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PRESS RELEASE

## Markforged and MSC Software Partner to Provide Simulation and Performance Tools to Customers

*New partnership will enable manufacturers to validate the strength and capabilities of their 3D printed parts, opening up the technology for more applications across the manufacturing process*

**Newport Beach, CA and Watertown, MA – November 20, 2019** - Markforged, the leading provider of metal and carbon fiber 3D printers, and MSC Software Corporation (MSC), a global leader in computer-aided engineering (CAE) simulation software and services, today announced a technology partnership to deliver process simulation, performance modeling, and material analysis tools for Markforged 3D printers.

Customers can already implement material analysis for the Markforged continuous carbon fiber and Onyx materials within MSC's Digimat materials modelling software, and the cooperation will soon extend to provide full-process simulation and part performance with Finite Element Analysis (FEA) within a common CAE environment.

"Markforged is a pioneer in the 3D printing space, and its continuous carbon fibre material is so strong, it's replacing aluminium in factories across the globe," said Olivier Lietaer, Business Development Engineer for Additive Manufacturing at e-Xstream Engineering, part of MSC. "This shift in design and manufacturing requires new analysis capabilities that can validate customer designs with the same confidence as traditionally manufactured parts. Because it applies data specific to printing conditions, Digimat gives customers 100% confidence that their part designs can be 3D printed, making additive manufacturing accessible to applications that require rigorous testing. Together, Markforged and MSC enable customers to guarantee the performance of a part from its material properties through to final part strength and weight."

### **A Partnership Driven by Customer Demand**

Danfoss Power Solutions is a global industry leader in providing mobile hydraulics and a complete range of energy-efficient and intelligent hydraulic, electronic, and electrical solutions for the construction, agriculture, and other off-highway vehicle markets. It is one of many customers excited about the partnership:

"We've been using Markforged metal and carbon fiber printers for more than a year now, and they're invaluable. We invested mostly with tooling in mind, and it's simplified and optimized our supply chain process for replacing fixtures at a much lower cost than machining," said Jeff Herrin, Vice President Research & Development, Danfoss Power Solutions. "But we wanted to identify more applications for 3D printing and validate the performance of our parts before they're printed. The company's partnership with MSC will not only demonstrate that their composite parts can replace metal, but also help identify a part's top potential. Simulating the ideal weight, ideal

cost savings, and ideal lead times with MSC will help us reduce our time and material usage so we can just print and deploy.”

Recent advances in additive manufacturing, such as reinforced continuous fiber routing, are extending 3D printing use cases to structural parts that bear heavy loads. However, these structural applications often require pre-validation at the design level to ensure performance and safety requirements can be met. Danfoss printed a lifting bracket with Markforged that will lift cast housings on an assembly line. Given the suspended loads and the proximity of workers, validation is needed to ensure safe working conditions. With MSC and Markforged’s partnership, the simulation workflow has been validated on the bracket demo part and the failure location has been identified. The results show a significant safety margin that validates that the lifting bracket can be safely deployed in operations and furthermore offers an opportunity to reduce mass and cost.

### **Partnership Features**

- **Material Engineering** – MSC and Markforged clients can access digital material cards that capture the mechanical and material properties of Markforged’s continuous fibers and chopped fiber-filled plastics.
- **Process Simulation** – Clients will be able to model 3D printing within the MSC software. They will also be able to establish print calibration standards, ensure each machine is optimized for the part, and make sure each part is printed accurately the first time.
- **Part Performance** – Customers will be able to connect the Markforged material and print information with FEA simulation from MSC. They can run simulations on proposed designs containing continuous fibers and printed thermoform plastics to predict the parts’ mechanical and structural performance.

“We’re thrilled to work with a leading provider of composite modeling and simulation software to provide this service to our customers. MSC’s best-in-class composites FEA will be critical in helping our customers identify the right design for their carbon fiber parts,” said Jon Reilly, VP of Product, Markforged. “3D printing is transforming the factory floor, and with MSC as our partner, we can ensure all parts made with Markforged will perform at their peak potential.”

For more details visit <https://www.mscsoftware.com/application/additive-manufacturing>

### **About Markforged:**

Markforged transforms manufacturing with the most affordable 3D metal and carbon fiber printers capable of producing parts tough enough for the factory floor. Engineers, designers, and manufacturing professionals all over the world rely on Markforged metal and composite printers for tooling, fixtures, functional prototyping, and high-value end-use production. Founded in 2013 and based in Watertown, MA, Markforged has about 300 employees globally, with \$137 million in both strategic and venture capital. Markforged was recently recognized by Forbes in the Next Billion-Dollar

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Startups list, and listed as the tenth fastest-growing tech company in the US in the 2018 Deloitte Fast 500. To learn more about Markforged, please visit <https://markforged.com>.

### **About Hexagon | MSC Software**

Hexagon is a global leader in sensor, software and autonomous solutions. We are putting data to work to boost efficiency, productivity, and quality across industrial, manufacturing, infrastructure, safety, and mobility applications.

Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

MSC Software, part of Hexagon's Manufacturing Intelligence division, is one of the ten original software companies and a global leader in helping product manufacturers to advance their engineering methods with simulation software and services. Learn more at [www.mscsoftware.com](http://www.mscsoftware.com). Hexagon's Manufacturing Intelligence division provides solutions that utilise data from design and engineering, production and metrology to make manufacturing smarter. For more information, visit [hexagonmi.com](http://hexagonmi.com).

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 20,000 employees in 50 countries and net sales of approximately 3.8bn EUR. Learn more at [hexagon.com](http://hexagon.com) and follow us [@HexagonAB](https://twitter.com/HexagonAB).

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