Final Project Evaluation Report

Your Details	
Full Name	Mayke De Freitas
Project Title	3D Characterisation and monitoring of Phytotriades auratus' habitat in Venezuela using UAVs and camera traps
Application ID	21379-1
Grant Amount	£5,000
Email Address	maykef@gmail.com
Date of this Report	8 October 2018

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
1) UAV payload and camera traps design and testing				Both the UAV payload (multispectral camera) and the camera traps were fully designed in the workshop in Cambridge. The camera traps were designed and programmed to detect pixel changes on live video, when the camera detected changes between video frames, it stored the frames with changes above a determined threshold.
2) IoT remote monitoring platform setup				The hardware was fully tested in Cambridge. The camera traps were programmed to send captured pictures to a Dropbox folder in the cloud. Due to lack of permits from environmental and national park authorities we could not deploy them.
3) UAV data acquisition & Camera traps positioning				Our drone was retained in customs for almost 6 months, and despite several meetings with authorities, we never got the required permits to deploy the cameras. To date, our permit application has not received any response.
4) Data processing				Despite the fact that neither the drone nor the cameras were deployed, we carried out the 4 field trips to all the locations mentioned in our application, collecting data manually and assessing the questions we posed for this research project using the field expertise of our team.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

We underestimated the unwillingness of authorities in Venezuela to provide any permits for research in the area. Despite the good understanding between our team

and the park rangers and local environmental authorities, our application for permits was never processed by the Ministry of Environment in Caracas. This rendered our initial objectives of flying the drone and positioning the camera traps unfeasible.

Despite this, we were allowed to continue surveying the area during the specific field trips. While we were not able to collect data for long periods of time using our equipment, we characterise all the four locations with a botanist and surveyed most bromeliads in search of the frog. We determined that *Phytotriades auratus* is not present in Margarita Island where the bromeliads assemblages are distinct to that of the other localities. The other three localities showed that plant assemblages are very similar to that of the type locality (Cerro Humo), but two of them presented anthropogenic intervention and changes in microclimate conditions due to changes in forest cover and plant diversity. Lastly, the surveys of localities within the national park showed positive results in terms of habitat quality, lack or very minimal disturbance and no signs of microclimate sudden changes intra-seasons. It is important to recall that this is not the case of the national park being effective in protecting habitats/species but, rather, the fact that most of these localities are remote and inaccessible.

3. Briefly describe the three most important outcomes of your project.

1. Despite the difficulties in deploying our equipment in the four localities, the team managed to characterised all of them and assess the conservation status of *Phytotriades auratus*;

2. The equipment was designed, assembled and tested in Cambridge, United Kingdom, showing that creating low-cost sensors for conservation projects is feasible. We managed to train a Convolutional Neural Network (CNN) using our camera trap. The CNN detects subjects with a 99% effectiveness. The equipment is ready to be deployed in other locations whenever possible;

3. Based on the assessment we completed during our four field trips, we completed a field guide of amphibians of the Peninsula de Paria. The guide was printed in English and Spanish, and the latter has been distributed for free within the closest communities to our four localities. At the moment, the team is submitting a series of species factsheets to the local NGO in charge of the IUCN red list in Venezuela. We are also updating the factsheets of the international red list.

4. Briefly describe the involvement of local communities and how they have benefitted from the project.

The field trips were possible thanks to the involvement and generosity of the local communities. Our local guides helped us collecting data, assessing anecdotal information about climate changes, identifying locations where amphibian activity was high and providing us with information about land use and potential threats. We have distributed the Field Guide of Amphibians of Paria Peninsula in those communities, and strive for keeping working with them in the near future.

5. Are there any plans to continue this work?

We definitely will keep working, but due to the difficult nature of the economic and political situation in Venezuela at the moment we have decided not to work there until situation improves. Instead, we are going to deploy our cameras and fly the drone in the Island of Trinidad, where the original population P. auratus was discovered. We have contacted people in the University of West Indies, and will carry our survey work there.

6. How do you plan to share the results of your work with others?

The results of our research have already been shared with local communities and authorities in Venezuela through our field guide. We are finalising our tutorial for the camera traps, which will be share through our website. Our team in Venezuela is finalising a peer-reviewed article about our findings.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

The grant was used between January-December 2017.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Electronic components	£2,816	£2816	0	
Software	£166	£166	0	
Logistics	£980	£1500	£520	
Accommodation	£320	£540	£220	
Airfares	£718	£850	£132	
Total	**£5,000**	**£5872**	**£872**	

9. Looking ahead, what do you feel are the important next steps?

We need to:

I. Get permits to carry out our work in Trinidad;
II. Get enough data to train a new CNN to detect *Phytotriades auratus*;
III. Disseminate the results among the conservation community so new technologies can be deployed to help conservation.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

We widely acknowledged Rufford in all our activities.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Mayke De Freitas (Software/hardware development)

Gilson Rivas (Field Work)

12. Any other comments?

We thank the Rufford Foundation for the financial support and look forward to a following up application to start working in Trinidad & Tobago.