Improving VHF tracking efficiency of wildlife using an Unmanned Aerial Vehicle (UAV) – A case study locating yellow-eyed penguin nests

Muller, C. G; Chilvers, B. L; Barker, Z; Barnsdale, K; Battley, P. F; French, R. K; McCullough, J; and Samandari, F

Wildbase, School of Veterinary Science, Massey University, Palmerston North 4442, New Zealand.

Endangered yellow-eyed penguins (*Megadyptes antipodes*) breed on Enderby Island in the New Zealand subantarctic, nesting individually underneath thick coastal scrub up to 1 km from the sea. Nests are difficult and time-consuming to find by ground searching. Handheld VHF tracking is useful but detection range and tracking ability are affected by topography and vegetation, and field conditions can be hazardous. Unmanned Aerial Vehicles (UAVs) or drones fitted with a camera are increasingly used for counting and monitoring wildlife, however, visual and thermal imagery are not suitable for detecting penguin nests under thick vegetation cover. We developed a multi-frequency VHF receiver and fitted it to a UAV (the Drone Ranger) to track penguins to their nests. The receiver simultaneously tracked multiple VHF transmitters operating on individual frequencies, providing key advantages over single-frequency receiver designs. Here we present the results of nest location using several different methods: manual ground searching, ground-based VHF tracking, and aerial tracking using the UAV system. This novel technology has applications for locating and tracking a wide range of wildlife, particularly when screened by thick vegetation, underground, or cryptic species which are difficult to see.