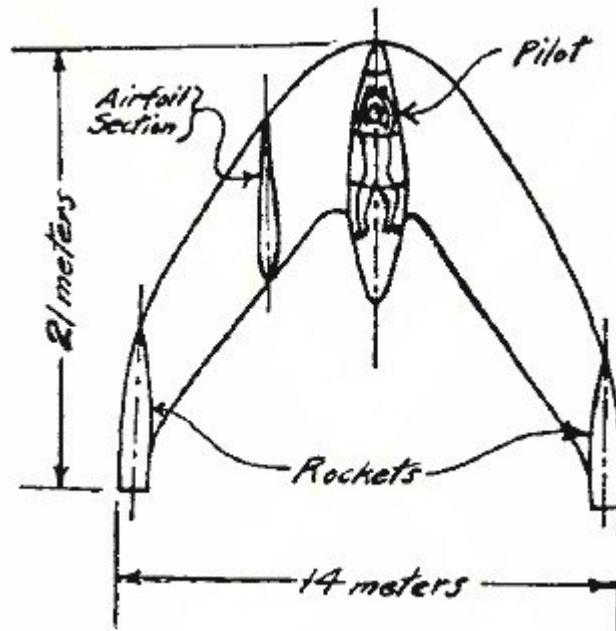


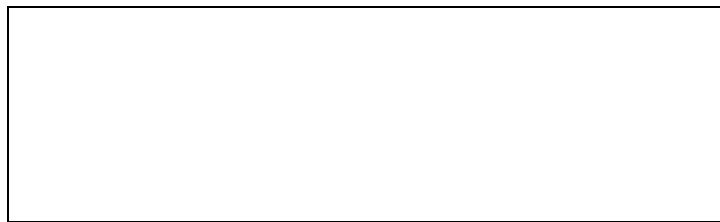
T.W.I.T.T. NEWSLETTER



This is listed as a Plan View of Horten Airplane. It looks like it comes from the book Horten Brothers and the Flying Wing. Haven't seen this concept drawing from their collection before.
Source: <http://www.abovetopsecret.com/forum/thread321480/pg1>

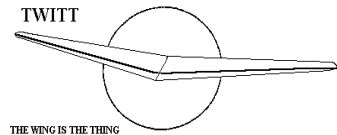
T.W.I.T.T.

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., 0910 means this is your last issue unless renewed.

Next TWITT meeting: Saturday, November 21, 2009, 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.

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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 (#1720), east side of Gillespie or Skid Row for those flying in).

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PRESIDENT'S CORNER

In case you may not have noticed I have changed to user ID and password to the members only section of the web site. We were having a problem with access that I thought may have had something to do with the codes. As it turned out the problem was related to a previous update I had tried to do for the September newsletter that failed. Long story short, I resolved that issue and the new codes are in place. **I have updated the ID and PW in the masthead column to the left.** So if you like looking at the newsletter in color or using the Internet links, then these are the codes you need to use.

Well, I wasn't proved wrong with the ESA Western Workshop over the Labor Day weekend. There were really great presentations mainly directed at more economical ways to get into and stay in soaring. Much of it related to electric self-launching along with more on the micro light sailplanes that make this even more feasible. There are some great developments in the electric propulsion units and batteries, and if coupled with a low drag flying wing could make such a design very competitive in the kit building market.

Bruce Carmichael offered the following: "During the discussion of more convenient less expensive soaring, Rienk Ayers stood up and announced his development of the SOLO LSA, which he is manufacturing. He would be able to tool up for a design if designed by the ESA. I phoned him and found out he is located in Santa Maria (CA) and has his plant at the airport. His office is at 3117A Liberator in Santa Maria, phone 805-714-6495. His SOLO LSA uses a commercial 2 cylinder 4 stroke 40 hp unit. He would consider tooling up for a 15.5 meter motor glider version of the SOLO. He felt he could greatly reduce the cost of existing motor gliders. Do we have some ESA members interested in such a deal? Do we have a project engineer to head it up?" So there are people out there that can help with the right idea. Give it some thought.

Andy

THERE IS NO PLANNED SPEAKER FOR THE NOVEMBER MEETING AT THIS TIME. CHECK THE WEB SITE FOR A MORE CURRENT UPDATE JUST IN CASE A PROGRAM COMES OUR WAY.



LETTERS TO THE EDITOR

September 2, 2009

My name is Claudiu. I am from Romania (eastern Europe) and because I have a passion for fly I dream to build my own ULM aircraft. To do that I need some plans, and I ask you if you can to donate me some kind of plans. I intend to build an ULM from fiber-glass with an engine with approximately 50 horse power for one or two person like an experimental. Thank you very much for your time and sorry for my bad English.

<aviatiromineasca@yahoo.com>

(ed. – I replied to Claudiu with: Based on what you have written I think you are asking about plans for the Mitchell U-2 flying wing. The link below has a join the group button if you would like to see if member has a set of plans he is willing to sell.

<http://groups.yahoo.com/group/U-2Wing/>

You can also write to mitchellwing@earthlink.net or visit <http://home.earthlink.net/~mitchellwing/> to get more information about ordering plans directly from the dealer.

I hope you find this information useful in meeting you needs to find a set of plans at a reasonable cost.

I have not heard back from so don't know if he can't afford the plans or perhaps this is not the aircraft he was thinking of. The ULM as far as I know is the U-2 that was built in Europe and hit all the magazine covers. If someone knows of another aircraft other than this one, please let me know and/or pass the information along to Claudiu.)

September 9, 2009

Guess what I've been doing the last few hours :-)

Model N1-M in wind tunnel

<<http://www.youtube.com/watch?v=wzJZk75asn8&feature=related>>

More N1-M in wind tunnel

<<http://www.youtube.com/watch?v=-s8-qOS1u9w&feature=related>>

1946 Lippisch DM-1 glider in tunnel with smoke

<http://www.youtube.com/watch?v=rQNPI5DdS5l&feature=channel_page>

XB-35 model tufted stall in tunnel

<<http://www.youtube.com/watch?v=kv0GCBfhPHY&feature=related>>

XP-56 model tunnel test

<http://www.youtube.com/watch?v=R9wG50sSFXM&feature=channel_page>

Consolidated Vultee XB-53

<<http://www.youtube.com/watch?v=ZCPI45YNM0E&feature=related>>

XFG-1 glider model tow test

<http://www.youtube.com/watch?v=UIFDSacpszs&feature=channel_page>

vertical tunnel Kaiser-Hughes and N-9M Model

<http://www.youtube.com/watch?v=W5HGHRz3bbl&feature=channel_page>

Swept wing flow studies

<<http://www.youtube.com/watch?v=v2yipTXBP-Y>>
<http://www.youtube.com/watch?v=hutx8ivD_yc&feature=channel_page>
<http://www.youtube.com/watch?v=w8SOuH9sNYc&feature=channel_page>

Spin Tunnel Tests in the RAE Vertical Spin Tunnel

<http://www.youtube.com/watch?v=UNZ234jfUy8&feature=channel_page>

NASA started uploading their old films to Youtube a couple months ago. So far there are 471 and I'm only half way through. Hopefully I'll find a spin test of the YB-49 model. I saw a mislabeled still of it in a NASA history so I know there was one. There were also helicopter drop tests

Norm Masters

<nmasters@acsol.net>

(ed. – Thanks to Norm for passing this information along. I am sure everyone can spend a lot of time

watching just these, let alone all the others that are currently available.)

September 10, 2009

I recently contacted the planes of fame museum and they sent me a picture of the SA-882 sitting outside their hangar in Valle, AZ and deteriorating....wonder if this could be an interesting restoration project or maybe the composites have deteriorated too much over the years...

Do you possibly have the phone number or email for Rod?

Thanks.

Hakan Langebro
langebro@avinc.com



(ed. – Rod has indicated he can't say much about the current status of this aircraft so I am hesitant about providing his e-mail address. He has said that perhaps next year he may be able to tell us more information and we look forward to that time since there has always been interest in this experimental design. Below is what it looked like while at the Planes of Fame Museum in Chino, CA.)



September 13, 2009

The Boeing X-48C, a modified version of the Boeing X-48B blended wing body research vehicle, completed a 300-hour wind-tunnel test program Thursday Sep 03 at NASA Langley Research Center in Virginia.

<http://www.nasa.gov/centers/langley/multimedia/iotw-x48c.html>

X-48C 'low-noise' BWB configuration concludes aerodynamic testing at NASA Langley wind tunnel

A modified version of the Boeing X-48B blended wing body demonstrator, given its own X-plane designation by the U.S. Air Force in August as the X-48C, has completed a 300-hour wind-tunnel test program at the NASA Langley Research Center in Virginia.

Data from the wind-tunnel testing will help the Boeing-NASA X-48 team refine flight control software, which will be used when the X-48C is taken to the NASA Dryden Flight Research Center at Edwards Air Force Base, Calif., for planned flight testing in 2010.

Configured with two turbofan engines instead of three and with twin-canted fins mounted on the aft body section, the X-48C will be used to examine BWB noise levels.

With a 21-foot wingspan, the 500-pound X-48 airplanes are 8.5 percent scale models of a heavy-lift, subsonic airplane with a 240-foot wingspan that the Phantom Works organization of Integrated Defense Systems believes could be developed in the next 15 to 20 years for military cargo applications. Because of the X-48B's efficient aerodynamics, Boeing and NASA researchers believe that the BWB configuration offers the potential for reduced fuel burn over conventional similar-sized tube-and-wing transports flying the same mission. In addition, in large part because of the way the engines are integrated into the vehicle – on top of instead of underneath of the wings - they believe the BWB concept offers the potential to be quieter, as well.

"Our tests in the wind tunnel at NASA Langley were aimed at helping us better understand and quantify the aerodynamics of the new vehicle," said Dharmendra Patel, Boeing Research & Technology X-48C project manager. "That is a crucial step in order to safely and efficiently conduct the flight-test program next year. And since our test article is an actual airplane, we are also getting necessary data for those aircraft systems that have aerodynamic inputs. We have been very

pleased with the quality of the results from the testing and the team is looking forward to incorporating them into the BWB flight-control software."



(NASA public release photo)

"Comparing the noise signatures and handling qualities of the X-48B and X-48C in flight test should provide insight for development of a low-noise subsonic transport," added BR&T BWB Program Manager Bob Liebeck.

Since July 2007, when the X-48B flew for the first time, Boeing and NASA researchers have been methodically pushing the research aircraft to test and validate the BWB data and flight-control system, and gather detailed information on BWB stability characteristics throughout a variety of flight regimes, including stalling and recovering the aircraft in flight. Last September, the X-48B was stalled and recovered in flight for the first time. So far, the X-48B has flown 61 times, with 10 to 15 more flights planned this year.

Patel said the X-48C is a follow-on project to the X-48B and is an evolution of the original BWB concept intended to incorporate and test emerging lower-noise technologies. The X-48C designation was an important milestone for the project, as X-plane status is selectively granted by the Air Force based on relevance to its vision of worthwhile flight research.

Larry Witherspoon
[<Ssspoon@aol.com>](mailto:Ssspoon@aol.com)

(ed. –Larry works in the Integrated Defense Systems section of the Boeing Company in Long Beach, CA, so has first hand information on what is going on with the progress of this test vehicle.)

September 14, 2009

Hí Andy,

Here are some updates to the TWITT staff and members from the IG-Horten? We finished our H XII, Horten XVI Colibri and now we are close to finishing the H XIV Sailplane.

I also got a donation of a Horten IIIe in half scale.

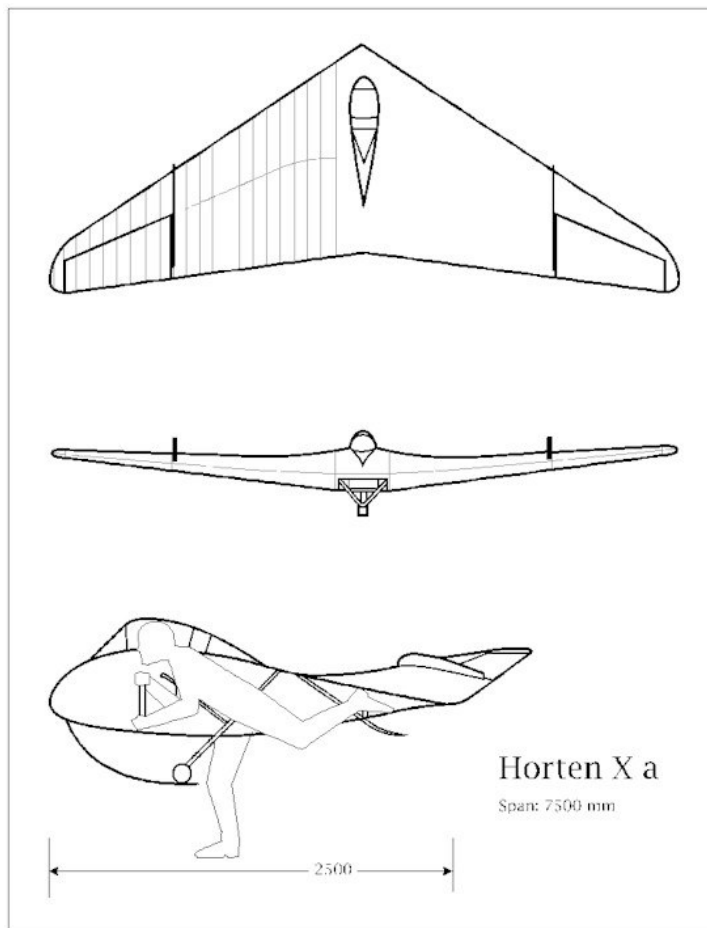
Regards

Jörg Schaden
[<info@ig-horten.de>](mailto:info@ig-horten.de)

(ed. – Check out the Horten site at: <http://www.ig-horten.de/welcomeeng.htm>)

September 15, 2009

Plans & Drawings for the Ho X a "Alito" or the Ho X b "Piernifero" Hang Glider?



I want to build this Hang Glider the "A" model. It looks like you know a lot about these gliders.

Thanks,

Doug Beasley,
[<energytool@sbcglobal.net>](mailto:energytool@sbcglobal.net)

(ed. – I wrote back that we knew of no plans for this or any other of the Horten designs that were in the public domain. Is someone out there knows something different and can provide him a contact point, please include us in your addressees so we can add the information to our library.)

September 15, 2009

(ed. – Bob Hoey writes, "Here is the exchange between Etienne Houssu and I. The video page has some out-standing coverage of his model flying. This is a typical email chain." You can see what this model looks like in the August 2009 issue. This is an excellent exchange of information across great distances through the miracle of the Internet. I wish we had more of this related to other subjects that interest that portion of the membership into full size aircraft. It could be amazing what bouncing ideas off of one another might bring out. We don't have a bulletin board for TWITT since there is already one from the Nurflugel.com web site serving that purpose. However, we have some members without an Internet connection so snail mail may be their only means. Please don't let that stop you even though it will take a little longer to get the questions out and answers back.)

Good morning Bob (Hoey)

Bravo for your work.

I built a Griffin vulture using your plans and this one. My bird has 2,5 m of wingspan for 3 kg. The dihedral is 14 ° and angle of incidence is 6,5 °. As you can see the tail is shorter than yours. I curve the 3 feather tips to look like photo. I installed a small directional rudder under the body with the drawing of a foot. My bird is in polystyrene with fiberglass and epoxy.

In flight many oscillations are difficult to control. Have you an idea? What is the amplitude of tip movement in ° under and above wings.

Thank you.

Etienne HOUSSU
[<etho.125.mm@free.fr>](mailto:etho.125.mm@free.fr)

Hello Etienne,

VERY nice looking bird!!

I have found that adjusting the dihedral is the easiest way to control the lateral oscillations. My original vulture used 16 degrees of dihedral (8 on each side) and I have reduced the dihedral to 10 degrees (5 on each side). The oscillations are much smaller and easier to control. That is the main reason that I used an aluminum plate as a joiner between the two wing halves. You can change the dihedral by putting the joiner in a vice and use a hammer to alter the angle. I'd suggest you change the dihedral a little bit at a time (maybe two degrees, then make a flight) since the model can become violently unstable if you reduce it too far.

I am using my transmitter adjustment to reduce the tip feather movement to about 10 degrees above and below the wing. (The normal rotational travel of a servo is about 60 degrees, and that is too much).

Good luck, and let me know if this helps.

Bob Hoey

Hello Bob

I reduced the dihedral to 10 degrees and it is better but it is insufficient. When I turn inclination is important. Oscillations during landing with metro conditions lightly turbulent are not good for model life. I will try to add aileron.

Perhaps I conserve the 3 moving tips or not? I fixed them with glue?

What is your advice?

Thank you

Etienne

Hello Etienne,

Is the oscillation a natural oscillation that occurs without any control inputs, or is it driven by the pilot control inputs to the tip ailerons?

If it is most bothersome during turbulence, I suspect it is a natural lateral oscillation. One trick that I have used successfully is to install a clear plastic, circular disk at the trailing edge of the wing, about 2/3 of the way toward the tip, canted inboard at the front about 20 degrees.

For the size of your model I would start with a disk about 3 inches in diameter. You may be able to make it smaller after some flight experience. This

provides some directional stability and should reduce the natural oscillations.

If your wing tip ailerons are not causing the model to roll (poor lateral control) then I'd suggest you check that the forward tip feather is mounted at an angle of -27 degrees relative to the wing chord. This should allow coordinated turns with the tip ailerons, where the nose does not swing in either direction when you apply a sharp roll command.

I doubt that adding normal ailerons would help. There is no method for adjusting ailerons so that they do NOT cause adverse yaw (nose swinging away from the direction you want to turn.) The zero position of the wing tip ailerons can be adjusted so that they will cause the nose to swing in either direction, allowing you to find a "sweet spot" where the nose remains steady when control is applied. (-27 degrees on the front feather is best for my models).

Hope this helps. Let me know how it works.

Bob Hoey

Hello Bob

I set 50% expo on my transmitter for wing tip and the oscillation are reduced and very small. The pilotage must be very soft!!!

I made a video of the flight, and I will search for a means to send it to you by the web.

A am not a good web surfer !!!

Thank you for your advices.

Etienne

Hello Etienne,

Sounds like you have the oscillation problem under control. That's great!! I have been unable to open the video, but will keep trying.

Good luck with your Griffon vulture. I expect you will have many successful flights with it - hopefully joined occasionally by real vultures!

Bob Hoey

Try this for vidéo:

<http://www.youtube.com/watch?v=tRhyau4bvhE&feature=fupldve>

Etienne

YES! I have viewed the video of your Griffon Vulture. Absolutely Beautiful!!!

It appears to be very stable and controllable. I see you have a clear plastic sub-fin under the tail. I couldn't detect any control movement. Are you controlling bank angle with the wingtip ailerons?

Congratulations on a very realistic, and good flying, bird model!!

I will attach the construction article that accompanied the Turkey Vulture plans. If you will send me your mailing address I will send you the full-scale drawings and details of the Turkey Vulture. (You may have to pay some import duty/tax).

Bob Hoey

Hello Bob

When I turn I begin the turn with the small rudder under the tail and I control the bank with wing tips.

For the drawing it is for a friend. I transmitted your message and he will contact you if he decides to make a bird looking mine !!! or yours !!!

Thank you

Etienne

September 16, 2009

Hello, I saw this video on you tube. Do you sell these products? It's an artificial bird (peregrine)

http://www.youtube.com/watch?v=ttNo2gFkquQ&feature=channel_page

Waiting for your reply.

Martin Gauthier
<martingauthier@live.ca>

Martin,

The video referenced in your note was one of my designs, a Turkey Vulture. The plans were published in the June 2002 issue of Model Airplane News, plan #FSP0602. Plans are available for \$19.95 from;

Air Age Mail Order
P.O. Box 407
Mt. Morris, IL 61054-0407

Quite a few Turkey Vulture models have been built (several in Europe) and they all seem to fly well.

Bob Hoey

September 28, 2009

Don't mess with a mama bird!!

<http://www.rcgroups.com/forums/showthread.php?t=1118364>

Norm Masters



July 3, 2009

(ed. – I got this from Fred Blanton back in July and it got misplaced until tonight when I went back through the stack of material that belongs to TWITT in my office. I apologize to Fred for not handling it when it came in.)

Your June 09 issue was great as usual. Sort of a "Backstrom Special Issue."

I would like to extend my condolences to Carol Avalon. I got to know Richard at Labor Day ESA events. We brought two of the U2s from Porterfield to Vacaville for storage over the winter.

I am sending you a group of articles that I have collected over the past 25 to 30 years, most by Backstrom. I don't know if you have any of them or not so use them if you can. One item is by Dennis Harmon & Larry Linville on the development of the "DINGUS" and a letter to A. Rogers from D. Harmon on the DINGUS.

H. Fred Blanton
Windsor, CA

Other articles included were:

"Flying the Plank" by Ted Janczarek
 "The WPB-1 Flying Plank, Part 1 – The Designer's Story", by Al Backstrom (1976)
 "The Elements of Tailless Sailplane Design" by Al Backstrom (2000)
 "A Flying Plank Sailplane For Today?" by Al Backstrom
 "Let's Take A Fresh Look at Ultra Light Airplanes" by Al Backstrom
 "Adventurer unveils solar-powered plane", The Press Democrat, 6/27/09 *(ed. – This is not a flying wing but it does have a lot of wing area. The newspaper article included a picture of a model, whereas I found this picture of the real thing in-flight.)*



Source:

<http://cleantechnica.com/files/2008/11/solarimpulse4.jpg>

(ed. – I don't have the luxury of time for this issue, but will see about working some of this material into an upcoming one when I am not so pressed against the publishing deadline.)

Mitchell U-2 Group Threads

Elevon Balance Weight Problem – U2

I am having problems with the elevon balance weight setup.

I have 1 lb. weights on about a 13" rod that 'almost' level the elevons, but are guaranteed to hit the ground in some stick positions.

I also have 2½ lb weights that need less 'arm' but add a hell of a lot of extra weight far aft of CG. But they are still too close to the ground for comfort.

Except for flutter dampening, I'm beginning to wonder if they're actually necessary for the U-2.
(The 503 engine is adjustable fore and aft for CG control.)

Thoughts appreciated. Maybe just a stick bungie? Or is elevon balance really a better idea.

Dave

The Elevon balance is absolutely necessary. Please do not try to fly without it them being balanced.

Jack

I am new to the group so I may be out in left field on this problem. I am under the impression that the tailskid on the fuselage is to keep the rest of the plane from hitting the ground. More importantly the prop is also back there & you definitely don't want a prop strike.

Stan - Owner of a U-2 kit.

It should but not all landings are graceful and sometimes those pesky runway lights jump right up at you. A light springy tip skid might not be a bad idea for the first few flights.

Norm Masters

Please clarify how you know the weight can hit the ground, and under what conditions. (on the gear, rocked backward, one wing down, stick in back corner) Is this on an assembled airframe?

D & J Gingerich

OK, maybe a little dramatic, but true. Sitting back on the tail wheel, full aft corner stick, the weight is on the ground. I'll just have to install a forward lock for the stick.

With a 14° takeoff/landing attitude there is 3" clearance with the stick full aft corner. NOT a stick condition I would care to be in near the ground. But not unreasonable for rear quartering crosswind ground taxi.

Control tuning has not yet been done, so that clearance might increase.

I may still use the heavier weights on shorter rods.

Dave

A-10 Stabilator Protractor

Project restore is at dead end till I find one, make one, buy one or figure another way to achieve the settings required.

Does anyone have a pattern for a stabilator protractor for a Mitchell wing A-10 I guess I need to make one or buy one to set the deflection movement of the stabilators.

Any idea's for another method to set up the deflection angle on Mitchell wing stabliators. My builders video gives the angles and just says to use the stabilator protractor.

I've even considered buying a set of builders plans for the B-10 or U-2 to see if the info I needs lives with a plan set or another method to get'er done .

Thanks

Ron

For \$27.99 I would buy a ITEM 95998-4VGA Digital Protractor from Harbor Freight Tools at <http://www.harborfreight.com/cpi/ctaf/displayitem.taf?itemnumber=95998> and compare the chord line of the stabilator to the chord line of the wing at the tip. On the B-10, I believe the max stabilator trailing edge "up" was 6-degrees compared to the wing.

Hope this helps or sparks other ideas/suggestions.

Tim

For about the same money you can make a multiple tube spirit level so you can measure both wings and stabilators against a common point. All it takes is some vinyl tubing, tee fittings and 1 X 2's for stands. Once you have it set up, fill the tubing with water mixed with red food dye to make it easy to see. The water in all vertical tubes will be at the same level no matter where you put them. Now you have a common reference to measure from that is independent from floor level. A little math and you're there.

Rick Girard

Ron,

Iwouldn't waste any money on the B10 plans - I just bought them for a new project and I'm very disappointed! Also, I just looked through them and the

book and can't find any reference to a protractor etc.

The good news is I found the item that that I had seen before, which shows a protractor right here in our group files. See the files "files" link on the left and click on the following---

Files - Johan's B-10 files - Elevonrig2.bmp

Your best hope is to contact Johan Prins - he seems to be the last remaining expert on the Mitchell wing.

Rog

I Was Just Looking Over My Plans Set

...and I see that the original plans set state the empty weight of the U-2 is 250 lbs, with a 50 lb engine (Zenoah 250?) and ultralight specs, except for the retractable gear. I have read that the plane is s'posed to be in the same class as a powered glider.

The US Pacific website states 300 lbs empty weight and 100 mph with retractable gear and a 50 hp engine.

Which is correct? I'm leaning toward the plans specs, but the retracts have me thinking maybe there was a modification in the early 80's to add retracts which put the weight at 300lbs due to the extra complexity and amount of steel tubing for the gear, and a larger (heavier) engine was used for more performance.

I was considering a faired, fixed tricycle gear and an early Arctic Cat 440 (Kawi?) engine.

Is it possible (and worth the extra effort) to make this plane ultralight compliant and register it as such? I didn't purchase the plans as ultralight, but because I just like the lines of the plane.

Will the modifications or website affect how the FAA will view this plane for registration, and force me to go ELSA or even plain Jane owner built Experimental rules even if I follow the plans?

If I reduce the weight of the gear and "fuselage" to bare minimum, but leave the wing and rudders alone, I can shave an incredible amount of weight with a fuselage shell of carbon fiber matrix or plywood door skin veneers (my personal favorite), wrapped around a welded or riveted aluminum tube fuselage 'cage', instead of the welded steel cage, steel gear, and fiberglass shell.

What do you all think?

Thanks,

Jeff

The empty weight is 100% dependent on how you build the plane. Efficient building will get it closer to spec (whichever that is). However, some spilled glue there, and a bit extra wood there, maybe a bit more dope on the fabric all add up to extra weight.

If you look far enough back in the archives, you'll find a fellow that was trying to build to ultralight specs. I'm not sure how it turned out though.

Personally, I'm going to certify mine as a powered glider. Still don't need a medical for it, but you do need a glider ticket.

The last time I talked to Richard Avalon, he recommended the Kawasaki 440 if a Zenoah couldn't be obtained. There were a couple of other engines from Europe that he recommended as well if I recall correctly.

As far as gear goes, I'm considering using something from Grove and incorporating it into the pod. There's been some reports about the main spar cracking due to the gear causing stress. That's some where in the archives too.

Andy Gamache

Jeff, all, There is NO way to make a Mitchell wing an E-LSA if you didn't get it registered before 1-31-2008, period. Even if you did get the registration you would have to get it inspected and a special airworthiness certificate issued before 1-31-2010. See FAR 21.191i(1).

(i) *Operating light-sport aircraft. *Operating a light-sport aircraft that—

(1) Has not been issued a U.S. or foreign airworthiness certificate and does not meet the provisions of §103.1 of this chapter. *An experimental certificate will not be issued under this paragraph for these aircraft after January 31, 2008*

Rick Girard

After building "Toms U2", and trying like hell to meet the Part 103 weight limit, my conclusion is that it can't be done. Our kit was Douglas Fir.

To save weight on any aircraft, you need to look at the big items. On the U2 they are engine, landing gear, and fuselage frame and pod. There are few savings to be had in the pod, because it doesn't weigh much to begin with. The frame might yield a few pounds. You

could, and should, mount the LG on the frame and save a couple more, but I always cringed at the weight of the wheels and tires.

We investigated backpack parachute engines, but eventually settled on the Rotax 235 as the most reasonable all around.

With the right choices, I think the U2 would deliver reasonably hassle-free flying while operating as a motor-glider.

Dave

Thanks Andy. I'm still in research mode, so will be a little while before I start the build. I appreciate the tips, especially the part about the spar problems. I also was considering a transverse leaf type gear off the fuse.

I have read that the early Arctic Cat engines were Kawasakis. I won't be sure til I have it in my hands and inspect it.

About the powered glider, can they have retractable gear and still fall into this class?

Jeff

Lot's of gliders have retractable gear. It won't be a problem.

Check out

<http://www.sonexaircraft.com/aircraft/motorgliderdefinition.html>

<<http://www.sonexaircraft.com/aircraft/motorgliderdefinition.html>>

for more info about motor glider certification. Follow their (Sonex) advice (like making sure the DAR knows what to do) and you should be fine as far as the FAA is concerned.

Andy

If you can take 50 pounds of weight out of the fuselage pod, carry the gear on the fuselage, and leave the wing alone do that. I would leave the wing design alone in ALL cases. The landing gear change should be an improvement.

I would like to hear if this works to get an ultralight weight with the U2.

Brett

Iwould estimate the weight of the fuselage pod at about 12-15 lb, so you are not going to take 50 pounds out. I weighed all the finished components before selling "Toms U2". There was no way we were going to get under 254 lb. Under 300 is very realistic.

Dave

The answer is YES! Don Mitchell made one out of foam, glass and wood. It was called the Victory Wing and you can read about it hear:

<http://www.twitt.org/MitchellVictoryWing.html>

It does not have ribs. It has a wood main spar and most of the pod is wood. The wing is foam with a glass shell. And although it is much lighter, there is room for improvement! It can be made lighter. The plane was NOT made from a mold. Therefore some of it is thicker/extra material then it needs to be. So the answer to your questions is YES! the U2 can be made light enough to be an ultralight!

Here is a suggestion for the landing gear.

First, attach it to the pod instead of the wings.

Second, consider using the rear leaf spring from an 82 or newer corvette. Don't laugh just yet. They are made out of fiberglass and don't weigh much. I think the 84 and newer corvettes have a fiberglass front spring as well. And you can get one cheap from a junkyard. Something to think about. :-)

Ray Landa

Thanks for the great responses! I have not started building yet, and I will get with my local EAA chapter and involve the FAA where necessary. I don't want to spend a lot of time, money, and effort and end up with something I can't fly legally. I wish I were in front of the ELSA deadline, but that ship has sailed.

I figure the most weight I can lose will be in the retracts, but if I can register it as a powered glider, then I may just redesign them a bit lighter.

I will not modify the wing structurally, but I don't like the looks of all the square gussets that don't support anything with the floating corners. I'd like to redesign some of them for better looks and stronger structure (which usually means more weight).

Thanks to all for the info.

Jeff

Just because you missed the deadline for registering your U-2 as an E-LSA, you can register it as an Experimental Amateur Built under FAR 21.191(g) and as long as it meets the LSA definition you can fly it with a Light Sport ticket. Since you'll be building from plans you will definitely qualify for the repairman's ticket on it (although unlike E-LSA no one but you will be able to do that should you sell the aircraft someday). The only other limitation that might spoil your plans is that you won't be able to have a retractable landing gear (see LSA definition in FAR 1.1)

Rick Girard

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.

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VIDEOS AND AUDIO TAPES



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

VHS tape containing First Flights "Flying Wings," Discovery Channel's The Wing Will Fly, and ME-163, SWIFT flight footage, Paragliding, and other miscellaneous items (approximately 3½+ hours of material).

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

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 Aerovirement project led by Dr. Paul MacCready.

Cost: \$8.00 postage paid
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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 Paul MacCready's presentation on March 21, 1998, covering his experiences with flying wings and how flying wings occur in nature. Tape includes Aerovirement's "Doing More With Much Less", and the presentations by Rudy Opitz, Dez George-Falvy and Jim Marske at the 1997 Flying Wing Symposiums at Harris Hill, plus some other miscellaneous "stuff".

Cost: \$8.00 postage paid in US
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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.

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