TreeSoft : STL & Image to CSV Converter

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Change Log

Date	Change
2013-11-30	• First version finished and posted

What is the STL & Image Converter?

STL & Image Converter is a program that loads 3D stereolithography (STL) files or image files and produces a comma separated values (CSV) file. This CSV file can be loaded into Vectric's V-Carve Pro (version 7 or greater) or Aspire (version 4 or greater) using the CSV Gadget, which generates 3D toolpaths. Although it works with VCP and Aspire equally well (or badly) Aspire users can work with STL and image files directly and more easily, so there is probably not much point for them. For VCP users, it gives an easy way to generate 3D carvings.

STL & Image Converter lets you set the X, Y and Z dimensions of the produced file, and lets you describe the tool that you will use to make the cuts; it will use the shape and size of the tool to avoid overcutting the material.

STL & Image Converter can also be used to cut 3D logos based on colour separations. You may also be able to do this by tracing the bitmaps; you can decide which approach is easier or produces a better cut file.

STL & Image Converter can read ASCII and binary STL files. It can read BMP, JPG, PNG and TIF image files, but not all TIF's read well.

STL, image and CSV files do not contain dimension information. You can use any units you want, but you must use the same units everywhere in the program.

Versions

STL & Image Converter is available free of charge and is distributed 'as-is' with no warranties or suggestions that it well-suited for any particular application. It can be used for anything you wish. The fully-functional program is available for download at http://PaulRowntree.weebly.com. Donations (via PayPal at the download site) lets you bypass the nag-screen that appears on program run, and supports continued development of these programs. If you are using this program, please reflect on how much you are selling your products for, or what your hobby means to you, and consider making an appropriate contribution commensurate with the value added provided by these programs.
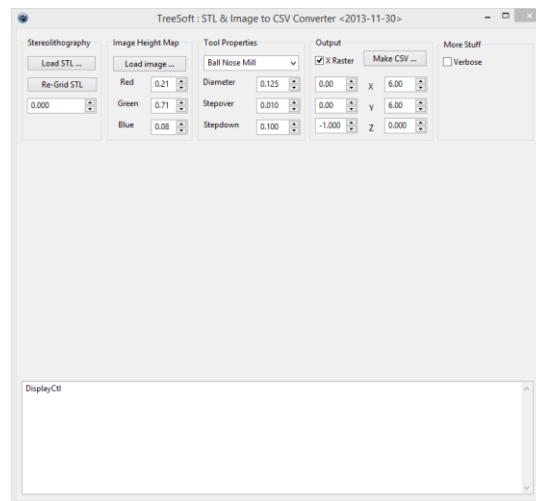
Installation

Download the **STL & Image Converter** ZIP file archive into a directory of your choice. There is no Windows installation, and the program does not use the registry or leave any junk scattered around in your computer. When you are done with the program, just erase the unzipped files, and you are clear and clean.

*** This program requires you to create the directory **c:\temp** if it doesn't already exist.

Using STL & Image Converter

Please read all of these instructions before making designs and toolpaths.
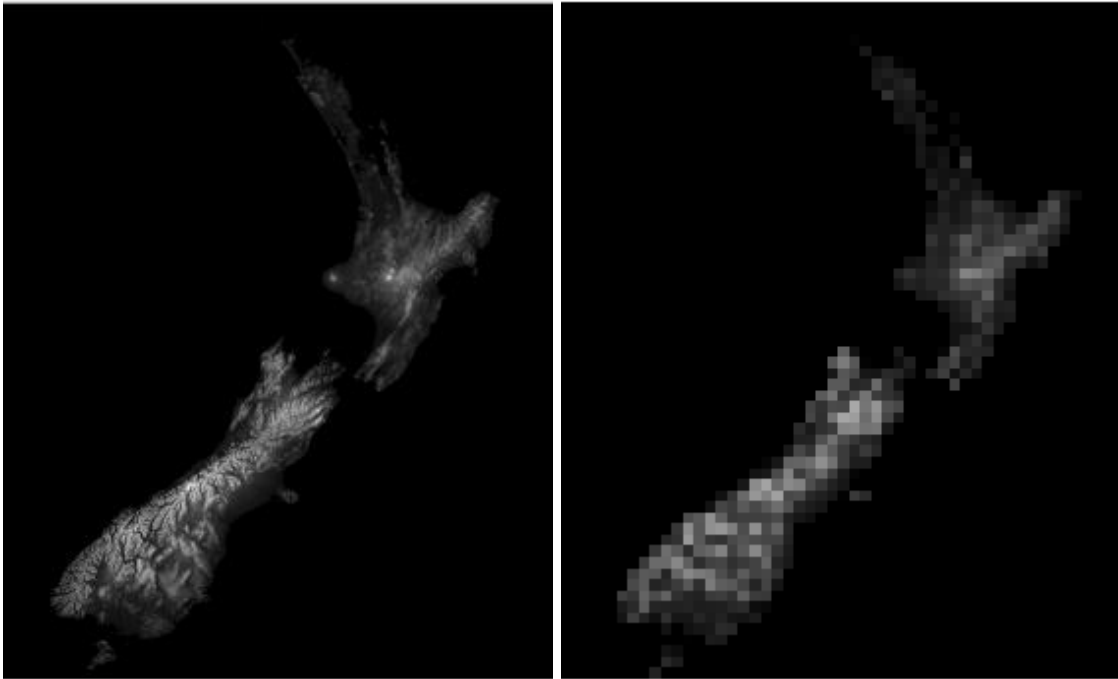
Double click on the program or shortcut icon to run the program. After the very-important-nag screen appears and is dispensed with, it should come up with a window like this.
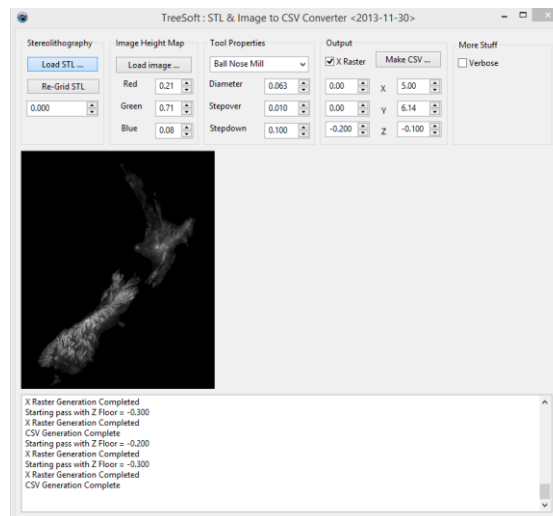

STL Conversions

1) Press "Load STL …" and select a STL file. This example will use the topographical map of New Zealand that was prepared using the **BigTopo** program, and is included in the program package (NZ_2.stl). A grey-scale image will appear showing the contents of the STL file, with brighter areas showing higher elevations in both the STL and the machined surfaces. It will fill in the X,Y and Z limits on the right-hand-side of the window with the information extracted from the STL file.
2) Ignore the controls in the "Image Height Map" section.
3) Setup the tool parameters for your preferred cutting tool. If the Stepdown parameter is less than the total depth of the cutting, roughing passes will be created that respect Stepdown. If you want to create roughing passes with a different tool, create two CSV files, one for each tool; make the total depth of the roughing cut slightly shallower than the final cut depth. If you have changed the Stepover, then press "Re-Grid STL" to recreate the image to reflect your choice. The following images are for New Zealand with 0.010 and 0.100 stepovers, respectively.
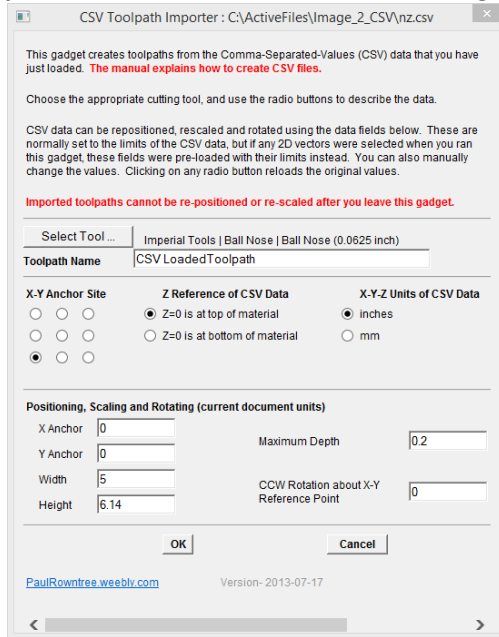
4) Adjust the X,Y and Z limits as you wish. If you are planning on using VCP with Z=0 referenced to the top of the material, then both Z limits should be less than or equal to 0.0. If Z=0 is set to the bottom of the material, then both Z limits should be positive. For this example set Zmin=-0.2, Zmax=-0.10. This is implicitly in inches. The tallest mountain will be 0.1" above the ocean, and 0.1" below the surface of the material.

5) Select if you want the toolpath to raster along the X or Y directions in VCP.

6) Press the "Make CSV…" button. It will regenerate the preview image, then ask you for a CSV filename, then go through the steps to produce the toolpath, including roughing trajectories if required. Normally this only takes a few seconds. It will show "CSV Generation Complete" when it is done.
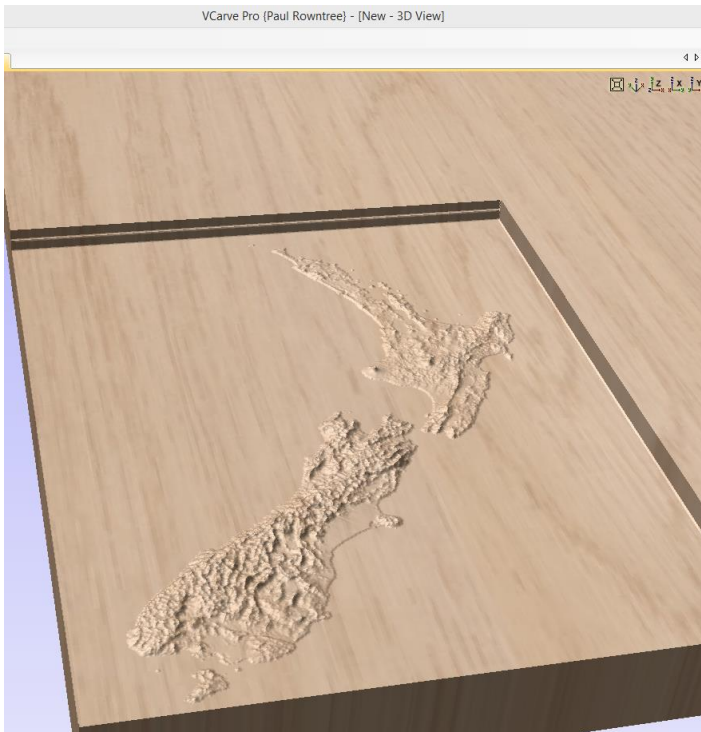

7) Now run V-Carve Pro, and start a new project. Set up the material as you want. For this example, use inches with (0,0) in the bottom left corner, and 1.0" thickness.

8) From the Gadgets menu, run the "CSV to 3D Toolpaths" gadget. Select the CSV file that you have just made, and after a few seconds the gadget front panel will open up.

9) Make sure that the selected tool is the same or similar to what you used to create the CSV file, and then press "OK" to create the 3D toolpath. It should appear in the Toolpath selection list, and is available to preview as usual.
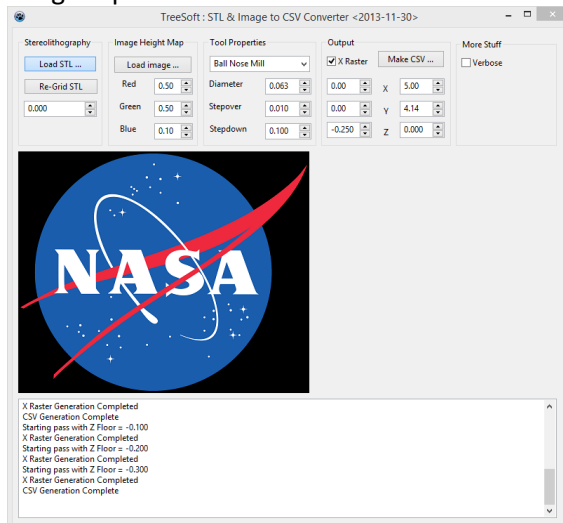

That is it!

Image Conversions

1) Press the "Load Image …" button and choose the image file you want to work with. For this example, the NASA logo will be used. IMHO the red line in front of the letters doesn't look quite right in 3D, but you can edit the images as you see fit, as long as you don't tell NASA. **STL & Image Converter** will scale the Ymax parameter to make the X/Y ratio of the CSV file respect the image aspect ratio.

2) The default Weights given to the three colours in setting up a Z scale (0.21, 0.71, 0.7) are used in the 'Luminosity' model (check Wikipedia http://en.wikipedia.org/wiki/Grayscale). They work, but here we want more red/blue separation. Try 0.5 / 0.5 / 0.1. These weights must be between 0 and 1.0, and do not have to add up to anything special.

3) Ignore the Stereolithography controls, and create the CSV file as described above. I used Z limits to -0.25 and 0.0.
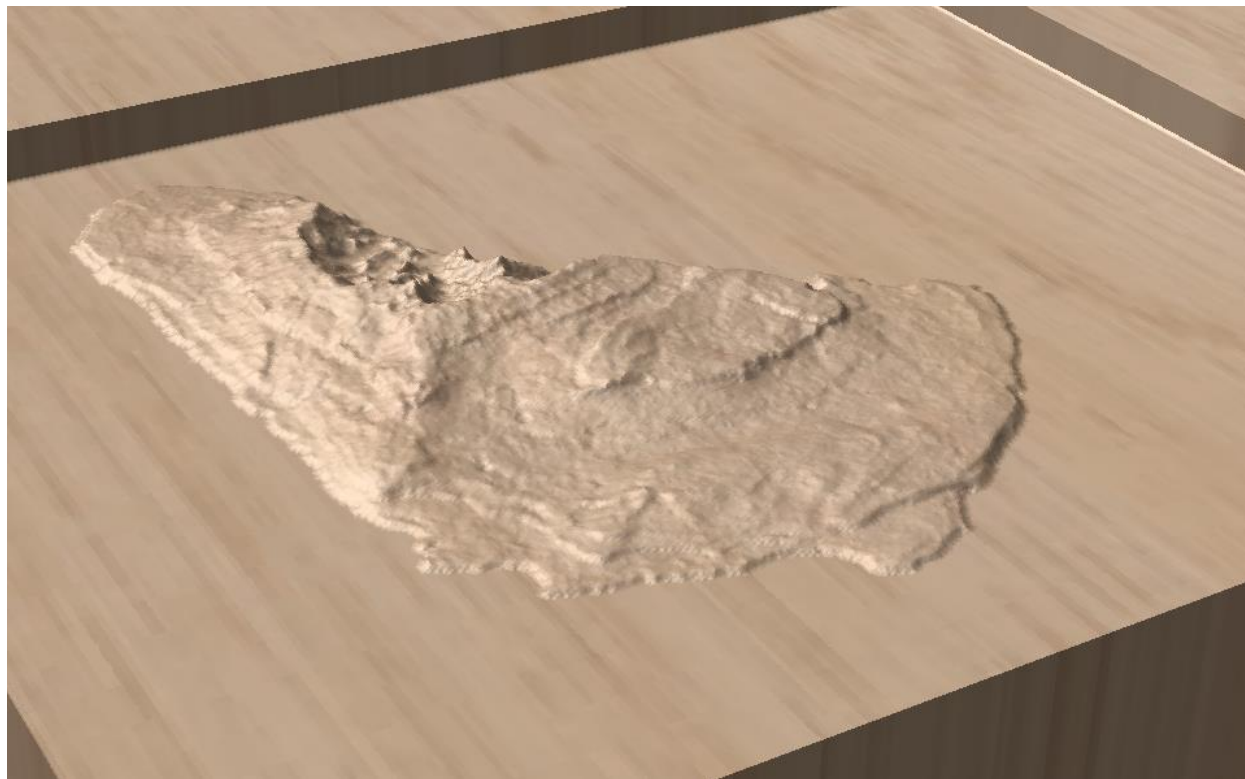
4) Load the CSV file into VCP, and preview the results.

That's it!

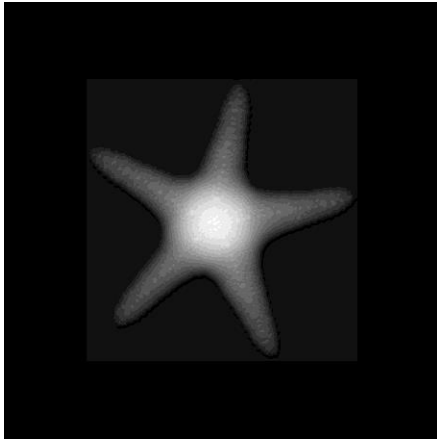Have fun! Please post anything interesting that you make!

Paul Rowntree, 2013

Other Examples (all previews were created in VCP)

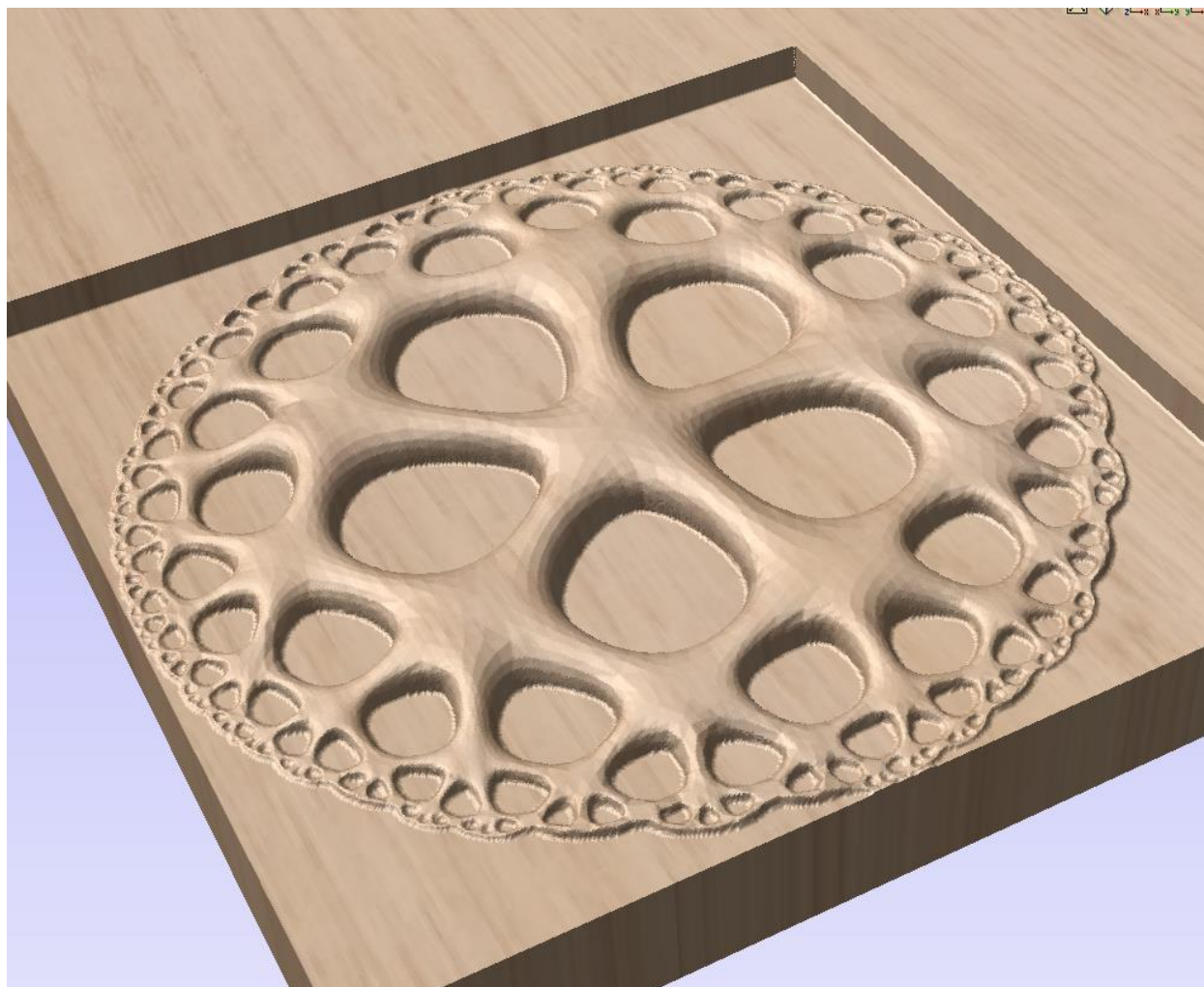Barbados (from STL file created in **BigTopo**)

Starfish (from Greyscale JPG image on Vectric Forum). Be careful with JPG files. Sometimes the colors are not as perfect as they seem because of the compression and anti-aliasing applied to the image, and this can show up as noise in the heights.

Sand Dollar (from STL)

'Lena', from web photo (BMP format). The eyes are a bit spooky in the preview ...