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Subject: 45 Sailplane Wing Off Balance Point and Pylon Location

### *Comet Sailplane Project*

This afternoon I installed the vertical and horizontal tails, the landing gear and wheels, the radio equipment including 500 ma flat battery pack, two servos, switch harness, receiver, charging jack, ignition unit with 350 ma battery pack, engine/tank/mount, and prop on the fuselage as shown below.



Notice the of the radio switch's push-pull rod extending out of the right side of the fuselage with the wooden button knob on the end in the close up below.



To determine the wing off balance point, I set up two one-gallon Randolph clear dope cans at the end of the

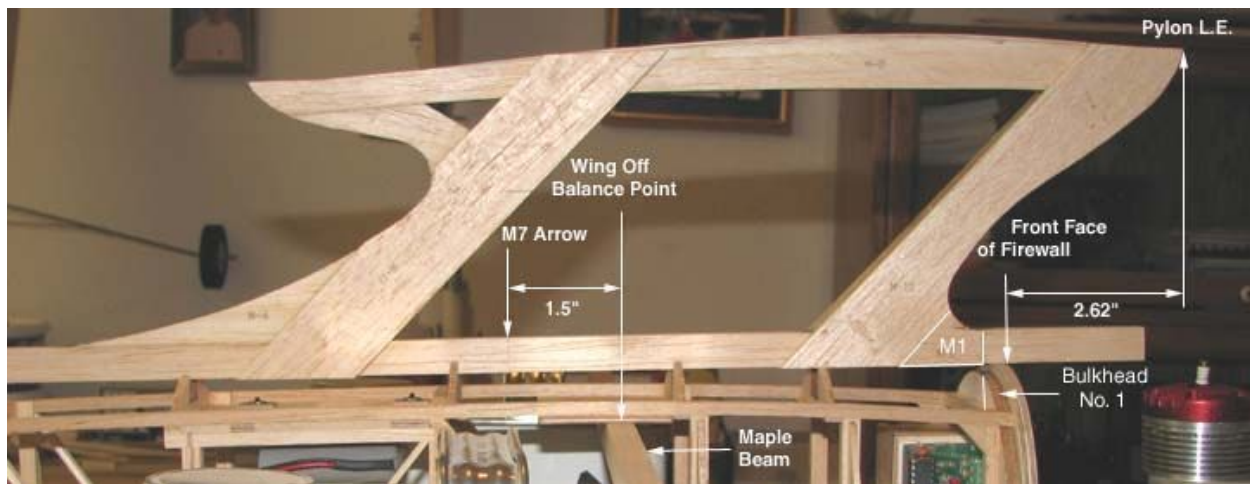
work table. A maple beam was run under the two top longerons and over the tops of the dope cans. Then the fuselage was adjusted until it balanced on the maple beam as shown below.



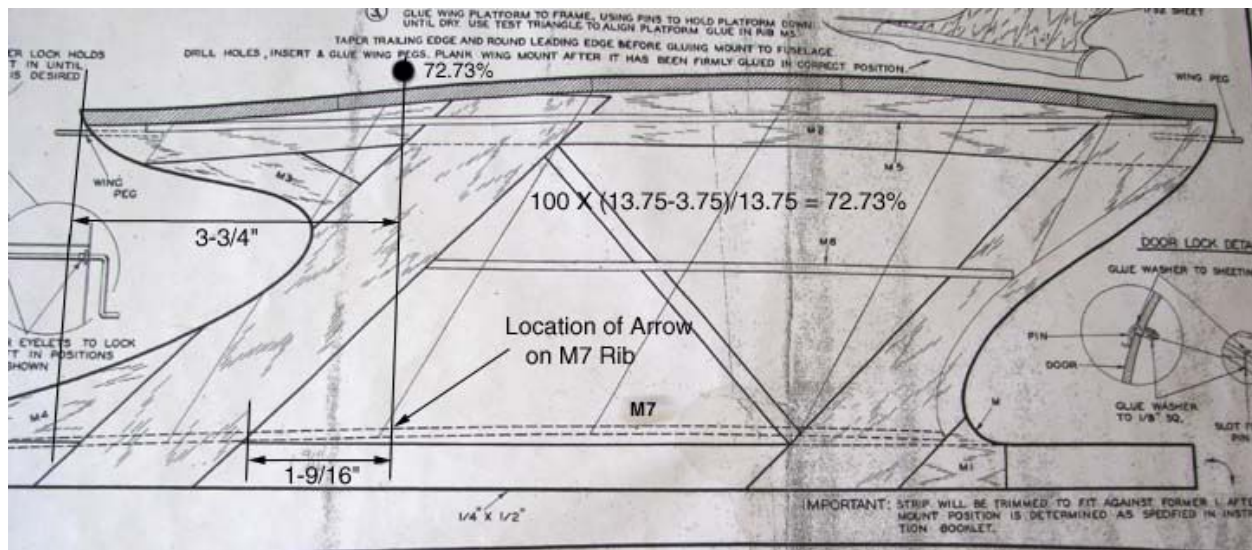
The pylon frame was placed on the fuselage in the most forward position in top slotted bulkheads as shown below.



Detailed measurements were made and added on the picture below. The M1 doubler on the pylon frame was positioned at the rear face of bulkhead No. 1, which is the pylons most forward on the fuselage. In this position, the leading edge of the pylon extend 2.62" forward of the front face of the firewall as shown below (*very close to what Steve Rozelle measured on his Sailplane*).



Notice in the picture above that the fuselage's wing off balance point is 1.5" forward of the rib M7 arrow location. From Report No. 43, the M7 arrow is located 3.75" forward of the pylon's trailing edge as shown below.



The wing off balance point is then  $(3.75 + 1.5) = 5.25$ " forward of the pylon's trailing edge. Therefore, the wing off balance point of this model is located at  $100 \times (13.75 - 5.25) / 13.75 = 61.82$  % of the wing's root chord, which is just about what is desired for the complete model's balance point.

The situation as I see it is as follows. The weight of the top stringers, fin and rudder structure, stab platform planking, some tail fillets, and all of the covering and clear dope on the aft fuselage, stab, and rudder in the back on a long moment arm will move the wing off balance point aft. However, the wing, its covering, and clear dope and the engine cowling will add more weight than is being added to the back and shift the model's balance point forward, but on a much shorter moment arm. With the pylon located all the way forward, the balance point may end up pretty close to the desired 62%. As a precaution, I think I will make a small ballast box compartment under the stab just in case the model ends up nose heavy. I would welcome any comments or input you might have this evening before I integrate the pylon frame into the fuselage structure tomorrow. I have a 6 month's check up with my cardiologist in the morning so I will not start on this until after lunch tomorrow.....Tandy