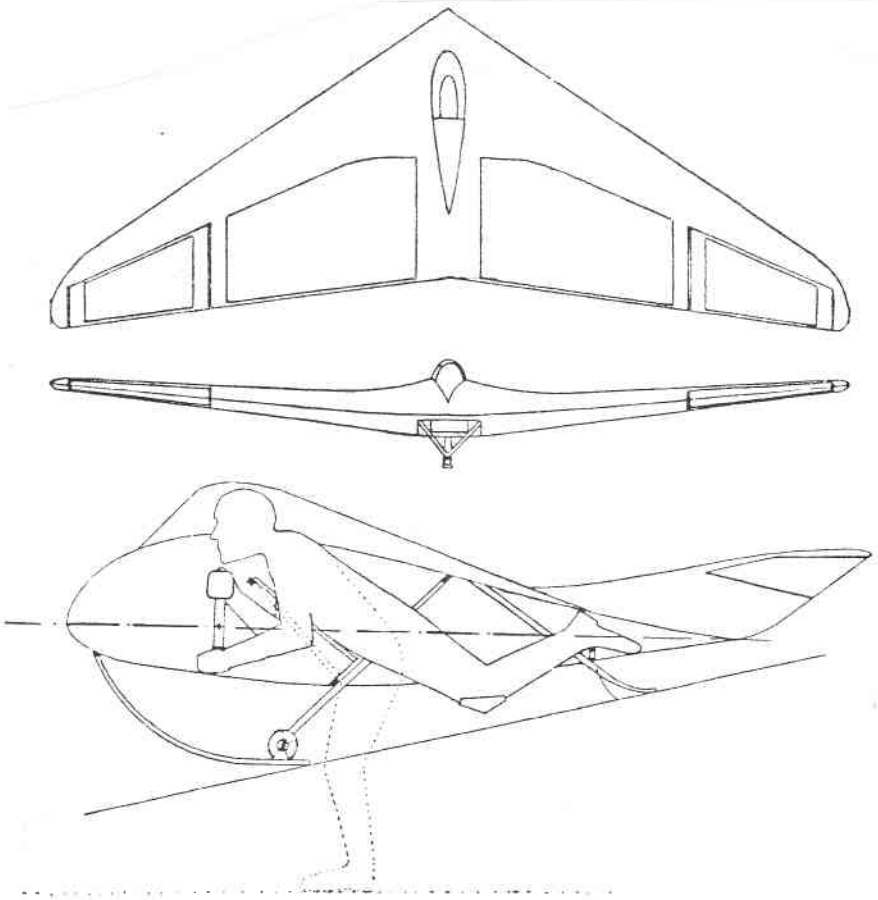
No. 89 NOVEMBER 1993

T.W.I.T.T. NEWSLETTER



The Horten X foot-launched, 7.5 meter, flying wing. Source: Soaring magazine, month and year unknown.

This 3-view was obtained by Jan Scott through communications with Dr. Reimar Horten after meeting his brother, Walter Horten, at an "Old Timers" vintage sailplane meeting in France.

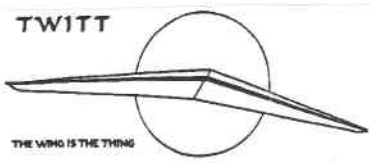
The article in Soaring was also accompanied by several photographs of the wing in operation, however, the quality prevented any reproduction.

If anyone knows which issue this appeared in, please contact TWITT at the P.O. Box so we can try to find an original copy. Thanks.

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., **9311** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, November 20, 1993, 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 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
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Editor: Andy Kecskes

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

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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

In September we reported the death of Dr. Reimar Horten. Since that time we have received a number of different pieces of material on Dr. Horten, some of it from people who have had personal experiences with him.

We thought it might be of interest to all of you to print these perspectives of Dr. Horten and his work. To that end, we will present some of it this month, and the remainder over the next month or two, depending on how much other material is available.

We are sad to report that one of our early TWITT supporters, Jerry Blumenthal, passed away in late October of a heart attack. In his memory we have put together a little biography and a collage of some of his designs. Jerry was a firm believer in the flying wing and had been working toward getting a radio controlled version of his Rattler in the air. Unfortunately, this project will probably never reach the flight stage.

Please take note of the right hand column and the pricing schedule for the information package and back issues of the newsletter. In the future, a single newsletter will be $1.00 including postage. For large orders, the cost will be 75 cents per issue plus the total postage which will end up being less than paying first class per issue.

We regret the increase, but printing costs have risen and demand for back issues continues as new members join. The treasury can't afford to absorb any further costs and still be able to meet our monthly obligations.

Please excuse the slight error in designations of the Horten wing on page 11 or the September newsletter. It is not a V, but rather one version of the Horten IX. We regret the error and appreciate it being brought to our attention.

Have a happy Thanksgiving Holiday.

Andy

NOVEMBER 20TH PROGRAM

Our program this month will be a presentation by **Thomas Bircher** on his Low Energy Aircraft (LEA). Thomas is a retired SwissAir pilot and aerodynamicist, and will be in the Southern California area for a while allowing us to learn more about these aircraft.

Below is a picture of his two designs, the aircraft on the right being the LEA 2 which first flew in October 1987. It is powered by a 6.5ccm pusher engine, has a 4.2m span, and was successful regarding all aspects of the flown flight envelope.

Thomas calls it a "Super-Delta" which is a pure flying wing with a high lift center, Horten type outer wings, and winglets. The cabin is a self contained sort of solar mobile, where you hang under the wing.

Bircher wings follow three principles:

1. They consist of two parts with aerodynamically different purposes: Inner part - high lift device, basically square, high aspect ratio, laminar flow profile.

2. Wing profiles vary with span in the outer part to equilize all moments in flight to give a smooth hands-off stability in all maneuvers.

3. Adjustable "cabin" along the X-axis so as to always fly at optimum center of gravity.

IN MEMORY OF JERRY BLUMENTHAL

In October we lost one of our more prolific flying wing concept designers, **Jerry Blumenthal**. He had been at the forefront of our group for a number of years, putting forth numerous designs he believed would produce a viable flying wing aircraft. With each new design and the resulting critiques, he came up with even better refinements, the culmination being his last design, Rattler.

Jerry had an interesting career after graduating from commercial art school in 1949.

Model design engineer for Comet Model Hobbycraft, Inc., Chicago, from 1950-56. He ended up as head of the design department. Designed free flight scale and semi-scale balsa models and plastic injection molded scale model kits, including all ink plan work and illustrations.

Model design engineer for Monogram Models, Inc., Chicago, from 1956-58. Designed molded plastic kits.

Convair/General Dynamics, San Diego, from 1958-89. Started as engineering illustrator and model builder in pre-design model shop. Transferred to the wind tunnel design group designing wind tunnel models. Supervised the display shop making all manner of scientific and pre-design models, as well as, radiographic reflectivity models.

After retirement in 1989, he worked on a number of different projects, both for himself and for others, such as, Peck Polymers doing what he did best, illustration drawings and building plans. The latter included a full set of scale plans for the "Lil Dogie" sailplane for the Torrey Pines Scale Soaring Society's scale championships.

On the following page we offer a collage of Jerry's more prominent, and in some cases unusual, designs. (The April 1991 Newsletter includes a centerfold of many more of Jerry's concepts of what flying wings might look like.)

We will all miss Jerry, who very rarely missed a Saturday gathering, and his unique approach to designing a high performance flying wing that everyone could enjoy. Hopefully, Jerry has found the ultimate drawing board and will be inspired to find the final solution to the age old problem of the "best flying wing."

LETTERS TO THE EDITOR

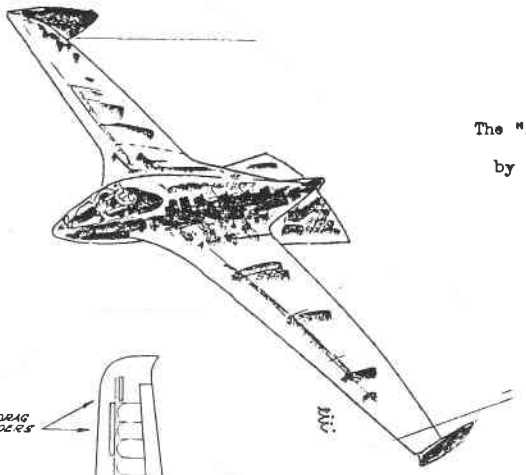
10/13/93

TWITT:

Circular wings and the Custer Channel Wing might have some practical potentials as indicated in two publications that are quoted from in the enclosure. **(cont. on p. 4)**

BELOW: Some of the designs and control concepts developed by Jerry Blumenthal during the period of 1989-1993.

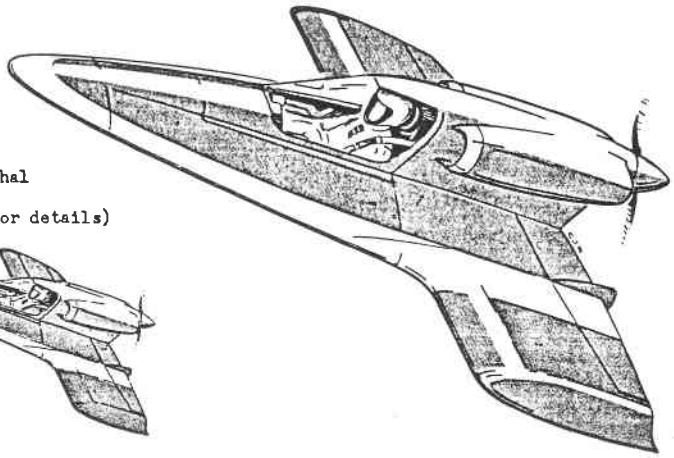
If you find any of his work intriquing, we know he would have liked you to use the ideas in any design and development work you desire.

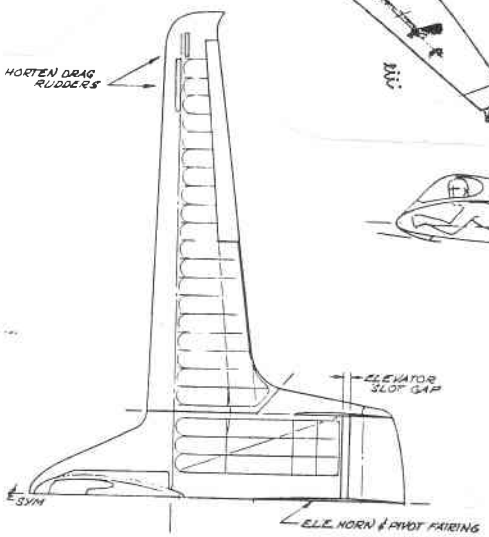


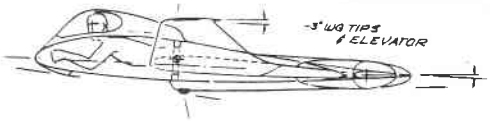
The "RASPBERRY"

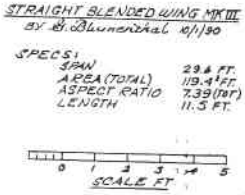
by Jerry Blumenthal

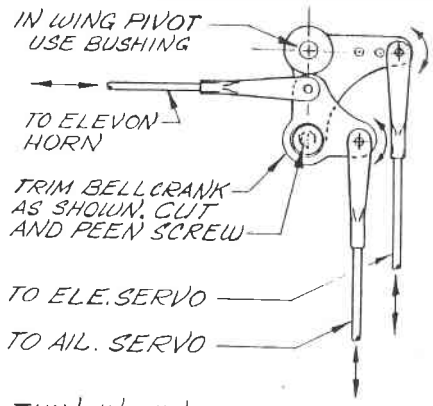
(See inside for details)







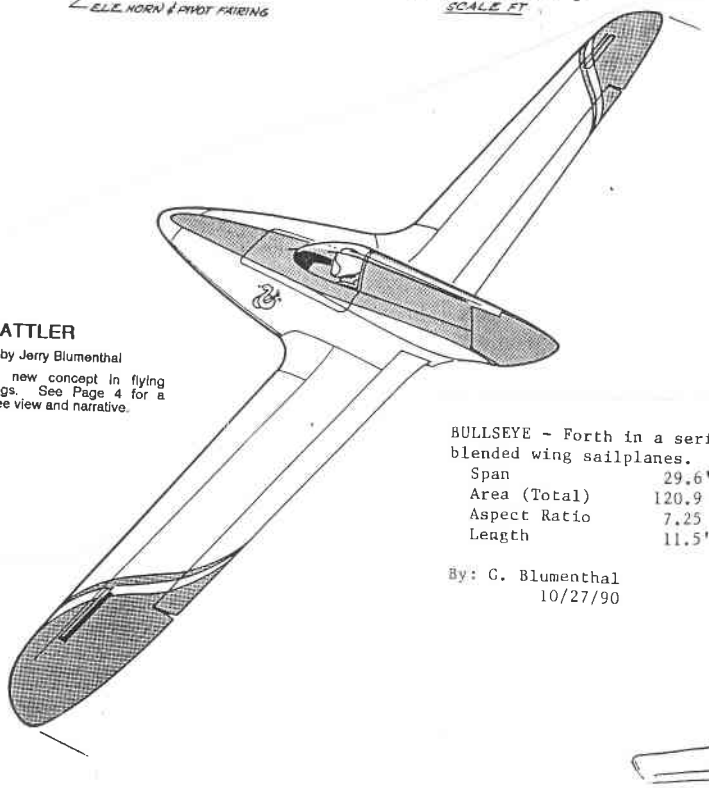




THIN IN-WING MIXER

USE DU-BRO BELLCRANKS & BUSHINGS. ONE UNIT IN EACH WING. MOUNT FIRM

This mixer was designed by Jerry Blumenthal for the combined elevator/aileron system on his scale model of the Rattler. It was designed to be slim so it would fit inside the airfoil just in front of the control surface. This was necessary since the interior of the fuselage would make it difficult to place a conventional mixer.



RATTLER

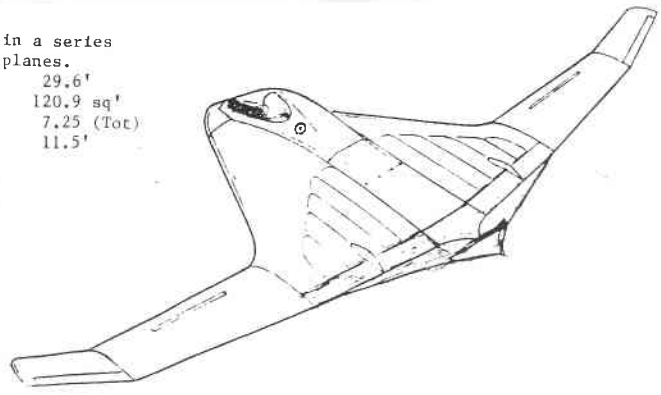
by Jerry Blumenthal

A new concept in flying wings. See Page 4 for a three view and narrative.

BULLSEYE - Forth in a series blended wing sailplanes.

Span	29.6'
Area (Total)	120.9 sq'
Aspect Ratio	7.25 (Tot)
Length	11.5'

By: G. Blumenthal
10/27/90



(cont. from p. 2)

Circular wings might make sturdy, portable, compact, low and slow, fun hillside/skilift type gliders; foot or tow launch type and, they and the Custer Channel Wing might be good as sturdy fun, short hop human powered aircraft, no (figure eight) prizes needed.

I wonder if any of the circular type wings that are mentioned in the two publications have been tested in glider configurations (in addition to the glider models tested by Lee and Richards), and also could the Custer Channel Wing be flown as a glider or does it need a prop?

These thoughts for your editorial opinion and consideration.

Thank you,

Edwin G. Sward
47 Beaver Street
Worcester, MA 01603

(Included with the above letter was the following:)

Incredible Flying Machines, by Michael F. Jerram, pp. 68-69. Englishman G.J.A. Kitchens of Lancaster patented a circular or annular wing and sold the rights to Cedric Lee. Lee and his engineer Tilghman Richards continued to experiment with gliders and with wind tunnel test models at the National Physical Laboratory and soon discovered that the circular wing had some very desirable properties. It continued to provide lift at extreme angles of incidence and had a gentle stall. Furthermore, a round wing could have a span or diameter less than half that of a conventional surface of the same lifting area. Doctor Cloyd Snyder (Arup) began to experiment with heel shaped model aircraft wings and like Lee and Richards before him discovered that circular and semi-circular wing sections possessed interesting properties. Not only did his models remain stable at extreme angles of attack, but they could even be made to pitch end-over-end and recover in level flight.

Unconventional Aircraft, by Peter M. Bowers, 1st Ed., pp. 91-95, refers to the Half-Round Farman 1020 of 1934 (France), the American Nemuth parasol of 1934, and the Arup Flying Wings. The American Vought V-173 of 1942; Charles H. Zimmerman had built successful flying models of it in the mid 1930s.

Custer Channel Wing (1942-53), pp. 105-108. The extra lift from the channels which existed even at zero airspeed allowed the overall wing to have a notably reduced stall speed. The CCW-2 faced into a slight breeze actually lifted off the ground restrained only by tiedown ropes. This flew unquestionably on the lift of its channel alone. The CCW-5, July 13, 1953; the effectiveness of the channel concept was considerably diluted by the presence of conventional wing panels outboard. This combination wing put on a spectacular demonstration os slow speed flight and maneuverability.

(ed. note: We would like to thank Ed for some interesting material to think about. This is the first time I can recall anyone putting forth the question of using circular type wings in a flying wing application. If any of you have thoughts about the practability of this concept, please write us with your comments, both good or bad.)

10/11/93

TWITT:

My check for 2 years subscription renewal is enclosed.

Are you keeping up with Jim Marske's new near-wing sailplane? John Roncz is working with him.

Peter King

(ed. note: The only information we have is "what we read in the newspapers." Just joking. We did run across the following item in Sailplane Builder, October 1993, Volume XII, No. 10, p. 9.)

"Jim Marske then gave us some good insights into the design process going into his new high-performance sailplane, Genesis I, under development in his new Marion, OH plant. John Roncz, of airfoil fame, is his consultant on the project. This was our first real look at the design, which is a departure for Jim: it's a near-wing, with a very short fuselage and a relatively small horizontal "trimmer" stabilizer mounted in the T configuration on a swept vertical fin. Even without this tailplane the ship will still fly at 60 mph. The carbon spar wing has five different sections, with surfaces laid up from new T77 S-glass. Wing loading varies from 5.5 lbs/sg ft to 9 lbs (with water). Projected price in kit form is $21,000. This machine is designed to be an all-out performer to establish the new company, but Jim suggests that once this kit is well into production he'll turn to simpler designs more within our reach, including another look at the venerable Monarch which so impressed us with its flight during the Workshop."

8/2/93

TWITT:

I thought the members might be interested in some of the following information.

Execuform, P.O. Box 7853, Laguna Niguel, CA 92607-2146, have a catalog of plastic Northrop N-1M, XP-56, XB-35 and YRB-49A, as well as, other odd airplanes.

Boomerang Publishers, 6164 West 83rd Way, Arvada, CO 80003, has a 23 minute VHS video, in color, of the YB-49 Northrop Flying Wing (catalog #BP 117).

(ed. note: Sorry it took so long to get this info published, but your letter got lost in my stack of "stuff" for the newsletter. There maybe members interested in obtaining the plastic models for their collection, and the video might be worth it, depending on the price. I wonder if the First Flights material we offer at $8 is basically the same footage.?)

9/23/93

TWITT:

We here at Higher Planes, Inc., are excited to learn of your organization. In enclose our company check for enrolling our company as a member. We look forward to your newsletters.

We are flying and manufacturing the A-10 and T-10 Mitchell Wings every day here. I enclose an advertising flyer on our A-10. Our company has built and sold 10 flying wing aircraft in the last 1 1/2 years and are gearing up for more expanded production.

Eager to learn more of TWITT.

Thanks,

Higher Planes, Inc.

(ed. note: Welcome to TWITT. I am sure some of our members would be glad to learn of a company currently producing Mitchell Wings. We have published your A-10 flyer on the following page, and will add an on-going advertisement in the back portion next month. We are always glad to help promote the expansion of flying wings into the "real world" of powered and sailplane operations.)

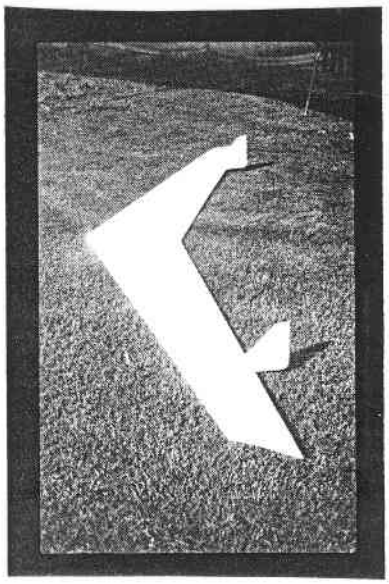
9/13/93

TWITT:

I would like to become a member of TWITT, even though I have never flown or even seen a flying wing. I enjoyed a series on the history of Horten wings, about 2 years ago in a UK model magazine, and I am in the process of getting an R/C model wing (the Fantasque). I fly a variety of conventional gliders both unpowered and electric in a number of fairly challenging sites in mountains around Geneva. I am aware there are interesting "wing" developments in Switzerland and Germany, but unfortunately have not yet made contact with these flyers. I subscribe to Silent Flight and RCSD, where I saw your ad.

I enclose $21: $15 for membership plus 12 back issue, plus $6 air postage for the bundle (the information package and newsletters).

Should air postage be more than $6, please bill me. For future issues of the newsletter, surface postage will suffice, but please let me know if there are better options on postage.



Thanking you in advance,

Greg Goldstein
21 Petite Garenne
1214 Vernier Geneva
Switzerland

(ed. note: I would like to welcome you to TWITT and hope that you find the information interesting and useful.

I am not sure if you have been sent, or received, the back issues and info pack requested. If you haven't gotten them yet, please let us know. There will be some extra postage and membership fees due, since the information from RCSD is somewhat dated. Foreign membership is $22, and postage for the 12 issues is an additional $5. So we do need an additional $14 to bring you up-to-date.

Since you received this newsletter, you can see we have started your membership, and I hope the back issues are, or will be, on their way shortly.

We printed your address so that some of our members in Germany and Austria will know how to get a hold of you.

We have also included a picture of the Fantasque so others will know what type of aircraft you will be building this winter. The September newsletter carried a brief description of the plane and how to get a hold of the distributor.)

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Mitchell Wing

DR. REIMAR HORTEN
SOME PERSONAL RECOLLECTIONS
AND A HISTORIC PERSPECTIVE

The following two essays represent different experiences over the years between these two gentlemen and Dr. Horten. We hope you enjoy their recollections.

FROM KARL SANDERS

I am happy to respond to your phone request for a brief summary of my association with Dr. Reimar Horten in Argentina, where he recently died. I met him first in June 1948 when I arrived in Cordoba - about a month after Horten - to take up my job as engineer with the FMA. And guess where in particular: in a hospital where he was recovering from a mild case of jaundice from excess consumption of whipped cream loaded cakes and other sumptuous foods which our shriveled post-war stomachs refused.

A few co-workers took me there to visit and introduce me to him. There, between naps and taking bitter fluids, he defined the wing geometry and sections for his upcoming tailless sailplane design the IA-34. With astonishment I thumbed through his 3" thick Horten-section "systematic" - probably already dating back years- which listing ordinates and aerodynamic properties at various stations for his typical family of swept wing/curved-TE planforms. Horten then said: "You're the right guy to work with me," and so my first assignment was indeed just that. Horten designed many sailplanes and at least one Delta wing hang glider which were built in the shops of soaring clubs.

In the early 50s Horten got his own design bureau within the FMA to study and WT.-test the merits of new configurations, but I was not part of it. Nevertheless, we had a daily contact and I learned many things during my association with this extraordinary man. In 1956 I worked again with him on his supersonic IA-37 Delta wing fighter design of which only a catapult-launched free-flying scale model and a full-scale experimental plywood glider were built and extensively tested. *(See 3-view on following page, which was found in a series of papers in the TWITT library.)* His greatest creation was the IA-38, a large 4-engine cargo prototype which suffered a procrastinated development (initiated 1950, first flight and canceled 1960). In December 1956, I came to the United States. The last time I saw Dr. Horten was in 1966 during a visit to Argentina.

FROM PHILLIP BURGERS

Dr. Horten and the F-117

In this article we will remember Dr. Reimar Horten, which is not a difficult thing to do. The reason for this comes from the large amount of work he did in the aerospace world. This time, we are going to recall some of his less well known findings in aerodynamics.

We relate Dr. Horten's efforts to flying wings and never to an F-16 or F-117. However, back in 1953 he and Dr. Karl Nickel designed an aircraft that at low speeds and high angles of attack would perform in the same way as the wing of an F-117 does today. The aerodynamics of low aspect ratio wings at this low end of the flight envelope is a little more complex than the classic Bernoulli's theory of explaining lift.

In order to find out how Dr. Horten was one of the first men in the history of aviation to get acquainted with this new essential way of creating lifts, lets go to the last days of November 1944 to find out.

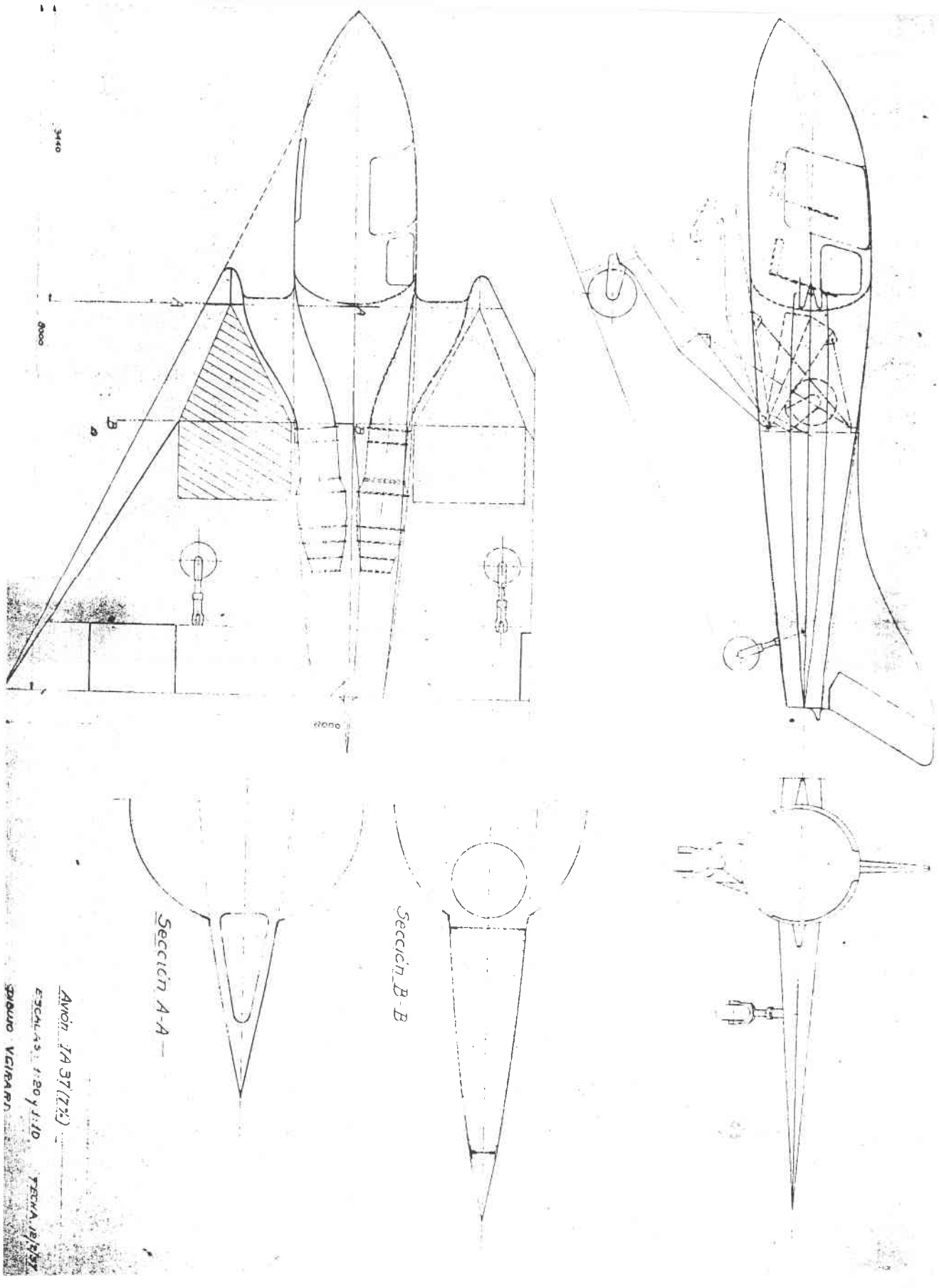
At that time, Dr. Horten was test flying the highly swept (60°) winged H-XIII when he decided to find out the stall characteristics of his new design. Surprisingly, the flying wing would not stall at the expected speed. It would keep flying at lower speeds than of the predicted stall speed!! Completely puzzled, Dr. Horten placed the probe of a stethoscope in contact with the inside of the skin around the midwing and listened to a never heard, curious cyclic sound that he immediately identified as vortex shedding from the leading edge of the flying wing. This pair of vortices, each vortex placed above each wing, created a very low pressure zone that "sucked" the wing upwards giving it extra lift at speeds lower than the theoretically predicted stall speed.

Coming back to 1953, he and Dr. Nickel designed the I.Ae. 37-P in Argentina. *(See 3-view on page 9. Notice there are differences between the two versions, with this one carrying the P - Prototype suffix.)* This aircraft had a delta wing planform with a sharp leading edge sweep of 63.4° and an aspect ration of 2:1. This prototype configuration was defined by Horten and Nickel and tested in a wind tunnel. This historical information, describing in detail the vortex patterns and behavior at different angles of attack (going way up to 30°) was published in 1955 in Argentina in the form of a report authored jointly by DeKrasinski and Conti. A future article, describing details about the results published in this report can be written in a future TWITT Newsletter (with the participation of Karl Nickel?).

Many years later, Northrop "reinvented" the vortex enhanced lift phenomena by accident. They found that by adding a fairing for a leading edge slat actuator of a well known low aspect ratio wing aircraft the fairing acted as a highly swept wing and started shedding vortices that increased the lift capability at low speeds and high angles of attack.

Another large effort in understanding vortex enhanced lift in low aspect ratio wings was done in England. This effort is largely credited to Kuchemann. **(cont. on p. 8)**

BELOW: The Horten I.A. 37 delta wing, circa 1937. Taken from a series of drawings currently in the TWITT library, probably donated by Bruce Carmichael.



(cont. from p. 6)

As we see, Dr. Horten has been opening new doors for us throughout his life and motivating people who would listen to him to do the same. Thank you Dr. Horten for all the exciting information that you have "yanked" from nature with some much hard work and given to us.

FROM PETER SELINGER

UNIQUE LIFES FOR FLYING WINGS

Dr. Reimar Horten 1915-1993
Walter Horten, 80 years old

(Permission has been granted by Peter F. Selinger to reprint this copyrighted material. All rights, including any partial usage are reserved.)

***August** 14, 1993, a heart attack finished the life of Dr. Reimar Horten and his life-long efforts for the pure wing, to design the real flying wing without fuselage and tail. This day, not only the family lost the husband and father in his second chosen home in Argentina, but also an again increasing number of friends of his flying wings, now never ended work from over more than 60 years.*

Great Honor From Great Britain

***With** a letter dated August 16, the Royal Aeronautical Society of Great Britain awarded Dr. Reimar Horten their highest decoration, the **"British Gold Medal for Outstanding Achievements in Aeronautics"**, as the second German overall, and after Dr. Hugo Eckener, the famous commander of the Zeppelin airships. But on this day, nobody in Europe knew anything about the death of Dr. Horten. It is with much regret that Dr. Horten shouldn't live to receive this late honor. This very great honor is more impressive in that the board decided unanimously. After the war, Dr. Horten longed for a chance to continue his development work on flying wings, especially in Great Britain, but sadly there was no possibility. Now this would have made him very happy.*

Pure Wing, No Fuselage and No Tail

***From** the earliest days they built sailplane models, Reimar and his elder brother Walter achieved success with the airplane without any disturbing additions. The wing itself must encompass everything other designers put into fuselages and tails. In addition to the self-evident lift, the wing had to ensure and give flight stability around all three axies, space for the payload, including pilot and passengers, and the power plant to meet the aim of the Junkers' ideal.*

In their parent's flat in Bonn am Rhein in 1933/34, they built the Horten I, a swept high tapered single-seated sailplane. To honor, the even well-known in those years, Alexander Lippisch, they gave it the name D-Hangwind (that means slope-lift), because Lippisch had the nick-name Hangwind, reverently donated by the old Rhön pilots.

This turned into a typical beginning for all of the following 27 years of active designing of flying wings until 1960. After the end of the 1934 Rhön competition they couldn't find a way to get the Horten I back to Bonn, so they had to burn it on the Wasserkuppe. With each success in the coming 26 years, may it be ever so small, they had to pay with lots of difficulties; very hard difficulties.

Horten II - Basis of all Horten Flying Wings

***However**, Reimar and Walter collected so much experience during construction, evaluation and flight tests that they planned to convert all these results in the Horten II. During the test flights they developed the drag-side-rudder, similar to an airbrake, to be later found in different constructions in all other Horten flying wing designs. They had to flight test the Horten I for many months. Numerous changes in controls and construction of the ailerons had to be made until finally they finally found sufficient aileron efficiency in the fixed wingtip. With the resulting leap in geometric washout between the aileron and wingtip, they needed to control the yaw forces to improve the handling characteristics. A recalculation of the lift distribution according to Schrenk, with the new method of Alexander Lippisch's, resulted in a correct way of calculation. But they were still missing lift in the center section of the wing. It wasn't until later they found that the so called "middle effect" resulted from not having the correct method of calculation at the time to correct the lift distribution of swept wings.*

As with the Horten I, the Horten II (D-Habicht) got such a thick wing that nothing except the undercarriage (skid) would be outside the pure contour of the wing. The Horten I, and some later other types, only had a small drop shaped canopy for the pilot's head on the upper side of the wing so as not to influence the airstream. This thick wing, compared with the then usual sailplanes, lead to what was at the time the unusual pilot-supine position that is now most common in the modern fiber reinforced plastic sailplanes.

The Horten brothers thought the this middle effect (less lift in the center section) had been created by the small drop shaped canopy for the pilot. Therefore, the Horten II got a thicker wing (.7m!) so the pilot would have enough space within the wing itself.

By the way, the Horten II became a push-propelled motorglider, which we could imagine very well even today. Later, the Horten IIIe got a folding propeller to increase the soaring capability and performance. ***(cont. on p. 10)***

BELOW: The I.Ae. 37-P delta wing jet interceptor, circa 1953.

Provided by Pillip Burgers from his collection of material obtained from Dr. Horten.