Standing conditions for drone operations on South Georgia & the South Sandwich Islands

All drone operators in SGSSI must agree to adhere to the following conditions. If you are unable to meet any of these conditions this must be clearly identified in your RAP application with a clear justification and suggested alternate mitigation. Please note that there is no exemption for drones weighing less than 250g on South Georgia.

Suitable aircraft

All drones must:

- Be powered by electric motors only.
- Have GPS and be capable of autonomous return to the launch point if contact is lost.
- Have a telemetry system capable of sending real time data to the pilot, including current altitude, speed, orientation and distance from the launch point.
- Have an alarm which is audible to the pilot when the battery is below 30% charge.
- Have an auto-land/return to home feature that triggers before the battery voltage falls below the voltage needed to sustain flight.

NOTE: Drones fitted with any active sensors (e.g., LiDAR) or ability to carry and/or drop a payload must be declared and will be subject to Category 2 Regulated Activity Permit application.

Planning and training

- You must have a permission under the Air Navigation (Overseas Territories) Order to operate a drone within 12nm SGSSI. This will specify dates of operation and named pilots.
- Pilots should be suitably experienced and have undertaken test flights in an environment which is comparable to the proposed flight locations on South Georgia. A CV and flight log may be requested as evidence of this.
- If a pilot has insufficient experience in flights in comparable conditions, a plan of how this experience will be developed through test flights in wildlife free areas must be submitted to and approved by GSGSSI
- For routine monitoring flights, automated flight paths are preferred

Flight Operations – all flights

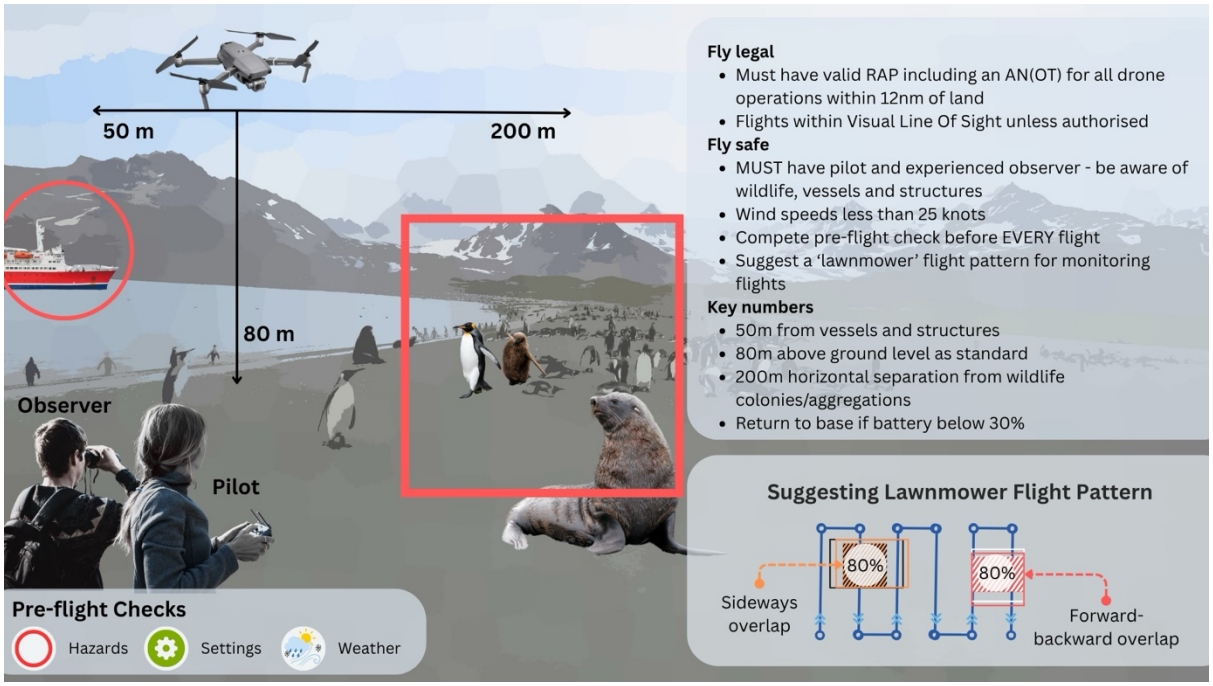
YOU MUST ADHEAR TO ALL CONDITIONS OF AN(OT)O

- There are high wildlife concentrations at many locations on South Georgia. Consider carefully where you fly and how to avoid disturbance.
- All drone operations must consist of a pilot and experienced observer who is familiar with South Georgia wildlife and worked with drones before.
- Safety systems of the aircraft must be tested prior to every flight.
- Flights must not be started in winds exceeding the aircraft manufacturers guidelines or 25 knots. If the winds substantially increase or gusts make the aircraft unstable, flights must be aborted, if visibility that is not consistent with Visual Line Of Sight (VLOS) operations unless BVLOS has been authorised under AN(OT)O.

- There must be a designated take-off and landing site which is at least 50m away from people who are not directly under control of the pilot/observer.
- Take-off and landing areas must be free from seabirds and seals.
- Drones must not be flown within 50m of any vessel, vehicle or structure which is not under the control of the person in charge of the aircraft, or for which they have explicit permission for from the Master of that vessel.
- Unless otherwise specified in your AN(OT)O permission and agreed with GSGSSI, the ceiling height for drone operations is 400 ft.
- Flights must be within VLOS at all times, unless specifically authorised under AN(OT)O. Binoculars may be used to assess and avoid wildlife presence and monitor impact but the drone MUST remain observable with unaided vision.
- Flights must be completed with more than 30% battery remaining. Flights should be precautionary and land with reserve, especially if needing to return to a vessel.
- No flights are permitted near buildings at King Edward Point or Grytviken without the permission of the Government Officer.
- No flights are allowed over Prohibited Areas surrounding the whaling stations at Stromness, Leith, Husvik or Prince Olav Harbour unless specifically agreed with GSGSSI.
- In the event of a crash or unscheduled landing, every effort must be made to recover the drone unless in doing so would cause disturbance to wildlife or involve entry into a Prohibited Area or otherwise unsafe environment.
- Observers must be vigilant for disturbance to wildlife. Disturbance means a change in behaviour, such as groups of birds taking off, skuas paying attention to drone in flight, seals raising their heads or moving to the sea, penguins moving as a group.
- Other drone operators may be present at sites. In the event other parties are present, you must liaise to determine the scope of their permitted activities and if UAV flights are planned should liaise with each other prior to commencing operations to ensure that adequate systems are in place to monitor UAV path in relation to other aircraft, persons, vessels and structures for the purpose of avoiding collisions.

Category 1 RAP - landscape only flights

- Flights must be 200m (horizontal) from known colonies or observed aggregations of wildlife for take-off and the duration of flight.
- Flights must maintain horizontal distance of 200m from cliff edges where seabirds may nest.
- Minimum flight height of 80m Above Ground Level (AGL) to avoid disturbance of unseen wildlife.
- If observers see any evidence of disturbance, move the drone further away (greater altitude and/or horizontal separation) or stop the flight. This should be reported in feedback form to GSGSSI
- Suggest using lawnmower flight pattern for monitoring flights



Category 2 RAP - flights over wildlife

If you have need to fly directly over wildlife you must complete a Category 2 RAP application form and meet the following conditions:

- For flights over penguins and seals minimum height of 50m AGL
- For flights over flighted birds including albatross, shags, terns etc, initial flight height should be 100m AGL. If no disturbance is observed after a test flight, flight height can be incrementally reduced to a minimum of 50m AGL.
- **Do not** overfly displaying birds (e.g courting albatross on Prion Island)
- Flight operations must be planned to minimise noise and changes of direction and speed over wildlife aggregation. Changes of direction or speed must be at least 50m outside the colony boundary.
- If disturbance to wildlife is noted by observers, the flight must be increased to 100m AGL or ceased. This should be reported in feedback form to GSGSSI
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NOTE: permission for flights over wildlife is usually only given if required for research/monitoring or for media projects that have significant global reach

Flights on the South Sandwich Islands

NOTE: for flights on the South Sandwich Islands the above conditions apply but additional mitigation measures may be needed depending on the nature and extent of planed activities. These should be detailed in your RAP application and appropriate additional mitigation measures identified and agreed with GSGSSI

Cited literature

Barr, J.R., Green, M.C., DeMaso, S.J. & Hardy, T.B. 2020. Drone Surveys Do Not Increase Colony-wide Flight Behaviour at Waterbird Nesting Sites, But Sensitivity Varies Among Species. *Scientific Reports* 10: 3781.

COMNAP (Council of Managers of National Antarctic Programs) 2021. *Antarctic Flight Information Manual* (AFIM).

Dickens, J., Hollyman, P.R., Hart, T., Clucas, G.V., Murphy, E.J., Poncet, S., Trathan, P.N. & Collins, M.A. 2021. Developing drone monitoring of South Georgia and the South Sandwich Islands' Iconic Land-Based Marine Predators. *Frontiers in Marine Science* 8: 630.

Harris, C.M. (ed.) 2021. *Wildlife Awareness Manual: Antarctic Peninsula, South Shetland Islands, South Orkney Islands. Second Edition.* Prepared for the UK Foreign, Commonwealth & Development Office, German Federal Ministry for the Environment and the International Association of Antarctica Tour Operators. Environmental Research & Assessment, Cambridge.

Krause, D.J., Hinke, J.T., Goebel, M.E. & Perryman, W.L. 2021. Drones Minimize Antarctic Predator Responses Relative to Ground Survey Methods: An Appeal for Context in Policy Advice. *Fronters in Marine Science.* 8: 648772

Mustafa, O., Barbosa, A., Krause, D.J., Peter, H.-U., Vieira, G. & Rümmler, M.-C. 2018. State of knowledge: Antarctic wildlife response to unmanned aerial systems. *Polar Biology* 41: 2387–2398.

Ratcliffe, N., Guihen, D., Robst, J., Crofts, S., Stanworth, A. & Enderlein, P. 2015. A protocol for the aerial survey of penguin colonies using UAVs. *Journal of Unmanned Vehicle Systems.* 3: 95–101.

Weimerskirch, H., Prudor, A. & Schull, Q. 2018. Flights of drones over sub-Antarctic seabirds show species- and status-specific behavioural and physiological responses. Polar Biology 41: 259–266.

SCAR (Scientific Committee on Antarctic Research) 2019. *An update to the state of Knowledge of wildlife responses to unmanned aerial vehicles.*