Applicant: **Trathan, Philip**
Organisation: **British Antarctic Survey**
Funding Sought: **£283,417.00**
Funding Awarded: **£283,417.00**

DPR8S2\1010

DPLUS109 Initiating monitoring support for the SGSSI-MPA Research and Monitoring Plan

PRIMARY APPLICANT DETAILS

Name	Philip
Surname	Trathan
Tel (Work)	[redacted]
Email (Work)	[redacted]
Address	[redacted]

Section 1 - Contact Details

PRIMARY APPLICANT DETAILS

Name	Philip
Surname	Trathan
Tel (Work)	[redacted]
Email (Work)	[redacted]
Address	[redacted]

GMS ORGANISATION

Type	**Organisation**
Name	British Antarctic Survey
Phone	[redacted]
Email	[redacted]
Address	[redacted]

Section 2 - Title, Dates & Budget Summary

Q3a. Project title

DPLUS109 Initiating monitoring support for the SGSSI-MPA Research and Monitoring Plan

Q3b. What was your Stage 1 reference number? e.g. DPR8S1\10008

DPR8S1\1017

Q4. UKOT(s)

Which UK Overseas Territory(ies) will your project be working in? You may select more than one UKOT from the options below.

☑ South Georgia and The South Sandwich Islands (SGSSI)

Q4b. In addition to the UKOTs you have indicated, will your project directly benefit any other Territories or country(ies)?

⦿ Yes

Please list below.

This project will contribute to the Blue Belt initiative currently underway by the UK Government, contributing to GSGSSI and potentially two other UKOTs - the Falkland Islands and the British Antarctic Territory. These Overseas Territories have surface breeding seabirds and marine mammals, so these UKOTs could also benefit from the project outcomes.

This project will also build on a recent Darwin Plus project (DPLUS065), focussed on Coastal Mapping of the Falkland Islands and South Georgia.

Q5. Project dates

Start date:	End date:	Duration (e.g. 2 years, 3 months):
03 August 2020	02 August 2022	2 years

Q6. Budget summary

Year:	2020/21	2021/22	2022/23	Total request
Darwin funding request (Apr - Mar)	[redacted]	[redacted]	[redacted]	**£** 283,417.00

Q6a. Do you have proposed matched funding arrangements?

◉ Yes

What matched funding arrangements are proposed?

In-kind co-funding from GSGSSI through support at the King Edward Point research facility during fieldwork, including accommodation, victualling and other related expenses.

In-kind co-funding from GSGSSI through vessel support during fieldwork.

In-kind co-funding from BAS through support for Dr Philip Trathan, Dr Adrian Fox, Nathan Fenney and Dr Martin Collins.

In-kind co-funding from BAS through purchase of second drone, matching the specification of the drone proposed in this project.

In-kind co-funding through Dr Philip Trathan's attendance at meetings of the Commission for the Conservation of Antarctic Marine Living Resources.

In kind co-funding through provision of existing BAS field equipment and software support.

Total in-kind co-funding from BAS is £[redacted], equivalent to 31% of project costs.

Q6b. Proposed (confirmed & unconfirmed) matched funding as % of total project cost (total cost is the Darwin request plus other funding required to run the project).	31%

Section 3 - Lead Organisation Summary

Q7. Summary of Project

Please provide a brief summary of your project, its aims, and the key activities you plan to undertake. Please note that if you are successful, this working may be used by Defra in communications e.g. as a short description of the project on GOV.UK.

Please write this summary for a non-technical audience.

No Response

Q8. Lead organisation summary

Has your organisation been awarded a Darwin Initiative award before (for the purposes of this question, being a partner does not count)?

⦿ Yes

If yes, please provide details of the most recent awards (up to 6 examples).

Reference No	Project Leader	Title
DPLUS009	Dr Philip Trathan	Antarctic and Sub-Antarctic Marine Protected Areas: using penguin tracking data
DPLUS054	Dr Philip Trathan	Managing Antarctic Krill Fisheries; identifying candidate marine areas for protection
DPLUS072	Dr Philip Trathan	Developing the risk assessment framework for the Antarctic krill fishery
DPLUS057	Dr Jennifer Jackson	Where are they now? Right whales in South Georgia waters
DPLUS069	Dr Susie Grant	Building data resources for managing the SGSSI Marine Protected Area
No Response	*No Response*	*No Response*

Have you provided the requested signed audited/independently examined accounts? If you select "yes" you will be able to upload these. Note that this is not required from Government Agencies.

⦿ Yes

Please attach the requested signed audited/independently examined accounts.

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - UK Research and Innovation - Annual Report and Accounts 2018–2019
17/11/2019
19:00:26
pdf 3.65 MB

Section 4 - Project Partners

Q9. Project Partners

Please list all the partners involved (including the Lead Organisation) and explain their roles and responsibilities in the project. Describe the extent of their involvement at all stages, including project development.

This section should illustrate the capacity of partners to be involved in the project. Please provide Letters of Support for the Lead Organisation and each partner or explain why this has not been included.

N.B: There is a file upload button at the bottom of this page for the upload of a cover letter (if applicable) and all letters of support.

Lead Organisation name:	British Antarctic Survey
Website address:	www.bas.ac.uk

Details (including roles and responsibilities and capacity to engage with the project):	Trathan will manage the project, including linkages with GSGSSI. Fenney and Fox will lead the fieldwork. Collins will contribute to all science aspects, including liaison with King Edward Point Project staff. Chatzela will oversee financial management. We will identify baseline sites at South Georgia that will allow monitoring across a range of species, each with varying dietary preferences, allowing the changing ecology of South Georgia to be documented in the context of recent warming and eradication of invasive mammals. Sites for, inter alia, Antarctic fur seals, elephant seals, albatross species and macaroni, king and gentoo penguins, etc will be selected in consultation with GSGSSI and relevant experts for each species. Many of these species are of interest to tourists. We will therefore, where feasible, consider mapping visitor landing sites. The field team will acquire high-resolution (2.5 cm or better) digital images for each of the monitoring sites using a fixed-wing UAV airborne-survey platform and high-specification camera. Analysis of imagery will be under the combined guidance of Fox and Trathan. BAS has expertise in different analysis methods, so that the most appropriate will be selected for each species. Trathan, Fenney, Fox and Collins will lead development of scientific reports and papers.
Have you included a Letter of Support from this organisation?	⦿ Yes
Have you provided a cover letter to address your Stage 1 feedback?	⦿ Yes

Do you have partners involved in the Project?

⦿ Yes

1. Partner Name:	Government of South Georgia and the South Sandwich Islands
Website address:	http://www.gov.gs/

Details (including roles and responsibilities and capacity to engage with the project):	Access to field sites will be facilitated by GSGSSI.
Have you included a Letter of Support from this organisation?	⊙ Yes

Do you have more than one partner involved in the Project?

⊙ No

Please provide a cover letter responding to feedback received at Stage 1 if applicable and a combined PDF of all Letters of Support.

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - GSGSSI Letter of Support
25/11/2019
20:40:06
pdf 47.04 KB

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - GBAT Letter of Support
21/11/2019
13:29:00
pdf 353.92 KB

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - BAS Letter of Support
20/11/2019
16:54:14
pdf 103.4 KB

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - Responses to First Round Review
20/11/2019
16:53:59
pdf 55.08 KB

Section 5 - Project Staff

Q10. Project Staff

Please identify the key project personnel on this project, their role and what % of their time they will be working on the project.

Please provide 1 page CVs for these staff, or a 1 page job description or Terms of Reference for roles yet to be filled. These should match the names and roles in the budget spreadsheet. If your team is larger than 12 people please review if they are core staff, or whether you can merge roles (e.g. 'admin and finance support') below, but provide a full table based on this template in the pdf of CVs you provide.

Name (First name, Surname)	Role	% time on project	1 page CV or job description attached?

Philip Trathan	**Project Leader**	14	Checked
Nathan Fenney	Aerial mapping expert	50	Checked
Adrian Fox	Aerial mapping expert	8	Checked
Martin Collins	KEP Project Manager	8	Checked

Do you require more fields?

◉ No

Please provide 1 page CVs (or job description if yet to be recruited) for the Project staff listed above as a combined PDF.

Ensure the file is named clearly, consistent with the named individual and role above.

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - Martin Collins CV
20/11/2019
12:53:54
pdf 651.15 KB

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - Adrian Fox CV
18/11/2019
13:06:46
pdf 84.42 KB

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - Nathan Fenney CV
17/11/2019
18:56:10
pdf 107.87 KB

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - Philip Trathan CV
14/11/2019
15:21:21
pdf 18.28 KB

Have you attached all Project staff CVs?

◉ Yes

Section 6 - Background & Methodology

Q11. Problems the project is trying to address

Please describe the problem your project is trying to address in terms of environment and climate issues in the UKOTs.

For example, what are the specific threats to the environment that the project will attempt to address? Why are they relevant, for whom? How did you identify these problems? How will your proposed project help? What key OT Government priorities and themes will it address?

In response to a changing climate, coupled with recovery of historically depleted species of seal, whale and finfish, large changes are anticipated in the marine ecosystem as species populations (and diets) alter. Similarly, eradication of introduced non-native mammals from South Georgia is likely to lead to changes in terrestrial habitats, with consequent changes in species diversity.

Baseline estimates have been missed, due to a lack of resources before the eradication of non-native mammals. However, it is still feasible to establish recovery patterns if monitoring starts as soon as possible. Ecosystem change is likely to occur rapidly, so this project is now urgent.

We propose to initiate monitoring for a range of species and vegetation types, in order to document change. The resulting sample data will provide direct counts and trend information. They will also help ground-truth satellite remote-sensing data that cover a wider perspective than is feasible from drone surveys.

Future use of ground-truthed remote-sensing will ensure a lifetime beyond the scope of the current project. Such future-proofing, and legacy outputs will be vital for the SGSSI MPA Research and Monitoring Plan. The last comprehensive surveys of all seabirds and marine mammals were completed using yachts; these are expensive and logistically challenging platforms. Modern monitoring requires a different modus operandi.

This project addresses key priorities in the South Georgia (2016 to 2020) Strategy, particularly for the environment. Specifically we address:

2.5 Enhancing knowledge of the biodiversity and habitats of SGSSI ... including to establish scientific baselines ... assess environmental change including the potential effects of climate change.

As ecosystem change proceeds consequent on the changes identified above, it is highly likely that changes in species, both for animal populations and vegetation, will occur. Understanding how these take place will enable GSGSSI to evaluate, and potentially mitigate, impacts on South Georgia.

Q12. Methodology

Describe the methods and approach you will use to achieve your intended Outcome and Impact. Provide information on:

- **How you have analysed historical and existing initatives and are building on or taking work already done into account in project design. Please cite evidence where appropriate.**
- **The rationale for carrying out this work and a justification of your proposed methodology.**
- **How you will undertake the work (materials and methods).**
- **How you will manage the work (role and responsibilities, project management tools etc.)**

Please make sure you read the Guidance Notes **before answering this question.**

(This may be a repeat from Stage 1 but you may update or refine as necessary)

Our methods can be divided into four parts. A: selection of field sites, B: field survey photography, C: image analysis, and D: documentation and handover to GSGSSI.

12.A. Selection of field sites: Led by Trathan and Collins, in consultation with GSGSSI and relevant experts at BAS. The process will use variables such as geographic location, population size, and accessibility, to determine priority. The project will engage with GSGSSI and the wider South Georgia scientific community during this process.

12.B. Field survey photography: Led by Fox and Fenney. We will use a fixed-wing UAV airborne survey system such as the Sensefly Ebee X (https://www.sensefly.com/app/uploads/2018/09/eBeeX-EN.pdf) for the

photographic survey.

The 1.2m wide delta wing design is stable in windy conditions (rated to 46kph), with an endurance of up to 90 minutes and can fly at speeds up to 110kph so that inaccessible sites can be imaged from convenient launching locations distant from the target. It will also allow us to survey much larger areas faster (up to 5km2 in a single flight) than the multi-copter systems that are now increasingly used.

The fixed-wing UAV proposed here is flown autonomously (limited human input), using pre-programmed flight plans. This is key as once setup, surveys can be repeated on a regular basis in the future, and surveys conducted using the same flight plan will be directly comparable. This will enhance the value of long-term comparisons.

The proposed 24 megapixel photogrammetry-grade camera gives a ground resolution of better than 2.5cm at 122m altitude. Coupling of the images with on-board survey-grade GPS provides photogrammetry-ready outputs without the need for surveyed ground control points. A survey grade GPS running at the launch site will be set-up using existing BAS equipment. This enables the generation of digital surface elevation models (DEM) for each site and hence production of ortho-rectified image mosaics where the distortion effects of terrain are removed so that they are geospatially accurate and each target will only appear once.

A number of sensors are available, including visible, thermal and multispectral options and can be tailored to the requirements for each monitoring site (including other considerations such as vegetation).

12.C. Image analysis: Led by Fox, Fenney, Trathan and Collins. The DEMs and orthomosaics described above (Section 12.B) will be generated using either Agisoft Photoscan or BAe Systems Socet-GXP software. Both of these are industry-standard systems and BAS has well-established workflows for both systems, including for UAV acquired imagery.

All population counts will be generated either by automated counting methods and/or by a citizen-science approach. BAS has expertise in both these aspects already. The most appropriate method will be selected on a case-by-case basis.

12.D. Documentation and handover to GSGSSI: Led by Collins and Trathan. Key to the impact of this project is GSGSSI's ability to continue the monitoring programme after the project has ended (the project is included in the 2019-2024 KEP Project Science Plan). To support this, training will be provided to GSGSSI staff for both data collection and data analysis protocols.

If necessary, please provide supporting documentation e.g. maps, diagrams, and references etc., as pdf using the File Upload below.

No Response

Section 7 - Stakeholders and Beneficiaries

Q13. Project Stakeholders

Who are the stakeholders for this project and how have they been consulted (include local or host government support/engagement where relevant)? Briefly describe what support they will provide and how the project will engage with them.

The stakeholders for this work are GSGSSI and those interested in the maintenance of South Georgia as a global biodiversity hotspot. Stakeholders also include CCAMLR Members actively engaged in developing a

new management framework for Antarctic krill, one of the key dietary species targeted by many of the air breathing predators that are the focus of this study. Other stakeholders include tourist companies and eNGOs that value the natural status of the South Georgia ecosystem. Other UKOTs (FIG and GBAT) are also key stakeholders as those Territories also hold large aggregations of predators that could be surveyed using the methods we propose. The project will also contribute to the UK Blue Belt initiative.

Trathan and Collins have engaged with GSGSSI and CCAMLR over many years; Trathan is currently the senior ecological adviser to the UK Delegation to CCAMLR; he regularly attends Working Group meetings, the Scientific Committee and Commission. He is active in the science of developing a new management framework for krill, working with eNGOs and fishing nations. Through BAS, Trathan has also led science to estimate predator population size and determine trends in species abundance. These are vital management inputs for both GSGSSI and CCAMLR.

Trathan has communicated with GSGSSI officials who are extremely supportive of this proposal. Trathan and Collins will continue to work with GSGSSI, through personal contact, email and Skype to ensure that they, as primary stakeholder, receive data and methods that help GSGSSI in the delivery of the SGSSI MPA Research and monitoring Plan.

Q14. Institutional Capacity

Describe the lead organisation's capacity (and that of partner organisations where relevant) to deliver the project.

BAS has a long history of ecological research at South Georgia. More specifically, the Project Leader, Trathan, specialises in policy-relevant research and leads a team that includes penguin, other seabird, seal and whale specialists. He has a high profile internationally, working with CCAMLR, SCAR and the IUCN Species Survival Commission Penguin Specialist Group. Trathan also sits on the Science Advisory Group for the Antarctic Wildlife Research Fund, a new collaboration between the krill fishing industry, NGOs and scientists. Consequently, Trathan has a wide network of contacts that will help facilitate engagement with the predator research community.

Collins is the Science Manager for the King Edward Point (KEP) Project, jointly funded by GSGSSI and the UK FCO. Through the KEP Project Collins has extensive experience of operations at South Georgia. He previously worked for Cefas and GSGSSI, so has wide experience of the management framework for South Georgia.

Fox and Fenney have extensive experience of drone technology, mapping and image analysis. They have been involved with similar projects in the past and have created solutions for delivering population counts from aerial imagery.

Thus, the project team includes individuals with first-hand experience of working within both national and international political environments, of working with multiple stakeholders, including fishing companies, tourist companies and eNGOs. Trathan and Collins co-led the development of the South Georgia MPA, whilst Trathan also worked closely with the leaders of a recent project that proposed the SGSSI MPA Research and Monitoring Plan (DPLUS069) to which this project will contribute.

Q15. Project beneficiaries

Who will your project benefit? You should consider the direct benefits as a result of your project as well as the broader indirect benefits which may come about as a result of your project achieving its

Outputs and Outcome. The measurement of any benefits should be included in your project logframe.

The intended beneficiaries of this project are GSGSSI and those interested in the maintenance of the globally important biodiversity at South Georgia. GSGSSI will benefit directly from having base line data for a number of important predator species at sites other than Bird Island and Maiviken. This is important as existing monitoring is not sufficient to explore local change, a vital aspect of the SGSSI MPA Research and Monitoring Plan.

Beneficiaries also include CCAMLR Members engaged in developing a new management framework for Antarctic krill. Results from this project will enhance understanding about krill-eating predators that breed in close proximity to the preferred location utilised by the krill fishery at South Georgia. Understanding the potential impacts of the winter fishery upon the propensity of krill-eating predators to breed and successfully rear offspring in the following summer, is a key management issue. Without enhanced monitoring this will be extremely difficult to determine.

Understanding how predator populations change, even across small spatial scales, has important implication for ecosystem managers elsewhere, including across other UKOTs, and across areas where fisheries exploit forage fish species. It is increasingly evident that concentration of harvesting has the potential to have local impacts on natural predator populations.

Section 8 - Gender and Change Expected

Q16. Gender (optional)

How is your project working to reduce inequality between persons of different gender? At the very least, you should be able to provide reassurance that your proposed work is not increasing inequality. Have you analysed the context in which you are working to see how gender and other aspects of social inclusion might interact with the work you are proposing?

Our project uses existing staff available within BAS. Where feasible, we will make best endeavours to make available opportunities to interested scientists, regardless of gender or other aspects of social inclusion.

In Q19 we highlight the potential to reach out to university students. If we do so, we will also ensure that we do so regardless of gender and other aspects of social inclusion.

Q17. Change expected

Detail the expected changed this work will deliver. You should identify what will change and who will benefit a) in short-term (i.e. during the life of the project) and b) in the long-term (after the project has ended). Please describe the changes for the environment and, where relevant, for people in the OTs, and how they are linked.

South Georgia is a biodiverse hotspot in the Southern Ocean, where multiple species of marine predator breed in very high numbers. Existing monitoring only exists at Bird Island, a long-term monitoring site established by BAS, and at Maiviken, a recently established monitoring site jointly established by BAS and GSGSSI.

Many, but not all, seabirds found at South Georgia breed at Bird Island; as such Bird Island is particularly biodiverse and consequently, not typical of the wider archipelago. In contrast, relatively few species breed at Maiviken. Species such as king penguins, chinstrap penguins, elephant seals and Weddell seals are not

monitored at either site. It is therefore unknown how well species population processes at Bird Island and Maiviken reflect processes more widely across South Georgia.

Moreover, it is not known how species populations are changing. There have been no published updates for many species since the 1980s. In this current era of rapid environmental change (and recovering cetacean populations), it is unknown how regionally and globally important species populations are changing.

Developing a portfolio of long-term monitoring sites that can be assessed and re-assessed at regular intervals into the future will help GSGSSI better understand the changing ecology of South Georgia.

An archive of images will allow for regular re-assessment and identification of which species may require more detailed conservation support. This represents a significant step forward from the current situation and such data can be fed into SGSSI MPA Reasearch and Monitoring Plan, national and international management fora.

Supporting the SGSSI MPA with trend analyses for important species will be key. Without improved understanding and objective evidence, management actions may be challenged. GSGSSI has a long record of pursuing evidence-based management, this project will therefore help ensure that the changing ecosystem can be more fully evaluated over time.

Q18. Pathway to change

Please outline your project's expected pathway to change. This should be an overview of the overall project logic and outline how you expect your Outputs to contribute towards you overall Outcome, and, longer term, your expected Impact.

Traditional methods for assessing species abundance and distribution generally require a high level of human investment. Moreover, such methods generally require investment in logistics and infrastructure. Historical data archived from such methods are also difficult to re-interpret in the light of change, given most data are initially recorded in hard-copy field notebooks.

Modern ecology now uses many new technologies for recording evidence. These can be less intensive in human investment, logistic infrastructure and provide data that is readily re-analysable in different ways. They may also create less disturbance to natural populations.

High-resolution imagery captured by UAV technology is proving itself invaluable in many studies. Delta-wing UAV technology is more reliable than multi-copter UAV technology, and offers proven opportunities for operation in stronger winds and more extreme conditions.

In developing new monitoring approaches, GSGSSI will future-proof itself in a way that will facilitate understanding about environmental change. To ensure success, we will engage with key stakeholders - GSGSSI and the wider South Georgia scientific community - to consider key factors in site/species selection (geographic location, population size and accessibility). Once the ability to conduct surveys on an ongoing basis has been established, the trends identified will inform national and international policy.

Q19. Sustainability

How will the project ensure benefits are sustained after the project have come to a close? If the project requires ongoing maintenance or monitoring, who will do this and how will it be funded?

We consider that investment in monitoring should be made as future-proof as possible. The methods we develop will therefore be passed on to the KEP Project staff, so that they can continue the monitoring and analysis into the future. This will ensure that the legacy from the project will remain alive, without the need for additional input from sources such as Darwin Plus. The KEP Project staff have capacity to undertake the necessary image analyses.

There is also the potential to involve university students, as part of BSc or MSc projects, in the analysis of the imagery, thereby creating a new pool of interested academics who may wish to undertake science at South Georgia.

Moerover, the outputs from our drone surveys offer the potential for the ground-truthing of satellite imagery. This will be particularly important as satellite imagery can cover areas not readily accessible to ground teams.

The solution proposed here has significant application across other UKOTs and as such we plan to publish separate methodology papers for both the geomatics (aerial survey) and image analysis aspects. Such papers in the peer-reviewed literature will also help establish credibility for the GSGSSI MPA.

Section 9 - Funding and Budget

Q20. Budget

Please complete the appropriate Excel spreadsheet, which provides the Budget for this application. Some of the questions earlier and below refer to the information in this spreadsheet. Note that there are different templates for projects requesting over and under £100,000 from the Darwin Plus budget.

- R8 D+ Budget form for projects under £100,000
- R8 D+ Budget form for projects over £100,000

Please refer to the Finance Guidance for Darwin/IWT **for more information.**

N.B: Please state all costs by financial year (1 April to 31 March) and in GBP. Darwin Plus cannot agree any increase in grants once awarded.

Budgets submitted in other currencies will not be accepted. Use current prices – and include anticipated inflation, as appropriate, up to 3% per annum. The Darwin Initiative cannot agree any increase in grants once awarded.

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - Budget
20/11/2019
12:54:50
xlsx 63.61 KB

Q21. Co-financing

Are you proposing co-financing?

⦿ Yes

Q21a. Secured

Provide details of all funding successfully levered (and identified in the Budget) towards the costs of the project, including any income from other public bodies, private sponsorship, donations, trusts, fees or trading activity, as well as any your own organisation(s) will be committing.

(See Finance for Darwin/IWT **and** Guidance Notes**)**

Donor organisation	Amount	Currency code	Comments
BAS	[redacted]	£0.00	BAS will contribute to the project through reduced overhead costs, reduced operating costs, and the purchase of capital equipment.
GSGSSI	[redacted]	£0.00	GSGSSI will contribute to the project through reduced boating costs, customs costs, landing fees and bench fees, etc.
No Response	0	*No Response*	*No Response*
No Response	0	*No Response*	*No Response*

Q21b. Unsecured

Provide details of any matched funding where an application has been submitted, or that you intend applying for during the course of the project. This could include matched funding from the private sector, charitable organisations or other public sector schemes. This should also include any additional funds required where a donor has not yet been identified.

Date applied for	Donor organisation	Amount	Currency code	Comments
No Response	*No Response*	0	*No Response*	*No Response*
No Response	*No Response*	0	*No Response*	*No Response*
No Response	*No Response*	0	*No Response*	*No Response*

No Response	*No Response*	0	*No Response*	*No Response*

Do you require more fields?

⦿ No

Section 10 - Finance

Q22. Financial Controls

Please demonstrate your capacity to manage the level of funds you are requesting. Who is responsible for managing the funds? What experience do they have? What arrangements are in place for auditing expenditure?

BAS/NERC will control finances through the fully audited UKRI Shared Business Services Centre (SBS). A separate budget cost centre will be created for the project. The Project Leader, Trathan, will oversee the strategic spending of funds, with day-to-day oversight and authorisation by Fox and Fenney. The PL will be ultimately accountable for managing the budget.

The PL has successfully managed budgets for both BAS/NERC projects and externally funded project for over 20 years. Some of these budgets have been considerably larger than the budget requested for this project.

BAS/NERC also employs staff within a dedicated Finance Department. These staff will also monitor spend to ensure that the budget is managed appropriately, providing quarterly account statements, and additional statements on request. The Finance Department, via Chatzala, will liaise with Darwin Plus over Finance and Auditing.

Q23. Financial Management Risk

Explain how you have considered the risks and threats that may be relevant to the success of this project, including the risks of fraud or bribery.

The majority of funds associated with this project will be for salaries and so will be controlled through the UKRI Shared Business Services Centre (SBS). The UKRI SBS system requires that all non-salary costs have associated receipts, again minimising the risk of fraud.

Apart from salaries, the only other expense will be associated with the purchase of the UAV drone and with travel to and from South Georgia for fieldwork. Planning for this, together with booking of travel and accommodation will again be through the UKRI SBS system, again reducing the risk of fraud.

Q24. Value for Money

Please explain how you worked out your budget and how you will provide value for money through managing a cost effective and efficient project. You should also discuss any significant assumptions you have made when working out your budget.

To provide an appropriate level of expertise, we will use an early career scientist, Fenney, with extensive

experience of geospatial survey work. Fenney has worked on similar projects in the past and has extensive experience of implementing the kind of surveys envisioned in this project. Fenney will be committed to the current project proposal until complete. BAS will complement support with additional staff-time and resources necessary for successful completion of the project. The proposed survey drone will be capable of surveying in wind conditions that would prevent the use of rotary-wing UAVs. Expert knowledge about survey approaches will therefore save time, effort and opportunity cost.

The project shall also benefit from use of systems and analyses that have already been developed. In doing so, we will avoid considerable start-up costs. We will make use of existing data and information on the distribution of breeding predators, so that we can reduce the need for data that are very costly to collect and that also require considerable logistic effort. Much of the data needed for identifying the core monitoring sites was amalgamated by Trathan in the delivery of the South Georgia Geographic Information System, which was initially developed in 1996 and now maintained under Fox.

The project shall also benefit from analysis expertise for aerial images developed during previous work at South Georgia, including population estimates for macaroni penguins undertaken by Trathan. Ongoing work elsewhere in the Scotia Sea has also led to the development of relevant image analysis routines.

Q25. Capital Items

If you plan to purchase capital items with Darwin Funding, please indicate what you anticipate will happen to the items following project end.

The delta-wing survey drone envisaged under this project will be passed to the King Edward Point Project for continued use by KEP Project staff under Collins. Along with the drone, we will forward information about the survey sites and transects, as well as analysis routines. This will facilitate continued delivery after the project completes.

The proposed survey drone can operate in winds stronger than most multi-copter drones and it is also capable of surveying significantly greater areas faster, than multi-copter UAVs. The onboard navigational system also keeps track of areas surveyed, so missed areas can be easily reflown.

Q26. Outputs of the project and Open Access

All outputs from Darwin Plus projects should be made available on-line and free to users whenever possible. Please outline how you will achieve this and detail any specific costs you are seeking from Darwin Plus to fund this.

All survey transect meta-data and survey images will be archived with the UKRI Polar Data Centre. Analysis routines will also be archived alongside the raw image data. Interested individuals shall be able to request the data from the PDC.

Re-analysis of historical data is a key issue for ecological monitoring, so having the raw images available will be important for future generations of scientists that want to re-analyse historical data using modern uptodate approaches.

Section 11 - Safeguarding

Q27. Safeguarding

Projects funded through Darwin Plus must fully protect vulnerable people all of the time, wherever they work. In order to provide assurance of this, projects are required to have appropriate safegaurding polices in place. Please confirm the lead organisation has the following policies in place and that these are available on request:

We have a safeguarding policy, which includes a statement of your commitment to safeguarding and a zero tolerance statement on bullying, harassment and sexual exploitation and abuse	Checked
We keep a detailed register of safeguarding issues raised and how they were dealt with	Checked
We have clear investigation and disciplinary procedures to use when allegations and complaints are made, and have clear processes in place for when a disclosure is made	Checked
We share our safeguarding policy with downstream partners	Checked
We have a whistle-blowing policy which protects whistle-blowers from reprisals and includes clear processes for dealing with concerns raised	Checked
We have a Code of Conduct in place for staff and volunteers that sets out clear expectations of behaviors - inside and outside of the work place - and make clear what will happen in the event of non-compliance or breach of these standards	Checked

Section 12 - Logical Framework

Q28. Logical Framework

Darwin Plus projects will be required to report against their progress towards their expected Outputs and Outcome if funded. This section sets out the expected Outputs and Outcome of your project, how you expect to measure progress against these and how we can verify this.

Impact:

Strategic long-term scientific monitoring project addressing ecosystem change relationships for important land-based predator species, forming an important contribution to the SGSSI MPA Research and Monitoring Plan.

Project summary	Measurable Indicators	Means of verification	Important Assumptions

Outcome: Outcome: Establishment of a rigorous, multi-species, baseline reference dataset for seabird and seal colonies at South Georgia, used to inform policy decisions by GSGSSI and CCAMLR.	0.1 Creation of a list by Q2Y1 of high priority, long-term monitoring sites, for which the baseline reference data will be collected. 0.2 Completion of field data collection at each monitoring site. To be undertaken over three campaigns and completed by Q2Y2. 0.3 Detailed description and maps / orthorectified imagery, defining spatial extent of each long-term monitoring site. To be complied by Q3Y2. 0.4 Baseline count data derived for each species at each monitoring site. To be completed by Q4Y2. 0.5 Documentation of the methodology / workflow used to undertake surveys to allow future monitoring to be conducted by GSGSSI as part of a long-term monitoring programme. To be completed by Q4Y2.	0.1 Formal report submitted to GSGSSI. 0.2 The generation of a fieldwork report, detailing sites visited and data collected. 0.3 Formal report and supplementary maps and image data submitted to both GSGSSI and CCAMLR. 0.4 Formal report submitted to both GSGSSI and CCAMLR. 0.5 Methodology provided to GSGSSI. Methodology paper submitted to an open-access peer reviewed journal and receipt received.	Expert knowledge from BAS scientists. Expert knowledge from BAS Mapping and Geographic Information Centre. Successful access to each of the proposed long-term monitoring sites.

Output 1: Creation of a list of high priority, long-term monitoring sites at South Georgia for species targeted as ecosystem indicators (king, macaroni and gentoo penguins, elephant and fur seals, and albatross species).	1.1 Discussion with GSGSSI and members of the wider South Georgia scientific community to consider potential sites for long-term monitoring. Discussion to be undertaken during Q1Y1. 1.2 Final list of proposed long-term monitoring sites to be complied Q2Y1. To include information such as location, access information, species, priority and temporal requirements (optimum period for data collection). 1.3 Working paper justifying species / sites selected, including important ecological aspects underpinning choice of species to be documented. To be completed before end of Y1.	1.1 Evidence of communication such as emails and minutes from meetings. 1.2 Formal report submitted to both GSGSSI and CCAMLR. 1.3 Working paper submitted to both GSGSSI and CCAMLR.	Expert knowledge from BAS scientists. It is key to involve GSGSSI during this stage as they will ultimately be responsible for maintaining the monitoring programme after the project has ended.

Output 2: High resolution, georeferenced, fixed-wing UAV aerial survey of each of the monitoring sites identified in Output 1 for the purpose of creating baseline reference datasets.	2.1 Completion of aerial survey / field data collection at each monitoring site. Three periods of fieldwork have been defined based on the requirements of the species being monitored, Oct 2020, Dec 2020 and December 2021. 2.2 Initial photogrammetric analysis to be undertaken after data collection. To be completed by Q2Y2*. 2.3 High resolution (2.5 cm), georeferenced, orthorectified (geometrically corrected), aerial imagery mosaics for each monitoring site to be created. To be completed by Q2Y2*. 2.4 Georeferenced outlines defining the current spatial extent of each colony / site. To be completed by Q2Y2*. *Q2Y2 represents when the data collected during the last deployment will need to be processed by. Data collected during the earlier deployments will be processed as soon as possible upon return to the UK.	2.1 Fieldwork report to be completed for each deployment. 2.2 3D models (output by the photogrammetric processing) available for each site. 2.3 Orthophotos available for each site. 2.4 Georeferenced outlines for each site available.	Survey sites are accessible via land, IAATO vessel or via FPV Pharos. Fieldwork deployment takes into account potential for weather related delays. Field activities can be rescheduled if delayed by significant weather events / operational disruptions during grant period. BAS will have the same or an equivalent platform to the proposed fixed-wing UAV (SenseFly Ebee X) that can be used as a backup system while operating in the field. BAS will provide GNSS base stations to enable Post processed kinematic (PPK) processing.

Output 3: Population counts for each of the monitoring sites identified in Output 1 using the aerial survey datasets and input into the relevant national and international governing bodies (such as GSGSSI and CCAMLR).	3.1 Investigate most appropriate method for deriving population counts for each species (either automated image processing software or citizen science platform). This is to account for the different spatial distributions exhibited by penguins and seals while on land. To be determined by end of Y1. 3.2 Determine baseline populations for each of the monitoring sites, using the orthorectfied imagery acquired during the aerial surveys. To be completed by Q3Y2.	3.1 Report progress to GSGSSI. 3.2 Outputs submitted in a formal report to both GSGSSI and CCAMLR.	Pilot projects for both types of counting have been tested as part of a WWF funded project. Elephant seals are likely going to have to be counted manually or by citizen science as they often lay on top of each other making it hard to distinguish one individual from another. Conversely, penguins make an ideal candidate for automated counting methods due to the regular spacing between nests.* *Although this does vary between different species.

Output 4: Documented workflow provided to GSGSSI to allow repeat surveys of monitoring sites to be undertaken on a regular basis into the future.	4.1 Produce a methodology paper documenting the workflow developed to both undertake the aerial surveys and determine the population. This is key as it would also allow for the methodology to be applied to other UKOT's. To be completed by Q4Y2. 4.2 Train at least two GSGSSI field assistants regarding the data collection and data analysis aspects of the project, to allow GSGSSI to maintain long-term monitoring of the sites. To be completed by Q4Y2. 4.3 Train at least one GSGSSI field assistant to operate the fixed-wing UAV / flight planning software. To be completed by Q4Y2. 4.4 At least one GSGSSI field assistant to undertake the Remote Pilot Qualification – small (RPQ-s) for fixed-wing UAV's (<20 kg), to allow GSGSSI to maintain long-term monitoring of the sites. To be completed by Q4Y2.	4.1 Methodology provided to GSGSSI. Methodology paper submitted to a peer-reviewed journal and receipt received. 4.2 Data collection / data analysis workshop successfully run at BAS. 4.3 Fixed-wing UAV / flight planning software training successfully completed at BAS. 4.4 GSGSSI field assistant successfully acquires RPQ-s for fixed-wing platforms weighing <20 kg. Please note, this qualification is the same level as the qualification required to fly mutli-copter UAVs, which GSGSSI already operate.	GSGSSI have already included project in KEP 2019-2024 science plan. Expert knowledge from BAS scientists. Expert knowledge from BAS mapping team. Would need to work with GSGSSI and KEP Project to identify most appropriate personnel to receive training.

Output 5: Increased scientific understanding of change at South Georgia.	5.1 Produce peer-reviewed scientific papers to consider what the project outputs tell us about South Georgia. To be completed by Q4Y2. The solution proposed (for undertaking large-scale, high resolution, repeatable aerial surveys using fixed-wing UAV's) has significant application across a number of UKOTs and as such, the intention is to publish separate methodology papers for both the geomatics (aerial survey) and image analysis aspects.	5.1 Submitted to peer-reviewed journal and received receipt of submission.	Incorporate historical data where available. Selected journal approves paper.

Do you require more Output fields?

It is advised to have less than 6 Outputs since this level of detail can be provided at the Activity level.

⦿ Yes

Project Summary	Measurable Indicators	Means of Verification	Important Assumptions

Output 6: Outreach to other UK OTs and to interested scientists.	6.1 We travel through the Falklands en route to South Georgia, so we will have a number of opportunities to provide presentations on our work whilst in the Falklands. This will help disseminate information to the Falkland Islands. We have also already been approached by US and Norwegian colleagues who are interested in the methods we have already developed and which we will develop under this project. They are keen to collaborate to use drones from fishing vessels operating in the Antarctic to survey penguin colonies at locations remote from national stations and facilities. This has the potential to be a major contribution to ecosystem-based management of krill fisheries in the Antarctic; that is, within BAT. We have a number of colleagues at BAS and at Exeter University who undertake science at various UKOTs through Blue Belt and through ODA; thus, in addition to South Georgia, the Falkland Islands and BAT, we can provide further outreach. We will provide seminars at both locations to ensure that we disseminate both our methods and our lessons learned.	6.1 Reports from colleagues in other UK OTs.	We will provide seminars and lecture, but will necessarily need to have sufficient time en route, especially when travelling through the Falklands.

Output 7:	*No Response*	*No Response*	*No Response*
No Response			
Output 8:	*No Response*	*No Response*	*No Response*
No Response			

Activities

Each activity is numbered according to the Output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1.

Output 1
1.1. Identify list of potential reference sites to be included in the monitoring programme.
1.2. Discuss proposed sites with GSGSSI and scientists in the wider South Georgia community.
1.3. Determine final list and submit to GSGSSI for signoff.
1.4. Produce a report detailing final list of long-term monitoring sites along with justification.

Output 2
2.1. Determine requirements for aerial survey (species / site dependant).
2.2. Produce fieldwork plan.
2.3. Work with GSGSSI and BAS to arrange logistics.
2.4. Ship equipment for fieldwork.
2.5. Deploy staff to South Georgia to undertake fieldwork.
2.6. Undertake data collection (for each monitoring site).
2.6.1. Run GNSS base station.
2.6.2. Undertake UAV survey.
2.6.3. Review data for quality control.
2.7. Undertake GNSS processing (for each monitoring site).
2.7.1. PPK processing of on-board UAV GNSS unit.
2.8. Undertake photogrammetric analysis (for each monitoring site).
2.8.1. Import and alignment of photos collected during the UAV survey.
2.8.2. Import PPK GNSS output to provide georeferencing.
2.8.3. Generate digital elevation model (DEM).
2.8.4. Generate orthophoto.
2.9. Prepare othrophotos for population count.

Output 3
3.1. Determine optimal counting method for each species.
3.2. Determine specific software to undertake image analysis / platform for citizen science count if required.
3.3. Process the prepared orthophotos to determine population counts.
3.4. Produce a report detailing the final counts at each of the sites for GSGSSI and input into CCAMLR.

Output 4
4.1. Document methodology used to undertake aerial survey and determine population at each site.
4.2. Produce a methodology paper and submit to peer reviewed journal.
4.3. Train GSGSSI KEP Project field assistant to undertake data collection and analysis.
4.4. Arrange for GSGSSI KEP Project field assistant to undertake RPQ-s qualification.
4.5. Train GSGSSI field assistant to operate fixed-wing UAV and flight planning software.

Output 5

5.1. Review outputs.
5.2. Consider other historical datasets for the sites where available.
5.3. Produce a scientific paper and submit to GSGSSI and CCAMLR.
5.4. Submit papers to peer reviewed journal.

Output 6
6.1. Outreach activities.

Section 13 - Implementation Timetable

Q29. Provide a project implementation timetable that shows the key milestones in project activities

Provide a project implementation timetable that shows the key milestones in project activities. Complete the Excel spreadsheet template as appropriate to describe the intended workplan for your project.

Implementation Timetable Template

Please add/remove columns to reflect the length of your project. For each activity (add/remove rows as appropriate) indicate the number of months it will last, and fill/shade only the quarters in which an activity will be carried out. The workplan can span multiple pages if necessary.

DPR8S2-1010 - Trathan - Darwin Plus Round 8 - Time table
22/11/2019
21:15:23
xlsx 21.32 KB

Section 14 - Monitoring and Evaluation

Q30. Monitoring and evaluation (M&E) plan

Describe, referring to the Indicators above, how the progress of the project will be monitored and evaluated, making reference to who is responsible for the project's M&E.

Darwin Initiative projects are expected to be adaptive and you should detail how the monitoring and evaluation will feed into the delivery of the project including its management. M&E is expected to be built into the project and not an 'add' on. It is as important to measure for negative impacts as it is for positive impact. Additionally, please indicate an approximate budget and level of effort (person days) to be spent on M&E (see Finance Guidance for Darwin/IWT**).**

A project steering committee will be created that will include all project staff, that is, Trathan, Fox, Fenney and Collins.

Trathan will be responsible for liaison with scientific experts interested in land-based predators breeding at South Georgia so that we identify the most appropriate monitoring sites. Trathan will be responsible for liaison with GSGSSI and CCAMLR. Information and reports relevant to either CCAMLR or SCAR will also be through Trathan, who regularly attends such meetings.

Collins will be responsible for liaison with the KEP Project staff. Collins will be responsible for liaison with Blue Belt, where appropriate.

The project steering committee will meet as soon as is feasible before the project commences. They will develop a detailed implementation plan with specific and detailed project objectives, timelines and project outputs, building upon the details described in this proposal. During this first meeting the steering committee will define clear milestones and delivery dates for implementation.

The steering committee will convene every month to monitor project delivery. During these formal meetings we will review outputs, outstanding goals and any obstacles or challenges to delivery. We will also review the detailed spend and remaining budget.

Costs associated with Monitoring and Evaluation will be covered from overheads. The only evaluation cost requested is the external audit fee of £2,000.

CCAMLR Working Group reports and the peer-reviewed literature will provide an unbiased independent evaluation of the project's progress.

Total project budget for M&E in GBP (this may include Staff, Travel and Subsistence costs)	£[redacted]
Number of days planned for M&E	31.00
Percentage of total project budget set aside for M&E (%)	3.50

Section 15 - Certification

Q31. Certification

On behalf of the

company

of

British Antarctic Survey, a constituent part of the Natural Environment Council and UKRI

I apply for a grant of

£283,417.00

I certify that, to the best of our knowledge and belief, the statements made by us in this application are true and the information provided is correct. I am aware that this application form will form the basis of the project schedule should this application be successful.

(This form should be signed by an individual authorised by the applicant institution to submit applications and sign contracts on their behalf.)

- **I have enclosed CVs for project key project personnel, letters of support, budget and project implementation timetable (uploaded at appropriate points in application).**
- **Our last two sets of signed audited/independently verified accounts and annual report are also enclosed.**

Checked

Name	Philip Trathan
Position in the organisation	Head of Conservation Biology
Signature (please upload e-signature)	DPR8S2-1010 - Trathan - Darwin Plus Round 8 - Signature 20/11/2019 13:06:54 pdf 48.45 KB
Date	25 November 2019

Section 16 - Submission Checklist

Checklist for submission

	Check
I have read the Guidance documents, including the "Guidance Notes for Applicants**" and "**Finance Guidance**".**	Checked
I have read, and can meet, the current Terms and Conditions **for this fund.**	Checked
I have provided actual start and end dates for this proposed project.	Checked
I have provided a budget based on UK government financial years i.e. 1 April – 31 March and in GBP.	Checked
I have checked that the budget is complete, correctly adds up and I have included the correct final total at the start of the application.	Checked
The application has been signed by a suitably authorised individual (clear electronic or scanned signatures are acceptable).	Checked
I have included a 1 page CV or job description for all the Project staff identified at Question 14, including the Project Leader, or provided an explanation of why not.	Checked
I have included a letter of support from the Lead Organisation and main partner organisation(s) identified at Question 13, or an explanation of why not.	Checked

I have included a cover letter from the Lead Organisation, outlining how any feedback at Stage 1 has been addressed where relevant.	Checked
I have been in contact with the FCO in the project country(ies) and have included any evidence of this. if not, I have provided an explanation of why not.	Checked
I have included a signed copy of the last 2 years annual report and accounts for the Lead Organisation, or provided an explanation if not.	Checked
I have checked the Darwin website **immediately prior to submission to ensure there are no late updates.**	Checked
I have read and understood the Privacy Notice on GOV.UK**.**	Checked

We would like to keep in touch!

Please check this box if you would be happy for the lead applicant (Flexi-Grant Account Holder) and project leader (if different) to be added to our mailing list. Through our mailing list we share updates on upcoming and current application rounds under the Darwin Initiative, Darwin Plus and our sister grant scheme, the IWT Challenge Fund. We also provide occasional updates on other UK Government activities related to biodiversity conservation and share our quarterly project newsletter. You are free to unsubscribe at any time.

Checked

Data protection and use of personal data

Information supplied in this application form, including personal data, will be used by Defra as set out in the latest copy of the Privacy Notice for Darwin, Darwin Plus and the Illegal Wildlife Trade Challenge Fund available here. This Privacy Notice must be provided to all individuals whose personal data is supplied in the application form. Some information, but not personal data, may be used when publicising the Darwin Initiative including project details (usually title, lead organisation, location, and total grant value) on the GOV.UK and other websites.

Information relating to the project or its results may also be released on request, including under the 2004 Environmental Information Regulations and the Freedom of Information Act 2000. However, Defra will not permit any unwarranted breach of confidentiality nor will we act in contravention of our obligations under the General Data Protection Regulation (Regulation (EU) 2016/679).