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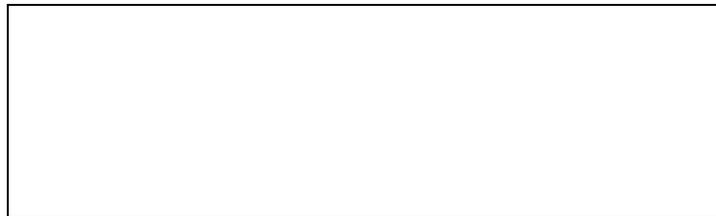
# T.W.I.T.T. NEWSLETTER



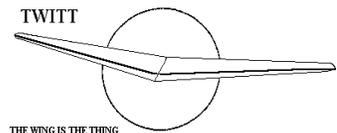
[http://aircraft.wikia.com/wiki/Boeing\\_X-32](http://aircraft.wikia.com/wiki/Boeing_X-32)

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

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



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**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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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).

**TABLE OF CONTENTS**

**President's Corner ..... 1**  
**Letters to the Editor ..... 2**  
**Nurflugel Threads..... 2**  
**Available Plans/Reference Material..... 9**



**PRESIDENT'S CORNER**

**N**ot much to say this month since everything seems to be staying quiet.

The weather here in central Texas is starting to warm up so the flying times and cross country treks are on the increase. I hope some of you are able to take advantage of the change.



**LETTERS TO THE EDITOR**

*(ed. - You folks have been quiet this past month so there are no information loaded messages to include in this issue.)*

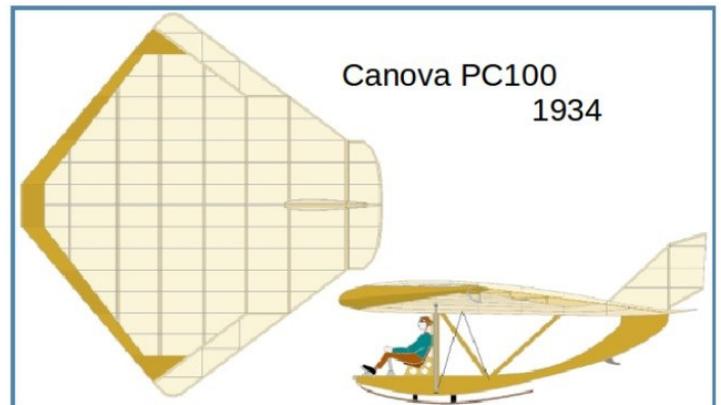
**Nurflugel Threads (cont)**

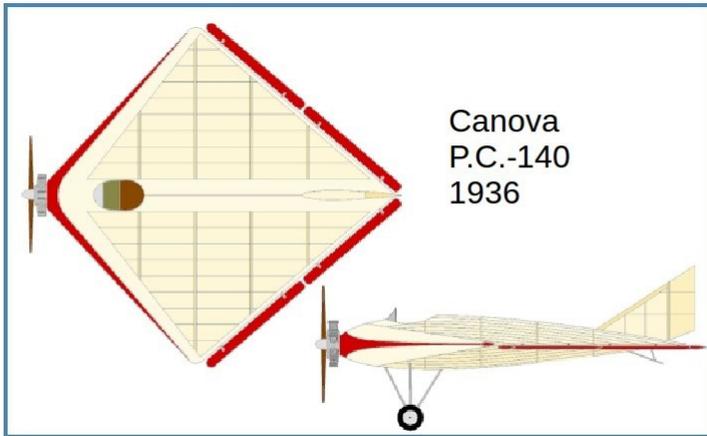
I researched for quite a while and built models of the Piana Canova about 4 years ago. The gliding ones flew reasonably well, although fairly slippery in turns. The motorised one (EMAX CF2822, 1200KV, 8' x 6" prop) was very fast and prone to excessively feel the torque generated by the power plant. I am putting two documents in the Files of this group: one is a page from an old aeronautical magazine and the other my translation of the pertinent pages of the German work "100 Jahre Nürflugel" by Klaus Niegratschka. In fact, it was the accident of the PC140 (costing S. Perego, excellent test-pilot and close friend, his life) that prevented Flaminio Piana Canova to continue with his aeronautical designs.

I believe this configuration is still worth further developments.

The glider flew many times was stable and aerobatic, won a few awards at competitions. No word on whether the motorized plane flew, but the war derailed any further experimentation. No commercial interest, and he needed to concentrate on his other planes which were being bought.

Bruno De Michelis

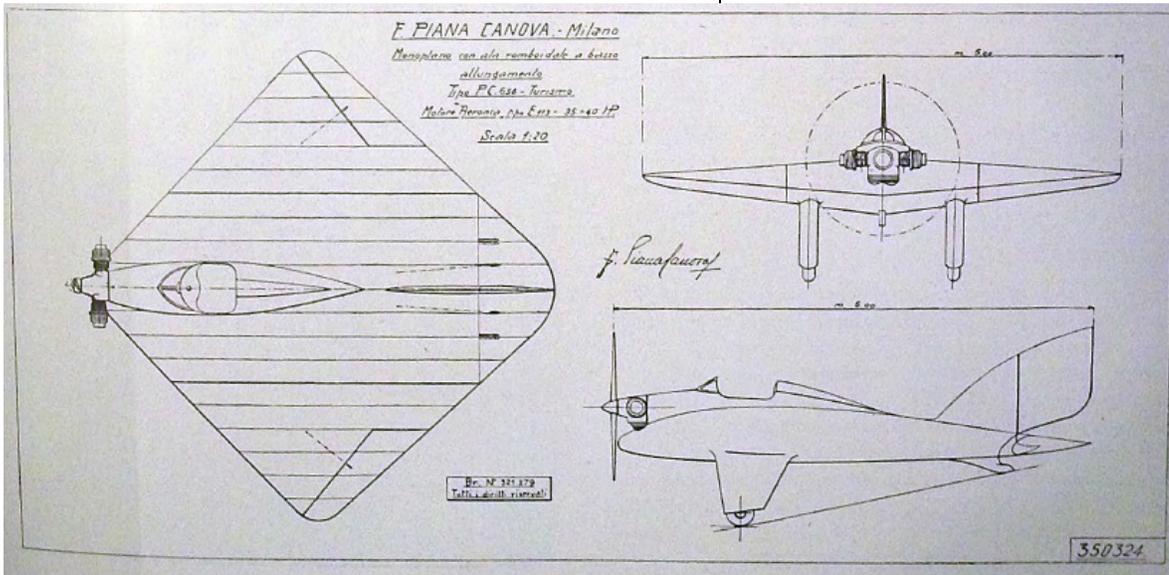




it, and that it was eventually developed to fly safely and controllably. It apparently carried more than other planes using the engine, though slower. Nothing came of the design.

KHAI-3 (KhAI-Aviavnito-3 "Sergei Kirov") flying wing, designed by A. Lazarev and A. Krol, was first flown at September 23, 1936 (pilot E. Schwarz). In 1937-38 it served at some local routes around Moscow carrying cargo and passengers, being the world's first flying wing really used as transport aircraft.

Powered by a single 110-hp M-11 engine, this small plane with a one-man crew could carry 12 passengers in two separate compartments, each one for 6. It was rather slow (cruising speed ~120 km/h), easy to handle and cost-saving. Only one was built.



weight  
(empty/loaded)  
1.4 tonne / 2.2 tonne  
speeds, knots  
(landing/cruise/m ax)  
32 / 62 / 73  
range 850 nautical mile

**1** of several planes designed around a standard 100+hp M-11 engine.

The Aviavnito-3 (often incorrectly called KhAI-3) was essentially an all-wing aircraft.

Structurally, the centre section was KhMA steel tube covered by DI Dural skin, while the outer panels were all wood, with truss ribs supporting closely spaced stringers.

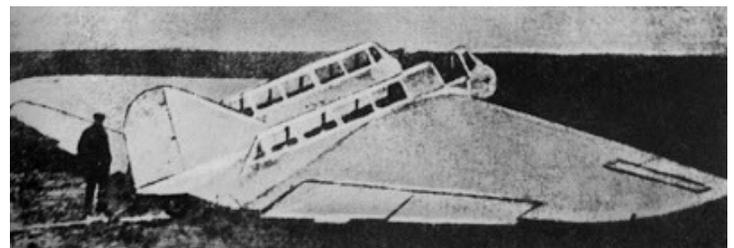
The flight controls comprised large unbalanced cable-operated surfaces divided into inner and outer sections to serve as ailerons and elevators. In addition, spoilers were recessed into the upper surface of each wingtip, driven by the pedals, to enable coordinated turns to be made.

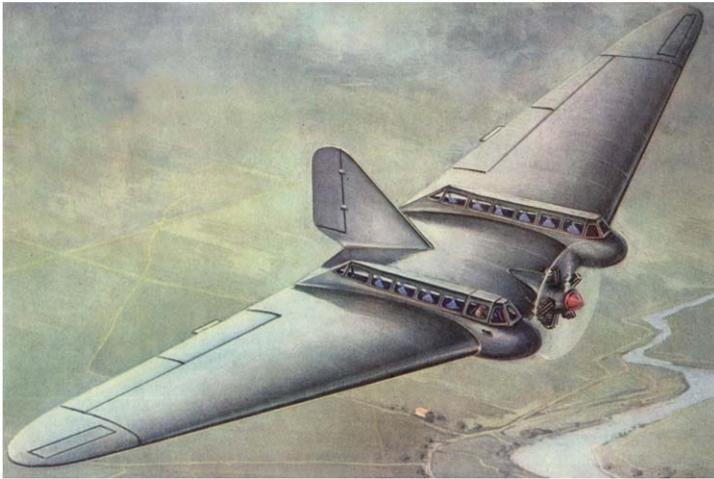
It is clear that this machine did everything expected of

<http://dieselpunks.blogspot.co.uk/2010/07/little-wing-soviet-style.html>

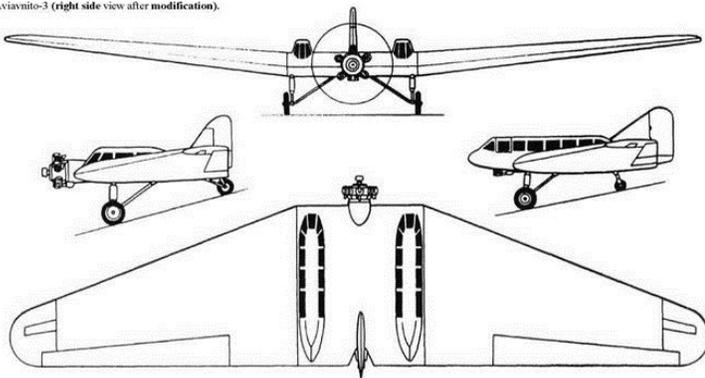
<http://ourairports.biz/?p=6456>

John F.





Aviavitto-3 (right side view after modification).



**F**or those interested, I've made a little more progress although nothing is set up as parametric as I would like. Also, I am using the airfoils that the spreadsheet came with for a much smaller model. I should probably research and change airfoils, but that is an aspect I haven't spent much time on recently.

I've mostly tried to develop the skills needed to generate the models. PVZs can be viewed using the free viewer called creo view: [Creo View | PLM | PTC](#)

Steve,

I really don't know, I've never used a service. The printer I built was \$250, the plastic filament is fairly cheap. Keep in mind it is a large time commitment for whoever is going to do the print. The print probably will have to be broken into 5inch chunks. You can print more than one chunk at a time, but printers commonly can print in a roughly 5" cube.

Most of the issues are going to be faults with the printer with a delicate (thin walled) build like this: base breaking from the print bed or some issue with filament temperature or feed. I only probably have a 75% success rate with any given print. It really isn't tuned enough that I can set it and leave. We'll see if I can get a process to drive proe/creo from the spreadsheet (or some intermediary file, and parametrically drive structure within the wing. It sounds fun if I can steal enough time to work on it. Also working on a parametric model frees me from making decisions that I don't really have answers for about what I want from an RC plane.

Just further FYI,

**A** company called 3d lab print is selling some beautiful designs that take advantage of the manufacturing method:

[Home – 3DLabPrint](#)

So has anyone printed a true tailless (without vert. stabs) yet? It seems like a no-brainer of a method for the required complex geometry. I might be able to do the cad work if someone has a concept they want modeled up..

I ran across this video:

[3D Printed plane - Will it fly?](#)

Thanks,

Nick Strum

Hi Nick,

**Y**ou can use my Excel sheet to design your own model. It is made for flying wings without vertical surfaces (Horten's style). It uses Bell Shaped Lift Distribution as defined by Prandtl, although you can use Elliptical too and everything in between.

Excel will give you coordinates for airfoils across the span positioned exactly as needed.. You then copy those coordinates to txt or dat files that you can import in CAD. After that you only need to loft imported airfoils and you have wing with complex geometry.

Or maybe I could do the designing of wing's shape and you do internal structure, control surface and the CAD for printing.

In both cases I would be very thankful if you would share the results with me and the group. It would be great to see the 3D printed flying wing.

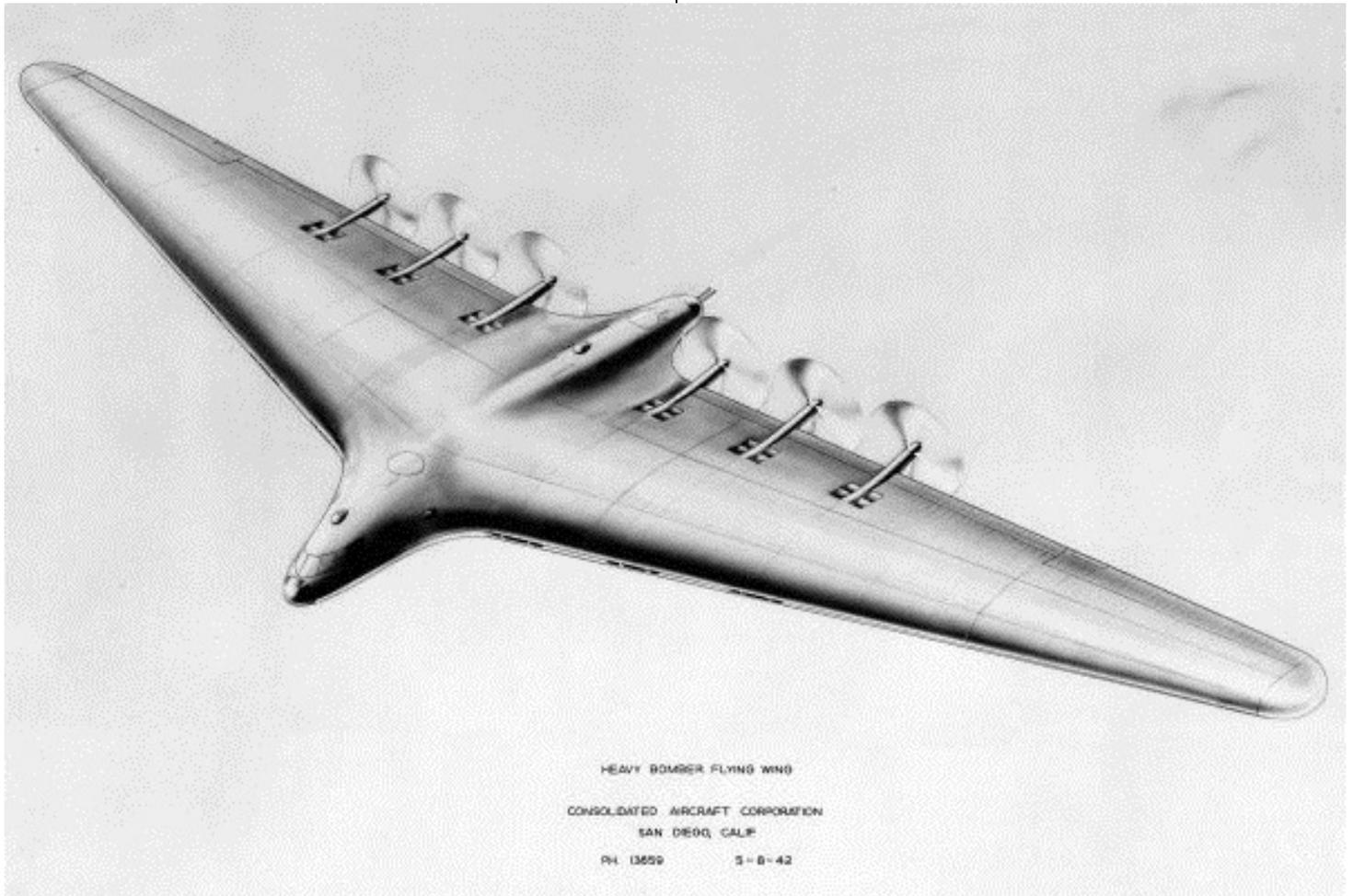
Here is the link for excel file: [Flying Wing Designer - Nest of Dragons](#) Be sure to read comments in the file, if you have any trouble using it be free to contact me (Skype is also possible).

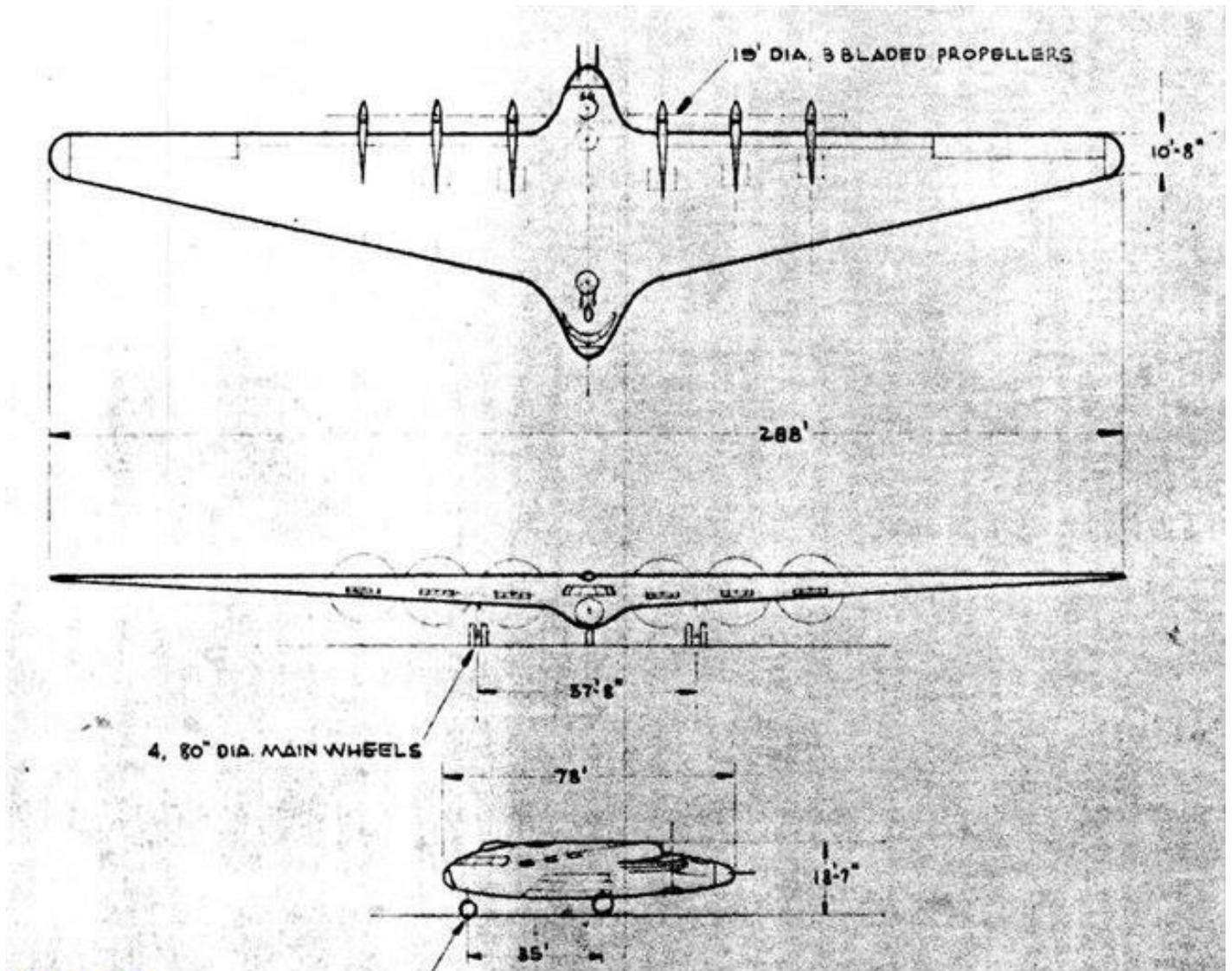
Best,

Marko Stamenovic

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*(ed. - This is the drawing that mentioned briefly above and included in photos downloaded into the Nurflugel group's web site by John F. This is the first time I have seen the concept out of Consolidated Vultee (Convair/General Dynamics.)*





**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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