

# Michigan Scout

Product of: **FLY-M FRED'S FLYING MODELS, LLC**

Designed by **Fred Matthis**

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Francis Rogallo with his **Parawing** (designed in 1948 and patented in 1951) attached to a Gemini space capsule model. The NASA wind tunnel tests in 1958 were to determine if the Parawing could be used to return the Gemini capsule to earth. The idea was to fly the capsule in with the possibility of landing on the ground, instead of water landings. NASA's decision: use regular parachutes. Simpler more reliable and less cost.. The included nose angle was 50 degrees.

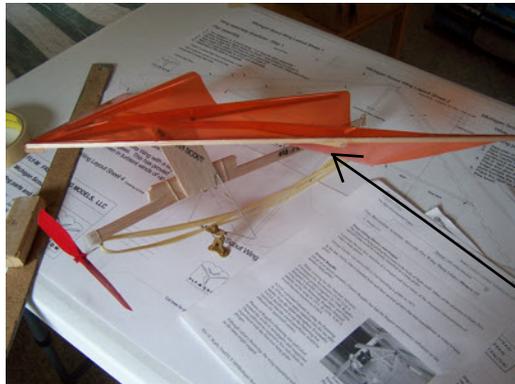


Australian John Dickenson saw the design and adapted it to tow water skiers aloft in 1963. In 1967 John introduced fellow Australian Bill Bennett to the Delta Wing. In 1969 Bennett moves to California and is designing, manufacturing and selling the towed water ski **Delta Wings**. By 1973 the Delta Wings were being launched from elevated ground sites. The hang glider, as we know it today, was born. There are **no control surfaces** on the Parawing or Delta Wing. Control is obtained by **shifting the weight of the pilot**. The included nose angle was increased to 90+ degrees



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Concept that makes the Parawing fly (have lift):



1. A good wing surface is a non rigid material that has some body to it.
2. A rigid or semi rigid frame that keeps the desired slack in the wing surface.
3. An angle of attack (Angle the wing makes with respect to the direction of flight) which will keep sufficient air pressure on the wing surface, to keep it inflated.
4. When inflate the wing surface forms 2 conical shapes that are just a section of a cone. The air passing under and over these shapes create lift.
5. During the launch process it is important that you cause the wing to inflate. If this is done you have an airplane without lift, called a rock. Flight will not occur.

Deflated wing (no lift)  
At rest (non-flying airfoil)



Now you can build and fly a Rubber Powered Free Flight version of this historic concept. With it's 90+ degree included nose angle, moveable pilot and it's Clearphane wing covering it is: stable in turbulent winds in excess of 10 mph, controllable, colorful and water proof.

Inflated wing (lift)  
Flying - The angle of attack is about 11 degrees.

#### 4. Continued - Construct the Wing on the Clearplane covering..

4.7 The covering is now cut all the way around. Rotate one leading edge until the leading edge is under the edge of the spar, as shown on the plan. The covering will sort of bunch up. It is designed to be.



With air pressure this forms the airfoil. Glue the joint with a drop or 2. Wait about 30 seconds and it should be glued. Do the other leading edge next.

4.8 Place the Nose Piece over the juncture of the Center Rib and the Left and Right Leading Edges, as shown on the plan. Put a drop of glue on each place where the Nose Piece touches the Center Rib and both Leading Edges. Hold the Nose Piece for 30 seconds until the glue cures.



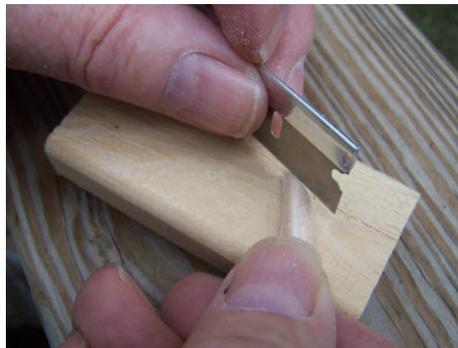
#### 5. Glue the Wing Pylon to the Wing

5.1 With the wing still upside down on the plans place the Pylon in the corner of the Center Rib and the Spar so the



Pylon Hold Down is lined up over the Center Spar. Be sure The rear of the Pylon is up against Spar. Glue along the Pylon and the Center Rib

5.2 Cut one end of the balsa saw dust tube off at a 45 degree angle.



5.3 Make a fillet (rounded area where the 2 pieces meet) with the balsa saw dust.



5.4 Put a drop or two of the Thin CA glue to complete the forming of the fillet. The glue will auto cure. The fillet is there to make a strong joint where 2 pieces of wood have just a line contact (where they touch forms a line).

