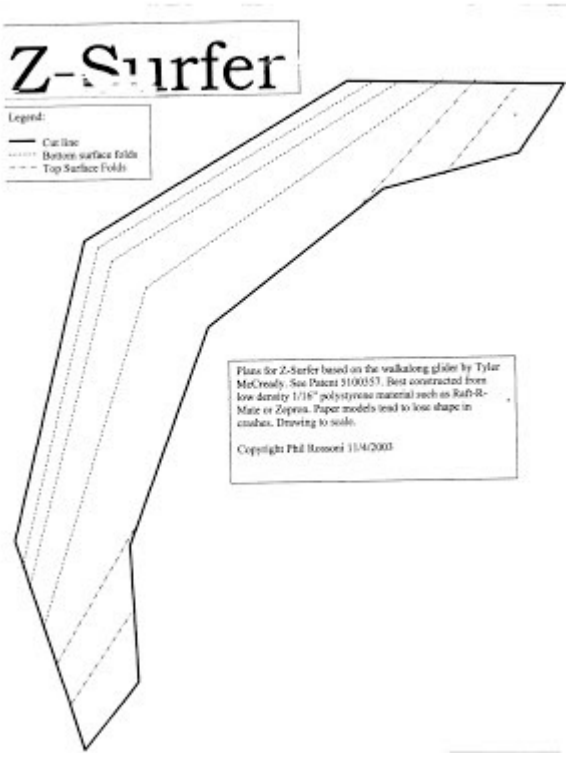
No. 397 OCTOBER 2019

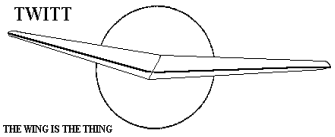
T.W.I.T.T. NEWSLETTER



A walkalong glider is a lightweight, slow flying model aircraft designed to be kept aloft by controllable slope soaring in the rising air generated by the pilot who walks along with the glider as it flies, usually holding a paddle. Hands or even the forehead can also be used to create an updraft.

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., **1910** means this is your last issue unless renewed.



THE WING IS THE THING (T.W.I.T.T.)

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation, which is dedicated to furthering education and research in a variety of disciplines.

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Wt/#Issues	FRG	AUSTRALIA	AFRICA
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Gatherings are held on the third Saturday of every odd numbered month, 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

My thanks to Robert Hoppe for his update in this month's newsletter. He sent along some nice pictures of what he doing to improve performance that I am sure will be of interest to everyone.

That's all I have for this month.

Andy

LETTERS TO THE EDITOR

Andy,

Here are some pictures of my flying wing as of summer 2019, I now have 57 hours on it and it has proven to be a predictable and fine flyer but there are several areas that need improvement. The major one of these is the very poor rate of climb of about 250 feet per minute which I attempted to address with a larger engine with no success to date. Here is a brief discussion of the changes I made for this year and my experiences with them.

- Replaced Rotax 377 35 HP engine with Rotax 503 45 HP eng.
- Replaced 4 Blade 48 inch Ultra-Prop with 3 blade 54 inch powerfin prop.
- Replaced 8 Gal. fuel tank with 12 gal. tank.
- Removed Vertical rudder.
- Reattached wingtip spoilers for rudder control.

No structural changes were made to the airframe for this season.

The engine and the spoiler rudders did not work well and I only made one 20 minute flight in the last week of July and was lucky to get back on the ground in one piece.

I thought that the larger engine would give me a much better rate of climb, but on my first, and so far only, flight with it I found the plane would not accelerate and climb rate was nil. I nursed it up to 500 feet, leveled off and the plane just mushed along at an estimated 60 mph. I made a turn, came back over the airport, made another turn, decided to land and was downwind midfield at 500 feet when the engine quit. If you have to have an engine quit, this is an excellent place to have it happen, I just made a descending 180 degree left turn and landed on the runway, no harm, no foul.

A couple of other things were happening as well, there was so much vibration from the engine that the airspeed and altimeter were not readable, the CHT and the EGT did not work, and I had a problem with the spoiler rudders. The last two problems are easily solved, I will rubber mount the instrument panel and make new rudder cam plates with proper slots.

Fixing the climb problem requires considerably more work. I believe the problem here is that the thrust line is about 20 inches above the CG of the airplane which results in a significant nose down pitching moment requiring aft stick, or up elevon, to trim the airplane. When you move the elevons up two things happen, the elevons force the wing to a higher angle of attack increasing the lift, but at the same time, raising the elevons increases the reflex in the airfoil, which reduces the C sub L of the airfoil and thus that part of the wing ahead of the elevon, and increases the drag of the wing.

This was apparent in the first flights with the 35 Hp engine, but I did not appreciate the magnitude of the problem as the airplane did climb, although slowly, and I attributed this to having such a small engine.

With the added thrust of the 45 Hp engine, these two effects almost canceled each other out and the airplane was barely able to climb. The solution, of course, is to make the thrust line go thru, or at least very close, to the CG of the plane.

In my case, this means lowering the engine which requires tearing out the rear of the plane and building new structure to support the engine and this is what I am currently doing as you can see from the pictures.

I have lowered the thrust line 12 inches and tilted it 4 degrees down which brings the thrust line very close to the CG. This should solve the climb problem, but unfortunately exacerbates the problem of prop clearance and being able to rotate sufficiently to take off. Next spring I will be able to try it out and will let you know how it performs.

Robert Hoppe


N147


N147

In the May, 2016 issue of the newsletter there was a web address that had plans for Al Backstrom's EPB-1 Plank glider. Apparently this website has been taken down. Is there any way to recover the website with the drawings?

Regards,

> Rod Lord

I am not aware of any other source for the plans but will ask around to see if anyone has a set they would give up.

> Andy

Andy,

That may not be necessary. I had the drawing saved but was unable to access them because of some corrupted files on my computer. I've managed to clear that up and discovered that the original drawings were intact. I have since saved them on a separate media.

Thanks for the effort.

Regards,

Rod

(ed. - I included this in case anyone else is interested in this Backstrom design and knew of a drawings source besides Rod. The Vintage Sailplane Association might have them as a starting point for a search.)

NURFLUGEL THREADS

Starting in the early 1970s and extending into the early 80s there was some interest in large, essentially all-wing cargo aircraft that would carry standard containers inside the wing structure.

They ended up with concepts that were only economical if they were built too large for any commercial airport. Still, they made good sense economically if you could get around that problem somehow. My thought was to fly them off the water - no problem with taxiway and runway clearance, and you could custom-build terminal facilities at the water's edge.

An earlier stream of thought by the original developer of the concept (Lockheed-Georgia) was to wed spanloaders to air cushion landing gear and boundary layer control, so they could in effect operate off-airport, but still on land.

Spanwise load distribution would be hard to tailor because of the requirement that the wing contain the cargo. A few years ago, when I was translating Prandtl's second big paper into English, I thought about adverse yaw and how to mitigate it in these monsters.

I know that Al Bowers has given the problem of adverse yaw a lot of thought, and I'm hoping he is still on this list and is willing to put some thought into this problem. I keep coming back to span loaders, which seem to solve production and operation problems better than anything else I've seen.

Best to all,

Marc de Piolenc

I am thinking that the problem could be solved by using pertinently sized blended wing-body aircraft, which allow for more internal volume without a huge size increase.

Bruno De Michelis

There are many possible solutions, but the span loader is interesting because of its very high payload to weight ratio compared to all other concepts tested. When implemented in "skewed" form, it might even beat the small-airport limitation. The machine could go from straight back to skewed immediately after landing, and taxi and be loaded and unloaded in that configuration.

Marc

(ed. - I included this mainly for the walk along glider piece we have covered in the past. I couldn't find a good picture of it but you can view the videos and some others that may come up showing how to build and fly one.)

This is remarkable.

The full size sailplane this is based on is perhaps the highest performance sailplane currently: 70:1 glide ratio and 101 ft wing span.

https://en.wikipedia.org/wiki/Eta_(glider)

Even in a reduced scale, the model handling is impressive as the full size requires a high degree of skill, due to long wing high aspect ratio and adverse yaw effects.

Initially I hoped this was going to be what my ultimate hero, Dr. Paul MacCready called **"walk behind" gliders**. He elegantly crafted his from foam and mylar, and would guide them around a gym or large open space, with them surfing off his forehead or body parts as he walked behind them. He could make them loop and spin on command. Paul considered the use of boards or pie pans cheating.

https://www.youtube.com/watch?v=tac2KXEuANU

I was privileged to have known him most of my adult life, and each time he greeted me by name, I considered it an honor.

https://en.wikipedia.org/wiki/Paul_MacCready

The Academy of Achievement, a compendium of Engineering and Scientific groups agreed. They named MacCready "Engineer of the Century!"

https://www.achievement.org/achiever/paul-b-maccready-ph-d/

Cheers,

Bob Storck

AVAILABLE PLANS & REFERENCE MATERIAL

VIDEOS AND AUDIO TAPES

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

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

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

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

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

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

Cost: $5.00 postage paid

Add: $1.50 for foreign postage

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

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

FLYING WING SALES

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

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