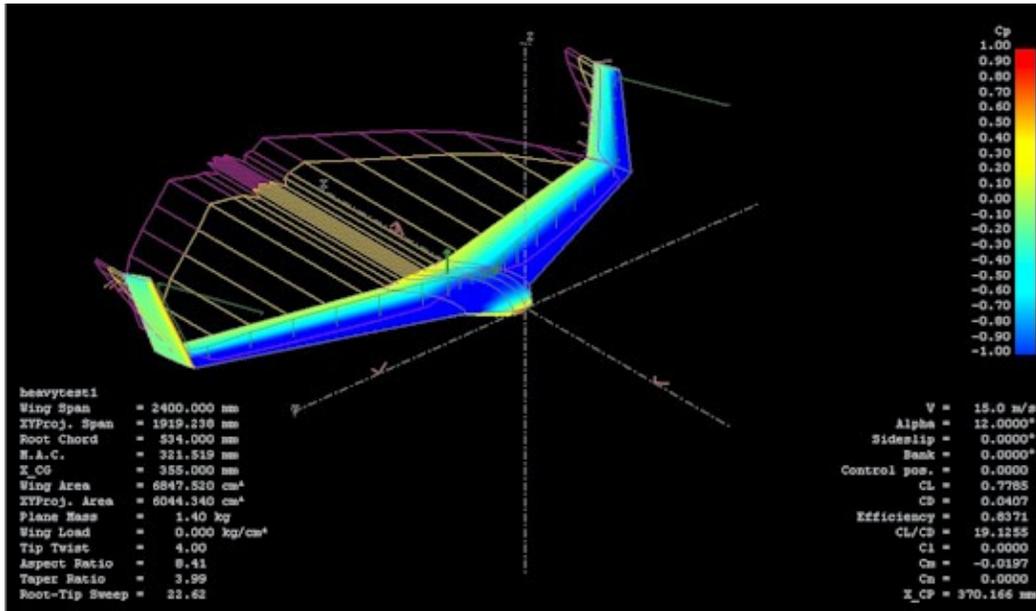


T.W.I.T.T. NEWSLETTER



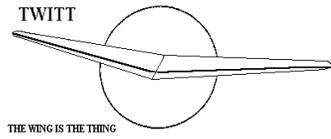
Screen shot of a CAD program being used by students at Loughborough University for their entry in the British Model Flying Association competition. More on page 2 inside.

T.W.I.T.T.

The Wing Is The Thing
 P.O. Box 20430
 El Cajon, CA 92021



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**THE WING IS
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(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. Officers:

President: Andy Kecskes (619) 980-9831
Treasurer:
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) 589-1898 (Evenings – Pacific Time)
E-Mail: twitt@pobox.com
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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).

TABLE OF CONTENTS

President's Corner 1
Letters to the Editor..... 2
Available Plans/Reference Material 6
Berblinger Competition Announcement..... 7



PRESIDENT'S CORNER

My thanks to John Newton for contributing a letter on a British R/C competition that is getting underway with his promise to send us pictures of the flying wing models once they are completed.

My thanks also go to Mike Hostage for contributing an article to ESA on his Marske Pioneer III kit build that is now complete. He is waiting for final FAA documentation and has indicated he will provide another update once it is flying.

This issue also includes the new announcement for the Berblinger competition in 2016. I think there have been TWITT members with some interest in this and had considered a submission. If this is the case again for 2016 I would appreciate you letting us know about any entry and kept abreast of your progress through the competition.

With the improvement in weather in southern California I had the best flight yet in my Schweizer 1-26 lasting 2 hours 50 minutes and reaching a height of at least 10,500' a couple of times. My previous best was only an hour forty about the same time and place a year ago, so I guess I am finally getting a handle on how to fly this thing again after a 44 year lay off.



LETTERS TO THE EDITOR

Hello,

Please find attached some screenshots of an R/C flying wing some of my first year undergraduate students are developing to take part in this years British Model Flying Association challenge. See here for details:

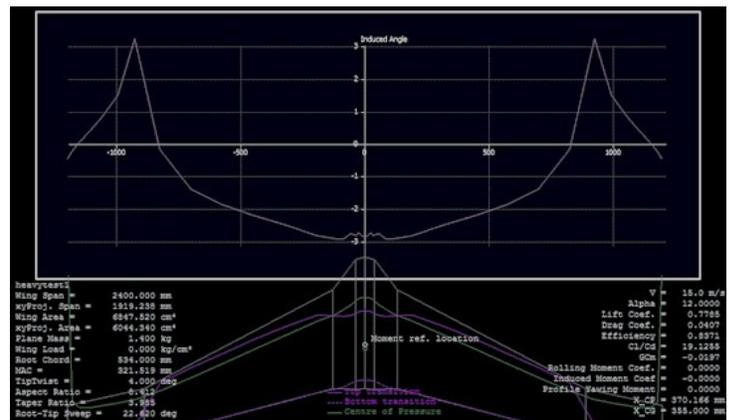
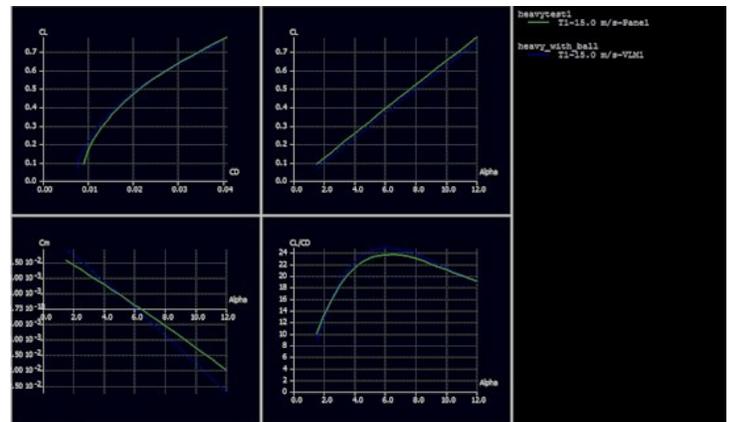
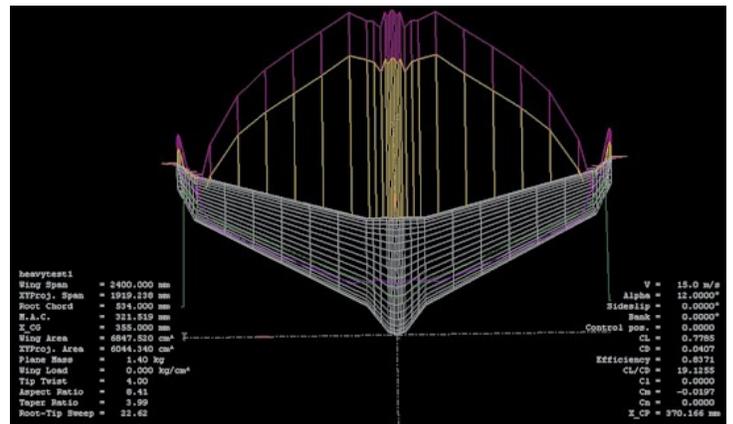
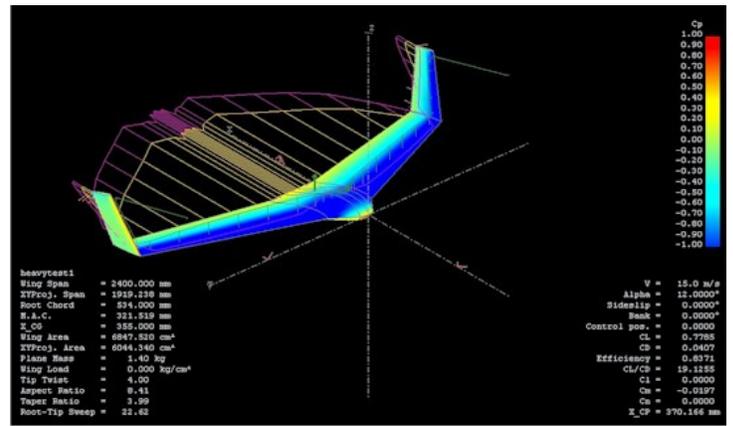
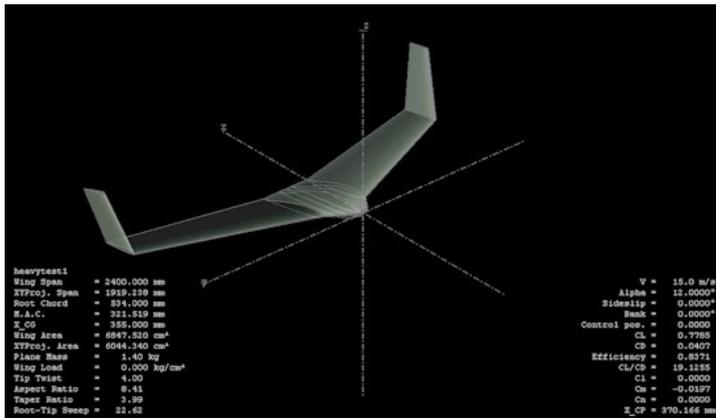
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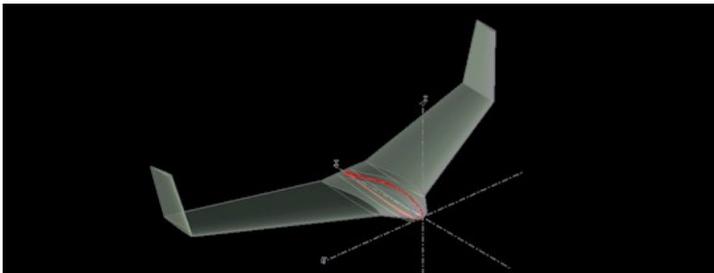
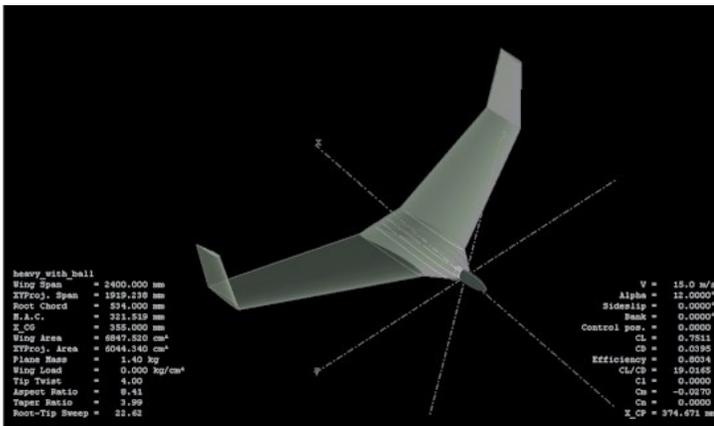
The students have done some successful test glides with the glider thus proving its static and dynamic stability and will be competing in the challenge at Elvington Airfield during the Summer Break, I'll keep TWITT members updated on how they get on. The team chose a flying wing layout to keep construction and design times down whilst yielding an aircraft with a fairly good L/D ratio, the electric power setup for the competition is fixed and therefore an aerodynamically and structurally efficient aircraft is required to do well in the competition.

Best regards,

John Newton
Aeronautical Technical Tutor,
Loughborough University.

(ed. – I have included the screen prints below although you probably won't be able to see any of the parameter values due to the size and clarity that came from doing screen shots. If you would like a copy of any or all sent to you for further analysis, just drop me an e-mail and I will send the back to you.)





Pioneer III N295MH

By Mike Hostage

I recently completed a Pioneer III designed by Jim Marske. Final inspection occurred on 26 May and first flight should happen in the next few days. The total construction time, from receipt of parts from Matt Kollman (kollmanwings.com) to inspection was 1001.3 hours. About 75 of those hours have been spent making the fittings and modifications to a trailer I purchased from Gary Davis of GCX Composites (GliderTrailers.net).



Finished P-III and builder

Matt Kollman molded the wing spar/D tube assemblies as well as the various fuselage pieces. He also welded up and painted the majority of the metal parts.

I built the glider from these various parts along with a multitude of shipments from the various aircraft supply houses and other raw material sources. The construction began in a two car garage in military base housing, on Langley AFB, on 7 April 2012, when I began stowing the parts in my workshop. In order to have work space, I had to suspend both wings, the fin, the rudder, and the canopy bubble (a bubble in a 4X8 sheet of acrylic), from the ceiling. Fortunately, the garage had a vaulted ceiling that allowed this plan to work!



Fitting many parts into two-car garage

I constructed the wings first, which involved making 40 sets of the aft half of each rib from fiberglass sheet and spruce cap strips, then jiggging the D-tube in a fixture, and assembling the spars and ribs into the structure aft of the spar and D-tube. After installing the spoiler boxes and aileron control rods, I set the wings aside and tackled the fuselage. The wing effort reminded me of a model aircraft project, on a huge scale.

The fuselage effort entailed fabricating/fitting/ installing/fussing with the retractable main gear and doors, along with a retractable nose skid. Since Jim's prototype had a fixed gear, mine would be the first attempt at making the retract installation. From start of the main gear to satisfactory completion of the extension/retraction of both the gear, the doors, and the skid, took almost 4 months. Once I'd iteratively figured out how to make them all work (I had to design and fabricate the nose skid shock absorption/ retraction mechanism, the actuating linkage from the

main gear, as well as the surprisingly difficult main gear doors) I concluded that if presented



Jigging spar blank



Adding built-up ribs and aft spars

with my final design at the start, installation of the gear/skid/doors would have taken perhaps two weeks. So much for designing on the fly!

After the gear came the control mechanisms, and then I confronted the need for a trim system. Back in the 90s I built Jim's earlier flying wing, the Pioneer IID, and had installed an internal sliding weight to provide trim inputs. One of the interesting traits of a flying wing is



Fitting gear doors

that one can trim from full forward to full aft CG by shifting a nominal amount of weight forward and aft (in the Pioneer IID's case, 9.5 lbs of lead in a 3" tube, molded to the shape of the fuselage bottom and extending from the rudder spar forward to just under the pilot's knees, operated by a hand crank and pulley system).

The Pioneer III does not have enough clearance under the pilot's seat to run the pulley system far enough forward to be fully effective, so I came up with a new plan. I molded a 1.5-gallon tank in the nose of the glider and a 1.5 gallon tank in the tail, just behind the rudder spar. By shifting 1.3 gallons (about 11 lbs) forward and aft, I calculated I could move the CG through its full range of travel. I installed a small 12 volt pump to move a water/ antifreeze mix. I have yet to fly this concept, so I can't tell you how well it will work...my only concern is with the flow rate of the pump and how long it will take to move the weight. It takes about 25 seconds to move the whole load. I think I could probably crank a lead weight faster than that, so the jury is out on how I'll like the pump. I do have a contingency plan to add a second pump, should that seem necessary.

With the internal parts of the fuselage complete, I mated the fin to the lower fuselage half, then began working on the canopy. This is my third amateur-built glider and the canopies have proven to be both challenging and nerve-wracking! I wrecked one Pioneer IID canopy, learning how to cut the blown bubble out of the acrylic sheet. On my second glider, a kit-built Silent II Targa, the canopy was already cut and mated to its frame, so no problems with that one.



Tipped on end to mold nose tank for trim system

Sadly, with the Pioneer III, I had successfully cut and fit my first canopy bubble to its frame, but wasn't happy with the result, so I procured a second acrylic bubble and tried again. This one is functional, but not as nice-looking as I might have liked.



Fitting canopy frame to fuselage

During the course of construction, I was in my last two years of active duty with the USAF. My last three years of service were as commander of Air Combat Command, which required a significant amount of travel, cutting in to my build time. The 1001 hours were accumulated at 0.5 to 3 hour intervals, working

nights and weekends, when the travel schedule had me at home. Upon giving up command and retiring on



Transparency cut, fit, and epoxied to frame

4 Nov 14, my rate of progress got more steady and I began to see light at the end of the tunnel. One challenge during this period was having to move our home and my workshop. This process delayed the project about 4 months. Our new home has only a small, two-car garage so I was forced to keep the wings in the trailer, stored 45 minutes away at our glider field.



Fitting glider into trailer, just in time to move!

The trailer was made by Gary Davis. I had to cut two holes in the forward end of the top shell, to clear the almost 6' root chord of the Pioneer III's wing. I then had to fabricate the dollies, tracks, hold-down fittings, and numerous other parts, to actually hold the glider safely inside. This part of the project was panic-

driven, when I realized I had to vacate the military housing and move the project in a trailer that was not yet ready to safely hold the glider.

Last summer I had the opportunity to fly the prototype P-III for two hours on a pleasant June afternoon. I am anxious to get my glider in the air and begin the tweaking process to maximize its performance! I will report back in a month or two, with a flight report.

AVAILABLE PLANS & REFERENCE MATERIAL

Tailless Aircraft Bibliography

My book containing several thousand annotated entries and appendices listing well over three hundred tailless designers/creators and their aircraft is no longer in print. I expect *eventually* to make available on disc a fairly comprehensive annotated and perhaps illustrated listing of pre-21st century tailless and related-interest aircraft documents in PDF format. Meanwhile, I will continue to provide information from my files to serious researchers. I'm sorry for the continuing delay, but life happens.

Serge Krauss, Jr. skrauss@ameritech.net
 3114 Edgehill Road
 Cleveland Hts., OH 44118 (216) 321-5743

Books by Bruce Carmichael:

Personal Aircraft Drag Reduction: \$30 pp + \$17 postage outside USA: Low drag R&D history, laminar aircraft design, 300 mph on 100 hp.

Ultralight & Light Self Launching Sailplanes: \$20 pp: 23 ultralights, 16 lights, 18 sustainer engines, 56 self launch engines, history, safety, prop drag reduction, performance.

Collected Sailplane Articles & Soaring Mishaps: \$30 pp: 72 articles incl. 6 misadventures, future predictions, ULSP, dynamic soaring, 20 years SHA workshop.

Collected Aircraft Performance Improvements: \$30 pp: 14 articles, 7 lectures, Oshkosh Appraisal, AR-5 and VMAX Probe Drag Analysis, fuselage drag & propeller location studies.

Bruce Carmichael brucecarmichael@aol.com
 34795 Camino Capistrano
 Capistrano Beach, CA 92624 (949) 496-5191

VIDEOS AND AUDIO TAPES



(ed. – These videos are also now available on DVD, at the buyer's choice.)

VHS tape containing First Flights "Flying Wings," Discovery Channel's The Wing Will Fly, and ME-163, SWIFT flight footage, Paragliding, and other miscellaneous items (approximately 3½+ hours of material).

Cost: \$8.00 postage paid
 Add: \$2.00 for foreign postage

VHS tape of Al Bowers' September 19, 1998 presentation on "The Horten H X Series: Ultra Light Flying Wing Sailplanes." The package includes Al's 20 pages of slides so you won't have to squint at the TV screen trying to read what he is explaining. This was an excellent presentation covering Horten history and an analysis of bell and elliptical lift distributions.

Cost: \$10.00 postage paid
 Add: \$ 2.00 for foreign postage

VHS tape of July 15, 2000 presentation by Stefanie Brochocki on the design history of the BKB-1 (Brochocki, Kasper, Bodek) as related by her father Stefan. The second part of this program was conducted by Henry Jex on the design and flights of the radio controlled Quetzalcoatlus northropi (pterodactyl) used in the Smithsonian IMAX film. This was an Aerovironment project led by Dr. Paul MacCready.

Cost: \$8.00 postage paid
 Add: \$2.00 for foreign postage

An Overview of Composite Design Properties, by Alex Kozloff, as presented at the TWITT Meeting 3/19/94. Includes pamphlet of charts and graphs on composite characteristics, and audio cassette tape of Alex's presentation explaining the material.

Cost: \$5.00 postage paid
 Add: \$1.50 for foreign postage

VHS of Paul MacCready's presentation on March 21, 1998, covering his experiences with flying wings and how flying wings occur in nature. Tape includes Aerovironment's "Doing More With Much Less", and the presentations by Rudy Opitz, Dez George-Falvy and Jim Marske at the 1997 Flying Wing Symposiums at Harris Hill, plus some other miscellaneous "stuff".

Cost: \$8.00 postage paid in US
 Add: \$2.00 for foreign postage

VHS of Robert Hoey's presentation on November 20, 1999, covering his group's experimentation with radio controlled bird models being used to explore the control and performance parameters of birds. Tape comes with a complete set of the overhead slides used in the presentation.

Cost : \$10.00 postage paid in US
 \$15.00 foreign orders

FLYING WING SALES

BLUEPRINTS – Available for the Mitchell Wing Model U-2 Superwing Experimental motor glider and the B-10 Ultralight motor glider. These two aircraft were designed by Don Mitchell and are considered by many to be the finest flying wing airplanes available. The complete drawings, which include instructions, constructions photos and a flight manual cost \$250 US delivery, \$280 foreign delivery, postage paid.

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The 2016 Berblinger Competition

In 1986 on the 175th anniversary of Albrecht Ludwig Berblinger's (known as the "Tailor of Ulm") attempt to fly, the city of Ulm organized an international flight competition. The objective was to follow in Berblinger's footsteps, flying over the River Danube at his historic site.

Albrecht Ludwig Berblinger (1770–1829), who is regarded as the first aeronautical pioneer to employ the principle of gliding flight, found his way into aviation history with his flight test in 1811. In commemoration of his work, the city of Ulm donated a prize bearing his name, which was awarded for the first time in 1988. The Berblinger Prize is awarded for special efforts, developments and innovative ideas in the construction of aviation devices in the field of general aviation.

In 1996, for instance, a prize was awarded to the first manned, self-starting, fully solar-powered aircraft developed for the competition. In the flight competition in 2011, prizes went to a self-starting, high-performance glider with a low-noise, ecological propulsion system and to a lightweight, solar powered motorglider. The new long-term goal of the competition is now the 2020 low-emission long-distance flight. An initial construction competition was held in 2013 to advance this goal.

For 2016 the city of Ulm is hosting another construction competition to find and support interest in specific innovative developments in the field of general aviation for a low-emission long-distance flight.

For 2016, the city of Ulm is hosting another construction competition in the field of general aviation. The aim of the competition is to promote ideas that could realize an environmentally friendly long-haul flight along the Danube in 2020. The prize money amount to 25,000 Euros.

Long-Term Objective: Vision Of A Danube Flight:

In 1811, Albrecht Ludwig Berblinger had the vision of crossing the River Danube from one bank to the other using a hang-glider. In the spirit of Berblinger, and continuing his vision, the city of Ulm aims to promote developments in general aviation that make it possible to follow the course of the Danube along its whole length from source to mouth, also in stages, as free of noise and emissions as possible, using innovative, economical and environmentally-friendly aircraft. Ulm's Berblinger Prize will initially be awarded in theoretical competitions for ideas that will particularly contribute towards reaching this goal.

<http://www.berblinger.ulm.de/en?symfony=c7b33d310b2d7914505e1b7789761010>

The purpose of the Berblinger Competition 2016 is to explore theoretical approaches, based on the latest research results, knowledge and developments in aviation, which could contribute towards achieving the long-term vision of a Danube flight from the source to the mouth of the river. We are looking for ideas for an innovative manned aircraft or for individual components for such an aircraft, which could contribute towards the realization of the declared vision of a "Danube Flight". Aspects of environmental sustainability such as energy consumption, exhaust and noise emissions, will play a particularly important role in this regard. Ultra-light aircraft are also eligible for the competition.



For poets and philosophers, however, was a fascinating figure. If in the beginning they were merely the authors of mockery rhymes, they were eventually joined by others more interested in the tragedy of the case. Engineer and author Max Eyth finally laid a foundation to Berblinger's memorial in 1906 with his two-volume novel "The Ulm Tailor". The subtitle reads, "The story of a man born 200 years ahead of his time". After rehabilitation via countless writers of all persuasions, poets, composers and eventually film producers, the aviators followed suit. After his machine's fitness for flight had been proved in principle, his greatest aeronautical justification came in 1986 when to commemorate the 175-year anniversary of the legendary date, the town of Ulm organized a Berblinger Flight Competition at the very same historical spot. In spite of the well-known lack of thermals at this site, one of the contestants succeeded in gliding across the Danube. This finally and conclusively vindicated the Tailor's reputation - albeit decidedly too late for him.