Interview: Rethinking 3D Printing for High-Volume Production with Exentis

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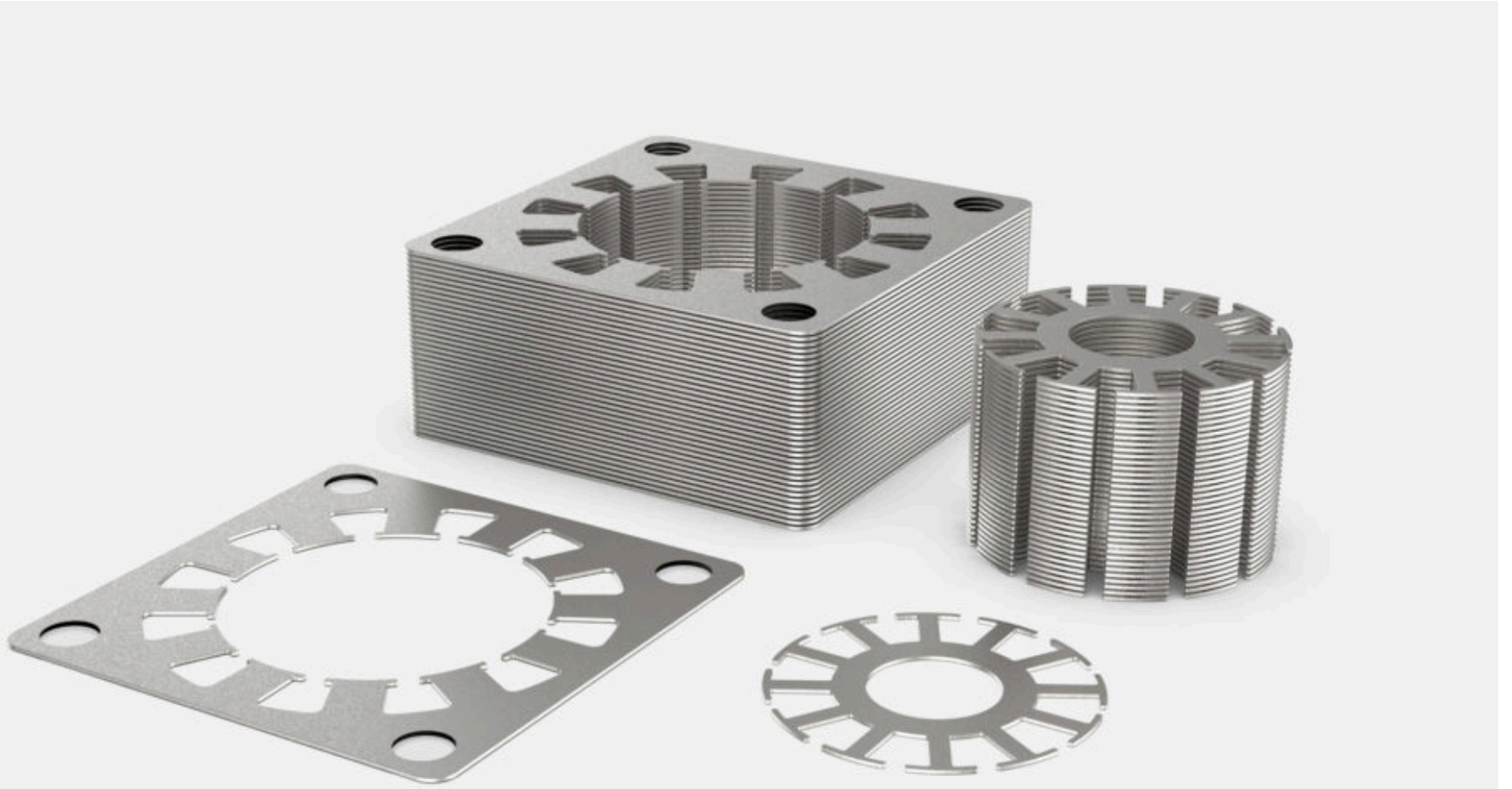


As the 3D printing market hits its bottom, leaving SPAC-merged firms grasping for cash, we may soon witness a new wave of additive manufacturing (AM) IPOs, with other companies able to right the last wave's wrongs. That seems to be the case for Exentis AG, a Swiss firm that has quietly been developing what may be the most viable approach to mass production with 3D printing so far.

Backed by over 4,500 patent claims, Exentis's 3D Additive Screen-Printing technology platform advances bound metal AM significantly by combining the design flexibility of 3D printing with the capability for large-scale production. To learn more about this potentially powerful technology, we spoke to the company's President of the Americas, Eric Bert.

Built for Production

With the Exentis technology, solid models are sliced into individual layers to create conventional screen tools. Paste is then distributed across the screen and deposited layer by layer onto a workpiece carrier. Each layer is dried and precisely aligned for the following layers, building up the part in a controlled manner. This cold-printing process runs automatically and unattended.

Ceramic and metallic green bodies are subsequently densified through sintering in a manner similar to other forms of bound metal 3D printing, like binder jet.

An industrial Exentis system.

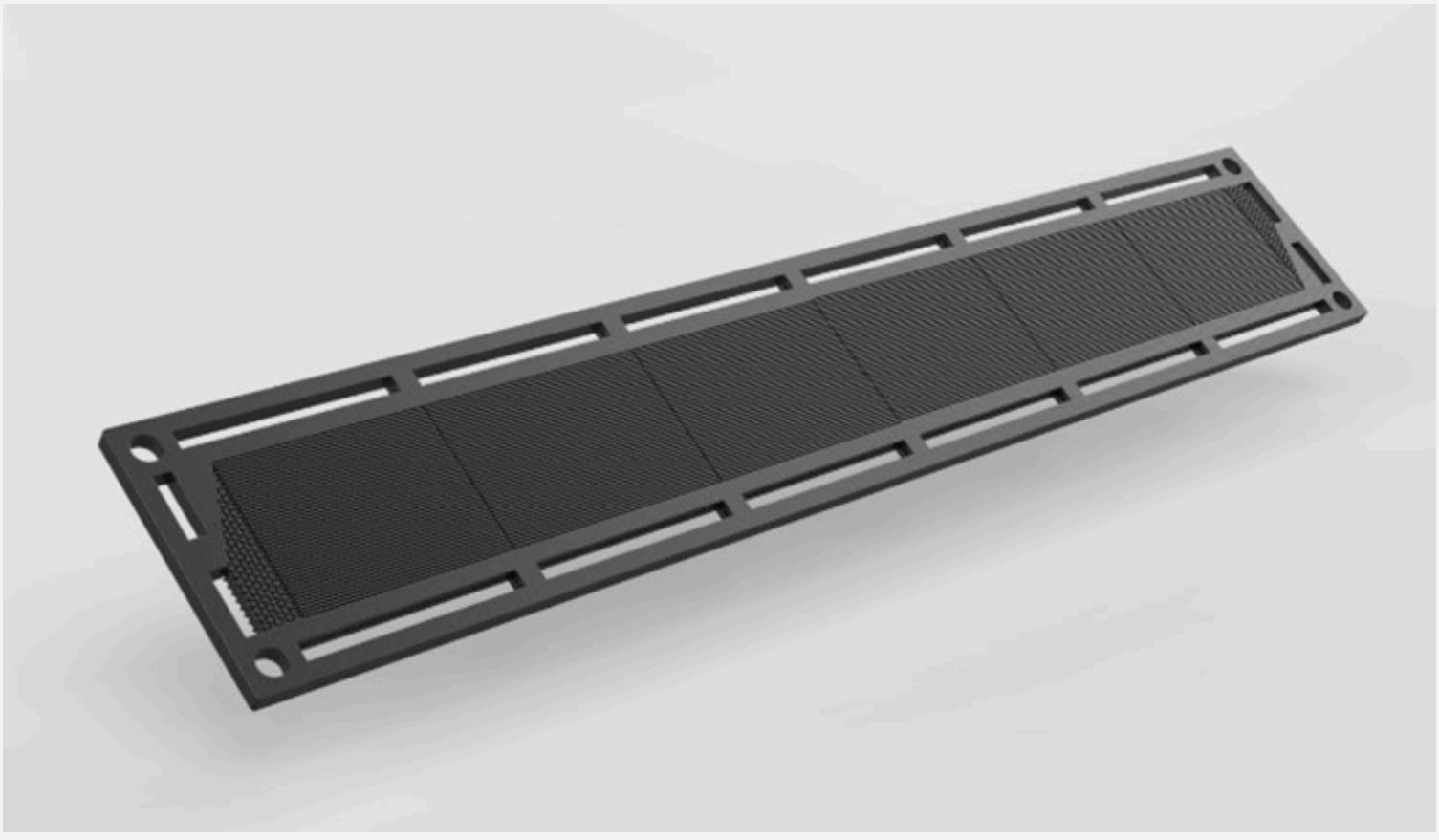
At the core of Exentis's innovation is a screen-printing technique that originally catered to the high demands of solar panel manufacturing which uses a stable production method to print conductive pastes onto ceramic substrates, a process that runs continuously with high precision and reliability—traits that are essential for mass production.

> "The technology was invented for high volume manufacturing of solar panels—you know, 24/7, 365, in-the-dark, five-sigma kind of stuff. That alone sets Exentis apart because it's a production technology. The very guts of our production systems are tried-and-true, high precision mechanical machines," said Bert, who navigated two decades of AM industry fluctuations while at Objet, Stratasys, and Arcam, before embracing the innovative screen-printing technology at Exentis.

Exentis's approach stands in contrast to more conventional AM methods, which often struggle with speed, cost, and material limitations. In turn, the technology is able to produce up to 5 million industrial parts per production system annually with part tolerance down to +/- 30 microns and wall thickness of less than 100 microns. There is no post-processing required, such as depowdering or machining.

A Broad Material Set for Broad Applications

The Exentis lineup includes lab systems for research and development and fully industrial systems capable of producing millions of parts per year. The lab systems, designed for smaller series production, provide the same level of accuracy and tooling as the more advanced systems but operate with a single-panel processing capability. This compares to the industrial machines, which are high-speed production lines, with a conveyor track of workpiece carriers racing below the precision placed screens.



A bipolar plate 3D printed using Exentis's Additive Screen-Printing technology.

The Swiss firm is rapidly gaining an understanding of where its technology fits. In electric motor manufacturing, the 3D screen-printing technique allows for the production of stator and rotor sheets that are significantly thinner, yielding motors that are more compact and efficient, thus boosting performance and cutting production costs. For clean energy the technology is used to advance the functionality of fuel cells by enabling the fabrication of intricate flow fields in bipolar plates, enhancing energy efficiency. Safety in automotive applications is augmented through the production of micro hydraulic filters with unparalleled precision, effectively preventing brake failures.

Because Extentis's technology relies on paste, the company can formulate feedstocks based on almost any material that's available in powder form. Just how diverse can this material set get? Not only are Extentis customers 3D printing metals and ceramics, but pharmaceuticals as well.

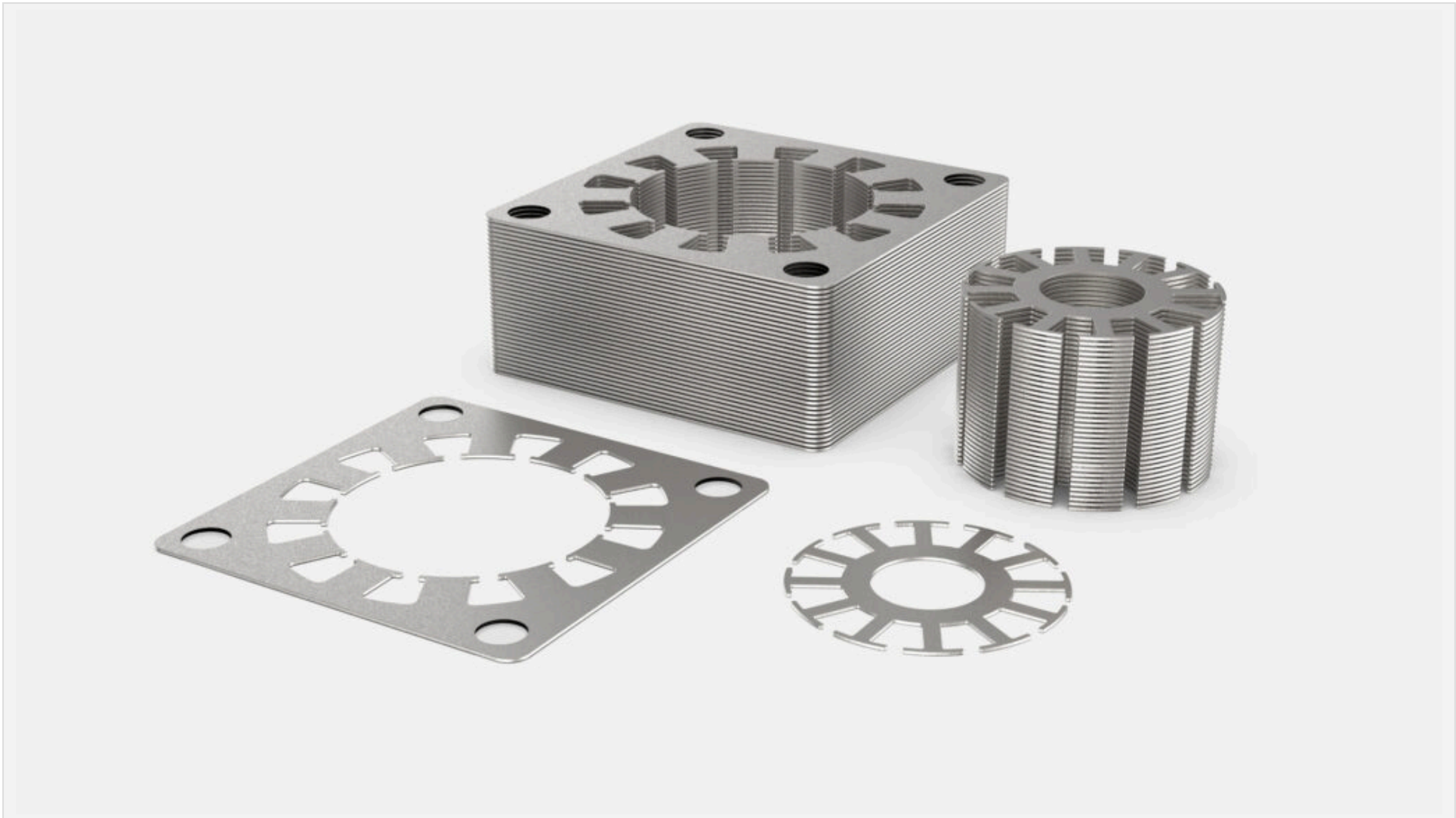
Using a medication-adapted clean room version of Exentis's technology, pharmaceutical companies are able to 3D print up tablets with customizable release profiles and multiple active ingredients. Perhaps more impressive for the AM sector is that a production system can produce up to 200 million tablets annually.

The technology has been applied to even more advanced applications in the medical space, including customizable anesthetic patches for targeted treatment, as well the integration of QR codes directly onto tablets, enhancing drug safety, combating counterfeiting, and improving traceability.

A Rapidly Growing Business

Exentis is steered by a formidable leadership team and board, including past tenures at high-profile entities including Daimler, SLM Solutions, Deloitte, OC Oerlikon and Saint-Gobain.

Since being founded in 2016, the company has grown significantly, securing manufacturing capacities and licenses for 3D printing in the United States, Australia, Japan, and beyond. This includes contract manufacturing with an annual capacity of 15 million parts.



A stator rotor 3D printed using Exentis's Additive Screen-Printing technology.

> "Our business model centers on selling an all-in-one package: production systems, providing support services, and supplying materials. We also offer technology licenses, granting our customers market exclusivity and a competitive edge by adopting our platform for their products," Bert said. "We aim to generate recurring revenue through service, materials, and licenses, which could be structured as either royalty or upfront license models. We're equipped to serve, supply, and sustain revenue streams."

Exentis now employs over 130 people as it prepares for a likely IPO. While it previously posted a run rate of CHF 26 million in 2022, the company is expecting around CHF 50 million in revenues this year.

> About his next steps, Bert relayed, "We are looking to establish a demo center and build a local team to create a sales support and applications engineering hub in the U.S. A significant objective is to establish a contract manufacturing partner in the U.S. While some clients will prefer to use their own Exentis equipment for production, others will likely opt for parts-as-a-service. Our established contract manufacturing services in Europe have significantly demonstrated this. By year's end, we aim to replicate this model in the U.S., which we believe will be a pivotal moment for our growth here."

Exentis Is IPO-ready

Leading up to the wave of SPAC IPOs of 2021, bound metal AM was touted as the 3D printing segment most primed for mass production. With HP and GE entering the space alongside Desktop Metal and Markforged, that could very well be the case. However, mass production with 3D printing may not come in the form of more traditional binder jet approaches. Instead, the technique most poised for mass production could be Extentis's Additive Screen-Printing technology platform.

The company initially prepped for an IPO on the Frankfurt Stock Exchange in 2022 but held back due to fears of a recession. This delay couldn't have been any more appropriate, given the performances of publicly traded AM companies over the past year. If Exentis is able to actually deliver the vision that SPAC firms painted for investors in 2021, it could potentially reinvigorate AM public markets.