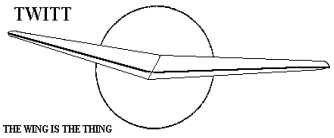
No. 370 MAY 2017

T.W.I.T.T. NEWSLETTER

Source: https://www.pinterest.com/xLORDxSIDIUSx/rc-uav/

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., **1705** means this is your last issue unless renewed.



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) 980-9831
Treasurer:
Editor: Andy Kecskes
Archivist: Gavin Slater

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) 447-0460 (Evenings – Pacific Time)
E-Mail: twitt@pobox.com
Internet: http://www.twitt.org
Members only section: ID – **20issues10**
Password – **twittmbr**

Subscription Rates: $20 per year (US)
$30 per year (Foreign)
$23 per year US electronic
$33 per year foreign electronic

Information Packages: $3.00 ($4 foreign)
(includes one newsletter)

Single Issues of Newsletter: $1.50 each (US) PP
Multiple Back Issues of the newsletter:
$1.00 ea + bulk postage

Foreign mailings: $0.75 each plus postage

Wt/#Issues	FRG	AUSTRALIA	AFRICA
1oz/1	1.75	1.75	1.00
12oz/12	11.00	12.00	8.00
24oz/24	20.00	22.00	15.00
36oz/36	30.00	32.00	22.00
48oz/48	40.00	42.00	30.00
60oz/60	50.00	53.00	37.00

Meetings are held on the third Saturday of every other month (beginning with January), at 1:30 PM, at Hanger A-4, Gillespie Field, El Cajon, California (first row of hangers on the south end of Joe Crosson Drive (#1720), east side of Gillespie or Skid Row for those flying in).

TABLE OF CONTENTS

PRESIDENT'S CORNER

Again, my thanks to Robert Hoppe for his article on his H1 design that I finish up in this issue. For those of you getting the hardcopy you won't see the color scheme on this aircraft, but you can go to the members only section of the TWITT web site and pull up the PDF version. This is always an option for any newsletter dating back to issue number 1.

The rest of this issue covers some recent Nurflugel e-mails discussing the availability of Al Backstrom's plank type flying wings. There is also some discussion on whether or not Al was okay with people building any of his designs where he produced drawings. I seem to recall in conversations with him that using the plans for building a new aircraft was what they intended for and he supported. He was always willing to talk with flying wing enthusiasts so anyone trying to fly a plank had a good sounding board for lessons learned.

I hope many of you are getting back to flying whether it is models or the real thing. The Texas weather is finally coming around so I have done some dual flights to knock off the dust from my skill set and got in a short flight in my 1-26 last weekend. Felt good to be back in the air.

Andy

(ed. – This is the last part of Robert Hoppe's article on his personal flying wing design. He wanted me to pass long his e-mail address in case you had further questions or comments on this aircraft and that he would answer them the best he could. (manflies@aol.com) I have also included the last of the pictures he sent along with the article.)

THE HOPPE H1

Part 2

CONTROL SYSTEM:

My original controls consisted of elevons for pitch and roll, spoilers at the wingtip for yaw, and glide path spoilers about half way out on the wing. The elevons have 15 degrees of travel both up and down and have worked out very well so I have no reason to change them.

The glide path spoilers coming out of both top and bottom of the wing were very effective and produced little pitch change but spoilers are very difficult to seal and get to match the contour of the wing so when I decided to mount an engine I removed the top spoilers so I would have a smooth and sealed top surface and now just have the bottom spoilers (air breaks). It turns out I don't really need them at all because when I throttle back the engine the propeller becomes a big air break and glide path control is very easy just using the throttle.
The prop being above the CG there is a noticeable nose up pitch, but not enough to cause a problem.

I consider the rudder spoilers at the wing tip to be a complete failure. They were about 3 feet long and 3 inches broad and came out of only the top surface on parallel links and were controlled by cam plates on either side of the fuselage. Pushing a rudder pedal rotated the cam plates and raised one spoiler while keeping the other locked closed. There were two major problems with these rudder spoilers. The first being that they had no effect below 40 mph, so I had no rudder control on take off. This was a particular problem when towing it as a glider, and later on a steerable nose gear largely, but not completely solved this.

The second problem is more subtle and showed up when high speed taxiing in a light cross wind. This is a cross control situation and I was using rudder to keep it straight down the runway while using aileron to keep the upwind wing low. With a little thought, you can see that the controls were fighting each other, the open rudder spoiler was always on the high wing and wanted to depress that wing while the ailerons were trying to keep it high. That is, of course, at speeds above 40 mph so below that speed the rudder spoilers didn't work and the only way to keep it straight was the steerable nose wheel and if I lifted the nose, it would immediately weathervane and head for the side of the runway. I didn't like any of this so eventually got rid of the spoiler rudders and went to a vertical rudder at the rear. The vertical rudder is very effective especially when I put it behind the prop and I now have excellent yaw control in all regimes.

Three other things I need to mention—curved wing tips, trim flaps, and servo tabs. I went to considerable trouble to build smooth curved wing tips for two reasons, first it was to be a glider and I wanted a graceful birdlike appearance, and second I intended to make the last 3 feet of the trailing edge a trim able surface and sweeping the wingtip back would give more surface area there. I never built the trim able surface because after 2 sets of spoilers and the elevons for both wings, I got tired of building stuff. Forty three years later, I wish I had taken the time to build them because it turns out I do need them and now have to go back and build them into the wing after it is finished.

The plane has a very definite nose down pitching moment when in cruise flight and the only way to compensate is to hold the stick back making the elevons about 5 degrees up. This is a good news/bad news thing, the good news is that the up elevons put reflex in the wing and add washout which makes the plane very stable in flight and eliminates adverse yaw. The bad news is that it adds drag and reduces the lift of the wing. What I need are those trim flaps I did not build 43 years ago which would allow me to trim the plane without using the elevons.

This does NOT mean the CG is too far forward; every good airplane is nose heavy which is what makes it stable. Moving the CG to the rear is a sure way to turn a mild mannered and safe flying wing into a killer, so builder beware, don't do it.

As for the last item, the rudder being behind the prop is very powerful, but is also very stiff, the rudder pedals feel like they are set in cement so I will have to build a servo tab into the rudder to lighten the load on the rudder pedals.

CENTER OF GRAVITY:

This is the most critical parameter of the design and yet is the one that is hardest to pin down. Even Karl and Michael in their excellent book are hesitant to give any hard and fast rules here. When I laid out my design, I did not have any information on location of CG for a flying wing and did not have any info on any of the flying wings built by Northrop, Lippisch, or the Horten brothers.

June 2016

When describing the location of CG, you first have to explain where you're measuring from. Professional designers use the Mean Aerodynamic Chord, but not being a professional, I use the Mean Geometric Chord (mgc) instead which serves just as well and is very easy to locate geometrically on a plan view of the plane. Because I had no other info when I laid it out, I decided to put the CG at 25% of the mgc which is a good number for a conventional plane but, as it turns out, is too far back for a small light flying wing.

June 2016

When I did a weight and balance at Boulder airport in 1974 I found the CG to be at exactly 25% and was very happy to have it where I thought it should be. My models flew pretty well in calm air at this location, but it is too close to the aerodynamic center and made the full sized glide much too sensitive in pitch. I am sure if I had ever stalled the glider, it would have spun handily and I would probably not have been able to recover, especially with the weak and ineffective spoiler rudders.

When I finally put an engine in the nose and took it to Dexter in 2009 and did a weight and balance, I found the CG to be at 13.5% which is way too far forward and the plane wouldn't fly. I then ripped the fuselage apart and rebuilt it with the cockpit forward and the engine in the rear and when I did a weight and balance at Sikeston, Mo. Airport in 2015, I was delighted to find the CG at 20% of the mgc which, based on my previous experience, was exactly where I wanted it to be and after a few adjustments, it flew beautifully in 2016 and I put 23 hours on it that summer.

June 2016

It is my opinion that for a flying wing of this type, the CG should be no further forward than 17% and no further back than 25% of the mgc. For my airplane this is only about 4.8 inches so you don't have much margin to play with on a flying wing. This is not a hard and fast rule, every design is different and CG location must be approached carefully if you want to survive to fly another day.

LANDING GEAR:

Location of the landing gear is critical because a flying wing has relatively weak elevators without much power to raise the nose on take off so the wheel has to be almost on the CG. A good rule of thumb to live by is that you should be able to raise the nose of a tricycle gear airplane at or slightly below the expected stall

speed. If you can't, you had better stop and fix it as it is a trap for the unwary and can kill you.

The scenario goes like this, you are doing high speed taxi tests and cannot raise the nose so you figure if you just go faster, sooner or later the nose will come up, and sure enough it does at a hundred mph or more, at which time at ten feet and a hundred mph you find out the plane is way out of trim and you don't have enough elevator power to control it, end of story, end of you. This has happened to unwary builders in the past, it is no joke. In 2015 I had just this problem, my plane was a tail dragger at that time, I was tearing down the runway at 50 mph and still could not raise the tail. I did not want to rebuild the landing gear, but I knew the main wheel was way too far in front of the CG so I stopped, took the wings off, took the fuselage back to the shop and spent 2 months rebuilding the gear.

August 2016

I moved the main wheel a full foot to the rear putting it about 2 inches behind the CG, put a steer-able nose gear on it, took the fuselage back out to the airport, put the wings back on it and continued with the taxi tests. I could now raise the nose at 35 mph and could balance the plane on the main wheel and found I had good control all around and it was safe to continue.

It was dammed hard work, and a very frustrating thing to have to do in the middle of the season but, hey, I am still alive and that is a good thing. As an aside to all of this, remember on a pusher you have to use the weight of the pilot to balance the plane and if you have the main gear positioned correctly, when you climb out, it falls back on its butt. That's just the way it is and why I left the tail-wheel in place.

PILOT POSITION:

The pilot position should be pretty straight-forward but it was the thing that bedeviled me the most. First I was laying on my stomach but that was too scary so I turned the cockpit around so I could sit upright. Then I lay back in a supine position and put a canopy on it, then took the canopy off and raised up again to a sitting position and, then moved the cockpit forward and installed a plastic molded seat to sit in.

I must have rebuilt the cockpit and controls a half dozen times over the years looking for the optimum position. The original design had the spar carry-thru passing under my armpits and I had a really great view over the nose of the wing. When I turned around to sit upright my legs went up and over the spar carry-thru and when I was supine it was like being in a lounge chair and I was locked in. It was a real trial just getting in or out and the view was atrocious. I couldn't see down at all, my head was too low on the wing and too far back and I hated it. What's the point of building a plane you can't enjoy seeing the world out of?

September 2016

The final position is the one I am happiest with. I have a beautiful view over the nose of the wing, am comfortable sitting up, and can get in and out reasonably well. This is stuff I never really gave any thought to until I was in the middle of it and it cost me a lot of time and effort to get something I liked that worked. Considering that I started out with a prone position flying wing glider, I am amazed that I was able to turn it into a successful powered plane with me sitting up front in the catbird seat watching the world go by under my wings.

I am going to stop here, this has gone on longer than I intended. I hope this account of my experiences, plain

and unvarnished as it is, will be of some value to anyone wanting to design and build their own flying wing or to anyone who has a serious interest in these things.

R. Hoppe 3-10-2017

Nurflugel Threads

(ed. The following is a series of messages about obtaining a good copy of Al Backstrom's flying plank plans. If you have anything that would help, let me know and I can forward it to the group.)

Has ANYONE ever found an ACTUAL set of Backstrom's Flying Plank plans?? I follow link after link and all seem to be dead ends.

Bob

Check with Vintage Sailplane Assn. I donated my set and paid to have K&E make a reproduction master of my EPB-1a. They had notes for my center fin option with split aileron drag rudder/spoilers, and were notated on the master by Al Backstrom. Al also donated the original master for his nice little powered plank.

Cheers,

Bob Storck

(VSA has reproducible plans for well over a dozen vintage sailplanes, everything from a Grunau Baby and Baby Albatross to the DFS Olympia, which has about a hundred drawings. Many others on microfilm.)

I bought a copy of VSA plans years ago. Don't remember any "extras" like that. The control system page is completely illegible. Al sent me some growth plank ideas before he died.

Dennis Olcott

Yes the VSA have the plans - I bought a set about 20 years ago and still have them.

Kirk Sutton

Hi Kirk,.. they no longer have or sell the Plank plans..

Here is the response from Jeff @ VSA, when I inquired about them.

I am sorry to have to reply to you in this manner, but the plans though in existence, are not available for building. The designer himself was not enthusiastic that they be made again available for building. In the litigious society we now live you can imagine where the finger would point if tragedy befell a builder of limited aeronautical skill; at the provider of the intellectual property. If you were in possession of an example, portions of the plans could be made available to you to repair the same. This is not what is our desire it is nonetheless, a decision of necessity.
Jeff Stringer
518-772-9603

If you still have your set, would it be possible to purchase a copy of yours from you, or if you no longer want yours, to purchase them? I'm on an extremely fixed income, but would be happy to purchase at a reasonable price, if you're willing to help Me out.. Thanks Again for your response Kirk, and perhaps you can let the folks on the site know they're no longer available.

Bob

That's a very disappointing response from the VSA for two reasons. First, Al passed away, so there is no liability to Al. Second, Al specifically gave the VSA his plans and the rights to sell them to help the VSA make a little money, especially since most people buy them for study and none have been built in decades, so even less liability.

As I said, my copy that I bought from the VSA about 20 years ago has a terrible page for the controls – several areas not legible at all. But I would be happy to have my set scanned (so I can have an electronic copy) and a full size set of prints made if you want to pay for it. I did a quick search and it was like $10/page for D-size prints. That sounds ridiculously expensive because there are probably 20 pages? If you search out places in the Denver area (better south of Denver) and send me a few links of places that can scan/copy at prices you are willing to pay, I'll drive over and get that done if you pay whatever the costs are via PayPal.

Dennis

Disappointing but interesting to know that apparently Al didn't want them to be available for building. I was only interested in the mixer so don't have the whole set of drawings. I have a scan of the mixer but it must be from the same original that Dennis' is from because it's so bad as to be useless for a builder. However it is an interesting mechanism. Much more complex than the V-mixers that are commonly used but it is installed vertically behind the seat rather than on the floor in front of the seat where it could get stepped on. Also the stick folds forward so that someone wearing a skirt or a kilt can get in without getting snagged.

Norm Masters

I would love it if you could take photos of the mixer. My copy is so bad I can't tell at all how it worked, so your must be better than that! I too was mostly just interested in the mixer ideas, and my copy didn't help. I asked Al and he said he didn't keep a copy.

Al wasn't against selling the plans! He just wasn't selling many, and getting old, so he turned it over the VSA.

Before he died, he sent me a bunch of flying wing and seaplane references, reports, drawings he had since his children weren't interested and he knew I was interested.

Dennis Olcott

I found these pictures years ago, either one the EAA web sites or National Soaring Museum, and assembled them into this collage. The plan was to use the pictures and low quality scan of the blueprint page of the controls to work up a clean drawing but I never got around to it.

https://groups.yahoo.com/neo/groups/nurflugel/photos/albums/1979101372

Norm

(ed. – If you are not Yahoo groups registered you may not be able to access this link directly.)

Ok. I moved house today so I'll look into the shipping container of aircraft stuff over the weekend and find the plank plans. Mine are a full set and like Norm I'm surprised at the VSA response as Al and I wrote to each other about the plank back in the late 90's and he was enthusiastic about people remaining interested in his plane - though we agreed the wing section was not a good one for any modern flight performance.

Sorry but I've dragged out the plank plans and the control sheet has been moved into another bundle - all drawings except the two smaller sheets of control are in the tube but I've clearly put them somewhere else. Will continue to look for them but at the moment I'm still rolling up the Wright Flyer drawings that I though looked like they had a few extras included - they did but tipsy nipper drawings are also not helpful.

I'll see what I can do locally to digitize them either scan or failing that I'll redraw them in CAD.

Kirk.

That would be great Kirk. If you can't find a place that scans at a reasonable price, I have a CAD print shop that scans My model plans to a disc for about $3.00 a sheet. (and some are quite large) If you tell me how many sheets there are, I can figure out the general cost, and see if I can afford it. I'm on an extremely fixed income, and if there are too many sheets, it would be a 1st of the month project. I'm P/C challenged (P/C idiot), but have good friends in R/C groups (modeling site) that at cracker jack in reducing the size of PDF's for posting to size restraint sites, and cleaning them up. If you can't find a viable source and want to trust Me to copy them, return them, and send you the PDF files, I will be happy to do it at My expense.. Thank You Again

Bob

Hello,

This email message is a notification to let you know that a file has been uploaded to the Files area of the Nurflugel group.

You can access this file at the URL:

https://groups.yahoo.com/neo/groups/nurflugel/files/blackstrom plank/Flying Plank 1.pdf

To learn more about file sharing for your group, please visit:

https://help.yahoo.com/kb/index?page=content&y=PROD_GRPS&locale=en_US&id=SLN15398

Regards,

miket5219

Thanks for those articles, Mike. I hadn't seen most of them. Page 7 of the blueprints you posted looks the same as what I have.

Norm

I uploaded photographs of my copy of the plans for reference. Some might have better (or worse) clarity than Mike's.

Dennis

AVAILABLE PLANS & REFERENCE MATERIAL

Coming Soon: Tailless Aircraft Bibliography Edition 1-g

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

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

Prices: To Be Announced

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

VIDEOS AND AUDIO TAPES

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

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

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

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

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

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

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

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

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

FLYING WING SALES

BLUEPRINTS – Available for the Mitchell Wing Model U-2 Superwing Experimental motor glider and the B-10 Ultralight motor glider. These two aircraft were designed by Don Mitchell and are considered by many to be the finest flying wing airplanes available. The complete drawings, which include instructions, constructions photos and a flight manual cost $140, postage paid. Add $15 for foreign shipping.

U.S. Pacific (559) 834-9107
8104 S. Cherry Avenue mitchellwing@earthlink.net
San Bruno, CA 93725 http://home.earthlink.net/~mitchellwing/

COMPANION AVIATION PUBLICATIONS

EXPERIMENTAL SOARING ASSOCIATION

The purpose of ESA is to foster progress in sailplane design and construction, which will produce the highest return in performance and safety for a given investment by the builder. They encourage innovation and builder cooperation as a means of achieving their goal. Membership Dues: (payable in U.S. currency)

United States	$20 /yr
Canada (Air Mail)	$25 /yr
All Other Countries (Air Mail)	$35 /yr
Electronic	$10 /yr
U.S. Students	Free if full time student as defined by SSA)

Make checks payable to: Experimental Soaring Association, & mail to Murry Rozansky, Treasurer, 23165 Smith Road, Chatsworth, CA 91311.