Case study: Precision manufacturing

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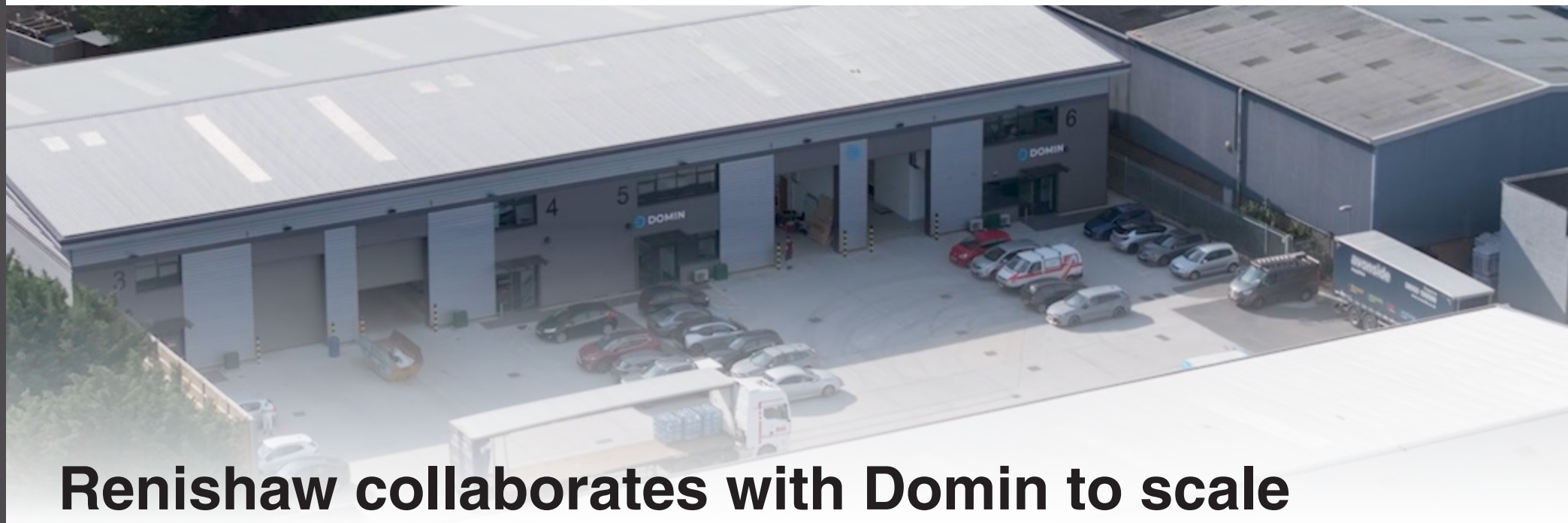


Renishaw collaborates with Domin to scale production using additive manufacturing (AM) for hydraulic products

Background:

Domin Ltd is a leading UK-based designer and manufacturer of innovative hydraulic products. Their range includes high-performance valves, components, and active suspension systems used in aerospace, manufacturing, and automotive industries.

Challenge:

To redesign hydraulic systems for improved performance, sustainability and cost-effectiveness. The industry had relied on outdated technologies for decades, leading to significant energy waste and limited innovation.

Solution:

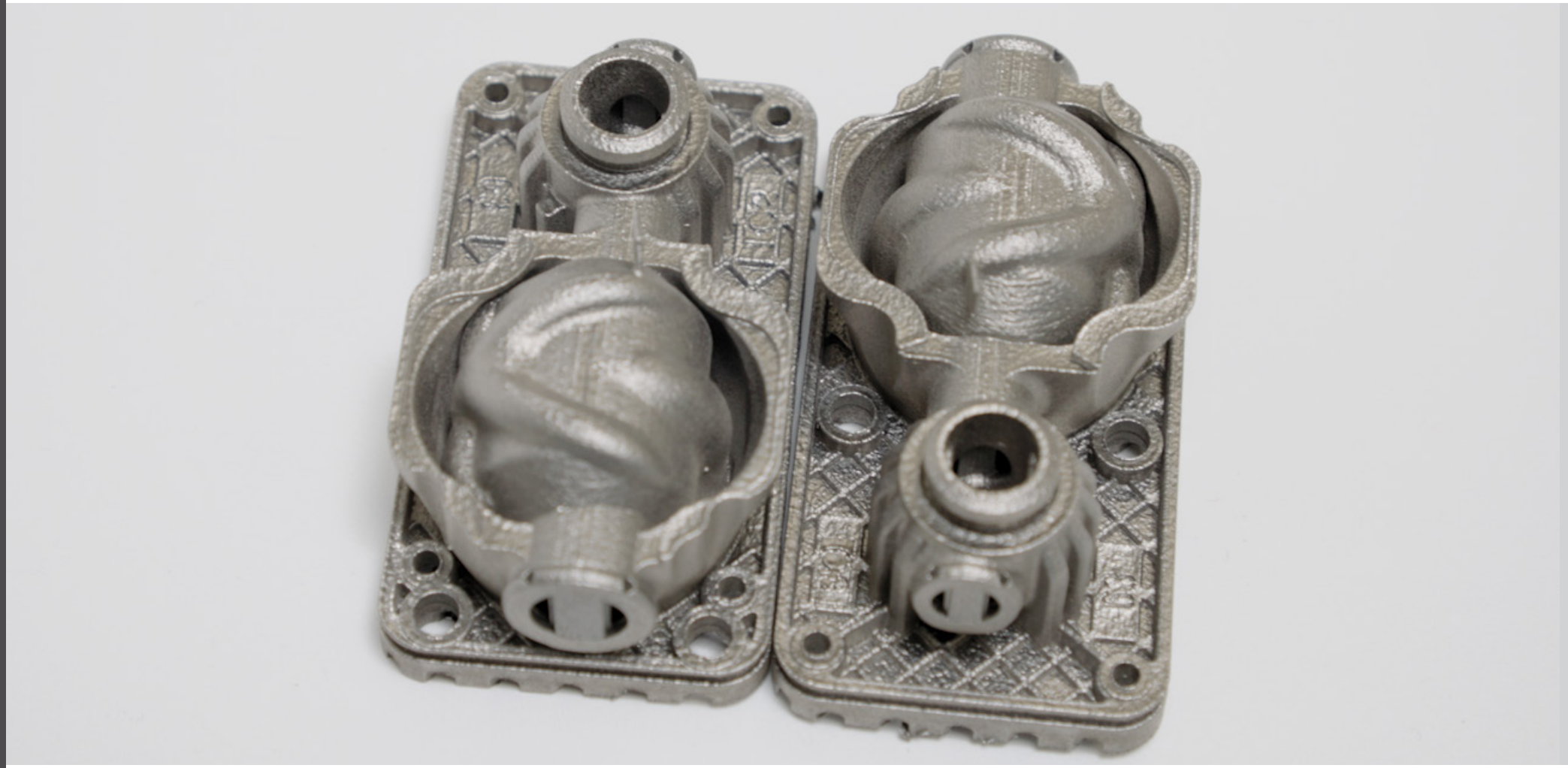
Harnessing advanced additive manufacturing (AM) technology — particularly the RenAM 500Q and RenAM 500Q Ultra — to transform the production of hydraulic components. Design innovation plus faster production means cost and efficiency savings for Domin and their customers.

> **“The installation of a new RenAM 500Q Ultra marks another exciting milestone in Domin’s growth journey.”**
>
> Marcus Pont
> Domin Ltd. (UK)

Domin Ltd is a leading designer and manufacturer of innovative hydraulic products. Their range includes high-performance valves, components, and active suspension systems used in aerospace, manufacturing, and automotive industries. The company has always been committed to pushing the boundaries of technology, striving to make its motion control systems not just more powerful, but also lighter, more energy-efficient and cost-effective.

Despite advancements in other manufacturing sectors, the hydraulics industry has seen little meaningful innovation in its core hardware according to Domin, with most systems relying on the same designs for decades.

“My co-founder Andrew Collins and I saw metal AM as a revolutionary technology. We analysed several industries to see where we could make the most meaningful change and it became clear that hydraulics would be a great place to start,” explained Marcus Pont, Chief Executive Officer of Domin. “Metal AM can provide the efficiency, sustainability and performance improvements the industry has long needed, and so we set out to make it central to Domin’s manufacturing processes.”



Domin first collaborated with global engineering technologies company, Renishaw, in 2019. The two companies worked together on a project intended to turn Domin's designs into commercial reality.

Once ready for full-scale production, Domin invested in a RenAM 500Q four-laser system, which was installed at the Domin Technology Centre in Pucklechurch, near Bristol, UK in 2023.

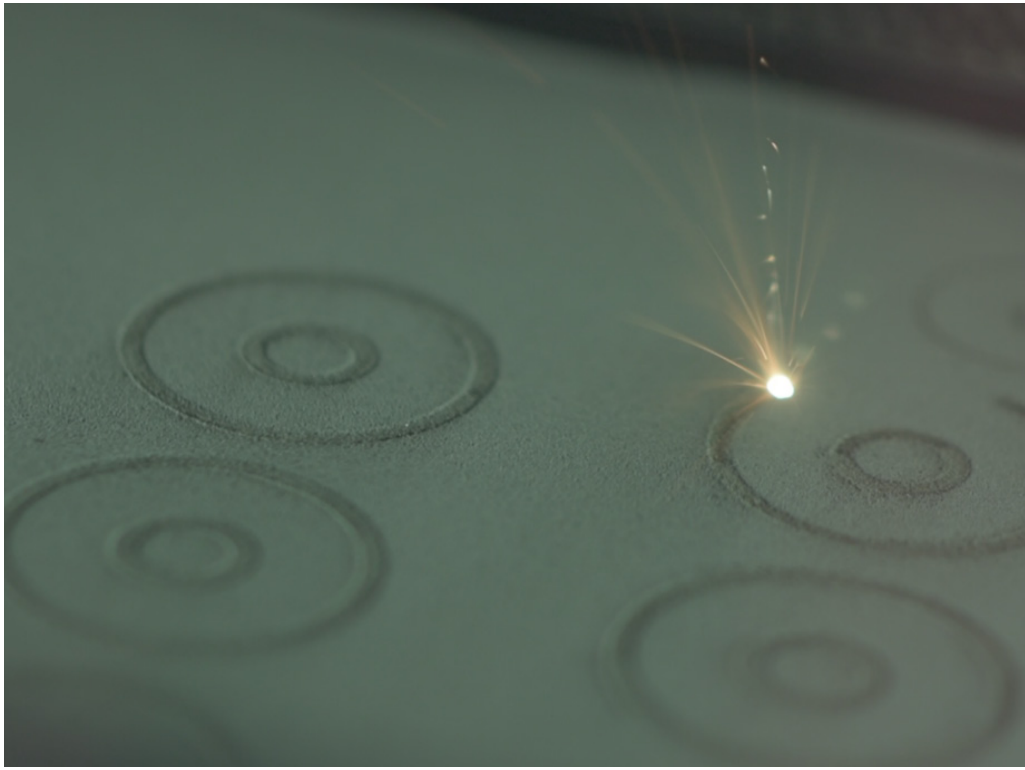
With its compact footprint and four 500W lasers that can simultaneously access the entire 250 mm² build area, the RenAM 500Q offers exceptional laser density, with the equivalent of 64 lasers per square metre. This enables the system to achieve build rates up to four times faster than single-laser systems, significantly improving productivity and cost per part.

By decreasing the cost per part, the RenAM 500Q broadens the appeal of AM in applications where it was previously considered uneconomical. The machine also delivers consistent, high-quality parts with unrivalled precision, achieving 99.9% density and maximising strength and ductility across the entire build plate. This technology allowed Domin to produce complex hydraulic components such as manifolds and valves with greater speed, precision and less material waste.

"In an industry so prone to waste and inefficiencies, we believed that metal printing could be the vehicle with which we could disrupt. It's not just an opportunity for 3D printing, it's an opportunity to create a new stable technology within hydraulics and motion control," explained Pont. "By combining metal 3D printing with other modern tools like advanced motors, hall effect sensors, modern electronics, design and simulation, we are able to achieve that opportunity."

An increasing demand for its products led Domin to invest in an additional AM system from Renishaw in 2024. They chose the RenAM 500Q Ultra, the highest-productivity model in Renishaw's RenAM 500 series of laser powder bed fusion (LPBF) systems. Equipped with Renishaw's exclusive TEMPUS™ technology, the RenAM 500 Ultra optimises build times by synchronising the system's lasers with the powder recoater. This reduces layer time by up to nine seconds, leading to faster builds and lower costs.

"The installation of a new RenAM 500Q Ultra marks another exciting milestone in Domin's growth journey," added Pont. "This state-of-the-art technology will further enhance our manufacturing capabilities, allowing us to deliver even greater value to our customers."

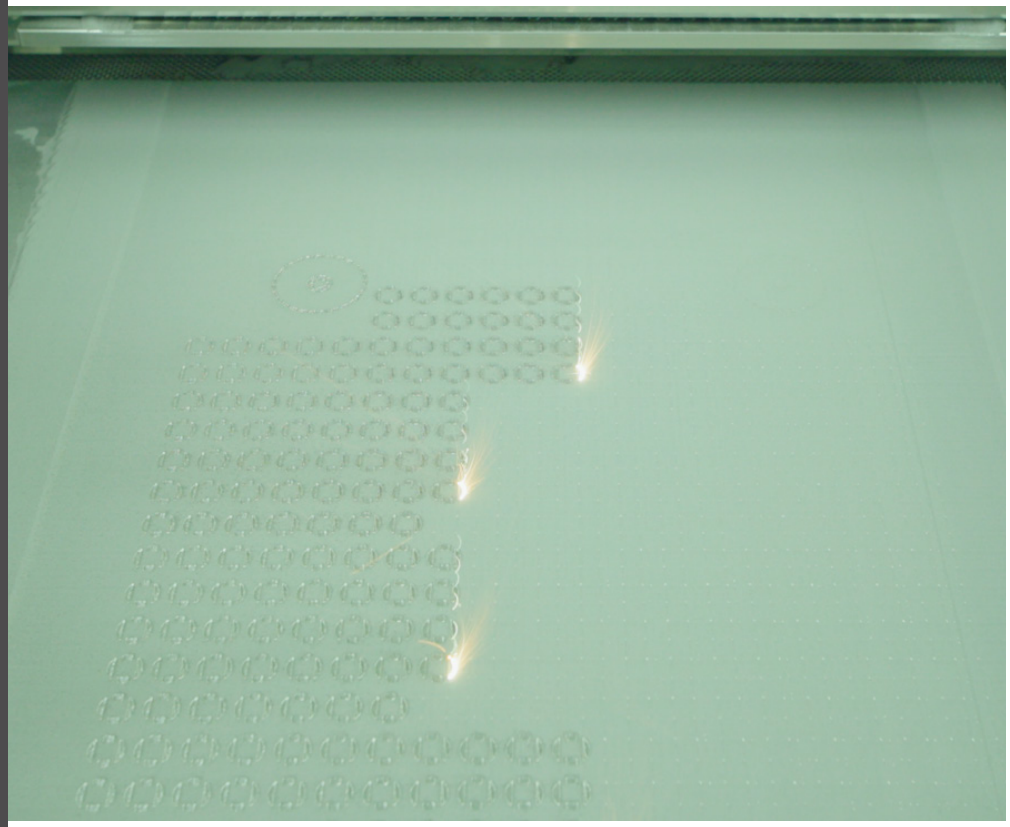


The collaboration between Domin and Renishaw has led to significant improvements in operational efficiency. One of the important outcomes has been the dramatic increase in production throughput, around 120 metal AM manifolds are now being printed every day.

Customers are also seeing efficiency benefits, with Domin's hydraulic products enabling operational savings up to 400 USD per valve, annually – which can add up to huge savings in large-scale applications. Beyond financial savings, the adoption of AM technology has helped Domin reduce material waste and improve fluid dynamics, leading to a decrease in CO_2 emissions.

"Hydraulic designs have remained unchanged for the last 70 years, and according to Oak Ridge National Laboratories, these systems are only 22% efficient. A McKinsey & Company report states that 15% of EU energy usage is from fluid pumps, which means hydraulics are wasting enough energy each year to power 82 million homes, and that's just in the EU," said Claudia Effra-Hume, Marketing Director at Domin. "There is a huge opportunity here for change."

Pont added, "For Domin, sustainability means achieving more with less. That means that we offer products which are faster and more stable than our competitors', that can be controlled more precisely — but at the same time, they use less energy, and they use fewer resources to make."



The ability to produce complex components with metal AM has also enabled Domin to scale rapidly. Since launching their first product, the company has seen revenue growth of around 75% year on year. “As we continue to expand, we are targeting some substantial markets,” continued Effra-Hume. “With such ambitious growth plans, ensuring we have the right technology and production capabilities is critical. The Renishaw team’s support is helping us move at the pace we need to accelerate our growth.”

“We’re very pleased to have installed the RenAM 500 systems to enable Domin to supercharge their production,” said Josh Whitmore, AM Area Sales Manager at Renishaw. “Our systems are designed and manufactured in the UK, and to sell to a UK volume producer of AM parts is a great result for our wider manufacturing ecosystem.

“This partnership reinforces how advanced manufacturing technologies, like AM, are redefining what is possible in hydraulic system production. Domin’s innovative approach, combined with Renishaw’s expertise in AM technology, is making a positive change to the wider industry.”

For more information, visit www.renishaw.com/renam500

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