SIEMENS

Press

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Siemens introduces new advancements for the industrialization of additive manufacturing

- **Seamless integrated software and automation solutions of the Digital Enterprise for additive manufacturing aimed at machine builders and users**
- **New integrated AM build process simulation software solution and new automated software and hardware solution for de-powdering parts**
- **Enabling industrial Additive Manufacturing through a digitalized production facility**
- **Extended partnership-based financing services enabling Industrie 4.0 implementation in the field of additive manufacturing**

Siemens will be showcasing its Digital Enterprise portfolio of seamless integrated solutions for additive manufacturing under the banner “Industrialize Additive Manufacturing” at formnext 2018, the lead exhibition for Additive Manufacturing (AM), in Frankfurt, Germany. The focus of the exhibition will be a digital representation of the real world – a digital twin – extending across the entire value chain, starting with design and engineering through simulation and production, to machine networking with Siemens Industrial Edge and the cloud-based IoT operating system MindSphere. Complementing its software offering, the company will also be presenting its matching hardware for complete machine and factory automation. The Siemens presentation is designed to address additive manufacturing machine builders and users alike. By featuring a variety of use cases, the technology company will be demonstrating how companies active in the field of additive manufacturing can use digitalization to significantly boost the flexibility and efficiency of their production, radically reduce engineering workloads and shorten the time to market, thus consolidating and expanding their competitive standing in global markets.

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“Siemens’ Digital Enterprise portfolio is the only solution capable of depicting the entire digital process chain in a single integrated and associated software environment, using a standardized user interface for machine builders and users. A single, integrated system houses the tools required for development, simulation, production preparation and 3D printing, with significant enhancements over the past 12 months. This eliminates the need for error-prone data conversion with all the associated possible loss of information,” explains Dr. Karsten Heuser, Vice President Additive Manufacturing, Center of Competence Digital Factory at Siemens AG. “Using this approach, we’re able to help machine builders and users transition from prototype and small-series production using single AM machines, to fully industrialized series production,” continues Heuser.

Build process simulation and solutions for peripheral processes

At formnext 2018, Siemens will be unveiling the Simcenter 3D Additive Manufacturing Build Process Simulation, a new integrated software solution which simulates the powder-based laser application process to enable ‘first time right’ prints. The new solution predicts deformations, overheating and other defects which could occur during the printing process and automatically generates the corrected geometry to compensate for distortion and defects. This minimizes trial and error, allowing products to be manufactured first time right at production scale.

Also featured in the Siemens booth at formnext will be integrated and automated solutions for post-processing steps, such as de-powdering and support structure removal. Working in cooperation with machine builder Solukon, Siemens will be demonstrating automated removal of metal powder from complex parts with internal channels and cavities. The SFM-AT800S machine from Solukon is engineered with Siemens’ Simatic controllers and Sinamics drive and motor solutions. To streamline the entire de-powdering process, Siemens is also developing intelligent algorithms that will determine the optimal de-powdering path and automate programming of the machine.

Working with machine builder EOS, Siemens will also demonstrate an automated support structure removal process using a CNC milling machine. A digital twin of the finished 3D printed components, including the support structures, is used as the basis for numerical control (NC) program generation. The process assists the user

from initial component positioning in the build space to ensuring the parts are optimally placed for automated machining.

Enabling industrial AM through a digitalized production facility

Siemens will explain how the implementation of the digital chain using the new software and hardware solutions within its new Additive Manufacturing facility at Materials Solutions – a Siemens business leverages the full potential of this technology. Siemens has a proven track record on more than 5,000 additively manufactured components for more than 80 customers worldwide within the Aerospace, Automotive and other industries. Siemens demonstrates its world leading position in designing and producing serialized commercial AM components with the world's first 3D printed burner for the industrial gas turbine SGT-700 in operation now for over 8,000 hours with no reported issues at E.ON's combined cycle power plant in Philippsthal in the German state of Hessen.

Siemens' Additive Manufacturing Network – a digital platform for the AM ecosystem

Siemens' Additive Manufacturing Network creates an online and collaborative platform designed to bring on-demand design and engineering knowledge and production capacity for industrial 3D printing to the global manufacturing industry. It instantly connects qualified members to enable innovation of new products using the latest software tools, 3D printing technologies and materials for additive manufacturing. The network benefits part buyers and manufacturing service providers by enabling streamlined collaboration, quoting, procurement and order monitoring. This can facilitate the design of innovative products for additive manufacturing, replacement of physical inventories with digital inventories, as well as economical scaling up or down of 3D printing production as needed. The network is the next step towards Siemens' vision to reduce the overall adoption risk of additive manufacturing and accelerate the delivery of innovative product designs.

Innovative, future-proof financing models

At this year's formnext, Siemens will be presenting new financing models tailored specifically to the needs of additive manufacturing users and machine builders for the very first time. Its financing solutions for digitalized smart production and for investment in additive manufacturing are designed to open up affordable and

sustainable implementation of Industrie 4.0 to users and machine builders in the AM sector and so boost the industrialization of 3D printing. The financing models of Siemens Financial Services include for instance leasing arrangements for 3D printing machines and in future also flexible pay-per-use models with connection to MindSphere.

Siemens' Digital Enterprise portfolio of seamless integrated solutions for additive manufacturing will be showcased at formnext 2018 under the banner "Industrialize Additive Manufacturing".

This press release and a press picture are available at
www.siemens.com/press/PR2018110044DFEN

More information on the subject of Siemens at formnext 2018 is available at
www.siemens.com/press/formnext2018 and www.siemens.com/formnext

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Siemens AG (Berlin and Munich) is a global technology powerhouse that has stood for engineering excellence, innovation, quality, reliability and internationality for more than 170 years. The company is active around the globe, focusing on the areas of electrification, automation and digitalization. One of the largest producers of energy-efficient, resource-saving technologies, Siemens is a leading supplier of efficient power generation and power transmission solutions and a pioneer in infrastructure solutions as well as automation, drive and software solutions for industry. With its publicly listed subsidiary Siemens Healthineers AG, the company is also a leading provider of medical imaging equipment – such as computed tomography and magnetic resonance imaging systems – and a leader in laboratory diagnostics as well as clinical IT. In fiscal 2018, which ended on September 30, 2018, Siemens generated revenue of €83.0 billion and net income of €6.1 billion. At the end of September 2018, the company had around 379,000 employees worldwide. Further information is available on the Internet at www.siemens.com.