

## SMARTTECH Empowers Young Engineer's Dreams



*By: Steven Hartig (Into3D LLC, CEO)*



*The founders of Into3D LLC (from left to right): Steve, Joseph, and John*

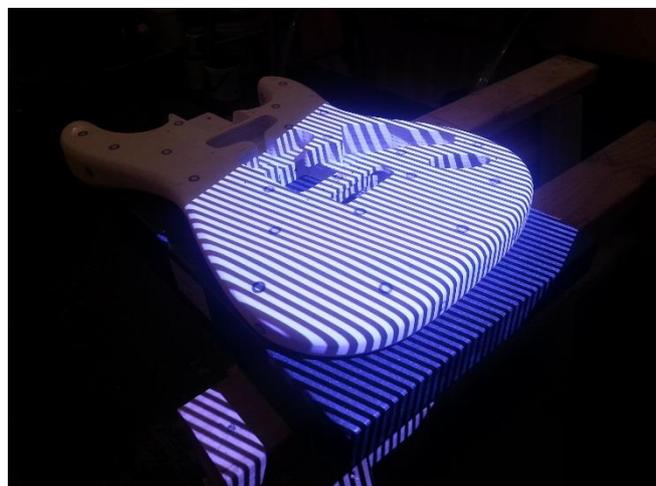
At the age of 20, I began my work as a designer for several firms—including the Milwaukee School of Engineering (MSOE) Rapid Prototyping Center—where I used both 3D printers and 3D scanners. While attending school, I teamed up with two fellow students (pictured left), and we began to discuss starting our own company.

It is very common in the United States for smaller companies to provide services for larger firms, as the manufacturing sector is both very specialized and highly-privatized when compared to Europe. Having worked in the 3D scanning industry in the past, I was aware that many large to mid-size

manufacturing companies still had yet to leverage this new technology for quality control and reverse engineering purposes. Many companies still use CMM machines for inspections, but these machines are slow, complicated, and are limited in the complexity of objects that they can measure. 3D scanning, in contrast, has no hard limit on the size or shape of the objects that can be measured and delivers results very quickly. Due to these advantages over traditional measurement methods, I believed that there was great, untapped growth potential for a company providing 3D scanning services.

When researching different 3D scanners, we found that many of them were out of budget for three college students. Eventually, we discovered SMARTTECH—a European 3D scanner producer.

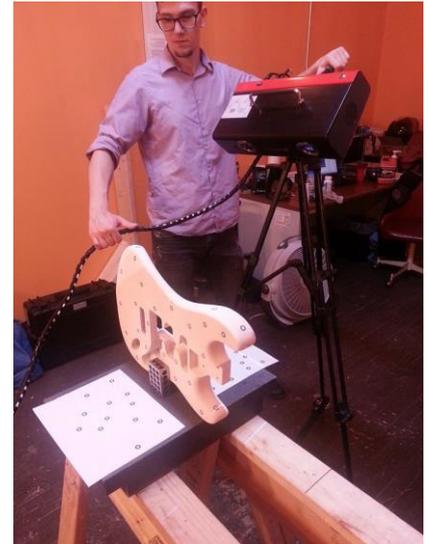
SMARTTECH's 3D scanning technology is based on structured light. This method relies on a fringe pattern projected over an object (pictured right), whereby a camera can detect an object's curvature. If the fringes are projected onto a flat object, they would



*A fringe pattern being projected over an object during a scan*

stay straight. If they are projected on a detailed object, the fringes will conform to its exact shape. The digital pictures are analyzed in software to create a measurement point cloud that has the same coordinates and color as the scanned object; every pixel corresponds to a point in the cloud.

After deliberations about which scanning system was right for us, we decided to not only purchase a SMARTTECH 3D scanner, but also become their distribution partner in the United States. We equipped our workshop with Scan3D Universe 5 Megapixel scanner, along with a small automated rotary table. Additionally, we were supplied with Geomagic Control for quality inspection and Geomagic Design X, formerly Rapidform, for CAD modeling.



We use our 3D scanner to provide first-article inspections before a manufacturer makes a full production run of parts. This process assures the company that all of the equipment on their line is calibrated and that their parts are in specification.

As an example, I can describe the case of a foundry that produced manhole covers:



Because it was their first experience with 3D scanning, we gave them a free presentation where we produced a quality inspection report for one of their covers. Using a Micron3D scanner—which is the most accurate optical metrology device on the market, thanks to its innovative green light technology—we provided an inspection within half an hour. When we compared our 3D scanning results to the customer's CAD model, we found that the wall thickness was far below specification in some areas. With traditional inspections, the only way to measure wall thickness is by cutting (and destroying) a part or through the use of a specially-made jig. In Geomagic Control, wall thickness inspection is a one-click operation, as are various other

analysis operations. No destructive methods need to be employed, and the object is no longer needed during the inspection phase, once it has been scanned.

Through the use of Geomagic Control software, we discovered other deviations which could have a significant impact on strength, and therefore, safety. The foundry is now a regular customer and we expect that they will be purchasing their own 3D scanner in the near future.

Having a SMARTTECH scanner in our office is indispensable, as they are the only 3D scanner manufacturer whose machines can be calibrated by an independent lab of metrology. Strict quality requirements dictate that many large companies such as General Motors, GE, and Harley-Davidson outsource all of their first-article inspections. The certificate of referential accuracy puts a SMARTTECH scanner in the same class as a CMM machine, which means that it is able to meet ISO requirements. Furthermore, it opens up the possibility for us to use our scanner in applications where safety paramount—such as the manufacture of airbags and seatbelts.

The next most common use of 3D scanning technology is reverse engineering. There are dozens of companies that provide aftermarket accessories for vehicles, aircraft, and boats. Using our 3D scanner, we can easily get full and accurate documentation of an existing chassis. Let's take an example from the automotive industry:

One of our local customs shops was restoring an Oldsmobile from the 1970s. In this case, one of the tail light housings was missing and a replacement part could not be located. Because the original cast piece from the other side was still intact, we were able to scan the object and, using Geomagic Design X, mirror the data and compensate for shrink. Being that our shop has a Stratasys 3D printer, we were able to print a new pattern in house that was sent to a foundry. A perfect replica of the missing piece was able to be produced, as can be seen below.



*Replica part (left) and 3D printed pattern (right)*

Even though we started our company as a group of students with a limited budget, we were able to purchase a 3D scanner along with two 3D printers. Our 3D scanner is working well, orders are coming in quickly, and we even had some interest from the local media. I recently had the pleasure of talking to our local FOX News station about 3D scanning. I feel that we are able to breathe some fresh air into the local industrial sector; our open-minded attitude has helped us to encourage new customers who have yet to benefit from 3D scanning technology.

In summary, working with SMARTTECH has been the best choice that we could have made, and we look forward to a prosperous partnership together.

Feel free to visit our website [www.into3dllc.com](http://www.into3dllc.com)