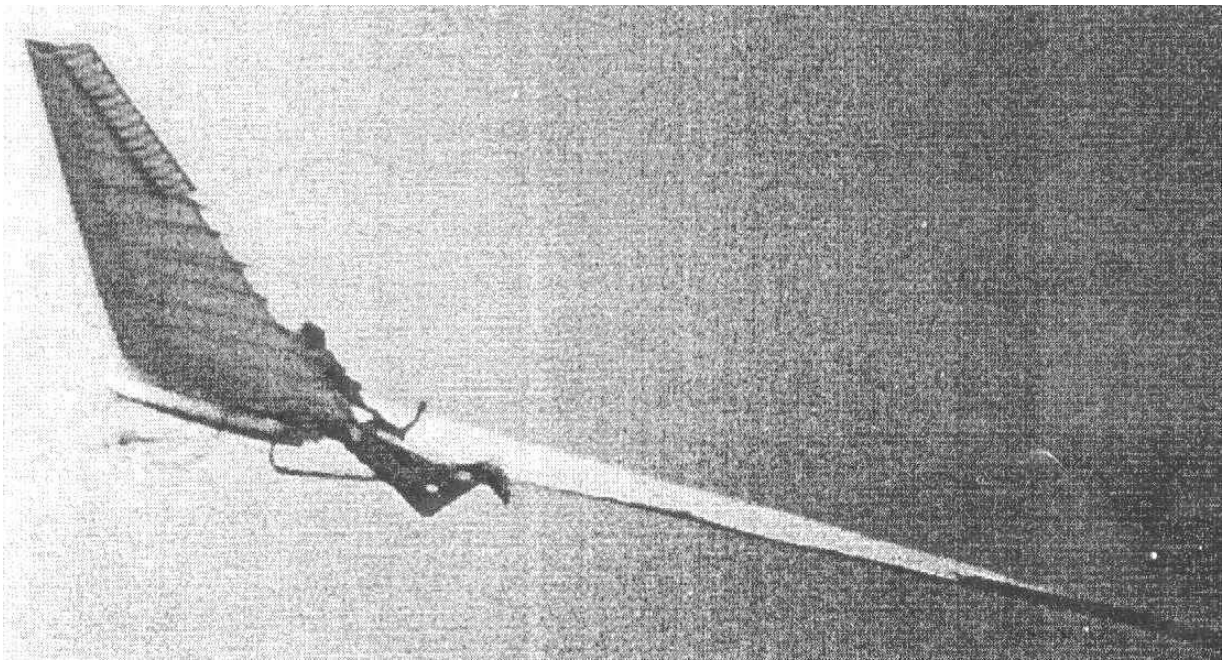
No. 149 NOVEMBER 1998

T.W.I.T.T. NEWSLETTER

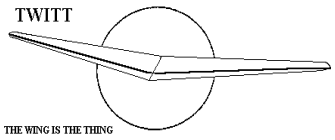


An inflight shot of Bill Moyes' (Australia) interpretation of the Horten Xc. Al Bowers commented that although Bill followed the design brief closely, his "improvements" may have resulted in an aircraft that is compromised. Al will have more on this at a later time and has been in contact with Bill in the past few weeks. We will bring the information to you as soon as it is made available.

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., **9811** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, November 21, 1998, 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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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).

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PRESIDENT'S CORNER

We have another first for TWITT. The transcription of Al Bowers presentation has turned out so long that we will be making it a three parter. You were left hanging last month with some of the historical stuff and this month you will be left hanging on Al's final conclusions and some of the more interesting questions put to him by the group after he finished the formal part. I think you will find it well worth waiting for.

I am also pleased to announce that we now have the videotape of Al's presentation ready for delivery. The package also includes a copy of the 20 overhead slides that he used since they sometimes are not completely readable on the tape. The price is $10, including postage (add $2 for foreign mailings). Although the minutes contain almost all of the information, you really have to hear Al tell you about it to get a full appreciation for his enthusiasm and the amount of work he put into getting this far. From on-going correspondence with him in the past several weeks, it is evident he is not letting this thing go and is nearly ready to do performance testing on a scale model being built by one of his students. He will keep us informed of the progress.

Next month I will include some of the pictures of Bill Moyes version from down under (Australia). Also, Philippe Vigneron has provided his interpretation of the design based on Moyes work. He also sent along some real pictures of the aircraft in drawings on page 7 of the October issue. I will try to get them into half-tones that will show up well in the newsletter next month.

Since we have had some turnover in the membership in the last year, I will use the January issue to include a new membership roster. Unless I hear an overwhelming complaint, I will organize it by state or country like last year to make it easier for you to find members in your own areas. It would be nice to eventually get telephone numbers for everyone to make this kind of contact more convenient in the future. So, if you think of it next time you send in your renewal, please add your phone number to the check or letter and we will update our records.

For those of you with Internet access, don't forget to check the web site every once in a while. I have updated some of it the other day, and once this is in the mail will go back to work on making some other changes.

Andy

NOVEMBER 21, 1998 PROGRAM

The program this month will feature **John Mitchell** who going to talk to us about the work of Witold Kasper. Through his father's videos, conversations with his brother (a pilot) who met Witold, and conversations with Withold's friend Arnie, as well as excerpts from Kasper's book and drawings of his Bekas BKB-1 sailplane, he will be presenting a picture of a very interesting man and his very different theories of flight and aircraft controllability. We will also have a Kasper wing on display outside the hanger along with some pieces of R.W. Long's Kasper project he built several years ago.

John grew up in Texas in the 50s and 60s hanging around airports since his dad was a helicopter test pilot and general aviation enthusiast. He spent his early years working on airplanes (dad's SNJ, J-3 and Lake amphib) while everyone else was mowing lawns. Though educated as a biologist, he actually earns a living as a manufacturer of advanced aerospace and marine composites through his small company in Santa Ana, CA.

His interest in flying wings began with Rogallo models in 1965. In the early 1980's his dad began looking for an ultralight to fly and sell in Texas, and his search took him to Washington state. There he met Witold Kasper and from that meeting and his father's conversations, John's interest in Kasper's theories and unique designs began.

MINUTES OF THE SEPTEMBER 19, 1998 MEETING

(Continued)

(ed. - Last month we published the first part of Al Bowers' presentation on "The Horten H X Series: Ultra Light Flying Wing Sailplanes." Presented here is the second installment of Al's talk along with some of the more of the slides he used to demonstrate his analysis of Horten's aircraft. Those parts marked AHB: are remarks added by Al as he proofread the text before publishing. We will print the last part in the December newsletter, since we need the room this month for some of the Kasper material to go with the upcoming program. Besides, it will keep your interest peaked waiting for that last installment.)

Al again referred to his slide showing Udens' eleven different aileron/elevon configurations to further illustrate his point on proverse and adverse yaw (see top of page 3). As more of the elevon surface is moved outboard the amount of proverse yaw increases. Udens wanted to confirm these findings so did two configurations, elliptical and bell shaped, and found they definitely had adverse yaw as noted for examples IV & V on the slide. The conclusion here is that inboard elevons for roll control are not necessarily a good thing since they produce more adverse yaw. The proverse moments become larger and larger as more of the elevon surface to pushed out towards the wing tip. It occurred to Al later that perhaps you could blend the outboard roll control surface with an adjacent elevon; and with the right amount of movement on each surface produce a fully coordinated turn. However, there is another piece to this puzzle and that this is applicable to only one particular spanload. If you change the amount of lift you are asking for, how does it affect the yaw moment of the wing? Al couldn't find anything in the literature or Udens' calculations, so decided he would take it on as a project.

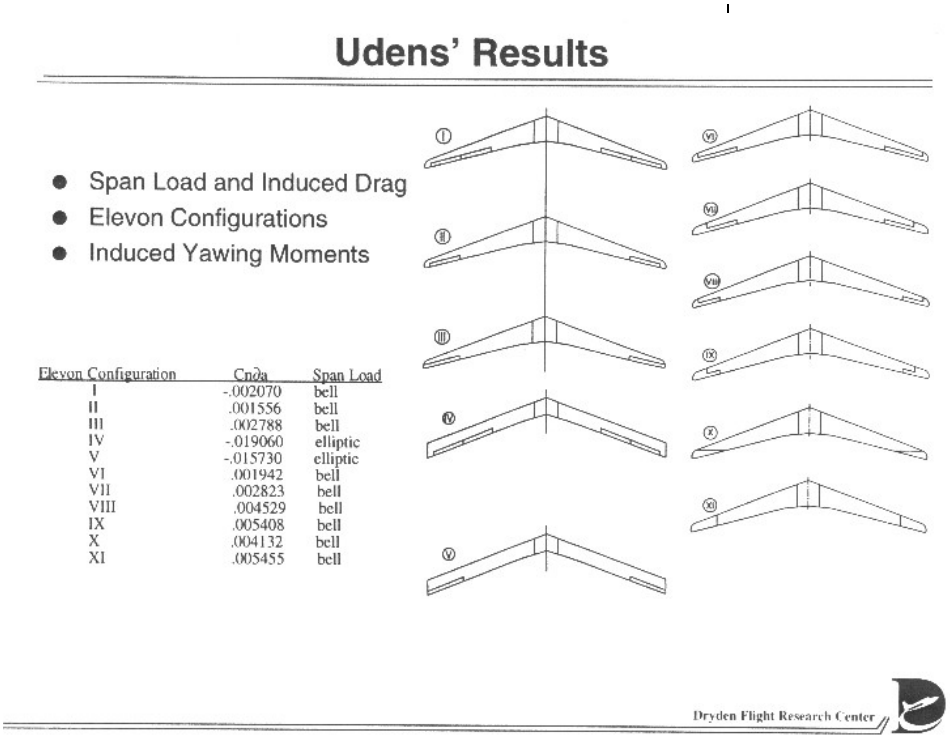
Al moved on to start covering the hardware aspect of the Horten's. His next slide covered the Horten H I, H II, and H III. The H I configuration was found to be all wrong with ailerons and an elevator in the middle. Trying to flair on landing had the predictable affect of actually dumping lift resulting in a rather hard landing instead of the gentle touch down trying to be achieved. Walter Horten had an interesting story about this problem that Al recommends everyone read. Walter also found that by pushing the stick forward slightly, he could fly in ground affect all the way down the runway. Since this obviously wasn't the way to go, the aircraft eventually ended up as a big bonfire.

With that experience behind them, in 1935 the Horten's build the H II with a bell shaped spanload and used some mathematical polynomial functions to get the spanload he wanted to achieve (the Hortens used Schrenk's method, as this was before Multhopp's theory). It was also the first time they used fully functional elevons in their design.

The H III was the next design that was looking for improved performance and a refinement in what they had found with the H II. This was also the first airplane they flew in the semi-prone position, since the previous models had a more conventional upright pilot seat.

The H IV and H VI were the cream of the crop for the Horten's since they had an almost unlimited budget and very few constraints on the design objectives. The H IV had a high aspect ratio and increased performance and most important was extensively tested producing a lot of hard data that could be used to improve future designs. The max L/D for the design was to be 37:1, but DFS testing only produced a figure of 32:1 and MSU came up with 29:1. Al felt the lower number found by MSU may have been to a misreading of the elevons, because the data the Dez Georges-Falvy published never showed the elevons reaching zero all the way across the wing at any time. This may have been the result of mis-rigging and/or due to some of the other work done to the airplane that might have changed the spanload somewhat.

The H VI (only two of which were built) had an extremely high aspect ratio, but the performance was truly



limited by the structure of the aircraft. It had two separate flutter modes that were excited at speeds that it commonly flew at and the only way to handle them was to fly through them. The "Mitteleffekt" solution was the addition of the Horten mini-tail that increased the area near the centerline of the wing to try and make up for the loss of lift they found in their analysis technique. The Hortens sort of thought the airflow was kind of colliding in the middle causing some turbulence that was creating the loss in performance they were experiencing. So they were trying to straighten out the quarter chord line from one side to the other, which was the case with the H IV. The H VI, if you plotted it out the quarter chord, actually went backwards which was an experiment whose results were inconclusive (today it is understood that the "Mitteleffekt" is an artifact of wing sweep). They did make one other sailplane that unfortunately never flew, the Horten Parabel, that would have proved to them this was not the problem (it, like the H I, ended up as a pile of ashes).

At the end of WW II, Germany was restricted from flying sailplanes and Reimar Horten ended up moving to Argentina to continue with his work, although there were some constraints on his ability to produce some of the designs. He did some amazing work considering the circumstances and the H XV series of three aircraft were certainly among his best. Al commented that Paul MacCready flew against the single seat version during the world championships and some day he is going to try and get Paul's reaction on what they were like flying with them.

One of the designs Al particularly liked was the H XVc (I. Ae. 41 Urubu in the Argentinean designation system) and he mentioned that a friend of his at a technical school in Buenos Aires was in the process of restoring one. Apparently all the H XV series of aircraft suffered some type of aeroelastic handling quality problems where a little bit of input got no response, but when the input was further increased all of sudden the aircraft responded very quickly. This created a tendency for PIOs. Joe Alvarez of SHA indicated the best way to fly them was by making a large input and then taking it out right away, which would allow you to fly the airplane relatively well. Al felt that with modern day construction materials the problem of aeroelasticity would become manageable.

About this time there was some emphasis on coming up with smaller and lighter sailplanes. Bruce Carmichael had mentioned this earlier in the program when he commented about his last trip to a soaring symposium at Elmira. To this end Horten designed a series of ultralights designated the H X, which was a recycled number so you have to be careful about which H X series you are talking about (the Horten X of WWII was supposed to be a supersonic jet).

The H Xa (L'Alita) at 7.5 m span was relatively small even by hang glider standards. It used Frise elevons (leading edge dips down into the airflow as the control surface is moved up creating more drag on that wing), was flown extensively, but didn't have a fully developed bell shaped spanload distribution. Reimar was afraid that with a fully developed bell shaped distribution he wouldn't have enough lift to get the pilot off the ground as a foot launched sailplane like he wanted. Although the H Xb was never completed, the design had a fully developed bell shaped spanload, so Horten put on plain elevon surfaces. He wanted to use the H Xb as a test bed for his ultimate foot launched goal which was the H Xc (Piernifero 3). The H Xc also was never constructed and exists only as a design study but was to be very, very high performance with a projected L/D of 30:1 and a minimum sink of 80 fpm [AHB: Recent sleuthing has uncovered an Australian built version of the H Xc which is built from composite and currently being flown by Bill Moyes]. These figures are better than the current Carbon Dragon design (25-27 L/D & 100 fpm) and capable of micro-lift soaring.

Al looked at Horten's performance prediction with some skepticism, since in the past Reimar's design projections had come out somewhat lower in actual flight tests. The H Xc is very labor intensive to build since it encompasses 72 ribs over a 15 m span with a proposed weight of about 90 lbs. This makes it very complicated and difficult to build to the standards envisioned by Horten. Bruce Carmichael offered to put the weight of the H Xc in perspective with Danny Howell's Light Hawk. It is built with the very latest in composites over a 15 m span and is

projected to come in at about 150 lbs, with a boom and tail surfaces.

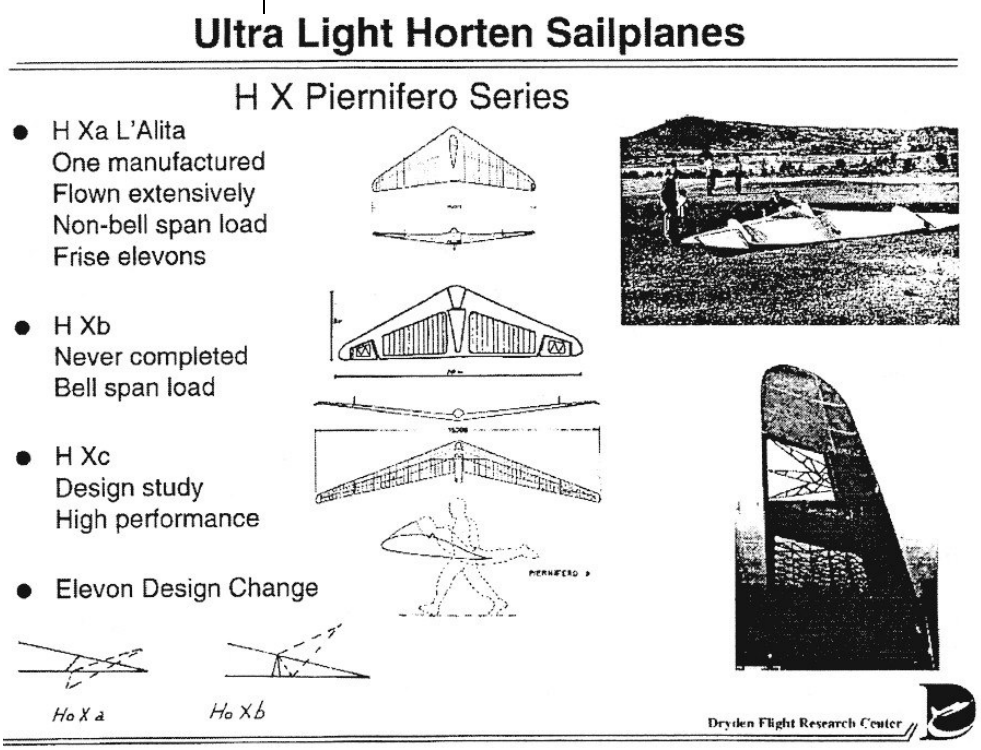
Al commented that Horten had painted himself into a very difficult corner with the design criteria, but both Al and Bruce mentioned that lowering the design load might make the difference. However, there was some concern about such a structure holding up under the loads that could be imposed by trying to launch into some of the Owens Valley lift.

Someone asked what construction materials were planned for the aircraft. Al noted it was classical wood and fabric, and that Horten's other designs using the same materials had all come in pretty close to the projected design weight. The difficulty becomes one of how much do you give up in structural rigidity and ultimate strength. The pencil drawing of the aircraft done by Jan Scott, with the help of Reimar, shows the pilot with a parachute, so maybe there is another story here we don't know about.

There was a lot of thought that went into the design. One item was the center stick connected to a push rod going out to the elevons. The mechanism was set up so that the lateral movement of the stick produced a 3:1 ratio to the aileron function and a 1:1 ratio to the elevator function. Unfortunately, there are only some unpublished notes by Dr. Horten that don't show the degree of detail Al would like to have seen for a better analysis of the aircraft's construction. But even with this limitation, Al is still hung up on this airplane which is probably a throw-back to his original hanggliding days in the 70s [AHB: Astute observation Andy!].

Someone in the audience asked which aircraft was being shown in its unfinished state on the slide. Al commented that it was the wing tip of the H Xb which is now hanging up in a facility in Cordoba, Argentina. At one time Jan Scott had tried to purchase it, but ran into difficulties with export permits which were further complicated by the Falklands war.

Al now moved on to the real meat of this presentation, an analysis of the H Xc based on the available information. The first thing he did was try to find some airfoils. The Hortens had used Gottingen airfoils throughout their careers so the H IV was probably a good choice for applying to the H Xc. He felt that the Horten's hadn't come up with any other airfoils in the few years between the aircraft. This became his baseline airfoil. The first thing he needed to find was the mean camber line in order to use the two analyzing tools he had at his disposal. He plotted the airfoil and had one of the programs create the camber line right down the middle of the airfoil (see top of page 5). He then wanted to determine if there is a function to describe the camber line and it turns out there is fairly easy one using a polynomial fit. Reinhold Stadler in Germany gave him the twist distribution data and he was ready to go.

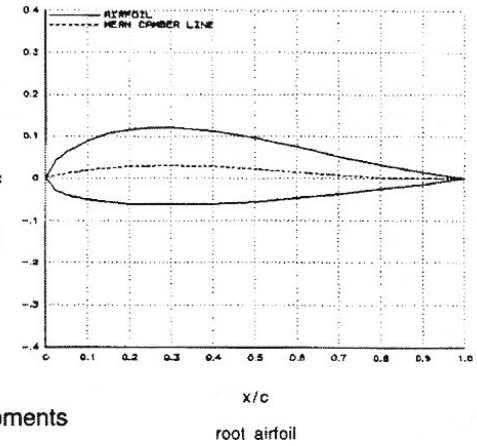


The two pieces of the puzzle here are spanload information as to what the induced drag is from the vehicle and, what do you get for profile drag from the airfoil. This latter piece was solved with Dr. Eppler's and Dan Somer's PROFILE program which also handles control surface deflections. The other program computes the spanload and twist distribution and if you have the right mean camber line in it gives you the trim condition, pitching moment, rolling moment and induced yawing moment (the profile yawing moment had to come from another program). With components all over the place this project became a bookkeeping nightmare.

Al moved on to the Vortex Lattice Analysis which does all these things, but the questions come up about proverse and adverse induced yawing moments as to the acceptable handling qualities. Trying to understand how the induced thrust makes it possible to get proverse yaw was a difficult concept for Al until he drew it out. If you look at the twist the Horten's used, you find very little twist in the center section. In fact, it washes in a little before it washes out very radically at the tip. This is in direct contrast to something like the Northrop designs that use nearly linear twist from the center to the tip. If you start the twist right away you don't get enough upwash at the tip to produce the proverse yawing, but because the Horten's have almost no twist in the middle and then twist radically at the end, it pushes the upwash out towards the tip. So what happens in Horten designs is if you look at the angle of attack you have a lift and drag vector with a resultant vector that is aft of the local angle of attack. That's always true even out at the tip, but if you have enough upwash from the center section and you average what the angle of attack is for the whole airplane, then

Horten H Xc Analysis

- Airfoil
- Airfoil Mean Camber
- Twist Distribution (Reinhold Stadler)
- Profile Drag Components
  Local lift coefficients
  Elevon deflections
  Local Reynolds numbers
  Proverse/Adverse profile yawing moments



Dryden Flight Research Center

look at that relative to the tip, you find that the resultant is forward of the average angle of attack. If it is forward and you deflect the control surface downward then you increase lift and drag, the resultant gets bigger and the component of it that moves forward gets larger. This is what produces the induced thrust and how you get proverse yaw out of the wing. (Phil Burgers commented it was like a horizontal winglet and Al agreed. This is a crucial point and is an absolutely correct interpretation)

In order to get the results he wanted, Al used 320 panels (40 spanwise and 8 chordwise) which seems like a lot, but its not since a typical program today would use a million panels. He then put up the slide showing the results of his symmetrical span load analysis on longitudinal trim. He used a 14% CMAC location which is probably about where Horten would have put it based on the middle effect numbers that he had at the time. The chart only gave Al induced drag but nothing on profile drag so he couldn't tell what the performance would be and what elevon deflections are needed to get certain lift coefficients.

Al moved on to the harder stuff, asymmetrical span loads (lateral directions). Here is where we start thinking about the amount of roll we get when the aileron is deflected. He likened this to the sailplane pilot moving the control stick based on the amount of roll he desires for a maneuver. There are some instances when the amount of roll can even exceed the capability of the rudder to handle it effectively. What isn't thought about in this type of maneuver is the amount of yaw it produces which has both an induced and profile drag component and these have to be added up to calculate the total component. There is also a change in the lift associated with this component. In order to overcome this, Al split the longitudinal trim into two and deflected them plus or minus two about that trim point. His graphs at this point illustrated the differences in these roll moments. The chart of lift coefficients and the resulting roll and yaw moments showed positive values for every occurrence until the final point of .198 CL which gave a -.00015 Cn (yaw moment). This indicates that the H Xc flies faster eventually it will get to a point where the adverse yaw will come up and bite you. He did point out that there are no aeroelastic considerations in these calculations, assuming that it is a rigid airplane, but also noting that this is not a good assumption for Horten's aircraft based on the construction.

(ed. - Part 3 will conclude Al's analysis of the H Xc and cover some of the questions from the audience. Keep your shirts on, it's worth the wait.)

TWITT'S LIBRARY OF WITOLD KASPER REFERENCE MATERIAL

1. "Some Ideas of Vortex Lift", by Witold A. Kasper, Engineering Consultant, Society of Automotive Engineers, Inc., Warrendale, PA, Paper # 750547, no date, pp. 12. Abstract - In tests on a glider designed for experimenting with vortex generated lift, the author experienced an unknown phenomenon which kept the glider afloat at half the usual sink rate and stalling speed. After study it was realized that a huge vortex had been forming after the stall which explained the presence of additional lift at high angles of attack and low speeds. The implications that this discovery has in terms of improving the slow speed characteristics of airplanes are explained in the paper in addition to a detailed study of the characteristics of this vortex.

2. "A Wind Tunnel Investigation of the Kaper Vortex Concept", by Edward W. Kruppa, University of Washington, American Institute of Aeronautics and Astronautics, Inc., 1977, Paper # 115704, pp. 10. Abstract - A model of the Kasper vortex lift wing was constructed and tested in a small scale wind tunnel in an effort to verify the inventor's high lift and low drag predictions. Not one of the vortex configurations tested performed as well as a conventional clean airfoil. Flow visualization studies using tufts indicated fundamental differences from Kasper's predictions, including both the direction of vorticity and the number of vortices present. *(See illustration on page 10.)*

3. "A Brief Wind Tunnel Test of the Kasper Airfoil", by Daniel Walton, Soaring, November 1974, pp. 26-27.

4. Kasper, Witold A., ed. H. Joe Meheen, The Kasper Wing, Meheen Corp., Denver, CO, 1979, pp. 55. Foreword (by Agne Lundgren) - Currently available technical data on the behavior of flying wings are fairly old, most of it dating back to the early 1930's. I am very grateful to my friend Witold Kasper that is

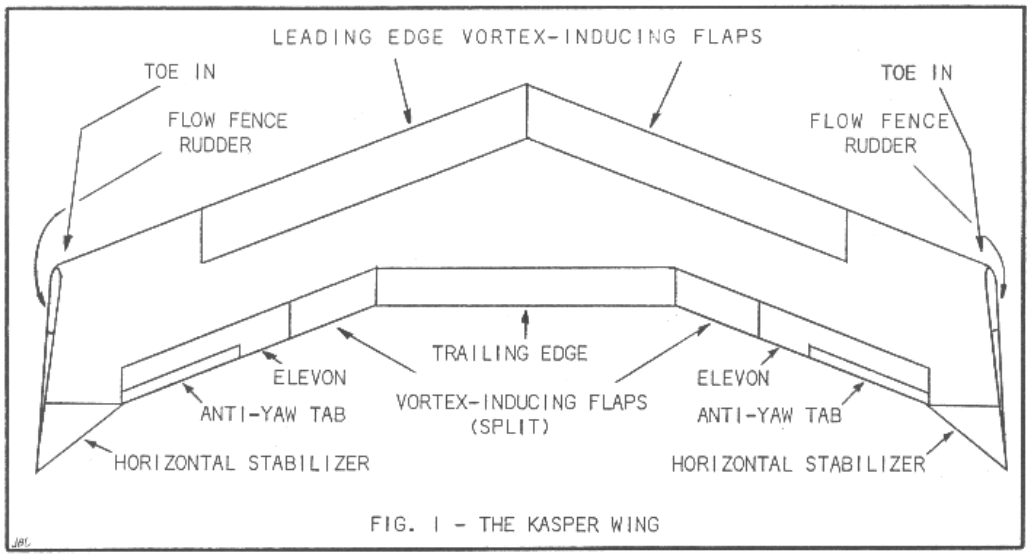


FIG. I - THE KASPER WING

ABOVE: " The Kasper wing . . . remember, protected by several patents . . . is a swept wing utilizing a reflex profile - NACA 8-H-12 profiles developed originally for helicopter blades. Wing tip washout is accomplished by means of a triangular horizontal stabilizer located at the trailing edge of each wing tip - adjustable from the cockpit. Upward displacement of the elevons also contributes to the washout effect." From reference # 14.

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willing and generous enough to share with aviation enthusiasts his discoveries of slow flight with safety. His explanations of controlled flight in deep stall by aerodynamic means and independent of forward speed, and his theory of stability are alone worthy of acceptance by the aeronautical community. Every student, every pilot and every aircraft designer will benefit from this. The road is now open for the advent of a safe air vehicle.

5. "Boy, I Don't Know", by Glayr Leitzke, Ultralight, date unknown, page 9. Personal account of the first flights in a Kasperwing ultralight at Cascade Ultralights in Issaquah, WA.

6. The Daily Mush, Newsletter of the Kasperwing Klub of America, Fairbanks, Alaska, April 1992, pp. 3. (Unknown if still being published.)

7. Information Brochure, Cascade Ultralights, Inc., Fairfield, IA, pages 8, date unknown. (Unknown if company still active.)

8. "The World According to Kasper", by Thomas A. Horne, AOPA Pilot, May 1981, pp. 61-70. Overview of Kasper's work over the years.

9. "Remarkable L/D Achieved by Short-Span Tailless Sailplane", by Peter Bowers, Air Progress HOMEBUILT AIRCRAFT, Spring/Summer 1966, pp. 62-98. Canada's loss is our gain as one of the truly unique sailplane designs crossed the border to find a home near Seattle. A good deal of the technical info that has been collected on Kasper's BKB-1 will be of interest to all amateur designers. AP's N.W. editor tells how it flies.

10. "Flying the Vertical Mush", by Jan W. Steenbilk, GLIDER RIDER, June 1983, pp. 49-51. Short article on flying the Kasperwing in the mush mode.

11. United States Patent, # 3,438,597, April 15, 1969, W. A. Kasper Aircraft, Witold A. Kasper, Non-Powered Gliding Aircraft Specifications.

12. United States Patent, # 3,831,885, August 27, 1974, Aircraft Wing With Vortex Generation, Inventor Witold A. Kasper, 4 claims, 22 drawing figures, pp. 10. *(See illustration on page 9.)*

13. United States Patent, # 4,781,341, November 1, 1988, Flying Wing Aircraft, Witold A. Kasper, 3 claims, 2 drawing sheets. Patent for Kasperwing ultralight, pp. 6.

14. "The Revolutionary Kasper Wing", by Jack Cox, SPORT AVIATION, July 1973, pp. 10-15. Article on the high-wing, single-place, all-metal powered flying wing.

15. "Flight Testing the Bekas N", by Witold Kasper, Soaring, November 1969, pp. 12-14.

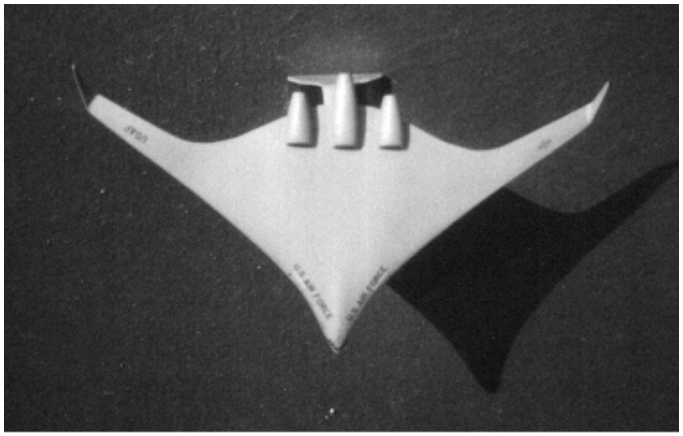
16. "What Happened to the Kasper Wing?", by L. D. Sunderland, SPORT AVIATION, January 1976, pp. 30-35. Follow-up article on the aircraft reported in item #14. above.

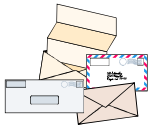
17. "An Antique Grand Champion Ultralight", by Mary Jones, SPORT AVIATION, January 1996, pp. 81-84. Steve Pinkham's Kasperwing celebrates ultralighting's early days.

18. Several pages of general discussion about Kasper's aircraft capabilities and related stories. Contributors included Russell Lee of the Smithsonian, Al Bowers of NASA Dryden, and Jan Hinote.

NEW ADDITION TO THE HANGER

We would like to thank Bob Recks and model maker Lorin A. Bliss for contributing a model of the Blended Wing Body NASA concept study aircraft for display in the hanger. This would be a high density passenger aircraft capable of long range yet operate out of current airports. Make sure to take a look at it when you come to the meeting or anytime you drop by the hanger.





LETTERS TO THE EDITOR

(Note: This month there wasn't much mail, but I have accumulated a large number of e-mail messages that I think are of interest to the general membership. So, here are several of them, with more to come next month.)

9/13/98

TWITT:

Just wanted to drop a line and commend you on the great web site. I am a long time hang glider pilot who is soaking up all the information that I can before starting my own foot launched flying wing project. After hearing Al's (Bowers) talk at Tehachapi, the HXc sounds like a good place to start, and I would wholeheartedly volunteer my time and effort to see this wing take flight. Do you know of anyone in our group who would be willing to work out the structure to go with Al's data?

I'm currently helping Don Santee with his Sa-4 sailplane here in Arizona and would be thrilled to help in any way I could to see a 30:1 foot launch wing become a reality.

Please let me know if anyone else is interested.

Blue skies and green air,
Rik Fritz
Flagstaff, Az
sorin@infomagic.com

(ed. - I passed this information along to Al, along with another message I received about looking for a project. Unfortunately (but understandably), Al's response was one of reluctance at this point since he doesn't have enough hard data to support going beyond the model development stage at this time. This is underway and he hopes to have more on this by the end of the year. It looks like patience is the watch word here for right now.)

9/7/98

TWITT:

I have just completed a flying wing seminar here in Marion, Ohio (Sept 3,4, & 5th) . We covered everything: flying wing aerodynamics, structures, spar design and calculations, performance calculations, airfoils, plug and mold making. We even did a workshop on composites.

The first afternoon we made ribs and a carbon rod spar. The second afternoon we laid up a leading edge skin and bonded the ribs and spar into it. The third afternoon we pulled the D-tube from the mold and trimmed it. These are parts to my new Pioneer 3, 15 meter flying wing that is under construction.

The seminar ended with a flying session with the Monarch flying wing. We auto towed to 900 ft and rode thermals to 3,000 ft or better. The eight attendees enjoyed the composite lay-up experience the most. We plan to hold another similar workshop in mid November (15-17).

Jim Marske

(ed. - Thanks for the report on your last workshop.

Jim also sent along via snail mail, a flyer and application for his next workshop and I also got an e-mail from Serge Krauss letting us know about this great opportunity, along with some more info on his latest project [see below].

Since the information came in too late for the October newsletter and the workshops will have already finished by the time you get this one, I have forgone telling you more. However, the prices appeared reasonable and the subject areas very comprehensive. If he continues to have good attendance there will probably be more of them in the near future.

If you want more information about upcoming events, or to let him know your interest in a furture workshop, write to: Jim Marske Workshop, P.O. Box 327, Hammondsport, NY 14840, or 1-800-231-2489, or visit he site at: www.continuo.com/marske/

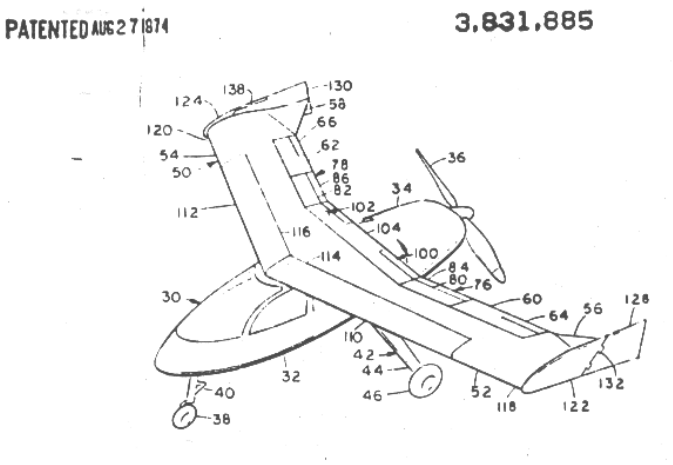
I'll try to keep you better informed if there is another one.)

10/16/98

TWITT:

I was looking around on the internet the other day and found a new Marske Flying Wing site. On it I learned that he had made arrangements with Mat Redsell to work with him as business manager working in sales for the Pioneer and Monarch. The site is informative: data, specs, prices, etc., on the Marske designs, plus word of the workshops at the Marion OH airport.

BELOW: Figure #1 from Kasper's 1974 patent application showing a perspective view of the aircraft at rest, with all the directional control airfoils and vortex generating and control airfoils in their neutral positions. (From reference #12)



After perusing the site, I contacted Jim for an update on the new Pioneer IIe, and found that it had become the Pioneer III. I had sent you information on his project a year ago, but I don't remember it reaching print. At that time he was talking about a sport sailplane with D-tube and cloth wing with a projected L/D=42.

This is what he had to say about the Pioneer III project: spar molds and D-tube molds are finished as is a foam fuselage plug, which he says has "very nice lines" - a lot like the Genesis shape. All control surfaces will be "in carbon". "No horizontal tail this time."

Although he hopes to fly it next summer, there are a lot of molds left to make. Performance is hoped to include an L/D of 40-42, min. sink of under 100 ft/sec, from a 15m, 345-lb. (empty) ship, with an A/R of 18. Normal wing loading will be 4 lb./sq.ft.

He expects to sell kits in the $15,000 - $20,000 range. His last words were "It's a sport sailplane, not a racer." I'm looking forward to seeing this one! Perhaps I can make it down there.

Serge (Krauss)

(ed. - Thanks for the fine report on the new web site.

I am hoping that as more of our members see there is a lot out there for them to see regarding flying wings and other aviation oriented sites, that more will take the plunge and get on the internet. It is a fantastic resource for just about anything you can think of or want to know more about. I will have to take a few minutes and try to put together a comprehensive listing of the sites we know about so far.)

9/27/98

TWITT:

Found this on one of the newsgroups.

Kevin Renshaw

Scott Lowther wrote:

I've scanned in drawings of several 1950 Northrop designs for long range flying wing bombers. These were different designs than the B-35 and B-49 bombers, and used turboprop engines.

Comments welcome.

Pictures at: http://www.webcreations.com/ptm/apr/apr.htm

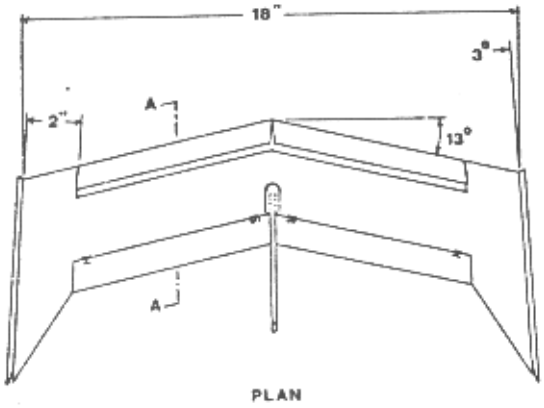
(ed. - Thanks for pointing us to this site.

It is interesting since the author is trying to put together a bi-monthly newsletter called "Aerospace Project Review" in which he will publish some of the sizable collection of documents he has in his library. It would be about 20 pages with design information being of paramount importance. He is planning on the first issue in early 1999 and is looking for potential subscribers [rate is estimated at $30 US right now].

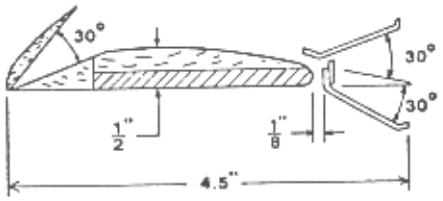
For those of you who can, visit his web site. If you only have e-mail capability, he can be reached at:

lexcorp@ix.netcom.com

He has a lot of material besides flying wings, so there should be something there for everyone. I have contacted him about an exchange of newsletters when he begins publishing and he seems agreeable, so we may be able offer some of the applicable material to you periodically.)



WING AREA 0.61 SQ. FT.
ASPECT RATIO 3.8



Wind tunnel model wing. From reference #2.