SCALING STAB SIZES
By George White

Recently, the remaining four guys of the Pensacola Free Flight Team (AKA Pelican FAC Squadron) got into a discussion of the wisdom of having the stab of a scale model to be equal to at least 20% of the wing area. I had always accomplished this by simply finding the wing and stab areas as shown on the plan, determining the percentage of how much the stab needed to be enlarged to be at least 20% of the wing area. Then I simply scanned the stab as shown on the plan and enlarged it in the printer by that percent, and walla, I had the plan for the enlarged stab.

I mentioned this to Gene Smith, my source of wisdom who's taught me at least 75 % of everything I know about this game. **He diplomatically advised me that my method was giving me a much larger stab than I intended.**

Here's what he said and it applies whether you're scaling a stab up or down:
"Assume the desired area divided by the old area = X
The square root of X = the new enlargement or reduction factor

For example, assume you have a plan which shows the stab to be 18% of the wing area. By the way, the wing and stab area we talk about here INCLUDES the area through the fuselage.

Assume you want the stab size to equal 22% of the wing area (I like 22% as minimum and occasionally will go as high as 25%)

Assume you've calculated the wing area including the area inside the fuselage to be 88 sq. inches and you've calculated the stab area on the plan, including the area inside the fuselage, and found it to be 15.8 sq. inches, or 18% of the wing area.

You want the stab to be 22% of the wing area, 88 X .22 = 19.4 square inches.

Divide the 19.4 new area by the 15.8 old area and you get 1.22 or 122%. Then take the square root of 1.22 and you get 1.11. That is the enlargement factor.
Scan the stab on the plan and enlarge it 11% and you'll have a stab size of 19.4 square inches."

Then, Gene asked the giant killer question: "What do you do with the new stab? Do you just set it inside the original fuselage? You can, but because the new stab has a larger chord than the original, you effectively shorten the tail moment. I prefer to lengthen the fuselage so that the leading edge of the new stab is the same distance from the trailing edge of the wing as the original stab. On a typical 22" to 24" wingspan model this is usually about 1/4" but could be more or less depending upon the model. This does take a little "engineering" but it's not hard to do. In my mind, the model looks better proportioned when you lengthen the fuselage and it also makes the new stab more effective."