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Hi-tech game-changer for hill farming sector

When I took on this job nearly four years ago I never imagined I would be saying that here at Crianlarich we are at the cutting-edge of the global Internet of Things! - the phrase used for the interconnection via the Internet of computing devices embedded in everyday objects.

We are particularly interested in being able to track our livestock no matter where they are on the farms, but although the use of GPS is now commonplace in many lowland and marine situations it is not an ideal technology to use in mountainous environments.

For one thing, it is not possible to get connection to a sufficient number of satellites in order to obtain a precise location fix. Just as importantly, any sensor fitted to an animal rapidly uses up battery power when connecting regularly to satellites – resulting in a battery life of days or weeks rather than the months or years that would be preferred.

LoRaWAN, or LoRa for short, is a long range, low power communications platform which is now being rolled out in cities worldwide. Providing a range of around five miles in urban, up to eight miles in suburban and over 10 miles in rural areas, LoRa is ideal for the deployment of sensors and battery-powered devices where small amounts of data need to be transmitted regularly.

As part of an ongoing Innovate UK project focussed on tracking livestock, we have established a LoRa network which covers the majority of the 2,200 ha of the farms. This is the first LoRa network covering a remote, rural location in the UK and it ranges from an altitude of 170 m in our inbye fields to over 1,000 m at the highest point on the hill.

There are already a range of LoRa-enabled sensors available for agricultural and environmental use (e.g. soil measurement devices, fluid level sensors, and even dendrometers to measure the growth of trees). Large and small companies are keen to develop more sensors and agriculture is seen as growth area for the future.

So in addition to the development of the livestock tracking technology, we are also looking to work with colleagues in CENSIS (the industry-led Innovation Centre for Sensor and Imaging Systems) and other organisations and institutes to explore the performance and robustness of a variety of existing and new LoRa-enabled sensors in our mountainous environment.

The cheapness and robustness of establishing a LoRa network combined with the fact that more and more LoRa-enabled sensors are becoming available will, I believe, be a game-changer for agricultural and environmental data collection in remote locations. Our collaborations with industry will not only highlight the capability of the farms to act as a platform for technology testing and development, but just as importantly will also help emphasise that the use of emerging technologies will be important in ensuring a future for hill farming going forward.

Davy McCracken. Head of SRUC's Hill & Mountain Research Centre