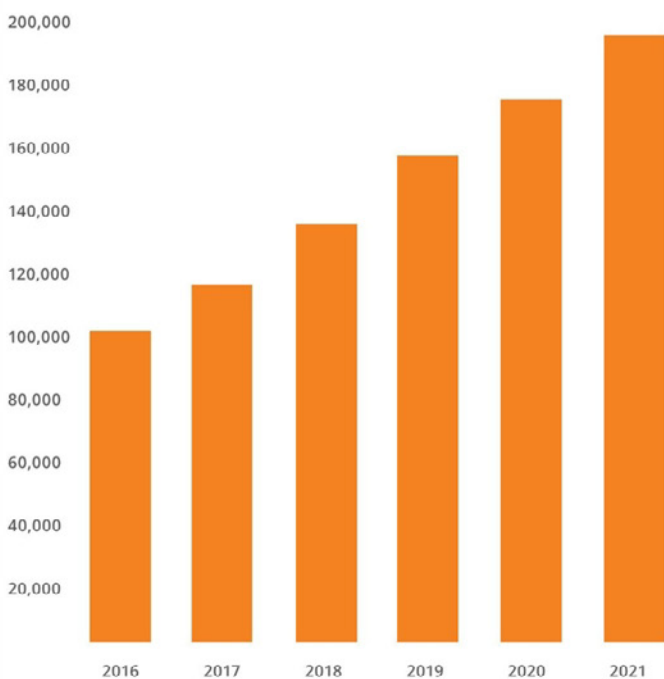# 3D PRINTING IN 2017

A *Service* OPPORTUNITY

BY TIM GREENE

Why today's print service providers should consider breaking into the 3D printing market.

3D printing is currently in a very interesting phase. Some of the industry leaders, the companies that have made the market what it is today, are being challenged by new players, and distributors are trying to figure out what key technologies they should stake. The types of companies buying the systems are changing as well, making it important for traditional PSPs to understand the new service providers that are emerging to offer 3D printing services.

Hardware Forecast

While the 3D printing market has existed for 30-plus years, it has almost all been in prototyping. Now, though, many developments indicate that 3D printing is at the threshold of wider adoption and utilization in production and manufacturing environments. One of these is the emergence of production configurations that "gang up" multiple 3D printers to increase capacity and automate some of the pre- and post-processing requirements. To date, 3D Systems, Stratasys, Formlabs, and Carbon have all introduced or announced some type of production configuration based on existing 3D printer models. This is an important point because customers (those who buy the 3D builds) have a set of expectations around materials, quality, rigidity, and other performance metrics and they've become accustomed to the current technology. This dynamic, which is designed to address one of the biggest obstacles to growth in 3D printing – speed – is expected to expand the installed base. Companies will adopt multiple devices, adding capacity instead of replacing one device with another. IDC expects the hardware market for 3D printers in the US to grow at a 14-percent CAGR from 2016 to 2021, from almost 100,000 in 2016 to over 190,000 printers sold annually by 2021.

This forecast builds in a lot of assumptions; one of the biggest is the launch of new systems with substantially lower initial investment points, even as the performance of the technology improves. There are some real game-changing technologies on the horizon that will dramatically increase

US 3D PRINTING SYSTEM SHIPMENTS

August 2017

BIG PICTURE

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Making a SCENE

Scott Niner, president and owner of Dangling Carrot Creative (DCC, danglingcarrot-creative.com), has kept his eye on 3D printing for years. The company calls itself a one-stop shop for the entertainment industry – a business that, according to Niner, "works at the speed of light." So, technology that could churn out prop guns, statues, and even set designs with a few pushes of a button would really be useful.

Until recently, however, the technology available didn't really meet Niner's standards: a balance of speed, size, and versatility. The shop recently brought in a Massivit 3D printer and has spent the past month or so tinkering and learning about the machine.

So far, it seems like the possibilities are endless. Hollywood insists on keeping its business shrouded in secrecy, of course, but Niner alludes to projects including a full-scale lion, custom furniture designs, a vignette of a sci-fi character, and an impressive 9 x 18-foot spaceship that appears as if it's crashing into the ground.

Usually, that spaceship would've been carved out of foam – talk about meticulous. With 3D, DCC pushes a button and then glues the panels together. "We don't have days to do jobs; we have hours," he says. The shop's daily delivery schedule – 5 a.m., 10 a.m., and 2 p.m. – underscores that nonstop culture. It pays to be your client's quickest choice.

DCC brings large-format expertise to the table, as well. The shop already offers capabilities like vehicle wrapping, backlit printing, sign manufacturing, and much more. That all comes in handy when extending the capabilities of its 3D machine.

"Some of the things that aren't really good for a 3D printer to print, we'll incorporate by laser-cutting those pieces and adding on to the 3D model," Niner says. But most critically, he adds that they're "working feverishly on perfecting wrapping these products with digitally printed vinyl."

Why is this so important? Again, we're talking hours, not days. Vinyl wrapping is far faster – and more economical – than bringing in a scenic painter for every new prop and design. The challenge is learning how to adapt 3D designs for 2D digital print. Niner says he's collaborating with a number of software companies – the kind that help manufacturers lay out the fabric for complex shapes like car seats, for example – to figure out how to flatten that 3D image for print.

"There are some challenges," he says, "but there's no way I'm not gonna get there. It's the number one priority right now." After all, someone has to be the first.


production capabilities while still allowing prices and operating costs to come down. A good example of this is Desktop Metal's production 3D printing system, which is expected to hit the market in 2018. The value proposition of that system is the ability to print the same materials used in metal injection molding (MIM) today. Those MIM metal powders are much less expensive than the metals used in most of today's 3D metal printing systems, which are based on sintering and melting technologies.

Technology Review

Today's 3D printing technologies have their strengths and weaknesses. About 80 percent of 3D printers sold are based on FDM (fused deposition modeling) technology. One of the strengths of FDM technology is that it's fairly well-proven and rugged. Many customers accept FDM-level quality, and there's an ever-increasing array of materials, including composite materials, that can be extruded. While the

US 3D PRINTING SERVICE REVENUE ($M)
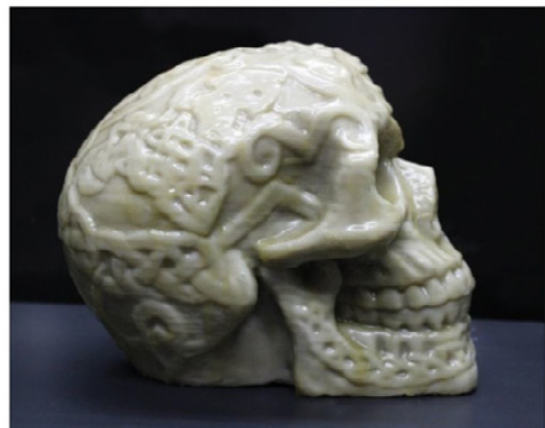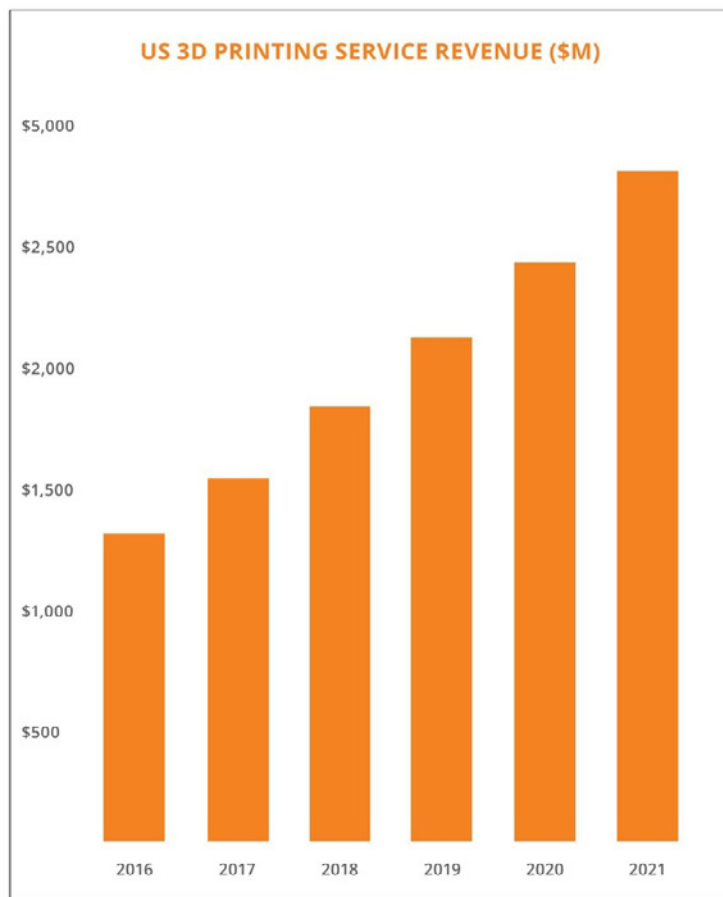
technology platform is established, the capabilities of FDM-based printers continue to expand. Printers are getting faster, build sizes are getting larger, and more suppliers offer multiple extrusion head printers that have multi-material and multicolor printing capabilities.

Another interesting printer technology was shown by Mimaki at the ISA Sign Expo this year. Mimaki's 3D printer, based on UV-LED technology, is unlike many of the other solutions available on the market because it's a full-color printer. At the tradeshow, Mimaki illustrated how 3D printing could be integrated into a typical business, in this case a sporting goods shop. Mimaki showed a number of samples of custom bicycle parts and accessories that were produced on the 3D printer.

One of the fastest-growing technology segments is stereolithography (SLA), which IDC expects to grow, in shipment terms, at a rate of over 25 percent from 2016 to 2021. SLA printers are getting faster, prices are coming down, more of the thermoplastics they consume are being developed, and systems are being automated to match production requirements.

The fastest growing technology segment, according to IDC research, is powder-bed fusion 3D printers. This is where many of the high-end metal printing systems are included and it's where HP's Multi Jet Fusion is categorized. Some of the original patents have expired in this segment, which is partly why we're seeing a flurry of new products at much more aggressive price points.

Service Providers

Some of IDC's research indicates a growing trend of manufacturers taking 3D printing in-house, which is natural as the price of the systems comes down and the simplicity of operation goes up. Still, IDC expects the revenue from commercial 3D printing services in the US to grow from $1.26 billion in 2016 to over $2.75 billion in 2021 – a rate of almost 17 percent per year.

As the market for these systems has grown, several constituencies have emerged to provide 3D printing services. Some of the key vendors, especially at the high end of the market, offer prototyping and on-demand parts manufacturing, but part of what they are doing is proving to customers that their systems are viable solutions. Another important group is the new set of online providers, companies like Sculpteo and Shapeways, that serve more or less as the Vistaprint of the 3D printing industry in that they will do one-offs or large, complex builds in any quantity or material because they have access to a lot of different technologies. Also, retailers and logistics companies, like Staples, UPS Stores, and The Home Depot, have launched 3D printing initiatives. Finally, the prototyping industry contains many companies that have adopted 3D printing but also use their CNC routing, milling, and injection molding systems for prototyping and small-batch manufacturing.

Here are some recommendations for large-format PSPs thinking about getting into 3D printing:

• **Get up to speed:** The latest 3D printing technologies offer huge advantages over earlier generations. These improvements make 3D printing faster, more accurate, and higher in quality, and provide more colors and textures. Understanding any necessary finishing and other post-processing can be a huge differentiator.

• **Observe the local market:** In addition to the vendors and online providers identified in this article, look at who else in your area offers 3D printing services.

• **Don't sell 3D printing on a cost-plus basis:** You have to sell your ability to fix some of the pain points that 3D printing adopters have experienced, such as improving cycle times and eliminating the learning curve.

• **Look to partner with companies in a specific industry:** The field of 3D printing is so broad that trying to convince customers that you know their industry, no matter what it is, will likely leave you spinning your wheels.

• **Find the synergy:** This sounds like consultant-speak, but it's smart to look for ways to sell 3D printing services to your existing customers, even if they're on the promotional side of the market and not involved in industrial-scale manufacturing of parts and pieces.

• **Connect:** Think social, mobile, and personal. Some sites, such as 3D Hubs, offer the ability to produce 3D builds on a paid basis for any company that has a 3D printer. Use your social media presence to illustrate your capabilities and share updates on projects you're working on. Also, go to maker events where you can discuss what customers want and need from 3D print providers. Many people who have a $300 home 3D printer will be amazed by how much better a professional service is. 🖝