



Department
for Environment
Food & Rural Affairs

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Roadmap for the use of Earth Observation across Defra 2015-2020

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Roadmap Vision

To ensure satellite data are playing to their full potential in policy development and operations across Defra by 2020

Introduction

Defra, working with the UK Space Agency and the Satellite Applications Catapult, has developed a roadmap to identify and realise the unique potential of Earth Observation (EO) data for Defra and the UK economy over the next five years. This roadmap explores the opportunities EO can provide for Defra in relation to the department's core objectives and overarching themes.

Defra's Objectives

- a cleaner, healthier environment which benefits people and the economy
- a world-leading food and farming industry
- a thriving rural economy, contributing to national prosperity and wellbeing
- a nation protected against natural threats and hazards, with strong response and recovery capabilities
- excellent delivery, on time and to budget and with outstanding value for money
- an organisation continually striving to be the best, focused on outcomes and constantly challenging itself

Overarching Themes

- boosting UK productivity
- data availability and utilisation
- better domestic regulation
- delivering our priorities internationally (including EU reform, US and China)

Context

This is an exciting time for Defra as EO is entering a new era. The Copernicus (previously known as the Global Monitoring for Environment and Security (GMES)) programme, is one of the European Union's (EU) space flagship programmes. Defra is the UK policy lead on Copernicus while the UK Space Agency has responsibility for the space component. From 2014 until 2020, the EU will invest €3.8bn in Copernicus, primarily on operational EO satellites (the 'Sentinels') but including €800m on information services targeted at environmental policy makers. This is the first time a space mission has been launched for the sustained monitoring of our planet and the provision of specific environmental information services.

The time is now right for Defra to explore and to exploit the opportunities arising from new EO data and to encourage UK businesses to create innovative products and services to address our policy and operational needs. The free, open and easily accessible EO information offered by the Copernicus programme will lead to growth and creation of new jobs in the UK and across Europe. The EO downstream market potential of Copernicus is estimated to be €1.8bn by 2030.

The UK Space Agency is committed to supporting the development of 'smarter', more efficient government through the use of satellite-derived services and data for better informed policy, operational efficiency savings and enhanced risk management. To do this UK Space Agency are working in collaboration with the Satellite Applications Catapult, through its Space for Smarter Government Programme (SSGP) across central, local and regional government to promote and encourage the use of space products and services. The SSGP Environment Focal Area is focused on the requirements of Defra and its agencies and public bodies. Case studies of the projects funded during 2014/15 are available here: <http://www.spaceforsmartergovernment.uk/case-studies/>.

Actions - Goals and Priorities

Capability and Capacity Building

We need to ensure that Defra has access to the right skills and infrastructure to enable us to be an intelligent customer for Earth Observation data and applications. Much of the expertise we need exists outside the department - in businesses, in universities, and in national and international institutions. Defra will build its own capabilities as an intelligent customer and help ensure that the UK's infrastructure and its researchers and applications developers are focused on our needs.

By 2020 we will have:

- Built a small but highly skilled and influential intelligent customer function capable of matching policy and operational needs with Earth Observation data and applications and working closely with industry, academia and institutions to deliver transformative solutions.
- Secured access to data handling infrastructure and operators so that the rapidly growing sets of data and information products can be used efficiently to meet our policy and operational needs.
- Helped develop new skills in the private sector and academia by demonstrating new uses and markets.

Our key milestones include:

- In 2015 the development of a Centre of Excellence on Earth Observation bringing together expertise from across our science and delivery bodies to shape and deliver this roadmap.
- By 2016 ensure Defra's renewed data and IT strategies align with our needs to integrate Earth Observation data and products into our policy and operations work.
- Over the period, work with UK Space Agency, the Satellite Applications Catapult, Innovate UK and others to build capability outside the department in the application of Earth Observation to our business.

Capability Focus Area: Synthetic Aperture Radar

The launch of Sentinel 1A and the resultant availability of Synthetic Aperture Radar (SAR) data has highlighted the need for a thorough understanding of the potential of SAR techniques for Defra policy areas. Many applications of EO data of relevance to Defra policy areas could potentially benefit from the increased use of SAR data as an addition to or substitute for optical data. Due to the different way in which radiation at SAR wavelengths interacts with the land surface SAR can offer complementary information to optical data. It is also able to operate through cloud and in darkness, increasing the amount of information that can be collected over time. However, compared to the use of optical data, practical experience with SAR in the UK is relatively limited. Defra is looking to understand the practical potential for the use of SAR, and to identify the target areas when its use would be most beneficial.

Research and Development and Innovation

Defra wants its policies and programmes to be informed by the best research and development and to drive and be driven by innovation in the wider economy. We want to be a trusted and respected partner with industry and academia, providing clarity on our requirements and priorities and we will be active in seeking opportunities where our needs coincide with business opportunities in the private sector and with the goals of research funding bodies.

By 2020 we will have:

- Influenced the shaping of relevant research and development programmes, including the EU Research and Innovation Programme “Horizon 2020” and relevant UK Research Council and Innovate UK programmes.
- Been successful in directing funding for academia and industry towards our policy applications.
- Have opened opportunities for business to provide data and applications into Defra programmes.

Our key milestones include:

- In 2015 advertising three Small Business Research Initiative (SBRI) topics through the UK Space Agency’s Space for Smarter Government Programme and Innovate UK.
- In 2015 establishing a strategic partnership with NERC’s National Centre for Earth Observation to deliver key innovation projects.
- By 2016 developing partnership opportunities with the AgriMetrics Centre at Rothamsted Research to deliver solutions collaboratively in areas of Earth Observations, Food and Farming and Farm Business Survey.

Space for Smarter Government Programme Small Business Research Initiative Environment focal Area Questions 2015/16:

- How can Earth Observation and satellite applications best contribute to modelling and monitoring plant health to help deliver UK plant health policy?
- How can Earth Observation and satellite applications be integrated into statutory marine monitoring?
- How can Copernicus Sentinel-1 data be used in fulfilling Defra’s monitoring requirements for Common Agricultural Policy compliance?

Integrating Earth Observation into Operational Delivery and Applications Development

Across Defra's business there are a wide range of existing and potential applications of Earth Observation - from crop and habitat monitoring to water pollution modelling and fisheries and marine conservation. We need to fully quantify the costs and benefits of these applications and address the technical, legal and cultural barriers to adopting them into the delivery of our business plan.

By 2020 we will have:

- Integrated Earth Observations into at least five policy areas to ensure cheaper, more effective, more customer focused delivery.

Our key milestones include:

- In 2015 the establishment of an Earth Observation Data Integration Pilot (EODIP) to draw together Earth Observation data and applications to provide integrated land cover, cropping and habitat condition products and demonstrate their accessibility and utility and cost-effectiveness across a wide range of Defra policy areas.
- By 2017 have developed and evaluated case studies across three other areas of Defra business.

Earth Observation Data Integration Pilot (EODIP)

The EODIP project will use EO data, integrated with other data sources, to map land cover including agricultural crops, forestry, wildlife habitats and human settlements in parts of northern England (pilot areas in Northumberland and Cumbria). As such, the project will be a test-bed for an integrated 'nature map' of England. EODIP is the first flagship project for the Defra Earth Observation Centre of Excellence.

The project will demonstrate the added-value of free and open EO data and develop integrated data products and tools to support the management of natural capital assets, supporting rural development. Its applications will include catchment-sensitive farming, water quality, flood management, carbon budgets, wildlife conservation, landscape and recreation and plant health. The pilot aims to drive forward innovation and integration in the use of data and data tools, and boost efficiency in the organisations that use them, to deliver an improved environment and help rural communities to thrive.

Approach to Delivery

The EO landscape is complex and requires a strategic approach to ensure maximum benefit is achieved by Defra.

Our key delivery partners for this roadmap are UK Space Agency, Satellite Applications Catapult and the National Centre for Earth Observation.

We will work with them to:

- Secure greater influence in Europe and more widely specifically in relation to the European Copernicus programme, Horizon 2020, European Space Agency and the International Group on Earth Observations.
- Be more open to industry – building their capacity to deliver to our agendas and helping grow the wider economy.
- Be a champion across Government - showcasing our successes and sharing learning from our challenges.

To find out more, please contact Defra's EO team:

Earth-Obs@defra.gsi.gov.uk