CATAPULT
Connected Places

Diatomic Year 3 Challenges

Public Open Call Release

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INTRODUCTION & BACKGROUND

DIATOMIC DIGITAL ACCELERATOR: INTRODUCTION

Overview of the accelerator programme

Funded by Innovate UK and the West Midlands Combined Authority, the accelerator programme is delivered by Connected Places Catapult in partnership with Birmingham City Council, University of Birmingham, Birmingham City University, Aston University and in collaboration with Wolverhampton City Council and the University of Wolverhampton.

It will support up to 10 SMEs, over four months who are developing digital solutions that can help improve how cities and places work.

The programme is part of the wider Diatomic Digital Twin project, which provides a dynamic digital model of the city that facilitates informed decision-making for infrastructure planning, environmental management, and sustainable development. Through its open architecture, the platform enables integration of various APIs and specialised digital twin solutions that draw from shared datasets, producing outputs including 3D visualisations. This approach allows SMEs to contribute their expertise to enhance the platform's capabilities and applications.

DIATOMIC STAKEHOLDERS

Project sponsors

West Midlands Combined Authority

InnovateUK

Challenge owners

Birmingham City Council

Birmingham Knowledge Quarter

Wolverhampton University

Wolverhampton City Council

Green Innovation Corridor

University technical partners

Birmingham City University

Aston University

University of Birmingham

CHALLENGE SITES:
INNOVATING INVESTMENT ZONES

Successful SMEs will get the opportunity to work on one of two challenge sites, which have both been designated Investment Zones. Investment Zones are areas across the UK where central and local government will work with business and local partners to create the conditions for investment and innovation.

Birmingham Knowledge Quarter (BKQ)

The Birmingham Knowledge Quarter is a dynamic innovation district spanning 210 hectares, anchored by leading universities, hospitals, and research institutions, and designed to drive economic growth through cutting-edge R&D, advanced manufacturing, and collaboration across health, life sciences, and digital technologies. Businesses located in the district benefit from generous tax incentives (including 100% capital allowances, business rates relief, and employer NIC savings) available until 2034 to support innovation and growth.

Learn more about BKQ here.

The Wolverhampton Green Innovation Corridor (GIC)

The Wolverhampton Green Innovation Corridor is a green construction, computing and engineering initiative connecting key assets at the University of Wolverhampton's Springfield Campus, Science Park, and the i54 advanced manufacturing business park. Designed to drive sustainable economic growth by attracting clean technology businesses, advancing green manufacturing, and accelerating low-carbon innovation across the region.

Learn more about GIC here.

DIATOMIC DIGITAL TWIN

Image

Data and digital approaches to the Diatomic digital twin platform

During phase 1 (2023-25), three use cases were developed on the digital twin platform (air quality and traffic management, hydrogen fuel cells for electric vehicles and energy systems). These use cases operate on real-time data collected from existing sensors and datasets in the West Midlands.

Phase 2 (2025-26) introduces new challenge areas developed in collaboration with local partners in Birmingham and Wolverhampton. These exploratory initiatives will require innovative solutions that leverage datasets provided, curated, or aggregated by SMEs.

As part of this opportunity, SMEs can either select a challenge area which connects to one of the existing use cases, therefore working with already compiled data, or choose a challenge which would require you to gather and integrate new data to help develop and test your solution on the digital twin platform.

RESEARCH & METHOD

OUR APPROACH:
RESEARCH & ENGAGEMENT

The challenges in Year 3 were identified through various design research methods.

Desk research to find relevant data and opportunities to support challenge areas.

Internal interviews with our technical specialists for added context and information.

1:1 interviews with challenge owners focused on their needs, and the possible impact.

Group workshops to validate, refine, and evaluate potential challenges.

CHALLENGES FOR YEAR 3

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1. Mobility and last mile at BKQ
2. Land usage and underground infrastructure at BKQ
3. Digital connectivity at BKQ
4. Building optimisation at BKQ
5. Planning at the GIC
6. Renewable energy at the GIC

1 MOBILITY & LAST MILE
BIRMINGHAM KNOWLEDGE QUARTER

Description:

The Birmingham Knowledge Quarter aims to provide people with connected green walkways and intuitive wayfinding. However, doing this in an urban space which is shared with multiple transport routes can be challenging. Digital twin approaches can help with optimising current mobility, as well as forecasting and modelling future requirements.

As well as walking and micromobility, the area will be supported by rail, bus, and light transit routes. The combination of all of these within an urban area and continually evolving space means that excellent planning and modelling is required to ensure smooth travel. Going further, understanding the mobility and last mile considerations helps with planning future developments and best land usage.

We are looking for innovative solutions that could support the following challenges:

- **Wayfinding** – Improving people's knowledge of getting around the space as well as breaking down perceived and physical barriers. This could include navigating large roads such as James Watt Queensway and the different rail stations within Birmingham.
- **Creating an identity and sense of place** – Helping BKQ understand how tramways, rapid bus routes and future developments have an impact on walking and micro mobility to provide everyone with a seamless experience of moving around BKQ.
- **Transport planning** – Solutions which can help the planning of new transport service. This might include positioning of a new bus stop on James Watt Queens Way or where to put bicycle rental stands.
- **Supporting delivery infrastructure** – BKQ will be a low vehicle zone, how can the area be designed for delivery vehicles, alternative delivery vehicles (drones) and taxi services.

2 LAND USAGE & UNDERGROUND INFRASTRUCTURE
BIRMINGHAM KNOWLEDGE QUARTER

Description:

The Birmingham Knowledge Quarter seeks to make more informed decisions when planning land usage and accelerating new developments.

Underground infrastructure includes water, electricity, gas, digital fibre and has parameters such as understanding what infrastructure is in use or defunct, as well as whether it is a public or private asset. Having this knowledge can be crucial when making decisions at ground level (such as the awareness of the gas mainline through the site).

We are looking for innovative solutions that could support the following challenges:

- **Mapping existing infrastructure** – Innovations that map and collate all underground infrastructure and land classification.

- **Planning at speed** – Innovations which help decision making on land use, such as knowledge on which areas would be better suited to be parks, housing, industrial, wasteland etc. which in turn reduces cost, planning and forecasting.

- **Better land use** – Innovations that can help when re-zoning and future developments. Could the land be used differently to deliver better impacts and outcomes?

3 DIGITAL CONNECTIVITY
BIRMINGHAM KNOWLEDGE QUARTER

Description:

The Birmingham Knowledge Quarter seeks to better understand how can we model and deliver seamless digital connectivity across the BKQ area ensuring both futureproof wired and wireless infrastructure.

Connectivity and communications infrastructure is at the heart of the Birmingham Knowledge Quarter's vision. Urban areas often face patchy and unreliable digital connectivity due to a mix of physical obstructions (like tall buildings), network congestion, and uneven infrastructure deployment. Planning where and how to install new connectivity assets, such as fibre lines, 5G towers, or public Wi-Fi nodes, is complex. Birmingham Knowledge Quarter wants to create a seamless experience as people move through space.

We are looking for innovative solutions that could support the following challenges:

- **Planning new connectivity assets** – Innovations which help decisions on where to put connectivity assets such as fibre lines, 5G towers or public wi-fi nodes. This might also include decisions on whether buildings should have their own masts or use external ones.

- **Creating a seamless digital connection experience** – Interoperability and consistency as people and equipment move through the space. e.g. smooth transfers from 5G to Wi-Fi.

- **Urban challenges** – Connectivity is affected by tall buildings, density development and high volume of users.

4 BUILDING OPTIMISATION
BIRMINGHAM KNOWLEDGE QUARTER

Description:

The Woodcock Building is a key building in Aston University's campus at BKQ, an incubator space for life sciences and clean tech. The goal is to maximise its usage and impact as a multi-purpose building for now and in the future.

Woodcock Street facility is a 220,000 sq ft building that will house:

The triple-crown accredited Aston Business School (teaching space, staff space, student space etc).

- Aston Business Hub: a home for 100 tech start-ups and innovation businesses, with state-of-the-art facilities, collaborative workspaces, and access to academic expertise, mentoring and investment.
- Aston Integrated Healthcare Hub: a new model for community healthcare and community pharmacy, offering preventative health and wellbeing services (GP, dentist, pharmacy, optometry, audiology).
- The Green Energy Centre: new generation sustainable technologies for heating and energy for our campus.
- Catering facilities for students, staff and the general public.

The Aston Business School, Aston Business Hub and catering facilities will be operational from 5 January 2026, with the aim of the Aston Integrated Healthcare Hub being opened early 2027. The Green Energy Centre project is due to be completed in 2028.

We are looking for innovative solutions that could support the following challenges:

- **Modelling the building** – Innovations which help decisions on where to put connectivity assets such as fibre lines, 5G towers or public wi-fi nodes. Decisions on whether buildings should have their own masts or use external ones if also a question wanting to be explored.

- **Net zero, efficiency and energy** – Ensuring the building is minimising emissions and wastage while supplying energy needs.

- **Climate resilience** – Understanding risks and possible extreme scenarios.

- **Usage** – Exploring the ways that people do, should and could use the space. Such as how to design the building for when it is at maximum capacity, but also for the quiet periods when there is low occupancy.

5 PLANNING
GREEN INNOVATION CORRIDOR

Description:

The UK is currently facing a significant housing shortage. In response, there is a national ambition to deliver 1.5 million new homes over the next five years. As part of this effort, Wolverhampton has set a target of delivering 9,330 new homes, and the GIC is expected to play a key role in supporting this goal.

AI and generative design technologies present a powerful opportunity to accelerate the development process. These tools can streamline planning applications, assess site density, and support master planning for both new developments and the regeneration of existing sites, ultimately driving inward investment and economic growth.

The University of Wolverhampton is seeking innovative, AI-driven digital solutions that can integrate and analyse a wide range of data sources, including land use and development information, to support the delivery of new homes.

We are particularly interested in solutions that address the following areas:

- Planning – Tools that can accelerate planning processes, optimise site density, and support master planning for both new and brownfield sites.

- AI-Enabled Design – Build tools that use generative design or spatial intelligence to support site analysis, layout generation, and scenario modelling.

- Digital Infrastructure – Innovations that leverage technologies such as blockchain, digital land registries, or planning portals to enhance transparency and efficiency in the development process.

6 RENEWABLE ENERGY GREEN INNOVATION CORRIDOR

Description:

The Green Innovation Corridor has big ambitions to develop its renewable energy programme alongside the vast development in the area.

The three main areas it wants to focus on are:

1. Renewable energy integration in the GIC
2. Optimising renewable energy data
3. Modelling and scenario testing for renewable energy risk

We are looking for innovative solutions that could support the following challenges:

- **Renewable energy integration in the GIC** – The GIC aims to integrate renewable energy sources (solar PV, wind, bioenergy) into local energy systems to decarbonise industrial zones and communities. They are looking for innovations that can help the GIC explore new renewable energy integration to optimise renewable energy deployment, grid stability and energy storage. E.g. Modelling solar PV integration on industrial rooftops.
- **Automating data processing** – The GIC generates vast amounts of data from renewable energy assets (solar PV output, weather patterns, grid demand) but much is underutilised due to lack of automation. They are seeking tools to automate data processing for areas such as predictive maintenance plans, fault detection, and how to enhance the life of the assets.
- **Risk modelling** – Innovations which undertake modelling and scenario testing to qualify the uncertainties and risks which come from scaling renewables such as grid capacity constraints, supply chain risk and regulatory changes.
- **Data reformatting** – Innovations which can look to standardise renewable energy datasets to enable integration with national digital twin programmes.

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