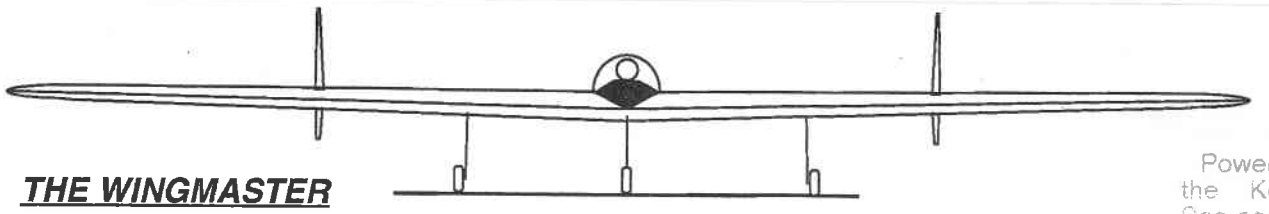
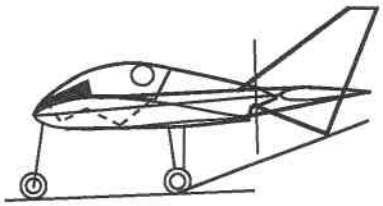
No. 74 AUGUST 1992

T.W.I.T.T. NEWSLETTER



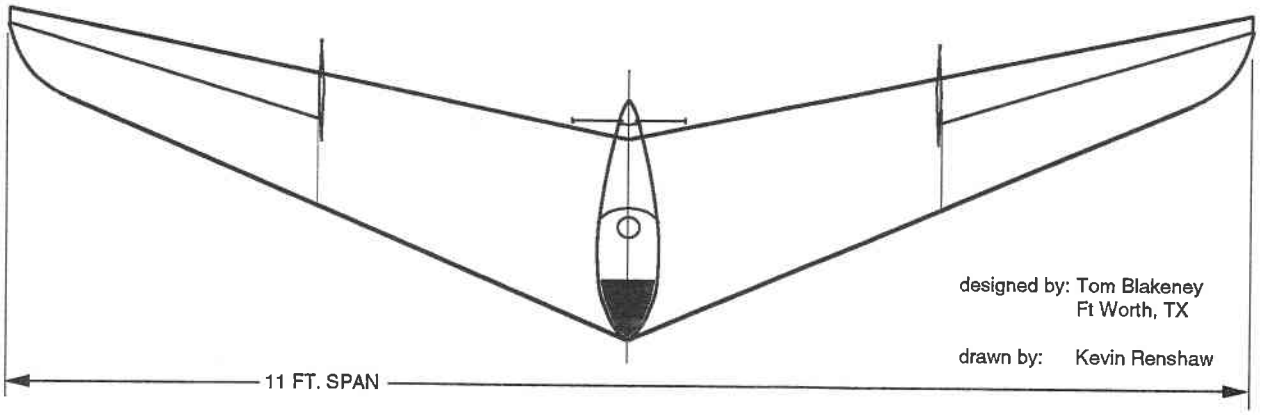
THE WINGMASTER

SPAN	132 inches
AREA	2000 sq. in.
WEIGHT	15 lb
POWER	.60
AIRFOILS	Klingberg
CONTROLS	Elevon, Throttle, Nose wheel steering



0 6 12
scale inches

Powered variation of the Klingberg Wing. See accompanying articale on page 9, reviewing design, construction, and flight performance of this model.



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., **9208** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, August 15, 1992 beginning at 1330 hrs at hanger A-4, Gillespie Field, El Cajon, Calif. (First hanger row on Joe Crosson Drive - East side of Gillespie.)

THE WING IS THE THING
(T.W.I.T.T.)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other types of tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is an affiliate of The Hunsaker Foundation which is dedicated to furthering education and research in a variety of disciplines.

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The **T.W.I.T.T.** office is located at Hanger A-4, Gillespie Field, El Cajon, California.

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Wt/#Issues	FRG	AUSTRALIA	AFRICA
1oz/1	1.00	1.00	1.00
12oz/12	5.00	6.75	5.00
24oz/24	9.00	12.25	9.00
36oz/36	14.00	19.50	14.00
48oz/48	16.75	23.00	16.75
60oz/60	21.75	30.25	21.75

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

For those of you who were on vacation, or just plain forgot about last month's meeting, you missed a most interesting afternoon. The talk by Robert Cardenas on his experiences with the X-1 and XB-49 programs generated a great many questions from an audience that was especially attuned to these aircraft.

All of you also missed the cake and ice cream celebration of our sixth anniversary. TWITT has grown from just a handful of enthusiasts to over 145 flying wing dreamers throughout the world.

Elsewhere in this issue are copies of the financial statements that have been forwarded to The Hunsaker Foundation for the first half of 1992. The Net Income figure primarily represents the new growth since the last statements. The Balance Sheet shows that our Cash, plus Accounts Receivables, is just slightly short of covering the Accounts Payable which represent our commitment in future newsletters. We continue to be financially solvent due to the value of owned assets which could be converted to sufficient cash to cover the liabilities that currently exist.

Robert Cardenas left us a number of glossy 8x10 photos, several photocopies and a narrative of his flight test program of the XB-49. Some of these we will publish with this newsletter, and the others will be added to the TWITT library. We are most grateful for these additions.

The July 1992 issue of R/C Soaring Digest contains a short article by B^2 showing Jerry Blumenthal's Rattler and the very compact elevon mixer for the model version. Jerry is making it big time, since his concept drawing of Raspberry was also published by F. Gale' in his recently published Tailless Tail book. We would like to congratulate Jerry on this recognition within the modelling community.

We would also like to thank R/C Soaring Digest for distributing TWITT fliers they prepared for the recent Mid-South Soaring Championships in Memphis, Tennessee. They also sent this material to a representative for handing out during the Western Championships held in July. Many of our members have come to us from this type of publicity by RCSD.

I had a chance to look through Tailless Tail by F. Gale, that is published by B^2 Streamlines. It appears to be very well done, and has a great many pictures and sketches that will give most readers ideas for new projects or ways to improve existing ones. We will place a

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continuing advertisement for this in the newsletter beginning this month, so the membership will have it available whenever they have that extra few dollars to spend.

That's all for now.

Andy

PROGRAM

Our speaker for the August program will be Phil Prophett, a retired flight instructor and test pilot. He will use his extensive background to talk about his experiences in flutter testing, something that should be of interest to any designer and homebuilder.

Phil worked for Ryan Aeronautics in the late thirties as a engines and structures instructor, before moving into Ryan's commercial flight school. In 1942 he left Ryan for Consolidated Aircraft (later Convair) where he was assigned to the Flight Research Department as a regular copilot for Art Bussy.

During his time with Consolidated, he flew or supervised testing of aircraft like the PBY, PB2Y-3, B-24 & B-32 (twin & single tail versions), XB-46, B-36, and the XC-99. After WWII he became involved in the Convair Liner and CV-880/990 flight programs. He was also active in the testing of the F-102/106 & Sea Dart (delta flying wings), the Pogo Stick, and the R3Y Flying Boat.

Also on the program, Bob has arranged for Rich Trafton to bring in his all metal homebuilt "Jeannies Teeny". This is a single place, low wing monoplane.

MINUTES OF THE JULY 18, 1992 MEETING

Andy opened the meeting by welcoming everyone to the very hot hanger, promising to keep the doors closed for only the minimum time necessary to show our guest speaker's video tape.

After an introduction of visitors, Andy announced what the raffle prizes would be for the day, and passed around a petition for helping to get a full ILS approach installed at Gillespie. He also announced that the Discovery Channel would be showing "The Wing Will Fly" which is about the Northrop flying wing program through the end when the aircraft were destroyed.

Andy then introduced Robert Cardenas, our main speaker for the day. He began his talk by showing a short video covering the X-1 flight that resulted in breaking the speed of sound. Bob was pilot of the B-29 that made the drop that day when Chuck Yeager flew into the history books.

Bob was part of the testing team made up of himself, Yeager, Bob Hoover, Jackie Ridley, and Dick Frost. Their task was to find out how to make the X-1 go through the sound barrier. One thing that made it easier was the atmosphere created by the upper echelon of command at the time, who tacitly approved of the attempt without placing a lot of restrictions on the team. This approach would be very difficult in today's military environment.

An interesting sidelight to the talks that Bob gives involved some Lockheed engineers who wanted to know what type of computers were used to project the energy maneuverability curves for the pilot. He explains that there were no computers at that time, so Ridley had Yeager fly at ever increasing mach numbers in straight and level flight and then pull a 3-g steady rate turn. At about .88 mach Yeager got a little pitch movement after entering the turn.

To solve this problem, the team created an all moving tail by locking the elevators to the horizontal and slotting the vertical so the surface could move. Using a worm gear and electric motor for control, they found that the pitch movement could be controlled.

Bob gave us a folder full of material including photographs, diagrams, and a history of the XB-49s flight test program. He started in the Northrop flying wing program as an Army Air Corps test pilot by learning to fly the N9M test beds. This was meant to give him some experience on how flying wings reacted and become familiar with the different types of control systems.

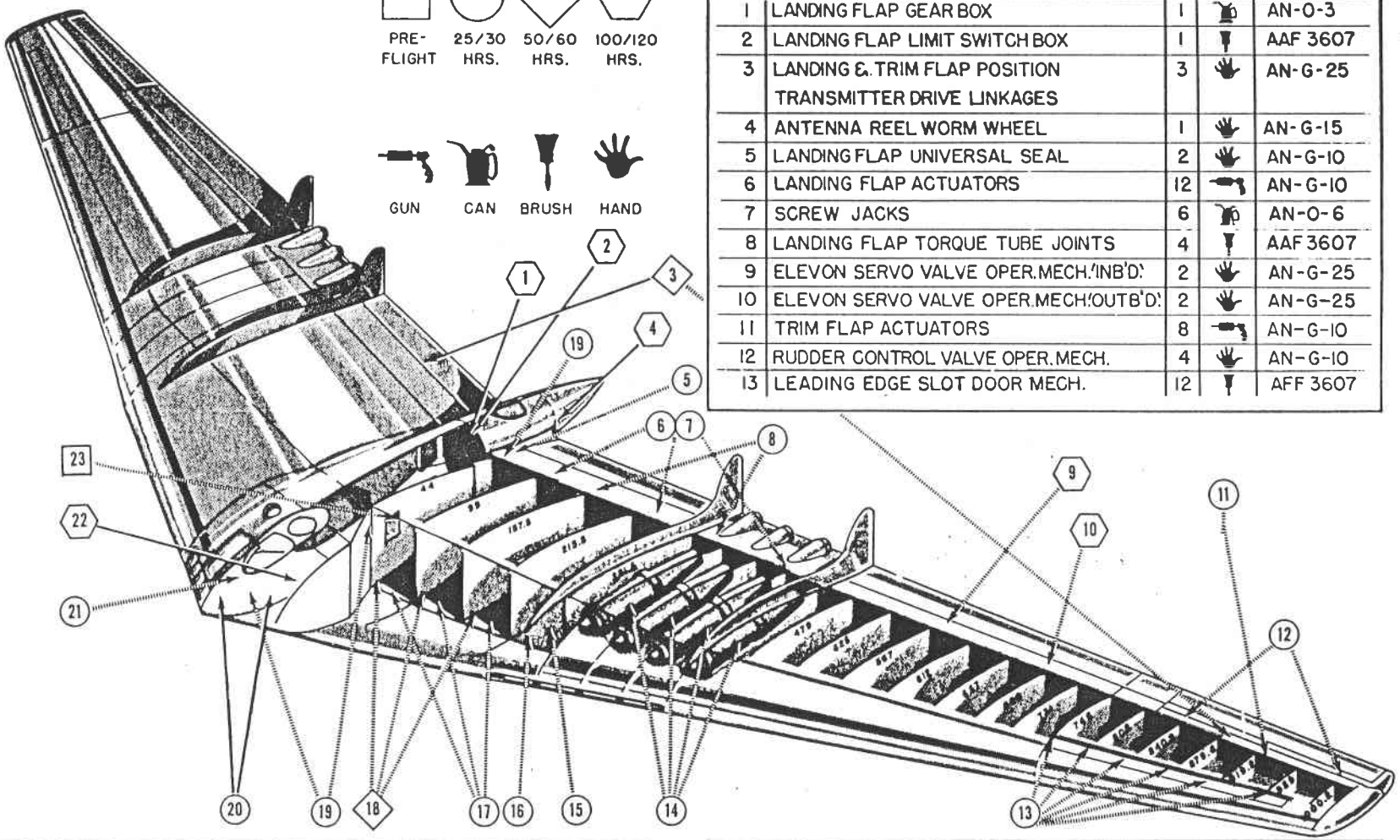
The rudder pedals were designed to open the outboard clamshells used to turn the aircraft. They had a compensating mechanism so that one would open less than the other if opened during a turn. They also could both be opened simultaneously by simply pushing forward on both rudder pedals. Bob commented this arrangement made it much easier to get the aircraft out of a spin than with a conventional rudder system.

The XB-49 was powered by 8 J-35 jet engines, which were the first jets available for operational aircraft. He thought each one produced about 2000 lbs of thrust.

Since the canopy did not open, the crew entered the plane through a hatch in the bottom. The pilot would move forward and climb up into his seat, which was facing 90 degrees from the line of flight. Once seated, it was rotated and then pumped up 4' to the flight position. The wing's upper surface was then at about chest level with the pilot.

The copilot was down and to the right of the pilot, sitting in the leading edge of the wing. This made crew coordination a little harder. The flight engineer was in back of the pilot with a large panel of engine instruments and 8 throttles.

The pilot only had 2 throttles, one for each side of the aircraft controlling 4 engines. They were placed in the overhead rather than



ITEM	DESCRIPTION	PLACES	APPL.	LUB. SPEC.
1	LANDING FLAP GEAR BOX	1		AN-O-3
2	LANDING FLAP LIMIT SWITCH BOX	1		AAF 3607
3	LANDING & TRIM FLAP POSITION TRANSMITTER DRIVE LINKAGES	3		AN-G-25
4	ANTENNA REEL WORM WHEEL	1		AN-G-15
5	LANDING FLAP UNIVERSAL SEAL	2		AN-G-10
6	LANDING FLAP ACTUATORS	12		AN-G-10
7	SCREW JACKS	6		AN-O-6
8	LANDING FLAP TORQUE TUBE JOINTS	4		AAF 3607
9	ELEVON SERVO VALVE OPER. MECH. 'INB'D'	2		AN-G-25
10	ELEVON SERVO VALVE OPER. MECH. 'OUTB'D'	2		AN-G-25
11	TRIM FLAP ACTUATORS	8		AN-G-10
12	RUDDER CONTROL VALVE OPER. MECH.	4		AN-G-10
13	LEADING EDGE SLOT DOOR MECH.	12		AFF 3607

14	ENGINE TRUNNION 'SLIDING'	16		AN-O-6
15	M.L.G. DOOR CONNECTING ROD BUSHINGS	12		AN-G-25
16	LANDING GEAR FWD. DOOR ACT. BEAM	4		AN-G-10
17	DOOR CLOSING MECH. PIVOT BEARINGS	12		AN-O-6
	BOMB BAY DOOR ROLLERS	444		AN-O-6
18	BOMB BAY DOOR CLOSING CHAIN	6		AAF 3607

19	CABLE PRESSURE SEALS - DOUGLAS	38		AN-O-366
	CABLE PRESSURE SEALS - BOEING	2		AN-6-25
20	CONTROL COLUMNS	2		AN-G-10
21	L.G. CONTROL HANDLE	2		AN-O-6
22	L.G. CONTROL SYSTEM SPRING	2		AN-G-25
23	AFTER-COOLER TURBINE	2		AN-O-9

49-04038

in a console along side the pilot. This proved to be a very good decision on the designer's part, which Bob found out during a stall series. At about 80 knots and 65 degrees nose up pitch, he tried to drop the wing off to one side with a clamshell and found he had no aerodynamic controls. Inertial coupling took over and the aircraft flipped over backwards, making 3 complete revolutions and throwing his hands out towards the throttles.

From left: Harold Pio, Ed Lockhart, Hernan Posnansky, Bob Cardenas, and Jerry Blumenthal.

Once he had a hold on them, he pushed one full forward and opened the opposite side clamshell to get the plane into a spin. Recovery from a spin was easy, but occurred with only about 1000' of altitude remaining. Obviously, a very scary moment in the flight test program.

The aircraft he generally flew was number 367, which was instrumented for stability and control testing. The sister ship, #368, was setup for performance testing and did not have as sophisticated a system of instrumentation.

Bob turned over performance testing on 368 to Capt. Glen Edwards in order to go finish his engineering degree. Unfortunately, 368 crashed and Bob was recalled to Muroc to help determine what had happened. The aircraft had left no lateral or transverse movement marks on the ground, which led him to believe they probably got into the same type of rotation, but were unable to recover in time.

He went on to comment on some of the things that happened during the initial development of the jet versions of flying wings. One of the XB-35s was converted to jet engines from the conventional propellers. On the first takeoff the gear doors blew off because the aircraft accelerated faster than had been anticipated. The fix was to pull the aircraft up into a steeper climb to keep the airspeed down during the long retraction cycle.

Another item involved the way in which fuel was stored in the wing. Since fuel was in bladders with no baffles, it could move around in the tank. This caused pitch oscillations no matter how smoothly the plane was leveled out after a climb. Bob proved this by hanging a plumb-bob from the spar which also swayed in unison with the fuel movement. He did mention it did not make the aircraft unstable, and he did not have to fight the oscillations with the controls, since they dampened out fairly quickly.

At high angles of attack the jet air intake ducts would not pass enough ram air through the engines. This caused the engine fire lights to come on. Bob put a quick fix on it by disconnecting the fire warning system.

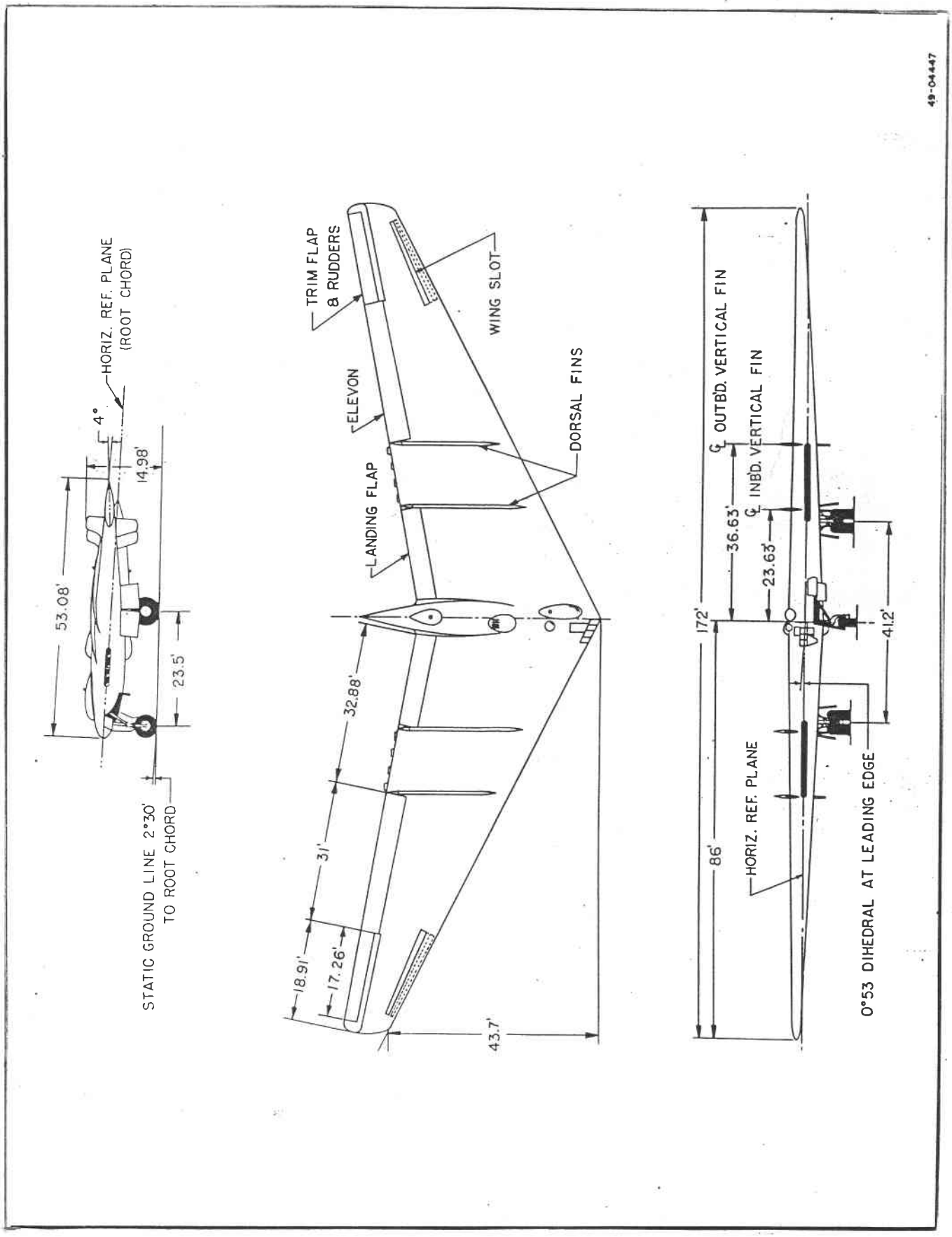
The original bomb-bay door was designed as a rollup affair like a rolltop desk. However, the first time it was opened, it was sucked off the aircraft. This obviously had to be redesigned.

When they got into testing the bombers ability to deliver a payload, Bob was misquoted as saying the aircraft was unstable. What, in actuality, he said was that it was marginally stable around all three axis'. For instance, in the yaw axis it would change heading the desired number of degrees, but then continue to hunt about a degree either side of the new heading. This could be fought to a standstill, but took a lot of effort by the pilot. This made it unacceptable as a bombing platform. In fact the movement made one very experienced bombardier sick watching the ground move back and forth.

He commented that the XB-49 handled very much like a fighter and was very maneuverable. The rate of climb was only limited by the engine thrust. The range was much improved over conventional type aircraft due to the low drag. Bob said you could fly the plane down one side of a wide Air Force runway, then roll it up into a turn, flip it around, and be able to land on the opposite edge.

To correct the stability problem a Honeywell autopilot system was developed and installed, but it did not sufficiently solve the problem for bombing accuracy. In his testing report he recommended developing some type of stability augmentation system for the pilot. Some mechanism was needed that could react faster than a pilot to dampen out the various movements about the axis.

One of the last flights Bob made in the XB-


49-04447
HORIZ. REF. PLANE (ROOT CHORD)
4°
14.98'
53.08'
23.5'
STATIC GROUND LINE 2°30' TO ROOT CHORD
TRIM FLAP & RUDDERS
ELEVON
LANDING FLAP
WING SLOT
DORSAL FINS
32.88'
31'
18.91'
17.26'
43.7'
℄ OUTBD. VERTICAL FIN
℄ INBD. VERTICAL FIN
36.63'
23.63'
17.2'
86'
41.2'
HORIZ. REF. PLANE
0°53 DIHEDRAL AT LEADING EDGE

49 was a non-stop flight from Muroc to Washington, D.C. They made the run un-refueled in 4 hours 4 minutes to overhead the airfield with an official time of 4:22. He thought this was also the first non-stop coast to coast flight of a jet powered aircraft.

While on the ground at Andrews AFB, President Truman went on board the plane for a look. Upon exiting he commented to the Chief of the Air Force that we got buy some of these things. The President took a few steps and turned back directing the General to have Bob fly down Pennsylvania Avenue so the public could see what they were buying. The flight was made at treetop level over the capital, and Bob had to actually pull up to miss the Capital Building dome.

Most people interested in the Northrop flying wing program know the outcome of events in the late forties that spelled the demise of the XB-36 & 49. Bob felt that had the nation's brain power been put into developing a stability augmentation system the aircraft would have proven successful.

Bob went on to comment about the production of "The Wing Will Fly." He felt it was very well done considering the controversy surrounding the Northrop flying wings. He was pleased with the way it came out, and gave TWITT an uncut copy of the program for the library.

A brief period of questions from the floor directed to Bob yielded some interesting facts. The crash of 368 involved the aircraft outer panels leaving the aircraft some 15 miles before it hit the ground. Bob feels that they must have gotten into a more violent maneuver than he had experienced.

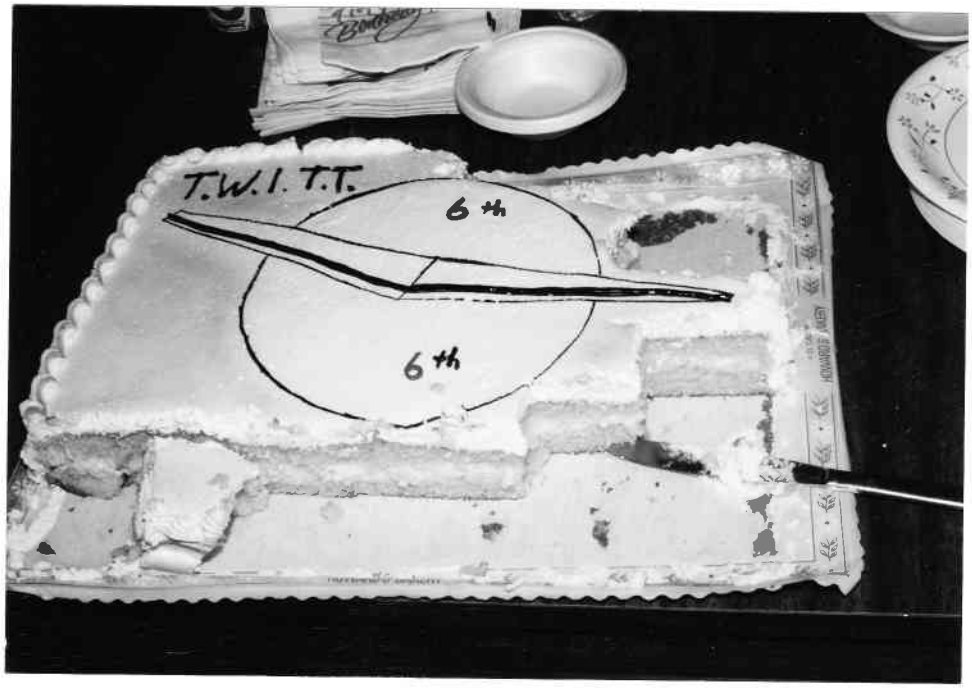
The large wing area caused a lot of ground effect during landing, with landing speeds getting as low as 60 knots at times.

Bob went on for some time talking about a number of different projects he was involved with as a test pilot. He was fortunate to be on active duty during a time period when pilots had much more freedom to do things that would not even be thought about today. We hope that he will be able to come back again some other day and talk about some of these experiences.

Andy introduced Roger Flower who described his Sea Hawker amphibian. He completed the aircraft about 2 years ago and has done a lot of modifications since then trying to make it fly correctly. Apparently, the first two planes finished by homebuilders resulted in fatal crashes.

When he did finally fly it for the first time he found it only had about a 5 knot speed range where it would not try to swap ends. Although the tail seems large enough, the redesign into a two place caused a blanking of the airflow over the tail. He has added a number of vortex generators on the fuselage sides and on the vertical fin to help correct some of the problem.

It now cruises at about 105 kts, hands-off, but he is trying to get more speed out of it.



Sixth Anniversary cake with the new logo. TWITTers can really dig in!!!

This probably won't happen unless he increases the horse power above the current 140 hp.

He has not made any full water landings or takeoffs, just simply performing touch and goes remaining on the step. He is waiting to land somewhere he can taxi out and take off conventionally if the plane won't get on the step.

The raffle was held while everyone was looking around the Sea Hawker. Tuto Fortunato won the can of hand cleaner, Bob Chase took home a VHS head cleaning system, and Bob Barbour won the book of flying jokes.

With all business completed, Andy adjourned the meeting.

FINANCIAL DATA

BALANCE SHEET (6/30/92)

Current Assets	
Cash	1,172.73
Acct. Recvble.	60.00
Inventory	192.28
Total Current Assets	1,425.01
Fixed Assets	
Material & Equip.	1,648.75
TOTAL ASSETS	3,073.76

Liabilities	
Acct. Payable	1,240.00
Equity	1,833.76
TOTAL LIABILITIES & EQUITY	3,073.76

INCOME STATEMENT (6/30/92)

Membership Dues	1,164.00
Raffle Tickets	114.00
Back Issues	47.50
Information Packs	18.00
Donations	57.55
Miscellaneous	193.70
TOTAL INCOME	1,594.75
Less:	
Newsletter Expense	402.19
Mailing Expense	413.68
Raffle Expense	76.64
Miscellaneous Expense	125.32
TOTAL EXPENSES	(1,017.83)
NET INCOME (LOSS)	576.92

LETTERS TO THE EDITOR

July, 1992

TWITT

First of all I'm not going to say anything about your abbreviated name, for I want to join your organization. I'm sending you $20 American for your full membership (I don't know if you need extra for overseas postage). If I have any change left could you please send me previous newsletters.

I'm looking forward to my first newsletter.

Yours Faithfully,
Paul Williams
Western Australia

P.S. - Where can I get books besides "Experiment in Flying Wing Sailplanes" by Jim Marske. We are also planning to build a Pioneer II.

(Ed. Note: Welcome to TWITT, Paul. By the time this newsletter is out you should have received #73 for your extra $1. The first page shows you the various mailing rates for as many back issues as you would like, so just send us the U.S. funds and which ones you want.

The following information was provided by Bernie Gross: The Pioneer IIA is now a IID; Bernie upgraded his IIA wings by recontouring the upper surface of the "D" tube as recommended by Jim Marske using a computer in finding higher performance at low speed (increasing L/D over 35:1); and the build up was done by mixed microballoons/epoxy resin and covered with 1.7oz Stits fabric and spray painted.

In answer to the question on other books, there is a fine bibliography published by another TWITT member, Serge Krauss. His address and price can be found in our advertisement section.)

June 6, 1992

TWITT

Yurtuigfeiogvnvncmr.... excuse me, I love the humor when someone doesn't take themselves too seriously. I couldn't stop giggling when I started to type.

If I understand your advertisement in SHAp TALK correctly, your membership is interested in and actively building flying wing aircraft. Good! You are the folks I want to speak with.

I am considering building a sailplane. The design I am looking for is a two place sailplane with an L/D ratio of 28:1 (the L/D ratio is a little negotiable, two seats is not). The design must be proven, i.e. there should be more ships than just the prototype flying.

Is there any sailplane design such as I have in mind? Please contact me at the address below. Thank you and

Sincerely,
Jon Sumpter
2014 E. 3rd Ave.
Kennewick, WA 99336
(509) 586-0817

(Ed. Note: Hopefully, one of our members knows of something that will help Jon find a two place design he can use. If anyone does, please send the information or call Jon directly. Thanks.)

July 3, 1992

TWITT

I am attempting to design and build a tailless ultralight airplane with totally enclosed ducted fan propulsion. When describing the general layout of my design, I have described it as resembling a Mitchell Wing U-2 but with the vertical stabilizers placed further inboard: a sort of long-winged Vought F7U Cutlass.

One fellow EAA Chapter member suggested that, instead of designing from scratch, I should adapt Mitchell's design to my needs. For a short time I did consider this argument very seriously. However, when I attempted to contact Mr. Mitchell at the address given to me by EAA's Information Services, directory assistance advised there was no telephone listing for a Don Mitchell or Mitchell Airplane Co. at the address given.

Being somewhat suspicious of people who sell anything from an address but with no telephone number, I was a bit put off. A telephone conversation with Mr. Ben Owen of EAA Information Services, and a subsequent mailing that included some Mitchell Wing accident reports indicated there might be some deficiencies in this design which could preclude using it as a starting point.

Finally, after much deliberation, I concluded that my design is sufficiently different from Mr. Mitchell's that adapting a set of plans would be almost as much work as starting with a fresh sheet of paper. Having decided to pursue my own ideas means that I must present them to a body of experienced airmen and designers and have them critiqued in order to produce an efficient and safe airplane.

I am writing to your organization to see if TWITT as a body will evaluate prospective designs, or do you refer questions to individuals in the organization and have correspondence take place between the querente and someone versed in that particular field?

I am also of the understanding that your organization produces a newsletter. I would appreciate information on its frequency of publication, format, and price.

Sincerely,
Phillip R. Ridenour
4508 Hickory Rd., Apt. 2A
Mishawaka, IN 46545

(Ed. Note: In answer to Phil's questions on the critique of designs, TWITT does it both ways he has described. In the past, we have presented plans to a panel of designers and engineers at a meeting and had them provide their evaluations as well as discuss the various points. We have also published the plans and asked the general membership to offer any comments directly to the designer. Both ways have merit, and I know that some design changes have resulted from the critiques.

Once Phil has sent us more specific information and drawings, we will attempt to pull a panel together for a future meeting and help him with this project.)

July 6, 1992

TWITT

Enclosed you will find by check for TWITT renewal. I may have missed a month's issue -lost continuity - so could you check and send on any copy I may have missed.

You will note that my Backstrom EPB-1c(?) Plank is now in the storage collection at the National Soaring Museum in Elmira, NY.

The Marske Pioneer, N4RE, also shown at the Mill, is now for sale. In excellent condition, having been stored at the Mill. Built by Bill Ree with full plans and 30lbs of other documentation, but no trailer. The price is about $4000.

Say hello to Bruce Carmichael at one of the TWITT meetings. Best regards...will visit west some time...

Bill Foshag
Heishmans Mill
1206 Creek Road
Carlisle, PA 17013

(Ed. Note: By now you should have received any back issues. We try to give everyone a month or two grace on their subscriptions, knowing most will be renewing.

We hope you have good luck in selling your Marske to a true flying wing enthusiast. We couldn't print the photo you enclosed due to the size and space limitations in the newsletter. For those of you interested, the fuselage was on the cover of Bungee Cord, Vol. XI, No. 2. Summer 1985.)

June 23. 1992

TWITT

Many thanks for your cassettes of Don Mitchell's talk. You'll find enclosed a little gift. I have it only in the French version. Maybe you have someone who understands it and can translate. If you want translation of any details, let me know, as I hold the same edition of Modele Magazine at home.

Concerning flying wings, there is the Horten with plans, and some others on page 92. The Horten has no spin or stall. Construction: dihedral is flat; no twist in central section; and twist in external part is -10 degrees.

The builder did it with white foam and covered it with balsa board to simplify and make for faster construction; but said that it was only one choice and that its possible in classic wooden structure.

TWITT is a very good labour. I'm happy at each edition, go forward like this in this job, and happy flying.

Sincerely yours,
Gunther Rudat
Sennecay (LeParc)
f-18340 Levet France

(Ed. Note: We would like to thank Gunther for two additions to our library. One is Modele Magazine, June 1992, No. 489, 15.17 Quai de l'Oise - 75166 Paris, pp. 26-30, covering construction of a Mini Horten. Pages 92 & 93 also included picture of several other electric powered flying wing models. The second item he sent was a set of basic plans for the Mini Horten (in French) with what appears to be full size templates for the ribs which would allow the foam cutting. The plans are on a sheet approximately 2' x 2 1/2' and could be reproduced if someone would like. We are not sure of the cost, but will find out if anyone is interested.

If there is room in this issue, we will try

to publish a photo from the magazine. Otherwise, we will try next month.)

WINGMASTER

(Ed. Note: The following is a review of the design, construction and flight performance of Tom Blakeney's flying wing he calls Wingmaster. It is provided by Tom in response to our request through Kevin Renshaw, a long-time TWITT member and constant contributor. We would like to thank both of them for their efforts in furthering flying wing models and full size aircraft. We would also like to have Tom send us a copy of his video so we can share it with the members.)

I was most gratified to hear about your interest in my flying wing project. Kevin Renshaw was a good choice on your part to find out more about Tom Blakeney and his flying wing as we both work at General Dynamics here in Fort Worth. As a matter of fact, Kevin supplied some valuable advice and support as this project progressed through design and construction. On to the details!

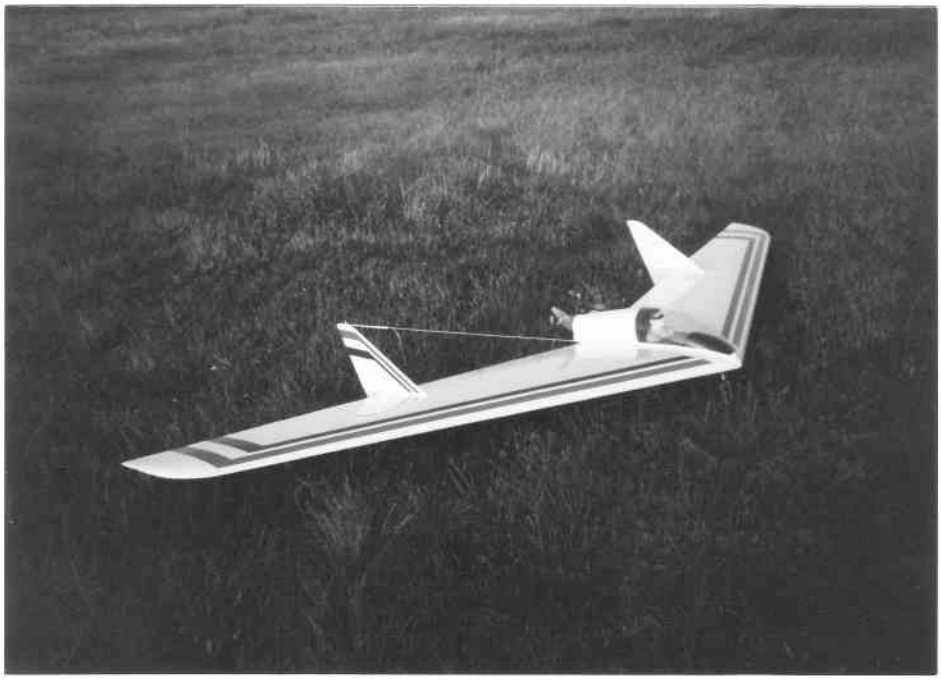
A couple of years ago I was in search of something a little different in the way of a large R/C model to bring to the popular "Giant Scale" gatherings in this area. I also was impressed by the performance of the popular Klingberg Wing R/C model, built by many of the local modelers. A large flying wing seemed to fit in nicely at this stage. To make the project a little more interesting, I decided to style the model as a reasonably possible full size experimental aircraft. I spend a little time on the ergonomics of the cockpit and looked at other details with this in mind. A 1/4 scale approach was taken and resulted in a model with a span of 132" and a wing area of 2000 sq.in.

The planform chosen was based on the proven success of the Klingberg Wing, with some very small changes. I increased the sweep by about a degree to allow the pusher powerplant to be a little closer to the c.g.. The airfoils and washout are unchanged from the Klingberg Wing. The model uses foam core wings sheeted with 1/16 balsa. For transportation purposes the model was constructed with a 66" center section and uses 1" aluminum tube wing joiners for mounting the wingtips. The canopy is made from my own vacuform tooling.

The model is powered by a Super Tigre .61 engine and uses a Futaba 7UAP computer radio with programmable mixing for the elevon control surfaces. A single servo is installed in each wingtip panel to activate the elevon. At this point the landing gear is fixed tricycle, but provisions were made to install retractable landing gear units at a later date.

I chose to install fixed vertical surfaces at the wing break. I fully agree with Al Backstrom on the need for vertical tails on flying wings; they will fly without them, but they fly better with them, particularly during aerobatic maneuvers. The ones on my wing are removable and I plan to experiment with others of different size and some incorporating split trailing edge devices for glide path control.

The model is now flying at a weight of 15 lbs. which includes 4.5 lbs. of nose weight (or, as I prefer to think of it, "simulated payload"). This gives the model a very reasonable wing loading of just over 17 oz./sq.ft.. The weight is a little bit of a challenge for the .61, but the flight performance is very realistic.



Flight performance has been most satisfying in all ways. The model is very "groovy" in flight and turns without a hint of adverse yaw. Loops track perfectly and rolls are pretty good, but the model wants to dish out somewhat on the second half of the roll. Takeoffs and landings are trainer-like. I estimate the model's speed at full throttle to be about 70 mph.

I have no plans to offer plans at this time, but I would be glad to offer advice to anyone interested in building a similar model. I have a fairly interesting video tape of the first few flights (including some at the big Byron Originals Aviation Expo fly-in) that I would be glad to copy and send you for one of your monthly meetings. If anyone would like to call and talk flying wings, my home phone

is (817) 551-6352 and the best time to catch me is between 8 and 10 pm CST.

Enclosed please find my check for my first year's subscription. Kevin Renshaw had made me aware of your organization some time back and had shared some of your newsletters with me, so I really have no excuse for not joining sooner. Also enclosed are some photos and a line drawing of my wing (thanks, Kevin!). Once again, thanks for your kind interest and please keep up the great work at TWITT.

SHA WESTERN WORKSHOP

The following information was extracted from the July 1992 issue of SHApTALK, newsletter of the Sailplane Homebuilders Association.

The SHA Western Workshop will be held at Fantasy Haven Glider Port, Tehachapi, CA, over the Labor Day weekend, September 5,6 & 7, 1992. The program will include presentations by Les King on construction; Dan Armstrong on a composite 13m sailplane; Danny Pearson on the Diamont sailplane; David Gustafson on a modified S-2, Alex Strojnik on design and construction; and L. Pazmany on metal construction.

Demonstrations and a question/answer session on wood, composite and aluminum construction will be conducted *(this will include one by Harald Buettner, a long-time TWITT member)*.

There are campgrounds, RV parking, a restaurant and many other activities at the glider port. Tehachapi has many fine eating places and motels, from low cost on up.

AVAILABLE PLANS & REFERENCE MATERIAL

Tailless Aircraft Bibliography
by Serge Krauss
Cost: $20
Order from: Serge Krauss
3114 Edgehill Road
Cleveland Hts., OH 44118

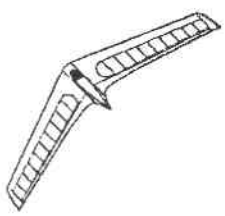
Tailless Tail, by Dr. Ing. Ferdinando Gale'. Consists of 268 pages filled with line drawings, tables and a corresponding English text. It is directed towards modelers, but contains information suitable for amateur full size builders.

Published by B^2 Streamlines, P.O. Box 976, Olalla, WA 98359-0976, or (206) 857-7249 after 4pm Pacific Time. Price is $38, postage and handling included (also applies to Canada and Mexico). Orders shipped elsewhere will be sent surface mail unless an additional $10 is included to cover air mail postage. Washington residents must add 7.5% sales tax.

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.
975 Loire Valley Drive
Marion, OH 43302
(614) 389-6055

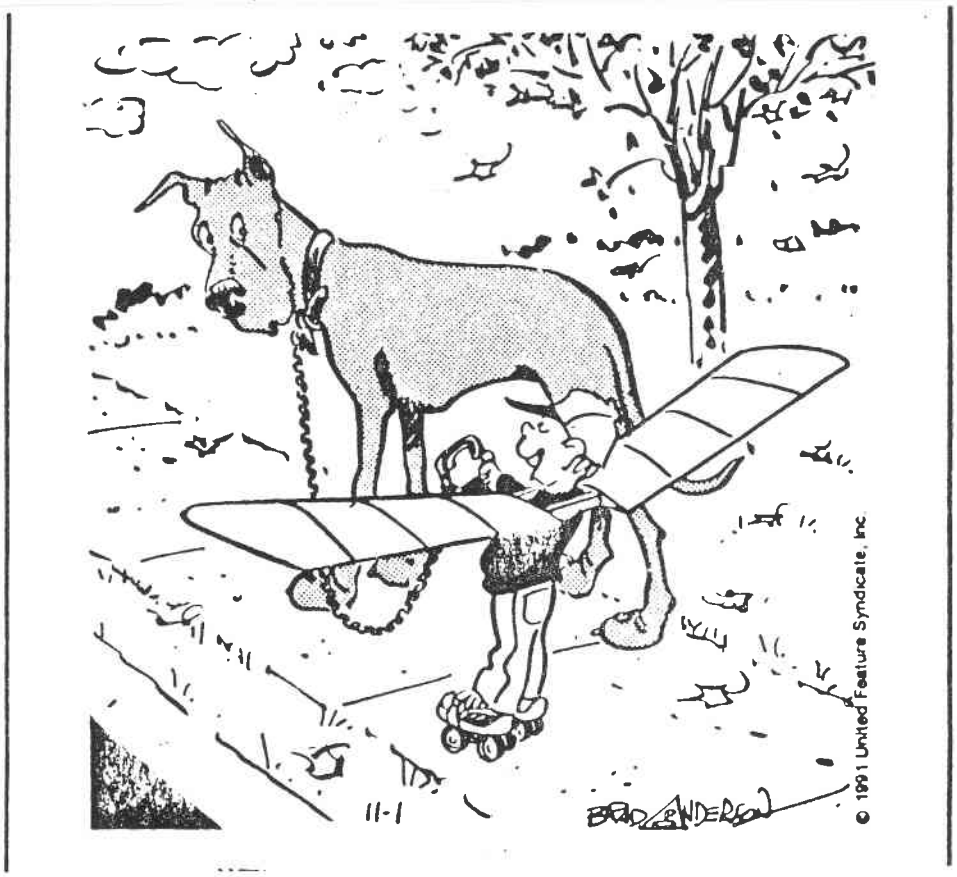


MODEL WINGS

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

Tower Hobbies carries the Future Flight Klingberg Wing kit for $39.99 (item #TE1130) and the Klingberg Wing 100 for $149.99 (item #TE1131). They can be contacted at:
P.O. Box 9078
Champaign, IL 61826-9078
1-800-637-4989 or (217) 398-3636
Shipping: $5.75



Young Robert Fronius

and

How TWITT Began