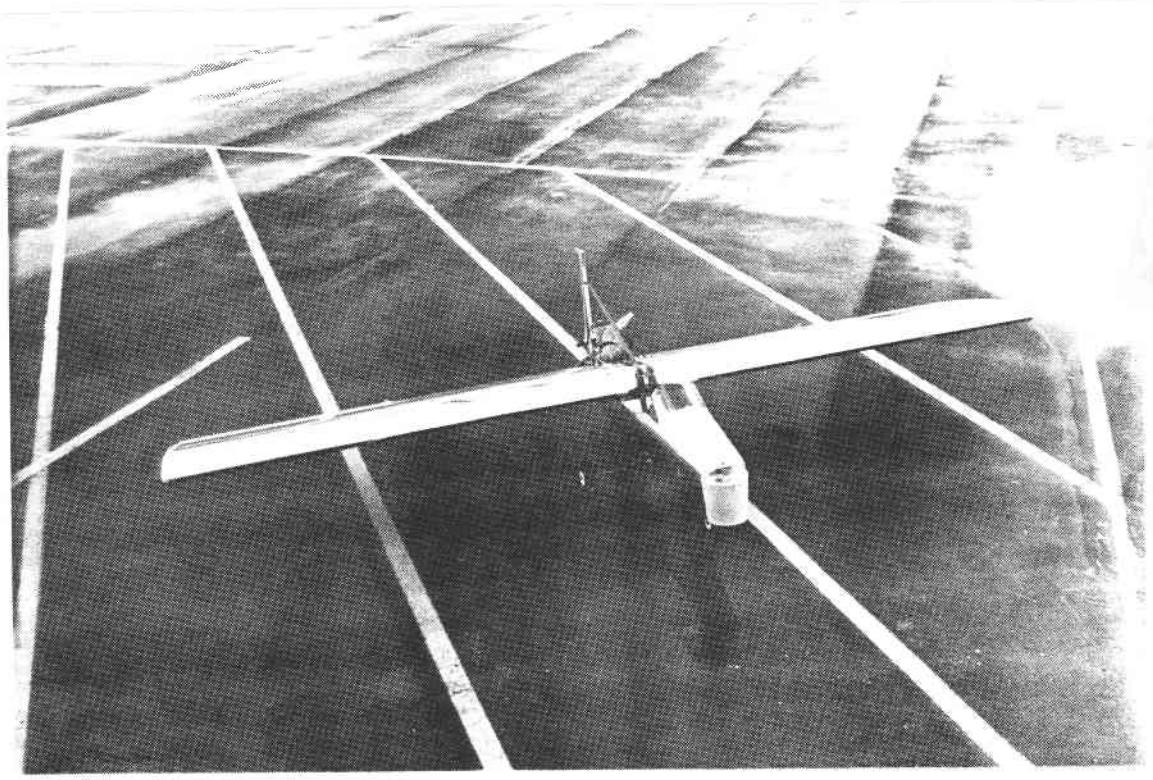
The Chief Designer Triumphant

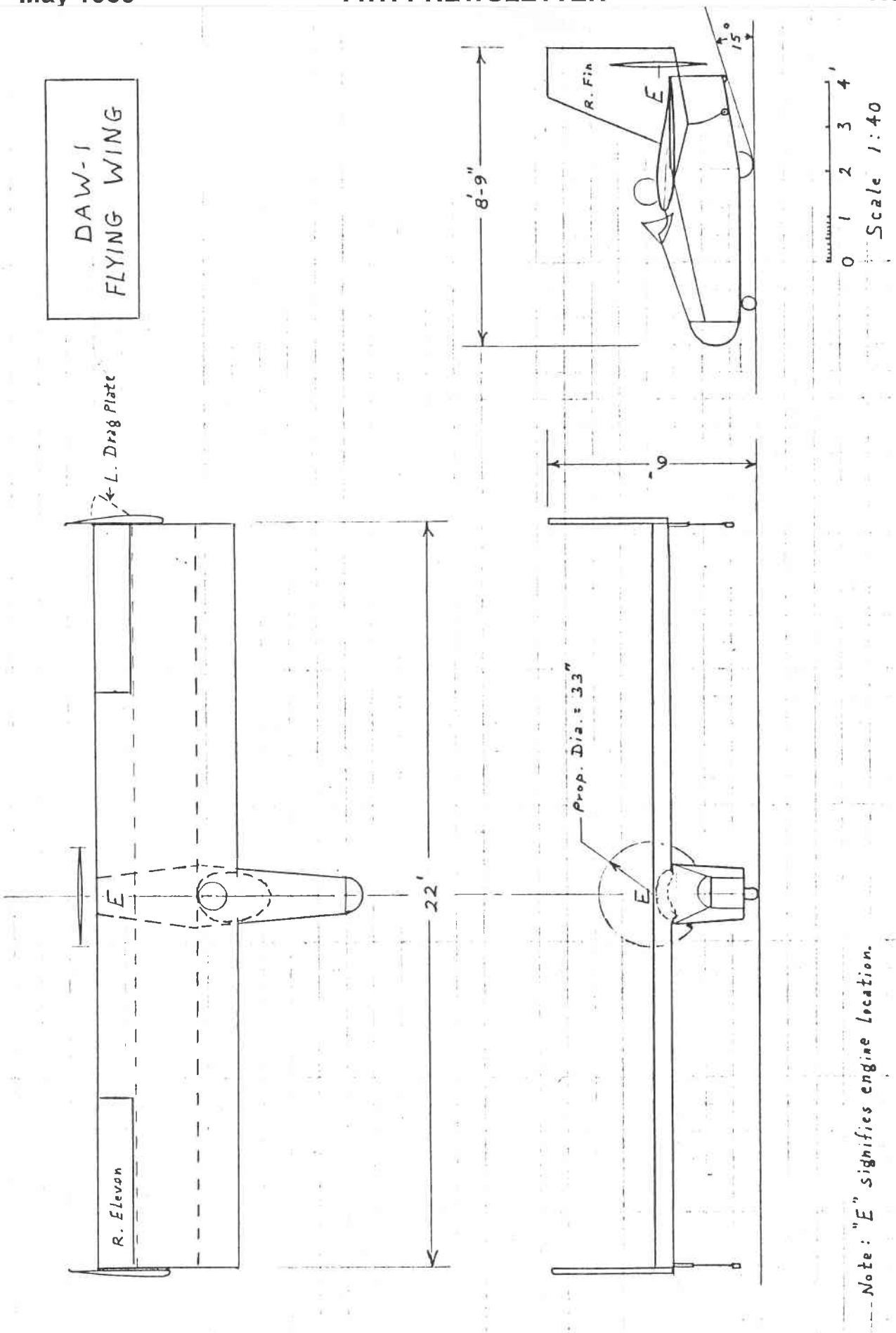
"She Flies, Charlie!"





DAW-1 Wing Structure




DAW-1
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