

Considerations for IAATO Operators carrying authorized/permitted scientists or veterinarians during high risk of Highly Pathogenic Avian Influenza outbreaks in Antarctica and the sub-Antarctic

Introduction:

On 24th February 2024, the first official case of Highly Pathogenic Avian Influenza (HPAI) was confirmed in Antarctica at Primavera Station in skuas^{1,2}. Since then, HPAI has been confirmed at several other sites along the Antarctic Peninsula^{2,3}. To better understand its impact and spread, scientists are planning ways to conduct surveillance in Antarctica, including sample collection. In 2023/24 some scientists reached out to IAATO Operators to assist them in the field to monitor and survey for HPAI arrival into the region. Now that HPAI has arrived in Antarctica, there is likely to be a significant interest in conducting research in the region. IAATO works closely with the SCAR Antarctic Health Wildlife Network (AHWN) to understand the scientific needs and understand the risks associated with working with HPAI.

This document contains important information and guidance for IAATO Operators to consider before carrying scientists* into the field who intend to work near wildlife, including for HPAI sample collection.

*Note: A scientist is anyone wishing to collect samples (animal or environmental), conduct research, or surveillance activities near wildlife colonies, including veterinarians.

Pre-season considerations for Scientific Activities

HPAI is a class 3 pathogen. It is known to **transmit to humans** under special conditions (e.g., those working closely with infected animals).

All Operators carrying scientists into the field to collect samples, even if for reasons **unrelated to HPAI** should assume that the samples **could be contaminated with HPAI and are a potential hazard. Examples include any biological material from animals, including faeces (e.g., for diet or microplastic research), soil and water samples. Animals also harbour human pathogens so even in the absence of HPAI, appropriate care must be taken. If you are supporting sample collection for any reason, take account of the considerations and precautions given below:**



Non-allowable activities

Operators, scientists and veterinarians are **not allowed** to:

- Sample at sites suspected or identified as having HPAI;
- Test samples in Antarctica or the sub-Antarctic from sites suspected or identified as having HPAI or another infectious disease;
- Collect samples from dead wildlife or animals showing signs of infectious disease.

An exception is if, the scientists (including veterinarians) are conducting HPAI research and infectious disease surveillance in Antarctica and the following considerations have been met:

- 1 Appropriate permits/authorizations have been issued by a relevant national Competent Authority, allowing access and sample collection from a suspected or confirmed site;
- 2 An appropriate risk assessment has been conducted by the science team (and approved by the Operator) to ensure risk to scientists, expedition staff and guests is minimal; including
 - a) Appropriately trained personnel;
 - b) Appropriate biosecurity procedures and risk assessments.
 - c) Appropriate PPE including training in its use and removal⁴;
 - d) Use and handling of sampling kits;
 - e) Use, handling and storage of samples and waste, including for onward transport to final destinations;
- 3 Scientists' permits for export and import of samples allow for the export/import of samples that have been collected from *"an animal/environment where an infectious disease is confirmed or suspected"*. Note:
 - a) Regulations/restrictions of handling class 3 pathogens will differ from country to country;
 - b) Some countries will change their rules at short notice and ban samples from particular regions due to infectious disease or may require samples to be sent to an appropriate facility.
 - c) If appropriate export permits are not obtained, samples will not be allowed to leave the vessel.
 - i E.g., In Ushuaia, the scientist will need to work with a Customs Agent to obtain necessary permits for export. Note these take time to arrange and need to be prepared in advance.
- 4 Final testing plans are in place including:
 - a) Appropriate facilities for testing are available at the final destination for the samples;
 - b) State/national laboratories have the capacity and willingness to analyse collected samples;

Under no circumstances should live virus (e.g. Samples stored in Virus Transport Media) be brought on board any vessel engaged in tourism operations.

- For scientific purposes including detection and sequencing of the virus, live virus is not required.
- Anyone wishing to work with live virus should work from a private vessel or National Program.
- **All** biological samples (e.g. faeces, swabs, etc) from wildlife must be deactivated in the field (e.g. before being brought back to the vessel) by storing in a preservation buffer that inactivates pathogens including HPAI (e.g., DNA/RNA shield, RNA Later, Nucleo Protect).
- Buffers such as Virus Transport Media, not only keep the virus alive, but enhances its growth and should **not** be used.

RPAS REMINDER

IAATO Operators are **not allowed** to fly RPAS over or near concentrations of wildlife under any circumstances (see *IAATO Statement on the use of Remotely Piloted Aircraft Systems. IAATO Field Operations Manual, section 07*).

Under special conditions, scientists may be allowed to fly RPAS over or near concentrations of wildlife for the surveillance, detection and monitoring of HPAI with appropriate permits, and authorization from a national competent authority (See Appendix I - *Antarctic Wildlife Health Network Guidelines for use of Remotely Piloted Aircraft Systems for Scientific Surveying During Wildlife Disease Outbreaks in Antarctica and sub-Antarctic regions*).



For Operators carrying scientists who are working with HPAI or may come into contact with HPAI (e.g., working close to wildlife, collecting guano samples, etc) Standard Operating Procedures (SOP) should be created by the scientist in collaboration with the Operator. Staff, and crew should be appropriately informed regarding these SOPs.

Practical Considerations for Supporting Scientists in The Field

If you are an Operator considering carrying scientists into the field to **sample for HPAI ensure you address the following questions with the scientist and your staff before agreeing to support them. We strongly recommend including an interview in this process:**

Topics	Questions to Ask of the scientist	To Your Organization
Project proposal, SOPs and risk assessments	Request a project proposal, SOPs and risk assessments. These should include: Objectives of the study Methodology (not just field based but post field analysis) Skills and expertise of all team members via a one page CV. Do they have SOPs and/or risk assessments for ALL aspects of the project: Data collection, transport, use and removal of PPE, etc.	Ensure you, the Operator, and your staff, understand any SOPs and Risk Assessments being used by the scientists being supported, such as for sampling or use and removal of PPE. You should consider field-based decontamination protocols to reduce the risk of HPAI being brought onto small boats, and reduce the exposure risk to staff/guests. Consider performing drills as part of your scenario planning; Ensure you and your team, including the EL and AEL, fully understands what type of sampling will be done and the risks involved. Consider carefully how you and the research team will communicate the activity to your crew, staff and guests.
Permits / Authorizations	Do Permits/authorizations cover all activities related to the scientific activity such as sampling, waste disposal (including at gateway ports), exports, use of RPAS? Is the scientist's permit/authorization separate to yours? If so, will they report to the National Competent Authority that issued it?	Check all details carefully. EL, AEL and field staff MUST be familiar with these details so they can check that all activities align with the provisions laid out in the permit/authorization. Ensure copies are available on board. Have you discussed all shared intentions with your National Competent Authority?
Ethics ¹	Are they handling wildlife? Do they require ethics training or certification?	Ask for details and check them carefully to understand the scope.
Methodology	What are the methods / collection processes in the field	Organize for scientist to explain details of project and methodology to field staff to provide opportunity for questions and raise any concerns. Field staff will be the ones who will field most questions from guests and will observe scientists in the field.
PPE and Sample Collection	What PPE will they provide / use? ⁴ Do they have an appropriate SOP for use and removal of PPE in the field and what training will be done prior to deployment to the field? What storage and handing requirements to they have?	Does your vessel/facility have storage for contaminated PPE and waste, away from people and food areas (i.e. restricted access)? Do you have enough storage space? Do you have appropriate equipment and procedures for handling and storing contaminated waste (e.g. biohazard bags sealed in clearly labelled barrels/bins)? Consider how and when PPE will be removed in the field. How will the waste be managed at gateway ports?
Import / Export	Do they have export permits from gateway cities, including ship to aircraft? Do they have import permits (for home country) and required licenses for sending a class 3 pathogen across borders?	Ask for proof of appropriate export licenses when appropriate. If appropriate permissions are not in place, the samples may not be allowed to leave your vessel.

¹ In most countries, governments have regulatory responsibility for animal welfare, including the care and use of animals for scientific purposes. All universities will have an animal ethics committee which reviews the appropriate and humane use of animals for scientific purposes. For example guidance, see these links to US [National Science Federation](#) and Australian [National Health and Medical Research Council](#).



Topics	Questions to Ask of the scientist	To Your Organization
Testing	Do the scientists have agreement from a certified laboratory for testing of samples at the final destination?	
Experience and skills	<p>Do the scientists have relevant training and experience? Their academic background and experience should be relevant to the intended activity (e.g. microbiology/virology/molecular sciences (for analysis of HPAI), wildlife biology or biological sciences (for wildlife))</p> <p>Consider all proposed activities, e.g. use of RPAS; experience working with Antarctic wildlife; wearing and removal of PPE; sampling etc.</p> <p>While the risk of HPAI remains high, it is not recommended to invite scientists on to your program who are doing the activity in Antarctica for the first time or do not have experience working with Antarctic wildlife or infectious diseases</p>	Consider doing your own desktop research on the scientist's background to help you ask the right questions. This can help identify any issues in the pre-planning stage and manage expectations. For example, if the researcher uses RPASs for other projects, but the proposal presented to you doesn't explicitly mention them, you might ask about this to check they weren't expecting to use them in the field.

- After getting the above information, do a final review and assessment before making your decision:
 - Consider if the project is appropriate for your operation? (e.g. for tourism operations, how will your guests perceive this activity? Could it be distressing to them or your staff to witness? What is the impact if guests post videos of any part of the activity on social media?)

If you, the Operator, or your teams are **not comfortable** about any part of the research, including sampling techniques or the person conducting the sampling collection, even if they have a permit/authorization, **you should say no**.

Operator Responsibilities if you DO Bring Scientists to Antarctica

- Ensure you have protocols in place for managing a situation where humans contract HPAI. It is important that this possibility is discussed with your medical team and that appropriate SOPs are in place.
 - **Note, Rapid Antigen Tests are not recommended for Avian Influenza (for human or animal infection), due to high levels of inaccuracy and should never be used.**
- If your EL, AEL or field staff express concerns about the scientists' activities during field operations, consider suspending activities and investigate. If required, report any unethical or dangerous behaviour to IAATO.
- Ensure copies of all permits/authorizations are available to relevant staff and crew in the field. The EL, AEL and other relevant staff MUST be familiar with these details so they can check that all activities align with the provisions laid out in the permit/authorization.
- Inform your National Competent Authority and IAATO that you are supporting the activity and provide copy of their permit.

Communications

- Organize for the scientist to explain details of the project and methodology to field staff to provide opportunity for questions and raise any concerns.
- Additionally, scientists should present a talk at the beginning of the expedition to all guests on board providing information on the research they are doing and that they are permitted to conduct the activity by an appropriate Competent Authority.
- Have a Communications Policy in place that includes, but is not limited to:
 - A clear statement about how the discovery of suspected cases of HPAI in the field will be communicated to staff, crew and guests. For example, scientists must inform the EL immediately if they suspect HPAI. EL will then follow appropriate reporting procedures to communicate with staff, crew and guests, including assistance from scientist if necessary;
 - A recommendation that scientists will not communicate suspected cases with media or via social media without permission from the Operator/IAATO;
 - How to manage known journalists or other communicators on your expedition;
 - Your response should guests post videos or images on social media about HPAI or related science activities in the field.
- In most cases, behavioural signs and unusual mortality will alert people to the suspected presence of the disease; it will not be possible to confirm the presence of HPAI. Therefore, HPAI should only be referred to as 'suspected' when communicating why landings have been cancelled or aborted.
- The EL and scientist should coordinate communications channels that follow established protocols as described through IAATO in seasonal documentation.
- If required, scientist may report to the Competent Authority that issued their permit/authorisation if separate to the Operator's.



References:

CSIC 2024. Scientists from the Severo Ochoa Molecular Biology Center of the CSIC confirm the presence for the first time in Antarctica of the Highly Pathogenic Avian Influenza virus. <https://www.csic.es/es/actualidad-del-csic/cientificos-del-centro-de-biologia-molecular-severo-ochoa-del-csic-confirman-la-presencia-por-primera-vez-en-la-antartida-del-virus-de-la-gripe-aviar-altamente-patogenica>

SCAR sub-Antarctic and Antarctic Highly Pathogenic Avian Influenza H5N1 Monitoring Project. <https://scar.org/library-data/avian-flu#cases>

Benjamín Bennett Lazo, Bárbara Berazay, Gabriela Muñoz, Naomi Ariyama, Nikita Enciso, Christina Braun, Lucas Krüger, Miloš Barták, Marcelo González-Aravena, Victor Neira. (2024). Confirmation of Highly Pathogenic Avian Influenza (HPAI) H5N1 Associated with an Unexpected Mortality Event in South Polar Skuas (*Stercorarius maccormicki*) during 2023-2024 Surveillance Activities in Antarctica. bioRxiv 2024.04.10.588951; doi: <https://doi.org/10.1101/2024.04.10.588951>

SCAR Antarctic Wildlife Health Network (2023). Biological Risk Assessment of Highly Pathogenic Avian Influenza in the Southern Ocean.

<https://www.scar.org/library/science-4/life-sciences/antarctic-wildlife-health-network-awhn/5973-risk-assessment-avian-influenza/file/>

IAATO Statement on the use of Remotely Piloted Aircraft Systems. IAATO Field Operations Manual, section 07.

Hart, T., Dewar, M.L., Humphries, G. (2023). Antarctic Wildlife Health Network Guidelines for use of Remotely Piloted Aircraft Systems for Scientific Surveying During Wildlife Disease Outbreaks in Antarctica and sub-Antarctic regions.



ANNEX I

IAATO Guidelines for use of Remotely Piloted Aircraft Systems for Scientific Surveys During Disease Outbreaks in Antarctica and sub-Antarctic regions

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The following guidelines have been created in response to IAATO queries and specifically for scientists using Remotely Piloted Aircraft Systems (RPAS) in Antarctica and the sub-Antarctic during wildlife disease outbreaks and on IAATO vessels.

Remotely Piloted Aircraft Systems (RPAS) offer an exceptional opportunity to remotely and minimally-invasively survey populations with suspected disease outbreaks such as Highly Pathogenic Avian Influenza (HPAI). Guidelines for use and permitting conditions are available via the Antarctic Treaty System, but here we summarise them and add considerations for RPAS use during disease outbreaks including HPAI and to provide clarity, especially to IAATO Operators.

Scientists are able to remotely survey for and monitor active HPAI outbreaks without direct contact with infected animals thus reducing exposure of humans to a possible zoonotic pathogen and limiting the potential spread. Videos are especially useful for the identification of behaviours, monitoring of disease outbreaks and assessing its impact and should be shared with national permitting bodies. Other benefits include less disturbance to the animals as this is a less invasive approach, it is a faster and less expensive method to survey the area and can be conducted even if conditions are unsuitable to land at a site.

We recommend the use of RPAS for early surveillance and detection of HPAI, monitoring of active outbreaks and gathering of important evidence in relation to the spread and movement of HPAI within a colony and the overall impacts HPAI has had on a colony.

However, any use of RPAS must be appropriately permitted/authorised by a relevant Competent Authority following risk and Environmental Impact Assessments that consider the below guidelines, as well as detailed information about other non-disease related risks to wildlife (e.g., noise disturbance, collisions, environmental waste).

RPAS activities must only be undertaken by trained pilots with experience of flying over wildlife. While appropriate guidance and recommendations will help limit disturbance, RPAS activities should by default be considered as invasive for birds and only be used when necessary (Brisson-Curadeau et al., *Accepted*).

Flying or landing in a manner that disturbs concentrations of birds and wildlife is prohibited in Antarctica except in accordance with a permit issued by an appropriate authority under the Madrid Protocol (ATCM Resolution 4 (2018) Annex). In the context of activities that are permitted for HPAI surveillance, detection and monitoring, disturbing concentrations of wildlife is not recommended.

Minimum Qualifications for RPAS pilots performing scientific surveys

Local experience is vital for a safe flight and avoiding disturbance. In the context of HPAI, flights need extra safety margins given that in the event of a crash, it may not be possible to recover the RPAS.

- Commercial RPAS Pilot Licence from a relevant Competent Authority. For example, Fed 107 issued by the FAA in the USA, or A2CofC issued by the CAA in the UK;
- Minimum of 10 hours of experience flying the RPAS listed on the relevant permit 90 days prior to deployment;
- At least five permitted flights over or near wildlife (in Antarctica or elsewhere). If not, then the RPAS pilot must have an additional 10 hours of flight time in the six-month period before deployment, and must have their first five flights over wildlife supervised by an experienced Antarctic RPAS pilot who can take control of the aircraft if necessary (i.e., standing in close proximity to the pilot);
- Previous experience working in the Antarctic, and at least five flights supervised by an experienced Antarctic wildlife RPAS pilot;
- An experienced observer looking for signs of behavioural change in the target wildlife due to presence of the RPAS;
- Permitted for RPAS flying with all pilots listed from a relevant permitting authority and must include flying over wildlife.



Suitable Aircraft

We refrain from listing suitable aircraft as the market is constantly changing, but due to the conditions experienced around the Southern Ocean and in Antarctica, aircraft should have:

- 25+ kt wind max tolerance;
- Minimum operating temperature of -10 degrees Celsius;
- Approximately 20 minute flight time at 0 degrees Celsius;
- GPS navigation;
- Dedicated control pad (i.e., not controlled by a smart-phone).

We highly recommend aircraft have visibility markings (e.g., reflective tape). Floatation devices are optional as they affect the aircraft's flight characteristics. Far more important is the pilot's approach to flying well within the capacity of the aircraft given the conditions and not to fly if the flight becomes less likely to be completed safely.

Suitable flying conditions

The RPAS pilot and observer must have a flight plan in place before leaving the operator's vessel that considers weather conditions and other possible risks to the survey. The following conditions are considered suitable and if they should worsen in any of these three categories, the flight should be aborted:

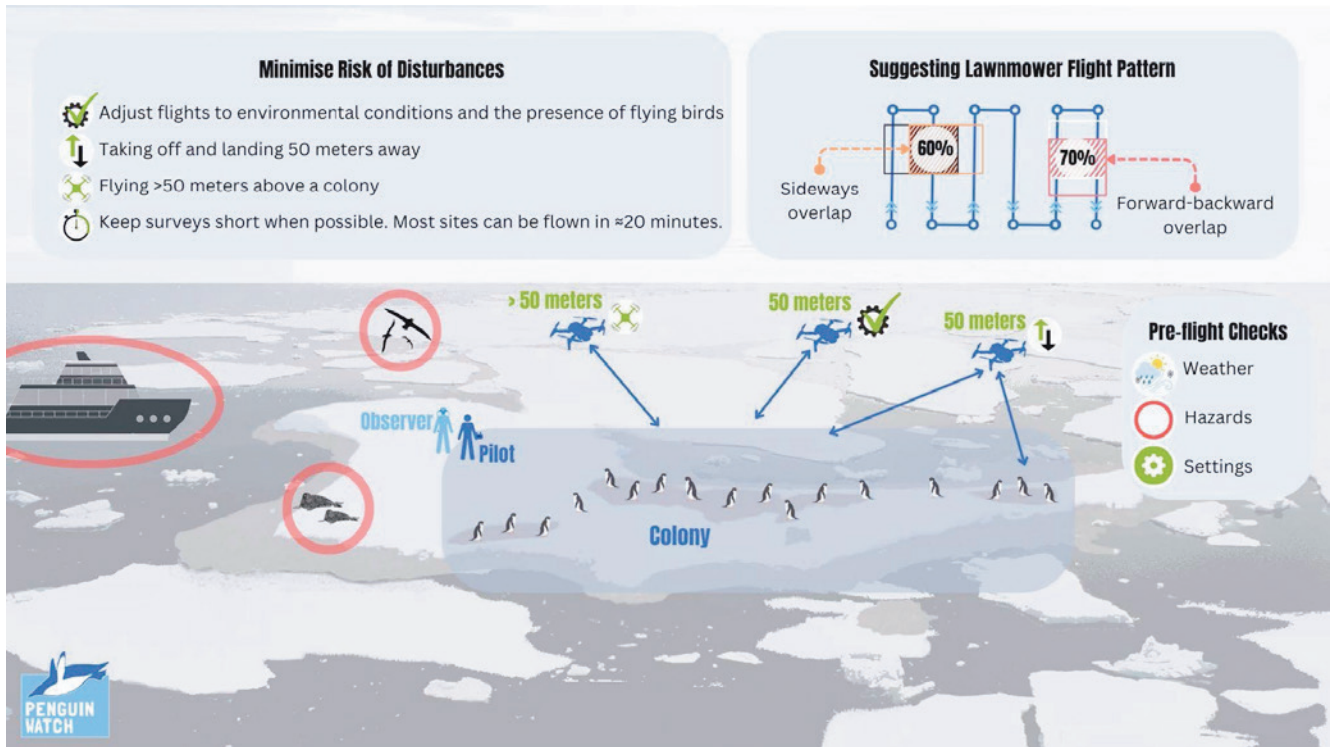
- Wind speeds < 20 kts (monitored by communication with the operator's vessel);
- Good visibility (> 200m);
- Minimal precipitation - stop flights if precipitation decreases visibility to < 200m.

Flying over colonies

Flight teams on land or water (i.e., boat-based) launches must include an observer to monitor wildlife for changes in behaviour due to presence of the RPAS, and watch for flying seabirds that might interact with the RPAS. The observer should be standing close enough to the pilot to be able to communicate instantaneously without raising their voices. Pilots should take off at least 50 m from birds or highways. Automated flight paths are often preferable for data collection, but pilots must be able to take manual control in the event of a flying seabird interacting with the RPAS. A hard-deck of 30m should be maintained above nesting penguins during flights (Brisson-Curadeau et al., *Accepted*). Due to skua being more susceptible to the impacts of disease outbreak (i.e., particularly HPAI), RPAS should maintain a distance of 50m from nesting brown and south polar skua.

Biosecurity

Upon completion of flights, all gear should be disinfected with biocide wipes or soap and bleach prior to being used at another site. This includes removing any solid material on either the drone or carrying cases. For ease, a landing pad for the RPAS should be used which can be easily biosecured.



Unplanned forced landing or loss of aircraft

In the case of a crash landing near wildlife, the RPAS should not be recovered if HPAI is suspected, unless permits include sampling of known HPAI and with appropriate PPE (please see Dewar et al 2023 for guidance). If HPAI is not suspected, the RPAS may be retrieved but with HPAI PPE precautions. The impetus should be on avoiding flights if they cannot be completed successfully. If the RPAS is lost, the National Competent Authority (NCA) and IAATO should be informed upon return to the vessel.

Detection of HPAI

If HPAI is suspected, RPAS flights may still take place, but from a vessel (e.g., a small boat such as a zodiac, RIB, or the deck of the ship (pending permission from the Captain of the vessel and the deck being within 500m of the colony)). If HPAI is detected during a land-based flight operation (e.g. HPAI was not detected via pre-landing surveys), the RPAS must be aborted and all personnel must return to the landing site immediately for evacuation of the landing. Once onboard the ship, all personnel and equipment must be decontaminated. After decontamination, if possible and with the Captain's permission, a flight to assess the extent of the outbreak can be conducted from a vessel.

Deep field operations

Deep field operations that have fieldworkers, including **scientists** who are permitted to fly drones over Emperor penguins must adhere to the land-based guidelines as laid out in this document. However, we recommend that the distance to Emperors be increased to 70m as per Rümmler et al. (2021).

Working with tourist operators

Ultimately, operators will be responsible for determining if RPAS activity can take place. For example, if inclement weather is incoming, the operator can cancel operations and pilots will have to return to the RPAS home point (i.e., point of launch or control pad) immediately and leave the landing site. In the case of HPAI, if the operator is uncomfortable with any RPAS operations (i.e., oncoming weather, high swell oc, too many dead or dying birds), they have the authority to cancel RPAS operations or prevent them from taking place.

References

Brisson-Curadeau, E., Lacombe, R.¹, Gousy-Leblanc, M., Poirier, V., Jackson, L., Petalas, C., Miranda, E., Eby, A., Baak, J., Léandri-Breton, D-J, Choy, E., Legros, J, Tranze-Drabina, E., Elliott, K,H. 2024. A meta-analysis of the impact of drones on birds. *Frontiers on Ecology and the Environment*. Accepted

Dewar, M., Vanstreels, RET, Boulinie, T., Cary, C., Clessin, A.,Gamble, A., Gray, R., Grimaldi, W., Hart, T., Morandini, V., Leonardi¹, S., Uhart, M., Younger, J., Wille, M. 2023. Biological Risk Assessment of Highly Pathogenic Avian Influenza in the Southern Ocean. Scientific Committee on Antarctic Research, Cambridge UK. <https://www.scar.org/library/science-4/life-sciences/antarctic-wildlife-health-network-awhn/5973-risk-assessment-avian-influenza/file/>

Environmental Guidelines for operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica (v 1.1). Antarctic Treaty Consultative meeting Resolution 4 (2018) Annex (https://documents.ats.aq/recatt/att645_e.pdf)

IAATO Statement on the use of Remotely Piloted Aircraft Systems (RPAS)

Rümmler, M.C., Esefeld, J., Pfeifer, C. and Mustafa, O., 2021. Effects of UAV overflight height, UAV type, and season on the behaviour of emperor penguin adults and chicks. *Remote Sensing Applications: Society and Environment*, 23, p.100558.

