Discover the RenAM 500 series

Renishaw's range of metal additive manufacturing systems

Productivity | Quality | Flexibility

Additive manufacturing with Renishaw

Renishaw is a market leader in the design and manufacture of laser powder bed fusion (LPBF) additive manufacturing systems. Since 2011 we have supplied systems to manufacturers all over the world, in industries as varied as aerospace, tooling, and medical devices.

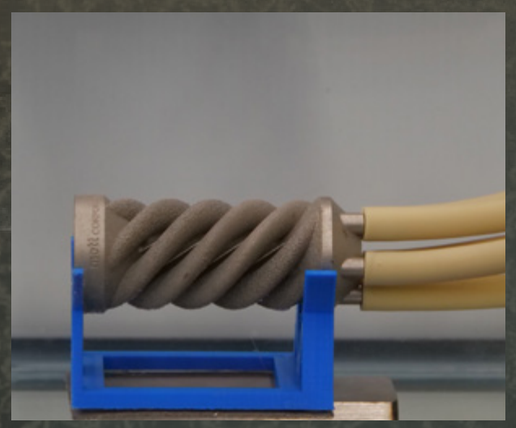
We believe AM stands to transform the world of manufacturing as a viable serial production tool. The RenAM 500 series offers the ideal system for every stage of the AM journey to volume production. Alongside best-in-class productivity, we offer a range of hardware options, software, expert consultation and training to support your application.

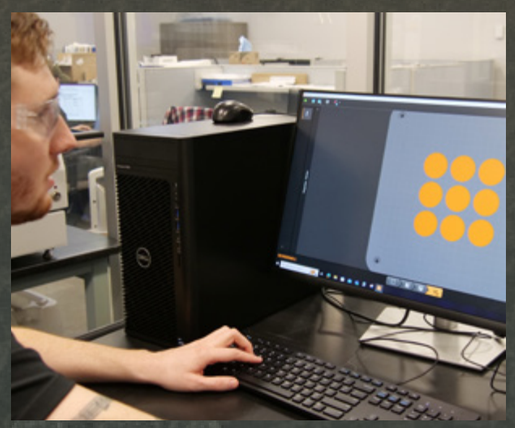
Why choose Renishaw as your AM partner?

- **Vertical integration –** All hardware, software and electronic components of the RenAM 500 series have been designed and built by Renishaw to work seemlessly together.
- **Metrology heritage –** Renishaw's 50 years of metrology expertise allows us to uniquely offer a complete end-to-end solution, including high-accuracy AM systems and world-leading measurement products.
- **Service and support –** Our global team of applications engineers provide in-country support with design for AM, system training, process optimization, parameter development, and more.
- **Stability and sustainability –** As a global engineering technology group, we have invested in AM for the long term. We aim to become a sustainability leader, working with our customers, suppliers, and local communities to create a sustainable future across our diverse range of products.

Renishaw supports Mott Corporation with open architecture additive manufacturing (AM) system

To meet customer demand for increasingly complex filtration and flow control systems, Mott Corporation from Connecticut, USA, invested in Renishaw's RenAM 500S Flex system. The system's open architecture enables users to freely adjust material parameters, which is essential for research and development work. This investment has led to reduced machine turnaround times, improved performance metrics, and increased flexibility in material usage. The collaboration with Renishaw has also fostered innovation and customer engagement, enabling Mott to develop unique components for various industries.





> "The open architecture of the machine platforms provided by Renishaw has been key in enabling our development of these unique components. Renishaw has also delivered incredible customer support from start to finish."
>
> **- Mott Corporation (USA)**

Read the full case study here
www.renishaw.com/mott

Configurable to your production

The RenAM 500 series can be configured with an open-loop flexible powder system, automatic powder recirculation for increasing throughput, or with TEMPUS™ technology for the fastest build rates.

All variants of the RenAM 500 series can be configured with one, two or four 500 W fibre lasers, each able to access the whole powder bed surface for optimized laser energy usage.

With a footprint of just 86 in (2 165 mm) x 49 in (1 236 mm), the compact size of the RenAM 500 series makes efficient use of factory floor space.

Number of lasers

Q — **With four lasers that can access the whole bed, it's easy to achieve outstanding build rates.**

D — **Dual lasers provide a substantial productivity boost at a balanced price point.**

S — **A single laser system is the perfect starting point to begin building your AM parts.**

Productivity

Ultra — **Ultimate AM capability, with TEMPUS™ technology and advanced process monitoring.**

500 — **Integral powder sieving and recirculation system is ideal for volume production.**

Flex — **Optimized for R&D applications with quick and easy powder swapping.**

Material support

The RenAM 500 series supports a wide range of engineering materials including titanium, aluminium, nickel-superalloys and copper. Our open platform means you can develop and optimize material parameters to suit your application.

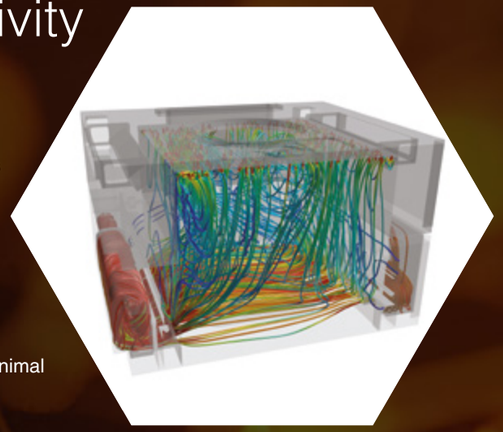
For datasheets on all our supported materials, visit www.renishaw.com/AMdatasheets

RenAM 500 series enables exceptional part quality and productivity

Intelligent gas flow design

A high-volume gas system ensures uniform processing conditions and efficient removal of emissions, with an intercooler for thermal control. Precise thermal management further contributes to the stable atmosphere and consistent build environment that leads to better and more consistent metallurgy.

The dual SafeChange™ filter system manages gas flow and pressure, while the sealed vacuum chamber and atmosphere generation system create a high purity argon environment with minimal gas consumption, enhancing powder quality and durability.



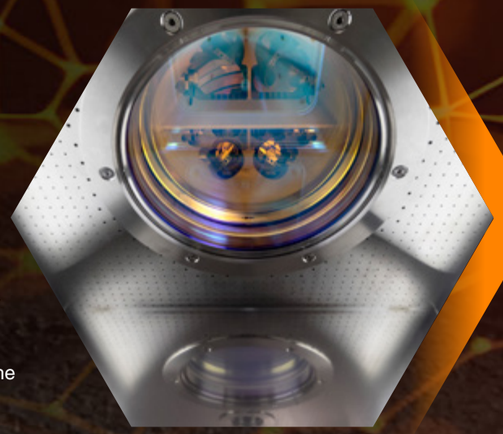
High-precision laser control

The optical system minimizes build times by enabling all lasers to precisely and simultaneously address the entire bed.

Includes a monolithic water-cooled galvanometer mounting with tight optical alignment and internal cooling channels. This is a key enabler for precision laser control.

The system also incorporates Renishaw's RESOLUTE™ optical encoder for high accuracy positional sensing and a kinematic recoater mounting for rapid, repeatable positioning of the recoater blade, ensuring accurate part manufacture.

Optical System Verification (OSV) lets you confirm and calibrate the positional accuracy of the lasers in your system.



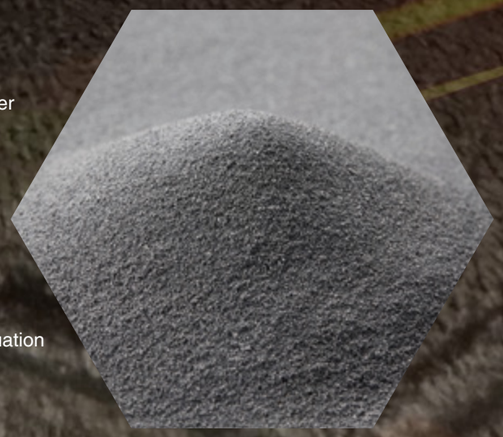
Configurable powder management

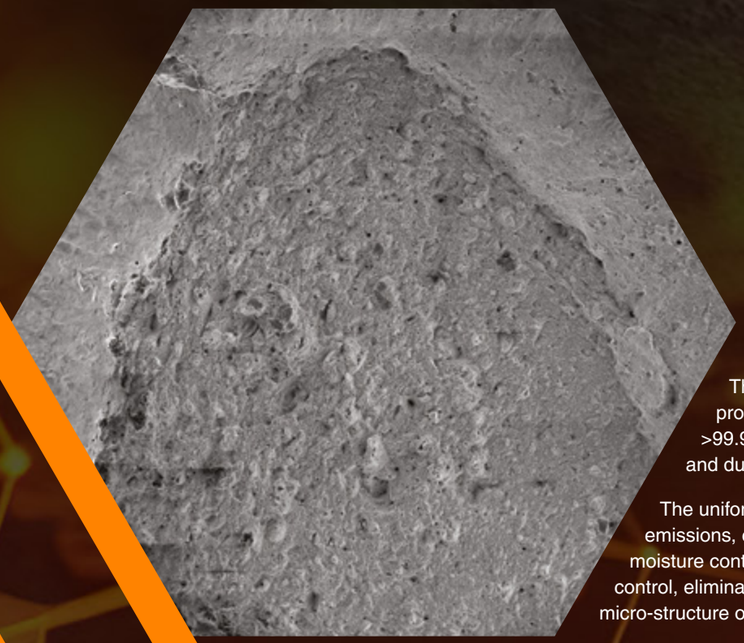
All RenAM 500 systems can be configured with closed loop powder recirculation or an open gravity-fed system.

The closed loop system enhances productivity and reduces costs through reducing operator intervention, while the open system (Flex) allows for easy material swaps.

The Flex system can be converted to powder recirculation for seamless transition from research to production.

We also offer a Reduced Build Volume (RBV) kit for low cost evaluation of novel materials.

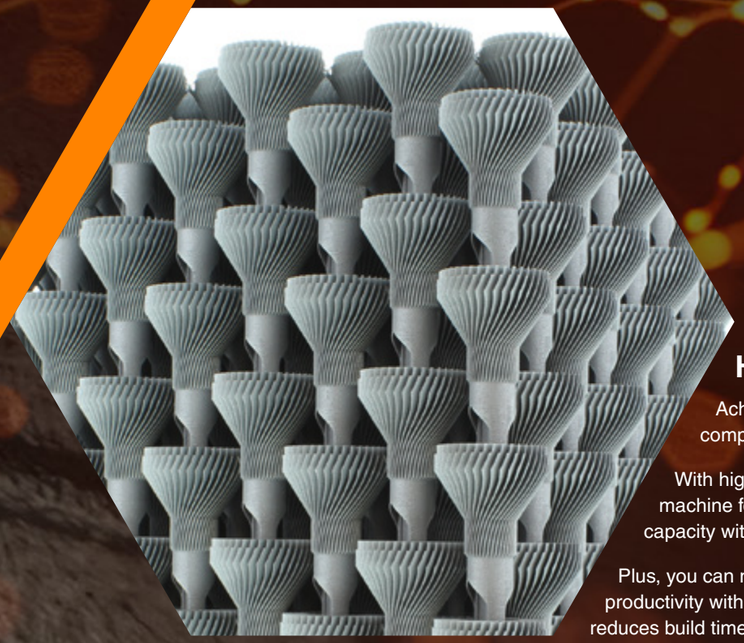




Exceptional part quality

The RenAM 500 series enables production of components with >99.9% density, maximized strength and ductility.

The uniform extraction of process emissions, exceptionally low oxygen and moisture content, and consistent optical control, eliminates sources of chemical, micro-structure or mechanical defects.



High productivity

Achieve lower cost per part, without compromising on quality.

With high laser density in a compact machine footprint, you can increase your capacity without increasing factory size.

Plus, you can now supercharge your productivity with TEMPUS technology, which reduces build times by up to 50%.

Capability upgrades

Renishaw provides a range of ancillary equipment to maximize the capability of its advanced additive manufacturing systems.

Reduced Build Volume (RBV)

For efficient material R&D

The RBV for the RenAM 500 series lets you print with < 0.75 litres of powder, in a self-contained, removable unit. This makes RBV the ideal tool for evaluating novel materials, without using the full powder system, but still benefitting from the RenAM 500's intelligent gas flow and precision laser control.

For more information, visit:
www.renishaw.com/rbv

Optical System Verification (OSV)

For ultimate confidence

To maintain precise control of the lasers within the RenAM 500 series, we have used our extensive experience in metrology and measurement tools to develop 'our Optical System Verification process

This toolset and accompanying machine-integrated software allows you to check and calibrate the focal point, positional accuracy and power output of all the lasers in your AM system. This capability not only ensures system performance for producing high-quality parts, but also provides full traceability of the machine performance back to international standards.

For more information, visit:
www.renishaw.com/osv

TEMPUS™ technology

Halve your build times with exceptional productivity

TEMPUS technology is a new innovation from Renishaw exclusively available on the RenAM 500 series. It delivers a substantial increase in AM productivity without compromising on part quality.

This technology synchronizes the system lasers with the powder recoater, allowing the lasers to fire whist the recoater is moving across the build area. This can reduce build time by up to nine seconds every layer, and with builds frequently containing thousands of layers, this can reduce total build times by tens of hours. When optimized with Renishaw's QuantAM build preparation software, all geometries can see a productivity benefit – over twice as fast in some cases.

For more information, visit:
www.renishaw.com/tempustechnology

Intelligent software solutions

Streamline your AM process with connected digital tools

For more information, visit:
www.renishaw.com/amsoftware

Design

QuantAM software lets you import CAD files, prepare your parts for AM and preview the laser path before printing. With an intuitive step-by-step workflow and open parameters, you can easily optimize your build.

QuantAM integrates with a wide range of third-party software for a seamless digital process.

Monitor

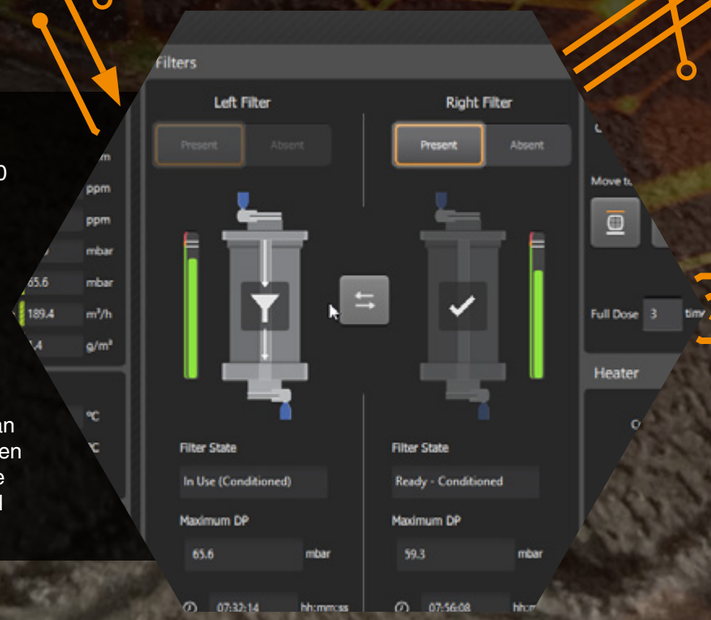
Renishaw Central collects and displays process data from your fleet of machines in real-time. Track key process variables for individual builds and monitor utilization and job performance over time.

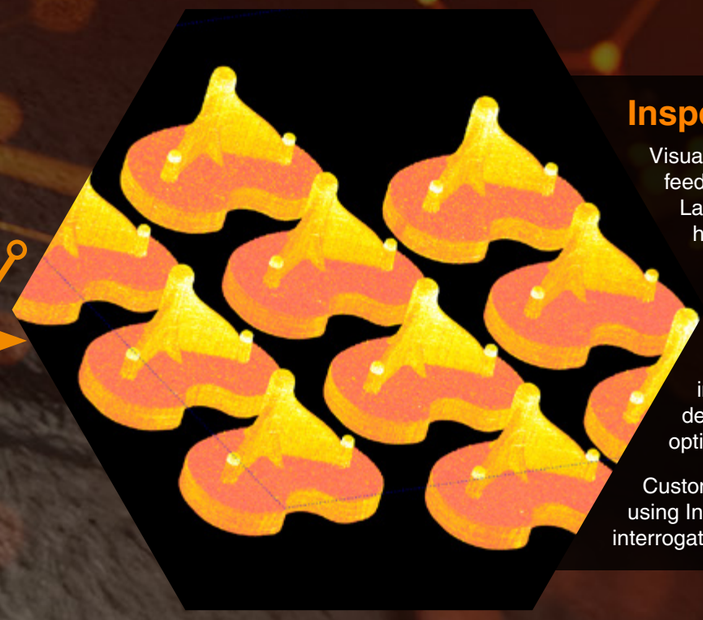
Email notifications provide instant alerts to status changes, and the API lets you integrate with your manufacturing workflow.

Build

At the heart of the RenAM 500 series is the MSS operating software. Developed by Renishaw, MSS integrates with our in-house optics, powder, gas and chamber sub-systems for maximized efficiency and control.

MSS has a rich graphical user interface operated from an industrial grade 19” touchscreen and features user configurable access controls and password protection.





Inspect

Visualize and inspect high-accuracy feedback from the melt pool (with LaserVIEW and MeltVIEW hardware), and chamber camera with InfiniAM. With in-line feedback from the laser input, visual and infrared emissions, InfiniAM provides layer and volumetric insight into your process. Quickly detect and identify anomalies and optimization targets.

Customize your data analysis using InfiniAM plugins for bespoke interrogation, archiving or exporting.

Renishaw support and service

In person, over the phone or online

We know responsive service and knowledgeable support are vital to the success of your business. Renishaw's growing network of local support teams operate across the globe to deliver rapid and effective support directly to you.

For more information, visit:
www.renishaw.com/amsupport

Experts at your service

- **Applications support –** our applications engineers can advise on optimizing your product design and build process, helping you reduce development time, production steps, costs and use of material.
- **Maintenance and warranty –** we are committed to supporting customers throughout the world via an extensive network of Renishaw offices and distributors. We offer support packages to suit your exact needs, covering parts, service and labor options.
- **Training –** to help you gain the maximum benefit from investment in additive manufacturing from Renishaw, comprehensive training programs are available, tailored to the needs and experience levels of users.
- **Installation and facility set-up –** we will install and commission the equipment with minimal disruption to your production schedule.
- **Online support –** user guides and other technical documents are available on our website. We also have an online store where customers can directly purchase consumables.

Visit our online store
www.renishaw.com/shop

Renishaw centres

Americas

- **Missisauga, Ontario (Canada)**
- **Chicago, Illinois (USA)**
- **Detroit, Michigan (USA)**
- **San Jose, California (USA)**
- **Apodaca, Nuevo León (Mexico)**
- **São Paulo (Brazil)**
- **Caxias do Sul (Brazil)**
- **Other worldwide offices**

Renishaw helps Tronosjet Manufacturing achieve FAA certification

Case study: Aerospace

Background:

When Tronosjet Manufacturing of Canada wanted to boost its additive manufacturing capabilities and achieve regulatory compliance for its metallic aerospace parts, it turned to Renishaw for support.

Challenge:

Tronosjet needed to demonstrate the repeatability of the material and its manufacturing process. It required a high-quality AM system that could produce complex metallic components and instil confidence with the regulators within the company's production team.

Solution

Renishaw supplied three AM machines in both single and multi-laser variants with total loss and recirculating powder schemes. Tronosjet used these to produce a safety-critical engine thrust control pulley bracket - one of the first additively produced metallic parts to be certified by the Federal Aviation Administration (FAA).

Tronosjet Manufacturing, a Canadian aerospace company established in 2001, partnered with Renishaw to enhance its AM capabilities. Tronosjet aimed to get FAA certification for a new engine thrust control pulley bracket – a safety-critical component that has been redesigned for AM. According to Jeff Campbell, Director of Maintenance and Manufacturing, "The reason we decided to go for a Renishaw system is the brand - it's highly trusted and we knew it was a company that offers excellent engineering and process capability."

Renishaw provided Tronosjet with multiple RenAM 500 series systems to produce various aircraft components. Among these was the new titanium alloy engine bracket, which replaced the previous cast magnesium version. Extensive testing showed that the printed titanium bracket was five times stronger than the original cast part. This success enabled Tronosjet to receive FAA certification under the Parts Manufacturer Approval (PMA) scheme, making it one of the first globally certified metallic AM components.

"We're grateful for Renishaw's engineering expertise and support — it delivered exceptional products critical for our certification success," concluded Campbell.

By leveraging Renishaw's advanced AM technology, Tronosjet demonstrated the viability of additive manufacturing in aerospace, achieving regulatory compliance and gaining a competitive edge.

> "[The] RenAM 500 series are world-class AM machines, and of the quality we needed to achieve FAA certification. Also, we were impressed with Renishaw's presence across North America, and its local support was important for us as a small business taking on new technology."
>
> **- Jeff Campbell**
> **Director of Maintenance and Manufacturing**
> **Tronosjet Manufacturing (Canada)**

Read the full case study here
www.renishaw.com/i3d

RENISHAW
apply innovation™

Applying innovation since 1973

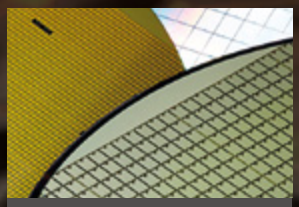
Renishaw is one of the world's leading engineering and scientific technology companies, with expertise in precision measurement and healthcare.

Our worldwide network of subsidiary companies and distributors provides dedicated global customer support, wherever you are.

Our principal markets include:


Aerospace


Automotive


Electronics


Energy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