C/L Model Analysis & Conversion Program

This is an Excel spreadsheet program that I wrote that grew out of the fact that I wanted to enlarge or reduce existing designs to suit my needs. As it evolved I've used it to compare designs with each other.

Basically the un-shaded portions in the "Original" column are the dimensions of the model. You got these from an existing drawing or just "what if" numbers when designing your own model. You must use "decimal numbers". No fractions. There are some assumptions when using this program. It assumes equal length wing panels, flaps, and elevators. The wing, stabilizer, flaps, elevators, fin, and rudder are with squared off tips. The shaded portions are computed and automatically displayed. The initial release will be V1.0 and is displayed in the upper right corner of the spreadsheet. Let's go over each portion and I'll explain it.

Conversion Factor

Under the "Original" column you enter the models data in the un-shaded cells. The other cells in the row are for the decimal you want to convert the "Original" numbers to. For example if you want to enlarge a model 10% then type in 1.1 in the first blank cell. The spreadsheet automatically computes the new numbers and will display them. This is very useful when you have a design that is 565 sq in and you want to enlarge it to 625 sq in. What you do is try 1.03 (a 3% enlargement) and see what the total wing area is. If it too small the try 1.04. You can even try numbers like 1.035 if you really want to zero it in. To reduce a model, try using numbers less than 1. Like .9 or so. I'm sure you get the picture. See the example. Leave "Conversion Factor" blank till you enter all the data and save the spreadsheet.

MODEL:

Type in the name of the model. When finished, I click on "Save As" in the "File" drop down menu and save the spreadsheet with the model name in it. As an example:
CL_Conversion_Legacy 40

WING

These are basically self explanatory. The reason I ask for the tip airfoil height is to derive an accurate airfoil percentage. What the program does is use the average height between the root and tip airfoils along with the mean chord to derive the airfoil percentage. The reason I did that was to accommodate a wing design where the flaps have either a large taper or less taper.
CG aft of LE (at the root). I usually keep entering a number in the cell till the "CG % per Mean Chord" cell displays 25%. I use this as my target on all my models.

FLAPS

The data that you enter should be for **1** flap only, not both.

WING SUMMARY

After entering all the above data the spreadsheet should display a lot of useful information about the wing. Some notes might be helpful.
Aspect Ratio is the wingspan divided by the mean chord.
Mean Chord is the chord located midway on each wing panel.
Flap Volume is the percentage of flap area divided by **total** wing area.

TARGET WEIGHT (oz)

These cells display the weight in ounces per square foot based on the wing area.

FUSELAGE

These dimensions give us an idea of how the model looks and are again, self explanatory. The term Datum is a line going from front to rear of the fuselage. I usually use the top line of the fuselage side where the top blocks are glued on. When measuring "down" to the Thrust Line and Wing CL I use regular or positive numbers.
The "Ratio of TM to NM (Using 25% of MC)" is for reference and is useful when comparing different designs. MC equals "mean chord".

STABILIZER

The "Bottom from Datum" cell will accept both positive and negative numbers. Typically when I measure "down" from the Datum I use regular or positive numbers. Where the stabilizer is above the Datum, I use a negative number. This is a very rare occurrence.

ELEVATORS

The data that you enter should be for **1** elevator only, not both.
The first shaded cell "Area" is the area for **both** elevators.
The next cell is for the total area of both elevators and the stabilizer.
The next cell represents the percentage the stabilizer is of total area of the tail.
"Tail Volume (Wing Area)" is the tail area divided by the total wing area. This is very useful information.

FIN & RUDDER

These are self explanatory and need no further comments.

OTHER

This section was developed after reading Ted Fancher's article "Designing the Imitation", Model Aviation September 1979, which can be found on the PAMPA website. All of these values are fully explained in the article. The one cell I pay attention to is the "Stability" cell. The higher the number the more tail authority the model has. The Legacy 40 (Stunt News July/August 2003) has value of .471 while Bob Hunt's Caprice has a value of .313. A typical Classic stunt design will have a value of about .250. This again, is very helpful in comparing and designing models.

OK, how can you get this "can't live without" program? One way is to go to my website **http://www.clguy.com**, the other is to e-mail at **crist@clguy.com**