Applicant: **Fretwell, Peter**
Organisation: **British Antarctic Survey**
Funding Sought: **£87,246.00**

DPR9S2\1032

Monitoring albatrosses using very high resolution satellites and citizen science

Monitoring the world’s threatened albatross species is challenging because of their remote nesting locations, making ground or aerial surveys expensive, infrequent and often incomplete. In this project, we will launch a citizen science campaign, using 31-cm resolution satellite imagery to count wandering albatrosses on South Georgia and Tristan albatrosses on Gough Island directly from space. Counts will be used to develop an automated, standardised and efficient monitoring protocol for future satellite surveys, greatly improving our understanding of archipelago-wide population dynamics.

Section 1 - Contact Details

PRIMARY APPLICANT DETAILS

Name	Peter
Surname	Fretwell
Tel (Work)	[redacted]
Email (Work)	[redacted]
Address	[redacted]

GMS ORGANISATION

Type	**Organisation**
Name	British Antarctic Survey
Phone (Work)	[redacted]
Email (Work)	[redacted]
Website	[redacted]
Address	[redacted]

Section 2 - Title, Dates & Budget Summary

Q3a. Project title

Monitoring albatrosses using very high resolution satellites and citizen science

Q3b. What was your Stage 1 reference number? e.g. DPR9S1\10008

DPR9S1\1054

Q4. UKOT(s)

Which eligible UK Overseas Territory(ies) will your project be working in?

- ☑ St Helena (ODA eligible), Ascension and Tristan da Cunha* (ODA eligible)
- ☑ South Georgia and The South Sandwich Islands (SGSSI)

*** if you have indicated a territory group with an asterisk, please give detail on which territories you are working on here:**

No Response

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

⦿ No

Q5. Project dates

Start date:	End date:	Duration (e.g. 2 years, 3 months):
01 December 2021	30 November 2022	12 months

Q6. Budget summary

Year:	2021/22	2022/23	2023/24	2024/25	Total request
Darwin funding request (Apr - Mar)	£29,238.00	£58,008.00	£0.00	£0.00	**£** 87,246.00

Q6a. Do you have proposed matched funding arrangements?

⦿ No

If none, please explain why:

This is a small initial trial project. If successful we will seek longer term matched funding with NGOs and stakeholders.

Section 3 - Project Summary and Conventions

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.

Monitoring the world's threatened albatross species is challenging because of their remote nesting locations, making ground or aerial surveys expensive, infrequent and often incomplete. In this project, we will launch a citizen science campaign, using 31-cm resolution satellite imagery to count wandering albatrosses on South Georgia and Tristan albatrosses on Gough Island directly from space. Counts will be used to develop an automated, standardised and efficient monitoring protocol for future satellite surveys, greatly improving our understanding of archipelago-wide population dynamics.

Q8. Biodiversity Conventions, Treaties and Agreements

Please detail how your project will contribute to the aims of the agreement(s) your project is targeting. What key OT Government priorities and themes will it address? You should refer to Articles or Programmes of Work here. You should also consider local, territory specific agreements and action plans here.

This project will primarily address the key priority for Darwin Plus Round 9 – "Implementation of National Biodiversity Action Plans" (NBAPs).

In relation to the main objectives in the NBAP of GSGSSI [11], the implementation of a remote-survey protocol for albatross censuses would "reduce the carbon footprint of GSGSSI operations" (Activity 1.2), by offering an alternative to boat, plane, or field based counts. It is also in line with Activity 5.1.3 – "Utilisation of new technologies and remote sensing techniques that maximise understanding of the Territories flora and fauna and minimal impact on the environment". In addition the crowdsourcing campaign will contribute to Objective 2 – to "increase SGSSI's environmental global reach though collaboration and knowledge sharing with our stakeholders". The media campaign and volunteer recruitment will "raise awareness of the global importance of SGSSI biodiversity amongst the international community" (Activity 2.2), and particularly addresses Activity 2.2.2 "Media projects which promote SGSSI biodiversity to target audiences". In GSGSSI's newly launched 5-year stewardship scheme [12], the project fits with many Guiding Values, notably "integrating new technologies and innovation for data collection with expertise and interpretation as drivers for evidence-based decision making", and to "minimise environmental impact". The crowdsourcing aligns with the commitment to "encourage participation in remote citizen science projects".

The project will also address key goals of the GSGSSI Wandering Albatross Action Plan [3], where an archipelago-wide census every 10 years is listed as a high priority (Activity 1.5). The plan specifically recommends investigating remote-sensing survey techniques for Annenkov Island (Activity 1.6). Archipelago-wide censuses are also highlighted as a Priority Programme by ACAP, along with demographic monitoring of Tristan albatrosses on Gough Island (of extra importance because of the RSPB mouse eradication programme). In the Gough and Inaccessible Islands World Heritage Site management plan [13], this project aligns with Priority Management Actions E1.1 "Monitor breeding Tristan albatross population". The citizen science campaign also aligns with High Level Objective 7 – "To promote an awareness through education of the intrinsic value, significance and vulnerability of the islands and their biota"

Finally, this project also addresses the Darwin Round 9 Priority Eligible environmental activities that respond to the effects or causes of the COVID19, and other, pandemics. Satellite monitoring will offer an alternative when fieldwork is cancelled, delayed or restricted in extent due to quarantine procedures. In terms of specific aspects for round 9, the study also pilots an approach or idea which has the potential to be developed into a larger project in the future. This is because the same methods could be directly applied to survey wandering albatross colonies across the globe, and could very easily be adapted to monitor other great albatross species, for example the Southern and Northern Royals.

Section 4 - Lead Organisation Summary

Q9. 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
DPLUS120	Victoria Warwick-Evans	Spatial segregation and bycatch risk of seabirds at South Georgia
DPLUS072	Philip Trathan	Developing the risk assessment framework for the Antarctic krill fishery
DPLUS092	Richard Phillips	Seabird sentinels: mapping potential bycatch risk using bird-borne radar
DPLUS054	Philip Trathan	Managing Antarctic Krill Fisheries; identifying candidate marine areas for protection
DPLUS057	Jennifer Jackson	Where are they now? Right whales in South Georgia waters
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.

⦿ No

If no, please provide details.

As part of UKRI, BAS is a Government Research Institution.

[redacted]

Section 5 - Project Partners

Q10. 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):	(Max 200 words) BAS has well-established management, operations and finance infrastructure, and extensive logistics capability to support Antarctic fieldwork. Dr Fretwell and Professor Philips will be involved in project management and provision of expertise. Dr Fretwell is an expert in remote sensing, and leads the Wildlife From Space research group at BAS. He has overseen several projects surveying penguins, whales, seals and albatrosses using satellite imagery. Professor Phillips has extensive experience in seabird ecology and conservation, and is closely involved with the international Agreement on the Conservation of Albatrosses and Petrels (ACAP) and other seabird conservation initiatives. Ellen Bowler will have responsibility for implementing the project. She will help design and oversee the crowdsourcing application and lead in subsequent analysis of the counts. She has experience in remote sensing, computer vision and deep learning, and has worked on automated detection of wandering albatrosses in 31-cm resolution satellite imagery as part of her PhD.
Have you included a Letter of Support from this organisation?	⦿ No
If no, please provide details	The application has been signed by BAS Head of Finance. The organisation is therefore supportive, and committed to delivery.
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:	RPSB
Website address:	www.rspb.org.uk

Details (including roles and responsibilities and capacity to engage with the project):	(Max 200 words) The RSPB plays a critical role in the conservation of biodiversity in the UK Overseas Territories through engagement with local stakeholders. The RSPB also hosts the Albatross Task Force, a global network aimed at the conservation of albatrosses around the world. Dr Steffen Oppel will be involved in data provision and evaluation of the proposed method. Dr Oppel has extensive experience in seabird ecology, and oversees the monitoring of seabirds on Gough Island. He curates and analyses Tristan albatross monitoring data, and his first-hand experience of Gough Island will be invaluable to adapt the proposed method for Tristan albatrosses. Stephanie Prince will contribute to the citizen science approach by engaging with supporters of the Albatross Task Force. Mrs Prince has extensive experience with monitoring albatrosses on South Georgia and with engaging the public to conserve albatrosses around the world through her role in the Albatross Task Force. She will facilitate the outreach to supporters to ensure that enough citizen scientists contribute to image classification.
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.

albatross SG cover-letter (006)
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pdf 164.5 KB

all-letters-of-support-darwin-plus-3
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Section 6 - Project Staff

Q11. Project Staff

Please identify the core staff on this project, their role and what % of their time they will be working on the project. Further information on who should be classified as core staff can be found in the guidance.

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?
Peter Fretwell	**Project Leader**	10	Checked
Richard Phillips	Co-project leader	5	Checked
Ellie Bowler	Lead analyst	100	Checked
Steffen Oppel	Data consultant	1	Checked

Do you require more fields?

◉ Yes

Name (First name, Surname)	Role	% time on project	1 page CV or job description attached?
Stephanie Prince	Citizen Scientist outreach coordinator	1	Checked
No Response	*No Response*	0	Unchecked
No Response	*No Response*	0	Unchecked
No Response	*No Response*	0	Unchecked
No Response	*No Response*	0	Unchecked
No Response	*No Response*	0	Unchecked
No Response	*No Response*	0	Unchecked
No Response	*No Response*	0	Unchecked

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.

all-cvs-darwin-plus
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pdf 1.9 MB

Have you attached all Project staff CVs?

⦿ Yes

Section 7 - Background & Methodology

Q12. 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?

Please cite the evidence you are using to support your assessment of the problem (references can be listed in your additional attached PDF document which can be uploaded at the bottom of the page).

The wandering albatrosses on South Georgia (SG) and Tristan albatrosses at Gough have been listed as two of only nine High Priority Populations for conservation by ACAP [1]. Incidental mortality (bycatch) in fisheries has caused major declines, while invasive mice are leading to critically low chick survival rates at Gough (with the RSPB-led Gough Island Restoration Programme aiming to prevent their extinction) [2]. However due to their highly dispersed nesting distribution, the number of regularly monitored breeding sites is limited due to accessibility and logistical constraints (further exacerbated by COVID-19 related fieldwork restrictions). Regular monitoring of wandering albatrosses is limited to three sites (Bird, Albatross and Prion Islands) on SG, with no information on annual variation elsewhere in the island group. This problem has been highlighted in the SG Conservation Action Plan for wandering albatrosses [3] and by ACAP, which lists archipelago-wide surveys as a high priority activity. ACAP also cite demographic monitoring of Tristan albatrosses as a Priority Programme [1].

To address these issues we will develop methods to survey albatrosses using very-high resolution satellites. Satellite counts can fill data gaps in locations where ground or aerial surveys are impractical, and increase the frequency of surveys, both between years and within breeding seasons. This will greatly improve our understanding of fine-scale population trends, alert researchers to sharp declines in numbers, and inform conservation strategies. Regular monitoring is also key to determining the response of the Tristan albatross population to the eradication of mice on Gough. We will raise public awareness of albatross conservation on UKOTs by launching a crowdsourcing campaign, engaging thousands of volunteers to count albatrosses using the GeoHive platform. The citizen science counts will be used to develop automated detection methods to facilitate future satellite surveys at reduced effort and cost, ensuring the longevity of the project.

Q13. 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)

The project builds on studies by Fretwell et al. [4], which validated the detection of wandering albatrosses in 31-cm resolution WV-3 imagery by comparing satellite counts to ground surveys on Bird Island (SG). The method has since been used in the French OTs to complete wandering albatross counts [5]. Subsequent work developed automated detection methods using images of four breeding areas [6]. More broadly this research links to similar projects carried out by the BAS 'Wildlife from Space' group (including satellite monitoring of whales [8], penguins [9] and seals), which will inform best practice for aspects such as manual analysis, crowdsourcing, and automated detection.
The proposed work will use crowdsourcing in a similar platform to [7] for counting Weddell seals in Antarctica. In that study, over 300,000 counters identified seals in VHR satellite imagery using the Tomnod app. We will use the successor platform, Geohive, to facilitate our counts. We will launch a media campaign to promote the counts, using extensive networks of BAS, RSPB, GSGSSI and stakeholders. Given the reach of these networks and the success of similar projects, we anticipate thousands of volunteers. Outside of satellite imagery there are a number of successful citizen science campaigns on similar themes, such as the Darwin funded Penguin Watch project (penguinwatch.org).

Specifically, to undertake the work we will:
1) Work with Maxar to collate all archival WV-3 imagery of wandering albatross colonies on SG and Tristan albatrosses on Gough. Archival imagery spans from 2015-present, and we will select images which have low percentage cloud cover, and were collected in the December-April nesting period. .
2) Images capturing annually monitored colonies (Bird, Prion and Albatross Islands on SG, as well as Gough) will be annotated by experts, and validated against ground-counts collected by BAS/RSPB field researchers. GPS coordinates of nests from on-the-ground surveys will be compared to satellite image detections using methods described in [4]. This will determine accuracy and annotator consistency.
3) Work with Geohive to develop the front end of the crowdsourcing platform, including links to relevant outreach material on conservation at SG, Tristan and Gough. We will consult the respective governments and RSPB to develop appropriate materials.
4) Publicly launch the crowdsourcing campaign to encourage manual counting of the imagery. Promote the campaign via the BAS, RSPB and GeoHive media offices, emails, NGOs and platforms such as scistarter.org. We will link to other campaigns such as the recently launched World Albatross Day.
5) Use the manual labels (assigned to individual birds) to train automated detection algorithms using machine learning, similar to methods described in [6]. In subsequent years these methods may prove more accurate and repeatable than manual counting. This will result in either a fully or partially automated system for processing WV-3 imagery of albatrosses from any site in the future.
6) Disseminate results of the crowdsourcing campaign and automated methods with stakeholders, working groups, and at conferences. Publish the results in a peer-reviewed journal, along with code for reproducing the analysis.

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

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pdf 425.06 KB

Section 8 - Stakeholders and Beneficiaries

Q14. 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.

Stakeholders amongst the UKOTs are GSGSSI and Tristan Government, which hold globally important populations of wandering and Tristan albatrosses respectively. Both have been consulted on the project plan, and support the crowdsourcing campaign as a means of promoting awareness of conservation threats to these two priority species, as well as highlighting the wider biodiversity of the UKOTs. They also support the development of satellite survey techniques to conduct archipelago-wide surveys, to enhance monitoring and inform management plans (outlined in their letters of support). The UK government is a stakeholder; as a signatory to ACAP, the UK is obliged to report progress to meetings of the ACAP Advisory Committee on research and management of ACAP-listed species, and particularly those populations (wandering albatross at SG, and Tristan albatross at Gough), which have been identified as global priorities for conservation.

Regular communication with stakeholders will ensure their continual engagement. In particular, stakeholder UKOTs will be consulted on relevant information to present in the crowdsourcing application to promote understanding and awareness of biodiversity and conservation of albatrosses in their territories. They will support the project by promoting the crowdsourcing media campaign, and providing data for colonies which are monitored on the ground. The results of the crowdsourcing counts will be communicated at stakeholder meetings, and disseminated in scientific journals. A final assessment of the methods and satellite survey protocol will be set out for future surveys.

Q15. Institutional Capacity

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

BAS is a research-driven organisation and is recognised for its commitment to excellence in science, operational professionalism and innovation. Additionally, BAS sustains an active and influential presence in Antarctica on behalf of the UK, and is an influential leader in Antarctic affairs, and engagement with policymakers, government and the public.
Dr Fretwell (BAS, Project Leader) is an expert on satellite monitoring of wildlife, and has supervised a number of projects at BAS surveying whales, seals and albatrosses. He will also lead a new project using citizen science to survey walruses in partnership with WWF. As such, BAS already has a strong research profile in the field, and has demonstrated capacity to support the proposed research. Prof Phillips (BAS, Co-leader) has extensive experience in seabird ecology and conservation, is closely involved with ACAP and other seabird conservation initiatives, and delivery of multiple large-scale projects (including Darwin Plus funded projects: DPLUS070and DPLUS092).
The RSPB is internationally respected for its contribution to evidence-based conservation, especially in the UKOTs and through the Albatross Task Force. Through its Gough Island Restoration Programme, the RSPB is committed to ensure the survival of Tristan albatrosses. Dr Steffen Oppel has extensive experience in seabird monitoring and data management, and Stephanie Prince is an expert in engaging with the public to support albatross conservation. They both will bring complementary expertise to this project to ensure high-quality participation and validation of albatross counts from satellite imagery.

Q16. 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.

Direct beneficiaries will be GSGSSI, as the project will address objectives outlined in their NBAP and wandering albatross conservation action plans. It will mean that all nesting sites across the archipelago can be monitored as required, thereby meeting the current target of archipelago-wide censuses every ten years. Compared to current methods, this will be possible at much lower cost, with little logistical input, no impact to the environment, and without any biosecurity risk.
Similarly, the Government of Tristan da Cunha and the RSPB will benefit because satellite- monitoring of Tristan albatrosses would reduce the amount of fieldwork required on Gough Island following the island restoration programme. Currently two staff members spend an entire year on Gough to count Tristan albatrosses and assess breeding success, but if this task could be reliably undertaken using satellite imagery then the resources currently required for fieldwork could be directed elsewhere.
More broadly, the citizen science campaign will raise awareness of albatross conservation and UKOT biodiversity, which will benefit a range of stakeholders. The methods can be directly transferred to study colonies around the globe, and so would benefit governments and NGOs beyond the UKOTs.

Section 9 - Gender and Change Expected

Q17. 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?

We do not consider this project to be at risk of increasing gender inequality. Outside the crowd-sourcing campaign, most work will be conducted by the project staff, which is a mixed team. Within the crowdsourcing campaign there are opportunities to enhance diversity amongst volunteers (e.g. promoting on websites encouraging women in science, initiatives for ethnical minorities such as Polar Impact). In regards to gender inequality in the relevant UKOTs (GSGSSI and Tristan Da Cunha), we do not consider the methods developed in this study will have an adverse impact.

Q18. 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.

Currently on SG, annual wandering albatross surveys take place at Bird, Albatross and Prion Islands but annual changes in status at other sites in the archipelago is unknown. Three archipelago-wide surveys have been conducted (in 1984, 2004 and 2015); however, with such long gaps, the variation in population trends among different areas is difficult to assess. This can be overcome by using VHR satellites to conduct more frequent archipelago-wide surveys, enhancing our ability to implement management strategies for specific sites, and to investigate potential drivers of fine-scale population dynamics (e.g. annual counts indicate that breeding success is higher, and the population decline less steep at Albatross and Prion Islands, than at

Bird Island [10]). VHR satellite monitoring also offers a low-cost means of monitoring population trends of the Critically Endangered Tristan albatross on Gough Island, which is key to evaluating the success of the mouse eradication programme. Population change will take many years due to the slow life history of these birds, and it is as yet uncertain whether funding for continued fieldwork will be available. Hence a satellite-based method of population assessment would overcome potential budget constraints in the future. These are the immediate benefits of the project. By establishing a framework for continuous, low-cost, remote monitoring, the project can continue to provide valuable data to inform management objectives. The crowd-sourcing platform and automated approach will facilitate future satellite surveys at reduced time and cost. These methods have wide scope beyond the UKOTs and these taxa, and could be used to conduct regular global surveys of multiple species of albatrosses. The ability to engage the public via the crowdsourcing platform also has long-reaching impact in terms of raising awareness of conservation threats, and presents opportunities to source volunteers and donations for future research, monitoring or management.

Q19. 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.

This project has the potential to substantially increase the frequency and span of wandering albatross surveys, using innovative remote-sensing techniques. This can help identify high priority sites (where declines are steeper) and improve management practices to safeguard this vulnerable species. In addition, monitoring of Tristan albatrosses on Gough Island will provide an important tool for tracking recovery of this Critically Endangered species following the RSPB-led mouse eradication programme. The crowd-sourcing campaign will increase public awareness of albatross conservation and management of UKOTs. Outputs of the project will be disseminated and discussed at stakeholder meetings, including those organised by GSGSSI and RSPB. Outputs will be used to advise management bodies, governments and ACAP on population status. The success of the remote sensing-crowdsourcing approach will be assessed, and protocols will be developed to ensure easy repeatability of future satellite surveys. This will be communicated through the websites, reports to stakeholders, and papers submitted to relevant meetings and scientific journals. Finally, our project will provide a case study which could be replicated for other colonies and territories (for example to survey wandering albatrosses at Indian Ocean colonies, or other species elsewhere), fostering collaborations among OTs and improving monitoring at a global scale.

Q20. Exit strategy

State how the project will reach a stable and sustainable end point, and explain how the outcomes will be sustained, either through a continuation of activities, funding and support from other sources or because the activities will be mainstreamed in to “business as usual”. Where individuals receive advanced training, for example, what will happen should that individual leave?

Outcomes of the project will be a semi or fully automated method for counting wandering albatrosses in satellite imagery, as well as an assessment of the feasibility of using such methods to monitor Tristan albatrosses on Gough Island. To reach a sustainable endpoint, a protocol for conducting the satellite survey will be written, which will outline the procedure from a practical perspective. This will be in addition to the peer reviewed manuscript which will present the scientific outcomes and implications of the study. The satellite survey protocol will include links to open-access, fully documented code for the running of automated methods, as well as an outline of how satellite imagery can be obtained from Maxar. Shapefiles outlining colony locations will be uploaded to a repository, which can be used to request images of specific locations more easily.

Section 10 - Funding and Budget

Q21. 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.

- R9 D+ Budget form for projects under £100,000
- R9 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.

Copy of Budget_under_100K_May_2020_albatross project with overheads seperate from staff costs
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xlsx 32.49 KB

Q22. Funding

Q22a. Is this a new initiative or a development of existing work (funded through any source)?

⦿ Development of existing work

Please provide details:

This work builds on previous studies carried out by Fretwell et al. [4], which was the first example of counting wandering albatrosses in 31-cm resolution WorldView-3 satellite imagery. This was funded research carried out at BAS. The technique was subsequently used to survey colonies in French OTs [5]. Using the datasets collected in these two studies, methods for automatically detecting wandering albatrosses were developed by Bowler et al. [6]. This work was carried out as part of a NERC funded PhD.

Q22b. Are you aware of any other individuals/organisations/projects carrying out or applying for funding for similar work?

⦿ No

Q23. Co-financing

Are you proposing co-financing?

◉ Yes

Q23a. 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
No Response	0	*No Response*	*No Response*
No Response	0	*No Response*	*No Response*
No Response	0	*No Response*	*No Response*
No Response	0	*No Response*	*No Response*

Q23b. 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
30 November 2020	ACAP	[redacted]	AUD	"Effects of delayed mouse eradication on conservation status and population viability of Tristan albatross on Gough Island" will include analysis of population count data and projections into the future against which satellite-derived counts can be compared.

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 11 - Finance

Q24. 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?

Fund management will be overseen by the Project Leader and Co-leader. Both have experience of budgeting projects of similar scale (including Darwin Plus funded projects: DPLUS070 and DPLUS092). BAS is a component part of NERC, which is a government body and part of UK Research and Innovation (UKRI). Supervision and regular reviews of the budget allocation will be carried out by the BAS Finance Department, which will set up a separate cost centre. Orders for equipment, and all T&S claims will be controlled by the Shared Business Centre (SBS), which conforms to UK government procedure and expenses rules. There will be an overall audit at the end of the project.

Q25. Financial Management Risk

This question considers the financial risks to the project. Explain how you have considered the risks and threats that may be relevant to the successful financial delivery of this project.This includes risks such as fraud or bribery, but may also include the risk of fluctuating foreign exchange and internal financial processes such as storage of financial data.

The financial risk of the project is relatively low, with the budget for salaries and associated overheads, purchasing of satellite imagery and funding crowd-source counts, travel and subsistence. Any equipment purchases will be within the strict UK government procurement rules, controlled through the UKRI SBS ordering system, which requires initial quotations and payment of invoices upon receipt of goods, minimising the risk of fraud. Travel and subsistence costs are for staff attending meetings. These claims will be made through the SBS system which requires all employee and non-employee clams to be submitted with receipts, minimising the risk of fraud.

Q26. Balance of budget spend

Explain the thinking behind your budget in terms of where funds will be spent.What benefits will the Territory see from your budget? What level of the award to you expect will be spent locally? Please explain the decisions behind any funding that will not be spent locally and how those costs are

important for the project.

Aside from staff salaries, project funds will primarily be spent on purchasing satellite imagery, and hosting the crowd-sourcing campaign via GeoHive. In general, this allows surveys to be conducted at reduced cost in comparison to traditional boat, ground, or aerial surveys. It also means that all research will be conducted remotely, with no logistical implications for the UKOTs. While none of the budget will be spent directly locally on either SGSSI or Tristan da Cunha, both territories will benefit from heightened public awareness generated by the citizen science campaign. We anticipate significant public engagement, and both governments will be consulted to finalise all information included on the project website. In addition, the final methods output by the project will allow future satellite monitoring to be conducted more regularly. This will directly benefit the UKOT's, allowing for enhanced monitoring of understudied colonies across the archipelagos.

Q27. Capital Items

If you plan to purchase capital items with Darwin Plus funding, please indicate what you anticipate will happen to the items following project end. If you are requesting more than 10% capital costs, please provide your justification here.

No capital items will be purchased.

Q28. Value for Money

Please describe why you consider your application to be good value for money including justification of why the measures you will adopt will secure value for money.

We have considered value for money throughout the design of the project. We will benefit from analysis which has been developed in previous studies ([4] and [6]), which will avoid considerable development costs and associated risks. The engagement of citizen scientists will ensure excellent value for money for the analysis of imagery. Importantly the campaign will also promote a conservation message for albatrosses on UKOTs, and address key public engagement targets in the NBAPs and other action plans of the OTs. This in itself has significant value. We are confident that the campaign will gain widespread attention, and will be promoted via the established media networks of BAS, RSPB, the UKOTs and other stakeholders. This promotion and advertisement has no cost other than modest staff time but high value in terms of raising public awareness. For the satellite imagery, the majority will be taken from Maxar's existing archive, which has a lower associated cost than tasking new imagery. Furthermore the automated detection methods (which will be developed within the year of the funding) will be available beyond the lifetime of the project. Staff costs are based on standard organisational pay scales, and BAS will complement support with waived overheads and resources necessary for the project.

Q29. 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.

Maxar satellite imagery is subject to copyright, and is generally not made available for open access data repositories. While the images themselves cannot be published, the unique image IDs will be made available, so that interested parties can purchase the relevant images directly from Maxar. In addition ground-truth labels for albatrosses will be published as georeferenced point markers, which can then be

plotted directly on imagery when acquired. We will provide full open-access to our analytical framework, code and software routines. These will be developed in the Python programming language, which is open source and is widely used in the scientific research community. We will ensure to document code in detail, so the analysis can be easily replicated by interested parties. In addition the final automated detection network (a convolutional neural network trained on the ground-truthed satellite images) will be made publicly available.
Additional papers and reports submitted to working groups will also be made available if the organisation permits it. We anticipate widespread public interest in the project, and will provide media releases about significant results. In particular we will commit to proving updates for all volunteers who contribute to the crowdsourcing campaign, on an opt-in basis.

Section 12 - Safeguarding

Q30. 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 safeguarding 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 our commitment to safeguarding and a zero tolerance statement on bullying, harassment and sexual exploitation and abuse	Checked
We have attached a copy of our safeguarding policy to this application	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

Please outline how you will implement your policies in practice and ensure that downstream partners apply the same standards as the lead organisation.

We will adhere strictly to the UKRI safeguarding policy https://www.ukri.org/wp-content/uploads/2020/10/UKRI-081020-SafeguardingPolicy.pdf. We will provide this guidance to the downstream partners and ensure it is embedded within M&E. The project is entirely desk based within BAS and RSPB offices, with volunteers participating remotely via the online citizen science campaign. We will be hosting the citizen science campaign through an established platform (GeoHive), which has policies in place to protect the information of all volunteers who choose to register.

Please upload the Lead Organisation's Safeguarding Policy as a PDF

- UKRI-081020-SafeguardingPolicy
- 02/02/2021
- 17:16:53
- pdf 111.65 KB

Section 13 - Logical Framework

Q31. Logical Framework

Darwin Plus projects will be required to monitor (and report against) their progress towards their expected Outputs and Outcome. 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.

- Stage 2 Logframe Template

Please complete your full logframe in the separate Word template and upload as a PDF using the file upload below. Copy your Impact, Outcome and Output statements and your activities below - these should be the same as in your uploaded logframe.

Please upload your logframe as a PDF document.

- R9 DPlus St2 Logical Framework Template_albatross
- 02/02/2021
- 15:37:29
- pdf 129.71 KB

Impact:

An efficient and repeatable method for conducting VHR satellite surveys of albatrosses is in place, allowing for more frequent and wide-ranging monitoring, including colonies beyond UKOT's.

Outcome:

Improved archipelago-wide monitoring of wandering albatrosses on South Georgia, and Tristan albatrosses on Gough Island, will enhance our understanding of population trends and inform targeted conservation efforts.

Project Outputs

Output 1:

A satellite survey protocol for wandering albatrosses across the South Georgia archipelago, which could easily be applied to other locations across the globe

Output 2:

First VHR satellite survey of Tristan albatrosses on Gough Island

Output 3:

Raised public awareness of albatross conservation and biodiversity on the UKOTs through engagement with the crowdsourcing campaign

Output 4:

Research outputs developed and shared with target audiences, local government and stakeholders

Output 5:

No Response

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.

⦿ No

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.

1.1 In consultation with Maxar, collate all archival WV-3 imagery which captures known wandering albatross nesting sites, across the SG archipelago.
1.2 Conduct expert analysis of Bird, Prion and Albatross Island imagery, and compare to ground survey data collected by field researchers.
1.3 Make all archive images available on GeoHive for crowd-sourced counts
1.4 Analyse results of crowd-sourced counts, assess variance, agreement, deviation from expert labels. Conduct analysis into uncertainty of the methods.
1.5 Train automated detection algorithms using the crowd annotations. Assess the performance of the automated methods using train and test datasets

2.1 In consultation with Maxar, collate all existing archival WV-3 imagery of Gough Island.
2.2 Using expert analysis, conduct counts of Tristan albatrosses on Gough. Compare satellite counts to GPS ground survey data at Gonydale to verify detectability.
2.3 Make Gough images available on GeoHive for crowd counting.
2.4 Assess results of crowd counts, compare variance, agreement and consistency.
2.5 Prepare report assessing viability of using satellite imagery to monitor Tristan albatrosses, to be submitted to stakeholder meetings (for example Tristan Da Cunha government, RSPB for monitoring of mice eradication scheme).

3.1 Develop relevant materials to be linked on GeoHive campaign site with UKOT's and RSPB
3.2 Develop front end of the GeoHive campaign site, in consultation with GeoHive.
3.3 Plan publicity campaign to launch crowd-counting website (for example name for campaign, twitter hashtag). Contact key stakeholders and groups who could advertise.
3.4 Launch campaign, in collaboration with the BAS and RSPB media offices. Press release.
3.5 Assess the success of the campaign in terms of engagement. Follow up materials with key results and update emails for volunteers if opted in

4.1 Prepare reports for meetings with stakeholders.
4.2 Share results with all stakeholders via email, conferences, and at meetings (e.g ACAP, GSGSSI annual stakeholder/ working group meeting)
4.3 Prepare and submit manuscript for peer reviewed, open source, journal
4.4 Make code and protocol for satellite monitoring publicly available.
4.5 Attend national/international conference to present results.

Section 14 - Implementation Timetable

Q32. 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.

- Copy of darwin-plus-round9-imp-timetable-financial-year
- 02/02/2021
- 15:49:09
- xlsx 12.81 KB

Section 15 - Monitoring and Evaluation

Q33. Monitoring and evaluation (M&E)

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**).**

(Max 500 words)
The project leader and lead analyst will be responsible for project M&E. A detailed timeline for all activities will be outlined at the beginning of the project. Over it's course the Project Leaders and Lead Analyst will meet weekly to discuss progress and day to day running of the project. In addition, formal monthly meetings will be held where overall progress will be assessed: in these outputs, short and long terms objectives, challenges and budgeting will be reviewed. Formal half annual meetings will also be arranged with all project partners, which will be written up and reported. Stakeholders will additionally be kept updated with new results as soon as they are available, either by email, teleconference, or in person. Their feedback will be requested, and incorporated into analysis as required.

All scientific outputs of the project will be formalised as either reports to working groups, or as manuscripts submitted to scientific journals. These results will be communicated to the wider network of overseas groups and NGOs through email and attendance of international meetings. The success of the

crowdsourcing campaign will be monitored via the GeoHive platform, using indicators such as number of volunteers, site views etc. Social media engagement will also be monitored by assessing the success of publicity posted, for example, on BAS/RPSB twitter pages.

Financial monitoring of the project will be carried out by the BAS Finance Office, and the project will be audited in the final year. Since all project personnel are based at BAS, and project partners are also based in Cambridge, costs of M&E will be low.

Total project budget for M&E in GBP (this may include Staff, Travel and Subsistence costs)	£[redacted]
Number of days planned for M&E	15.00
Percentage of total project budget set aside for M&E (%)	[redacted]

Section 16 - Certification

Certification

On behalf of the

company

of

British Antarctic Survey

I apply for a grant of

£87,246.00

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	Mags Clarke
Position in the organisation	Head of Finance, British Antarctic Survey

Signature (please upload e-signature)	MC signature 02/02/2021 17:12:26 jpg 1.78 MB
Date	02 February 2021

Section 17 - 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 attached my completed logframe and timeline as a PDF using the templates provided.	Checked
I have included a 1 page CV or job description for all the Project staff identified at Question 11, 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 10, 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 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 Plus 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).