

**News Release - 11 September 2017**

**Issued by EPSRC on behalf of The UK Collaboratorium for Research on Infrastructure and Cities (UKCRIC)**

## **UKCRIC is formally launched at the International Symposium for Next Generation Infrastructure 2017**

The launch of the UK Collaboratorium for Research on Infrastructure and Cities (UKCRIC), a major UK research programme established with an investment of £125 million by the Engineering and Physical Sciences Research Council (EPSRC), marks the government's commitment to investment in infrastructure research that will support the nation's changing needs and grow the economy.

Government support for UKCRIC was first announced in the 2015 Budget and, in total, more than £216.6 million is being invested in associated new facilities by EPSRC and partner organisations.

The formal launch of UKCRIC takes place on September 11, at the [International Symposium for Next Generation Infrastructure 2017 \(ISNGI\)](#), held at the Institution of Civil Engineers (ICE), London. UKCRIC is a co-sponsor of ISNGI 2017, the fifth in a series of symposia and, to mark the launch, UKCRIC researchers will feature throughout the programme to offer an overview of the current research projects and plans for the future.

UKCRIC is central to the UK's infrastructure and cities research agenda but its collaborative aims and objectives – to understand how to make the system of systems that constitutes the nation's infrastructure more resilient to extreme events and more adaptable to changing circumstances, while providing services that are more affordable, accessible and usable to the whole population – have international reach.

Transforming cities and their infrastructure through smarter information will establish the UK at the forefront of this growing sector that offers industry considerable commercial opportunity to establish international markets.

### **UKCRIC vision**

The vision of UKCRIC is to provide leadership and support for the development and growth of a coordinated and coherent, world class, UK-based national infrastructure research community, which engages government, city and commercial policy makers, investors, citizens and academia in a joint venture that drives innovation and value creation in the exploitation of services provided by national infrastructure.

State-of-the-art new facilities to upgrade the nation's infrastructure will be created at 11 universities as part of the programme. UKCRIC will initially be established at 14 universities to conduct world-leading research through a network of experimental facilities and urban laboratories.

Professor Brian Collins, Professor of Engineering Policy at UCL and convenor of the initial UKCRIC partners who represent the UK's major university-based infrastructure, civil and construction engineering research groups in the UK, said: "Understanding how to invest in, build, operate and maintain resilient and adaptable high-quality infrastructure based services, such as good public

health, safe mobility, heating, lighting and sustainable economic activity, is vital to the wellbeing of citizens in the UK and across the world.

“UKCRIC will provide the science, engineering and research base for delivering that understanding in a low carbon context in UK industry and government, and for international partners.”

Professor Philip Nelson, EPSRC’s Chief Executive, said: “Today’s launch of the UCRIC is an important step in the UK’s approach to infrastructure planning, construction and use. Research is vital to ensuring we develop and adopt systems that will be resilient and adaptable to change, and will make the UK a fully connected nation.”

### **UKCRIC partners and facilities**

Initial partners in UKCRIC represent 14 of the major university-based infrastructure, civil and construction engineering research groups in the UK.

The UKCRIC research facilities comprise a co-ordinated set of interlinked National Laboratories, a National Observatory of networked urban laboratories and a Multi-level Modelling and Simulation environment, which are geographically spread throughout the UK. This involves three stages:

- A set of interlinked National Laboratories for research on the basic science, technology and engineering that underpins the economic infrastructure sectors and delivers innovative solutions meeting international, national and city needs
- A National Observatory of networked urban laboratories for rapid trialling of solutions at scale and gathering/curating large volumes of diverse data about current and proposed infrastructure so as to allow policies, regulation, systems and capital investments to be made on the basis of evidence, analysis and innovation
- A Multi-level Modelling and Simulation environment to enable ‘what if’ experiments to be carried out in a high-performance computing environment on possible large scale solutions at national, regional and city level; this will allow the de-risking of proposed large scale investments, give insights into possible futures and highlight new mechanisms for value capture and benefit realisation.

Urban observatories are already up and running having benefited from substantial inward investment, and have established local authority and stakeholder partnerships and offer ready pathways for delivering impact. The National Laboratories are under various stages of funding and development.

### **UKCRIC National Laboratories include:**

#### **National Buried Infrastructure Facility, Birmingham**

This facility will enable assessment of fully-instrumented buried pipes, culverts, shallow tunnels, barrier walls and other structures at or near full scale. The refurbished Transient Railway Aerodynamics Investigation (TRAIN) rig will facilitate research into air pollution, pressure transients and sonic booms in tunnels. The aim is to deliver lower costs, greater reliability and more value to citizens. It will also develop a better understanding of the interdependencies between buried infrastructure and linear infrastructure.

#### **National Infrastructure Lab, Southampton**

This lab will focus on transport infrastructure, predominantly rail. It will provide a greater understanding of soil-structure-vehicle interactions of trackway systems and innovative structures that will drive the intelligent design, remediation and management of linear infrastructure systems. The aim is to deliver higher value, lower cost reliable and safe transport for people and freight. This is particularly needed in the context of increasing demands placed on urban systems and more extreme events.

### **Centre for Infrastructure Materials; Imperial College London, Leeds, Manchester**

The three-partner institutions within this National Centre will all develop facilities according to their respective strengths. The Centre will be a networked facility for underpinning materials research on both existing and novel infrastructure materials. New materials and new construction methods have been designed in response to increased performance requirements, but there is a pressing need for scientific research that provides the underlying knowledge to support the adoption of these materials in order to address increasing resource scarcity, urbanisation and zero carbon goals.

### **National Soil-Foundation-Structure Interaction (SoFSI) Facility, Bristol**

The ways in which real structures, such as offshore wind turbines, large span bridges, rail tracks, nuclear power plants and buildings, actually interact with their foundations and the surrounding soil are still inadequately understood. The resulting conservatism in design, construction and operation, drive up costs and inhibit innovation. The National Soil-Foundation-Structure Interaction (SoFSI) facility will take advantage of world leading control and actuation technologies, developed in Bristol's BLADE laboratories, which now enable well-controlled experiments on prototype, or near-prototype, scale SoFSI specimens. Such tests will fill key gaps in understanding of the fundamental mechanics of these systems. The new, highly adaptable and extensible SoFSI facility will also deliver a unique, high value, capability for de-risking investments in innovation and development, for example in life-extension techniques for existing infrastructure or the application of new materials and devices.

### **National Research Facility for Infrastructure Sensing, Cambridge**

This research facility will focus on research in the application and development of advanced sensor technologies for the monitoring of the UK's existing and future infrastructure, in order to improve resilience and extract maximum whole life value. The use of advanced sensors and appropriate data analysis will ensure better product quality, enhanced construction safety, and smarter asset management.

### **Urban Water Infrastructure Facility; Cranfield, Newcastle, Sheffield**

The UKCRIC Urban Water Innovation & Test Facilities at Cranfield, Sheffield, and Newcastle will provide capabilities to advance our understanding of long term performance and serviceability of water infrastructure; test the effectiveness of active and passive technologies for managing flood water in urban areas; deliver cheaper and more environmentally benign approaches to water treatment; enable full-scale testing of new technologies for treatment, distribution and collection networks and flood management; and pilot smart water management systems. Investment in a suite of complementary water infrastructure research facilities across three of the UK's leading water research groups will provide an internationally leading capacity.

### **Person-Environment-Activity Research Laboratory (PEARL), UCL**

Innovation in infrastructure system design often flounders because interaction with human users occurs in an unexpected way (an example of this was the Thames Millennium Footbridge). The

models used to design systems such as buses, tube trains and railway coaches have been, until recently, woefully inadequate and unsupported by real evidence and data. This investment expands on the existing and very successful and influential work carried out at UCL (influencing Crossrail, TFL, Thameslink, Singapore MRT) to enable experiments involving people to be carried out on a large scale, in more diverse conditions, investigating accessibility issues for elderly and disabled. This will reduce the cost of ownership of rolling stock and public transport vehicle investments, generate more revenue for operators and provide greater utility for citizens.

### **National Observatory of Integrated Urban Infrastructure Labs, Bristol, Cardiff, Manchester, Newcastle, Sheffield, Strathclyde**

UKCRIC's network of interlinked urban infrastructure observatories are for the digital capture, mapping, sensing, monitoring, and testing of real urban infrastructure systems over the long term. The key objective is to capture the complex interrelations and interactions of real systems with the environment, people and society. The research will be enabled by close collaboration with local government and industrial partners.

Results will be used in combination with data from experiments on infrastructure systems and sub-systems and work in modelling and simulation to construct an urban infrastructure systems model (or a federated suite of models) that can be validated and refined as our understanding improves.

### **Data Analytics Facility for National Infrastructure (DAFNI), Oxford**

This investment will enable unprecedented understanding of complex cities and infrastructures to inform planning, design and management. Coupled with better data from sensors and the urban observatories this investment will produce more rapid and more reliable predictions of the impact of options in infrastructure investment across and between all infrastructure sectors. Building on a considerable investment already made by RCUK in modelling tools and expertise, this investment accelerates the exploitation of that expertise into commercial organisations. This will enable further de-risking of all large-scale infrastructure investments.

### **Challenge and opportunity**

National and local infrastructure (transport, water, waste, energy, ICT systems) in the UK needs to be fit for purpose for supporting societal development in a changing world. Research across a wide range of UK Universities drawing on all the expertise, creativity and resources is essential to successfully address this nationally critical issue. UKCRIC will

- Generate new knowledge, technologies and digital solutions that reduce the risk of, and add value to, the very large investments in infrastructure that will have to be made over the next 50 years
- Develop innovative solutions, including digital solutions, to infrastructure problems that reduce the cost of ownership of infrastructure and enhance the value of derived services
- Radically improve the resilience of infrastructure systems and services against extreme events
- Grow and maintain the capacity and capability of infrastructure professionals so as to enhance domestic and global commercial market opportunities.

With inadequate infrastructure estimated to cost the UK £2 million a day, UKCRIC will allow academia, industry, government and end users to collaborate to upgrade infrastructure and reduce its cost to the nation.

UKCRIC will lead to the development of new materials, techniques and novel technologies, as well as research into issues such as investment in rail systems, roads and flood and water management.

It will also facilitate the introduction of smart sensors and systems to generate data to optimise the use of assets and networks, while computation and big data infrastructure will be established for the modelling, simulation and visualisation of cities and infrastructure.

- For further information about UKCRIC see [www.ukcric.com](http://www.ukcric.com).
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