How drones could help save our most endangered species

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(left to right): Duncan Hine, Ben Schellenberg, Caspian Johnson, Grainne McCabe, Matt Watson, Tom Richardson and Will Walker. Credit: University of Bristol and Bristol Zoological Society

With funding from Cabot Institute for the Environment, BZS and the

EPSRC's CASCADE grant, a joint team flew to Cameroon in December to trial the use of drones, sensor technologies and deployment techniques to monitor populations of the Critically Endangered Kordofan giraffe at Bénoué National Park.

"There has been a significant and drastic decline recently of larger mammals in the park and it is vital that accurate measurements of populations can be established to guide our conservation actions," said Dr. Gráinne McCabe, Head of Field Conservation and Science at Bristol Zoological Society.

"Bénoué National Park is very difficult to patrol on foot and large parts are virtually inaccessible, presenting a huge challenge for wildlife monitoring. What's more, the giraffe are very well camouflaged and often found in small, transient groups," said Dr. Caspian Johnson, Conservation Science Lecturer at Bristol Zoological Society.

Keen to identify the best strategy for airborne wildlife monitoring, BSZ approached Dr. Matt Watson from the University of Bristol's School of Earth Sciences, and Dr. Tom Richardson from the University's Aerospace Department and a member of the Bristol Robotics Laboratory (BRL).

The team were able to draw on successful collaborations using drones to monitor and measure volcanic emissions to begin developing a system for wildlife monitoring.

Bénoué National Park in Northern Cameroon with two Kordofan Giraffe in shot. Credit: University of Bristol and Bristol Zoological Society

"On the surface this might seem relatively easy but imagine an area the size of greater London - (~1600 square kilometres) - heavily wooded, in which you are trying to find and identify an estimated population of just twenty to thirty Kordofan giraffe," said Dr. Watson.

"It is likely that we will need more than one type of drone, and several different sensors to allow us to operate 24 hours a day and throughout the year. Modern multispectral cameras combined with machine learning and high-performance vehicles will need to be fully automated to cover an area of this size. Combine that with remote, constrained field operations and we have an interesting set of engineering problems to tackle," said Dr. Richardson.

Dr. Watson and Dr. Richardson, together with Dr. Tilo Burghardt from the Department of Computer Science are now working with Bristol Zoological Society to put together a large-scale proposal to develop the technologies required for this challenge.

Early morning flight over Bénoué National Park using a thermal camera. Credit: University of Bristol and Bristol Zoological Society

"A machine learning based system that we develop for the Kordofan giraffe will be applicable to a range of large mammals. Combine that with low-cost aircraft systems capable of automated deployment without the need for large open spaces to launch and land, and we will be able to

make a real difference to conservation projects worldwide," said Dr. Watson.

The group are planning to return in early 2021 and are keen to hear from any potential project partners, either individuals or organisations.

Provided by University of Bristol

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