

New funding for innovative space tech to help solve problems on Earth

Through the UK Space Agency, the government is giving a cash injection to 5 projects specifically designed to bring together UK business expertise with universities to help build space solutions to global problems, on UK soil.

One of the projects, involving the University of Southampton, will use artificial intelligence to automatically detect buried archaeological remains on satellite imagery, providing construction companies with higher accuracy at an earlier stage. This will save them time and money during the planning permission process and help them to reduce their carbon footprint.

Meanwhile the University of Leicester will use satellite analytics to track the greenhouse gas and pollution emissions of shipping fleets, ushering in a new approach that could help shipping companies to face down climate change.

Another, run by the University of Edinburgh, will support Malawian farmers by developing land-classification maps of high potential agricultural sites, providing a vital tool that can enable effective planning of large-scale agriculture in the region.

Science Minister Amanda Solloway said:

The UK's space sector is flourishing and it is vital we give our most innovative space businesses and universities the right support to collaborate, share best practice and drive forward new ideas that could help enrich all our lives.

Today's funding will provide lift off to some of the country's most ambitious space collaborations, accelerating potentially game-changing technologies that will help the UK respond to global challenges such as cutting carbon emissions.

The UK Space Agency funding will see the national Space Research and Innovation Network for Technology (SPRINT) support the new space projects, with industry working alongside scientists from the University of Southampton, University of Edinburgh and University of Leicester.

SPRINT provides unprecedented access to university space expertise and facilities to help businesses develop new commercial products.

The scheme has previously supported 87 collaborative projects with 70 companies, developing space hardware or using space-enabled data and transferring space know-how and expertise to develop products destined for non-space use.

Professor Martin Barstow, Leader of the SPRINT project and Director of

Strategic Partnerships for Space Park Leicester, said:

We appreciate the vote of confidence for SPRINT that the UK Space Agency has given in making this funding award.

We are very grateful to the Agency for providing this new support for SPRINT, which allows us to support more companies in their development journey.

Ross Burgon, Head of the national SPRINT programme, said:

SPRINT has developed a novel approach to knowledge exchange and industry/university collaboration for the space sector.

We've spent the last two years building and demonstrating the efficacy of our approach and this new partnership with the UK Space Agency is a great milestone for us to further our mission to support business growth through university collaboration.

The SPRINT approach makes it much easier for both companies and academics to build successful, productive and collaborative partnerships that are focused on growing the space sector and that also demonstrate the increasing benefits of space sector knowledge in addressing challenges across many other sectors.

What is space archaeology?

It is archaeology using satellites or high-flying aircraft to take pictures remotely of the Earth's surface to find hints of ancient features buried under the ground. Things may show up visually or near infrared may show small differences in vegetation, with growth on top of buried stone likely to be less healthy.

Dr Fraser Sturt, a professor of archaeology at the University of Southampton, said:

Aerial photography transformed archaeology in the early 20th century, revealing sites in a way that few people could have conceived of in the past. Advances in Earth Observation and Machine learning offer another leap forward, helping us to identify and monitor sites across of space and time.

This information is critical not only for our understanding of the past, but how we manage the built environment and its development in the future.

In December 2020, the government redefined treasure to increase protection for archaeological finds to ensure more significant artefacts are saved for

the public. For the first time, the official treasure definition will not be based solely on the material qualities of an artefact. The changes will make the treasure process more transparent and efficient for museums and the public.

ArchAI Ltd – University of Southampton

This project will use AI to automatically detect archaeology on Earth observation data. Knowing where archaeology is located at the earliest planning stages will allow accurate estimates of time and cost involved with acquiring planning permission and significantly reduce the risk of discovering unexpected archaeology during construction. This means that ArchAI will lower the cost of construction and ensure that vital historical sites are preserved.

Absolar Solutions Ltd – University of Southampton

The collaboration will develop Absolar's Carbon Action Planning Tool that integrates satellite images, solar radiation and LiDAR with other data sources to provide organisations with a clear view of a building's current energy performance, develop plans for achieving Net-Zero carbon emissions and reduce their energy costs while tracking and reporting on their progress.

XCAM – University of Leicester

Critical equipment for use in the space industry is often built in clean rooms to make sure it is not contaminated with small particles. Cleanliness is vital because if equipment is contaminated it might fail completely or not operate as it was designed to do.

This project uses a novel machine learning solution to improve the accuracy of clean room monitoring, and to efficiently report problems in real time. In addition, this solution will be used to monitor potential contamination of sensitive equipment during the launch of spacecraft, which is something that has never been done before.

Redshift Associates Ltd – University of Leicester

This collaboration will develop analytics to track the carbon and pollution emissions of ships, with a new approach to establish emission audits of shipping fleets and their individual vessels. The project builds upon previous work developing analytics solutions for ports and harbours, extending this to coastal and international waters.

Trade in Space – University of Edinburgh

Trade in Space and Geospace Agricultural are collaborating with the University of Edinburgh School of Geosciences to support the generation of a land use classification map of key agricultural production regions of Malawi.

This will be a vital tool that can enable effective planning of large-scale agriculture in the region, following the model set by the 'Jacoma Estates'

mega-farm in the area, which has already provided productivity improving micro-financing, and a route to market for over 5,000 Malawian smallholder farmers.