

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

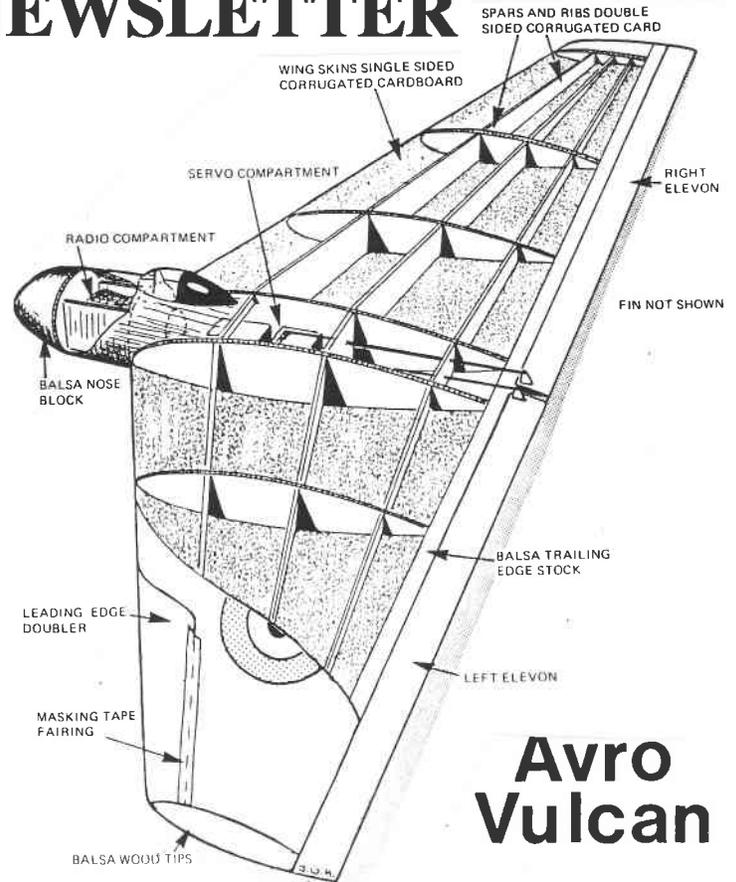
This month's cover is from an article "Try Cardboard" sent in by Eugene Turner, which he extracted from his library of modelling material.

The ribs, spars, control surfaces and building jig were built using double-sided card coming from 152# Test Board IBM boxes. It's about 1/8" thick and weighs about 1 1/2 oz per square foot.

The single-sided corrugated card for the wing skins came from a roll of packing material available at most stationary stores. It weighs in at about 1 oz/sq ft.

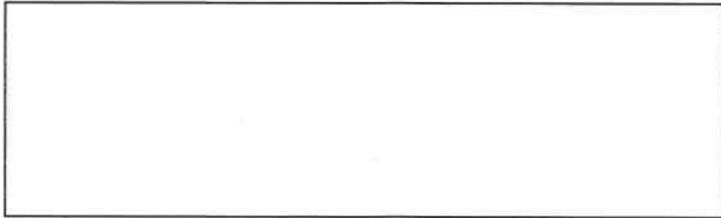
The cardboard is cut using a new (very sharp) X-Acto knife to prevent crushing the edges (scissors will do it). Covering is self-adhesive wall paper or a mylar type.

It has about at 50" span with a NACA 63A015 airfoil and a root chord of 18". It uses a two channel radio with one push/pulling a typical servo tray for elevon action. It was found to fly just as well with or without a vertical fin.



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

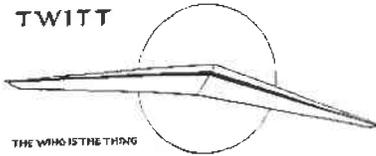
The Wing Is The Thing  
 P.O. Box 20430  
 El Cajon, CA 92021



The number to the right of your name indicates the last issue of your current subscription, e.g., **9411** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, November 19, 1994, beginning at 1330 hrs at hanger A-4, Gillespie Field, El Cajon, CA (first hanger row on Joe Crosson Drive - East side of Gillespie).

TWITT



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

**T.W.I.T.T.** is a non-profit organization whose mem-

bership 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:**

- President: Andy Kecskes (619) 589-1898
- Vice Pres: Bob Chase (818) 336-5485
- Secretary: Phillip Burgers (619) 563-5465
- Treasurer: Bob Fronius (619) 224-1497

Editor: Andy Kecskes

The **T.W.I.T.T.** office is located at Hanger A-4, Gillespie Field, El Cajon, California.

**Mailing address: P.O. Box 20430  
El Cajon, CA 92021**

- (619) 596-2518 (10am-5:30pm, PST)
- (619) 224-1497 (after 7pm, PST)

**Subscription Rates:**

- \$18 per year (US)**
- \$22 per year (Foreign)**

- Information Packages: \$2.50 (\$3 foreign)  
(includes one newsletter)
- Single Back Issues of Newsletter: \$1 each (US)  
Postage Paid
- Multiple Back Issues: \$0.75 ea + bulk postage

Foreign mailings: \$0.75 each plus postage

Wt/#Issues	FRG	AUSTRALIA	AFRICA
1oz/1	1.00	1.00	1.00
12oz/12	5.00	6.75	5.00
24oz/24	9.00	12.25	9.00
36oz/36	14.00	19.50	14.00
48oz/48	16.75	23.00	16.75
60oz/60	21.75	30.25	21.75

*PERMISSION IS GRANTED to reproduce this publication or any portion thereof, provided credit is given to the author, publisher & TWITT. If an author disapproves of reproduction, so state in your article.*

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, east side of Gillespie).

**TABLE OF CONTENTS**

President's Corner	1
This Month's Program	2
Letters to the Editor	2
Available Plans/Reference Material	6
1994-95 Membership Roster	7
Model Wings	11

**PRESIDENT'S CORNER**



This month you will find a new membership roster included in the newsletter. (I can't believe I got the whole thing in with all the other information this month.) I have sorted it by ZIP code this time so each of you can easily find members who live in your general area. For those of you in Southern California the hope is that it may enable some of you to car-pool to the meetings which will make the trip more pleasant and interesting.

Now for some bad news. Due to rising costs of reproduction, the price for back issues of the newsletter are going up effective January 1, 1995. At that time they will be \$1.25 each, postage paid for U.S. delivery, and \$1.00 each plus the postage indicated in the first page masthead for foreign orders. Any orders received before January will be filled at the current prices (could make for an excellent Christmas present to yourself).

We regret having to raise the prices, but the number of orders we've been receiving has started to cost us rather than be a break even proposition.

We have received a request from Alpha, USA, a distributor of European manufacturers radio controlled gliders, for a copy of our membership roster so they can mail out a free catalog. We don't feel this should be a problem, however, if you have an objection to your name being released in this way, please drop us a postcard or give us a quick call and we will remove your name from the list we provide.

Don't forget, those of you who missed the presentation by Barnaby Wainfan can still hear what he had to say in all its detail through a set of two audio tapes available for \$4 postage paid. Just drop us a note with your check or money order and we will get a copy to you in 2-3 weeks (depending on my class and other activities schedule). It was a most interesting presentation and could not be fully captured in the written word of the minutes.

I hope you all have a happy Thanksgiving holiday period with your family and friends.

Andy

## NOVEMBER 19, PROGRAM

**This** month we are pleased to have **Karl Sanders** as our guest question and answer man. He has indicated he would rather use this format to cover issues that are important to the members rather than come with a pre-planned talk. Karl is an aeronautical engineering consultant, having retired from a long career with Northrop. He is also an Associate Fellow of AIAA and SAWE. For you regulars, you know that these types of meetings often turn out to be the best since the topics range far and wide, and bring out some of the most unusual ideas or possible solutions.

**The** video presentation this month will feature University High School's (Oragne County, Florida) project involving the rocket launching of a **radio-controlled space shuttle** (a tailless aircraft). They have managed to capture the full affect of an actual launch with stage separations, etc.

The students and their teacher, Robert Catto, constructed a 1/40 scale launch pad and shuttle over a period of several school years. The launch took place on March 8, 1994, with the following flight information:

Altitude:	230'
Mission Duration:	25 seconds
Orbitor Weight:	2 lbs empty
Orbitor Length:	36.6"
Orbitor Wingspan:	26.0"
Liftoff Weight:	6 lbs 8 ozs
Flight Dynamics:	
Acceleration	3.7 G
Max Velocity:	57.0 ft/sec

The March 8th flight was to be the first in a series of flights from the school's 39C launch pad. The project has had the help of numerous professional engineers, who assisted in scaling the shuttle and launch complex. Because detailed drawings were not available, some scale dimensions had to be extrapolated from photographs. Development was accomplished within an engineering class using the sequence: scale dimensions, design and draw each part using a CAD program, then begin construction.

The project was to take three years, but because NASA requested a launch during National Engineer's week, the schedule was pushed up a year and a half. The project will continue with the planning and construction of a mobile Launch Control Center, which will be the conversion of a bus type vehicle into a complete center for use in furthering other school's space projects.

The video and other support material is on loan to us from Marcia Prim, Sales Representative for Hitec RCD, Inc., of Santee, CA. They apparently have provided some of the radio control equipment for the project.

This is an excellent video that shows what some of our "younger generation" can do with a little help from "the professionals."

## LETTERS TO THE EDITOR

10/21/94



TWITT:

**Thank** you for the address of the book store. I was able to order the book I wanted.

I am very much hoping to build a Davis flying wing. I have been writing to him and they may have a kit in a few months. Davis suggested this book to me.

When things develop, I will certainly let TWITT know all the details.

Barney

(ed. - At the September meeting we asked if anyone knew how to get a copy of Jack Northrop And The Flying Wing: The Real Story Behind The Stealth Bomber, by Coleman and Wenkam. Well, the newsletter had hardly settled in the mail boxes when Johnny Parker called to say he had it in his library and provided the following information on where to get it (this is for those of you who think you also need a copy): Historic Aviation, 1401 Kings Wood Road, Eagan, MN 55122, cost is \$24.95 plus postage, item #4450A. Johnny indicated it was a good book and he has enjoyed reading through it and the over 2,000 other aviation books in his library. Thanks to Johnny for helping a fellow TWITT.)

10/7/94

TWITT:

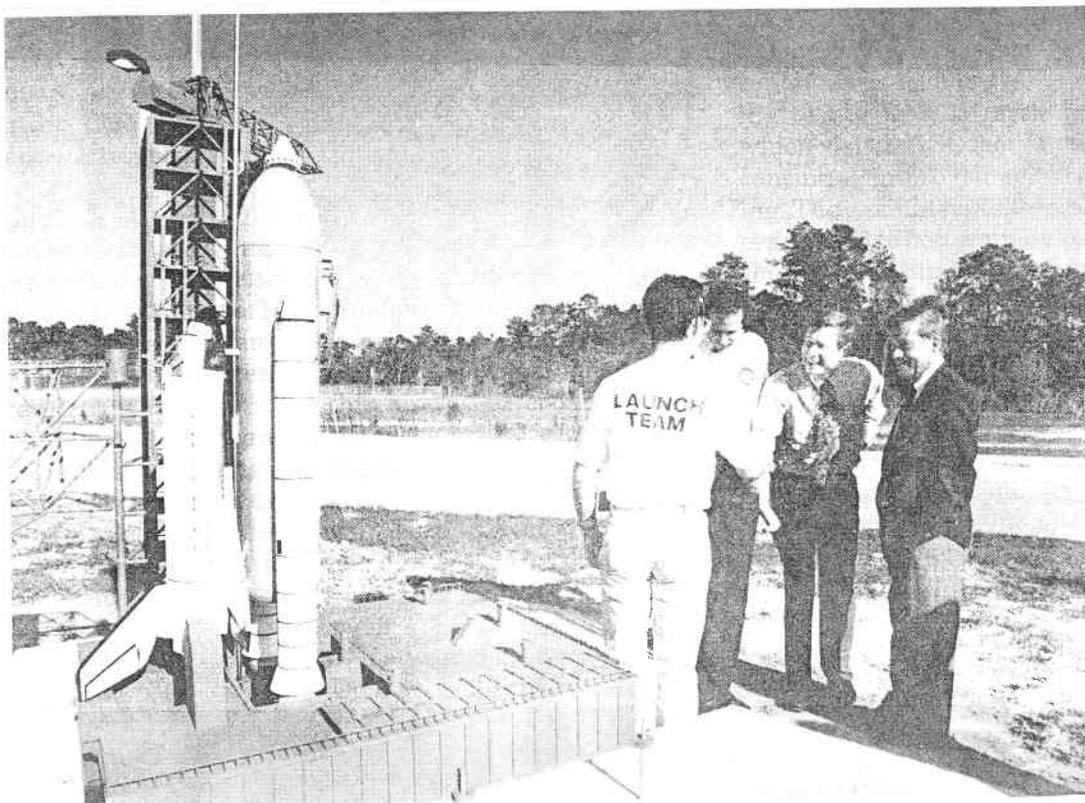
**Enclosed** is an AIAA paper for the archives that describes the development of the A-12, which was canceled by the Navy in January 1991. This aircraft represented the latest generation of all-wing aircraft, since it was designed after the B-2. The 3-view and wing some of the other figures should be of interest to our fellow TWITTs.

Also enclosed are some photos of RC models that Don Downing, a well known local model builder, has built and flown. Both the A-12 and The B-2 are powered by a single pusher .049 engine and are flown on 2 channel radios (mechanically mixed elevons for pitch and roll) with no yaw spoilers. The A-12 is 1/20 scale and the B-2 is roughly 1/30.

Regards,

Kevin Renshaw

(ed. - Thanks for the material. We will add the article to the library in the event anyone should desire a copy. Some of the figures will



ABOVE: Prior to liftoff, several of the team members chatted about its success.

be included elsewhere in the issue to remind our members what the A-12 looked like. I will also include several of the photos in this issue to give everyone an idea of what other modelers are doing with flying wing designs.

You were right about the half-tone pictures being better for reproduction in the newsletter. We have found that color photographs do not copy well and have been changing them over to half-tones before publishing.

The article being added to the library is: The A-12 Avenger, by S.K. Jackson, Jr., AIAA Aerospace Design Conference, February 3, 1992, copyright 1992 by General Dynamics Corp., all rights reserved, 17 pages, no references. If interested, a \$1.50 should cover copying and postage.)

10/13/94

TWITT:

Enclosed are two catalogs (Historic Aviation and Zenith Aviation) that I order a lot of books and videos from. You can have these copies, or write them for the most recent editions (they are free). I have tried to tag some of the books that are of interest to TWITT.

I have also enclosed a discount form from Zenith (which is part of Motorbooks). If you order reasonable quantities of books (25+),

you can get them at wholesale prices (30% to 42% off list). You need to register with them as an educational group by sending them a letter on TWITT letterhead. You might pass the catalog around at the monthly meetings. One person has to act as the "banker", and collect money from everyone and send one check in with the order. The guys I work with do this once or twice a year, and it does save a lot of money on books. Or you may just want to skip all this and let everyone order on their own.

Regards,  
Kevin Renshaw

(ed. - Thanks for the material. As can be

seen from Barney's letter, Historic Aviation is a good source of books, and I will publish the addresses and telephone numbers of both companies so those interested can order catalogs.

As cost conscious as everyone is these days, it may be possible for TWITT to act as an ordering agent for the members if we receive enough interest, both locally at the meetings and through mail (or phone) in requests. This might delay obtaining a particular book several months, but depending on the cost it may be worth it. Member, let me know what you think after you have reviewed the catalog and decided on one or more books. With these types of savings you might be able to get 3 books rather than 2 if you are willing to wait a little.

I will list some of the books noted by Kevin from the two catalogs, since many will be of interest to a lot of our members.)

Historic Aviation, 1301 Kings Wood Road, Eagan, MN 55122, 1-800-225-5575.

Top Secret Bird (Spate) - Me-163 Comet - A first-person account of testing and combat flying. 270 pp, 88 photos, \$11.95.

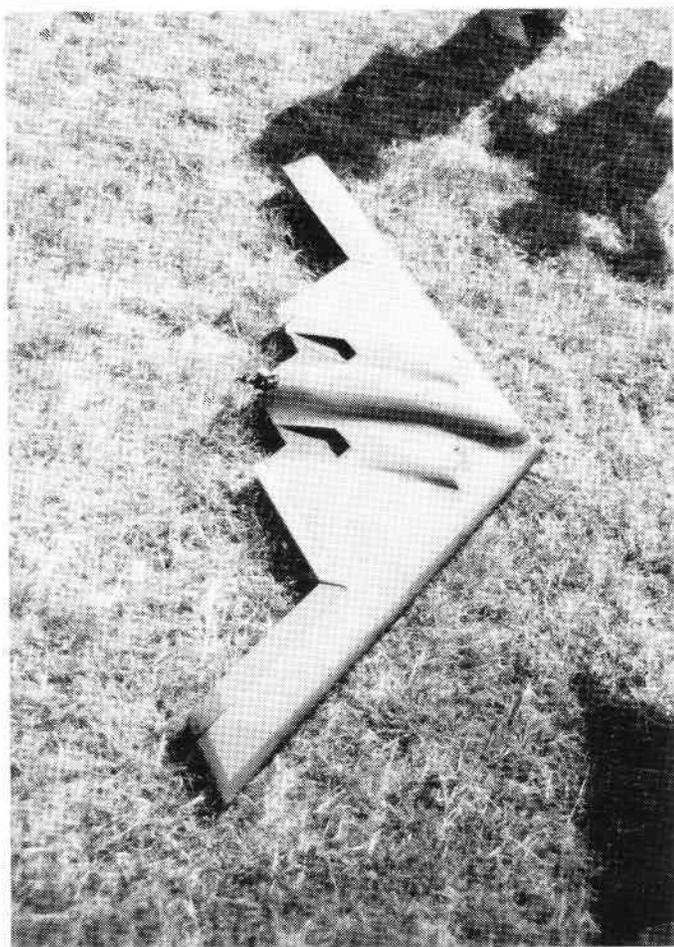
The Horten Flying Wing in World War II (Dabrowski) - History, development and construction details, 52 pp, 130 photos, \$9.95.

Northrop B-2 Stealth Bomber (Sweetman) - History of development, the technology used, and the operational roles the B-2 will be expected to fill, 96 pp, 60 illus., \$9.95.

Inside The Stealth Bomber, The B-2 Story (Scott) - Detailed account of every phase in the bomber's development from 1978 to the present, 240 pp, 42 illus. (12 color), \$18.95.

Chance Vought F-173 and XF5U-1 Flying Pancakes (Ginter) - History, structural analysis, landing gear and cockpit detail, test flights and wind tunnel tests, scale drawings, cutaways, and details for the modeler, 34pp, 58 photos, \$6.95.

The Flying Wings of Northrop (Kohn) - Forward on the inception, development and demise of the flying wings, reprint in its entirety of the Flight Manual for the YB-49, 89 pp, 81 photos & diagrams, \$9.25.



ABOVE: The .049 powered version of Don Downing's B-2 radio controlled model.

Winged Wonders: The Story of the Flying Wings (Wooldridge) - The gamut of flying wings and tailless aircraft from early failures to the magnificent Northrop bomber designs of the '40s, 230 pp, 200 photos, bibliography, \$21.50.

Northrop Flying Wings (Maloney) - Coverage of the 16 different flying wing designs from 1928 to the YRB-49 & X-4, wing evolution chart,

specifications, flight control operations, 88 pp, 70 photos & drawings, \$14.95.

Jack Northrop And The Flying Wing (Coleman) - Real story behind the stealth bomber, obstacles, personalities, government interference, etc., 284 pp, 83 photos, \$24.95.

**Zenith Books, P.O. Box 1, Osceola, WI 54020, 1-800-826-6600.**

The Horten Flying Wing in World War II (Dabrowski) - \$9.95.

Lippisch P-13: The Experimental DM-1 (Dabrowski) - Unusual delta-wing jet conceived by the Germans in WWII, detailed line drawings, 48 pp, 89 illus., 18 diag., \$8.95.

America's Stealth Fighters and Bombers (Goodall) - The F-117, B-2, YF-22 & YF-23 in nearly 100 color photos, close-ups, detail shots, etc., 128 pp, 145 color ill., \$19.95.

The Flying Wings Of Jack Northrop: A Photo Chronicle (Pape, Campbell & Campbell) - Detailed coverage of the flying wing and tailless aircraft designed and produced between 1939 and the early '50s, 64 pp, 118 b/w illus., \$9.95.

The Flying Wings of Northrop (Kohn) - \$9.95.

Northrop Flying Wings (Maloney) - \$14.95.

Laminar Aircraft Design (Strojnik) - Details the properties and incredible benefits of laminar flow aerodynamics, easy to understand text, plus applications for ultralights, motorgliders & sport planes, 239 pp, 142 illus., \$36.95.

Laminar Aircraft Structures (Strojnik) - Covers materials, applications, loads, design, structure, stresses and skins, 200 pp, \$36.95.

Laminar Aircraft Technologies (Strojnik) - Laminar aircraft capabilities, materials, loads & stresses, construction methods, testing and more, 200 pp, illustrated, \$36.95.

10/17/94

TWITT:

**November** 1993 through the year 1994 thus far could be called the year of the low aspect ratio aircraft, and now to top it off in the October 1994 Newsletter Barnaby Wainfan's amazing Facetmobile FMX-4, "Flying Gem" that provides a safety zone around the pilot with a window to the world view through floor windows. The multi-faceted design talents of Barnaby Wainfan will make him the Cloyd Synder of the 1990's; plus a Flying Gem, Jewel, Diamond, et.al., certainly has greater marketing appeal than does that of a Flying

Pancake.

People are becoming interested in low aspect ratio flying wings, possibly because of their many practical qualities, and also because back in the 1930's and '40s for one reason or another due to unpropitious circumstances, such type flying wings weren't given sufficient opportunities to demonstrate their capabilities, nor were they fully tested or properly evaluated.

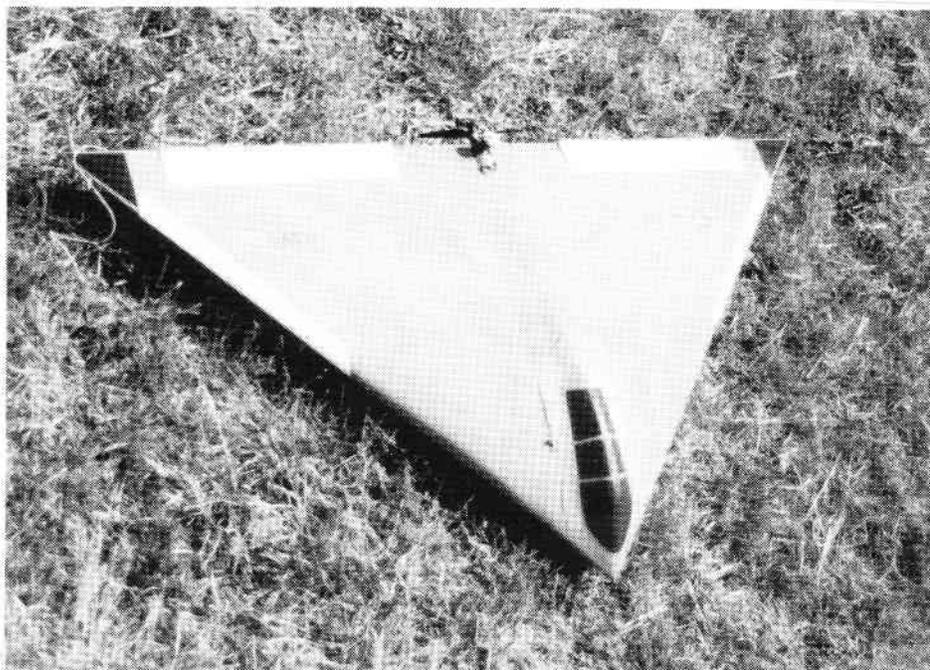
So now in the 1990's, there is a revival of interest in low aspect ratio type flying wings that over a span of years had become all but forgotten. In the mid '90s, its flying pancakes hot off the griddle, and flying gems hot out of the high tech gem makers.

Yours truly,

Edwin Sward

*(ed. - Your right about interest in low aspect ratio wings, since we have had several articles in the past year on various types of designs. It would seem they offer a low cost alternative for the "Sunday Flier" homebuilder in terms of materials and construction time/skills.*

*Perhaps Barnaby has lit an even bigger fire under some of these homebuilders who only dreamed such a craft could fly as well as the Facetmobile. Only time will tell.)*



ABOVE: The .049 powered model by Don Downing showing his version of the Navy's cancelled A-12 flying wing project.

10/25/94

TWITT:

The TWITT NL of November 1993 on p. 8 published a note from Peter Selinger (co-author of Reimar Horten's book Nurflügel (Allwing)), mentioning the presentation by the Royal Aeronautical Society to Reimar Horten with their highest award, the British Gold Medal for Outstanding Achievements in Aeronautics. Selinger's note reads as if this award was received just after Horten's death on August 16 last year. This appears to be incorrect in the light of pertinent information given in Aeroespacio, the bi-monthly Argentine Air Force magazine.

In their Sept-Oct '94 issue the following was published with a very clear photo and facsimile of the medal; I send you the original page so a clear reproduction of it can be made along with my translation of the article for the next newsletter.

Karl Sanders

*"On grounds of the article Horten: Designer of Flying Wings, published in our issue No. 496, the son of the well-known and recently deceased German designer, contacted Aeroespacio. Diego Horten expressed his gratitude for the remembrance of his father, and informed us that Dr. Ing. Reimar Horten had received in 1975 an award granted by the Royal Aeronautical Society sponsored by the Queen of Great Britain. This was the Gold Medal, and the second time it was conferred to a German citizen. The first was to the Count of Zeppelin, creator of the dirigible carrying his name. Diego Horten has no doubts that this decoration also means an honor to Argentina, the country his father choose to live in after the second war, and where he developed numerous designs and projects. He also mentioned that exhibitions in two aeronautical museums (Washington, DC and Berlin (Germany)) carry his name. Dr. Ing. Reimar Horten's remains rest at the German cemetery in Villa General Belgrano, Córdoba."*

*(ed. - Thanks for the updated information on this prestigious award presented to Dr. Horten. I have cut out his picture and the photo with the medals and included*

*them in the newsletter, as you can see.*

*I will put your table of accomplishments in here too.)*

HORTEN PROJECTS							
Model	Span m.	Length m.	Weight, kg Empty/Max	Vmax km/hr	Quant. Built	Engines	First Flight
IA 34a Cien Antú (Sun Ray) Tandem seat glider	18	4.4	275/475	120	5		June '49
IA 34M single st	18	4.4	220/440	120	1		June '49
IA 37 Supersonic Δ wing flighter	10	11.78	3300/4800	M2 calc.	1 wooden glider		Oct '54
IA 38 Flying Wg Cargo Transport	32	13.5	8500/16000	215	1	4 pusher radials	Dec '60
IA 41L Urubú Hanglider	18	5.8	250/450	100	1		1953
IA 48 Supersonic Δ wing attack/reconnaissance	9	10.0	6000/16800	M2.2 calc.		2 R.R. Avon	1959 Prelim design, wndtnl tests

**ULTRALIGHT SOARING NEWS  
HITS THE STREETS**

A meeting was held in conjunction with the SHA Workshop at Tehachapi to form the United States Ultralight Soaring Association (USUSA). It was unanimously agreed this type of association was needed to represent the specific interests of this segment of the soaring community.

Their Statement of Purpose is "...to foster a heightened consciousness about ultralight soaring, to encourage an exchange of knowledge and information making possible the growth of this sector of soaring, and to serve Association members in their common ultralight soaring needs."

Danny Howell is serving as the Ad-Hoc President during this initial formation period, and Chuck Rhodes (from the original Rigid Wing Reader) has begun publishing the Ultralight Soaring News (USN) with an issue in October 1994.

Donations are being accepted to cover the cost of sending out the newsletter. \$15 is suggested for a year's subscription, which may be later credited toward your first year's membership dues. You can also send \$25 for your "Founding Membership".

Please make checks payable to: Chuck Rhodes (this is necessary since the association is not yet incorporated).

You can send your donation/subscription to:

Chuck Rhodes  
130 Los Padres Drive  
Camp Pendleton, CA 92054  
(619) 385-4068

OR contact Danny Howell for information at:

23114 Joaquin Ridge Drive  
Murrieta, CA 92562  
(909) 696-0887

If you don't take time to do it now, we will be carrying a reciprocal advertisement for the Ultralight Soaring News in our classified section in future issues, so you can get the subscription information.

**AVAILABLE PLANS &  
REFERENCE MATERIAL**



**Tailless Aircraft Bibliography**

by Serge Krauss

**4th Edition:** An extensive collection of about 2600 tailless and over 750 related-interest listings. Over 15 pages of tailless design dates, listing works of over 250 creators of tailless aircraft, and the location of thousands of works and technical drawings for the Ho 229 (IX), Me 163, & Me 262.

**Cost:** \$23 (Domestic)  
\$32 (European destinations)  
\$35 (Asia/Australia destinations)

Order from: Serge Krauss  
3114 Edgehill Road  
Cleveland Hts., OH 44118

Bruce Rose  
8820 SW Grabhorn Road  
Aloha, OR 97007

Art Jacobson  
14538 S.E. 26th St  
Bellevue, WA 98007

Chuck McGill  
P.O. Box 304  
Mercer Island, WA 98040

Jim Raichle  
P.O. Box 325  
Burlington, WA 98233

Bill Kuhlman  
P.O. Box 975  
Olalla, WA 98359

Lindy Bahnsen  
8132 N. Bicentennial Lp S.E.  
Lacey, WA 98503

Michael Shoen  
8202 NW 16th Avenue  
Vancouver, WA 98665

Goetz Matthias  
88069 Hiltenweiler  
Saarbrucken GERMANY

Roderick Pottinger  
728 Haliburton Road  
Victoria, BC V8Y1H6  
CANADA

Ferdinando Gale'  
Via Marconi 10  
28042 Baveno [NO]  
ITALY

---

## "INSPIRED BY AN IDEA"

Wright Cycle Company  
1127 W. 3rd Street  
Dayton, Ohio

May 13, 1900

To: Mr Octave Chanute, Esq., Chicago, Ill.

Dear Sir:

For some years I have been afflicted with the belief that flight is possible to man. My disease has increased in severity and I feel that it will soon cost me an increased amount of money, if not my life. I have been trying to arrange my affairs in such a way that I can devote my entire time for a few months to experiment in this field.

My general ideas of the subject are similar to those held by most practical experimenters, to wit: that what is chiefly needed is skill rather than machinery. The flight of the buzzard and similar sailors is

a convincing demonstration of the value of skill, and the partial needlessness of motors. It is possible to fly without motors, but not without knowledge and skill. This I conceive to be fortunate, for man, by reason of his greater intellect, can more reasonably hope to equal birds in knowledge than to equal nature in the perfection of her machinery.

Orville Wright

Note: The Wrights believed that flight by man was possible, and could be achieved through systematic study.

*(ed. - This came from Volmer Jensen, but its message is as pertinent today as it was in 1900. Although we know that man can fly (both with and without power), we still are dependent on knowledge and skill to make better flying machines to accomplish the task more efficiently and safely. In part, that is what TWITT is all about; helping flying wing enthusiasts design, produce and fly better aircraft through the exchange of knowledge that in turn will result in the development of better skills in building flying machines in the 1990s.)*

---

## CLASSIFIEDS (cont.)

Tailless Tale, by Dr. Ing. Ferdinando Gale'

**Consists** of 268 pages filled with line drawings, tables and a corresponding English text. It is directed towards modelers, but contains information suitable for amateur full size builders. Price is \$38, postage and handling included (also applies to Canada and Mexico).

You might also want to purchase his new book Structural Dimensioning of Radioguided Aeromodels, priced at \$18.00.

On The Wing...the book, by Bill and Bunny Kuhlman (B<sup>2</sup>) is a compilation of their monthly column that appears in RCSD. Many of the areas have been expanded and it includes coding for several computer programs to determine twist and stability. Priced at US\$28.00.

All these are available from B<sup>2</sup> Streamlines, P.O. Box 976, Olalla, WA 98359-0976, or (206) 857-7249 after 4pm Pacific Time. Orders shipped elsewhere will be sent surface mail unless an additional \$10 is included to cover air mail postage. Washington residents must add 7.5% sales tax.

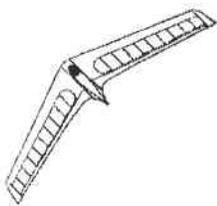
---

**VHS VIDEOS AND AUDIO TAPES**

VHS tape containing First Flights "Flying Wings," Discovery Channel's The Wing Will Fly, and ME-163, SWIFT flight footage, Paragliding, and other miscellaneous items (approximately 3½+ hours of material).  
 Priced at: \$8.00 (postage paid)

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 tape of Alex's presentation explaining the material.  
 Priced at: \$5.00 (postage paid)  
 \$6.50 foreign (postage paid)

Audio tapes of presentations by Don Mitchell at the September 1991 SHA Western Workshop, Tehachapi, CA (1 cassette), and his March 1992 presentation at a regular TWITT meeting (2 cassettes).  
 Priced at: \$3.50 (1 cass.)  
 \$4.00 (2 cass.)  
 Add: \$1.00 for foreign postage



**FLYING WING SALES**

**The** A-10/T-10 Mitchell Wing motor gliders are well-proven designs, ready to fly, with an aluminum clad wing giving aerodynamic cleanliness. These are fully trailerable, with

flight instruction provided in a T-10 by a C.F.I. Major components are available for the homebuilder.

Information pack for \$10.  
 For more information contact:

Higher Planes Inc.  
 Box 4  
 Dover, KS 66420  
 (913) 256-6029

**SAILPLANE HOMEBUILDERS ASSOCIATION**

**The** purpose of SHA is to foster progress in sailplane design and construction which will produce the highest return in performance and safety for a given investment by the builder. They encourage innovation and builder cooperation as a means of achieving their goal.

Membership Dues: (payable in U.S. currency)  
 United States \$21 /yr  
 Canada \$26 /yr  
 So/Cntrl Amer. \$36 /yr

Europe \$41 /yr  
 Pacific Rim \$46 /yr  
 U.S. Students \$15 /yr  
 (includes 12 issues of SAILPLANE BUILDER)

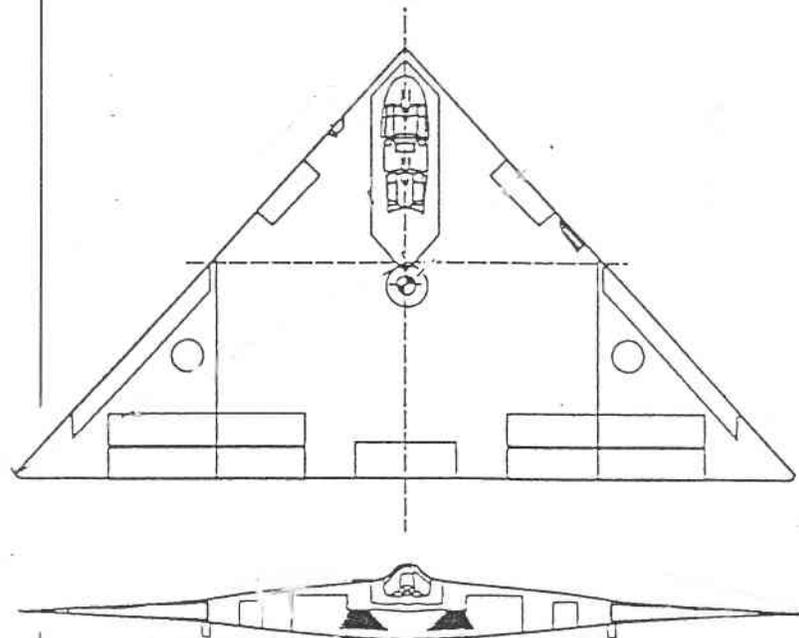
Make checks payable to: Sailplane Homebuilders Association, & mail to Secretary-Treasurer, 21100 Angel Street, Tehachapi, CA 93561.

**A Monthly Publication for the R/C Sailplane Enthusiast**

A reader-written publication about R/C soaring, dedicated to sharing technical and educational information from theory to practical application.

\$30 First Class in U.S.A. for 12 Issues (Texas res., please add \$1.52 tax.)  
 Outside USA? Please write.

**R/C Soaring Digest**  
 P.O. Box 2108  
 Wylie, TX  
 75098-2108



**ABOVE:** Two-view of the A-12 from the AIAA paper contributed by Kevin Renshaw. See next month's newsletter for more.