Media Release

3D printing is changing the way we manufacture

Technical University of Munich, Oerlikon, GE Additive and Linde to establish additive manufacturing cluster in Bavaria

- **The initiative aims to accelerate the broad use of additive manufacturing (AM) in various industries through integrated research and development initiatives.**
- **The cluster underlines Bavaria's reputation as a leading location for technology innovation.**
- **The new Additive Manufacturing Institute is aimed at cross-disciplinary AM research.**

Zurich (Switzerland) and Munich (Germany), October 9, 2019

The Technical University of Munich (TUM), Oerlikon, GE Additive and Linde are collaborating to create an additive manufacturing cluster. This cluster is a grouping of companies and organizations that will conduct research on and develop additive manufacturing technology from a single hub location.

The collaborative efforts will help integrate AM into the manufacturing process and enable companies to use the technology in their production. The open cluster also includes academic institutions (TUM) researching and educating on AM and regulatory authorities responsible for overseeing and regulating the use of the technology in industries. The cluster will be open to additional participants in the future.

"By having all of the players located in a single hub, we are accelerating the development and application of the technology for the various industries," commented Prof. Dr. Michael Suess, Chairman of the Board of Directors of the Oerlikon Group. "Bavaria is the perfect place for us to house this initiative as it promotes energy and production efficiency, which supports Germany's sustainability goals and the country's desire to incorporate new technologies."

"The project is an excellent example of close collaboration between industry, academia and politics to innovate and industrialize a technology like additive manufacturing," commented Dr. Roland Fischer, CEO of the Oerlikon Group. "AM is a technology that supports our aim of providing sustainable solutions for all industries."

Additive manufacturing technology, commonly known as 3D printing, allows for layer-by-layer printing of metal components during the manufacturing process. TUM, Oerlikon, GE Additive and Linde all play different roles in the additive manufacturing process. Additive manufacturing completely transforms the production process. It requires change in every aspect of manufacturing – supply chain, production, employee training, quality inspection, product validation and regulation.

Jason Oliver, President and CEO of GE Additive, added: "Bavaria already enjoys a stellar reputation as a global hotspot for additive technology – with a thriving ecosystem and a rich seam of talent. We're excited to be part of this initiative from the very beginning and look forward to building on that solid foundation and driving tangible impact both for the region itself and further afield."

"We see this opportunity to collaborate as a win for the companies and TUM, as well as for the region," said Dr. Christian Bruch, Executive Vice President & CEO of Linde Engineering. "We expect

the new hub will bring jobs to the area, while also delivering new technologies and capabilities to the companies located here."

New Additive Manufacturing Institute
As one of the first initiatives enabled by the AM cluster, Oerlikon and TUM are creating a new research institute. The Additive Manufacturing Institute will focus on interdisciplinary research in raw material powders, optimized AM production and end-to-end process integration, including automation and AM digitalization. Oerlikon engineers and scientists will work hand in hand with researchers and students at various TUM faculties (mainly mechanical engineering, but also chemical engineering, the physics department and informatics) to address all aspects of AM research and production. This will include the verification and qualification of products and the development of new AM business models.

"An integrated collaboration between powerful partners from industry and science is necessary for the industrialization of additive manufacturing processes," explains Prof. Dr. Thomas Hofmann, President of TUM. "This is the only way we will be able to overcome technological obstacles and find answers to unresolved issues in the field of standardization."

Like the cluster, the research institute will also be open for research cooperation with academia and industry once the initial frameworks have been established. The aim is to broaden the international network and encourage an architecture of open partnership.

The new additive manufacturing cluster and research institute are being highlighted at the Munich Technology Conference (MTC3), which is currently taking place at the Technical University of Munich in Germany (October 8-10, 2019). The conference this year addresses the industrialization of additive manufacturing and features top speakers from the industry, academia and political sectors.

Picture: Signing Letter of Intent in Dec. 2018

From left to right: Dr. Sven Hicken (Business Unit Head, Oerlikon AM), Prof. Dr. Thomas Hofmann (President, TUM), Jason Oliver (President and CEO, GE Additive), Dr. Wolfgang Dierker (CEO, GE Germany), Dr. Christoph Laumen (Executive Director R&D, Linde AG), Prof. Dr. Michael Suess (Chairman of the Board of Directors, Oerlikon Group), Dr. Christian Haecker (Head of Industrialization, Oerlikon AM), Dr. Andreas Lessmann (Managing Director, GE Additive Germany GmbH, Senior Leader, Legal Operations), Dr. Christian Bruch (Executive Vice President & CEO, Linde Engineering), Andreas Rohregger (Head of Global Properties, GE Additive), Dr. Alice Beck (Deputy Director, TUM ForTe)

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Boilerplate

About TUM

The Technical University of Munich (TUM) combines top-class facilities for cutting-edge research with unique learning opportunities for students. It is committed to finding solutions to the major challenges facing society as we move forward: Health & Nutrition; Energy & Natural Resources; Environment & Climate; Information & Communications; Mobility & Infrastructure. The university thinks and acts with an entrepreneurial spirit. Its aim: to create lasting value for society. All this combines to make it one of Europe's leading universities.

About Oerlikon AM

Oerlikon AM is a business unit of the global technology and engineering powerhouse Oerlikon, which is headquartered in Switzerland. Oerlikon's additive manufacturing unit is leading transformative change in the aerospace, medical, automotive, power generation and tooling industries. Oerlikon AM provides print-tested and qualified metal powders, design for AM expertise, conventional and additive manufacturing services, from prototyping to production, as well as product validation and quality inspection support to leading global manufacturing companies who are incorporating additive manufacturing into their business models. Oerlikon AM employs more than 300 people at its five service centers and six production sites in Europe, the USA and China, and is backed by Oerlikon's 10,500+ employees in 37 countries.

About GE Additive

GE Additive – part of GE (NYSE: GE) is a world leader in additive design and manufacturing, a pioneering process that has the power and potential to transform businesses. Through our integrated offering of additive experts, advanced machines and quality materials, we empower our customers to build innovative new products. Products that solve manufacturing challenges, improve business outcomes and help change the world for the better. GE Additive includes additive machine providers Concept Laser and Arcam EBM; along with additive material provider AP&C.

About Linde

Linde is a leading industrial gases and engineering company with 2018 pro forma sales of USD 28 billion (EUR 24 billion). The company employs approximately 80,000 people globally and serves customers in more than 100 countries worldwide. Linde delivers innovative and sustainable solutions to its customers and creates long-term value for all stakeholders. The company is making our world more productive by providing products, technologies and services that help customers improve their economic and environmental performance in a connected world.