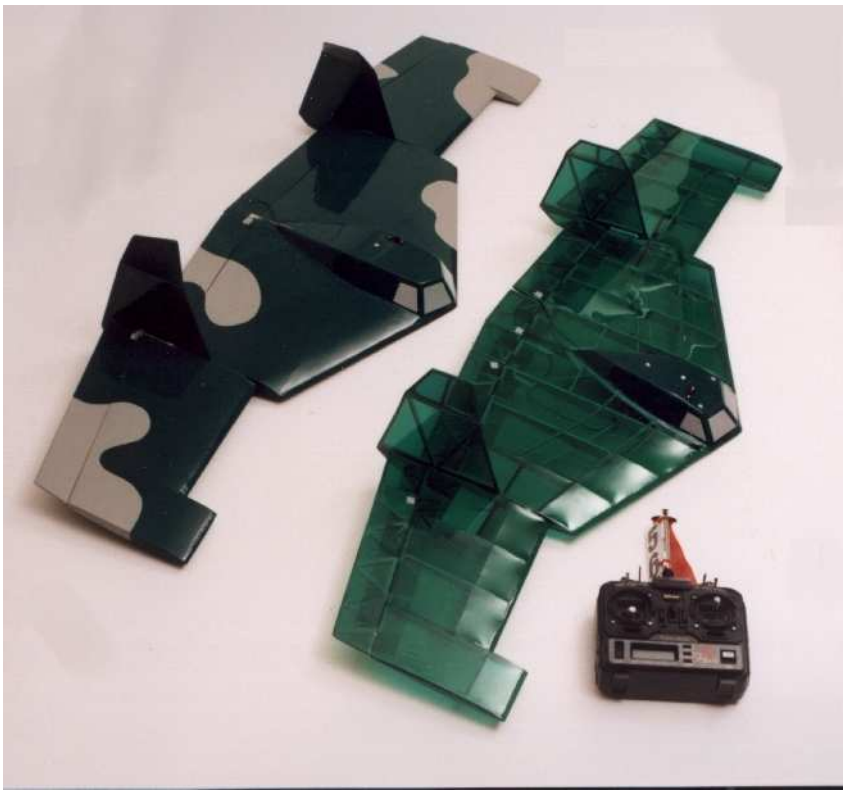
On the 'Wing... #113

Michael St. John's *Tarantula*

Design Intent: Highly maneuverable 100 inch slope soarer with an emphasis on slow speed close-in flying... while making a unique styling statement.

A few weeks ago we received an e-mail message from Michael St. John, Long Beach California, stating simply, "Well, it is the biggest thing I have ever made. Second test flight this weekend." As an attachment, he included a picture of his latest and largest creation. Not satisfied with this simple declaration, we asked Michael to provide more information about "Tarantula," and he forwarded the following report:



Over the last six months I have made four flying wings: a 60 inch foamy utilizing a conventional swept back wing, and three others having this wing platform. Two of the latter wings have a wingspan of 50 inches, 500 in^2 wing area, a fully symmetrical airfoil, and weights of 14 and 23 ounces. Due to the successful flight characteristics of these first two, I decided to make something big.

This wing, named “Tarantula,” has six foam core wing sections to hot-wire cut out. I use my own airfoil. It is a positive camber design, six percent thickness at the swept-back center section, and eight percent at the swept-forward outer wing panels.

Once the sections are cut out they are epoxied together. Two carbon fiber rods are glued as spars to the center wing section. The outer wing panels are positioned 2.5 inches back. This is to reduce the need for additional nose weight to achieve the correct center of gravity, and it looks good too.

One carbon fiber rod is then inserted into both of the outboard wing sections and the center section. The four push rods (Sullivan Gold-N-Cable) are installed. The wing is planked with 1/16" balsa sheet using 3M 77 spray. The outer tips are then attached. To secure all the wing sections, three inch width fiberglass is epoxied to each joint. Ailerons and elevators are three inches wide

Tarantula 105 inch Version

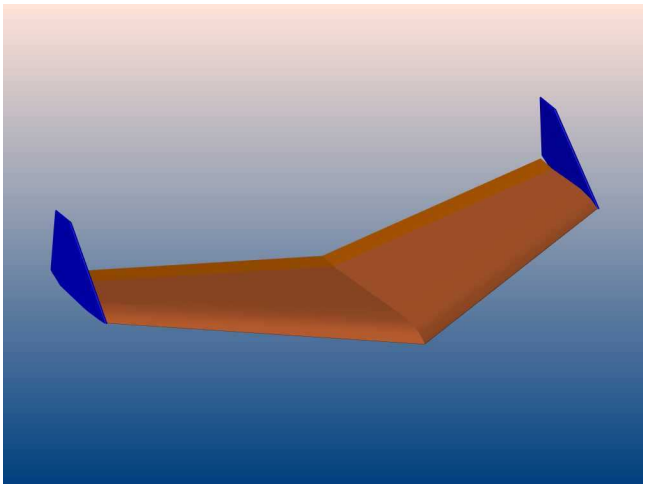
Wing span	105 inches
Wing area	1800 in^2
Airfoil	Semisymmetrical, reflexed
Weight	61 ounces
Wing Loading	4.9 $ounces/ft^2$
Chord, root	24 inches
Wing planform	Swept back - swept forward
Dihedral	Main panels - 1.5 degrees Tips - 20 degrees from horizontal
Wing construction	White foam with balsa sheeting
Control surfaces	Ailerons, elevator, split airbrake
Mixing options	Flaperon, elevons, and ailerons coupled to elevator
Servos	Five
Radio	Airtronics *Radiant*

and are built-up balsa structures. Two vertical stabilizers are used. These are also a built-up balsa structure.
For covering, I used Hobby Shack FlightKote, then painted the camouflage markings with the cheapest paint I could find at Home Depot. The canopy is constructed out of 1/16" balsa sheet, fiberglassed on the inside for strength. To achieve the correct center of gravity, four ounces of lead was added to the nose.

The split airbrake is located at the center portion of the airframe, on the trailing edge, next to the elevators. Each side is six inches long by three inches wide. The left side goes up 50 degrees and the right side goes down 50 degrees. Due to close location to the centerline, the split airbrake has no effect on rolling the airframe. I use the retract switch to operate it (off/on). This was developed from the 50 inch version. That wing carried more speed on landing approaches than I wanted — it just kept flying over the landing site without scrubbing off air speed.

Flying this wing is a real pleasure, mainly due to its tight turning radius and anti-stall characteristics created by the forward-swept outer wing panels. In all of my slope soaring designs, I try to achieve a wing loading of under seven ounces/ft^2. This gives the additional slow speed handling I am looking for.

But the biggest secret in the flight performance is the larger chord wing tips on all three versions. I have used this wing planform for many years now. A full size aircraft cannot have a wing built strong enough, but we can. Modelers, do not look to the next US military fighter aircraft for your next model improvement idea, do it yourself — experiment.



Bigger in this case means different, not better. Yes it is smoother, and more dramatic visually, but it does take more area to fly compared to the two 50 inch cousins. Low rolls next to the cliff's edge... I think not.

At all angles viewed, the design of this wing makes a unique styling statement. This gives me the pleasure of flying the only one like it in the world.

P.S. About that simple swept 'wing... It's my kick-around, let everyone fly it, 60 inch foamy. Yes it is very conventional, but it was my first all foam wing. I made it for the beginner pilot. I felt a 48 inch combat wing is too small for most beginners, and they need the

extra wing length/area for lift and to improve visual reference. This 'wing is modeled with SolidWorks Engineering software.

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