ONE OFF ROBOTICS

Robotic Metal Additive Manufacturing Systems

2024

America Makes

MADE IN USA

www.OneOffRobotics.com

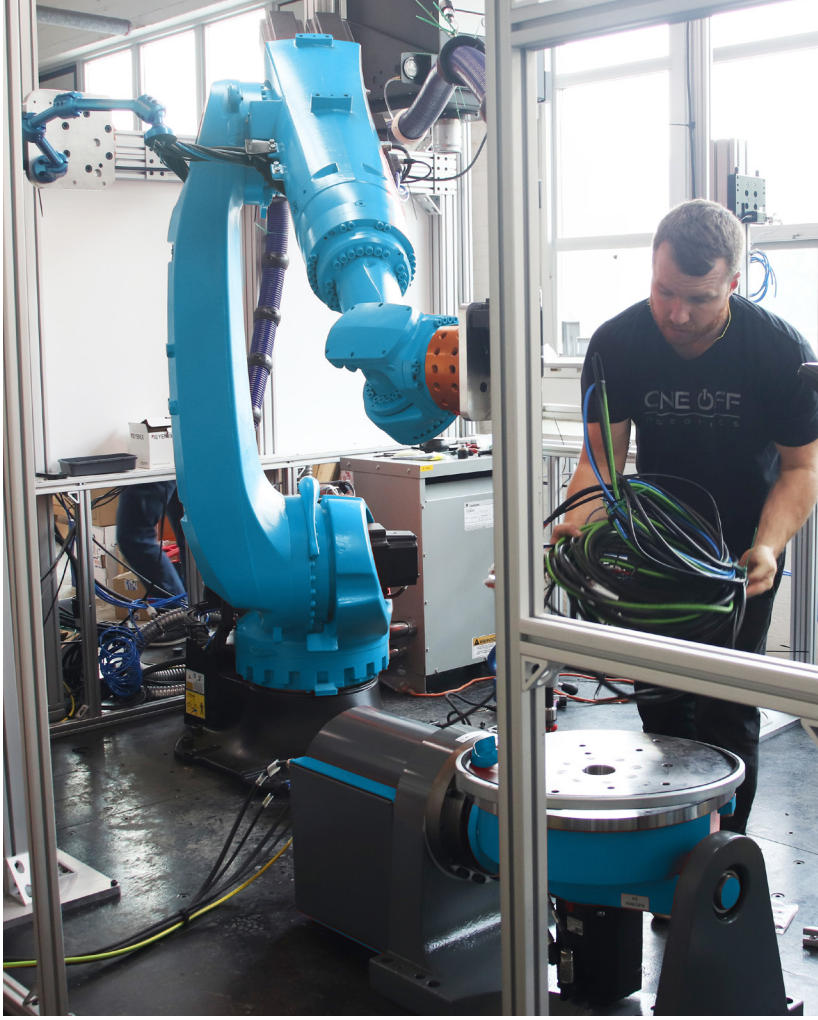

KUKA
Fronius

ONE-OFF ROBOTICS

Founded in 2018, One-Off Robotics is a Chattanooga, Tennessee based advanced equipment manufacturer designing and building the world's most innovative Robotic Metal Additive Manufacturing systems.

One-Off Robotics sets the bar in Robotic Metal Additive Manufacturing, developing technologically superior systems for use in Defense, Aerospace, Research, and Specialized Production.

Our mission is to supply customers with highly dependable leading-edge technologies to fulfill critical production needs.



PARTNERS

ABB

KUKA

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MELTIO

SIEMENS

RENISHAW apply innovation™

MECAWELD

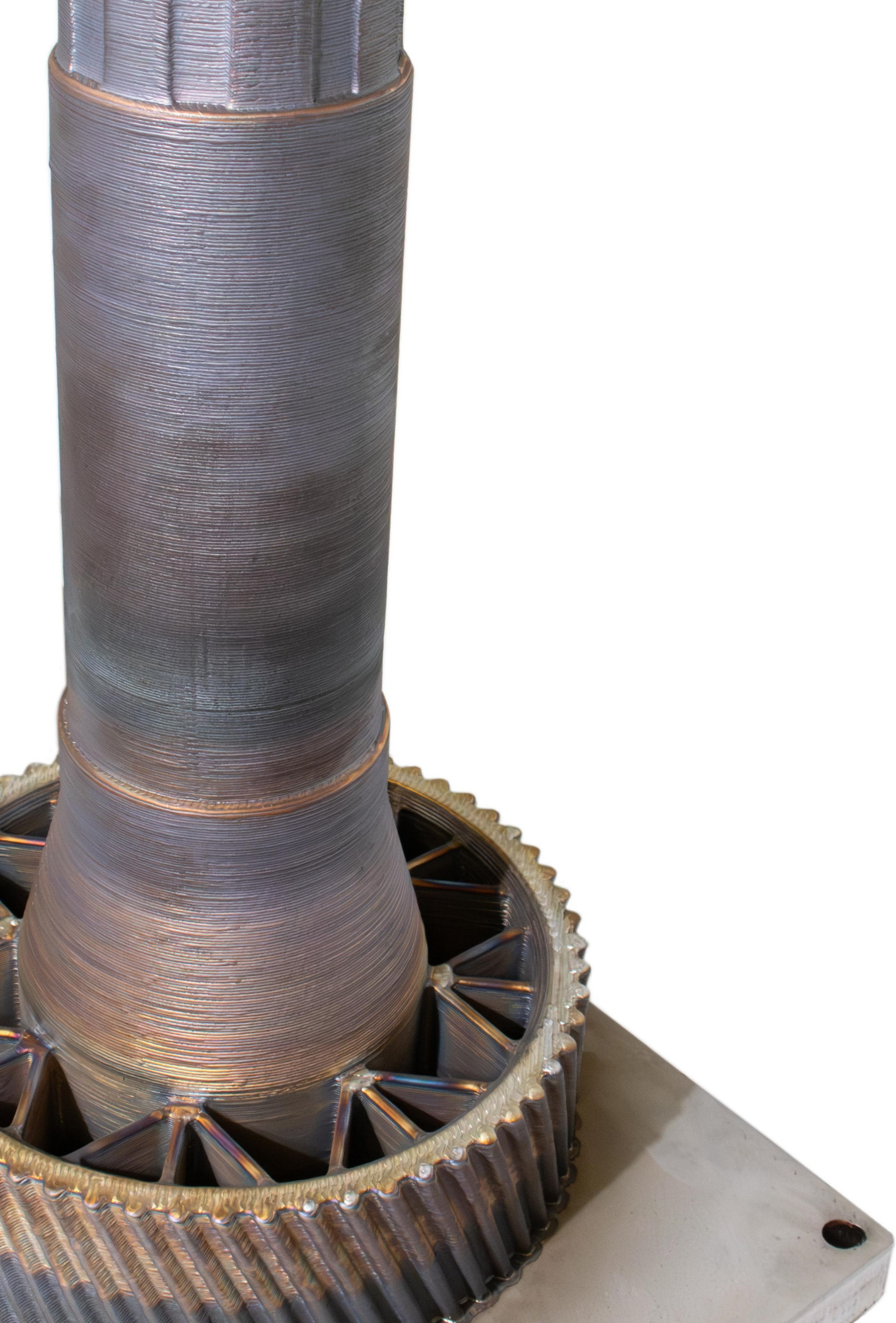
FASTECH

ADAXIS

Ai BUILD

Rhinoceros

SEAMTN



THE POWER OF METAL ADDITIVE MANUFACTURING

DESIGN WITHOUT LIMITS

Metal additive manufacturing allows for the creation of complex designs previously thought impossible.

This means lighter, stronger parts and the freedom to innovate without traditional constraints.

WASTE LESS, SAVE MORE

By adding material only where it's needed, metal additive manufacturing significantly cuts down on waste compared to traditional manufacturing methods.

It's smarter, greener, and more cost-effective.

SPEED FROM CONCEPT TO REALITY

Rapid prototyping and production are at the heart of metal additive manufacturing.

This means you can develop, test, and refine your products faster than ever, without sacrificing quality.

CUSTOMIZATION MADE EASY

Whether it's a single, unique item or a small batch of specialized parts, metal additive manufacturing makes customization straightforward and affordable, opening up new possibilities for tailored solutions.

STRONG AND DURABLE

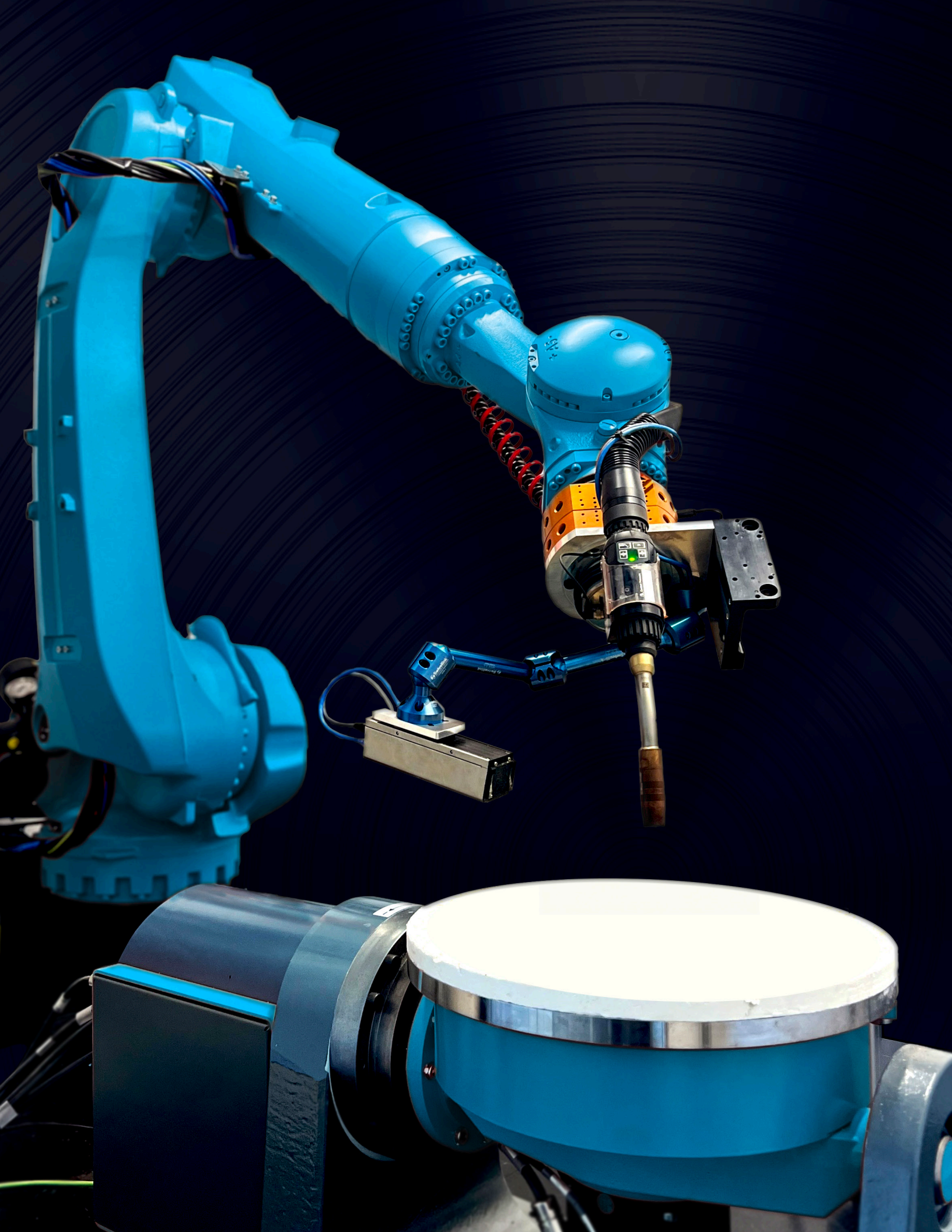
Parts made with metal additive manufacturing are not only complex and lightweight but also strong and durable.

Advanced materials ensure your parts meet the highest performance standards.

IDEAL FOR LOW VOLUME PRODUCTION

Avoid the high costs of traditional manufacturing for small production runs.

Metal additive manufacturing is cost-effective for producing high-quality, specialized parts in the quantities you need.



ONE-OFF ROBOTICS

METAL ADDITIVE MANUFACTURING CELLS

Robust enough for Defense production, flexible enough for R&D. We integrate the most advanced metal additive hardware and software into user-friendly interfaces, and develop proprietary software to simplify your manufacturing workflow. Our custom cell enclosures are safe, portable, and made to last.

One-Off Robotics works with all proven equipment manufacturers to deliver customized solutions that will fit your exacting requirements.

FEATURED SYSTEMS

Multi-Process Robotic Metal Additive Cells

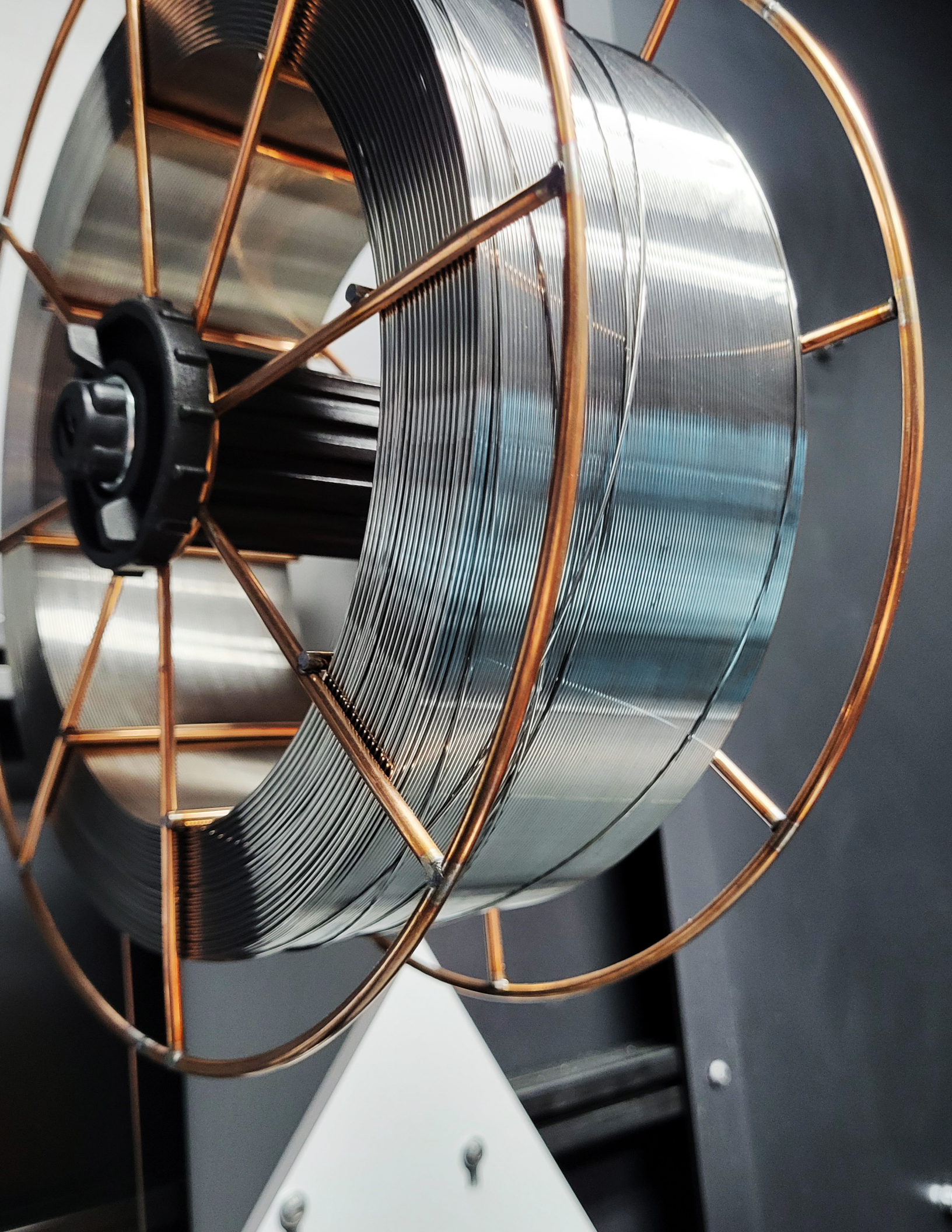
The most advanced metal additive cell on the market, utilizing multiple directed energy deposition technologies with automated calibration capabilities and closed loop control.

Field-Deployable Robotic Hybrid Fabrication Cells

High volume, low cost deployable advanced metal manufacturing cells with machining and dedicated clean power supply.

Multi-Robot Marine Fabrication Systems

Large-scale digital fabrication system capable of making boat plugs and molds as well as carbon fiber trimming and finish work.

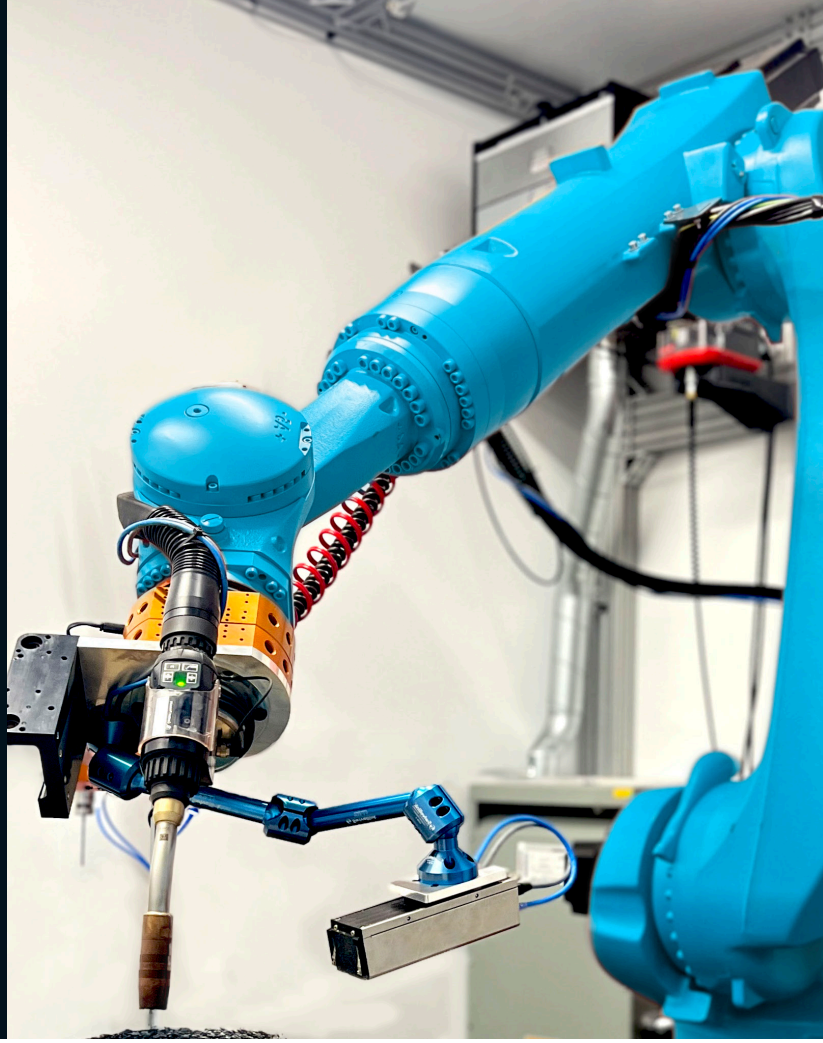


WAAM

Wire Arc Additive Manufacturing

WAAM is a Directed Energy Deposition (DED) process used to 3D print or repair metal parts. WAAM combines an electric arc with certified welding wire, as feedstock, to produce medium to large scale, free-form parts.

Our Fronius WAAM end-effectors are the industry standard and have metal deposition rates averaging 4 Kg per hour.



Cost-Effectiveness

WAAM uses standard welding equipment and wire, making it a more affordable option compared to other additive manufacturing methods that require specialized materials and machinery.

Material Efficiency

This method produces near-net-shape objects with minimal material wastage, as it adds material only where needed.

Robust Deposition

WAAM is well-suited for creating large components due to its relatively high deposition rates and the ability to handle large build volumes.

Improved Mechanical Properties

The process can enhance certain mechanical properties of the manufactured parts, such as strength and toughness, due to the inherent metallurgical processes involved in welding.

WLAM

Wire Laser Additive Manufacturing

WLAM is a Directed Energy Deposition (DED) process that functions by feeding wire into a high intensity laser field, forming a weld bead that, with precise placement of successive layers, builds up the desired object.

One-Off Robotics provides a variety of WLAM end-effector solutions, supporting multiple laser wavelengths and variable power levels.

Infrared lasers like Meltio achieve deposition rates of 0.25 Kg/hr, while our multi-spectrum laser systems (pictured) can deposit at +10 Kg/hr.

- ### Precision and Quality

  WLAM offers higher precision and surface quality compared to WAAM, due to the focused laser beam providing better control over the melt pool.

- ### Enhanced Material Properties

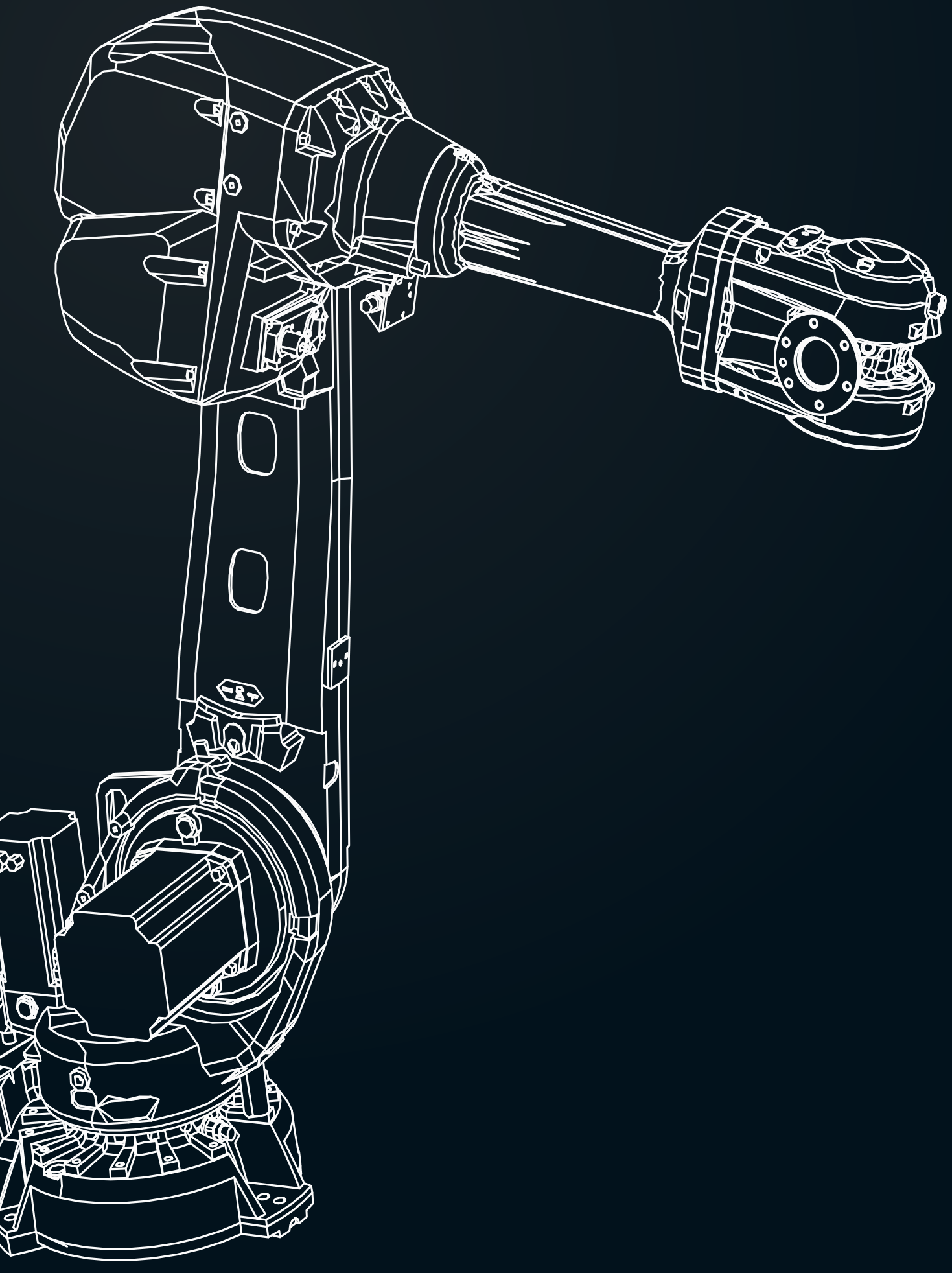
  The rapid cooling rates associated with the laser can lead to finer microstructures in the manufactured parts, potentially improving their mechanical and physical properties.

- ### Flexibility in Design

  Like other additive manufacturing processes, WLAM allows for the creation of complex geometries that would be difficult or impossible to achieve with traditional subtractive methods.

- ### Energy Efficiency

  The focused nature of the laser beam results in more efficient use of energy, reducing the overall energy consumption of the manufacturing process.



ROBOTS & POSITIONERS

One-Off Robotics uses 6-axis industrial robots, optional linear rails, and 1 or 2-axis positioners designed specifically for demanding environments and commercial applications. Our robots are specially designed for flexible use cases and scenarios, and can communicate extensively with a variety of external systems.

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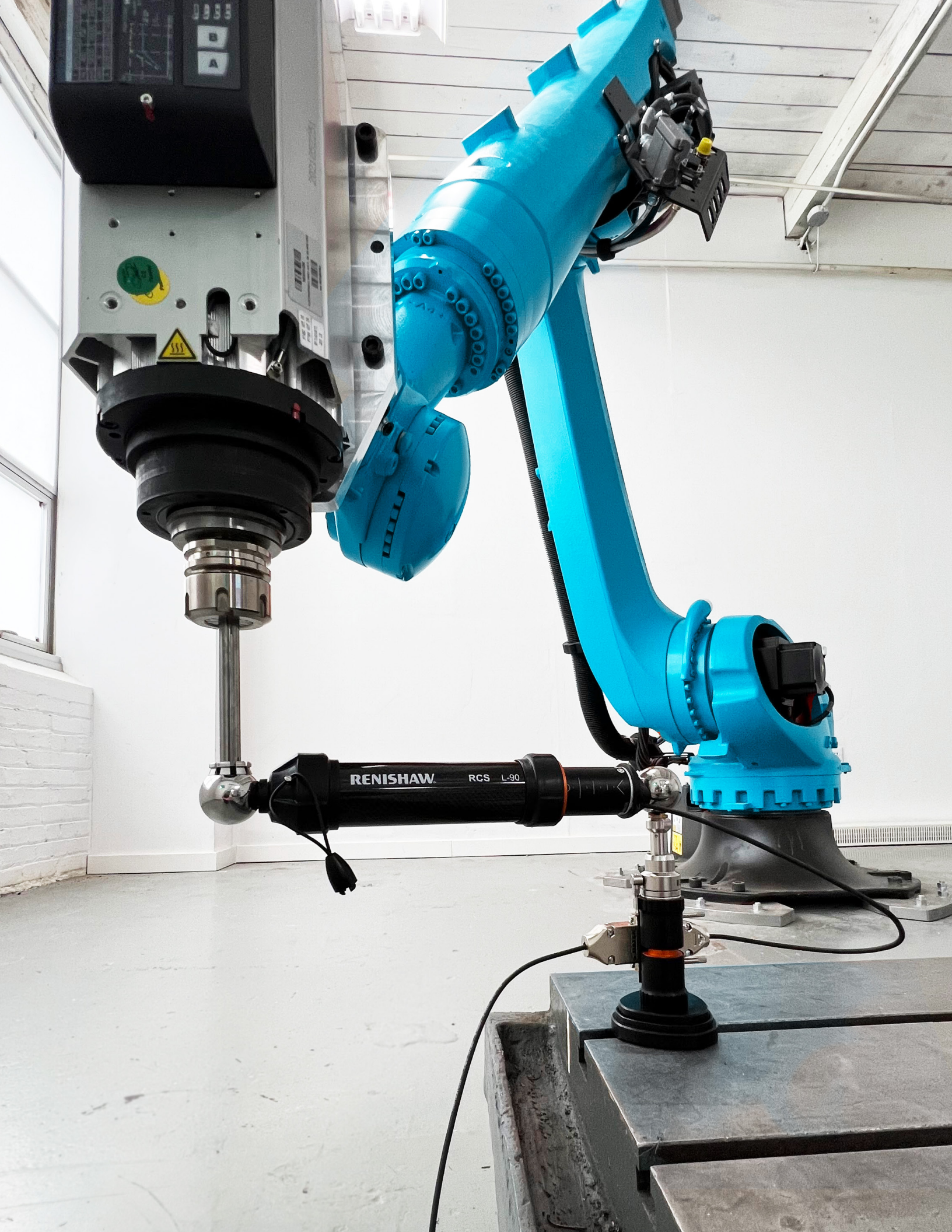
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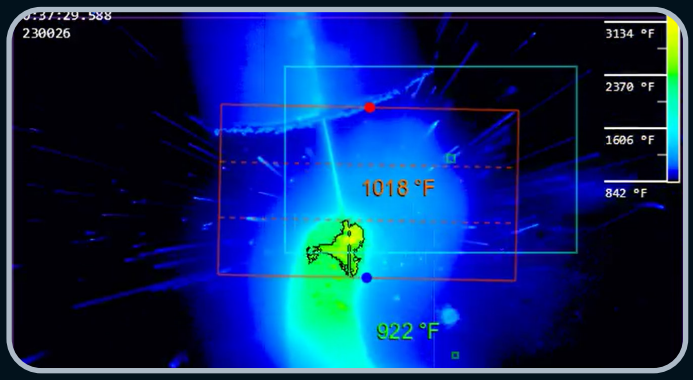
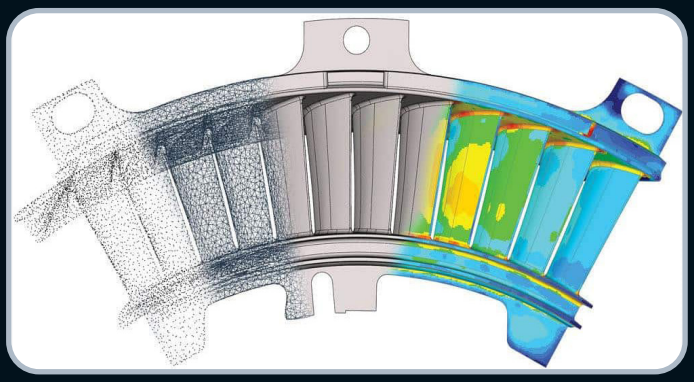
SENSORS

Thermal Imaging

Real-time temperature measurement with an exceptionally clear view of your process and melt pool, even in harsh environments where vision would typically be obscured by smoke, fumes, and





Point Cloud Scanner

Point clouds use a 3D scanner to capture a collection of spatial data points to recreate the shape of the physical print, making measurement and analysis possible at any location.

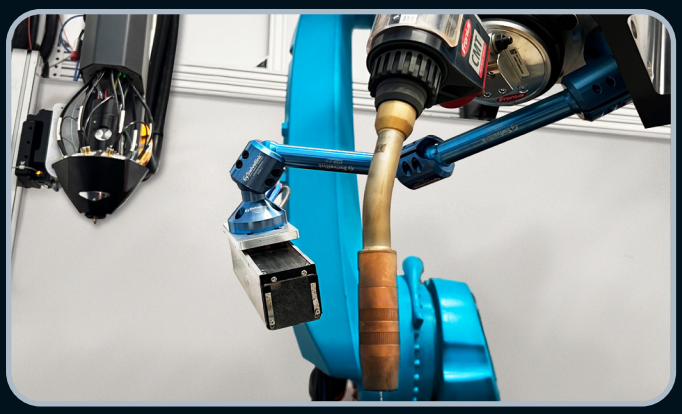
Wireless Touch Probes

Machine tool inspection probes play a key role in achieving precision throughout the manufacturing process. Our precision measurement devices provide automated workpiece set-up, in-process control, and part verification.

Audio Data Collection

Non-invasive acoustic monitoring is an effective addition to optical or laser measurements. The combination of visual and sound monitoring in additive manufacturing improves operators' abilities to fine tune and monitor the manufacturing process.

ACCESSORIES



Automated Tool Change

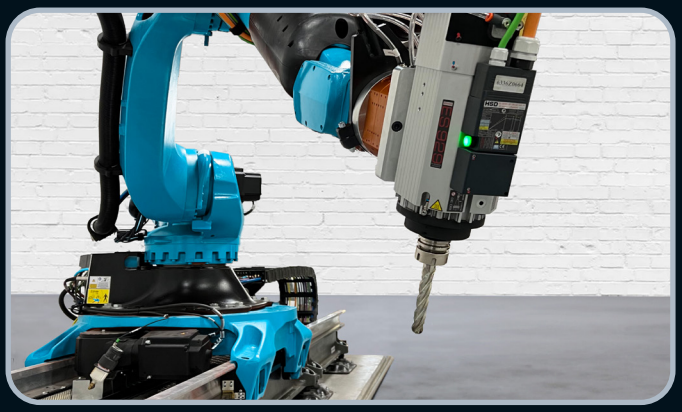
Robotic tool changers allow for the use of multiple end effectors. Packages include tool stands, robo-couplers sized for your application, and all necessary sensors and programming.

Automated Tip Change

For large prints that require many hours of continuous printing we offer automated tip changeovers. This process allows for continuous uptime without print failure due to wear item fatigue.

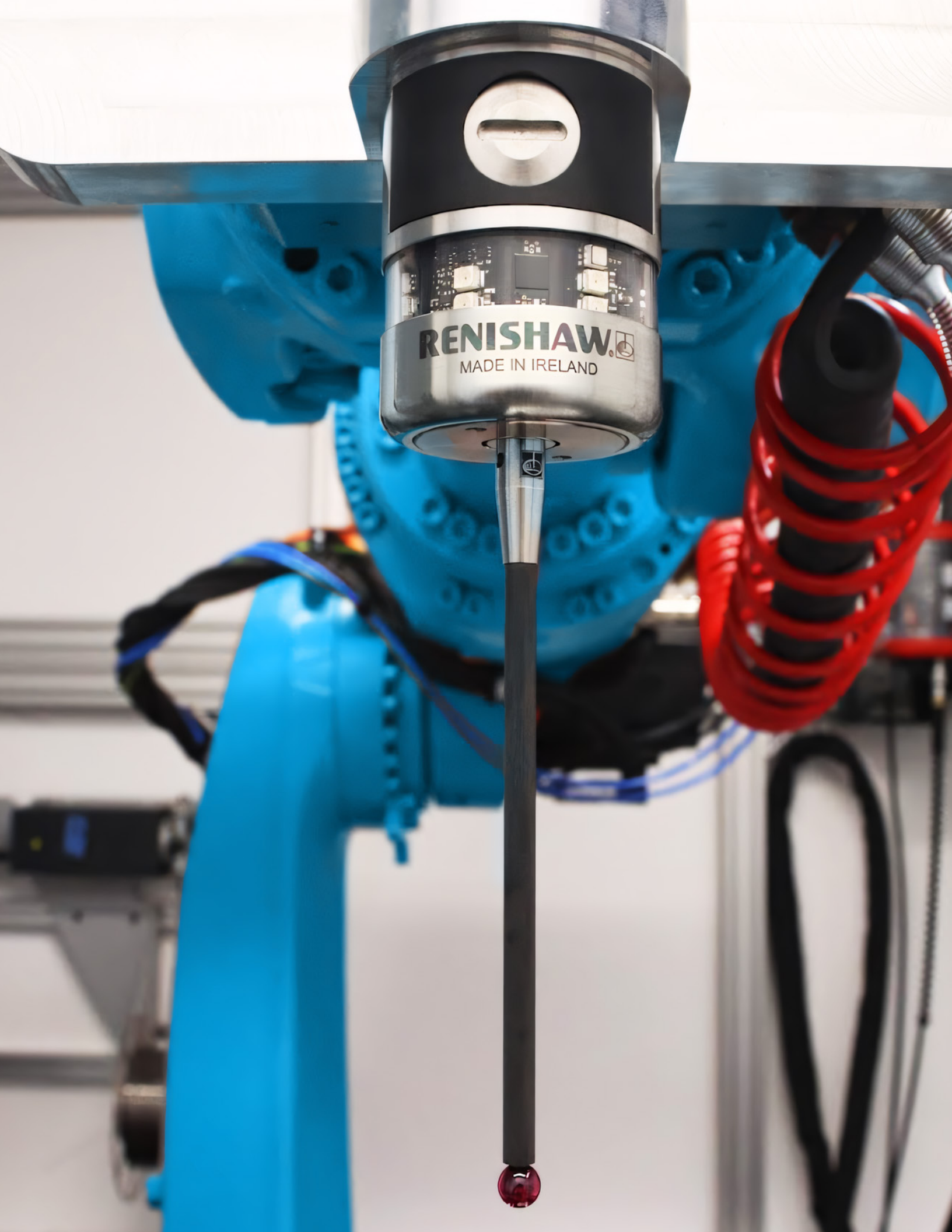
Forced Air Cooling

Heat accumulation can significantly affect the molten pool shape and the forming quality of metal prints. Air Blade Cooling offsets this while also allowing for added efficiency by increasing the overall deposition rate and decreasing the interlayer dwell time.



Robotic Machining

One-Off Robotics has a long history in advanced, high accuracy, robotic machining. Having the option to do in-situ part machining can save valuable time in the process of metal additive fabrication.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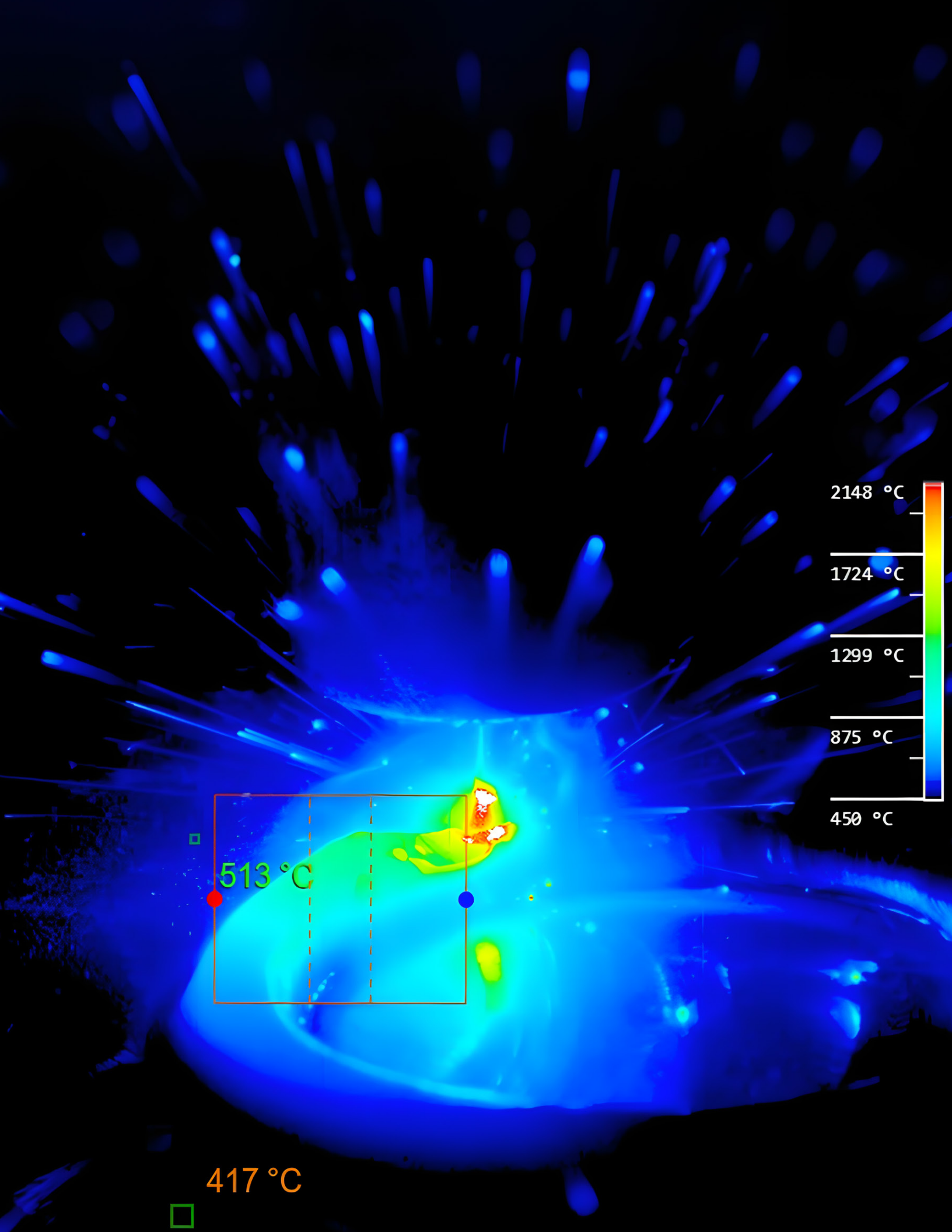
Enclosures

All One-Off Robotics cell enclosures are built for durability, portability, and safety.

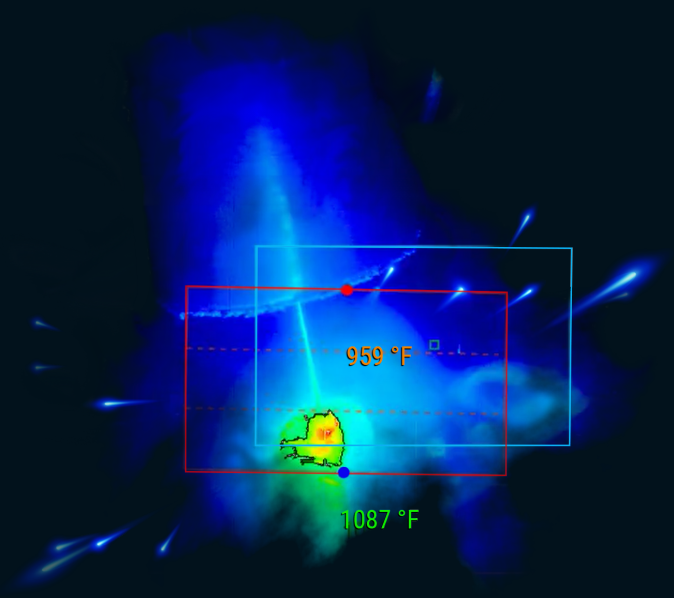
- **Reduced Footprint**
  Our smallest cell enclosure has a footprint of 8x10x8ft.
- **Portable**
  Strong but lightweight cell enclosures can be moved easily with a forklift.
- **Light Tight**
  FDA approved laser safe enclosure.
- **HEPA Air Filtration**
  All enclosures can include fume containment and air evacuation.
- **Plug-in Ready**
  All One-Off Robotics additive manufacturing cell enclosures are plug-in ready.
- **Gas Containment Systems**
  Inert bagging and argon enclosures are available
- **Trace Oxygen Sensors**
  Trace oxygen and moisture sensors are available


2148 °C
1724 °C
1299 °C
875 °C
450 °C
513 °C
417 °C

DATA COLLECTION
And Proprietary Software

Since 2018, One-Off Robotics has built and deployed proprietary software for all aspects of Robotic Metal Additive Manufacturing with a focus on data collection and processing for real-time quality control and correction.

Our systems are designed to record real-time data across a multitude of process variables to provide a thorough technical documentation package.



Single Point System Control

Our bespoke software system allows for a single point interface control ensuring programmatic recreation of parts. All One-Off Robotics technological components are controlled via the system master. This allows you to repeatedly and reliably create parts.

Closed Loop Machine Vision Analysis & Correction

Process-induced defects present a significant challenge to wide-scale industrial uptake of additive manufacturing technologies. Thermal images are collected during manufacturing and used for pattern recognition and correction, including: Interpass Temperature, Layer Height, and Melt Pool Analysis.

Post Process Quality Verification

Your part's data package can be stored for the projected lifetime of any part produced on our systems. This means as the standards are solidified we can quickly re-qualify previously printed parts.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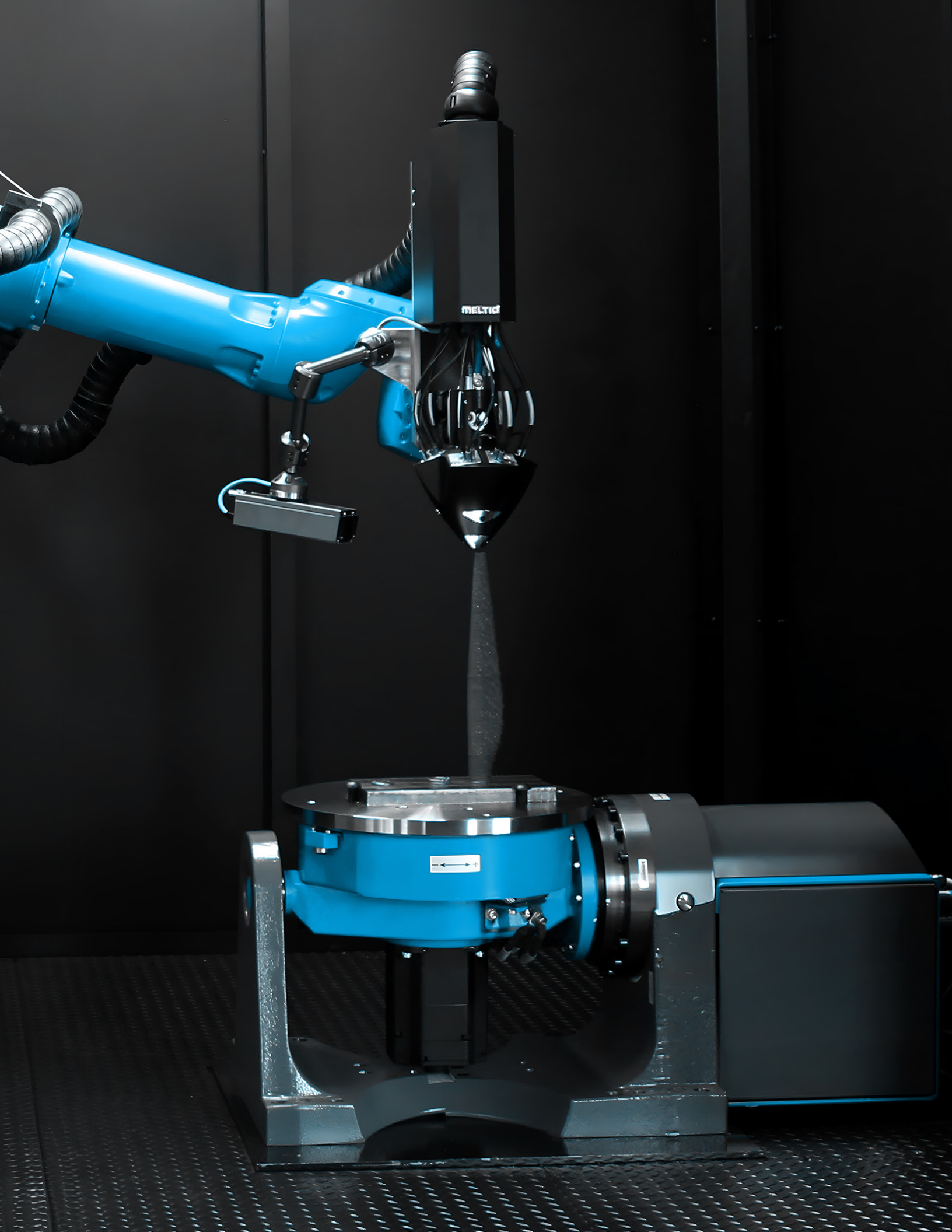

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