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

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 did not respond initially, because, frankly I did not know how to help him with Excel. I figured that there were plenty of computer wizards out there that could help with what he asked. When I saw that he did not receive a prompt response, I contacted him, and we were able to accomplish what he needed. He was so impressed with the results of what I was able to do with a different program, he suggested that I put it down on paper, as it might help other "prop cutters" or other builders out there. So here is how I helped Dan. First, the caveat. I am not an engineer. 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 and Mac experts may completely disagree with, but all I can say is, it worked for me. While I am no engineer or computer expert and I can't figure out a CAD program, what I am fairly proficient with is a Program that is an Apple Product, called Pages. Before I go on, Let me say this. You may not be a Mac user, but I would bet that you know someone that is a Mac user, and you can get them to do this work for you. So, for all of you Windows users, please follow along, or at least print this out and hand it to your "Mac addict".....

This is the description of Pages, taken from the Apple website-

"Pages '09 is both a streamlined word processor and an easy-to-use page layout application. It allows you to be a writer one minute and a designer the next, always with a perfect document in the works. You can easily create stunning documents, ranging from a simple letter to a professionally polished resume to a newsletter and more. Or start with a blank page and create your own design on a free-form canvas. Whatever you write, Pages puts powerful tools at your fingertips. So you can create beautiful, media-rich documents in minutes."

It is a great Program, much like Microsoft Office, only on Steroids. It allows you do many things that a word processing program does, but also many thing that a program, such as Photoshop allows you to do. The tool that I used was Pages ability to quickly resize graphics files. Please follow along as I show you step-by-step how to resize an airfoil to any size you want.

Step 1. 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 Clark Y Airfoil that I found simply by using Google. Or Bing, or the Search engine of your choice.
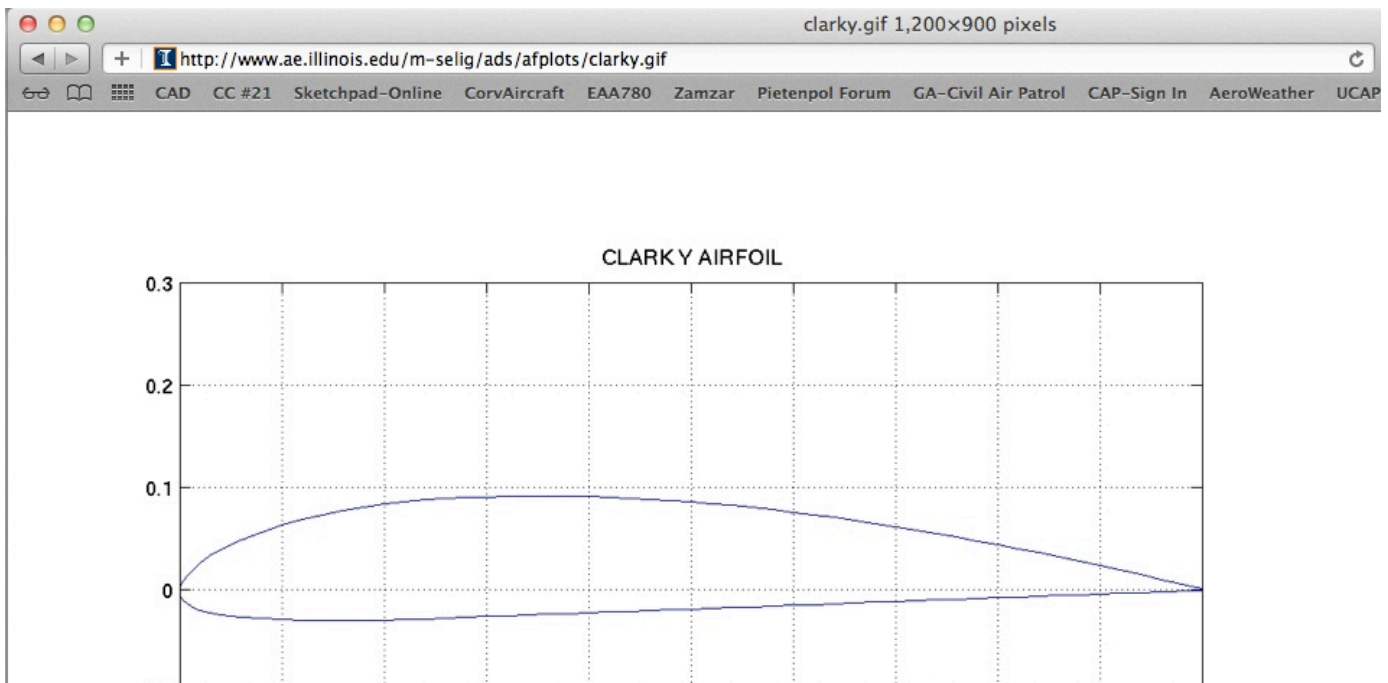
## Step 2. Take a snapshot of just the Airfoil.

I have changed snapshots of the Clark Y Airfoil to one that is a little easier to see with the red outline, but the procedure remains the same no matter which Airfoil you use.In order to do the resizing, you do not need the coordinates on the left side. All you need is the airfoil itself. If you notice, there are no numbers along the bottom. 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 100% of the Airfoil in view. The way to "grab" just the airfoil is to press the Command-Shift-4 buttons all at the same time. That allows you to take a picture of anything on your computer screen. By pressing the Command-Shift-4 buttons, you get a cursor on the screen. You can see in the picture below I have pressed the Command-Shift-4 buttons and I have moved the cursor to the top left of the graph with my left-click button of my mouse. You can see the cross hairs with the coordinates 112-181. 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.
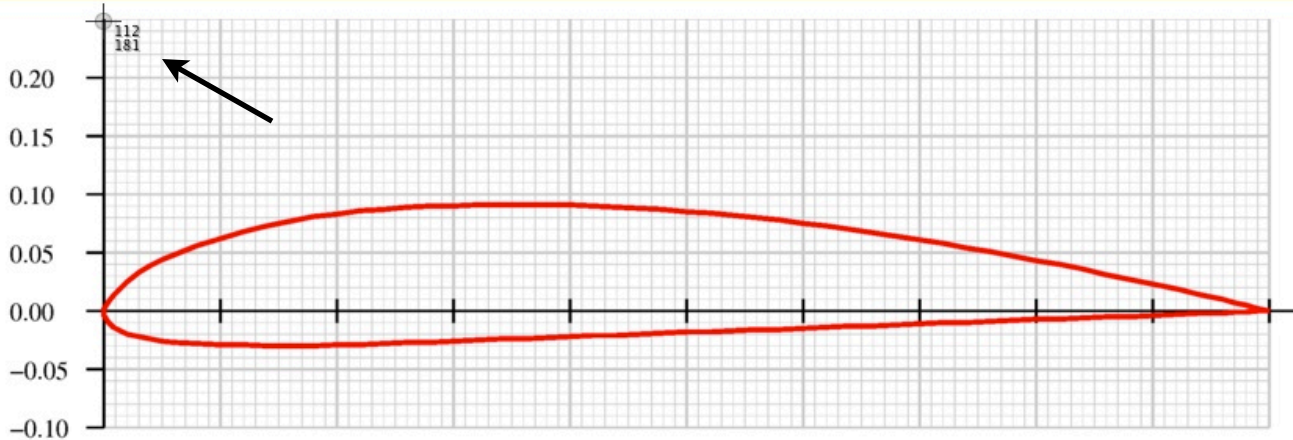
Now, drag the cursor to the bottom right of the graph. Hold the left-click button down while dragging the cursor. Make sure that you are ONLY taking a picture of the Airfoil. You want the picture/snapshot that you are taking to be 100% Airfoil. That is the key. Prior to taking the snapshot, you should see this-
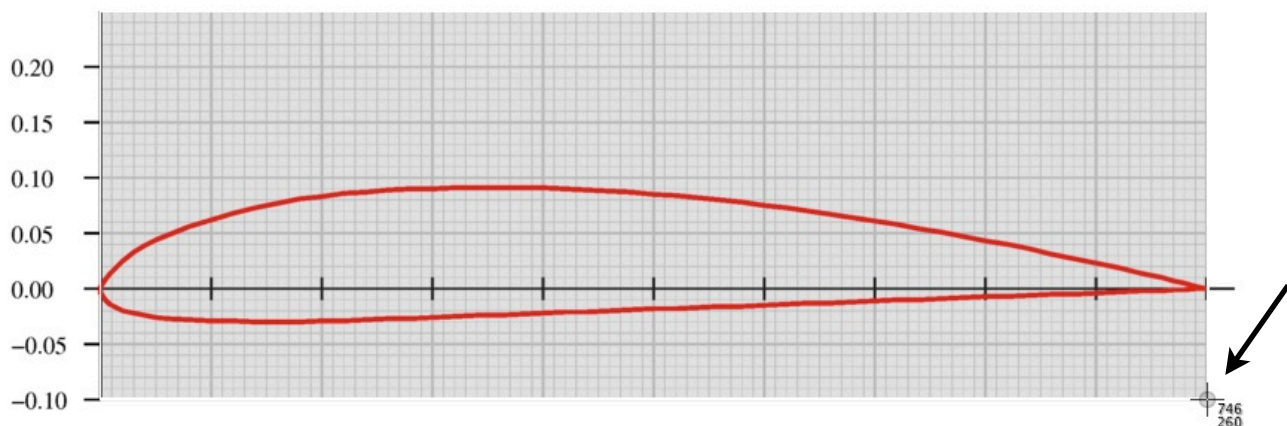
Once you have released the left-click button the picture is taken. On my Mac, the picture is saved to the desktop. It should something look like this-
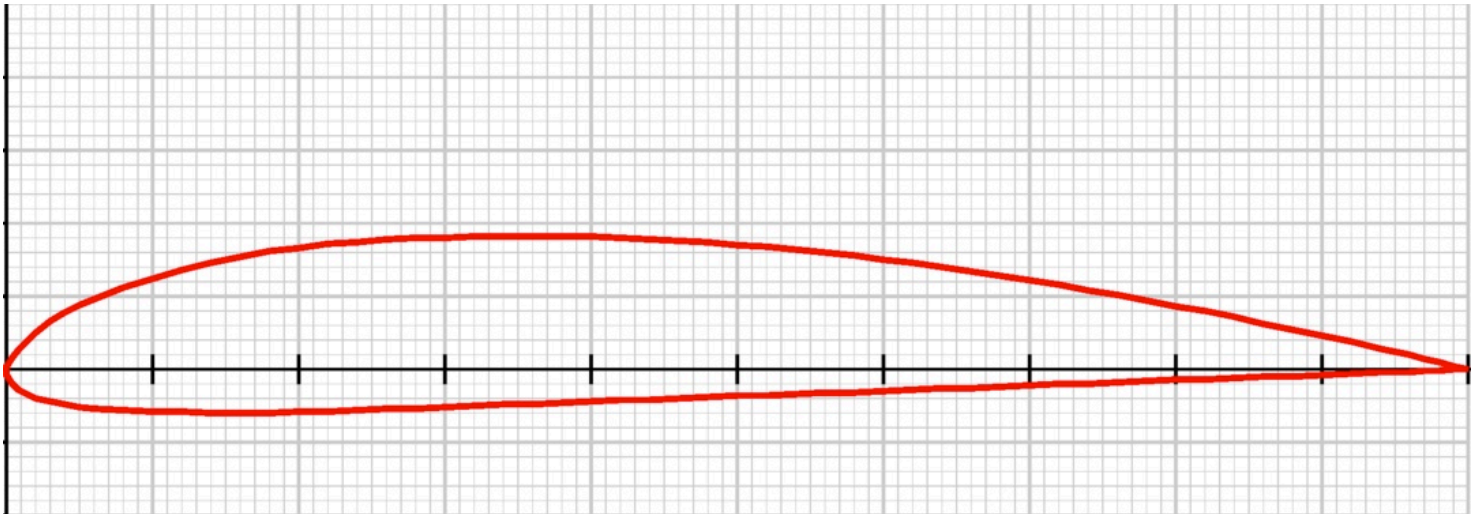

What you now have is an airfoil with its entire length defined by the width of the screenshot. It does not matter if the picture is 4 inches wide or 9.275 inches wide. The picture width is now 100% Airfoil.

Step 3. Open up a new File in Pages and Drag the Screenshot to the new Page

Now go and open the Program, Pages. Once the Program has started, see below the steps needed to open a new File in Pages-
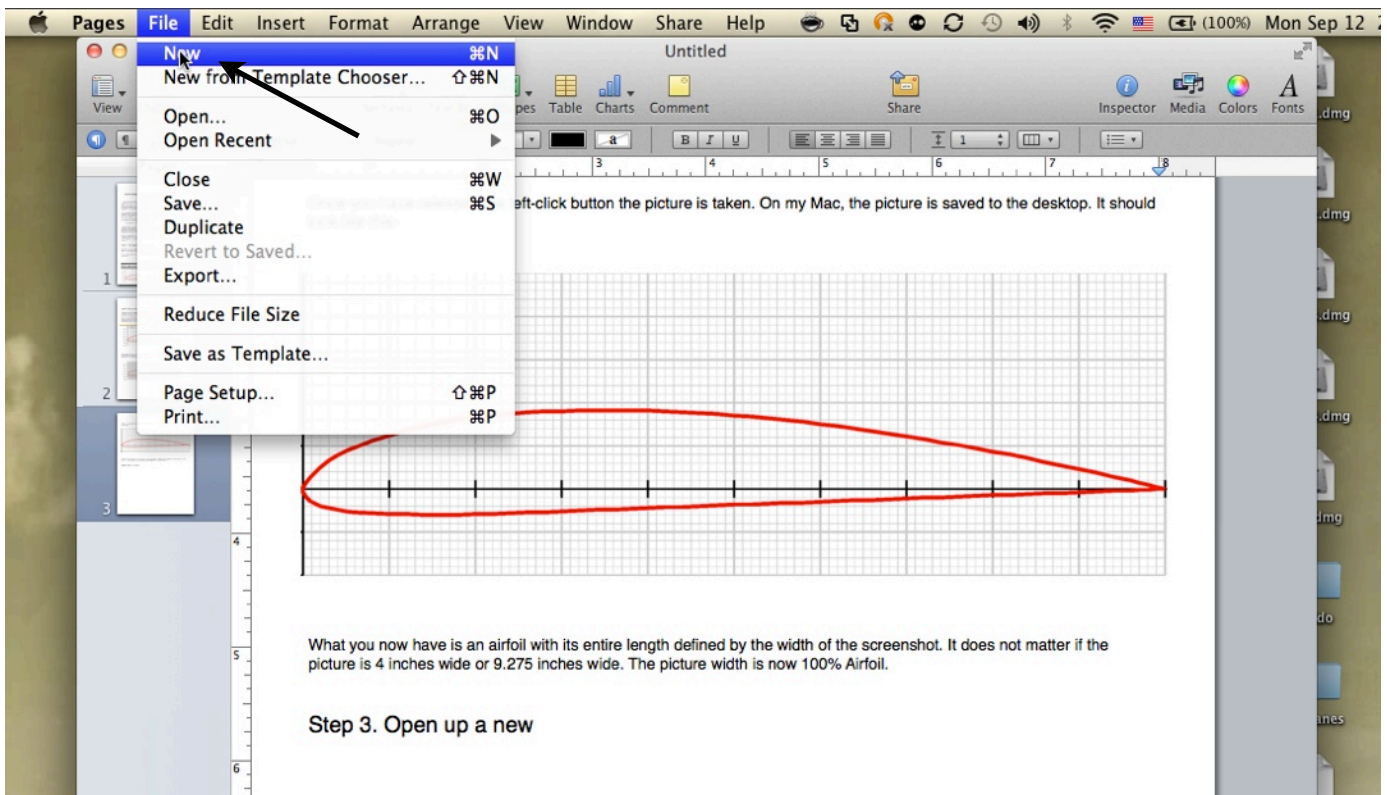
Select a Blank page. In this example I clicked on portrait, but landscape might be a better idea, depending on how large an Airfoil you want to create. Actually you can make the "paper" as big as you would like. As an example, I plotted my Airfoil for my wing rib jig using Pages, and the "paper" is 1 foot high by 5 and 1/2 feet long! I just took the file to Kinko's and printed it out on their megaprinter. But I digress...
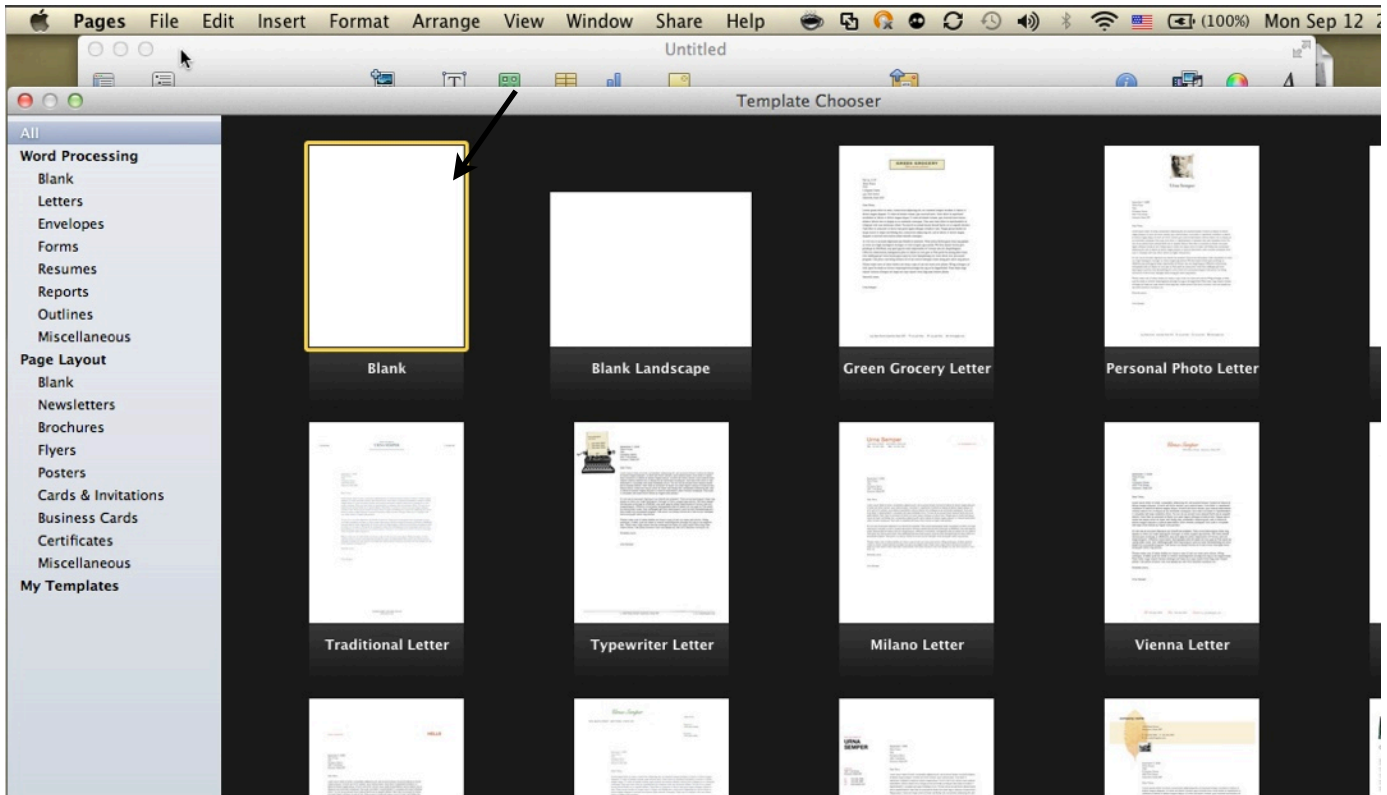
This is what you should see.
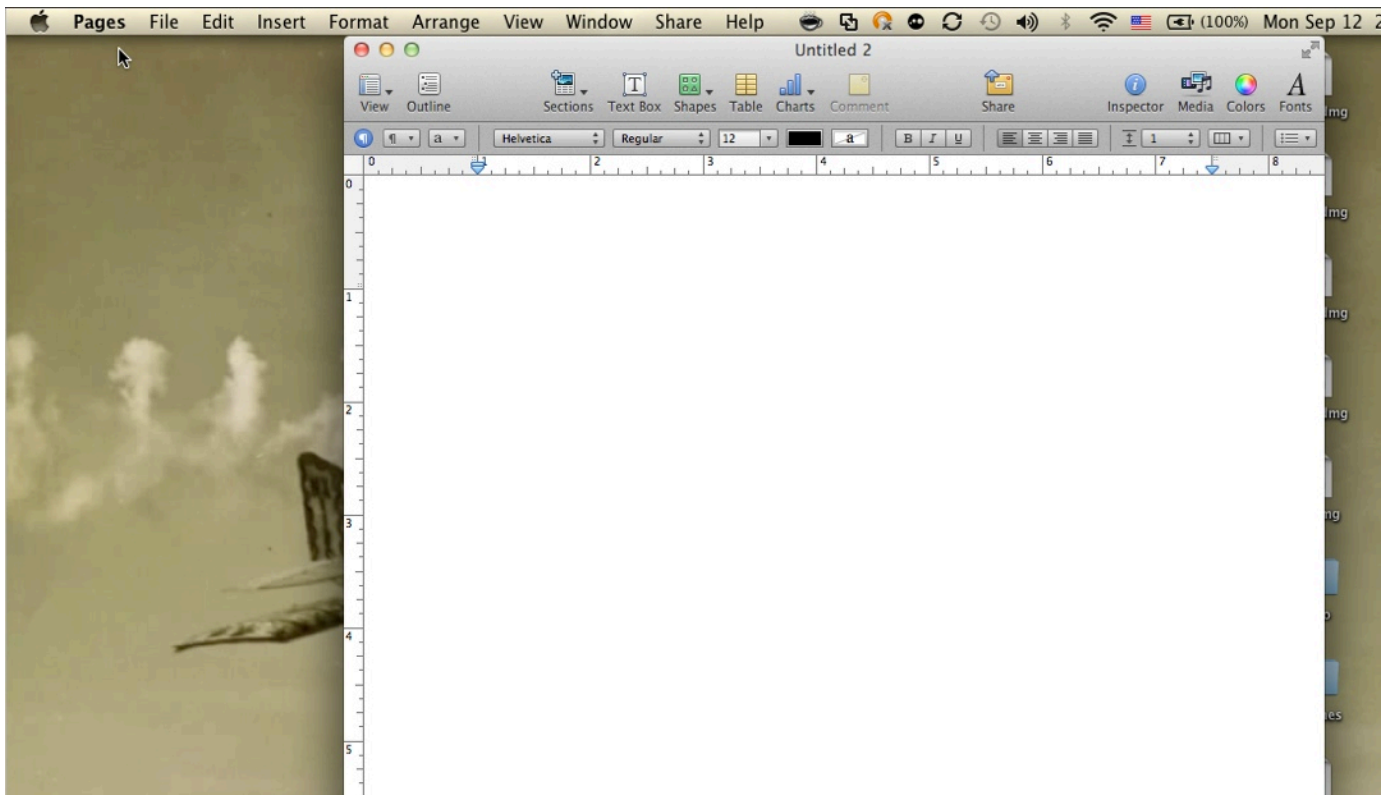
Once the Blank page is open, (1) drag the airfoil screenshot from your desktop to the blank page, (2) click on the inspector button on the top right, and then (3) de-select "Object causes wrap". I do that to make the Airfoil Screenshot stay in place on the page once I start working on it.
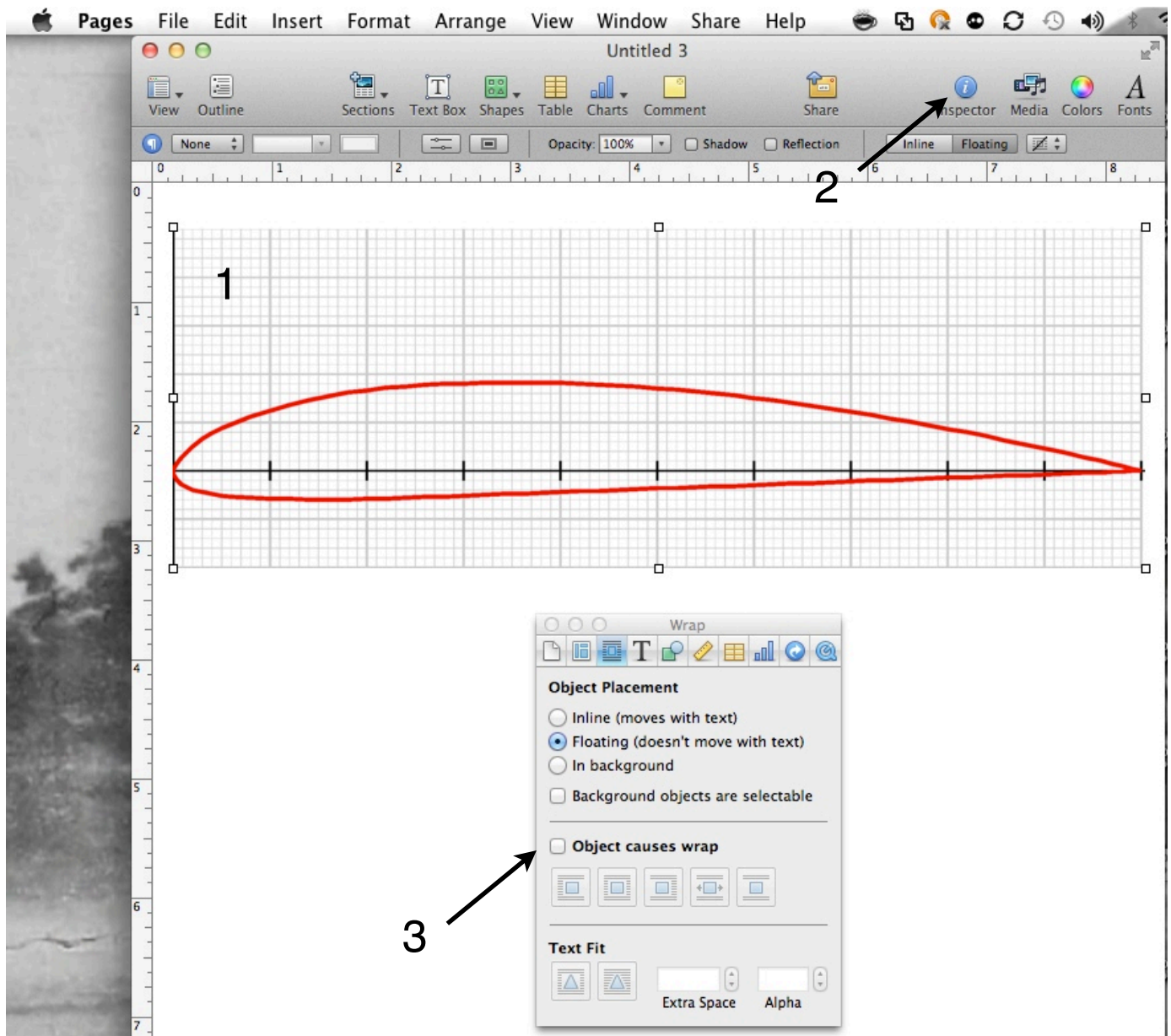
Step 4. On the Inspector page, now open the Metrics Menu.

If you keep that Inspector menu open, you will see a button at the top that has a little ruler icon. This is the menu item that works the magic. If you click on the icon it opens to a Metrics menu that shows you the size of the current screenshot/Airfoil. in the example below we see that the Airfoil is 4.68 inches wide. Or maybe a better way to say is the chord length of this Airfoil is 4.68 inches. Make sure that before you move on <u>select</u> the item "constrain proportions". That is what allows you to resize the Airfoil without losing the scale
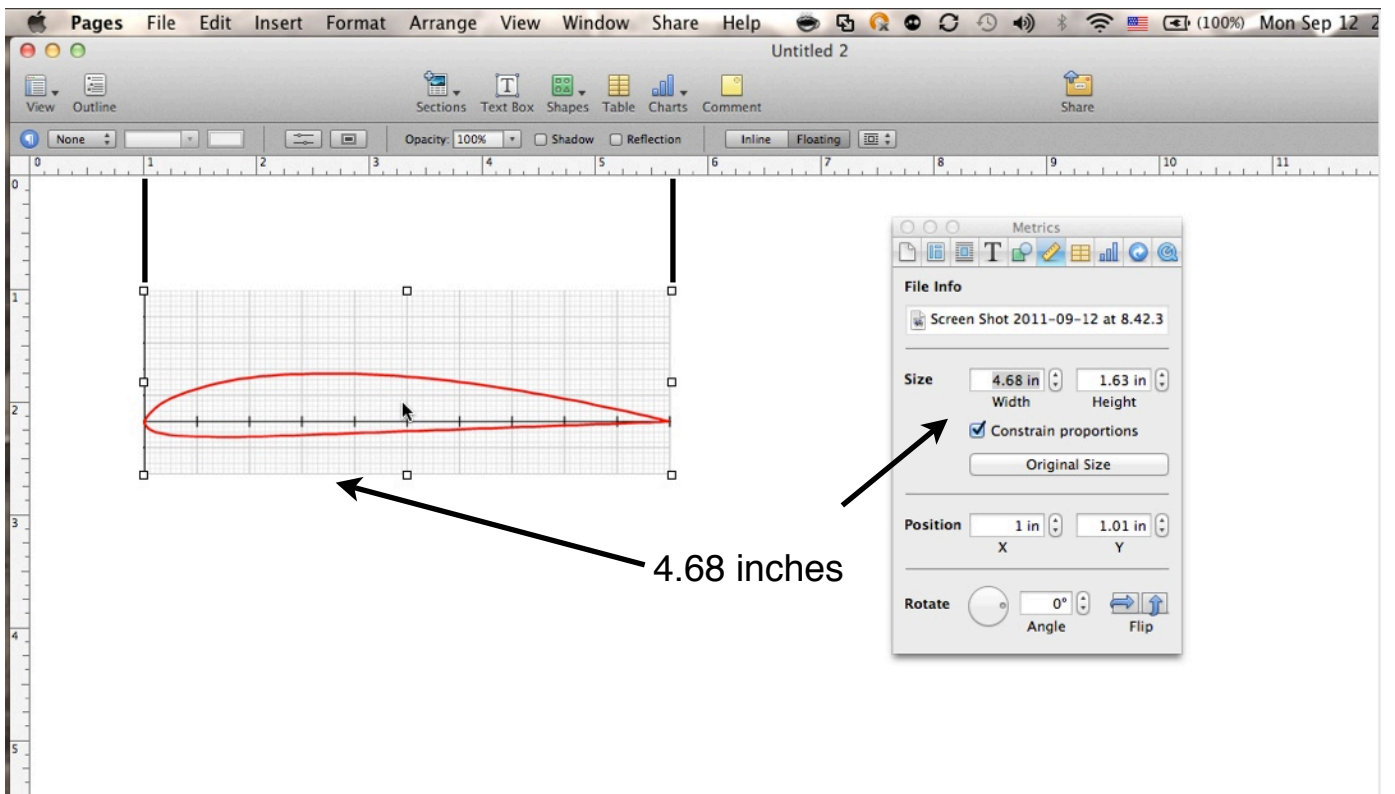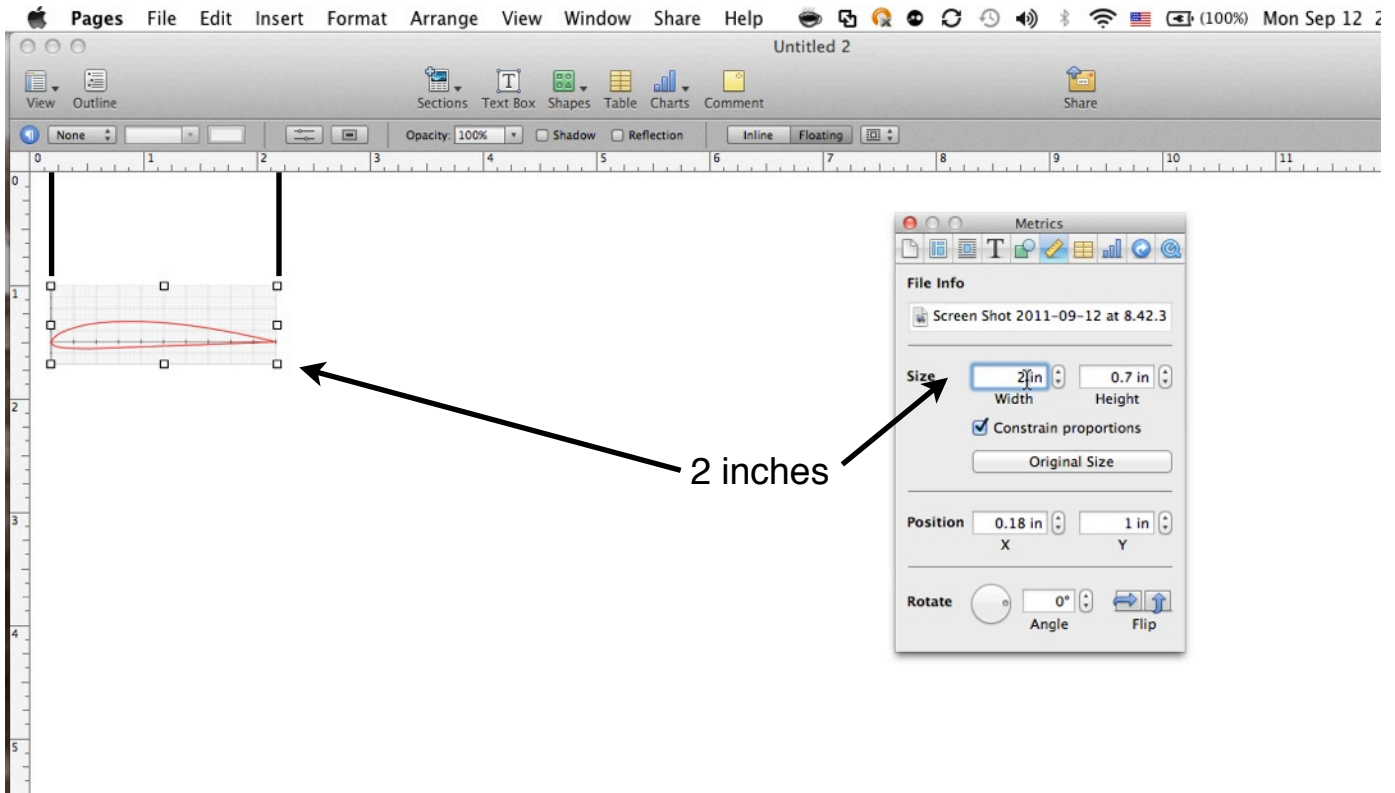
5. Change the width of the Screenshot/Airfoil to the size that you need.

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

2 inches

4.68 inches

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,

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