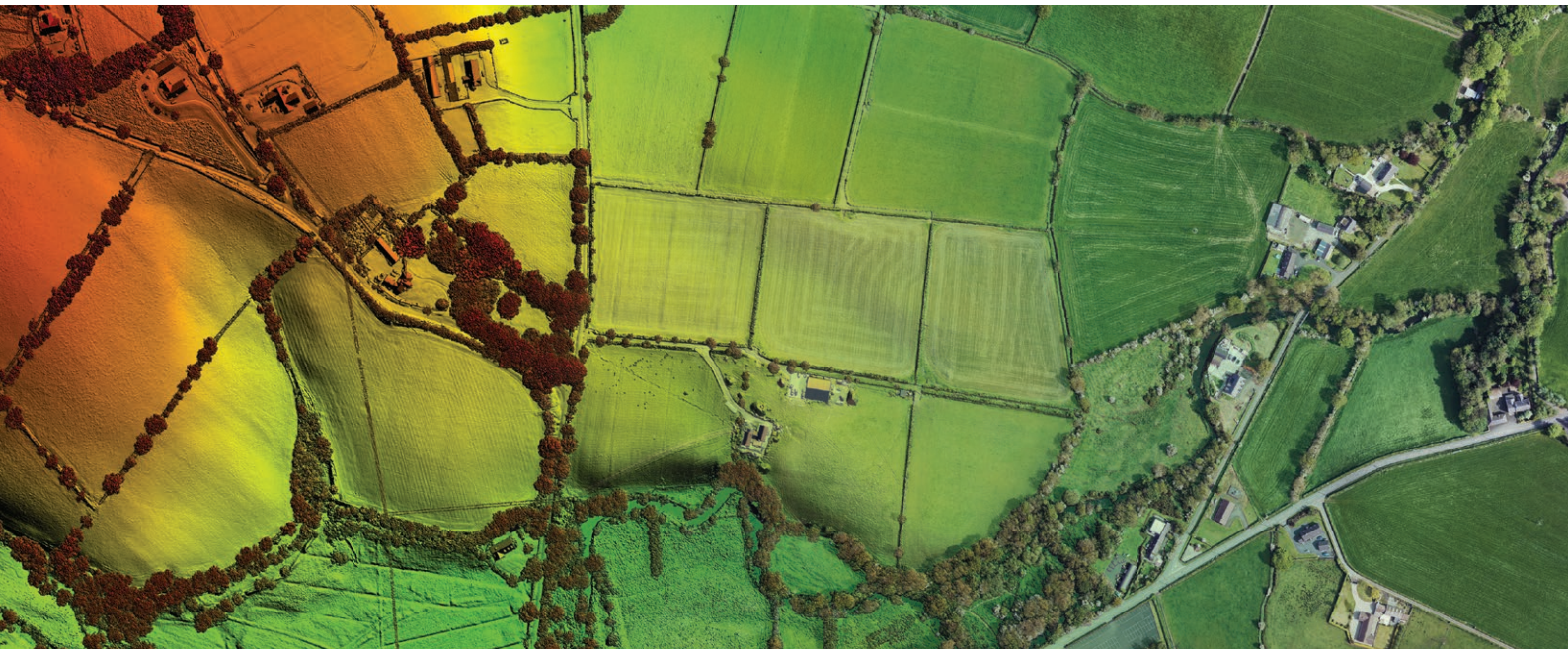
Case Study

LiDAR Benchmarks Carbon Neutral Farming in Northern Ireland



Client:

ARCZero (Accelerating Ruminant Carbon Zero) is a farmer led innovation project supported by The European Innovation Partnership (EIP) Scheme which, in Northern Ireland, is jointly funded by the European Agricultural Fund for Rural Development (EAFRD) and the Department of Agriculture, Environment and Rural Affairs (DAERA). Other project partners include Devenish, Queen's University Belfast, Birnie Consultancy and AgriSearch.

Industry:

Agriculture

Product:

LiDAR

> *"Using the Bluesky LiDAR we can precisely measure stocks, such as soils, trees and hedges, which will help us to calculate a base-line greenhouse gas position for each farm. Having assessed the current position, we can then prioritise future management practices and share our experiences to help other farms accelerate their move to net carbon zero farming."*
>
> John Gilliland, Chair of ARCZero Operational Group

Summary:

ARCZero is made up of a co-operative of seven farms across Northern Ireland, from a diverse range of enterprises, seeking to measure and manage carbon flows at the individual farm level in order to empower farmers to make positive changes towards carbon zero farming.

Using specially commissioned LiDAR measurements, ARCZero can calculate above ground carbon storage which, when combined with the results from a whole business Life-Cycle Analysis calculator, will inform future farming practices.

Challenge:

Actual net farm greenhouse gas footprints, at the individual farm level, are not usually calculated as most methodologies use gross footprints across farm enterprises and they do not accurately assess on-farm carbon stocks and their potential for carbon sequestration.

In addition, current Life-Cycle Analysis (LCA) calculators focus mainly on enterprises – not on a whole farm basis. Exceptions, such as SRUC's AgReCalc, better reflect inter-enterprise transfers and allocations of overheads, allowing public claims to made on any positive change that occurs.

Solution:

Each of the seven farms within the ARCZero project is supplying input and output data at the start and the end of the project for use in the AgReCalc calculator. The farms are also undertaking GPS soil analyses covering pH, P&K as well as carbon content and bulk density and have been subject to a specially commissioned LiDAR.

Captured at 40 points per metre, together with RGB aerial imagery, the LiDAR data was processed to produce 25-centimetre resolution Digital Terrain and Surface Models (DTM / DSM) with an accuracy of +/- 0.5-centimetre RMSE.

Results:

The LiDAR was processed by researchers at the Agri-Food and Biosciences Institute using ArcGIS to locate and measure above ground carbon storage. These results are being entered into the AgReCalc calculator to determine overall gross farm emissions which will be added to carbon stock results to create a net farm carbon balance from which future management practices will be assessed.

Example outputs from the ARCZero work to date include the measurement, on one farm alone, of 33,000 tonnes of CO_2 equivalent stored in the top 30-centimetres of soil and 400 tonnes of carbon stored in trees and hedgerows.

The LiDAR data is also being used to identify potential routes of overland water flow, including rainfall, that may impact on the volume of soil present and the nutrients contained. This information will also be considered in terms of potential pollutions incidents.

LiDAR Specification	
Resolution	16 - 100 PPM
Coverage	Selected areas across the Republic of Ireland
Accuracy XY	± 15cm rmse
Accuracy Z	± 10cm rmse
Formats	Include: ASCII Grid, ASCII XYZ, DXF Point, GeoTiff, LAS
Standard Projection	Irish Transverse Mercator (ITM95)

Get in touch today at **info@bluesky-world.com**

At the time of publication all of the information was correct but could be subject to change.

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