Scan to Toolpaths: Big Coins From Tiny Scans

Background

Not all 3D scans need time consuming post-processing in order to be used to generate useful information. Our scanner generates very clean scans, nearly free of noise or outliers, and can be used with very little post processing. 3D scans can be scaled up or down, trimmed, mirrored and manipulated in any number of creative ways and used to generate 3D CNC toolpaths directly, without any additional processing. We put together this project to help demonstrate just how powerful 3D scanning can be.

Our Process

We used a standard US mint quarter and penny in order to demonstrate just how much scan detail we are able to capture. While our scanner could potentially capture even more detail and significantly higher scan resolution, we felt this made a pretty good point. The quarter was prepped using a whitening agent to limit any glare. We adjusted our scanner to capture the entire surface of the quarter in a single scan, and we were able to

generate exceptionally clear 3D surface scans of the coins, capturing surface resolution down to 0.020mm (0.0007"). At that resolution, we could not only read the text clearly, but just make out the shape of Lincoln sitting between the pillars on the Lincoln memorial on the back of a penny.
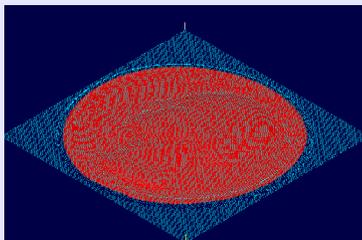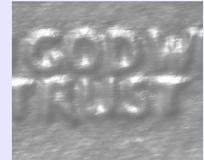
We scaled the scan up 10x and reoriented the mesh along the XYZ planes, and used the scan to automatically generate CNC toolpaths. The code was then cleaned up and transferred to out CNC machine to cut the final profile in dense CNC foam.

The Results

We went from a real coin to a 10x enlarged carving in less than a day. No extensive computer work, and almost no post processing. Before 3D scanning, this process would have been time consuming and impractical, but with our approach we can make cost effective reproductions of any shape in just about any material.