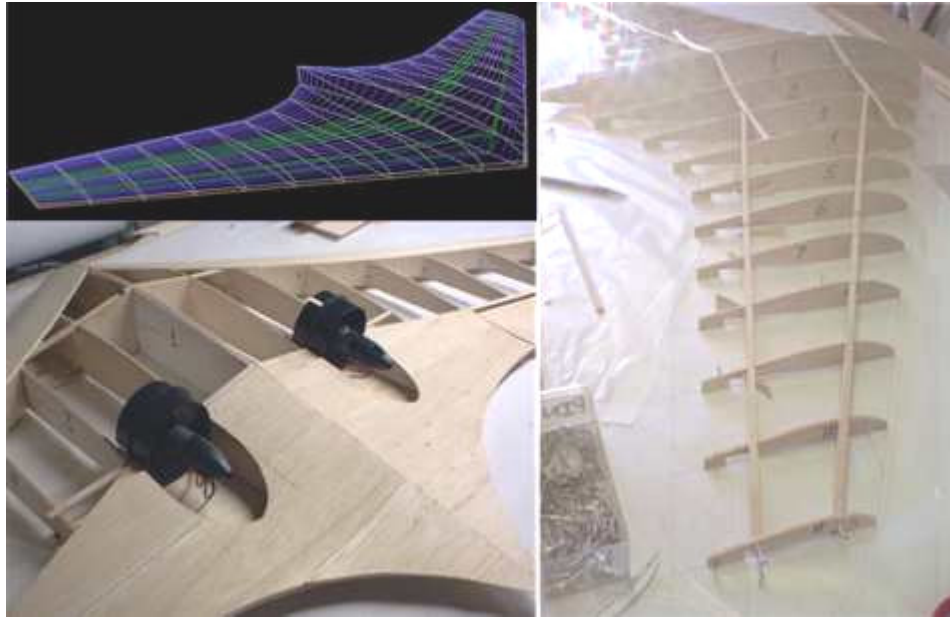


T.W.I.T.T. NEWSLETTER



This is a couple of shots taken from The Bell - Imel Group, LLC, Designers of Flying Wing Aircraft website at this URL. <http://www.bellimelgroup.com/Ho229.htm> The computer model was dated 10/16/04, the rib frame-up on 10/18 and the ducted fan shot on November 1. Take a look at the rest of the pictures when you get a chance.

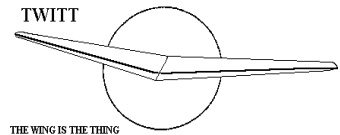
T.W.I.T.T.

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., 0411 means this is your last issue unless renewed.

Next TWITT meeting: Saturday, November 20, 2004, beginning at 1:30 pm at hanger A-4, Gillespie Field, El Cajon, CA (first hanger row on Joe Crosson Drive - Southeast side of Gillespie).



**THE WING IS
THE THING
(T.W.I.T.T.)**

T.W.I.T.T. is a non-profit organization whose membership seeks to promote the research and development of flying wings and other tailless aircraft by providing a forum for the exchange of ideas and experiences on an international basis. T.W.I.T.T. is affiliated with The Hunsaker Foundation, which is dedicated to furthering education and research in a variety of disciplines.

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- Secretary: Phillip Burgers (619) 279-7901**
- Treasurer: Bob Fronius (619) 224-1497**
- Editor: Andy Kecskes**
- Archivist: Gavin Slater**

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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

I sure wish the program front was better this year, but as I have noted in the past, it has just been real hard finding new speakers within our reach. At least we will have a good start to 2005, and perhaps we can do more to find some types of presentations for the group, even if they are not directly related to flying wings. If you have any ideas, please let me know.

This month's issue is a composite for what our members have been sending in and what I think are interesting material from the Nurflugel bulletin board run by Doug Bullard. From what I can see, there is not much overlap between our membership and the subscribers to the board, so most of you are seeing this stuff for the first time. I was particularly interested in the thread started by Greg that Al Bowers took on with an extensive listing of aviation heroes that was then added to by other contributors.

When the name of John Roncz, from the Genesis project, came up there were some differences of opinion on his roll in aviation history. So I decided to include it, partly to show the competition between designer/engineers, and partly because David Lednicer's comments included a lot of historical information. Some of it was related to flying wings, as well as, Boeing history, which everyone always seems to marvel at due to the company's dominance in the industry.

A special thanks to Bob Fronius for sharing his brother Joe's photos with us. Joe has been working on his own design flying wing over the past years, but has now had to give it up due to age and health reasons. So take a lesson from Joe and don't wait too late to start your pet project and then not being able to finish and fly it.

I hope everyone has a wonderful Thanksgiving Holiday with family and friends.



NOVEMBER 20, 2004 PROGRAM

I thought I was going to be able to put a program together for this month, but alas I came up short so the last meeting for 2004 is no more. We will be at the hanger if you want to drop by to just chitchat, and maybe watch a video, but if you want to stay home and watch one of the college football games, we won't hold it against you.

Don't forget to mark your new 2005 calendar for January 15th for Dave Raspet talking about his father's experiences with flying wings at Mississippi State. This should be a good program giving you some insight into August Raspet's thoughts about aircraft design and testing. I am sure Bruce Carmichael will be able to add more insights to highlight Dave's recollections.

Also, if you have an antique airplane and need to get tax exemption display time, we are a qualified museum so fly in and spend some time with us. Please bring along your certification form so we can sign you off for a display period.



LETTERS TO THE EDITOR

October 10, 2004

TWITT:

Please accept my application for membership to TWITT. Find enclosed a check for \$20 for the dues. My contact information is below.

I have a strong and abiding interest in paleoaerodynamics, including theoretical work on the influence of ground effect in severely power limited fliers such as Archaeopteryx. I also work as a volunteer at McClellan Aviation Museum and Aerospace Learning Center in Sacramento, with an interest in education, general aerodynamics, and the history of high speed flight and space travel.

I look forward to membership within your organization, and being entirely self-taught in the subject of aerodynamics, very much look forward to some stimulating discussion and exposure to perspectives that just are not encountered or

discussed within the academic community studying biological powered flight.

Most sincerely,

Ronald R. Easley
6536 Markley Way
Carmichael, CA 95608
916-966-8652
rre@isp.com

(ed. – Ron became introduced to TWITT when he called looking for a contact number for Philip Burgers, our previous Secretary. He liked what he saw on the website, which renewed his interest in flying wings.

If you are interested in biology flight dynamics, then you should make contact with him and get a discussion going. Phil's papers on our sight would be a good, common ground starting point.

Here is Ron's original message that got him hooked. By the way, if anyone has heard from Phil)

Hi there!

I ran across this website while conducting a Google search trying to find current contact information for Philip Burgers, formerly of ComairRotron. I was introduced to Phil through Dr. Kevin Padian of the UC Museum of Paleontology in Berkeley while working on similar issues concerning the origins of powered flight among bird ancestors. I saw in the attached article that, as of 1999 at least, Phil was secretary of your organization.

I last spoke with Phil a couple of years ago and am aware that he has had some recent setbacks. I wish to reestablish contact for several reasons: 1) to find out his progress on the definitive presentation of his model used in the 1999 paper in Nature; 2) to bounce a few ideas off of him regarding energy-maneuverability theory as it relates to flying animals, both living and extinct; and, most importantly, 3) to see how a friend and respected colleague is doing these days after some pretty damned rough times.

I suppose one can say a lot about Phil, but "brilliant" is always going to be at the top of the list, regardless of what one may think of his ideas on bird flight. For myself, I generally agree with his presentation and hope to see a lot more. Having encountered a lot of the same parochialism and intellectual inertia that Phil has among certain prominent members within the field, I can fully relate to any frustration that he might feel. However, I feel that his contributions have the potential to revolutionize our understanding of powered flight and hope that he will continue on with his work.

Any help that you may offer in helping me re-establish contact with Phil would be very greatly appreciated. If it is possible, you may feel free to forward this message to him directly.

October 12, 2004

TWITT:

Subject: October 2004, #220 TWITT Newsletter, pages 9-10 "Klingberg Wing".

I have built a few of the 78" Klingberg wings, along with Horten, Northrop designs that I modified. The swept back makes them very tail heavy, requiring an engine or motor and batteries in the leading edge area. To have a pusher design you must have long drive shafts.

A good design was Frank Zaics' "Sail Wing 50".

I would assume a fair price for a Klingberg Wing kit would be about \$25.00.

Eugene Turner

(ed. – Thanks for writing about your experience with the Klingberg Wing kits. From what I can determine they are getting hard to find, but reports have indicated they fly very well when properly trimmed. There was also a version where a Horten type twist was added, and it can be seen on our website.)

October 24, 2004

Hello TWITT organization.

Iwould like to introduce myself and associates who are currently building and designing flying wings. It's great to discover your college of information and sharing of recent achievements.

We have a 56 ft. span Horten IX with a 454 Chevy V-8. It has a drive shaft to prop behind the center trailing edge. It is currently on the landing gear, canopy installed, skinned and getting the controls assembled. The Horton is in Red Bluff, Calif. and will fly possibly in the summer of 2005.

Two other craft have been designed and tested as models in a wind tunnel and X-Plane software. One design is a variation of the low aspect F-5U flapjack and the other looks like a Velocity without the canard.

What do you get with a \$20 membership? What kind of private information is available.

I'm looking for elevon mixer control designs. There seems to be so many different and complicated

apparatuses. Would you have any control mixer plans that might look like an A frame shape?

I'm looking forward to your correspondence.

Stephen Sawyer
<s-sawyer@sbcglobal.net>

(ed. – We had heard there was some type of Horten project going on in the Sacramento area, but it appeared the designer/builders were keeping it under wraps. I guess we now know what it is all about.

I wrote back to Steve to see if we could get some pictures and a little more information, but I haven't heard back from him since then. I also don't know which airport they might be using, so can't direct our northern California members to a location to snoop it out.

I will let you know more when I learn it.)

November 1, 2004

Flying wing transport

In response to your inquiry on TWITT, a blended wing would be better for a 1,200,000 pound transport because it would allow a longer central cargo bay. Start your research by looking at the huge flying wing transport built by the Horten brothers in Argentina (post World War 2). It had a huge central pod for crew, cargo, etc.

Start by designing your cargo bay, then determining how big a wing, engines, etc. you need. You may want to park tanks 2 or even 3 wide to shorten the cargo bay.

Also remember that paratroopers are happiest/quickest exiting side doors, so you need doors on both side 1 meter wide by 2 meters tall.

<riggerrob@hotmail.com>

(ed. – Here is the original message that solicited this response.)

Flying Wings

Date: March 8, 2003

My name is Rudaba Khan I am a final year aerospace engineering student. For our final year design project we must design an ultra heavy lift aircraft (max payload approx 1,200,000 lbs). It must perform paratrooper drops, lapse drops and be able to carry ten tanks. As a part of our conceptual studies we are looking into the feasibility of a flying wing design for such a role,

particularly the blended wing body design. Could you please provide any assistance on the matter especially in regards to why a BWB flying wing design would be better than a flying wing design such as the YB-49 or the B2 bomber. Any assistance would be much appreciated. Thankyou.

Kind regards

Rudaba Kha
fskhan@bigpond.com

(ed. – The following pictures come from Joe Fronius who has been working on the model and full size version for a couple of years. It is amazing just from the standpoint that he was building it on his apartment balcony and in his living room. He also had just minimal tools to work with, like a hand jig saw versus a table version.

Unfortunately, Joe has had to give up his project due to his age and health, along with the declining health of his wife Fran.

I don't know if Joe is interested in selling what he has so far, but I do know he has about \$500 in materials he has now, and he estimates the spar material would cost an additional \$800. We don't know if there are any plans (suspect not formal ones).

after initial test flights of the model with just the basic swept wing configuration.



Here is Joe holding the model when it didn't have the obvious dihedral as shown in the earlier picture. The concrete where Joe is standing was labeled in one picture as a 20' runway, but it did look a little tight for



This gives you the best view of the overall layout of the wing, with a pusher engine.



Although the picture quality is poor, you can see the dihedral of the wing tips that apparently were added

both takeoff or landing, especially with a barbeque unit perched right on the edge.



This is a shot of the full size wing tip section. The full faced rib on the right is the inboard end, and the left side is the structure for the formation of the tip shape. Based on this picture, it can be assumed that the tip would be covered with fabric to achieve the desired shape.



Here is a shot of what appears to be the two wing tip sections set side-by-side. Obviously he has put a lot of work into building the ribs and spar section trying to keep them as light as possible.



This shot was labeled as being 18 ribs, obviously hanging from one of the apartment walls. You can see the reflex in the airfoil in this view.



This shows both the model's underside uncovered and one of the wing tip sections with part of the D-tube sheeted back to the spar. It also gives you an idea of the limited amount of space Joe was utilizing in putting together his dream wing.

October 24, 2004

November 5, 2004

TWITT:

This is the U2 Mitchellwing by Wolfgang Uhl. This airplane will be in the new Sport category.

Richard Avalon
<mitchellwing@earthlink.net>

(ed. – Here are the two pictures that Richard sent along. As you recall we have featured this U2 in a past issue and have the original pictures on the website. But these are interesting composites showing it in a very unusual place, especially since the aircraft is based in Europe.)



This is from Larry Witherspoon as posted on the Nurflugel bulletin board. *(ed. – We told you about this upcoming event a couple of months ago, and Gary was finally able to complete the model for the induction ceremony.)*

Engineer's Model Inducted Into Air & Space Museum

A futuristic sailplane model, built and flown 20 years after its conceptual design was published in a hobbyist magazine, was formally inducted Oct. 29 into the National Air & Space Museum's Udvar-Hazy Center at Washington Dulles International Airport. The Altostratus designer, John McMasters, is a Boeing Technical Fellow and program manager with the Ed Wells Initiative and SPEEA-Boeing Partnership, a joint program between Boeing and the Society of Professional Engineering Employees in Aerospace. Gary Fogel, vice president of Natural Selection, Inc. and Altostratus "test pilot," attended the ceremony. "We're honored that John's vision of the future will be on display as a reminder to the public that the future of aviation design is only as far away as the local hobby shop," Fogel said.

McMasters had written an article in 1981 for Soaring magazine, describing the innovative Altostratus, which would push the limits of aerodynamic efficiency. Nearly two decades later, the Altostratus concept inspired Fogel and two other model sailplane enthusiasts in California to build a 1/5-scale (five-meter-span) model out of foam, fiberglass and carbon fiber. They tested their prototype using off-the-shelf flight simulator software then took the plane to a remote mountain ridge for its successful first flight. The team tracked down McMasters through the Internet and told him of their achievement. "It was all kind of magical," said McMasters. Besides demonstrating the flying capability of his original design, he said the project illustrated how less experienced engineers can gain valuable airplane development experience using computer simulations, modern aircraft construction materials and available electronic equipment to quickly prototype and evaluate novel aircraft designs at a relatively low cost and risk.

(ed. – Here is a thread from the Nurflugel bulletin board on the Unsung Heroes of Aviation. It has many designers and engineers familiar to the flying wing community, but also many that have just contributed so much to aircraft design and development their names have almost become household words. If you think of

any others that weren't included in the listings provided by the various participants, write them down and pass them along to me and I will put them on the bulletin board.

There was also a side conversation about the contributions of John Roncz as part of the listing. I have included it as an insight into the competitive world of aircraft design/engineering and how different individuals perceive the work of their contemporaries.)

From: Al Bowers
 October 21, 2004
 Subject: The Unsung Heroes Of Space Flight & Aviation

Greg wrote:

I had to sit back and think about all the unsung heroes behind the scenes who really made a difference in space and aviation. From engineering to safety to pushing that envelope. The public should know of these men and women. Can anyone list some names and their accomplishments? They should be acknowledged for whatever they've done.

Al contributed the following names:

Mark Drela: who's developed and forgotten more technology than I will ever know.

Bruce Carmichael: for lifetime accomplishment in laminar flow.

Peter Selinger: who is the walking soaring encyclopedia.

Ilan Kroo: mentor to the future.

Mike Selig: for drive in airfoil development.

Dan Somers/Richard Eppler/FX Wortman/Dieter Althaus: airfoil development.

Paul MacCready: for knowing what to do from all the crazy ideas he has.

John McMasters: trying to make sense of outrageous ideas.

Ludwig Prandtl: for turning aeronautics into the science it is today.

RT Jones: America's mad scientist.

The **Schweizer** brothers: for making soaring available to the common American.

Mike Riggs: for the first production high aspect ratio hang gliders.

The **Horten** brothers: duh.

Jack Northrop: belief in the way the future should be.

Mark Maughmer: chair to the International Sailplane Development Panel.

John Bosworth: flight research engineer to over 800 X-plane missions (and who hasn't gotten a promotion in over a decade for his contribution).

Gary Krier: research test pilot of the FIRST digital fly-by-wire aircraft (talk about courage!).

Mark "Forger" Stucky: flying everything from hang gliders to the SR-71A including the F-18 HARV and the Eclipse F-106 aero-tow in between.

Col Joe Kittinger: for development of bailout techniques up to 103,000 ft msl the Wright brothers: duh.

Col Joe Lanni: chief test pilot of the F/A-22 and wing commander at Edwards AFB.

John Young: going to the Moon TWICE.

Gene Cernan: going to the Moon TWICE.

Jim Lovell: going to the Moon TWICE and doing it the hard way one time.

Dick Ewers: NASA Research pilot who flew Vietnam, the first gulf War, and has walked away from TWO crashes and still takes time to talk to the Boy Scouts.

Joe Wilson: NASA (ret) for his wealth of knowledge of handling qualities.

Joe Pahle: NASA engineer and researcher of 20+ years in controls, and Sunday school teacher.

Vance Brand: astronaut and friend, who thinks everyone is better than he is.

Gordon Fullerton: who made the transition from test pilot to astronaut and back.

 Bob Storck wrote:
 October 29, 2004

I would give **Jim Marske** equal credit with some of these guys.

Add **Gus Raspet** for inspiring generations of future aerodynamicists.

Paul Bikle for shaping so many impossible projects, and bringing flight measurement from an art to a science.

Stan Smith contributed much to the X-1, X-2, X-5, and probably created the first real jet powered VTOL aircraft, one that could lift vertically and fly horizontally. Plus he was National Soaring champion almost two decades apart. (and could well have done so another two decades later but for an illness while leading the competition in the 60s!).

Dick Johnson has been national soaring champion too many times to count, and refined the art of aerodynamic improvement and standardized performance measurement.

John Roncz for remarkable intuitive airfoil development, the heart of so many recent lifting surface and propeller projects.

Glider and sailplane designers extraordinary. Each of these Americans had a remarkable impact on the science and the sport in their time:

Dick Schreder
Hawley Bowlus
Irv Prue
Harland Ross
Don Mitchell

Frank Zaic for teaching so many of us about flight basics as youngsters.

Mike Collins deserves special mention for not only Gemini and Apollo, but for bringing the Air and Space Museum to fruition.

Paul Garber for keeping the flame of aviation alive within the Smithsonian from 1917 until his death well after the Mall museum was a reality. (For a reality check, where is the Smithsonian Car Museum? Or the Boat Museum? or the Train Museum?)

Jimmy Doolittle for first Doctorate in Aero Engineering; first blind flight; championing high octane fuel that wound up being the allies secret advantage in WWII, military and civil air racing championships, to say nothing of his military record.

Charles Blair for Polar navigation.

 Andre Martins wrote:
 October 26, 2004

Is there time to add another name?

Alberto Santos-Dumont - Brazilian aviation pioneer. Son of a wealthy coffee tycoon, Alberto went to study engineering in Paris in the late 1800's. Designed several dirigible airships, winning a prize at the turn of the century for being able to perform a controlled airship flight around the Eiffel tower and coming back to the same spot. Turning his attention to heavier-than-air flight, he designed his own (original) airplane, the No. 14-bis, with which he performed a 60 m powered flight (without any launching devices) in 1906, at a 2~3 meter height, witnessed by a huge crowd, press and (early) aviation authorities of the time. His flight is believed to be the "big-bang" of heavier-than-air flight in Europe, inspiring people like Voisin, Bleriot

and Farman to proceed in their efforts. A very prolific designer, the later came up with the No. 19 "Demoiselle" ("Lady") in 1909, which can be considered the predecessor of most light plane designs that came later (tractor engine, high wing, Penaud configuration) and which he used as personal transportation (!). Alberto did not think he should patent his inventions, making everything public instead. For instance, the plans for the "Demoiselle" were published in the "Popular Mechanics" magazine, from which several planes were built by people around the world (including a handful in the US).

 David Lednicer
 Oct 23, 2004

I have to take issue with one "hero"

John Roncz for remarkable intuitive airfoil development, the heart of so many recent lifting surface and propeller projects.

I worked for him for three years and observed that he was the biggest grandstander that I have ever seen. He is far too widely sung for accomplishments that are actually quite minor. I have known and worked with airfoil and propeller designers that have done far more, in complete obscurity.

John once told me that he knew more about boundary layers than anyone that had ever lived. My response was that Ludwig Prandtl and **Theodore von Karman** were spinning in their graves.

I realized that the time had come to quit working for John when I found myself out front of his house, explaining to him why the perpetual motion machine he had "invented" wouldn't work, while he painted his garage door in his pajamas...

I think my real issue with John is that he has worked to de-legitimize the engineers working in the trenches. There are a lot of truly unsung heroes out there that John claims are "brain dead". The end result is that the world looks at John as a genius and the rest of the engineering community as dumb idiots.

The truth is that he spends a lot of time working the media, while the typical engineer spends this time getting the job done right. Examples: you have probably never heard of **Bernie Gratzner**, but Bernie worked at Boeing starting with the 367-80 and after he retired he was the brains behind the Aviation Partners winglets (he's in his 80s and still active).

How about **Bill Cook**, who started at Boeing on the B-29 and was a huge force on the B-47, 367-80 and everything up to the YC-14 (he's also in his 80s(?) and still active). Or **Jack Wimpress**, who was a huge

part of the YC-14 and many other Boeings. There is also **George Schairer**, who started at Consolidated and was a big part of the B-24 and B-32. Then he moved to Boeing and was instrumental in the B-47 and B-52 (he was one of the famous four who designed the B-52 over one weekend in a Dayton hotel room). How about **Hank Borst**, who was Mr. Propellers in the US for a long time. And there is my good friend **Dick Scherrer**, who was the head of PD on the S-3 Viking, before moving to the Skunk Works where he was the head of PD on the Have Blue. Then, he moved to Northrop where he headed up PD on the B-2. Dick's 85 and still designing airplanes, along with building a new house over in Port Townsend. How about **Ian Gilchrist**, who was Mr. Transonic Airfoils at Boeing and then head of aero on the Learfan. When this went bust, he was the aero designer of the SJ30. Since then, he has been involved with fixing the AASI JetCruzer and designing the Ayres Loadmaster and Eclipse. He sits in the office next to mine and continues to crank them out. The list goes on, but the common theme is that they all never grandstanded in front of the media.

John's output might appear prolific, but how about this: I have done engineering work on every Boeing jet airliner model, including most subtypes (eg. 737 Initial models, Classics and Next Generation), every Douglas jet airliner model, every Airbus jet airliner, except the A310, several other jet airliners (BAC 1-11, etc.), every Gulfstream business jet model, every Learjet model, every Beech/Raytheon jet and turboprop model (except the one-off jet King Air and the turboprop Lightning), a lot of other turboprops and quite a few military combat jets (I'm working on a mod to a Su-30 right now). I also figured out how to cut the fuel burn of a Learjet 35 by 5%, which is the basis of the just certified Raisbeck ZR mod. The difference is that I don't spend the time getting my story published (unless this rant is considered).

The rule I've learned is that those getting the press are usually not those who deserve it.

Bob Storck wrote:

While I'm somewhat aware of his ego, and I suspect you have personal issues with John, is he not responsible for some excellent work?

Our society is full of folks whose flaws are legendary, and a lot of pioneers have undermined the value of their work by too much puffery and exaggerated claims. Custer, Bernoulli and Richard Byrd come to mind. Yet, does this disqualify them for their undisputed accomplishments?

In Roncz' case, the sheer volume of his work makes him noteworthy.

Jim Marske wrote:
October 28, 2004

I was afraid I would get sucked into this debate. Despite some differences, I have a lot of respect for John Roncz. John is very intelligent. He can be very entertaining. He is highly respected among the EAA crowd. He knows how to make a computer dance in developing airfoils. You must keep in mind that he is not professionally trained in aerodynamics. Most often this is a blessing because it steals a lot of creativity out of you. John is a creative person. He is pretty much self taught in aerodynamics. We had hired him to do the computer aerodynamics on the Genesis sailplane. Unfortunately, it was his first sailplane design. He had a large training curve to overcome to get up to speed. Several vital mistakes were made. He is like the rest of us. We all make mistakes - especially on something new like a flying wing.

Does John have an ego? Perhaps. Who is to say how our ego would inflate if we had the same notoriety. Opinionated? I know I can be if I'm positive I'm right. There were several times when I feel John overstepped his authority to get a point across or take all the credit for the design.

Getting back to the topic in hand. This is a flying wing group. Let's call on heroes of flying wings. I have not heard the names of **Charles Fauvel**, **Alexander Lippisch** or **Al Backstrom** besides the well-known names of John Northrop and the Horten brothers. Then there are **J.W. Dunne** and **Jose Weiss** and my hero **Rene Arnoux**. We must not forget the **Wenk-Peschke's** 'Weltensegler' flying wing sailplane which inspired many aircraft designers at the 1921 meet at the Wasserkuppe in Germany.

(ed. - I found this item interesting in light of the successful X-Prize flights by Burt Rutan's group.)
Fri, 22 Oct 2004 10:59:49 EDT

From: evolbaby@aol.com
Subject: No sooner said than done: Privatization & Space Exploration & Bill Shatner

Well, looks like a new space race is on. This time with celebrity power! I could go on with a million jokes but I'll leave that up to guys like Norm Crosby.

Best,
Greg

<http://www.cnn.com/2004/WORLD/europe/10/22/branson.space/index.html>

Shatner aims for real 'Star Trek'
 Friday, October 22, 2004 Posted: 10:40 AM EDT (1440 GMT)

LONDON, England -- William Shatner wants to boldly go where he's only pretended to go so far.

The "Star Trek" star is among more than 7,000 people who have told Richard Branson they would gladly pay him \$210,000 (£115,000) for a trip aboard his planned spacecraft, the entrepreneur said Friday.

Former Red Hot Chili Peppers guitarist Dave Navarro has signed up for a ride, and a Hollywood director who was not identified has booked an entire ship.

Trevor Beattie, chairman of the ad agency TBWA -- responsible for campaigns such as the "Hello Boys" Wonderbra campaign with Eva Herzigova -- offered to send a check as soon as the project was launched last month.

In all, more than \$1.45 billion (£800 million) has been pledged -- years before the Virgin Galactic spaceship is even built, Branson said.

Branson, 54, is pouring \$135 million (£74 million) into his latest commercial experiment, which promises to send the paying public 70 miles above the planet to experience six minutes of weightlessness and see the curvature of the Earth.

Speaking from the Mojave Desert in California, Branson told the UK's Press Association he was overwhelmed by the response.

"We are extremely pleased because it just means in a sense that the gamble we took seems to have paid off," he said.

"Market research suggested that there were that sort of number of people willing to agree to that sort of price.

"We have committed £60 million and we have had a tremendous take-up. All indicators are that the risk was worth taking.

In addition to that amount, Virgin has spent £14 million buying the licensing rights to Burt Rutan's SpaceShipOne, which successfully launched into space twice earlier this month to win the \$10 million Ansari X Prize.

Five- or nine-seater spacecraft are being designed which will travel at three times the speed of sound. The journey into space will last around three and a half hours.

Despite the interest, Branson said the first flight will be reserved for him and his family -- including his father, Ted.

The spacecraft is scheduled to be ready in 2008 -- to coincide with the elder Branson's 90th birthday.

"My dad has put his hand up and will be 90 at the time, my kids definitely want to come and if there is room for my mum she will come as well," Branson said.

If his father joined the flight, he would be the oldest person to fly in space, beating U.S. senator and space pioneer John Glenn, who went back into space in 2001 at age 77.

Alongside would be his mother Eve, 80, his 21-year-old daughter Holly and 18-year-old son Sam.

But Branson said his wife, Joan, has no desire to leave the planet.

"My kids definitely want to go, my parents definitely want to go, but Joan will have her feet firmly on the ground, I suspect, trying to encourage the kids to stay on the ground."

Virgin will build five spaceships, and Branson said he hopes they will eventually be launched from various stations around the world, including Europe.

"If we can make it a success, then I hope we can lower the price so that more people can realize their dream and go into space."

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