

High Value Manufacturing Catapult

# How we work with SMEs



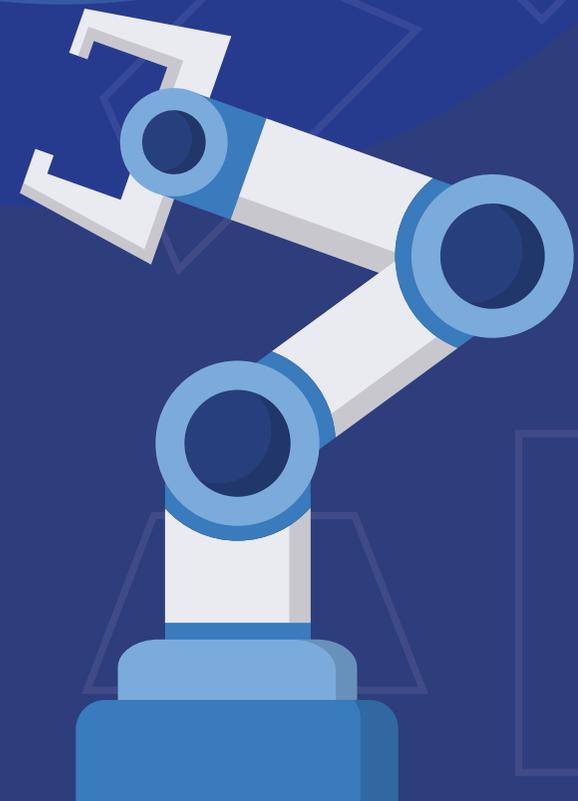
The High Value Manufacturing Catapult's mission is to create the conditions for economic growth by enabling UK manufacturers to achieve significant improvements in their performance and productivity.

We do this by providing open access to world-class innovation capability and the technical expertise that helps companies of all sizes embrace different ways of working, adopt new technologies and achieve a step-change in their performance.

The High Value Manufacturing Catapult gives you the power to improve your business performance by transforming the products you sell, the way you make them and the skills of your workforce.

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# What is the High Value Manufacturing Catapult?

The HVM Catapult is an independent research and innovation organisation, backed by Innovate UK. We're here to help turn great ideas into commercial realities by providing access to the world-class research, development facilities and expertise that would otherwise be out of reach for most businesses in the UK.

The HVM Catapult offers:



## Expertise

Access to more than 3,000 of the UK's best engineers, scientists and technicians ready to help solve your business challenges.



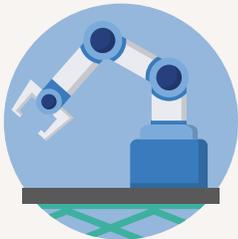
## Capability

Spanning material technologies, processing and formulation through to high integrity product assembly and validation.



## Connections

A magnet for conversations and collaborations that will shape tomorrow. We connect SMEs to the UK's leading supply chains and with government and academic support.



## Equipment

Access to the specialist equipment and technology you need to develop and test your ideas.



## Insight

Deep industry understanding and experience allows us to guide your business towards the best outcomes in a fast-changing and competitive world.



## Workforce development

Business success starts from within. We are experienced in reskilling and upskilling your current workforce. We also offer access to apprenticeships, knowledge transfer partnerships, training courses and student placements to help build and maintain the high-level skills needed to transform your business.

# How can we help your business innovate and grow?

Our ambition is to help smaller businesses become more productive and win more business. Half of our projects are with smaller businesses, helping them develop innovative new products, improve their processes, commercialise their ideas and capture new markets across the globe.

The HVM Catapult offers a range of services geared to translating great ideas from inception to a commercial reality. We offer early-stage development, access to equipment, toolkits, collaborative R&D with a consortium and more. These activities are aimed at SMEs that want to improve their productivity, reduce costs, develop new products or processes and de-risk the innovation process.



# How can we work together?

We pride ourselves on tailoring our service to each individual business.

Below is an overview of some steps we could take to understand the direction of your project and some examples of how your business can engage with the HVM Catapult experts.



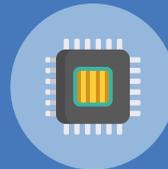
## Walk the line

We can arrange a walkthrough (virtual or otherwise) of your facility, meet your engineers and production staff and look at your business processes to help you to identify areas where gains could be made



## Consultation

We offer bespoke support and can talk through your idea in detail, drawing on expertise from across the whole HVM Catapult



## Technology workshops

We offer access to seminars and workshops to help you decide whether new technologies could offer solutions to the business challenges you face



## Innovation workshops

We can work with your team to explore how innovation could unlock the potential of your business and identify how you can bring your ideas to reality



## Funding advice

We can make recommendations on where to find finance and the best funding direction for your project

# Who do we work with?

We have worked with firms of all shapes and sizes, and from a broad variety of industries.

We offer small to medium sized enterprises tailored access to world-class equipment and teams who can apply their previous experience of working with the biggest industry players to your business.



# How much does our help cost?

There are no charges for an exploratory conversation or meeting to discuss your idea and the support you may need. From there, our teams are able to scale and shape a project to match your level of ambition and the funds your business has available. If additional funding is required to develop an innovative product or service, the HVM Catapult has strong connections with multiple funding bodies including Innovate UK – the UK's innovation agency.



The companies best suited to make use of the HVM Catapult offering will be:

## Innovative

Want to work on innovation projects that require new manufacturing solutions not (yet) easily available to your business

## Growing

Have the potential to generate jobs and growth in your business and beyond

And have access to:

## Idea

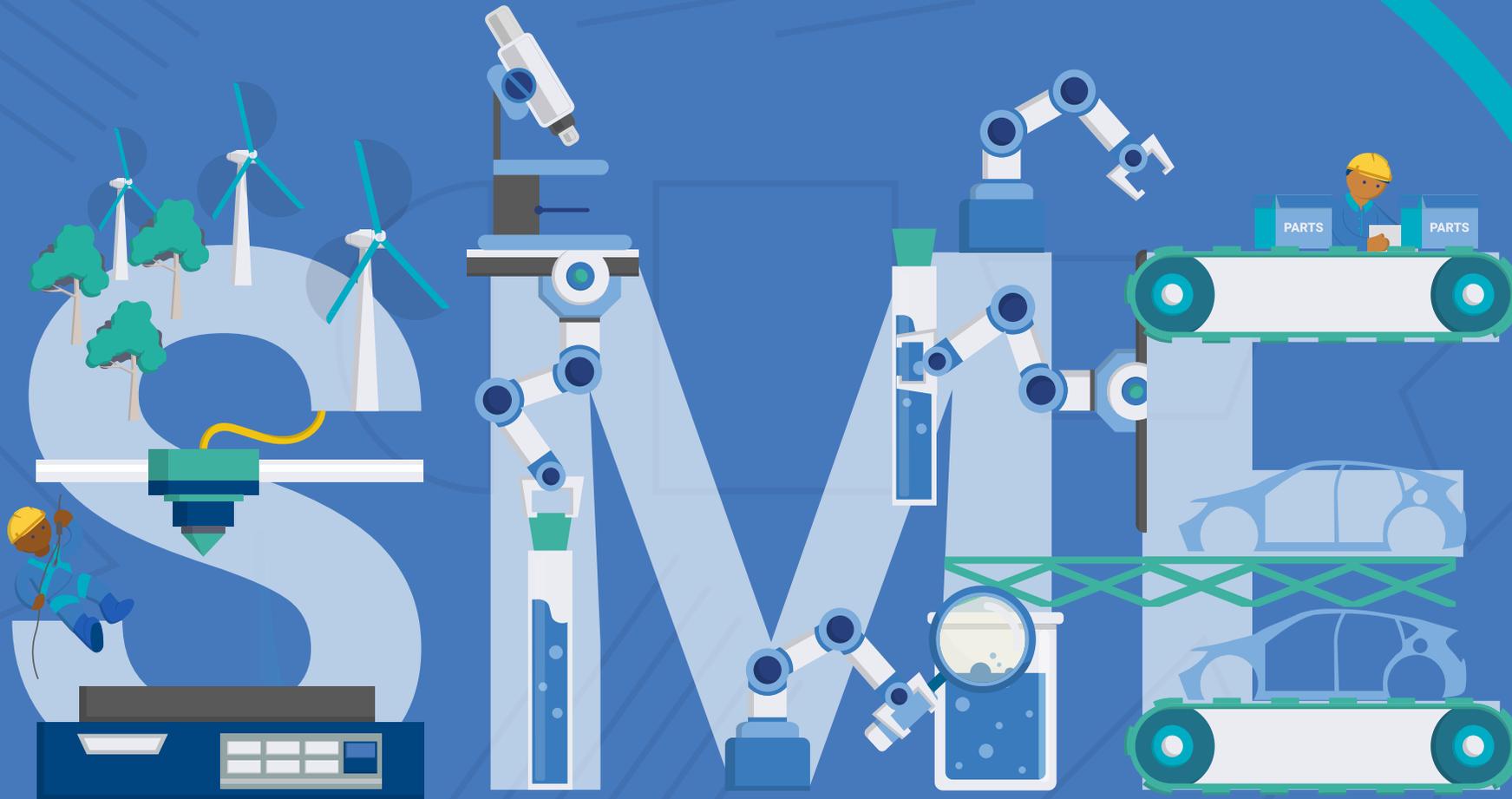
Have an idea, developed concept or prototype but need help to progress its development

## Resources

Have the technical/business resource including both time and money to commit to a project

# Access and capabilities

We have sites around the UK each offering unique technological capability. An important benefit of our network is that it provides access to the expertise and facilities of all of our centres to find the right solution for your particular needs.





Advanced Assembly



Automation



Biologics



Biotechnology



Casting



Composites



Design



Digital Manufacturing



Electronics



Flexible Manufacturing



Formulation



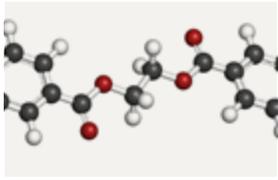
High Temperature Processing



Joining



Machining



Manufacturing with Polymers



Materials Characterisation



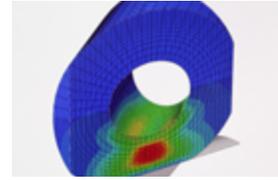
Medicine Manufacturing



Metal Forming and Forging



Metrology



Modelling and Simulation



Net Shape and Additive Manufacturing



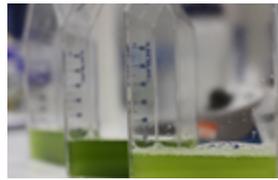
Powder Technology



Power and Energy Storage



Printable Electronics



Resource Efficient and Sustainable Manufacturing



Surface Engineering



Tooling and Fixtures



Visualisation and Virtual Reality

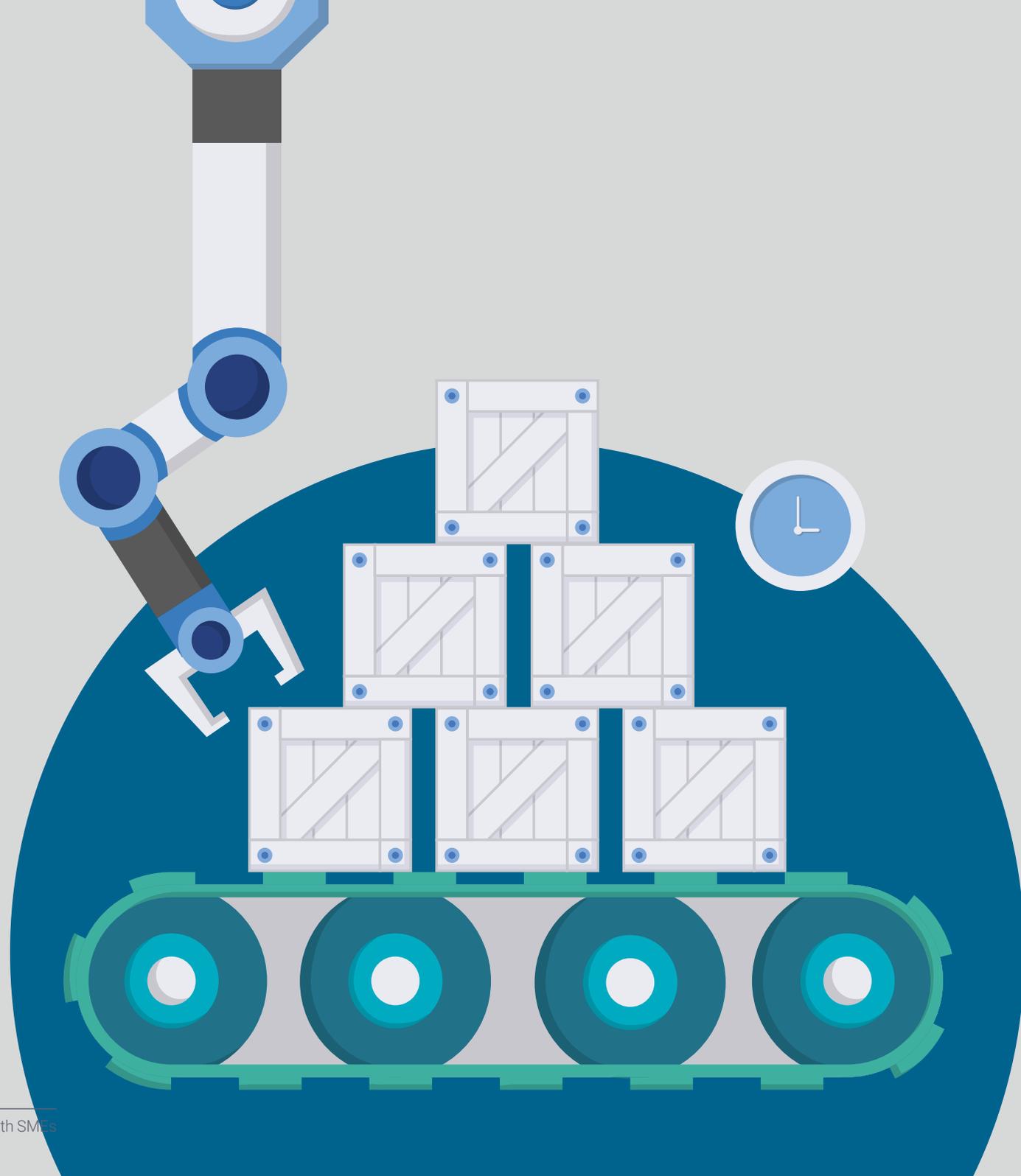
# Success stories

In the last decade, HVM Catapult has worked with more than 11,500 SMEs. Our deep sector knowledge and experience has identified a number of areas which are key to remaining competitive in the marketplace:

## Improving productivity

**For small businesses to thrive in a global marketplace you need to be offering the right products at the right quality, price and time. Harnessing new technologies can help maximise your productivity and competitiveness.**

Drawing on our experience of working with some of the biggest, most productive players in UK manufacturing, the HVM Catapult has worked with thousands of SMEs to improve productivity in operations of all types and sizes. Our team can help your business adopt new technologies to optimise everything from material handling and processing techniques to business systems.





## pragmatIC, CPI

PragmatIC is a leader in ultra-low-cost flexible electronics, which enable the potential for trillions of 'smart objects'. The business turned to our CPI team for help in fulfilling demand for applications of its new technology (FlexICs) with some of the world's largest consumer brands. CPI expedited the launch of its unique FlexLogIC® fab-in-a-box system, which allows low capital, high volume and distributed production of FlexICs.

CPI prepared the technology for mass production, accelerating its technology development and aiding the formation of robust technology methodology. Access to CPI's state-of-the-art facilities and expert knowledge was a key factor in the business choosing to base its new FlexLogIC fab-in-a-box in the North East, where CPI enabled the rapid growth of its new manufacturing team and supported its expanding business resource requirements.

The success of the project saw CPI and PragmatIC continue to collaborate on publicly funded R&D projects, carry out further research and development work and test PragmatIC's new processes.



## Pashley Bikes, WMG

Pashley, the British bicycle manufacturer, approached WMG to help them diversify their business and prepare to bid for a contract to develop the new TfL London Cycle Hire scheme.

To prove that they were the right partner for a bid, WMG's experts executed the rapid prototyping of a new bicycle design to demonstrate how metal and plastic moulded parts could be used in place of traditional materials. As well as enabling Pashley to prove the new bike design's robustness, WMG also swiftly leveraged its extensive network of UK manufacturers to anchor the supply chain for the plastic components firmly in the UK.

Completed in just two weeks, the project helped Pashley succeed in securing a five-year contract to supply the next generation of London Cycle Hire bicycles.

The success of this project was timely and has led Pashley to invest in developing their hire bike capability, with the first of many new contracts being the Edinburgh Bike Scheme.



## Chafer, MTC

Chafer Machinery, a leader in technologically advanced spraying equipment, was struggling to meet delivery times whilst maintaining a quality product with its current resources. MTC helped the business reduce build hours, increase capacity and flexibility and ensure on time delivery to customers.

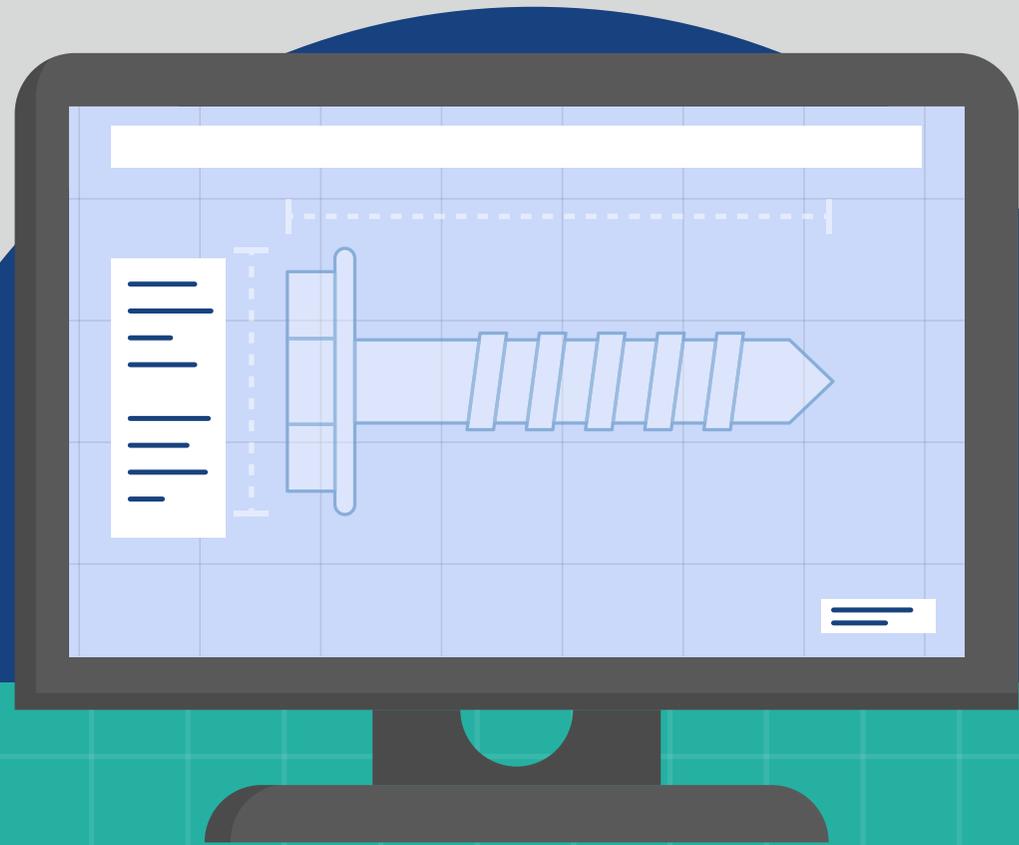
MTC optimised the factory layout and introduced a visual management system, giving staff greater visibility of the production plan. The digitisation and display of engineering requests allowed teams to monitor delivery to the customer, with deviations quickly identified and rectified.

As well as factory improvements, MTC created a specification for future investment in technology advising on what to buy and when to invest, with trials being completed to mitigate the risk of future investment. The workforce also entered an improvement programme, ensuring they were able to adapt to big changes within an already busy environment. With MTC support, the Chafer team were able to reduce staff hours per machine by 45%, and doubling turnover in two years without a significant increase in overhead costs.

## New product design

The development of new products and services is often the key to growth for any businesses, but for small businesses with limited development budgets, and even more limited time, it can feel like a risky business.

The HVM Catapult helps firms reduce the risks of new product development and supports companies through design, prototyping and testing, without the need for large capital outlay. Our expertise and facilities give firms the tools and advice they need to test and tweak new product plans before making a commitment to invest, saving valuable time and resources.





## Tzuka, MTC

Tzuka, a university start-up with a vision to create the most durable sports earphones, worked with MTC to create a shock-proof, impact resistant and operational underwater earphone for the sports enthusiast.

In the first phase of the project, MTC's Product Manufacturing Incubator provided Tzuka with a de-risked environment in which to develop and commercialise their earplugs, specifically to increase the attractiveness of the new product to investors. Its end-to-end service conducted the mechanical engineering working with Tzuka towards an advanced prototype to increase the robustness of design ready for manufacture and assembly. Tzuka was then able to make use of the sports facilities on Loughborough University's campus to conduct competitor testing and is now entering its third phase of the project with MTC.

Thanks to the work conducted with MTC, Tzuka was able to secure investment with Wilkinson Future, taking the product one step closer to commercial market reality.

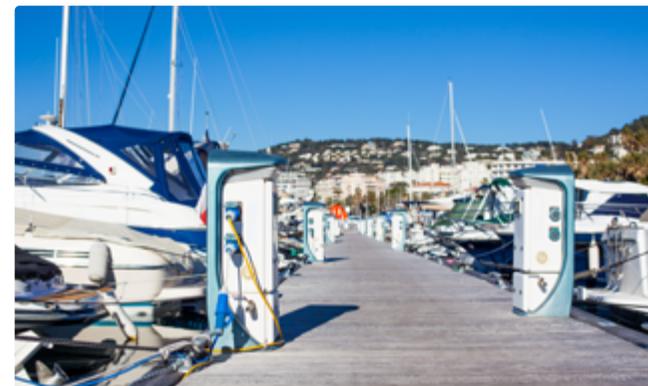


## 6IXT9, AMRC

The AMRC offered design and machining expertise to an entrepreneur developing a watch-style bracelet made from 'space glass' that has a custom, uncut diamond in its crown forming the centrepiece of a new luxury lifestyle brand, 6IXT9.

The initial concept was little more than a pencil drawing on a scrap of paper when AMRC engineers started work on turning the rough sketch into a reality. In just five days, the AMRC gave the business all it needed to progress its idea: a successful prototype design, a knowledge transfer pack including CAD designs, a suitable machine and cutting tool, and a detailed method for manufacture. The AMRC also used its expertise to carry out further investigation into UK suppliers of the Zerdour® 'space glass' material.

Since the 5-day assist programme with the AMRC team, 6IXT9 has registered for design protection in the UK and EU and is looking to take the product to the next phase of development.



## Rad Propulsion, NCC

RAD Propulsion, a business revolutionising marine electric propulsion, worked with the NCC to define the requirements for a new product line. The NCC provided a diverse team of experienced engineers to investigate potential solutions, including amending the design to aid in manufacturing, exploring alternative manufacturing processes and material options. The NCC team created a number of viable options, and then supported RAD in investigating the recommended manufacturing process.

NCC's work helped the company identify ways to drive down production costs by using less wasteful processes and improve productivity by reducing the time needed to manufacture a single part, enabling RAD to increase its production rates in the future as required.

NCC's work ultimately led to the increasing the range of the crafts that the RAD propulsion system is integrated with, opening the business up to new opportunities and markets.

## Supply chain management

Recent changes in border access and rules, as a result of the COVID-19 pandemic and wider political shifts, have exposed the fragility of many global supply chains. The HVM Catapult is experienced in developing resilient supply chains and supporting the reshoring of key current supply chains by providing the technological efficiencies that make domestic production globally competitive.

The HVM Catapult can enable SMEs to become more responsive to the demands of operating successfully in these supply chains, as well as making sure that smaller firms can leverage the opportunities presented by a fast-moving supply chain situation.





## Albert Jagger, MTC

Albert Jagger, a vehicle hardware supplier, approached the HVM Catapult's MTC to help in re-shoring production of a product range that had previously been outsourced to China.

MTC helped the company evaluate the financial, performance, technology and training issues associated with profitably re-shoring products, optimising the factory layout and introducing new technology into the workshop. A team of 11 engineers created a bespoke solution and approach that suited the needs of the firm and supported the company through implementation. The MTC used VR and AR (virtual and augmented reality) technology to help the Albert Jagger workforce immerse themselves into the potential future-state, helping to devise the best factory layout for working together as a team.

Albert Jagger successfully created an agile facility and resilient supply chain and has been able to produce the product range for 20%-50% less than the cost of purchasing from overseas. They have also been able to reduce their stock-holding costs by 50% and have optimised their factory layout and technical equipment for future growth.



## Fit for Nuclear and Offshore Renewables, Nuclear AMRC

The Nuclear AMRC's Fit For Nuclear (F4N) programme is now established as the benchmark for manufacturers wanting to win work in the nuclear supply chain.

F4N is a unique service to help manufacturing companies assess and develop their readiness to bid for work in the nuclear supply chain. Developed with the support of leading companies in new build and decommissioning, F4N lets companies measure their operations against the standards required to supply the nuclear industry and take the necessary steps to close any gaps.

Around 120 companies have been granted F4N, collectively reporting a total of £75m of new nuclear contracts and £1.1bn non-nuclear contracts won.

Building on this success, the Nuclear AMRC is working with the Offshore Renewable Energy Catapult to bring supply chain development to the wind sector. The Fit 4 Offshore Renewables (F4OR) collaboration was piloted in Scotland in 2019 and is set to deliver the targeted support needed to keep wind sector jobs in the UK.

**Albert Jagger successfully created an agile facility and resilient supply chain and has been able to produce the product range for 20%-50% less than the cost of purchasing from overseas**



## Skills

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Every day the HVM Catapult has the privilege of working with ambitious small and medium sized businesses with a real appetite to innovate and explore new technologies. We understand that having the right talent is vital to getting the best return for that investment, from shop floor production line workers to leadership teams with the capability and confidence to turn good ideas and strategies into viable, deliverable plans. Because we know that all that too often vital skills are in short supply we have made workforce development and knowledge transfer a key part of our offer to your business.

The HVM Catapult is focused on creating a workforce fit for the future. SMEs can benefit from attending HVM Catapult workshops and conferences, engaging with tailored training programmes specific to the technologies being implemented in your business or simply from working side-by-side with our experienced teams.



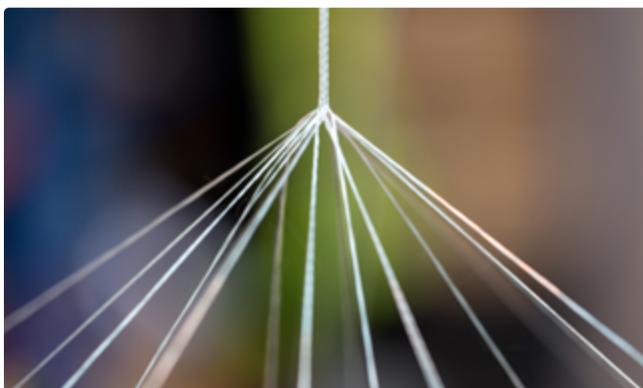


## Raybloc, MTC

Raybloc, a major manufacturer and installer of high-quality radiation protection products, had seen order times lengthen inhibiting the growth of the business. The firm's management team turned to the MTC to help them become more responsive and in turn increase its turnover.

The MTC created and supported Raybloc through a development journey to achieve the goals of the business. With the aid of digital tools and up-skilling the team, productivity was increased, and overtime order times reduced by improving visibility and developing accountability in operations. MTC also provided guidance on suitable technology options and the best timing and method of adoption.

Raybloc achieved greater accountability and defined roles and responsibilities for the leadership team. The workforce saw a 50% reduction in lead time from 16 to 8 weeks, reduced production costs by 10% and increased revenue by 10% thanks to their newly competitive lead times.



## Heatsense, Nuclear AMRC

Heatsense, the UK's leading manufacturer of high-performance thermocouple and signal cables for extreme environments, wanted to become a specialist provider to demanding sectors such as nuclear and reduce barriers to new markets under a new and ambitious management team.

The Nuclear AMRC worked with Heatsense through its Fit for Nuclear (F4N) programme, which helps companies prepare to bid for nuclear work. The Nuclear AMRC's industrial specialist advisors improved the firm's health and safety culture, supported the introduction of lean manufacturing methods, and developed digital processes on individual production lines to improve efficiency quality and throughput rates.

After being granted F4N status by the Nuclear AMRC, Heatsense has bought an additional plant and equipment, expanded its manufacturing capabilities, employed more staff, and won a number of new high-end customers. With increased leadership skills, the business also successfully delivered its first bespoke order for a nuclear client within one week of the first enquiry, compared with a four-week industry norm.

With the aid of digital tools and upskilling the team, productivity was increased and order times reduced.



## Digitalisation

COVID-19 has made many firms think about how digital tools might make their business more resilient as well as more efficient. The HVM Catapult's SME team can help you explore the potential of digital technologies for your business. From online work instructions which can be delivered through Augmented Reality (AR) technologies, to RFID (radio-frequency identification) tags to help track stock movements, digital technologies provide opportunities for safer, more efficient working.





## Footprint Tools, AMRC

Robotics and automation offer huge opportunities for firms to improve productivity levels. All too often, smaller firms hold back from investigating their potential fearing that benefits will come with a high price tag. Footprint Tools has shown that need not be the case.

The 150-year-old Sheffield firm has been in the Jewitt family for four generations and had enjoyed huge success during the hey-day of coal and steel. But the low-wage economies in the Far East, the collapse of coal and steel and the 2008 crash brought Footprint Tools to the brink of closure. To fight back they turned to the AMRC.

The result is a robot cell producing their staple product - the humble builder's line pin. Freeing up two skilled workers for other tasks, the company now fulfils orders three times faster than before – a massive impact on an SME like Footprint Tools.



## Helson And Jackets, NMIS

Helson and Jackets, an award-winning media art and design company making video installations and productions for film and TV, approached the AFRC to validate a number of design decisions for their 'io' projector that suspends 3D holographic images in space.

Funded by a Scottish Funding Council Innovation Voucher, an experienced modeller from the AFRC's team used 'Finite Element' (FE) modelling to test the projector under a number of different conditions. The FE modelling approach helped reduce the number of physical prototypes and experiments needed during the product design phased and helped show how the design would behave in real-world conditions.

The collected data addressed the challenges of each design and helped Helson and Jackets avoid wasting time and resources pursuing options that would not deliver. The AFRC's work with the company accelerated the design process and gave the firm the confidence that the io projector would perform both safely and effectively.



## Hobsons, WMG

The loss of empty beer barrels has eaten into the profits of the UK's brewers for many years. Shropshire firm, Hobson's Brewery wanted to improve its tracking of beer casks on route to customers and improve their stock control, and aged status of the brews to increase asset utilisation and profitability.

The HVM Catapult's WMG SME team worked with the company to develop a 'smart' beer cask track and trace solution which delivered real-time alerts, status, tracking, traceability and asset management reports and a smartphone-ready 'Near-Field Communication' (NFC) robust enough to withstand a brewery environment. They also provided the Hobsons team with a proof of concept software application to visualise the location data.

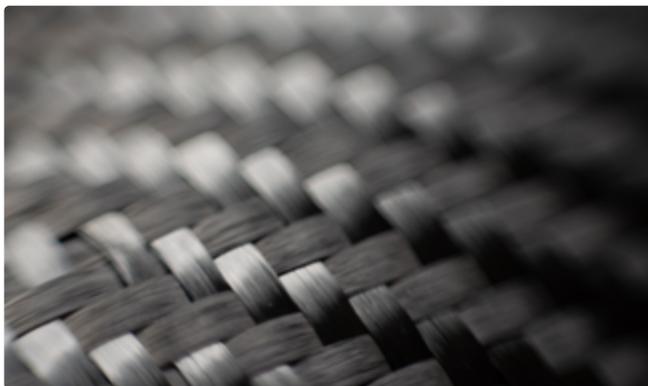
Thanks to WMG's work, Hobsons Brewery are able to manage its stock much more effectively, reducing working capital by 20%. The project also allowed the firm to understand its supply chain better and dynamically reconfigure based on supply and demand. Building on this project, Hobsons started a new data analytics business, securing new customers including major brewers and manufacturers.

## Sustainability

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The UK Government has set an important but challenging target for the UK to reduce its net carbon emissions to zero by 2050 in order to combat the threat of climate change. Businesses of all sizes have a vital role to play and there are significant opportunities for those looking to put sustainability at the heart of their business strategy, provide new, net zero-capable products and use sustainable materials and processes. The HVM Catapult has great experience of working with smaller firms to improve their environmental impact, win new customers and thrive in the competitive domestic and global marketplace.





## ELG Carbon Fibre, ncc

The NCC and ELG Carbon Fibre Ltd started work together to demonstrate a sustainable, commercially viable, circular economy for the composites industry, leveraging the NCC's experience with composite materials.

At present only 15% of all composites produced in the UK annually are reused or recycled. While commercial recycling methods such as ELG's exist, lack of awareness and confidence in these materials currently limit wider adoption in industry. Through the partnership with ELG, the NCC has proven and showcased the use of recycled fibres in a number of different applications from battery enclosures through to bogies. The intent is to develop interconnected and communicative supply chains to accelerate industry growth for sustainable composites.

NCC is currently engaged in a project with ELG exploring alternative recycling routes and is developing enabling technologies that are sector specific to further eliminate barriers to adoption and stimulate market demand.



## Nuclear Energy Components, Nuclear AMRC

Nuclear power offers huge potential deliver the low carbon energy that the world demands. Nuclear Energy Components, which specialises in metal components for the nuclear industry, turned to the Nuclear AMRC to develop environmentally friendly machining techniques to reduce the cost, lead time and risk of high-value nuclear components.

The year-long project, called Process Improvement Through CO2 Cooling (PITCO2C), is funded by the UK government's Nuclear Innovation Programme, and builds on previous projects led by the Nuclear AMRC with early research funded by the High Value Manufacturing Catapult.

As well as supporting business-critical items such as a financial modelling tool, NEC worked with the Nuclear AMRC to develop a prototype system which will allow supercritical CO2 coolant technology to be retrofitted to legacy machine tools, removing barriers to adoption for SMEs. While the project is ongoing, research to date suggests technology could reduce machining costs by half.



## Evavi Bikes, CPI

Start-up Evavi Bikes Ltd worked with CPI to innovate the design and build of its high-end, high quality composite e-bikes with the aim of accelerating the product towards commercialisation.

Through the IMPACT project, Evavi Bikes began their partnership with CPI in 2019 to explore how graphene could be used to strengthen the frames of its e-bikes. CPI's expertise in securing funding was leveraged to obtain grants from the European Union and regional governments, and CPI then began a project to develop a graphene formulation that could be successfully introduced to the carbon fibre epoxy resin bike frame.

CPI carried out the proof-of-concept and feasibility study, identifying areas where further development work was required and greatly accelerating the route to market for this innovative e-bike.

## FAQs and contact details

### Where do I start and how do I get in touch with the HVM Catapult?

Simply email [SME@hvm.catapult.org.uk](mailto:SME@hvm.catapult.org.uk) with an outline of your business needs, and our team will get in touch for an introductory, no obligation consultation.

### What technology support do you offer?

We have capability in a wide range of technologies that can help manufacturers improve their productivity or develop new products and processes. Page 7 of this guide gives you an at-a-glance view of our capabilities

### What industries do you cover?

With access to around 3,000 people working at centres around the UK and specialists dedicated to supporting SMEs to access this capability, we're here to help businesses of any size and from across every manufacturing sector.

### Where can I find out more about the HVM Catapult?

You can find out more about the work we do with SMEs through our website [hvm.catapult.org.uk/SME](http://hvm.catapult.org.uk/SME)

#### HVM Catapult

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