

# T.W.I.T.T. NEWSLETTER



Some of the models and aircraft that appeared at the May 2003 meeting. Clockwise from top left, Bernie Gross' Dragonfly, Pat Joyce's Tri-Pacer, Pat Oliver's Northrop N9M replica, Andy Kecskes' Delta Wing, and center is Bruce Carmichaels simple test model for his Dyna Mite ultralight discussed during the meeting.

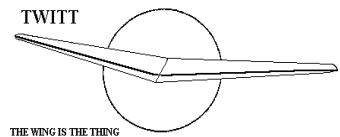
## T.W.I.T.T.

The Wing Is The Thing  
P.O. Box 20430  
El Cajon, CA 92021



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Next TWITT meeting: Saturday, July 19, 2003, 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**



**It** always amazes me that when we don't have a formal speaker sometimes the Saturday meetings come out just as good, if not better. Everyone had a good time on the 17<sup>th</sup> sharing some of their models, viewing Pat Joyce's Piper Tri-Pacer and enjoying Bruce's impromptu talk on his latest building project. The donuts were sticky, as they should be, and June had some cake treats to go with the coffee and tea so everyone stayed fed and refreshed.

Don't forget that the July meeting will be our usual anniversary party, so there will be a special cake with ice cream and we can congratulate Bob on making it through another year to his birthday.

I hope you enjoyed the last installment of Irv Culver's work. Bruce thought Irv's coverage of surface flutter would also make a good article for TWITT, as well as SHA, so I have included the first part in this issue. It was a little too long for all of it and leave any room for the meeting recap and letters, so you will have to wait until next month to learn all his secrets on how to diagnose and correct flutter conditions.

For those of you with antique/old airplanes that are looking places to display them for you annual tax exemption, the TWITT meeting qualifies as an event for this purpose. So next time you attend, why not fly in and get credit for having your aircraft on display at the same time.

This has certainly been an easy issue to put together since I had lots of material that came in from all of you and other sources. I didn't have to rely on taking things out of the Nurflugel mailing list board to fill in the empty space, which is great since it means the newsletter is reflecting your concerns. I hope you all enjoy the issue and find the information it contains useful in your own projects. Please keep submitting material, since that's what sharing is all about.



## JULY 19, 2003 PROGRAM

I hate to sound like a broken record, but as of publication time we didn't have a program locked in. As usual we are exploring a number of different options, but none are firm at this time.

If anyone has an idea or a contact point for a program, please get a hold of us through the e-mail address or by phone at the hanger during day time hours or my home phone in the evening, and let us know what you've got. Any help would be greatly appreciated.

## MAY 17, 2003 MEETING RECAP

Andy gathered everyone together for an informal meeting that would be comprised of some information sharing and, Bruce Carmichael telling us all about his building project (more on that later).

The first to share some experiences was Bob Chase who had attended the annual EAA Sun & Fun Fly-in at Lakeland, Florida earlier in the month. The highlight of his trip was a visit to Wallaby Ranch where is got in several dual flights in a hangglider, something he thought he might never be able to do again. This was made possible with a simple landing gear system that allows the pilot and student to begin and end the flight in a facedown-prone position, just like being in the air. Like Bob said had found it was prudent that he no longer fly anything the body is part of the primary structure, namely his legs as landing gear. The flights were made from a air tow behind an ultralight and the instructor told Bob to just use the tow plane's wheels as an artificial horizon and keep them on the horizon. It worked very well and Bob had little trouble towing up to 2,000'.

One of the reasons Bob when to Sun & Fun in the first place was to search for an ultralight trike he might be able to acquire to get back in the air at home. He found some designs, but felt them might not be sturdy enough to handle the extremes on weather conditions that can occur in the western desert, so still needs to think about them some more before making the final decision.

Bob also mentioned he had brought along a copy of the January 2003 issue of Hang Gliding magazine that featured a two part article on Bob Trampeneau, who is well known in the world of hang gliding. It was Bob's hope that TWITT can get permission to publish some, or all, of the article as a series in our newsletter.

Bob had one safety item related to hang gliders. In the early days of sweptback wings there was a lifting surface center section and inverted airfoils on the outer sections. This worked fine for a really rigid wing, but if you have a flex wing it can cause problems. While the center section is trying to pitch down, the outer tip is trying to twist up which then results in negative Decalogue and drives the aircraft into

the ground. Trampeneau realized this and always recommended using a lift airfoil along the entire span of any flex wing hang glider.

Maybe one of our international members can answer a question raised by Bob during his recent trip to Italy. Except for one small aero club field, he did not see or hear any private airplanes during his entire one-week stay. The group didn't have an answer for this condition, although we assumed there was glider and hang glider activity throughout Italy, but that maybe economics was a key factor in very few powered aircraft. Can someone fill us in on what Bob didn't see and why?

We had a new visitor at the meeting by the name of Brent Van Arsdell. He is a pilot and aeronautical engineer with an interest in flying wings, so what better place to be than a TWITT meeting. He makes his living promoting and selling Stirling Engines (they work on temperature differential) for commercial applications. His current desire is to find a home at an airpark so he can have the best of both worlds, a home next to a hanger next to a runway. He was impressed enough by the end of the meeting to join our group. Welcome, Brent.

Bruce announced that one of our prior speakers and frequent visitors, Professor Gene Larrabee of MIT, had passed away recently. He was known as "Mr. Propeller" and was very instrumental in the achievements of the manpowered flights with his efficient propellers, along with involvement in other projects like wind generators.

As Andy's contribution to the program, he showed some video footage of sea gulls soaring off the windward side of the cruise ship he was on while we had the March meeting with Paul MacCready. Some of the shots were interesting in that you could see the changing wing shapes as the birds moved in and out of the areas of lift. He found it intriguing that they were just soaring for the sake of soaring, since they never dove into the water to retrieve a fish. He also had some video of glider flying at Torrey Pines the week before the March meeting, so those that missed the flying due to the weather the following weekend could see what it was supposed to look like.

Andy then asked Bruce to come up and tell us about his latest project which is actually under construction in his garage.

Bruce led off with a self-introduction of being known throughout TWITT and SHA as "Lots of charts, no parts Carmichael", but this time around he does have parts (along with some charts), as we would find out. He did preface his remarks with the comment that he has no plans to publish for this design and is not even sure if at age 79 he will get it done in time to fly himself. One of the project goals is have an ultralight sailplane that won't require a pilot's license or those pesky physical exams.

Another reason you wouldn't want this sailplane is because he has designed it around himself. It's for a pilot 5'6" and 125 pounds, which means you won't fit if you are more typical in height and weight. It is truly a MOBA design, "My Own Bloody Aircraft" as coined by Sutherland in Australia many years ago.

His design requirements are:

- Must work micro-lift - very light stuff.

- Need low sink rate and low turn radius.
- Wing loading of less than 2.5 lbs. per sq. foot. Which is like some of the current heavier hang gliders.
- Must meet ultralight sailplane empty weight of 154 lbs. because at his age and building skills the probability of himself or the aircraft getting licensed is problematical.
- Needs to be compact to take advantage to take advantage of his small size. Being the runt of the litter he has had to put up with it all his life, so now it's payback time.
- It needs to fit, on the trailer, into his 19' deep garage without knocking holes in the wall for the trailer hitch. The fuselage pod and 16' center section would go crosswise on the trailer.
- Why tailless – to help meet the empty weight requirement and the compactness parameter.

At this point Bruce started the slide show, which we will include here as we go along. The features are:



- 3-piece, 20 degree swept back
- 40' span with an A/R of 13
- Area of 122.4 sq. ft., average chord 3'
- Center wing section – 16' integral with the pod
- Outer panels – 12' each
- Meets Culver anti tumble criteria
- Employs Culver Twist Distribution – more angle of attack on the inboard part of the wing with most of the washout on the inboard third of the wing instead of all of it at the tip.

- Employs Fauvel 15% thick airfoil of reduced reflex per Backstrom to improve  $CL_{max}$  – benefit of sweep angle.
- Fuselage pod length – 8.33', width 1.75' (21")
- Empty weight – 154 lbs., payload +136 lbs., gross 290 lbs.
- Wing loading – 2.37 #/sq.ft.
- Gross Weight/Span Squared = 0.18 #/sq. ft.

He started building before he had all the design work done, but since it took him so many years to get to this point he decided to go ahead and learn what he could even if it meant burning some of the mistakes.

The first slide showed how he made his longerons. He mounted a 3/4" piece of plywood cut to the shape of the fuselage onto another piece of 3/4" plywood. The shape is based on the NACA 67020 Series Airfoil with a length to depth ratio of 5:1. He then glued two strips of 1/4" x 3/4" Douglas Fir together and mounted them between the form and the retaining pegs. Once dried they retained the fuselage shape with the inner side representing the inside dimension of the cockpit.

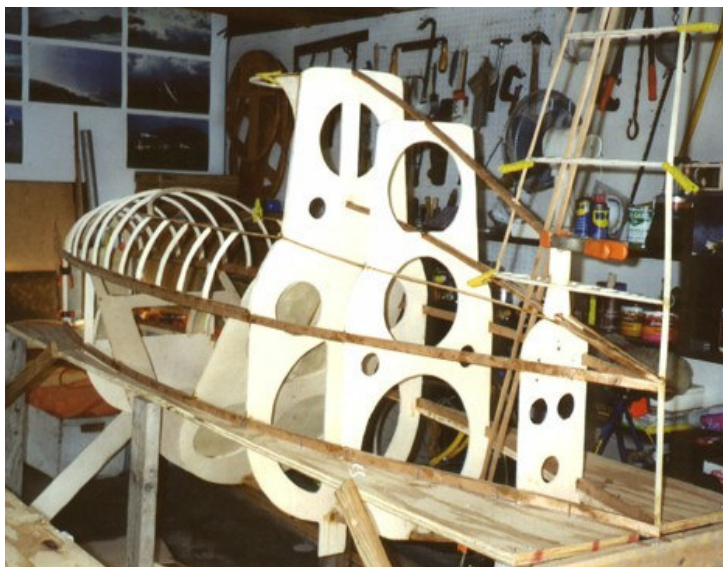


In the next shot you see the bulkheads sawed out of 1/4" finished Birch plywood. Not having a band saw, he cut all the holes using a saber saw so it's a little rough, but some sandpaper helped with that problem. He now has been loaned a band saw so when another part requires cutting he will be in good shape.

He then put some transparent tape on the top edge of the longerons to separate them from the upper part of the fuselage as he glued the rings on. The next shot shows the canopy structure removed from the main part of the fuselage.

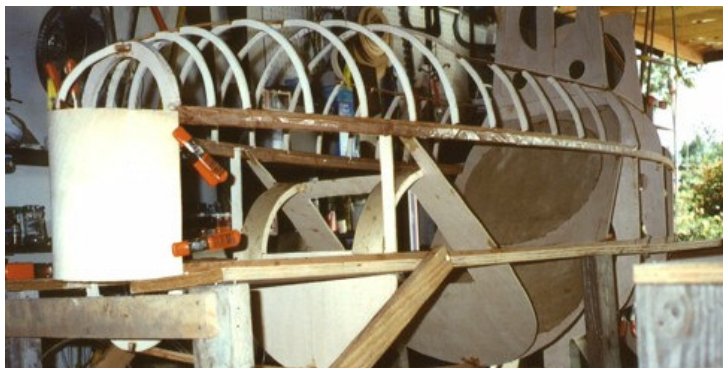
Then you see where he has started the fuselage skinning process, which is a single degree of curvature that avoids any double curves that can cause forming problems.





Bruce has found that the height of the canopy was too much and would interfere with flow around the stabilizing fin so he is now cutting it down about 9". He originally made it tall to take into account wearing a helmet and having a sufficient rollover structure. The added depth also allowed for more material between the ground and his bottom side as protection, but he realized it was over done so is making the corrections.

Although not shown in the photos, he now has the inside skinned so has two good structural beams on either side of the cockpit. The skins are either 1/16 or 1/32 Birch plywood and he is using two-part epoxy for the glue.



He ran across a product called Feather Fill and it sounded like it would be ideal for filling in the imperfections, but he found that to not be the case. It was heavy and hard to sand, but someone told him to use light Spackle, which has worked much better.

Getting back to the overall features:

- Longitudinal 5% static margin, 20-degree sweep provides some pitch damping
- Directional – Swept wing at + lift coefficient
- Fin at pod trailing edge cancels pod instability
- Lateral – 5-degree outer panel dihedral plus sweep corrects roll due to yaw, but it may be a Dutch Roller which is better than spiral instability

- Pitch control – trailing edge elevons from 8' to 18' feet out
- Pitch trim – Trailing edge flaps from 1' to 8' out, when deflected will give incremental lift but also a positive pitching moment for trim since the lift is forward of the CG that compensates for the pitching due to the camber (used on the SWIFT)
- Roll Control – Trailing edge elevons 8' to 18' out
- Yaw Control – trailing edge flaps at the tips 18' to 20' out – two people have recommended winglets with drag rudders but they create more complexity and weight
- Desired performance – Max L/D of 30, min sink 1.7 ft./sec., stall with flap 25 m.p.h.
- Concerns – Handling during take off and landing – trailing skid and telescoping forward skid



So far the fuselage weighs in at 26 lbs. but he hasn't skinned the bottom yet, but he feels like he is on target for the final weight limit. He is having fun building, but only spends about 2 hours a day since he has many other things going on in his life that need taking care of. He does try to do something each day so he doesn't lose momentum. Bob Chase asked if he had done any flutter studies, to which Bruce commented he had not but was looking forward to the up coming article on flutter by Irv Culver in [Sailplane Builder](#).



That was it for this meeting and Andy made sure everyone had a chance to get a donut and coffee while they continued talking about the various models on display.



LETTERS TO THE EDITOR

May 5, 2003

TWITT:

I am an aviation enthusiast and always like to hunt down obscure and unusual aircraft...hence I found your site.

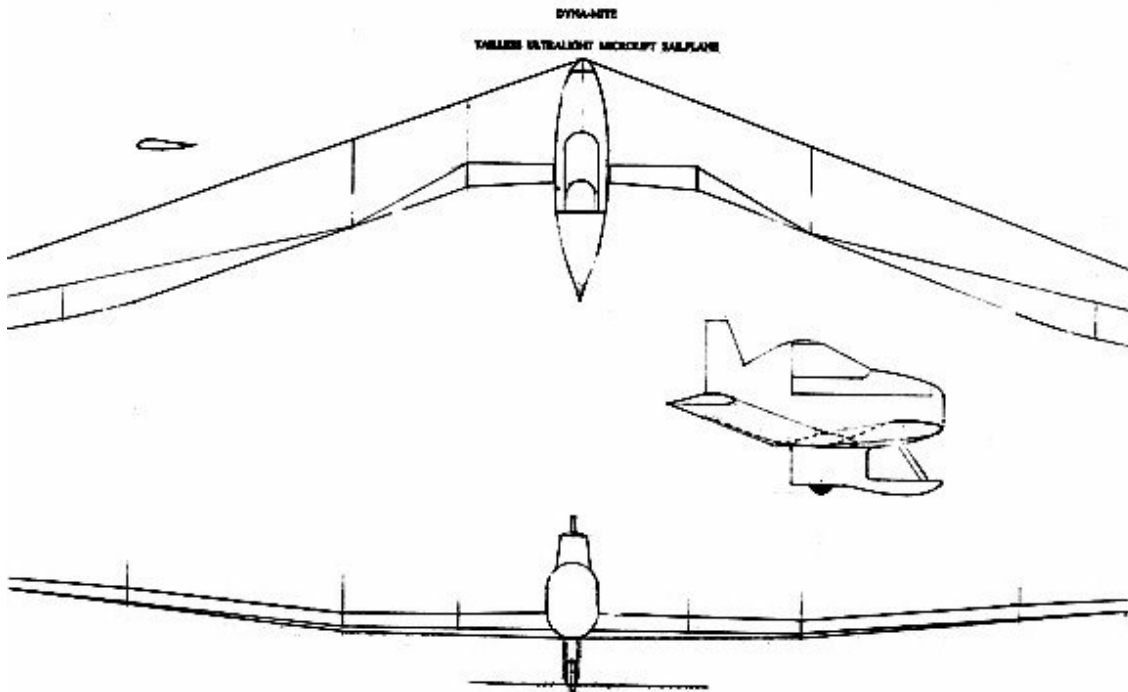
I have been interested in BWB aircraft since an article in Flight Journal, 1996. This article brought to my attention the designs and aircraft of Vincent Burnelli. I have been so involved with the Burnelli story, that I was able to suggest his aircraft and there merits to our news department who in turn ran a story on his work. Looking through your website, I didn't find anything under the BWB section about Vincent Burnelli. An aircraft designer who built and patented the first BWB back in the early 1920's.

Enclosed is a paper by Richard M. Wood: "The Contributions of Vincent Justus Burnelli". (AIAA 2003-0292, pp. 11, in .pdf file format, 980kb.)

I hope you find the paper enjoyable and informative. My hope is that you might extend a courtesy to the real father of safer, more efficient aircraft design: Vincent J. Burnelli

Sincerely;

Ralph T. Capobianco  
WFLX FOX 29  
West Palm Beach, FL



*(ed. – We have published several pictures of Burnelli's aircraft sitting in disrepair at a museum, but didn't find a place for them on the website. I wrote to Ralph and let me know that when I got time I would update the BWB section to include some information on Burnelli's designs and include a link for downloading the AIAA paper if people would like to know more.*

*If any of you would like a copy of the paper and can't find it on the Internet, just drop me an e-mail and I will forward it to you as an attachment.*

*I also got the following in reply to my message from Ralph.)*



May 6, 2003

May10, 2003

I'm glad you liked the paper. Rick Wood works at the Langley Center, in what capacity I don't know.

Mr. Wood's paper will soon have some company, as there is a book in the works due soon. I have read an advance copy and it is very entertaining and informative. I met the author through the Burnelli company.

As for pictures of Burnelli aircraft you can go to aircrash.org, the Burnelli company website. You can find a pictorial history of Burnelli aircraft and pictures of a fantastic flying model of the RB1 or RB2.

Sometimes I just go to Google and click images and type in Burnelli or Burnelli Aircraft and you can get a lot of pictures that way.

Anything I can help you with please let me know.

Ralph T. Capobianco

May 8, 2003

TWITT:

**S**orry about the delay in answering your e-mail. I got all wrapped up in saving those photos and forgot to respond back to you. Thanks for the photos. It's really fascinating, isn't it, watching the gulls sitting motionless just above the ship!

We were hurting for space on our Australia cruise so didn't take the video camera. I have some stills of the Albatross, but they're not very good. You really need videos to see what they are doing relative to the waves and wind.

I am just putting the finishing touches on a new Raven model, which can adjust the wing shape in flight. The mechanism got really complex, but I think it will work. We'll find out if the wind ever stops blowing up here. It changes from a straight wing to an "M" shaped wing with 14% less span and 14% less area. I'm hoping it will allow me to stay with the real birds when we top out a thermal and head out for the next one.

Bob Hoey  
bobh@antelecom.net

*(ed. – This was in response to my message to Bob sending him copies of some of the pictures I took of gulls soaring off the side of a cruise ship in March. For those of you who correspond with Bob once in awhile, note the change in his e-mail address.*

*Hopefully, we will see some pictures of their variable geometry Raven when they get the bugs worked out and have it flying.)*

TWITT:

**T**he attached document provides some information on a flying wing glider from the 1930's that I recently unearthed from the nurflugel fossil record. I'd be curious if any TWITT members can shed more light on this early design.

With best regards,

Gary Fogel  
gfogel@natural-selection.com

*(ed. – Here is the information Gary sent along. If anyone know more about the Chamberlain wing, please get in touch with Gary and include TWITT as a cc: in your message so we can pass it along to our other members.)*

## **The Chamberlain Flying Wing Glider of 1938**

**By Gary Fogel**

**P**aul D. Chamberlain of Santa Monica, California, developed a monoplane "flying-wing" glider in 1938. The unusually shaped, single-seat, aircraft was completed on September 15, 1938. At the time, Paul Chamberlain was the Research Engineer at Chamberlain Aircraft Engineering, 1015 24<sup>th</sup> Street, Santa Monica. Upon application for an aircraft license with the U.S. Department of Commerce on September 19, 1938, Chamberlain wrote:

"This letter is in reference to my application for an experimental license for the "flying wing." In answer to the question put by your branch office, here in Santa Monica, 'Why are you applying for an experimental license,' my answer is: This plane is of an entirely different design, construction, and nature than any, to my knowledge, that has ever been built before. As a result I will have to spend a few months in testing and research work before I can apply for my regular license. After completing said tests I have two bids to be submitted to the War Department, for planes along this line." (1)

The Chamberlain flying wing was granted aircraft license number NX 18991 on October 3, 1938. However, by April 1, 1939, the license was cancelled due to an expiration of the airworthiness certificate...a short-lived experiment.

Not a flying wing in the true sense of the term, the Chamberlain "flying wing" sported a full-flying elevator and rudder. Very narrow ailerons on the trailing edge of the wing would have provided minimal roll authority. The wing was impressively wide (8 feet, 9 inches) and thick (16 inches) at the root for its 26 feet 8 inches of wingspan. The fully enclosed cabin protruded just in front of the leading edge of

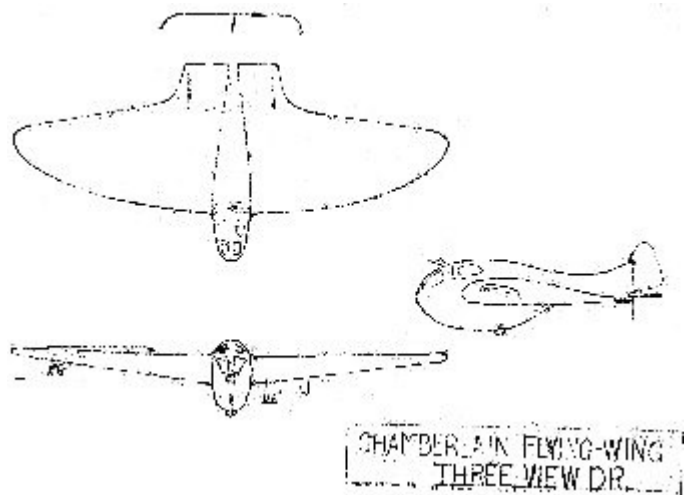
the wing, with two tires located side-by-side near the center of gravity under the bulbous fuselage.

M. N. Meyenberg, Test Pilot for the Chamberlain Aircraft Engineering company, was known to have flown gliders at the Hollywood Riviera glider port near Redondo Beach as early as 1932 (2). Paul D. Chamberlain also had an early interest in gliders, receiving near fatal injury on the second test flight of his "sailplane" on May 5, 1929 at Clover Field (now Santa Monica Airport) (3). Their shared interest in gliding through the early 1930s in Los Angeles probably led to the design and construction of the Chamberlain Flying Wing glider as a test of the potential for this design for the U.S. Government. It remains unknown if this design actually flew or not.

References

- 1) Records for NX18991, United States Department of Commerce.
- 2) *Redondo Reflex*, January 1, 1932.
- 3) *Los Angeles Times*, May 6, 1929.

Figure 1. A three-view of the Chamberlain Flying Wing from U.S. Department of Commerce records for NX18991.



May 19, 2003

TWITT:

Re: Arado 555-3

**A**re there any German speaking people, looking for a unique scratch-built flying wing? I would like them to have a look at <http://members.chello.at/karla.poisinger/>, but I do not know where I can publish the information. There are step-by-step building instructions for the big (1,8 meters) version, lots of photos in the finish section, and a short video. Greetings from Vienna

Josef  
poisinger@chello.at

*(ed. – If anyone decides to take on this project, please let us know. I have included a couple of pictures for those of you who may not have Internet access, but would like to see if is something they would be interested in as a project.)*



May 22, 2003

TWITT:

**I** am sending you three pictures of Don when we were working on the Stealth II at Tehachapi. This is as far as we got when he passed away. Les King took over the project for a Dave somebody in Los Angeles and now Norm Castagneto owns the ship. I would like to have this airplane, maybe one day I will.



Also, on a different subject, I don't think that Norm Masters will ever find information on displaced stabilators on flying airplanes in "1940". This is when Don came up with the idea of his reversed airfoil, located behind and below the outer wing section. Alexander Lippisch and others may have had a similar idea, but I don't think, in 1940, Don would have researched and found any data relating to this idea. He was more of a designer-builder type and he usually used his own ideas. I don't think he researched the Internet in the mid 70's and early 80's when he designed the B-10 and the U-2. He just made the airplanes and they fly super.

Then he built the Victory Wing for me. On the first taxi tests, the controls were perfect and on it's first run (at Porterville) I took off and flew around the pattern. Weight and balance, CG, control system, all right on, right out of his shop in Mariposa. I could go on and on but I'll close this with reporting that I may have a shop soon, in Petaluma CA, 1 hour north of San Francisco. If it happens, you will see kits and wings out there flying.

Richard Avalon  
mitchellwing@earthlink.net

He built in leading edge slats in the outer panels, to also reduce landing speeds, which were very effective. We installed a direct drive KFM twin cylinder 22 hp motor, which weighted only about 50 pounds complete. He started out with a single wheel but switched to a small dual wheel arrangement attached to the pod. We almost met the weight requirement so we installed a ballistic parachute to gain the extra 10 pounds that we needed.

So Don finished the airplane, did the CG, weight and balance, rigged it, all in Mariposa, and then took it to Porterville for test flying. I did some taxi work and then took it out to the main runway to do some high speed taxiing. At about 150 feet into the first run, I was pulling back on the stick to see at what speed the front wheel would unstick, and the airplane tookoff. Of course I was a bit surprised, to say the least, but what surprised me even more, it felt perfect. I'm about 25 ft off the ground, stick is centered, the airplane is flying straight and level, in trim.

So I decided to just go for it. I flew it around the pattern a couple of times and to say that Don is a great airplane builder is putting it mildly. Right out of the box it flew perfect. The only problem was that we were under propped, not

enough pitch. So back to the shop and as fate would have it the ship never was flown again.

We moved to Tehachapi and set up shop there and went on to the next project, the Stealth II. I do have the wing now. I took it apart with all of the control settings 'set', and I plan on reconfiguring the airplane to look more like Wolfgang Uhl's U-2

in Germany. And I will still try to keep it in the ultralight category. Can you imagine, a U-2, with power, as a true ultralight? This was another, unfinished, chapter in the Don Mitchell aviation history.



*(ed. – Thanks to Richard for providing this information. Don certainly was a unique designer. I have included one of the pictures (above) that Richard sent along. When I have time, I will add the it and the others to the Mitchell section of the website.*

*Richard also sent along the following on the Victory Wing.)*

May 29, 2003

**C**oncerning the Victory Wing built by Don Mitchell in 1983. I was spending time with Don and I asked him if he could build me an ultralight version of the U-2. The standard U-2 weighed 320 pounds and we were shooting for 254 pounds and a stall speed of under 27 mph, the standard U-2 stalled at 32 mph. So he did build this ship for me.

He did several things different with this airplane. He used a wooden spar but he used lightweight foam for the leading and trailing edge and this was hollowed out to save weight. He then fiber glassed the whole ship with (I think) only one layer of light fiberglass cloth. He made the pod the same way.





(ed. – This was an original request for information. Following it is a response that just got sent to Wes after Peter saw it on our website.)

Wes asked: Who would I get to help me with my wing design project. I would like to build an ultralight wing from an R/C combat wing as a glider. This would be a single place, 35' wingspan, approximately 200' wing area, prone pilot, 25 to 30 mph stall speed, 60 mph cruise speed, foam and fiberglass construction, with a 30-40 hp engine.

What I am basically looking for is someone to make templates for a hot wire saw method of construction. I do not wish to market this wing, it's just for my own interest. Or perhaps you know of a kit type or plans built ultra light flying wing that is on the market. Another wing that is close to what I want is the Davis Wing. It is not yet available and it's way too expensive, too fast and too heavy for my needs.

Wes Peters  
wweessp@hotmail.com

Peter responded with:

Hi Wes,

I saw your posting on the TWITT website and your idea is interesting. I have seen the combat wings fly on slopes and they look real slick. I have always thought it would be interesting to build a man-carrying sized one. It would really require a new design for several reasons, the control responses would not likely be suitable for simple manual controls, scale effects could give you unpredictable results, the wing loading, speed ranges, etc. generally do not scale up in a predictable way because of the differences in the Rn.

Also, why fiberglass? It is the most unsuitable material for an ultralight (and for most light aircraft in fact). It has the worst stiffness to weight ratio and one of the worst strength to weight ratio. Wood, metal tube and rag and even all sheet metal designs are all superior to fiberglass (and most are less costly too!). True nice smooth shapes of compound surfaces can be achieved, and premolded fiberglass parts are suited for a production kit, but neither are consideration in your design I would think. Go to the EAA website and look over the databases of weights information.

I once built a fiberglass sea kayak with a friend in high school, and I have never wanted to touch it again. Itchy, smelling, expensive, and difficult to work with. Yes there are slick designs in it, but they are not weight efficient at all. For lightweight construction I now favor all wood with synthetic fabric covering. It is fun and easy to work with simple hand tools, very pleasant to work with, non-toxic, available anywhere, and I can do it from almost all salvaged lumber that I select, recut and qualify myself. Aluminum tube with riveted gussets, or welded steel tube is more expensive, but is also very weight efficient too, and perhaps a bit less labor intensive. With careful design, it could look real sleek and sexy too. You should rethink your reasons for considering fiberglass.

Peter Chopelas  
pac@premier1.net

(ed. – Here is another where he offered some help.)

Can anybody out there direct where I can research (airfoil selection, CG, control setup, pro-con, etc) on diamond planform flying wings? I remember seeing one in Soar Tech about 10 years ago, just wondering how well it flew. In a book titled Unconventional Aircraft (Peter M. Bowers), there's a full scale Dyke Delta 4 seater, that was suppose to perform extremely well, 190 mph. Thought it might make a cool looking plane with a little futuristic updating. A friend of mine had a Hobby Shack diamond shaped sailplane, he said it never did fly well. Perhaps it was incorrectly setup?

Please email me back or to the exchange if you want to start a thread. Thanks in advance for any information!

Bob  
Rhokita@aol.com

Hello Bob,

I know a bit about flying wings and diamond plan forms. They do not have that many advantages for small aircraft since they tend to have very low aspect ratios (which means it is not suitable for a sailplane!). I have an article about the Dyke delta, with performance and handling details, I could either FAX you or mail a photocopy. It is a very interesting looking aircraft, but there are some limitations to its performance that would not be present if it was of conventional configuration.

Why your interest in a diamond wing? Do you have a particular project in mind? There are advantages to certain configurations, and disadvantages. The choice of shape depends on your priorities for your design. All wing designs have certain advantages, but there are some design missions where they are not suited (like in a fighter or acrobat where you need fast response to control inputs). In a homebuilt project often appearance is reason enough to choose it, but do not fool yourself you are building something efficient.

Peter Chopelas  
pac@premier1.net

June 3, 2003

*(ed. – Do any of you have any opinions on the subject of diamond plan form wings? If so we would like to hear them and could in turn pass them along to both Bob and Peter. It would be interesting to hear what progress has been made by Barnaby Wainfan on the updated FacetMobile, since it is somewhat of a diamond shaped aircraft. The original seemed to have performed well enough for the team to move ahead with a more advanced version, so there must be some good things in the design philosophy.)*

May 29, 2003

TWITT:

**L**ooking for a built up flying wing about 6 foot that has a motor in front. Do you know of any plans that are for sale?

Thanks,

Terry  
Tdlgar@aol.com

*(ed. – Based on the span requirement I would assume he is talking about a model wing. Does anyone have any plans for something like this?)*

May 31, 2003

TWITT:

**I** am interested in building a full sized replica of the Horten Ho Xb Piernifero II or the Ho Xa. Could you direct me in my search for available plans or detailed drawings?

Tom Israel  
MSC 8350 (use Mail Stop Code to assure prompt delivery)  
(512) 723-7321  
(512) 283-2489 (fax)

*From Al Bowers:*

*The H Xa was a very small sailplane, only about 22 ft wingspan. So unless you are exceptionally small, I would not recommend the H Xa as a viable aircraft to build. It has other problems as well, including the non-bell shaped lift distribution (which means it had a fair bit of adverse yaw). The H Cb on the other hand was a very nice aircraft. It had about a 33 ft span, and might be suitable. It was never series produced, and no plans were ever made (some rudimentary drawings may have existed at one point). It would be a fairly serious task to reverse engineer the outer mold line, and then a pretty serious task to engineer the structure and the detailed design for the aircraft. My best recommendation would be to contact Juan Manuel Mascarello in Buenos Aries, as he recently restored the H Xb.*

Dear TWITT:

**M**y name is Patrick Wichert and I'm a student of Aerospace Engineering at the University of Stuttgart, Germany. Right now, I'm in the final stages of my study and busy with the first of my two research projects. I have some questions concerning a BWB model. I have to define and/or extract from literature comparison figures concerning the aircraft performance (rate of climb, range etc.) between a scale version and the original version. These figures should contain the dimensions, the mass, and the density of the surrounding fluid. Maybe you can help me with my problem, forward this or recommend some publications concerning this subject.

Thank you very much and best regards,

Patrick Wichert  
Pathraig@gmx.de

*(ed. – Al Bowers provided the following answer. TWITT has a copy of the Powers article in the archives if anyone is interested. Contact us for a pricing.*

*There are two articles in English, which explain the issue of dynamic scaling very well. One is by Bradford Powers in Model Aviation in January 1978, and the other is by Stan Hall in Sport Aviation in July 1987. Both deal with the issue of scaling full size aircraft to model scales and projecting performance data.)*

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