

T.W.I.T.T. NEWSLETTER

In keeping with the general theme of this month's newsletter, here is a picture of three flying wings, two of which are Pioneers. On the left is Bob Mitchell's Ild, at the back is Bernie Gross' early model Pioneer called Deaf Hawk and, on the right is Jim Marske's Monarch II.

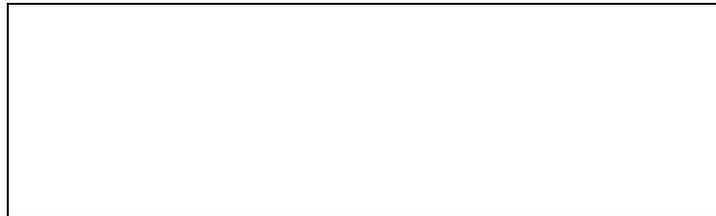
For more on other Pioneers, see the letters and stories on the inside.

Photo by Bernie Gross.



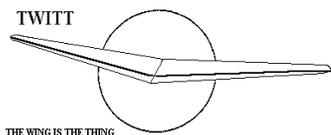
T.W.I.T.T.

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., 9809 means this is your last issue unless renewed.

Next TWITT meeting: Saturday, September 19, 1998, 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:

- President: Andy Kecskes (619) 589-1898**
- Vice Pres:**
- Secretary: Phillip Burgers (619) 563-5465**
- Treasurer: Bob Fronius (619) 224-1497**
- Editor: Andy Kecskes**

The T.W.I.T.T. office is located at:
 Hanger A-4, Gillespie Field, El Cajon, California.
 Mailing address: P.O. Box 20430
 El Cajon, CA 92021

(619) 596-2518 (10am-5:30pm, PST)
(619) 224-1497 (after 7pm, PST)
E-Mail: twitt@home.com
Internet: www.members.home.net/twitt

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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, east side of Gillespie).

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PRESIDENT'S CORNER

I am very proud to announce that TWITT is now on the internet with its own web page. I installed it on August 19th and by the tenth day there had been 330 accesses to the main page. I have updated it a little since then, but am still learning how to insert images, pictures, etc., to make it a little more attractive.

The goal with this web site is to have unique items that are not carried by other pages, while still providing everyone with the links necessary to find the other pages. I already have pictures from some of our members and others interested in flying wings, and I will be getting these on the site as time goes by. There is a guest book already on the site and I will be adding a direct e-mail link and a counter to everyone can see how popular the site has become over time.

You can see the web site by accessing at:

www.members.home.net/twitt

For those of you who pay attention, I have also changed the TWITT e-mail address. This is all part of the new internet service I have subscribed too, so this will allow me to keep my personal and TWITT mail separate in the future.

If anyone has pictures, stories, etc., they would like to see on the web site, please e-mail them to me at:

twitt@home.com

I am sure that as I learn more about how to use the various tools associated with building a web site, I will be able to offer much more information, including the possibility of an electronic newsletter. We will be getting a flat-bed scanner here in the next several weeks which will allow for copying printed pictures and putting them directly into the newsletter. This will improve the quality of material in the newsletter, while allowing us to make a completely electronic copy for transmission.

Obviously the future is starting to creep into TWITT's capabilities to better communicate with its members. We hope you enjoy these new innovations and will take advantage of what they can offer you.



SEPTEMBER 19, 1998 PROGRAM

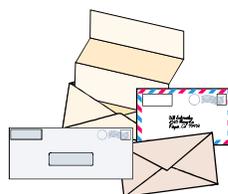
This meeting is going to be another really good one. You don't want to miss **Al Bowers** giving his presentation on (ed. - I've heard it and this is an excellent analysis; for Horten lovers this is a must):

The Horten H X Series:
Ultra-Light Flying Wing Sailplanes

Ultra-light sailplanes, when coupled with flying wing aircraft, are attractive for their apparent simplicity and potential performance benefits. A classical example of an ultra-light sailplane, the Horten H Xc, is analyzed as an example of this class of aircraft. A short history of Horten sailplanes are presented as an introduction. The Horten span load methodology is also presented. Specific emphasis on the Horten H X series of ultra-light sailplanes is made. Analysis shown includes longitudinally trimmed span load distributions, asymmetrical roll spanloads, induced thrust effect proverse yaw moments, drag build-ups, and estimated lift-drag polar performance.

- Introduction
- Spanload History
- Span Loads: Bell vs Elliptical
- Middle Effect ("Mittelleffekt")
- Calculation Method (Multhopp)
- Uden's Results
- Early Horten Sailplanes
- High Performance Horten Sailplanes
- Later Horten Sailplanes (Argentina)
- Ultra-light Horten Sailplanes (H X Piernifero Series)
- H Xc Analysis
- Vortex Lattice Analysis
- Symmetrical Span Loads for Longitudinal Trim
- Asymmetrical Span Loads for Lateral-Directional Roll/Yaw
- Airfoil (Profile) Analysis
- Performance Polars
- Concluding Remarks & Audience Questions

Al is a senior aerodynamicist for NASA at the Dryden Center. He belongs to a number of organizations like USHGA, SSA, and AIAA. He's worked SR-71s, high alpha thrust vectoring, authored a graduate level textbook and, has just completed work on towed space launch vehicle concept. He is now beginning work on the blended-wing-body concept which will involve development of a heavy weight model for high altitude drop tests from a B-52. Although discussions are in the early stages, it sounds like a very interesting endeavor by NASA, and Al mentioned he probably won't be able to talk about some aspects of the project.



LETTERS TO THE EDITOR

(Note: This month will include several e-mail messages (letters) in response to my announcement of the new web page. I have included those that offered some other relevant information.)

7/15/98

TWITT:

The unidentified tailless in the July newsletter is the Ackerman. I am enclosing all the information I have on it. It is supposed to be in a museum in Philadelphia.

I am also enclosing a copy of an article by Stan Hall that did not get in the collected works book.

Al Backstrom

(ed. - Thanks for the material, Al.

What he sent was: "The John D. Akerman Tailless Airplane (Model I - 1936), John D. Akerman, Minneapolis, MN, March 31, 1969. pp. 10 + attachments; "Stability of Tailless Gliders", Stan Hall, Ground Skimmer, July 1976, pp. 22-26. *This material will be added to the library.*)

8/24/98

TWITT:

Fine to get your e-mail. Great to hear that we grow closer to each other, but like you I still have a lot to learn about the net and linking.

PROGRID, our Fingerfeathered-Wing Prometheus, has now flown over 35 hours and we have gathered so much data that we will be busy for quite a while. Next official meeting is ICAS in Australia.

Give my best to everyone, especially Bob and June. We plan on being in California in Summer/Autumn of 1999. See you then.

Thomas Bircher

(ed. - Thanks for the "letter". If you have a few free minutes could you write a little piece on the latest design and perhaps include a picture in an e-mail to twitt@home.com so I can show the rest of the members what you are doing. Thanks in advance for your help.)



ABOVE: This year's anniversary/birthday cake design showing a stylized wing/bird Genesis type flying wing for all to enjoy, i.e., the cake was delicious as usual.

8/27/98

TWITT:

Yesterday I was working on my old program of lift distribution based on the classic work of Weissinger's method of influence coefficients for lift distribution calculations of any rectangular or tapered wing with positive, neutral or negative sweepback angle and with or without washout.

The program was translated from Spanish to English and is very simple to use (executable file) and is possible to attach to any .txt file to explain its use.

If you would like I can send an e-mail with an attachment of this software to distribute to TWITT members at no charge. Please let me know if this is of interest to TWITT.

Miguel Angel Melli

(ed. - Of course, you know I took him up on the offer and the following is his reply.)

8/30/98

As I promised you, I am sending you a modest program to calculate the lift distribution over any straight wing with any amount of taper and sweepback or sweep-forward, or zero sweep angle. You have two attachments with this message:

LIFT.EXE is the program itself and README.DOC is the instruction sheet for how to use it.

If someone has any questions feel free to contact me at my e-mail address (melli@ibm.net)

This program was translated from my principal program that also can be used for structural purposes. In the future I will translate this from Spanish to English and then send it to TWITT.

Miguel Angel Melli

(ed. - I have included a copy of the instruction sheet below so those of you who might be interested in experimenting with the program can see what it's all about. The actual program is in a 65k file so it is easy to attach it to an e-mail message just like I

received it. For those of you with a computer, but not an e-mail service, I will be glad to provide you a copy. Just send me a disk in a disk mailer already addressed and with the proper amount of postage, and I will copy the program over and get it right back out in the mail.)

LIFT DISTRIBUTION COMPUTER PROGRAM

This is a simple to use program for lift distribution on rectangular or tapered wings based on Weissinger's "L" methods (influence coefficients). If you use any amount of sweepback (negative or positive) in your computations the program will calculate all of influence coefficients and then you can reach the downwash integral solution along the wing. The program automatically prints all the data (you do some of the input, the printer records the results then asks for the remainder of the input before printing the final data).

The program name is LIFT.exe and the first module is named DATA ENTRY and requires the following items.

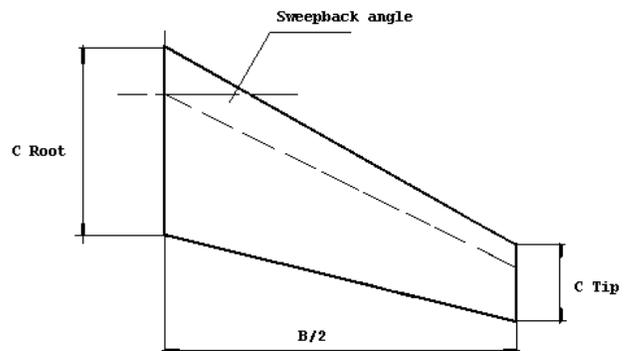
Wingspan stations on B/2: This is the number of angular stations over the half span. I think twelve stations is good number for a normal computation without a great error in matrix internal operations (matrix inversion procedure).

Root chord length: Feet.

Tip chord length: Feet.

Wingspan: Feet.

Wing Sweepback angle: Measured from an angle between a line perpendicular to the wing center line passing through 1/4 root chord and the line defined by 1/4 chord stations along half wing in degrees. Positive for sweepback. Negative for sweepforward. Zero for straight wing.



Wing washout: Measured angle from root section "zero lift" line to tip section "zero lift" line. Negative for washout. Degrees.

Inflight weight: For wing CI computation on this condition.

Mach number: Normally you can use 0.1. From a mathematical point of view it is possible to take account of the factor $(1 - \text{Mach}^2)$ to have a slight aerodynamic correction of wing aspect ratio (free of charge), giving us

the effective AR = AR * SQRT (1 - Mach**2). This is the Prandtl Glauert conversion factor.

Now the program will give you results like this:

M.A.C Length: Mean chord length of M.A.C. In feet.

M.A.C Position from Center line: In feet.

25% M.A.C From 25% of root chord: This is the distance from 25% M.A.C. and 25% root chord positive with sweepback positive . In feet.

This is the point where it prints all the initial design data.

It will then ask you for a new wing root angle of attack in degrees. Measured from root section "zero lift" line.

After some computations, the program completes the automatic printout with the complete results:

Wing lift coefficient:

Dynamic pressure:

Wing surface:

Wing loading:

Wing aspect ratio:

It also gives you a table of results in columns with the following data:

2y/b	: Non dimensional wing stations in fraction of semispan.
Local AA	: Local angle of attack in degrees aspect to the wing root chord at each wing station.
Cl	: Lift coefficient (local) at each wing station.
Chord	: Chord length at each wing station.
C*Cl/q	: This value give us the specific aerodynamic load (Lb/ft).
Induced AA	: Induced angle of attack at each wing station.
Cdi	: Induced drag coefficient at each wing station.
Cds	: Wing section drag coefficient at each wing station. Lineal Interpolated between root to tip sections.
AA effect	: Effective angle of attack. Is the difference between geometric local angle of attack and induced angle of attack.
Wing Cdl	: Is the integrated Cdi over the wing.
Wing Cd	: Is the integrated Cds over the wing.
CD Total	: Is the sum of both.

The program makes a question about option selection (3).

To change the geometric data.

To change the angle of attack.

To finish .

That's all folks.

References: NACA TR 1228 "Calculated Spanwise Lift Distributions, Influence Coefficients for Unswept Wings in Subsonic Flow."
"Aeroelasticity" Bisplinghoff Ashley and Halfman.
"Matrices" Frank Ayres.

8/24/98

TWITT:

Nice page. I am sending by separate e-mail a draft of an article for Kitplane for your use. I have not done a proof of the article and I will attach several other pictures.

Lloyd Watson

8/25/98

Thanks for the pictures. I now have a few hours on the wing.

The top picture (top of next column) is just before the first aero tow. My wife Denise is next to the aircraft and the airport manager is behind the wing.

The other photo (top of next page) has Buddy Watson, my brother and co-builder, with my wife and several students looking on.

I have attached a few thoughts using MS Word software. Please feel free to use and edit as you need.

Again, thanks,

Lloyd Watson.

(ed. - Thank you for the pictures. They make for good material in the projects web page for others to see. You are obviously getting seen since I got the following letter from John Irwin after he looked at the page and took exception to my comment on the configuration of the vertical tail surface. As you can see, I have included the pictures in this newsletter so the rest of the members can see what we have out there for the public to view.

I have edited your material to mainly get it down to a size that would allow for publishing it as a two-part piece between this newsletter, which seems to have become somewhat dedicated to Pioneer aircraft, and next month's. It is presented below as a separate section titled "It Ain't Got No Tail". Thanks for providing it.)

8/29/98

TWITT:

I am the builder of Lloyd Watson's Pioneer Ild. I burned out on the project with the ship almost ready for inspection and it sat for several years. Lloyd bought the ship last fall and Lloyd and his brother, Buddy, finished the ship. I was present for the inspection.

There has been no deviation in the vertical tail from Marske's plans. This is a "Ild" model and was built to spec with the exception of a half-meter added to the span with Jim Marske's assent. I believe that the extended span is now part of the standard plans. The only other significant modifications are the addition a layer of fiberglass cloth over the plywood on the D-tube and a faired-in skid in place of the 1-26-style skid in the plans.

The wings and control surfaces are covered with Ceconite and enameled white with red trim.

First autotow flights were from Sequin, TX airport and aerotows from New Braunfels, TX airport. The tape on the canopy is the result of a hard landing on an early autotow.

John W. Irwin
pahaska@ibm.net

(ed. - Since I have the feeling John will see this copy of the newsletter, I will thank him for the message and correction on my misstatement-statement about the tail surface. I had taken what someone else had said about another Ild's tail in comparison to an earlier model Pioneer. My apologies to all concerned.

I am glad that someone, in this case Lloyd, took over your project and got it into the air. It also makes a good companion to Mike Hostage's Pioneer that I will include on the web page in the coming weeks.)

8/25/98

TWITT:

Hi, my name is Mike Hostage. I was a member of TWITT a number of years ago, but let my membership lapse. I am flying a Marske Pioneer that I built and first flew in 1994. I have attached two photos of it. If you are interested, I can send other photos.

(ed. - This came in after Mike saw Lloyd's Pioneer on the web site. I immediately e-mailed him back asking for more photos and a commentary on his building experiences. He then sent the following.)

8/30/98

I'd be happy to provide comments on my experience with building and flying the Pioneer. Are you more interested in the building experience or the flying? I have hundreds of construction photos and a few more flying shots. I can send anything you would like.

I heard of your web site from Lloyd Watson. I would imagine word will get out exponentially, as there are quite a few wing aficionados out there. I monitor the Nurflugel fellows and I imagine they would enjoy your site.

Good luck with it and thanks for your efforts to promote flying wings!

Mike Hostage

(ed. - I have asked Mike to give us some of the more unique aspects of the building portion and then more on the flying characteristics. This will be a good comparison with the article by Lloyd Watson on his experiences during the initial testing flights.)



ABOVE: Here is one of the pictures sent along by Mike. The other was an inflight shot that wasn't going to show much in a black & white format so I didn't include it here. Note Mike's use of winglets on his "dream" machine. This is the first time we have seen this adaptation on a more modern version of a flying wing in the amateur builder arena. We look forward to hearing more about the flight characteristics they have produced.

"It Ain't Got No Tail"

(ed. - This is the first of two parts of Lloyd Watson's recount of his experiences in test flying his Pioneer Ild flying wing. The second part will be included in next month's newsletter. And, no I won't give away the ending. You will just have to wait it out.)

I think I am ready to test tow the "wing". My head says I am ready and my gut says WHAT THE HELL ARE YOU DOING? Do you think you are CHUCK YEAGER? Interesting how the head says one thing and the body tells you the truth. Sunday, clear, calm, sunny, no wind, no clouds, no excuses, get cup of coffee, clear, calm, sunny, no wind, no clouds, no excuses, get more coffee, call brother, no excuses, I guess I am going to join in and become an amateur test pilot. Now driving to the airport, sunny, no wind, no clouds, no excuses, get cup of coffee, no excuses and we put the wing together.

Great start! We put the spoiler cable in wrong. Have a hang up on the left spoiler working.....YES, found a reason not to fly. Buddy, my brother figures out I put the cable in wrong. Rat's now I have to fly. I want to fly, I want to test, I think. I cannot show my nerves to them. OK Lloyd it's just a plane that Marske, Hostage and many others have flown.



ABOVE: Getting ready for the first aero tow. Lloyd's wife Denise is leaning over making last minute adjustments and/or getting instructions. The airport manager is standing behind the wing keeping an eye on things since not very many aero tows are made from his facility.

Initial tow at 25 mph. Wings level no yaw. Good control on roll control. No weight problem with balance of plane on wheel. Roll control started at about 15mph. No pitch control yet and aircraft stayed on nose skid for first 0-18 mph. At 20 mph the elevator came alive like a light switch. No effect until that speed. Nose came up past level and with a small amount of down or even natural it leveled out. Now the rudder authority was zero until about 10 mph and then went active about 15-18. Good authority and very positive. This first tow was noisy because of the skid and the nose heavy. Marske suggested 3-4lbs of weight so with this Texas mentality I put 6lbs. The run went for about 2000' with plane on the ground with the exception of one 2" jump off the ground with a bump in the runway. All controls had authority and all worked in the right direction. Wind was calm maybe 2-3mph cross wind on a runway NE to SW. Runway was 3200 ft and I felt that was short but usable. We had a 100' run off at the end of runway and then open field on both ends.

After first tow at 25-30 we moved to several tows at 35-40. These tows produced the same start up effect of point the wing where you wanted to go at the beginning of the tow because you are going there until about 15 mph then the light switch starts and the plane wakes up as if to say, you want to fly now? The first lift off was at about 28-30mph (I have a helicopter speed indicator and it works from 0 to forever) thanks to Mr. John Irwin the builder of the bird. Great Job John. At lift off we stayed in ground effect for the second and third flight for the length of the runway. I had NO roll or yaw problems. Just a touch and the wing responded. It took me a few runs to get used to the bird pitching from skid to tail wheel when the elevator took effect. PIO was this problem. I had read Mike Hostage's note (F-16 Wing Commander in Utah and Pioneer IID owner) to me about his test flights over and over so much that the paper was worn from finger prints

and exposure to night lights. He also warned me about the elevator becoming a large flap in ground effect. More on that latter.

I found out that in ground effect I was at about neutral with the elevator or just a tab up. No trim was needed. I also noted that the noise after skid was very quite. We did several short hops down the runway both directions in ground effect at increasing speeds to get the feel of the wing. No big surprises. Herk Stokley, a great friend told me to just keep calm and remember it just a plane and treat it with respect and it will fly. Thanks for the advise it worked. My brother said that I was a bit intense after the first several tows. I don't remember anything except attempting to fly smooth and focused on responding to any surprises. So far None.

We proceeded to tow up to about 25-50' for about 6-8 tows into the wind. I got more and more relaxed with each tow. No big events and the wing had no pitch change after release of tow rope. That surprised me. I had never flown a wing or harness like this much less a tow under the wing. NICE design Marske. I did notice the effectiveness diminish after I slowed to around 30 mph. We kept the speed around 40-50 during these tows.

My approach to landing was at least 50-55 until ground effect. OK Mike, I forgot to listen to your warning. I leveled off at ground effect and decided to try to land without spoilers (by the way the spoilers work like parachutes, great) and in ground effect at about 35 pulled back to flair.....WOAH! (*&)\$^#&##.....Where'd the thud come from and do I have any cavities left. I then pulled the spoilers out of fear and rolled to a stop. Canopy off and LLOYD took a big breath. I repeated the exact flight with Mike landing techniques and perfect touch down. Nice roll out. Yes Mike I hope I have it in my brain to level and spoil to landing. IT WORKS!

The next 4 flight were up to as high as 100'+ and speeds as high as 65 mph in flight. I used the entire runway because the brakes went away and it was just me and the skid. I now found the secret that Mike has been preaching on use of the spoilers and I finally got it through my head and from then on landings were acceptable and very comfortable. On these tows I tested the spoilers, Great and also the roll and pitch inputs very carefully. Good effectiveness and I felt better with each tow. I got used to the initial tow challenge. It's like flying the HP 14 with V tail and no authority until about 25 mph. John Irwin should be proud of his building. I heard no creaks or squeaks during flight.

The last flight of the day was to about 150' at about 55mph with a quick climb and about 2500' to end of runway. I notice the wind gusts at this altitude. The wing responded well. I wanted to try some more turns to get a handle on rudder authority. At 150' I released and started two 40-60 degrees turns at maybe 10 degrees of bank. No problems. Noticed I was at half way point of runway and decided that it's time to come down. Added spoilers and came down like an elevator. UNDER control. At touch down felt good. I relaxed.....DUMB! Gustwe proceeded to look at ground from 20'. I landed for the second time at about 3000' at 35 kts and another smaller

gust hit me from the right 45 and left wing toughed the ground and the wing decided to go 45 to the runway going left. Like a good boat captain **HARD RIGHT RUDDER** and I added right roll. Wing came up and rudder moved me right. OK now we have this thing under control and bam gust again (.....I latter think I must be in a bubble thermal coming across the runway, or at least this is a good hanger excuse) and the right wing goes down. Now at this speed and full spoilers very slow response and I decide since I am some 100' to end of runway to proceed to grass to help slow down.

One week latter at the Big airport! Friday was clear and 2-3 knots of wind. Perfect for test flight. So my prayers were for safety and no wind. I had called my tow pilot and checked to insure his arrival at the New Braunfels Airport with long runways the day before. My brother had the wing all prepped and ready for her first true flight.

We had agreed to have the tow plane, a Super Cub, there about 9:30am. So with friends and relatives we put the wing together. Before it was even together several people from the FBO came over and one came up and said "It Ain't Got No Tail". You could see in their eyes their opinion of , "your not going to get me in that thing! " And several walked around to the rear and said where's the rest of the tail. This thing can't fly. I asked if I had any volunteers for testing and there was a mass exodus to the coffee lounge. I had a parachute so we did another weight and balance and all was well.



ABOVE: The pre-takeoff scene from a different angle. Along with Denise and the airport manager, we now see the group of student's to whom we can attribute the title of this story.

As several of the students and flight instructors looked the wing over you could hear the comments and laughter. " Wouldn't catch me in that thing, it doesn't have a tail." Several just watched in amazement as the wing sat in the Texas sun. Now the tow plane arrived and pulled over but kept the engine running since he had a flat on the tail wheel and also a low battery and was asking if we could just go now. What! Go now, I'm , well I guess so, You really mean NOW? But!

I chose the runway into the 3 knot wind. Clear blue and as I strapped on the parachute it hit me. I going to test fly

this wing. For most of my life I have had a obsession with wings. In John Sealy Hospital at age 6 or 7 I remember my father bringing me a Cutlass Jet model because he could not find a flying wing I saw in popular science magazine. I built R/C flying wings with the help of friends in Virginia and even stopped in Chino and saw the N9M. In my youth I saw a flying wing plank test flown in the valley of Texas and it just been a part of my dream. Now the dream was at hand.

(ed. - The conclusion, and hopefully, some more pictures in next month's issue.)

1/4 SCALE HORTEN IV

Bob Fronius is continuing to make good progress on his scale Horten IV project which includes the aircraft's transport trailer, something not usually done when doing scale presentations.

Although he is moving along with the trailer portion, he still needs any pictures he can find that would help with the fine details. He is working mainly from the Nurflugel book's pictures which makes scaling more difficult due to the angle from which they are shot. He would sure appreciate copies of any other photos anyone might have of the trailer.



ABOVE: Here is a photo of his progress as of a couple of weeks ago. The center section can be seen at the front mounted at the angle used for fitting it into the trailer. It will eventually be covered with a full shell that is supposed to slip on from the front.

The framing behind the fuselage is designed to raise up from each side just above the lower solid portion to allow the wings to be removed from the side. (Not shown is the framing for the aft shell portion that is removed as one piece to expose the entire length of the wing to make is easy for removal from the trailer.)

The wing is broken down into four pieces, with the wingtip sections being placed inside of the main wing at the aft end of the trailer.

The wheel and axle will be moved forward by about 8" from where you see them to more approximate the actual location on the real trailer.



ABOVE: The scale R/C model mold plug being built by Harald Buettner for Bob's project. Harald is building it to be as close to the specifications of the original aircraft as possible using plans and other reference material available. Fortunately, he can read the original German text giving him a little edge in the construction. *(ed. - Bob had this and the trailer all together at the SHA Workshop for everyone to see.)*
