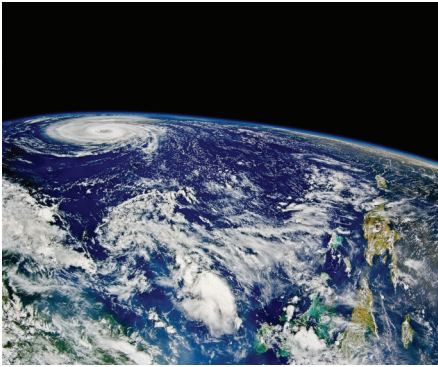


BUILDING A CLEARER PICTURE OF CLIMATE CHANGE

IMPACT!

Engineering and Physical Sciences Research Council | Case study 19



↗ **220,000**

people killed by weather, water and climate related disasters between 1996 and 2005 – down from 2.6m in the period 1956 to 1965. This reduction is due, in part, to increasingly accurate early weather warnings.

Source: WMO

↗ **250m**

people affected by climate related disaster each year.

Source: Oxfam

More accurate global weather forecasts and a better understanding of climate change are in prospect thanks to a breakthrough by electrical engineers at Queen's University Belfast.

The team has developed a high performance electronic device – known as a dual polarised Frequency Selective Surface filter – to be used in future weather satellites.

IMPACT ON THE ENVIRONMENT

- Filters will enable complex imaging of clouds and help improve the global weather forecasting vital to areas such as aviation safety and mitigating the effects of floods and hurricanes.
- They will provide new data on ozone depletion – providing important insights into climate change.

Building a clearer picture

The new filters will be installed in instruments being developed by the European Space Agency (ESA) for meteorological satellites it plans to launch between 2018 and 2020. The ESA instruments are used to detect thermal emissions in the Earth's atmosphere. The data measures temperature, humidity profiles, and gas composition, which are in turn entered into operational systems and used to forecast weather and pollution.

Lead engineer Dr Raymond Dickie said: "The devices will help to provide a much more comprehensive analysis of conditions in the Earth's atmosphere than has been possible previously.

"Up to now, spaceborne remote sensing instruments have only been capable of separating either the vertically or horizontally polarised components of naturally occurring thermal emissions from gases in the Earth's atmosphere – but not both together at the same time. The invention of the new filter resolves this problem and will enable complex imaging of clouds to be undertaken for the first time at very short wavelengths."

Global patent applications have already been filed for the filters which are constructed by ECIT engineers and research staff at Queen's University's Northern Ireland Semiconductor Research Centre in Belfast.

A decade in development

The filters have been developed as a result of a £1.2 million investment in Queen's by EPSRC, EADS Astrium and ESA to develop the technology, and have taken over ten years to develop.

Dr Robert Cahill, a member of the project team, added: "As a result of the new filter, scientists will gain access to completely new data on a range of phenomenon including ozone depletion and the size of water particles in cirrus clouds. This in turn will enable more accurate global weather forecasts to be compiled and will provide important new insights into climate change."

For more information about EPSRC and the impact it is making visit www.impactworld.org.uk

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