

DPLR2\1006

Darwin Plus Local - Final Report (1)

Officer: Linzi Ogden

Section 1 - Darwin Plus Local Project Information (Essential)

Project Reference Number

DPL00047

Q1. Project Title

Increasing environmental monitoring capacity on FI: a Thermal Imaging UAV

Overseas Territory(ies)

Falkland Islands (FI)

Lead Organisation or Individual

South Atlantic Environmental Research Institute

Partner Organisation(s)

Department of Agriculture Department of Planning Department of Environment Falkland Islands Maritime Authority

Value of Darwin Plus Local Grant Award

£24,569.50

Project Start Date

01 October 2023

Project End Date

31 March 2024

Project Leader Name

Tara Pelembe. Project Manager Jack Ingledew

Project Website/Twitter/Blog etc.

<https://www.south-atlantic-research.org/increasing-environmental-monitoring-capacity-on-fi-a-thermal-imaging-uav-dpl00047/>

Report Author(s)

Jack Ingledew and Tara Pelembe

Report Date

23 April 2024

Project Summary

This project's objective is to increase the ability of SAERI to undertake on-the-ground applied research and monitoring to feed into policy and decision-making in the Falkland Islands by purchasing a thermal imaging UAV, setting up all of the documentation required to fly the drone, undertaking test flights and a delivering a partner demonstration workshop. Post project, the drone will be used in partnership with FIG in the following areas: Agriculture; Energy Auditing; Wildlife Monitoring; Environmental Surveys; Coastal Oil Spill Detection.

Project Outcomes

Checked	Biodiversity: improving and conserving biodiversity, and slowing or reversing biodiversity loss and degradation;
Checked	Climate Change: responding to, mitigating and adapting to climate change and its effects on the natural environment and local communities;
Unchecked	Environmental quality: improving the condition and protection of the natural environment;
Checked	Capability and capacity building: enhancing the capacity within OTs, including through community engagement and awareness, to support the environment in the short- and long-term.

Section 2 - Project Outcomes (Essential)

On a scale of 1 (high – outcome substantially exceeded) to 5 (low – outcome substantially did not meet expectation), how successful do you think your project has been?

2 - Outcome moderately exceeded

Project outcomes and justification for rating above

Original objectives and outcomes:

The objective is to increase the ability of SAERI to undertake on the ground research to feed into policy and decision-making in the Falkland Islands by purchasing a thermal imaging Unmanned Aerial Vehicle (UAV) i.e. a DJI Matrice 300 RTK UAV with an attachable Zenmuse H20T Thermal Camera.

This project was to procure a piece of equipment, a DJI Matrice 300RTK unmanned aerial vehicle (UAV) with a H20T thermal imaging camera, something that has previously been unavailable on the Falkland Islands.

The project was successful in procuring this equipment, albeit a newer model of the UAV (a DJI Matrice 350RTK) along with the H20T camera.

This project aimed to improve the capacity to undertake a number of future functions, which are described below.

- Agriculture: Farmers and agricultural assistants can use thermal imaging UAVs to monitor crop health, identify areas of irrigation issues, detect pest infestations, and assess overall plant stress. The thermal data can provide valuable insights for optimising irrigation, identifying diseased areas, or assessing the effectiveness of fertilisers.
 - Energy Auditing: Thermal imaging UAVs can assist in energy auditing for buildings and industrial facilities. They can detect heat loss, identify insulation gaps, or locate energy inefficiencies in heating, ventilation, and air conditioning (HVAC) systems. This information can help improve energy efficiency and reduce operational costs.
 - Wildlife Monitoring: Thermal imaging UAVs are useful for tracking and monitoring wildlife populations. They can help identify animal movements, track migration patterns, and locate animals in dense vegetation. This information aids in wildlife research, conservation efforts, and tourism activities.
- other areas include environmental Surveys and Oil Spill Detection.

The UAV arrived on the Falkland Islands on 27th January 2024, discussions are currently ongoing with project partners to identify specific use-cases for their areas of interest.

One test flight was undertaken, scanning the burning waste pile located within Stanley. This provided a good test setting for the thermal imaging camera. Photos attached in the supporting evidence.


The UAV has also been used to scan for Avian Influenza on Beauchene Island in the Falklands on behalf of the Falkland Islands Government as a rapid response to the ongoing situation of confirmed cases in various locations around the Islands. This trip undertaken in February 2024 was possible due to the flight time of the DJI Matrice 350RTK and the increased ability to handle inclement weather. Beauchene Island is closed to any visitors and it's remote location means it is only accessibly via Zodiac boat. This type of survey would not have been possible before because of the protections around the island and risk of an in-person survey. The capabilities of the thermal imaging camera and zoom of the H20T payload mean that this type of survey is very low impact and low risk of spreading the virus itself.


Changes:


There is increased capacity to undertake the activities described above, as having been shown already with the test flight and search for Avian Influenza.

Supporting Evidence - file(s) upload

 [Supporting evidence images.docx](#)

 23/04/2024

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 pdf 520.88 KB

Supporting Evidence - links to published document/online materials

supporting evidence images provided in the file attached above.

Project Challenges

The project encountered 3 main obstacles:

Model obsolete:

After being awarded the funding, it became apparent that the DJI Matrice 300RTK model was no longer being sold in all the online stores that had been used for the quotes for procurement. The newer replacement model (the 350RTK) was more expensive, which could have been prohibitive to the project.

Discussions were held with the sales teams of one of the companies who offered a discount on the latest model, allowing it to remain within budget.

Test flights in the UK:

Test flying and familiarisation with a training professional is not possible in the Falkland Islands. In order to circumvent this, Jack Ingledew, the project manager was booked in for this handover/familiarisation day whilst being back in the UK for other project work.

Shipping hazardous cargo to the Falkland Islands:

Batteries over 100kwh cannot be transported on the South Atlantic Airbridge – the main form of travel from the UK to the Falkland Islands. To resolve this, the UAV equipment had to be transported by cargo ship, which, although much slower is able to bring hazardous cargo.

Lessons Learned

i) What worked well and why?

- The communication between vendor and SAERI worked well. A very helpful customer service that included a large discount to factor in the budget and changing from the obsolete model to the newer one.
- There were no problems encountered when shipping from the UK to the Falkland islands and the equipment arrived in working order.

The fact that SAERI is based in the Falkland Islands is integral to the in depth understanding of shipping and movement of equipment to and from UK. It is also a vital component of making the new equipment available on island to project partners in the Falkland Islands Government into the future.

ii) What did not work well and why?

The project challenges have been highlighted in the section above

iii) If you had to do it again, what would you do differently?

The proposal would have included budget for both a photogrammetry payload (a P1 model) and also a Lidar sensor (L2) to further the functionality and applications of the UAV. These are something that could be considered for future bids.

iv) What recommendations would you make to others doing similar projects?

To include enough budget for excess batteries, a DJI Enterprise Care Package, along with considering additional payloads for wider applications.

Budget for test flights in the UK/country of source to ensure that the operator has the required training and that the equipment is fit for purpose before it is shipped long distances to remote places.

Section 3 - Project Finance (Essential)

Project Expenditure

Project Spend (indicative) since last Annual Report	2023/24 Grant (£)	2023/24 Total actual Darwin Plus Costs (£)	Variance %	Comments (please explain significant variances)
Staff Costs				
Consultancy Costs				
Overhead Costs				
Travel and Subsistence				

Operating Costs			
Capital Items			
Others			
Total	24,569.50	24,569.50	0

Please provide a short narrative summary on project finances.

As the main focus of this project was on the purchase of equipment, with a small input of staff time and associated overheads, it was relatively simple for the actuals to align with the budget.

There was no difference between the planned and actual expenses.

There was no co-financing secured for the project.

Section 4 - Contribution of Project to Darwin Plus Programme Objectives

Please select up to **one** indicator that applies within **each group/indicator list (A, B, C, D)** and report your results for that indicator in the text box underneath. If you do not have relevant results to report for any of the indicators in a particular group, you can leave them blank.

Please also submit some form of evidence (above) to demonstrate any results you list below, where possible.

Group A: Capability and Capacity - Core Darwin Plus Standard Indicators (select one)

- Checked **DPLUS-A01: Number of people from key national and local stakeholder groups completing structured and relevant training.**

- Unchecked **DPLUS-A02: Number of secondments or placements completed by individuals of key local and national stakeholders.**

- Unchecked **DPLUS-A03: Number of local/national organisations with improved capability and capacity as a result of project.**

Unchecked **DPLUS-A04: Number of people reporting that they are applying new capabilities (skills and knowledge) 6 (or more) months after training.**

Unchecked **DPLUS-A05: Number of trainers trained reporting to have delivered further training by the end of the project.**

Group A Indicator Results

1 person completed structured and relevant training i.e. Jack Ingledew from SAERI undertook the operator training in UK

Group B: Policies, Practices and Management- Core Darwin Plus Standard Indicators (select one)

Unchecked **DPLUS-B01: Number of new/improved habitat management plans available and endorsed.**

Unchecked **DPLUS-B02: Number of new/improved species management plans available and endorsed.**

Unchecked **DPLUS-B03: Number of new/improved community management plans available and endorsed.**

Unchecked **DPLUS-B04: Number of new/improved sustainable enterprises/ community benefits management plans available and endorsed.**

Unchecked **DPLUS-B05: Number of people with increased participation in local communities / local management organisations (i.e., participation in Governance/citizen engagement).**

Unchecked **DPLUS-B06: Number of Local Stakeholders and Local Communities (people) with strengthened (recognised/clarified) tenure and/or rights.**

Group B Indicator Results

not applicable

Group C: Evidence and Best Practices - Core Darwin Plus Standard Indicators (select one)

Unchecked **DPLUS-C01: Number of best practice guides and knowledge products published and endorsed.**

Unchecked **DPLUS-C02: Number of new conservation or species stock assessments published.**

Unchecked **DPLUS-C03: New assessments of habitat conservation action needs published.**

Unchecked **DPLUS-C04: New assessments of community use of biodiversity resources published.**

Unchecked **DPLUS-C05: Number of projects contributing data, insights, and case studies to national Multilateral Environmental Agreements (MEAs) related reporting processes and calls for evidence.**

Group C Indicator Results

not a applicable

Group D: Sustainable Benefits to People, Biodiversity and Climate - Core Darwin Plus Standard Indicators (select one)

Unchecked **DPLUS-D01 Hectares of habitat under sustainable management practices.**

Unchecked **DPLUS-D02: Number of people whose disaster/climate resilience has been improved.**

Unchecked **DPLUS-D03: Number of policies with biodiversity provisions that have been enacted or amended.**

Group D Indicator Results

not applicable

Section 5 - Project Partnerships, Wider Impacts and Contributions

Project Partnerships

i) The roles of the various partners in the project...

The project partners mainly played a role in scoping out potential ideas and uses for the UAV for their areas of interest. Since the drone has been purchased and the test flights undertaken, there is increasing interest in the opportunities it provides, and SAERI will continue to work with the project partners post project to build on these.

ii) Was the Government of the Territory/Territories involved in this project?

Yes, the partners listed in this project are four departments of the Falkland Islands Government. There was limited involvement in the procurement of the UAV, but each has been in discussions for possible projects since the initial plan to submit the proposal.

iii) Particular achievements, lessons, strengths or challenges with the partnership(s)...

The original plan for this project was to hold monthly meetings with the project partners to discuss potential ideas for use of the thermal UAV with their areas of interest. Due to logistics, it was more suitable to meet with individual partners, where their specific needs could be planned, rather than a broader group approach. These ideas will continue to be developed as the potential is realised for the equipment.

A notable advantage of the partnership lies in the effective communication and keenness to leverage the UAV, especially demonstrated by the swift assessment of Beauchene Island for Avian Influenza. The ability to rapidly confirm the feasibility of conducting surveys showcases the enhanced capacity for such tasks

Wider Impacts and Decision Making

Currently, it's premature to underscore any broader decision-making outcomes stemming from this project. However, it is anticipated that as the enhanced surveying capabilities of this UAV become more recognised, it will play a larger role in future decision-making processes.

Sustainability and Legacy

The acquisition of a thermal imaging UAV, underpinned by the project's focus, promises enduring benefits through its integration into SAERI's equipment programme for routine testing and upkeep, managed by the GIS and Database manager. This ensures the UAV's continuous readiness and legal compliance, reflecting a commitment to sustainability and efficient use of resources.

Securing the H20T thermal imaging camera payload is more than an equipment upgrade; it's a strategic enhancement of capabilities, enabling a broader spectrum of future projects. Post-project, the UAV is set to support environmental work identified by FIG project partners, provided by SAERI, paving the way for innovative data service approaches in various sectors:

- Agriculture: Enhancing crop health monitoring and irrigation efficiency, optimising resource utilisation.
- Energy Auditing: Identifying and rectifying energy inefficiencies, reducing costs.
- Wildlife Monitoring: Tracking animal movements to aid conservation and research.
- Environmental Surveys: Assessing impacts of industrial activities through thermal analysis.

These uses not only demonstrate the UAV's versatility but also solidify its role in advancing environmental stewardship and operational efficiency. This strategic application of technology ensures SAERI and its partners remain leaders in environmental innovation, establishing a sustainable legacy for the UAV project.

Section 6 - Communications & Publicity


Exceptional Outcomes and Achievements





One social media post about the project was issued across multiple platforms (twitter (X), facebook Instagram and linked in. Screenshots of the posts and analytics below.





A project webpage has also been created on the SAERI website and can be accessed via this link <https://www.south-atlantic-research.org/increasing-environmental-monitoring-capacity-on-fi-a-thermal-imaging-uav-dpl00047/>





Photo, video or graphic to be used for publicity and communications.





Please upload at least one relevant and engaging image, video or graphic that you consent to be used alongside the above text in Defra, JNCC or NIRAS communications material.

 [uav](#)
 23/04/2024
 17:46:55
 jpg 252.36 KB

 [test flight](#)
 23/04/2024
 17:46:41
 jpg 314.49 KB

 [temperature](#)
 23/04/2024
 17:46:35
 jpg 139.79 KB

 [colour ramp](#)
 23/04/2024
 17:46:20
 jpg 192.06 KB

 [Social media posts](#)
 23/04/2024
 17:45:26
 pdf 302.74 KB

Photo, video, and/or graphic captions and credits.

Colour_ramp.jpg – Testing various colour ramps whilst flying the UAV over an open fire at Eliza Cove Tip, Stanley, Falkland Islands. © Jack Ingledew, SAERI

Temperature.jpg – using the spot temperature function with post-processing DJI software, Stanley, Falkland Islands © Jack Ingledew, SAERI

Test_flight.jpg – the first flight of the UAV in the Falkland Islands at Eliza Cove Tip, Stanley, Falkland Islands © Jack Ingledew

UAV.jpg – unpackaging and updating firmware in the SAERI office upon arrival, Stanley, Falkland Islands © Jack Ingledew, SAERI

I agree for the Biodiversity Challenge Funds Secretariat, Administrator, and/or JNCC to publish the content of this section.

Yes, I agree for the BCFs Secretariat and/or JNCC to publish the content of this section.

Please list any accounts that you would like tagged in online posts here. This can include project pages, partners' pages or individuals' accounts for any of the following platforms: LinkedIn, Facebook, Twitter, or Instagram.

Twitter/X: @SAERI_FI

Facebook: SAERI - South Atlantic Environmental Research Institute

LinkedIn: @SAERI_FI

Instagram: saeri_fi

Section 7 - Darwin Plus Contacts

Please tick here to confirm that you have read and acknowledged the BCF's Privacy Notice on how contact details will be used and stored and that you have sought agreement from anyone that you are sharing personal details with us on their behalf.

I confirm I have read the Privacy Notice and have consent to share the following contact details

Project Contact Details

Project Contact Name	Tara Pelembe
Role within Darwin Plus Project	Project leader
Email	[REDACTED]
Phone	[REDACTED]
Do you need further sections to provide additional contact details?	<input checked="" type="radio"/> Yes

Additional Project Contact Details

Project Contact Name	Jack Ingledeu
Role within Darwin Project	Project Manager
Email	[REDACTED]
Phone	[REDACTED]
Do you need further sections to provide additional contact details?	<input type="radio"/> No