No. 218 AUGUST 2004

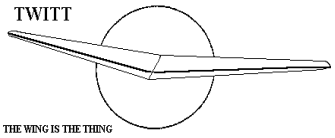
T.W.I.T.T. NEWSLETTER

A new shot of Mike Hostage's Marske Pioneer II flying wing at the flying field in Texas. For more on what he has been doing with this sailplane, see the letters section inside.

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., **0408** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, September 18, 2004, 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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Subscription Rates: $20 per year (US)
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Information Packages: $3.00 ($4 foreign)
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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).

TABLE OF CONTENTS

PRESIDENT'S CORNER

Thanks to all who came to the meeting last month. The one thing we forgot to take care of was the annual anniversary party with cake and ice cream. It's my fault for getting behind on the newsletter and not thinking about all the things I should have going into the meeting. We did have donuts, but it just wasn't the same without a cake with a picture of a flying wing and some cold ice cream on a hot day in the hanger. We will do better next year.

It has been great this month getting a lot of e-mails that could be used for the newsletter. These always make my job easier since it just becomes a case of cut-and-paste from the message into the newsletter and then put in my editorial comments (whether or not you like them or even bother to read them). There are some very interesting ones this month, and I hope you keep them coming.

Don't forget, the user ID and password for the members only section of the website is always in the masthead, just below the contact and website information. I don't have any plans on changing it in the near future, and right now I don't have anything to add to this section other than the latest newsletters for you to download or look at the pictures in color.

Also, don't forget that Labor Day Weekend, September 3-6, 2004, is the SHA Western Workshop at Mountain Valley Airport in Tehachapi, CA. The speakers will be giving their presentations on Saturday and Sunday, and there is a Sunday night banquet followed by the auction of donated items. There are several motels in Tehachapi, and more in Mojave if you can't find a local one. There is also a campground on the field with full services. I hope to see you there.

Eugene Turner has sent us some items from his archives, which we greatly appreciate, and we will give you more information in the next issue.

Andy

SEPTEMBER 18, 2004 PROGRAM

We don't have a firm program lined up for September yet, but continue to work on finding something interesting.

JULY 17, 2004 MEETING RECAP

Andy welcomed everyone to what was our first true meeting in quite a while. Since everyone knew the housekeeping routine, Andy introduced our speaker, John Seelig, who was going to tell us about his experience in building a Laister LP 49 glider, so we could all appreciate the complexity of such a project and some of its pitfalls. We set up a couple of tables and John put out a lot of pictures and some of the plans for everyone to look at as he talked, or for afterwards.

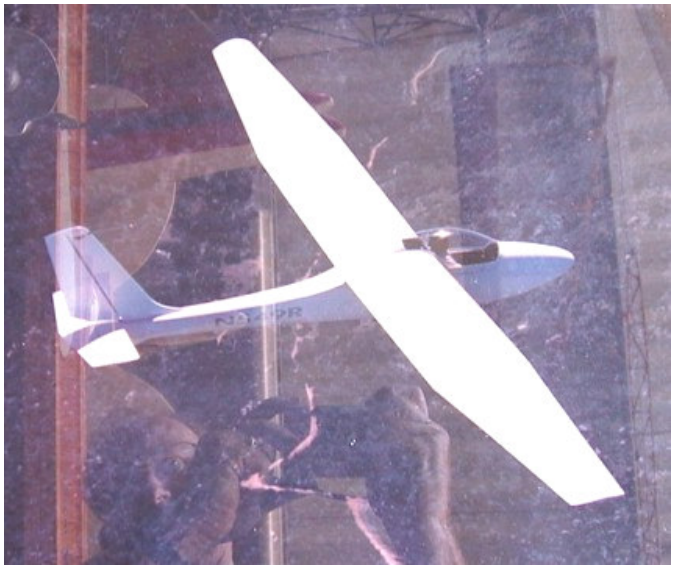
A nice group of people listening intently to John.

John opened by saying that if there were any questions to make sure to ask them at the time so the program can flow along naturally. He then gave us some background about wanting to build a sailplane from a kit for a long time. At the time there weren't many kits available, but he did take a look at the Schreder HP-18 before finding the LP-49. When he bought it, it had come out of Jack Laister's factory and was sort of a whole lot of parts in bags (he later found that not all the parts were there).

ABOVE: John giving us his views on building the LP-49.

In 1966 Laister designed the LP-46 and LP-49, which were essentially the same, but the –49 had a longer wingspan. He went into production on the –49 and factory built 7 aircraft as part of total run of 50 aircraft, but only 15 kit versions were produced for a total run of 22 sailplanes. Since the rules were different back then, some of the kits actually came out as type certificated aircraft. Unfortunately, the metal/composite combination of the LP-49 wasn't able to compete with the all glass Glasflugel Libelle, as was the initial intention, and Laister ended up closing the factory after this run.

John's aircraft was serial number 5, with the wing spar having been built at the factory. It's built-up aluminum from riveted back-to-back angle pieces with a shear web, and tapers to ¾ of the inch at the tip. The kit had been through several hands before John bought it in 1982, and the last owners had built the tail surfaces. They were so bad he had to scrap them and start over, so he contacted Laister to obtain the tooling for these parts, which delayed the project by about 8-9 months as he built the parts and assembled the new surfaces.



ABOVE: The LP-49 in flight.

The project was completed in 1986, just short of the four-year point. He worked on it pretty steadily in the evenings and on the weekends.

ABOVE: John standing next to LP-49 on the tie down line at Warner Springs glider port.

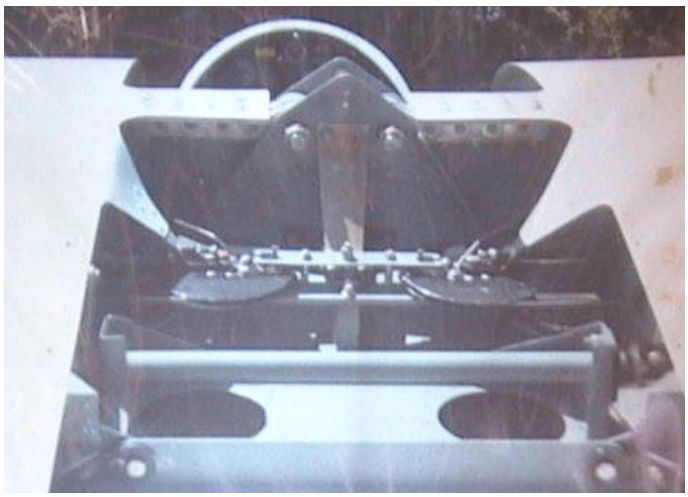
He explained a little about the basis for the design including the arrangement for the flap/dive brake surface. When first deployed it acts more like a spoiler as it rotates around the pivot point and the leading edge pokes out from the upper surface. With further deployment it acts more like a flap and provides a lot of drag. It makes for good short field landings.

The basic specifications for the LP-49 are:

Airfoil: NACA 64618, laminar flow
Area: 143 sq. ft.
A/R: 16.9
Gross Wt.: 750 lbs.
Wing Loading: 5.25 lbs./sq. ft.
Span: 15 meters
L/D: 33:1 @ 57 mph
Sinking Speed: 2.3 ft./sec. @ 49 mph
Stall Speed: 35 mph
Vne: 135 mph
Maneuvering: 85 mph

It has a strutted, retractable gear to absorb the landing loads, with a 4.10x5 tire that he wishes was a little bigger. The original brake was not very good, so John later adapted a small drum brake with a better mechanical advantage linkage than the original version, and it has proven to be much more effective. The original design also included a steerable tail wheel, but John abandoned it for a fixed version, which made construction much less complicated, and hasn't been a problem in terms of ground handling.

The control systems all hook up automatically as the sailplane is assembled. There is an index bar on the ailerons and two roll pins have to line up exactly with the index bar for the wing to fit in place properly. The flaps/dive brake have a torque tube that has to line-up correctly or the wing won't seat. The only exception is the elevator, which has a push rod that is connected by a 1/4-28 bolt through a rod end that you have to make sure is in place.



ABOVE: This may be hard to see, but is the automatic aileron connection system described by John.

One of the things John likes about the control system is that it is all cables with a couple of very short push/pull tubes. This gives him very smooth, light stick forces and no lash like with tubes. This has made it a delight to fly. The ailerons have counter weights on extended arms at each end. All the tail surface controls have internal counter weights. The rudder has an overhung counter balance weight that was formed by pouring lead shot into a fiberglass mold and filling it with resin.

The trim forces are super light. It uses a spring trim that is mounted on the stick through a knurled wheel. Once he has it trimmed you don't have to adjust it again for the rest of the flight.

The flaps are driven via a torque tube driven by a push/pull handle in the cockpit. Between the tube and the handle is a bell crank that proved to be a real problem. The bell crank is eccentrically driven (not on centerline) so there is a tendency for the flap air loads to move it side-to-side especially if there is any play in the bearing. Consequently, when the certification ship was flown they found out this movement acted like a spring resulting in flutter over 100 mph. An engineering note was put on the drawings to install a restraint plate to limit the side-to-side movement.

ABOVE: This is a shot of the carry through section of the fuselage showing the flap torque tube at the bottom.

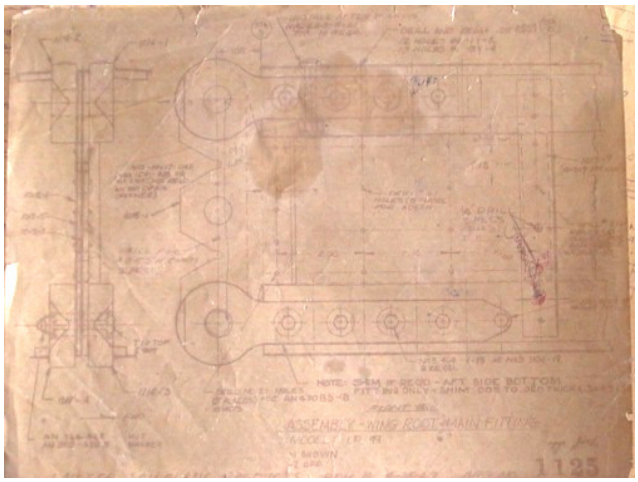
John looked at the note and the amount of work it would take to install the constraint and figured he could just skip it and not fly over 100 mph. Well, you can guess what happened when he did, at about 120 mph on a low pass over the field, and needless to say he went back in and installed the plate. As the flap is closed, the arm of the bell crank slides up against a nylon scuff pad that reduces the gap until the arm is totally pinched with absolutely no room to move sideways.

He went on to say that not only are the control forces light, but they are well harmonized. Most sailplanes have a tendency toward adverse yaw and dutch roll, whereas, the LP-49 doesn't. Although it looks short coupled, it has a lot of area coefficient at the rudder, so you never seem to run out of rudder, making it a pleasure to fly. There is a 2.5:1 differential in the ailerons.

The wing is "quiet" in that it doesn't sound like a Schweizer trash can rolling down the runway or being bounced around in a thermal. There is only one point on the wing about half span on the trailing edge that oil cans a little when pushed to 2.5 g or more.

One of the only characteristics that was alarming about it was the tendency to drop the left wing on initial launch behind a tow plane. Part of it is due to the high angle of attack sitting back on the tail wheel like it does, and then getting caught by the prop wash. Obviously, this makes it easy to ground loop on takeoff. So it has to be flown with full forward, full right stick on takeoff, but you are able to fly through the abrupt left wing drop and everything is normal after that. He did note that it is more prevalent when using towropes of 200' or less, so is directly related to prop wash.

John pointed out that the instrument panel sits very low in the cockpit so he doesn't have a really good attitude reference. It takes a little getting used to, especially since it is a little slippery and can change speeds easily.



ABOVE: I'm not sure how well you might be able to see the lines on the schematic showing the layout of the main wing fittings.

He went on to explain in more detail the construction of the wing. The leading edge skins are 0.032 aluminum attaching to the built up spar noted earlier. The wing root where it goes into the carry through structure was an interesting build. You can see some of the hardware that was constructed to make the transition between the spar rails and the carry through in the picture below. The fittings are ½ inch 4130 steel plate and machined to fit up into the inner part of the angles. There are fittings on the top and bottom, and fore and aft parts of the rails that are

bolted both vertically and horizontally through the spar with NAS close tolerance high strength bolts. The four tapered wing pins are 4130 5/8th inch Brown and Sharp attaching the roots to the carry through structure.

ABOVE: Here is a shot of the wing under construction that shows the stiffening indents on the ribs, and the double angle spar rails as described by John, before the main fittings have been attached.

All the wing ribs were formed in the "O" condition and are 0.032 2024 aluminum then heat treated to T3. There was a little warpage, but he didn't have to do a lot of truing up, but where it was necessary he concentrated on the top surface and let the lower surface go where it may. This gave him a smoother upper surface. The skins were not predrilled and John noted there were 900 rivets in each flap, let alone the large number in the main body of the wing. The skins were attached to the ribs using USM pop rivets, which had been approved by the FAA as part of the certification Jack Laister went through. There was a lot of countersinking to do and milling to give the smooth surface.

The D-tube is a single skin from the rear stringer around the leading edge back to the corresponding rear stringer. The wing was placed in a template jig that was bolted to the floor to put in the 1.5 degrees of washout. The skins were held in place by bungee cords about every foot along the wing and layout dye used to locate the ribs and layout all the rivet holes. The holes were all drilled and kleco'd, then pulled off to clean them up before final installation.

The balance of the skin from the stringer to the tailing edge is 0.025, so there is a tiny little step between the two skins where they are butted together. This was filled with a polyester filler. This seam turned out to one of the regrets he had about the wing. He should have bonded the seam with HySol 9430 so it wouldn't have as much chance to work and allow moisture to get in under the skins. What has happened over the years is the moisture gets in, works through the various temperature changes and tries to open the seam, which has resulted in a crack in the finish along the length of the wing.

Moving on to the fuselage, he remarked there was nothing really special. It is bonded from two fiberglass shells, but the one thing that did come up that bugged him was the glass angles that had been added to the shells after the initial curing. These were supposed to mate up with the carry through structure. Even Laister has some misgivings about this area in terms of it ripping, not so much about shear stress. They made some modifications that included using 2024 T3 0.063 angles to duplicate the glass angles to build a channel in between and then bolted them through the fuselage. This has made for a very strong structure and eased the loads through the fuselage.

ABOVE: Here is a shot of the center section from the front side showing the wings in the carry through structure with the four main pins.

There were some design modifications made during the construction. One of these was in the landing gear area. There is a cast aluminum fork that rolls the gear up into the fuselage, and after about 11 hours of flying time he hit a gopher hole that shocked the whole gear system and twisted the fork, snapping it off. It wasn't the forces but the deflection that caused the failure in the fork. So he built a 4130 chrommoly 1" square tube welded fork that has not had any problems since the change.

The next area he ended up changing was the gear door. On the original drawings Jack Laister wrote "I think you will like the Nugget door better", and after messing around with the original door John wrote, "I

think you're right Jack". The door was a single piece door that rolls up inside the glider, but doesn't want to seat or seal, and it never seems to end up in the same place from operation to operation. He ended with a long term project building guides so it would exactly move to where it was supposed to be with enough spring to pop into the hole, yet still be overridden to get the gear down. With all that work he managed to get it working consistently and he is satisfied with the current arrangement.

He put in a landing gear warning system that goes off if you deploy the flaps without the gear being down, and is very loud. He related a story about flying without a battery for the warning system, and thought he had put enough reminders on the flap handle to not forget the gear. Well he did open the gear door, but didn't put the gear down, however, he realized his error just in time to do a quick pull up and pop the gear down before reaching the runway.

With that story he wrapped up his presentation and asked for any further questions. He was asked what type of battery he uses for the warning system, and he replied it was the type used in an emergency lighting system and is kept charged with a small solar panel. He also uses the battery for the radio and variometer. He was asked if he knew of any other owners that had the steerable tail wheel, to which he said he did not.

At this point we adjourned the meeting and everyone milled around looking at the material John brought, having donuts and sodas, and just enjoying the milder temperatures for July than we are used to.

ABOVE: Some of the plans and diagrams brought along by John for the group to look through.

Our thanks to John for coming to the meeting and telling us about some of the joys and pitfalls of building your own sailplane.

LETTERS TO THE EDITOR

July 27, 2004

TWITT:

Hello - I recently purchased software from Malcolm Hardy's Australian based website. The Version 2.2 of Winfoil is US manufactured and shipped. I spent the extra cash for a CD version in case of program corruption, which occurred one week into the use of the program. Upon reinstalling the design program from the CD I had a functioning unregistered version. The unregistered version is so limited in capabilities as to be useless to me. I have not had any of my inquiries for advice/assistance returned from Hardy.

The US distributor of the software, Digital River, has been contacted regarding this issue and I am awaiting a response at this writing.

Has anyone in range had any dealings with this software or originating entity? Please advise. I cannot understand why an organization would put the effort into developing and marketing this complex program and then not back it up after the fact.

Thanks for any help you can provide.

July 31, 2004

Hello Andy - Malcolm Hardy responded to my inquiry this morning. He is a busy fellow. His answers to my problems were concise and complete. I recommend his product, Winfoil V2.2.

Henry E. Whittle
Gulfrose@Juno.com

(ed. – I included Hank's original and follow-up messages so you can see what can happen when you buy software, but continue to pursue corrective action from the manufacturer. It may take time, but it could be worth it, as in Hank's case, seeing that he is now satisfied with the product and is recommending it.)

(ed. - TWITT was cc:'d on this message from our old website location that still contained information on the Creature Gliders manufactured by Jay Sadowski before he passed away a couple of years ago. I have since gone back and removed the links to all the background pages from the old site to prevent this type of confusion from happening again. Apparently the

large, bold text on the home page directing viewers to the correct site wasn't enough. ***If anyone has information about a similar product that Frank could purchase, please let him know.*** *I did write back to Frank explaining the situation with Jay, but haven't heard anything from him since that time.)*

August 2, 2004

Blended Wing Foam Glider

Dear Mr. Sadowski:

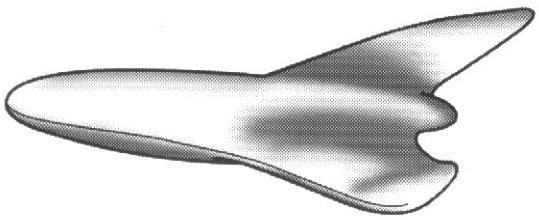
Good Morning! My name is Frank Maranto and I teach project-based, 8th grade level, physical science at Chino Valley Christian Schools in Chino, California. The phenomena of flight is a significant part of our curriculum. I usually spend much of the summer break "surfing" the Web, seeking out new approaches and new ways to make visually and demonstrably real what seems highly unlikely. The weather here and the large open areas afforded by our campus are great for everything from soda bottle rocketry to trash bag airships.

I came across your patented Blended Wing Foam Glider on a site entitled Creature Gliders Series. I would like to request a few of these blended wing gliders, but I couldn't even store, much less use 5,000 of them right now. So, is it possible to buy 25 or so, no logos or color, just "as is out-of-the-mold"? I'd be more than happy to pay product, packing and shipping costs.

I appreciate your consideration of this request.

Sincerely,

Frank Maranto
marantof@adelphia.net



August 2, 2004

Hi Bob:

I live in South Africa, fly radio control gliders, love watching soaring birds and am fascinated by soaring flight. I happened across your bird models on the TWITT page and really enjoyed your very realistic looking bird models and must say that you did a good job on the building side too, with those compound curves. What grabbed my attention was the use of the tip feathers to do roll control. I made a 1/4 model and then later a full scale 10m glider with a team and entered the Red Bull Gives You Wings Competition of 2000 and 2002, using winggrid as tips for reduced induced drag and trying to optimize for slow flight and short span. On this glider i used the front winggrid for roll control almost like a spoiler, creating drag and reduced lift on the side i wanted to turn too,

(http://www.winggrid.ch/do%20and%20do%20not.htm#Figure%203:%20The%20glider%20showed%20a%20span%20efficiency%20of%203

figure 3 and 4 shows pictures of the model and the actual glider). I would like to have more information on your aileron/tip feather control system if any is available.

I noticed that you put kinks in the tip feathers (bending upwards) to simulate those of real birds. From the information on the winggrid site (equal angle configuration), I learned that the front feathers carry most of the load, and therefore bend more than the other feathers, that is why the front feathers stand up more. This of course gives a positive pitching net effect. Another question is what airfoil you used for the tip feathers, camber and thickness? On your models you have something like the "equal load configuration" where the tip feathers each carry roughly the same load. Maybe it would help to go for cambered airfoils, thin, and reduce the negative angles, as your feather airfoils might suffer from stalling at higher angles of attack.

I see on your models that you are using reflex airfoils and an elevator/tail, almost like the Obelix model for pitch control - and would like to know what airfoil you used for the wing. I have previously looked at the Albatross on

http://www.charlesriverrc.org/articles.htm

using positive pitching airfoils with more rearward cg and fly by wire pitch stabilization, I was wondering if you have considered trying this type of application on your models.

Looking at the page on trim

http://www.charlesriverrc.org/articles/asfwpp/lelke_trimattitude.htm,

especially Figure 11, I realized that if the cg position could moved using the trim position as reference – resulting in no trim deflection (cg is adjusted as the center of lift moved from slow flight to fast flight), drag could be further reduced. The other method to do this of course is to adjust the wing planform in flight - move the aerodynamic center (moving the lift center relative to the cg), like the Exulans

http://www.diomedes.co.za/exulans/

This of course is not a problem for a bird in flight, and I think that birds therefore do not need reflexed airfoils - resulting in less drag.

I am thinking of being able to adjust tip feathers for different speeds, having them sweep back for faster flight, and at the same time retract the wing - shorter span, and vise versa, sweep the tip feathers forward and extend the wing for slower flight. I am also thinking of a way to change the angle of attack of the tip feathers in flight. I would still like to have the tip feather angle of attack in line with the camber line of the wing airfoil. But I need to finish the designs and test them to learn more, be it failure or success.

Congratulations from my side for your achievements thus far. I would like to know of more as you progress - if you want to share it with me.

Tony Neerings
<tony.neerings@iscor.com>

(ed. – This was a message to Bob Hoey based on his bird models on the website. As of publication, I haven't seen a reply from Bob to Tony, but if it comes in I will include it in the next newsletter so you can see what he thinks of all this. The following came in through Nurflugel and seemed like a good companion piece.)

July 20, 2004

Hallo everybody,

My latest brain spawn is in the Birdwing configuration. What am I trying to do? Well, create a BULM (Basic UltraLight Motorized) that fits with no modifications in a garage. Sources of inspiration are:

1) Pelican
2) Superfloater (ultralight glider)
3) Mosquito harness for hanggliders

Simply stock the central part in your garage and fit the feathers and V-tail at the airstrip. I guess it can lead to a rather easy and light construction. I think about using wood to be able to make it myself. The ribs are all the same. So rather easy to make. I hope to increase the efficiency of the wing by the use of those bird feathers at the tips.

I use the "cockpit" layout of the Superfloater. Anything easier ... send it to me. You will have noticed that the prop is rather large for this skid and wheel configuration. I hope to get the prop more efficient by giving it a wider diameter and to prevent the prop from touching the ground at take off. You need to run while two bars (those green things at the bottom of the wing) are tilted downwards and support the engine and prevent the prop from touching the ground. Once in the air, you place your feet on the footrests on the skid and you retract the green bars. Landing? I suggest to use a folding prop and just land on the skid.

I am still doubting what kind of airfoils I should use. Autostable and have a tail with not so much negative AoA (angle of attack) or use a more lifting flat bottom airfoil and have the pitch moment corrected by a "classic" V-tail. Euh ... I think more about the autostable airfoil. Reason: I hope to make elevons in that split V-tail.

Now my questions:

1) I noticed in the TWITT that Bob Hoey uses -27° to 0° AoA for his set of bird feather tips of his Pelican model. OK, those will give not much lift. Can they be counted in as wing surface? I do mean ... I need about 12m2 (+/- 129 sq ft). Without those tips I have 1.7m x 5m (=8.5 m2) of surface. Can I make the rest in those feathers?
2) I am still wondering what would be the best and easiest system to make the BULM turn. Only elevons or is there a chance that it will never work without some kind of drag rudder?

All comments are welcome. I will be off for some weeks soon and I hope to use your advise while drawing in my sketchbook during the holiday.

Koen Van de Kerckhove
<nestofdragons@hotmail.com>

August 3, 2004

TWITT:

I am interested in the Hills Westland Pterodactyl and am surprised that I cannot find anything on the net. Is there a reason? These were developed over a number of years and in several progressively improved models. I can find the Baynes Bat which has to be even more obscure so why not the Pterodactyls?

Can you help?

Regards

Richard Moore
<EAMOORE@xtra.co.nz>

(ed. – I looked up Westland Pterodactyl through Google and came up with these sites that have some information and very few pictures or drawings. These were forwarded to Richard, although I imagine he already looked at them and decided they didn't really represent anything concrete.

http://www.britishaircraft.co.uk/aircraftpage.php?ID=563
http://www.ajjcollection.co.uk/w4.htm
http://www.southsomersetmuseums.org.uk/monographs/monograph02.htm
http://freespace.virgin.net/john.dell/AArt2.htm
http://www1.odn.ne.jp/~can55330/gallery/pollo.htm)

August 4, 2004

TWITT:

Andy, here are two shots of my Pioneer in it's current state. I have hinged the canopy and installed a trim system that consists of an 8 lb sliding weight that moves forward and aft in a smooth bore tube, which runs the length of the fuselage. Because the flying wing has such a short CG travel, this sliding weight very effectively trims the ship from hands off at stall to hands off at 90 mph or so. The best part is that there is no drag penalty for a trim tab!

The hinged canopy was more for convenience that anything else, but it sure looks cool sitting there by the flight line!

I am currently based at Randolph AFB, Texas and I am flying the glider at Boerne-Stage airport, on the NW side of San Antonio.

Mike Hostage
<hijackgmh1@satx.rr.com>

(ed. – Thanks to Mike for sending in the pictures. I will add them to his section on the website so others can see what he has done. It would probably be interesting to see a schematic of his trim tube system and crank, since he is obviously pleased with the results.)

July 28, 2004

TWITT:

Enclosed is an article about the return of the V-173 Flying Pancake. Circular wing aircraft are very stable in flight and require only short takeoff areas, so I have often wondered why it is that they are not common place aircraft in the skies instead of remaining just aircraft curiosities.

Maybe some day an enterprising entrepreneur will make them a common place reality in the skies.

Best regards,

Edwin Sward

Source:
http://www.daveswarbirds.com/usplanes/backdoor.htm

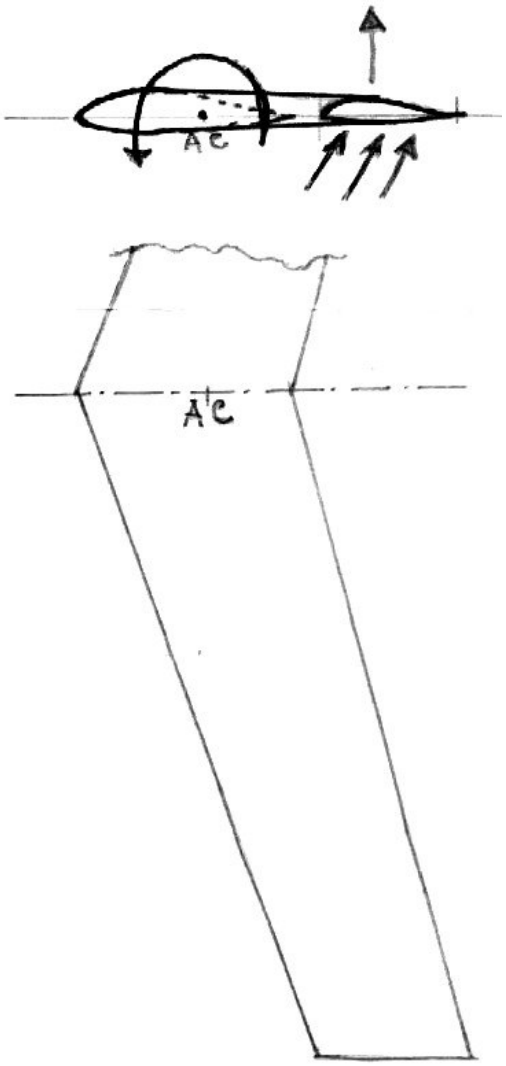
(ed. – The article was published in the Smithsonian magazine, August 2004, and was written by Damond Benningfield. Apparently, the V-173 has been returned to the Vought plant in Dallas, TX, under an arrangement with the Smithsonian for former Vought employees to restore it. Once done in about two years, it will be on display at the Dallas Frontiers of Flight Museum before being returned to the Smithsonian.)

July 25, 2004

TWITT:

Time to renew my annual membership, so please find enclosed $30.

I've been doing some design work on a swept wing ultralight glider and there is a point I haven't seen anything written yet, that is the effect of updrafts and downdrafts hitting a tip of a swept wing. As you can see in the sketch, it seems that an updraft hitting the tip will produce a moment around the wing aerodynamic center, pitching the nose down. There is also an increase of the tip angle of attack leading to an extra lift and induced drag that disturbs the pitch and yaw stability. My question is how those effects work together?



It would be great to read about this subject from flying wing modelers, full-scale pilots and other interested members in the TWITT Newsletter.

Regards,

Artur Goncalves
Ermesinde, Portugal

(ed. – Here is the sketch Artur was referring too in his letter. If you have any comments, please send them along to me and I will make sure the get to him. He doesn't have an e-mail address that I am aware of.)

July 16, 2004

TWITT:

Enclosed please find my check for $20 for dues for TWITT. I look forward to learning all I can, Just maybe I could help you out in some way also.

Sincerely,

John D. Patten
Jackson, LA
jppatten@aol.com

(ed. – I have talked with John on the phone recently and found out he may have a video tape we would be interested in getting a copy of. He has also purchased the plans for the Mitchell U-2, so perhaps we can follow along with him when he starts this project. Right not he is putting the finishing touches on a Stearman that should be in the air by the time you read this.)

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