

AMRC /
ADVANCED MANUFACTURING
RESEARCH CENTRE



The
University
Of
Sheffield.

A world-class centre for advanced manufacturing



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The University of Sheffield Advanced Manufacturing Research Centre (AMRC) is a network of world-leading research and innovation centres working with advanced manufacturing companies of any size around the globe.

We transform industrial and economic performance by making step changes in productivity, increasing competitiveness, developing new products and processes and training new talent and skills.

Our 110-plus industrial members range from global giants like Boeing, Rolls-Royce, BAE Systems and Airbus to small companies.

Our operations have grown significantly since we were founded in 2001 and in 2003 we became the anchor tenant on the Advanced Manufacturing Park at Catcliffe, South Yorkshire.

The AMRC now employs over 500 highly qualified researchers and engineers in Sheffield, Rotherham, Broughton and Preston.



AMRC Group

The AMRC is part of the AMRC Group, a cluster of world-class centres for industry-focused research and development of technologies used in high-value manufacturing sectors.

It has a global reputation for helping companies overcome manufacturing problems and has become a model for collaborative research involving universities, academics and industry, worldwide. We are expanding to establish a network of collaborative centres across the United Kingdom, North America and Asia, with centres recently opening in Korea focusing on Industry 4.0 technologies and composite materials.

The group also includes the Nuclear AMRC, which helps UK companies win work in the civil nuclear sector and the AMRC Training Centre which provides training from apprenticeship through to degree level.

Our pioneering AMRC Training Centre was established to train the next generation of world-leading engineers. The centre provides advanced apprenticeship, degree apprenticeship and higher level skills training, as well as a range of courses for continuing professional development for more than 250 companies in the UK.



The Advanced Manufacturing Innovation District

The Advanced Manufacturing Park (AMP) in Rotherham has developed rapidly over the past fifteen years, driven by successful partnerships with global brands such as Boeing, Rolls-Royce, BAE Systems and supporting local advanced manufacturing companies.

The AMRC is now expanding the development of further transformational research facilities onto Sheffield Business Park (SBP) next door, with the development of the University of Sheffield's Advanced Manufacturing Campus (AMC).

Local partners are now working together to develop this area as the UK's Advanced Manufacturing Innovation District (AMID), a centre for innovation, research and technology to attract inward investment in UK manufacturing.

By combining and growing the successes of the AMP and the SBP it is hoped collaboration between academia and industry to produce the world-class research and development to support UK advanced manufacturing businesses to compete on a global scale.

The AMID will be the place for leading manufacturers to go for research, technology transfer, production, networking and industrial collaboration.

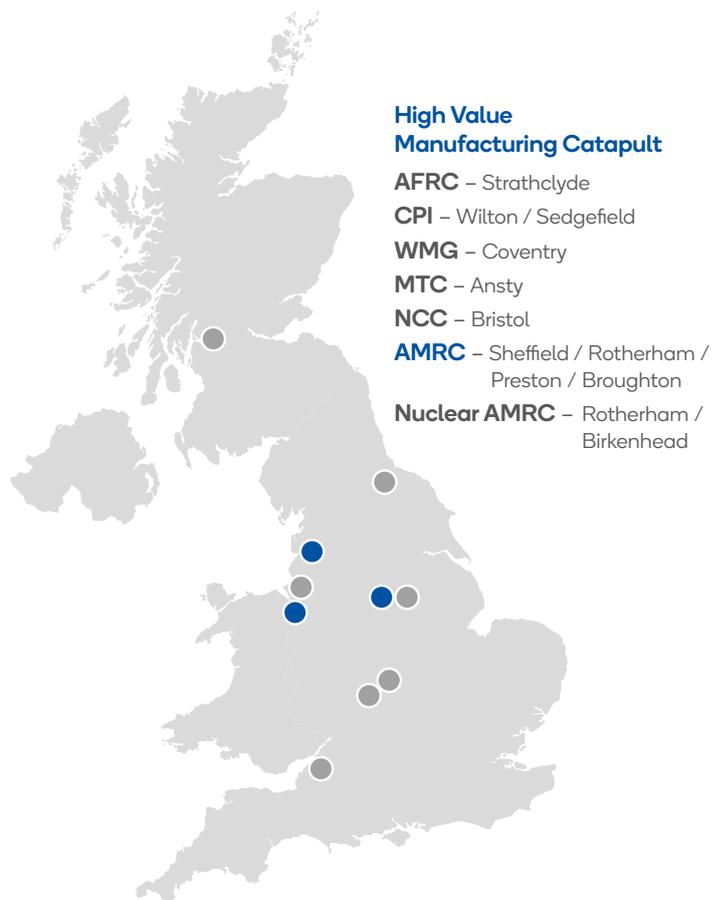
High Value Manufacturing Catapult

The AMRC is a core part of the High Value Manufacturing Catapult, an alliance of seven leading manufacturing research centres backed by the UK's innovation agency, Innovate UK.

The High Value Manufacturing (HVM) Catapult is a thriving alliance that works with companies of all sizes to bridge the gap in – and accelerate the activity between – technology concept and commercialisation.

Being part of the Catapult ensures that we play a core role in the revival of the national manufacturing sector. It also allows companies working with us to tap into a national network of manufacturing research excellence.

If any aspects of a particular challenge fall outside any Catapult member's areas of expertise, each can call on the other centres' knowledge and resources.



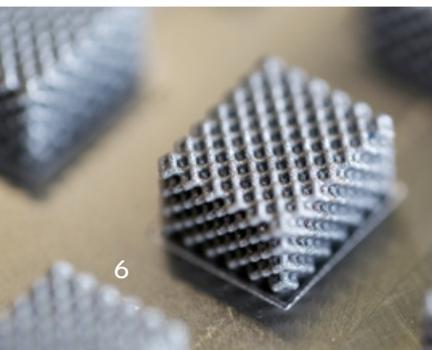
Research Themes

The AMRC's board of industrial partners advises on the topics for our research and development, ensuring our work focuses on industry's commercial requirements and provides lasting value to members.

But you don't have to be a member to take advantage of our world-leading expertise and resources, which are open to all manufacturers.

We work in a wide range of sectors, including aerospace, automotive and transport, construction, energy and medical.

Our researchers work with individual companies on specific projects and collaborate on generic research which will benefit all members. We work to the relevant industrial standards and are accredited such that our customers and partners are able to trust the outputs of our work.



Researchers are organised into a number of core groups, backed by support services:

Machining Group

Research into high-performance machining is at the heart of the AMRC Machining Group. The work of the group focuses on developing systems for machining components in the shortest time possible, without compromising their structural or surface integrity. The Machining Group can typically improve a machine tool's efficiency by around 40 per cent by using dynamic analysis and other techniques to reduce chatter and avoid other problems.

Integrated Manufacturing Group

The AMRC Integrated Manufacturing Group (IMG) specialises in solving problems assembling low-volume, high-value and difficult-to-handle components. Key research themes include the automation of component assembly, integrated large-volume metrology, digitally assisted assembly methods including the use of virtual, augmented and mixed reality technologies and manufacturing informatics and intelligence.

Composite Centre

The AMRC Composite Centre develops manufacturing technologies for advanced fibre reinforced plastics. Core research focus includes development in the design and manufacture of advanced composite structures and hybrid materials in areas of research such as advanced cure technology (including microwave curing), automated production, composite machining, dry fibre processes and novel materials and processes.

Design and Prototyping Group and Medical AMRC

The Design and Prototyping Group, which includes the Medical AMRC, develop everything from conceptual designs, to fully functional prototypes for industry across a variety of high-value advanced manufacturing sectors.

The group develop designs to meet the requirements of current and next generation manufacturing processes by pushing the limits of technology. This is applied to create market leading products and opportunities that enable customers to keep their competitive edge.

Structural Testing

The AMRC's Advanced Structural Testing Centre (ASTC) provides testing and certification services for components and assemblies. The centre can also ensure parts produced by innovative methods meet industry standards. Accredited by UKAS, the ASTC are currently the only structural test facility within a UK university to hold an 'in-house methods' accreditation.

Castings

AMRC Castings develops new castings technologies and provides advanced manufacturing capabilities and expertise to the castings industry. Conducting research into materials and casting processes allows AMRC Castings to help industrial and academic partners improve their global competitiveness.

Additive Manufacturing

Our Additive Manufacturing (AM) work is focused on powder metallurgy materials and processes and design for additive manufacturing.

National Metals Technology Centre

As the metals research group of the AMRC, NAMTEC's work in powder metallurgy is focused on materials and processes for metal additive manufacturing. Core research includes understanding and optimising powder characterisation, powder metallurgy processes and powder handling best practice. Additionally NAMTEC has a UKAS accredited microscopy laboratory for studying the effects of manufacturing processes on the surface integrity of materials.

Manufacturing Intelligence

The AMRC Manufacturing Intelligence team has the capabilities and expertise to develop numerical and simulation models to support projects and research in operations planning, facilities planning, supply chain modelling, cost analysis and trade-off analysis.

Metrology

The AMRC Metrology group develops new metrology methods and technologies, using statistical techniques to benchmark results and providing valuable data to help achieve technology readiness level targets.

The group also provides a range of dimensional metrology technologies and services to our research groups and partners, qualifying novel parts and processes to make sure that they meet physical requirements and industry standards.

Research Support

We have a range of technical, analytical and management support services, which underpin the activities of our core research groups, that are available to member companies and third parties.

Our support teams have a wide range of specialist expertise, including quality services, advanced visualisation and project management for large collaborative research programmes.





Machining Group

The AMRC Machining Group develops innovative techniques and optimised processes for machining high-performance materials.

Our technology teams develop techniques which deliver significant improvements in machining performance and span:

- **Process Monitoring and Control** – enabling lights-out machining by deploying the latest tools for intelligent, autonomous manufacturing.
- **Machining Dynamics** – developing new methods to predict, diagnose and control machining vibration.
- **Machinability** – understanding the characteristics of high-performance aerospace materials and cutting tools and exploring emergent machining techniques such as ultrasonic and cryogenic machining.
- **Process Modelling** – developing a deeper understanding of metal cutting, composite machining, residual stress and distortion.
- **Grinding** – improving productivity across the range of grinding and surface finishing operations whilst controlling part integrity precision.
- **Computer-Aided Manufacturing Development** – creating next generation knowledge based CAM systems and generating more cost-efficient NC programs to reduce cutting time or improve tool life.
- **Gear Manufacturing** – combining sophisticated software, modern machining centres and standard tooling as an alternative to traditional bespoke equipment and making it easier for companies to develop prototype gears, launch new designs and make a wider range of products.
- **Automotive** – developing automotive products and manufacturing processes to technology readiness levels (TRL) of 6 and above and offering the opportunity to develop pre-production demonstration cells that transfer processes and products directly into a partner's facilities.
- **Emerging Technologies** – performing research into developing and proving out novel machining technologies that can be applied in industrial environments.
- **Residual stress measurement** – Understanding the development and distribution of residuals stresses during manufacturing is a key factor in the development of methods to minimise distortions in components during machining.



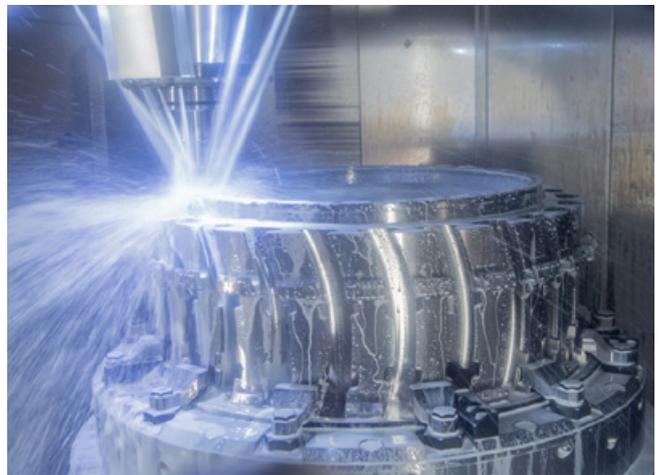
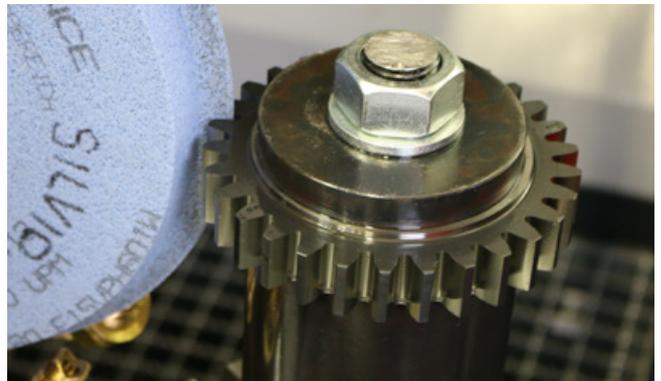


The Machining Group has a number of platform teams which focus on particular component families for our core aerospace partners.

Our teams develop machining processes using techniques created by the technology teams and make demonstration components to prove these processes, so that they can be introduced into industry.

Platform teams include:

- **Rotatives** – manufacturing techniques for aeroengine discs and shafts.
- **Casings** – strategies, tooling and workholding technologies to optimise machining of aeroengine casings.
- **Aerofoils** – manufacturing aerofoils for aeroengines and power generation.
- **Structures** – techniques for machining large and complex components like landing gear and actuation systems.
- **Workholding and automation** – techniques for optimising machining strategies.





Integrated Manufacturing Group (IMG)

IMG are developing ways of meeting demand for high variation and mass customisation, intelligent machines and processes that monitor and optimise their operations, techniques to shorten lead times and ramp production up and down rapidly, ways of handling and making sense of big data, human machine collaboration and techniques for digitally assisted assembly.

We are leaders in the development of augmented reality solutions with smart connected tools and devices, used for complex assemblies where automation is not applicable. We are equally adept in integrated large volume metrology – including the design, development and process improvement of inline inspection and verification techniques used during the manufacture of large components and complex assemblies.

Our research into the smart applications of robotics and automation have led to partnerships with the leading names in aerospace and defence. A collaboration with BAE Systems has de-risked a major robotics investment for the company and is now on the way to achieving significant, six figure cost savings for the company.

We are also at the forefront of manufacturing informatics, integrating sensor and measurement systems, data collection, analytics, visualisation



and decision making to drive step changes in the manufacturing processes.

Our main research themes are:

- Robotics and automation
- Digitally assisted assembly
- Integrated large volume metrology
- Manufacturing informatics





Composite Centre

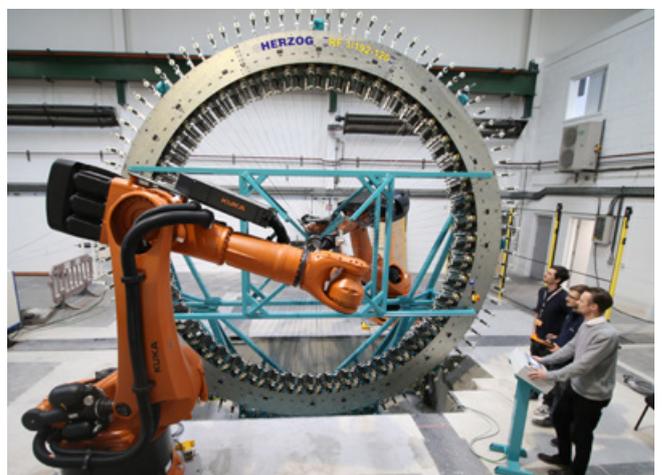
The AMRC Composite Centre is a state-of-the-art facility for advanced composite manufacturing research and development, based in a dedicated extension to the AMRC Factory of the Future.

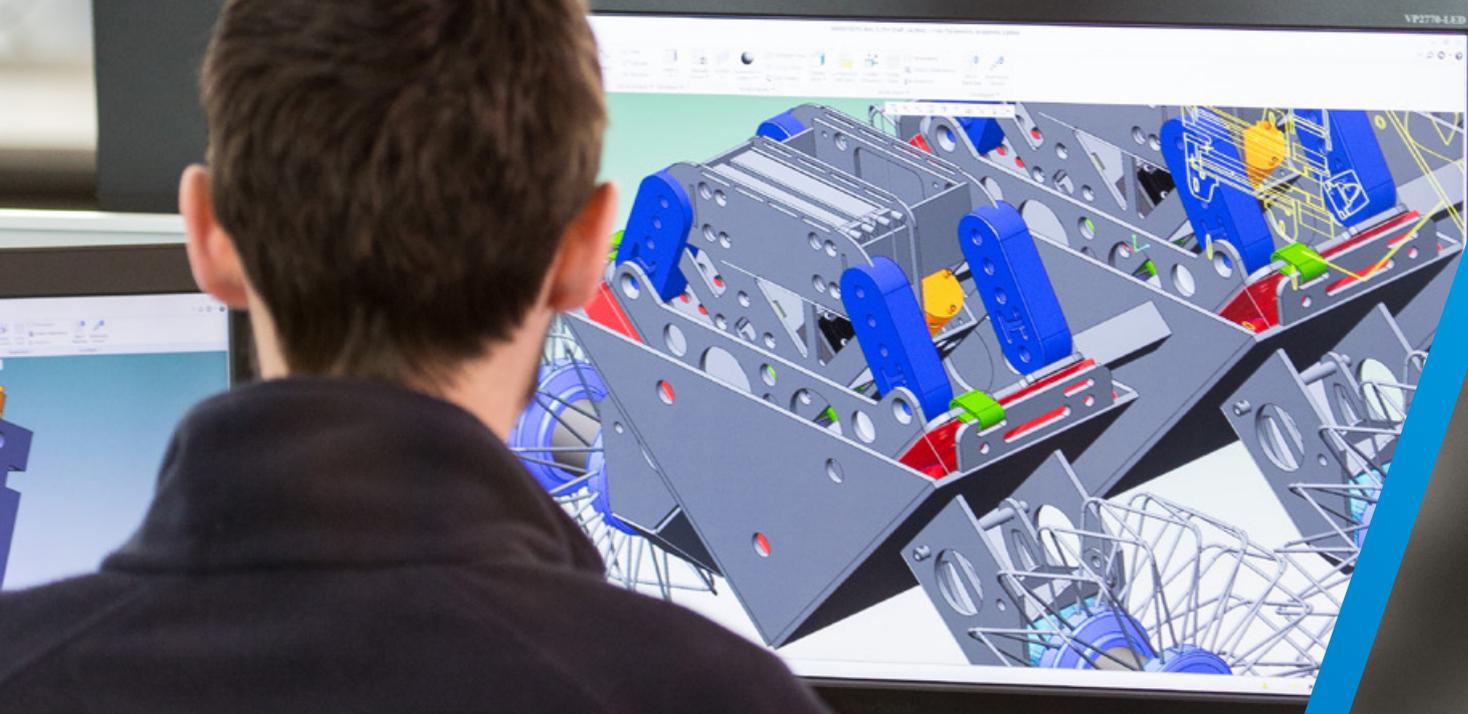
We extend the AMRC's expertise in metals production into the new generation of carbon fibre composite materials. These materials are increasingly used in aerospace, marine, automotive and other high-value industries because they offer high strength and light weight, but they also present a host of manufacturing challenges.

Our research focuses on producing and machining composite components, including hybrid parts combining high-performance metals and composites in a single structure. These structures can provide significant weight savings while maintaining the highest material and structural performance, offering improved fuel efficiency for aerospace and other transport applications.

Our main research area themes are:

- Automated production
- Machining
- Advanced curing
- Novel materials and processes
- Dry fibre processes





Design and Prototyping Group

The Design and Prototyping Group, which includes the Medical AMRC, develop everything from conceptual designs, to fully functional prototypes for a range of industries.

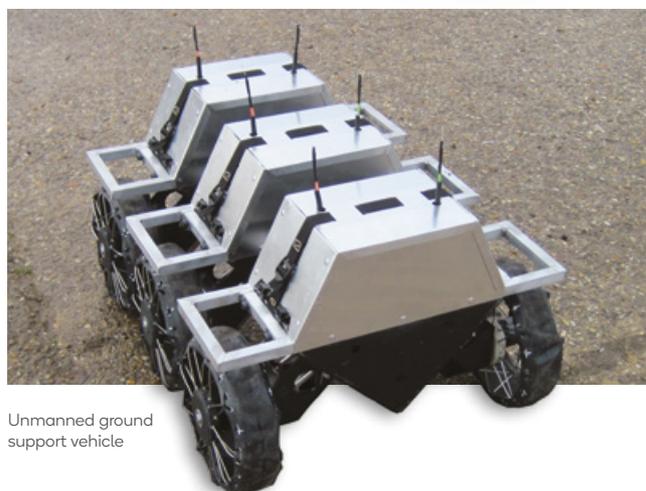
Our multidisciplinary team engineer advanced products across a variety of high-value manufacturing sectors, including transport, healthcare and energy. We apply the latest design strategies to achieve research driven solutions.

Our group is situated at the centre of active research themes across the AMRC and the wider University of Sheffield, enabling us to combine world-class research and development with innovative and flexible design capabilities. The Medical AMRC further expands this focus with access to clinical expertise, including the University of Sheffield's clinical resources.

We utilise in-house high-precision machining processes, additive manufacturing, fabrication, advanced analytical tools and clean room facilities to develop next generation prototypes.



High performance, large volume additive manufacturing machine



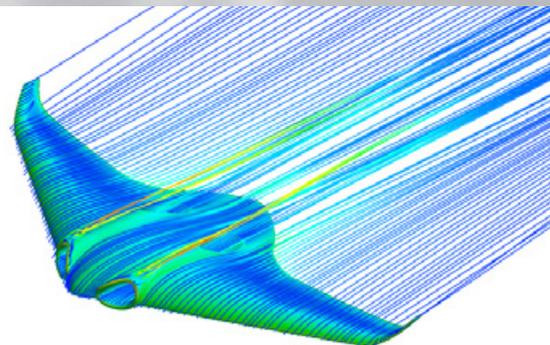
Unmanned ground support vehicle





Through the Medical AMRC we also specialise in developing designs to meet the requirements of current and next generation manufacturing processes, pushing the limits of technology. We apply this to create market leading products and opportunities that enable our customers to keep their competitive edge.

Our current portfolio includes: the design and build of a high performance, large volume additive manufacturing machine; the development of an unmanned ground support vehicle; the successful launch of powered and free-flight unmanned aerial vehicles; the re-design of a pyro-electric fuel shut off valve and the development of next generation orthopaedic devices.



The Medical AMRC is supported by the Catalyst Fund, managed by the Higher Education Funding Council for England (HEFCE).





Structural Testing

The Advanced Structural Testing Centre (ASTC) has the capacity and capability to help any company or research group prove its technologies and achieve certification for products and systems.

All our work is certified and irrefutable and the results are auditable, giving our customers complete peace of mind.

We are accredited by the United Kingdom Accreditation Service (UKAS) and are currently the only structural test facility within a UK university to hold 'in-house methods' accreditation. This means we are not restricted to testing to specified international procedures, but can also develop new test procedures in collaboration with our customers to prove out components under real-world conditions.

We are able to physically validate research, analysis, material properties, components, sub-assemblies, and full assemblies for both research and commercial projects.

Our capabilities range from testing coupons to prove the material properties of new manufacturing processes, to complete finished components and assemblies. We can test materials ranging from composites, including metal matrix composites, and ceramics to rapid prototype filled lattices, steels, hi-tech alloys and other metals, such as aluminium.

Physical size, load requirements and the number of measurements needing to be made at the same time present no barriers for the wide range of equipment in our fully-fitted workshop.

Our large reconfigurable testing rig can cope with components up to 10 metres square and its actuators can exert a combined force equivalent of 800 tonnes as a compressive or tensile load, giving us the capability to carry out tests for the civil engineering, rail and marine sectors.

Further down the scale, we can carry out static and fatigue tests in the one meganewton to 10 kilonewton range and have the capacity to go as low as one newton.

We can also apply tension, compression or fatigue forces simultaneously from eight separate points on a component, sub-assembly or assembly, over a period of time.

Meanwhile, our state-of-the-art data recording equipment can record up to 200 channels of data, taking 16,000 samples, from each sensor every second, if necessary.





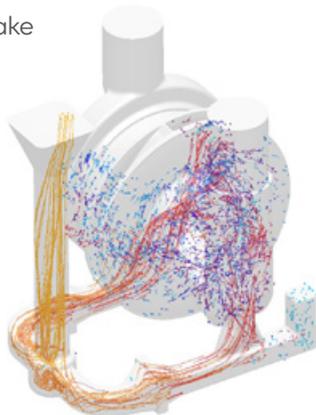
Castings

AMRC Castings provides advanced casting expertise and manufacturing capabilities; including computer process modelling, design for casting manufacture, rapid low-volume manufacture of precision castings and casting process and materials research.

We play a vital role in setting the agenda for Research, Innovation and Development. Our unique unbiased position ensures this can be done for the benefit of the industry and the sectors in which castings are, or could be used.

We are developing new casting technologies and techniques to produce a wide range of materials including titanium, super-alloys, aluminium, steel and iron. Our main building was expanded in 2016 to house Europe's biggest aerospace castings facility that is capable of melting 1000kg of Titanium required to make a 500kg casting.

Developments often expand the scope of the castings process so that it can be used as an alternative to fabricating or machining critical components from solid, increasing performance, reducing cost and eliminating material waste.





Additive Manufacturing

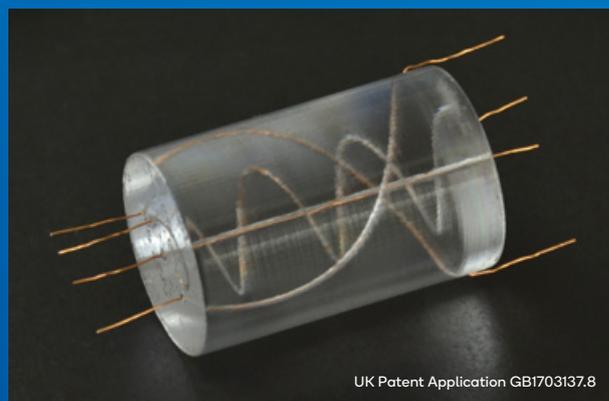
Our Additive Manufacturing (AM) work is focused on design for additive manufacturing and, through our National Metals Technology Centre, powder metallurgy materials and processes.

The Additive Manufacturing (AM) process allows complex design geometries to be produced in polymers and metals.

To exploit the maximum benefits of additive manufacturing (AM) it is necessary to re-think the design process. With our dedicated team of design engineers, with experience of and access to the latest additive manufacturing processes, we are able to fully optimise the product design for the manufacturing route.

We have developed specialist knowledge in the areas of:

- Pushing the capability of AM systems
- Optimising build layout and support strategies
- Topology optimised designs for lightweight structures
- Application of fused deposition modelling (FDM) technique
- Simulation of the AM process to predict build issues



UK Patent Application GB1703137.8





National Metals Technology Centre

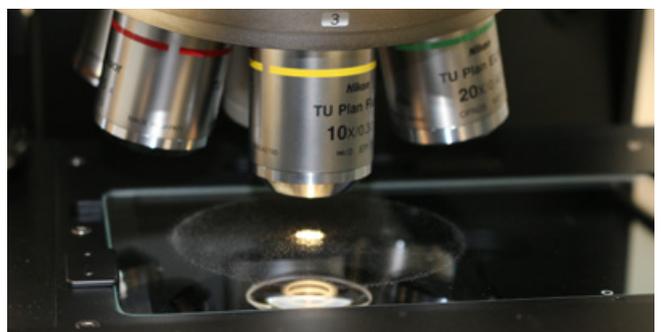
The National Metals Technology Centre (NAMTEC) joined the AMRC in 2012 after providing services to the UK manufacturing supply chain for several years.

Our work in powder metallurgy is focused on addressing some of the fundamental unresolved issues associated with powder metallurgy processes and materials; reducing barriers to mass adoption of metal additive manufacturing such as cost of raw material and variation in powder performance.

We conduct in-depth analysis of powder characteristics that will lead to greater understanding and control of current variance in the existing grades of powder; helping predict their performance in powder metallurgy processes.

We are also exploring and optimising the capabilities of powder bed and blown powder additive manufacturing techniques by combining process technology with powder characterisation to help meet the demands of production.

These kinds of techniques, of building directly onto a component, are of interest to manufacturing sectors where high-value components can be repaired such as high-value blades and blisks used in the gas turbine sector.

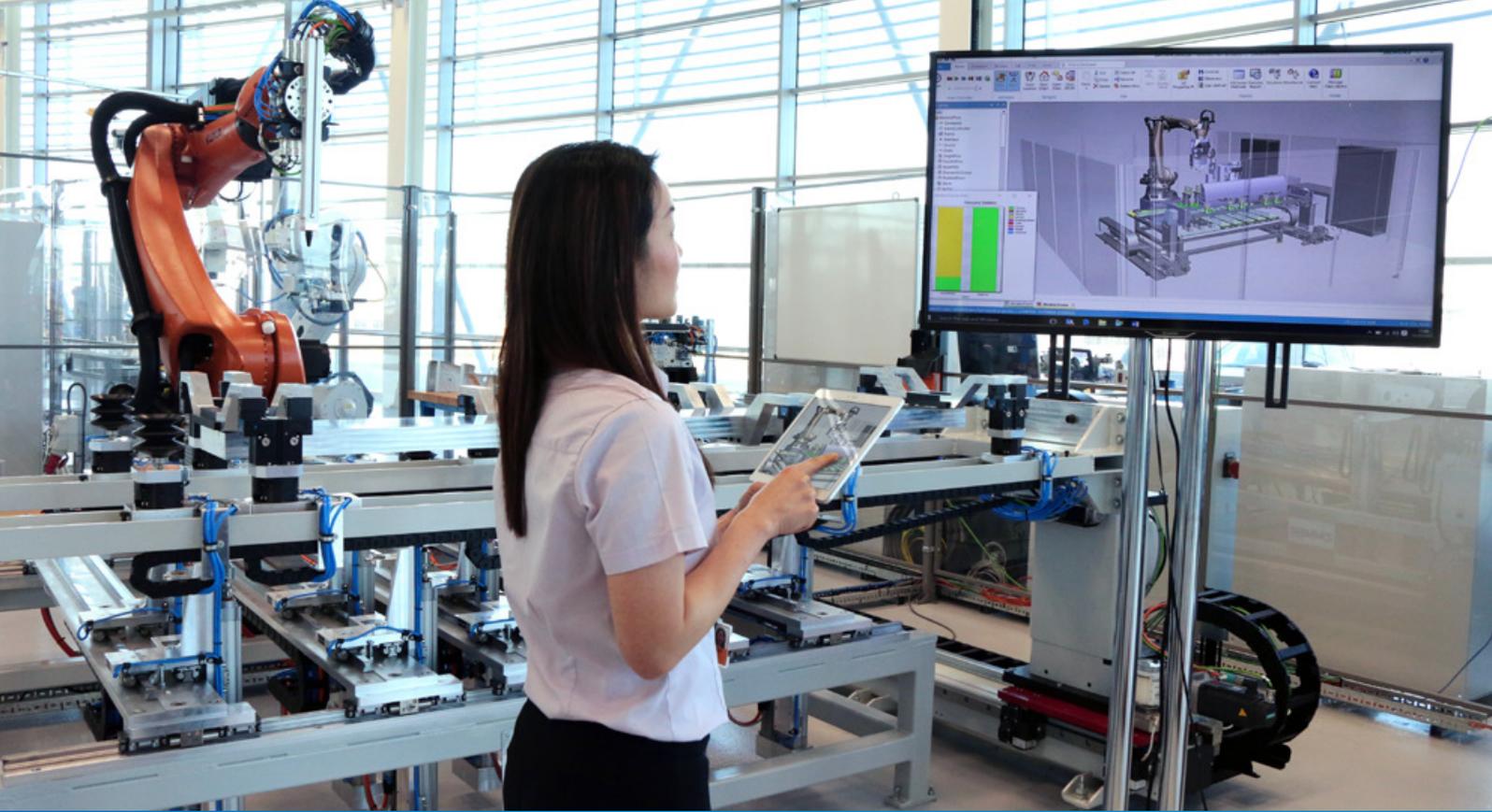


Alongside this work, we are investigating the safe and economical use of metal powders and formulating best practice for powder handling.

NAMTEC also includes the AMRC Microscopy Laboratory; a UKAS accredited testing facility for studying the effects of manufacturing processes on the surface integrity of materials and supports AMRC research activities with the following techniques:

- Optical microscopy
- Scanning electron microscopy
- Surface topography
- Hardness testing





Manufacturing Intelligence

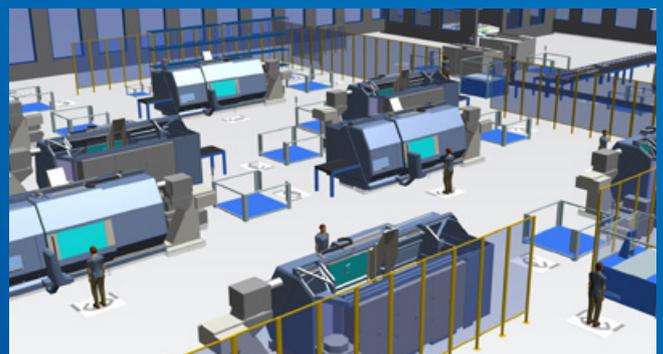
The AMRC Manufacturing Intelligence team has the capabilities and expertise to develop numerical and simulation models to support projects and research in operations planning, facilities planning, supply chain modelling, cost analysis and trade-off analysis.

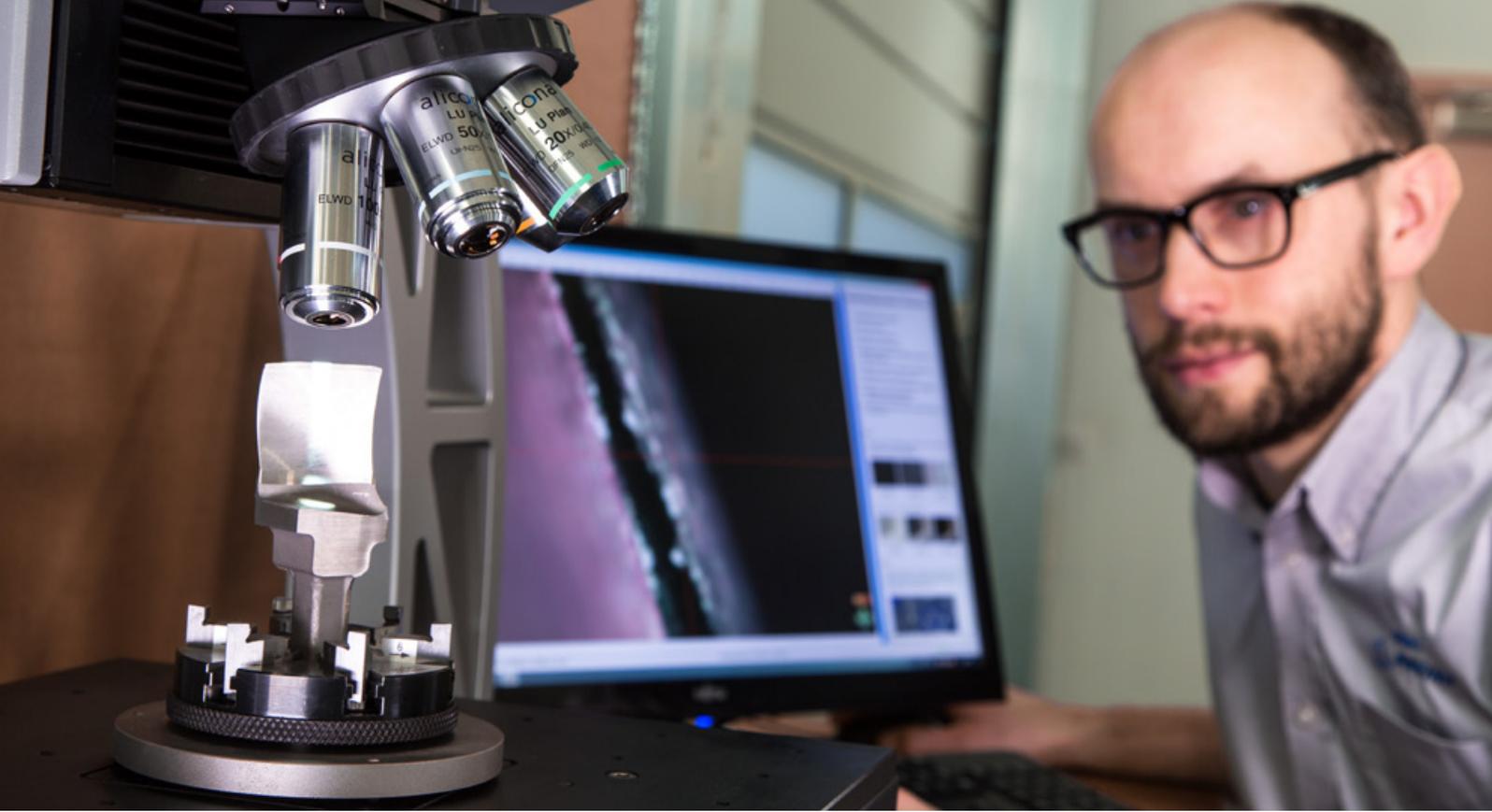
Our team works very closely with the AMRC core research groups and our partners to identify the right improvement solutions, analysing them through our simulation models and optimisation techniques to make sure the right decision, right planning and right technology are down-selected and verified.

Our key capabilities include:

- **Discrete Event Simulation (DES)** – we have proven expertise to model manufacturing facilities or business processes to evaluate system performance, optimise resources and perform what-if scenario testing. These models can run along physical systems in real time to achieve predictive analyses.
- **System Dynamics** – we apply system dynamics techniques to model complex systems, understanding nonlinear system behaviour over time.

- **Cost Analysis and Prediction** – we apply a model-based approach to perform cost estimation and cost assessment to support decision making in both early stages of design and during manufacturing.
- **Trade Study Analysis** – we have developed a trade study matrix which provides a systematic way to evaluate potential solutions by capturing expert knowledge against a range of specified requirements.





Metrology

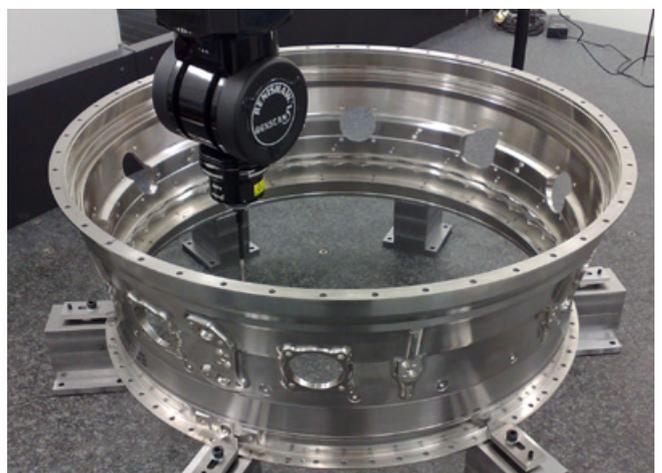
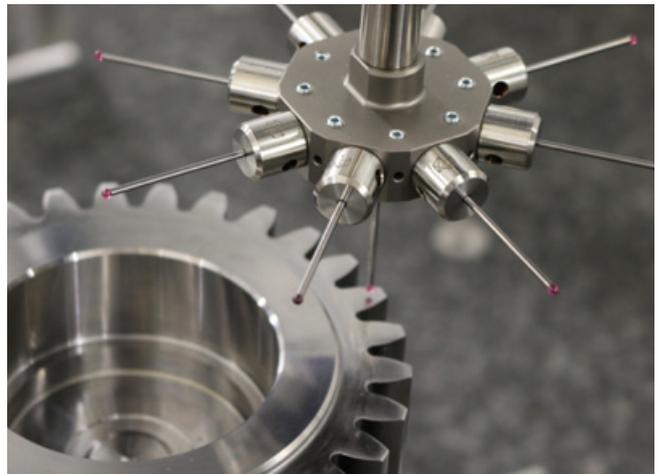
Our metrology capability provides a range of dimensional metrology technologies and services to our research groups and partners.

We are skilled in many areas of dimensional metrology, and have experience in a number of industry sectors.

Based in dedicated facilities within the AMRC Factory of the Future, the Metrology team supports the research groups by qualifying novel parts and processes to make sure that they meet physical requirements and industry standards.

To meet the needs of the AMRC's core research areas, we have developed the flexibility to qualify diverse items such as:

- High tolerance machined parts
- Free form carbon composite parts
- Airframe assembly fixtures
- Near net shape components





Work with us

We have over 110 fee-paying members, ranging from global giants like Boeing, Airbus, Rolls-Royce, BAE Systems and Sandvik Coromant, to local small businesses and specialist suppliers. Our members have access to our resources and expertise and help to set our research priorities.



Membership is open to all, but you don't have to be a member to take advantage of our capabilities.

Our resources are open to all manufacturing businesses and we work with hundreds of other companies on specific research projects and business support initiatives.

Each year we carry out 500 non-member engagements, of which 400 are SMEs.

The AMRC applies its knowledge and delivers impact across a wide range of sectors including aerospace, automotive and transport, construction, energy and medical.

The benefits of being a member of the AMRC

Becoming a member gives you the highest level of support and provides you with a high-profile platform where you can showcase your capabilities to key companies and stakeholders and gain industry recognition through your active association with the UK's leading centre of excellence for advanced manufacturing.

Membership allows you to direct our research focus and capabilities, and to commission projects of direct value to your business. Close engagement with our research teams will give you even greater benefits, as we can leverage your research investment to solve your manufacturing challenges.

AMRC members participate in and share the results of our generic research and development programmes.

Board Generic projects involve research into areas of shared interest, where sharing the costs and risks provides significant gearing of your R&D investment.

Directed Generic projects, involve research into an area of specific interest to your business, funded from your membership subscription.

Working in collaboration with others and having access to the wide range of expertise at the AMRC reduces what might be the prohibitively high costs and risks you might face if you had to establish an in-house team to carry out the research on your own.

Member companies appoint representatives to the AMRC's board of industrial partners, which advises on the topics for our research and development, ensuring our work focuses on industry's commercial requirements and provides lasting value to members.





Showcase your capabilities

Membership of the AMRC provides you with a high-profile platform where you can showcase your capabilities to key companies and stakeholders and gain industry recognition through your active association with the UK's leading centre of excellence for advanced manufacturing.

The AMRC welcomes 20,000 visitors a year to our facilities, including international, UK government and industrial decision-makers. Members providing in kind equipment or services can demonstrate how their products are delivering real benefits, and manufacturing members can highlight their capabilities and innovation.

As a member, you will have the opportunity to use our prestigious workshop to showcase your capabilities to your target audience at company-led technology events.

Members can use our boardroom or the flexible facilities of the AMRC Knowledge Transfer Centre for marketing events, or have our unique travelling showcase, Mantra, visit your own facilities and attend external events.

Our marketing and communications team can also support your marketing activities through a variety of channels, including our AMRC Journal, targeted PR and case studies, and priority access to events.





Membership gives you access to networking opportunities with companies across your supply chain, a large portfolio of generic research, access to training and industry recognition through association with a world-class centre of excellence.

Road Mapping

The AMRC's Road Mapping sessions are designed to enable us to understand what technologies will bring important benefits to our members in the future, whether we already have the capabilities to support those technologies and what capabilities we might need to develop.

Technology Portfolio Planning

All our members can attend and participate in Technology Portfolio Planning for group updates, Road Map reviews and to develop future activities identified during Road Mapping.

Tech Fellows Conference

The Tech Fellows conference has been a highlight of the AMRC calendar for many years and gives members an opportunity to learn about the progress and achievements of AMRC Research Groups and the outcome of completed board generic projects.

AMRC Forum

The AMRC Forum is our technology network for manufacturing businesses. The Forum organises events that cover a range of topics that are relevant to manufacturers, offering insights into current and emerging technologies and supply chain issues.





Main Board

Our Main Board meets in May and November to review the AMRC's operations and determine our future strategy. May meetings are hosted by one of our commercial partners and the November board meeting takes place at the AMRC.

The Board comprises:

- 1 representative from each Tier 1 member.
- 4 representatives for the Tier 2 members.
- Key personnel from the University of Sheffield.
- Each Tier 1 partner may also nominate an observer who may attend the vote but who may not vote on any proposals.
- Half the Board Members must be in attendance and at least half of those present must represent commercial partners for the meeting to be quorate. Decisions are taken by a simple majority.

Tech Board

The AMRC Main Board has delegated responsibility for deciding how research funding should be spent to the Tech Board. The Board's primary function is to consider how funding for Board Generic Projects should be spent, taking into consideration how the money might benefit the overall organisation and lever in funding from other sources.

The Board meets in April/May and November. The Board is always hosted at the AMRC.

The Board comprises:

- 1 representative from each Tier 1 member.
- 4 representatives for the Tier 2 members.
- Key personnel from the University of Sheffield.
- Each Tier 1 partner may also nominate an observer who may attend the vote but who may not vote in any decision being taken.
- Half the Board Members must be in attendance and at least half of those present must represent commercial partners for the meeting to be quorate. Decisions are taken by a simple majority.



Becoming an AMRC member

We offer two levels of membership, tailored to suit the needs of companies and the annual membership fee contributes to our shared resources, including generic research projects.

Tier 1 membership

Costs £200,000 per year in cash or in kind.

Tier 1 members have an individual seat on the AMRC Main Board, giving them the opportunity to determine the AMRC's strategy and the direction of its research, in addition to being able to access the AMRC's R&D capabilities and the results of Board and Directed Generic Projects. They can also propose specific projects to the board for approval.

Tier 2 membership

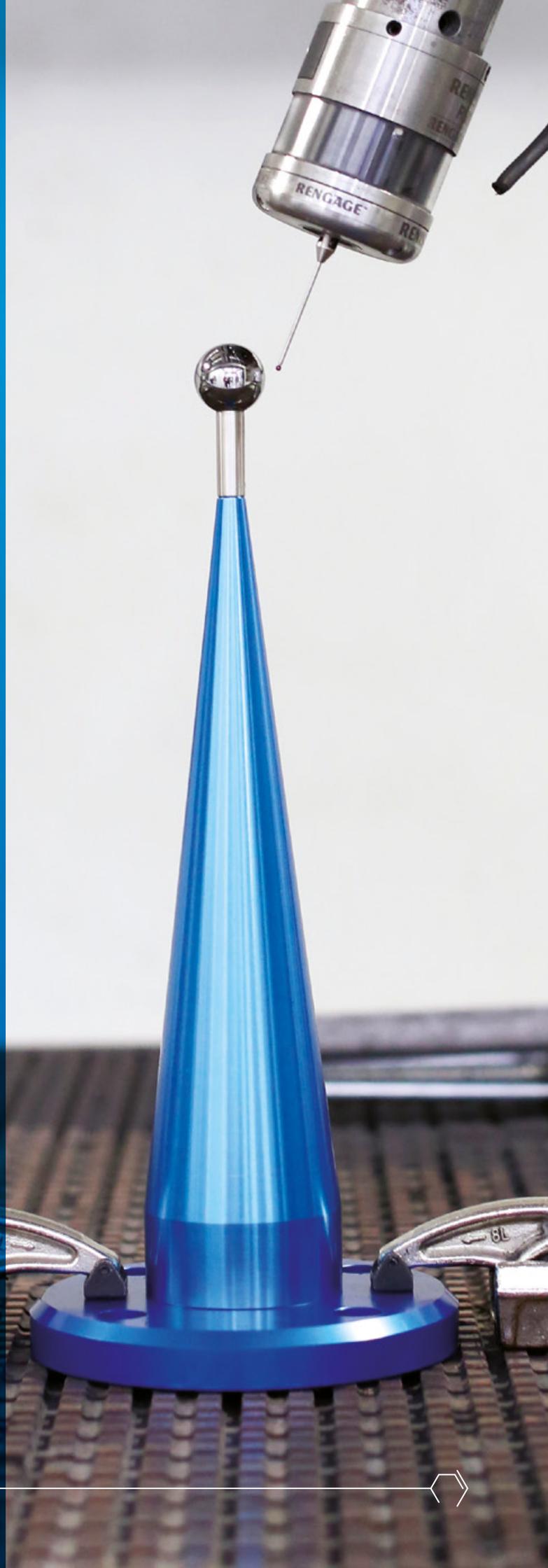
Costs £30,000 per year in cash or in kind.

Tier 2 members have access to the AMRC's R&D capabilities, the results of Board and Directed Generic Projects and the opportunity for networking and supply chain development. Four board members represent all Tier 2 members.

Applications are usually submitted following discussions with AMRC business development managers and directors, to make sure that membership is right for your business and to decide which Tier of membership is appropriate.



If your company is interested in becoming a member, please contact **Julia Yeardley** at j.yardley@amrc.co.uk



Service	Tier 1, Cash	Tier 1, In kind	Tier 2, Cash	Tier 2, In kind	Non-members
Total subscription	£200,000		£30,000		Nil
Access to the AMRC's world-class facilities and information	✓	✓	✓	✓	X
Industry recognition through association with a world-class centre of excellence	✓	✓	✓	✓	X
Determine strategy and research direction	✓	✓	X	X	X
Allowance to specify Directed Generic Projects in the AMRC	£133,333	Nil	£20,000	Nil	Nil
Access to results of all AMRC Board Generic Projects	✓	✓	✓	✓	X
Access to results of all AMRC Directed Generic Projects	✓	✓	✓	✓	X
A seat on the Main Board and a vote in any decisions	✓	✓	X	X	X
A say in who is to represent all Tier 2 companies on the Main Board	X	X	✓	✓	X
A seat on the Tech Board and a vote in any decisions (eg. for agreement on Board Generic project spend)	✓	✓	X	X	X
A say in who is to represent all Tier 2 companies on the Tech Board	X	X	✓	✓	X
Delegates invited to attend Road Mapping sessions	✓	✓	✓	✓	X
Delegates invited to attend Technology Portfolio Planning sessions	✓	✓	✓	✓	X
Delegates invited to attend the Tech Fellows Conference	Unlimited	Unlimited	Unlimited	Unlimited	X
A printed copy of the AMRC Journal	✓	✓	✓	✓	X
Networking opportunities with companies along the supply chain	✓	✓	✓	✓	X
Access to AMRC research capabilities by commissioning specific research paid for separately to the membership	✓	✓	✓	✓	✓

“Our work with the AMRC is on track to save BAE Systems millions of pounds in capital and operational costs over the coming years.”

Austin Cook, BAE Systems.

“Using the Medical AMRC’s range of skills and experience, they delivered a design that fit the brief perfectly. We will be more than happy to work with them again on further projects, and look forward to it.”

Joel Treen, JRI Orthopaedics.

“The VR project with the AMRC is a step change in how we design our new engineering projects and has the potential to generate significant cost savings.”

Nevil Muncaster, Director of Asset Management, Yorkshire Water

“For an SME to be able to access this technical level of knowledge to develop a project or resolve manufacturing issues is incredible.”

**Ken Shackleton, Managing Director,
The Cardboard Box Company**



“The manufacture of full scale demonstrator components at the AMRC validated the new approach in readiness for the launch of our new high technology disc factory near Newcastle. I am confident that the methodology developed through this project can now be used and applied to similar complex process challenges.”

Steven Halliday, Rolls-Royce.

“We evaluated several options to achieve this objective but the opportunity created by the AMRC at the University of Sheffield was compelling. At the AMRC, we have access to some of the world’s finest composites and materials research capabilities, and I look forward to building a world-class facility and talented team at the new McLaren Composites Technology Centre.”

Mike Flewitt, CEO, McLaren Automotive.



AMRC

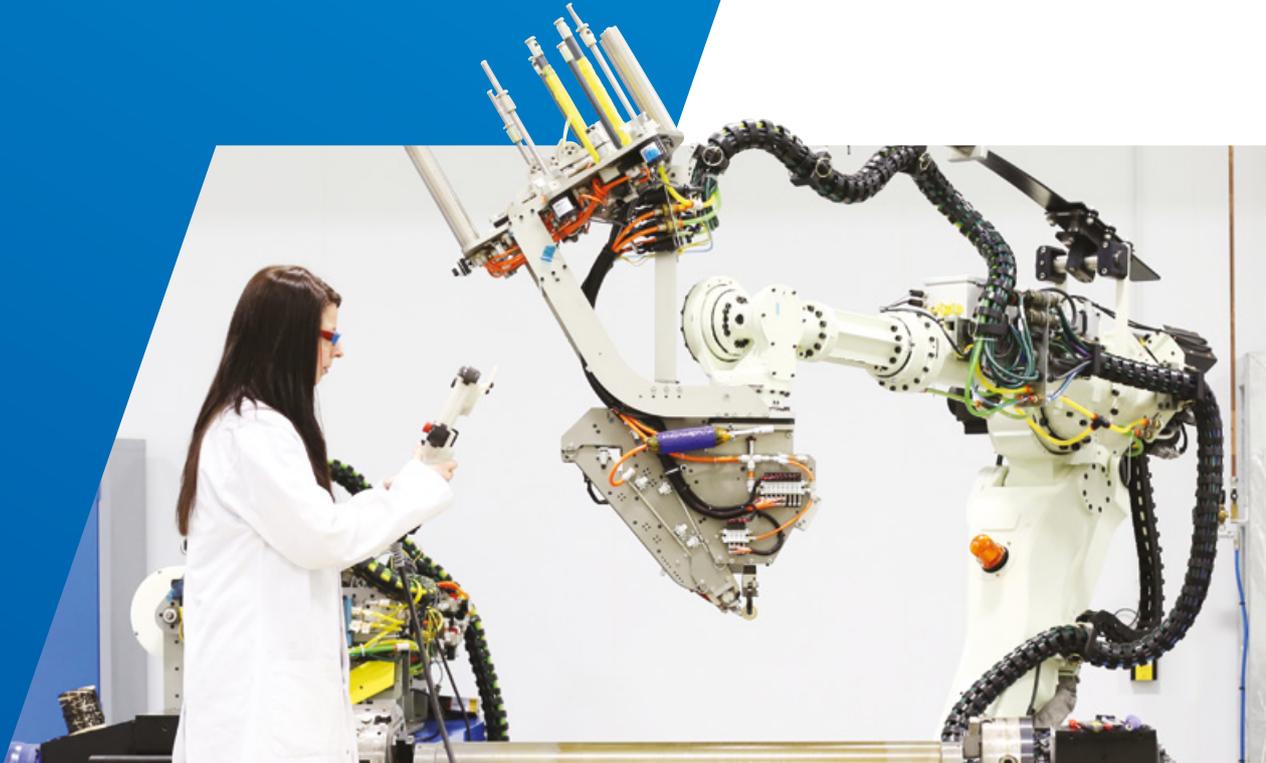
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