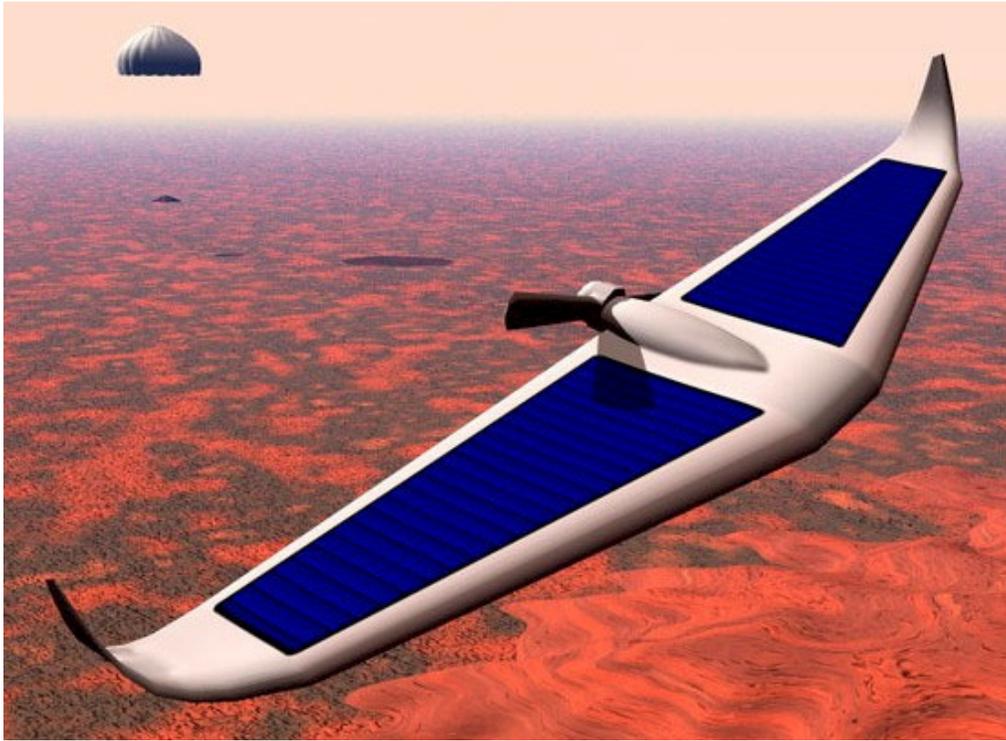


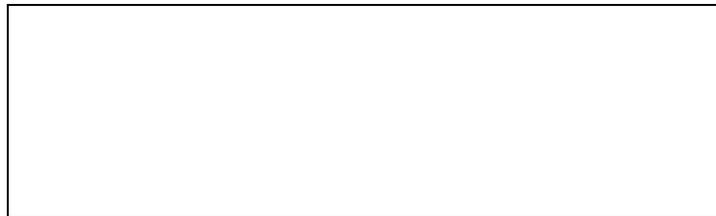
# T.W.I.T.T. NEWSLETTER



Mars wing slips over the Red Planet, thinking its way across the terrain and in search of landing spot. Credit: G. Frederick/Oregon Public Education Network. Tech Wednesday, 6/12/02, Leonard David. Source: [http://www.space.com/business/technology/technology/mars\\_plane\\_020612-1.html](http://www.space.com/business/technology/technology/mars_plane_020612-1.html)

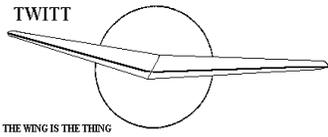
## **T.W.I.T.T.**

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., 0812 means this is your last issue unless renewed.

Next TWITT meeting: Saturday, January 17, 2009, beginning at 1:30 pm at hanger A-4, Gillespie Field, El Cajon, CA (first hanger row on Joe Crosson Drive - Southeast side of Gillespie).



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

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

**T.W.I.T.T. Officers:**

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**Treasurer:**  
**Editor:** Andy Kecskes  
**Archivist:** Gavin Slater

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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**

I hope that everyone is ready for a great and joyous holiday season. For a lot of you there will be snow on the ground and not much in the way of flying weather. For those of us on the west coast it will probably be sunny and warm with no distinguishable change in the color of foliage.

I was searching the Internet looking for something to put on the cover and ran across the article on a Mars flying wing. I don't recall having seen or used an image from it in the past, but I bet if I did one on you will remind me what issue it was in.

Since I was pretty much out of material for this month I took Bob Hoey's presentation from the ESA Western Workshop to fill out this issue. It is amazing the number of modelers around the world that are experimenting with different types of bird models. I have a hard enough time trying to just build something from a kit, let alone scratch build a model of this complexity. I am also amazed at the intricate paint schemes on some of the larger models, which might be hard to see in the black and white printed version. You can really see the effect if you pull up the issue from the Members Only section and look at them in color.

I would like to thank everyone for sticking with TWITT through another year. The number of members has stayed pretty stable at 80 worldwide and continues to be a mixture of full size and model flying wing enthusiasts. It also looks like we will be able to hold the line on membership fees for the coming year, which is one bright spot in an otherwise dismal economic outlook.

**HAPPY HOLIDAYS**



## LETTERS TO THE EDITOR

November 9, 2008

Andy,

**T**hanks for the Kasper Wing info I ordered. There was quite a bit of info that I was not aware of.

No need to apologize for the delay. Having been Secretary/Treasure of our R/C club I am fully aware of the daily demands on your time. The 10/08 newsletter was especially interesting because of the R/C article.

I am sending you another e-mail with a picture of my current 48" wingspan motorized BKB-1 project. I am still sorting out the motor thrust line to obtain stable flight. It is currently trying to dive into the ground.

Stan Teleski  
<delsol77@peoplepc.com>



November 14, 2008

Hi, Stan--

**I** saw your letter to TWITT in this month's newsletter. I have the Kasper bibliography and I agree with Andy that it wouldn't be very useful to a modeler. If you read RC Groups you've probably already seen some of these links but who knows. Sometimes I find one before it's common knowledge.

Ken Bates has built two 100" BKB-1s. A few months ago he advertised one for sale here:  
<http://www.rcgroups.com/forums/showthread.php?t=9>

[16685>](#)

Dale Bowers' build log:  
<http://www.rcgroups.com/forums/showthread.php?t=752781>

There are also some short video clips on Youtube:  
<http://uk.youtube.com/user/jaiosworld>

Norm Masters  
<nmasters@acsol.net>

Norm,

Thanks for the links for BKB-1 model info. I have been following Dale's 1/3 scale build. I am Red Runner on RC Groups.

The pictures attached are: 9-4-08 BKB (*not included*) My first 48" BKB-Me (Modified electric) model with the motor in line with the wing. This is a Depron model that flew well. The fuselage was designed as an updated design but used the same basic dimensions as the BKB-1.

9-20-08 BKB (*on the left*) My second design because I needed 11 oz of weight on the front of the first model that weighed 16 oz. When I raised the motor above the wing I didn't add any down thrust (need to raise the prop end of the motor) and the plane flew into the ground. I am still working on this problem.

My plan is to build a 1/5 self-launching glider with the BKB-1 wing.

I haven't joined TWITT so I don't know if the newsletter had any pictures with my letter.

I know the full size info isn't very useful for the model but I am also interested in the background of the full size BKB-1. I also received an e-mail from Stefanie Brochocki regarding her dad's BKB-1.

Thanks again for your info.

Stan Teleski

Thanks for the pictures, Stan--

**I**f you don't mind I can offer a couple bits of advice. The longer pod is fine for moving the CG forward but it reduces your directional stability by increasing side area up front so you'll need to make the fins

bigger to compensate. Google for "center of lateral area"?

Re your thrust line, check out this thread:

<http://www.rcgroups.com/forums/showthread.php?t=704575&page=2>

This method will allow you to get the thrust line perfectly aligned with the center of mass so there's no pitch response to power changes. Even if the thrust line passes through the CG you'll probably still have to reflex the elevons a bit because the center of drag is usually behind the CG and your thrust line can produce a pitching moment around it too. However this moment is not so bad because in a swept wing it's not a bad idea to have the thrust push the nose down just a little bit. By using the elevons to balance the pitching moment of a slightly offset thrust line when the power goes off the elevons don't have to go down past the fixed TE and possibly create a tip stall problem. The thread in the above link is about hovering 3D models. The link in message #16 of that thread is a flying wing specific version.

Re Kasper's comments about the BKB-1. Kasper said that the wing didn't have washout. But Stefan Brochocki was the aero guy in the BKB team and probably built the wing jig. He said it had 4 degrees of washout. The things that Kasper actually did design didn't work out so well. His balance tab broke on the first flight. The stretched wing version of the BKB that Kasper designed fluttered and crashed, killing somebody whom he told it was completely safe and so easy you didn't need special instruction. The powered plane that Kasper designed stalled and crashed the first time it left the ground.

This video:

<http://uk.youtube.com/watch?v=1MI9mo-eAls&feature=related>

shows a guy making a paper flying wing. He has a method of building washout into a paper plane that would also work for other sheet materials.

PS - Since you brought this up in the TWITT News letter I'm sending Andy a copy. I think he knows he has permission to reprint anything of mine that he finds interesting

Norm

*(ed. – Thanks guys for a great exchange of information and thanks to Stan for sending along the picture of his current project.)*

November 18, 2008

Hi Andy,

Here is some information concerning the name Keller in connection with the Horten brothers, as requested by TWITT reader Joerg Schaden (Nov 2008 issue).

It is taken from a recently published book. See bottom of page. It has been written by my friend Giorgio Evangelisti, who is also a lifetime friend of Richard Keller.

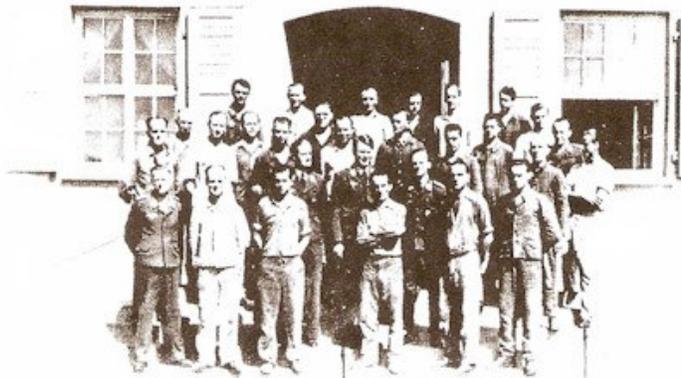
Keller is now living at Arco, near Trento, on the Eastern Italian Alps. He was born on 5 November 1923 at Augsburg (Bavaria) and started his aeronautical career by building plenty of free flight tailless models. No radio gear was available in those days. While testing his models in a field near his home, he was noticed and contacted by the (then middle aged) professor .Alexander Lippisch. This extremely valid researcher, a Messerschmitt employee, was experimenting with his model airplanes side by side with the young Keller.

Lippisch so was impressed by the innovative shapes of Keller's flying models that hired him as his assistant and collaborator. Computers and CAD did not exist yet, but the young Keller had developed an extraordinary capability for tracing three-dimensional drawings of aero planes, which existed only as blue prints. Starting from the ME 163, Keller designed in 1942 a two-reactor interceptor. The drawing that he made of this aero plane was so realistic, that Hermann Goering took it as true photography, and asked Lippisch and Keller whether they had already built it.



When Lippisch and Messerschmitt parted company, Keller was transferred to the Horten *Sonder Kommando*.

curiosity: for this project Keller had available a long horizontal drawing board (15 meter by 2). Keller's first job with the Horten team was the set of aerodynamic calculations for the H-IX-V1. After the war, Keller could not emigrate in America, as requested by Reimar Horten, because he had suffered TBC.



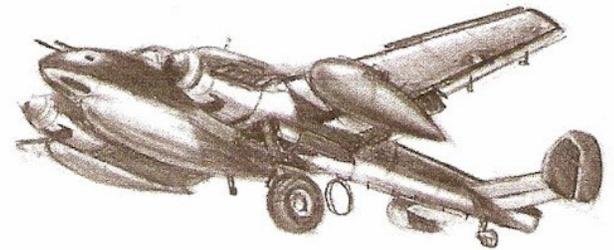
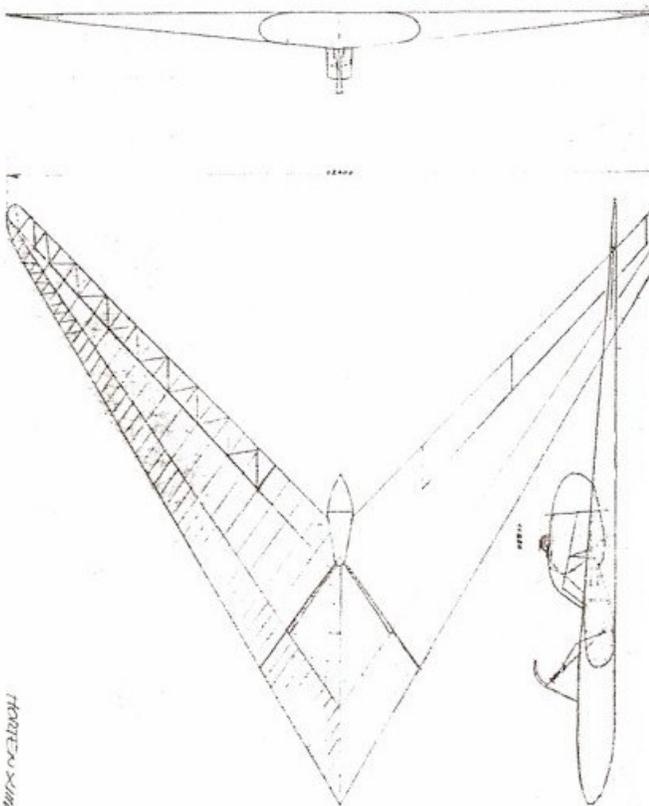
Luftwaffen-Kommando IX:  
1944

Reimar Horten      Richard Keller

In this new position Keller was very instrumental in designing the Horten H-XIII-a delta plane, the first one with a 60° sweep.

Drawings and technical reports by Keller, which had been given in custody to a friendly family, were burned in order to prevent American soldiers to seize them. Another curiosity: when employed by the

Messerschmitt firm at Augsburg, the young Keller had the opportunity of drawing the image of a two reactor plane with enormous auxiliary fuel tanks.



Only later he learned that it was piloted by Rudolph Hess, in his historic escape to England.

Very little remains of the Keller's advanced work: a two-reactor pursuit plane; a rocket interceptor (1942), designed upon request by Lippisch. (both on next page)

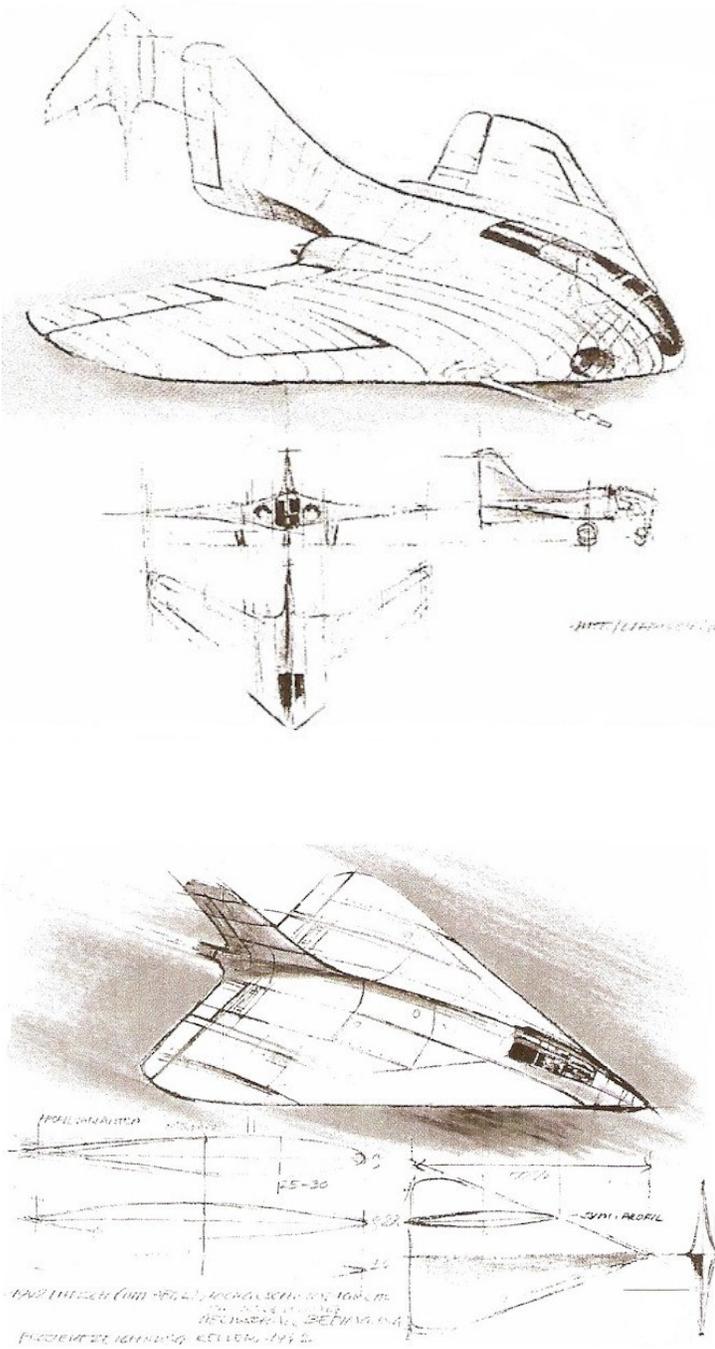
PS: **EROI DEL CIELO** (Heroes of the Sky) by Giorgio Evangelisti, Editoriale Olimpia, Florence ([www.edolimpia.it](http://www.edolimpia.it)), 42 €.

The text is Italian, but Spanish speaking Twitters could easily undersand it. By the same token, we Italians read easily the papers in Spanish, written by Dr. Horten in Argentina.

The relevant basic drawing was made by Keller on November 6, 1944, his 21st birthday. The plane was test-towed in the air, like a sailplane, on November 27, 1944 !!!!! Everything went fine, exactly as expected. A

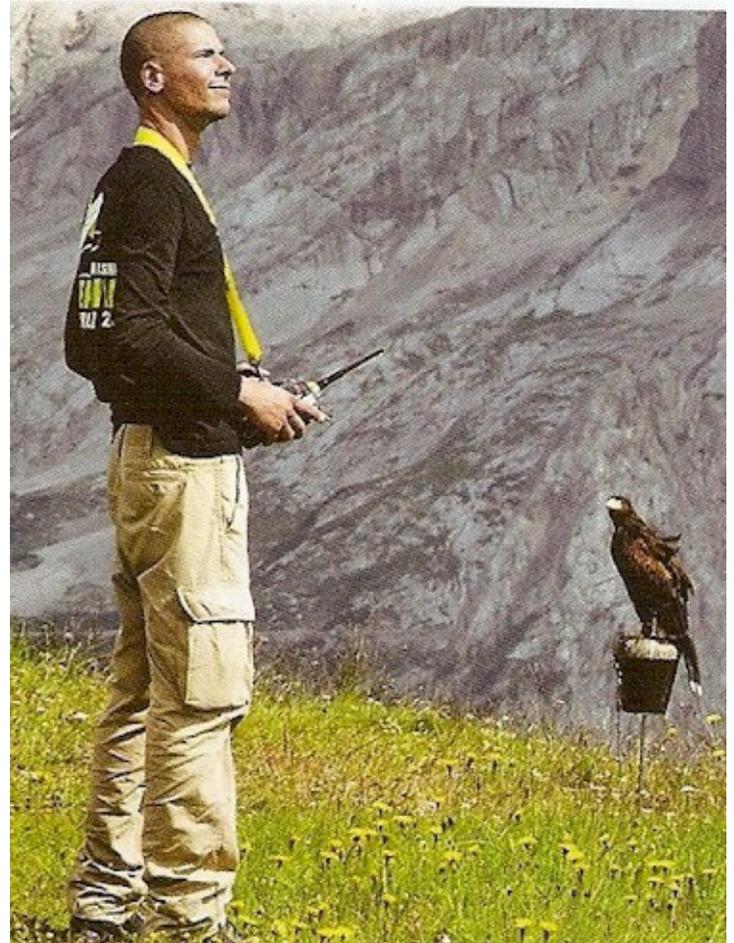
FOTOGRAFIA  
 MUSEO  
 un giorno dopo il mio 21. compleanno...

Ferdi Gale  
[<ferdigale@alice.it>](mailto:ferdigale@alice.it)



**MORE ON THE FRIENDLY HAWK**

The mystery of the friendly hawk has now been clarified. It is an orphan hawk, called Tato, saved and raised by a keen modeler (Alessandro Marcon, upper photo), then trained by means of different whistles. As a result, the hawk is taken to slope soaring competitions sites. He goes looking for thermals; once this goal has been achieved, and the RC sailplane is ascending, an appropriate whistle calls back the hawk to his trainer (or on one of his friends, lower photo). The hawk is then remunerated with a bit of meat.



## BIRD MODEL DEVELOPMENT

By Bob Hoey

**R**etired Flight Test Engineer, Bob Hoey gave a fascinating talk on his R/C model aircraft of bird configuration. With these he has discovered just how the birds maneuver. He takes them aloft and drops them from a powered model mother ship. His experiments with the wing tip feathers led to the discovery of their production of thrust and proverse yaw in the turn. He showed photos of Ravens, Vultures, Goshawks and Pelican models and had the model of the Pelican present. He showed photos of bird models constructed by other both in the US and abroad. Robert Musters of the Netherlands has truly perfected the art of model bird flight. You can get some idea of this ornithopter type action from the pictures below, however, for a short video you can go to: <http://nl.youtube.com/watch?v=sBAhYMuQmyg&fmt=18> Robert hopes his efforts will eventually result in selling these models to the Schiphol Airport at Amsterdam as a means of scaring off the numerous birds that get into the jet engines of commercial flights. As you can see from these pictures this is a flapping wing bird model that looks about as real as you get. Between the realistic paint scheme, layout and flapping you can see why this would scare away other types of birds when confronted with this bird of prey.



Here is another one from Italy that takes a different approach on how to propel (*two photos of version with nose propeller, an option Bob has tried with somewhat less success*) the bird that is simpler and may be just as effective as Muster's. There are several versions and I have included a web site link at the end of the recap provided by Bob where you can find more information and some short video clips of the birds in flight.

"Bird Raptor has unveiled in Rome its Falco Robot (robotic hawk) gregarious bird removal system (GBRS) unmanned air vehicle (UAV)." The Falco Robot, which has been in development for 11 years, "is designed to eliminate the need to train real birds of prey to discourage the presence of birds at airports." The UAV "is a life-size copy of a female goshawk, with a 1.6m wingspan and 1kg weight, built using composite materials and powered by a small brushless electric motor driving a ducted fan installed into the 'body.' (bottom in-flight photo below) Powered flight lasts only a short time,...after which the air intake and exhaust are closed." Then, "[t]he Falco Robot...flies like a goshawk, exploiting thermal updrafts." Flight Global noted that, in a recent test of the UAV's capabilities, "the Falco Robot kept all birds away from" runways at Italy's Rome Fiumicino airport "for an entire day after a single mission lasting only 35 seconds." <http://birdraptor.com/lang-en/photogallery.html>



Here is one of the other launch methods besides an onboard power system. This shows the bird on top while others place the bird underneath. Sort of depends on the type of runway you are using.





This is a Turkey Vulture structure from a builder in Italy. It looks like it is setup with an elevator at the tip of the tail and will probably include a drive mechanism to move the forward set of tip feathers for roll control. From Bob's original testing this has proved to be an effective method of control.

The left picture is of a Red Tail Hawk by a designer and builder in Oregon. The right picture is a "super" goose by a modeler from the eastern US. Notice that each of these also use the tip feathers approach. Bob didn't indicate the large leg extensions had any control purposes or whether they were included when flying. Must have taken a lot of patience to do the paint schemes.





This is Bob's White Pelican with the electric fanjet power pack for longer flights. These small fanjets are a perfect match for this type of application with Bob also putting one on his Raven model.

Bob's Raven II and Turkey Vulture models. If you look at the Turkey Vulture's left wingtip shadow, you can see the three front "feathers" have a different angle. These are the feathers that create roll control while the aft feathers stay stationary. Water tunnel testing has shown the flow across the aft feathers to be smooth.

Bob has also had an experience where one set of wing feathers were knocked off during release from under the mother ship. Rather than a disaster, the bird flew in a stable mode although it could only turn in the direction of the good wing. It was landed successfully and went on to many more flights.



Below is an electric powered Seagull from a builder in New England. This is a different approach than mounting a fanjet on top. Bob didn't mention it and there is no way to tell from the photo how the pitch control worked with the propeller shaft going through the tail feathers. The model does appear to have ailerons for roll control, whereas Bob's version moves the outer portion of the wingtips.



This is the nose section of Red Tail Hawk by a builder in Pennsylvania. Going into this much detail certainly adds to the realism of the bird model and creates conversation at the flying field. It probably also helps when the model gets into contact with an actual flock of birds, which happens on occasion.

This is an easier building method for some modelers. Some quick foam cores, a little carving to create the fuselage and cut out some ailerons. Obviously hawks don't have swept up wingtips, but they may help improve the handling characteristics. Bob didn't note where this one came from.



**AVAILABLE PLANS & REFERENCE MATERIAL**

**Coming Soon: Tailless Aircraft Bibliography  
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**Edition 1-f**, which is sold out, contained over 5600 annotated tailless aircraft and related listings: reports, papers, books, articles, patents, etc. of 1867 - present, listed chronologically and supported by introductory material, 3 Appendices, and other helpful information. Historical overview. Information on sources, location and acquisition of material. Alphabetical listing of 370 creators of tailless and related aircraft, including dates and configurations. More. Only a limited number printed. Not cross referenced: 342 pages. It was spiral bound in plain black vinyl. By far the largest ever of its kind - a unique source of hardcore information.

But don't despair, Edition 1-g is in the works and will be bigger and better than ever. It will also include a very extensive listing of the relevant U.S. patents, which may be the most comprehensive one ever put together. A publication date has not been set yet, so check back here once in a while.

Prices: To Be Announced

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**VIDEOS AND AUDIO TAPES**



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

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

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

Cost: \$10.00 postage paid  
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**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  
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**An** Overview of Composite Design Properties, by Alex Kozloff, as presented at the TWITT Meeting 3/19/94. Includes pamphlet of charts and graphs on composite characteristics, and audio cassette tape of Alex's presentation explaining the material.

Cost: \$5.00 postage paid  
Add: \$1.50 for foreign postage

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

Cost: \$8.00 postage paid in US  
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**VHS** of Robert Hoey's presentation on November 20, 1999, covering his group's experimentation with radio controlled bird models being used to explore the control and performance parameters of birds. Tape comes with a complete set of the overhead slides used in the presentation.

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