kurtz ersa



ADDITIVE MANUFACTURING

Modular & Scalable – Solutions for Your Production

GLOBAL. AHEAD. SUSTAINABLE.

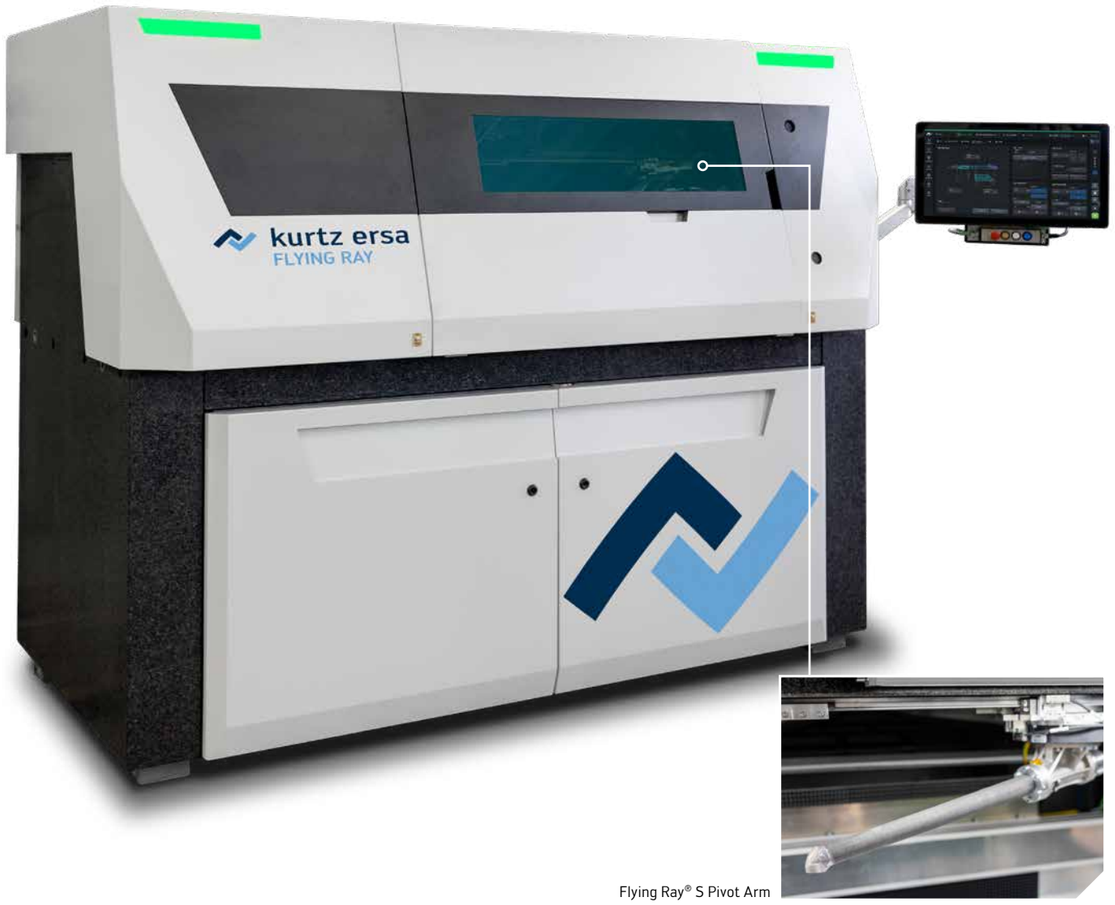
Process control starts with machine architecture.

Flying Ray® S at a glance

Flying Ray® S combines the established PBF-LB/M process with a new machine architecture for industrial metal production. Laser beam delivery, software and process control are designed to work together as an integrated system.

The system reduces position-dependent process differences and supports consistent part properties across the entire build area and over many build jobs. This gives AM teams greater control over manufacturing conditions. Kurtz Ersa thereby lays the foundation for less testing and qualification effort, less rework and less scrap. Flying Ray® S is designed as the entry point to a larger machine family with scalable build volumes and transferable process conditions.

250 × 250 × 350 mm	*400 W per Pivot* *one or two arms available*	*Stainless Steel 316L*	*Inconel IN 718* *Titanium Ti6Al4V*
Build Volume	Laser Power	Available Material	Planned Materials



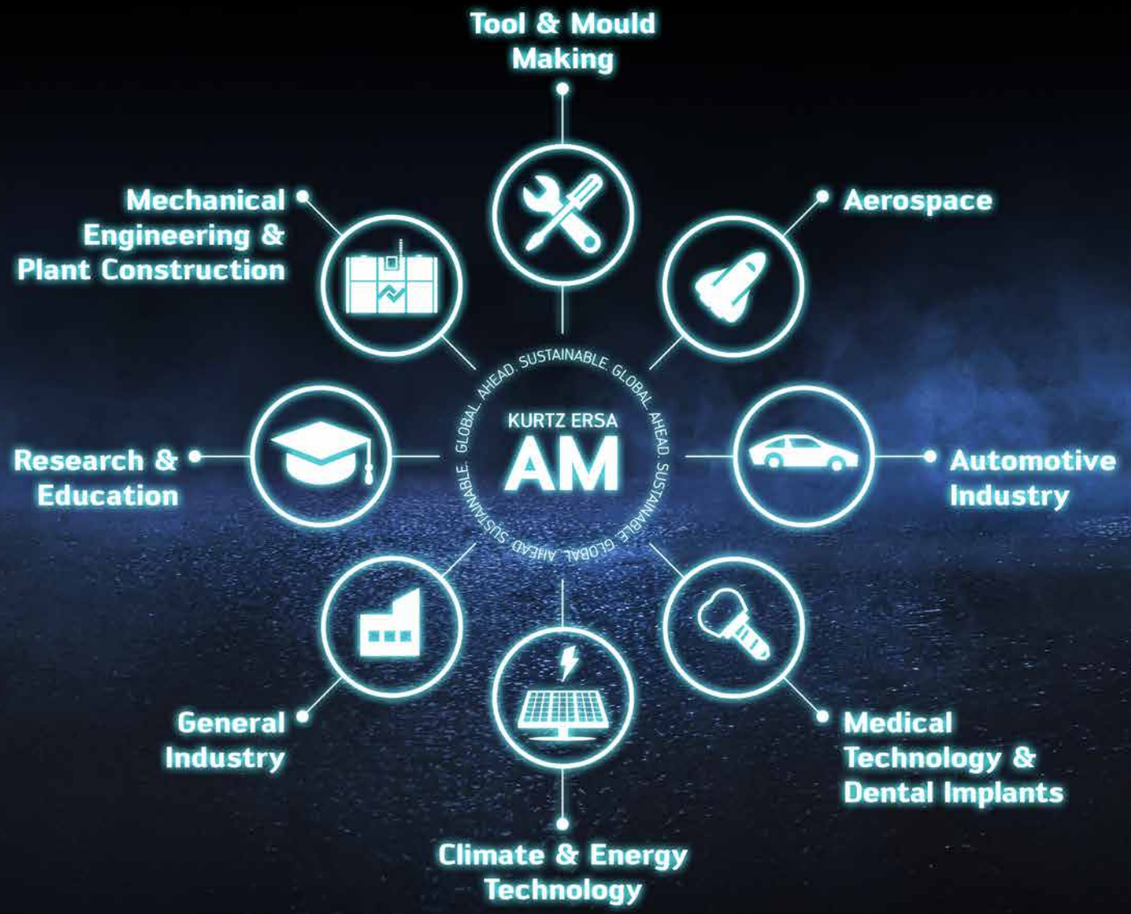
Flying Ray® S Pivot Arm

Industries of 3D metal printing.

Every application is unique

Additive Manufacturing (AM) uses geometric freedom to integrate functions, achieve tailored properties and conserve resources. AM also shortens the supply chain and enables a high degree of customisation.

- Function integration and integral designs that are impossible or only achievable with great effort using other manufacturing processes (geometric freedom)
- Bionic structures
- Contour-close cooling channels
- Avoidance of joining processes
- Load-dependent material distribution
- In-situ heat treatment
- Tailored mechanical properties of different component areas
- Conservation of resources and contribution to sustainability (lightweight construction)
- Shorter supply chains
- Individualization



New beam delivery. Established process. Increased control.

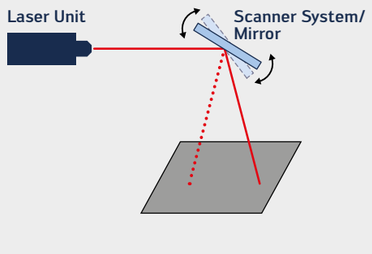
Consistent process conditions across the build area

A successful build job alone does not make for stable series production. With Flying Ray® S, Kurtz Ersa uses a Pivot Arm with which melting remains constant across the entire powder bed, creating the basis for scalable applications.

The Pivot Arm maintains a constant angle of incidence across the powder bed. The laser therefore interacts with the metal powder in the same way across the build area, resulting in consistent melting behaviour.

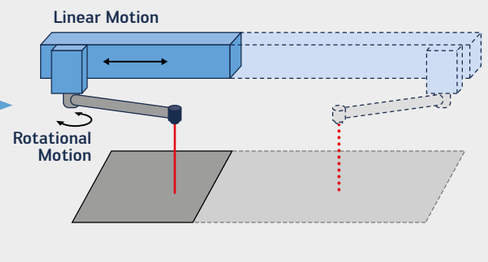
It enables reproducible melt pools and reduces variations in microstructure and mechanical properties within a part and across the entire build area.

BEST PRACTICE



Conventional PBF-LB/M systems direct the laser across the build area from a stationary scanner, which changes the angle of incidence.

FLYING RAY® TECHNOLOGY

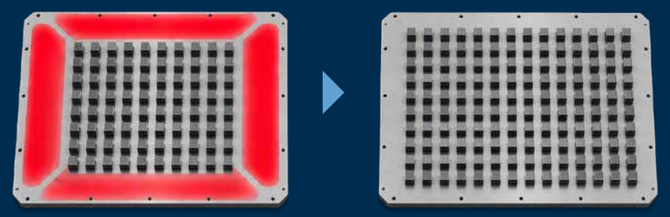


Flying Ray® S moves the optics over the powder bed with a Pivot Arm and keeps the angle of incidence constant.

More freedom when preparing build jobs

Place parts wherever they fit in the build job:

AM teams can position and orient parts freely across the build area, not being limited to specific "safe zones" with more favourable angles of incidence. Build-job preparation becomes considerably simpler and reduces the need for adjustments.



Improved process behaviour

Precisely guided. Built uniformly.

Latest test results for path accuracy and part density

AM teams need predictability in manufacturing. This includes ensuring that exposure follows the calculated pattern and that samples produced across the build plate have comparable properties. Current positioning and density tests on Flying Ray® S provide concrete results.



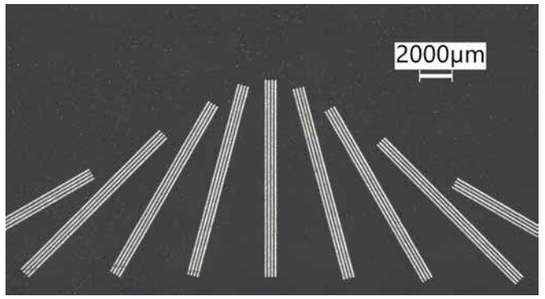
For our customers, predictable part quality is what matters. The fact that our density values show so little variation tells us that we are on the right track in terms of homogeneity. This is the basis for less scrap and rework, simpler qualification and more stable series production.

Lisa Maria Grimm, 3D Printing Process Engineer @ Kurtz Ersa

The exposure follows the plan

For the powder to melt uniformly, the position and spacing of the exposure lines must be correct. In a stress test, Flying Ray® S achieves a positioning accuracy of ±10 µm, even at high scan speeds and during acceleration and deceleration. Line patterns in different orientations and dynamic motion sequences were tested.

The rigid Pivot Arm design, combined with high-performance drives, enables an optimised distribution of moving mass. The control system coordinates the motors involved and synchronises laser switching with the motion. This ensures that every exposure starts and ends at the intended point.

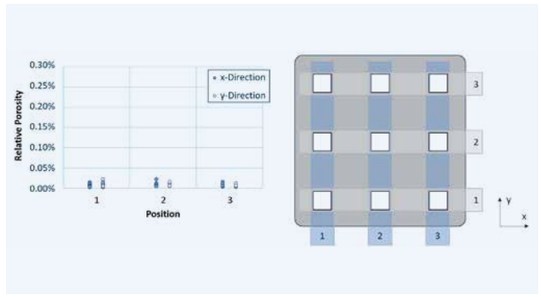


Path accuracy: ±10 µm, even at high scan speeds and during acceleration and deceleration

High density and low variation

For predictable manufacturing, parts must achieve comparable properties at different positions on the build plate.
A recent test shows positive results in the density analyses: light-microscope images of polished cross-sections show only minor differences between the positions examined in the x and y directions. All measurements in this test are above 99.97 % in relative density.

This low variation is an important prerequisite for qualifying applications and repeating build jobs with consistent quality.



Material 316L – low porosity and homogeneous distribution (see scale)

Build-job preparation, process monitoring and reporting.

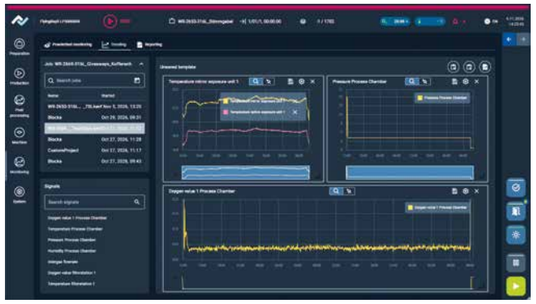
Plan. Monitor. Document.

Repeatable part quality requires controlled manufacturing conditions and traceable process data. Flying Ray® S links build-job preparation with monitoring of relevant process conditions and job reporting. This helps users detect deviations, investigate their causes and improve the manufacturing process.



Fuse-IQ: exposure planning for Flying Ray®

Fuse-IQ is the core of build-job preparation. Intelligent algorithms are used to create the exposure plan. Preparation considers not only part geometry, but also the physical behaviour of the material being processed and the relevant machine components. The precise sequence of the entire build process is therefore defined before the machine starts.



Stable conditions for the build process

During manufacturing, an extensive sensor system monitors relevant process conditions and enables targeted control. Gas flow in the build area has been optimised using simulations, test rigs and prototypes. Precise build plate and an intelligent laser strategy control the thermal balance. The goal is stable operating conditions and a consistent laser-powder-interaction. If the actual state deviates from the target, the operator is notified. The recorded sensor values enable the analysis of deviations and identify their causes.



Making build jobs traceable

The job report documents information about the build job, the machine, the software versions and the parameter set used. The documented manufacturing conditions can be traced later.

1. **Build job and machine**
   Job ID, time and machine assignment.
2. **Software versions**
   Software versions used.
3. **Data preparation**
   Slicer, Fuse-IQ and parameter set.



Putting sustainability into practice together.

Resources considered throughout the entire process

For Flying Ray® S, resource conservation does not stop at the build area. Becker AMS's integrated process gas management solution combines powder recovery, long-life filtration and condensate management in a single architecture.

An integrated cyclone makes it possible to recover powder carried out by the process gas flow and reuse it. Condensate is automatically passivated without additional passivation media. For users, it results in less material loss and fewer consumables, less handling and less handling and treating condensate effort, and simpler, more predictable processes.

"In developing Flying Ray®, the Kurtz Ersa team rethought the energy input from the laser into the powder, thereby creating an important basis for scalability for users. That is what Kurtz Ersa's special innovative achievement is based on. We are pleased to contribute our CYCLEAM expertise in process gas management."

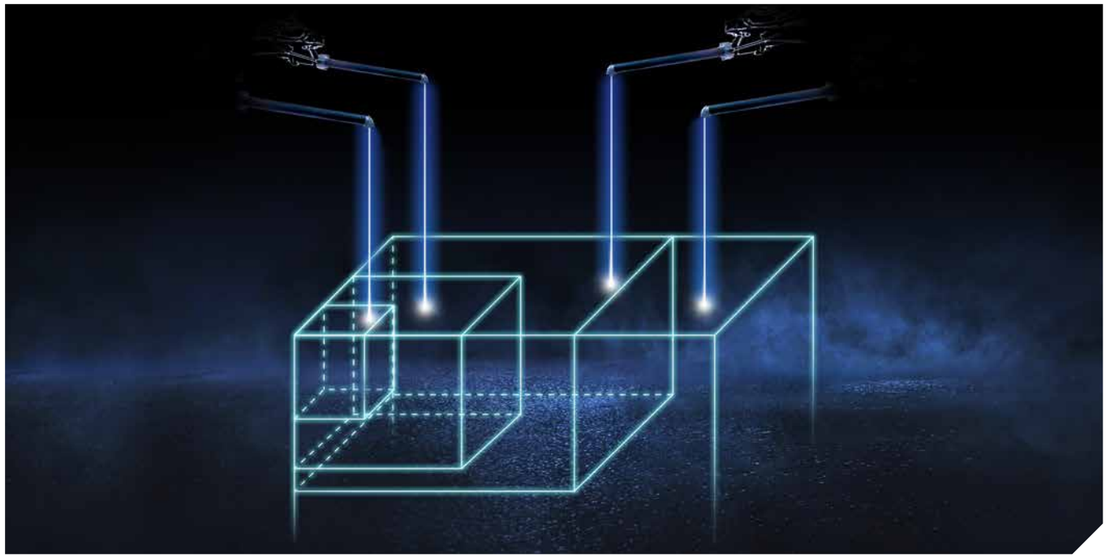
Sven Pawliczek,
Managing Director, Becker Additive Manufacturing Solutions GmbH

Sustainability goals of Kurtz Ersa

Kurtz Ersa gives ecological, social and economic issues the importance they need in our time:

- Reaching carbon neutrality by the company's 250th anniversary in 2029 (in Scope 1 and 2, and partially in Scope 3).
- An ESG rating as evidence of the successful design and implementation of measures.
- Development of sustainable solutions for six defined fields of action.

GOLD | Top 5%
ecovadis
Sustainability Rating
MAY 2026



Modularity and scalability.

A platform with a future

Manufacturing larger parts, increasing capacity and reusing existing process know-how: Kurtz Ersa is developing the Flying Ray® platform to meet these requirements. Flying Ray® S is the starting point for a planned machine family with larger build areas.

More room for new applications

The modular machine architecture is designed to support different build area sizes and multiple Pivot Arms. The aim is to transfer these controlled conditions to larger build areas as well, enabling users to take on larger parts and reduce the effort involved in developing the process again.



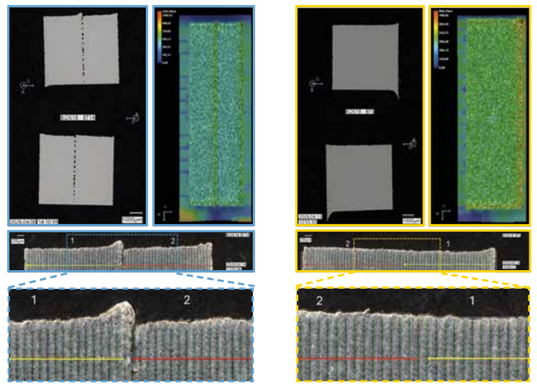
Build volume sizes from S to XL (LxWxH)
Individual configurations upon request.

Flying Ray® S	250 x 250 x 350 mm
Flying Ray® M	600 x 600 x 600 mm
Flying Ray® L	1,020 x 1,020 x 1,300 mm
Flying Ray® XL	1,500 x 1,000 x 1,000 mm

MultiHead – more capacity, seamless transitions

Multiple Pivot Arms enable parallel processing. When working on the same part, their exposure areas must be coordinated so that the material is built up uniformly despite the higher capacity. Kurtz Ersa improves overlap, sequence and laser timing. Investigations already show transitions that are almost invisible. The team evaluates surface quality and microstructure and refines the rules for repeatable handovers.

MultiHead: investigation of the overlap region



Always close to the customer.

Additive Manufacturing benefits from Kurtz Ersa's Global footprint

Working together internationally

As part of the Kurtz Ersa Group, the Additive Manufacturing division offers customers not only technological excellence but also comprehensive service. Kurtz Ersa has more than 20 production and sales locations, as well as representatives in around 90 countries. The international sales and service network complements the company's own development and manufacturing.

This provides an organisational basis for working together with customers that have international production sites.

Supporting operations

For maintenance, technical support and spare-parts supply, Flying Ray® draws on the existing structures of the Kurtz Ersa Group, helping to secure long-term operation of the machine.

Trust beyond the machine purchase

Qualifying a new manufacturer represents a major commitment for customers. Behind Flying Ray® are the investment strength, development resources and in-house manufacturing capabilities of the Kurtz Ersa Group. In a volatile AM market in particular, customers need the confidence of having a supplier with a long-term outlook at their side. Kurtz Ersa has taken the long view since 1779.



One group. One goal.

The No. 1 team for sustainable production solutions

Kurtz Ersa is a leading high-tech mechanical engineering company. Sustainable growth has been a focus of its efforts since 1779. We equip both our own sites and our customers' production facilities with sustainable solutions and prepare them for the future. Kurtz Ersa has created a diversified, crisis-resilient company operating under the shared Kurtz Ersa brand.

The Additive Manufacturing division, with its start-up character, benefits from the experience and customer relationships of the Kurtz Ersa Group's established business units: Electronics Production Equipment, Moulding Machines and Smart Production Automation.

Electronics Production Equipment
Solutions for electronics manufacturing



Moulding Machines Equipment for particle foam processing



Additive Manufacturing (PBF-LB/M)



Smart Production Automation
Micro and nano assembly and seamless product automation



The know-how behind Flying Ray®.

Bringing AM expertise together

Since entering metal additive manufacturing in 2020, Kurtz Ersa has built a dedicated AM division. In a very short time, the journey has progressed from small-format printers to the Flying Ray® platform.

Experience of different manufacturing environments

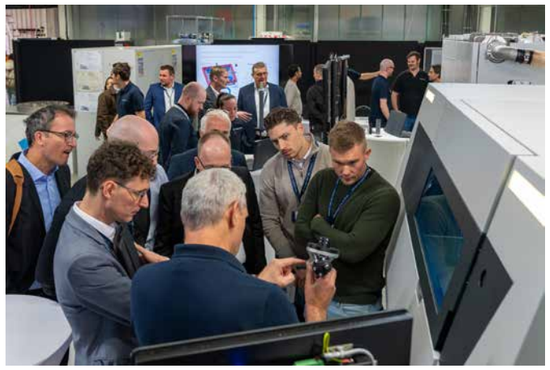
The Flying Ray® team brings together experience in AM, powder metallurgy, large-scale plant engineering and highly regulated application industries. The experts combine an understanding of materials and processes with in-depth practical knowledge.

All key technologies from a single source

Because Kurtz Ersa develops key hardware and software for Flying Ray® in-house, the team can coordinate how they work together, enabling users to control and optimise their processes more effectively.

Expanding knowledge together

For Additive Manufacturing, Kurtz Ersa combines group-wide mechanical engineering, software and process expertise with the knowledge of research partners such as ETH Zurich and the Additive Manufacturing Center at TU Darmstadt.





When the process is stable and the laser melts the powder consistently across the entire build area, parts with consistent quality and repeatable mechanical properties are produced. That is exactly what our revolutionary Flying Ray® technology has been developed for. Less testing, less rework and less scrap. Manufacturing becomes easier to plan, leaving more time and capacity for new applications.

Victor Kurtz, Head of Additive Manufacturing @ Kurtz Ersa



Let's discuss the role Flying Ray® could play in your production.
We look forward to hearing from you: info@kurtzersa.de or +49 9342 807-0.



Product Page
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