Do the Environmental Guidelines for operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica (v 1.1) need to be revised?

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**Working Paper submitted by Germany**

***Summary***

This paper examines the question of whether the RPAS Guidelines (v 1.1) adopted with Resolution 4 (2018) should be revised. Two main assessments were carried out to clarify this question. Firstly, the technical development of drone technology was summarised and the state of scientific knowledge of the impacts of drone use on Antarctic wildlife since the Guideline’s development in 2017 was evaluated. Secondly, a survey was conducted among interested National Competent Authorities of the Antarctic Treaty Parties. The evaluation revealed a need to improve the content and structure of the RPAS Guidelines (see IP39). Finally, recommendations are given for the future revision of the RPAS Guidelines.

***Introduction***

Remotely Piloted Aircraft Systems (RPAS[[1]](#footnote-1)) are increasingly used in the Antarctic Treaty Area. The technology offers many benefits, including for science and operations, and also has the potential to reduce environmental impacts and to improve safety in some circumstances. RPAS can be less invasive than conventional methods like helicopters or aircraft, i.e. their use in the field is associated with a lower potential for wildlife disturbance. This also applies in principle to the area of application outside scientific research. Here, however, there is also the danger of future mass use, e.g. in the field of touristic or recreational application, even in Antarctica, if it is not appropriately regulated.

Guidelines and handbooks have been developed to address operational and safety aspects of RPAS in Antarctica (COMNAP 2016), and a number of Parties have also prepared practical manuals for RPAS use (e.g. Spain 2015; New Zealand 2017; BAS 2017). In addition, IAATO has also developed policies for member use of RPAS (IAATO 2016), which currently prohibit recreational use of RPAS by members in coastal areas of Antarctica.

In addition to that and because of the rapidly growing use of RPAS in the Antarctic Treaty Area and its partly known impacts on wildlife, Environmental Guidelines for RPAS were developed during an intersessional ICG in 2017/2018, which was convened by Germany (see ATCM XL IP38 *Use of UAVs in Antarctica - A competent authority’s perspective and lessons learned* & ATCM XLI WP29 *Report from the CEP Intersessional Contact Group to develop guidelines on the environmental aspects of the use of Unmanned Aerial Vehicles (UAVs) / Remotely Piloted Aircraft Systems (RPAS) in Antarctica*). With Resolution 4 (2018) the Environmental Guidelines for operation of Remotely Piloted Aircraft Systems (RPAS) in Antarctica (v 1.1) were adopted.

Four years after the adoption of the Guidelines, Germany raises the question whether the current state of knowledge and the experiences gathered so far with the Guidelines could already justify a revision of the Guidelines. In that sense, aims and purposes of this paper are:

1. to review and up-date the available information regarding the environmental impacts on wildlife of RPAS since 2017;
2. to draw conclusions from the assessment of the survey based on questionnaire feedbacks from National Competent Authorities regarding their opinion on the RPAS Guidelines (see IP39);
3. to recommend whether and when the RPAS Guidelines should be revised.

***State of knowledge regarding the environmental impacts of RPAS on wildlife***

While the need for comprehensive data on the impacts of RPAS on Antarctic wildlife has been expressed repeatedly since the development of the ATCM guidelines (Harris et al. 2019), very few studies have been conducted specifically to gain knowledge on this topic. Three studies were focused on penguins in the colony during breeding period (Krause at al. 2021, Rümmler et al. 2021a, b). Further, three species of seals have been investigated (Krause et al. 2021, Laborie et al. 2021). In flying bird species, two additional studies were conducted (Fudala & Bialik 2022, Rexer-Huber 2020). With the knowledge gathered, the emperor penguin can be added to the list of species with known recommended minimal flight distances (Harris et al. 2019), and the data quality of knowledge foundation of already included species can be significantly improved for five species. For most species, further information is still needed; for example, different times during the breeding cycle, different locations, various RPAS models. For the majority of Antarctic species, the information available still has to be categorised as ‘data poor’ or ‘extremely data poor’ (Harris et al. 2019), or there is no information available at all. In general, data on impacts of fixed wing RPAS on wildlife is extremely sparse.

***Technical development of RPAS deployment***

In recent years, RPAS have undergone technical developments that necessitate changes in the regulations of their usage. RPAS advancements include improved collision avoidance systems, longer flight periods (and hence less starting and landing events with their associated increased risks of impacts) and developments of out-of-line-of-sight systems. Easier availability, more affordable prices and easier handling/more user-friendly systems lead to widespread applications through the fields of science, journalism, tourism, logistics and others. Systems used in the consumer market also include higher safety standards, making save deployment possible even for not well-experienced users. Higher security, particularly in regions with multiple (airborne) human activities, is increasingly expected in coming years due to remote identification systems and Automatic Dependent Surveillance–Broadcast (ADS-B) receivers. Additionally, external conditions for RPAS flights have developed to ensure increased flight security: high resolution digital elevation models are available for more extensive areas in Antarctica and a higher satellite density leads to better Global Navigation Satellite System (GNSS) reception.

***Summary of responses to the questionnaire on RPAS use by Competent Authorities (see IPXX)***

In order to receive feedback from different National Competent Authorities regarding their opinion on the RPAS Guidelines, Germany carried out an opinion poll based on a questionnaire. Different recommendations can be derived from the results of the feedback given by interested Parties (see IP39). The evaluation has shown, inter alia, that the majority of Parties that responded, use RPAS as part of their activities (89 %),. All competent authorities of the Parties that responded know the Guidelines and most of them have worked with them already (84 %) or have even included them as a requirement of the permitting process or in the Environmental Impact Assessment (79 %). The answers show that most applications were submitted by scientists (mean = 2 applications/year), followed by tourism (1.6 app/year) and journalism (1.2 app/year). The fewest applications were made for logistical purposes (0.83 app/year) and others (0.17 app/year), including communication purposes and recreational use. In average, 25 % (0-80 %) of permit applications include RPAS use. Most authorities consider the RPAS Guidelines (v1.1) as useful (11/17) or adequate (4/17), while one authority deemed it useful with limitations and one not useful. For most authorities they are well balanced (14/16), for two authorities they are too weak in its current state.

Comments on possible future improvements of the guidelines included a number of proposals that can be viewed in detail in IP39. The most commonly mentioned topics included:

* specific minimum distances to animals;
* RPAS operation and reporting forms;
* specific limitations on RPAS characteristics (weight, size, noise level);
* requirements of certifications (Ingress Protection, airworthiness);
* coordination and restrictions of multiple RPAS usage in one area or in areas of manned flight activities;
* consideration of non-scientific applications and a more user-friendly/more comprehensive version of the guidelines.

***Conclusion***

From the points made above, it can be concluded that there is a definite need for action with regard to a revision of the RPAS Guidelines (v 1.1), despite the fact that the level of scientific knowledge on the impacts of RPAS use on wildlife has only increased slightly since the RPAS Guidelines were adopted.

***Recommendation***

The CEP is invited to consider the following recommendations which are based on the feedback of the survey amongst national competent authorities, the technical advancements and the state of knowledge on the impacts of RPAS use on Antarctic wildlife:

1. consider the need for a structural as well as a substantive revision of the guidelines, including, but not necessarily limited to:

* a user-friendly, comprehensive summary or short version of the guidelines
* a report form for accidents/incidents as a guideline attachment
* inclusion of specific minimal distances to wildlife and of specific RPAS limitations
* requirements of certifications for RPAS and pilots
* restrictions for multiple activities in one area

1. establish, as appropriate, an informal ICG in 2022 to discuss this issue further and set up Terms of Reference for a formal ICG with the aim of a comprehensive revision of the RPAS Guidelines commencing right after CEP XXV;
2. encourage Treaty Parties to carry out further studies and to collect information about the impacts of RPAS use on Antarctic wildlife.

1. A Remotely Piloted Aircraft System (RPAS) is defined by the International Civil Aviation Authority (ICAO) (2015) as “A remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other components as specified in the type design”. A Remotely Piloted Aircraft (RPA) is “An unmanned aircraft which is piloted from a remote pilot station”. RPAS are one class of Unmanned Aerial System (UAS), and they are often referred to as Unmanned Aerial Vehicles (UAVs), Unmanned Aircraft Systems (UAS) or ‘drones’. In this context RPAS is used for all types of remotely piloted drone systems, the term which has also been adopted by COMNAP, SCAR and a number of national authorities, and RPA is used to refer specifically to the aircraft itself. [↑](#footnote-ref-1)