



Accelerating the  
Adoption of Compound  
Semiconductor Applications

**CATAPULT**  
Compound Semiconductor Applications

# WELCOME FROM CEO



Compound semiconductor devices have the potential to transform the world of technology in the 2020s as radically as the silicon transistor did in the 1960s and 1970s. At CSA Catapult we're playing a key role in accelerating the development of innovative net zero technologies, helping to achieve the government's target of net zero emissions by 2050. Through compound semiconductor technology, we are also paving the way for UK companies to claim a share of the future secure telecoms infrastructure. We also see great potential in intelligent sensing for applications in healthcare such as early diagnoses, screening, imaging and communications between medical devices.

We're proud to be part of developing these innovative technologies, through compound semiconductors, to deliver long-term benefit to the UK economy and accelerate economic growth.

CSA Catapult has a talented and diverse team of 80+ employees who are based at our Innovation Centre in South Wales, helping to transform applications of the future.

I hope you find this brochure informative and inspiring. We are delighted to be helping bring you next-generation technologies.

A handwritten signature in white ink that reads "Martin McHugh". The signature is stylized and cursive.

Martin McHugh, CEO  
CSA Catapult

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# STRATEGY

Our aim is to make a positive impact to businesses in the UK compound semiconductor sector and the wider UK economy. We are doing this by collaborating across the entire industry with partners and supporting companies' aspirations by accelerating the adoption of compound semiconductor-based technology.

## DELIVERING NET ZERO

At CSA Catapult we are at the centre of net zero technology. As a nation, we have a government target to reach net zero emissions by 2050. To reach this, it will require innovation across the economy, developing new technologies and deploying existing ones to achieve a clean energy system and vehicle electrification. Through our world-class facility and capabilities plus our deep technical expertise, we're helping the UK to build advanced technologies at the centre of the new net zero economy through the power of compound semiconductors and collaboration with the UK electronics industry.

## ACHIEVING SECURE COMMUNICATIONS

Compound semiconductors are at the forefront of creating a secure communications infrastructure in the UK. We're in a great position to achieve this, with the combination of the entire Catapult Network and its capabilities we have the potential to drive the UK towards a secure and resilient telecoms infrastructure. Compound semiconductors will be at the core of this innovative technology.

## MOVING INTO INTELLIGENT SENSING

We are just beginning our journey into intelligent sensing which will benefit a range of areas such as future medicines and digitally-enabled healthcare. It can also improve disease prevention, long-term disease management, screening and diagnoses via medical devices and medical equipment.



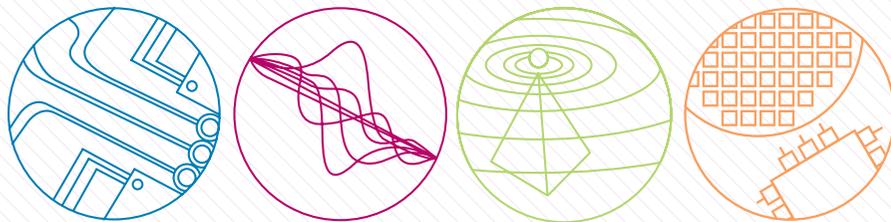
# OUR COMPANY

At the Catapult, our vision is for the UK to become a global leader in developing and commercialising new applications for compound semiconductors and helping to enable their adoption. We are doing this through the extensive knowledge and talent of our expert team at our world-class Innovation Centre, based at the heart of the compound semiconductor cluster in South Wales.

Our Innovation Centre is home to a design studio, laboratories, and test facilities, supported by our modelling, characterisation, integration, and validation (MCIV) capabilities which allows companies to accelerate the development of new products using compound semiconductors.

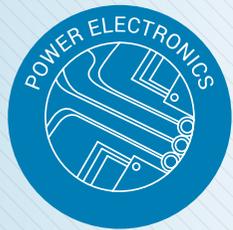
Our Innovation Centre has been purpose built to house innovation. Our Building Management Systems ensure clean rooms within our laboratories are fitted to the highest standards allowing our engineers to work on next-gen technology in the cleanest and most efficient environment.

We are focusing on four key technology areas: Power Electronics, RF & Microwave and Photonics with underpinning expertise in Advanced Packaging. We will accelerate the adoption of next-generation devices within areas such as clean energy, electrification of transport, digital communications and intelligent sensing.



# TECHNOLOGIES

We focus on four key technology areas to help accelerate the adoption of compound semiconductor applications.



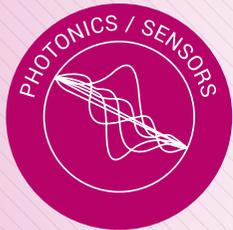
## POWER ELECTRONICS

The next generation of semiconductors in Power Electronics are critical to enable components in the electrification revolution, covering everything from clean energy to automotive. CSA Catapult's Power Electronics laboratory is one of the UK's most advanced and comprehensive modelling, characterisation, integration, and validation facilities for power electronics innovation.



## RF & MICROWAVE

CSA Catapult's RF & Microwave Lab provides the services to accelerate development and optimise system designs. The ultra-high frequency operation enabled by the use of compound semiconductor materials, such as gallium nitride and silicon germanium, is driving manufacturers to explore the use of new devices, new architectures and new packaging techniques.



## PHOTONICS

The Photonics division provides support and assistance in product development and system design spanning from medical diagnostic devices through to the enabling sensors for autonomous vehicles and the emerging digital economy. The Photonics lab provides extensive test beds for evaluating, characterising and benchmarking compound semiconductor emitter and detector technologies to enable the best component selection to suit a specified application.



## ADVANCED PACKAGING

Compound semiconductors typically operate at a very high frequency and temperature. CSA Catapult's Advanced Packaging Lab has the specialist engineering expertise, equipment, and portfolio of services to help customers develop packaging designs. The lab offers cross-disciplinary expertise include specialist thermal, electrical, mechanical and optical engineers dedicated to design, test and assembly.

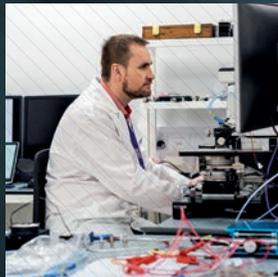
# EVMs

Our EVMs allow SMEs and large companies to develop prototype systems using UK sourced semiconductors and components. This activity will stimulate demand for end systems, in turn, driving growth in the supply of devices and services within the supply chain.

Our EVMs will allow businesses to:

- Accelerate evaluation of new compound semiconductor devices
- Discover and implement many applications for compound semiconductor devices in new and existing markets
- Rapidly develop new products

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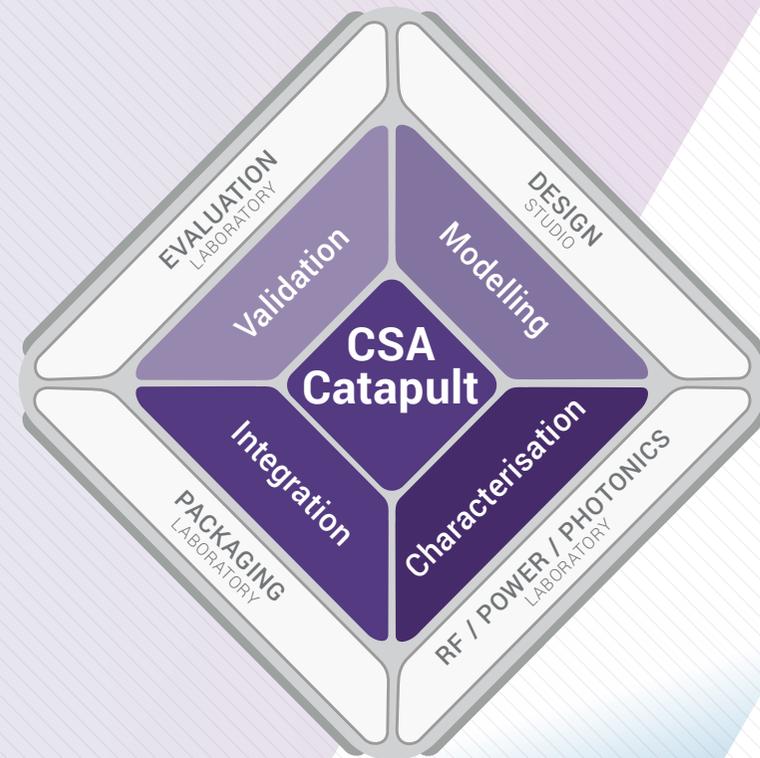
# MCIV (Modelling, Characterisation, Integration, Validation)

The MCIV framework through which CSA Catapult provides its services to adopters of compound semiconductors, mirrors the flow of a design innovation as it is transformed from a raw concept into a market-ready product, in a process known as Virtual Product Development (VPD).

The VPD capabilities of CSA Catapult have been configured to support the flow of commercial, market-or customer-oriented development projects. They can also be integrated into collaborative R&D projects with commercial and academic partners. This is in line with CSA Catapult's remit to support the development of commercial proofs-of-concept, prototypes and products, and to accelerate the release of commercial products to the market.

The MCIV services that CSA Catapult provides help customers to:

- > **Optimise** their selection of a compound semiconductor device or module
- > **Simulate** accurately the behaviour of a compound semiconductor system in its intended application
- > **Refine** the electrical/optical/thermal design of a packaged device, module or system
- > **Optimise** the system design to meet targets for lifetime, reliability, cost or any other design parameter



# ADDITIONAL SERVICES

## MARKET INTELLIGENCE

It is normal practice for large organisations to have global and regional teams or individuals dedicated to market strategy and analysis. However, smaller companies and start-ups won't have the budget to fund such an activity. This is where the Catapult can assist by providing virtual access to our in-house market intelligence team.

### > Market Analysis

Data is the cornerstone of all good decision making. We are able to examine adjacent markets and where necessary collect additional data points to create bespoke analysis.

### > Competitor Intelligence

Understanding your competition and/or the opportunity is always a good thing when developing new products and services. At the Catapult it is standard practice for our market intelligence team to perform one or more of the following pieces of strategic research:

- > Threat analysis (global, regional, country, industry sector, technology)
- > Industry health check
- > Intellectual property search and analysis

### > Thought Leadership

Demonstrating that your organisation is forward thinking and innovative can be as straightforward as having a class leading product or technology within your market or industry segment. We can help articulate that point of view through topical papers or articles that can be written in collaboration or independently commissioned.

## BID/PROJECT MANAGEMENT

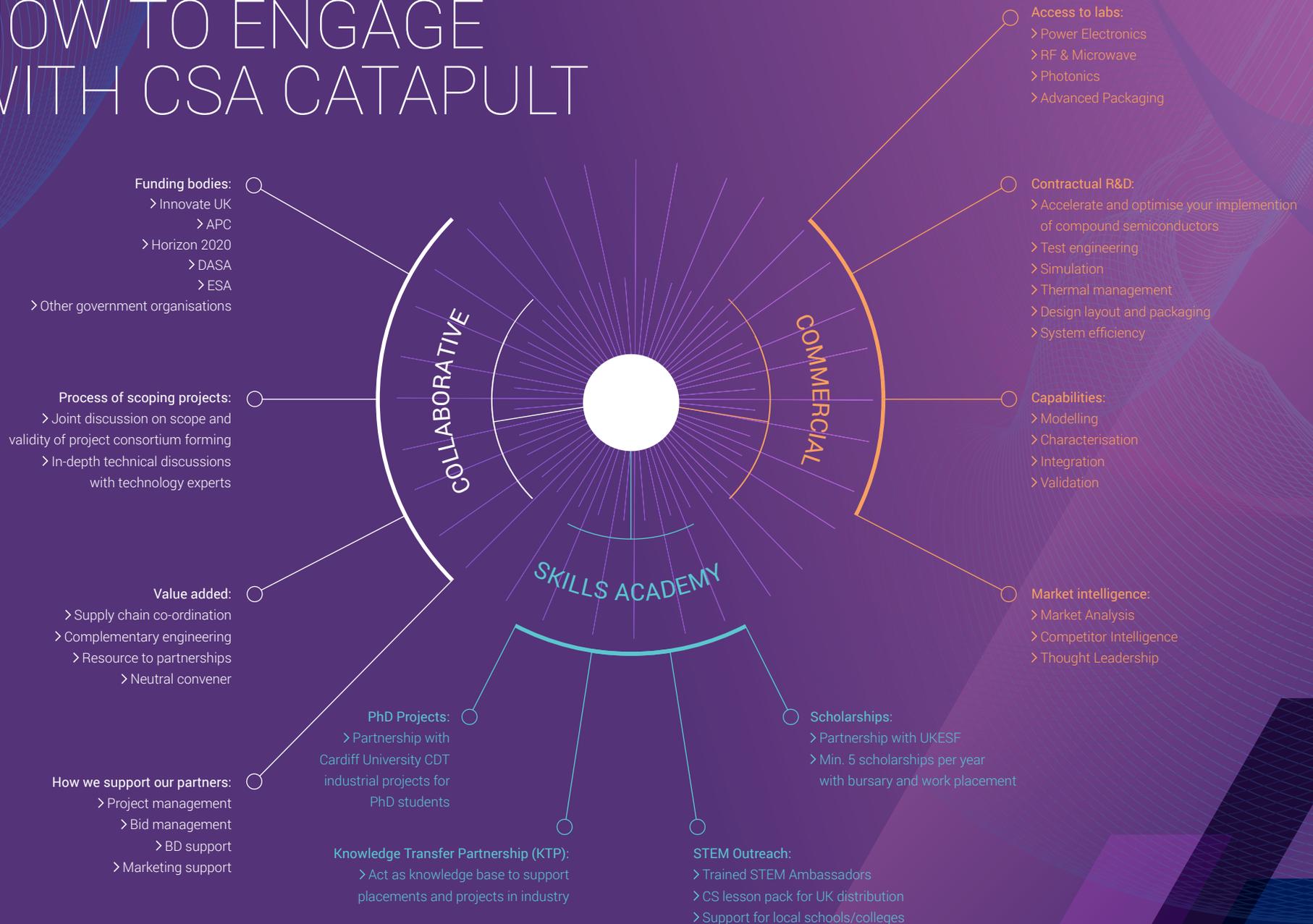
As part of working on a project with us we provide access to bid management services where we build and engage with consortia to move the project forward. We also provide project management services from start to finish.

## KNOWLEDGE TRANSFER PARTNERSHIP (KTP)

Knowledge Transfer Partnerships have been running for the past 40 years and CSA Catapult is the first Catapult to be acknowledged as a Knowledge Base within Knowledge Transfer Network (KTN) Knowledge Transfer Partnership (KTP). A KTP is a three-way partnership between a company, Catapult or University and recent graduate and it provides companies with the opportunity to gain expert skills and a dedicated resource in-house for a fraction of the cost. KTP's are a successful way to facilitate new business relationships and provide new market and commercial opportunities.

For any information on the services above, please contact us at [collaboration@csa.catapult.org.uk](mailto:collaboration@csa.catapult.org.uk)

# HOW TO ENGAGE WITH CSA CATAPULT





CGT Catapult is bridging the gap between scientific research and full-scale commercialisation, working to break down technological and market barriers, enabling the large-scale manufacture and supply of living medicines. We work with companies helping them manufacture at scale in our unique manufacturing centre, and with hospitals enabling seamless adoption of these new medicines. We aim to make the UK the best choice for partners to develop and commercialise advanced therapies.

[ct.catapult.org.uk](http://ct.catapult.org.uk)



CSA Catapult aims to deliver long-term benefit to the UK economy and accelerate UK economic growth in industries where applying compound semiconductors creates a competitive advantage and enables new products or end markets. Compound semiconductors bring many advantages in size, weight and performance when used in systems. Typically they have a much wider bandgap compared to silicon which allows devices to operate at much higher voltages, frequencies and temperatures to power the essential technologies of the future.

[csa.catapult.org.uk](http://csa.catapult.org.uk)



The Connected Places Catapult accelerates smarter living and travelling in and between the places of tomorrow. We focus on growing businesses with innovations in mobility services and the built environment that enable new levels of physical, digital and social connectedness. We help innovators to navigate the complexity of doing business, creating new commercial opportunities and improving productivity, socio-economic and environmental benefits for places.

[cp.catapult.org.uk](http://cp.catapult.org.uk)



Digital Catapult is the UK's leading advanced digital technology innovation centre. We connect large established companies, start-up and scale up businesses and researchers to discover new ways to explore big challenges in the manufacturing and creative industries. We provide physical and digital facilities for experimentation and testing that would otherwise not be accessible for smaller companies, de-risk innovation for large enterprises and uncover new commercial applications in immersive, future networks, and artificial intelligence technologies.

[digicatapult.org.uk](http://digicatapult.org.uk)



Energy Systems Catapult was set up to accelerate the transformation of the UK's energy system and ensure UK businesses and consumers capture the opportunities of clean growth. It bridges the gap between industry, government, academia and research, taking a whole systems view of the energy sector, helping to identify and address innovation priorities and market barriers, in order to decarbonise the energy system at the lowest cost.

[es.catapult.org.uk](http://es.catapult.org.uk)



High Value Manufacturing (HVM) Catapult creates the conditions for economic growth by enabling UK manufacturers to achieve significant improvements in their performance and productivity. We do this by providing open access to worldclass innovation capability and technical expertise, enabling companies to embrace different ways of working, adopt new technologies and achieve step-change in their performance.

[hvm.catapult.org.uk](http://hvm.catapult.org.uk)



Medicines Discovery Catapult is a national facility connecting the UK life sciences community to accelerate innovative drug discovery. We provide unique scientific capabilities and act as a gateway to UK resources and expertise. By helping to industrialise and drive the adoption of new scientific tools and modern techniques for discovering medicines, we support the UK life sciences industry, SMEs and innovators deliver growth for the UK life sciences economy.

[md.catapult.org.uk](http://md.catapult.org.uk)



Offshore Renewable Energy Catapult is the UK's leading innovation centre for offshore renewable energy. With a worldleading test and demonstration facilities and engineering and research expertise, we convene the sector and deliver applied research, accelerating technology development, reducing risk and cost and enhancing UK-wide economic growth. Active throughout the UK, ORE Catapult also operates a collaborative research partnership in China.

[ore.catapult.org.uk](http://ore.catapult.org.uk)



Satellite Applications Catapult helps UK organisations harness the power of satellite-based services and realise their potential from space infrastructure and its applications. We accelerate new research and its commercialisation and bring together multi-disciplinary teams to generate ideas and solutions in an open innovation environment. We aim to support UK industry to capture a 10% share of the predicted £400Bn global space market by 2030.

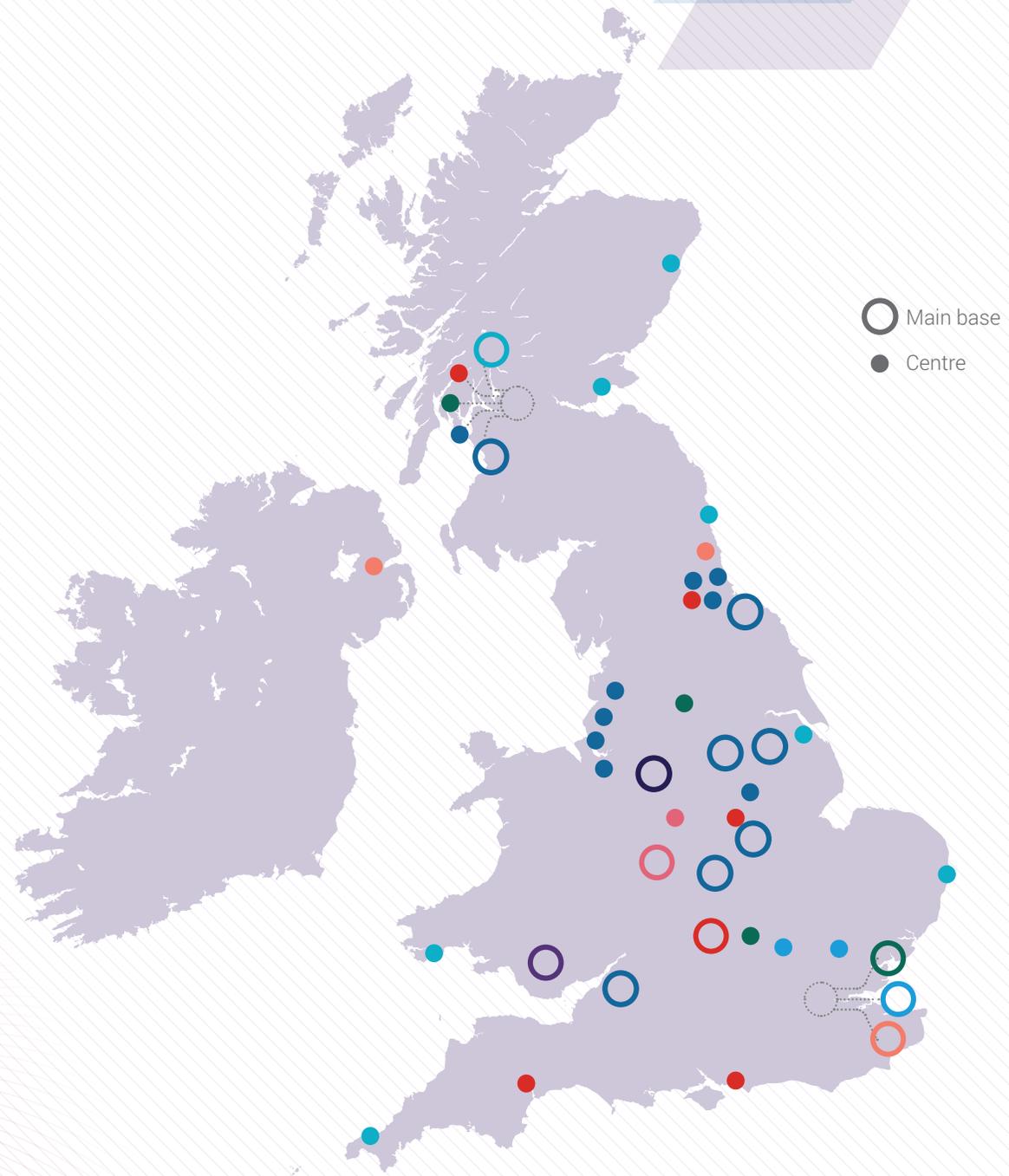
[sa.catapult.org.uk](http://sa.catapult.org.uk)

# CATAPULT

Network

The Catapult Network supports businesses in transforming great ideas into valuable products and services. We are a network of world-leading technology and innovation centres established by Innovate UK. We deliver impact across the UK economy, enabling businesses to thrive in global markets.

- Cell and Gene Therapy
- Compound Semiconductor Applications
- Connected Places
- Digital
- Energy Systems
- High Value Manufacturing
- Medicines Discovery
- Offshore Renewable Energy
- Satellite Applications



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