

Press Release



TRUMPF Ltd.
Public Relations Dept.

President Way,
Airport Executive Park,
Luton, Bedfordshire. LU2 9NL

Tel. No. 01582 725335
Fax No. 01582 399250
e-mail. sales@uk.trumpf.com
Web: www.trumpf.com
Twitter: @TRUMPF_Ltd
www.linkedin.com/company/trumpf-uk

Ref: TMT\898
Transmission date: March 2019

TWI ORDERS UNIQUE TRUMPF 3D LASER SYSTEM WITH ADDITIVE MANUFACTURING CAPABILITIES

TWI Ltd has ordered a TRUMPF TruLaser Cell 7040 five-axis machine with a disk laser and laser metal deposition (LMD) functionality.

The LMD process uses a focussed laser beam and metal powders to add weld material onto a substrate. Through multiple layering techniques, a coating or 3D geometry can be deposited to replace damaged features or to manufacture entirely new geometries. The advantages of the process include a high integrity fusion bond between the deposited material and the substrate, and a very low heat input from the laser beam into the base material, which produces a small heat affected zone and accurate and reproducible positioning. TRUMPF customers benefit from a wide range of lasers and laser systems, process expertise, and services for numerous applications, which means LMD technology can also be combined with laser welding or laser cutting. This is indeed the case with the TruLaser Cell 7040 where, thanks to inherent modularity, users can change easily between cutting, welding and LMD.

TWI, which is one of the world's foremost independent research and technology organisations, will locate the machine at its Rotherham facility on the Advanced Manufacturing Park, where it will be put to work on the Open Architecture Additive Manufacturing (OAAM) project, for which TWI is the lead partner. The OAAM programme plans to develop directed energy deposition (DED) additive manufacturing (AM) technologies that can be scaled up to accept multi-metre component sizes for the benefit of UK Aerospace. These new platforms will enable aerospace manufacturers and their supply chains to develop advanced AM manufacturing concepts.

"We've been running several LMD systems on both industrial robot manipulators and a TRUMPF DMD 505 gantry-type five-axis cell for the past 15 years," says Carl Hauser, Section Manager, Laser Additive Manufacturing at TWI. "Although the TRUMPF machine still functions perfectly well, being part of the OAAM project allowed us to consider our options and specify a new high precision system to meet the growing needs of the aerospace industry and of TWI member companies. After an assessment, the decision was made to invest in a new large scale five-axis gantry facility for laser additive manufacturing."

Following a public tender, an order was duly placed for a TRUMPF TruLaser Cell 7040 with LMD capability.

The TruLaser Cell 7040 features several important modifications that make it unique in the marketplace. Importantly, TRUMPF and TWI are working in close co-operation to deliver a system that will meet specific requirements of the OAAM project. This work has led to the specification of a number of critical adjustments to the standard system. For instance, the 1m Z-axis capacity will be extended to 1.5m in order to accommodate large aerospace parts; coupled with a 4m x 2m capacity X-axis and Y-axis. In addition to the machine's five-axis capability, there will be a fully integrated rotate and tilt table with a 1500kg load capacity, controlled by special software routines specified by TWI and being developed by TRUMPF. This will be further supported by Autodesk, who are developing common CAD/CAM control interfacing across the OAAM DED technologies. The modularity of the TruLaser Cell will also enable TWI to integrate additional process steps (e.g. non-destructive inspection systems) for optimum implementation to aerospace requirements.

“The OAAM project will steer the development of large-scale 3D printed aerospace parts, typically aero body and fuselage components, but also engine casings and landing gear parts, for example,” explains Dr. Hauser, adding, “the new TRUMPF machine will be an integral and critical resource to drive our organisation forward, not just on the OAAM project, but for many years beyond.”

The TRUMPF TruLaser Cell 7040 is due to arrive at TWI's Sheffield facility in the summer of 2019.

The OAAM project, which is supported by Innovate UK (ref:113164), commenced on the 1 January 2018 and will run for three years.

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Tel: 01920 468443 Email: info@newriver.co.uk www.newriver.co.uk

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