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The journey from idea to innovation

Berthold Leibinger Innovationspreis awarded to research team from Fraunhofer and RWTH Aachen University

Having received a Joseph von Fraunhofer Prize in 2017, a research team from Aachen has now also won the prestigious Berthold Leibinger Innovationspreis. Their award-winning process “Extreme High-Speed Laser Material Deposition” is known by its German abbreviation, EHLA. The technology allows protective metal coatings to be applied at extremely high speeds in a cost-effective and environmentally friendly manner. EHLA is also a model of successful cooperation based on partnership and of how to solve practical, application-oriented problems. In addition, it exemplifies how the Fraunhofer-Gesellschaft works.

Back in 2010, Gerhard Maria Backes from the Chair of Digital Additive Production DAP at RWTH Aachen University was already wondering how to make the technique of laser material deposition faster. The classic method involves creating a melt pool on the surface of the material with a laser and then fusing a metal powder there. Although well established, this technology is relatively slow when it comes to processing large areas. What if we could melt the powder while it is still in the air and then deposit the liquid metal?

However, the fundamental science for implementing this idea had not yet been researched. Dr. Andres Gasser from the Fraunhofer Institute for Laser Technology ILT applied for research funds from the Fraunhofer-Gesellschaft and hired Thomas Schopphoven. The latter was able to devote himself fully to the problem in the internal Fraunhofer funding program for SME focused, applied research. Schopphoven carried out basic research in interdisciplinary teams, developed the systems technology together with partners from industry and brought the technique to industrial application over the following years.

Bringing research and industry together

A company from the Netherlands with an interest in the technology, Hornet Laser Cladding BV, was brought into the project at a very early stage. Together, the partners integrated the laser into a conventional lathe. With this first machine, the research team and Hornet were able to convince first customers. In close coordination, they built a machine for coating 10-meter-long hydraulic cylinders. As well as being highly

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efficient, the solution also offered an alternative to the use of hexavalent chromium, which is damaging to human health and the environment and which is now subject to strict regulations. In this way, lasers can be used to apply highly robust and durable coatings to hydraulic cylinders and to applications in shipbuilding and the oil industry. In recent months, the technology was not only officially recognized with a prize – the Steel Innovation Award 2018 shows the major importance of the technique for the steel industry – but industrial partners in the Netherlands and China also booked the first five orders. Others have followed since. The developer team is already working on the next innovation – adapting the method for additive manufacturing.

Innovation is no coincidence

“Success is not something you can plan out with certainty, but you can create the ideal conditions for it,” explains Prof. Reimund Neugebauer, President of the Fraunhofer-Gesellschaft. “An organization’s success depends in large part on the expert knowledge, experience and commitment of its people, especially in a research organization. We’re constantly striving to create an environment for our scientists that facilitates creative, forward-looking and solution-oriented research. After all, innovation always begins with an idea. Our principal role is to translate these ideas into industrial applications and thereby support the innovative capacity of the German economy. Awards like the prestigious Berthold Leibinger Innovationspreis are proof that we’re on the right track.”

Award-winning research

The Fraunhofer-Gesellschaft focuses on needs- and problem-oriented research. In domains such as climate change, health and environmental protection, the results of research by the organization’s scientists provide solutions that address various social challenges. The employees of the Fraunhofer-Gesellschaft produce research of outstanding quality. They help Fraunhofer maintain its position at the pinnacle of research in Europe. For their excellent achievements, they are honored with top national and international prizes every year, such as the Franco-German Business Awards, the European EARTO Innovation Awards and the Engineering Emmy Awards.

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From left to right: Thomas Schopphoven, Dr. Andres Gasser (Fraunhofer Institute for Laser Technology ILT) and Gerhard Maria Backes (Chair of Digital Additive Production DAP at RWTH Aachen University) with Prof. Michael Zäh (Technical University of Munich), who delivered the prize-giving speech, at the award ceremony on September 21 in Ditzingen.

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Award-winning protective coating: First prize of the Berthold Leibinger Innovationspreis 2018 was awarded to a joint research team from Fraunhofer ILT and the Chair of Digital Additive Production DAP at RWTH Aachen University for development of the EHLA process.

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