MARCH 2012
SHARE YOUR SUBSCRIPTION TO THE FREE MONTHLY AEROSENTE GLIDER WORKSHOP NEWSLETTER. If you would like to receive your own copy of this newsletter each month then all you need to do is visit www.aerosente.com and enter your email address. That’s it. No spam. Each month when the newsletter is ready, you’ll be sent an email with a link to download the newsletter at your leisure. Click here to visit the link in order to subscribe.
I belong to an odd tribe of men who believe that sailplanes and gliders should never have an engine or a motor. Sailplanes and gliders should never fly upside-down nor should we belong to an odd tribe of men who believe that sailplanes are superior to their jet counterparts. Which is why I have always been attracted to vintage gull wing gliders.

Why We Do This

This is a hobby and a business for us... a labor of love (nobody in the business of selling kits is in it for the money, at best you squeak out a modest income doing this). We started Aerosente because we love sailplanes - especially classic and vintage versions. We love building them and flying them, and Aerosente is a way of sharing this hobby with others. So what we're saying is that we are not in the commodity business, nor are we Amazon. We don't have millions of dollars invested in technology. We don't own a fancy building. We don't have a flashy web site. We don't have a toll-free number to take your phone calls, we are not ISO 9001 certified and we are not your servants. We don't look at you as a customer or a business transaction, you're a fellow enthusiast and over time perhaps a friend.

THIS PLACE IS A LITTLE MESSY ISN'T IT?

If you spend any time on the aerosente web site you will see that there is a lot of stuff there. You will also notice that it is a touch messy, not unlike our shop, but if you give us a minute or two we'll generally find whatever we're looking for. It is not unusual to have a visitor spend several hours on the site reading articles and looking at the photos and videos of our kits, a lot of that content is posted on the web site. Detail like manuals, build logs, historical photos, documentation, videos, etc. Publishing all this content comes with a hazard - it is difficult to make sure everything is up-to-date and accurate. So from time to time you may stumble across something that is inaccurate or out-of-date - for example when we update all the prices or contents of our kits we may miss a couple of old prices or specs. If we do make something we'll notify you to let you know how the new price is or how the kit contents have been modified and then give you the option of continuing or refunding your money.

IF YOU DON'T LIKE TO BUILD THEN YOU WON'T LIKE OUR KITS

If you're looking at building a scale model for the first time it is important to understand a simple dynamic. We do this because we love the building process at least as much as we do flying the aircraft. If you don't like to build or you are expecting a model that is almost ready to fly then you're come to the wrong place. It's interesting to hear some guys say "why would I pay hundreds or thousands of dollars for a model that I then need to spend hundreds of hours building?" Well the answer is simply because we like to build. Building is entertainment for us. Flying is fun. When you pencil it out, compared to other forms of entertainment - building scale models is damn cheap, and your wife will always know where she can find you!

YOU DON'T GET DETAILED BUILD MANUALS WITH OUR KITS

If you're the type that needs everything to be perfect then don't get started building scale kits. Or, if you're the type that actually reads the instructions before you put something together then don't get started building kits. While some of our kits have manuals, most do not and require the builder to "readable" things out on their own via the plans, build logs and interacting with the build community. All our kits have been designed by other hobbyists, not aerodynamic engineers - which means from time to time there will be errors on the plans or the parts that you'll need to correct. Most of the time we point these errors out - but not always.

WE ARE ALWAYS AVAILABLE BY PHONE OR EMAIL

The reason we mention everything above is to make sure you understand what you're getting into before you order. If you have any questions or potential concerns before you order then please give us a call at 415.246.4337 or email us at bolt55@aerosente.com. After you've ordered if you have any questions call us or email us. Remember what I said in the first paragraph about "not having operator's standing by"? The reason for that is because we take all our own calls and answer all the emails. Generally speaking we make a lot of calls as they come in and I respond to all emails the day we get them. We do ask that you leave voicemails. Some of you will call and leave a detailed 5 minute voicemail that requires me to write stuff down and listen to it several times to understand what you said. Instead send an email. We check about 10 times an hour.

WHAT COMES IN A KIT?

We will ship kits and fat kits. Skinny kits come with the plans and laser cut parts only. Fat kits come with laser cut parts, canopy, instrument panel, hardware and plans - each fat kit is a little different so check the kit specs to see exactly what you're getting. You will need to buy the long stock (spars, stringers, leading and trailing edges) and see what you can do to store the covering. Some of my kits have a detailed "buy-out" list for all the additional parts and pieces you need to buy, but many don't. We always recommend that you wait until you have the plans and the parts in hand before you buy your cuts. Do your own take-off from the plans and generate your own list. And of course you will supply the doors, and other on-board electronics. Each kit has it's own specification so please review it to see exactly what you're getting and call me if you have any questions.

WHEN WILL MY KIT SHIP?

Most of the time within 7-14 days of placing your order. Preparing the exact date is impossible because of how we run this business. We try to batch our orders, packing and shipping. Which means the date your order ships is contingent upon how many other orders we get and when we get them. We will not call you when your kit ships, but we will email you the shipping information so you can track your order.

WILL ANY OF MY PARTS BE PLACED ON BACKORDER?

Everything should ship within 7 days of your order except for custom fabricated parts like canopies and instrument panels. From time to time our suppliers may extend their deliveries to us which will require us to put items on backorder. We try to keep stock items on custom parts but we're not always able to match supply and demand. If we're out of stock then it should generally be around 30 days after the item ships out. Because canopies and instrument panels are installed towards the latter part of the build this isn't a problem. Please call us or email us at bolt55@aerosente.com to confirm if you have any concerns about backorders.

WHAT ABOUT RETURNS AND REFUNDS?

As I said above we are not Nordstroms - we can't offer "no questions asked returns and refunds". Because of the nature of the kit business it is very difficult to accept returns because of the hassle of returning them, shipping them, and then being able to return them in good order to stock. Which is why we have attempted to explain in detail what each kit comes with and what you get from aerosente. Because of the delicate nature of some of the parts from time to time the shipping process may damage some of the parts. Most of the time you can repair the damage with a little CA. If not we'll cut and ship replacement parts. If anything is missing from the kit we will ship it out to you as soon as you let us know. Beyond broken parts or missing parts, if you just want to return your kit we will have to charge a 20% restocking fee and you'll need to pay for shipping. Once we get the kit back I'll refund your payment less 20%. Visit our company store at www.gliderworkshop.com where you can browse from the hundreds of products that we now offer. And of course you should have questions at all call us at 415.246.4337 or email us at bolt55@aerosente.com.
MARCH 2012

ASHTEN GOODENOUGH

Make sure to visit Mike Malak's WINGS OF ANGELS - vintage WWII pin-ups
GRUNAU BABY

1950 SOARING NATIONALS
From the Mark Nankivil photo archive
MARCH 2012

AEROSENTE NEWSLETTER

Photo of the Month: Horten IV on Tow

Feature Article: Sascha Heuser

Deal of the Month: Sailwing 50

Plan of the Month: Sailwing 50

Pin-up of the Month: Ashten Goodenough

Nankivil’s Hangar: Baby Grunau

Product Catalog

PHOTO OF THE MONTH - HORTEN IV ON TOW (Photo Credit: www.nurflugel.com)
SASCHA HEUSER IS BUILDING A HORTEN IV FROM SCRATCH

Crew: 1
Length: 3.81 m (12 ft 6 in)
Wingspan: 20.3 m (66 ft 7 in)
Height: ()
Airfoil: 21.8
Empty weight: 246 kg (541 lb)
Loaded weight: 349 kg (768 lb)
Minimum sink rate: 0.55 m/s at 55 km/h (1.8 ft/sec at 34.2mph)
Best glide ratio: 32 at 73 km/h (45.3mph)
Sascha Heuser is a vanishing breed. He trained as an apprentice for the “Sportflugzeugbau JUBI GmbH” in Oer-linghausen. In that time he helped build the last AS-K13 sailplanes under license from Alexander Schleicher. Sascha was Germany’s last “entitled” wooden airplane master craftsman in Germany.

This month we interview Sascha about his latest project... building a full scale Horten IV from scratch.
Editors Note: Horten’s hold a certain fascination for me. Which is why I sought out Sascha for this month’s interview. Some of you may be aware that we have a several year project in house to build out a complete line of Hortens. Our Horten project is in partnership with Tony Elliott and has proven to be a challenging effort - which makes it all the more worthwhile. Directly below is the interview with Sascha and at the end you will find 20 build photos. Also, directly to the right I have reprinted K.G. Wilkinson’s report for the British on the activities of the Horten Brothers which provides a nice history and point of view following the end of WWII.

Hi Sascha. Let us start the interview with some background about you.

Ok. I am 45 years old and a professional sailplanebuilder since 1988 which was the end of my apprenticeship. I learned my profession (and favorite occupation) in Western Germany and was the last entitled master craftsman for wooden airplanes in Germany (1997).

In 2002 I followed my wife to Potsdam, where she got a job as Ph.D student. In the meantime we had a seven year old daughter.

Since 2003 I am self-employed in my one-man-workshop.

I was fascinated by the Horten sailplanes since I first read about them in a book when I was 13. When I started building model sailplanes and later when I learned to fly in a local gliding club, I always annoyed the grown up “specialists” with my questions and ideas relating to flying wings. I kept a “secret dream” that one day, I would build a Horten for my own. Of course the innocent dream was in danger, because I would never have coped with all the problems and costs alone.

So I was very glad, when I was asked by Professor Ewald at an aircraft exhibition, if I possibly could build the plane.

K.G. Wilkinson’s Report On the Status and History of Horten “tailless” aircraft immediately after cessation of hostilities

Farnborough Hants

THE HORTEN TAILLESS AIRCRAFT

The activities of the Horten Brothers in the design of tailless aircraft have been reported at various times in the German journal “Flugsport” and translations have been published by R.P.E. during the war. Their more serious efforts based on early experience with gliders were not well known until a C.I.O.S. team investigated the Horten home at Bonn (March 1945) and interviewed Herr Berger who who supplied information of many of their later projects.

After the cessation of hostilities, the Horten Brothers were interrogated in England (May 1945) and in the first two weeks of June 1945 the writer visited Germany, with the Hortens, and investigated their center of activity. Final interrogation was carried out by a team sponsored by the Tailless Advisory Committee in September. The material from these investigations has been collated and a fairly complete picture of the Horten development is presented in the following report. The complete series of aircraft is described in some detail and the design methods used are summarized. Results from flight tests on performance and handling are given where possible, but no written evidence in the way of reports or calculations were found by any of the investigators. This feature is unfortunate since many of the figures quoted for performance, etc., are dependent on the accuracy of Reimar Horten’s memory.

Only one aircraft (the H IV sailplane) was discovered in the British sector in Germany in a condition suitable for transport to England for test flying. Other gliders were found in the American and French sectors but all the power aircraft were so badly damaged as to be useless.

Illustrations for the report have been prepared from general arrangement drawings of the early gliders (I, II and III) published in the German technical press together with drawings of the later aircraft found in Germany. Photographs were supplied by Reimar Horten or taken by the author.
MARCH 2012 FEATURE ARTICLE

TELL US MORE ABOUT HOW THE PROJECT GOT STARTED.

It is to the credit of professor emeritus and degree engineer Bernd Ewald (former holder of the chair in aerodynamics of the famous Technical University of Darmstadt 1983-1998), for initiating this project nearly ten years ago. He started a foundation, and recalculated lost stress analyses in collaboration with the National Aviation Authorities (Luftfahrt-Bundesamt).

Because of his professional network, he could involve the Lufthansa-Technik GmbH, which contributed the welded tubeframe of the center section. It was built in their apprentice-ship workshop without charge. Also, the hundreds of different wingribs were glued together in a carpenter workshop of the DLR (the German equivalent to the NASA), given without charge as well.

An important factor were the drawings of Edvard Uden and Peter Hanickel (Deutsches Museum) which gave a technical base to the project. They have made many, many drawings to document the original structure as far as possible. They also delivered many contemporary photographs, which helped to reconstruct the structure of the outer wings, the elevons and undocumented parts of the controls. The very few original drawings, as the ones, which circulate in the U.S., were for the prototype only and not useable.

HOW DID THE ORIGINAL HORTEN IV COME ABOUT?

In 1941 Reimar Horten, a German Mathematician and airplanebuilder designed and built the Horten IV. First meant as an experimental sailplane to analyze some unknown effects on swept back wings, it showed such nonproblematic behavior, handling and excellent performances, that a batch production of three further specimen was built. (Worksnumbers 22/24/25/26)

BRIEF HISTORICAL SURVEY

Walter and Reimar Horten commenced their experiments on tailless aircraft at the ages of 11 and 10, respectively, by building and flying small models. In 1927 they started gliding and in the following years helped the Bonn group at the Wasserbuppe. By 1932 Walter had his C glider license and an A2 power license, and Reimar had his C glider license and had started power flying.

In 1933 they started work on their first man carrying glider which they built in the family home in Bonn. Trials began with bungee catapult launches on level ground; auto and winch launches were tried without much success and finally it was aero towed. About two hours flying were done up to March 1934 and later that year it won a prize at the Rhön gliding competitions as an original design. Longitudinal stability seemed to have been fairly good but lateral control was unsatisfactory (due mainly apparently to adverse yawing moments from the ailerons), and longitudinal control became very ineffective at low speeds.

After the 1934 Rhön contest the first aircraft was scrapped and work started on the Horten II, which incorporated lessons learned on the previous H I. This was finished in May 1935 but could not be entered for the Rhon, so a 80 hp engine was fitted (Fig. 1) and extensive test flying carried out.

At this stage the brothers were called up for military service, but continued to work on their tailless designs and during 1936 schemed the H III and IV (gliders) and the twin engined H V. Two more H II’s were built and entered by the Luftwaffe for the 1937 Rhön contests. No great success was achieved because the brothers were out of practice. General Udet was interested in the Horten’s work and asked Hanna Reitsch to test a H II, in December 1938, and give an independent assessment. Her report showed that considerable development was necessary in control design but that the aircraft had some very good features, in particular the behaviour at the stall was good and the longitudinal damping satisfactory. Mail troubles were with lateral and directional control.

Whilst studying at the Bonn Technical High School in 1938 and 1939 the brothers organized the construction of a number of H III’s which were paid
Even its last direct successors, the Horten IV b with a laminar airfoil and the Horten VI with even more span and aspect ratio couldn’t compete with the capability for daily use and behavior. Reimar Horten designed some more sailplanes in Argentina after the war, but these designs never reached the performances of his wartime sailplanes.

Two specimens survived the war and were taken by the allies for further investigations. Worksnumber 25 went to the United States and was used by the Mississippi State University for aerodynamical modifications. It was airworthy till the mid 1950s. It finally found its way to the Planes of Fame Museum in Chino, California. Worksnumber 26 stayed in Germany under the responsibility of the British forces, which further developed the towing hook and added some wooden outboard wings instead of the original detachable lightmetal outboard wings, which were lost at the end of the war.

Because of the corrupted design and weight it was difficult to handle and put out of service in the late 1940s. Its last residence is now the Deutsches Museum Munich / Flugwerft Oberschleissheim.

Because of the beauty of the Horten IV, the unusual sight and the old reports of the behavior in flight there was much concern to get an originally designed Horten IV back to flight again. Because of failures of the used german wartime glue, and the understandable aim of the Museums to preserve a maximum of the original structure, it is impossible to get one of the originals airworthy again. Anyway, the economically best solution was a total reconstruction.

**DESCRIBE TO US HOW YOU RECONSTRUCT A VINTAGE GLIDER.**

I always found that the most important base for a later good craftsmanship with regard to vintage airplanes are accurate and unambiguous drawings. Therefore I spend much time in the beginning of a project to check all available drawings for logical and geometrical coherence. Most times, sources have many mistakes in detail or are incomplete.
In addition to that you have to consider that the Horten IV drawings of the Museum were carried out for documental reasons only. They reproduce the measured original dimensions but were never meant for production. Fortunately Reimar Horten has left a complete table of geometrical data for the theoretical outer shape of the Horten IV. So in this case I wasn’t obliged to guess.

Therefore I decided to make a complete and coherent set of drawings for my own in CAD. Who knows, after a successful maiden flight, perhaps there is another one interested in an airworthy Horten IV… and with these drawings, with all the jigs and devices I had to make for the first one, it will go much quicker…

One problem on reconstructions, especially at the Horten IV with all of its semi-trailing links and undocumented levers, is the correct movement and deflection of the controls. You have to carry out a sort of reengineering. Here CAD helps, too.

The building itself follows the same order like it is at model airplanes. - building jigs- sawing- cutting- gluing- grinding… just a little more enhanced. Perhaps, an important thing, while building an airplane, even ahead of skills and knowledge, is process, I think.

I realised that because -retrospective- the discrepancy between my imagined ideal and the carried out work decreased constantly. At a certain stage, you haven’t to do all things twice. You will be quicker and better at once.

LAST TELL MY READERS HOW THEY CAN DONATE TO THE PROJECT.

The only feasible way to cope with the expected high costs compared to other less complex sailplane reconstructions was, to initiate a nonprofit foundation to get the benefits of production work into the Fuhrers’ emergency programs. The meeting put on record that it considered the flying wings produced by the Hortens to point the way for future development of all aircraft (presumably excluding rotary aircraft). The State Research Council was ordered to organize a group of specialists to cooperate with the Hortens in future development work, and give the brothers all possible support. Production for training purposes was ordered to recommence.

There the story of the Horten’s tailless work finishes; a remarkable record of progress made in spite of obstacle. In the early stages work was only kept going by a genius for getting people to work for nothing and in the end continuity had to be achieved in spite of fluctuating official support. In addition to running a very complex and dispersed organization, the brothers, with assistance on calculations from their sister, had to grapple with aerodynamic and engineering problems on a bewildering variety of aircraft. This side of the work was run mainly by Reimar who remained independent and original in his thought throughout and got little help from outside.

Apart from the design and production of the VII, VIII and IX, which represented an ambitious series, time and resources were found to pursue the old interest of glider design. By 1945 serious production of the III and IVb had been organized, amount to about four a month and two new gliders were constructed – the aerobatic H XI and the mass production H XIV sports sailplane, designed to the Olympic Games specification.

Concurrently with this work a new two-seater private owners aircraft with a 100 hp engine was designed, and one built and flown as a glider. Serious thought was also being given to supersonic aircraft and tentative steps in this direction were taken with the research designs H XIII and H X.

In reviewing the Horten achievements one cannot help being impressed with the speed of their work and the utter irrelevance of much of it to the German war effort. Prototype gliders were knocked up with astonishing speed with the very minimum of drawings. Although the basic design and general arrangement were soundly worked out by Reimar, detail work was largely settled by the workmen on the job with occasional interference from Horten. Perchke was reduced to despair by the Hortens on many occasions because they were always altering details as the design progressed and he could never get the produc-
of donations. This was effective at the beginning of the project. Many general aviation companies, Universities, clubs and quite a number of people donated their manpower (see above), a part of the used material and last not least a part of the needed money.

The current progress can be seen on my website:

http://www.holzleicht-flugzeugbau.de/Heuser_Datlen/H-IV/Prj_H-IV.html

I am sorry to say that it is just in German. But you will see a lot more pictures.

If you want to donate to the project:

account for donations:

recipient: Felix-Kracht Stiftung
reference: Horten IV
iban: DE18 5085 0150 0000 6930 81
bic-/swift-code: HELADEF1DAS

Chairman Address:
Prof. em. Dipl.-Ing. B. Ewald
Brunnenstraße 20
64372 Ober-Ramstadt
Germany

DONATE e-mail : bernd.ewald [at] gmx.de

On demand you will get a donation bill.

K.G. Wilkinson’s Report - con’t

There is no doubt that much of the work on sailplanes was a dead loss to Germany – for example the HVI, H IX and H XIV and the motor sailplane IIId had no connection with military or civil designs and taught no useful lessons. Much of the work was without R.L.M.’s consent, and Reimar commented that an advantage of dispersal was the R.L.M. could not find out what was going on, or how their money was being spent. An extreme example was the second glider H VI, which was started at Bonn, moved to Hersfeld when the Allies threatened Bonn and finished just before the Armistice. It was then hidden in a barn where we found it in June 1945. The construction took about 8000 man hours. Reimar said that he preferred building sailplanes because he could do the complete design himself.
THE HORTEN IV
A non-flying restoration at Deutsches Museum
Photo 1: Controlling the wingtwist with gauges (and - not being visible - with water level)
Photo 2: All nose ribs in place.
Photo 3: Details with rodguides for the outer wing controls.
Photo 4: Pre-laminating the d-tube from two sheets of thin plywood over molds.
Photo 5: With all scarfings, ready to glue.
Photo 6: With and without.
Photo 7: Changing the jig to build the rear side.
Photo 8: Customizing the plywood covering.

DONATE: e-mail: bernd.ewald [at] gmx.de
Photo 9: Nearly completed main wings.
MARCH 2012 FEATURE ARTICLE

Photo 10: Weighing the components.
Photo 11: Building the main dive brakes.
Photo 12: The varnished front tubeframe of the fuselage.
Photo 14: Completing the controls.

DONATE: e-mail: bernd.ewald [at] gmx.de
Photo 15: The plywood supports for the wooden fuselage ribs are already riveted to the tube frame.
Photo 16: Laminating the fuselage ribs.
Photo 17: Semi-finished products.
Photo 18: Hybrid construction.
Photo 19: Customizing the gap and shape at the joints.

DONATE: e-mail: bernd.ewald [at] gmx.de
Finally the fuselage will all be covered with plywood, aluminum and acrylic glass.
Photo 21: Pre-molded parts of the canopy. The molds were the original ones from 1941! They could kindly be borrowed from the Technik Museum Berlin.
Photo 22: A rough 3-view drawing.
BUY THE SAILWING 50 KIT FOR $34.95
Shhhhhhhhh... I got a special deal for you.

Remember our big gull the 1:3 scale LT-IV? Well we’ve just completed the design and engineering on its baby brother - a 1:6 scale LT-IV. We’ll be doing a first cut on this brand new kit next week. If all goes as planned then we’ll cut 10 beta kits for experienced modelers to help us proof and finalize the production kit. When this kit goes into production it will retail for $249 - $299 (it has more than 350 laser cut parts) for a skinny kit. For the first 10 beta builders I’ll offer these kits at $149 for the laser cut parts and plans. If you want in on this deal then email me at bolt55@aerosente.com. The plan is to cut these beta kits in two weeks and ship them out for April 1 deliveries. So email me now if you have questions or want to secure your spot. I’ll follow-up with more details later next week along with payment instructions.
We are featuring 15 of our kits in this newsletter spanning our product range from the new 1:2.5 Scale Ka2b down to our 1:32 Scale “Chuck” Schweizers. All of our kits, plans, prints and parts are available for sale at www.gliderworkshop.com. Prices are subject to change. Please check our online store for current pricing.

The Aerosente Sailplane And Glider Fleet

CONDOR

Conductor IV
MAGNIFICENT! We offer the Condor IV under license from Tom Bode of Germany based Woodwings.

Scale: 1:3
Wing Span: 6.0M
Hull Length: 2.5M
Wing Area: 2.57 M2
Weight: 16kg
Price: $1,595

DFS Reiher III
EXQUISITE! We offer the DFS Reiher III under license from Tom Bode of Germany based Woodwings.

Scale: 1:3
Wing Span: 6.33M
Hull Length: 2.6M
Wing Area: 2.10 M2
Weight: 16.5kg
Price: $1,495

Slingsby Petrel
BEAUTIFUL! If there was a beauty contest for vintage sailplanes the Petrel would win hands down.

Scale: 1:3
Wing Span: 5.78M
Hull Length: 2.41M
Rate of Sink: 54m/s
Price (Fat): $1195
Price (Skinny): $795

The Aerosente Sailplane And Glider Fleet

CONDOR

Conductor IV
MAGNIFICENT! We offer the Condor IV under license from Tom Bode of Germany based Woodwings.

Scale: 1:3
Wing Span: 6.0M
Hull Length: 2.5M
Wing Area: 2.57 M2
Weight: 16kg
Price: $1,595

DFS Reiher III
EXQUISITE! We offer the DFS Reiher III under license from Tom Bode of Germany based Woodwings.

Scale: 1:3
Wing Span: 6.33M
Hull Length: 2.6M
Wing Area: 2.10 M2
Weight: 16.5kg
Price: $1,495

Slingsby Petrel
BEAUTIFUL! If there was a beauty contest for vintage sailplanes the Petrel would win hands down.

Scale: 1:3
Wing Span: 5.78M
Hull Length: 2.41M
Rate of Sink: 54m/s
Price (Fat): $1195
Price (Skinny): $795
Ka2b  
Another Tom Bode masterpiece. This is the Alexander Schleicher Ka2b at 1:2.5 scale. Magnificent in the air!

Scale 1:2.5
Wing Span 6.40m
Hull Length 3.23m
Weight 22kg
Price $1,695

Ka6e  
From Tom Bode again the Alexander Schleicher Ka6e at 1:3 scale is 5.0 meters at the wingspan making building and transporting easy.

Scale 1:3
Wing Span 5.00m
Hull Length 2.22m
Weight 11kg
Price $999.95

SGS 2-8  
The all metal construction and strut-braced wing is a classic! We also sell this in 1:5 and 1:10 scales.

Scale 1:2.5
Wing Span 6.30m
Hull Length 3.08m
Airfoil NACA 4412
Price (Skinny) $499.95

SGU 1-7 PTERADACTYL  
The SGU 1-7 is a vintage pre-WWII Schweizer with its open cockpit and windscreen. We also sell this in 1:6 scale.

Scale 1:3
Wing Span 146"
Hull Length 60"
Weight 160 oz
Price (Fat) $499.95

SGP 1-1 Primary  
The SGP 1-1 is the first Schweizer ever made and is patterned after the German training gliders of that time. We also sell this in 1:6 scale.

Scale 1:3
Wing Span 128"
Hull Length 60"
Weight 16 lbs
Price (Skinny) $179.95

SGS 1-23  
The SGS 1-23 1:4 scale is one of our best selling kits. This is the sailplane from the original Thomas Crown Affair and is available in 1:5 scale too.

Scale 1:4
Wing Span 158"
Hull Length 61.5"
Weight 10 lbs
Price (Skinny) $159.95

KA2B  KA6E  2-8  1-7  1-1  1-23
Thermic 50 50X 70  
The classic Frank Zaic/Jasco designed thermic 50, 50X and 70 are all here. These vintage kits have been updated and adapted by Tom Martin to build in about half the time with self-jigging and pre-shaped parts. Each laser cut kit comes with the original plans and all the parts you need to build each model - you supply the covering. All three of these kits can be built by a beginner.

“CHUCK” THERMICS  
We offer three of John Zaic’s well known designs - the Thermic 18 (12.5” wingspan), Thermic 20 (18” wingspan), and the Thermic “B” (20” wingspan). These kits come with all laser cut parts and instructions. We also have online building instructions for each kit. These are fabulous beginner kits for dads and sons and grandfathers and grandsons.

“CHUCK” SCHWEIZERS  
Great fun for fathers and sons and grandfathers and grandsons. We are now offering “Chuck” Schweizers - 5 exact 1-32 scale flat profile gliders. Build them and fly them in an hour. They fly just like the real sailplane. You get laser cut parts for 5 sailplanes - the 1-23, 1-26b, 1-26e, 1-34 and the 2-12 plus full color spec sheets on each aircraft and detailed build instructions - all for just $19.95 - for all five gliders!

Hall Cherokee  
The Hall Cherokee at 1:4 scale is a great beginner scale sailplane from the standpoint of both building and flying.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Wing Span</th>
<th>Hull Length</th>
<th>Weight</th>
<th>Price (Fat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:4</td>
<td>132”</td>
<td>64.9”</td>
<td>6.5lbs</td>
<td>$399.95</td>
</tr>
</tbody>
</table>

1-26e  
Our 1-26e is about as scale as it gets and comes in 1:4, 1:5 and 1:6 scales. The 1-26e does great on the slopes.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Wing Span</th>
<th>Hull Length</th>
<th>Weight</th>
<th>Price (Fat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:4</td>
<td>120”</td>
<td>63-3/4”</td>
<td>105oz</td>
<td>$399.95</td>
</tr>
</tbody>
</table>

Thermic 50 50X 70  
The classic Frank Zaic/Jasco designed Thermic 50, 50X and 70 are all here. These vintage kits have been updated and adapted by Tom Martin to build in about half the time with self-jigging and pre-shaped parts. Each laser cut kit comes with the original plans and all the parts you need to build each model - you supply the covering. All three of these kits can be built by a beginner.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Wing Span</th>
<th>Hull Length</th>
<th>Weight</th>
<th>Price (Fat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:5</td>
<td>133”</td>
<td>69 3/8”</td>
<td>7.5lbs</td>
<td>$299.95</td>
</tr>
</tbody>
</table>

SGS 2-12 - TG-3A  
Jack Hiner’s design employs the classic military colors showing off it’s D-Day heritage and it’s striking “warbird” colors.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Wing Span</th>
<th>Hull Length</th>
<th>Weight</th>
<th>Price (Fat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:5</td>
<td>133”</td>
<td>69 3/8”</td>
<td>7.5lbs</td>
<td>$299.95</td>
</tr>
</tbody>
</table>

CHEROKEE 1-26  
TG-3A  
50 50X 70  
$59.95  
18 20 “B”  
3 FOR $19.95  
SCHWEIZERS  
3 FOR $19.95