



**Darwin Initiative/D+ Project  
Half Year Report  
(due 31<sup>st</sup> October 2019)**

<b>Project reference</b>	DPLUS092
<b>Project title</b>	Seabird sentinels: mapping potential bycatch risk using bird-borne radar
<b>Country(ies)/territory(ies)</b>	Falkland Islands (FI) and South Georgia and The South Sandwich Islands (SGSSI)
<b>Lead organisation</b>	British Antarctic Survey (BAS)
<b>Partner(s)</b>	BirdLife International
<b>Project leader</b>	<i>Richard Phillips</i>
<b>Report date and number (e.g. HYR3)</b>	<i>HYR1 – 31/10/2019</i>
<b>Project website/blog/social media etc.</b>	<a href="https://www.bas.ac.uk/project/bycatch-risk-of-wandering-albatrosses-using-radar-detection/">https://www.bas.ac.uk/project/bycatch-risk-of-wandering-albatrosses-using-radar-detection/</a> <a href="https://www.bas.ac.uk/media-post/new-funding-uses-seabirds-as-sentinels-of-south-atlantic-ocean/">https://www.bas.ac.uk/media-post/new-funding-uses-seabirds-as-sentinels-of-south-atlantic-ocean/</a> <a href="http://www.birdlife.org/worldwide/news/seabird-sentinels-will-help-mitigate-bycatch">http://www.birdlife.org/worldwide/news/seabird-sentinels-will-help-mitigate-bycatch</a> <a href="http://www.birdlife.org/sites/default/files/attachments/sea_change_17-7-19_web.pdf">http://www.birdlife.org/sites/default/files/attachments/sea_change_17-7-19_web.pdf</a> (page 4) <a href="https://twitter.com/BirdLifeMarine/status/1157328360332320773">https://twitter.com/BirdLifeMarine/status/1157328360332320773</a>

**1. Outline progress over the last 6 months (April – Sept) against the agreed baseline timetable for the project (if your project has started less than 6 months ago, please report on the period since start up to end September).**

Reporting period: 1 July 2019 – 30 September 2019 (3 months)

**Output 1 Understand fine-scale attendance patterns of wandering albatrosses of different age, sex and breeding status to legal and illegal fishing vessels.**

***Activity 1.1. Organise fieldwork logistics***

Progress to date: All the equipment, including multiple types of tracking device, has been ordered and the last set of devices due for delivery in the next 1-2 weeks. A fieldwork protocol detailing the deployment strategy (i.e. number of birds in each sex and life-history stage), deployment periods (tailored for each life-history stage) and device configurations (sampling intervals etc.) has been finalised. Deployment of devices on juvenile wandering albatrosses will start in early December 2019 by the BAS field assistants at Bird Island. Ana Carneiro (BirdLife PI) will arrive at Bird island by mid-December to carry out the bulk of the deployments, expanding the work to other life-history stages (pre-breeders, breeding adults, and non-breeding adults). Ana will be in the field until the end of February, and the BAS field assistants will carry out the later device deployments on breeders during brood-guard and post-guard chick-rearing. Applications for animal welfare and ethical review, environmental evaluation and govt. permits to conduct scientific activities in South Georgia have all been approved.

Ana Carneiro attended a series of training courses (including personal survival techniques and first aid), and completed medical and dental examinations required to travel to BAS field stations.

**Activity 1.2 Collect and compile fisheries and tracking data (i.e. radar, 3-D acceleration, GPS location, and immersion data).**

Progress to date: Although this activity was due to start in October 2019, we have already contacted fisheries representatives in Brazil, Argentina, Chile, Uruguay, South Georgia and the Falkland Islands to access their Vessel Monitoring System (VMS) data. We have also contacted David Kroodsma (Director of Research and Innovation at Global Fishing Watch) with regards to accessing satellite Automatic Identification System (AIS) data from vessels. Satellite AIS and VMS data will be correlated with radar data to identify vessels with which the birds are interacting and the proportion with AIS in operation, determine the distance at which birds respond to fishing vessels (legal and IUU), and the proportion of time spent behind vessels (and are therefore at risk).

The collection of tracking data with radar loggers will commence in early December 2019. The project will also benefit from existing tracking data collected in previous field campaigns (without radar).

**Activity 1.3 Data analysis to determine the distance at which wandering albatrosses respond to vessels (i.e. change direction, flight height etc. based on acceleration data), and proportion of time spent behind each vessel.**

This activity will commence as soon as the fieldwork finishes and the radar data are available.

**Activity 1.4 Assess whether a signature is detectable in GPS, acceleration and immersion data that indicates scavenging behind vessels vs feeding on natural prey. If so, quantify time spent following vessels from other GPS and immersion datasets (from the current and previous seasons).**

A literature review has been conducted to compare different methods for identifying search behaviour from GPS, immersion and acceleration data. Several methods were considered including: 1) first passage time, 2) speed-tortuosity thresholds, 3) k-means clustering, 4) Hidden Markov Models, and 5) Expectation-maximization binary clustering.

Based on the results from the literature search, we are developing scripts written in the R language to work with Hidden Markov Models (HMM) using the package *momentuHMM*. Hidden Markov Models allow the inclusion of many data streams to classify behaviour (acceleration, turning angles and step lengths derived from GPS data, and number of landings derived from immersion loggers). Using *momentuHMM* we will also test for the effect of covariates on the probability of transitioning between states. For example, we may be able to use radar detections in state classification to assign two foraging states: “natural” vs “anthropogenic (behind fishing vessels)”.

**Output 2 Model habitat preferences of wandering albatrosses of different age, sex and breeding status.**

Progress to date: activities under this output are not due to start until April 2020.

**Output 3 Identification of the areas, periods and fleets from which bycatch risk is greatest for wandering albatrosses of different age, sex and breeding status.**

Progress to date: activities under this output are not due to start until October 2020.

**Output 4 Dissemination and application.**

Progress to date: activities under this output are not due to start until January 2020. However, we have already set up communication channels to publicise the project (see “Project website/blog/social media etc.” above).

**2a. Give details of any notable problems or unexpected developments/lessons learnt that the project has encountered over the last 6 months. Explain what impact these could have on the project and whether the changes will affect the budget and timetable of project activities.**

Nothing to report

**2b. Have any of these issues been discussed with LTS International and if so, have changes been made to the original agreement?**

Discussed with LTS: n/a

Formal change request submitted: n/a

Received confirmation of change acceptance n/a

**3a. Do you currently expect to have any significant (e.g., more than £5,000) underspend in your budget for this year?**

Yes  No  Estimated underspend: £

**3b. If yes, then you need to consider your project budget needs carefully.** Please remember that any funds agreed for this financial year are only available to the project in this financial year.

If you anticipate a significant underspend because of justifiable changes within the project, please submit a rebudget Change Request as soon as possible. There is no guarantee that Defra will agree a rebudget so please ensure you have enough time to make appropriate changes if necessary.

**4. Are there any other issues you wish to raise relating to the project or to Darwin's management, monitoring, or financial procedures?**

No

If you were asked to provide a response to this year's annual report review with your next half year report, please attach your response to this document. Additionally, if you were funded under R25 and asked to provide further information by your first half year report, please attach your response as a separate document.

Please note: Any **planned** modifications to your project schedule/workplan can be discussed in this report but **should also** be raised with LTS International through a Change Request. **Please DO NOT send these in the same email.**

Please send your **completed report by email** to [Darwin-Projects@ltsi.co.uk](mailto:Darwin-Projects@ltsi.co.uk). The report should be between 2-3 pages maximum. **Please state your project reference number in the header of your email message e.g. Subject: 25-035 Darwin Half Year Report**