

Developing next-generation climate and weather models



Hartree Centre
Science & Technology Facilities Council



The Met Office is taking advantage of the STFC Hartree Centre's expertise in high performance computing (HPC) to develop their next generation weather forecasting and climate prediction model.

Challenge

In recent years, severe winter weather experienced in the UK has reduced its GDP by as much as 0.5%, and resultant travel disruption can cost the UK economy up to £280 million per day (House of Commons Transport Committee Report). The weather has a huge impact on our lives, affecting transport, agriculture, energy use and leisure. The Met Office is a world leader in weather forecasting and climate prediction and runs a sophisticated and complex unified forecasting and prediction code on high performance computers.

Solution

The GungHo project has been set up to design and build the heart of the Met Office's next-generation software, known as the dynamical core, using algorithms that will scale to millions of cores. The software is being written so that it can be configured to run efficiently on the different styles of next-generation computers. The project, funded by the Natural Environment Research Council (NERC), is a collaboration between the Met Office, the Hartree Centre and NERC. The new code is anticipated to replace the dynamical core of the Met Office's Unified Model (UM) from around 2020. The UM is the principal UK tool for weather and climate prediction and is also used by other national weather services including Australia, South Korea, India, New Zealand, South Africa and the U.S. Air Force Weather Agency.

Benefits

In less than a decade, we will be using supercomputers that are thousands of times faster than any existing system. The ability to harness the power of these next-generation computers for weather and climate prediction will mean more accurate forecasts to help us to better deal with severe weather and adapt to climate change, maintaining UK leadership in environmental prediction.

Weather and climate related natural hazards are associated with huge economic losses and hence ability to predict these events is of great economic value. The rapidly developing "climate services" agenda involves major new economic opportunities for the UK. This action is essential to ensure that the UK has the predictive tools to play a leading role in these developments.

"The Met Office is at the forefront of scientific developments in weather forecasting and its forecasts are ranked in the top two national meteorological services in the world. This project between the Met Office, STFC's Hartree Centre and NERC will ensure that the UK continues to benefit from the best science and advice available."

– Andy Brown, Head of Foundation Science, Met Office

Work with us

We collaborate with industrial clients and research partners on projects that create insights and value using high performance computing, big data analytics, simulation and modelling.

By combining our world-class facilities with access to our specialists and computational scientists, we can enable your organisation to produce better outcomes, products and services more quickly and cost-effectively than through conventional R&D workflows.

With our partners we are developing the next generation of supercomputing architectures and software, combining existing best practice with innovation to deliver faster, cooler and more sustainable solutions capable of meeting the challenges of data intensive computing.

For more information:

- +44 (0)1925 603708
- hartreecomms@stfc.ac.uk
- @hartreecentre
- /company/stfc-hartree-centre