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| **Location:** | Port Moresby and selected Provinces in PNG |
| **Type of Contract:** | Professional Service Contract with a Firm (Request for Proposals) |
| **Project:** | Strengthening the Management Effectiveness of the National System of Protected Areas |
| **Languages Required:** | English |
| **Starting Date:** | December 2018 |
| **Duration of Initial Contract:** | Approximately 100 person days over the period December 2018 to June 2020 |

**Report to the UNDP**

**Re: Trip to various locations: 26 October – 8 Oct 2019**

# Introduction

At various occasions between April, 2018 and May, 2019, personnel from various government and non-governmental organisations received drones (DJI Phantom 4 Pro) and associated equipment. At the time of this report, staff of Michon Enterprises (‘Camzilla’) had provided formal theory and practical training to these personnel. The objectives of the training were that the attendees would be competent and confident in the use of the drones for mapping, observation and surveillance operations and basic photography / videography.

From 26 October to 9 November 2019, I (Justin Hechinger) – accompanied by James Sabi (CEPA) – travelled to multiple sites throughout Papua New Guinea, in order to perform basic maintenance checks and to provide supplementary training, support and advice to recipients of the drones. It was anticipated that drone pilots would have been using the drones for various purposes, and that on this mission, we would identify and address gaps in skills and/or knowledge, and build upon previous training.

This report summarises the activities undertaken, observations made and my recommendations going forward.

## Site 1: Vanimo (27-30 Sep)

## In Vanimo, I taught an introductory drone course to several personnel – some of whom had attended earlier training. The course was nevertheless a valuable refresher. Our practical flying sessions took place at a soccer field in a nearby settlement. The training is viewed as successful, and it appears that the attendees are confident they can effectively-employ the drones.

A review of completed surveys reveals that drones have been used to map structures and forested areas, although assistance has been requested (see Charlie Begoit’s and Sylvester Nakia’s surveys). Other surveys indicate that drones have been used to conduct aerial inspections. It is clear that personnel are becoming comfortable with using the drones.

## Site 2: Ambunti (1-5 Nov)

The mission in Ambunti centred around mapping crocodile nesting habitat – areas that are overflown by helicopter during the annual crocodile nest survey. We trialled the use of drones to perform mapping missions in order to test their effectiveness at generating maps which could be analysed to determine the number of crocodile nests in each area. It was anticipated that success would result in a significant savings, as drones could partially – or fully – replace the much more costly helicopter. The substitution of drones for manned aircraft is an important objective because of the dangerous nature of low-level helicopter flight.

During the mapping missions, the personnel who participate in the helicopter surveys were present. The indication was that the drones are as-good as helicopters in areas of grassland habitat, but not as effective in treed habitats. This is due to the static nature of the drone-mapping process; small drones cannot push aside trees so photos can be taken of the underlying ground, whereas helicopters can blow the trees so that the observers can identify any crocodile nests below.

Based on the above and a preliminary analysis of the generated maps, helicopters may be replaced by drones in grassland habitats. The regular observers should be consulted regarding this matter.

The personnel who travelled to Ambunti were experienced drone pilots from East New Britain and CEPA (Port Moresby). It was evident that these personnel have been using drones in the time since they attended their drone training.

## Site 3: Wewak (6 & 7 Nov)

We met with drone pilots from West New Britain who had been unable to accompany us on the Ambunti leg. We were scheduled to meet with Derek Warakai, but he was unavailable at all on 6 November and was only available for approximately one hour on 7 Nov. During that hour, pilots from New Britain mapped a war memorial. The rest of the time in Wewak was spent debriefing following the trip to Ambunti and processing maps from the crocodile habitat missions.

Observations and recommendations:

1. **Inter-organisational training:** In Vanimo, personnel possessed a range of drone experience, with most having not attended any of the previous training sessions. As previously-discussed, training novice pilots alongside experienced pilots disadvantages both groups, as neither group receives the attention it deserves.

**Recommendation:** Organisations should employ their personnel who have received formal instructions regarding drone operations as ‘in-house’ trainers. This would increase the number of trained pilots, while maximising the efficiency of training sessions held by personnel from Camzilla. *If it is preferred that training be held by Camzilla, it is recommended that trips be scheduled expressly for this purpose.*

1. **Utilisation of drones during crocodile survey:** As mentioned above, it appears that drones can partially-replace helicopters during crocodile nest surveys. It is clear that the use of drones is habitat-dependent, and it is also evident that experienced personnel must view the generated maps to identify nests. It is also clear that drones can be used for other purposes in Ambunti, such as locating/monitoring fires

**Recommendation:** Further consultation with crocodile nest survey participants is recommended.

1. **Recommendation - Availability of personnel in Wewak:** It appears that the person/people responsible for the drone allocated to Wewak are not able to dedicate sufficient time to meet with me. As such, despite two trips to Wewak, it is still unclear what the drone has been used for, and for what purposes the drone can be effectively-employed in the area.
2. **Pix4d Mapper –** In the brief time since the August/September mission, no Pix4D licenses have been purchased, and no suitable processing stations have been procured. This means that any personnel wishing to generate orthomosaics must do so using trial licenses and their existing computers (most of which are not powerful enough).

**Recommendation:** At least one Pix4D license should be purchased, and a central processing station should be established. Please see recommendations from previous reports.

1. **Suggestions for future missions –** Based on a review of surveys, it is recommended that another trip be made to Vanimo, with time allocated to discussion on specific drone application and emphasis on map generation.

In conclusion, it appears that drone use is increasing overall, as pilots become more comfortable, and new applications are discovered. All the drones that were examined were in excellent condition, and there have been no mishaps reported. Inter and Intra-organisational training will assist in an increase of drone-use. Maps of crocodile nest habitats should be analysed by experienced personnel in order to confirm the effectiveness of the drones. The purchase of Pix4D Mapper and suitable processing station(s) should be prioritised, as the ability to reliably-generate maps will be a significant milestone.

We welcome comments in response to this report, and appreciate any feedback you can provide regarding our performance.

Warm regards,

Justin Hechinger

Director, Michon Enterprises / Camzilla