IDC Innovators

IDC Innovators: Plastic-Based 3D Printing, 2018

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THIS IDC INNOVATORS EXCERPT FEATURES: RIZE

IN THIS EXCERPT

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Why Rize Was Chosen as an IDC Innovator

Rize Inc. was selected as an IDC Innovator because of its differentiated 3D printing technology, Augmented Polymer Deposition (ADP), which provides key advantages in the reduction of post-processing time and enables the application of identification data in a single step. Rize has developed its own safe medical- and engineering-grade material, Rizium One, which creates parts stronger than polycarbonate and ABSplus

Rize			
Founded 2012	**Number of Employees** 23	**Headquarters** Woburn, Massachusetts	
Product Name Rize One 3D Printer, Rizium One polymer materials		**Founders** Eugene Giller	
Profiled Product/Service APD-based 3D printers and materials		**Funding** Rize is venture-backed; funding details are not disclosed	

Source: IDC, 2018

IDC Innovator Assessment

- Rize has a thoughtful supplies strategy, as evidenced by the launch of a black version of Rizium One to complement the original white version. Rizium One is the company's own compound of engineering-grade thermoplastic. The combination of Rize's printer and Rizium One material is critical to the company's value proposition.
- Rize's APD technology also requires the marking ink, which enables product marking and authentication, which IDC believes could become a key capability for 3D-printed parts and products.
- Rize scored with the recent agreement with Production Services Management Inc. (PMSI) to deliver on-demand parts manufacturing, potentially across the 250+ industrial facilities that PMSI manages. PSMI

reports that the entire experience with Rize's process, including preprocessing, printing, and support removal, is one of the key reasons PSMI adopted Rize's technology.

Key Differentiator

Rize's key differentiator is the company's patented, hybrid technology, APD, which takes two existing technologies, material extrusion and material jetting, and combines them to enable multimaterial printing with minimal post-processing and the sustainable use of safe, nontoxic, and recyclable materials — all designed to make industrial 3D printing safe and easy enough to be used at the point of consumption.

Challenges

IDC believes the reduction of post-processing, one of Rize's key differentiators, is an undervalued aspect of speed/productivity improvement. Still, Rize will have to compete with competitors that are improving speed through faster deposition.

IDC INNOVATORS IN PLASTIC-BASED 3D PRINTING

Plastics are excellent materials for 3D printing because they are relatively inexpensive and have a relatively high strength-to-weight ratio. Over 95% of 3D printers sold in North America are designed for plastic-based 3D printing. The performance of plastic-based 3D printing is improving across a range of metrics. Build sizes are getting larger, production speeds are increasing, and it is becoming possible to use a wider range of materials that further increase the addressable market for 3D printing. While large companies have invested significant resources in the development of new plastic-based 3D printers, there are several smaller vendors that are innovating in the plastics market. IDC has identified four of the small, emerging vendors with revenue <$100 million but have an innovative new technology or a groundbreaking business model that could accelerate their growth and potential market impact. We refer to such companies as IDC Innovators, and this document profiles four such companies in the plastic-based 3D printing market: Carbon, Formlabs, Rize Inc., and Ultimaker.

TECHNOLOGY DEFINITION

IDC has defined 3D printers as those that enable the creation of objects and shapes made through material that is laid down successively upon itself through any number of print technologies from a digital model or file. 3D printers are typically used in environments for use in industries such as architecture, construction, design, educational institutions, engineering, and medical equipment manufacturers. IDC strives to align our market segmentation in line with the ASTM definitions of 3D printing/additive manufacturing processes. The ASTM definitions are as follows:

- **Material extrusion** is an additive manufacturing process in which material is selectively dispensed through a nozzle or orifice. The term *material extrusion* is often used interchangeably with technology terms such as fused filament fabrication (FFF) or fused deposition modeling (FDM). There are more than 100 suppliers of FFF/FDM or materials extrusion technology printers worldwide.
- **Vat photopolymerization** is an additive manufacturing process in which liquid photopolymer in a vat is selectively cured by light-activated polymerization. The term *vat photopolymerization* is used interchangeably with stereolithography.
- **Material jetting** is an additive manufacturing process in which droplets of build material are selectively deposited.
- **Binder jetting** is an additive manufacturing process in which a liquid bonding agent is selectively deposited to join powder materials.

- **Directed energy deposition** is an additive manufacturing process in which focused thermal energy is used to fuse materials by melting as they are being deposited.
- **Powder bed fusion** is an additive manufacturing process in which thermal energy selectively fuses regions of a powder bed.
- **Sheet lamination** includes ultrasonic additive manufacturing (UAM), laminated object manufacturing (LOM), and select deposition lamination (SDL). These technologies combine sheets of materials such as paper, film, or metal using glue or heat.

As previously noted, materials extrusion and vat photopolymerization are the dominant technologies in plastics-based 3D printing. In materials extrusion, the materials used are called thermoplastics. The most common plastic materials are PLA and ABS, but there is move toward materials like nylon and high-density polyethylene (HDPE) because these materials are lightweight and strong. These materials require higher temperatures so hardware and materials companies are working together to develop these materials for 3D printing.

On the vat photopolymerization side, the materials used are called thermosetting plastics. Thermosetting plastics include a photosensitive resin that becomes polymerized when it is exposed to light. Photosensitive resins are made up of a monomer, an oligomer, a photoinitiator, and other elements such as a colorant. Many of the SLA-based 3D printer manufacturers offer a range of materials that offer different levels of rigidity and strength.

Productivity can be achieved in 3D printing in a number of ways. Instead of using a single extrusion nozzle, some companies use dual extruders to extrude materials twice as fast. Some efforts at increasing productivity are based on syncing up whole printer units two, three, four, or more at a time, effectively increasing capacity by the number of printer units that get connected. Other productivity improvement efforts come from the smarter placement of build supports, which reduces the cost of printing because less material is being used and improves speed because there are fewer artifacts to remove as part of post-processing. The reduction of post-processing is also enabled through hybrid technology that allows parts to be peeled off the build plate with no artifacts. The companies selected as IDC Innovators for this document have applied innovation to the challenge of productivity.

Another important area of innovation is to address specific industry challenges that lead to greater adoption and utilization. IDC Innovators identified in this document have addressed these challenges by developing new materials that expand the addressable market for 3D printing or by changing the economics to accelerate adoption of 3D printing in new markets.

IDC INNOVATORS INCLUSION CRITERIA

An "IDC Innovators" document recognizes emerging vendors chosen by an IDC analyst because they offer an innovative new technology or a groundbreaking business model, or both, and were approved by the IDC Innovators Review Panel. It is not an exhaustive evaluation of all companies in a segment or a comparative ranking of the companies.

An IDC Innovators document highlights vendors that meet the following criteria:

- In IDC's opinion, the company exhibits innovative technology or a new business model.
- The company has annual revenue <$100 million at the time of selection.
- Customers are currently using the company's products and services (i.e., the products and services are not conceptual or in the process of being released).
- The product, service, or business model must solve or help alleviate an IT buyer challenge.

In addition, vendors in the process of being acquired by a larger company may be included provided the acquisition is not finalized at the time of publication of the document. Vendors funded by venture capital firms may also be included even if the venture capital firm has a financial stake in the vendor's company.

The four vendors chosen as IDC Innovators were selected because of the specific steps these companies have taken to advance the adoption and utilization of 3D printing. Carbon has created a lot of excitement based on the speed and quality combination its technology offers. Moreover, the company's work with Ford and Adidas inspires more evaluation of how 3D printing can be used to facilitate inventory management or deliver mass personalized products. Formlabs has changed the market by driving the price/performance of vat photopolymerization systems to levels that made it possible for many professional users to adopt 3D printing. Many other equipment manufacturers have since entered the low-priced vat photopolymerization market to compete against Formlabs. Now Formlabs is set to alter the SLS market in the same fashion. Rize has a unique technology that attacks one of the major challenges in 3D printing, the time required for post-processing, as well as part or product marking capabilities that could enable product authentication. Finally, Ultimaker, which is clearly one of the market leaders in the professional segment within the materials deposition market, has started working with leading plastics manufacturers to develop industry-specific materials. Ultimaker is an open systems manufacturer, and as part of its alliances with top plastics companies, the company will provide software tools that allow the material companies to generate and maintain material profiles so that customers can reliably use those materials filaments on Ultimaker 3D printers. In summary, these IDC Innovators are enabling specific industries, higher levels of productivity, new marking capabilities, new levels of speed, and greater access to 3D printing technology.

LEARN MORE

Related Research

- *Worldwide 3D Printer Forecast, 2018-2022: An Analysis* (IDC #US41988417, June 2018)
- *3D Printing: Market Spending and Trend Outlook for 2018 and Beyond* (IDC #US43803018, May 2018)
- *Ones to Watch in 3D Printing in 2018* (IDC #US43596618, March 2018)
- *IDC TechScape: North America 3D Printing Technologies, 2018* (IDC #US43581717, March 2018)

Synopsis

IDC Innovators are emerging vendors with revenue <$100 million that have demonstrated either a groundbreaking business model or an innovative new technology – or both. This IDC Innovators study highlights four compelling manufacturers in the plastic-based 3D printing market and identifies some of the key developments that IDC believes will have a meaningful positive impact on the 3D printing market in the future.

"These vendors are creating important breakthroughs that address and solve some of the challenges that end users in a number of industries have identified with and can relate to," said Tim Greene, research director, IDC's Hardcopy Solutions group. "If you are a user, and you think you are up-to-date on what 3D printing can offer or how your company can use it, follow innovative companies like these that are changing basic assumptions about the technology."

About IDC

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