



**NATIONAL  
COMPOSITES  
CENTRE**

Delivering impact  
for the UK





# Overview

The National Composites Centre (NCC) is an independent, open-access technology centre. Its mission is to bring together the best people and the best technologies to address some of the world's most complex engineering challenges.

Headquartered at Bristol and Bath Science Park, the NCC delivers pioneering work to drive industrial transformation. Since it opened, this has included accelerating the development of new products, investing in the talents of our current and future workforce, and working with innovators, small and medium enterprises (SMEs), the supply chain and original equipment manufacturers (OEMs) to realise their growth ambitions. All of this anchored in the NCC's expertise as:

- the National Centre of Excellence for **composite** technologies, a critical enabling technology for many sectors;
- proficiency in the use of **digital engineering** to transform all aspects of the product lifecycle; towards improving time to market, productivity, and in-service support; and
- strengths in **sustainability**, in all elements from materials, design, reuse and recycle.

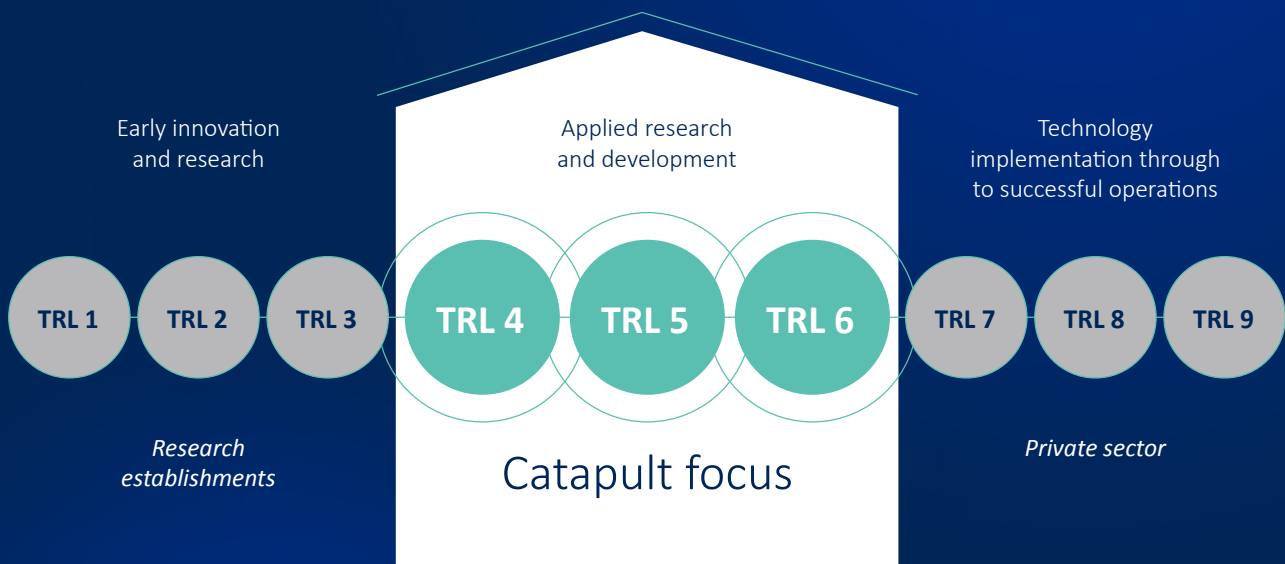
Together, these capabilities underpin the NCC delivering impact across a diverse range of sectors to deliver benefit to the UK, from aerospace to construction, and energy to space.

## Our purpose and structure

The NCC specialises in the translation and application of early-stage research, 'bridging the gap' between academia and industry; 'pulling through' and industrialising research to deliver impact. It does this with businesses of every size, from micro-enterprise to multi-national, providing a de-risked environment to design, develop, test and scale ideas and get them to market fast.

Translating research into application – bridging the 'valley of death'

**CATAPULT**  
High Value Manufacturing



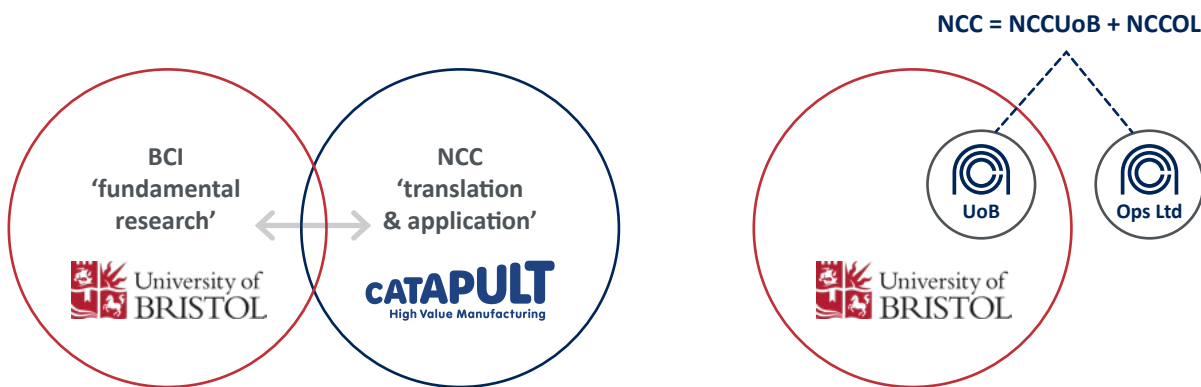
The NCC's 'best of both world's' structure underpins its success. A wholly owned, but independently operated subsidiary of the University of Bristol, the NCC has broad and deep academic networks.

This includes but extends beyond Bristol Composites Institute (BCI) to encompass over 100 universities and a plethora of Research and Technology Organisations (RTOs). As part of the High Value Manufacturing (HVM) Catapult, the NCC reaches across industry to both 'pull-through' research and set industry-led research challenges to keep the UK at the cutting edge.

## NCC structure

The National Composites Centre is wholly owned by the University of Bristol and split into two parts:

- A subsidiary company which runs the commercial operations and the staff (NCCOL)
- Part of the University which includes all of the research work and assets (NCCUoB)



## CATAPULT

High Value Manufacturing

Established in 2011, the HVM Catapult is a network of leading manufacturing and process research centres, backed by the UK's innovation agency, Innovate UK. The HVM Catapult serves to bridge the gap between business and academia, helping to turn great ideas into reality by providing access to world-class research and development facilities and expertise that would otherwise be out of reach for many businesses in the UK.

Its role is to help grow businesses and the contribution of manufacturing to the UK economy; investigate innovative technologies; scale up new products and processes; work with academic partners to build on research in the UK; shape manufacturing policy; and work with government and other bodies to develop training and skills to meet industry needs.





The University of Bristol is ranked within the top 10 universities in the UK and 55th in the world (QS World University Rankings 2024); it is also ranked among the top five institutions in the UK for its research, according to analysis of the Research Excellence Framework (REF) 2021; and is the 4th most targeted university by top UK employers. The University was founded in 1876 and was granted its Royal Charter in 1909. It was the first university in England to admit women on the same basis as men.

The National Composites Centre has a 'sister' composite research institute, Bristol Composites Institute (BCI), which sits inside the University of Bristol's Faculty of Engineering. This faculty undertakes fundamental research in the lower Technology Readiness Levels (TRL) while the NCC specialises in translation and application into industry.



## Our growth journey

The NCC has undergone a significant growth trajectory since it opened its doors.

**March 2010** – Bristol & Bath Science Park is announced as home to the NCC



**November 2011** – NCC is formally opened by the then-Secretary of State for Business

**May 2016** – UK Composites strategy reinforces the NCC's leadership role

## 2009

**November 2009** – Government announces £16m investment to establish a National Centre of Excellence for Composites



**July 2013** – NCC becomes part of the High Value Manufacturing Catapult

**CATAPULT**  
High Value Manufacturing

**November 2018** – Official opening of a new NCC satellite site based in Filton

**June 2010** – Airbus, AgustaWestland, GKN Aerospace, Rolls-Royce and Vestas become the NCC's five founding members



**December 2018** – NCC announces a £36.7m Government investment in 10 new cutting-edge digital manufacturing technologies for composites



**February 2023** – NCC becomes a Knowledge Transfer Partnership (KTP), a 'Knowledge Base' to help businesses innovate for growth



**May 2023** – NCC is announced as the future home of Isambard 3, a new TOP500-class supercomputer service for AI and high-performance computing (HPC)



**March 2023** – NCC becomes home to the West of England Space Hub- 'Space West'

**March 2019** – NCC launches NCC Connect, a new business unit dedicated to supporting small to medium-sized enterprises



**September 2023** – NCC is announced as the home of Isambard-AI, the UK's most powerful supercomputer



2024



## Our impact

The NCC strives to support people and businesses to be more productive and therefore to be more competitive, locally, nationally and internationally.

The NCC helps businesses to grow and also helps people to gain more appropriate skills to take up job opportunities in these growing businesses.

It does this through:

- Investing in differentiated partnerships;
- De-risking innovation and investing in capability development;
- Providing access to expertise, equipment, as well as research and development (R&D) space; and
- Connecting innovators to researchers and industrial partners.



Initial economic assessments suggest that over the last five years this has delivered:

**£59m** of direct gross value add (GVA) per annum through the annual generation of **50** enhanced products, processes, and services.<sup>1</sup> **£40m** GVA per annum being realised in the West of England region:<sup>2</sup>

**800 jobs** per annum created and sustained through the generated GVA. With a further **800** jobs being sustained in the supply chain, and **400** in the wider economy.

In terms of what this equates to in practice, on an estimated annual average the NCC has:

**Supported some 300 businesses** annually over the last five years, **90% of which had a footprint in the West of England**, and around **33% being SMEs**;

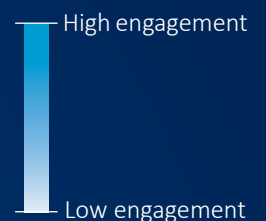
### Continued to grow its reach.

In 2023, engagement rates were more than double the five-year average, with an estimate of over **625 businesses engaged**, **40% of which were SMEs**; and

### Worked with companies at several different stages on their innovation and growth journey.

Almost half of the companies the NCC has worked with since 2020 have returned for additional support to deliver a broader portfolio of innovation programmes.

### NCC projects across the UK



Although commercial impact varies with every firm, it is estimated that within six years of investing in an enhanced product or service, turnover in the beneficiary firm is likely to increase by at least **16%**.<sup>3</sup>

<sup>1</sup> Scottish Enterprise Research in the impact of innovation on enterprises

<sup>2</sup> Based on an estimate that 70% of impact was retained in region.

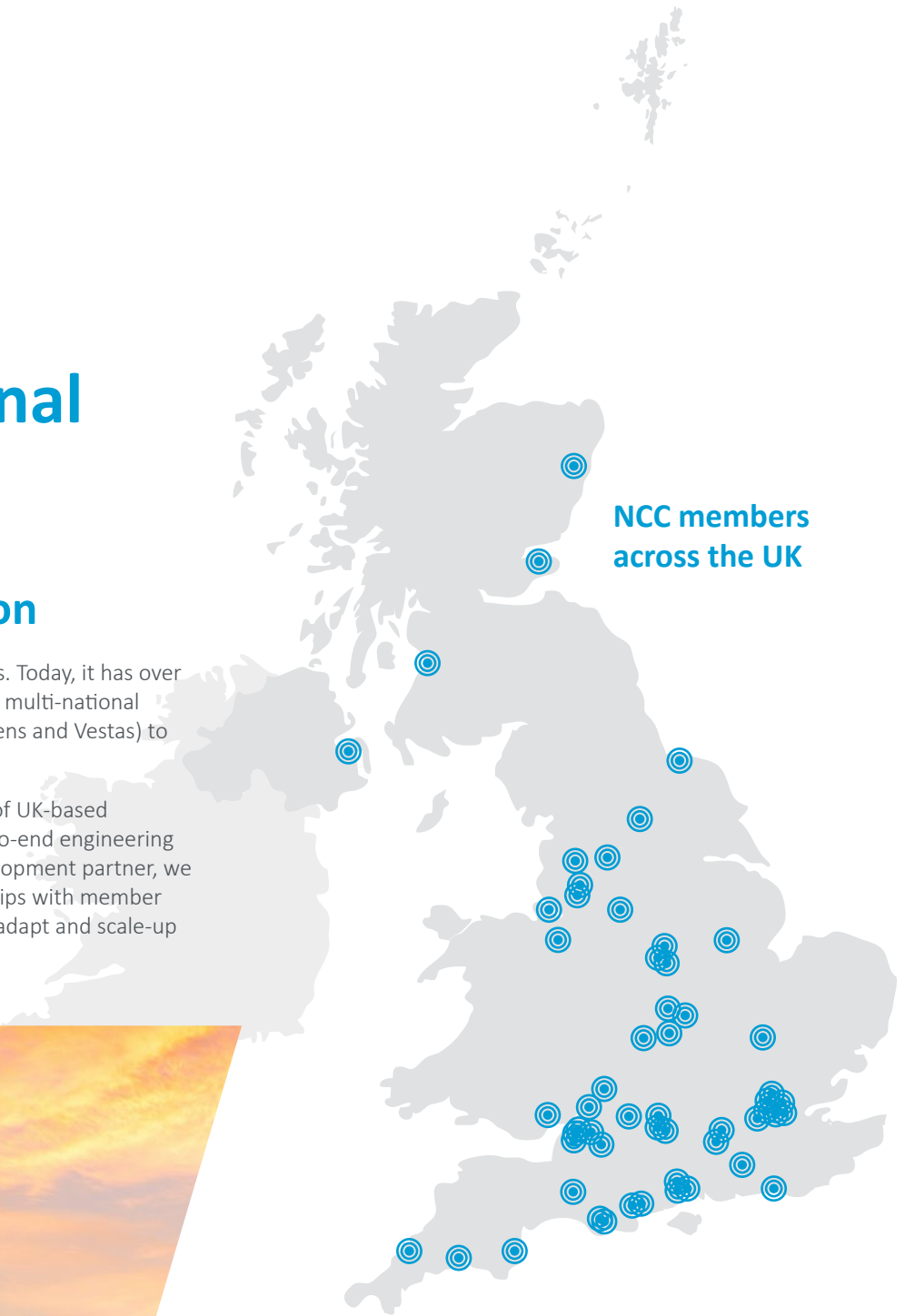
<sup>3</sup> Innovate UK commissioned report by Enterprise Research Centre and Innovation Caucus based on a survey of 300 SME businesses.

# Transformational innovation

## Industrial collaboration

In 2011, the NCC had five founding members. Today, it has over 70 member organisations. These range from multi-national companies (e.g. Airbus, Baker Hughes, Siemens and Vestas) to regionally based SMEs.

The map on the right provides an overview of UK-based members, that benefit from the NCC's end-to-end engineering capabilities. As industry's research and development partner, we build long-term collaborative R&D partnerships with member and non-member organisations to develop, adapt and scale-up new and existing processes and innovations.



Demand for the NCC's services and capabilities extend far beyond the South West and indeed the UK. For example, it is an active participant in five Horizon Europe programmes and has long worked with companies with an international footprint and RTOs located in other geographies.

## Growing industrial clusters

The West of England's globally prominent aerospace cluster has been a core driver of the South West region's engineering prowess. This includes pioneering companies; Airbus, GKN, Vertical Aerospace, Rolls-Royce and ZeroAvia, to name a few. The NCC works with each of these companies to deliver the innovation needed to advance net zero flight and unlock the potential of next generation of fuel-efficient aircraft.



CASE STUDY

## Optimising future flight

A trusted innovation partner to Airbus, the NCC was part of the company's **Wing of Tomorrow** programme and its **eXtra Performance Wing** demonstrator programme. The former explored radical new approaches to the design and manufacture of aircraft wings, constructing a series of full-scale demonstrators that significantly reduced the number of separately assembled parts and the associated bolting compared to today's metallic wing covers. The latter developed technologies that will see aircraft wing shape adapt to suit flight conditions, improving aircraft performance and reducing emissions.



Trusted by the Government and the defence industry, the NCC collaborates with partners to deliver technological advancements that bolster the UK's prosperity and security. This includes with industry leaders; GKN Aerospace, MBDA, Leonardo, BAE Systems, and Rolls Royce, reflecting the NCC's dedication to tackling complex challenges in a fast-evolving defence landscape that demands innovative solutions.



CASE STUDY

## Future design concepts for defence



The NCC collaborated with the Defence, Science and Technology Laboratory (DSTL) on the latest technologies for the next generation of lightweight, strong, and resilient combat aircraft structures. The Advanced Design of Composites Structures for future Combat Aircraft (ADCoSCA) programme developed novel and transformational ideas for airframe design concepts. The research findings have scope to influence future programmes, such as the Global Combat Air Programme and Future Combat Air System.



In addition to enabling the growth of established clusters, the NCC is also at the forefront of work to grow nascent ones. In 2023, the NCC became host to Space West, a regional consortium of academic and industry partners designed to accelerate growth and innovation in the space sector. With significant capabilities in secure and resilient communications as well as intelligent systems and robotics, Space West is focused on meeting next generation challenges like dynamic networking, space based solar power, and in-orbit servicing.



# Innovating for sustainability

**SusWIND** is a collaborative innovation programme focused on creating a viable circular economy for wind turbine blades. It brings together partners from across the composites industry and wind energy sector to look at every aspect of the wind turbine product lifecycle.

Founded by the NCC, partners include bp, SSE Renewables, Owens Corning, Crown Estate Scotland and more. Two years in, and the programme has created a robust evidence base to inform bold industry decision-making across three programme facets:

- **Reclaim** – value from blades and manufacturing;
- **Adopt** – sustainable materials and processes; and
- **Develop** approaches and designs to deliver sustainability.

To move the industry and opportunities further forward, the focus now is on converting insights into action.

The NCC also works with SMEs that are exploring routes to tackle end-of-life challenges.

A photograph of a wind turbine in a field at sunset. The sun is low on the horizon, creating a warm orange and yellow glow. The turbine's blades are silhouetted against the bright sky. In the background, another turbine is visible. The image is partially obscured by a dark blue triangular graphic on the right side.

**CASE STUDY**

## Blade recycling breakthrough

Plaswire, a polymer recycling and repurposing company, worked with the NCC to create prototype construction components from end-of-life wind turbine blades. The Northern Irish-based SME created a new formulation of ground blades, combined with other recycled polymers. The NCC tested various ways to process this new formulation, making several panels and omega shaped prototypes. This support enabled Plaswire to use these prototypes to showcase their recycling and repurposing capabilities to various organisations in the UK renewable energy supply chain.



# Advancing the energy transition

## Next generation offshore wind

Funded by the Department for Energy Security and Net Zero, the NCC and Offshore Renewable Energy (ORE) Catapult are together delivering the Joule Challenge. This explores the opportunity to develop and anchor a future wind industry in the UK. Through the use of composites it will unlock next generation 20 MW floating wind turbines that could lower the cost of energy, deliver sustainability benefits and create jobs, skills and export opportunities for the UK supply chain.

# Hydrogen economy

Composites are critical to unlocking the potential of hydrogen. Lightweight, strong, and durable with significant design flexibility they are the only practical solution to storing compressed hydrogen. The NCC is exploring innovation in the design and development of hydrogen pressure vessels, pipes, and cryogenic tanks to develop sustainable solutions. Working with British SME partners B&M Longworth Ltd and Cygnet Textimp, it successfully reclaimed continuous composite carbon fibres from a pressure vessel and re-used them to manufacture a new pressure vessel. An award-winning innovation, this is the

first time this process has been achieved in the UK. Building on this success, the NCC is investing in a UK composite cryogenic storage tank programme that will validate and accelerate design, manufacture, and test capabilities for storing liquid hydrogen (LH2).



## CASE STUDY

### **UK-First:** Designing composite cryogenic tanks for the future

NCC's unique concept design tool optimises hydrogen cryogenic tank designs according to a customer's specific requirements. Developed over 12 months, the tool works around key parameters such as hydrogen mass, boil off rate and dormancy – the amount of time from the refuelling of a tank to the need to vent a gas pressure build-up if the aircraft was stationary overnight. The new design tool enables the NCC to quickly deliver the most efficient tank design for a given set of parameters. It will help manufacturers identify the right designs to take forward to the detailed design phase, thereby lowering the barrier to entry for businesses.



*“The new design tool enables the NCC to quickly deliver the most efficient tank design for a given set of parameters.”*

## Digital engineering

The NCC has deep strengths in digital engineering. In addition to using to working to support companies like Vertical Aerospace through digital design expertise, it is at the forefront of the collaborative Digital Engineering Technology & Innovation (DETI) initiative to create a fully functioning digital test-ground.

Made possible by a £5m investment from the West of England Combined Authority with co-investment from HVM Catapult, DETI is delivered by the NCC, Centre for Modelling & Simulation (CFMS), Digital Catapult, and the universities of the West of England, Bristol, and Bath. Working with industry leaders including Airbus, GKN Aerospace, Rolls Royce and Siemens, DETI has delivered innovative research and proofs-of-concepts that underpin next generation electric vehicles, quantum-secure 5G connectivity to operate remote factories and efficiencies in digital design some five times faster than traditional methods.



The NCC's digital engineering strengths are set to deliver even broader impact. Awarded to the University of Bristol, NCC will host Isambard-AI, the UK's most powerful supercomputer. This follows the GW4 Alliance universities being awarded Isambard-3, a high-performance computer that will be installed at the NCC by the end of 2023. These national assets provide a unique springboard to pioneer a whole life-cycle approach to accelerating the journey from data and digital innovation to impact; from drug discovery to astrophysics and advanced materials.







CASE STUDY

## **UK-First:** Bridging the global market gap for urban air mobility



The NCC's design for manufacture approach used digital design technologies to develop new Gen 2 blades for Vertical Aerospace, with novel internal blade architectures. Dynamic finite element modelling was used to simulate and predict the structural effects of emergency landing scenarios to support the airframe's crash worthiness.

*“Collaboration with the National Composites Centre’s expert team has significantly contributed to the development of critical components for our aircraft, and de-risking our path to certification. Ultimately, our priority is to ensure the VX4 achieves the highest safety, reliability and performance standards.”*

**Michael Cervenka**, Chief Technology Officer, Vertical Aerospace

## Growing future businesses

NCC Connect is a dedicated SME team. SMEs are less likely to have access to the necessary resources or expertise to lead on high value innovation projects. This means there is a greater risk of technology pull through projects failing to take place without the NCC's support.

Initiatives like the NCC Smart Factory Innovation Hub have contributed to SMEs such as INSPHERE establishing a larger presence in the West England region; delivering additional jobs, growth and innovation impact.



In addition to attracting SMEs to the region, the NCC has played a key role in supporting businesses on their growth path from an innovative idea to a thriving business.



### CASE STUDY

## Supporting spin-outs

Lineat Composites has grown from three people in a small flexi cell at the NCC's headquarters in Bristol to a team of 11 at NCC's Filton site; where it has built the world's first commercial fibre alignment machine to produce highly aligned recycled carbon fibre tapes. Working with the NCC allowed Lineat to perform early material validation, and enable direct interfacing with OEM's and Tier 1 members, bringing Lineat technology early into joint research and development projects.

---

*"Being housed at the NCC has positioned Lineat in the centre of composite innovation, surrounded with experts and market leaders, accelerating us from proof-of-concept phase to first commercial orders."*

Gary Owen, CEO, Lineat

---





CASE STUDY

## Enabling Growth Ambitions

Carbon ThreeSixty first invested in Tailored-Fibre Placement (TFP) technology after a successful trial with the NCC. As an SME Affiliate member, the structural composite specialist gained affordable access to NCC capabilities, expertise, training, and industry networks. Collaborative benefits also extended to being involved in novel design challenges, such as developing an innovative helicopter wheel for Leonardo. In 2023, the SME became NCC's first Knowledge Transfer Partnership (KTP) participant, with a KTP associate being trained at the NCC to further the company's growth ambitions.

*“Since investing in the KTP, our ongoing collaboration with the NCC continues to unlock novel preforming techniques that help prepare us for future customer needs across the globe. As we continue to expand our business, the NCC helps us remain at the forefront of low cost, automated manufacturing in our sector that never compromises on quality.”*

**Adam Black**, Commercial Director at Carbon ThreeSixty



As a Knowledge Base for the Innovate UK Knowledge Transfer Partnership (KTP) scheme, the NCC is training its first KTP associate for Carbon ThreeSixty to support company growth ambitions.





## Research collaboration

The NCC works with over 33 universities from across the UK and up to 30 internationally. Past academic and research organisation partnerships include collaborations from the USA, Canada, South Korea, Japan, Singapore, and India.

Unique to the NCC is its Technology Pull-Through Programme (TPT). In collaboration with the EPSRC Future Composite Manufacturing Research Hub the TPT programme de-risks, scales up and facilitates the industrialisation of proven low-TRL technologies by transferring them from the lab environment into the NCC's semi-industrial set-up for further testing. In addition to sponsoring projects, the NCC works collaboratively with project teams, using its project management, research and development expertise to help further the technology.



# Workforce transformation

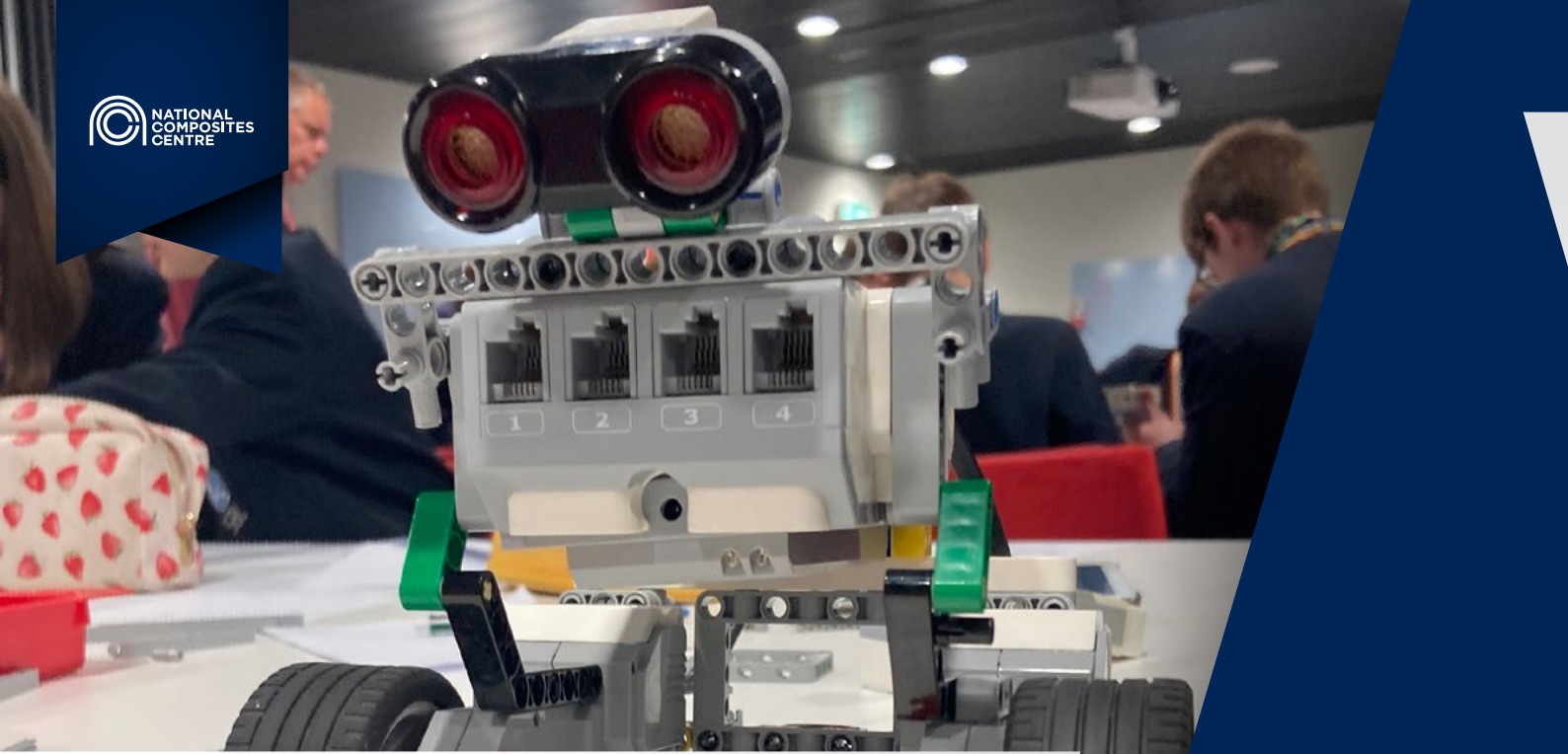
## Hydrogen skills

Together with Cogent Skills, the NCC founded the National Hydrogen Skills Alliance (HSA). Through the HSA, the NCC is working with partners to develop a Skills Framework for Hydrogen, a landscape mapping activity for hydrogen skills, a hydrogen skills strategy and a national cross sector forum.

The NCC led on behalf of HVM Catapult the development of a series of open access hydrogen awareness modules spanning the full hydrogen value chain – make it, move it & use it. Over the last 6 months, these have been accessed by over 670 people from a wide range of sectors, career stages and companies (micro-enterprise to OEM). In addition to upskilling and re-skilling today's workforce, the NCC is leading skills foresighting cycles in hydrogen to understand future skills requirements; a current focus is on 'cryogenic and pressurised storage tanks in bulk storage for commercial use'. This work will support the understanding of skills needs and gaps in the mid-term future, which in turn will enable the UK to thrive in the dynamic global marketplace.

## Digital skills

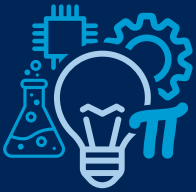
Through its Workforce of the Future programme, the NCC offers SMEs in the West of England Combined Authority region the opportunity to develop their digital capabilities in applied learning scenarios such as "Digital Learning Factory", giving businesses and their employees the understanding and confidence to immediately apply digital technologies in the workplace. Similarly, the Combined Authority's Made Smarter West of England, delivered in partnership with the NCC and the University of the West of England supports local manufacturing SMEs to understand and overcome operational challenges through digital technologies, helping them to innovate, create new opportunities, and boost productivity.



## STEM engagement and inspiration

In support of the future generation of engineers, the NCC's STEM programme engages with schools and universities from across the UK. Ongoing engagements with teachers, parents and guardians aims to enable follow-on support to help students realise available pathways into a career in STEM. The NCC also contributes to public engagement initiatives, for example, with Aerospace Bristol, and many more.

### STEM Outreach



Students:  
**2358**

Teachers:  
**100**

Parents/  
Guardians:  
**173**

### Workforce Development in 2022/2023

#### Organisations



**35** Primary/  
Secondary

College/Sixth  
Form:  
**8**

University:  
**4**  
Other:  
**49**

### Skills & Workforce Development



Graduates/  
Apprentices:

**40**

External  
learners:

**347**

Course  
places:

**560**

Online  
learners:

**981**

## Investing in its people and places

As an employer, the NCC adopts a people-first approach to workforce development with Equality, Diversity and Inclusion at its core. It fosters an environment where everyone is respected, valued, and recognised for their unique contribution. All staff have access to internal and external training, mentoring, coaching, as well as access to Charterships and professional registrations. Working in partnership with the University of Bristol, the NCC supports annual staff and student exchanges to facilitate the cross-share of knowledge.

Over the past year, employees collectively raised £10,000 for FoodCycle – the biggest single donation that the charity’s project in Bristol has ever received. Employees also raised over £2,000 for Bristol Children’s Charity through gift, food, and money donations in December 2022.



**800** new jobs created per annum

**800** jobs sustained per annum, plus...



**400** jobs sustained in the wider economy per annum

**£59m** direct gross GVA per annum



# IMPACT OVERVIEW



some **300** businesses supported per annum...

circa **50**

enhanced products, processes and services per annum

**16%** increase in supported organisation’s turnover within 6 years



...of which **90%** have a footprint in the West of England...

...and approx. **33%** were SMEs

*This is an initial estimate of NCC’s annual average impact from 2017-2022.*



## Contact

**National Composites Centre (NCC)**

[nccuk.com](http://nccuk.com)

[info@nccuk.com](mailto:info@nccuk.com)

