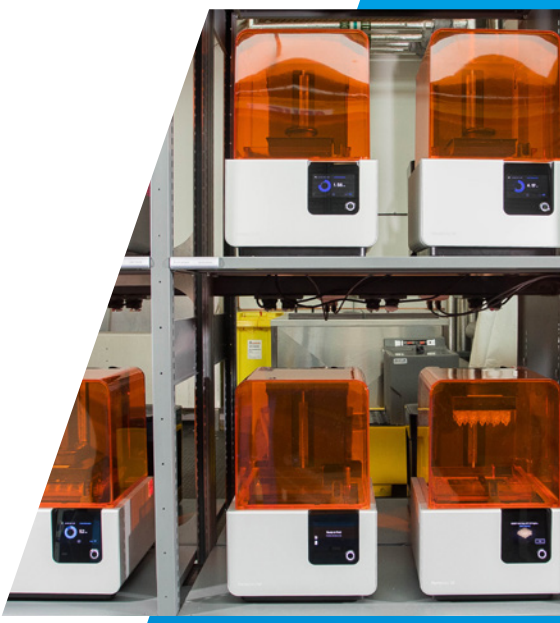
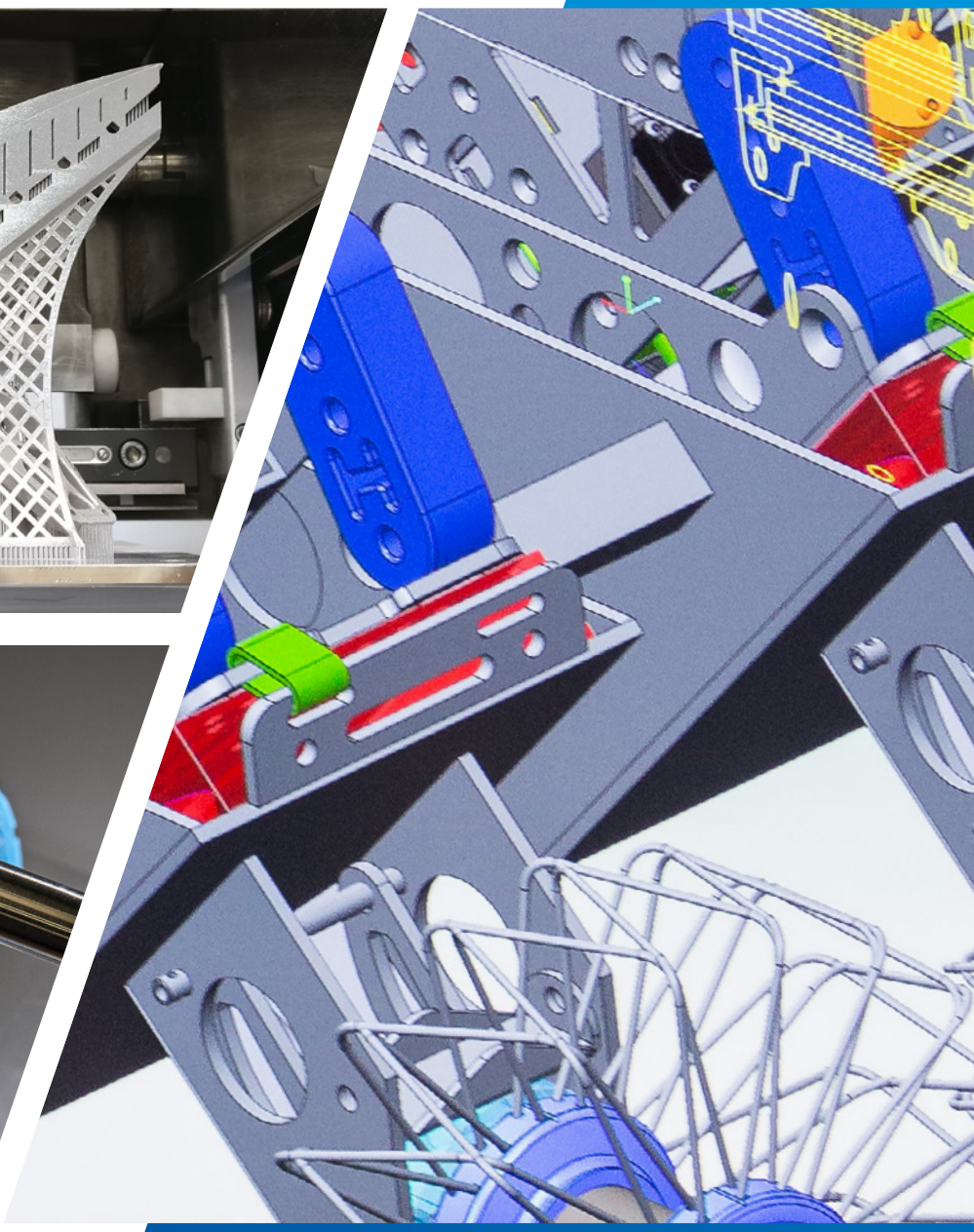
AMRC
ADVANCED MANUFACTURING RESEARCH CENTRE

The University Of Sheffield.



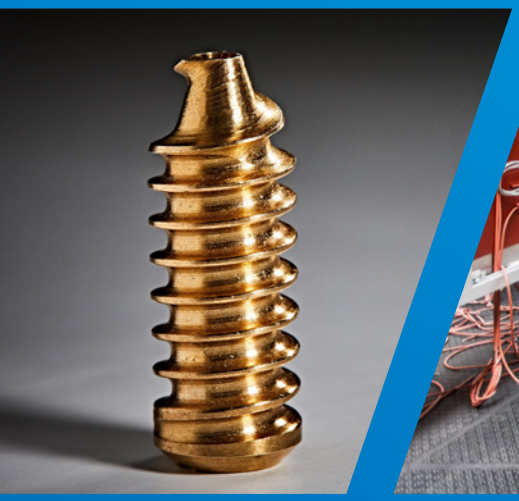
Design and Prototyping Group

Capability directory



amrc.co.uk

CATAPULT
High Value Manufacturing



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.

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.

Our main research area themes are:

- **Stage gate product development**
- **Design thinking**
- **Design for additive manufacturing**
- **Analysis**
- **Mechanical design**
- **Electrical design**

For more information, contact:

Craig Roberts, Head of Design and Prototyping Group
c.roberts@amrc.co.uk

The AMRC Design and Prototyping Group can bring a wide range of capabilities and expertise to our industrial partners.

Technical capabilities

Click page to jump

Our technology teams develop the techniques and underpinning science that can deliver significant improvements in engineering performance, including:

To put this expertise into practice, we work with an array of state-of-the-art technologies located in the AMRC Design Prototyping and Testing Centre.

We have a wide variety of available technologies, many of which are optimised for specific prototyping applications. Our resources are available for collaborative research and development projects, giving companies the capability to develop innovative and optimised engineering solutions.

See next page for: **Equipment capabilities**.

Equipment

Click page to jump

The following pages give full details of our equipment, housed in the AMRC Design Prototyping and Testing Centre.

Laser cutting

Machining

Additive manufacturing

Polymer

Metal

Inspection & validation

Digital Lab

See next page for: **Software and Design Tool capabilities.**

Software and Design Tools

Click page to jump

The AMRC Design and Prototyping Group has access to advanced software and design tools to support visualisation, prototyping, simulation and manufacture.

CAD

Topology optimisation / Generative design

Metal AM build preparation

Digital Design

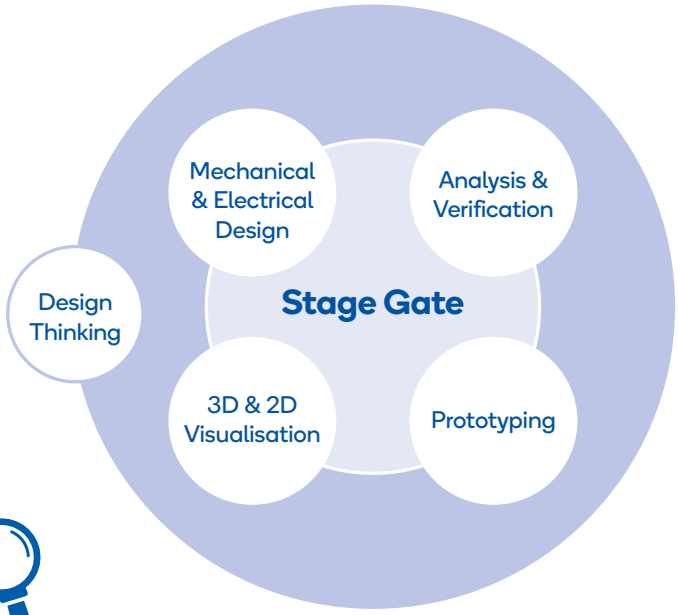
Stage Gate Product Development

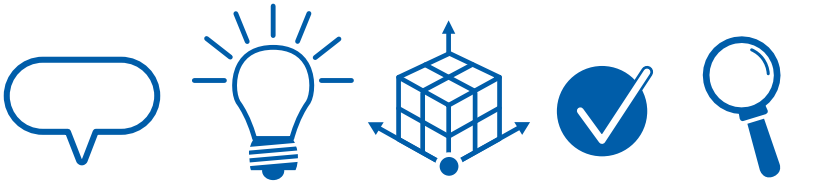
The Design and Prototyping Group has created a five stage design and development process, moving from Initiation and Concept Generation, through to Detailed Design, Validation and Lessons Learnt.

The brief is defined and set during Initiation, initial ideas are explored during Concept Generation, after which the chosen design is developed in the Detailed Design stage.

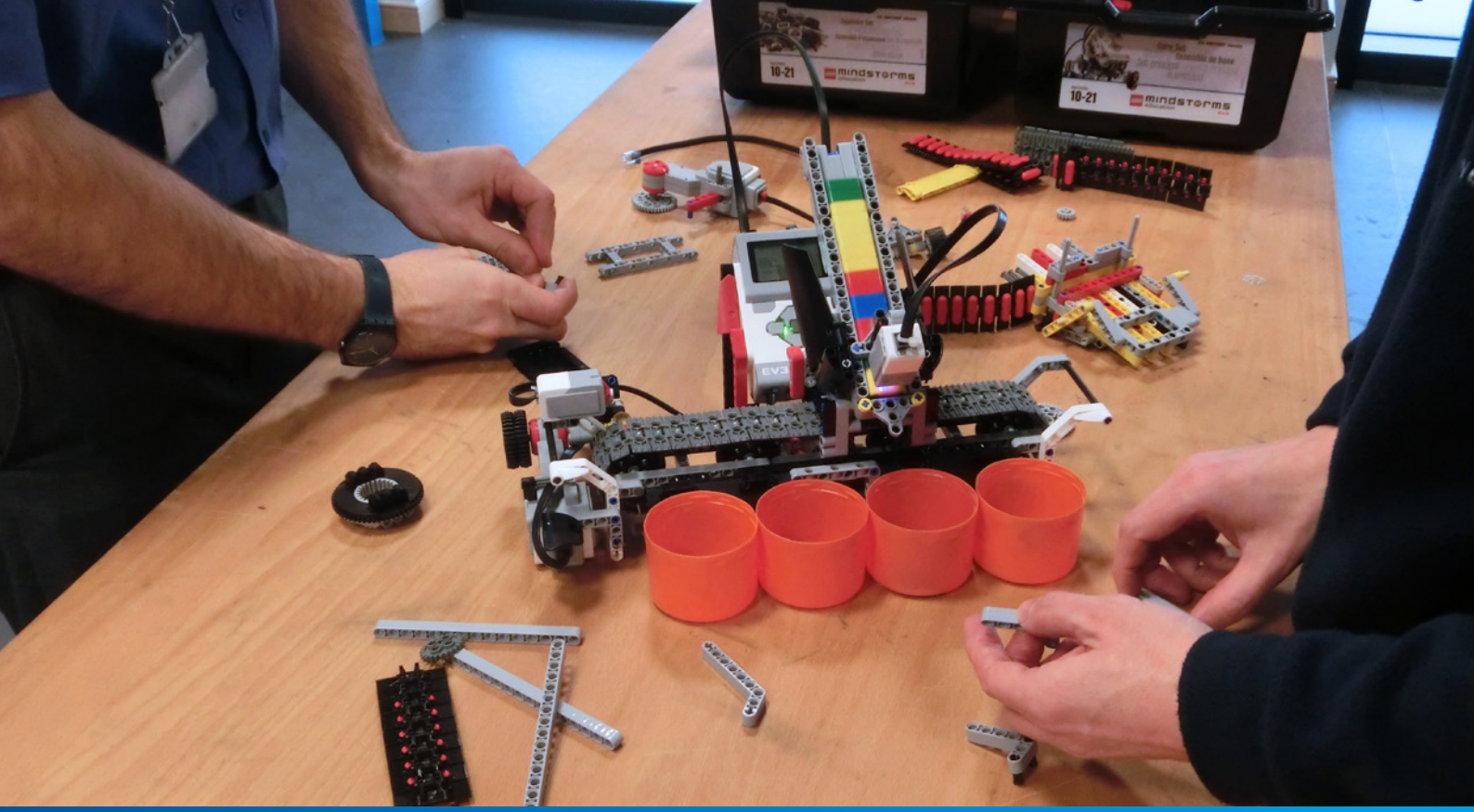
Prototyping and testing takes place at the Validation Stage and the final, critical stage, Lessons Learnt, ensures our future projects benefit from the outcomes of past projects.

Each stage of the process is supported and monitored by using activity checklists. As no two projects are the same, we select from a wide range of tools and techniques to develop a bespoke approach for each project.





Initiation Concept Design Validation Learnings



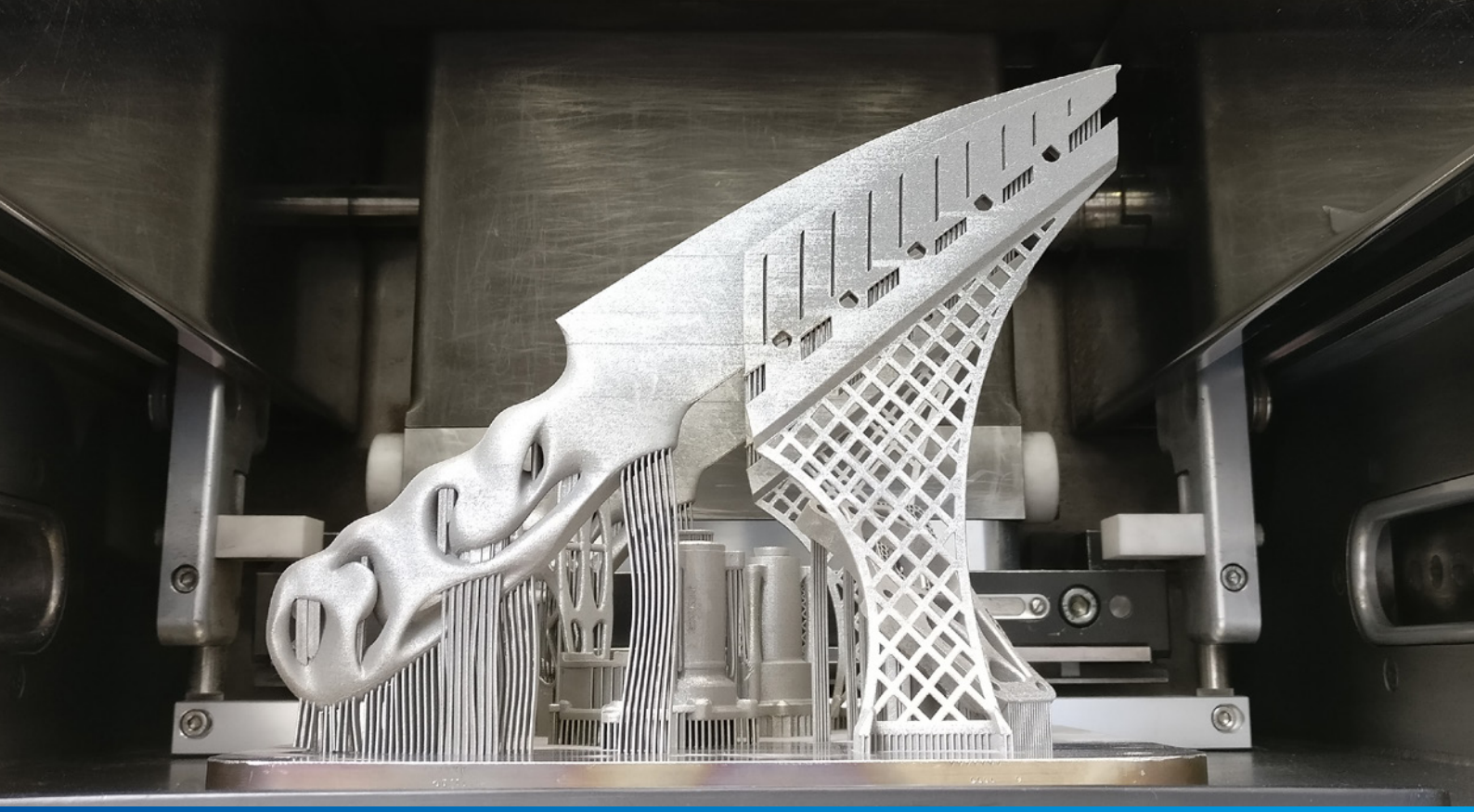
Design Thinking

The Design and Prototyping Group applies the latest research to the design process to create a hybrid design methodology, called Storyboard Design. The technique allows designers to overcome critical issues faced in new product development, which include:

- Avoiding fear of judgement.
- Cognitive Inertia – where familiar assumptions aren't challenged.
- Production Blocking – the tendency for one individual's ideas to dominate during a group discussion.
- Social Loafing – where some people working in a group put in less effort than if they were working on their own.

The process also takes account of the availability of equipment to produce low cost prototypes in the early phases of the design, reducing the likelihood of 'sunk cost thinking' where investment in what has already been done influences future decisions.

Storyboard Design is a fast, clean and efficient way of producing a number of unique ideas that can be incorporated in complete product designs.



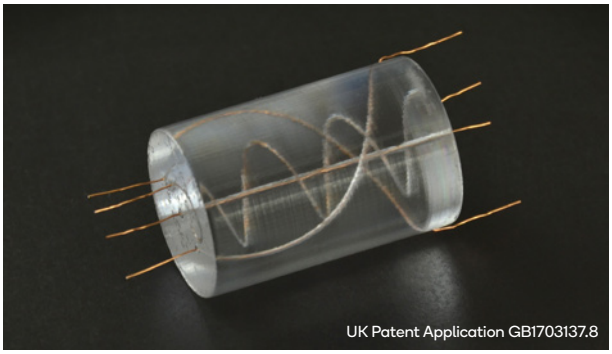
Design for Additive Manufacturing

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

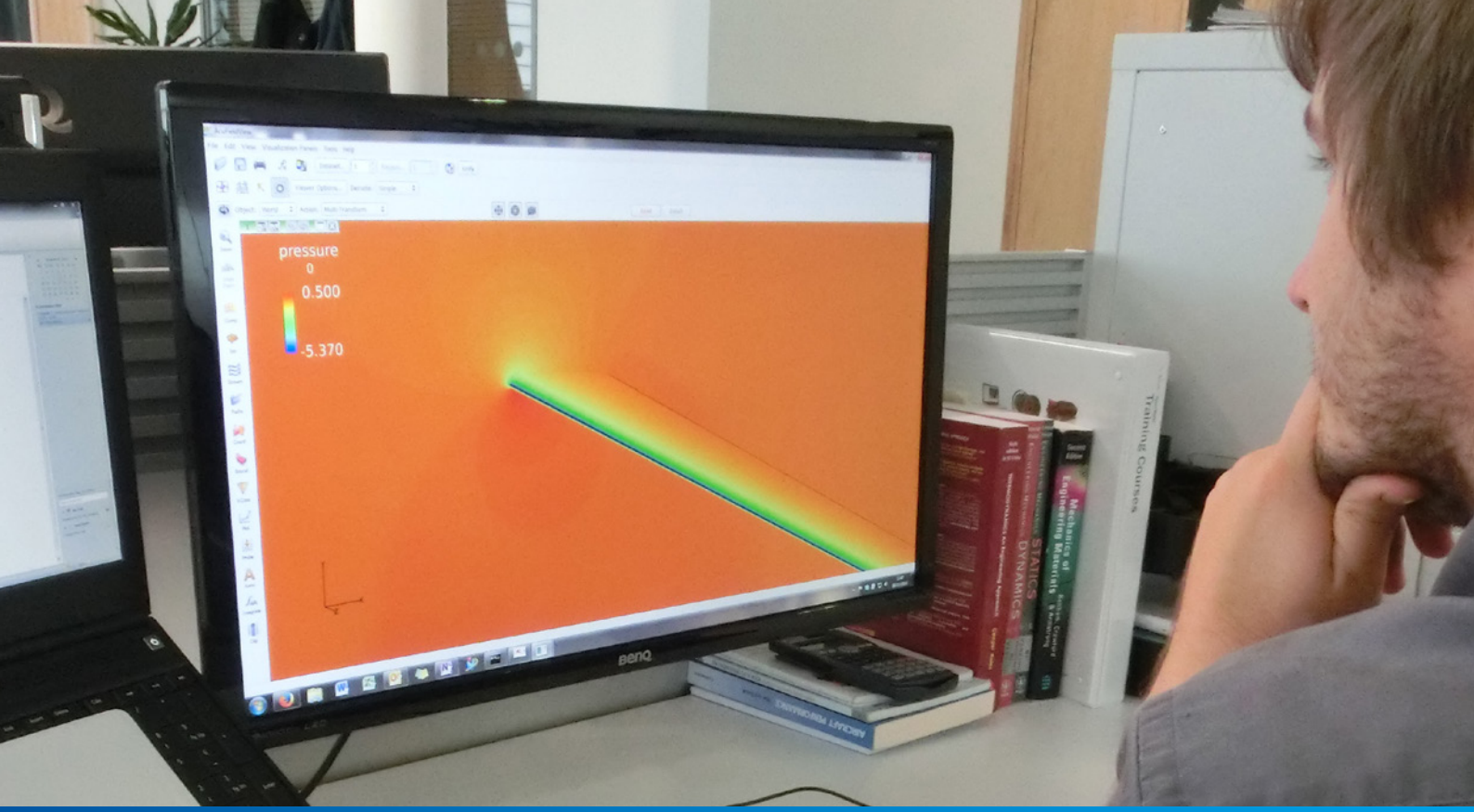
To exploit the maximum benefits of Additive Manufacturing it is necessary to re-think the design process. With our dedicated team of design engineers with experience of and access to the latest additive manufacturing processes, we are able to fully optimise the product design for the manufacturing route.

We have developed specialist knowledge in the areas of:

- Pushing the capability of AM systems
- Optimising build layout and support strategies
- Topology optimised and generative designs for lightweight structures.
- Application of fused deposition modelling (FDM) technique
- Application of metal AM from design, manufacture and testing



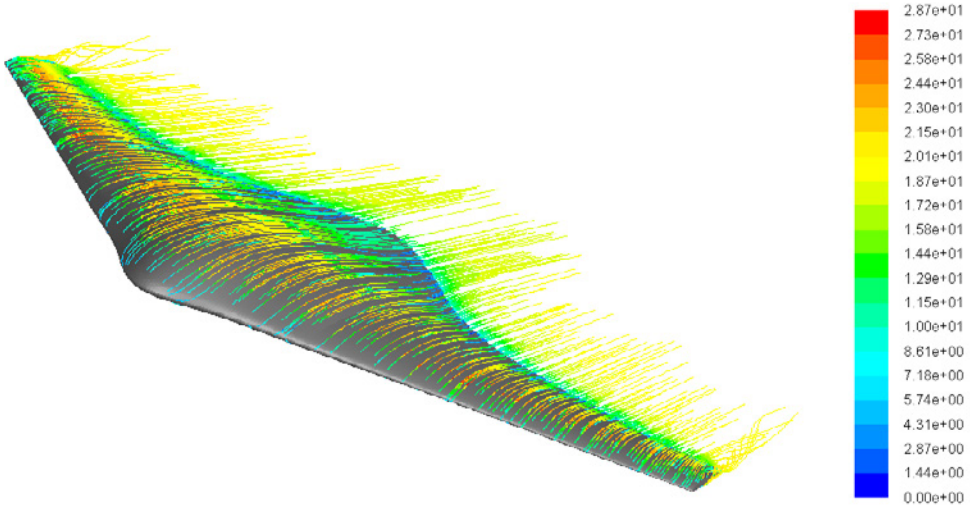
UK Patent Application GB1703137.8



Analysis

Our Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) tools allow us to undertake a variety of analytical tasks. We have the capability to develop and validate analyses for many structural, fluid flow and thermal design questions.

Our HyperWorks software suite allows us to create goal driven optimisation studies using tools such as shape morphing or topology optimisation. These tools can create designs which mimic biological organisms, such as dragonfly wings, bird bones and other organic structures.



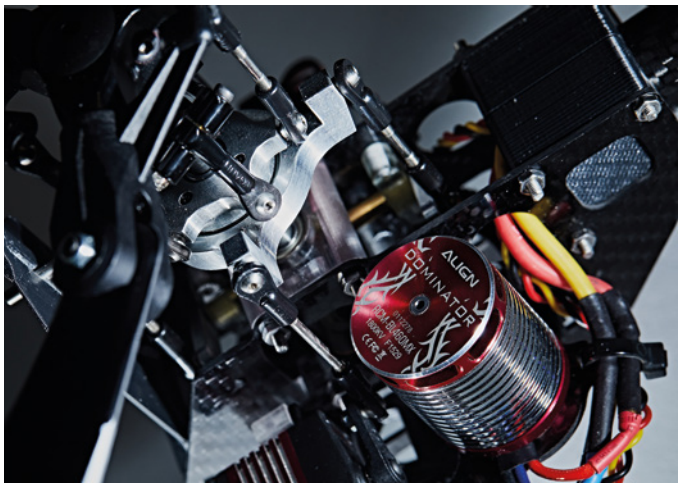
Mechanical Design

The Design and Prototyping Group has a wide range of mechanical engineering expertise, having completed a diverse array of projects from sectors including aerospace, automotive, healthcare, energy and heavy industry.

Our success is based upon experienced design engineers using sound engineering principles combined with state-of-the-art design, analysis and prototyping tools. Our engineers work to an in-house drawing standard (based upon BS 8888), and are fully conversant with Geometric Tolerancing and Model Based Definition techniques.

We are leaders in the field of additive manufacture, having designed and built the world's largest high speed sintering machine for polymers. Our experience in design for additive manufacture resulted in our highly innovative, globally recognised 3D printed UAV's, and a catalogue of successfully completed customer projects.

In order to hone our skills, we also conduct in-house research projects. These have resulted in a novel method of inserting wires into 3D prints, an innovative confined space drilling gearbox and benchmark studies aimed at validating our analytical techniques.



Digital Design

The main focus for our Digital Design Team is to research and demonstrate the state of the art in Agile digital prototyping techniques. The team are based in our brand new Digital Lab (see page 26 for details on equipment).

The team consists of multi-disciplined engineers and academics with over twenty five years combined industrial experience. They have industrial product and systems development experience with a diverse set of skills including electronics, software and visualisation. The team have a qualified Scrum master (PSMI) to lead Agile methodology and have cross-sector project experience including Nuclear, Aerospace and Medical.

Digital Design Skillset

- Electronics Design
- Software Development
- Control Systems Design
- AR/VR Visualisation

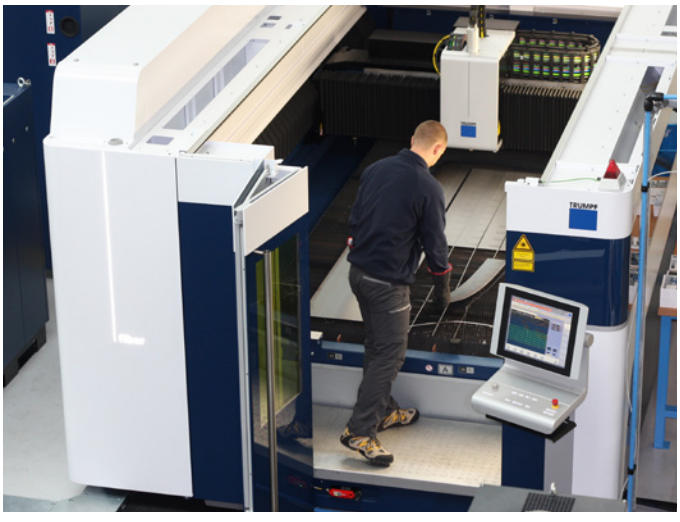
Software capabilities

- Altium Electronics Design
- Embedded Microprocessor Development
- QT Embedded GUI Development
- Microsoft OS Development (Desktop, Azure Cloud)
- Android / IOS mobile development
- Unity
- Vision Render
- Blender
- 3DS Max
- Matlab/Simulink
- NI Labview
- EPlan Electrical Design

Trumpf TruLaser 5030 fiber

Laser cutter for thin and thick sheet metals.

The TruLaser 5030 is a high-performance laser cutting machine capable of high precision on metal sheets. The machine features a 3 kW TruDisk 3001 fibre-guided laser with a beam quality of 4 mm mrad.



Type	2-axis fibre laser cutter
X-axis travel	3000 mm
Y-axis travel	1500 mm
Z-axis travel	115 mm
Max material thickness	Mild steel: 20 mm Stainless steel: 15 mm Aluminium: 15 mm Copper: 6 mm Brass: 6 mm
Max axis speed (simultaneous)	265 m/min
Max laser power	3 kW

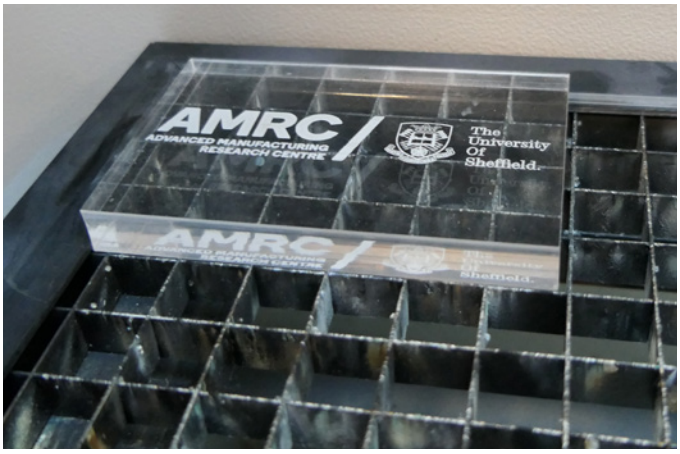
Trotec SP500

Large format, CO2, cutting, and engraving system for high volume production and large surface materials.

The laser has a work area of 1245 x 710 mm. The system is offered in power levels from 60W-200W.

It can cut a wide range of engineering plastics, natural rubber, leather and wood and engrave a wide range of engineering plastics, natural rubber, leather, wood, painted metals, stone and glass.

We can mark materials such as anodised aluminium and, using a marking compound, a range of metals, including steel, titanium and aluminium.

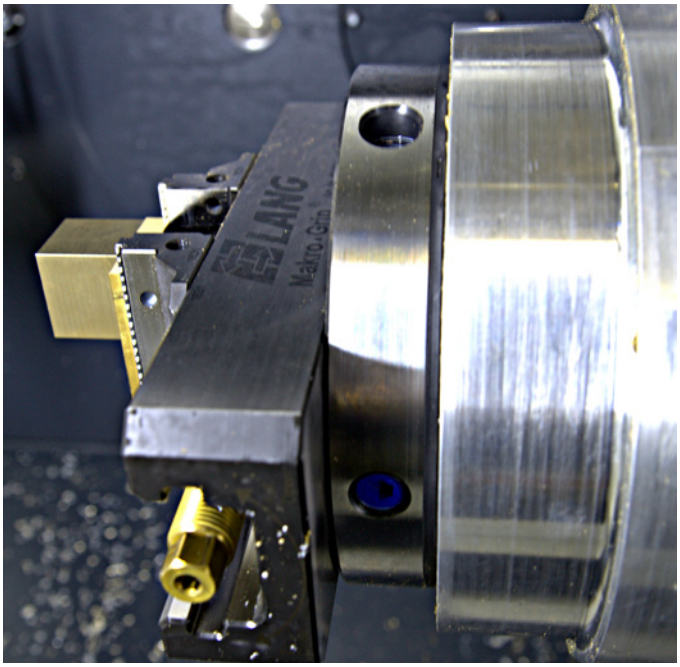


Type	2-axis, CO2 laser cutter
X-axis travel	1245 mm
Y-axis travel	710 mm
Z-axis travel	112 mm
Max material thickness	Cutting: 20 mm acrylic, 15 mm plywood/MDF
Max processing speed	2.54 m/sec
Max laser power	120W

DMU 50 Ecoline

Universal milling machining for five-sided machining.

The DMU 50 offers accurate five-sided machining of complex workpieces. The patented NC swivel rotary table enables an accuracy of up to 0.008 mm on the direct measuring system, or 0.02 mm for indirect measuring.



Type	3 + 2 axis milling machine
X-axis travel	500 mm
Y-axis travel	450 mm
Z-axis travel	400 mm
B-axis travel	-5° to +110°
Rapid traverse	2,160°/min
Clamping surface	Φ630 x 500 mm
Load height	790 mm
Max table load	200 kg
Max torque	83 Nm
Max power	13 kW

Piranha 1325

The Piranha 1325 CNC router is a 3 axis machining centre for wood, plastics, and composite boards.

The machine is equipped with a vacuum table and extraction system allowing us to cut most types of soft material. Integral extraction gives a dust free working environment.

Bed size	1300 x 2500 (the usable size is slightly less than this)
Resolution Accuracy	0.01mm/100mm
Spindle	Water Cooled 5.5KW (Single Phase - 4.5KW)
Spindle Speed	0-24,000 RPM
Cutter size	Up to 13 mm shank ER25
Interface	USB - Hand Controller
Materials	MDF, Plywood, Hardwood, Melamine Laminates, Solid Surface Materials, Foam Core, Corrugated Plastic, Aluminium, Di-Bond, Soft Metals
Software	Vectric Aspire V9.5
Files supported:	DWG, DXE, EPS, AI, PDF, BMP, JPG, TIF, GIF

Formech 1372 Vac Former

Vacuum forming machine

Used to form plastics over wood, MDF or aluminum moulds. Ideal for prototyping and small batch production, the machine is capable of using a wide range of thermoformable materials to a relatively large size.

We have used it for producing:

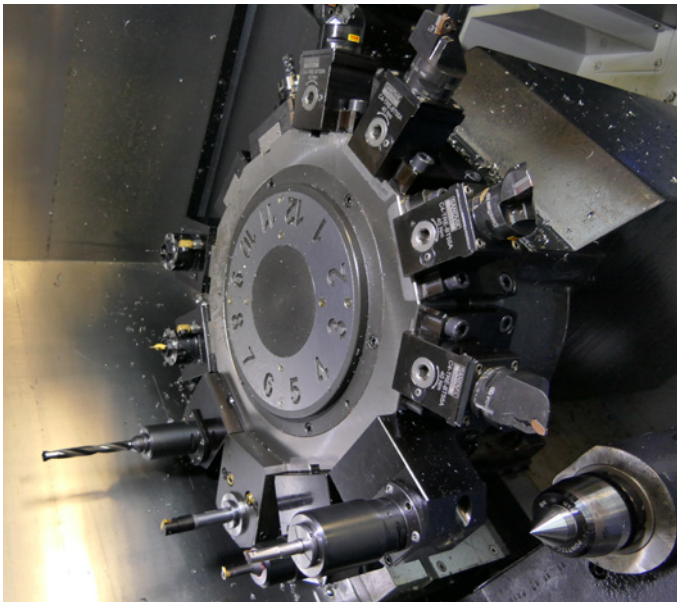
- Tanks
- Covers
- Enclosures
- Moulded decorative panels
- Tray inserts

Forming area	1330 x 620 mm
Sheet size	1372 x 660 mm
Max depth of draw	420 mm
Max material thickness	6 mm
Materials	• Acrylonitrile Butadiene • Styrene ABS • Polyester Copolymer PETG • Polystyrene PS • Polycarbonate PC • Polypropylene PP • Polyethylene (sheet and foamed sheet) • PE (HDPE) • Polyvinyl Chloride PVC • Acrylic PMMA
Heating zones	52 kW
Heater type	Quartz controlled by a heating pyrometer

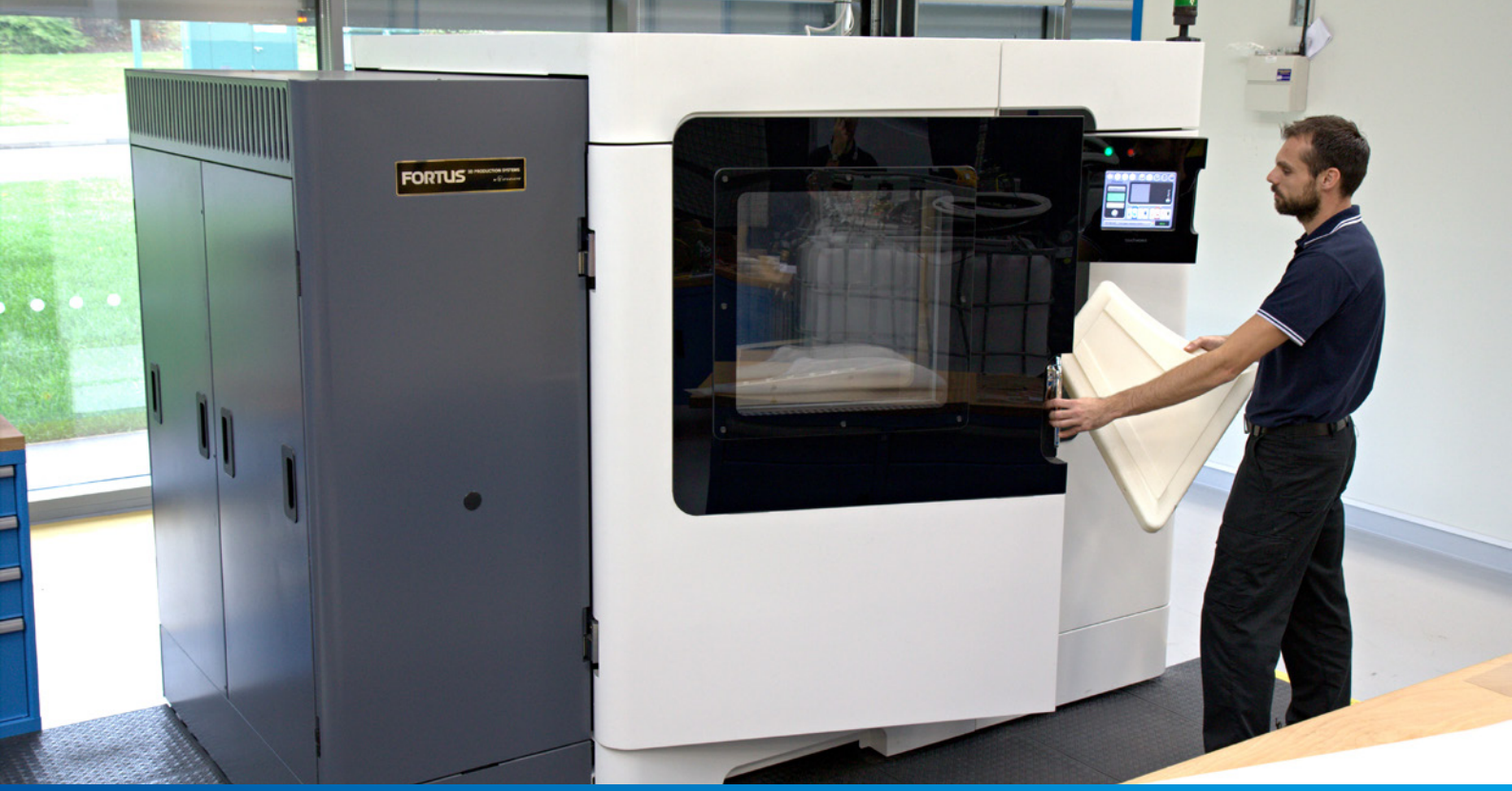
Doosan Puma GT2100M

Turning Centre

The GT2100 series lathes provide manufacturers with increased part accuracies and repeatability's, superior cutting performance and greater process reliability.



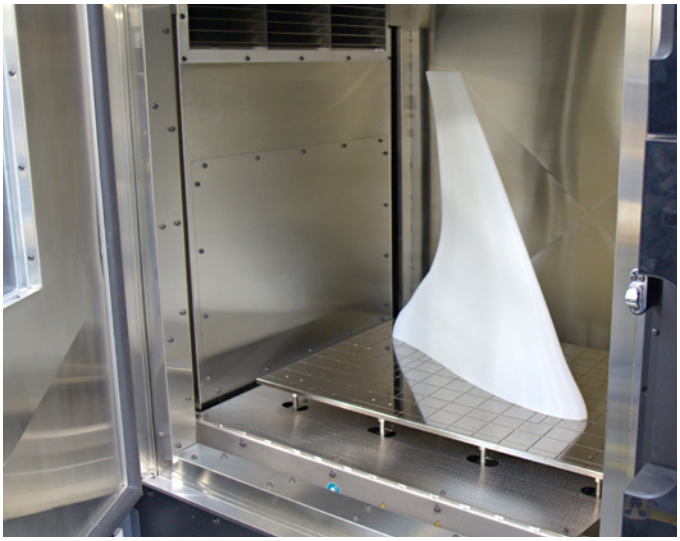
Chuck size	8"/10"/12"
Bar capacity	250 mm
Maximum swing	250 mm
Maximum turning diameter	250 mm
Maximum turning length	0.125 mm
Spindle	VisiJet SL HiTemp
Milling spindle (model dependant)	Up to 7.5 kW/5000 rpm
Turret	12 (std)/24 (option) position
Control	Doosan-Fanuc i Series or Siemens 828D



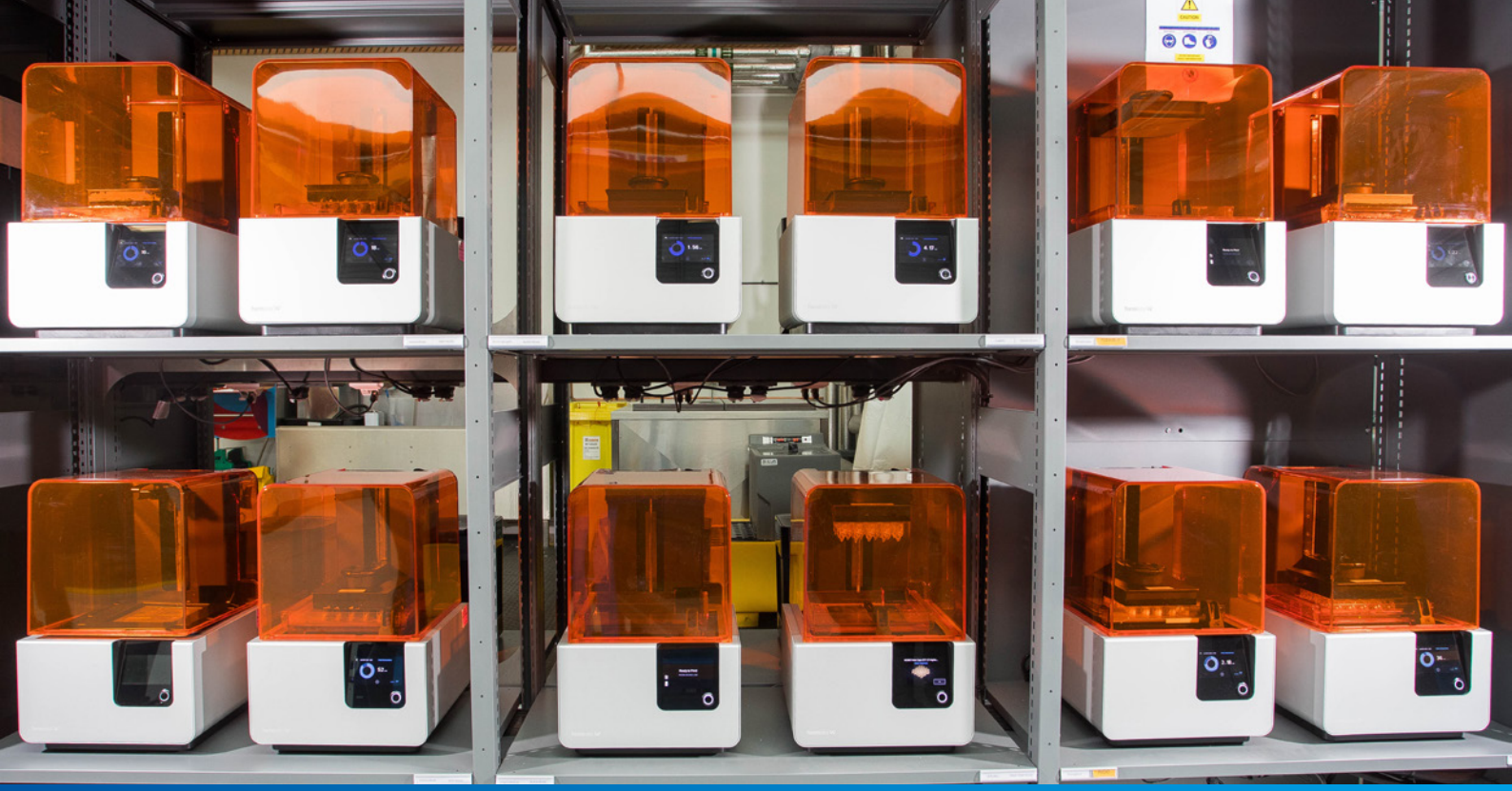
Stratasys Fortus 900mc

Large, 3D-printing centre for high-performance plastics.

The Fortus 900mc builds large, accurate and repeatable parts from high-performance thermoplastics. In addition to demanding 3D-prototyping applications, the Fortus is suitable for creating fixtures, tooling and end-use parts. It offers a choice of three layer thicknesses and nine material options.

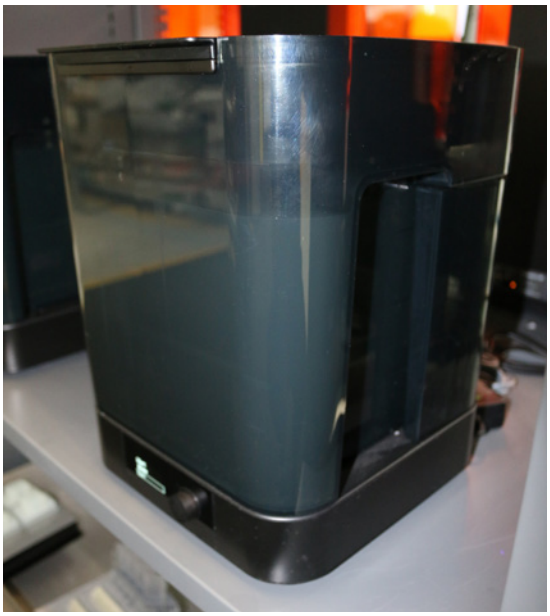


Type	Fused deposition modelling (FDM) machine
X-axis travel	914 mm
Y-axis travel	610 mm
Z-axis travel	914 mm
Layer resolution	0.330 mm / 0.254 mm / 0.178 mm
Accuracy	±0.09 mm absolute accuracy, or ±0.0015 mm per mm build (whichever is greater)
Model materials	ABS - M30 BLK



Formlabs Form2 printer bank (Photopolymer) Laser based

The Form 2 delivers high-resolution parts at a fraction of the cost and footprint of industrial AM machines. Stereolithography (SLA) AM uses a laser to cure solid isotropic parts from a liquid photopolymer resin.



12 x Form 2 printers

Technology	Stereolithography (SLA)
Laser spot size	140 microns
Laser power	One 250 mW laser
Build volume (W x D x H)	14.5 × 14.5 × 17.5 cm
Layer thickness	25 – 300 microns

4 x Form Wash and Form Cure systems

Temperature	An advanced heating system precisely controls curing temperatures up to 80 °C
405 Nanometres	13 multi-directional LEDs emit the optimal wavelength of light for curing Formlabs materials
Turntable	A rotating turntable (1 RMP) provides uniform exposure during post-curing

Photocentric Liquid Crystal Precision 1.5

Precision 1.5 is a standalone unit ideal for detailed prints, in particular jewellery, dentistry and figurines.

Technology	Daylight polymer printing
Dimensions (W) x (D) x (H)	38 x 35 x 58 cm
Weight	15 kg
Power requirements	100–240 V, UK/USA/EU plug
LCD specification	5.5"(2560 x 1440 px)
Connectivity	USB
Printer control	Interactive 7"Touch-screen
Homing	Pre-set homing
Resin fill system	Manual
Build Volume	121 x 68 x 160 mm
Layer thickness	25, 50, 100 microns
XY pixel density	47 microns
Cure speed at 100 micron	4-11 sec/layer (depending on resin)

Stratasys F170 (Bank of four)

The F170s series works with a range of materials – so you can produce complex parts with flexibility and accuracy. And it includes advanced features like Fast Draft mode for truly rapid prototyping, and soluble support to prevent design compromise and hands-on removal.

System size	1626 x 864 x 711 mm
Weight with consumables	227 kg
Build tray size	254 x 254 x 254 mm
Layer thickness	ABS 0.330 mm, 0.254 mm, 0.178 mm, 0.127 mm.
Accuracy	Parts are produced with an accuracy of +/- .200 mm, or +/- .002 mm, whichever is greater.

Markforged MK2 (FDM/CFF)

The Mark Two combines Markforged's unique continuous carbon fibre reinforcement with significant reliability for the strongest, most versatile parts in our portfolio. It is the only 3D printer in the industry that enables you to go from CAD to beautiful, strong, end-use parts in hours, making it ideal for manufacturing and industrial applications.

Build volume	320 mm x 132 mm x 154 mm
Plastic Materials	Onyx
Fibre Materials	• Carbon Fiber • Fiberglass • Kevlar • HSHT Fiberglass (High-Strength High-Temperature Fiberglass)
Z Layer Resolution	100 micron

RenAM 500Q

Multi-laser metal Additive Manufacturing for industrial applications.

The RenAM 500Q is a laser powder bed fusion additive manufacturing system designed specifically for the production of metal components on the factory floor. It features automated powder and waste handling systems that enable consistent process quality, reduce operator touch times and ensure high standards of system safety. The system build volume is 250 mm x 250 mm x 350 mm.

The RenAM 500Q is built using a Renishaw in house designed and manufactured optical system and control platform which forms the basis for our future additive manufacturing systems product range.

Fully dense components to near net shape manufacture.

Processing of components within a high purity Argon atmosphere at less than 100 parts per million oxygen levels. Minimal material waste as over 98% of powder is re-usable post processing.

The DPG are able to offer in-situ monitoring capabilities analysing thermal histories through measurement of reflected emissions from the melt-pool.

This technique provides an indication into any unexpected issues or defects with the build process.

Type	500 W x 4 Laser Powder Bed Fusion system
Build envelope	250 x 250 x 350 mm (X, Y, Z)
Layer resolution	Standard layers 0.03 - 0.06 mm layers can be optimised to run outside this range
Accuracy	Geometry dependant
Material	Ti-6Al-4V powder grade 23
Build rates	Up to 150 cm^3/hour

Desktop Metal Studio System

The Studio System eliminates lasers and loose powders often associated with metal 3D printing, making it safe to use in any facility. Unlike other systems, there is no third party equipment or special facilities required—just power and an internet connection.

From simplified model preparation to supports that are easily removed by hand, the Studio System makes it easy to print metal parts in-house. Integrated software automates the process to take the guesswork out of achieving parts with good metallurgy.

The system is designed to adapt to diverse business needs. The software auto-generates custom build plans optimized for multi-part jobs, while increased debind and sinter capacity enables scalable throughput for low volume production.

Printer

Build envelope	30 x 20 x 20 cm
Max build rate	16 cm^3/hr
Min layer height	50 µm

Debinder

Fluid vol	17.4 L (4.6 gal) max
Vapor management	No external ventilation required
Footprint	102 x 74 x 57 cm (h,w,d)

Furnace

Gas	2 x 900L onboard canisters, external gas connectors
Max temperature	1400 °C
Footprint	162 x 138 x 75 cm (h,w,d)

Nikon Metrology CT Scanner

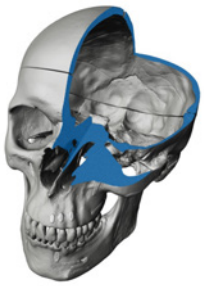
CT scanning provides vital non-destructive information to aid design optimisation.

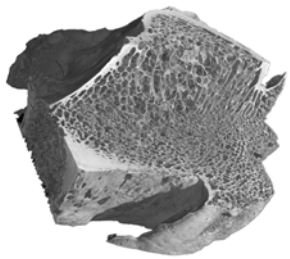
X-ray computational tomography is an essential capability for developing design and manufacturing processes for new technologies.

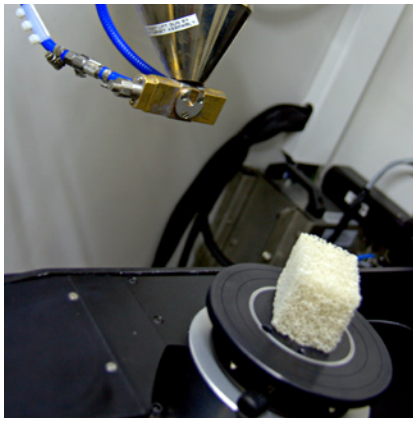
Insight into organic and inorganic structures provides critical information which feeds back into design optimisation.

- Non-destructive inspection of complex internal structures.
- Measure internal dimensions with high accuracy without sectioning part.
- Inspect porosity and defects for developing new design processes for additive layer technologies.
- Inspect internal structures of a wide range of materials – composites, metals, polymers, ceramics, bone, foams.
- Compare scanned geometry to original CAD files to analyse variance and optimise design and manufacture.
- Fibre analysis to calculate fibre orientation and concentration, as well as deviation from predefined orientations.

Type	225 kV / 225 W and 320kV / 320 W micro focus X-Ray sources
Resolution	3 - 200 micron and 30 - 300 micron
Detector	Perkin Elmer 1620 flat panel 16-bit detector (2000 x 2000 pixels)
Geometric magnification	up to x150
Sample weight	up to 100 kg
Scanned artefact dimensions	Up to 600 (h) x 600 mm (d) 200 x 200 mm maximum scan envelope
Image processing and reconstruction	VGStudio MAX 2.2







Voltera V-One PCB Printer

The V-One prints double sided PCBs, dispenses solder paste, and is helping us to explore new materials and substrates.

HTC Vive VR

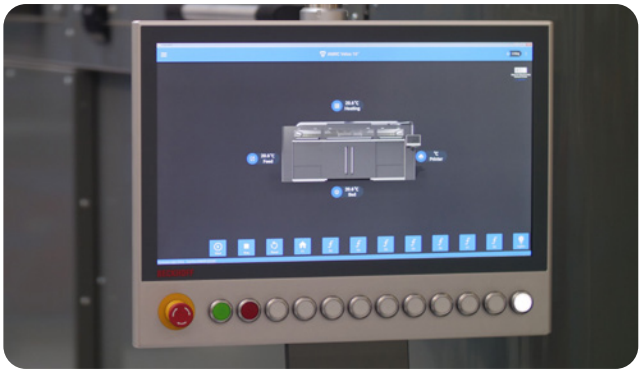
The HTC Vive is a virtual reality headset developed by HTC and Valve Corporation. The headset uses “room scale” tracking technology, allowing the user to move in 3D space and use motion-tracked handheld controllers to interact with the environment.

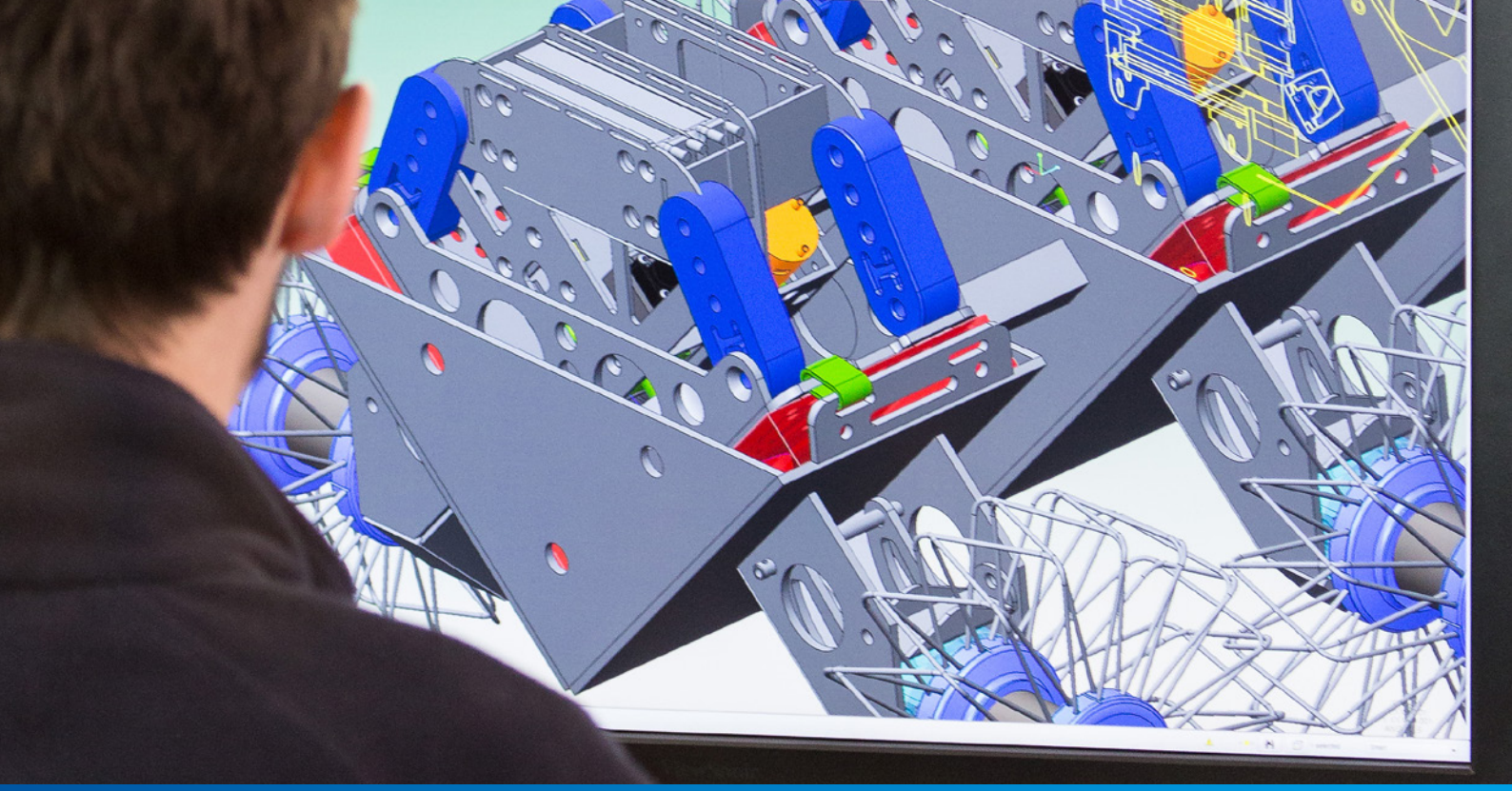
MS Hololens AR

HoloLens offers the most comfortable and immersive mixed reality experience available, with industry-leading solutions that deliver value in minutes – all enhanced by the reliability, security, and scalability of cloud and AI services from Microsoft.

Beckhoff Automation Systems

Beckhoff implements open automation systems based on PC Control technology. The product range covers Industrial PCs, I/O and Fieldbus Components, Drive Technology and automation software.





DPG have acquired an in-depth proficiency with a variety of software for design and analysis of demonstrators, proof-of-concepts and prototypes, a few examples of which are described below.

This also demonstrates how quickly and well the DPG engineers are capable of learning and using new equipment software for project related activities.

PTC Creo

Creo parametric has many product capabilities ranging from 3D solid part modeling to complex assembly modeling. Creo parametric can also enable the generation of 2D technical drawings to support 3D modeled geometry. Creo is the primary CAD application package the DPG use and is supported with Windchill PLM software allowing storage and uploads of Creo generated components.

ANSYS SpaceClaim

SpaceClaim is a multi-purpose 3D modeling software providing efficient solutions to common modeling tasks. SpaceClaim enables users to create, edit and prepare models for additive manufacture faster and more efficiently. SpaceClaim has a series of analysis tools to help ensure your model has adequate wall thickness and overhang protection in critical cases.

Blender

Blender is an open source 3D creation suite supporting the modeling, rendering, motion tracking, video editing and game creation.

Autodesk Fusion 360

Autodesk Fusion is a cloud-based CAD platform, allowing teams to collaborate easily and iterate quickly. In addition to part and assembly modeling, Fusion 360 can perform motion studies and simulations, create CAM programs and make photorealistic renderings.

Topology optimisation is a simulation based method for optimising the shape and size of component with a goal of minimising material use while maximising performance.

Optmisation routines can also be used to opitimise the form and size of complex lattice structures, which are commonly used for additive manufacture.

Altair HyperWorks OptiStruct

Altair HyperWorks offers an industry proven structural analysis solver OptiStruct. OptiStruct is a modern structural solver with comprehensive solutions for linear and nonlinear analyses across statics, dynamics, vibrations, acoustics, fatigue and multi-physics disciplines. OptiStruct has a unique solution to design lattices based on topology optimization.

Altair Inspire

Altair Inspire allows users to rapidly explore and assess designs for static loads, normal modes, buckling and motion through user experience. Altair Inspire allows DPG to undetake system simulation, structural performance, motion and fluid simulations as well as manufacturability.

Autodesk Lattice Topology Utility

Part of the Autodesk Netfabb suite, the lattice topology utility allows for the creation of optimal lattice structures. Iterative stress analysis simulations are conducted and changes made to the lattice. The result is a lattice which is stronger in areas of higher stress, and thinner in areas where strength is not needed.

Materialise 3-matic

Materialise 3-matic is a 3D modelling software program that enables the design optimisation and modification on mesh level, using CAD designs, scanned data and topology optimised models. Design your own structures in CAD and import them to Materialise 3-matic to grow your own library.

Renishaw QuantAM

Renishaw QuantAM accepts CAD exports in the form of .STL data and allows you to prepare your model for the AM process. This software is specifically designed for Renishaw AM platforms allowing tighter integration into the machine control software and the ability to accurately and rapidly review all build files for Renishaw AM systems.

Materialise Magics

Materialise Magics is a versatile software for STL preparation allowing you to convert files to STL, repair errors creating watertight data and edit the design and prepare the build platform. Magics can also be used to add logos, serial numbers and apply self-supporting hollows.

Netfabb Advanced Toolpath Utility

Advanced Toolpath Utility for Netfabb is a development environment based upon a generic driver platform for AM machines, which is used to generate machine specific build data. The model preparation, toolpath creation and machine exports are fully programmable using the JavaScript language.

Altium Electronics Design

Altium Designer is a PCB and electronics design software. Altium integrates a number of features including: circuit simulation: 3D MCAD-ECAD integration: design for high speed; printed electronics design; and Rigid-Flex PCB (combination of rigid and flexible substrates). Altium Designer offers powerful software tools for electronics design from rapid prototyping electronics to design for manufacture.

Qt

QT is a software development platform that allows us to create user interfaces and supporting back end code. QT has great cross-platform support, which makes it very useful for deploying on a number of different devices: tablets, phones, computers and embedded systems. We can quickly create software prototypes that can evolve with the needs of the project, not limiting ourselves to a specific device or operating system. All whilst relying on QTs industry-proven robustness.

Unity

Unity is a 3D visualisation, scripting, animation and authoring platform. It is commonly used for creating advanced video games, but has become one of the cornerstones of advanced visualisation for virtual reality, augmented reality and 3D content display for industrial applications. Unity also allows for flexible deployment, often allowing the same application to be deployable from mobile hardware, through to VR/AR devices and up to high end desktop deployments. Due to its popularity, there is excellent support for almost any use case and many vendors of visualisation hardware and software have ready made plug-ins and scripts to allow for easy integration.

Visual Studio

Visual Studio is an IDE (Integrated Development Environment), used to develop applications and software. It supports a wide range of programming languages which are commonly used in the different areas in which we work: Web based applications, embedded solutions, PLC control systems, visualisation and user interface programming, cloud platform development, AI and machine learning applications. Visual studio is an excellent resource due to its capabilities to help create code quickly and efficiently, and its functionality for debugging, performance analysis and deployment.

Visionary Render

Visionary Render is an industrial visualisation package which is often used for visualising complex CAD models, very large data sets, and point cloud scans. This software includes scripting functions to develop advanced tools, visualisations and interactions within the software itself. Visionary Render also supports many different display technologies, such as 3D displays, Powerwalls, VR headsets, and CAVE installations for any size and type of model being visualised.

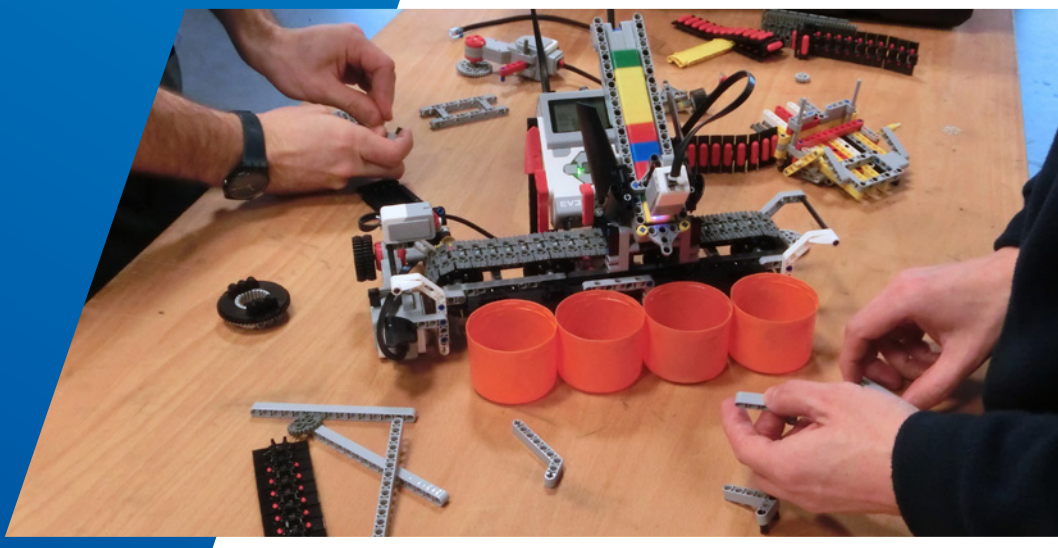
Matlab/Simulink

MATLAB and Simulink work in conjunction to combine textual and graphical programming to design your systems in a simulation environment. Engineers use Simulink to perform multidomain modelling and simulation, because you can reuse models across environments to simulate how all parts of the system work together.

National Instruments LabVIEW

LabVIEW offers a geographical programming approach that helps visualise every aspect of the application. This software can be used for hardware configuration, measurement data and debugging. This software application delivers point-and-click simplicity to challenging engineering problems by focusing on the specific needs of one industry.

AMRC/



AMRC
Design, Prototyping and Testing Centre
Advanced Manufacturing Park
Wallis Way, Catcliffe
Rotherham, S60 5TZ

e: enquiries@amrc.co.uk
t: +44 (0)114 222 1747
w: amrc.co.uk

@TheAMRC

CATAPULT High Value Manufacturing

UKRI Innovate UK

European Union
European Regional Development Fund