

How digital twins can enhance climate resilience

How can digital twins help us tackle the effects of climate change? The Climate Resilience Demonstrator aims to find out, using connected data and virtual modelling to enhance the reliability of energy, telecoms and utilities services under extreme weather conditions.

Challenge

As we look to the future of climate change, infrastructure planning improvements are essential to minimise disruption to vital public services during periods of extreme weather. From medical equipment losing power to an emergency service call operator losing contact, in the most extreme examples a delay of even a few minutes could be devastating. To keep people safe and ensure reliable services are maintained, connected data and virtual modelling could make a big difference.

Approach

Aiming to create the first digital twin of its kind in the UK, the Hartree Centre worked with the National Digital Twin programme (NDTp) as part of a larger consortium to investigate how connected data across weather, water, energy and telecoms systems could provide access to the right information at the right time to improve adaptation and resilience. Using the Hartree Centre's data engineering leadership, the project specifically explored the effects of flooding caused by extreme weather, connecting data from the different sectors to create the Climate Resilience Demonstrator (CReDo). The digital twin proof-of-concept demonstrates how infrastructure operators can use secure, resilient information sharing across sector boundaries to mitigate the effect of flooding on performance and service delivery to customers.

Benefits

Alongside the potential to reduce disruption and ensure public safety in extreme weather, CReDo demonstrates how infrastructure operators could also benefit from connected digital twins. Having digital predictions available enables companies to speed up the decision-making process, reducing the cost and time taken to resolve disruption. Connected digital twins are an important part of achieving climate resilience and Net Zero, by creating efficiencies in systems that could prevent future damage. Connected data can provide better insights and lead to improved resilience of systems overall. CReDo provides a critical demonstration of how interoperability between digital twins can unlock further value for society and the UK economy.

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Trying to predict and mitigate the effects of climate change when you can only see a small part of the bigger picture is almost impossible. Connected data is the key.

Tom Collingwood
STFC Hartree Centre

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“We’re demonstrating how digital twins can help industries like water, energy and telecoms to build a more joined-up view of how our national infrastructure could be impacted by climate change.”

Ben Mawdsley
STFC Hartree Centre

At a glance

- New digital twin proof-of-concept developed
- Connected up data from weather, energy, telecoms and water networks
- Investigates the effects of flooding on infrastructure
- Demonstrates how data-driven insights can improve decision-making and build climate resilience
- Could save time and money for operators by reducing disruption and improving public safety

Who we are

- 70+ computational scientists and technologists
- World-leading supercomputing and AI infrastructure
- Bespoke small teams built around your project
- Tailored business development support
- Access to our network of industry, academic and technology partners

What we do

- Boost productivity and enhance innovation for industry
- Big data analytics and artificial intelligence (AI)
- High performance computing and quantum simulation
- Training and skills development
- Insights into future technologies



Credit: STFC Hartree Centre

Our impact on UK industry and society

The Hartree Centre was created by UK Government to help businesses and public sector organisations accelerate the adoption of high performance computing (HPC), big data analytics and artificial intelligence (AI) technologies. We play a key role in realising UK Government’s Industrial Strategy by stimulating applied digital research and innovation, creating value for the organisations we work with and generating economic and societal impact for the UK.

The Science and Technology Facilities Council (STFC) Hartree Centre is part of UK Research and Innovation.