POPULATION SURVEY PILOTS UNMANNED AIRCRAFT

Robotic aircraft or 'Unmanned Aerial Vehicles' (UAVs) could soon take to the skies in the name of marine mammal research, if a pilot project to test the technology succeeds.

JOSHUA SMITH AND MICHAEL NOAD

Through the Australian Centre for Applied Marine Mammal Science, Dr Amanda Hodgson and Dr Michael Noad, of the University of Queensland, will conduct and compare traditional manned and UAV surveys of dugongs and humpback whales, to test whether UAVs can improve the safety, cost-effectiveness and accuracy of marine mammal population surveys.

'Aircraft hire and personnel costs mean that traditional manned aerial surveys are expensive, and eight people have died over the past 20 years after aircraft crashed during aerial surveys,' Dr Hodgson says.

'So we want to determine whether UAVs offer a better way of monitoring marine mammal populations, by reducing the cost and the risk, and by increasing the accuracy of species detection, location and identification using on-board imaging technology.'

UAVs have been around since the 1950s and developed for a range of applications including defence, weather research, and search and rescue. They are largely untested in wildlife research, but they have the potential to be used at night – with infrared cameras attached – or in extreme environments. Their lower cost would also enable more aerial surveys to be conducted, improving population estimates.

The research team will use a large (5 m wingspan), commercially available UAV, supplied by Aerocam Australia and equipped with video and still cameras.

'A larger UAV can carry more equipment and a lot more fuel – allowing us to cover the greater distances necessary for whale surveys,' Dr Noad says.

The first phase of the project will test the basic capabilities of the UAV for viewing and surveying marine mammals. It will ask a range of questions, including: does the UAV provide video and still images that can be easily analysed by researchers or image analysis programs; what is the optimal camera height and system for different species; can images be viewed in real time to enable operators on the ground to alter the flight path when animals are sighted; and how much post-flight analysis of images is required?

Dugongs and humpback whales are being targeted as they live in different environments, are sighted using different cues from the air, and have very different movement habits and aggregation patterns.

'Dugongs sometimes congregate in large herds of up to 300 individuals, and need to be circled to be counted,' Dr Noad says.

AEROCAM AUSTRALIA

Aerocam's UAV 'Shadow'

Aerocam's 'Shadow' specs

Wingspan:	5.2 m
Length:	2.9 m
Max weight:	90 kg
Fuel load:	12-24 l
Max range:	1500 km
Endurance:	3-8 hr
Speed:	160-200 km/hr
Max payload:	25 kg

'Migrating humpback whales usually travel singly or in pairs, and often you just see their blows before they submerge again. They're spread out on a long migratory path, so you have to cover quite a bit of ocean to find them.'

For dugongs, the UAV will fly transects over Moreton Bay and Hervey Bay, in south-east Queensland, and when a herd is sighted - through the live video link – researchers will take over the controls and circle the herd to get an accurate count.

Humpback whales will be located during their winter migration past North Stradbroke Island, and the UAV will again be tested at varying heights above the animals. Still and video images will then be compared to see if there is any advantage of one over the other.

'Still images will likely have a better resolution than video images, but it may be easier to detect whales from movement in the video,' Dr Noad says.

If this first phase of the project proves successful, the researchers will move on to the second phase – to directly compare the results of UAV surveys with manned surveys.

The scientists admit this is a high-risk project. But even if the technology does not prove adequate today, with the pace of development, it may be in just a few years' time.

'In the medium to long term, smaller UAVs could reduce the cost of flights to just a few dollars an hour, while better imaging software could negate the need for human analysis at all,' Dr Noad says.

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