PROJECT INFORMATION SHEET

New technologies for monitoring livestock behaviour

This work began as a collaboration between IBERS, the Computer Science Department at Aberystwyth University, the RSPB and the Elan Valley Trust, with additional support provided by Aberystwyth University's Earth Observation and Ecosystem Dynamics team. A combination of new and existing monitoring methods using fixed-wing Unmanned Aerial Vehicles (UAVs; drones) as sensor platforms were developed to 1) track the movements of livestock animals on large-scale (~100 ha) hill enclosures, 2) quantify and map the vegetation present, and 3) identify key features which might influence animal behaviour (e.g. water bodies, pathways etc). The understanding of how different species of grazer interact with the landscape around them was then used to suggest targeted interventions (cutting areas and pathways, new water sources for drinking) which should alter grazing patterns on specific areas to meet nature conservation goals.

A key objective within this project was to develop and test low-cost equipment that is easy to use, so that the resources can be utilised by non-specialists. In association with a local company (Ystumtec Ltd), this included the deployment of fully customised GPS loggers, and the validation of the first custom built system of animal tracking that uses radio-frequency identification (RFID) tags and a UAV receiver.

These tags, which are placed on either the horns or ears of the animals are a low cost (~£11), low maintenance, alternative to GPS collars that work by transmitting individually recognisable radio signals to a UAV receiver, which triangulates each individual tag's position using its on-board GPS. The flight range of UAVs together with the low cost of the tags could allow large numbers of livestock (100s) to be monitored on over large (150-200 ha) areas.

Accurately mapping resources such shelter, water and the nutritional quality of different areas of vegetation is also necessary if the drivers influencing the animals' behaviour are to be understood. We have been working with a range of drone-mounted cameras and sensors to develop three-dimensional computer models of study areas and identify the relative importance of different features and requirements in determining localised grazing pressures.

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