

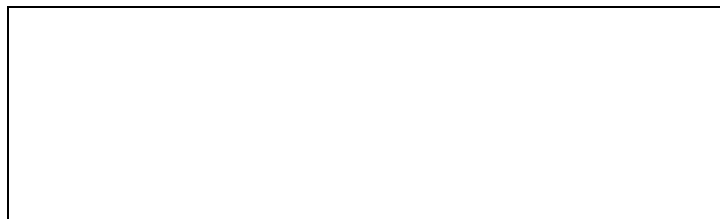
# T.W.I.T.T. NEWSLETTER



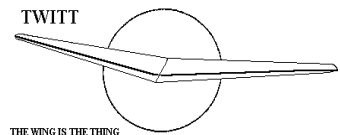
Fauvel AV 36 (2014). Source: <https://abpic.co.uk/pictures/model/Fauvel AV.36>

## **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  
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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Gatherings are held on the third Saturday of every odd numbered month, 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 was surprised to see in the April 2018 issue of Model Aviation an article on pages 42-45 about fixed wing FPV racing. These are flying wing models being raced around a course at speeds up to 100 mph. This is an off-shoot of drone racing so the pilots are wearing visors linked to onboard cameras going around well defined course markers. Looks like really tense flying to me, but then I my own problems just flying regular radio controlled airplanes and gliders. If you can find a copy of the magazine at your local library or from a friend who flies R/C.

I have included some new drawings of Robert Hoppe's flying wing that we showcased about this time last year. It is good to see that he is continuing with the aircraft's development.

The Nurflugel group was a little more active than it has been for the past couple of months, so I threw their message traffic in for your reading enjoyment.

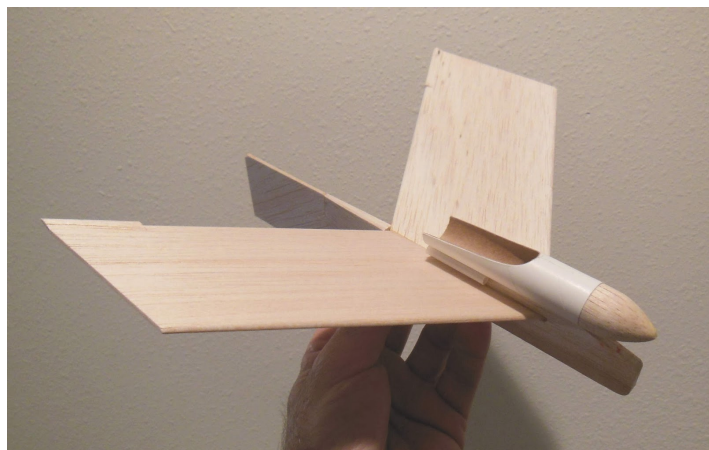
I hope you are getting back into your flying season and enjoying being back in the air again.



**LETTERS TO THE EDITOR**

Hello Andy,

I was just looking up links to post in a reply to a swept-wing tailless model rocket boost-glider discussion thread on “Ye Olde Rocket Forum” (YORF), when I came across a possible celebrity connection to Al Backstrom’s Super Plank tailless sailplane. (The YORF thread [it also contains photographs], which your readers may also find interesting, is *here* <http://www.oldrocketforum.com/showthread.php?p=219711#post219711> . The tailless boost-glider being discussed in this thread is a classic design by SAI [Space Age Industries], called the Mini Bat [see:

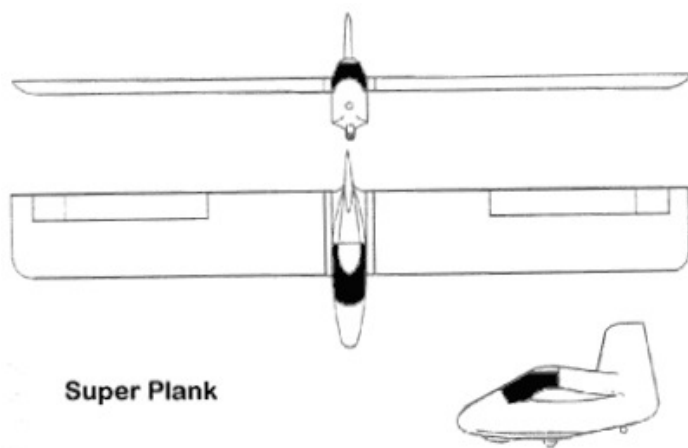


[www.google.com/search?source=hp&ei=e3moWoXMHoiU0gLg\\_o-AAg&q=SAI+Mini+Bat+boost-glider&oq=SAI+Mini+Bat+boost-glider&gs\\_l=psy-ab.12...1706.15045.0.17300.25.25.0.0.0.122.2665.3j22.25.0....0...1c.1.64.psy-ab..0.22.2329...0j46j0i131k1j0i46k1j0i131i46k1j46i131k1j0i10k1j0i22i30k1j0i22i10i30k1j33i160k1j33i22i29i30k1.0.6SRqxneu22Y](http://www.google.com/search?source=hp&ei=e3moWoXMHoiU0gLg_o-AAg&q=SAI+Mini+Bat+boost-glider&oq=SAI+Mini+Bat+boost-glider&gs_l=psy-ab.12...1706.15045.0.17300.25.25.0.0.0.122.2665.3j22.25.0....0...1c.1.64.psy-ab..0.22.2329...0j46j0i131k1j0i46k1j0i131i46k1j46i131k1j0i10k1j0i22i30k1j0i22i10i30k1j33i160k1j33i22i29i30k1.0.6SRqxneu22Y) ].)

Regarding the Super Plank sailplane:

Some time ago I had read online that—as the caption of the Super Plank picture *here*

[http://claudel.dopp.free.fr/Les\\_planeurs/Descriptions\\_planeurs/Backstrom\\_EPB-1C/Backstrom\\_EPB-1C.htm](http://claudel.dopp.free.fr/Les_planeurs/Descriptions_planeurs/Backstrom_EPB-1C/Backstrom_EPB-1C.htm)



says (this website also contains other Backstrom Plank website links)--“An improved version of the EPB-1C, called “**Super Plank**”, was developed in 1973. The wingspan was increased to 9.30 m and the fuselage extended. At least two copies of this version were built by Larry Linville and Dennis Harmon.” I wonder if the Larry Linville mentioned in the photo caption (and on *this*

<http://www.nurflugel.com/Nurflugel/Fauvel/backstrom.htm>

website) was the actor who—perhaps most famously—played Major Frank Burns (see: [http://en.wikipedia.org/wiki/Larry\\_Linville](http://en.wikipedia.org/wiki/Larry_Linville) ) on the television series “M\*A\*S\*H?” His obituary (see:

<http://lasvegassun.com/news/2000/apr/14/mash-co-star-shaken-by-linilles-death/> )

says that “Linville was a third-generation Californian born in Ojai, who began a lifelong hobby of designing and flying gliders as a child. He majored in engineering at the University of Colorado, where he performed with a local civic theater group, starring in ‘The Glass Menagerie’.”

The swept-wing tailless configuration—which was used in the Snark (see:



[www.google.com/search?ei=86SoWvOSGsKSjwOlzYmlAg&q=snark+missile&oq=Snark+missile&gs\\_l=psy-ab..1.0.0i67k1j0l2j0i30k114j0i7i5i30k1j0i5i30k112.50111.55366.0.57839.16.11.0.0.0.0.158.999.0j8.8.0....0...1c.1.64.psy-ab..8.8.998...0i13k1j0i7i30k1j0i7i10i30k1j0i13i30k1j0i8i7i30k1j0i8i7i10i30k1.0.1zXLkI57Jq0](http://www.google.com/search?ei=86SoWvOSGsKSjwOlzYmlAg&q=snark+missile&oq=Snark+missile&gs_l=psy-ab..1.0.0i67k1j0l2j0i30k114j0i7i5i30k1j0i5i30k112.50111.55366.0.57839.16.11.0.0.0.0.158.999.0j8.8.0....0...1c.1.64.psy-ab..8.8.998...0i13k1j0i7i30k1j0i7i10i30k1j0i13i30k1j0i8i7i30k1j0i8i7i10i30k1.0.1zXLkI57Jq0) )

and the Regulus I (see:



[www.google.com/search?ei=Bp6oWtT1NZG6jwPF2Y7YAQ&q=regulus+i+missile&oq=Regulus+I+mi&gs\\_l=psy-ab..1.0.0j0i22i30k1i9.131133.137428.0.140518.12.11.0.1.1.0.136.1213.1j10.11.0....0...1c.1.64.psy-ab..0.12.1216...46j0i13i1k1j0i46i67k1j46i67k1j0i46k1.0.ZPJ1dLN4teA](http://www.google.com/search?ei=Bp6oWtT1NZG6jwPF2Y7YAQ&q=regulus+i+missile&oq=Regulus+I+mi&gs_l=psy-ab..1.0.0j0i22i30k1i9.131133.137428.0.140518.12.11.0.1.1.0.136.1213.1j10.11.0....0...1c.1.64.psy-ab..0.12.1216...46j0i13i1k1j0i46i67k1j46i67k1j0i46k1.0.ZPJ1dLN4teA) )

cruise missiles of the 1950s and 1960s—has been adopted for the new air-launched, turbojet-powered AGM-158 JASSM (Joint Air-to-Surface Standoff Missile, see:



[www.google.com/search?source=hp&ei=7p2oWtKxA9TWjwOVmbOIBQ&q=agm-158a+jassm&oq=AGM-158&gs\\_l=psy-ab..1.4.0i5.2383.7630.0.23520.7.7.0.0.0.0.129.742.3j4.7.0....0...1c.1.64.psy-ab..0.7.740...0i13i1k1j0i10k1.0.yHwM\\_ad9u9l](http://www.google.com/search?source=hp&ei=7p2oWtKxA9TWjwOVmbOIBQ&q=agm-158a+jassm&oq=AGM-158&gs_l=psy-ab..1.4.0i5.2383.7630.0.23520.7.7.0.0.0.0.129.742.3j4.7.0....0...1c.1.64.psy-ab..0.7.740...0i13i1k1j0i10k1.0.yHwM_ad9u9l) ).

A video on this Lockheed Martin JASSM page (see: [www.lockheedmartin.com/us/products/jassm.html](http://www.lockheedmartin.com/us/products/jassm.html) ) shows the missile in action.

Here (see: [www.youtube.com/watch?v=zwXLDjYqVgc](http://www.youtube.com/watch?v=zwXLDjYqVgc) ) is another—from just last year, and with still shots, too—video of one of the delta-winged pulsejet RC models.

I just came across videos of tailless (delta-winged) RC pulsejet-powered model airplanes (see: [www.youtube.com/watch?v=r50DRou0LsM](http://www.youtube.com/watch?v=r50DRou0LsM) and [www.youtube.com/watch?v=h6D47Lkfcw](http://www.youtube.com/watch?v=h6D47Lkfcw) [these first two videos also contain still shots, which are ideal for printing out—videos of other such models can be seen \*here\*:

[www.youtube.com/results?search\\_query=delta+wing+RC+pulsejet](http://www.youtube.com/results?search_query=delta+wing+RC+pulsejet) ). Their pulsejet engines, surprisingly, sound like aircraft *piston* engines. These pulsejet models use thick-section, moderate-leading edge sweep subsonic delta planform wings, similar to those of the Avro Vulcan bomber (particularly the early ones with pure delta wings, and the Avro 707 delta wing research aircraft [which were built to gather data for the Vulcan]), with twin (and often inward-canted) low-aspect ratio vertical stabilizers, between which the pulsejet engine is mounted. A full-size airplane built along these lines, using a turbojet, turbofan, or cold jet (motorjet—a ducted fan) for propulsion, would make a sporty pleasure aircraft.

I hope this material will be helpful.

Jason Wentworth

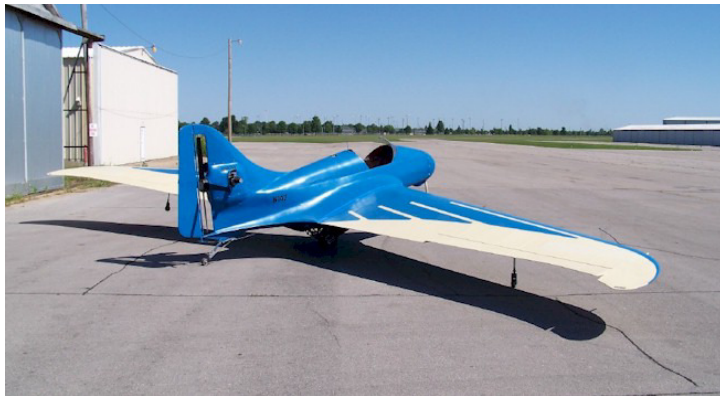
Andy,

**A**ttached are a few drawings of my plane which I feel might be of interest to your readers. Together with the photos I sent you last year this should give them a very good idea of what I am doing. Feel free to publish these as you see fit.

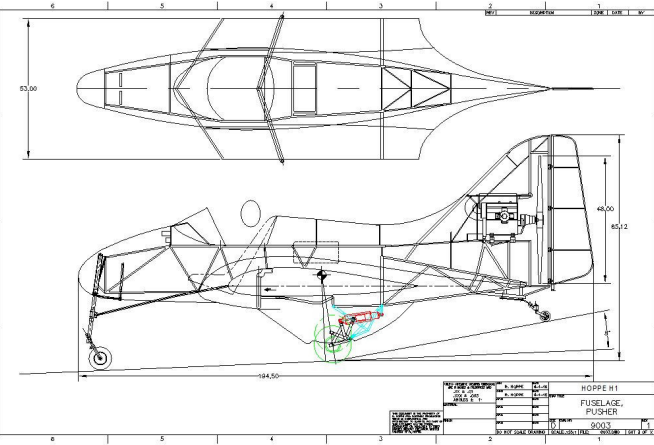
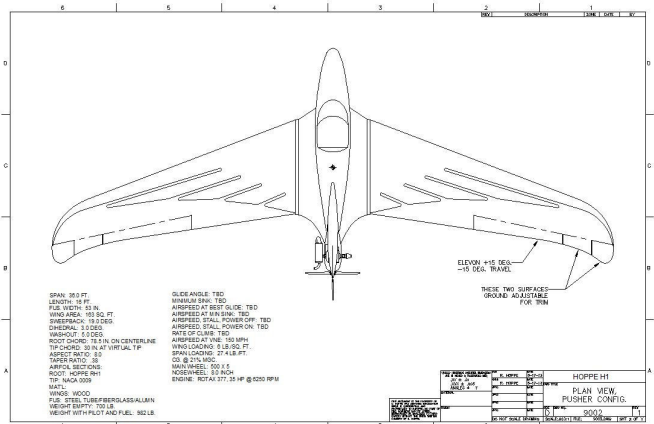
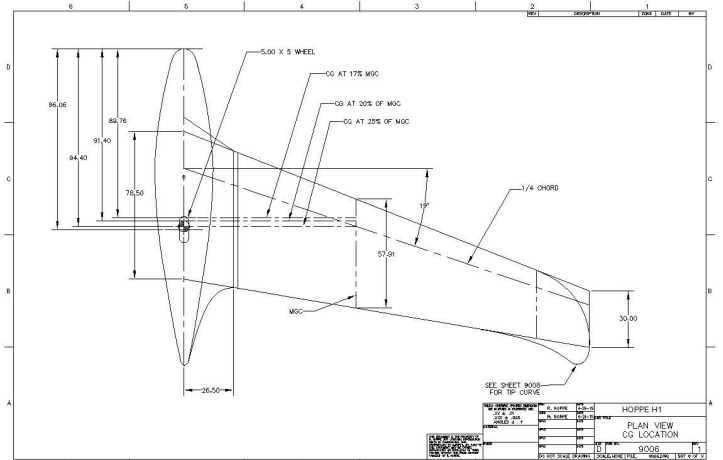
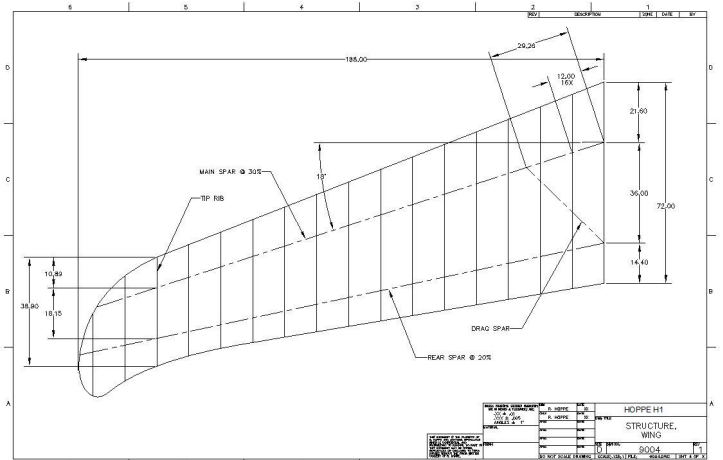
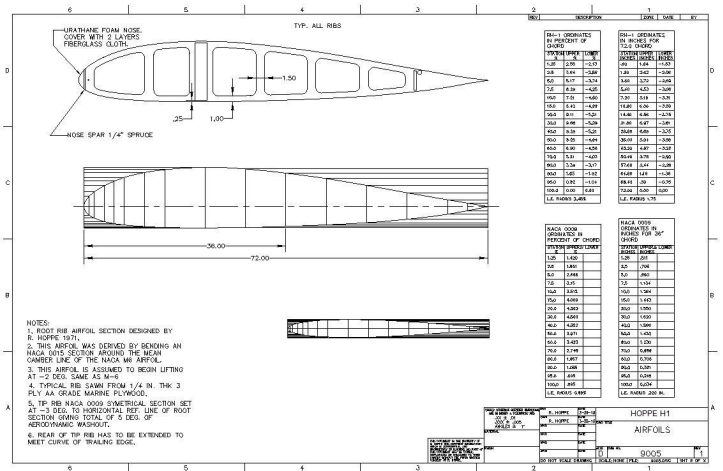
I put 23 hours on it in 2016 and another 10 last summer and I am happy to report that it flies extremely well so far. It is very stable and solid in the air and responds very well to all of the controls. I have not done any stalls or other characterizations yet but hope to do all that this summer. I spent most of last summer cutting into the trailing edge of the wing and installing the trim surfaces at the wingtips and did not get it out to the airport until middle of Sept. and did not have much time to fly it before winter shut me down.

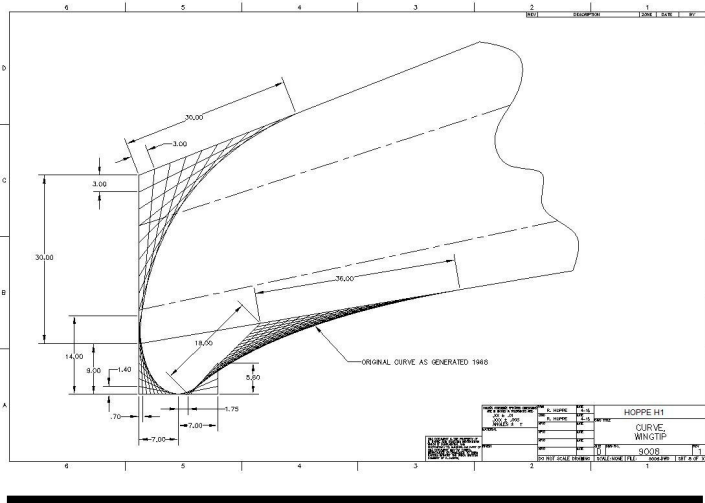
The trim surfaces worked really well and I was able to trim out all of the nose heaviness without using the elevons and picked up 3 or 4 mph. This year it is already out at the airport and I should be able to put 50 or 60 hours on it if nothing else bends or breaks. I'll write again after I have a better idea of how it reacts to slow flight and stalls.

**Robert Hoppe**



Above: The is what it looked like last year.  
 Below: Several of the drawings included with this e-mail.





**Nurflugel Threads**

**A**side from the usual flying bathtub variants tried by NASA, here's one reminiscent of the Horton wingless and similar things. 1972 Rockwell C-1057 "breadbox"

Engineer at Rockwell was tasked with making the Shuttle launch stack shorter, so he turned the payload sideways. Was projected to have lower thermal troubles (light loading) and better cross range and about 2/3 the landing speed of the cranked-delta plane that Rockwell finally built.

The only data I can find online is this model kit

<http://fantastic-plastic.com/RockwellC-1057BreadboxShuttlePage.htm>



John F

**T**he aero concept is sound, and in a bit of hindsight, the Rockwell concept would have been mounted forward at launch, and would have avoided the damage that resulted in the two shuttle accidents.

Cheers,

Bob Storck

**M**ounting it on top of the tankage would block those rocket engines. And eliminated the desire to make the whole thing shorter.

We know how unlikely-seeming many of these all-wing/lifting body things are, yet many of them work, including the Horton, if it's taken as an example of lower-speed lifting body that's entirely workable. I haven't seen Rockwell's numbers, nor anything that takes away fr their assurance that it was workable.

Many said the Rutan SS1 would never work.

John F

**H**allo!: You may like the attached patents, all about tailless flying machines, some as early as 1929. Hallo!: as it seems there was not enough room to move for the patents, I write here the authors and reference numbers, for several Wingless Wonders, it all is in ESPACENET:

- A Berliner US228253; -R Scroggs, US184857; -A Lippisch, US2918233; -M Henter US2194596; -RJ Thompson, US2167143, US2303713; -C Schottroff, US2065401; -WP Fleming, US2294367; -RM Fruits USD123595S; -R Sauvage & R Payen, FR729568; -HM Knight, US2332648.

All I wanna do is have some fun with flying machiens.. Nothing new under the sun, or history repeating? Have a nice season,

regards, Salut +

Jose Gros-Aymerich  
Madrid, Spain

**N**o results found for Berliner, Scoggs, Schottroff, Knight Boundary layer control for the Lippisch.

The Henter planes are great. I'd love to make big

models of the bigger ones. The aileron-flaps on the big ones, combined with rudder mounts look great. Only thing I could ask is to move some props outboard to blow over the tails.

Fleming is interesting. Too bad it never flew.

Are these posted in the group photos or links? Some of them should be, for clear record.

Not directly relevant to the lifting body space vehicle, except maybe the Fleming.

John F

---

**F**irst photo is the TU-404 logistics transport, or the similar Airbus-assisted design for an airliner. Tupolev plane had many engines driving contra-props on top across the trailing edge, while the Airbus had conventional under-wing podded T-fans.

Second photo is a early '70s Sukhoi concept T4MS-200 long range supersonic bomber which was to use all common materials and technologies, but in the lifting body configuration. It was selected as obviously superior, but since Sukhoi was busy with Su-27 and 24, it was sent to Tupolev, who ignored its superiority and built the B-1 larger cousin the "White Swan" (Blackjack")

It would still be a better choice than the copy of a McD/Boeing/NASA BWB which they appear to be actually looking at for PAK-DA.

[https://testpilot.ru/russia/sukhoi/t4/ms/t4ms\\_e.htm](https://testpilot.ru/russia/sukhoi/t4/ms/t4ms_e.htm)  
[https://testpilot.ru/russia/sukhoi/t4/ms/images/200\\_3.gif](https://testpilot.ru/russia/sukhoi/t4/ms/images/200_3.gif)

<http://www.ussr-airspace.com/images/al/sm/109/17022852.jpg>

First suggested as Apollo vehicles, at least one of these went on to be considered for a space nuclear force, in the North American proposed command vehicle.

The smaller ones are very like the "shuttlecock" design of the SpaceShip One.

Note that I'm only referring to actual airplanes of circular design. No vertol or EM thrusters or UFOs needed.

The planform especially of the larger one should seem normal enough, to us here who are acquainted with several actual airplanes which flew, though they looked unlikely if you're not familiar with others.

Such a plane with props on the top surface might be practically normal, as a low aspect-ratio all-wing.

<http://fantastic-plastic.com/LRVCatalogPage.htm>

<http://www.astronautix.com/l/lenticularvehicles.html>

Kehlet argued that a lenticular vehicle, as a manned spacecraft launched into orbit by a conventional booster, had clear advantages over ballistic, lifting body, and winged designs. At hypersonic re-entry speeds it would undergo lower heating and require less shielding. At the same time it was more maneuverable at subsonic speeds than a winged design, and could land at sea or on land without undercarriage. The symmetrical shape meant it would integrate easily into conventional booster designs, without creating excessive drag or asymmetric loads during ascent to orbit.

John F

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**T**his goes in the same category I guess... What's the point of having a lifting body vehicle in... vacuum?

[X-48B Blended Wing Body](#)



Stilgar Arrakis

---

**L**ifting body \_re-entry vehicles\_ (note the name implies they're for atmospheric flight) have to spend lots of time in atmosphere coming back down.

These lenticular vehicles and even the Soviet Uragan ("Spiral" to NATO), lifting body being used in the SNC Dream Chaser space plane have lighter aerodynamic loading and much better re-entry heating conditions than for instance the Death-Trap NASA Shuttle had. More cross-range and slower landing speed too. All of which makes a better vehicle for its mission.

Lifting body subsonic planes have been around since Bruineloi 1921, and suggested before that.

This BWB hype insists that they're futuristic, needing 2040s technology. Not so, to realize great benefits.

Look up the Boeing 754, as a copy of numerous Burnelli designs. Boeing is intransigently against ever building a commercial or logistics lifting body of any sort. That's why they're not in use, not because of any problems with the concept or lacking of any technology.

"Not Invented Here" is strong with Boeing, to the detriment of the State of the Art.

Might as well ask what's the point of landing gear or parachutes or wings or heat-shields in a re-entry vehicle.

Ouch! My bad.

I read the subject and thought of "space vehicle" - not a vehicle to shuttle objects to space. I'm still in awe by Rutan's Space Ship One.

Lesson learned

John F

**AVAILABLE PLANS & REFERENCE MATERIAL**

**VIDEOS AND AUDIO TAPES**



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

**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 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 \$140, postage paid. Add \$15 for foreign shipping.

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