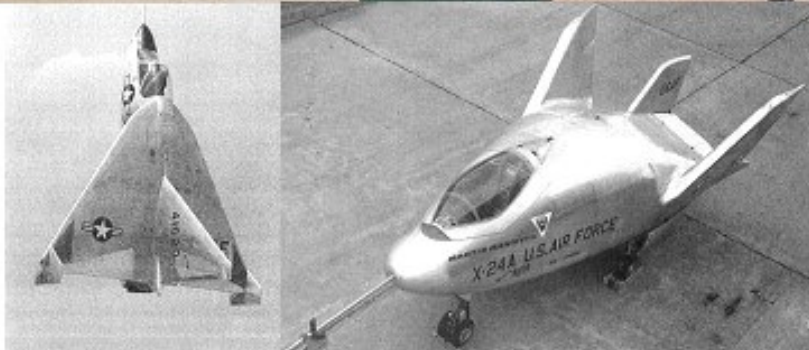
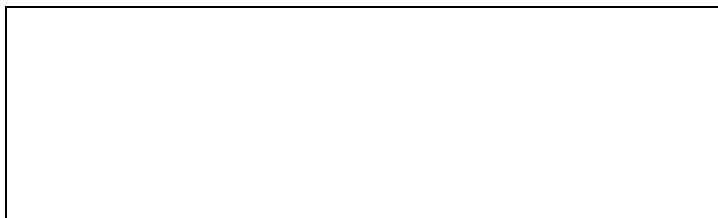


**T.W.I.T.T. NEWSLETTER**

Historical look at tailless aircraft. From top left going clockwise: Convair's XF-92 delta wing prototype; Space Shuttle Columbia; Martin Marietta X-24A lifting body, and; Ryan X-13 Vertijet. These were examples of the progress of flying wings and tailless aircraft presented by Martin Hollmann, our March speaker. For more see the recap inside.

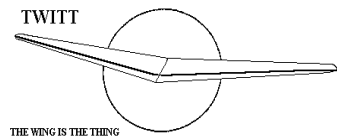
**T.W.I.T.T.**

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., 0604 means this is your last issue unless renewed.

**Next TWITT meeting: Saturday, May 20, 2006, 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.

**T.W.I.T.T. Officers:**

- President: Andy Kecskes (619) 589-1898**
- Secretary:**
- Treasurer: Bob Fronius (619) 447-0460**
- Editor: Andy Kecskes**
- Archivist: Gavin Slater**

The **T.W.I.T.T.** office is located at:  
 Hanger A-4, Gillespie Field, El Cajon, California.  
 Mailing address: P.O. Box 20430  
 El Cajon, CA 92021

- (619) 596-2518 (Hanger-No answer call evening number)**
- (619) 447-0460 (Evenings – Pacific Time)**
- E-Mail: [twitt@pobox.com](mailto:twitt@pobox.com)**
- Internet: <http://www.twitt.org>**
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Meetings are held on the third Saturday of every other month (beginning with January), at 1:30 PM, at Hanger A-4, Gillespie Field, El Cajon, California (first row of hangers on the south end of Joe Crosson Drive (#1720), east side of Gillespie or Skid Row for those flying in).

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**PRESIDENT'S CORNER**

**A**s I noted to those present at the last meeting, I was rather disappointed at the turnout, especially when we had a program featuring a speaker who had to come a long way to give his presentation. I apologized to Martin for the dismal showing and fully understand why he gave us a shortened version so he could catch a flight home that afternoon. I couldn't even blame the weather since it turned out to be a beautiful day with no rain.

I have had a chance to do some work on the website, so if you haven't visited it lately you can go to the Member's Project link, click on the Bob Hoey button under Birds, then the Letter Exchange link and drill down to the Raven link. Or you can just click on the home page picture and go directly to the letters page. I have added pictures of Bob's variable geometry model that he presented at the ESA Western Workshop last year.

One of our founding fathers, Bob Fronius, 90, has had some aging problems over the past several weeks that landed him in the hospital for a short stay. He was eventually moved to a convalescent hospital for additional care and physical therapy. I am happy to report he is doing well and expects to be released to go home in the coming weeks. If anyone would like to send get well cards send them to the TWITT PO Box address, or you can give him a call at 619-447-0460 probably after April 10<sup>th</sup>.

I heard from Thomas Bircher last week with some new pictures and information on the LEA project, but just didn't have any room to include them in this issue.

This is good since I now have some material for next month, but bad since you will have to wait to see it. There were also a couple of other letters I won't be able to get to next month, so I apologize to their authors for the delay in passing the information along to the members.

*Andy*



**MAY 20, 2006  
PROGRAM**

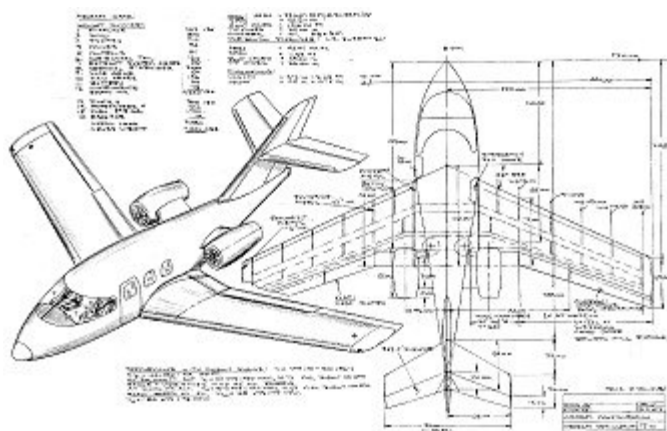
As what seems usual we don't have a program lined up yet for May, but I am working on getting one together we had expected late last year. The speaker had an accident that prevented him giving his presentation, so I am now hopeful he is well enough. If I learn more before the next newsletter I will add an icon to the website with the announcement.

**MARCH 18, 2006  
MEETING RECAP**

At the usual starting time we only had four people present to hear the presentation by Martin Hollmann so we delayed until 2 PM to see if a few more of the usuals would arrive. However, there were no late arrivals so Martin gave us an abbreviated version of the talk so he could make a flight back to Monterey that afternoon and not have to stay over night.

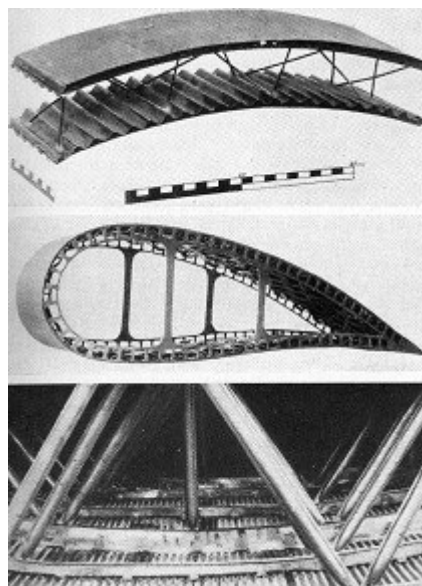
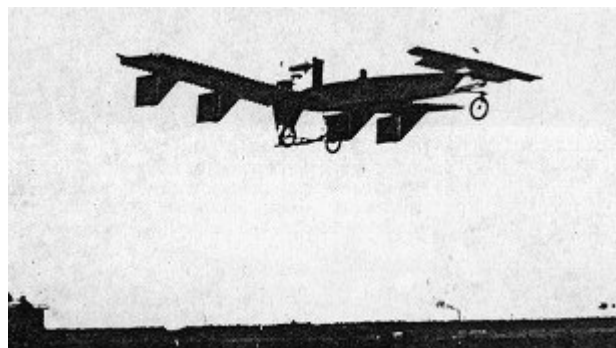
Martin's first slide included a drawing of his AeroSpace 1 entry into the commercial space travel market that has been sparked by the StarShip One's successful flights. It also had a memorial photo of Dick Reichel who had passed away a couple of weeks ago.

Dick was a sailplane pilot and owned a Lancair 360, and had attended the ESA workshops at Tehachapi over the years. He also had a note on the invention of aluminum by Friedrich Wohler in 1827, which he would talk more about later.



He moved on to talk some about Hugo Junkers who probably did more for the early development of metal aircraft than any one in his time. One of the first was a canard design he built out of steel in 1911. The J-1 was his next aircraft (again in steel) and it had a

very thick airfoil as can be seen from the picture. In 1919 he built the F-13, which was the first all aluminum aircraft and also the first commercial transport that could carry 6-10 people. He noted that Junkers had over a 1,000 patents with 183 of them related to aluminum airplanes. Dominique noted the introduction of cantilever wings even at this early stage of aircraft development.



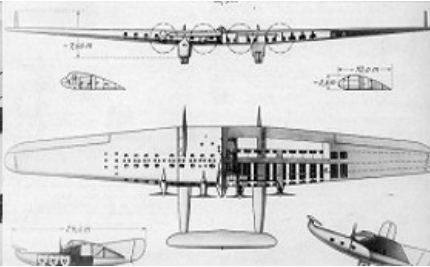
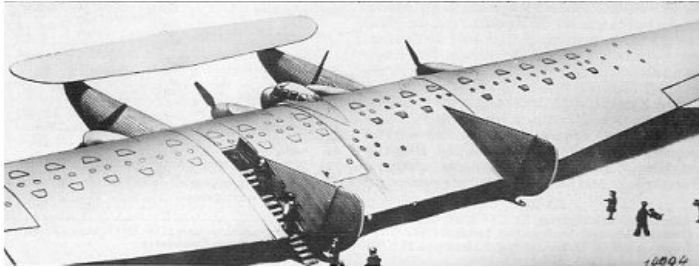
Junkers liked flying wings and had proposed a large canard aircraft that could carry 80,000 lbs in 1924 that was designed the J 1000 to Henry Ford. Ford commented that there was no future in aviation and declined the offer. A year later Ford bought the Stroud Aircraft Company and says there is a big future in aviation they will build the best aircraft. As it turned out Ford actually copied a Junkers design, was sued by Junkers and eventually lost in the courts.

Martin moved onto Alexander Lippisch who became the father of the delta wing design. Lippisch started out with the Storch design series, then progressed into tailless and delta types. His philosophy was to design, build test models, move up to gliders and then finally a powered version of the aircraft. A good example was the 1929 Storch that

started as a glider and then had an 8 hp motor attached to become the first powered glider. In 1932 Hermann Koehl funded the Lippisch Delta II and, in 1935 introduced the DFS 39. The Delta IV was very successful and was flown by the noted pilot Heini Dittmar.

the control cables were too heavy and had too much friction which made the aircraft unstable. The aircraft flew well after the installation of lighter cabling.

The swept wing design found on the jets developed in the early 1940's were derived from those of flying wings. The Me P.1101 swept wing introduced in 1944 provided the basis for most of the fighter wings that followed. This can be seen in the diagram on page 5. The Me 262 was actually used on the F-86 Sabre jet in 1948. All these wings leading edge slats (mechanical, retracting) so that the tips wouldn't stall first.

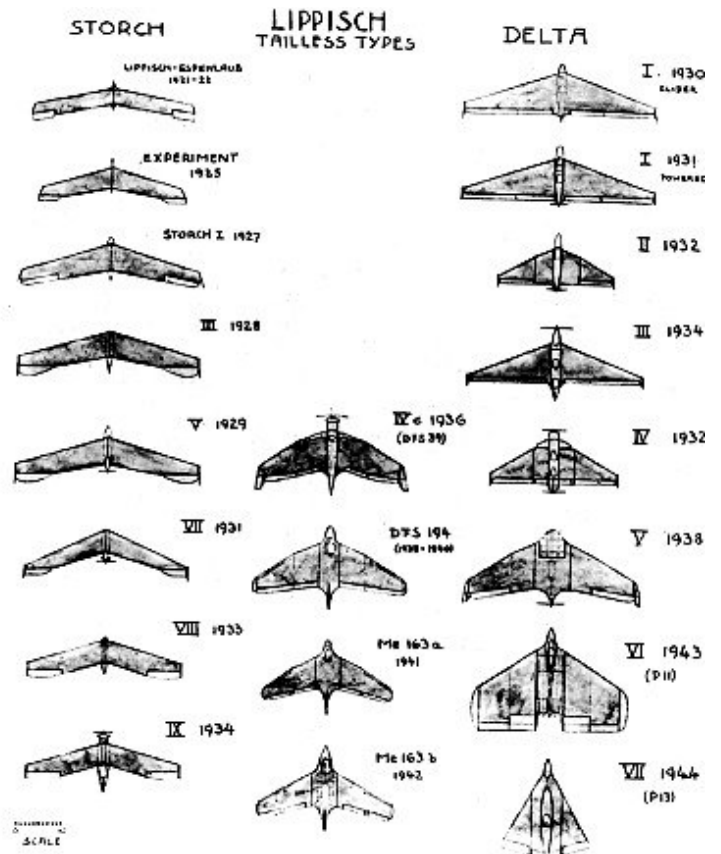


ABOVE: Junkers J 1000

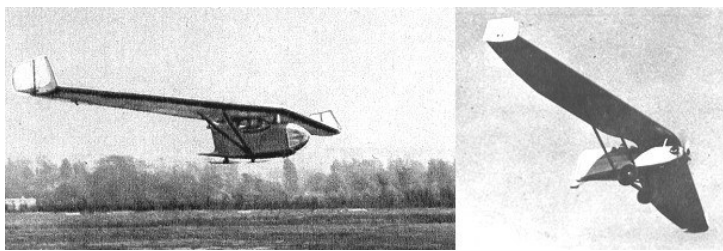


In the early 1940's, Lippisch (*above*) introduced the DFS 194 that was the forerunner to the Me 163. The 194 used leading edge slats and, had flaps and elevons. Dittmar achieves 627 mph with it in October 1941 using a HWK 509B rocket engine producing 3,310 pounds of thrust. The Me 163 could reach an altitude of 39,370' in 2.5 minutes at a speed of 702 mph and, was the first rocket interceptor to enter battle.

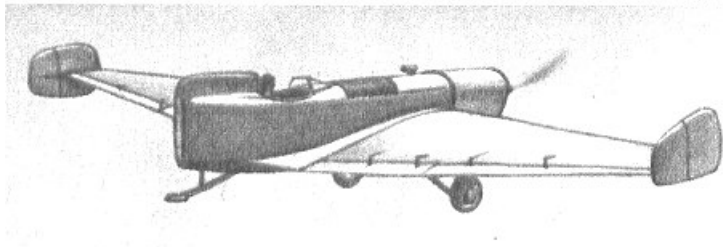
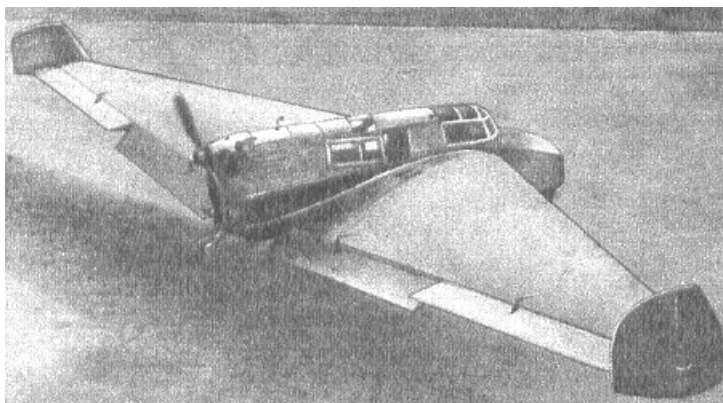
The Junkers Ju 263 was a follow-on to the Me 163 and it was upgraded from having a landing skid to permanently mounted retractable wheels. This all led to the Me 263 that reached speeds of 620 mph during flight tests in 1944. The Me 263 was the forerunner for Northrop's X-4 that first flew in December 1948 and which eventually reached a speed of 0.90 Mach or about 630 mph. The initial test flights discovered that



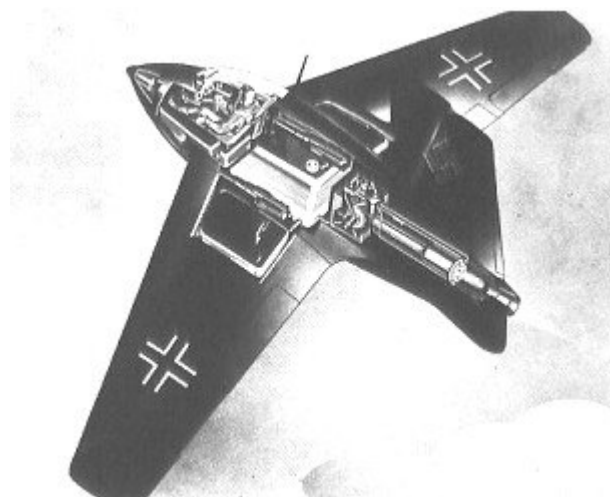
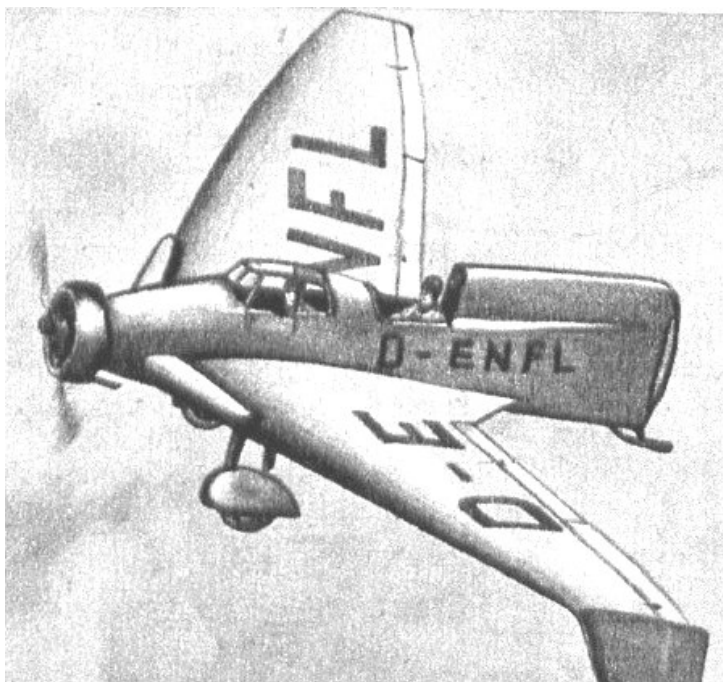
Martin went through a series of slides that covered more conventional early jet fighter designs like the Multhopp P-138 that sort of became the model for the Mig 15 as German and Russian engineers worked together after the war. In the US, we started with the Bell XP-59A in 1942, moved to the Lockheed P-80 in 1944 and, then the North American F-86 that originated with a straight wing but was eventually "Germanized" with the now famous swept wing in 1945.



**ABOVE:** Lippisch Storch. **BELOW:** Lippisch DFS 39.



**BELOW:** Lippisch Delta IV.



**ABOVE:** Me 163.



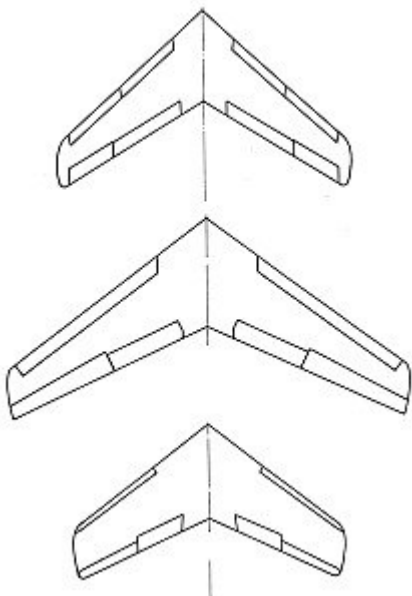
**ABOVE:** Me 263. **BELOW:** Northrop X-4.



At this point, Martin moved on to some talk about the Horten brothers. He started with the Horten Ho 1 that first flew in 1934. Walter and Reimar worked very similar to Lippisch by first building models, moving to glider versions and then finally adding the necessary power plant. They were true homebuilders as shown in the picture of their Ho 2 "Habicht" (rear aircraft in picture on following page – Ho 5 is front aircraft) built in their home in 1935 and was powered by a Hirth M-60.

The Ho 7 was another upgrade as a twin-engine pusher.

surface of the wing. He finds vortices that are enhancing the lift, which was a first.

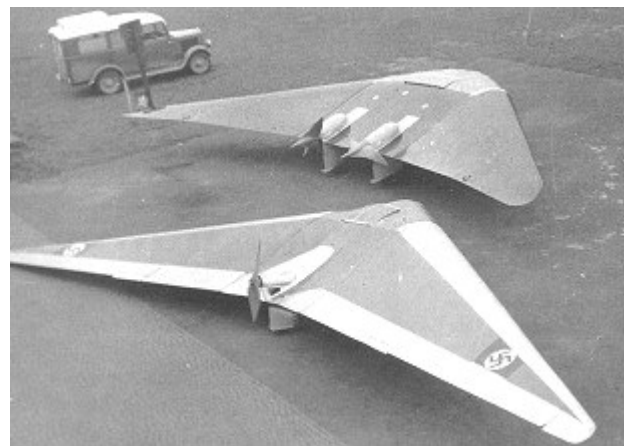


Me P-1101 wing,  
1944, sweep  
40°, thickness  
12-8%, 635  
mph.

F-86 Sabre,  
1948, 35°, 12-  
11%, 630 mph.

Douglas D-558,  
1948, Skyrocket,  
35°, 12-10%,  
1,335 mph.

The Ho 9 powered by two Jumo 004 engines is probably one of the best known of the Horten designs. An engine flame-out did cause a crash in September of 1945 that killed pilot Erwin Ziller. *(ed. – From a novice standpoint it seems strange that an aircraft with nearly center-line thrust having a controllability problem with an engine out.)* The Ho 9c followed but had a vertical stabilizer and a cockpit buried in the vertical very similar to the DM-1 design by Lippisch. Martin



**ABOVE:** Horten Ho 2 “Habicht” – rear aircraft.  
**BELOW:** Wing tip sticking over the dining room table coming from another room in the house.



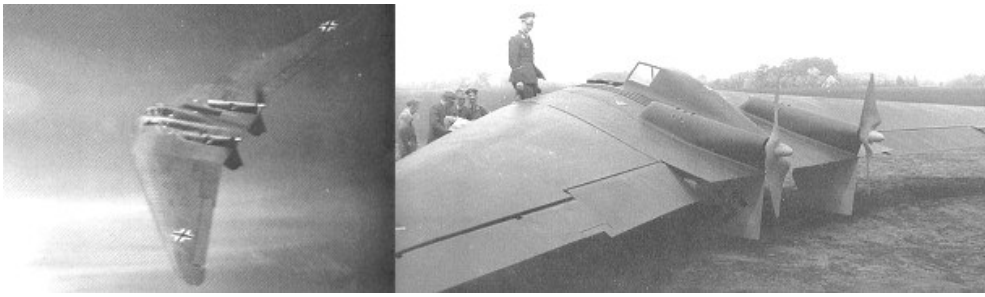
**ABOVE:** Left Reimar Horten, right Walter Horten.

also mentioned the Ho 13 that had extreme taper and swept. Phil Burgers offered up an interesting story about Reimar flying this aircraft and not being able to get it to stall. In order to learn more about this he took a highly specialized aerodynamic instrument, a stethoscope, on a flight and used it probe the inner

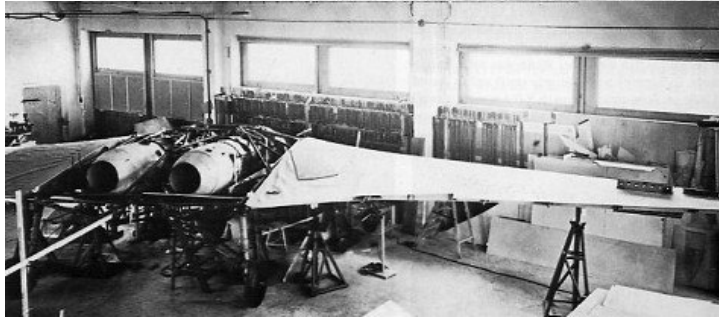
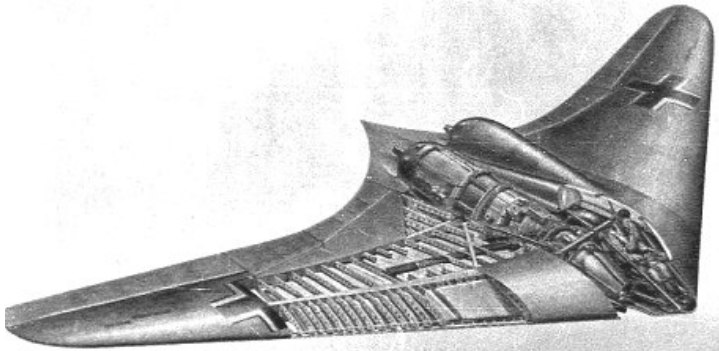


The last of the Horten slides was of the Ho 18 that was powered by the Heinkel-Hirth HeS 011 engine in 1945. He noted that the Muhldorf factory that was used for some construction of these aircraft had an 18 feet thick roof to try and protect it from allied bombing.

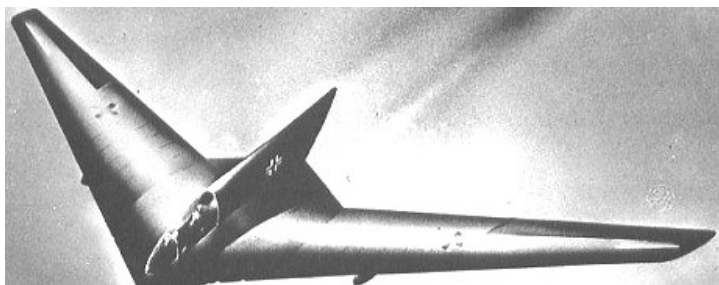
Martin introduced the work of Dr. Ludwig Prandtl whose theories during the period about 1905 were most profound. Some of these included thin airfoils, boundary layers, circulation theory of lift, lifting lines, oblique shock/expansion waves, compressibility effect



**ABOVE:** Horten Ho 5. **BELOW:** Ho 9.



**BELOW:** Horten Ho 9C



and, supersonic nozzles. His legacy also included what he passed along to his students who went on to further advance the science of aerodynamics. One of these was Dr. Theodore von Karman who was a great supporter of flying wings and acted as a sponsor for Lippisch when he immigrated to the US after the war.

The discussion moved on to the Lippisch DM-1 ramjet powered delta wing (top of following page). A plywood mockup was constructed and put in the Langley Field wind tunnel for testing. As you can see

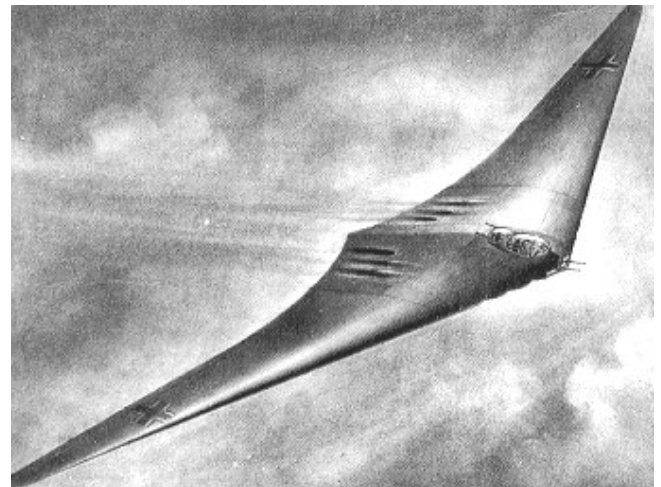
from the picture below the DM-1 was the forerunner of the Convair XF-92 delta wing that later became the F-102 and F-106, which were both successful interceptors.

Moving on, we went through the usual designs of Jack Northrop. These included the N-1M and the YB-49 as the

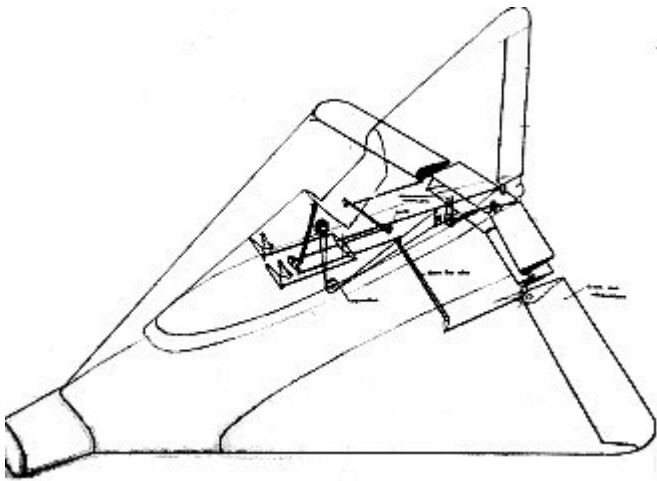
early and late examples of Northrop flying wings. There was a slide shot of a Northrop engineer trying the prone position in the



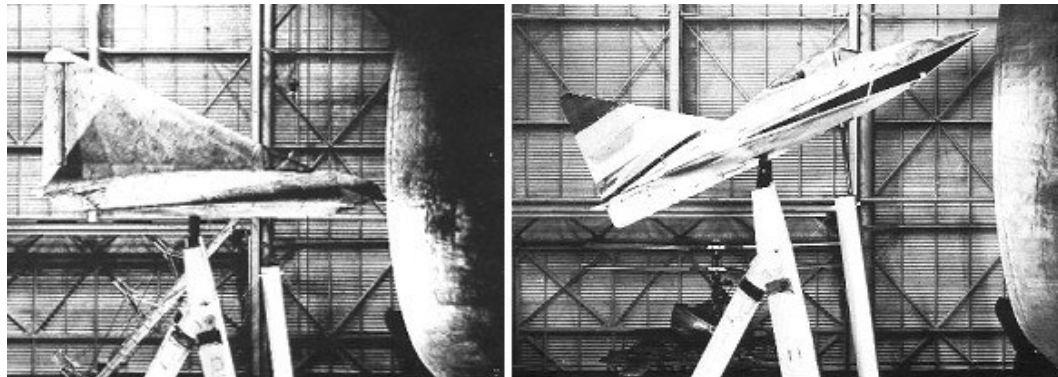
**ABOVE:** Horten Ho 13A. **BELOW:** Ho 18.



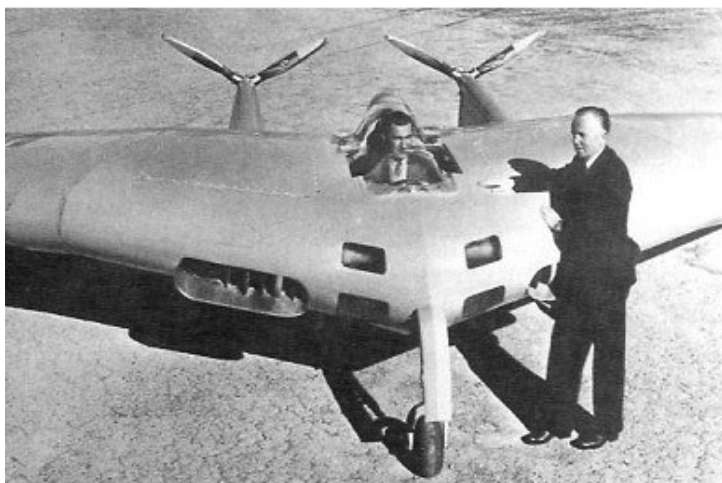
Horten Ho VI, which brought up the question of how much Northrop knew of Horten's designs during development of his flying wing series. Martin indicated that Northrop did have access to Horten material and was aware of what was being done in Germany. There was also the mention of the YB-49's demise due to the politics of the time when the government requested Northrop combine with Consolidated Vultee (Convair) on the B-36 program versus the YB-49. Of course we all know that Northrop told them where to take their proposal and went in his own direction.



**ABOVE:** Lippisch DM 1. **BELOW:** DM 1 at left, XF-92 in wind tunnel at right.



**BELOW:** Jack Northrop and the N-1M.



One slide noted that Glenn Edwards and his crew had perished in the crash of YB-49 in May 1948. This led some to declare the aircraft was difficult to fly and an unstable bombing platform. Andy noted a previous thread on the Nurflugel bulletin board and that he had determined from General Cardenas' statements this was more due to the lack of a stability augmentation



**ABOVE:** Northrop engineer in the Ho VI.

system at the time versus being something inherent in the aircraft.

The last slide in the series was a compilation of other types of tailless aircraft from the era and beyond (on cover). These included the Convair XF-92, Ryan X-13, Martin Marietta X-24A (lifting body) and, the space shuttle Columbia.

Martin closed by giving us some information on the various classes/workshops his firm conducts on an on-going basis. These include aircraft design using finite element methods, hands-on flutter analysis, hands-on composite aircraft builders workshop, and gyroplane design class. For more information on these you can call 831- 649-6212 or go to his website at:

[www.aircraftdesigns.com](http://www.aircraftdesigns.com)

With that our small group broke up and we thanked Martin for coming down and talking to us. Martin indicated he would send those in attendance some CDs that covered Hugo Junkers and Fighter Comparisons. He also gave us a copy of his PowerPoint presentation that was the source for all the images included in the recap.



**LETTERS TO THE EDITOR**

January 17, 2006

I note with dismay the absence of Bruce's name from your masthead. I hope he is just hiding, because he is my only contact. Also enclosed is my renewal.



It is my hope that you will produce some good issues this year, to keep my mind on better things. And in this connection, I will repeat a question I sent you a while ago: Your format deals with wings – will you publish, complete and unabridged my revelation of a new type aircraft, a LOPTER, a four bladed counter-rotating co-axial ultralight craft that takes off as a helicopter and travels and lands as an autogiro, at modest speed and low horsepower (low-fuel) with modest performance – built in – so duffers can handle it safely.

For legal reasons I wish to publish this – a “Statement of Prior Disclosure” and TWITT would be the most appropriate publication, because both it is your field and also membership criticism would be most valuable.

I intend to follow this, soon thereafter, by the design arguments of my version, together with my design and soon thereafter by the demonstration flying of the LOPTER (which I intend to use for personal transport to snow next winter.

Sincerely,

Syd Hall  
Nevada City, CA

*(ed. – Thanks for the renewal. I owed Syd a couple of issues that he should have by now.*

*I don't recall having heard this question before, but am intrigued by the concept. In June 2002 we did publish his concept drawings of another type of ultralight. At this point I don't know why TWITT couldn't publish your statement so we can proceed with the expectation it will happen. In the mean time I will do some research to make sure we are not taking on something outside of our core charter.*

*Since I also publish the ESA quarterly newsletter, this might be a good publication to use since it sounds like a homebuilders type aircraft.)*

March 14, 2006

**O**n page 6 of the T.W.I.T.T Newsletter No. 237 of March 2006 Mister Warren Bean asks:

*‘What was the reasoning behind the bobtail on most Horten designs? Did it contribute to stability in some way?’*

To this question I can give you the answer “straight from Reimar Hortens mouth”

In the fall of 1942 when I started to work for the Horten brothers I once asked Reimar Horten what was

the aerodynamic purpose of the curved trailing edge in the centre part of the Horten H IV (see Figure 1). He then laughed and told me

*“When I first designed the H IV it had a straight trailing edge with a bend in it (see Figure 2). When I showed this outline to my brother Walter he was disappointed and declared that it just didn't look good. He took a curve template (see Figure 3) and did draw a curved line for the centre part of the trailing edge (see Figure 4). After some discussion his idea was adopted. I then smoothed out the curve with a quadratic parabola (see Figure 5). Later on at the design for the H VII even superimposed a cubic parabola to this.*

Many years later I wrote down a “Memorandum” (unpublished) about my time together with the Hortens. On October 16<sup>th</sup> of 1998, I showed the above lines to my wife (she is the sister of the Horten brothers). We never had spoken about this fact before (why should we have?). She exclaimed spontaneously

*“Of course, this rounding at the H IV has been attached because of a better appearance. I remember quite clearly that Reimar and Walter discussed this at length at home, with me present. The final decision was reached alone because of aesthetic grounds with the reasoning “if it does not do any aerodynamic harm then we do it this way”*

Only many years later Reirnar Horten invented as an alibi the “counteracting of the middle effect” and “desweeping the quarter chord line” and published this in the book **Horten/Selinger, Nurflugel** without telling the original grounds.

At this lime I would like to thank you again very much for all the work you did for the flying wings and especially for the information I got from the T.W.I.T.T. NEWSLETTER over the years. You really did and do a great job Thank you again.

Sincerely yours,

Karl Nickel  
Freiburg, Germany

*(ed. – Thank you for the comments in answer to Warren's question. It is always good to hear from you. I have included the drawings on the following page that show the figures Karl refers too in his reply.)*

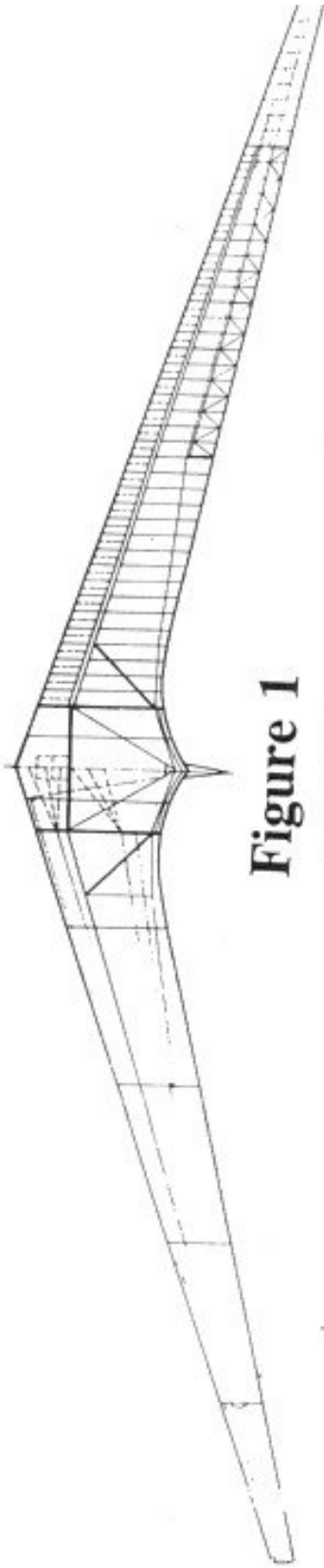


Figure 1

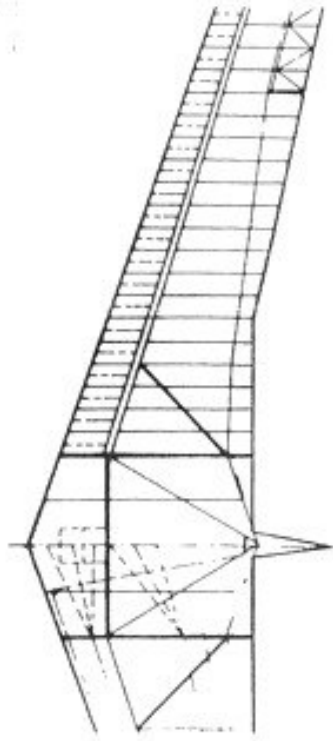


Figure 2

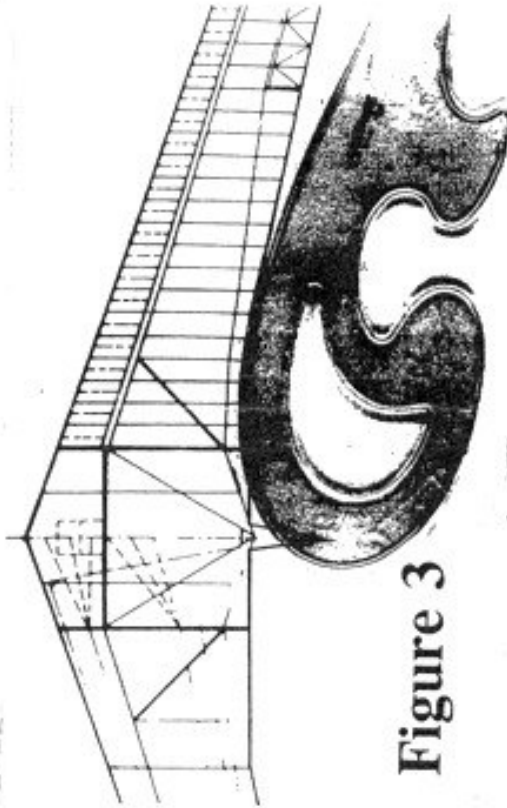


Figure 3



Figure 4

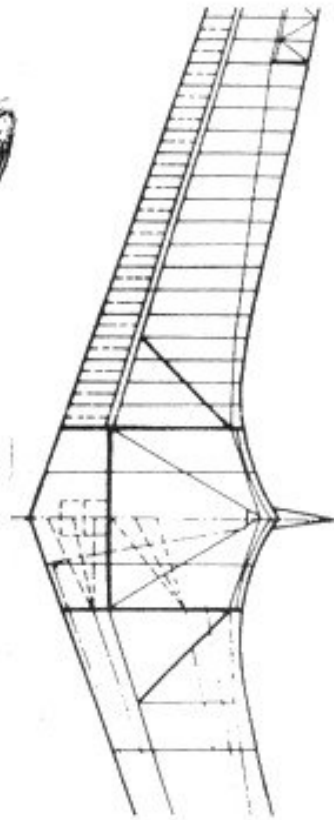


Figure 5

March 27, 2006

I got word that the new edition of Pelican, now named Vampyr, has two under construction in development in the USA. A third one might start soon. I have no idea where.

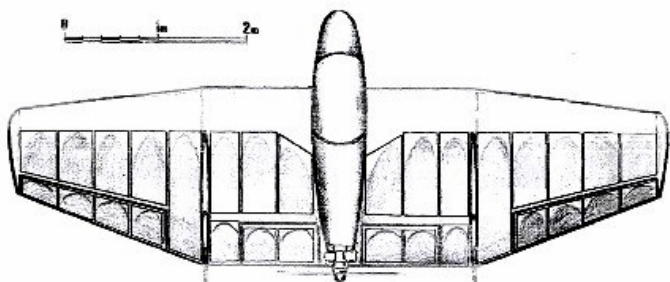
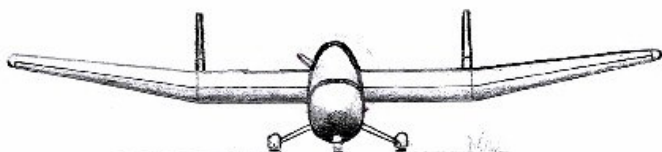
I did send some data about it to TWITT. I hope they can show it soon. The files are too large to be placed in a mail to this group.

Michels email is now obccz@yahoo.fr

Keep that brain spawning wings,

Koen Van de Kerckhove  
<nestofdragons@hotmail.com>

(ed. – Koen included a 3-view of the new aircraft that I have included below. He also sent some of the specifications included to the right. I have added this to the Pelican link on our website if you want to download the picture.)



**AVAILABLE PLANS & REFERENCE MATERIAL**

**Coming Soon: Tailless Aircraft Bibliography Edition 1-g**

**Edition** 1-f, which is sold out, contained over 5600 annotated tailless aircraft and related listings: reports, papers, books, articles, patents, etc. of 1867 - present, listed chronologically and supported by introductory

material, 3 Appendices, and other helpful information. Historical overview. Information on sources, location and acquisition of material. Alphabetical listing of 370 creators of tailless and related aircraft, including dates and configurations. More. Only a limited number printed. Not cross referenced: 342 pages. It was spiral bound in plain black vinyl. By far the largest ever of its kind - a unique source of hardcore information.

But don't despair, Edition 1-g is in the works and will be bigger and better than ever. It will also include a very extensive listing of the relevant U.S. patents, which may be the most comprehensive one ever put together. A publication date has not been set yet, so check back here once in a while.

Prices: To Be Announced

Serge Krauss, Jr.  
3114 Edgehill Road  
Cleveland Hts., OH 44118

skrauss@earthlink.net  
(216) 321-5743

**VAMPYR**

Technical characteristics

Plane is one seat with close cockpit.  
Type: rigid Flying Wing. Aerofoil section thickness (17 %)  
Construction: fibre glass in mould for all structure of fuselage, leading edge (D BOX) and frame of rudders. Ribs are coming from foam.  
3 Axes conventional controls.

*CAUTION ENGINE WEIGHT IS IMPORTANT FOR BALANCE.*

Span	7,20 m
Length	3,10 m
Mean Cord	2,00 m
Aerofoil thickness	17 %
Surface	12,00 m2
Empty weight	90/95 kg
Security coefficient	+ 5 / - 2,5 g

Performances:\*  
Achieved with SOLO engine 12 hp no reduced

Take off	150 m*
Climbing rate	2 m/s*
Cruising speed	75 km/h*
Stall speed	40 km/h
Consumption	3 l/h*

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