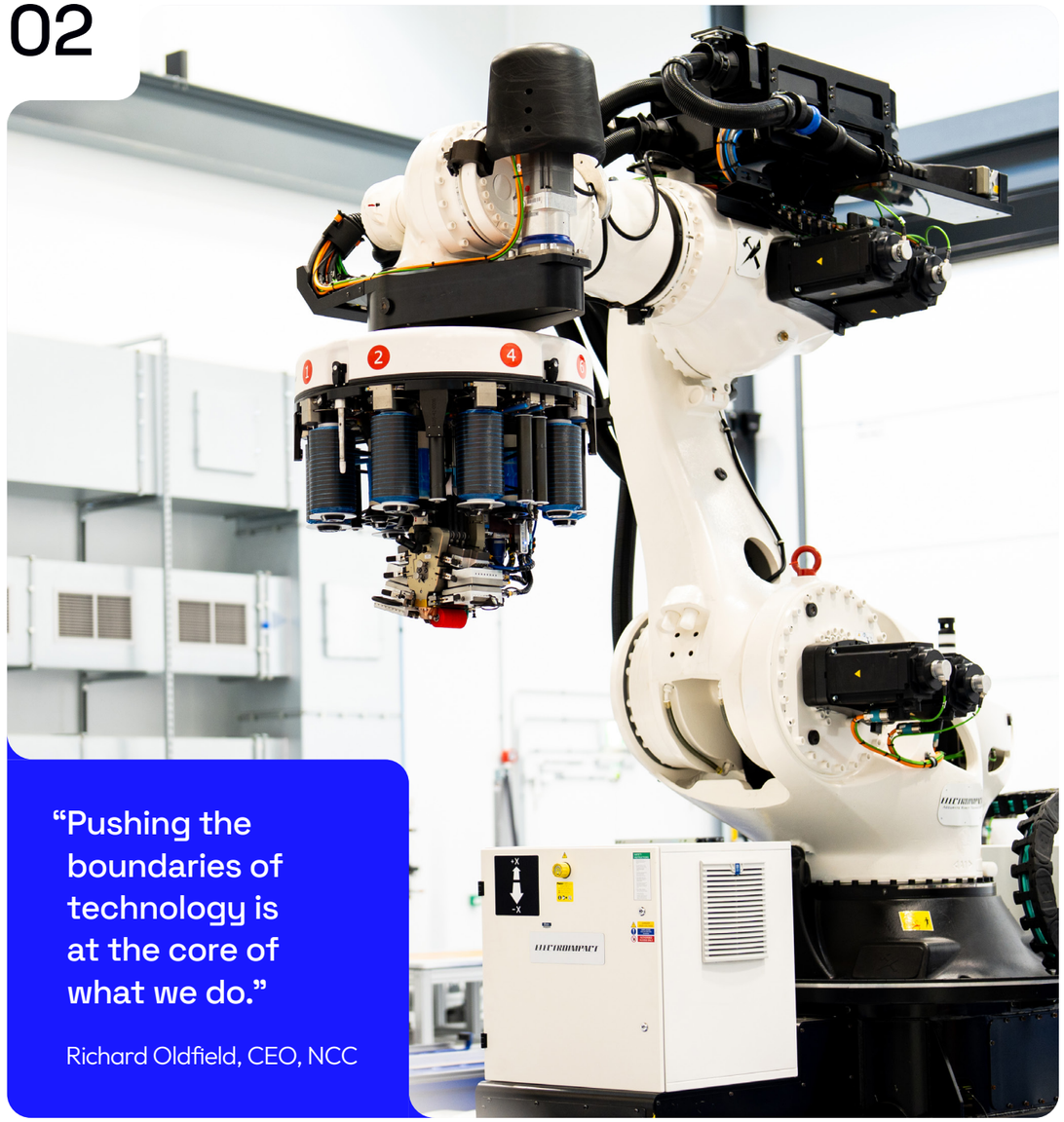
ncc
innovating
for industry

Technology Strategy

Critical capabilities and pathways for industrial transformation

Proud to be part of | University of BRISTOL | CATAPULT High Value Manufacturing



> “Pushing the boundaries of technology is at the core of what we do.”
>
> Richard Oldfield, CEO, NCC

Terms

AI: Artificial Intelligence
CCUS: Carbon Capture, Utilisation & Storage
CMC: Ceramic Matrix Composite
DfX: Design for “X”
EOL: End of Life
FST: Fire, Smoke & Toxicity
HVM: High Value Manufacturing
IOT: Internet of Things
MBSE: Model-Based Systems Engineering
MDO: Multidisciplinary Design Optimisation
ML: Machine Learning
MRO: Maintenance, Repair, and Overhaul
NDT: Non-Destructive Testing
TCP: Thermoplastic Composite Pipe
V&V: Verification & Validation

We use our end-to-end engineering services to connect technology leadership to real-world delivery.

NCC is a world-leading innovation organisation that turns cutting-edge research and technology into industrial impact. We bridge the gap between academia and industry, helping companies of all sizes to capitalise on cutting-edge innovations to deliver more. We do this at every stage of their journey and across the entire product lifecycle, from the earliest concept to end-of-life.

Proud to be part of the High Value Manufacturing (HVM) Catapult and the University of Bristol, NCC provides a gateway to world-class expertise and facilities. This includes being the national Centre of Excellence for composite technologies, with a proven track record of innovation, world leading capabilities, and deep expertise in composite materials and manufacturing.

We believe the UK’s most successful, multi-generational manufacturing ecosystems are anchored in product and technology leadership. This is why we will continue to expand our technology expertise and to develop wider capabilities in fields such as advanced materials and digital engineering. This is all in service of our mission to solve today’s industrial challenges and to deliver on the demands of tomorrow’s industries.

This technology strategy identifies the priority technologies and capabilities which will transform the way we design, manufacture, and test new products and processes. They are integral to the rapid advances in engineering required for the UK to seize the opportunity to become a world-class destination of choice for advanced low-carbon manufacturing.[1]

The strategy also sets out how NCC will stay at the forefront of technology leadership, building on our strengths and expanding our capabilities to deliver impact for UK industry.

[1] Innovate UK Materials and Manufacturing Vision 2025

Our technology portfolio

Our technology portfolio is grouped into 4 categories and 11 themes.

This structure provides us with the building blocks that generate ideas, tools, and methods that are essential to deliver innovation and industrial impact for our customers and partners.

Materials

Advanced Materials: Developing and applying novel materials to enhance performance, durability, and sustainability across demanding applications.

Process

Composite Processes: Advancing the manufacture and assembly of composite structures to deliver lightweight, high-performance, and cost-effective solutions.

Metallic Processes: Improving the forming, joining, and processing of metallic materials to meet evolving demands in strength, precision, and sustainability.

Production Systems: Designing and optimising manufacturing systems that are flexible, scalable, and digitally enabled for modern industrial needs.

Assurance: Applying advanced inspection, monitoring, and measurement techniques to ensure manufacturing processes consistently meet quality and performance requirements.

Product

Systems Engineering: Integrating complex technologies through a structured, whole-system approach to ensure functionality, efficiency, and reliability.

Design & Test: Accelerating innovation through advanced design methods, simulation, and physical testing to validate performance and reduce risk.

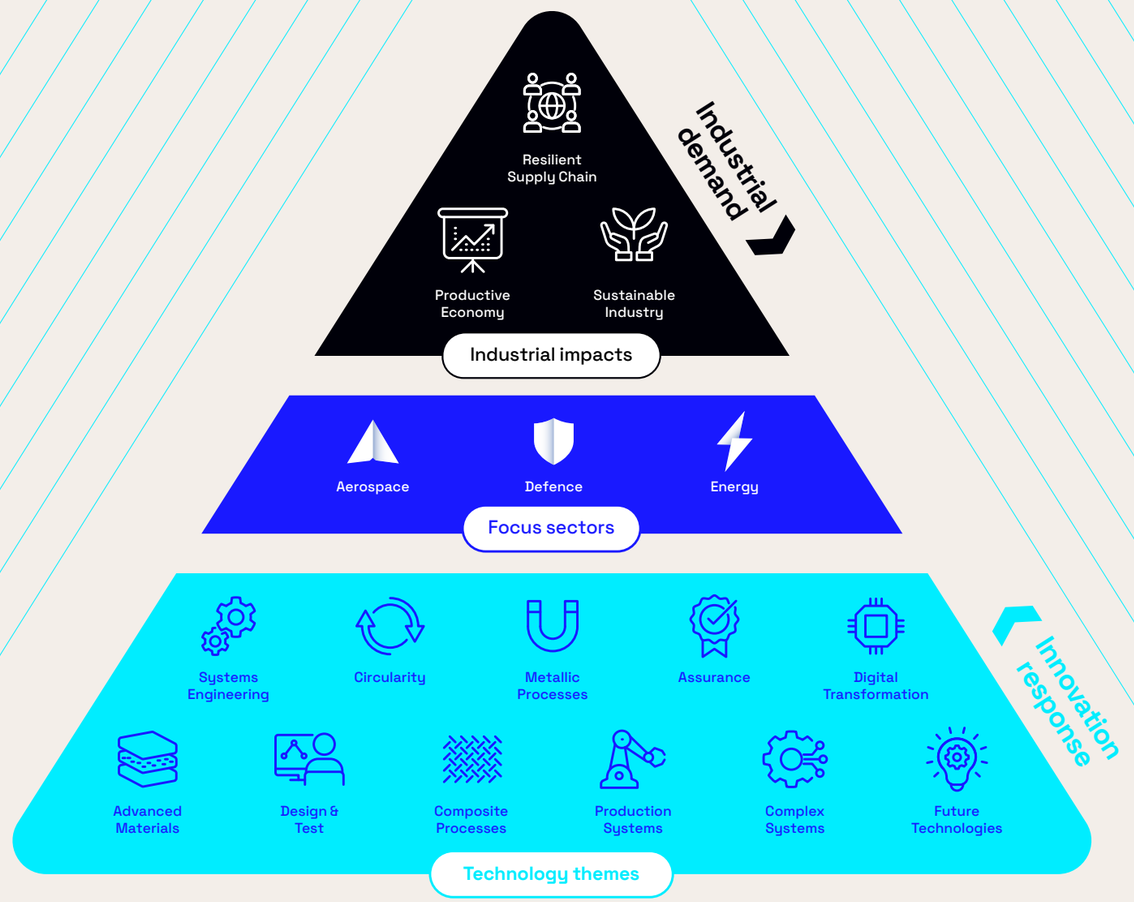
Circularity: Enabling efficient and sustainable product lifecycles through design for repair, maintenance, reuse, and end-of-life recovery — reducing waste and extending asset value.

Growth initiatives

Complex Systems: Understanding and managing highly interconnected systems, from multi-domain products to infrastructure and supply networks.

Digital Transformation: Harnessing data, automation, and digital tools to revolutionise design, manufacturing, and decision-making processes.

Future Technologies: Exploring emerging and disruptive technologies to unlock new capabilities and prepare for long-term industrial evolution.



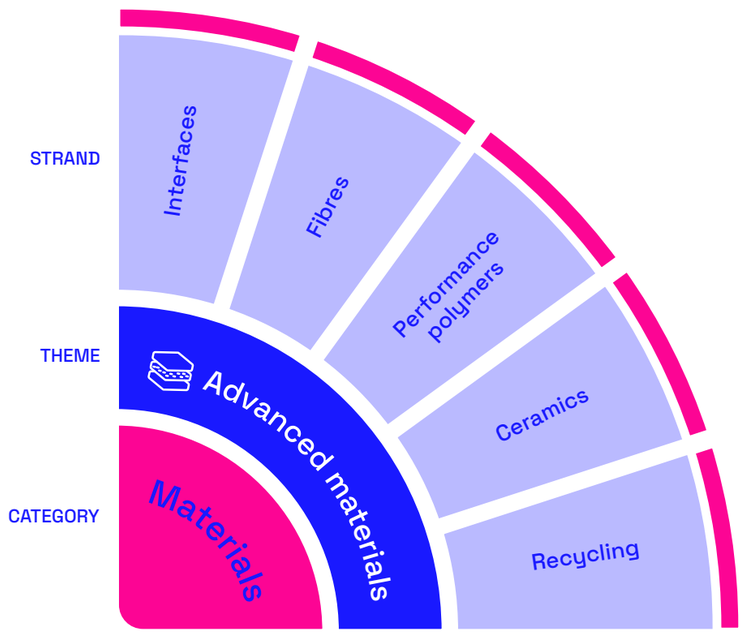
Our technology leadership

We focus on strategic technologies that build on or extend our existing capabilities and contribute to solving major industrial challenges – ensuring we deliver real-world impact at scale.

The graphics below detail our technology priorities. Areas where we can deliver the greatest value to industry are represented by long, dark strands. Areas we assess as potential high impact technologies are represented by short, light stands.

Materials

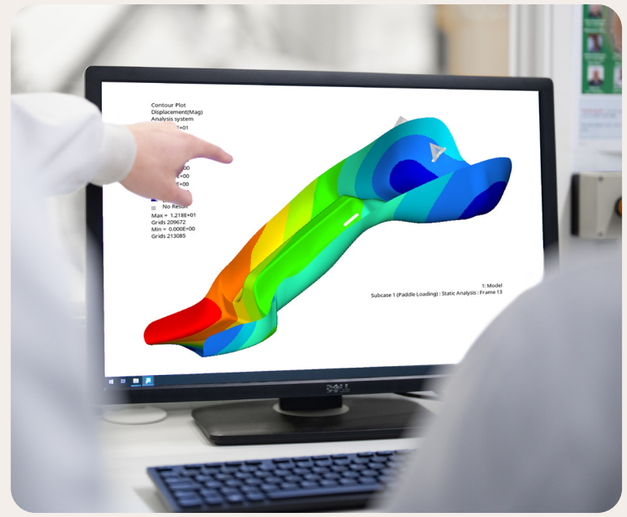
NCC's advanced materials capabilities are expanding to include specialist laboratories for sustainable materials assessment and ceramic materials development. A new Carbon Fibre Development Facility will be fully operational in Spring 2026. This facility will enable carbon fibre innovation and train future chemists and engineers.

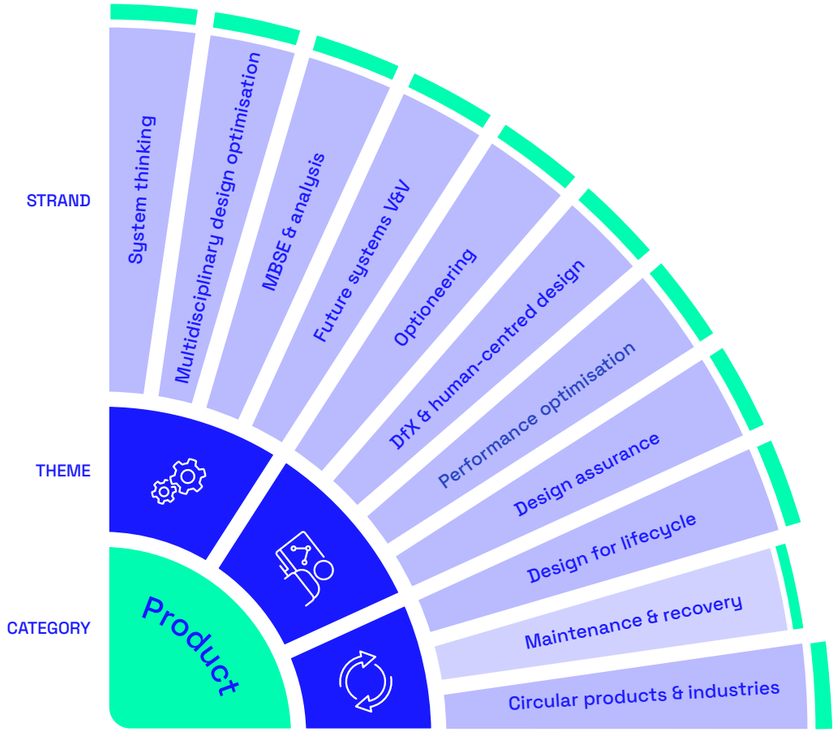


Strands indicate current NCC priority technologies.

Product

NCC engineers are at the forefront of developing lightweight, high-performance products through use of cutting-edge digital and AI design tools, simulation methods, and deep expertise in systems engineering. These digital-first capabilities have been instrumental in our rapid progress in the design, test, and verification of hydrogen pressure vessels.



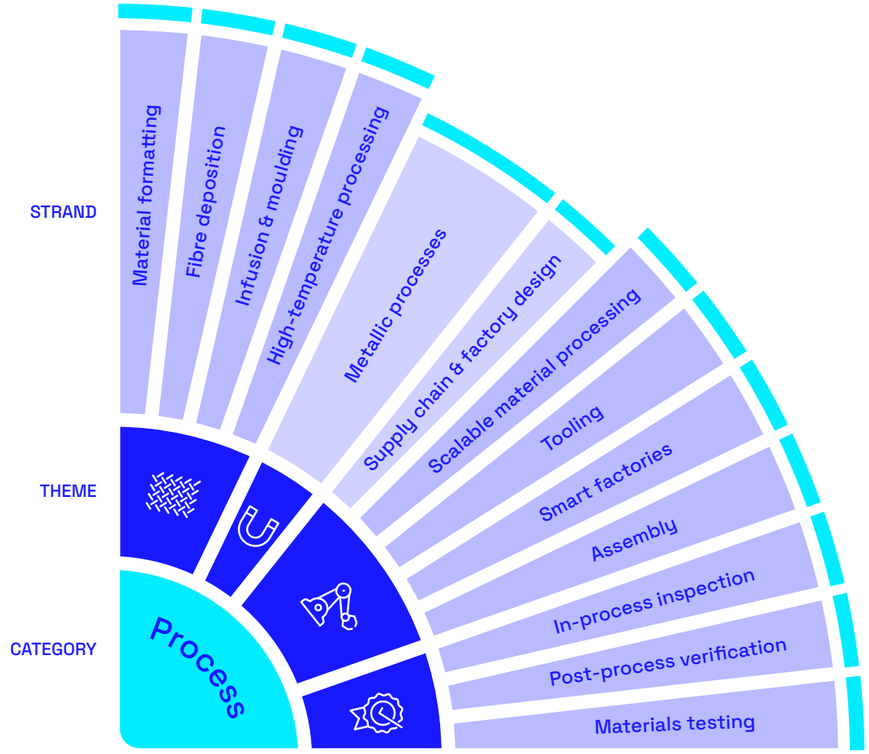


Long strands indicate current NCC priority technologies.
Short strands indicate potential high impact technologies.

Process

As the national Centre of Excellence for composite technologies, NCC has the largest and deepest concentration of composites manufacturing technologies anywhere in the UK.

Our open access facility and on-site expertise allows us to test and iterate the latest industrial techniques for industry. As part of the Airbus ‘Wing of Tomorrow’ programme, NCC’s High-Rate Deposition Cell demonstrated the potential to transform wing production, reducing the number of individual components required and increasing the production rate.



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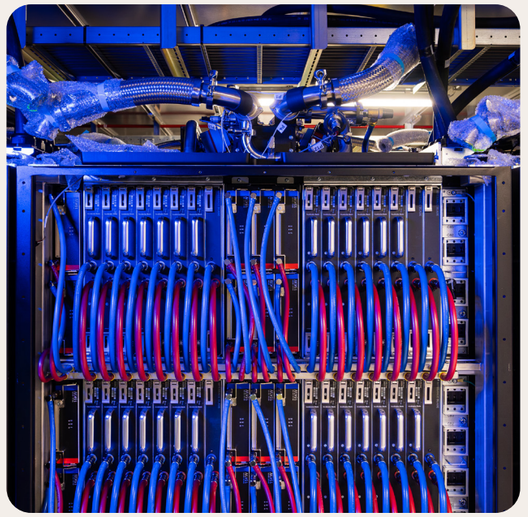
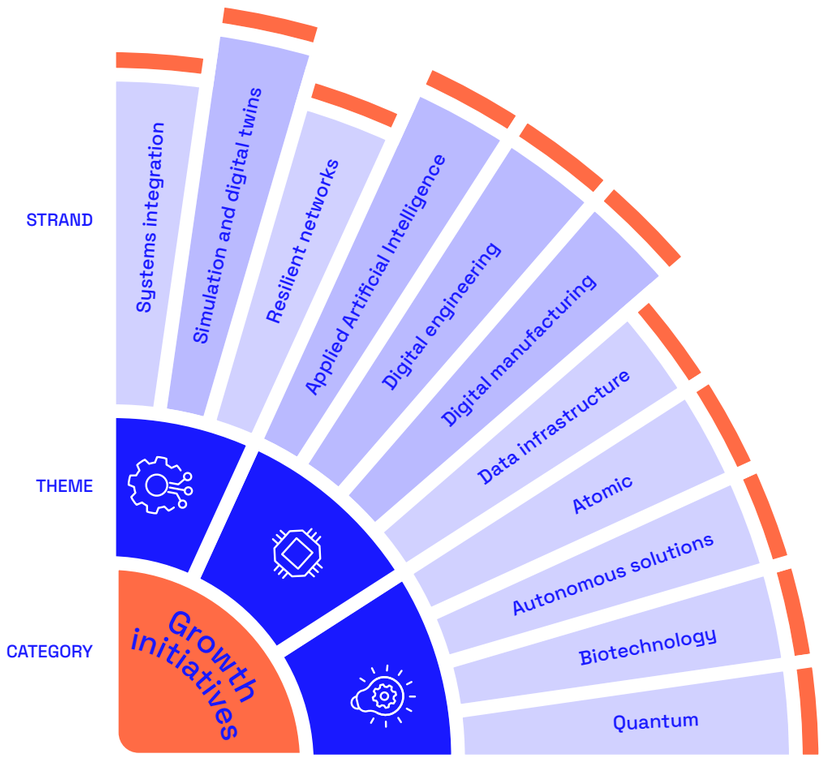
Growth initiatives

Through technology foresighting, NCC continually seeks to identify and advance those transformational technologies which are set to have the greatest industrial impact for the UK.

NCC is host to the UK’s most powerful super-computer – Isambard-AI. Awarded to the University of Bristol, this £225m government investment expands the opportunity for academia and industry to harness the power of AI in fields such as robotics, climate research and drug discovery.





Long strands indicate current NCC priority technologies.
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Our technology delivery

To deliver technology innovation that matters, we build our capabilities around the needs of industrial sectors. This ensures our work remains focused, relevant, and aligned with our Strategic Delivery Plan.

Our sector-specific Innovation Pathways set out how we apply our technology portfolio to deliver industrial impact. Each technology block is linked to a sector-agnostic category, shown here with a colour highlight – pink, green, blue or orange.

Each pathway is developed in collaboration with partners across government, industry, and the wider innovation system, ensuring our work supports national priorities and delivers value where it's needed most.

Technology pull through to industry adoption

NCC will continue to pull through a broad portfolio of science and engineering research and emerging technologies. Collaborating with global academic partners to identify breakthrough technologies, through to demonstrating technologies at full industrial scale with leading companies.

We are working across our technology portfolio to deliver step changes in technology development.

Aerospace

Our commitment...

NCC will develop the future materials, products, and processes that secure the UK's position on next-generation sustainable aircraft platforms.

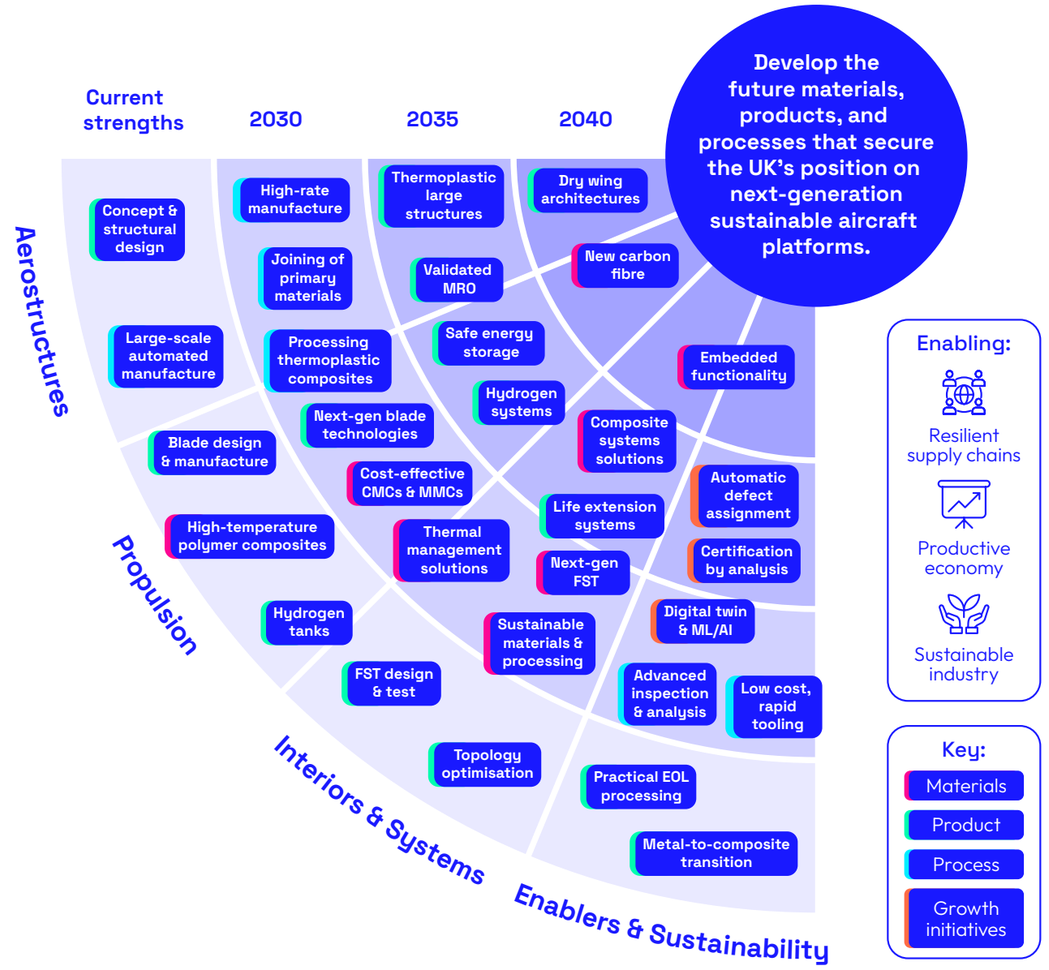
Focusing on...

Aerostructures: Lead in high-value structures innovation for wings, fuselage, and empennage, underpinned by digital technologies.

Propulsion: Advance novel material & technology solutions for propulsion through process innovation and digital engineering.

Interiors & Systems: Accelerate the development of innovative interior and system solutions, using advanced and novel material and manufacturing technologies to drive sustainable supply chain offerings.

Enablers & Sustainability: Build capability in advanced tools and processes to enhance our offering and enable next-generation sustainable and certifiable aerospace technologies.



Defence

Our commitment...

NCC will become a centre of defence innovation in advanced materials, manufacturing, and digital technologies shaping a secure, sovereign, and sustainable defence future.

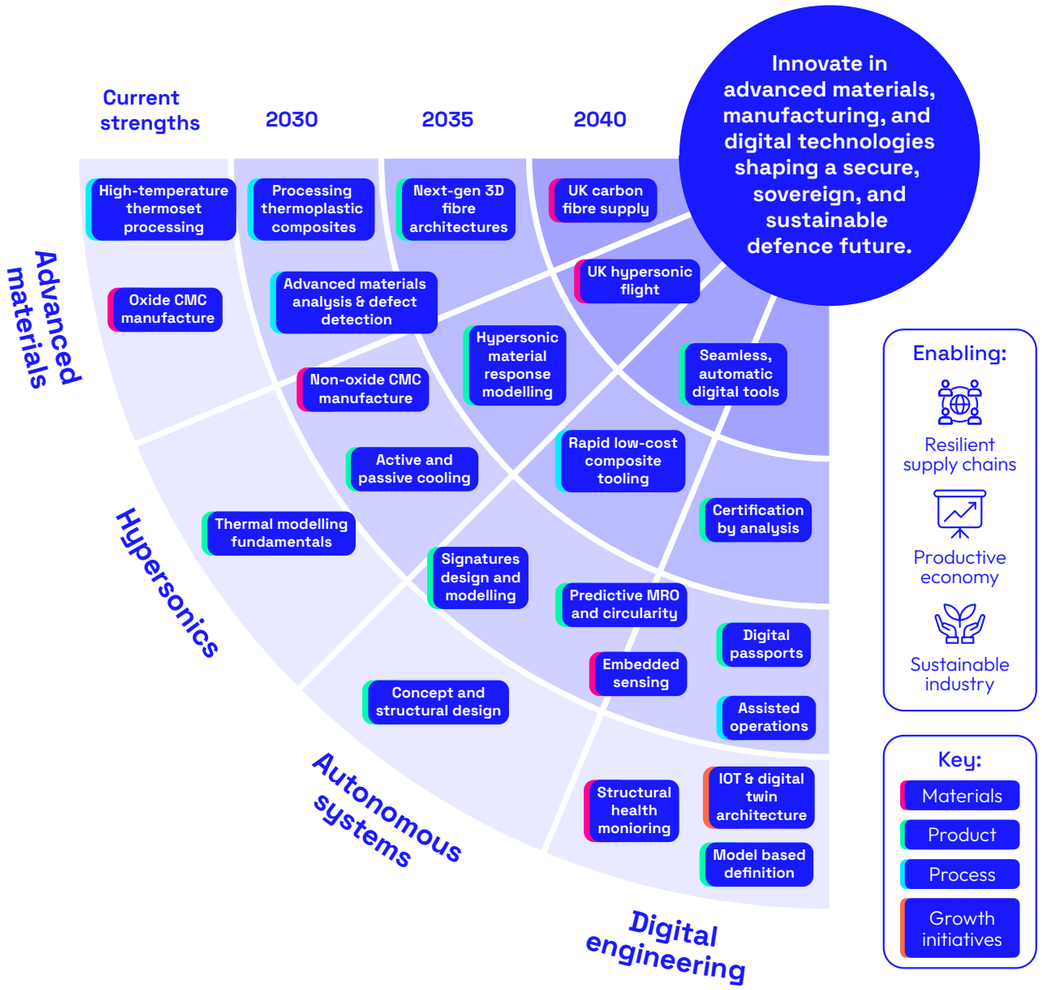
Focusing on...

Advanced Materials: Develop lightweight, high-performance composites for enhanced performance and mission survivability.

Hypersonics: Advance high-temperature composite systems for thermally resilient, next-generation platforms.

Autonomous Systems: Drive the adoption of modular, lightweight, low-cost structures to boost payload, range, and rapid deployment.

Digital Engineering: Leverage digital twins and data-driven tools for improved availability and through-life performance.



Energy

Our commitment...

NCC will develop the products and technologies that anchor future industries, grow supply chains, and accelerate the energy transition.

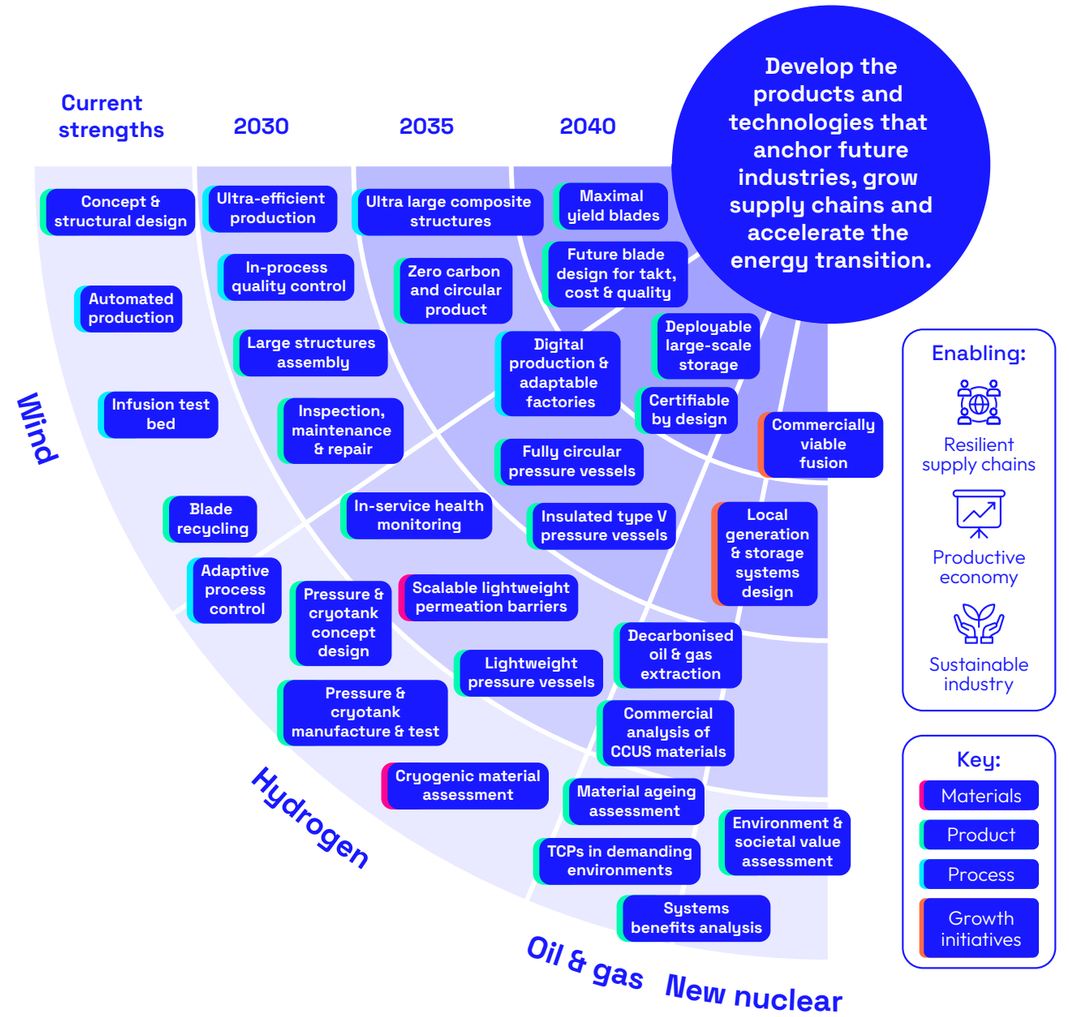
Focusing on...

Wind: Lead innovation in large-scale wind structures by leveraging our unique, transferable engineering capabilities.

Hydrogen: Advance materials and product technologies for efficient hydrogen storage and distribution.

Oil & Gas: Drive the deployment of composite solutions in extreme environments to enhance performance, durability, and sustainability.

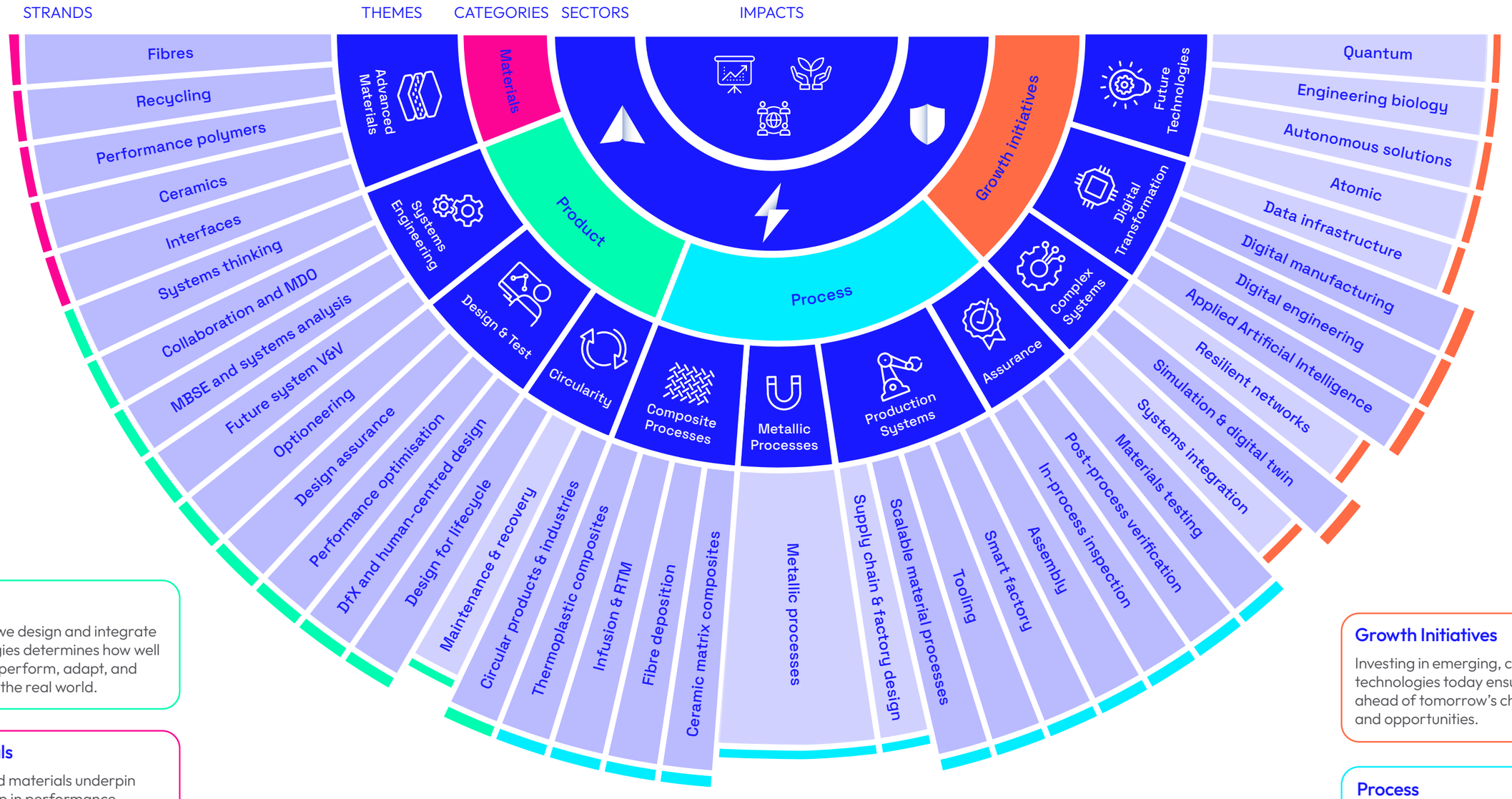
New Nuclear: Pioneer the development of advanced materials for high-temperature nuclear applications.



An overview of our technology scope

Prioritising technologies that will deliver the greatest impact for industry.

The graphic below details our technology priorities. Areas where we can deliver the greatest value to industry are represented by long, dark strands. Areas we assess as potential high impact technologies are represented by short, light stands.



Product

The way we design and integrate technologies determines how well products perform, adapt, and endure in the real world.

Materials

Advanced materials underpin every leap in performance, efficiency, and sustainability – enabling innovation in everything from lighter structures to cleaner energy.

Growth Initiatives

Investing in emerging, cross-cutting technologies today ensures we stay ahead of tomorrow's challenges and opportunities.

Process

Manufacturing process innovation is key to producing high-quality, cost-effective solutions at the rate and scale which industry demands.

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