

High Value Manufacturing news
Issue 03

CATAPULT
High Value Manufacturing

HVM CONNECT



WMG:
The power to move Page 8

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WELCOME TO HVM CONNECT

Your bi-monthly high value
manufacturing update



Rosa Wilkinson
HVM Catapult
Communications
Director

It may be some years since I left formal education (OK, decades), but despite that early Autumn still retains a start-of-the-year feel. Although the leaves are already on the turn, there's somehow something fresh about this season that bids me to roll up my sleeves and get active. In the light of recent announcements that may be no bad thing. In August the Chancellor confirmed our continued funding for the next 5 years – an investment that reflects Government's confidence in the work we do. Now the pressure is on for us to repay that confidence and deliver.

This month's edition of HVM Connect tells you about some of the recent developments in our network that will help us to do that, from the new Manufacturing Incubator at the MTC to the world's most advanced hot forging research platform at the AFRC in Strathclyde. We also turn the spotlight on the amazing work going on at WMG Catapult that will transform our experience of getting about – it's certain to make you think when you next get into a car. Looking to the future, a guest column from our CEO, Dick Elsy, looks at what the next five years will bring and how the HVM Catapult team, through all its centres, will be working to give the UK the confidence to face what could be a challenging future. With daily reminders in our press about the trials and tribulations we may face, I think we'll all be rolling our sleeves up.

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Facing the Future with Confidence



Dick Elsy CBE
Chief Executive Officer
High Value Manufacturing Catapult

In 2011, the UK economy was in the doldrums. International business confidence was low with IMF chief, Christine Lagarde, warning of a 1930's-style slump. Against this gloomy backdrop, the High Value Manufacturing (HVM) Catapult was created, pulling together seven UK centres of technology excellence to take on a shared mission to deliver a sustainable high value manufacturing future for the UK. Its goal was to accelerate new concepts from the research base into commercial successful realities.

Seven years on and the appetite for the HVM Catapult's capability continues to grow. Today, the HVM Catapult sits at the fulcrum of the relationship between our research community and innovation-hungry businesses. It is reaching more and more diverse manufacturing businesses. It is increasing their confidence to invest in innovation. It is connecting them with the concepts, expertise and equipment they need to turn that investment into growth. It is bearing down on the spectre of persistent low productivity levels to improve the bottom line performance of companies across the land and, in turn, increasing the prosperity of their employees and local communities.

In August, the value of our offer to UK manufacturers – and in turn the wider economy – was recognised when Government confirmed continued funding for our work for the next five years. That funding, which represents about a third of the HVM Catapult's total income, will allow us to build capabilities in areas where there are opportunities to be seized, risks to

be managed or improvements to be made by UK manufacturers - digital manufacturing; robotics and automation; materials processing and new materials; process engineering, biotechnology and biologics; and product design and verification. All are areas where UK manufacturers have told us they need the sort of support we offer before they have the confidence to invest in turning the great ideas bubbling up from our research base into world-beating, market-leading goods and processes.

You will also see us driving activity in areas where we already see great opportunities for the UK, in particular:

- Increasing the uptake of digital and automation technologies to increase UK productivity and global competitiveness
- Establishing the UK as a global leader in additive manufacturing
- Making sure that the UK has a presence in the manufacture of the next generation aircraft wings and aero propulsion.
- Increasing the uptake of automation to create a more productive food and drink sector
- Developing and commercialising the technology for vehicle electrification to help government achieve its carbon reduction and emissions targets
- Establishing a UK nuclear supply chain creating sector market share, jobs and growth in the UK
- Modernising UK construction practice and developing an affordable construction supply chain
- Creating growth in the UK pharmaceutical and healthcare sectors by increasing efficiency and developing new products and processes
- Enabling the shift from petrochemical based products to products and ingredients that are derived from sustainable bio-mass
- Increasing the UK's share of the through-life services market by better integrating design, manufacturing and through-life performance
- Developing and commercialising the technology for vehicle autonomy
- Improving the competitiveness and resilience of the UK defence sector delivering better value for money for the taxpayer.

Continued on page 4

We also want the work we do to contribute to the long-term health of our planet. We are working on some game changing technologies which support the wider Green Growth agenda. Many of our developments naturally reduce the amount of energy and resources used for manufacture. As we slash production time, we automatically slash production energy and other production resources like water. It feels like a natural part of what we do, but it's only a part of the story. Few are more straightforward to grasp than the mass electrification of the car fleet in the UK. The HVM Catapult is central to the development and scale-up of battery technology which will be used on our cars and for energy storage as we push to de-carbonise the UK power and transport sectors. The article from WMG, one of our seven HVM Catapult centres, on page X tells you more about the work we're doing.

In the Industrial Strategy it published last year, Government made plain its commitment to raising the level of UK research and development (R&D) from 1.7% of GDP to a level closer to the OECD average of 2.4%. That can't happen unless our manufacturers are fully involved. In the UK, 68% of current R&D investment hails from manufacturing, so manufacturing must be at the heart of action to boost investment further. We help to make that happen by heightening investment confidence. In our first 6 years of operation the HVM Catapult generated £1bn of new R&D in the UK. In the next five years we want our work to increase that investment by £2bn more and to increase the value our manufacturers get back from innovation whether that's through increased productivity or growing market share.

Ultimately the work we do at the HVM Catapult is about giving the UK the confidence to face a challenging future: whether that challenge comes from fiercely competitive markets, from the need to solve difficult engineering problems or from a desire to build prosperity and protect our environment. In our early years we've shown that we've got what it takes to help UK manufacturers meet those challenges. The next five years will see us making an even greater contribution, driving up the UK's investment in R&D, giving businesses the tools to boost their productivity and attracting the high value international investment that benefits communities across the UK. The High Value Manufacturing Catapult will be part of a bright future for UK manufacturing.

[Keep watch on our activity through HVM Connect.](#)

CATAPULT

High Value Manufacturing





MTC Manufacturing Incubator opened by Chancellor

A ground-breaking 2,500 sq ft product manufacturing incubator on the Manufacturing Technology Centre (MTC) campus at Ansty Park in Coventry has been officially opened by the Chancellor of the Exchequer, the Rt Hon Philip Hammond as he announced £780 million extra funding for innovation and technology.

The Sopwith Building is set to provide a ground-breaking facility to help start-ups and entrepreneurs bring innovative products to market.

Unveiling a plaque within the building, the Chancellor said: "This new incubator will help start-ups turn their ideas into reality. By backing this centre with £122 million funding we are supporting Great British innovators to create the technologies of the future and boost productivity".

The three-storey Sopwith Building will provide incubation cells for start-ups to develop and manufacture prototypes of their innovative products. They will have access to the MTC's world-class advanced manufacturing and research facilities, as well as the MTC's team of engineering and manufacturing experts.

MTC's Strategic Development Director Neil Rawlinson welcomed the announcement, "we are able, with this new building, to provide a de-risked environment for start-ups with the support of our product development team from concept to manufacture. Through the MTC's membership we can give young companies the opportunity to draw on the wider manufacturing community to create a successful and sustainable business. Our knowledgeable team offers an end-to-end service to reduce the stress of bringing a product to market".

Strathclyde secures £16.5 million funding for major new advanced engineering facility to revolutionise the global hot forging sector

FutureForge, funded by the UK Aerospace Research and Technology Programme, Scottish Enterprise and the Advanced Forming Research Centre's (AFRC) High Value Manufacturing Catapult funding, will adjoin the world-renowned Renfrewshire-based centre and will revolutionise the global hot forging sector.

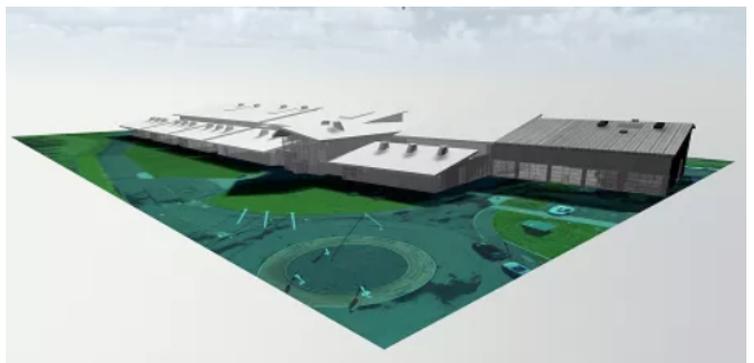
Set to begin operating in 2020, FutureForge will be the world's most advanced hot forging research platform and will include a one-of-a-kind, industry 4.0 ready, demonstrator.

It will see the AFRC work with companies in the aerospace, automotive, oil and gas, energy, nuclear and rail industries helping companies to increase their global competitiveness. The facility will help generate around £40 million of new collaborative R&D projects over 10 years, creating up to 34 new jobs.

Speaking about the announcement, Scottish Government's Minister for Trade, Investment and Innovation Ivan McKee said: "I'm delighted to see this latest development for the AFRC. The new facility will put Scotland at the forefront of the latest industrial revolution, helping some of the most traditional manufacturing businesses and their supply chains embrace the latest in digital technologies. When I visited the centre last month, I was able to hear first-hand how the funding will be invested to develop this world leading technological capability.

"Today's news follows our announcement either months ago that we are investing in a £65 million National Manufacturing Institute for Scotland (NMIS) in Renfrewshire, also in partnership with the University of Strathclyde. This latest project by the AFRC in the region highlights once again the importance of Scotland as a centre for cutting-edge manufacturing technology, and demonstrates our world leadership ambitions".

[Click here to read the full story](#)



Games tech at the heart of AMRC app created for Steel Man project



The 'Heart of Steel' has been created to raise money to build that landmark sculpture – with people donating to the Steel Man project to have a name etched on to the 2.4m heart, which weighs in at just over one ton.

The heart is destined to sit inside the Steel Man, which will be a soaring 32m landmark sculpture planned for a former landfill site overlooking the M1 and Meadowhall, serving as beacon to honour the people and places behind the area's steel and coal heritage, and a symbol of the advanced manufacturing sector.

The team behind the iconic project want visitors to be able to see exactly where those names are engraved so they turned to engineers from the AMRC's Integrated Manufacturing Group (IMG) to develop an interactive, touchscreen app that would let people do just that.

It has been created using the latest games engine technology which, with some clever coding, allows visitors to pinpoint the precise location of a name. It was developed by Michael Lewis, Digitally Assisted

Assembly Technical Lead for the IMG, and Charlie Conte, a computer games and programming skills student from Coventry University on a work placement with IMG.

Michael and Charlie flexed their creative muscles to design an app that visually reflects the project's industrial roots, showing the Heart of Steel dominating a factory floor with blazing welding sparks firing from behind workshop screens that surround the impressive structure, bringing the scene to life for users.

The app has a smart function built in that allows users to view a film about the project and watch some of the emotional heart-wrenching stories from those who donated to the appeal in memory of a loved one. It also lets visitors learn more about the AMRC, the British Heart Foundation and how to engrave a name and make a donation.

Michael said: "The application we have built is tablet-based and sits on a pedestal in front of the akingheart so a person can come along, type in a name and the app will animate through the heart and zoom in to where that name is engraved on a particular panel so the person knows where it is on the actual heart.

"The way we did this was by getting a 3D CAD model of the heart and importing it into a games engine called Unity and programmed the functionality to tie it to the names and then gave it the ability to animate when you type a name and the intelligence to be able to do that. We have essentially made a mini game".

It is made up of 135 individual panels set to be engraved with 150,000 names chosen by people who donate to the appeal, with ten per cent of all donations going to the British Heart Foundation to fund lifesaving research.

[Click here to find out more about the project](#)

Making the most of a disruptive twin report

An explosion in information streaming capability and cool-to-wear immersive technologies will have a hugely disruptive impact on global manufacturing over the next five years, according to a new report launched at the world's most influential media, entertainment and technology show, the IBC, in Amsterdam.

The new report, Feasibility of an Immersive Digital Twin, which is published by the UK's High Value Manufacturing Catapult (HVM Catapult), was produced by a team of researchers within the HVM Catapult who work at the cutting edge of manufacturing digitalisation, with a special focus on augmented reality and digital twins.

"Our report is the second in a series of studies that takes a forensic look at how immersive technologies, including augmented reality and digital twins, could

dramatically change manufacturing around the world," says Sam Turner, Chief Technology Officer at the HVM Catapult.

"We know the digital twin market is going to grow to over \$15 billion over the next five years, and that much of this growth will be in manufacturing applications. Here in the UK, the HVM Catapult is not only making industry aware of the opportunities that these technologies open up, but also supporting them in developing the capability to exploit these technologies to the full.

"This opportunity includes the development of new business models with remote monitoring of equipment driving a move towards servitisation. It is also expected to speed up the rate of new product introduction, as better insights into how products are being used become more accessible."

[Click here to read the new report, Feasibility of an Immersive Digital Twin here.](#)

Industrial energy efficiency and decarbonisation in the UK

Innovate UK
Knowledge Transfer Network

Jenni McDonnell & Ben Peace, *The Knowledge Transfer Network*

The way we supply and manage our energy services is changing driven by the welcome and ever-increasing focus on Clean Growth, affordability and customer needs.

As the Industrial Strategy makes clear, the move to cleaner economic growth – through low carbon technologies and the efficient use of resources – is one of the greatest industrial opportunities of our time. By one estimate, the UK's clean economy could grow at four times the rate of GDP. Whole new industries will be created, and existing industries transformed as we move towards a low carbon, more resource-efficient economy. That's why the Industrial Strategy has identified clean growth as one of the four 'grand challenges' that must be addressed if we're going to put the United Kingdom at the forefront of the industries of the future.

In 2017 the Department for Business, Energy and Industrial Strategy (BEIS) received £100 million for innovation projects which will develop and demonstrate ways in which industry could maintain production levels whilst reducing energy demand through the application of diverse new technologies like waste heat recovery, use of low carbon fuels and energy efficiency equipment associated with the industrial process itself.

The Knowledge Transfer Network is playing a leading role in promoting funding opportunities for new projects and supporting the development of suitable collaborations and partnerships. Here is how the funding will be allocated:

Industrial Energy Efficiency Accelerator - £9.2m – OPEN

Do you have an energy reduction technology concept that is ready to be demonstrated in industry? Are you from a forward-thinking industrial site that could be interested in demonstrating an innovative new technology that will reduce your energy costs?

If the answer to either of these is yes, then the Department of Business, Energy and Industrial Strategy's £9.2 million Industrial Energy Efficiency Accelerator (IEEA) could be of interest to you.

BEIS lead Phil Cohen

Industrial Carbon Capture and Utilisation Demonstration - £20m - Opens Autumn

As part of the government's Clean Growth Strategy BEIS has allocated up to £20 million to design and construct carbon capture and utilisation (CCU) demonstration projects. This programme is designed to encourage industrial sites to capture carbon dioxide which could then be used in industrial applications, while enabling learning and development of capture technologies at an intermediate scale, so reducing costs and risks.

BEIS lead Solmaz Parsa

Industrial Carbon Capture Utilisation and Storage Innovation - £15m – OPEN

On 31 July 2018 BEIS launched a £15 million Call for CCUS Innovation to offer grant funding for innovation projects that lead to:

- a significant reduction in the cost of capturing and sequestering carbon dioxide; &/or
- a quicker, more widespread deployment of CCUS in the UK and internationally

The innovation programme funds the development of new technologies for carbon capture and storage or carbon capture and utilisation. The programme is aimed at innovations at Technology Readiness Level 4-6 for Industrial research or Experimental development. Applications close 11th November 2018.

BEIS lead Nick Bevan.

Hydrogen Supply Demonstration - £20m - Opens Autumn

The £20 million Hydrogen Supply programme aims to accelerate the development of low carbon bulk hydrogen supply solutions in the above sectors. It is aimed at projects at a technology readiness level of 4 to 7, which could result in lower capital or operating costs when compared to Steam Methane Reformer with Carbon Capture & Storage, or improve the capture rates at a comparable cost.

BEIS lead Phil Cohen.

Industrial Heat Recovery - £18m - Opens September

In addition to the £100m funding from the Industrial Strategy BEIS has also committed a further £18m through their Heat programme to support the manufacturing industries to recover and use their waste heat.

The Industrial Heat Recovery Support (IHRS) Programme was launched in July 2017 and will open for applications in Autumn 2018. The aim of the IHRS is to increase industry confidence to invest in technologies to recover heat from industrial processes and to increase the deployment of such technologies in England and Wales.

BEIS lead Mithila Manage

If you have any questions about the funding opportunities or would like help to find suitable partners for your projects please contact Jenni McDonnell of the Knowledge Transfer Network (jenni.mcdonnell@ktn-uk.org).

[To keep up-to-date with funding opportunities sign up to KTN's newsletters here](#)

[Visit the KTN website here](#)



WMG: The power to move



Do you drive an electric car? Does it have internet access? Can it squeeze itself into small parking spaces without making you break into a sweat? 20 years ago, the answer would almost certainly have been 'no'. Even 10 years ago, when there were some electric cars on the market, the answer was 'probably not'. Today, even if the answer is still no, the likelihood is that you expect that a future vehicle you drive will have all of these features.

Recent years have seen a surge in demand for electric vehicles, EVs, in the UK – new registrations of plug-in cars increased from 3,500 in 2013 to more than 166,000 by August 2018. And the number of pure-electric and plug-in hybrid models available in the UK has ballooned with many manufacturers now offering a number of EVs as a standard part of their model range.

What we see here is being repeated around the world. The global market for EVs and plug-in hybrid vehicles was estimated to be £58bn in 2017, and is growing fast. Predictions that EVs will become as affordable as conventional cars by 2022, will trigger a further boom in demand. All of this provides increased opportunities for the UK supply chain, around EV battery manufacture, power electronics and electric machines and drives.

But it's not quite as straightforward as that. If the UK is to seize those opportunities, it's also needs to put in place an environment which works for EVs: charging infrastructure, domestic charging solutions, and second-life and recycling options for automotive batteries. Big challenges which the WMG, the lead centre for Vehicle Electrification and Connected and Autonomous Vehicles, is working to address. The

WMG team is also active in showing how digital manufacturing technologies can help improve supply chain health as it drives towards the goal of improving the competitiveness of the UK automotive sector at a time of significant change in the industry.

WMG's vision is to develop and enhance the UK's automotive manufacturing capabilities to enable the development of cleaner, safer and smarter vehicles – WMG has coined the phrase 'Low Emissions Mobility' to explain the concept which aligns with the Government's recently announced 'Road to Zero' strategy which aims to make road transport emission-free by 2050.

WMG delivers this vision by working with UK-based manufacturing companies and their supply chains to help them innovate to overcome existing challenges and develop new technologies. The team serves businesses of all shapes and sizes. Between 2012 and 2017, WMG's dedicated SME Group supported 789 businesses. The results speak for themselves: the projects either created or protected some 240 jobs and added around £55m in value was added to the West Midlands economy.

The expertise and value WMG brings to the success of the UK's automotive companies is recognised within Government and across industry. Its track record and reputation for delivery has seen the team win significant funding competitions from Innovate UK and take on roles as the Electrical Storage Spoke of the Advanced Propulsion Centre and as a principal collaborator in the development of the new Faraday Institution, the UK's institute for electrochemical energy storage science and technology.

Everything WMG is doing is helping UK businesses seize the significant domestic and export opportunities presented by electrification – estimated to be worth over £6 billion by 2025. There is a continuous global drive to improve the performance of EVs, including range, extended battery life, safety and rapid charging. WMG's insight and expertise is helping to address these challenges. In recent collaborations WMG developed new sensor tech for commercial Lithium-ion batteries - demonstrating that including instrumentation inside battery cells allows five times faster charging than current charging limits, without affecting temperature or causing over-heating. In addition the APC funded Higher Energy Density Battery project saw WMG identify significant potential improvements to the Nissan battery process, successful implementation of this process would result in £millions of savings.

The next five years will see WMG continuing to develop the manufacturing systems for cell and battery pack assembly and supply chain solutions, via its UK Battery Industrialisation Centre funded as part of the Government's Faraday Challenge competition.

Of course, electric vehicles are just one part of the story. Technology is not just opening up options in the way cars are powered, it's also changing the way we drive them. Already basic autonomous functions like automatic parking and braking are becoming familiar,

but the concept of intelligent vehicles is evolving rapidly with WMG leading research that will help move ideas from concept to commercialisation. Their work extends to making sure that great concepts work in real world environments - WMG is leading the Midlands Future Mobility consortium developing a real-world environment to test driverless vehicles on roads in the Midlands.

Automotion is about so much more than getting people or goods from point A to point B. Often it's about keeping costs down, increasingly it's about reducing damage to the environment and it's always about keeping people safe and, ideally, happy. WMG has four decades of insight into the UK's automotive industry and deep experience of bringing business and academia together to solve a host of challenges faced by the sector. A principal goal will see it working to develop improved manufacturing systems for cell and battery pack assembly and supply chain solutions which will help to grow the UK market for batteries to £3.1bn by 2025 and safeguard some 50,000 jobs as the industry shifts from conventional cars to EVs, but who knows where other roads might lead.

www.wmg.warwick.ac.uk

WMG Profile

Who we are

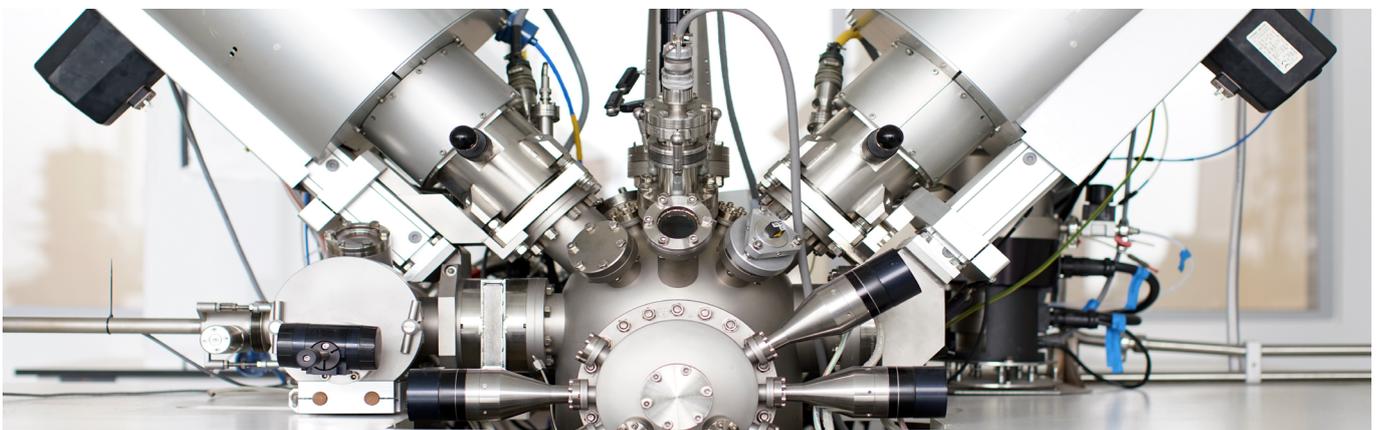
WMG is actively researching projects that improve how we travel, how we interact and even the quality of the air we breathe. A multidisciplinary department of the University of Warwick, our 600+ staff are made up of academic researchers, ex-industry engineers, business specialists and educators. Our mission is to improve the competitiveness of UK industry through innovation in new technologies and business models and skills development.

What we do

We advise and work alongside organisations to help deliver change. It's about developing technology through innovation, to drive competitiveness in UK industry. We do this by collaborating on R&D projects, transferring knowledge into business sectors and educating highly skilled people.

Why we do it

Everything we do is for the benefit of our end-users – industry, commerce, the service sector and Government. We exist so that our innovation and world-class academic and practical knowledge and expertise can meet the biggest global challenges and make a real-world difference. We believe our partners and students are actively shaping the future.



Transforming Manufacturing, Transforming Lives

At the HVM Catapult, we know that harnessing the latest technologies and making best use of new materials isn't just good news for companies with major production lines. It can also transform lives. That was certainly the case for aspiring Paralympic alpine ski racer Scott Hiller who worked alongside HVM Catapult technologists to develop his new sit ski.

The project was completed as a collaboratively delivered technology demonstrator of low cost sensors and analytics, advanced composites, additive manufacturing and advanced design tools, showing that the HVM Catapult's collective capability can improve performance in a niche area, which is new to the organisation.

Earlier this year, Scott's new sit ski zoomed past a major milestone to complete its first alpine testing in one of the world's most demanding ski resorts, Chamonix in France.

The ultimate goal of the project is to encourage innovators in manufacturing to embrace the possibilities of our technology capabilities and realise that we can make the unthinkable happen.

The successful testing of the sit ski shows the power of these high value manufacturing technologies to companies who adopt them. As Gary Capewell, Supply Chain Designer, Rolls-Royce commented: "The digital measurement technology used in Sit Ski proved vital to help validate an improved supply chain. This mitigated a large equipment spend for us, with the ability to go five per cent higher on customer delivery, creating supply chain duality"

The success of this project has also been recognised by The Engineer magazine, with the Sit Ski team being shortlisted as finalists for the Collaborate to Innovate Awards in the Manufacturing Technology category. Up against the likes of Gordon Murray Design, Bentley Motors, Rolls-Royce and Laing O'Rourke, this major achievement demonstrates that the HVM Catapult is at the cutting-edge of driving improvements through the deployment of advanced manufacturing technologies. Fingers crossed for the finals in November!

[Click here to watch the Sit Ski being tested on the slopes.](#)



CPI drives forward vehicle work with Oxis energy

The Centre for Process Innovation (CPI) is set to develop the next generation of batteries capable of extending electric vehicles' mileage range.

CPI is collaborating on the Lithium Innovations for Future Electric vehicles (LIFE) project with lead-partner OXIS Energy, a company that is focused on the development of Lithium-Sulfur battery chemistry.

The Innovate UK-Faraday Challenge- funded project aims to develop a lithium-metal cell with improved longevity and a higher energy density than conventional lithium-ion (Li-ion) batteries, by investigating the scale-up of lithium-metal coatings.

CPI will use its extensive expertise in this research and development area to provide support.

This will include applying coating technologies developed by OXIS and performing large-scale trials to assess the feasibility of scaling protective coatings on lithium-metal cells.

The LIFE project aims to develop a lithium-metal cell with improved longevity and a higher energy density than conventional lithium-ion batteries.

Nuclear AMRC's new Derby facility welcomed by minister

The Nuclear AMRC's new Derby facility has been welcomed by government as aligning with the aims of the £200 million nuclear sector deal.

The Nuclear AMRC is initially taking space in the iHub facility at Derby's Infinity Park, to explore innovative technologies whilst it develops the case for a new full-scale bespoke facility.

The new facility will complement the capabilities of the Nuclear AMRC's core research factory on the Advanced Manufacturing Park in Rotherham, and its modularisation R&D facility in Birkenhead, and help expand the centre's capabilities into new technology areas.

Industry and energy minister Richard Harrington MP welcomed the expansion as great news for the Midlands Engine initiative to grow the region's economy. "This latest cutting-edge facility in Derby will further boost the future ambitions of the area to lead the way in the UK's efforts to upscale and innovate, creating top-tier modern jobs for Midlands Engine workers!", Harrington said. "Following the recent announcement of the landmark £200 million nuclear sector deal supported by both government

and industry, it again demonstrates the UK's advanced manufacturing and technology as part of our forward-thinking modern industrial strategy".

The centre is now kitting out two workshops within iHub, plus office space, and planning a launch event for regional businesses in October.

[Find out more about the Nuclear AMRC Derby here.](#)



Aerospace suppliers urged to join £15m programme

Suppliers to the UK aerospace industry are being urged to engage with a £15 million programme funded by Innovate UK and the Aerospace Technology Institute aimed at encouraging them to adopt additive manufacturing (3D printing).

The Manufacturing Technology Centre is leading the DRAMA (Digital Reconfigurable Additive Manufacturing for Aerospace) programme, an industry-directed project to support the uptake of metal additive manufacturing in the UK aerospace industry. The project also aims to build a digitally-enabled additive manufacturing learning factory at the MTC.

Additive manufacturing is employed across many manufacturing sectors in a variety of materials, producing everything from simple tools to major parts for aero engines.

Dr Katy Milne, who leads the DRAMA project at the MTC said the importance of additive manufacturing to the UK aerospace industry couldn't be overstated

"It has the potential to revolutionise design approaches and component manufacturing. There are more than 4,000 companies involved in the aerospace industry in the UK and additive manufacturing offers the biggest opportunity since the introduction of composites. We have spent the last few months speaking to suppliers and OEMs and we now have a much greater understanding of the requirements of the manufacturers and the barriers to implementation among suppliers," she said.

OEMs with an established additive manufacturing capability are keen to exploit the digital capabilities that DRAMA will develop including component design, manufacturing process simulation and the connectivity of process chain equipment. Chiefly, they are looking for DRAMA to focus on enabling capability within the supply chain, process validation, quality processes and traceability.

Suppliers can learn more about DRAMA at an all-day event at the Manufacturing Training Centre on Ansty Park, Coventry on October 23. Organised by the Midlands Aerospace Alliance, the event will bring together suppliers, OEMs and technology providers.

[Click here to find out more and register for the DRAMA event taking place on October 23rd](#)



Sheffield knife maker at cutting edge of 3D printing technology

A highly respected Sheffield knife maker has put himself at the cutting edge of advanced technology by joining forces with the AMRC to design and develop a bespoke, 3D printed titanium chef's knife.

Stuart Mitchell, 48, has been making knives for more than three decades, cutting his teeth in the trade as a keen ten-year-old at his father's knee. His bespoke blades are made using many of the same tools his dad used before him in the same red-brick workshop his family took on in 1980.

Despite his feet being firmly rooted in tradition as a craft maker, Stuart's curiosity about additive manufacturing made him want to find out whether the advanced 3D printing technology could be combined with his top quality knife making skills to create something truly beautiful and unique.

It led to a project with the Design and Prototyping Group at the University of Sheffield Advanced Manufacturing Research Centre (AMRC) to produce a titanium chef's knife to demonstrate the technology and allow Stuart to compare and contrast the end product with his own handcrafted knives.

Design Strategy Manager for the DPG, Andy Bell, said:

"This is design-led disruption in the truest sense of the word; a craft maker applying advanced manufacturing technologies and exploring how this could change their business model now and in the future.



"Design methods allow us to explore, through different frames, how we can approach a wicked problem like the introduction of additive manufacturing to an organisation that would never normally approach this technology due to the high perceived risk, cost and knowledge gap.

"We can use design to change perceptions by understanding the way in which small businesses work, their needs and wants, and then developing a response to this in a risk-free way.

"The project has been about understanding what the opportunity is. We provided Stuart with an AM blank which he would normally make himself from sheet metal, grind it and sharpen it up. The difference with what we've done is integrating the blade and the handle, which was moulded and customised to a chef's hand. We then delivered the printed knives to Stuart for finishing."

[Click here to read the full story](#)

Additive Manufacturing Awareness Events

HVM Catapult in partnership with the KTN are hosting four AM awareness breakfast-events targeting potential AM adopters across the whole AM supply chain. The awareness events will cover the potential benefits of Additive Manufacturing and look to address the current barriers within its uptake. Details of the awareness event dates and agenda can be found below.

Awareness breakfast-event locations and dates:

- 6/11/18: AFRC, Strathclyde
- 13/11/18: NITC, Belfast
- 20/11/18: NCC, Bristol
- 14/12/18: AMRC, Sheffield

Awareness breakfast-event agenda:

- 8:15 Registration, Refreshments & Networking
- 9:00 The Business Benefits of 3D Printing
- 9:45 Applications & Case Studies
- 10:30 Funding and Support available
- 11:00 Site tour
- 11:30 Close

[Head to our events page to find out more](#)



Current Innovate UK funding opportunities

Innovation loans: September 2018 open competition

Loans for game-changing innovations with strong commercial potential that will significantly improve the UK economy.

Competition opens: Monday 17th September 2018

Registration closes: Wednesday 14th November 12:00pm

Innovate UK is to offer up to £10 million in loans to [micro, small and medium-sized enterprises \(SMEs\)](#). Loans are for highly innovative late stage projects with the best game changing and/or disruptive ideas or concepts. There should be a clear route to commercialisation and economic impact.

[Click here to find out more.](#)

Innovate UK

UK Manufacturing Forum: From Research to Success (date change)

Register your interest today for the next annual UK Manufacturing Forum: From Research to Success will be held on the **10th and 11th December 2018** at the Slate Conference Centre, University of Warwick.

Please send any questions or queries to questions@hvm.catapult.org.uk

[Click here to register your interest](#)



The HVM Catapult has a wealth of quantitative and qualitative data on the impact it is having on the companies we work with. Our case studies give a good impression of the value we have added to many companies across all sizes and all sectors. Maybe we could help your business? There is a cost involved, but we can signpost sources of funding, for example, through Innovate UK. Email us at info@hvm.catapult.org.uk if you'd like more information or to discuss working with us.

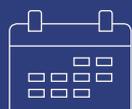
The Centre for Process Innovation recognises the potential of seaweed

SeaGas is a three year project, funded jointly between Innovate UK and BBSRC. The aim of the project is to assess the viability, technical and financial, of farming sugar kelp seaweed for bioenergy production through anaerobic digestion (AD). The technical focus is divided into three key areas; seaweed storage to ensure year-round supply; the potential for biomethane production and AD operational factors, plus; environmental and socio-economic impact. The financial case is assessed through a financial model created for SeaGas to include the specifics of seaweed cultivation, harvesting and storage.

The project is underway, and the practical AD work has moved into the pilot scale digesters (from the small scale 5L reactors to the 800L reactors). This provides an opportunity to assess operational practicalities and parameters, so that the process can be optimised as far as possible. Scalability of the process (seaweed storage and AD) will also be assessed. The environmental and social impact studies are under way and will be reporting throughout the remaining months.

CPI is now applying some of the knowledge and understanding gained through SeaGas, together with existing knowledge in AD and waste water treatment, to address multi-issue problems around the energy-waste-water-food nexus. They are applying a circular economy approach to solving societal problems where one or more of these issues arise. Quite simply, trying to make sure that [waste] resources are harnessed to recover maximum benefit, where possible. The ancillary benefits to communities of such an approach might include reduced environmental pollution, improved health, jobs/skills and improved community sustainability and stability. So far, CPI's work in this area is taking them from the Highlands & Islands of Scotland, to the Caribbean and potentially the Asian sub-continent. CPI looks forward to further challenges, where ever they may be.





Dates for your diary

Hyperloop - The next transport revolution?

4th October 2018 - Milton Keynes

A conference dedicated to discussing how the UK can accelerate the global roll out of this technology.

The Transport Systems Catapult would like to invite you to their 'Hyperloop - The next transport revolution?' conference in Milton Keynes on Thursday 4th October.

You will hear first-hand from leading Global Hyperloop experts on how this technology could revolutionise future transport and how the UK can accelerate the global roll out. The event will also feature a new report from the Transport Systems and High Value Manufacturing Catapults entitled 'Hyperloop - opportunities for UK Supply Chain'.

[Click here to find out more and register your place.](#)

Digitalising Manufacturing Conference 2018

29th October - 30th October 2018
MTC, Coventry

This year, the MTC's Digitalising Manufacturing Conference will focus on impact and progress. One year on from Prof. Juergen Maier's launch of the Made Smarter Review at last year's conference, where do we stand and what has changed?

[Click here to find out more and register your place](#)

WORK WITH US

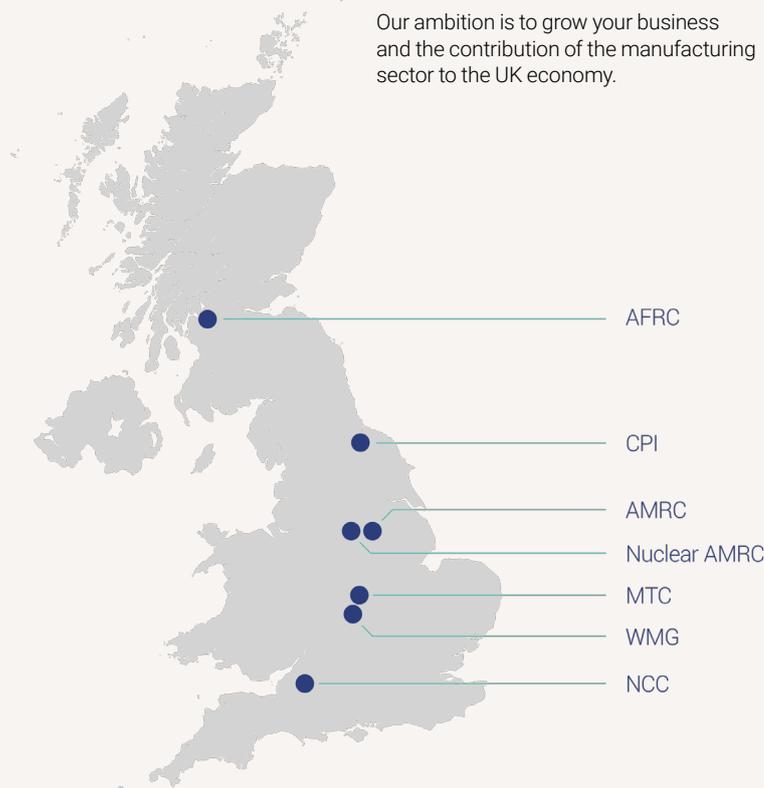
The High Value Manufacturing (HVM) Catapult is here to help UK businesses of all sizes accelerate new concepts to commercial reality.

Working through seven world-class centres of industrial innovation, we provide access to the specialist equipment and expertise you need to help investigate new technologies and processes and test their application. We can also help you to improve existing processes. We're here to help you strip away the risks of innovation and make investment decisions when you are confident that an idea can be scaled up to deliver on a commercial scale.

Our services are available to firms of all shapes and sizes, from FTSE-listed companies to SMEs deep in the supply chain. They include:

- Capability which spans from basic raw materials through to high integrity product assembly processes
- World-class facilities and skills to scale-up and prove high value manufacturing processes
- A network of leading suppliers who contribute to key UK industry supply chains
- A partnership between industry, government and research in a shared goal to make the UK an attractive place to invest in manufacturing

Our ambition is to grow your business and the contribution of the manufacturing sector to the UK economy.



For more information or to discuss working with the HVM Catapult, please contact:

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