

How to Resize Airfoils (or Practically Anything, for that matter) using a PC and Windows

There was a recent posting on the Pietenpol Forum by Dan Wilson asking help in resizing a Clark Y Airfoil in different sizes for his propeller project by using coordinates on an excel spreadsheet that he had provided. I helped Dan not by plotting the coordinates, but rather resizing Airfoil diagrams using my MacBook Pro and a Program called Pages. I posted the steps on how to do that, but after having posted the instructions, I thought that I should also write instructions for those who use primarily a PC and the Windows Operating System. I would advise downloading and keeping a copy of both methods. My goal in writing this paper is to show people how simply this could be done on a PC using freeware as well as free Airfoil files that are readily available on the Internet. I like Free! First, the caveat. I am not an engineer or a IT guy. I was a Liberal Arts major in college, and like to refer to myself as merely a computer semi-literate. I tried to learn a CAD program this past weekend, and I gave up because it made my head hurt, and I just did not understand how to use it.

I may discuss or describe some things in this paper that some of the computer experts may completely disagree with, but all I can say is, it worked for me. In a nutshell, here is how I solved the problem of plotting Airfoil coordinates of varying chord lengths. I found an acceptable copy of the Clark Y Airfoil that Dan asked for. Instead of replotting the coordinates numerous times, I merely resized the picture, while keeping the proportions the same as you resize the picture. Follow along with me and I will show you what I mean-

Step 1. If you do not already have such programs, download a Screen Capture program and an Office Suite such as Microsoft Office, or in the case of freeware, download Open Office.

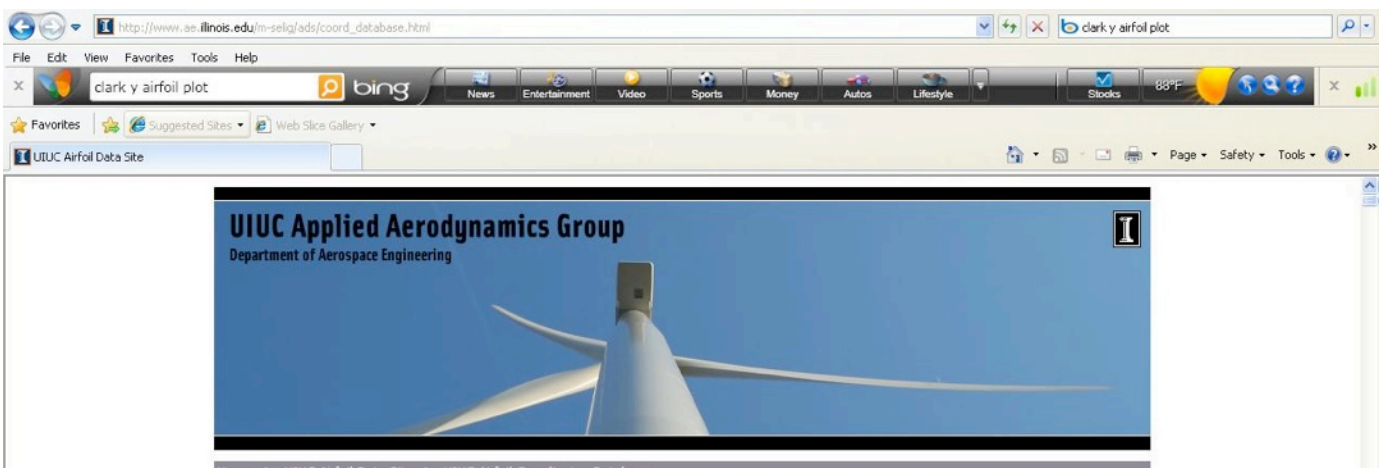
I simply Googled the phrase "Freeware Screen Capture Software" and found a program called Easy Capture. There are many other Programs out there that do the same thing. This is not an endorsement of Easy Capture. Easy Capture was the first freeware Program I stumbled upon, and I grabbed it for sake of time. Actually, I found Easy Capture to be a little cumbersome, but you can use it or some other similar Program. Also, I recommend downloading OpenOffice. It is a freeware Office Suite of programs, very similar to Microsoft Office, but less expensive. Less expensive, as in Free (there's that word again). I think that what I am showing you can be done in Microsoft Office, but I am not sure as I did not have a copy of MS Office to try this with. As you will see in the following pages, this can definitely be done using OpenOffice.

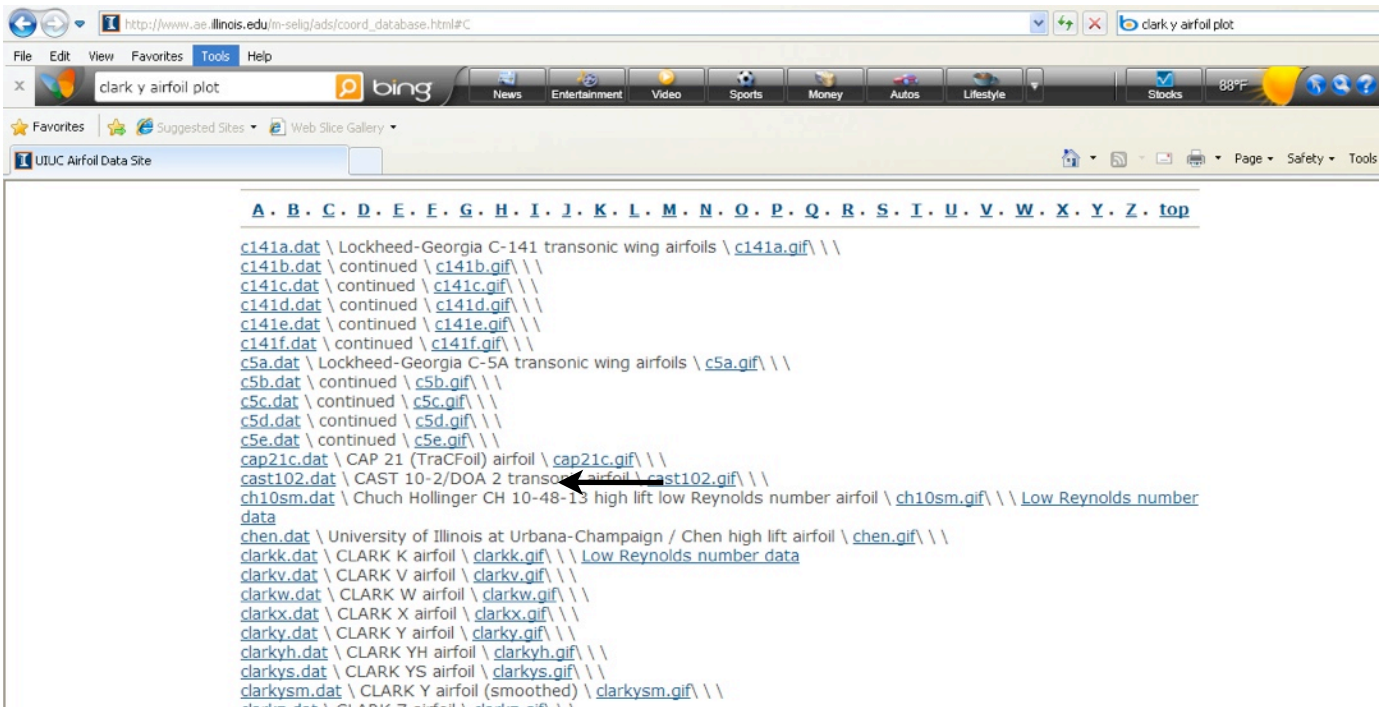
A word of warning here is in order. Be careful blindly downloading Software off the Internet. That is a great way to pick up a Computer virus or Malware. It is best to go to a website such as Tucows.com, or some other safe web site and getting a program that is much less likely to be carrying a virus than if you downloaded straight from the Internet.

Once you have downloaded these two Programs (or other similar programs), installed them, and have them available for use, move on to Step 2.

Step 2. Find a quality picture of your Airfoil.

Dan sent me coordinates for Excel, and truthfully, I did not know what to do them. What I did was go out on the Web and find a plot of the Clark Y Airfoil that I could use. This is the screenshot of a website that has hundreds of Airfoil diagrams available for free download. I got the Clark Y Airfoil from here.



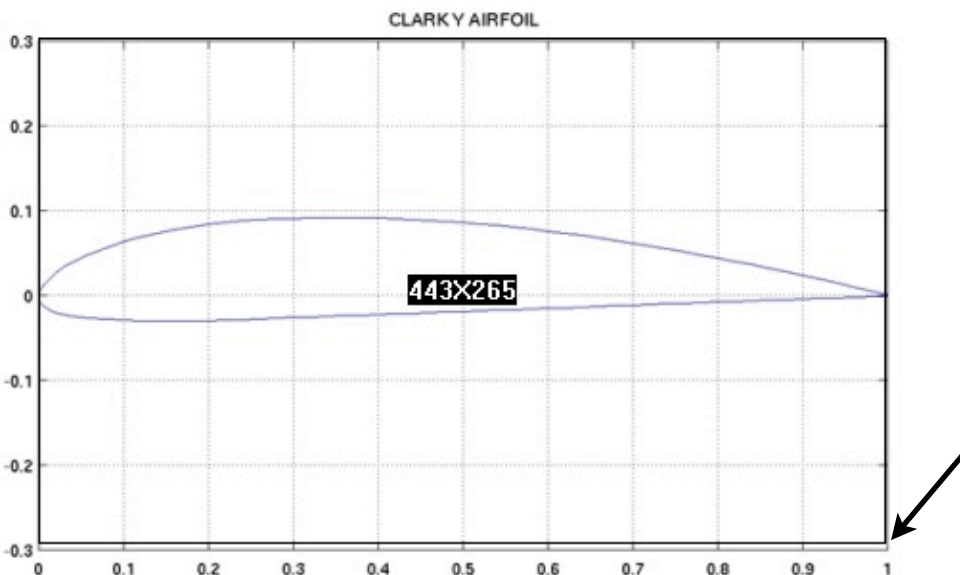
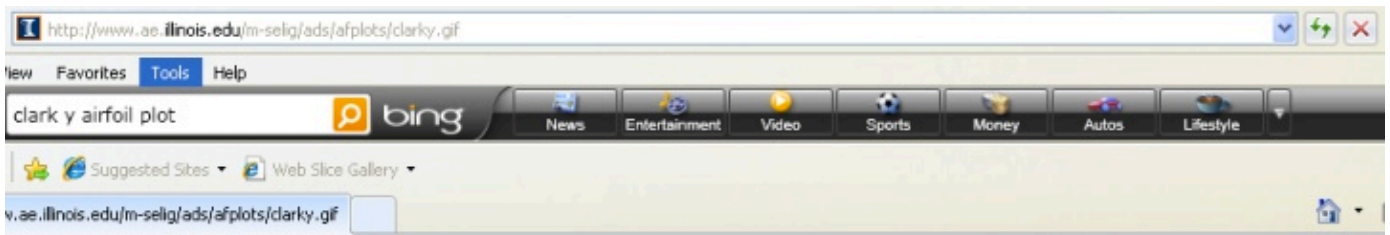


Step 3. Take a snapshot of just the Airfoil using the Screen Capture Program

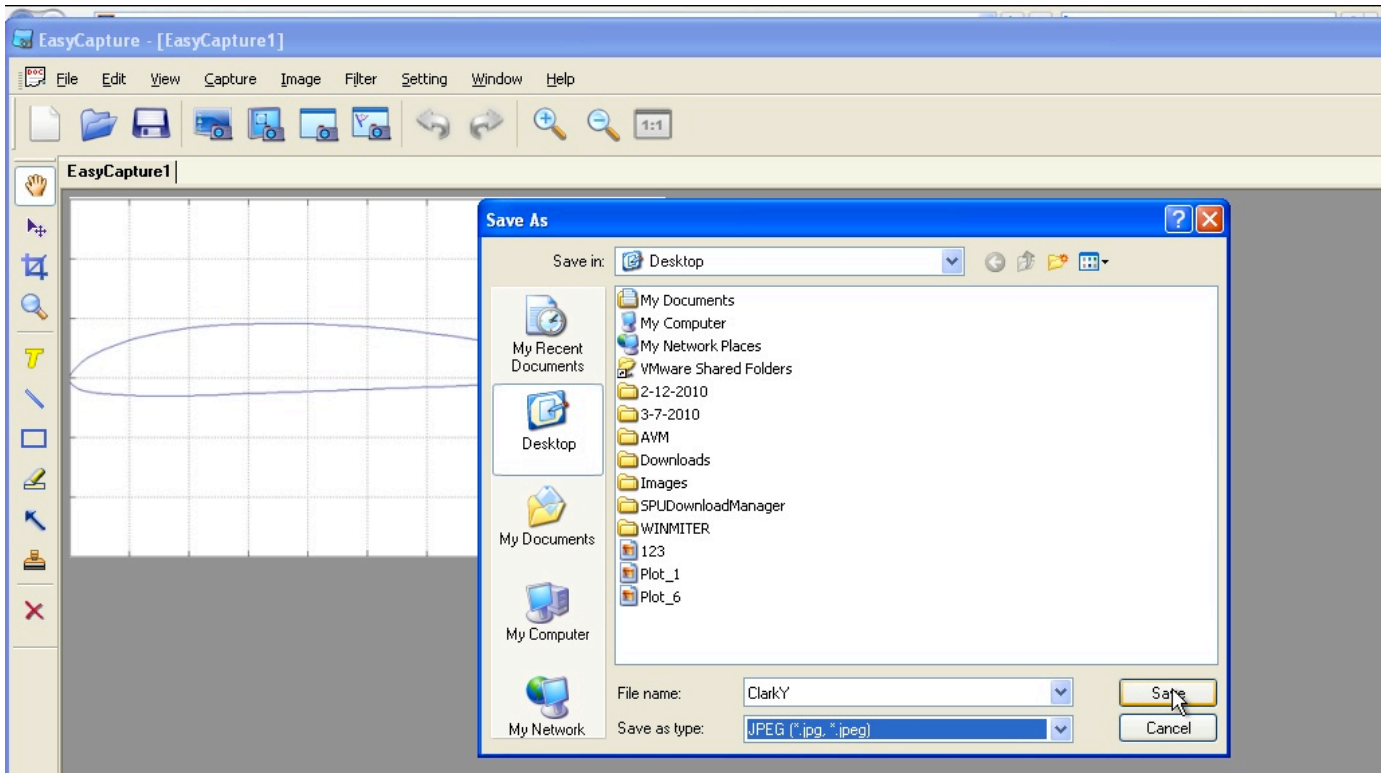
When you click on the Clarky.gif, on the website (as shown above) you are taken to a diagram of the Clark Y Airfoil, as shown below. In order to do the resizing, you do not need the coordinates on the left side or the bottom. All you need and want is the airfoil itself. The Airfoil is divided into ten sections. Each section could be an inch, 2 inches, 6 feet, whatever you want it to be. That comes when you resize the airfoil. The graph merely signifies that 100% of the Airfoil is in view. Use the Screen Capture program to capture the diagram, and only the diagram. Most programs are similar in that they give you a cursor that you place in the top left of the screen area that you wish to capture, or take a picture of, and while holding down the left-click button of your mouse, you drag to the bottom right of the area you wish to capture. The program then takes a "snapshot" of that area and then you save the picture. I typically just save it to my desk top, but you can do it other ways. It takes a little practice, but play with it a little bit, and you will see that it is not very hard to "grab" a picture off your screen. Look at the pictures below as an example of how I used Easy Capture to do all of that. The arrow below shows where I have placed my cursor on the top left of the diagram. Remember, you need ONLY the diagram, none of the numbers down the side or across the bottom. You want your picture to be the Airfoil only. What you are doing is making the width of the picture of the Airfoil to be the chord.



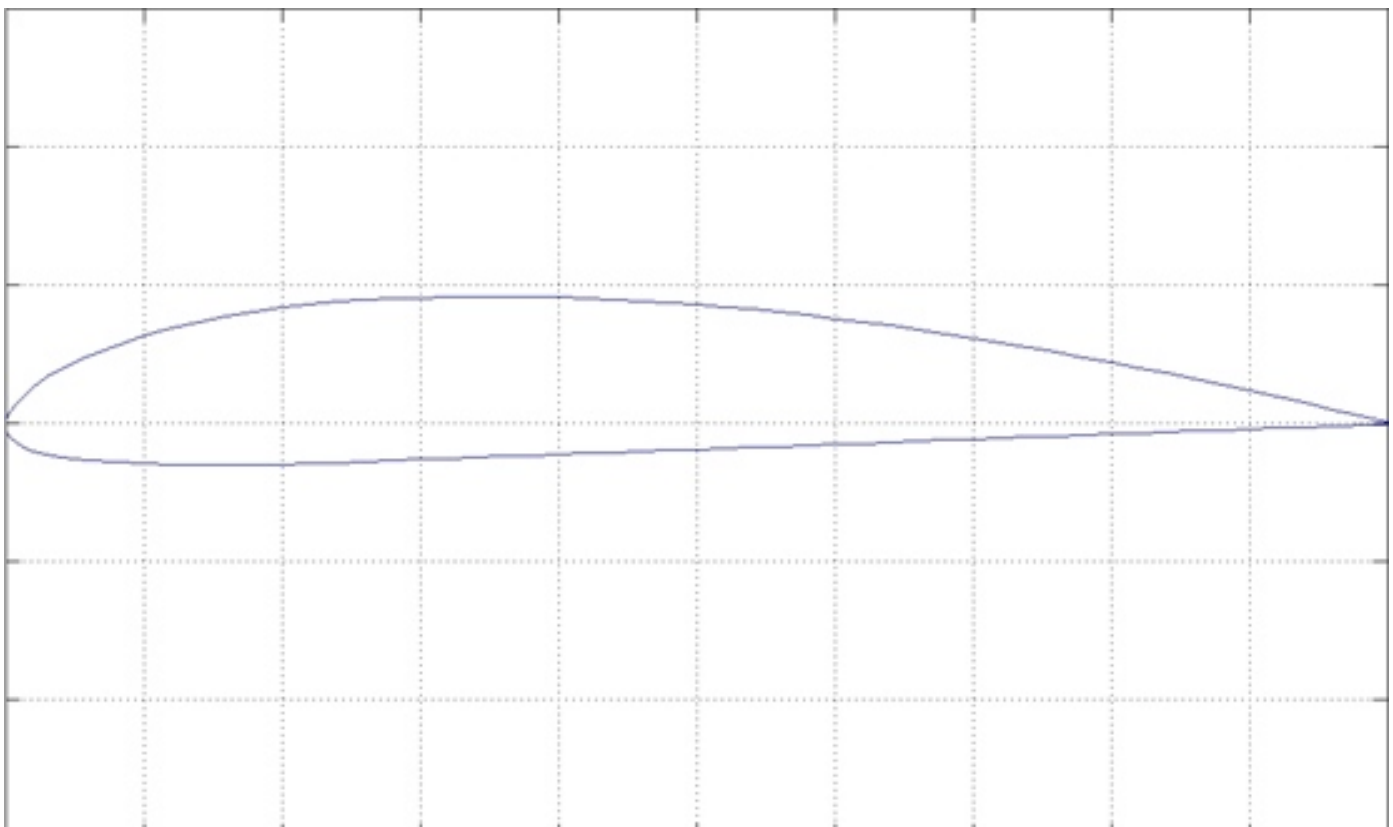
Now, drag the cursor to the bottom right of the graph. Hold the left-click button down while dragging the cursor. Make sure that you are ONLY taking a picture of the Airfoil. You want the picture/snapshot that you are taking to be 100% Airfoil. That is the key. Prior to taking the snapshot, you should see this-



Once you have released the left-click button the picture is taken. On my Mac, the picture is saved to the desktop. With Easy Capture you have to tell it to save the picture and tell it where to save the picture. It should something look like this-



Here is the end result-



What you now have is an airfoil with its entire length defined by the width of the screenshot. It does not matter if the picture is 4 inches wide or 9.275 inches wide. The picture width is now 100% Airfoil chord length.

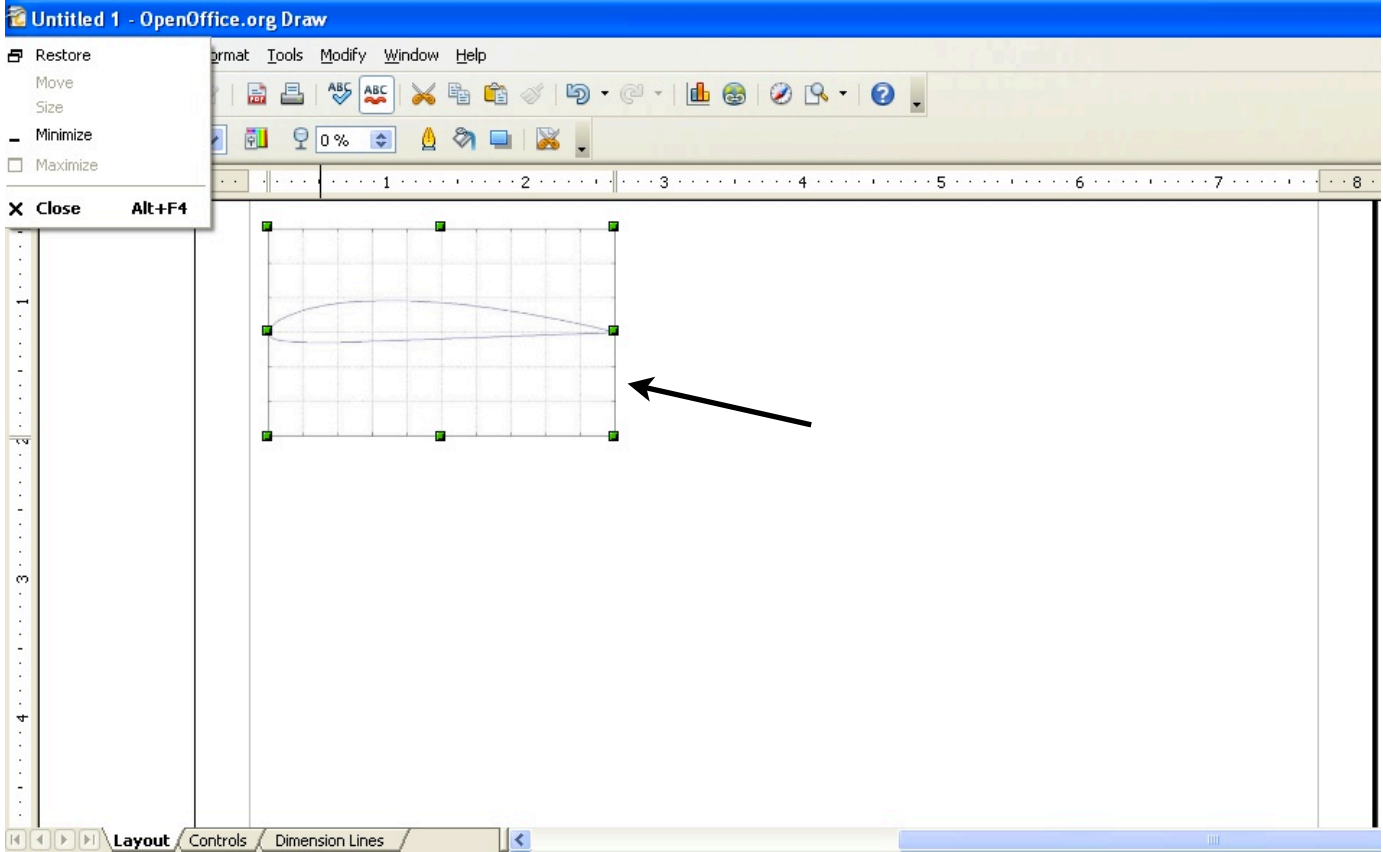
Step 4. Open up a new File in Open Office and Drag the Saved Airfoil to the new Page

Now go and open the OpenOfficeProgram. Once the Program has started, see below the steps needed to open a new Drawing File in OpenOffice-

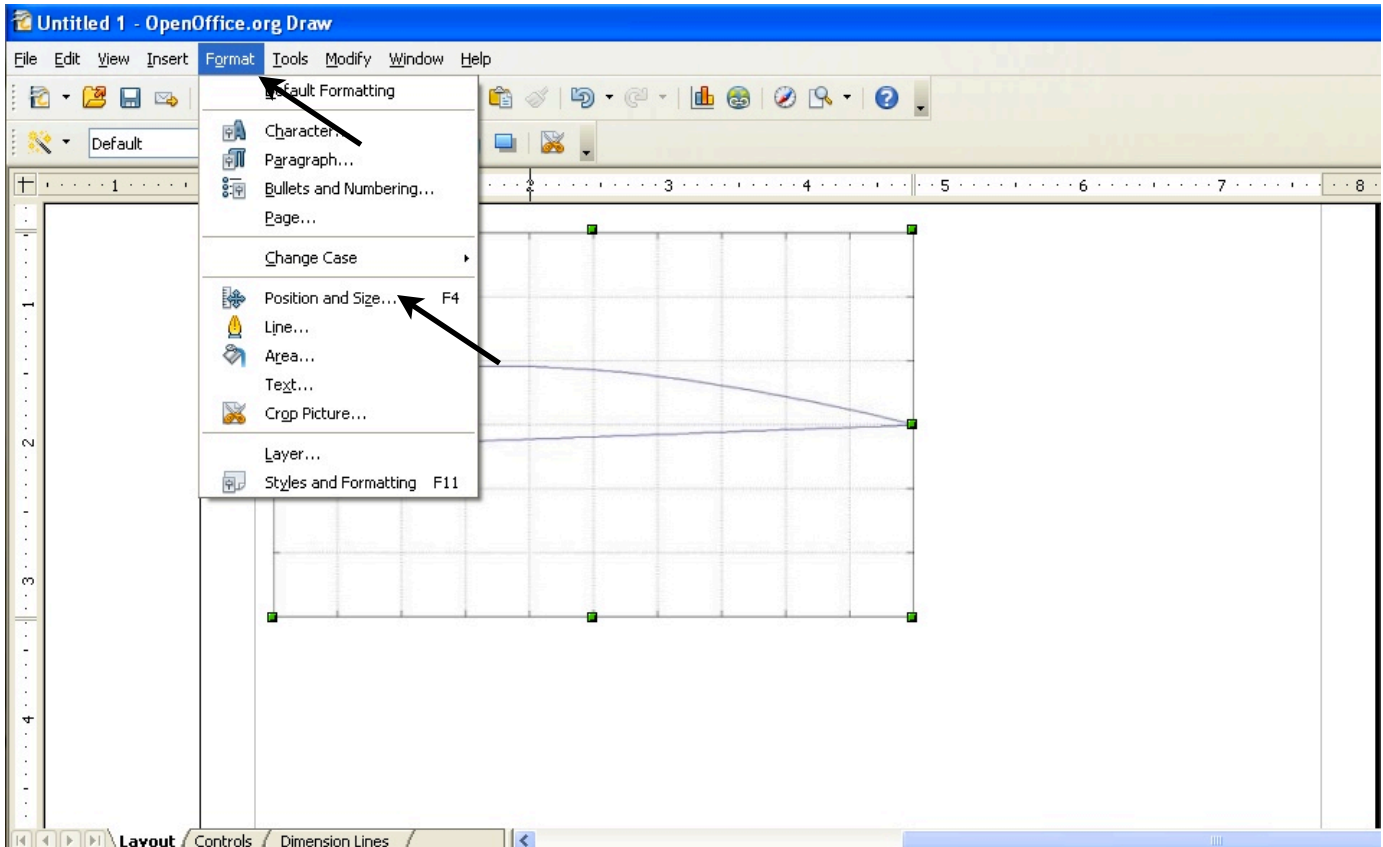
Select a new Drawing Document



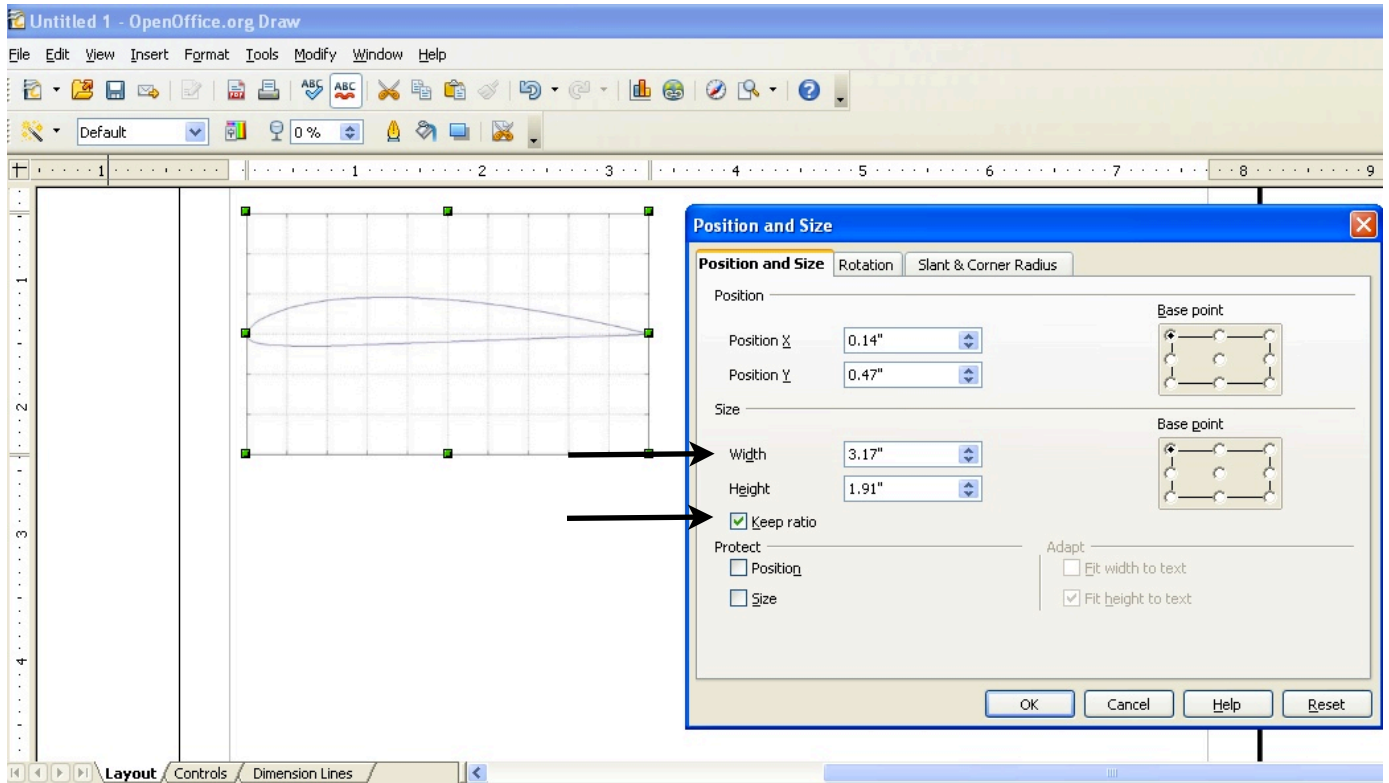
Drag the Airfoil diagram onto the blank page that has opened up.



Once the Airfoil is on the page, select "Format" at the top menu line. A menu will drop down and you will select "Position and Size".

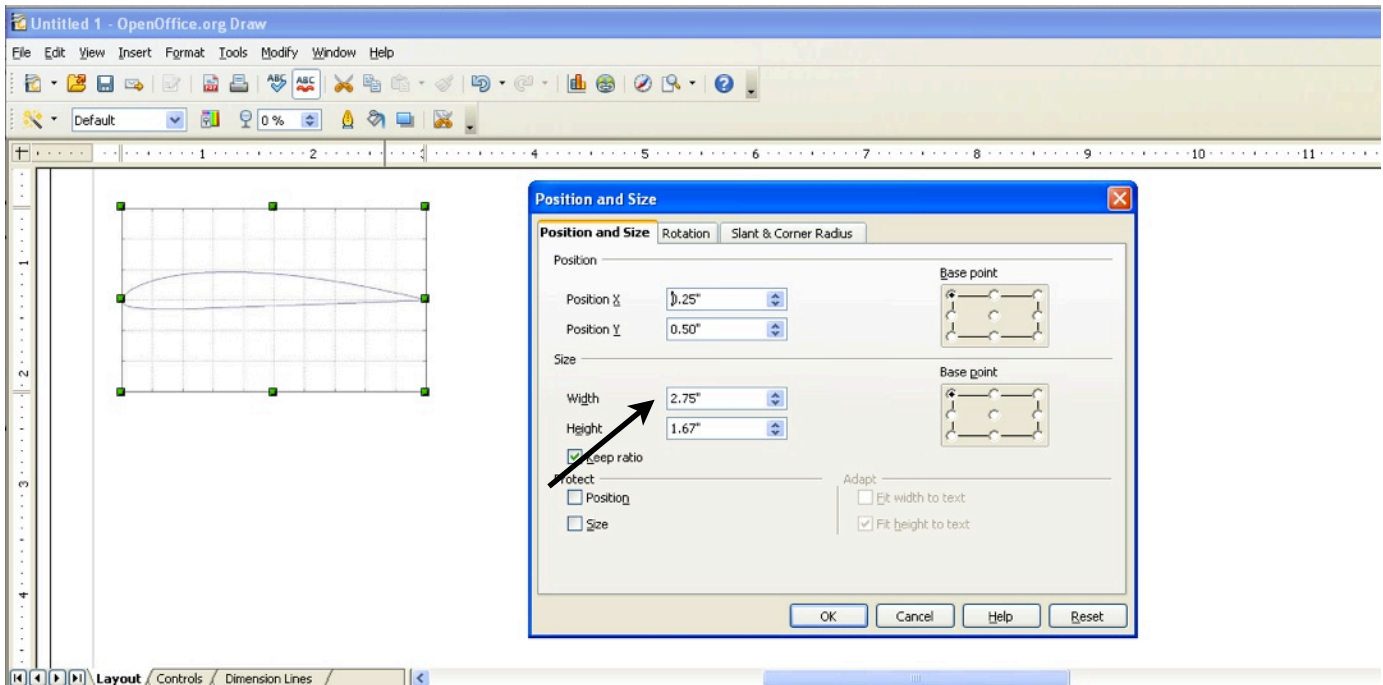


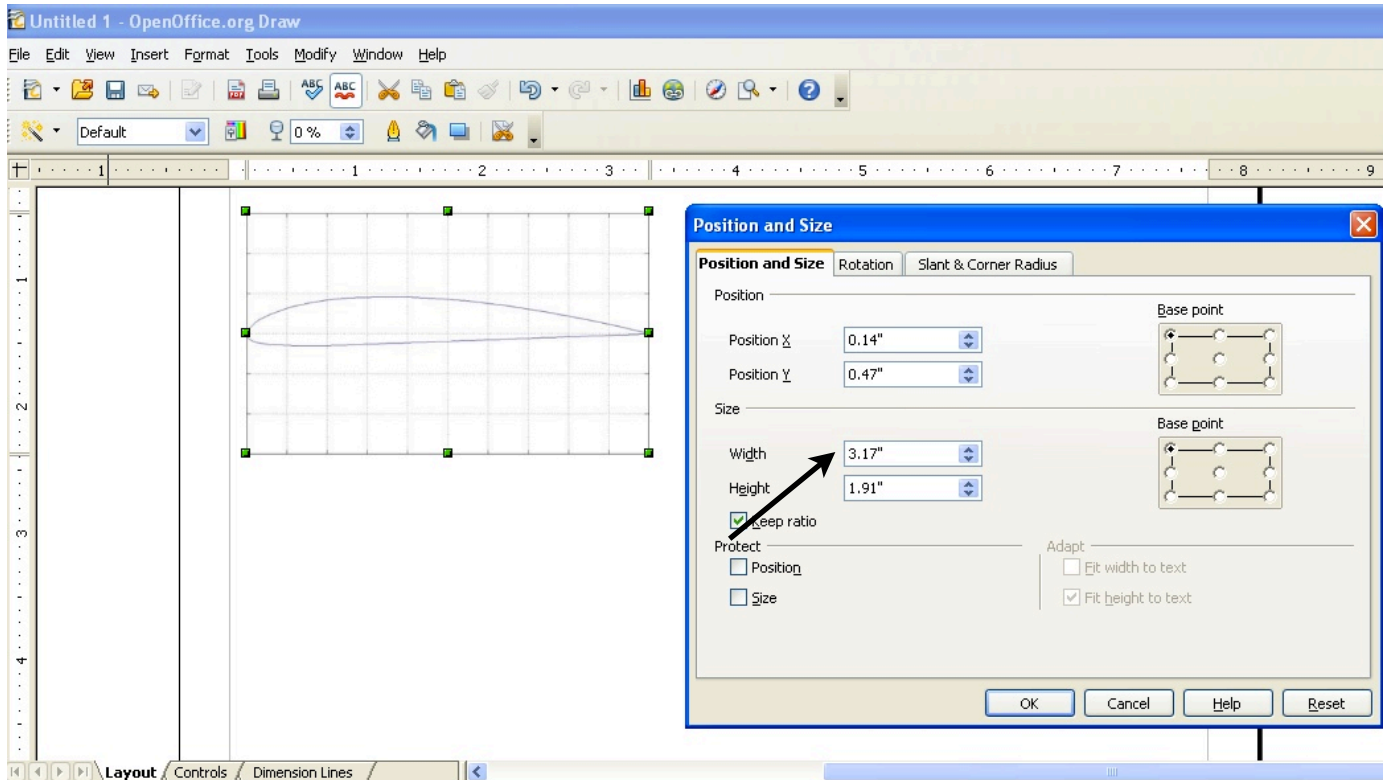
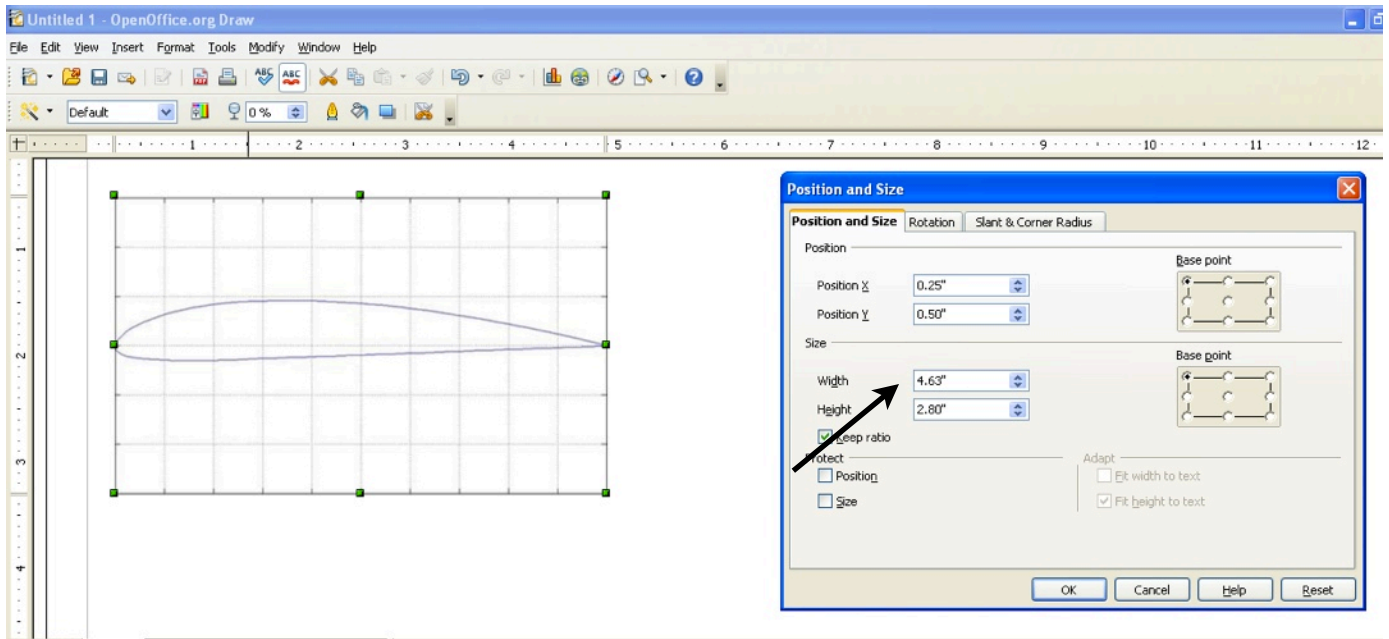
Next, a box will open for adjusting the size of the Airfoil. Make sure that you select the box that says “Keep Ratio”. That is what keeps the Airfoil correctly proportioned as you enlarge/reduce the chord length. Then in the box that says “width”, input whatever chord length you desire. Just make sure that the “Page” that you are putting the diagram is big enough to hold. By that I mean I would most likely use a Legal size paper in the landscape mode for most of your needs. That gives you a full 14 inches of chord length.



5. Change the width of the Screenshot/Airfoil to the size that you need.

See below the various sizes I made just by changing the width-





6. Go back up to the File Button, Save the file and/or print it out.

Now all you need to do is save or print out each size and go from there.

I could go on and on, and make the Airfoil any size you want, but I think that the pictures show what I mean. If you still do not understand, please feel free to email me, and I would be happy to walk you through this.

I hope that this helps people out there figure out how to make Airfoil templates without using Excel or other such programs.

Semper FI,

Terry Hand

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