

2013 UK AGRICULTURAL TECHNOLOGIES STRATEGY

- The UK's 5 year, £160 million Agri-tech strategy set out for the first time how the government, science researchers and the food and farming industry will build on the strengths of the UK agricultural technologies sector.
- Objectives:
 - ▶ Galvanise the whole sector around the agreed challenges
 - ▶ Establish new collaborative networks to work on the grand challenges
 - ▶ Deliver long lasting game changing innovation
 - ▶ Drive collaboration that tackles the issues that no one part of the sector can address alone

■ UK EXPERTISE

The UK is strong in the 3 elements that are vital to support the growth of the sector:

- we have institutes and university departments at the forefront of areas of scientific research vital to agriculture and related technologies
- we have innovative and dynamic farmers, food manufacturers and retailers
- we are well positioned to make an impact on global markets through exports of products, science and farming practices

The strategy integrates the UK's progressive food and farming businesses, and world class science base, with the government's support for trade, investment and international development, unlocking a new phase of global leadership in agricultural innovation.

■ KEY AIMS:

- Improve the translation of research into practice through a £70 million government investment in an Agri-Tech Catalyst, a single fund for projects.
- Increase support to develop, adopt and exploit new technologies and processes through £90 million of government funding for Centres for Agricultural Innovation.
- Developing a global centre of excellence by establishing a Centre for Agricultural Informatics and Metrics of Sustainability, exploiting the potential of data and informatics.
- Provide stronger leadership for the sector through the Leadership Council, giving industry a stronger and more cohesive voice with government and the science researchers.
- Build a stronger skills base to attract and retain a workforce who are expert in developing and applying technologies from the laboratory to the farm.
- Increase understanding of what is being spent and where to increase alignment of industry research funding with public sector spend.
- Targeted sector support to increase exports and inward investment performance.
- https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/227259/9643-BIS-UK_Agri_Tech_Strategy_Accessible.pdf

UK AGRICULTURAL TECHNOLOGIES STRATEGY: AGRICULTURAL CENTRES OF EXCELLENCE

- The Agri-Tech Centres are a unique collaboration between Government, academia and industry to drive greater efficiency, resilience and wealth across the agrifood sector.
- A £90m investment from the UK's strategic innovation agency (Innovate UK) is enabling the Centres to harness leading UK research and expertise as well as build new infrastructures and innovation
- The Centres are essential catalysts for change. They provide a gateway for business to access the best scientific expertise - stimulating new research, practice and technology for the agrifood sector.
- Each Centre has its own unique focus; building capabilities that can lead the world in delivering sustainable food and farming solutions.

Together, the four Centres serve the needs of everyone involved in the UK Agrifood sector: From farmers to advisors; scientists to suppliers; processors to retailers.

The Centres, each with their own unique focus, are a gateway for companies and individuals seeking access to the very best science, expertise and technologies. They are also building on existing knowledge, stimulating new research and technology as well as the transfer of knowledge at farm and processor level.

The capabilities being developed by each Centre empowers the UK agrifood sector to lead the world in delivering sustainable solutions, as well as meet the diverse needs of all those involved in producing food.

<https://www.agritechcentres.com/>

■ TOGETHER THEY WILL DRIVE:

Productivity: A step change in crop and livestock productivity over the next five years with the uptake of precision and data technologies to reduce costs of food production and minimise impacts on the environment.

Sustainability: Holistic systems in place that benefit all; from food producers to processors, retailers, suppliers and society. Improving biodiversity to foster a thriving wildlife population, protecting our natural resources and enhancing the landscape.

Enterprise: A catalyst for innovation; new businesses, services, tools and products that meet the global food and environmental challenges of today and tomorrow.

Leadership: Transparency across the whole food chain with world-leading standards of sustainable production, welfare and environmental responsibility meeting the needs of a healthier society.

■ THE CENTRES COVER:

Crop and soil health & protection: CHAP (Crop Health and Protection) is fundamentally changing how soil and crop threats are managed with fewer interventions, lower environmental impact and improved productivity.

Achievements:

- Nationwide early warning pest system capturing real-time data
- Field Scale Soil 'lab' to test new pesticides and improve soil health
- UK Agriculture's first mesocosm to set a gold standard for pesticide regulations
- New facilities to test vertical plant growth systems

Animal productivity, welfare & health: CIEL (Centre for Innovation Excellence in Livestock) is driving new industry-led research and innovation to position the UK livestock sector as world-leaders in sustainability.

Achievements

- £60m investment in research facilities; the biggest for a generation
- New facilities and research across all main livestock species.
- Provision of open access for wider industry use and commercial scale capability.

Engineering & precision technologies: Agri-EPI (Engineering, Precision and Innovation Centre) is accelerating the adoption of new technologies to boost productivity.

Achievements

- Three new Innovation Hubs at the leading academic institutes of Cranfield University, Harper Adams University and SRUC
- Established a UK and International network of precision monitored commercial Innovation farms to accelerate the uptake of new technology
- More than 70 organisations from across the agri-food supply chain and beyond, collaborating to deliver precision agriculture solutions

Data science, analytics & modelling: Agrimetrics is driving ground-breaking solutions from a range of valuable data sources influencing how we produce, supply and ultimately consume food.

Achievements

- Pioneered the adoption of new data technologies, artificial intelligence and machine learning for the UK agrifood sector.
- The UK's biggest investment in agrifood data collection and connection.
- Delivering bespoke professional services to help companies build their own data resource and analytical skills.



UK AGRICULTURAL TECHNOLOGIES STRATEGY: CATALYST FUND

A £70 million fund, to support collaborative research projects which take agricultural innovations from the laboratory to the marketplace. Co-funded with industry, the catalyst supported small and medium sized enterprises. Also included funding from the UK's Department for International Development (DFID) to support the transfer of technology and new products to developing countries.

■ AIMS

- Promote innovation and the translation of science and technology into common practice Help new agricultural technologies bridge the so called 'valley of death' between the lab and the marketplace.

■ ACTIVITY

- 120 grants awarded over 5 rounds – 70% crop applications, 23% livestock, 7% aquaculture Approximately a third of projects involved all value chain actors Roughly half of the projects had a multidisciplinary approach go their research

Agri-tech Catalyst Case Study:

IBEX2: Autonomous robot weed sprayer for less favoured areas



<http://www.ibexautomation.co.uk/>

Project aim was to develop a robotic weed sprayer for hilly and other difficult terrain farm land. IBEX2 is a self-driving tracked vehicle approximately 1m long, based on bomb disposal robots. Its software performs weed recognition from on-board cameras and terrain navigation using a suite of on-board range sensors coupled with prior knowledge from maps and satellite images. Software is based entirely on existing, now-standard approaches as found in commercial autonomous systems and relies on a user group of 40 real farmers to feed back into the design via a series of demos and discussions. The project has no academic partners and its approach is to focus purely on producing commercial and technical feasibility studies of existing, off-the-shelf research and components as quickly and simply as possible. In June 2018 Ibex received support from the European Commission's East Pennine Innovation Partnership LEADER programme to continue development of precision weed spraying technology.

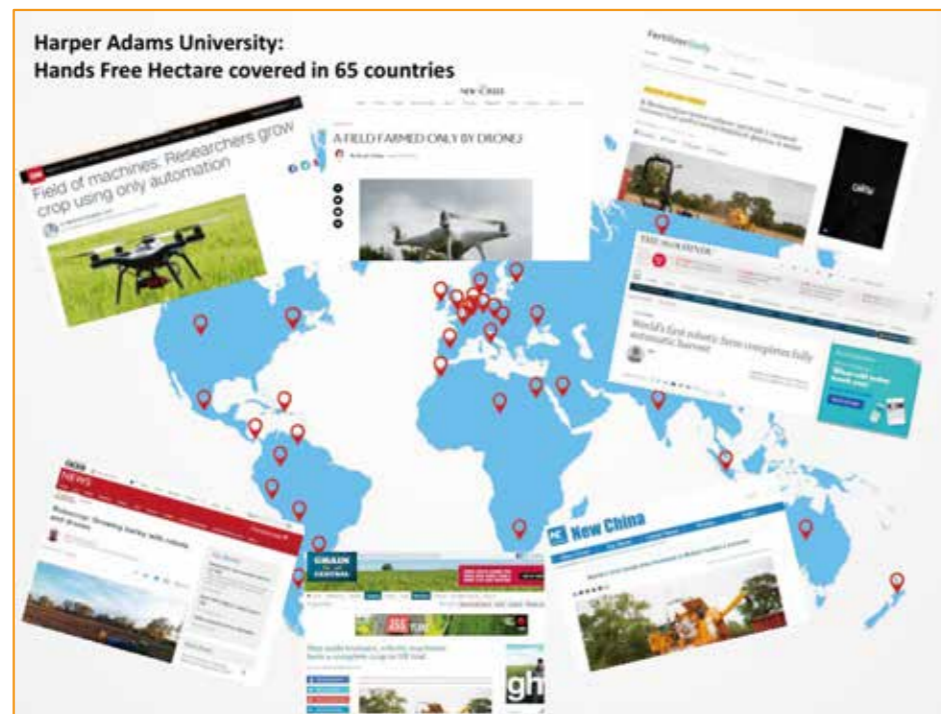
PRECISION AGRICULTURE AND ENGINEERING

Leveraging UK world leading excellence in science/engineering and commercialising new technologies for high productivity food production

Opportunities exist for engineering technology firms from many sectors, to contribute to a technology revolution and growth in agriculture; using innovation in satellite imaging, remote sensing and precision farming for more efficient farm operations with less environmental impact.

■ TELFORD UK – A HIGH POTENTIAL OPPORTUNITY

- A commercial advantage for investors – Access to the Agri-Epi Centre, Harper Adams University and Midlands Engine (Catapult Centres, Horticultural Colleges, Research Organisations, University Partnerships) – for research, development demonstration and training on precision agriculture and engineering for livestock, arable, horticulture and aquaculture sectors.
- A gateway opportunity for the design, build, testing and operation of agricultural technologies on-farm with 10% of England's farmland and a high agricultural GVA.
- A well established advanced engineering supply chain that can be leveraged in agriculture by engineering technology companies. One such innovation is the "hands free hectare" project: the world's first to plant, tend and harvest a crop with only autonomous vehicles and drones.



HARPER ADAMS AND HANDS FREE HECTARE

The Hands Free Hectare is the world's first project to plant, tend and harvest a crop with only autonomous vehicles and drones.

■ BACKGROUND

The project assessed the feasibility of using open source GNSS autonomous navigation systems within field agriculture. The systems were developed by the open source community and utilised within the small scale UAV/drone market.

The project adapted these systems for use in infield situations, integrating them into existing commercial farm machinery. These adapted machines were then used to autonomously sow, grow, and harvest a cereal crop without a human entering the trial area.

■ FUNDING

This "proof of concept" project cost around £200,000. It was funded by precision farming specialist Precision Decisions Ltd and Innovate UK. Innovate UK awarded just under £160,000 to support the feasibility study of the modified agriculture machinery.

■ RESULTS

Using this method returned a yield of 4.5 tonnes of spring barley, against a predicted yield of 5 tonnes. In Autumn 2018 it successfully harvested a second crop achieving a yield of 6.5 tonnes with drilling misses fallen from 2.82% in the first year of the project to 0.35% this year.

■ IMPACT

It demonstrates that an entire crop can be grown from start to finish without people ever needing to go into the field to directly work the land. Smaller machines, which are already readily available to farmers, were chosen to limit the impact on the soil, improve precision and plant health. This supports the thinking that in future, farmers will manage fleets of smaller, autonomous vehicles. These will go out and work in the fields, allowing the farmer to use their time more effectively.

■ HARPER ADAMS UNIVERSITY

Harper Adams is a core partner of the Agri-EPI Innovation Centre, one of the four centres funded as part of 2013's Agri-tech Strategy.

Agri-EPI is a consortium of key organisations in the field of precision agriculture and engineering brings together expertise in research and industry, as well as data gathering capacity in all areas of farming.

AQUACULTURE

Developing and deploying technologies for life support (nutritious feed, health and welfare) to processing fish for sale using UK scientific excellence.

The demand for farmed fish, shellfish and plants both domestically in the UK and globally, is growing at unprecedented levels; creating opportunities for business growth in a sustainable UK aquaculture supply chain using a diverse range of technologies (sensors, automation, engineering).

■ DORSET AND SOUTH WEST COAST - A HIGH POTENTIAL OPPORTUNITY

- Access to world-class research and skills to address key industry issues for the aquaculture sector through related skills training programmes and cutting edge aquaculture R&D programmes at the Centre for Environment, Fisheries and Aquaculture Science (Cefas) Exeter University, Marine Innovation Centre, Plymouth University and Institute of Marine Sciences and Portsmouth University.
- A coastline rich in environmental designations and the perfect setting for aquaculture companies and technology providers to flourish. This includes:
 - a) numerous sheltered harbours and land based development opportunities for hatcheries and recirculation systems;
 - b) onshore areas with potential for development of processing facilities etc;
 - c) excellent water quality and growth conditions – for shellfish especially;
 - d) warm coastal sea water temperatures and less aggressive tidal flows than found in competitor sites – fostering opportunities to produce a wide variety of fish, shellfish, molluscs and plants;
 - e) a vibrant tourist industry with demand for local fresh fish; and
 - f) renown fish restaurants in location.
- A full scale mapping exercise to identify potential sites to develop aquaculture projects from Swanage to Beer undertaken by Dorset’s Fisheries Local Action Group (FLAG) includes:



- Poole and Portland harbours provide sheltered bases for operations in the open ocean and have infrastructure and space for the construction of more hatcheries and aquaculture facilities. In-land areas and on-shore facilities within both ports are also available and ready to be developed.

