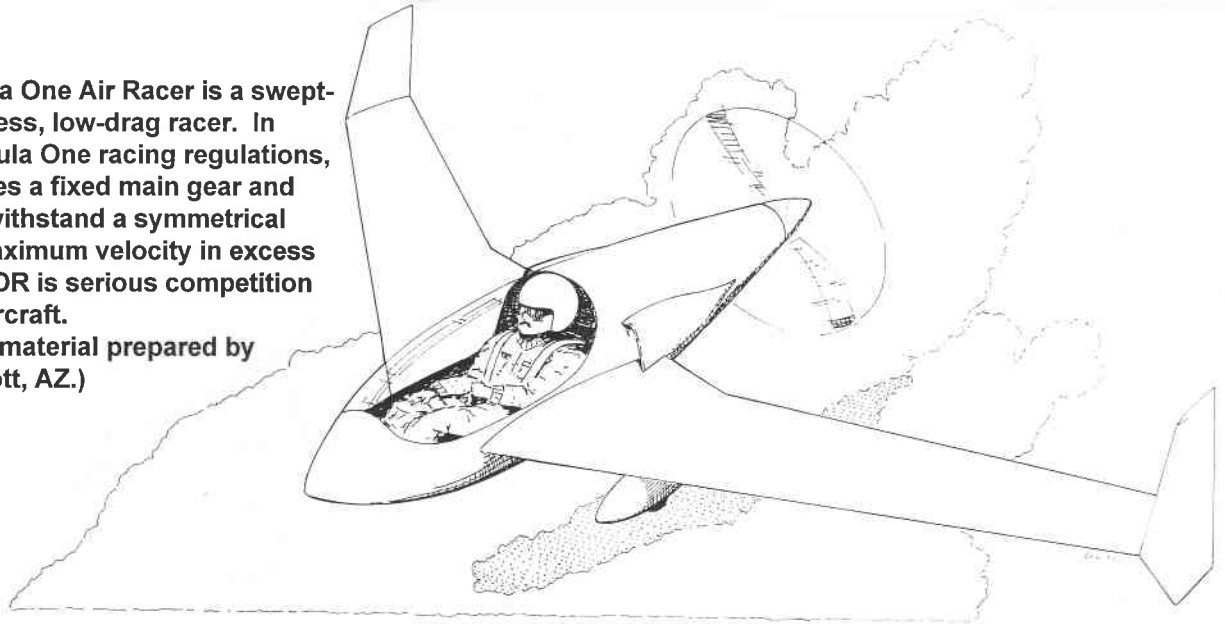


T.W.I.T.T. NEWSLETTER

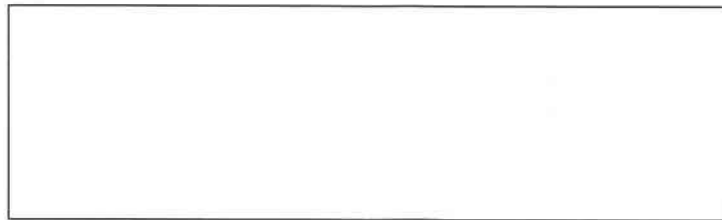
The REACTOR Formula One Air Racer is a swept-wing, pusher-type tailless, low-drag racer. In compliance with Formula One racing regulations, this design incorporates a fixed main gear and structural stability to withstand a symmetrical +6g pull-up. With a maximum velocity in excess of 260 kts, the REACTOR is serious competition for existing winning aircraft.

(Source: Promotional material prepared by Dean Rosenlof, Prescott, AZ.)



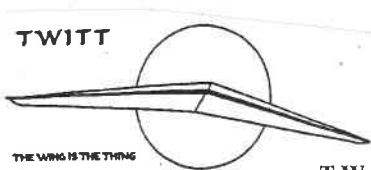
T.W.I.T.T.

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



The number to the right of your name indicates the last issue of your current subscription, e.g., **9612** means this is your last issue unless renewed.

Next TWITT meeting: Saturday, January 18, 1997, beginning at 1330 hrs at hanger A-4, Gillespie Field, El Cajon, CA (first hanger row on Joe Crosson Drive - East side of Gillespie).



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

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

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

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- Vice Pres: Bob Chase (818) 336-5485
- Secretary: Phillip Burgers (619) 563-5465
- Treasurer: Bob Fronius (619) 224-1497
- Editor: Andy Kecskes

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Meetings are held on the third Saturday of every other month (beginning with January), at 1:30 PM, at Hanger A-4, Gillespie Field, El Cajon, California (first row of hangers on the south end of Joe Crosson Drive, east side of Gillespie).

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PRESIDENT'S CORNER

Here it is, the HO HO HO time of year again and I haven't even thought about doing my Christmas shopping. Looking at the weather reports each night it seems many of our members aren't having any trouble getting into the spirit since all they see outside their windows is snow. On the other hand, those of us in sunny Southern California have had some of the clearest days we've seen in a long time along with mild temperatures. With very few trees losing their leaves it's hard to tell that winter is upon us.

Recently I received an e-mail from Diedrich Rotert in Hannover, Germany, giving us an address for the PUL 10 manufacturer. This was in response to our request for the information to help Barney Vincelle get in touch with them, and we appreciate his time and effort in getting the address. Diedrich also called the factory and talked with Mr. Panek who said that the PUL 10 is a real Horten flying wing and that it was a small group that had designed and built the plane. Now they are in the process of getting the approval as an experimental plane. Mr. Panek said he would like to answer our members questions concerning the PUL 10, but he would prefer a letter more than a phone call from the U.S. I passed this information along to Barney, and it is too soon to expect an answer back from any inquiry he may have made. For those interested, the address is:

Nurfluegel Flugzeugbau GmbH
 c/o Mr. Panek
 Hauptstr. 38
 D-65558 Hirschberg
 Germany
 Tel. +49-6439-7559

Depending on space, you will see some of the material I have been able to print off of the internet over the past several weeks. This is only a small fraction of the type of information available from the various aviation oriented web sites across the country and throughout the world. I will be looking for more as time goes by and pass them along to you.

That's it for now. Have a Happy Holiday Season and Joyous New Year.



**JANUARY 18, 1997
PROGRAM**

The program for January will be **Gene Larrabee** talking about low speed aerodynamics and other things not related to propellers. He has a wealth of information to pass along that will be of interest and use to many of our members. We will get more details for you by the January newsletter.

As for future programs, if anyone in the Southern California area has an idea for a program and knows of a speaker who could present the information, including yourselves, please give us a call. In the past some of our best programs have been our own members telling us about their specialty in designing or building. Let us know if you have something you would like to offer the group. It doesn't have to be long and fancy, just informative and related to the development of flying wing technology. Give it some thought.



**MINUTES OF THE
NOVEMBER 16, 1996
MEETING**

The start of the meeting was delayed somewhat as we waited for your primary speaker to arrive. Unfortunately, Gene Larrabee marked his calendar wrong and thought it was the next Saturday. (Bruce Carmichael assures us that Gene's January calendar is marked for the 18th.)

To fill in the time **Bob Fronius** took everyone on a walking tour of the hanger area and talked about some of the various propellers that had been gathered together for the day.

One of the first was on a BD-5 displayed by ALTURAIR a company that offers a comprehensive line of custom parts and services for the BD-5 builder. This one had a self contained, manually adjustable propeller that appeared to be very simple to install and use. It is actuated by a knob in the cockpit and through the transfer of hydraulic fluid moves the prop in a wide range of positions which are indicated on an instrument in the cockpit.

Down the row was a hanger full of all types of fully functional props, molds for making them, and an assortment of novelty props made out of wood and plaster. Among these were a Hartzell Q-Tip provide by Bill Orvosh, three Formula 1 carbon fiber racing props from Ray Cote's "Alley Cat" championship racer, a three-bladed ducted fan

system that was never tested from the shop of Bob Fronius, and a test stand with prop provided by Ed Lockhart. Floyd Fronius brought his 2-bladed man-powered propeller that is built up similar to a model sailplane wing and very light, and Don Westergren brought in another type of 4-bladed ducted fan system.

Bob then took everyone over to hanger where the Ryan Cloudster is currently undergoing an annual inspection to get it airworthy after a number of years in storage. The propeller on this motorglider has a 3-position manual system that works at different RPM settings to allow for climb, cruise and feather modes. Bob also had a machined prop hub and wood blades carved by Pete Girard that had been prepared for the Cloudster but it turned out to be too heavy and a lighter version was currently on the aircraft.

Since we didn't know at the time whether or not Gene would be there in time to make his presentation, the meeting was delayed for a while longer. However, Andy went to work talking with two of our newest attendees who had material that would be of interest to the group. When all was said and done, the program developed into a presentation by Dean Rosenlof on his proposed Formula 1 racer flying wing, and Russ Eckre who was there at the request of Phillip Burgers to share information on the Horton Wingless airplane that successfully flew in 1952.

After the usual housekeeping items, Andy asked **Bruce Carmichael** to tell the group a little about the upcoming flying wing exhibit at the National Soaring Museum. Bruce indicated the gathering would probably be about the 18th to 20th of July 1997 at Harris Hill NY, and would feature the work of Al Backstrom, Jim Marske and Don Mitchell. He also mentioned there would be some discussion of Horten flying wings and they were hoping to find a young man that had flown a Kasper ultralight wing to describe this machine. Apparently it could be fully stalled and put in a controlled descent and then move the CG forward again to get it flying. Witkold Kasper had some odd theories about trapped vortices on top of wings and unbelievable lift coefficients so the exhibit would like to have this as part of the presentations. The SWIFT would also be making an appearance. Andy noted that TWITT had sent a bunch of material to Al Backstrom for use as part of the exhibit.

The question was asked about whether NSM would be video taping the presentations so that it could be viewed by those of us who probably wouldn't be able to attend an event as far away as New York. Prior exhibits have been taped and it is expected the 1997 event would be no different. We will get in contact with the organizing committee to see whether or not we can offer any such tape for sale through TWITT, although it probably will be available through the museum or SSA.

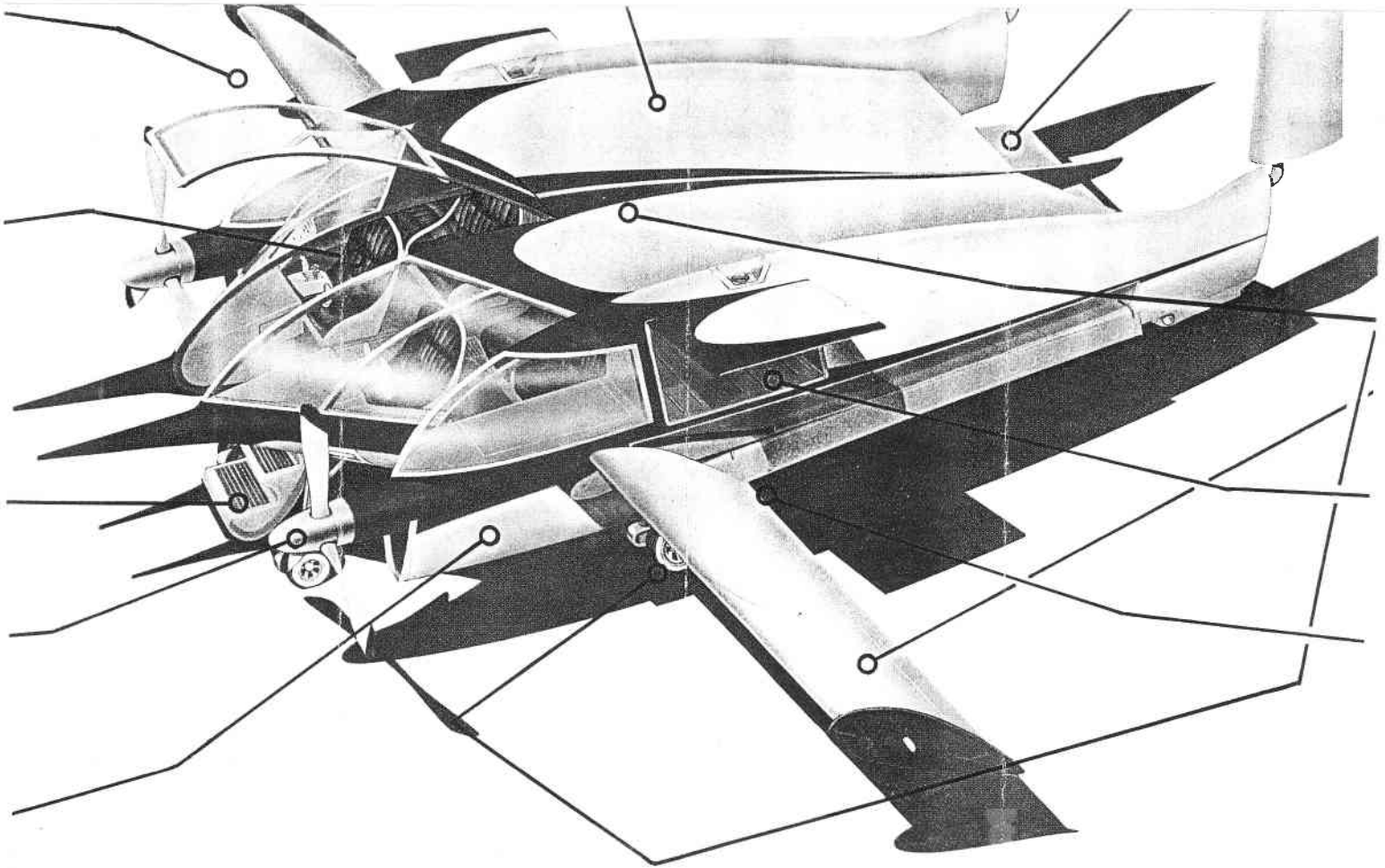
Andy also noted that our Hospitality Chairpersons could not be at the meeting today due to a medical problem that came up after Chris returned from a trip to Illinois. We would miss their unique brand of "goodies" for the day, but Andy noted that June had stepped in and put together some snacks for our enjoyment.

Mark Motely said he was getting interested in a joined wing after looking at some material provided by Bruce Carmichael. Since then Mark has talked with Phillip Burgers and gotten some new ideas on different ways to proceed with model development. Mark will keep us informed of his progress.

Andy asked Phillip Burgers to introduce our first speaker, **Russ Eckre**. After the intro Russ started off the revised program with a description of how he became interested in this "Horton" (*ed. - note the spelling is -ton and not -ten as in Dr. Reimar*) Wingless plane. He learned of William Horton back in the 1960's while a farm boy in North Dakota and answered an ad about selling franchises for this new airplane. Unfortunately the business venture didn't go anywhere as will be seen below.

William Horton called it Wingless since it is a low aspect ratio wing. Russ passed around a picture of what was supposed to be the production model of this plane. Horton had designed the airplane in the early 1950s but didn't have the money to develop it. He then was able to get into a partnership with Howard Hughes and Harlow Curtis since Hughes obviously had the money for producing the plane.

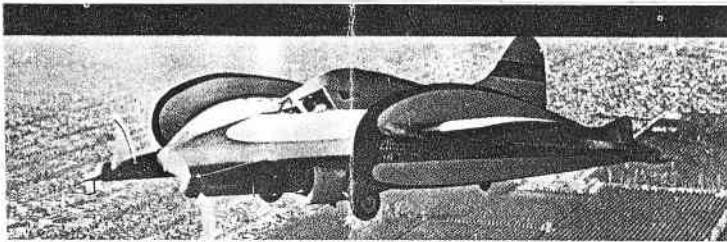
The venture failed not because the airplane didn't fly, but because Hughes wanted to take full credit for the patents and production rights, which Horton refused to do. To prove that money talks, Hughes slapped a law suit on Horton that effectively stopped any further development of the aircraft until this day. Horton, who is in his 80s, is still fighting to get the legal mess cleaned up so he can again try to see his idea fly.



ABOVE: The Horton Wingless production concept drawing from an unknown aviation magazine provided by Russ Eckre. The "wing" sticking out from the side of the wingless was the airbrake and was designed to be retracted into the side of the end plate during cruise. However, none of the test flight video seen at the meeting showed them in the retracted position. The original base price was supposed to be \$25,000 based on a factory production of 50 ships per day, with the avionics package and extra charge.

Hughes managed to get the prototype and a partially constructed production version destroyed. One aspect of the law suit was a statement the aircraft couldn't fly, which the video obviously shows this was not true. At one point in time Horton was put in jail because he was selling stock in a company for an airplane that "couldn't fly" and had several violent confrontations with people associated with Hughes and Curtis because of the law suit and resulting injunctions.

Russ had a video of the prototype making its initial and some subsequent flights out of what is now John Wayne Airport in Orange County CA. The video was sort of a theatrical presentation of waiting for the government to approve the aircraft for flight, preflight preparations and taxiing, and then finally the flight. The most obvious thing that caught the groups attention was the fact that on the ground the outer control wings (which Horton calls airbrakes) were able to be retracted, but none of the flight footage show them retracted so we wonder where the term wingless really came from. (See the partial view in this newsletter.)



ABOVE: The prototype Horton Wingless in flight over Los Angeles. The 5 ton aircraft had been tested for more than 160 hours.

The engines and general layout of the underside of the aircraft had some similarity to a Bamboo Bomber. Russ indicated that indeed the basic airframe was a Bamboo Bomber with a modified cockpit area and of course the low aspect wing structure. He also mentioned that the engines had been upgraded to 450 hp each since the original lower horsepower units weren't sufficient for the aircraft.

Russ managed to get a copy of the patent which turned out to be on the wing end-plates that supposedly prevented the air from washing over the top and making the wing section more efficient.

One of the things that Russ is interested in doing at this point is writing a book about Horton and the plane. He thinks that it would make good reading for aviation buffs, however, he hasn't had the time or money to undertake the venture.

Andy thanked Russ for stepping in and giving us a good presentation at the last minute. Russ then drew the raffle tickets before the group broke for coffee and snacks. The first winner was Wayne Donaldson who chose the socket and driver set, then Bruce Carmichael took a pair of cutting shears, Bill Orvosh selected the Aircraft Spruce catalog, and Ed Lockart got the roll of heavy duty twine to use in tying down his high-speed, camouflaged, high-wing speedster (really it's an Airknocker).

After the break, Andy introduced **Dean Rosenlof** and **Kimberly Heidt** who had come all the way from Phoenix, Arizona to attend today's meeting. Dean received his degree in aerospace engineering from Emery Riddle University in Prescott Arizona. As part of his final project a team was given a choice writing their own mission

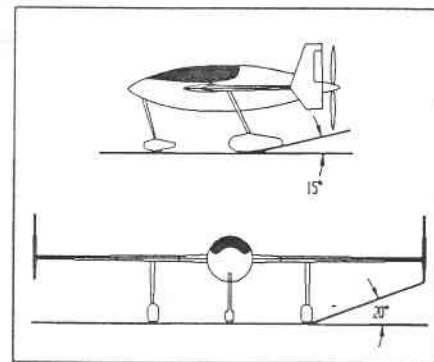
specification for an airplane or take one that was already developed. His team decided on a Pratt & Whitney design competition for a Formula 1 racer they called REACTOR since it was something he was interested in and thought could be built after the graduation.

As they looked at the various configurations available to them, they decided on a flying wing and he has been hooked on flying wings ever since. The plane was initially developed through wind tunnel testing and the usual design techniques but without having talked with actual Formula 1 racing pilots. After the project was done and the paper submitted he got a chance to talk with some of the pilots and found what they had done wrong with the design. He has since been trying to correct some of the problems and come up with a better overall aircraft.

The aircraft specifications are shown in some of the material he left behind and what could be obtained from his internet homepage. Address is:

<http://www.paloverde.com/~rosenlof/reactor.html>

He is currently building a 1/3 scale radio controlled model to see how well it performs. He will then make the necessary modifications to make it fly correctly. That is one of the reasons he and Kim were here today since he figured he could learn more about flying wings. (ed. - He sure picked a good meeting since he got to talk with Bruce Carmichael, Phillip Burgers, Alex Kozloff and Ray Cote.)



ABOVE: Longitudinal and lateral tip over angles. Source: Aircraft Spruce & Specialty contest submission booklet prepared by Dean Rosenlof.

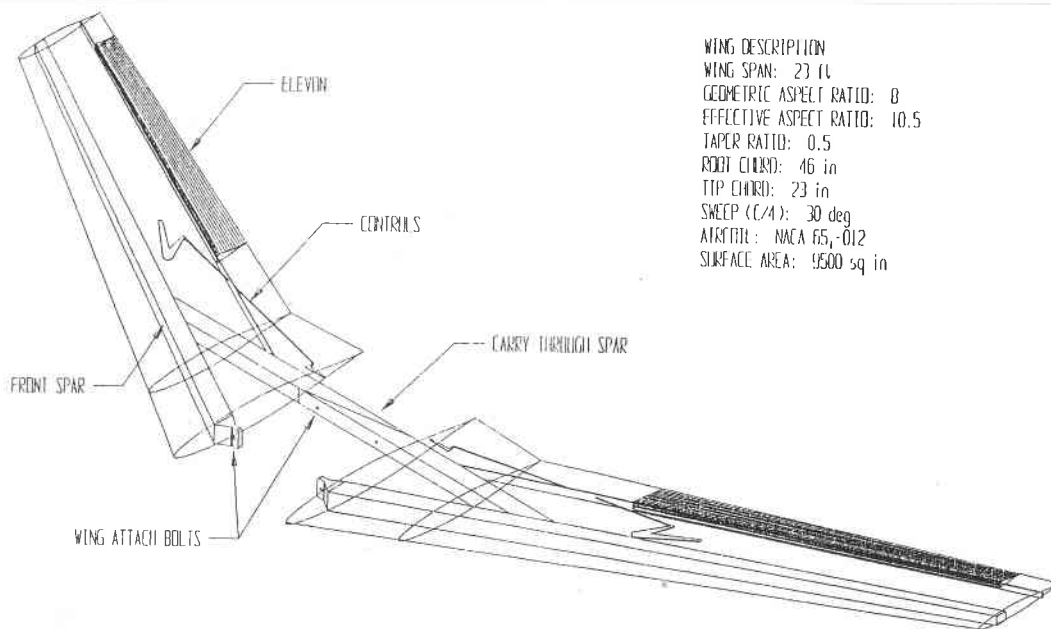
They did 1/10 scale model tests in a wind tunnel at the university. These were mainly trend data tests with various configurations ending up with winglets, a 30 degree swept wing, a 23' wing span and an effective A/R of about 9. They tried to get a laminar fuselage with a pusher configuration and fixed landing gear. As they got further into their research they learned there wasn't as much information available on flying wings as there was on conventional aircraft, so the team made some assumptions and filled in data as best they could.

Dean passed around two of the project booklets that the team produced to support their project and both received good compliments from our group.

Bruce asked about what airfoil they chose, and Dean indicated it was initially a series 65 symmetrical since they really didn't know any better. He now knows that there are better airfoils to use which will one of the things he can test with his model.

these things that came out after the design had been locked up for the final submission. He is still learning and had about as many questions for member of TWITT as the members had about the project.

With no more questions from the audience, Andy thanked Dean for stepping in and completing an interesting program for our meeting even though it was not what we had planned.



WING DESCRIPTION
 WING SPAN: 23 ft
 GEOMETRIC ASPECT RATIO: 8
 EFFECTIVE ASPECT RATIO: 10.5
 TAPER RATIO: 0.5
 ROOT CHORD: 46 in
 TIP CHORD: 23 in
 SWEEP (C/A): 30 deg
 AIRFOIL: NACA 651-012
 SURFACE AREA: 9500 sq in

ABOVE: The Reactor's general wing layout and specifications. Source: Aircraft Spruce & Specialty contest submission booklet prepared by Dean Rosenlof.

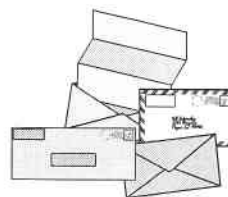
Ed Lockart asked why Pratt & Whitney would have an interest in Formula 1 racers. Dean said he thought it was because P & W was part of a larger pool of money put up for this AIAA sponsored competition. The Reactor was never submitted to the competition since it was for an individual effort and this had turned into a team concept. However, he did submit it to the Aircraft Spruce & Specialty competition about 2 years ago, but didn't win since it is sort of an impractical homebuilt. Kim said he was being a little modest in that the design was one of those in the semi-finals leading up to the selection of the top three finalists. (ed. - Bob thinks that the final winner was a flying wing from Sweden.)

The team is now down to 3 members working together over the internet with plans to put a single place version in the air as sort of a proof of concept. They will then move on to a redesign effort to create a 2-place version which would be more commercially viable.

Phillip asked about the stall characteristics from the wind tunnel tests. Dean said that it was stalling at about 7 to 7 1/2 degrees which turns out to be about half of that available from the airfoil. That is another of the reasons Dean is working on a redesign effort to correct some of

With no more questions from the audience, Andy thanked Dean for stepping in and completing an interesting program for our meeting even though it was not what we had planned.

Andy then wished everyone a happy and joyous holiday season, invited everyone back for a new program in 1997 and adjourned the last meeting of 1996.



LETTERS TO THE EDITOR

11/5/96

TWITT:

I am looking forward to publication of photoprints and short descriptions of tailless semi-scale and scale aircraft models in the newsletter. I have written to some of the TWITT members who have had their aircraft in the newsletter.

Concerning newsletter No. 116 from February 1996 on page 8, you showed some tailless models from the publication Design For Flight. I am very interested to know

where this publication can be obtained. Finally, I am very interested in addresses of such model builders so I may contact them about this.

I would enjoy hearing from you at my address in Florida and remain with best regards.

Rudolf Storck, Dipl. Ing.
 Bruckmeierweg 2
 82041 Deisenhofen
 Germany

(ed. - First I must apologize to Rudolf on not getting the information to him while he was in the US. The letter got sidetracked for a while, but as you will see phone contact with the model builder would have been difficult anyway.

The models were built by Bernie Gross, I am imagining in the late 1940s, and were featured in the magazine article he sent to us. Bernie is a deaf mute and uses a special phone machine to talk with others who have similar equipment. I don't know if the magazine is even published anymore or whether a copy of the original can be obtained although Bernie does have a copy.

For Rudolf, now that he is back in Germany, I have included Bernie's mailing address so you may write to him and have him explain more about his models.

For Bernie, I have included Rudolf's address if you care to write to him with a description of some of your models including wing spans, construction type, etc. and any prints you might be able to spare that show them in more detail.

Bernard Gross
 3535 Acorde
 Palmdale, CA 93550 USA

We hope the two of you can get together via the snail mail route and exchange ideas.)

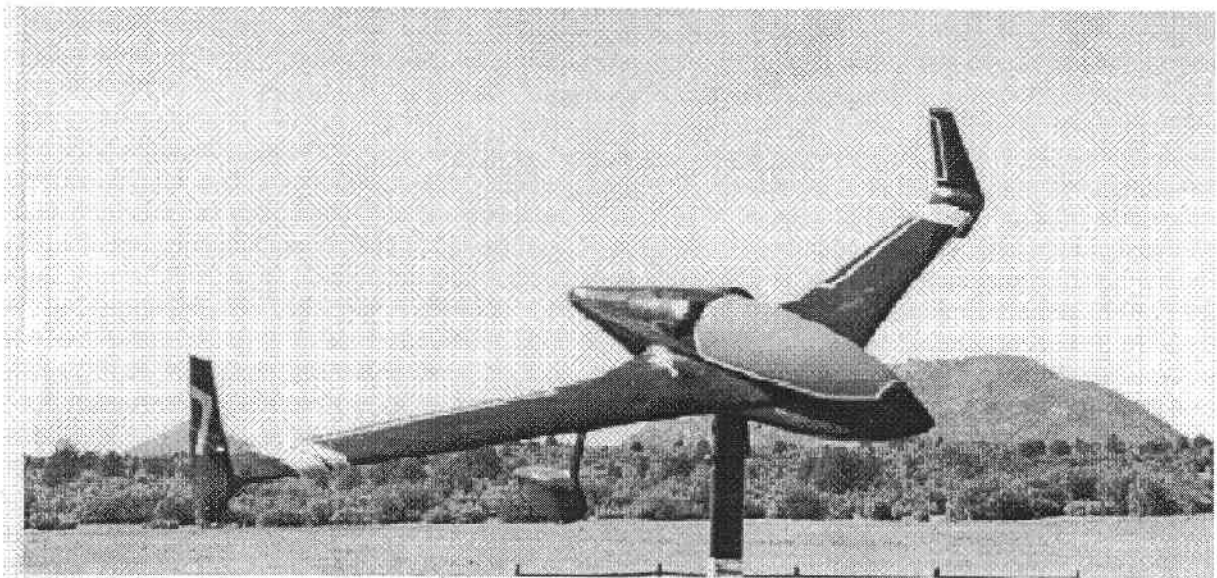
Type	Formula One Air Racer
Maximum Speed	260+ kts
Stall Speed	57 kts
Engine	Continental O-200
Empty Weight	500 lbs
T/O Weight	715 lbs
Range	25 miles

Reactor Specifications

**1997 NSM
 Designers/Builders
 Exhibit**

Bob Fronius recently received a letter from Paul Schweizer, Chairman NSM Exhibits Committee, explaining the subject for the 1997 Designers/Builders Exhibit at the National Soaring Museum (NSM) at Harris Hill, NY. The letter contained the following:

"On another matter, this year our Designers/Builders Exhibit will feature Al Backstrom, Jim Marske and Don Mitchell and their flying wing sailplanes. We are looking for anything related to flying wings for the exhibit and wonder whether TWITT has any material. Al Backstrom says that he has some material from TWITT,



ABOVE: The 1/10 scale wind tunnel model of the Reactor taken from Dean Rosenlof's internet homepage.

so maybe you have already sent it to him.

"We are planning on a Symposium on Flying Wings in connection with the Flying Wing exhibit and are trying to determine whether to have this on the Friday, May 1st, of the Hall of Fame Weekend when we dedicate the Exhibit or on the Thursday July 17th, the day before the start of the Eastern SHA Workshop. Is there any chance that you, June and other members of TWITT can come? If so, which date would you prefer?"

Paul's assumption was correct in that we sent pictures and audio material to Al Backstrom to work into part of the exhibit program. This included Don Mitchell's talks at Tehachapi and a TWITT meeting where he talked about his interest in flying wings.

If any of our members are interested in attending the Exhibit and would like to have a say as to when it will be, please drop us a note or give us a call. I would think that for most TWITT homebuilders it would be more beneficial to have it in conjunction with the SHA Workshop.

This is a fabulous opportunity for other members of the soaring community to see the beauty and efficiency of flying wing sailplanes and maybe spark some new interest. Although TWITT may not have a direct representative at the Exhibit, we will be providing an updated version of our information handout to the organizers so it will be available to those in attendance.

WEB SITES

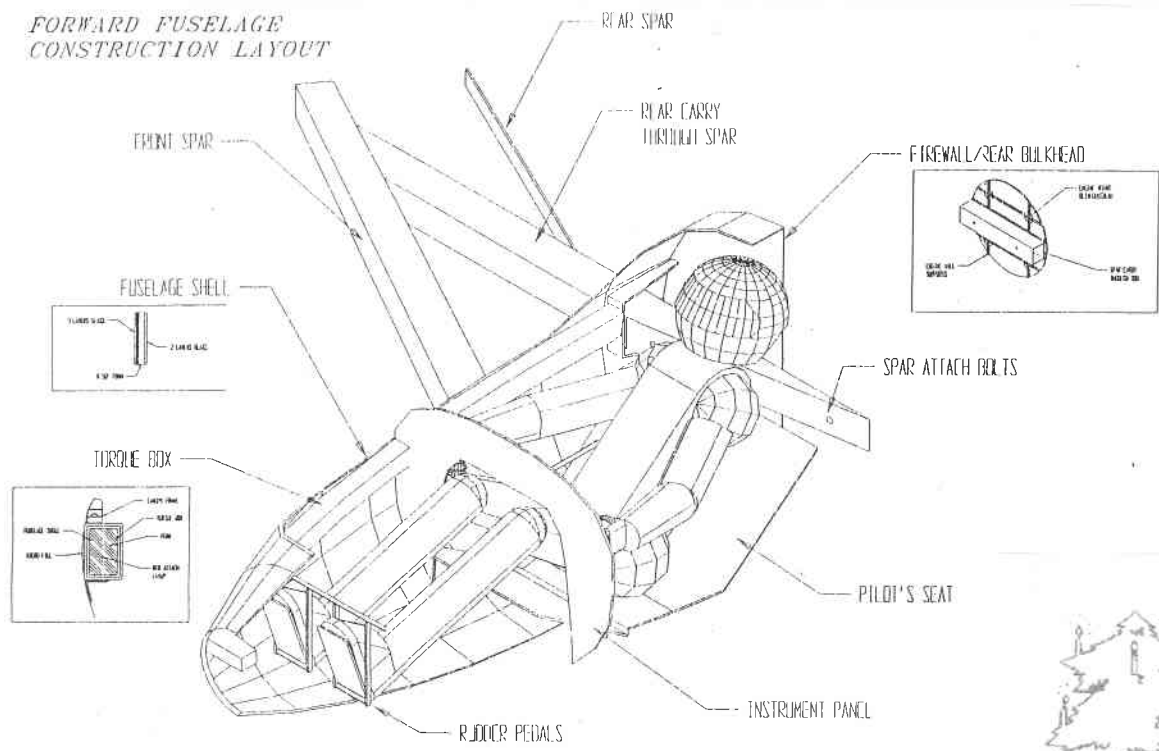
For those of you who like to look at things on the worldwide web, here are a couple of homepages where you can find flying wing and other material of interest.

<http://www.teleport.com/~dbullard> or <http://www.teleport.com/~dbullard/nurflugel>

These will get you to either Bullard's homepage that has a lot of varying interests that you can choose from, or you can use the nurflugel address and go directly to his flying wing pages. I have included some of the material he has on these pages in this month's newsletter.

<http://www.dfrf.nasa.gov/PhotoServer>

This will get you into the Dryden Flight Research Center's page of project photographs where you can choose the aircraft and size of file to download. Depending on your modem speed, you may want to stay with the smaller KB sized files to minimize the download time. I have included a couple of the items I printed off the pages in this month's newsletter.



ABOVE: Reators forward fuselage layout showing just how tight the pilot space would be to minimize frontal area.



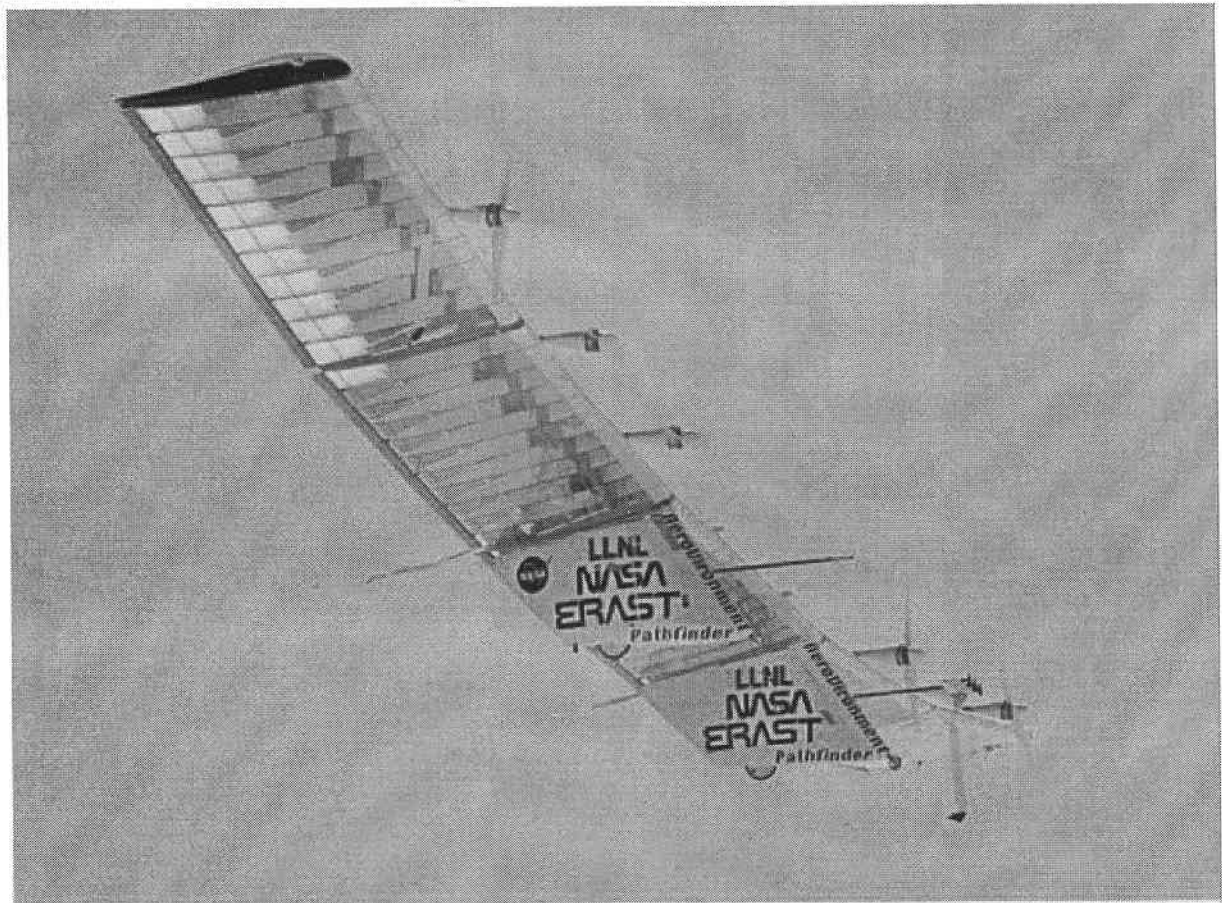
BELOW & PAGE 9: These are photos from the Dryden Flight Research web pages showing the X-31 Enhanced Fighter Maneuverability demonstrator (delta wing with canard and trust vectoring paddles mounted on the aft fuselage area).

The Pathfinder is a 98' span sub scale proof of concept vehicle for an extremely long duration solar powered aircraft that would have a span of almost 200'. It was built by AeroVironment Inc. in California.



Dryden Flight Research Center EC94 42478-8 Photographed 1994
X-31 and F-18





Dryden Flight Research Center EC95 43207-76 Photographed 7/27/95
Pathfinder Research Flight



Dryden Flight Research Center EC96-43817-13 Photographed 11/19/96
Pathfinder Flight #1. NASA photo by Carla Thomas

