

Rivelin Robotics

A business has developed a robotic solution to automate the labour-intensive post-processing of additive manufacturing, making it safer, smarter and more efficient.

Additive manufacturing (AM) is the industrial production name for 3D printing. This computer-controlled process creates three-dimensional objects by depositing materials, usually in layers.

AM processes often produce a near-net shape (NNS), meaning the initial printing of the part is as close as possible in size and shape to the finished item, but it still requires post-processing to achieve the final net shape. NNS manufacturing also uses sacrificial structures to support the part during printing, which later must be removed.

[Rivelin Robotics](#) led a collaborative project between the UK and Canada called SALSA (Separation of Additive-Layer Supports by Automation & Artificial Intelligence). SALSA combines pneumatic and electro-mechanical tools to remove AM supports and surface witnesses (or build imperfections) in a wide range of metallic materials. Replacing manual removal with robotics improves people's wellbeing by reducing their risk of exposure to toxic dust like nickel and cobalt.

Rivelin Robotics founder and Chief Executive Officer Robert Bush said: "By leveraging SALSA Rivelin was able to launch its first product, NetShape, a software application to program and control metalworking robots without specialist robot programmers or pre-defined toolpaths.

"For OEMs and their supply chains that use metal additive manufacturing, Rivelin NetShape enables the automation of support removal to meet the standards of mission-critical industries."

Sheffield-based Rivelin Robotics began in 2018, centring on creating positive changes for people and the environment. For now, the company is focused on the defence, space and aerospace markets but has plans to move into the medical, low-carbon automotive and energy markets over the next few years.

In 2020, Rivelin Robotics won an Innovate UK grant of £166,011 and received investment via the Canadian Enhancing Industrial Productivity (EIP) funding competition. The company worked with the Advanced Manufacturing Research Centre (AMRC), part of the High Value Manufacturing Catapult (HVMC), and the National Research Canada (NRC) Digital Technologies Research Centre. Successful collaborations have followed.

Robert said: "Renishaw has been invaluable, collaborating with us on the SALSA project and acting as an early-stage proof-of-concept customer. Meanwhile, our Canadian

partner NRC's Digital Technologies Research Centre's computer vision team gave us a great head start on what hardware to purchase, how to set it up and what software APIs we should use. This research collaboration helped us to develop a crucial feature for NetShape, called Scan & Plan."

"Replacing manual removal with robotics improves people's wellbeing by reducing their risk of exposure to toxic dust like nickel and cobalt."

The company is now commercialising the SALSA technology through its product NetShape. Robert Bush said: "From SALSA, we launched NetShape and immediately Rivelin Robotics won its first substantial contract with a significant defence organisation to produce a demonstration unit. We have also just started working on another UK aerospace tier one contract, and have a significant USA contract in the pipeline."

Since Rivelin Robotics began, it has secured two patents, two trademarks and six design rights, resulting in company growth. Robert said: "Since securing our Innovate UK grant, we've been able to grow the company from one employee to seven from the Sheffield area."

