

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

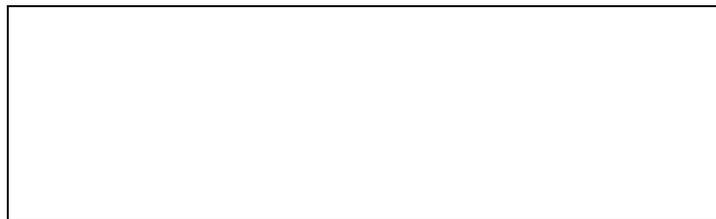


*These are shots of the Leonardi-Da-Vinci like hang glider model Bob Hoey was working on for a British filming company. It is a modified Volmer Jensen VJ-24 rigid wing glider. Bob will be telling us more about this project at the meeting so make sure to attend.*



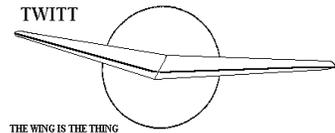
## **T.W.I.T.T.**

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., 0209 means this is your last issue unless renewed.

Next TWITT meeting: Saturday, September 21, 2002, 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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- Vice Pres:**
- Secretary: Phillip Burgers** (619) 279-7901
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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** ..... 1  
**This Month's Program** ..... 2  
**Letters to the Editor** ..... 2  
**Available Plans/Reference Material**..... 9



**PRESIDENT'S CORNER**

**W**e are very pleased to have Bob Hoey coming back for another program in September. You may have noticed that we are having more repeat speakers here lately, which is due to the fact that we have just about tapped everyone in the Southern California area at least once. So I will make my periodic plea to our members in So. Calif. to see if they can find some new speakers on any subject that relates to flying wings. We need someone for the November 16<sup>th</sup> meeting to finish out the year and I would appreciate your help.

Since I have only heard back from one person on my proposal for an electronic version of the newsletter, I will shelve the thought for now (except for sending that person an electronic copy). If for some reason anyone would like an electronic copy of the newsletter, just drop me a line and I will send it to you as an attachment.

I just got back from the SHA Western Workshop at Tehachapi and it was good as always. Bruce Carmichael lined up a stellar group of speakers and demonstrations for everyone to enjoy. If you live in or around California and don't make it to this event at least every couple of years, you are missing an excellent experience to share ideas and learn about all kinds of new innovations in amateur built aircraft. There was a motorized SWIFT and, the Mitchell prototype Stealth Wing, along with a B-10. See some pictures toward the back of the newsletter. You just never know what will show up at anytime.

I have been roaming around the Internet looking for links to TWITT on other websites. I have been amazed at the number that are out there. Some of them have our old URL, but I have been successful in getting most of them updated. It is nice to know that we are so well known throughout the world. I was just able to register "twitt.org" so look for a new URL in the future.



**SEPTEMBER 21, 2002  
PROGRAM**

The September program will feature Bob Hoey. He provided the following on what will be covered.

"I will present a brief update on "bird model testing" relating back to my earlier presentations to TWITT. The Seagull model has been equipped with a flexible section of wing to allow for a smoother flow transition for the tip-aileron. The wing section is covered with ripstop nylon (from an old parachute).



I will also present a summary of a design study performed last spring to create a "Leonardo-Da-Vinci-like" hang glider for a British filming company. The design was based on modifications to Volmer Jensen's VJ-24 rigid-wing glider. (See the photos on the cover for this one.) The "Leo" design has no vertical tail and uses tip ailerons. A radio-controlled model was built and flown successfully. The "cage" on the model holds the battery and receiver in the region where Leonardo would have been sitting. The concept was discarded by the film producers in favor of a single-surface, (Rogallo-type) hang glider design."

This will be a good program so mark your calendar for the 21<sup>st</sup> and come join us. Let your friends know about it and bring them along. Also, mark March 15, 2003 for a program by Dr. Paul MacCready, which everyone has been asking for.



**LETTERS TO THE  
EDITOR**

July 8, 2002

TWITT:

**Hi** guys... I'm trying to get as much information on the Mitchell B-10 wing. I'm planing on building one and believe there have been a few modifications that greatly improve flying characteristics of the wing. Does anyone have information on the Culver twist or any other enhancement on this craft?

Thanks

Alex Pericchi  
alex@steinbergadvertising.com

*(ed. – I wrote back to Alex and suggested he get in touch with Richard Avalon and see what additional information he could get on the B-10 from that source. If anyone else out there has anything they could offer Alex, please copy TWITT on any message you might send Alex so we can pass it along to others.)*

July 23, 2002

TWITT:

**G**reat website and links. I thought some of your technical types could direct me to a suitable airfoil for a project I was considering, an all wing ultralight aircraft. I want to keep it simple, and I feel no need to plow new technological ground. So rather than reinvent the wheel, I was wondering if any of you know of a good positive pitching moment airfoil to use. I was planing on using a moderate amount of sweep (20 to 30 degrees at LE) and taper, wing loading and speeds would be consistent with ultralight aircraft. Because of the low speeds drag is not as much an issue, but I did want to keep the wing size down so a fairly high Cl max would be nice (without high lift devices). And anywhere from 10 to 14 percent thick. It seems to me there should a perfectly suited airfoil for such an aircraft readily available.

Any suggestions, and is the data available on-line?

Thanks,

Peter Chopelas  
pac@premier1.net

*(ed. – I have to apologize to Peter for not getting on this earlier and adding it to the request section of the website or put the information out to the Nurflugel mailing list group.*

*There are a lot of good airfoils out there, but I am not the one to be recommending anything in particular, not being an engineer or aerodynamics specialist. So, if anyone out can help Peter, please make sure to copy TWITT on any message you send him so we can pass the reply along to others.*

*Below is one that came back from the Nurflugel mailing list.)*

August 16, 2002

August 23, 2002

From: "almartins2000" almartins2000@yahoo.com.br  
 Subject: Re: Request For Help

Hi, list

**W**ell, if Peter does not intend to be too wild about the design, I think there are numerous possible airfoil choices. If he really wants  $Cm_0 > 0$  ("self stable"), maybe the best choice would be some reflexed NACA like we find in the Marske Monarch/ Pioneer designs. If he is willing to adopt  $Cm_0 = 0$  with trimming through twist on the swept wing, then maybe a NACA 23015 would be a good choice. It offers good spar depth and gentle stall characteristics (contrary to its thinner 23012 counterpart). As far as I remember, it is used for the Mitchell B-10 also, a fact that might give him some flight experience reference.

Andre

August 27, 2002

Dear Peter:

**I**n Richard Eppers published airfoils are some for flying wings. If you are in the USA you can request his book from any public library via inter-library loan. [I did so]

Eppler's work seems more reliable than some other published sources and, it is well documented. I am considering it as a starting point for a Horten airplane.

Dennis Gwynn  
 dengwynn@worldnet.att.net

*(ed. – Here is the original message from Ray Byrd and a reply recently received from John Bottoms.)*

October 10, 2001

**I** have in mind to complete an embryonic preliminary design of a two-place, powered, tailless design using a BKB-type wing and controls mated to a fuselage designed after Fabio Goldschmied's Model, which if properly configured, is reported to have a drag coefficient of "zero", while also providing the propulsion.

I would like very much to know if anyone has experience or credible insight into either the BKB Wing or Goldschmied Body technology?

Thanks,

Ray Byrd  
 byrdr@xch-bsco-05.ksc.nasa.gov

Ray,

**A**s an owner of an old rag-and-tube Kasperwing motorglider, I am interested in updating my flying to a more modern design while retaining the wonderful slow flying qualities of the Kasperwing. If you would be willing to include my e-mail address in any pertinent mailings that you make regarding your progress in design, construction and flying, I would be most appreciative. A super efficient design with thin film solar cells built into top surface of wings with electric propulsion would appeal to many recreational and soaring enthusiasts!

John Bottoms  
 bottoms@asagroup.com

July 16, 2002

TWITT:

**E**xpiration of my subscription sneaked past me. Please find my check for a couple of years of newsletters, including, if possible, the issues I missed since May.

I appreciate your writing up my inquiry regarding currently commercially available man-carrying flying wings about six months ago. I did get one response from an enthusiastic owner of a Mitchell Wing. My choice continues to be the all-composite, factory built P-Swift (motorglider version of hang glider Swift now built in Belgium).

Would you happen to know if anyone is working on or has available now very thin film solar cells that could be added to existing wings and electric motors for propulsion? If memory serves me, Paul MacCready has had an interest in electric powered efficient flying wings, but has he or anyone else marketed such a combination. If it do not get back into the air within the next few years, I will become too old to do so safely and will become, like the vast majority of TWITT's membership, simply an armchair dreamer and history buff....no criticism intended.

Best wishes,

John Bottoms  
 431 Bottoms Way  
 Waynesville, NC 28786  
 828-452-5164 (voice)  
 828-456-9829 (fax)  
 bottoms@asagroup.com

*(ed. – I put John in touch with Eric Raymond of Solar Flight, Inc., (www.solar-flight.com) since he is now flying a new solar powered aircraft with much improved cells. If anyone else knows of a source for such cells, please let us and John know.)*

August 20, 2002

TWITT:

The April issue of TWITT with Al Bower's talk on bird aerodynamics was of special interest to me. I have access to a collection of wings – humming bird, swifts, turkey and on through to red tailed hawk and vultures.

Since on red tails, at least, at the most forward sweep of the primaries, the secondary section increases camber (1/2" on a 10" chord), it should be practical to use the extra camber on the outside wing while turning to provide the needed bank for this maneuver. Please pass this along to Al.

Thanks for a very interesting TWITT series. Bob Hoey in September should be outstanding; his second program if I can remember correctly.

I has also enclosed my renewal into 2003.

Thanks for a greatly appreciated publication – TWITT.

Charlie Person  
2576 Mountain Woods Drive  
Birmingham, Alabama 35216

*(ed. – I have forwarded Charlie's observations to Al and Bob will see them in the newsletter before giving what will be his second program for TWITT.)*

*It sounds like he has a very extensive collection of bird wings that might be of interest to Bob, so hopefully they can make contact with each other.)*

July 24, 2002

I send you a photo of the new Aeronautical's National Museum in Argentina, where the Urubu, Horten project is exhibited in a place of honor.

Sincerely,

Roberto Alarcon  
roberto@alarcon.net



*(ed. – Here are the pictures Roberto included with his message. It appears that the Urubu has been moved from a position on the floor to an overhead spot. You can see both locations at: [www.members.cox.net/twitt/URUBU.htm#top](http://www.members.cox.net/twitt/URUBU.htm#top).)*

August 25, 2002

Hello all,

While digging through my video collection, I ran across a video tape I acquired while working at an experimental aircraft company a few years ago. At that time, the folks that designed the PUL-10 were looking for a company in the US to produce kits, so they sent a "package" to many US kit makers. This particular company wasn't interested, so I got custody of the info pack.

Since this was several years ago, and I haven't seen anyone offering kits, I guess nobody was interested. What a shame.

Does anyone know of anyone working on a similar design in the US? I would love to build something like the PUL-10, but would prefer to simplify it (fixed gear) and would likely build it from aluminum instead of composites to save weight and tooling costs. (I also wouldn't be averted to installing "tip sails" for better yaw control and stability. I know... I know... it wouldn't be pure, but it would still be unique.

Any info and/or links to similar designs would be appreciated.

Best Regards,

Chris Boultinghouse  
Austin, TX  
sonexbuilder@yahoo.com

*(ed. – I am attempting to get a copy of the video from Chris if it contains footage of the PUL-10 flying in Germany. I will keep you informed.)*

*In the mean time, I had an e-mail from Phil Batterson of Davis Wing, Ltd. It appears that the Davis Wing is possibly coming back into kit production according to their website:*

*http://www.daviswingltd.com. Phil can be reached through the website if you are interested in getting more information than is provided. They have a business plan and seem to be gearing up for orders. I have passed this information along to Chris, although the Davis Wing was made of composites, but you never know what could come of it.)*



July 22, 2002

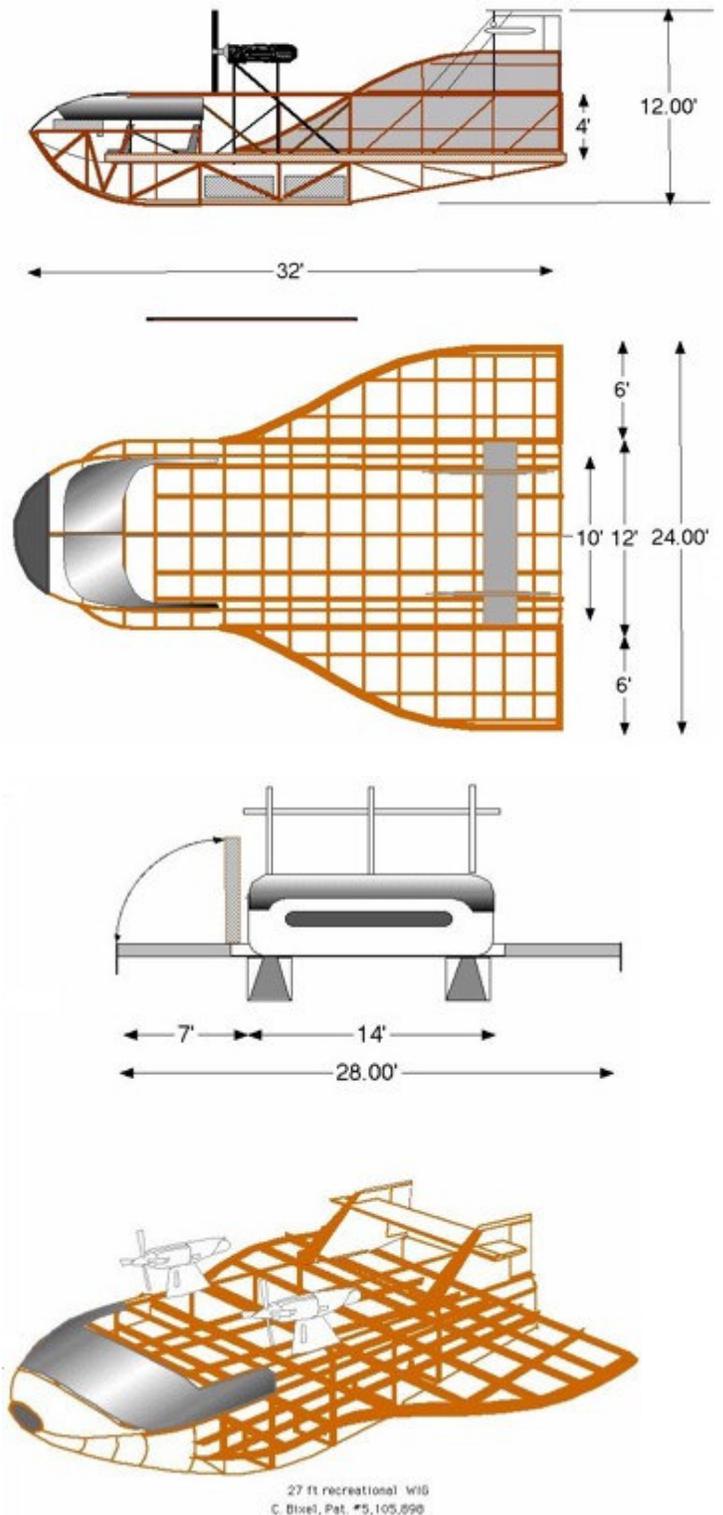
From Chuck Bixel:  
To Jim Wixson

**S**aw your note in TWITT about lifting body designs. My work in the Lifting Body design area may be of interest. The Double Wing lifting body was derived from a study into Ground Effect Flight designs. All variations of the Double Wing WIG possess the capability for safer and more efficient flight than standard aircraft.

Enjoy

Chuck Bixel  
bixel@fwb.gulf.net

**WIG ABSTRACT**  
**HOVERCRAFT GROUND EFFECT VEHICLE**  
Inventor: Charles G. Bixel, Jr.  
395 Gardner Dr..  
Ft. Walton Beach, Fla. 32548  
USA. Patent #5,105,898, April 21, 1992



A Double-Wing WIG lifting body seaplane design. The design incorporates a new hovercraft augmented twin hull design that, allows open sea and rough water take off and landing. The twin hull SES Hovercraft design, by lifting the vehicle to the waters surface is capable of smooth, zero draft, very high speed open sea operations. The very low Aspect Ratio, large wing area planform optimizes the capture and containment of the Ground Effect reactions. This very low Aspect Ratio flat airfoil design has unusual pitch stabilizing Wave Riding WIG flight characteristics that, make it safer to fly near the surface than the pitch sensitive

standard airfoil WIG aircraft designs. The design produces usable Ground Effect reactions at more than four times height of the GE modified standard aircraft designs. Primarily a low-speed (100-200 Kts), long range lifting body cargo, (Type 3), WIG seaplane design. The basic design allows size variations, from small one-man units, to large ocean-going high-speed cargo craft of 300 feet and over, with gross weights exceeding five million pounds. The design's cargo capacity, (size & weight), can be ten times that of any standard cargo aircraft of equal hull length. The design can generate up to half the lift required for flight from the trapped Ground Effect reactions, making it more efficient than any modern cargo aircraft. A long range Ground Effect cargo seaplane design that is ten times faster than cargo ships and is capable of going into true flight to over fly land masses for ocean-to-ocean and inland lake or river access. The design's greatly simplified straight-line structure resembles a series of identical box shapes. These identical simple lightweight box structures allows simpler production practices greatly reducing manufacturing costs. The design does not require special seaplane docking facilities. The fold-up Double-Wings reconfigures the flying planform to a zero draft (slow to very fast) barge shape for tie up to standard ship loading, refueling, and maintenance docks. The designs zero draft capabilities, also allows cargo load-off-load by ramps directly on beaches.

August 24, 2002

Hello,

Re: Canard assisted flying wing

I recently read something in a French magazine (Vol Moteur) about a new homebuilt project. It is called BRONGO. It looks a bit like the Bronco. Double tail-boom, but no rear horizontal tail and, it has a canard. Maybe this info is already on the net. Is it of interest?

Keep that brain spawning wings,

Koen Van de Kerckhove  
nestofdragons@hotmail.com

*(ed. – I looked through a couple of search engines and couldn't find anything about a flying wing with the name of BRONGO. It may be a one of project that hasn't found its way to Intranet yet, or is being done by someone with access to the net. Does anyone know anything about it??)*

*(ed. – This is from the Nurflugel mailing list and thought you might be interested in the availability of this book. The first messages were testaments to the value of the book, so I put them at the lead and then give you more information on how to order it.)*

August 28, 2002

Horten IX Publication from Russia

I have just received the booklet and translation on the Horten IX I had ordered from Andrei Shepelev. All I can say is that for those interested in the history and development of the Horten IX this publication is a real jewel.

The work Andrei has made with the three view drawings and renderings is just impressive. Those that are familiar with the Autocad SW will be able to realize of the amount of work necessary to create those images.

But this book is not only impressive for the computer-generated drawings. Andrei has made an extensive research work and thanks to this we can find pictures in the booklet that had never been published before. The pictures of the arrival of the Horten IX V3 by train to Freeman Field in Indiana deserve a special mention.

All I can say is that it is worth for anyone to own this work and from my point of view 10,00 USD are a really small amount to reward such a result.

Regards from Spain

R. Escapa  
Raul.Escapa@casa.eads.net

August 28, 2002

Hi,

Just a small addition: An English translation of both the complete text and the photo captions is also included so there is no need to start learning the Russian language:-)

Nurflügel Forever!

Huib Ottens  
ottens@tref.nl

July 24, 2002

I just received my copy of this book. If anyone is into the Ho229 as I am then this book is a must have. Very nicely done. A lot of new pictures. Great drawings and the 3D-models are a sight to behold. Just trying to give Andrei Shepelev a bit of advertising. Took 16 days via airmail from Russia to the US. Everyone have a good day.

Jon Johnston  
jonnypjohnston@hotmail.com

Dear Horten enthusiasts,

As Jon said, it's a real great book. Thank you Jon for the trigger. It's astonishing and to admire how much information, photos and drawings, including the 3-dimensional cutaways, he could put together and all this work Andrei Shepelev did

far away from original source places in Europe and the States. Very best congratulations to Andrei for this book!

Peter F. Selinger  
Peter.F.Selinger@jocki.org

June 1, 2002

Subject: New Horten Ho 229 publication available for 10 US Dollar or 10 Euro!!!

**M**y dear friend Andrei Shepelev has produced a great new monograph on the Horten Ho 229. It is called: "Horten 229, Spirit of Thuringia", The story of the Horten Ho 229.

This booklet is a 56 page soft back with 8 color pages. It is written in the Russian language, but for non-Russian readers an English translation of both text and photo captions will be inserted.

The book contains some 13,000 words, a great collection of photos and last but not least Andrei Shepelev has produced some stunning color computer art and drawings. For a preview of the art and drawings I invite you to visit my website "Huib's Aviation Books and Flying Wings Page" at the following (new) URL: <http://home.planet.nl/~otten100> and go to the "Horten 229, Spirit of Thuringia by Andrei Shepelev" entry in the "Book section".

Amongst the art and drawings presented are:

- \* Color profiles of the H IX V1, H IX V2 and Ho 229 V3
- \* Color cutaways and some subassemblies diagrams
- \* Color drawing of the Ho 229 V3 cockpit
- \* " Production" Ho 229A drawing / art, based on the Horten design 8-229 V6
- \* Scale (1/72) line drawings of H IX V1, H IX V2 and Ho 229 V3, H IXb, Li P.11, Go P.60 (various levels of detailing)
- \* Detailed 1/48 and 1/32 drawings of H IX V3

The art and drawings are very accurate and based on available production drawings and photographic evidence. These drawings are very interesting to both the modeler and the historically interested reader.

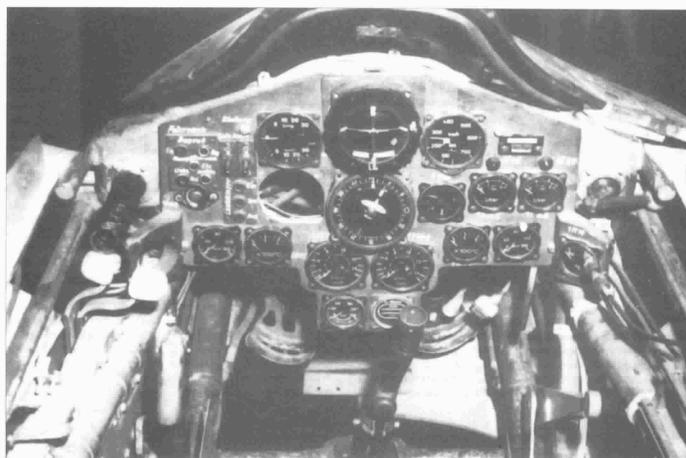
The price of the booklet is 10.00 Euro or 10.00 American Dollars for non-Euro(pean) customers, Postage and Packing are included. (I think this is great value for money!)

If you want further information you can contact Andrei Shepelev at: [gala\\_may@samaramail.ru](mailto:gala_may@samaramail.ru)

Limited numbers of the booklet will (probably) be available from the "Luchtvaart Hobby Shop" in Holland in the near future. They sell through the Internet and can be reached at: <http://www.lhshop.nl/>. Their price is not yet available. (I have no financial interest in the sales of is booklet.)

Nurflügel Forever!

Huib Ottens  
ottens@tref.nl



Кабина пилота самолета 8-229 V3. Отсутствует левая носовая секция обшивки. Приборная доска изготовлена из толстой фанеры.

**ABOVE:** The caption for this picture was: "The cockpit of the 8-229V3. The left nose section of the skin is missing. The dashboard was made of thick plywood." This, along with Huib's website material will give you an idea of what to expect in this book. (Source: [Horten 229, Spirit of Thuringia](#), 2002, page. 35)

July 26, 2002

Hi friends,

**T**hanks for your reviews regarding my book! For the moment it available only from me directly.

You may send money (USD 10 per copy incl. P&P surface mail, add USD 2 for airmail) through Western Union for:

Shepelev Andrei Ivanovich  
P.O. Box 5086  
Samara 443125  
Russian Federation

Upon this please e-mail to me the 10-digit transfer code and your postal address. Your copy will be dispatched immediately in registered parcel, complete with English translation insert. I will inform you on dispatching your order.

*(ed. – The cost of a Western Union wire may be as much as the cost of the book, due to its low cost. You might want to consider ordering multiple copies since the cost of the wire would be the same, regardless of the number of books. These would make really great birthday and Christmas gifts for your aviation friends, even if they aren't into flying wings.)*

PLEASE DO NOT SEND CASH MONEY IN LETTER !!!

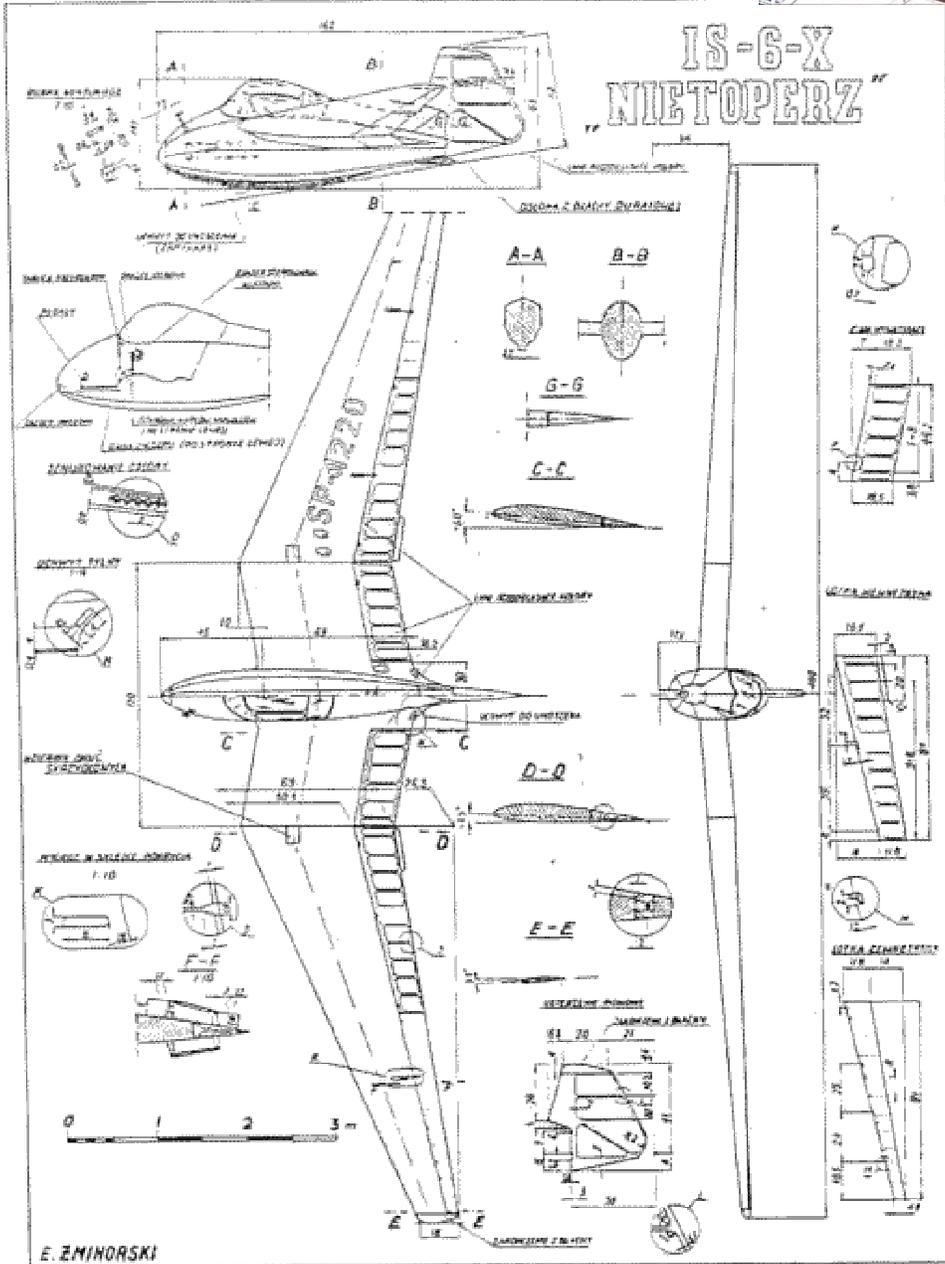
Regards,

Andrei Shepelev  
[gala\\_may@samaramail.ru](mailto:gala_may@samaramail.ru)

(ed. - We thought you might like to see a couple of pieces from Dr. Ing. Ferdinando Gale's book *TAILLESS TALE*. It has been in our classifieds section for a number of years, published by B<sup>2</sup> Streamlines run by Bill and Bunny Kuhlman. We would like to thank B<sup>2</sup> Streamlines for giving us permission to share this with you.

The soft cover book is 257 pages of diagrams, tables, 3-views, illustrations, formulas and an 88-item bibliography all relating to tailless and flying wing aircraft. If you are interested in obtaining a copy, please see the pricing and ordering instructions in the Reference Material section.)

The first item is the Polish IS-6-X Nietoperz. This is an



Specifications:

Span	12 m
Length	4 m
Height	1.3 m
Wing Area	14.4 sq. m.
Aspect Ratio	10
Empty Weight	194 kilos
Take-off Weight	269 kilos
Top Speed	300 kph
Landing Speed	65 kph

Wing Twist: From +6° at the root (section C-C) to +3.5° at the wing knee (Section D-D) to -3.5° at the wing tip (Section E-E).

Controls: Rudder, landing flaps (from C-C to D-D), ailerons, split flaps, pitch trimmers and drag rudders (section F-F).

(ed. - I have also included a museum picture of this glider for comparison to the drawings. The picture and other information can be found on: <http://www.muzlotnictwa.krakow.pl/samolot/sam10.html>)

The next section we offer from *TAILLESS TALE* is a chart of various wing tip turning devices. Ferdinando wrote: "There are hundreds of patents describing a vast variety of drag rudders to be used on tailless configurations. All are aimed at creating an additional drag at the wing tip. The 'craft is thus supposed to make an almost flat turn, with limited banking.

"Most of these drag rudders are impractical for aeromodelling purposes and many of them are also so for full size aircraft.

example of a swept forward and back wing. The actual sweep angle is not easy to assess in this case. The longitudinal stability was obtained only with aerodynamic twist and a conventional disymmetrical airfoil (NACA 23012).

“Advantages and disadvantages of each type are impossible to assess seriously during the design phase. Only flight tests can give adequate, qualitative information.

“From the practical point of point of view, it makes no difference whether the steering moment is generated by drag rudders at the wing tips or by vertical rudder(s), provided enough angular acceleration is produced to make turns and/or to compensate the aileron yawing moment.

“Tip airbrakes are effective at all angles of attack, while vertical rudders could be influenced by the wing wake, particularly in the case of very low aspect ratios, as in a delta planform.”

*(ed. – Here are a couple of the pictures I took at the 2002 SHA Western Workshop over the Labor Day weekend.)*



**ABOVE:** Here are two shots of Norm Castagneto’s motor glider. It is powered by a 3-cylinder, 24 hp Konig engine. Rate of climb taking off at nearly 4,000’ was not spectacular, but he was still tuned for sea-level performance. **TOP RIGHT:** This is Norm’s (standing by tip) Mitchell Stealth, which has a very colored history. Norm said it is for sale if anyone is interested in putting it back into the air.



**ABOVE:** Here is TWITT’s Pat Oliver test flying one of his paper creations before turning it over to his young student pilot on the left. Pat had a whole box of his paper planes for the kids to try out over the weekend. These are also learning tools to teach configurations and performance through comparison flights and “doing the math”, according to Pat.

**AVAILABLE PLANS & REFERENCE MATERIAL**

**Now Available: Tailless Aircraft Bibliography Edition 1-f**

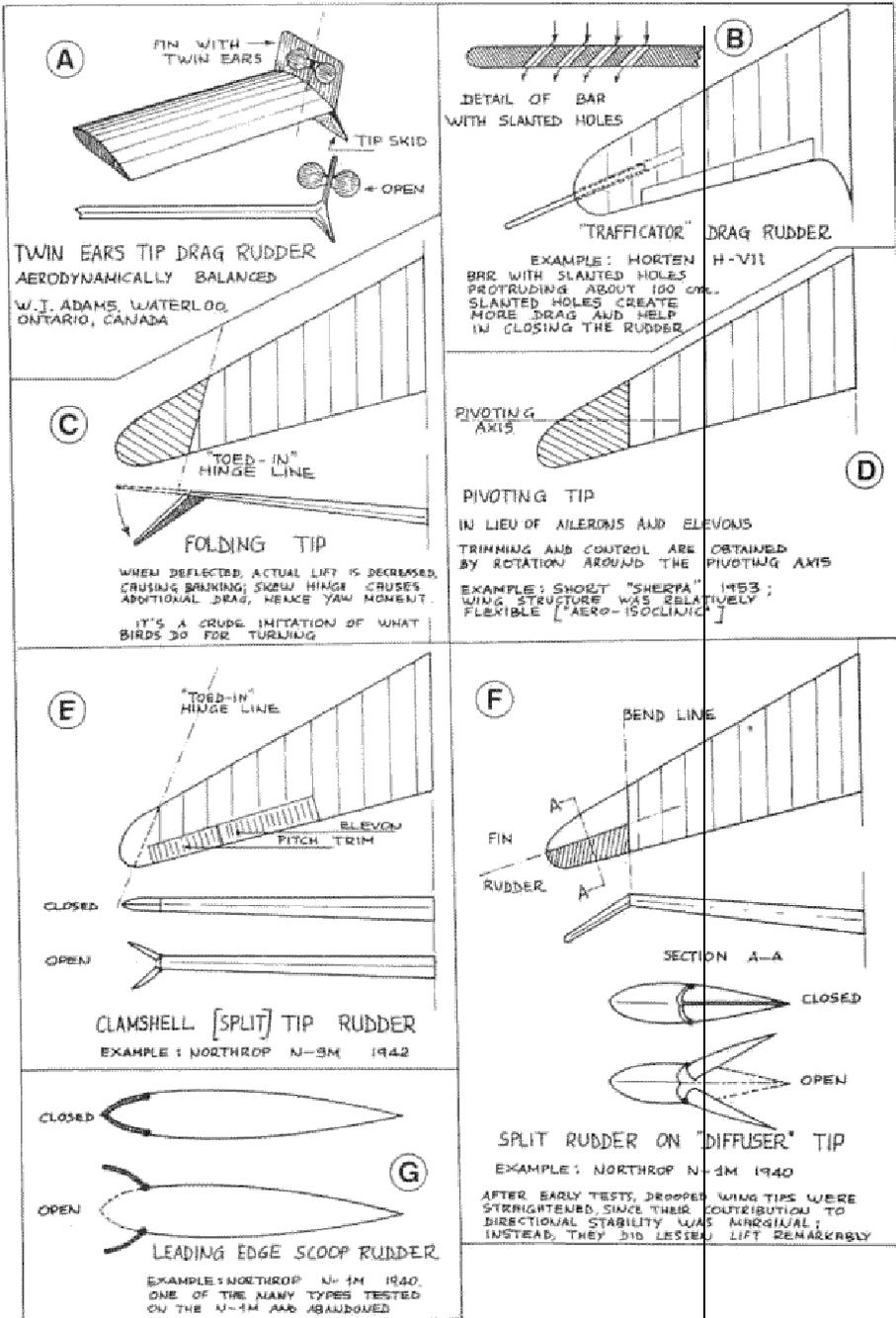
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