Joint press release

Press

by Siemens and EDAG

Hanover, April 2, 2019

Hannover Messe 2019, Hall 9, Booth D35

Siemens and EDAG cooperate in projects for the industrial application of additive manufacturing

- **Improving engineering and production processes**

Siemens is intensifying its cooperation with the EDAG Group as a leading global independent engineering company for the automotive industry, in order to further promote industrial applications of additive manufacturing (AM) and to make engineering and production processes more efficient. Based on many years of successful project-specific collaboration in factory and production planning, in the field of engineering the innovative "NextGenerationSpaceframe 2.0" project will be presented at the Hannover Messe from April 1 to 5, 2019 at the Siemens booth (Hall 9, Booth D35) as the clear result of this successful cooperation.

The "NextGenerationSpaceframe 2.0" intelligent modular system features a combination of bionically designed and additive manufactured nodes and high-strength, energy-absorbing aluminum extrusion profiles. The concept offers extremely flexible manufacturing, enabling it to support the growing number of vehicle derivatives while still taking economic aspects into account.

The collaboration has now been extended by a seamless digital engineering process chain for AM resulting in the implementation of a use case. The project result, which will be presented at the Hannover Messe 2019, was led by EDAG and Siemens together with Constellium, Fraunhofer IAPT, Concept Laser and BLM. It shows a flexibly manufactured lightweight aluminum structure - "NextGenSpaceframe 2.0"

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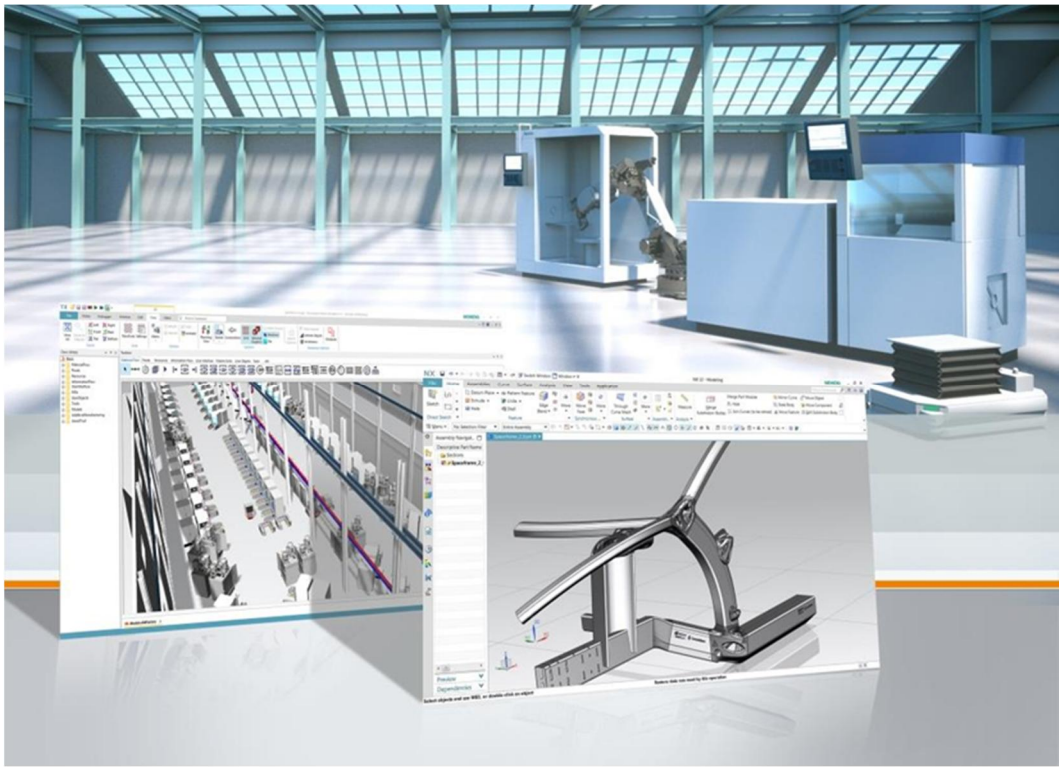
as an automotive use case for Siemens.

Key features of NextGenSpaceframe 2.0:

- Shorter "time-to-market" for additive manufactured prototypes and small series components for automotive or industrial applications due to a digital engineering process chain.
- Industrie 4.0 philosophy: combination of 3D-printed aluminum car body nodes with high-strength, energy-absorbing aluminum extrusion profiles combined as highly flexible "on-demand" manufacturing with 3D bending and jigless joining technology for automotive and industry applications.
- Calculations and actual tests demonstrated that the crash areas can absorb the crash energy as predicted and the AM node did not fail structurally.
- The costs for AM could be reduced by optimizing the process and minimizing the support structure.
- The seamless engineering data process chain has contributed to significantly shorter development and lead times, as well as ensuring a higher level of development maturity.

The know-how provided by the EDAG Group in the field of production processes made a significant contribution to the collaboration. Tailored future factory concepts have been created, enabling the components developed for additive manufacturing to also be produced efficiently in larger batches and transferred to actual series production. An important factor in the success of the project is the competence that Siemens brings for factory automation and digitalization with knowledge from their own manufacturing applications for gas turbines (Finspang and Worchester UK) as well as the know-how provided by EOS GmbH in the field of process technology of additive manufacturing.

In Hanover, Siemens presents the first steps in the process for successfully implementing this transformation using a digital twin. As well as the actual printing, this includes the industrialization of the entire AM production chain with all subsequent process steps. In future, scalable modules will be created to pave the way from small series through to mass production.
Siemens and EDAG share the goal of building on their respective strengths as project-specific partners and positioning themselves as service provides in the future market for the industrial introduction of additive manufacturing for their respective customers.



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Dr. Martin Hillebrecht, Head of Innovation EDAG Engineering Group, Rainer Wittich, CEO EDAG Production Solutions meet Dr. Wolfgang Heuring, CEO Business Unit Motion Control at Siemens and Dr. Karsten Heuser, VP Additive Manufacturing at Siemens (from left) at the Siemens EDAG "NextGenSpaceframe 2.0" Automotive use case.

This press release and press pictures are available at
www.siemens.com/press/PR2019040220DIEN

For further information on Siemens at the Hannover Messe 2019, please see www.siemens.com/press/hm19 and www.siemens.com/hannovermesse

For further information about EDAG please visit: www.edag.com

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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 power generation and distribution, intelligent infrastructure for buildings and distributed energy systems, and automation and digitalization in the process and manufacturing industries. Through the separately managed company Siemens Mobility, a leading supplier of smart mobility solutions for rail and road transport, Siemens is shaping the world market for passenger and freight services. Due to its majority stakes in the publicly listed companies Siemens Healthineers AG and Siemens Gamesa Renewable Energy, Siemens is also a world-leading supplier of medical technology and digital healthcare services as well as environmentally friendly solutions for onshore and offshore wind power generation. 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.

EDAG is an independent engineering services provider to the global automotive industry. The company serves leading domestic and international vehicle OEMs and sophisticated automotive suppliers through a global network of about 60 sites in major automotive centers of the world. EDAG offers complementary engineering services across its Vehicle Engineering, Electrics/Electronics and Production Solutions businesses. Based on these extensive capabilities, EDAG can support clients across the entire value chain from the original design idea to product development and prototype construction all the way to the delivery of turnkey production systems. As a technology and innovation leader, EDAG also operates established centers of excellence that design landmark technologies for future applications in the automotive industry: lightweight construction, electric mobility, car IT, integral safety and new production technologies.
In financial year 2018, the company generated revenues of EUR 792 million and an adjusted EBIT of EUR 47.6 million. As at 31 December 2018, 8,641 employees (including apprentices) worked for EDAG globally. Further information is available on the Internet at www.edag.com.