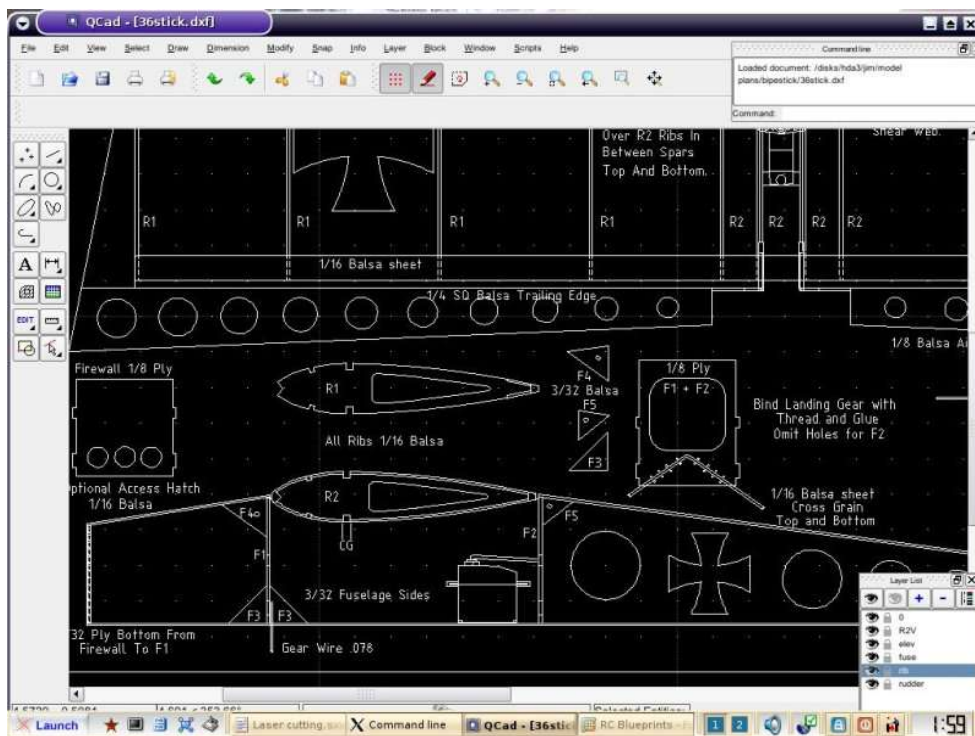


Laser cutting has made the art of model airplane construction easier. It can give the builder the quality and precision to construct an accurate model. Why do I say can? Well, preparing the file for cutting is just as important as a good glue joint. The time spent with your file is worth the end result. Once you have your file, it can be used to cut another set of parts just as accurately as the first or, you can mod it for your next project.

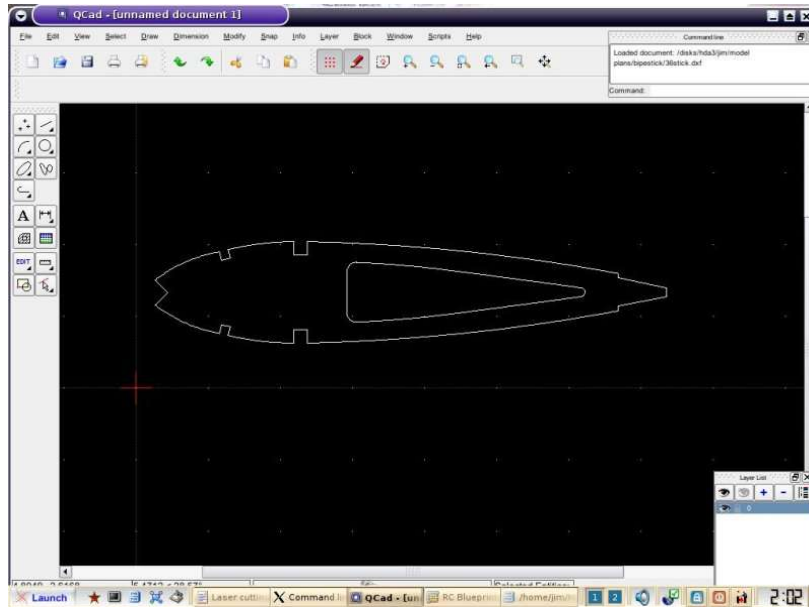
Ok, you just spent your vacation from work designing your dream plane on your favorite CAD software. Now what? What needs to be done? There are a few things that a builder needs to do to prepare their parts to be cut. First thing check to make sure your cutting service you choose can cut the size and thickness you need. Various services have different size cutting tables so see if there are any limitations.

To prepare your file you should remove any text from the drawing and ensure that all lines are on the same layer. (We'll cover labeling your parts later) Also ensure that all lines are of the "continuous" type. Files should be saved in the industry standard ".DXF." Contact your laser cutting service to see if they require any special instructions that need to be followed with your file.

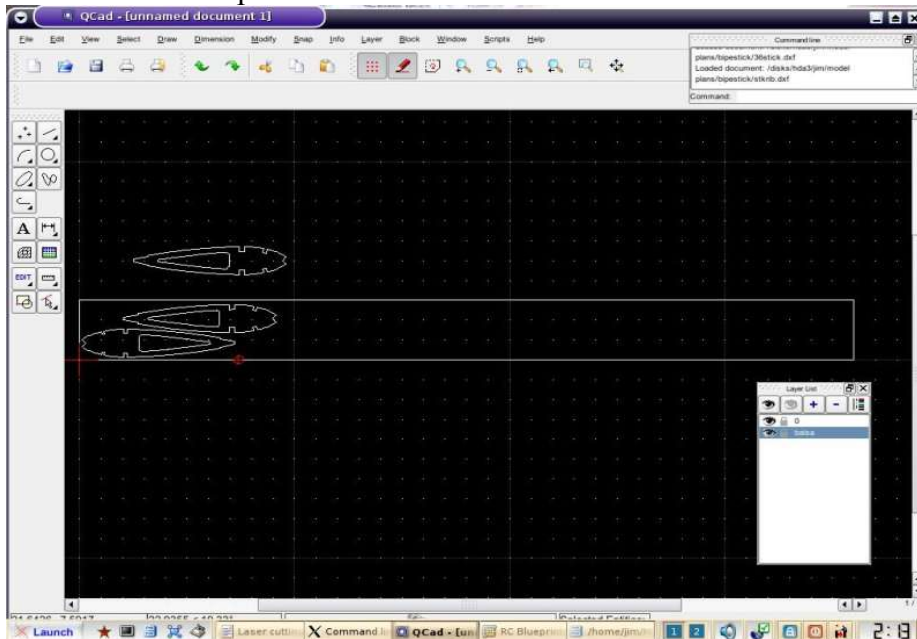
For our example here we will be using a set of wing ribs for a sport plane based on the Ugly Stick. I will be using Qcad for this exercise but feel free to sub in your favorite software. The goal is to have the parts to be cut, laid out on the material to be cut. Some things to consider when doing this is grain orientation of the wood and reducing waste.

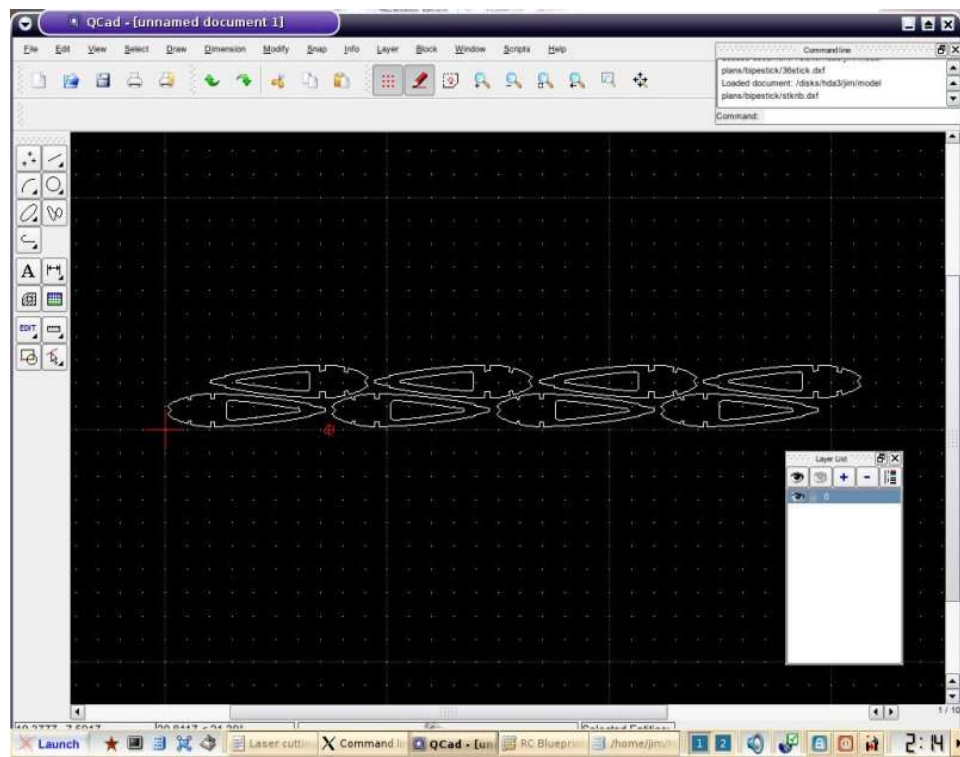
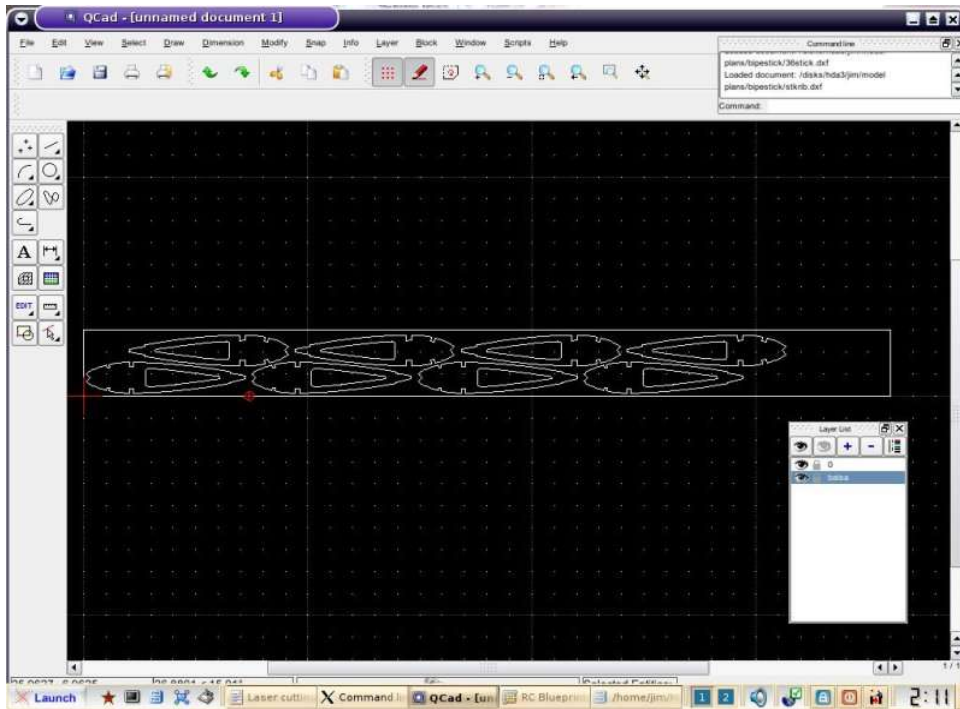


The ribs here are to be setup to be cut on a sheet of balsa 3"x36". The first thing I do is copy the rib to a blank page into Qcad. I then create a second temporary layer to draw the 3"x36" balsa sheet on, to use as a reference. This is done so you can visually see that the parts actually fit on the sheet. Create this virtual Balsa sheet in the 00 or home position.



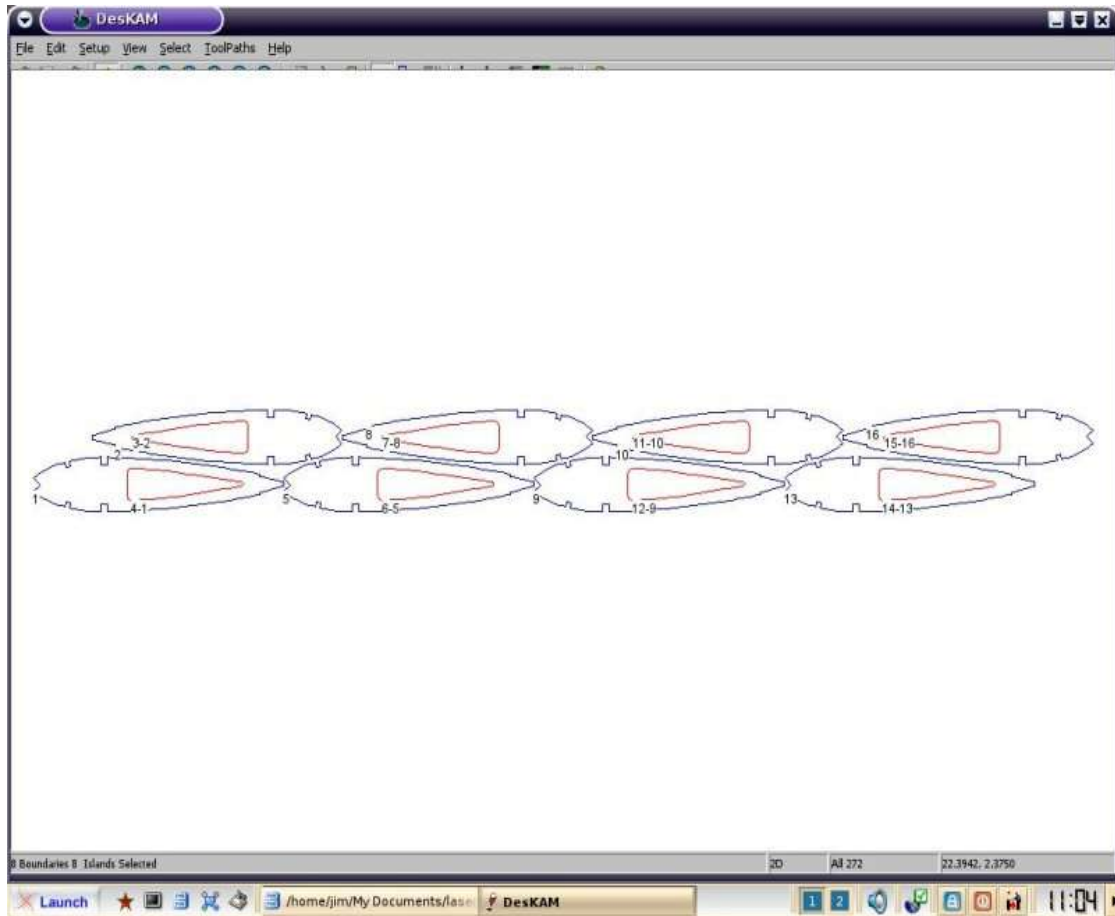
Now that we can see where the ribs go, we need to copy and paste multiple copies into position on our "balsa". For this model we need 8 of the R1 ribs. Again take note of the grain and try to save material where you can. Leave 1/8" minimum around the sheet perimeter and between the parts.



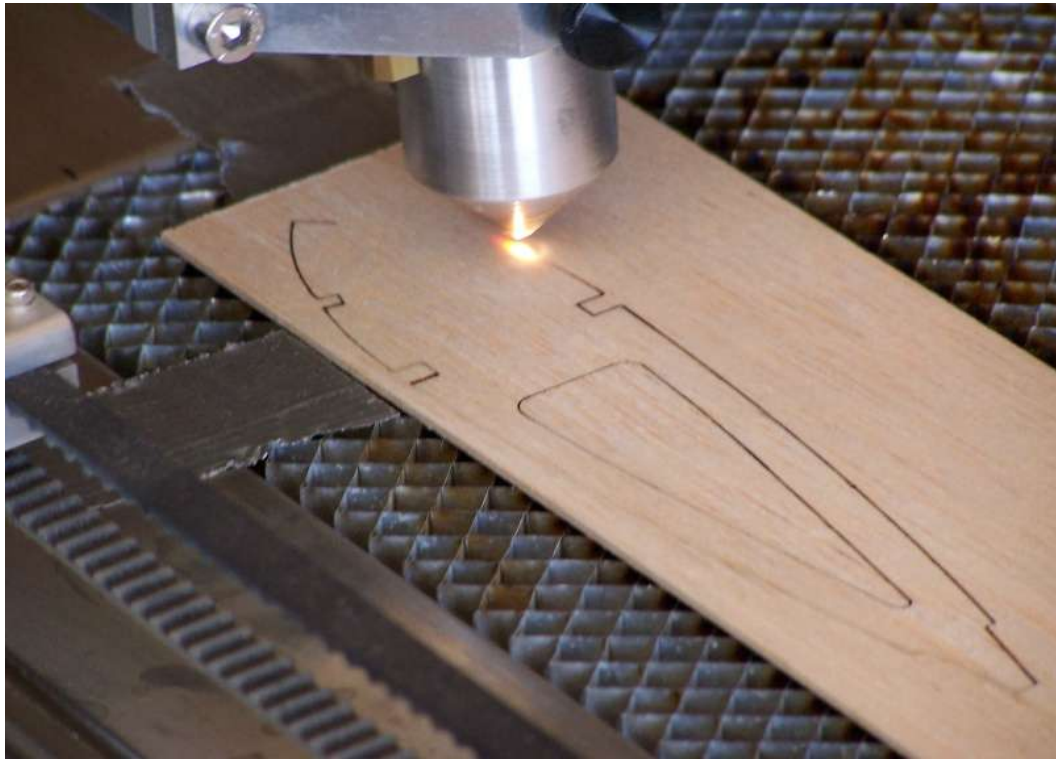
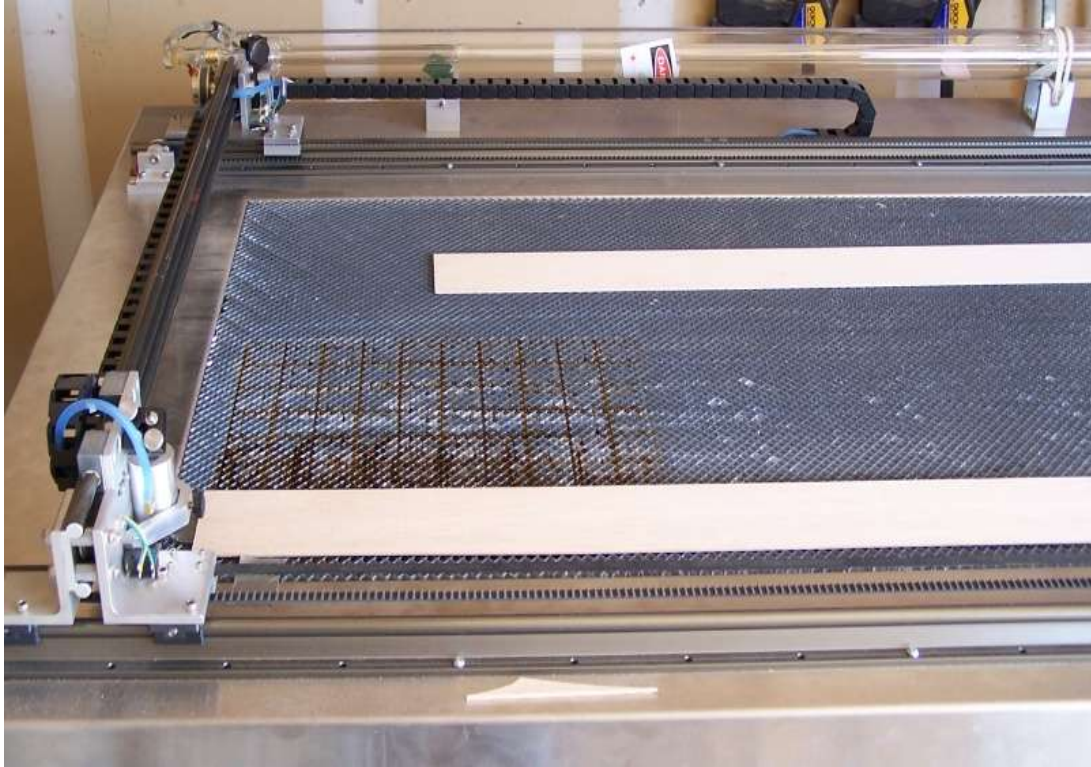


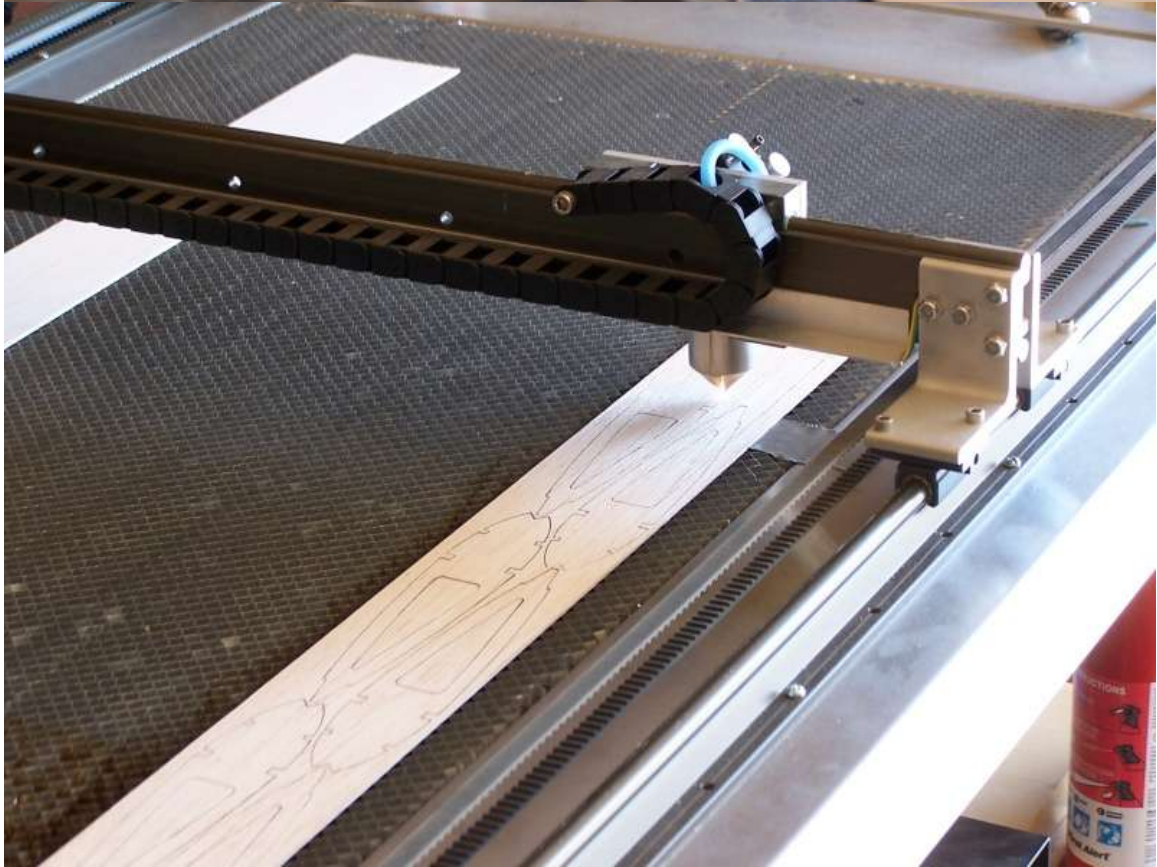
Once the ribs are in position, the “balsa” on our temporary layer can be removed. Save your file and it's basically ready to be sent to the cutter. Remember one sheet one file. If you have two different sheets to cut make two files.

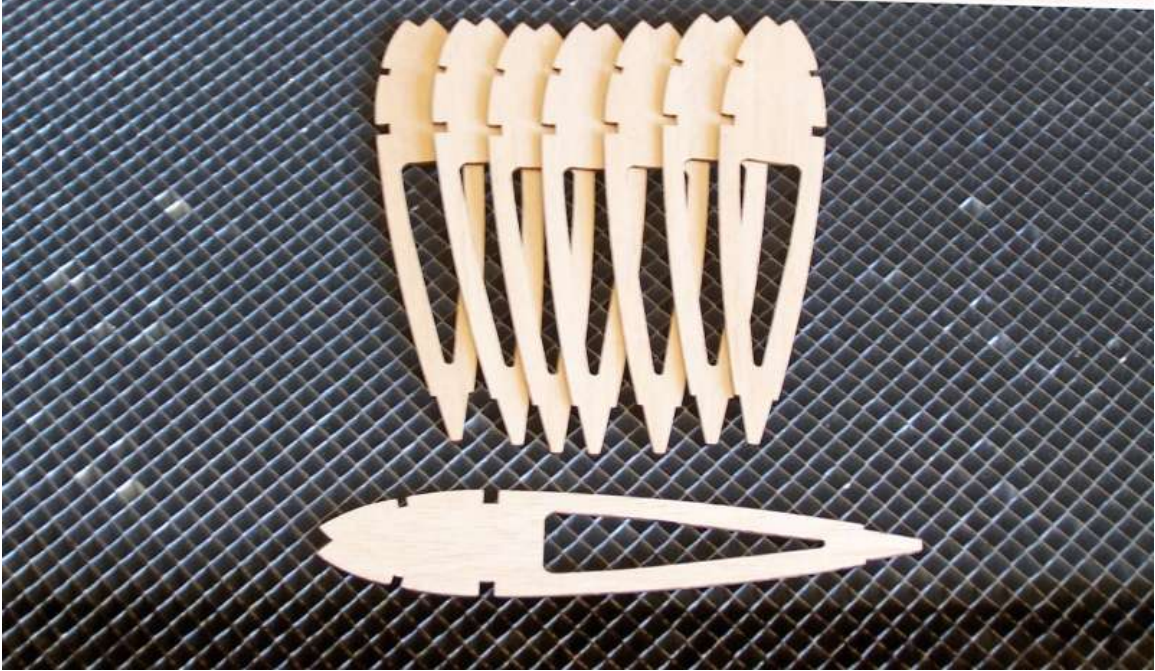
Now that the laser cutting service has your file, what do they do with it? For the software and cutter we are using, the file needs to be converted to G-code. This is the format the machine needs to cut the parts. For this I use Deskam2000. This is where the offset for the kerf is set if needed, speed of the laser, adding text and various other settings if needed. Once the file is saved as a .dnc, the file can be loaded into the computer controlling the laser and the cut can be made.



The next few photos show the laser cutting process of the ribs that were prepared in our example.









Lets touch on labeling parts. What I do is setup the text in another layer on the Cad drawing. This will be on another layer separate from the ribs. With the software I'm using it's easier to label the part first, adjust the power on the laser, then cut the parts out. There are services that can label and cut in one pass. Again check with your laser cutting service to see what they require..

There are a few things we will look at now. Some services require tabs be left on your parts so they won't fall out of the sheet when cut. Check with your cutting service and adjust your file as needed. They typically would like two per part about 1/8" running with the grain. Some services will cut without tabs if you don't want them though.

One question I get is what if the part has to be exact size? Whenever something is cut out, be it with a laser, router, tablesaw or any cutting tool. There has to be allowance for the kerf of the cutter or the part will be the wrong size. The laser I use has an .011 kerf. The software for the cutter allows tool offset to compensate for the width of the cut. That way if you have a 1/4" spar in a rib, you can design your rib with 1/4" cutout to accept the spar. Once cut out, the spar will be a good fit in the rib. So when designing your aircraft make your parts the exact size needed.

I hope this has shed some light on what it takes to prepare your file for cutting. The first time you try it it might seem a little involved. Once you do it a few times though you'll have all your parts ready to be laser cut in no time.

Jim Wagoner  
jtechlaser.com