



# Improving Automation through Additive Manufacturing



ROBOTICS & AUTOMATION  
CONSULTATION & INTEGRATION

## THE CHALLENGE

In automation, light-weight end effectors increase the productivity of the robot, which in turn increases efficiency, reduces costs and wear and tear. The challenge is how to achieve bespoke, light-weight, cost-effective solutions, and quickly.

## THE SOLUTION

Integrating Additive Manufacturing into all engineering processes. Active8 Robots has a dedicated innovation centre with an expansive range of Additive Manufacturing technologies for rapid prototyping capabilities. Furthermore, Active8's portfolio of Markforged 3D printers enables manufacturing on demand, and avoids stockholding.

## THE RESULTS

*"The key benefit from integrating the Markforged 3D printers is the flexibility. We can begin solving any sort of problem immediately" highlights Silvia Sanchez, Marketing Manager.*

Markforged 3D printers have enabled Active8 Robots to:

- Produce lighter weight end of arm tooling and end effectors
- Reduce production lead times from 3-4 weeks to <12 hours
- Generate new business, by producing end-use components with the Markforged 3D printers that were previously too difficult and costly to achieve using traditional manufacturing methods

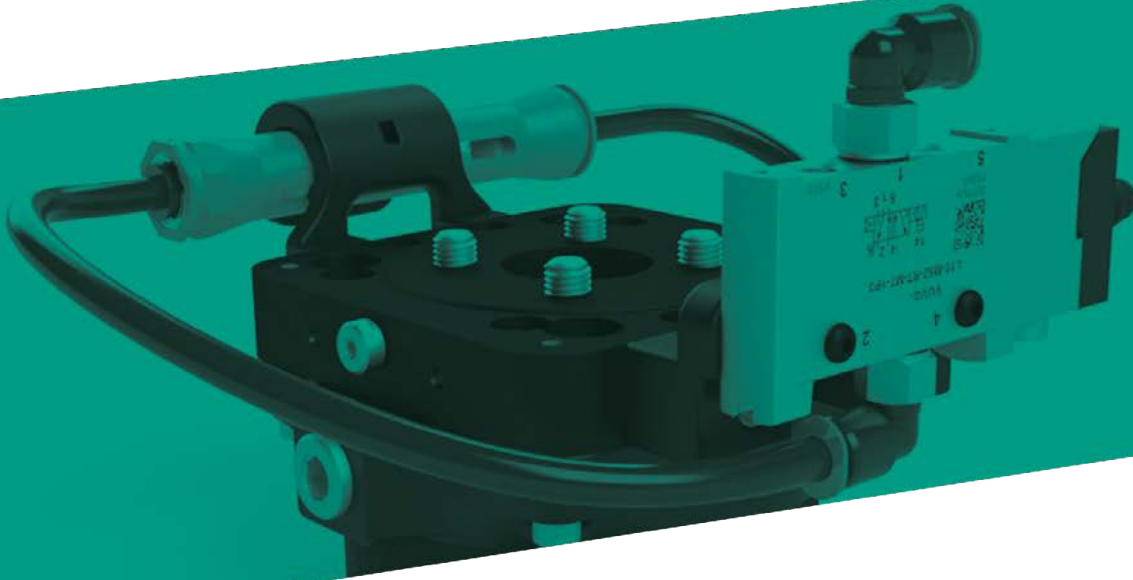
## ABOUT ACTIVE8 ROBOTS

Active8 Robots specialises in the smarter application of robotics technologies, industrial automation and system integration solutions.

Active8 Robots has strong experience in delivering solutions to a wide range of sectors including food, pharmaceuticals, defence, automotive and 3PL. Active8 Robots also works closely with some of the UK's top universities and Research & Technology Organisations (RTOs) from a Research and Development perspective.

A repetitive dexterous task, such as grabbing, lifting, picking or positioning is considered simple and easy for an able bodied human but is often too complicated and involved for a robot to achieve by itself. Active8 Robots has considerable expertise in designing and developing solutions to overcome such challenges. With an industry renowned rapid prototyping capability that can go from paper to prototype in 24 hours, Active8 Robots has provided countless iterations for bespoke end of arm tooling and adaptations to existing industrial robots and cobots.

Additive Manufacturing has become an integral part of Active8's portfolio, in particular delivering bespoke 3D printed end-use components for highly intricate tasks. These 3D printed parts have enhanced functionality, are more light-weight, have lower costs and are designed, developed, tested and produced faster than traditionally manufactured parts.



## THE APPLICATIONS

Clients approach Active8 Robots from a variety of industries, and backgrounds at different stages of their automation journey, all with different needs and objectives for adopting new or adapting existing robotic technologies.

A client may already have one or several robots but needs to adapt or customise them to perform new tasks. Others may need expert guidance on all things robotics. Active8 Robots will work with the client to really understand what they are setting out to achieve before creating a proposal that is designed to get the most out of automation.

Regardless of the application, the solution needs to be highly effective, and be generated quickly and cost-effectively. The solution will also often be uniquely tailored to carry out a particular task, so Active8 needs tools that can deliver on these aspects and that's where Additive Manufacturing is a fast, easy and low-cost fulfilment to the brief.

Furthermore, in automation, producing more light-weight end effectors increases the productivity of the robot, which in turn increases efficiency, reduces costs and wear and tear.



## THE SOLUTION

Active8 Robots has a dedicated Additive Manufacturing innovation centre, with over 12 3D printers in total including a range of FFF extrusion machines, SLA machines and three CFF Markforged Industrial and Desktop Composite 3D printers.

***"Our 3D printers are indispensable to us. They form a fundamental part of our process"***  
**explains Alan Quinn, Engineering Manager.**

The SLA and FFF machines are used for early-stage prototype and design development whilst the Markforged Industrial and Desktop machines are also used to produce end-use components to customers. These parts include conveyor guides, sensor mounts, bracketry, tooling, end of arm tooling and stabilising arms.

***"We use Onyx [the Markforged material], for massive weight reductions" explains Alan Quinn, Engineering Manager. "The quality and performance of the printed parts off the Markforged printers is excellent. Parts are strong and tough, they don't shatter under load and have superb surface quality. You have to look really closely to see that the parts are not injection moulded"***

### Active8 Robot's Additive Manufacturing Farm

- < Markforged X3 Industrial
- < Markforged Onyx Pro Desktop
- < Markforged Onyx One Desktop

## THE RESULTS

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*"We can prototype quicker, design better, produce a more refined end product and we can achieve continuous improvement"* explains Alan Quinn, Engineering Manager.

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### Faster turnaround

Additive presents a phenomenal time saving, reducing lead times to a matter of hours versus 3-4 weeks for external CNC machining.

Using 3D printers in house means that Active8 Robots can provide their clients with a superfast turnaround on idea and product development. This shortens the development loop, minimises risk and speeds up the entire process.

Designs, from initial concept, to end components are done in-house, overnight. Testing is carried out quicker, and any design changes that need to be made are effected immediately, reprinted and retested, reducing risk. This enables Active8 Robots to get it right, first time.

Furthermore, there is no need for additional purchase orders, supplier selection or supplier management, reducing the need to use external third party providers.

### Custom Solution – Manipulating Sandwiches

The development of a bread lifting tool was achieved through the use of Markforged Composite 3D printers through producing accurate prototypes for fit and test assessments, before producing the final product in Stainless Steel (due to hygiene and cleaning requirements).

The first tool is capable of lifting a slice of bread with ingredients on and quickly rotate it 180° before placing it on top of another slice of bread to assemble a sandwich. The second tool can pick an assembled triangle sandwich from a conveyor and rotate it 180° in the right position before packing it.

### Benefits of 3D printing the bread lifting tool (for skilleting cell), using Markforged X3 Industrial 3D printer:

- Reduction of 88.6% in lead time. From outsourced supply of 4-6 weeks to internal 3D print time of < 24 hours



### Light weight = enhanced part performance

Another key benefit Active8 have seen from integrating Markforged 3D printers, is a solution to a weight problem.

In automation, producing more light-weight end effectors increases the productivity of the robot, which in turn increases efficiency, reduces costs and wear and tear. As the end effectors are 3D printed, it enables the storing of a digital file only, enabling manufacturing on demand and avoids stockholding, reducing the warehousing space required and storage costs.

Often the geometry of end of arm tooling can be difficult to machine. With 3D printing, the design can be adapted to better fit the task, and in addition, it is made lighter. Using Onyx (Nylon with micro carbon fibres), Active8 Robots are able to print end of arm tooling that is hollow, yet strong.

“We use Onyx [the Markforged material], for massive weight reductions” explains Alan Quinn, Engineering Manager. “The quality and performance of the printed parts off the Markforged printers is excellent. Parts are strong and tough, they don’t shatter under load and have superb surface quality. You have to look really closely to see that the parts are not injection moulded”

The end result is often an end of arm tool that is capable of a higher pay load than the cobot itself.

### End of Arm Tooling - Foam Gripper

The functionality of an end of arm tool is key to implementing a successful automated solution. Active8 Robots’ Foam Gripper is a highly versatile tool, able to pick up multiple objects up to a weight of 10kg, thanks to a vacuum generator and solenoid built inside. The main body of this gripper is a 3D printed one-piece hollowed part, something hard to achieve through traditional fabrication methods.

“3D printing with the Markforged X3 enables us to rapidly iterate prototypes, reduces part lead times and gives us product flexibility in terms of testing variants of our designs. It reduces time and costs considerably. We highly recommend these printers” Alan Quinn, Engineering Manager

#### Alan Quinn, Engineering Manager highlights

*“Cobots have limitations on pay loads, generally somewhere between 2 - 6kg. The benefit of 3D printed end of arm tooling is that those 3D printed components are extremely lightweight, which means the productivity of a robot can be substantially increased. A huge advantage.”*



**Benefits of 3D printing the main body of the Foam Gripper against using traditional fabrication methods.**

**3D printed on Markforged X3 Industrial 3D printer:**

- Reduction of weight by 50%
- Reduction of development time from 1 weeks to 3 days
- Reduction of costs from £70 to £10 in materials



**Mobile Palletising Cell using an adaptation of the Foam Gripper**



## 3D printing as a trusted tool in every solution

Additive Manufacturing is now an invaluable and essential tool. 3D printing is used in some context on all physical projects by Active8 Robots, whether in early concept stages, design development, product testing, end solutions or end-use component and continuous development. Active8 Robots always focus on solving the problem, using 3D printing as an indispensable tool within that solution.

*"I can only ever see us investing more in Additive Manufacturing technologies" explains Alan Quinn.*

Active8 Robots have won new business, including a single project worth £35,000 through incorporating a solution with their Markforged 3D printers. The flexibility, speed and capabilities the technology has given the Engineering Team at Active8 Robots sees them remain ahead of their competition, delivering bespoke, light-weight, better performing solutions to their clients, faster.

## CREAT3D

### CREAT3D Ltd

Additive Manufacturing Solutions Provider

CREAT3D offer Additive Manufacturing end-to-end solutions including: business consultation, independent buying advice, provision of 3D printers and related equipment, tailored training packages, ongoing technical support, servicing and maintenance, repair & business continuity programmes.

520 Eskdale Road, Winnersh Triangle,  
Wokingham, Berkshire, RG41 5TU

T: 0800 689 1011 | E: info@creat3d.co.uk

W: creat3d.shop

LinkedIn: /company/creat3d-ltd

Twitter: @CREAT3Dprinters



## ACTIVE8 ROBOTS

### Active8 Robots (Active Robots Limited)

17 Bath Business Park, The Industrial Quarter,  
Peasedown St John, Bath BA2 8SF

T: 01761 234 376 | E: sales@active8robots.com

W: www.active8robots.com

LinkedIn: /company/active8-robots/

Facebook: facebook.com/active8robots

Twitter: @active8robots