



TIN MODEL to 3D PDFs

By Ken Aiken

Using STL files exported from TIN MODEL for 3D printing and a few of 3rd party, free programs, it is possible to create 3D PDFs. We're using the U3D-2-PDF routine, which works together with MeshLab and MiKTeX and .NET Framework 4 to convert the STL data to a 3D, manipulatable image (*.U3D). The program then embeds the U3D file in the familiar PDF file.

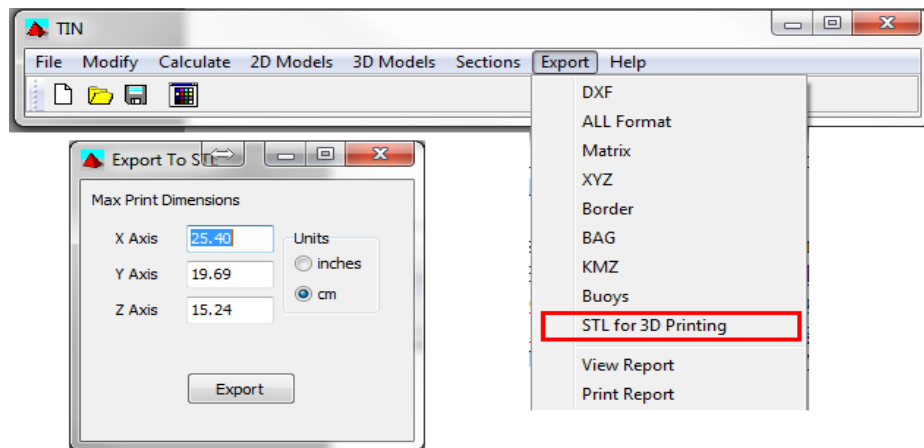
1. **Acquire and install the required programs and libraries:**

- U3D-2-PDF - (<http://u3d2pdf.sourceforge.net/>)
- MeshLab - <http://meshlab.sourceforge.net/>
- MiKTeX - <http://miktex.org/>
- .NET Framework 4 (may already be on your computer) - <http://www.microsoft.com/.NET/>

For convenience I've placed them all together in a ZIP file at ftp://ftp.hypack.com/Ken/3D-PDF_Files.zip

2. **In TIN MODEL, load up your files, build your TIN model and export the STL file.** Select EXPORT>STL for 3D printing. A dialog asking for maximum print dimensions will pop up. This can be ignored because it will be rescaled for display in the PDF.

FIGURE 1. Exporting STL Files From TIN MODEL



3. **Open the U3D-2-PDF program.** The first time, it may ask for the install directories of either MeshLab or pdfLaTeX. These are likely included in these directories:
- pdfLaTeX: C:\Program Files (x86)\MiKTeX 2.9\miktex\bin\pdflatex.exe
 - MeshLab: C:\Program Files (x86)\VCG\MeshLab\meshlabserver.exe
4. **Setup the PDF page layout.** Once the program is open, there is a setup tab which is fairly easy to configure (Figure 2).
5. **Configure the 3D image display in the PDF.** There's another tab to setup the display of the output file (Figure 2). This can be difficult can may require a few attempts to get right. The different labels meaning's are as follow:
- **aac** = opening angle(in degrees) of the camera
 - **roll** = start rotation angle(in degrees) of the camera around its axis

- **coo** = coordinates of the center of the orbit (should always be 0 since the STL is centered on 0)
- **roo** = radius of the orbit on which the camera moves i.e. zoom
- **c2c** = The initial position of the Camera to the center of the orbit, which in this case coincides with the origin of the coordinate system and the center of the object.

In Figure 2, I've included the parameters that I've found work the best.

6. **Select the source STL file and the target PDF file, and click Start.** The open PDF button opens your output PDF file.

FIGURE 2. PDF Page Layout (left) and Initial U3D Display Parameters (right)

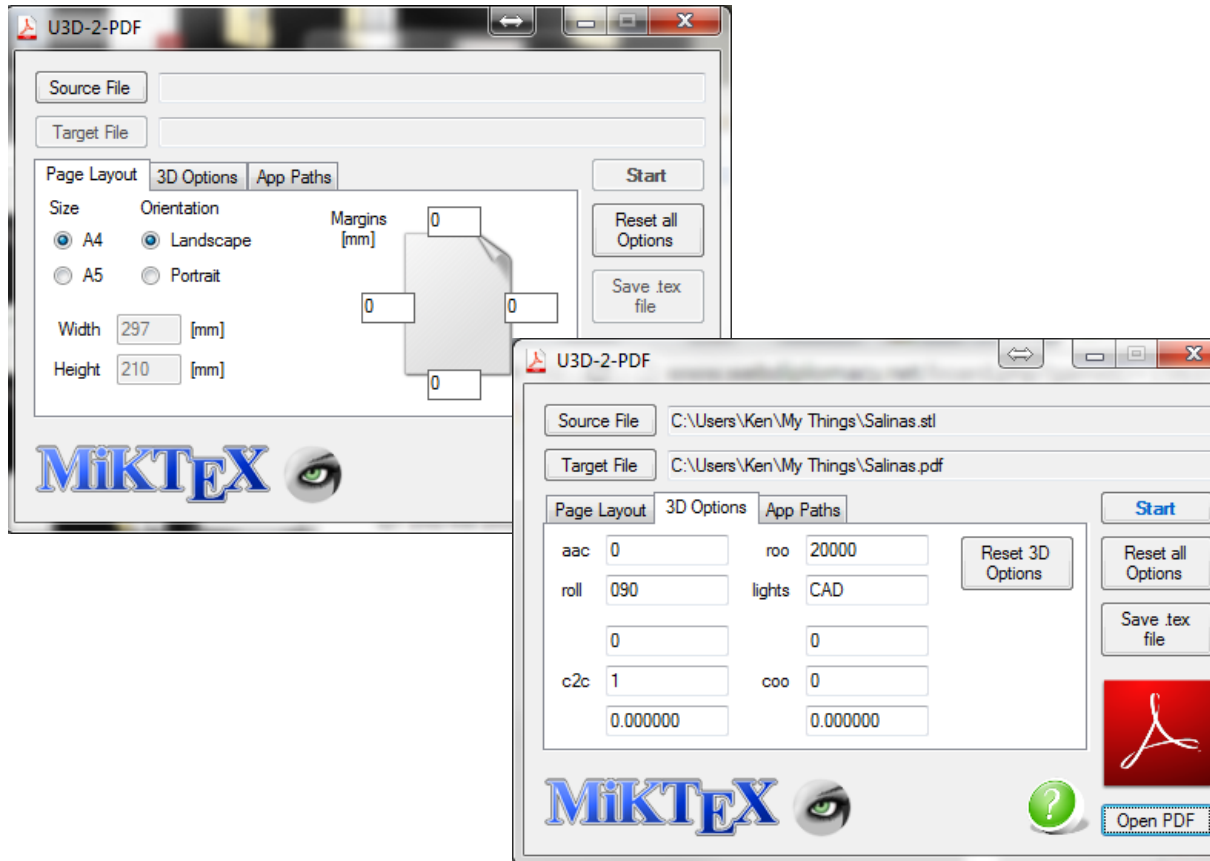


FIGURE 3. *Sample PDF with Embedded, 3D Image*

