

## **Abstract – TWS 2022**

### **Re-Inventing VHF Tracking – How To Avoid The Pitfalls of Drone and Aerial Wildlife Monitoring**

VHF-radio tracking is widely-used for locating and monitoring wildlife, but the equipment has changed little since the 1980s. Multi-frequency receiver technology can revolutionize conservation research, especially when paired with new aerial-tracking technology.

Tracking from the air offers many advantages over traditional ground-based survey and research techniques. As well as making fieldwork faster, safer, and more efficient, searches can follow an automated flight plan for repeatability. Unmanned Aerial Vehicles (UAVs, or drones) are cheaper and more portable than aircraft, making them more accessible to biologists. However, there are a number of technical considerations to get best results from this emerging tool.

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 (0.6 miles) from the sea. Nests must be monitored but are difficult and time-consuming to find by ground searching, and field conditions can be hazardous.

For this research we developed a multi-frequency VHF receiver offering many advantages over traditional single-frequency receivers, especially for aerial tracking, including simultaneous monitoring of 500 frequencies (instead of sequential scanning). Unlike standard receivers, this system also stores position data for easy spatial analysis, and comparisons over time.

Here we discuss the evolution of this technology and the successes and failures of various methods of using drones, including the performance of different sensors such as thermal imagery and multi-frequency VHF for applied conservation. In this case-study we present results comparing the efficiency of different tracking methods for locating cryptic penguin nests.