Government backs ground-breaking space technology to tackle climate change

Press release

Trailblazing technology that will help tackle climate change and predict global disasters using satellites is receiving new funding from the UK Space Agency.

UK from space. Credit: ESA/NASA

Eleven UK organisations have been awarded a share of just under £7 million of government funding to put into action the latest advances in space innovation. The majority of the projects focus on climate change or environmental management, with others designed to secure our telecommunication systems and protect digital infrastructure against cyber-attacks.

Projects receiving the cash boost include Global Satellite Vu Ltd, which will build a compact high-resolution infrared camera for satellites to measure thermal emissions from our homes, schools and places of work, helping to improve energy efficiency. The Open University in Milton Keynes will develop the mission concept for “TreeView”, a forestry and management tool that will support a nature-based solution to tackling climate change by monitoring the health of trees from space.

Science Minister George Freeman said:

> Satellites in space are helping us solve some of the most significant challenges we face, from climate change to cyber attacks, and through the National Space Strategy we are putting the UK at the forefront of unleashing these innovations.

> Whether it’s monitoring greenhouse gas emissions or supporting

> increased tree planting, this new funding will take game-changing ideas from the UK space sector and our brilliant scientists, and turn them into reality.

The funding comes from the UK Space Agency's National Space Innovation Programme (NSIP) and has been announced today (9th November 2021) as the UK hosts the COP 26 climate talks in Glasgow. Space is playing an essential role in the fight against climate change, with satellites collecting half of the 56 types of data we need to measure and understand climate change.

This £7 million in funding is in addition to £7 million provided last year which was to support the projects through their development phase. The new funding ranges from between £157,000 and £1 million per project and will allow the organisations to take their projects to the next stage and implement their innovative ideas.

The government recently launched the National Space Strategy which outlines the long-term plans to grow the UK space sector and make Britain a science and technology superpower, including building on manufacturing and technology capacity, attracting investment and working internationally.

Projects in detail:

Development of Novel High Resolution Infrared Sensor Payload for Heat Detection

- Global Satellite Vu Ltd, Surrey
- £999,698
- Global Satellite Vu Ltd will develop and launch the world's first small satellite that will deliver high-quality thermal video and thermal still imagery of the Earth, initiating the design, build and integration of the infrared camera. By launching a small constellation of infrared satellites, this project will enable the measurement of thermal emissions from any structure on the planet. The technology will act as the Earth's thermometer to monitor energy efficiency, economic activity and carbon footprint.
- Consortium Partners: Surrey Satellite Technology Ltd and KISPE

TreeView: Precision Forestry to Tackle Climate Change

- The Open University, Milton Keynes
- £477,456
- Trees are a natural carbon-sink and are vital to support diverse ecosystems. TreeView will enable precision forestry and management to be achieved remotely from space on a national and global scale, supporting a nature-based solution to climate change.
- Consortium Partners: In-Space, Beck Optronic Solutions, XCAM, Adiuvo Engineering, Teledyne e2v, 2Excel Geo, Centre for Ecology and Hydrology, Forest Research

Quantum Accelerometer Climate Explorer (Q-ACE)

- Thales Alenia Space, Oxfordshire
- £345,032
- The Quantum Accelerometer Climate Explorer (Q-ACE) mission will bring together the University of Birmingham and Teledyne e2v's cold atom interferometry technology with Thales Alenia Space's new revolutionary Very Low Earth Orbit 'SkimSat' satellite platform. The work will help to develop the Q-ACE mission that will measure the density of the Earth's thermosphere and provide data that will help better understand climate predictions.
- Consortium Partners: Teledyne e2v, University of Birmingham, RAL Space, Fraunhofer UK Research Limited and the Met Office

High resolution thermal infrared space telescopes for globally monitoring the energy efficiency of buildings

- University of Cambridge (Institute of Astronomy and Cambridge Zero)
- £726,978
- Thermal infrared telescopes in space can monitor the energy output of buildings which makes them a powerful tool for ensuring that governments, companies and even individuals are on track to meet internationally agreed carbon emission goals. The team will study how the data can be used and develop prototypes for an innovative unfolding telescope as part of a nanosat constellation to accurately produce thermal images of buildings and infrastructure.
- Consortium Partners: Open Cosmos Ltd, S4 Limited and Durham University

ROKS payload flight model – implementation phase

- Craft Prospect Limited, Glasgow
- £869,769
- The Responsive Operations for Key Services (ROKS) mission will demonstrate technologies for future secure telecommunication systems using Quantum Key Distribution (QKD) and supported by artificial intelligence. This implantation phase will incorporate progress since the discovery phase, through to flight model build, test, and finally delivery to demonstrate in-orbit operation by 2022.
- Consortium Partners: University of Strathclyde, University of Bristol, Fraunhofer Centre for Applied Photonics (CAP)

Global Lidar Altimetry MISsion: GLAMIS

- University of Edinburgh
- £300,236
- The School of Geosciences at the University of Edinburgh, GLAMIS will bring together expertise from Scotland's growing space and photonics sectors to pioneer a new approach to space-borne lidar; a system capable of mapping global topography and above-ground structure and change detection. This phase will focus on increasing coverage through increasing laser wavelength stability and signal processing.
- Consortium Partners: Fraunhofer UK Research Ltd (Glasgow), UK Astronomy

Tech Centre, Resilience Constellation Management Ltd and Space Flow Limited.

Faraday Digital

- In-Space Missions Limited, Hampshire
- £157,366
- Faraday Digital will provide a global LEO ultra-wideband communications and processing infrastructure which can be used by third parties to develop, test and deploy a substantial range of applications and services. This activity will de-risk the remaining technology elements in preparation for a flight demonstration in 2023. Ultimately, the disruptive Faraday Digital service will provide a ubiquitous, in-orbit infrastructure which can underpin the new space revolution and provide the ability to upload and deliver new services from space on timescales of weeks instead of the traditional three-five years.
- Consortium Partners: Subcos Wave RF Ltd

Laser Communications for CubeSats

- University of Northumbria at Newcastle
- £644,617
- The aim of the project is to replace the existing low-speed radio frequency transceiver used in CubeSats with the high-speed, light weight and lower power free-space optical transceivers, enabling a step-change in our approach to communications constellations and space science missions. By the end of this project, a test-bed design will have been developed together with a mission design study for future testing of the system in space.
- Consortium Partners: SMS Electronics Limited, Durham University and e2E Group

Hyperspectral Microwave Sounder Constellation of Nanosatellites for Climate change And Mitigation (HYMS CONCAM)

- STFC RAL Space, Oxfordshire
- £814,129
- As average global temperatures rise, hazards such as heatwaves and floods grow in frequency and severity, and chronic hazards intensify, such as drought and rising sea levels. Improved observations of our weather systems and more accurate forecasts are essential for our understanding, planning, and mitigation of extreme events. STFC RAL Space is developing a new small satellite observation system using microwave sensors that will enhance our ability to monitor our planet’s increasing weather variability. These observations will support meteorological services to deliver accurate and timely weather forecasts that will enhance our ability to react to climate change.
- Consortium Partners: NanoAvionics UK, STAR Dundee UK and UK Met Office

GHGWatch

- Geospatial Insight, Birmingham

- £324,812
- Greenhouse Gas (GHG) emissions are the critical factor driving climate change and temperature increase, but detection and monitoring of locations where emissions are occurring is problematic and expensive using current technologies. Building on the successful outcomes of their discover project, Geospatial Insight aims to deliver a space-based operational solution to detect, quantify and monitor point source plume emitters of Greenhouse Gases, focusing initially on methane – this project will focus on developing a service targeted at commercial users in the Oil & Gas and “Green” Finance sectors.
- Consortium Partner: University of Leicester

Towards a Federated Satellite Quantum Key Distribution System

- Arqit Ltd, London
- Our digital economy is at the mercy of advances in quantum computing which could threaten our encryption services. Arqit supplies a unique quantum encryption Platform-as-a-Service, QuantumCloud™, which makes the communications links of any networked device secure against current and future forms of attack – even from a quantum computer. Arqit’s Federated Quantum System enables private instances of its QuantumCloud™ product to be provided to customers that want control of their cryptographic infrastructure.
- Consortium Partners: STFC RAL Space, QinetiQ Group plc, Honeywell (COM DEV Ltd), Heriot-Watt University, Virgin Orbit UK Limited.

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