



OXFORD -  
CAMBRIDGE  
ARC

# The Oxford-Cambridge **Arc** Economic Prospectus







# Foreword

We are at a critical time, during which our nation's economic resilience is being tested far beyond anything we've seen before. From the pioneering work on vaccines, through to distributing tens of thousands of ventilators to the NHS, our area's immediate response during this pandemic confirms the strength, capabilities and ingenuity of the Arc region's business community, universities and public bodies. It shows our ability to collaborate, innovate and respond, at speed, to protect our health, wellbeing and livelihoods.

Our vision is for the Arc to be a global hub for innovation, and home to exemplary models of green development that will inspire communities around the world. This will be made possible through bold leadership that focuses on the big opportunities. The Arc's world-leading innovation across multiple sectors can deliver prosperity for the UK. We now need the commitment from Government and international investors to make the ambition a reality.

The Arc region has a critical mass of research, high-technology expertise and innovation assets found nowhere else in the UK. Working with Government

we can release the potential of the Arc's key sectors, scientific community and entrepreneurial spirit to propel our country's response to the major national and global challenges we face. The Arc's place is at the forefront of the UK's green recovery. This is the region that can deliver new technologies, new industries and new investment, at scale to strengthen the country's position in the world economy.

Through strong collaboration, we can enhance the lives of our residents, increase the global opportunities for our businesses and improve our environment for the prosperity of all.

The Arc's economic priorities are clear. Together we can make this happen.

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**Cllr Barry Wood,**  
Chair of Arc  
Leadership Group

**Professor Sir  
Peter Gregson,**  
Chair Arc  
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Group

Left. AstraZeneca,  
Cambridge Biomedical Campus.



# The Oxford-Cambridge Arc

The Oxford-Cambridge Arc has unrivalled assets of international standing and significance. With the commitment of Government to long term investment in the area, the Arc will fulfil its true potential to deliver transformational economic growth that will benefit the whole of the UK. Investment is critical to tackle connectivity and congestion constraints and to provide the skills that industry requires to enable the Arc to pursue its role as a leading global innovation region.

The Arc is already home to nearly four million people and two million jobs which together generate over £111bn of economic output each year. With investment, this area will enhance its world-leading science, technologies and industries which can drive competitive growth, deliver sustainable outcomes and secure inclusive job creation for the UK economy over the coming decades.

The region has an incredible tradition of bringing the best minds together to create solutions to the most complex challenges. It is home to some of the world's greatest innovators who transform lives with their ideas, entrepreneurs who have created world leading products and services and researchers and academics who are at the frontier of human discovery.



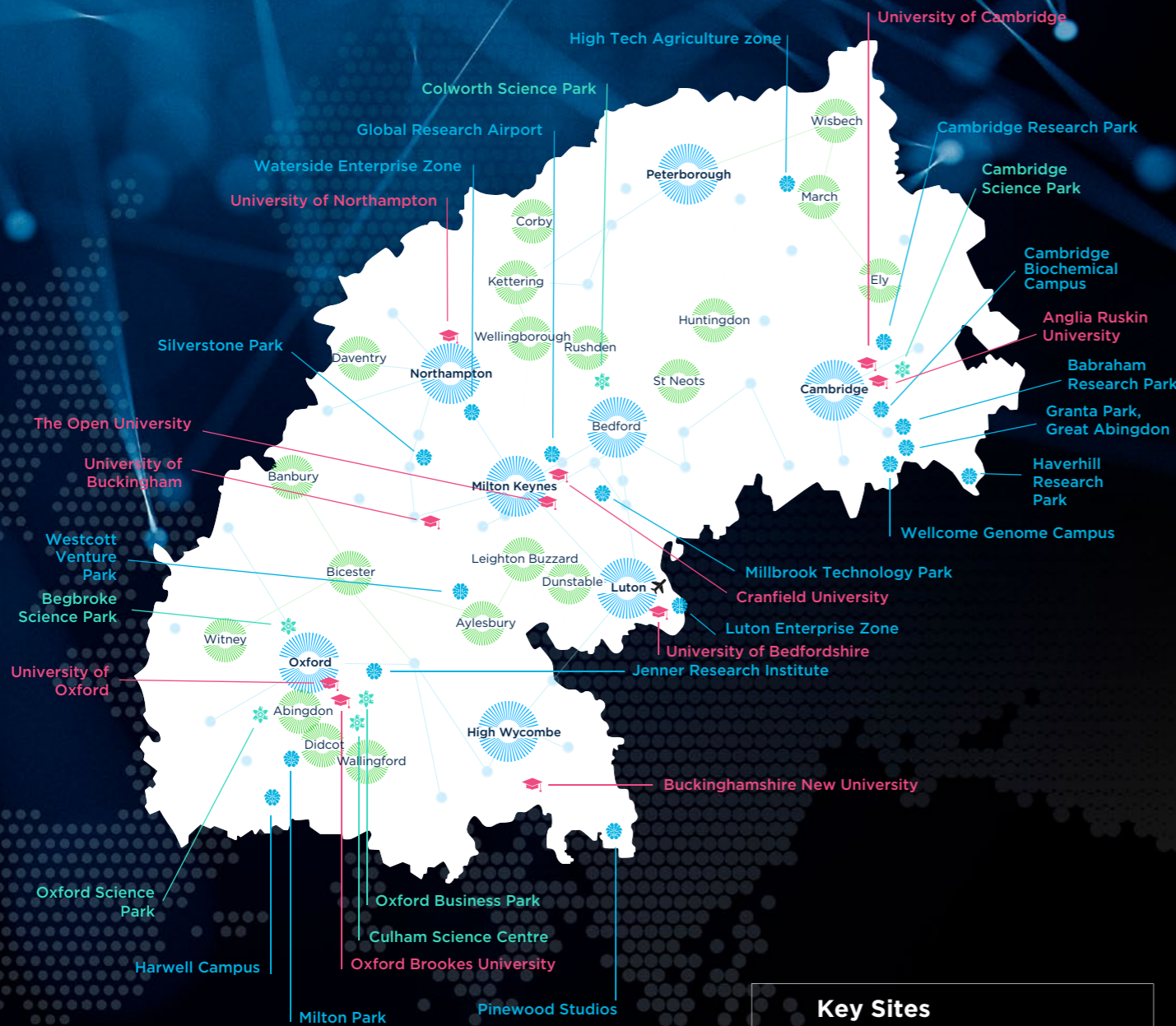
Above. Students at National Film and Television School.

From understanding the building blocks of life in DNA, through to today's search for new vaccines. From pioneering IVF medical practices, to connected machine learning that is stimulating human behaviour. From codebreakers at Bletchley, through to quantum computing. The Arc is synonymous with ambition, science and technology and knowledge industries. We now need to enhance its economic ecosystem to better connect communities, expertise, world-class capabilities and high-technology sectors. This will enable innovation at scale and pace to inspire and lead the UK's green recovery and future in the world economy.

We have ambition for a Green Arc. We aim to be home to world-leading innovations that seek to address climate change and the decline in natural capital. Where a protected and enhanced environment, natural resources and the health and wellbeing of people are fundamental aspects of our economic ambition. The Arc's growth will be innovation-led and aimed at helping to solve the major economic, environmental, health and social challenges facing the world. This will drive UK growth and create better-quality opportunities for our residents and businesses, now and in the future.



Below. Oxford University COVID vaccine development.



Key Sites within the Arc	
	University Sites
	Research and Technology Zones
	Science Parks
	19 FE College Groups



The Arc is a highly successful, fast-growing and productive network of places. Our internationally renowned cities, their neighbouring towns and rural communities, are home to vital innovation hubs that attract knowledge-led industries and workers and are critical locations to support sustainable and inclusive communities.



Each part of the Arc has its own distinct potential, underlying specialisms, cultural attractions and heritage. Our settlements are joined together with rural economies, places of natural beauty and environmental assets that have intrinsic value.

The Arc benefits from its position at the centre of the UK transport and logistics network that connects to the Midlands, Greater London, East Anglia, the South West of England, UK ports and global markets beyond.

Our region's successful places, thriving and well-connected communities are key to helping us to attract, develop and retain the skilled and talented people that will help drive our sustained economic future.

Left. Leading Agritech, Cambridgeshire.

Above. University of Northampton, Waterside Campus.

The Arc comprises

- 
3.8 Million Residents
- High-tech clusters and science parks and a current GVA p.a. of £111bn

- 
2 Million Jobs
- 10 universities, contributing £13bn p.a. GVA<sub>2</sub>

- 
1 International Airport
- 7000+ English Heritage recognised sites

- 
26 local authorities, covering 5 historic county areas
- 3 local enterprise partnerships<sub>1</sub>

- 
1 Combined Authority Business Board
- 1 emerging sub-national transport body

- 
one shared ambition





**Our ambition**

Our ambition is to unlock the potential of our assets to create a world leading innovation economy.

Using our vision, we will maximise the Arc's transformative economic potential. We will increase productivity by intensifying our global strengths in science, technology and high-value manufacturing together and contribute to a doubling of GVA by 2050 to over £200bn<sup>3</sup>.

**The Arc at work**

The Arc partnership will work at pace to achieve our vision. We will work collaboratively with local, national and international stakeholders eager to explore new models of delivering the economic outcomes we want to see. Our focus will be on:

**Initiatives which have impact across local borders:** Initiatives that maximise the collective strengths of the region.

**Nationally significant initiatives:** Programmes which will reinforce positive perceptions of the UK and have a global impact.

**Innovation and thought leadership in key economic policy areas:** Where the Arc can set and shape the agenda to help achieve UK national priorities.

**What we are about:**

**Bold leadership:** Setting and delivering a bold and ambitious agenda for environmentally sustainable economic growth within the Arc and demonstrating new routes to global economic competitiveness for the UK.

**Pioneering innovation:** Spearheading the adoption of new solutions emerging from the Arc, and beyond, to be at the vanguard of new solutions for green, inclusive and innovation-led growth.

**Catalytic advocacy:** Enabling cross sector fertilisation of ideas and securing international investment to accelerate adoption of new solutions and projecting our ambitious plans to a global audience.



Above. Apprentices at Metalcraft.

Below. Aerial view of Milton Keynes.

1. South East Midlands LEP, Oxfordshire LEP, Buckinghamshire LEP.

2. University of Oxford, Oxford Brookes University, University of Northampton, Buckinghamshire New University, University of Buckingham, The Open University, Cranfield University, University of Bedfordshire, Anglia Ruskin University, University of Cambridge.

3. This is an aggregation of the four Local Industrial Strategies produced in the Arc.

**Our vision:** By 2050, the Arc will be the world leading place for high-value growth, innovation and productivity. A global hub where ideas and companies are generated and thrive, home to exemplary models of 21st century development, with a high-quality environment and outstanding quality of life, and with a strong economic focus that drives inclusive clean growth.

**Our commitments**

Our collective ambition is significant, and we are committed to delivering genuinely transformative outcomes. We will:

**Unlock investment:** To enhance connectivity and innovation assets to ensure the Arc plays a leading role in solving big global challenges.

**Drive economic growth:** To secure positive environmental, health and social change which improves the life-work opportunities of local people.

**Promote our world-class research, innovation and technology assets:** To strengthen the UK's global profile.

**Transform our approach to building and delivering sustainable development:** For the betterment of our communities by capitalising on new technology and anchoring intelligent, creative and sensitive design in plans, infrastructure and housing developments.



**Our immediate actions**

Being a partner of choice for government and investors, our immediate next steps are to:

**Establish visible leadership:** Partners will work to set ambitious and credible targets that shape the scale of our ambition. We will create a new and accountable executive team which can drive forward our shared endeavours.

**Galvanise our wider partners:** Seeking networked excellence by working through our advocates to communicate our shared ambition and showcase our strengths and opportunities among our communities, businesses and investors.

**Progress our priority investments:** Working closely with central government to secure critical investment for Arc priority initiatives.



Top. Woburn Forest, Centre Parcs.

Above. Workstation at TWI.



## Our ask of Central Government

Arc partners have three immediate asks of central government which will help us step up to the challenge of delivering our vision:

**Increased focus on the Arc's strategic innovation infrastructure:** Unequivocal recognition that the Arc is central to the government's ambition under the R&D Roadmap for the UK to be a world leading science superpower. It will, therefore, have acknowledged status for major innovation and R&D investment across our sector and industry strengths. These are health and life sciences, electric powered transport, space technologies, artificial intelligence and autonomous navigation and energy systems, and environmental sciences. This will speed up the commercialisation of ideas, create new products and services and lead the UK's economic recovery.

**Continued support for planned Arc-based projects:** For example, emerging plans for east-west connectivity, the electrification and digitisation of road and rail infrastructure and a step change in active travel infrastructure.

**Establishment of an Arc-governed investment channel:** We need more direct and efficient investment channels to match our ambitions. This support needs to be in the form of flexible funding for capital and revenue to build collaborative business cases, unlock local public and private sector funding and to secure delivery.

## Investment propositions

The dynamic nature of innovation and world leading research and development in the Arc<sup>4</sup> provides the basis for an investment return to government in the order of £4 for every £1 of public expenditure. This will further catalyse increased value across the UK economy through new inter-regional collaborations, increased expenditure in research and development and creation of new supply chain opportunities across the country.

The Arc needs to have a clear shared identity: one which collectively promotes the connected assets and opportunities across the functional economic area and, is empowered to deliver. To fulfil our potential, we need to be recognised by government and stakeholders as the channel for Arc priority investments, with committed and dedicated Arc funding

channels for the future. We will continue to work with government, local, national and international partners to develop a suite of critical initiatives specifically for the Arc that are of economic significance to the UK.

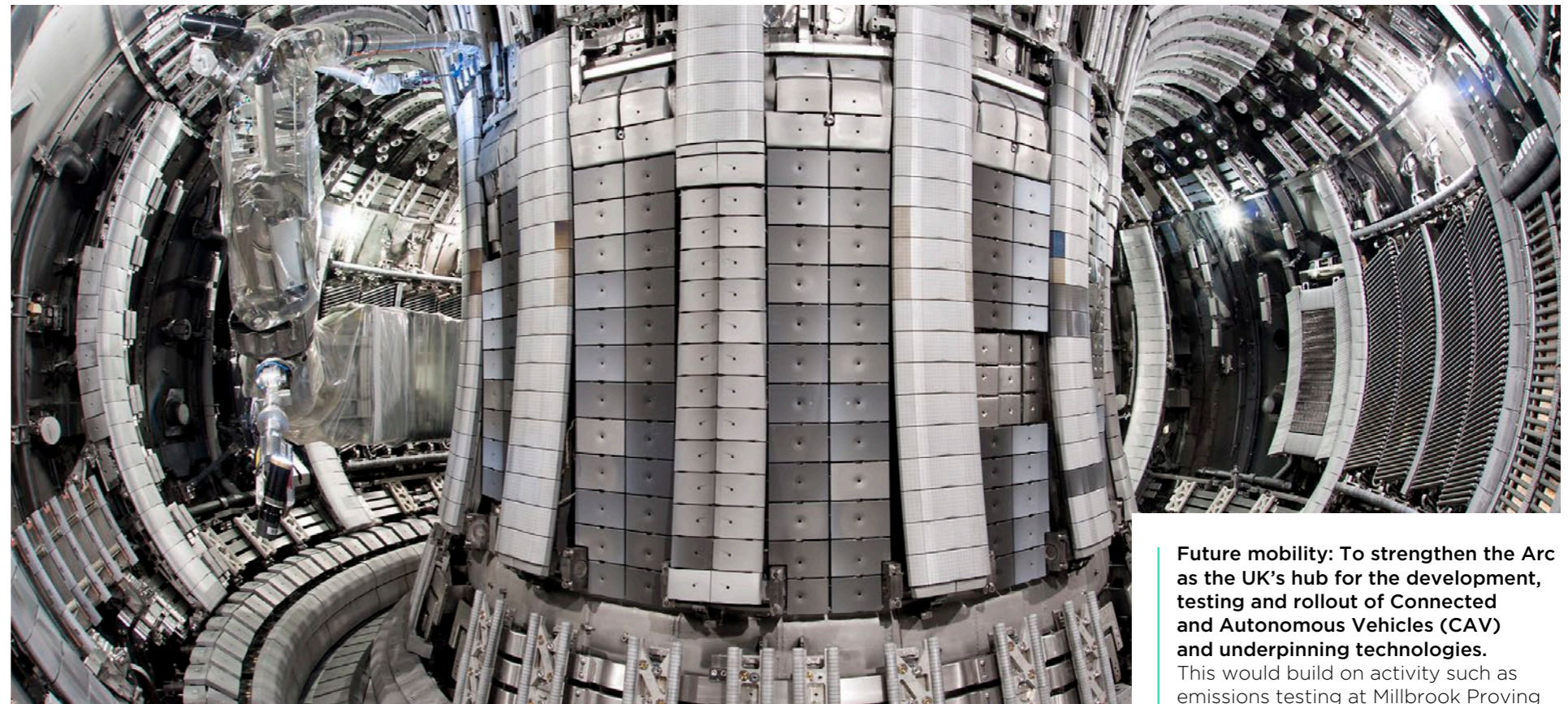
Our proposals will be developed, and supported by strategic business cases, prepared jointly by LEPs, universities, national research and innovation bodies and public and private sector partners. These will deliver increased research and development in key technologies and sectors leading to accelerated commercialisation of innovation and ideas and the development of new high growth businesses which will power job creation across the Arc and the UK.

## Arc's strategic innovation infrastructure

Innovation is the key strength of the Arc. Below we summarise major areas where Arc proposals are at the forefront of R&D expertise:

**Life Science innovation network: To build on the world-leading capability of the clusters around Oxford and Cambridge, which have been central to the UK's response to the COVID-19 crisis.** The scientific and business community's response to the challenge of developing a vaccine and antibody therapy for COVID-19 has demonstrated the importance of collaboration and sharing of resources. The Life Sciences Innovation Network will facilitate increased opportunities for greater collaboration, accelerate innovation and commercialisation and power the scaling up of high growth spinout companies within and beyond the Arc. This will support and level up local economies by creating new opportunities across the Arc that bring high technology, high quality, high value jobs to towns and cities across the Arc.

**Sustainable aviation: To forge a pathway towards zero-carbon aviation, delivering a leadership position for the UK in the evolving global market of 'green' aviation.** At the heart of this will be three networked and collaborative world-class academic partnerships with industry and innovators: the UK Zero Carbon Airport and Aviation Centre, based at Cranfield's Global Research Airport, the Oxford Thermofluids and Energy Institute and the National Centre for Propulsion and Power at the New Whittle Laboratory in Cambridge.



Top. JET, fusion energy at Culham Science Park.

Above. Rolls Royce - Cranfield University flight simulator.

4. BEIS and Cambridge Econometrics, (2020), Macroeconomic Modelling of the 2.4% R&D Target.

## Future mobility: To strengthen the Arc as the UK's hub for the development, testing and rollout of Connected and Autonomous Vehicles (CAV) and underpinning technologies.

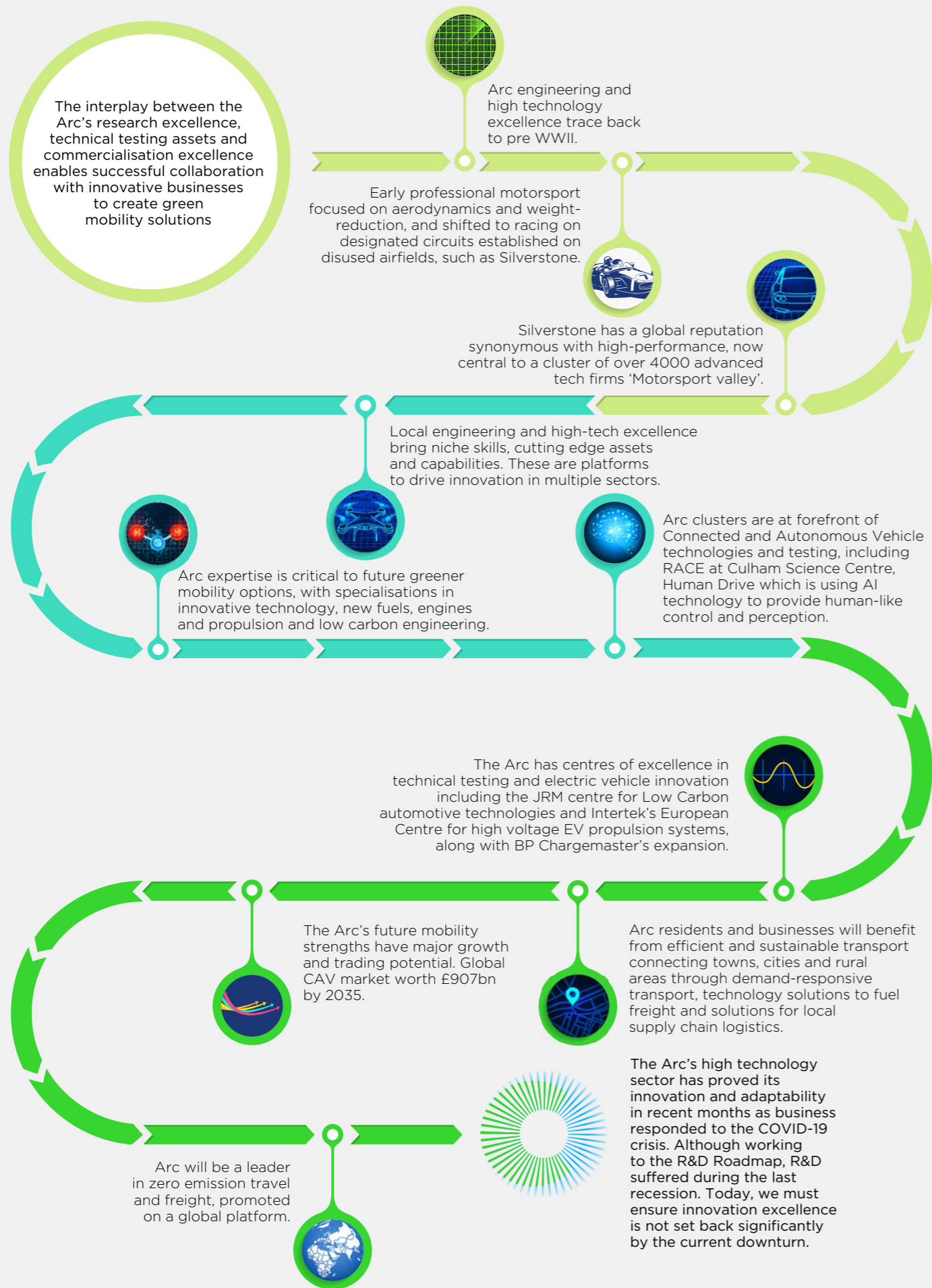
This would build on activity such as emissions testing at Millbrook Proving Ground, CAV testing at Cranfield and Milton Keynes, the national CAV test centre at Culham Science Park and the pioneering work of companies such as Oxbotica and Latent Logic in Oxford and TWI in Cambridge.

**Zero-carbon energy: To accelerate solutions to tackle climate change and enable us to advance towards a zero carbon Arc we aim to build on leading collaborations between industry and academia through national energy systems demonstrator pilots in Oxfordshire, hydrogen research at Cranfield, the trialling and testing of hydrogen fuel in HGVs at Chelveston and world leading research in fusion technology at Culham Science Centre, home of the UK Atomic Energy Authority.** We will pioneer new solutions in energy management, battery technology, renewables and clean forms of energy. This will revolutionise how the UK generates power for residential, industrial and commercial use and form new technology sectors which will be exportable and market leading. We will continue to develop and spread the benefits of our world-leading research to other UK regions through programmes such as STEP (a staged programme to design and build the world's first compact fusion reactor).

## UK Space Gateway: To maximise the global potential of the Harwell Space Cluster, the largest in Europe, and rocket propulsion and testing capability at Westcott Venture Park to position the UK as a market leader in space technologies and applications to meet the national ambition for a 10% share of the global space market.

Investments include a new space accelerator for spinouts and scale up companies, an AI Lab to harness machine learning and 5G technology to transform the satellite value chain. This includes in-orbit servicing, remote diagnostics and data acquisition processing and new Disruptive Innovative Space Centres (DISC) to provide open access specialist facilities with dedicated 'upstream assets' (rockets, satellites) and 'downstream applications' in health, energy transport and agritech.





Detailed business cases for the innovation infrastructure priorities are being developed. With a clear focus on achieving at least a net-zero carbon footprint together with net environmental gain and net biodiversity gain by 2050, our aim is to create the assets required to stimulate the innovation needed to realise our full economic potential.

In the immediate term, we need revenue support to on these business cases, by providing local, dedicated capacity and capability. Longer-term investment channels, will give confidence to investors and emerging businesses.

**Enabling infrastructure**

The five innovation investment areas have the potential to advance current thinking and transform the UK with opportunities for commercialisation and the creation of new highly skilled jobs.

To provide the environment for these initiatives to flourish and succeed, we also need to invest in underlying infrastructure in its widest sense. This includes business support, skills development, digital, rail and road connectivity, energy, water and the environment. It is important to ensure that everyone in the Arc, whether in towns, cities or rural areas, has the skills and opportunities to engage in our potential economic prosperity.

**Business growth and commercialisation**

**Business scale up programme:** focused on providing a world class leadership, coaching and high-performance support programme to SMEs with high growth potential, drawing on successful models operating in other leading international locations.

**Arc investment fund:** a fund to provide new finance, equity and investment mechanisms to support and accelerate the growth in the next generation of innovative start-up and scale-up businesses across the region, which can pioneer new ideas and translate these into successful commercial enterprises.

**Internationalisation programme:** to promote the Arc's investor potential in key global markets, aligned to our world leading technologies and sector strengths, accelerate and deepen UK export opportunities for Arc firms and attract international capital investment to support critical science and infrastructure development. It will build on the work already being carried out through a partnership between LEPs and the Department for International Trade.



Top. Connected and autonomous vehicle testing systems, provided by Cranfield University.

Above. Person working with red robot at Intelligent automation lab, Aerospace Integration Research Centre.



**Connectivity**

**Digital infrastructure:** An area based on innovation requires exceptional digital infrastructure. We need to accelerate the roll-out of full-fibre and 5G to better connect rural locations, stimulate digital innovation to facilitate new learning solutions and working patterns.

**East west rail:** It is essential to deliver the agglomeration effects of better connectivity across the Arc in a sustainable way. To this end, the whole East West Rail project, electrified to meet our de-carbonised transport objectives, must be delivered as soon as possible.

**East west road connectivity:** Future roads will be designed to accommodate the needs of all users including cyclists and pedestrians and enable the use of innovative and sustainable methods of travel such as electric vehicles. Significant investment is already committed and underway between Bedford and Cambridge (Black Cat Roundabout, A421, A428 improvements). There is a need to look again at the links between Oxford and Milton Keynes in order to channel investment more effectively to improve connectivity between the M40 and A14 and establishing the link between Jn 13 on the M1 and the A5 in Milton Keynes. Improvement of the A34 is also essential to reduce congestion, improve safety and improve air quality.



Top. Elmswood eco-town.

Above. MK:U development.

**First mile – last mile connectivity:**

There is a need to provide greater funding certainty to support local and regional sustainable and innovative forms of transport to link the strategic road and rail networks with our businesses in towns and cities. Active travel initiatives are fundamental to greater connectivity and these must be seen as integral to improved connectivity for the Arc – including connecting the places we live and work with the places we seek nature and well-being. The Cambridge Autonomous Metro is a good example of the sort of innovative sustainable transport that would be fitting in the Arc. There are similar examples of low-carbon Mass Rapid Transit opportunities in Milton Keynes and Oxford. A dedicated and committed Arc Connectivity Innovation Fund should be established to generate viable, commercial business cases to then seek private/public investment funding for viable mass transit and active transport at scale.



Above. Aerial view of Harwell Campus, Oxfordshire.

**Skills**

**A dynamic and responsive skills system:** To build on the successful pilot in Cambridgeshire and Peterborough to transfer unused apprenticeship levy resources from larger employers for investment in SMEs. Extending this across the Arc will support the development of a more responsive skills system which creates new employment pathways for young people, aligned to the skills needs of businesses. This will significantly increase Levy utilisation and the number of apprenticeships. This will be supplemented by an efficient source of high-quality advice for young people on their learning and work choices aligned to our sector strengths, building on the joint LEPS-Careers Enterprise Company Skills Hubs model.

**New STEM focused institutions:** Such as new universities in Milton Keynes and Peterborough. MK: U is a new model university with a STEM focused curriculum. Milton Keynes' world leading smart city credentials, which is being jointly developed by industry and will complement the existing university provision to provide young people with opportunities to excel in digital and engineering skills.

**Skills capital fund:** A co-investment fund comprising both capital and revenue budgets, to accelerate the development of world class vocational education facilities, including Further Education Colleges, to help to strengthen the supply of technical skills and routes to non-vocational and life-long learning for the Arc's young people and wider labour market.

**Place and environment**

**Living labs:** To integrate pioneering technology and innovation developed across the Arc in mobility, healthcare, energy and sustainable design to create flourishing communities and deliver improved public service and public engagement outcomes for residents across the region.

**Settlements of the future:** To establish testbed locations to trial new sustainable and affordable solutions for living and working based around green transport hubs and modern methods of construction – all settlements will be assessed against the aim of delivering net environmental gain, net biodiversity and net zero carbon.

We will work with government to enhance building regulations that align to sustainability principles, and actively reduce our carbon footprint, water and energy consumption in new and existing commercial and housing stock. A dedicated Town Deals Fund for the Arc will test ways to rejuvenate and modernise our town centres of the future.

**Green Arc:** To double the amount of land actively managed for nature by 2050 by establishing a Doubling Nature Fund to protect and enhance the environment and increase investment in natural capital assets working with major landowners and our important agriculture sector across the Arc, building on the ambition already set in Cambridgeshire and being delivered in pilot projects across the Arc.

**Environmental enhancements:** To invest in projects, such as the Bedford to Milton Keynes Waterway (a scheme that has both flood alleviation and water resource resilience benefits) and the Marston Vale Forest and establish Arc wide and more local Natural Capital Investment Plans to inform and support the emerging Arc Spatial Framework and Local Plans.

**Arc data lab:** Using data and AI to enhance understanding and inform decision making around decarbonising transport, strategic planning and investment, environmental protection and infrastructure planning. The Arc Data Lab would host a network of universities who will develop a Doctoral Training Centre to train professionals of the future. A 'digital twin' of the Arc will be created here and will be used to help deliver the government's Arc Spatial Framework.

Below. Aerospace Integration Research Centre, Cranfield University.

Bottom. Apprentices at Reaction Engines, Oxford.





# The Arc of success

## A UK and international success story

### Critical mass of commercial innovation:

Nine of the UK's top 100 (and two of the top 10) high growth tech firms are based in the Arc<sup>6</sup>. We have world leading innovation clusters of life sciences, aerospace, advanced manufacturing, transport, energy, creative and digital companies existing at greater scale and density here than anywhere else in the UK.

### Pioneering at the frontier of discovery:

Throughout history, the Arc has been the place of breakthroughs. Today, Arc scientists, entrepreneurs and academics are focused on solving the next generation of social, environmental, health and technological challenges. Industry-government-academic partnerships are innovating in areas from electric powered and autonomous flight to leading the fight against COVID-19.

**Places that attract and retain:** The Arc's global connectivity, knowledge-based job opportunities and high-quality natural environment and places make the Arc a desirable location to live and work. Enhancing our region's places by protecting and improving the environment will strengthen our offer further. We will ensure developments are well-designed and sustainably built. They will be better connected and inclusive, delivering net biodiversity gain, net environmental gain and achieving net zero carbon aims.

Below. Aylesbury Waterside Theatre.



Below. Students walking around university campus.

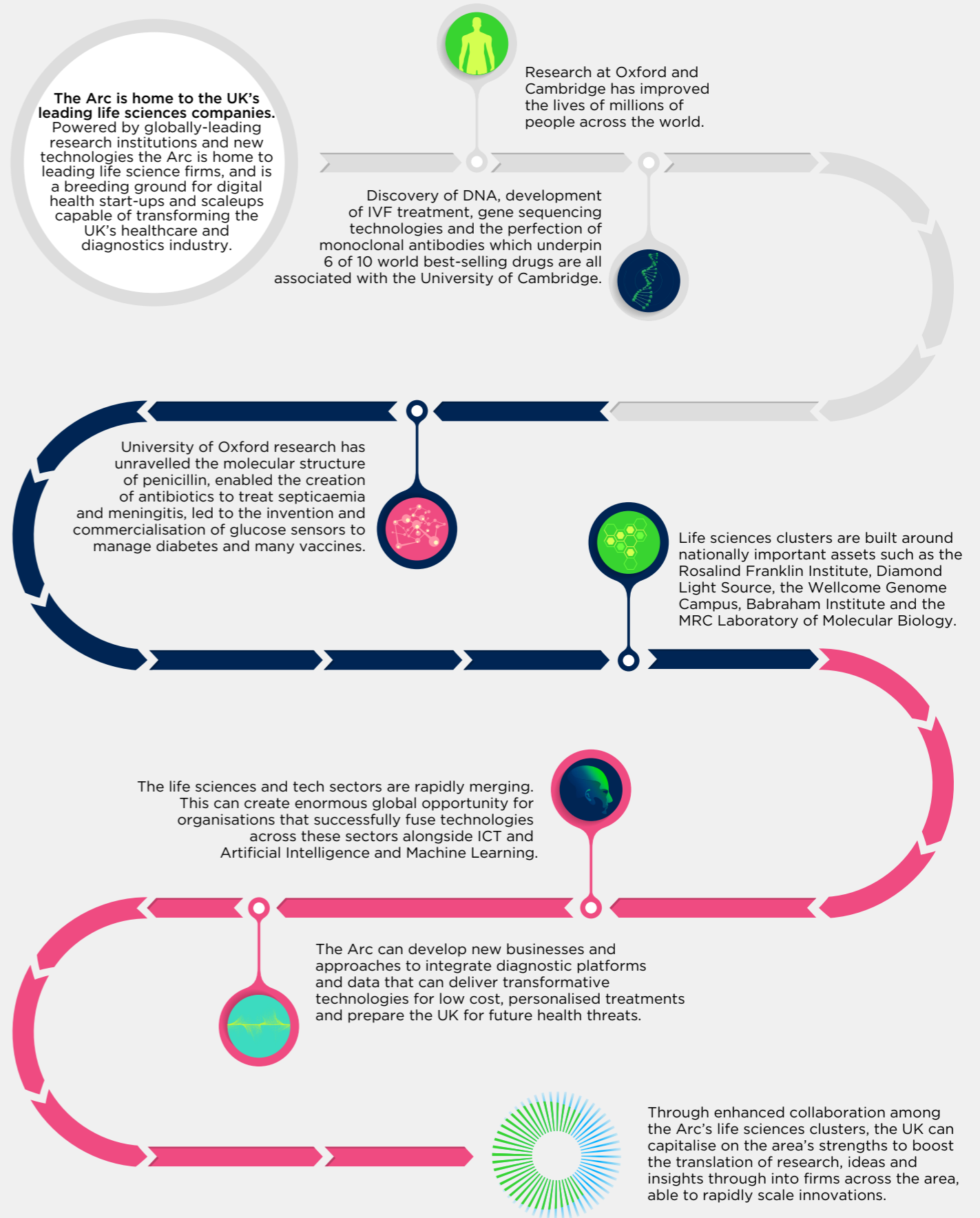


**A global magnet for knowledge and talent:** 10 universities, including Oxford and Cambridge which both consistently rank in the top four in the world. Together with our leading businesses, science parks, Catapults and government labs, the Arc provides the UK with an unrivalled concentration of world leading academic and commercial innovation expertise across many disciplines which draw international talent and creates innovation-led growth.

**Talented, productive & entrepreneurial:** The Arc's schools, colleges and universities work with businesses to support and train the next generation of highly skilled people, equipped with the know-how needed to drive future growth. We must build on this strength and collaboration to meet the skills and job needs of the future economy.

**A growth pedigree that sets us apart:** The Arc has a strong track-record in creating higher value jobs for all communities in the Arc and in a wide range of sectors needed to drive global growth.

6. Centre for Cities (2016), Cities Outlook 2016.





### Providing leadership to tackle the UK's challenges

Alongside our strategic priorities and our investment priorities, partners recognise the importance of the Arc's key role in demonstrating its contribution to the very immediate issues facing the country. As we progress our plans, partners will be eager to help address:



**COVID-19 recovery:** The industry and inventive capabilities of the Arc region provide scope to lead the UK's acceleration towards a greener and more resilient future. Our businesses can export innovations in the fight against COVID. But the economic damage from COVID-19 is likely to hit the younger generation and our towns and cities. The Arc's resilience and government support will play a central role in bolstering the UK's recovery and tackling future threats.



**EU exit:** The Arc's science and technology strengths and skilled workforce will be central in strengthening the UK's competitive advantage as we forge new trading deals. Research and development, an entrepreneurial spirit and strengths in commercialising new technologies here, will enable the UK to capitalise on emerging industries and international partnerships such as the European Space Agency. The region's university and business global reach enables us to explore and break into new markets that can secure prosperity for the UK.



**National rebalancing:** The Arc is uniquely placed to play a leading role driving change in the UK growth dynamic. The region can support the growth potential to secure better jobs for local people, by promoting the capabilities of, and connecting the assets in, our area. The region can connect the growth trajectory of London and the South East to the rest of the country.



Above. UTC Oxfordshire.



**Climate change and other sustainability challenges:** The Arc's sector strengths show that this region contributes significantly towards the global response to climate change. The Arc will urgently pursue its commitment to achieve global sustainability outcomes. We will work to secure investment for local innovative solutions to support the circular economy. We will promote the switch to renewable energy supply, the more efficient use and management of waste and resources alongside improving travel choices, supporting changing working practices and enhancing building design, planning and construction. This will enable the improvements to design and development of sustainable communities and the protection and enhancement of our natural environment.



**Inclusive growth:** Inclusivity is central to the Arc and our ambition and values. We will reduce health and social inequality by creating opportunities, raising productivity through skills, infrastructure and place-shaping investments.

### Re-imagining our long-term future

The Arc has a long-term vision for transformative change. This will enable the UK to strengthen its global competitive standing and position the economy for a long-term transition ensuring our businesses, institutions, communities and residents are able to capitalise on the emerging opportunities for growth, innovation and prosperity and respond to the global and local challenges we face.

Together, our ambition is to create a future for people living and working here that is characterised in three ways:

#### A zero carbon and net environmental and biodiversity gain corridor

We will become at least carbon neutral before 2050 and secure transformative economic growth through innovation, increased productivity and a more inclusive economy which furthers the potential of all our communities.

In practice, we will: Pioneer new solutions in energy management, battery technology, renewables and clean forms of energy which will revolutionise how the UK generates power for residential, industrial and commercial use. This will catalyse new technology sectors which will be exportable and internationally market leading.

- Attract and concentrate R&D investment on the global effort to tackle climate change, natural resource depletion, the protection and enhancement of the natural environment and quality of life.
- Revolutionise our use of renewable energy to power our growth, whilst embedding this into upgrades to our infrastructure, housing and commercial premises to maximise resource efficiency.
- Protect, nurture and enhance our wildlife, natural capital assets and green spaces to provide vital green infrastructure for the Arc.
- Increase resilience of our places by investing in infrastructure to manage the risks of, and embed our proactive response to, flooding, water resources and quality, sustainable energy, soil degradation and air quality.

### A pioneer in digitally connected and open networks

We will make our places, people and institutions more resilient, better informed and more widely connected to opportunities in the Arc and around the world. In practice we will:

- Test and develop new ideas, products and solutions to drive prosperity and sustainability in the Arc, grow UK supply chains and export our know-how to the rest of the world.
- Sustain a culture of openness, collaboration and transparency in our institutions and amongst our businesses to use the broadest range of expert insights and continually improve the quality of what we do.
- Create flexible, accessible and resilient infrastructure to allow more people and businesses to share ideas, trade globally and facilitate stronger collaboration between institutions and businesses.
- Deploy leading edge digital technology to increase the range and accessibility of learning and work opportunities for people and places across the Arc.
- Develop our communities to allow people to continue living and working in harmony with our zero carbon and net environment and net biodiversity gain ambitions.

### The destination of choice for talent & skills

We will ensure the Arc remains and grows as a source of world-class skills, a top destination for the most able people who can drive forward our commitment to solve global challenges and a place where everyone can access the learning they need to realise their full potential. In practice, we will:

- Champion broad-minded businesses that invest in our local talent and suppliers to ensure solid foundations of our economic growth.
- Attract upcoming talents from around the world to work in Arc institutions and help support our innovation-led growth plans.
- Drive ambitious, excellence-based growth in applied research and learning in all our universities.
- Instigate a revolution in innovative, flexible and accessible learning that capitalises on digital channels to ensure people have the skills they need to fulfil their potential and employees have access to globally best in class lifelong learning.



Top. The Schrodinger Building, Oxford Science Park.

Middle. Person using virtual reality headset at the UK Atomic Energy Authority.

Above. People walking in open spaces.



# Our economic priorities

To realise our Vision the Arc will pursue six economic priorities:

## Globally recognised proposition

The Arc will establish a global reputation as a breakthrough region for innovation-led growth.

## Oxford University's Jenner Institute is at the heart of Coronavirus vaccine trials

The Arc must develop and promote a stronger identity that represents our unique combined proposition to investors and entrepreneurs. Our proposition will be based on the Arc's quality of life offer, innovation potential and the diversity of investment opportunities on offer for communities and businesses.

*The Arc will have a strong, instantly recognisable brand that is centred on its unique innovation and commercialisation strengths in industries that are shaping our future.*

By 2050, the Arc will be the world leading place for high-value growth, innovation and productivity. A global hub where ideas and companies are generated and thrive, home to exemplary models of 21st century development, with a high-quality environment and outstanding quality of life, and with a strong economic focus that drives inclusive clean growth.

## Future-proofed places

The Arc will create attractive places with robust connectivity that sustains growth in our network of sites and priority sectors.

## Living Labs will trial and commercialise new technologies like Connected and Autonomous Vehicles and electric energy, smart homes and sustainable living

Better connectivity is essential for releasing the full potential of our assets and people right across the Arc. Alongside our sub regional transport body 'England's Economic Heartland', the Arc will implement infrastructure plans for growth.

We will champion de-carbonisation of the transport system, seek investment to innovate, test and develop our digital and transport infrastructure to boost our reach and unlock our commitment to innovation-led growth. We aim to establish and sustain active and connected communities which can benefit from easy access to employment, learning, natural, cultural and heritage assets.

We will seek to address our environmental constraints turning them to net advantages - managing flood risk through developing green and blue corridors. We will increase and promote access to, and interaction with, green and blue spaces enhanced and created.

*The Arc will be recognised for its comprehensive network of green, blue and smart transport connections that facilitate economic growth and boost quality of life.*



Top. A student at The Foundry, Oxford.



Above. RAL Space, Harwell.

## Commercialisation culture

The Arc will stimulate a dynamic business culture which fosters entrepreneurship, innovation, commercialisation and business growth at scale.

## Oxford and Cambridge have developed nine unicorn businesses of \$1bn+ in value plus a tech sector worth \$57bn

The Arc already has a strong track record of deploying its skills and know-how to secure economic growth. We must accelerate and broaden our successes through an enhanced focus on intellectual property creation, support for spinouts into commercial ventures and attention on scale-up enterprises aiming to reach global markets. We will strengthen collaboration among supply chains to help small businesses scale up in size and boost commercial knowledge flow to SMEs. The Arc will establish a living and working testbed ready to roll-out the latest technologies for sustainable development and modern working ideas in readiness for large scale deployment.

*The Arc will be recognised as the natural home for entrepreneurs and innovators ambitious to realise their goals and drive innovation-led growth.*

## Innovation assets

The Arc will deepen and better integrate its global innovation assets into the economy to better establish sector clusters that attract top global talent and investment.

## University of Cranfield's Project Fresson is spearheading the development of electric flight

The Arc has a highly competitive base of sectors and clusters and a network of innovation centres undertaking R&D, supporting in commercialisation and facilitating business networking. We need to continue to strengthen our innovation assets and exploit every opportunity to harness their know-how to secure local economic growth and rapid expansion into new international markets for the UK.

*The Arc will be recognised as having the country's strongest portfolio of universities, research centres and knowledge-driven businesses to attract UK and international innovation investment.*

## Workforce of the future

The Arc will develop top global talent in the local labour market to drive future growth and unlock the potential of people living and working in the area.

## The Arc is home to 1/3 of the UK's biotech employees

The Arc has internationally leading academic institutions complemented by a series of learning and research organisations that work closely with businesses and supply thousands of well qualified people into the local labour market each year. We need to expand these organisations to deliver more and ever better qualified people who can help share in our ambitions for innovation and knowledge led growth.

*The Arc will be known for the skills needed to meet the evolving requirements of business and ensure everyone living in the area can fulfil their potential for success throughout their working lives. The Arc universities will deliver training and skills provision to help equip the future workforce.*

## Investor ready region

The Arc will attract global investment to drive innovation-led economic growth and generate new opportunities for people to work and businesses to prosper.

## In the last five years, Foreign Direct Investment generated and protected over 26,000 jobs in the Arc<sup>8</sup>

The Arc has a strong economic track record of investment in our urban centres, employment sites, innovation assets and businesses. We need to replenish our assets, strengthen our infrastructure and upscale our businesses so we can sustain a new wave of innovation-led growth into the long term. Our appetite for growth and our potential to commercialise innovation needs further investment from venture capital, inward investors, public sector partners and sovereign wealth funds to realise its growth plans and fulfil its potential contribution to UK economic growth.

*The Arc will be globally recognised by investors as a secure destination for investment which can deliver good returns and unlock new globally competitive assets.*



Top. Academic Centre, MK Hospital.



Above. UAV Flying Lab.

8. DIT (2020), 'Inward Investment Results 2019-20'.



# Sector strengths

## Building a new economy

The Arc is the UK's leading region of innovation. The area's research, technology and testing capabilities, alongside our record in commercialising ideas, attracts new business, talent and investment. This is already creating significant economic value to the UK.



The Arc clusters provide the UK with strong foundations to drive growth. They are innovating in high profile disciplines on global platforms, including in vaccine development, med-tech, space applications, connected and autonomous vehicles, robotics, electric and hydrogen powered transport, quantum computing, through to artificial intelligence.

To continue the success of spin outs in these fields, we need to further connect and invest in the Arc's business ecosystem.

The Arc has the capability to be a world-leader in a wide array of industries with global reach and strong growth potential. The Arc can help focus UK economic growth towards innovation-led sectors with export potential which help solve the urgent challenges facing society.

### Working with government, the Arc needs to support:

new enterprise and investment to stimulate the next generation of businesses in newly emerging markets driven by the latest technological developments

revolutionising our mature sectors such as healthcare, tourism and hospitality and manufacturing, logistics and supply chains to create long term higher value sustainable employment.

The Arc is committed to supporting new innovation infrastructure, enhanced connectivity and attractive places to sustain economic growth to further develop our existing sector strengths.

Highest density of R&D institutions than any other UK region which provide a vital capacity to translate innovation into commercial successes.

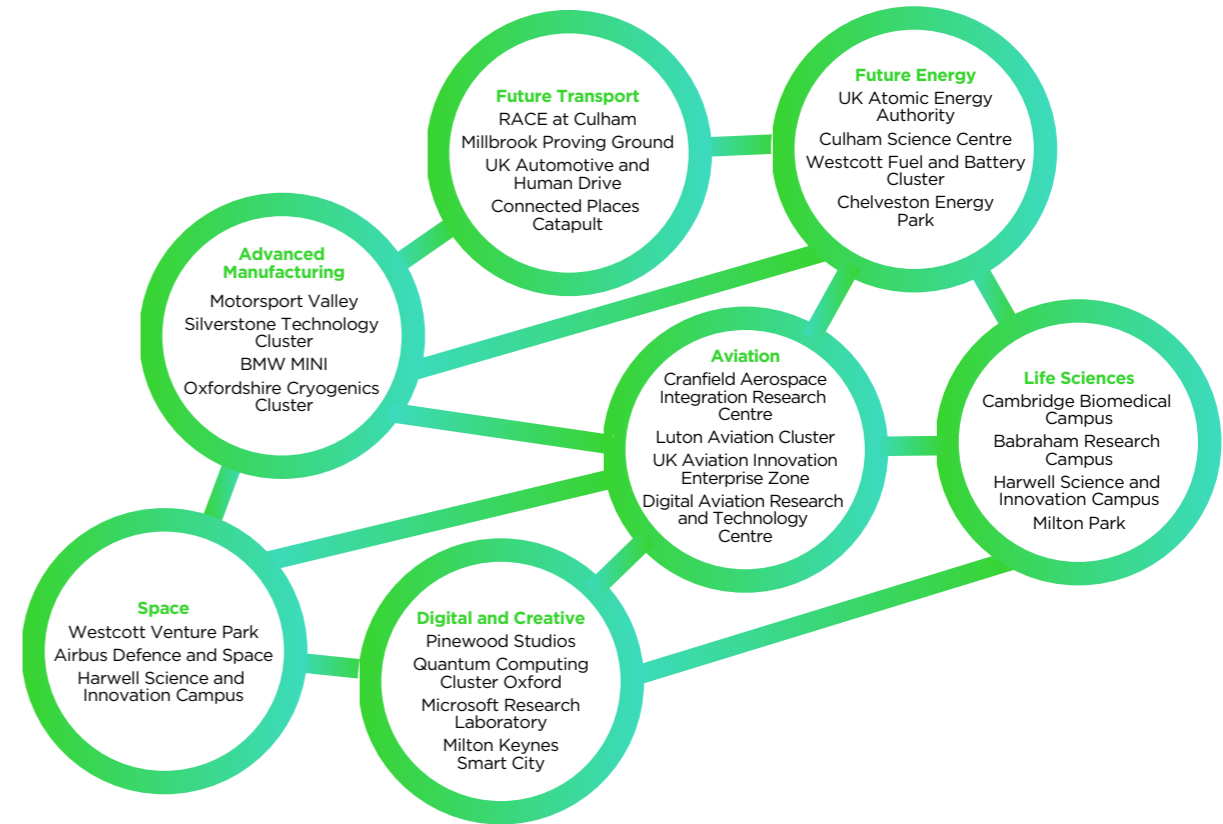
Established venture capital and angel investor networks not seen elsewhere outside London.



Top. Students in a laboratory.

Middle. Plane testing.

Above. StreetDrone autonomous vehicle.



## Life Sciences

The strength of the Oxford to Cambridge Arc's life sciences sector has been underscored by the recent COVID-19 crisis.

The two globally renowned life science clusters around Oxford and Cambridge are the most productive in Europe and compete internationally. Specialisms include med-tech, pharmaceuticals, genomics, biodata, diagnostics, digital health and biomedical engineering.

Oxfordshire hosts a leading bioscience cluster, with over 300 companies operating in biotech, med-tech and diagnostics, including the world leading Jenner Institute and the national Vaccine Manufacturing & Innovation Centre. The Cambridge life sciences cluster of 400+ companies, employ 15,500 people and contribute nearly £3bn annually to the UK economy. Buckinghamshire is home to a growing med-tech sector, with the development of the Buckinghamshire Life Sciences Innovation Centre.

The life science clusters have the critical mass and growth potential to reach across the Arc and rival the world's largest life sciences ecosystems.

## Space

The Arc supports the largest space cluster in Europe. Our local base of space businesses is three times more productive than the national average and is rapidly growing. The application of space-based technology such as remotely sensed data and satellite technology is helping humanity to better understand our natural environment and improve communications to drive the next generation of growth in digital health, agri-tech and energy. Supported by innovative space and technology research at Arc universities, developing new AI, 5G and propulsion solutions, the sector has the potential to maintain a leading edge globally.

The space cluster at Harwell Campus employs over 1,000 people and supports 110 organisations including the European Space Agency (ESA), the National Satellite Testing Facility, Lockheed Martin and Airbus Defence and Space.

Westcott Venture Park in Buckinghamshire is home to the National Propulsion Test Facility where the UK Space Agency is investing over £4 million to develop a new generation of space propulsion engines, along with a 5G Catapult Centre.

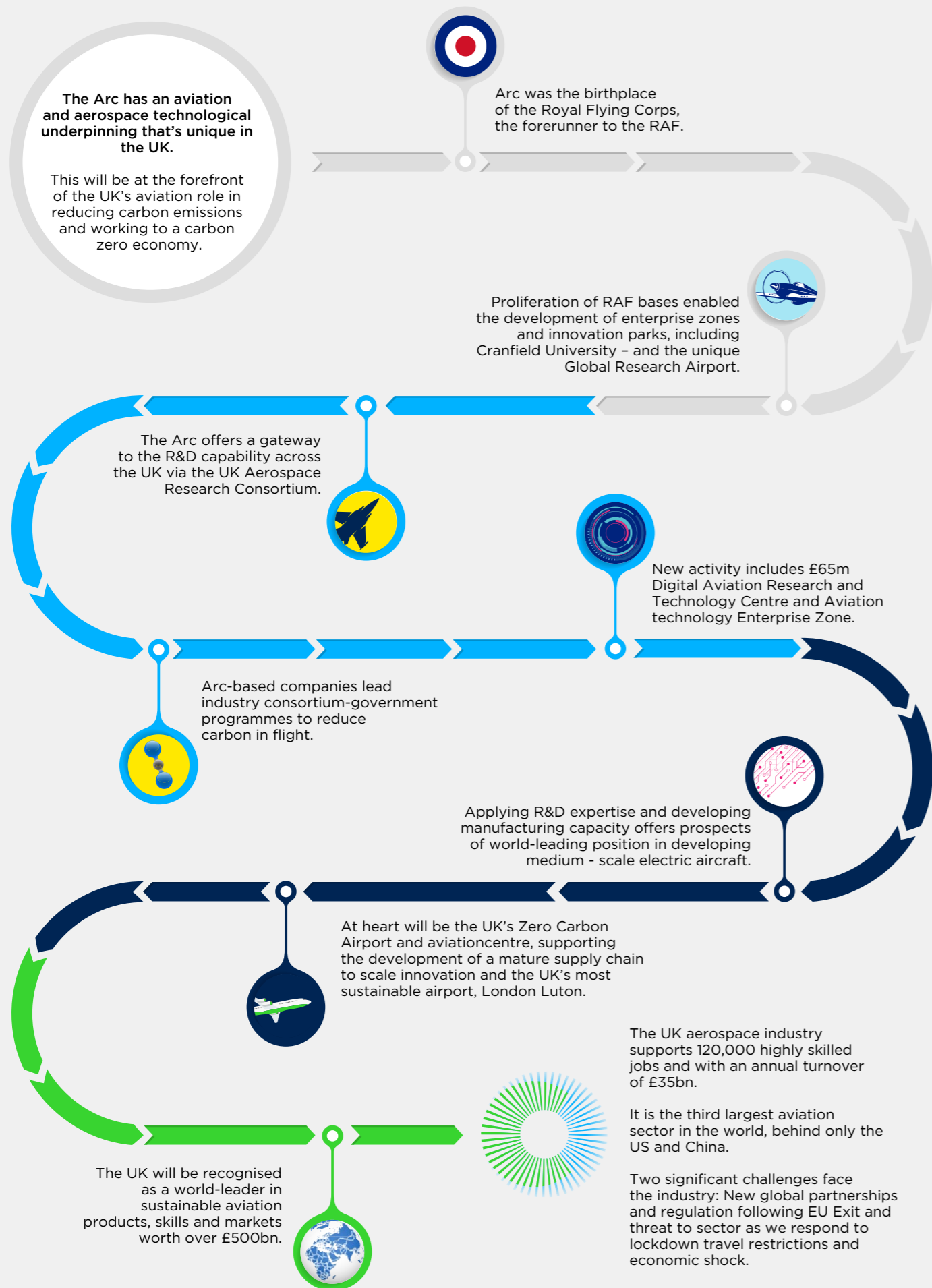
These assets are essential if the UK is to remain at the forefront of global competition in this growing, global market.



Top. Glasshouse, Agriculture Technology Centre, Cranfield University.

Above. Red Bull Racing driver, in central MK.





**Aviation**

Electric and hydrogen propulsion, autonomy and airspace management technology are becoming increasingly important drivers of competitiveness in the aviation market.

Cranfield University is a research-airport with a global reputation operating at the forefront of aerospace technology and engineering. It is home to the Aerospace Integration Research Centre, Cranfield Aerospace Solutions and the Aerospace Technology Institute. Together with the new Digital Aviation Research and Technology Centre (DARTeC), Cranfield is the nation's flagship research institution in the Future Flight aerospace sector deal. The Arc is also home to the Whittle Laboratory in Cambridge, which is the world's most academically successful laboratory in the field of aerospace propulsion and to Oxford Thermo fluids Institute, which is world leading in its research in heat transfer and thermal systems – both essential for the introduction of zero carbon flight.

As well as having the UK's fastest growing major airport, the Luton Airport cluster is one of the top three hubs for business aviation services, specialising in aircraft maintenance.



**Digital and creative**

Digital innovation is driving rapid progress in artificial intelligence, robotics, cybersecurity, advanced quantum computing, the internet of things (IoT), virtual reality (VR) and augmented reality (AR). The Arc is already on the map as a major centre for application and testing in these technologies which complement our strong foundations in creative, digital and ICT.

Oxford supports 4,700 businesses with strengths in gaming, software development, cybersecurity, high performance computing and film and TV. It is also leading in quantum readiness and is the home of the new National Quantum Computing Hub at Harwell Campus.

Cambridge also has a strong IT and digital technology sector and is home to several award-winning games companies including Microsoft's first lab outside the US, along with Google, Amazon and Apple.

Milton Keynes is a testbed for AI innovation at the heart of the Arc. The Smart City has over 1,000 people with direct AI or machine learning skills and is home to over 6,000 software engineers and 4,000 data engineers. The city is working to integrate real time data and deploy the UK's first dedicated 5G Network to trial applications in mobility, health and energy solutions. The city has the world's largest fleet of delivery autonomous robots and has clear scope to be a global destination for future waves of innovation-led growth in the application of AI.

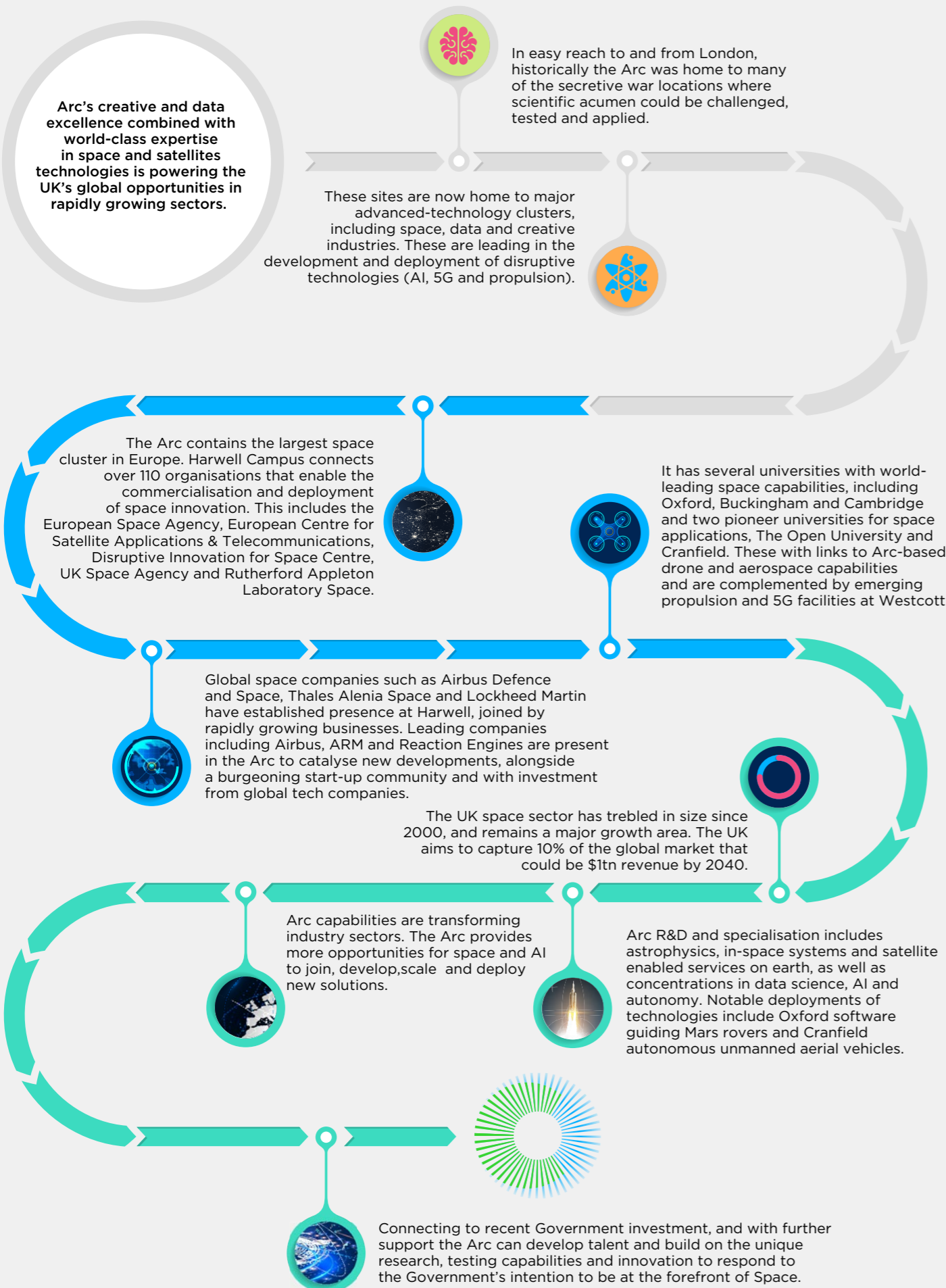
The creative cluster at Pinewood is globally renowned for its state-of-the-art film, TV and gaming production and development.



Top. Digital Aviation Research and Technology Centre.

Above. Drone flight.





**Advanced manufacturing**

The Arc's advanced manufacturing cluster is known for high-performance technology and motorsport engineering. We have specialisation in the design and manufacture of innovative technology, engines and products that incorporate low carbon engineering and the application of lightweight materials and composites.

**Motorsport Valley is a £6bn global cluster of automotive, motorsport and advanced manufacturing companies extending from Northamptonshire to Oxfordshire. Silverstone is at the heart of the advanced manufacturing sector, testing facilities for materials and vehicles and the world-famous F1 Circuit.**

Related capabilities in defence, electronic sensors, medical devices, food and drink and technologies such as Cryogenics, in which Oxford is a world leader, are critical to underpin our longer-term competitive potential in high value manufacturing and engineering.

**Future transport**

The Arc's expertise in future green mobility options is built upon specialist expertise in the design and manufacture of innovative propulsion systems that incorporate low carbon engineering.

The Arc has the credentials to lead the UK's push for global prominence in connected autonomous vehicles (CAV), building on its expertise in robotics and autonomous systems (RAS) in which RACE at Culham Science Centre is a key UK centre of excellence, alongside the Millbrook Proving Ground which is employing 5G technology for innovative real-time autonomous vehicle trials

Milton Keynes is home to the UK's most advanced EV charging infrastructure and an EV experience centre, while the Multiuser Environment Autonomous Vehicle Innovation project at Cranfield and Northampton's 1.5-mile route for fully autonomous vehicles can help transform our know-how into world leading technological solutions.

**Future energy**

Energy is central to the green Arc vision for carbon neutrality by 2050 and the UK's Clean Growth Grand Challenge. Oxford is developing future energy systems at scale in high capacity batteries and intelligent battery management systems at the Culham Centre for Fusion Energy and the Faraday Institution.

The Arc is also home to Westcott in Buckinghamshire with its specific capabilities around hydrogen fuel cell testing and development, and renewable energy generation is being pioneered in several locations including Chelveston Renewable Energy Park which integrates high energy consumer businesses with large scale on-site renewable energy generation and storage facilities alongside include renewable hydrogen production capacity.

In fusion, the region is home to three different approaches making it unique: they are led by First Light Fusion, Tokamak Energy and the Culham Centre for Fusion Energy. The cluster is supported by technical research, a Superconductivity Centre, a Cryogenics cluster and technical innovators.

**Below.** ICEoxford Cryogenic engineering work experience.





## Connecting threads

The Arc's strengths are concentrated in innovation-led and highly productive sectors. They draw on a set of shared technologies, skills and assets. The Arc is determined to further deepen the connections between its priority sectors and innovation assets to deliver networked excellence. We have shown that connecting businesses, academia and clusters across industries stimulates new ideas, collaboration and technologies that have a dynamic effect on growth and productivity. We have the environment to develop, apply and test new solutions across other sector challenges and create efficiencies for businesses. The Arc has the ability to lead the UK as it drives further waves of:

**Green growth:** securing low carbon solutions that minimise depletion of precious resources.

**Innovation-led growth:** promoting technology and know-how to develop new products and processes that help solve the world's greatest challenges.

**Inclusive growth:** creating new opportunities for new talents to be harnessed which allow more people to realise their full potential and make a contribution to growth.

Alongside the area's innovation sector strengths, the Arc will continue to develop and support the cross-sector collaboration among the area's growing and enabling sectors, such as care, learning, logistics and the visitor economy. These crucial sectors provide employment opportunities for many and underpin the successes of the rest of our economy.

These foundational sectors also have scope for huge transformation as technology and new business practices transform traditional business models. The Arc will harness innovation in technology rich sectors and apply this to mature industries to help them innovate and create new jobs.



# A call for action

The Arc has significant strengths and transformative economic potential. The Arc is the UK's leading region for research, development and commercial exploitation of innovation. We have world-renowned assets, talent and a recognised track-record in globally significant discoveries and industrial breakthroughs.

**The Arc Leadership will pursue innovation-led growth to help solve major, urgent environmental, health and social challenges, and at the same time, drive UK competitiveness and local prosperity.**

We have established a vision for sustainable and inclusive growth that will be an exemplar of net zero and net gain approaches and have assembled a partnership to harness the assets that together make the Arc the UK's obvious choice for investment in future growth.

This economic prospectus sets out our plan to work with UK government to make the UK a world-leader in new technology and industries in zero-carbon aviation, space, life sciences, future mobility and energy. With investment, we can better connect and realise the potential of the critical mass of assets and know-how created by our area's people, businesses and institutions. We aim to be a testbed for new ways of living and working including by demonstrating net zero and net gain are achievable and economically beneficial. This will unlock the connected potential across our sector strengths to propel the Arc and the UK into an era of global growth at the vanguard of innovation.

The Arc's economic potential is great but we are very early in the life cycle of regional maturity. We now need government backing and investment from across Whitehall to help us clearly establish our nationally significant status and to develop robust and committed investment channels so that we may upgrade critical parts of our infrastructure and to secure the future competitive edge of our knowledge assets.

We can bring forward our energy and our vision, we can unlock co-investment and we can deliver success, but we need full government backing to do so.

In partnership with the government, the Arc can double its economy by 2050 to over £200bn. With committed and sustained support, this can be achieved through science, technology and high value manufacturing, which will drive green, inclusive and innovation-led growth supporting our local communities, the country and the world. We will be an exemplar for other regions in the UK with the investment here spreading benefits across the UK as a whole.

The Oxford to Cambridge Arc is a genuine global asset and a national investment priority. With determined leadership and financial backing, the Arc can deliver for the UK.



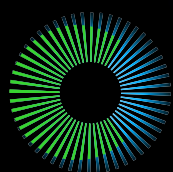
**Above.** Volante Vision concept, Rolls Royce, Aston Martin, Cranfield Aerospace Solutions.

**Left.** University of Bedfordshire, Luton.

**Below.** Entrance to Pinewood Studios, Buckinghamshire.







OXFORD-  
CAMBRIDGE  
ARC