From satellite to soil
Connecting environmental observation to agri-tech innovations

Programme and speaker biographies
By bringing together two technologies, satellites and agri-tech, which were listed among the last government’s ‘eight great’ technologies, the UK has an opportunity to become a global leader in this industry.

Introduction

The pace of change in our capacity to observe the planet and the growing ability to apply new ‘big data’-style analytics is transforming the way that we understand our environment, and the way that we interact with it. This has profound implications for future agriculture, which is both a contributor to the environmental ecosystem, and significantly impacted by the risks of future climate change.

There is a clear value chain connecting the space and environmental observation (EO) technology developers with the end-users in the agricultural community. In the middle of this value chain are intermediary companies which convert the ‘big data’ produced by the EO technologies, and through data visualisation, convert it into a format that the end-user can engage with. Ensuring that these three groups are linked is key to the successful adoption of EO technologies by the agricultural community.

The From satellite to soil conference bridges this gap between researchers and end users. Doing so is essential for the successful application of EO technologies to improve the UK’s agricultural productivity and resilience. By bringing together two technologies, satellites and agri-tech, which were listed among the last government’s ‘eight great’ technologies, the UK has an opportunity to become a global leader in this industry.

This conference is the third in the Royal Society’s Breakthrough science and technologies: transforming our future series, which addresses the major scientific and technical challenges of the next decade. Each conference covers key issues including the current state of the UK industry sector, future direction of research and the wider social and economic implications.

For more information visit
industry@royalsociety.org
royalsociety.org/industry
Programme

9am  Registration, refreshments and coffee

9.30am  Welcome
Sir Martin Sweeting OBE FREng FRS

9.35am  Dr Barbara Ryan, Group on Earth Observations (GEO)
Leveraging Earth observations for a food secure world

10.20am  Stuart Martin, CEO, Satellite Applications Catapult
Addressing global challenges to drive economic growth

10.45am  Coffee and networking

11.15am  End-users' perspective
Chaired by Minette Batters, NFU
Keith Norman, Velcourt
Earth observation, precision farming – the sky's the limit!
Andrew Richards, Agrii
Using environmental data to improve season management of wheat
Sergio Moreno Rojas, G’s Growers
Salad and vegetable crop monitoring using remote sensing
David Gardner, Innovation for Agriculture
Opportunities and future potential for satellite and sensor technologies in livestock agriculture

12.10pm  Technology companies’ perspective
Chaired by Stuart Martin, Satellite Applications Catapult
Vince Gillingham, AG Space
Space to grow
Roelof Kramer, Rezatec
Transforming big data into knowledge and decision support to improve production systems per crop, per grower and per field

1.10pm  Lunch and networking

2.10pm  Academic perspective
Chaired by Professor Melanie Welham, BBSRC
Professor Simon Blackmore, Harper Adams University
Farming with robots
Simon Griffin, SOYL Precision Crop Production
10 years of using imagery to increase yields
Iain Cameron, Environment Systems
Integrated data: unlocking agriculture

2.40pm  Table discussions
Chaired by Professor Melanie Welham, BBSRC

3.40pm  Coffee and networking

4.10pm  Panel discussion
Chaired by Sir Martin Sweeting OBE FREng FRS
Dr Jim Godfrey, Innovate UK Sustainable Agriculture and Food Innovation Platform
Professor John Crawford, Rothamsted Research
Andy Shaw, Defra Earth Observation Advisor

4.55pm  Closing remarks
Sir Martin Sweeting OBE FREng FRS

5pm  Drinks reception and networking

6pm  Close
From satellite to soil

SSTL has built and launched 47 small satellites and is currently building the 22 satellite navigation payloads for the European Galileo constellation.

Sir Martin has pioneered rapid-response, low-cost and highly-capable small satellites utilising modern consumer electronics to ‘change the economics of space’ and establish the UK at the forefront of this new field. SSTL has built and launched 47 small satellites and is currently building the 22 satellite navigation payloads for the European Galileo constellation. Sir Martin also leads researchers at the Surrey Space Centre investigating advanced small satellite concepts and techniques, which acts as the research laboratory for SSTL – an exemplar of real academic-commercial synergy. Sir Martin is a Fellow of the Royal Society and a Fellow of the Royal Academy of Engineering, and received the prestigious von Karman Wings Award from CalTech/NASA-JPL. He is a Distinguished Professor at the University of Surrey, a member of the UK Space Agency Leadership Council and, in 2014, was identified by The Sunday Times as one of the UK’s 20 most influential engineers.

ORGANISER AND CHAIR

Professor Sir Martin Sweeting OBE FREng FRS
Executive Chairman, Surrey Satellite Technologies Ltd

Speaker biographies
Melanie has a well-developed understanding of the requirements and demands of delivering BBSRC research and the interface between the Council and the research community.

Earlier in her career, she was awarded a BBSRC Research Development Fellowship, which enabled her to develop and pursue new research directions. She moved from the study of signalling in white blood cells to seeking to understand the fundamental mechanisms controlling the behaviour of embryonic stem cells.

Melanie has a well-developed understanding of the requirements and demands of delivering BBSRC research and the interface between the Council and the research community. For more than four years she served on BBSRC peer review committees, including periods as either chair or co-chair. Professor Welham also served on the advisory committee for the UK National Stem Cell Network from 2009 – 2011.
Minette has been a member of the NFU governance board and the agricultural representative on the SW Environment Agency Flood and Coastal Committee.

Minette grew up living and working on-farm, with no succession tenancy available. It was not until 1998 that she was able to secure a long-term Farm Business Tenancy. She built the business from nothing to over 300 head of stock, finishing Angus cattle on a premium scheme for a major retailer.

Minette has also diversified into horse livery, converted a 17th century tithe barn into a wedding and corporate events venue, and runs a catering business which specialises in using home grown produce. Minette now employs two full time and up to 20 part time staff. More recently Minette has worked with industry and retailers to develop ‘Ladies in Beef’ and the ‘Great British Beef Week’.

She has been an NFU member from grassroots through to County Chairman; she served as Wiltshire’s Council delegate and also as Regional Board Chairman for the South West. Minette has also been a member of the NFU governance board and the agricultural representative on the SW Environment Agency Flood and Coastal Committee. She is also a focus writer and is regularly interviewed for local and national media.

Barbara J. Ryan is Secretariat Director of the intergovernmental Group on Earth Observations (GEO) located in Geneva, Switzerland. GEO coordinates the activities of 101 Member States, the European Commission and 95 Participating Organisations who are integrating Earth observations to make informed decisions across eight Societal Benefit Areas.

Before becoming GEO Director, Ryan served as Director of the World Meteorological Organization (WMO) Space Programme with responsibility for coordinating space-based observations to meet the needs of WMO Members. Previously, Ryan was the Associate Director for Geography at the U.S. Geological Survey in Reston, Virginia, responsible for the Landsat, remote sensing, geography and civilian mapping programs of the agency. Under her leadership, the Landsat data policy was reformed to release all data over the internet at no additional cost to the user – resulting in the global release of more than 25 million Landsat scenes to date, with significant economic returns.

Ryan holds a Bachelor’s degree in Geology from the State University of New York at Cortland, a Master’s degree in Geography from the University of Denver, and a Master’s degree in Civil Engineering from Stanford University. She has been awarded an honorary Doctorate of Science degree from the State University of New York at Cortland.

Mr Richards was instrumental in establishing Agri’s demonstration farms (iFarms), of which there are now more than 25 around the UK. He has created a partnership of companies working on the Best of British Wheat project, closing the yield gap with genetic potential.

Mr Richards persuaded Agri to make significant investment in precision farming and its Decision Support Division now employs more than 30 people. He leads Agri’s engagement with the agri-informatics hub and working with The University of Nottingham and RAGT he secured one of the first Agri tech catalyst projects, on remote monitoring of pre-symptomatic disease and abiotic stress.

Mr Richards has been a member of the Agri technical team for 20 years and sits on their Research and Development Strategy Board, which provides a coherent approach to their research and development programmes and enables better links between Agri and science in the UK and beyond. The board has recently overseen the rebuilding of Agri’s research farm at Throws, Essex, and the establishment of regional research centres through a £6 million investment.

Keith has worked on various overseas projects in Spain, France, Germany and Zambia and has been actively involved in Velcourt’s recent activities in Russia and the Ukraine.

Velcourt’s R&D is primarily to provide its team of 46 farm managers with independent technical information from which they can make cost effective decisions to optimise yield and profit. In addition, Velcourt are partners in many collaborative projects funded by Innovate UK. Velcourt R&D also work with all the major agrochemical manufacturers, providing independent evaluation of new and existing active ingredients.

Keith Norman graduated from Newcastle University specialising in crop production and plant science. Since then, Keith followed a career in practical farm management for six years. In 1989, Keith changed to a more technically based role as Technical Director, supporting Velcourt’s team of 45 farm managers in crop production technology and managing Velcourt’s in-house research and development activity. Velcourt currently manage 53,000 hectares in the UK.

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Sergio Moreno Rojas
Remote Sensing Technologist, G’s Growers

Sergio graduated in 2012 with a Master’s Degree from Cranfield University in Geographical Information Management and with a Bachelor’s in Engineering from the Polytechnic University of Madrid (UPM), in Agronomic Engineering specialised in ‘Crop Protection and Improvement’. He had the opportunity to work as an intern in the Centre for Biotechnology and Plant Genomics (CBGP) as a laboratory assistant.

In 2013, Sergio finished his training at ESRI Spain deepening his understanding and management of GIS software, SQL Server, Python and C# programming for geoprocessing workflows, web development or data publishing.

He recently finished working for Cranfield University within the AgriFood Remote Sensing Systems project as a KTP (Knowledge Transfer Partnership) Associate, based at G’s Growers Ltd, where his role was to develop and implement remote sensing technology using multi-spectral imagery and evaluating different systems on salad and vegetable crop farms.

Sergio is currently working at G’s Growers as a Remote Sensing Technologist.

David Gardner
Chief Executive Officer, Innovation for Agriculture

David is the CEO of Innovation for Agriculture and the Royal Agricultural Society of England. Innovation for Agriculture is a new initiative which brings together a group of agricultural societies to promote the emerging technologies that will shape agriculture over the coming decades.

Previously, David enjoyed a long career with The Co-operative Farms who he joined as a graduate after studying at Seale Hayne. During his time with The Co-operative Farms David held a number of senior positions including Head of Fruit Operations and Manager of Stoughton Estate in Leicestershire. He has considerable experience in the combinable, dairy and fruit sectors.

In 2010 he completed a Nuffield study on ‘New Science and Pioneer Technologies to transform UK agriculture’ which took him to leading research facilities in the USA, New Zealand, Australia and Japan. The study developed a particular interest in genetics and automation.

David is married with two grown up sons and lives in Leicestershire.
Longji Rice Terraces, China. © BIHAIBO.
Prior to setting up AgSpace in 2013, he founded and developed the largest independent precision farming business in the UK (IPF UK).

Vincent Gillingham is the founding director of AgSpace Agriculture Ltd. Prior to setting up AgSpace in 2013, he founded and developed the largest independent precision farming business in the UK (IPF UK). Accessing new satellite technologies and developing them into researched, commercially beneficial products is central to his responsibility. Vincent developed a unique satellite processing technique for precision soil mapping – soil brightness imaging – this technology has reduced the cost to thousands of European, African and Chinese farmers making precision agriculture more affordable. Vincent is currently developing new products for the agricultural market using Synthetic Aperture Radar (SAR).

His great passion is the transition of extensive to intensive crop production systems in developing countries and the sustainable intensification of agriculture in the developed world.

Roelof Kramer is an executive in agribusiness with specialisation in arable crops. His experience spans over 20 years of building businesses and providing services to customers worldwide. His great passion is the transition of extensive to intensive crop production systems in developing countries and the sustainable intensification of agriculture in the developed world.

In March 2015 he joined Rezatec Ltd a company specialised in analysing Earth data. As Head of Agriculture he is responsible for developing new products and services that optimise the efficiency of crop production systems.

From 2007 to 2015 he ran the consulting firm Rectory Farmhouse, providing business consulting services. Based on extensive knowledge of crop value chains, in 2013 he created a UK based consortium with British Sugar and Rezatec to develop a crop growth measurement system for the optimisation of sugar beet yields. The consortium received a TSB grant to do a feasibility study.

Roelof previously worked for Advanta Seeds, Novartis Agro and Syngenta Crop Protection in strategic and commercial roles, where he gained a deep understanding of agricultural input markets.

Roelof speaks English, German, Russian and Dutch. He holds a Master’s degree from the Agricultural University Wageningen and received an MBA from Nijenrode University, both in the Netherlands.

SPEAKER

Vincent Gillingham
Director, AgSpace

SPEAKER

Roelof Kramer
Head of Agriculture, Rezatec
Iain was the Project Manager for Project URSULA, a recently successfully completed five year research and development programme, which explored the potential for developing agricultural solutions from drone data.

Iain has been involved in several projects for the UK Space Agency including one to develop an operational service, using SAR data, for routine monitoring of land management in the upland areas of the UK, and recently, one with the Satellite Applications Catapult to “Improve Food Security and Agriculture Competitiveness in Peru”, a project to show the potential use of satellite technology to aid improved management of agricultural land, particularly in applications such as crop yield, disease and pest control, nutrient and input management, soil management, and reduced environmental impacts.

Simon Griffin is Technical Manager at SOYL. During his time there over the last 20 years, SOYL have become market leaders in UK precision farming. They pioneered use of GPS and spatial data in crop management in the 1990s, initially providing soil nutrient mapping and GPS controlled fertiliser application services. SOYL then developed the SOYLsense Nitrogen service using satellite imagery to help manage crops and improve yields. Further innovations include the mapping of soil physical properties using electrical conductivity and its use in a number of applications such as SOYLseed variable rate drilling. More recent developments include GPS controlled variable depth cultivation, variable rate growth regulators and the use of drones. SOYL are currently focusing on the big data area of farming. Bringing together information on soil, crop growth and weather and linking them to yields and crop quality will add value to existing information and help improve management decisions and yields by understanding more complex relationships in the soil-root-plant-weather environment.
Simon Blackmore is a key figure in the development of precision farming and agricultural robotics, with a world-wide reputation. He worked for 12 years in Africa and Europe before starting his academic career. Simon is currently Professor and Head of Engineering at Harper Adams University, Director of the National Centre for Precision Farming and runs the European FutureFarm project. Simon has extensive experience of multidisciplinary collaboration across universities, commercial partnerships and research projects, including the design, building and running of laboratories and workshops. He holds seven Chairs around the world and lectures on topics including precision farming, biosystems instrumentation, mechatronics and systems analysis. Simon leads the research in the UK on agricultural robotics. His personal research focuses on improving precision farming by developing more intelligent machines and processes, and making crop production more efficient and sustainable.

Dr Jim Godfrey OBE
Farmer and Chair of Innovate UK Sustainable Agriculture and Food Innovation Platform

Jim Godfrey is a director of the family arable and pig farming business in Lincolnshire and Yorkshire. He is Chairman of the International Rice Research Institute (IRRI), the Commercial Farmers’ Group and the Innovate UK’s Sustainable Agriculture and Food Innovation Platform. He is a member of the UK Government’s Agri-Food Technology Council, and a steering group member of Farming Futures, a Trustee of the National Institute of Agricultural Botany (NIAB), a director of the Lincolnshire Rural Support Network (LRSN) and a Vice President of the Royal Agricultural Society of England. His awards include an OBE for services to agricultural research, the World Potato Congress Industry Award, Honorary Doctor of Science from Reading University, a special British Potato Council Award and the RASE National Agricultural Award. He is a Fellow of both the Institute of Directors and the Royal Agricultural Societies.
Andy acted as advisor to two AgriTech Centres of Excellence (AgriMetrics and CHaP) and was previously a Director at the NERC National Centre for Earth Observation.

Andy has 20 years’ experience in the satellite Earth observation business operating at the interface between government, academia and industry. Much of Andy’s current work is focused on the AgriTech sector. He is currently advising Defra’s newly formed EO Centre of Excellence on EO applications and leading on external liaison activities. He is also supporting the £24m STFC UK-China AgriTech programme focusing on strategic programme development. Andy acted as advisor to two AgriTech Centres of Excellence (AgriMetrics and CHaP) and was previously a Director at the NERC National Centre for Earth Observation. This experience is complemented by 10 years’ satellite industry consulting work and places Andy in a unique position to comment on the challenges of connecting technology to end users.

SPEAKER

Andy Shaw
Defra Earth Observation Advisor

He was elected a Fellow of the Institute of Mathematics and its Applications in recognition for services to mathematics in 2003, and a Fellow of the Royal Society of Edinburgh in 2007 in recognition of his contribution to science.

Professor John Crawford
Associate Director of Research & Scientific Director, Sustainable Systems Programme, Rothamsted Research

Professor John Crawford is Associate Director of Research and Scientific Leader of the Delivering Sustainable Systems strategic programme at Rothamsted Research. Previously he was Judith and David Coffey Chair at the University of Sydney where he was also Head of Sustainability and Complex Systems in the University’s flagship $0.5bn research hub, the Charles Perkins Centre. John is a theoretical biologist with a research focus on systems approaches, and works on the integrated behaviour of the soil-plant-microbe system; microbiology; the structure and dynamics of plant and microbial communities; and in the systems biology of plant, microbial and human cells. He was elected a Fellow of the Institute of Mathematics and its Applications in recognition for services to mathematics in 2003, and a Fellow of the Royal Society of Edinburgh in 2007 in recognition of his contribution to science. Professor Crawford’s grantsmanship exceeds £20m and he has published more than 190 peer-reviewed articles.
The Royal Society
The Royal Society is a self-governing Fellowship of many of the world’s most distinguished scientists drawn from all areas of science, engineering, and medicine. The Society’s fundamental purpose, reflected in its founding Charters of the 1660s, is to recognise, promote, and support excellence in science and to encourage the development and use of science for the benefit of humanity.

The Society’s strategic priorities are:
- Promoting science and its benefits
- Recognising excellence in science
- Supporting outstanding science
- Providing scientific advice for policy
- Fostering international and global cooperation
- Education and public engagement