

TAILLESS FOR CROSS COUNTRY (XC)

Last year at about this time we heard about a XC meet in Portland Oregon and decided to go. We didn't enter, but we did take an airplane with us - an FAI maximum area tailless. It wasn't trimmed for flight; in fact, it hadn't been flown at all, having been completed the night before. With the help of several people at the contest (lead weights from Jim Arnold and some great hand launches of our 10 pound monster by Mike Bamberg...) we found that while there was certainly some potential, being severely tail heavy is no way to try to fly a 'ship of this type. We were most grateful for the impressions of others at the contest (particularly Alan Halleck, who got us even more excited about the its potential than we were already). We had such a fun time even without competing, we're planning on going back again this year.

We had the chance a few weeks later to add more weight in the nose and try her out as a cliff soarer. She flew magnificently until pilot error put her in the water. We were certainly heartbroken over a totally destroyed airplane with only 20 minutes of flight time, but we were ecstatic over her performance and determined to build a replacement. The replacement, Pirouette, is now finished and has flown successfully from winch launches.

Why would anyone build an FAI maximum area tailless design? Well, there is a certain morale boost to be gotten from having the biggest airplane at a contest... particularly when it has no tail. Seriously, there are some logical reasons, and we'll outline the major points here:

First, as a general rule, "bigger flies better", and we certainly found this rule to be true while flying our giant.

Second, there is an upper weight limit of 5 kg. (11 pounds) for FAI sailplanes. The weight limit is reached very fast when building a big conventional sailplane.

Third, keep in mind the wings of a conventional sailplane must support all of the aircraft's weight, and all of the flight stresses. The stresses on a XC machine can be extremely high while speeding between thermals and traveling through "microbursts" of turbulence, and it is little wonder the casualty rate for these machines is relatively high. The ultimate effect of the FAI weight limit is to prevent really large conventional sailplanes from having the strength they need.

Tailless designs have an inherently light structure. In fact, it is sometimes difficult to end up with a completed aircraft which meets the minimum wing loading requirements of 4 oz/ft², as we found out with our HL 'wing. Most tailless designs are able to take advantage of what is called "span loading." This is a topic we'll talk about in another article, but the concept translates into more manageable flight loads and an airframe which is easily integrated into a very strong structure. Since the stabilizer of any tailless design is a part of the wing itself, there are no tail feathers to blow off.

Visibility is also of concern when flying XC, as height directly equates to distance and speed, and that's the combination which wins contests. While many color schemes have been tried in an effort to maximize visibility, nothing seems to work so well as having the largest airplane possible. We feel controlling the distribution of surface area can also assist, as a large square is easier to see at altitude than a thin rectangle of the same area.

Our XC machine relies on Dave Jones' "Blackbird 2m" design (the same basis as our RC-HLG). By multiplying all linear dimensions of the 2 meter original by 1.36 we arrived at a wingspan of about 107 inches, a root chord of nearly 27 inches, and a tip chord of over 17 inches. The overall weight of Pirouette is about 10 pounds, and her wing area is just under the FAI maximum of 2325 in². This still makes for "interesting" hand launches, and our 12 volt winch groans if there is a breeze. She turns on a dime and gives change. Her top speed is deceiving because of her size, but it is at least half again as fast

as an equivalently loaded conventional design!

Between now and this year's Portland XC meet we'll be practicing as frequently as possible. See you there!

