

Wildlife Monitoring Using Satellite and Wireless Sensor Networks: WiSE (Wireless Internet Sensing Environment)

Scott Newey¹, Sajid Nazir², René van der Wal², Fabio Verdicchio², Justin Irvine¹, Iain Learmonth², and Gorry Fairhurst²

¹The James Hutton Institute, Craigiebuckler, Aberdeen AB15 8QH; ²University of Aberdeen, Aberdeen AB24 5UA
Email: scott.newey@hutton.ac.uk

dot.rural www.dotrural.ac.uk/wise



Introduction

Camera traps have become increasingly popular in animal ecology, and offer many **advantages** for wildlife and environmental monitoring;

- Non-invasive and automated data collection
- Allow collection of data in remote areas
- Relatively easy to use, reliable and affordable
- A picture is worth a thousand words

However, currently available commercial camera traps also have **disadvantages**;

- Maintenance and image retrieval can be labour intensive
- Data and fault diagnosis are retrospective
- Huge amounts of data are generated with problems for processing and sharing
- Prone to high rate (circa. 95%) of 'false positives', and largely unknown number of false negatives
- Commercially available units are often inflexible and not designed for scientific research purposes

The amount of data and non-information (false positives) collected by current camera trap technologies are seen as the Achilles heel of camera trapping in animal ecology.

To date camera traps have largely failed to exploit the advantages of wireless, satellite and Internet technology, or the availability of small, powerful computers to control multiple sensors and carry out *in situ* image processing.

Acknowledgements

This project is funded by Scottish Government's Rural and Environment Science and Analytical Services and the Research Councils UK dot.rural Digital Economy Hub.

The WiSE project is researching and testing new digital image capture and transport techniques for automated wildlife monitoring in remote environments

The WiSE System

- WiSE has developed a solar powered camera system that is currently deployed and live in the Cairngorms National Park
- The system combines image and video capture to monitor a remote study site
- Image capture is controlled by multiple, configurable sensors that can run singularly or in series
- The system is built around a RaspberryPi computer that controls all communications, sensors and image capture, and allows on-board image processing to reduce the volume of unwanted (false positive) images, and system & data management
- The system is linked via satellite Internet (IPv6) that allows two way communications between the system and end user, scheduled and 'on demand' access to imagery

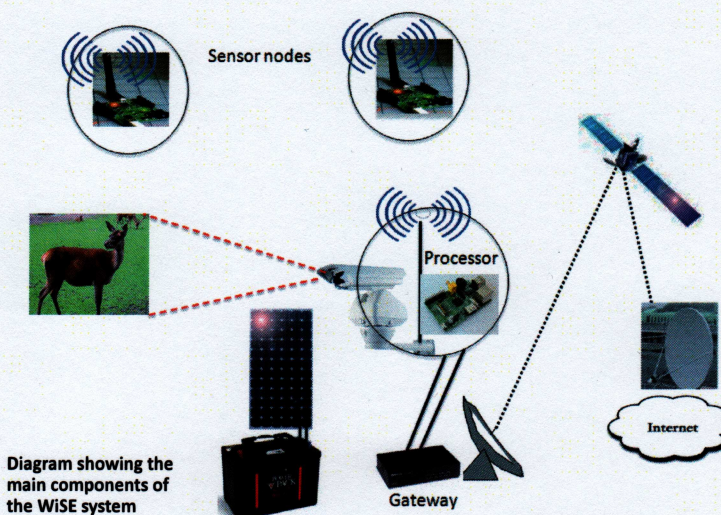


Diagram showing the main components of the WiSE system



Photograph of the WiSE system currently deployed in the Cairngorm National Park

Benefits

- Flexible open source platform
- 'On demand' image streaming and system management
- Reduced costs and improved efficiency
- Facilitate public engagement, narratives and contextualisation of the environment