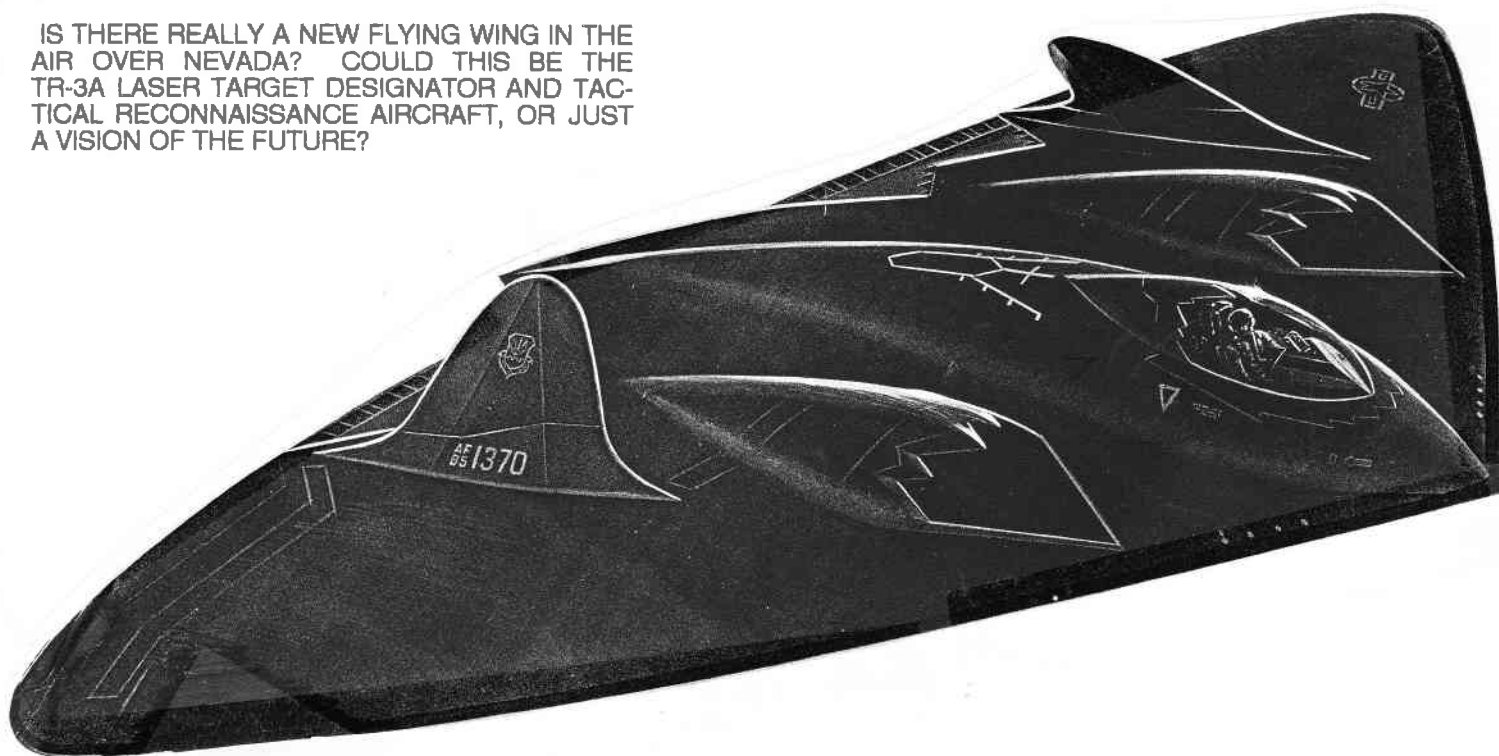
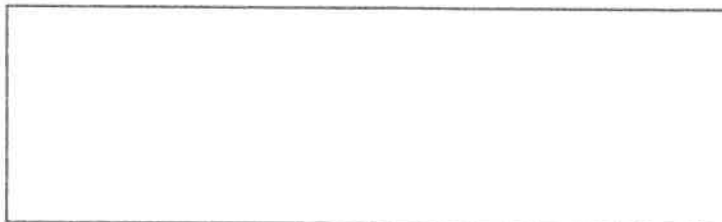


T.W.I.T.T. NEWSLETTER

IS THERE REALLY A NEW FLYING WING IN THE AIR OVER NEVADA? COULD THIS BE THE TR-3A LASER TARGET DESIGNATOR AND TACTICAL RECONNAISSANCE AIRCRAFT, OR JUST A VISION OF THE FUTURE?



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., 9112 means this is your last issue unless renewed.

THERE WILL BE NO DECEMBER MEETING

Next TWITT meeting: Saturday, January 18, 1992 beginning at 1330 hrs at hanger A-4, Gillespie Field, El Cajon, Calif. (First hanger row on Joe Crosson Drive - East 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 types of tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is an affiliate of 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., Dave Pio (619) 789-1650
 Secretary, Phillip Burgers (619) 563-5465
 Treasurer, Bob Fronius (619) 224-1497

Editor (Acting), 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) 224-1497

Subscription Rates:

\$15 per year (US)
 \$19 per year (Foreign)

Information Packages: \$2 (includes one newsletter)

Back Issues of Newsletter: \$0.75 each (US)
 Postage Paid

Foreign mailings: \$0.50 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 each 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, east side of Gillespie).

TABLE OF CONTENTS

President's Corner	1
This Month's Program	1
Meeting Minutes	2
Letters to the Editor	3
From the Pen of Kark Sanders	5
Available Plans/Reference Material	8
Model Wings	8
Barnes Airship Specifications	9
Peck 1300 Blimp Specifications	10
Frank Zaic's Tailless Record Holder	11

PRESIDENT'S CORNER

First of all I would like to apologize for the error in last month's Table of Contents where I gave the Spectra by-line to Don Woodward instead of the author Gene Sandburg. It was a momentary lapse in mind and finger control, and I hope Gene will forgive the boo boo.

We have kept the minutes short this month in order to get full coverage on a letter from Karl Sanders and some comments on it from TWITT members. We hope this will spur other comments, both on Karl's submission and the additional comments. Some of this stems from a misquote on the editor's part in talking about wing twist in the Horten wings and Jerry Blumenthal's RATTLER.

There may have been an apparent misunderstanding on the issue of TWITT providing audio tapes of its meetings. The fee charged is not a rental fee, but a straight purchase of the tapes for your own library. For the member that returned the tapes, they will be sent back to you shortly so you can enjoy them again in the future.

We here at TWITT hope all of you will have a merry and joyous holiday season. We are looking forward to a new and exciting 1992, hopefully with some new flying wings projects getting started and seeing those begun this year get into the air. For you adventurous ones out there please don't forget to let us know how your pet project turned out.

HAPPY HOLIDAYS
 ANDY

NO PROGRAM FOR DECEMBER

THIS IS OUR OFF MONTH DUE TO THE HOLIDAYS SO THERE WILL BE NO MEETING UNTIL JANUARY 18, 1992

EVERYONE HAVE A SAFE AND HAPPY HOLIDAY SEASON

MINUTES OF THE NOVEMBER 16, 1991 MEETING

Andy called the meeting to order and reminded everyone that this would be the last meeting of the year. He then apologized to Gene Sandburg for using the wrong name on the Table of Contents by-line last month for his article on Spectra.

June Wiberg wanted to thank TWITT for the lovely flowers we sent her during a recent stay in the hospital. She does a lot of the routine bookkeeping and is an integral part of getting the newsletter folded, stapled and mailed each month.

Bob Chase indicated he had run across a Mitchell B-10 for sale at Flabob Airport. The asking price is \$3500, with an electrically started KFM engine. It is fully instrumented, included an electric turn and bank. It also has a fully enclosed trailer. If anyone is interest they can contact Bob at 824 S. 3rd Ave., La Puente, CA 91746.

Bruce Carmichael introduced Todd Hodges, who is an engineer with NASA's Ames Research Center. He has been involved in glider designing with Laister and Windecker, has worked with composite structures, and currently is working on remotely piloted helicopters.

Andy then introduced Sandy Peck of Peck-Polymers to talk about their radio controlled blimps. This type of aircraft got started about fifteen years ago when Bob Peck designed one for an indoor contest sponsored by some model builders.

These models are specifically designed for indoor use in advertising promotions or for sporting events. They can be made into different shapes, like a shark, so it matches a teams mascot.

The blimps are controlled by three electric motors: one mounted in the tail rudder, and two ducted units mounted on either side of the gondola. They will run for approximately 15 minutes, and require 15-20 minutes for recharging. They basically provide directional control, since the helium in the envelope provides the lifting force.

Sandy showed a video tape of some of the more interesting applications their blimps have been used for over the years, including the Chicago Bulls Bull blimp flown during their games. This video is available for use and return for a deposit of \$15 for those of you who might be interested. Peck-Polymers address is: P.O. Box 710399, Santee, CA 92072-0399, (619) 448-1818.

At this point, Andy introduced Marc

dePolenc and Don Woodward who would continue with a presentation on full sized airships. They both belong to the Association of Balloon and Airship Constructors (ABAC) which was established back in the 1970s as a special interest group of the EAA by George Wright. It publishes a magazine called AEROSTATION.

Don Woodward has both a historical and technical capability within the area of airships, which is a very complex subject as we were about to find out. There is now occurring a continuing interest in airships due largely to the advent of advanced construction materials and techniques.

Don took the floor and narrated a couple of videos on current projects. Due to technical difficulties with one of the tapes, the MagnusSphere airship was not covered in the detail Don had anticipated. This particular ship uses a rotating balloon envelope to produce additional lift over that provided by the helium alone. The gondola has a very unique shape that sort of wraps around the balloon for a futuristic look that would also reduce drag during flight.

Don moved on to the second tape, which was on an unmanned effort for a reconnaissance balloon that could also carry one man if necessary. The video showed a very successful flight test program that unfortunately ended in the crash of the airship due to a radio problem.

The last video presented by Don was of another one man airship being developed for commercial use. This ship is being put together by Tracy Barnes who has been involved for years in hotair balloons.

The craft used a five horse power gasoline motor mounted on the tail fin and the pilot sat in an open cage type framework for the initial test flights. The craft appeared to fly relatively well during the flight sequences shown, and the pilot became bolder with each one, ending one flight with successive buzz jobs of the filming crews. The ship apparently reaches speeds of about 25 mph, with the production model expected to reach 30-35 mph.

According to Don, the first production model is still being worked on, and the initial release date of April 1991 had not been met. We have included a page out of the Winter 1990 edition of AEROSTATION that gives more information about this airship along with a picture of the Zephyr 200 "Pilot Optional Airship" being tested by Memphis Airships.

LETTERS TO THE EDITOR



11/13/91

TWITT

This letter is directed to Karl Sanders, or anyone interested in computer games.

I currently use: Chuck Yeager's Air Combat, Secret Weapons of the Luftwaffe, Dynamix Red Baron, Jet Fighter II by ATF, and Wing Commander II.

These are on a 386 compatible supported by Creative Labs, Sound Blaster board, 180mb hard drive, VGA and a Mach II joy stick. A 100 amp receiver provides excellent sound support.

To really enjoy these games, you need a lot of memory and a good sound system.

When I want to fly a really hot ship, it's hard to beat the F-23 in Jet Fighter II, for great combat flying I much prefer Chuck Yeager's Air Combat. I has a good selection of airplanes with good sound and graphics support. This is the best one as far as I'm concerned. The airplanes in Secret Weapons of the Luftwaffe are good but the graphics are not as good as Air Combat's. Also you need 560k of expanded memory to operate the program. Make sure your hardware will handle these programs or you won't be happy with the game play.

If you want additional information on these games, there is a publication called SIMCAP, Inc.

Simulation Combat Air Patrol
20 Lafayette Avenue
Kingston, NY 12401-4408

This magazine discusses in detail all of the current flight games. You might ask for volume 1, Numbers 3 and 4. These two issues talk about AIR COMBAT and SECRET WEAPONS, in detail.

With the cost of these games in the \$40 to \$60 range, try to get a little air time before you make a purchase.

GOOD LUCK
Dick Avalon

(Ed. Note: From what Karl has said in the past, he apparently only has a MacIntosh system to use for these games, and I am not sure if they are available for it. Maybe Karl will be able to get some enterprising store clerk to show him the value of a IBM compatible system so he will have the best of both worlds. My son is running Air Combat on a 286 with 610k

of RAM, a VGA monitor, using a proportional joystick and seems to like it. As much as I enjoy flying, I still find it hard to adapt my normal skills through the joystick even though I have been flying radio control models for a number of years. It's just something about the flat screen that throws me. I wish Karl luck in finding something he can use and enjoy.)

11/10/91

TWITT

Your advertisement in the SHApTalk got my attention - flying wings have fascinated me for a long time. I've built many radio controlled models ranging from circular "pancake" to swept to straight planforms. All of them flew once I hit upon the correct combination of CG and upsweep of the trailing edge.

Jim Marske seems to be the only designer of successful wings today.

Look forward to your newsletter.

Sincerely,
Alex Rogers
10660 N. Sundust Court
Tucson, AZ 85737

(Ed. Note: Welcome to TWITT Alex. You will get an eye-full of flying wing controversy with your first issue as you read on, and we hope you enjoy it. It is nice to know that our exchange program with the other newsletters is having the desired results - bringing people interested in flying wings together to help develop the technology and exchange information.)

TWITT

I am the proud owner of a Mitchell A-10 (metal). Send me your wing letter.

W. E. (Ed) Mux
1500 E. Main Street
Merrill, WIS 54452

(Ed Note: Welcome Ed. I have included your address so other A-10 owners, if we have any hiding in the closet, can correspond with you directly if the need should arise. We hope you find the newsletter to your liking.)

11/23/91

TWITT

I received the back issues, and have really enjoyed reading through them. Please pass along my thanks to Bob also, since I noticed his name was on the envelope.

I am still shy a few back issues, and have enclosed a check for \$6 for the copies, and some for your postage. I need numbers 50, 62, 63, and 64.

Your suggestion about the TAILLESS NEWS will be followed up on, and I appreciate that you put in the address for me. I also wish to thank you for asking the membership for rubber powered wing plans, etc. Hopefully I'll hear from somebody.

Are the tapes for Don Mitchell available? Apparently the issues that I am missing address this and the TWITT logo.

What does the logo look like? Let me see the emblem that will catch men's eyes, and take their minds off tails....and put a proud look on my derby!!! Hopefully, it doesn't look like a fixgig, but more like a wingdoodle than a whatszit.

Best Wishes,
Dave Laney

(Ed. Note: Bob has sent off the copies you requested, and I will put a set of Mitchell tapes into the mail shortly. For this, you will owe us an additional \$4, and as you have seen from the note in my column they are your's to keep. As for the logo, it has not been settled yet, so if you have a catchy idea please submit it right away, since we are getting ready to publish the submissions for a vote by the membership. You will see all of them in many of the more recent newsletters. I hope that the membership has responded to your needs for rubber powered wing designs.)

11/5/91

Tailless News Readers

Enclosed is issue #19 which, hopefully, will not be the last. But as you read the comments on the last page from John Pool who puts this together, it might be. A number of people, including myself, have sent John some money for postage (rather than a SASE which he requested) but as it turns out the cost of converting dollars into pounds is too much to

make it worthwhile for small amounts. He ends up sending out the issues for "free" as it were. The newsletter was being run on a "send me a SASE+ and I will send out the next issue" type basis which does not leave much margin for freebies. If you enjoy reading this stuff as much as I do, let John (and myself) know.

Even if there is not another formal issue, John said he will be sending me some more of this information which I can put together and send out. If you are interested, please send me a SASE and I will pass along what I get.

I hope there is enough interest in TN to keep it alive!

Clark Calkins
1907 Alvarado Ave.
Walnut Creek, CA 94596
(510) 939-8153

(Ed. Note: Thanks for the current issue of TN, Clark. As you have seen, I use material from it to fill in the pages of this newsletter with proper credit being given to the true author or designer. I know the amount of work that goes into putting out that much material on a continuing basis, so for John it must be a true labor of love, especially since it is all hand written. For those of our members who might be interested in material from the European area, I have included your name and address again so they can get in touch with you. And thanks for providing this liaison work with John Pool.)

11/29/91

TWITT

A few short notes: First, keep up the fine work at TWITT. I really enjoy each month's newsletter, and have decided to attempt a listing of each year's more prominent topics/articles for a yearly entry in my bibliography; haven't quite decided how to do it yet.

I have come to the last copy of edition 1b of my bibliography and will need to re-edit and print some copies of a new edition soon. It will be at least 20 pages longer (160+ pp.), with a lot of "loose ends" tied up (but perhaps a few new ones!). I would like to hear from members who wish to make last-minute contributions of information for inclusion in version 1c. Those great people who have contributed in the past will find my thanks also in a new preface. Although feedback, often from unexpected sources, has been most

encouraging, a total of only about 100 bibliographies have been sold thus far; the demand for this type of information is modest at best. Therefore, the next printing will be correspondingly small. Any of our members who wish to reserve a copy should write to me. This will also help me gauge the demand. As long as there seems to be interest, I'll continue the work.

Jerry Blumenthal's work is most interesting and imaginative. It would be good to know the relative glide speeds of the "Rattler" model with and without wing twist and the behavior of the forthcoming giant scale R/C model with weight scaled from the projected full-scale plane. Will this be investigated? These strike me as important clues to the roles of the main vs. forward wing and their interaction. I hope this very pleasing concept proves successful!

Finally, statements in my tailless bibliography introduction are providing all too prophetic, and I must report the unfortunate further demise of a source of valuable aeronautical information. During the past few months nearly all original copies of NACA and A.R.C. reports, memoranda, etc., have been removed from the shelves of the U. of Michigan's library, along with bound volumes of The Aeroplane, Flight, and other historic periodicals. The formerly excellent aeronautical section has diminished by 50%. It is unclear yet just how much of this material is available on micro-film. The reports are "in storage" somewhere and can still be accessed - with patience - of you know what you want! No more exploring through stacks. A similar occurrence at Case-Western Reserve here underscores the need for us to copy and preserve all relevant information, historical and otherwise, whenever the opportunity presents itself.

Have a great season, and I'll let you know further developments.

Sincerely,

Serge Krauss

3114 Edgehill Road

Cleveland Hts, OH 44118

(Ed. Note: For those of you who are new members, Serge has produced an excellent bibliography on tailless reference material. He has contributed material for the library, and needs our support for this valuable project. If you don't already have his earlier version, please write him and order his new, improved version. If you have information that

would be of interest to others as a bibliography reference, please send it to him so he can publish it in this update.

We at TWITT would appreciate any effort on Serge's part to produce a listing of important information from the newsletters. It is one of the projects we wanted to do this year, but has, as yet, not gotten done. If we can be of assistance to you, Serge, please let us know.)

FROM THE PEN OF KARL SANDERS

11/11/91

(Ed. Note: Karl submitted this piece early so we could obtain comments on it before publishing, rather than have a continually drawn out dialogue within the newsletter. However, for those of you out there who feel there is more to this subject, please do not hesitate to write in and give us your thoughts.)

Here is another epistle with comments/suggestions for Bill Hinote - and others - in regards to his letter of 10/15/91 to TWITT.

1) Section Reflex. This is not an absolute must for a flying wing; its main attribute is the small (or even slightly positive) C_{Mac} . This in turn points to the need for proper airfoil selection, in conjunction with wing sweep (back or forward), twist, and CG location with respect to the "complete" airplane ac location on the MAC. The best combination (e.g. highest trimmed L/D max) must be determined by varying all three items in several sets of stability and control calculations. Many good text books show how to do this. For flying wings, moderate sweepback may be needed for stability and trim; too much can be very bad (ultimately lethal! - tip stall, etc.) if you fly at high C_D 's. Your average housebroken and acrobatic gliders are quite gust sensitive (high AR, low W/S), and their C_D 's range from that for the point of max L/D up to C_{Dmax} !

Dr. Horten's and Nickel's books are well worth to be consulted for related information. There is also the very valuable NACA Report No. 1939 by Furlong and McHugh, "A Summary and Analysis of the Low Speed Longitudinal Characteristics of Swept Wings at High Reynolds Numbers" (goes into low RN too!).

The (apparent) crave for 3-D flow software is not really justified for the purposes at

hand - except that it's "in vogue."

NACA/NASA (et al) have given us all the necessary tools for good aerodynamic wing design. As far back as the middle thirties, Anderson's design charts (condensed in Dover's edition of Abbott and Doenhoff's "Theory of Wing Sections," and the 1950s NACA Reports Nos. 921, 1056 and 1071 by John deYoung provide all the needed 3-D wing design charts. In 1968 NASA's John Lamar published NASA TND-4427 + Supplement "A Modified Multhopp Approach for Predicting Lifting Pressures and Camber Shapes for (Conventional and) Composite Planforms in Subsonic Flow." It contains a "direct" procedure (given planform and camber (i.e., section camber, flap/aileron deflection, and twist); loading, C_{Di} , $C_{L\alpha}$, ac are calculated), and an "inverse" procedure (given planform and loading; camber and twist are calculated). Suitable thickness distributions must be wrapped around it. In any case, anyone interested should - for his own good - contact John Lamar at NASA Langley Research Center and kindly request he make the PC version of this program available, should it exist. John Lamar also developed a Vortex Lattice Method in 1976 for trimmed wing and tail (canard) combinations. As far as I know (from people at Northrop) it does not work in its present form for tailless aircraft! There is a PC version of it!

And here are two other handy references on design "quickies" that are always so good to have for "home work."

1) Journal of Aircraft (AIAA), Jan-Feb 1967, pp. 73-74, Lundry, "Minimum Swept Wing Induced Drag with Constraints on Lift and Pitching Moment."

2) Journal of Aircraft, Nov-Dec 1967, pp. 563-565, Gilman & Burdges, "Rapid Estimation of Wing Aerodynamic Characteristics for Minimum Induced Drag," (he referenced a journal article by "yours truly").

A work of caution: Anderson's and DeYoung's design charts, and the above two references, are for wings with continuous leading and trailing edges, i.e., no kinks, kranks or otherwise jarred planforms, or non-planar wing tips. Lamar's TND-4427, however, allows one kink in the leading and trailing edge, respectively.

I recommend the standard well proven sequence staring out with these wing (3-D!) charts, the range of expected lift coefficients, lift distribution, induced drag coefficient, twist needed for ellipticity and tip stall avoidance, etc. After that you pick

the best available sections (2-D!) that match the above, in addition to providing the precautionary margins; OR you develop your own sections (e.g. with Eppler's program).

NOTE: Incidentally, there are frequent semantic squabbles over the definitions of: ac_{wing} , $ac_{section}$, $ac_{airframe}$, C_M from span loading, C_M from camber, C_{Mo} and $C_{Mc/a}$. However, all of these are properly explained and defined in the classic text books.

To make along story short: as of the middle thirties, classical applied wing aerodynamic practice conveniently separated pitching moments due to "additional" span loading, from those due to wing sections. Span loading in turn, was split up into 1) an "additional" loading due to AOA and planform, and 2) "basic" loading due to twist. Specifically, 1) wing pitching moments due to span loading are due to twist only, and act about the wing ac ; 2) pitching moments due to wing sections are due to their camber only. The two added together give the total "wing zero-lift pitching moment coefficient:"

$$C_{Mo\ wing} = C_{Mo\ twist} + C_{Mo\ camber}$$

The effects of wing geometry (aspect ratio, taper ratio, and sweep) on the pitching moment from the additional loading are accounted for by the ac_{wing} location (in % MAC), for which charts are given, along with charts for C_{Mo} twist, in the above listed references.

These concepts, although still valid for all practical purposes, were superseded in the late '60s by more accurate (and costly) vortex-lattice panel methods (e.g. Lamar's VLM). All of the above considers the wing to be perfectly rigid - which it is not! For example, a swept-back wing (if not too rigidly built) has the tendency to twist itself under load to a near elliptical distribution. These elastic structure aspects throw aero and structures into one mixed bag of computational matrix calculus.

2) I suspect that, what Bill means with "3-D" is "Vortex Flow;" generally speaking "separate flow." All of the above was for 3-D attached flow! But why pondering vortex flow? - that's draggy stuff, typical for thin, low AR, sharp (even round) leading edges of fighters, SSTs, etc., at low speeds or high AOA!

But just in case the "3-D" crave should persist Bill, you can get the NASA programs VSAERO and PMARC (an outgrowth from VSAERO) from COSMIC, University of Georgia, 382 East Broad Street, Athens, GA 30602. Also look at NASA CR-4023, TM 101024, 86782, 86715, CR-3227 and SAE paper 881485.

I would abstain from it for your purposes. But before spending your money - if you're independently wealthy - I'd advise you seriously to contact Dr. Joseph Katz, San Diego State University; he was intimately associated with the VSAERO development at NASA Ames.

Incidentally, there is a PMARC version for MacIntosh and IBM PC. Running time is from several hours to throughout the night (up to 12 hours, depending how many ten of thousands nodal points your panelling involves). But Joe Katz knows more about all this - and may even have improved the programs, and may know of newer/better ones.

GOOD LUCK

(11:10 PM Wow! I'm gonna sleep now, Chau, and greeting from all of us! K.

(The following was received from Bruce Carmichael, who was among the "experts" given an advance look at Karl's treatise.)

11/17/91

At Bob's request, I have read the letter he received from Karl Sanders. As in all of Karl's writings, the information is clear, concise, and correct. The addition of the most useful references is also very helpful. For the basics of stability and control I would add the fine textbook of Perkins and Hage.

Just a few comments (which it would be well to check out with Karl as I have been away from this stuff for some time and would not want to mislead anyone). The excellent paper by Anderson does not cover wingsweep if my memory is correct. I once read a British paper that had an empirical method for correcting the spanwise lift distribution for sweep based on a few measurements they had at that time. The charts of DeYoung as I remember were limited to aspect ratios less than 8.

On page 3 of Karl's letter he mentions the twist of swept wings designed for ellipticity and guarding against tip stall. Should it not also be selected to do the trimming in pitch, say at L/D_{max} , with the flap deflections used for excursions in lift coefficients from this point?

On the subject of less complicated vs. more complicated methods, such as, the vortex lattice, the latter may only be needed for very low aspect ratio, highly swept or even more unorthodox planforms. The higher the aspect ratio the less they should be needed providing the effect of sweep on the spanwise lift

distribution is also included.

On another subject, I seem to have been misquoted or perhaps incompletely quoted with respect to Jerry Blumenthal's design. He had mentioned that he wished he did not have to twist the wing for reasons of building simplicity. His design is not a swept wing, but rather an unswept wing with an unusual fuselage sticking out in front sort of like an unusual canard surface. Washout would produce trim, but he could just set the entire untwisted wing at a negative angle with respect to the forward (whatever it is) and simplify his construction. The main worry over the design is that the low aspect ratio center portion will hang on to any old angle of attack long after the rest of the wing has stalled and should produce violent pitchup. The whole thing is so unusual that predictions are probably risky. Maybe Karl could comment on this design?

Bruce

11/19/91

Bob gave me this with a request for comments. I have no comments: this is far out of my bailiwick. I spent the remaining days of my aerodynamical existence devoted to home buildable, soarable flying. My only reason for experimenting with tailless machines was to get the engine out from obstructing my field of view. In the course of building, flying, and measuring the two tailless motorgliders (Mitchell B-10 and U-2), I got disenchanted with the concept. The stability and control problems one has to cope with are too complex, and so are the problems in the shop during construction.

I do not challenge the idea of flying wings; the birds do that (however, I still have to see one flying on instruments without attitude control by ground observation), but you should try to copy their control mechanisms: variable sweep. That, to me, means something like a rectangular wing mid-section (with a constant airfoil section!), and the wingtips (the outer 1/3 of the half-span) hinged for fore-and-aft pitch control - with conventional ailerons added.

What this treatise suggests: a complex computer developed combination of airfoils, twist angles, and sweeps just cannot be reproduced in a home shop.

Well - I have given up thinking about all this. I have done enough of it for quite some

time now. At the age of 81, I am entitled not to think anymore than I absolutely have too.

I wish you luck
Tasso Proppe

AVAILABLE PLANS/REFERENCE MATERIAL

Tailless Aircraft Bibliography

by Serge Krauss

Cost: \$20

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

Horten H1c construction drawings with full size airfoil layout. 30 sheets 24" x 36" with specification manual. Price: \$115.

Horten Newsletter

Cost: \$5 per year for US/\$7.50 foreign

Order from:
Flight Engineering and Developments
2453 Liberty Church Road
Temple, GA 30179
(404) 562-3512

FLYING WING SAILPLANE PLANS AND KITS: Two time-proven, 13m homebuilt designs suitable for the novice pilot. Build either the MONARCH "F" ULTRALIGHT (19 to 1), or the PIONEER II-D (35 to 1) sailplane.

Info packs \$8 each, or \$15 for both.

Marske Aircraft Corp.
130 Crestwood Drive
Michigan City, IN 46360

MODEL WINGS

The cover of the July 1991 issue of RCModeler features a flying wing called the "Stealthbat" offered by Wing Manufacturer. There was no price listed, but they can be contacted at:

306 E. Simmons
Galesburg IL 61401
(309) 342-3009
Catalog: \$4.00

Omni Models carries the Future Flight Klingberg Wing kit for \$39.99 (item #FTF4000). They can be contacted at:

P.O. Box 1601
Bloomington IL 61702
1-800-747-6664 or (309) 663-5798
Shipping: \$5.00

Peck-Polymers' GENESIS R/C flying wing glider, with 59" wingspan. (See construction and flight characteristic article in the December 1991 issue of RCM magazine.) Suggested retail price is \$34.95 plus shipping.

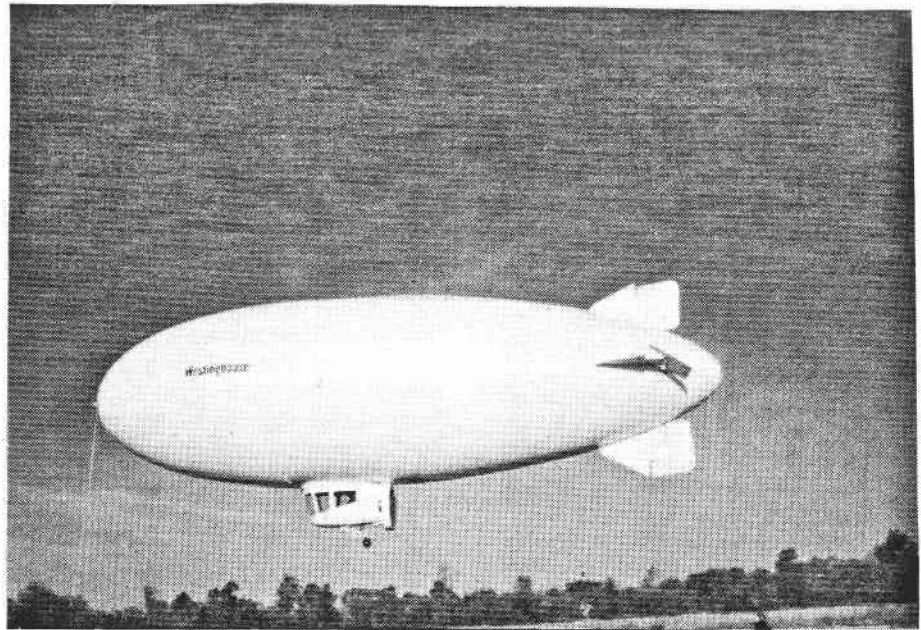
P.O. Box 710399
Santee, CA 92072-0399
(619) 448-1818
FAX (619) 448-1833



In God's wildness lies the hope of the world—the great fresh, unblighted, unredeemed wilderness. The galling harness of civilization drops off, and the wounds heal ere we are aware.

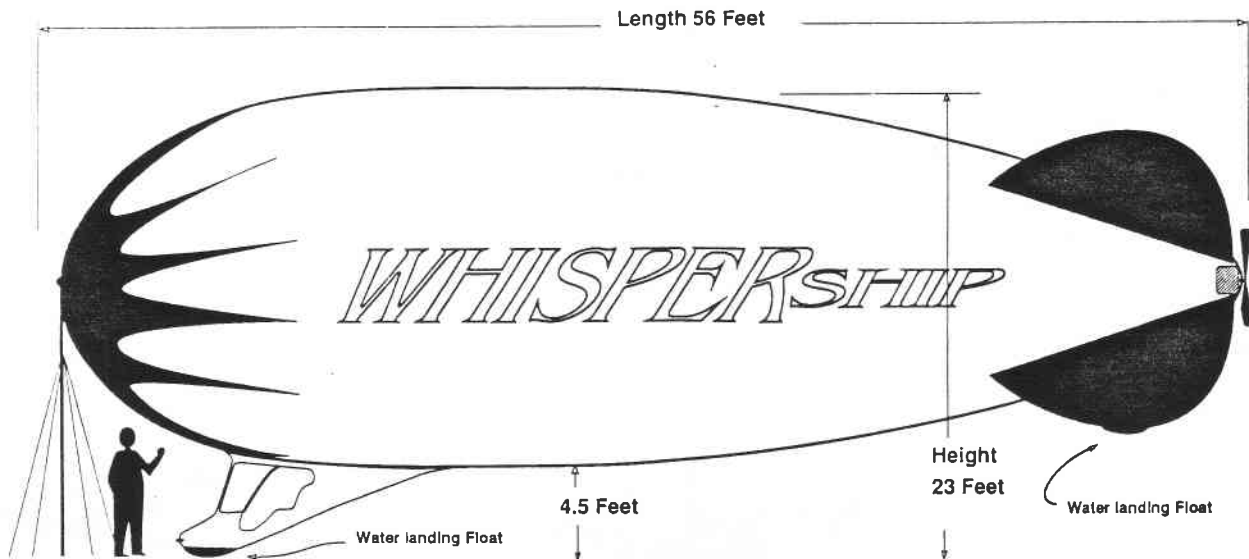
John Muir

Barnes Airships has been formed by Tracy Barnes and Bill Meadows to market production versions of the Skywalker non-rigid recreational helium airship. Now dubbed "Whispership", the vehicles will be marketed in 1-, and 2-man ultralight versions and a certificated 2-man Whispership III has been projected. Two gondola options will be available - a woven wicker type similar in construction of a balloon basket, and a composite unit. The first production Whispership I was inflated in the firm's hangar in mid-November, 1990 and is scheduled to make public demonstration flights on January 12-13, 1991. A dedicated hangar for the prototype has arrived and is under assembly. A local airship flying club has reportedly been formed, although funding for their vehicle is still not firm. Barnes Airships has applied to the FAA for a training exemption to apply



to their prototype 2-man Whispership II, which will be used for check rides and basic airmanship. Whispership I's are priced at \$39,000 and are to be available for sale in January 1991, with deliveries starting in April 1991. The Whis-

pership II trainer will become available in the fall of 1991 and is to cost \$59,000. Contact: Barnes Airships, Route 2, Box 86, Statesville, NC 28677. Tel (704) 876-2378.



**ONE MAN
HIGH PERFORMANCE
AIRSHIP**

AIRSHIPS

ROUTE 2 BOX 86
STATESVILLE NC 28677
704-876-2378

SPECIFICATIONS

ENVELOPE DIAMETER	19 FEET
ENVELOPE LENGTH	56 FEET
HEIGHT	23 FEET
FINENESS RATIO	2.94 TO 1
VOLUME	9,500 CU. FT.
EMPTY WEIGHT	304 LB.
GROSS LIFT	603 LB.
ENGINE	5 HP. 4 STROKE ELEC. START

PERFORMANCE

MAX SPEED	32 MPH.
CRUISE SPEED	25 MPH
PAYLOAD	240 LB.
CEILING AGL	3000 FT.
FLIGHT DURATION (NORMAL FUEL AT 25 MPH)	10 HOURS
FLIGHT DURATION (WITH AUX FUEL TANKS)	1 1/2 DAYS
MAX ASCENT RATE	1000 FT./ MIN.
MAX DESCENT RATE	800 FT./ MIN.

PECK 1300 · BLIMP

READY TO FLY

THE HI-PERFORMANCE REMOTE CONTROLLED BLIMP



We have been building blimps for 14 years. The 1300 Blimp incorporates all the best features we have learned to give you the most maneuverable and efficient blimp possible. The new 1300 also features prop. guards for safety.

1300 Blimp Features

Quick turns with powered rudder, motor turns with rudder.

Fast altitude change — 2 gondola motors tilt straight up.

Can fly up and down like a helicopter.

Rudder motor can be shut off.

Electronic speed control with forward and reverse normally fly with low power and in case of air conditions has power to fly away.

New low-drain motors — Peck Silver Streak. These new motors only use 25% as much power and by flying at low speed we get 1/2 hour flight using a ni-cad rechargeable battery 4 cells at 1200 MAH.

Blimp envelope Material — Fireproof and Ultraviolet treated vinyl or urethane.

13 ft. long X 57 inch dia.

Volume — 160 cubic feet.

Lift — 60 oz. without gondola and radio about 20 oz. with gondola.

Remote Controls are:

Forward & Reverse

Up & Down

Right & Left Turn

Tailmotor ON-OFF

The 1300 is made for indoor use only. We have a 15 ft. and 20 ft. Outdoor Blimp available. See other literature, these blimps are not radio controlled only tethered on lines for display.

Another feature is a convenient hatch in the bottom of the gondola to change batteries easily.

You'll love flying the new Peck 1300 blimp.

The Blimp is available in White, Yellow, Gray, Red, and Blue.

Ready to Fly — Completely built, tested with 4 channel Airtronics Radio all batteries and charger, helium filler.

READY TO FLY

Stock No. PP034 \$1,795.00

Designed by Bob Peck

Paint: The blimp is easily painted with Naz-Dar #44 series vinyl silkscreen paint. We have an artist that can paint your logo or message on the sides of the Blimp. Let us quote your LOGO.

BANNERS AVAILABLE



Banner — Fits on Blimp for adding logos and messages has banner for each side 2 ft X 5 ft. Held in place with elastic bands. Colors — White, Yellow, Blue & Red. Made of Nylon.

Stock No. PP039 \$100.00

The blimp uses helium available at welding shops — We recommend renting the K-size tank 217 cubic ft. Approx. cost to fill 1300 Blimp in San Diego: \$35.00.

Stores in box 2 ft X 2 ft. X 3 ft.

BLIMP VIDEO (VHS)

See Blimp in Flight. Send \$15.00 Deposit. Refundable upon return of Video.

Prices F.O.B., SANTEE, CALIF.



Peck-Polymers

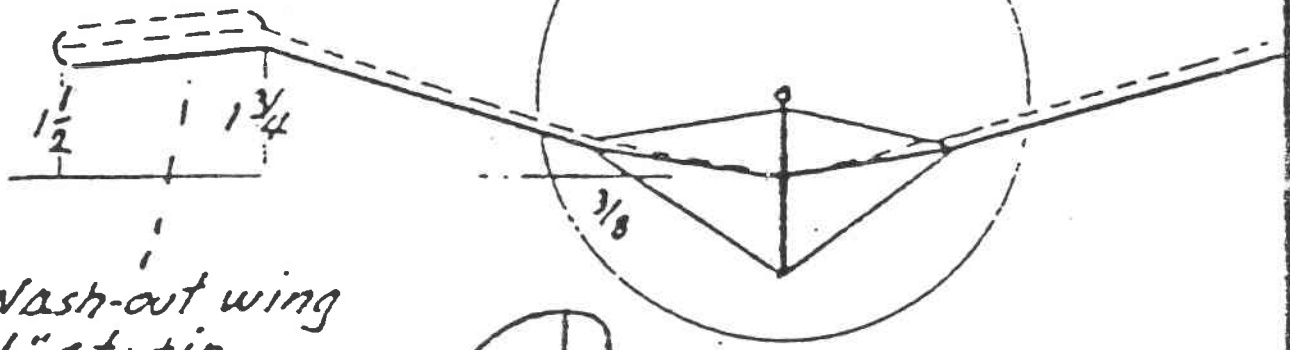
P. O. BOX 710399 • SANTEE, CA 92072-0399 U.S.A.

TEL. (619) 448-1818 FAX (619) 448-1833

WE ACCEPT
VISA and MASTER CHARGE
CREDIT CARDS

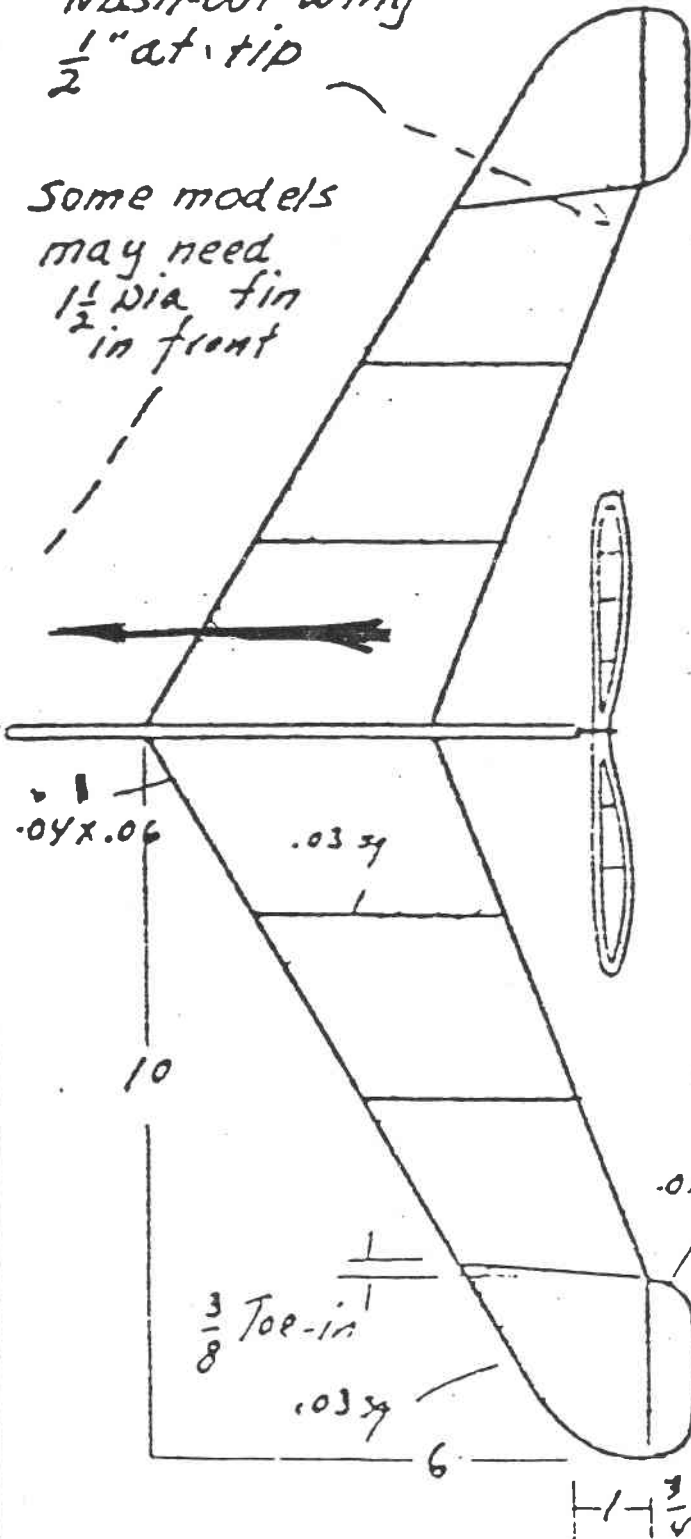
- From one of the famous Frank Zaic YEAR BOOKs

BRITISH TAILLESS H.L. RECORD HOLDER
4m 13s on 1200 Turns by R.C. MONE



Nash-out wing
 $\frac{1}{2}$ " at tip

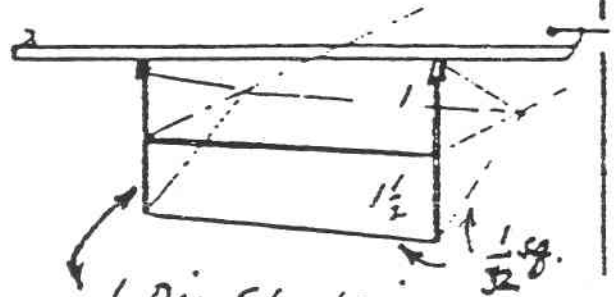
Some models
may need
 $\frac{1}{2}$ " dia fin
in front



CONTRIBUTED BY:

BILL HANNAN OF ESCONDIDO, CA

M/stick $\frac{3}{16}$ Dia x 8 x .012



$\frac{1}{16}$ Dia Struts in
Paper tubes

Flat wing section

Prep from $\frac{3}{4} \times 1 \times 8$

Power: Loop of $\frac{3}{64}$

Wt. .02102

F. Zaic