



Australian Government

Department of the Environment and Energy

Dr Gordon de Brouwer PSM
Secretary

MS16-002184

Dr Jane Thomson
Committee Secretary
Senate Standing Committees on Rural and Regional Affairs and Transport
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Dear Dr Thomson

Thank you for the invitation to make a submission to the Committee's Inquiry into Remotely Piloted Aircraft Systems, Unmanned Aerial Systems and associated systems.

The Department of the Environment and Energy and its portfolio agencies, the Director of National Parks, the Bureau of Meteorology and the Great Barrier Reef Marine Park Authority welcome the opportunity to provide the attached submission for the Committee's consideration.

The Department holds an Unmanned Aerial System Operator's Certificate issued by the Civil Aviation and Safety Authority. The Portfolio has embraced the use of Remotely Piloted Aircraft Systems across an increasing range of activities including scientific research, environmental monitoring and operational support.

Yours sincerely

Gordon de Brouwer

5 December 2016



Australian Government

Department of the Environment and Energy

**Submission to the Senate Standing
Committee Inquiry into regulatory
requirements that impact on the safe use of
Remotely Piloted Aircraft Systems,
Unmanned Aerial Systems and associated
systems**

December 2016



Introduction

The Department of the Environment and Energy and its portfolio agencies—the Director of National Parks, the Bureau of Meteorology and the Great Barrier Reef Marine Park Authority—welcome the opportunity to provide this submission to the Senate Standing Committees on Rural and Regional Affairs and Transport inquiry into current and future regulatory requirements that impact on the safe commercial and recreational use of Remotely Piloted Aircraft Systems, Unmanned Aerial Systems and associated systems.

The Department holds an Unmanned Aerial System Operator's Certificate issued by the Civil Aviation and Safety Authority. There are multiple areas across the Portfolio either running Remotely Piloted Aircraft Systems operations themselves, contracting Remotely Piloted Aircraft Systems service providers, or planning to use Remotely Piloted Aircraft Systems in the future. The use of Remotely Piloted Aircraft Systems by the Portfolio is growing.

The Portfolio has developed its own procedures to govern the operation of Remotely Piloted Aircraft Systems under the *Environment Protection and Biodiversity Conservation Act 1999* and related legislation, alongside the Civil Aviation and Safety Authority's requirements:

- a. Procedures developed by the Department's Australian Antarctic Division respond to the particular environmental and regulatory considerations associated with operating Remotely Piloted Aircraft Systems in Antarctica, the Southern Ocean, and at subantarctic islands.
- b. The Department's Supervising Scientist operates a number of platforms and sensors, primarily for work related to landscape and mine site assessments in the Alligator Rivers Region in the Northern Territory, including Kakadu National Park.
- c. The Director of National Parks is responsible for the administration, management and control of Commonwealth reserves including the World Heritage listed Uluru-Kata Tjuta and Kakadu National Parks. Operation and use of Remotely Piloted Aircraft Systems in and over Commonwealth reserves, including for filming and photography and research purposes is regulated in these areas.

This submission describes the Portfolio's current and potential future uses of Remotely Piloted Aircraft Systems in conducting its business. Key issues for the Portfolio concerning this inquiry are:

- The use of Remotely Piloted Aircraft Systems by the Portfolio is diverse and primary use is by those areas that cover large and remote geographic regions.
- Changes have occurred to the regulations for holders of Unmanned Aerial System Operator's Certificates and Remotely Piloted Aircraft Operator's Certificates that have reduced administrative requirements and streamlined the Portfolio's operations.
- The current regulatory requirements for beyond visual line of sight operations are limiting the Portfolio's operations where response time may be tight or risks are suitably low (e.g. remote localities).
- The value of regulatory arrangements concerning the safe use Remotely Piloted Aircraft Systems that are responsive to the particular environmental and safety considerations associated with operating Remotely Piloted Aircraft Systems in remote and inhospitable locations in Antarctica, the Southern Ocean, and at subantarctic islands.

Responses to Terms of Reference

(a) Current and future regulatory requirements that impact on the safe commercial and recreational use of Remotely Piloted Aircraft Systems (RPAS), Unmanned Aerial Systems (UAS) and associated systems, including consideration of:

(i) Civil Aviation Safety Regulation Part 101,

The Portfolio is an active user of Remotely Piloted Aircraft Systems. Use has been steadily increasing across a range of environment and compliance related activities as the Portfolio becomes more innovative in their application. Regulations on the use of Remotely Piloted Aircraft Systems need to strike a balance between managing the array of inherent risks associated with the use of unmanned aircraft, without overly restricting use and innovative application.

Due to the often unique nature of Remotely Piloted Aircraft Systems use by the Portfolio, additional consideration and regulatory arrangements are necessary where there are no specific Civil Aviation and Safety Authority or equivalent regulations legislation. An example is specific policy and guidelines to mitigate the risks of environmental impacts from disturbance. As outlined in this submission, the Portfolio takes a proactive approach in establishing such arrangements where there are unique environmental and safety concerns, such as in Antarctica, the Southern Ocean, and at subantarctic islands.

In addition to Civil Aviation Safety Regulations (and Australian Maritime Safety Authority legislation), the commercial and recreational use of Remotely Piloted Aircraft Systems in Commonwealth terrestrial and marine reserves and Antarctica and surrounds is further regulated under a range of Commonwealth environment law administered by the Portfolio. This is necessary to accommodate the broad range of scientific and environmental applications, harsh environmental conditions and safety considerations (for example that are unique to Antarctica), and to minimise any impacts on protected species and other wildlife, the environmental, social, cultural and heritage values of protected areas, and to limit interference with science and research activities and park operations.

For example:

- The *Environment Protection and Biodiversity Conservation Act 1999* and *Environment Protection and Biodiversity Conservation Regulations 2000* regulate commercial Remotely Piloted Aircraft Systems activities in and around protected areas and near specific species, such as cetaceans.
- The operation of Remotely Piloted Aircraft Systems in the Great Barrier Reef Marine Park, depending on the likely environmental impact, may require assessment under the *Great Barrier Reef Marine Park Regulations 1983*, and permission under the *Great Barrier Reef Marine Park Zoning Plan 2003*.
- Flying Remotely Piloted Aircraft Systems in Antarctica requires an environmental impact assessment and environmental authorisation under the *Antarctic Treaty (Environment Protection) Act 1980* and adherence to guidelines for the operation of Remotely Piloted Aircraft Systems on fishing vessels.
- Assessment and authorisation of Remotely Piloted Aircraft Systems use in the Commonwealth administered World Heritage site of Territory of Heard Island and

McDonald Islands is undertaken in accordance with the *Environment Protection Management Ordinance 1987*.

In the event of changes to Civil Aviation and Safety Authority legislation, the Portfolio would ensure its own regulatory arrangements remain complementary to those. In the meantime, the Portfolio will continue to develop policy and guidance on a case-by-case basis on advice from the Department's Chief Unmanned Aerial Vehicle Controller.

The Department obtained an Unmanned Aerial Systems Operator's Certificate in June 2014. The Certificate was renewed in June 2015 and the Civil Aviation and Safety Authority granted a renewal valid for three years. The renewal for three years has reduced the administrative requirement in submitting annual renewals. When contracting external Remotely Piloted Aircraft Systems service providers, the preference is to engage service providers that are holders of Civil Aviation and Safety Authority Operator's Certificates. This ensures the provider is trained appropriately, operates safely and has access to the appropriate level of insurance.

The main focus of the Supervising Scientist's operations is the Ranger uranium mine site and surrounds, which are located within 3 nautical miles of the untowered Jabiru airfield. In late 2015, holders of Unmanned Aerial Systems Operator's Certificates were issued with an approval to operate within 3 nautical miles of untowered airfields. This was a welcome change to the previous requirement of completing approval documentation and the change enabled the Department to conduct its business more efficiently.

Beyond visual line of sight operations

Use of Remotely Piloted Aircraft Systems beyond visual line of sight and night time operations is expected to become essential to the work of the Supervising Scientist and the Great Barrier Reef Marine Park Authority respectively. The current Civil Aviation and Safety Authority operating conditions (101.073) require that aircraft can realistically be used only to a few hundred metres. Most commercial certificates held by the Portfolio, such as those held by the Supervising Scientist and the Great Barrier Reef Marine Park Authority, currently allow aircraft to operate beyond visual line of sight on a case-by-case basis with an application to the Civil Aviation and Safety Authority required for each use. This is onerous and does not necessarily support quick responses to mine site incident assessment or other time-dependent environmental events or illegal activity (e.g. illegal night fishing, oil spill tracking at night).

(ii) local design and manufacture of RPAS and associated systems,

Additional research and development is required to build systems that can operate reliably in the extreme northern Australian conditions. The challenges to effectively and safely operate Remotely Piloted Aircraft Systems in northern Australia include attacks by large birds, and high temperatures and humidity which can impact on the operation of both aircraft and sensors. This is an area that local design and manufacture suppliers could support, particularly with respect to field tests. Where possible the Portfolio contracts local suppliers and specialists to provide the Remotely Piloted Aircraft Systems solutions it requires.

(b) The existing industry and likely future social and economic impact of RPAS technology.

As technology improves, it is envisaged that Remotely Piloted Aircraft Systems will be utilised more widely by the Portfolio, enabling more efficient, effective and safer environmental research and monitoring, and compliance surveillance.

Current Civil Aviation and Safety Authority regulations provide approach distances which protect social and other values of Commonwealth protected areas, such as across the Great Barrier Reef Marine Park. In the event those approach distances were reduced, the Portfolio would need to consider options to further strengthen its own regulatory and compliance frameworks in this regard. Further, as capability in aircraft advances (endurance, range, carrying capacity for example), non-Portfolio use for recreational and commercial purposes in Commonwealth reserves and other protected areas will need to be closely monitored to ensure any impacts to social (as well as environmental and cultural/heritage and amenity) values continue to be minimised.

There has been a steady development of interest in recent years in operating Remotely Piloted Aircraft Systems in Antarctica, the Southern Ocean, and at subantarctic islands for a range of purposes. These purposes include:

- a. *Scientific research*—to support data gathering, such as aerial surveys of wildlife (seabirds) and sensitive flora (moss beds, etc).
- b. *Operational support*—to obtain real-time aerial imagery to assist sea ice navigation, as well as for station mapping, project planning and monitoring purposes.
- c. *Commercial operations*—to record aerial imagery for visual media.
- d. *Recreational use*—by station personnel (subject to strict permit conditions administered on Australia's Research Stations).

The regulation of Remotely Piloted Aircraft Systems use by the Australian Antarctic Division complements the application of Civil Aviation Safety Regulation Part 101, and addresses those activities not otherwise regulated by the Civil Aviation Safety Authority.

(e) the relationship between aviation safety and other regulation of RPAS for example, regulation by state and local government agencies on public safety, security and privacy grounds;

See response to Term of Reference (a) above regarding other Commonwealth legislation administered by the Portfolio relating to operation and use of Remotely Piloted Aircraft Systems in and over Commonwealth protected areas.

(f) the potential recreational and commercial uses of RPAS, including agriculture, mining, infrastructure assessment, search and rescue, fire and policing operations, aerial mapping and scientific research;

The Portfolio has embraced the use of Remotely Piloted Aircraft Systems across a range of activities, and use is increasing. The following describes the Portfolio's current and potential uses of Remotely Piloted Aircraft Systems for environmental and scientific applications.

The Portfolio's Remotely Piloted Aircraft Systems program is pivotal to the **protection of the Great Barrier Reef and Kakadu National Park World Heritage Area**. Activities include landscape assessment, aerial mapping, monitoring, and scientific research. Remotely Piloted Aircraft Systems are particularly useful as traditional airborne aerial mapping is expensive and satellite imagery is often obscured by wet-season clouds or dry-season bushfire smoke. Using Remotely Piloted Aircraft Systems, field staff have a reduced risk of heat exhaustion and risks posed by dangerous animals like crocodiles and are able to be responsive to environmental conditions and have greater flexibility in obtaining high resolution imagery. The Supervising Scientist is looking towards the use of long range Remotely Piloted Aircraft Systems that can

cover large areas and remote operations. The Great Barrier Reef Marine Park Authority is trialling the application of Remotely Piloted Aircraft Systems to assist staff in remotely monitoring and mapping natural resources (e.g. vegetation communities, seabirds and marine turtles) in the Great Barrier Reef, with early results looking very encouraging.

Cost-effective Remotely Piloted Aircraft Systems technology is a potentially beneficial tool to **enhance the delivery of the Bureau of Meteorology services**. This includes its potential as a visual validation tool for forecasters, to a future where supplies could be delivered to its remote stations.

There are two key areas of Bureau's operations where Remotely Piloted Aircraft Systems would be beneficial:

- *Infrastructure management*—the use of Remotely Piloted Aircraft Systems for infrastructure inspections will reduce the potential work health and safety risks to Bureau staff working in remote and difficult to access areas. Remotely Piloted Aircraft Systems may also be useful calibrating instrumentation in-situ, leading to more efficient work practices and higher quality measurements.
- *Scientific Research*—the use of Remotely Piloted Aircraft Systems for atmospheric profiling and severe weather research will expand as the technology becomes more accessible and cost-effective. Remotely Piloted Aircraft Systems could be deployed into hostile environments, such as cyclones and storms, which would have otherwise been inaccessible or dangerous for Bureau researchers to access.

Remotely Piloted Aircraft Systems have considerable potential to provide cost effective and efficient **methods for survey and monitoring of biodiversity**, in particular nationally listed threatened and migratory species, and threatened ecological communities. They can provide platforms for remote sensing, photographic and video equipment which can be used to observe and measure the distribution, abundance and condition of species and vegetation communities. Remotely Piloted Aircraft Systems technology can provide cost effective alternatives to on-ground monitoring, particularly in remote or rugged terrain. The increasing sophistication of sensors mounted on Remotely Piloted Aircraft Systems is also generating data on a broader range of important environmental variables that has not been possible in the past.

The Commonwealth Environmental Water Office is investigating the use of Remotely Piloted Aircraft Systems and has recently commissioned Remotely Piloted Aircraft Systems work to assist with both **scientific data collection and communications**. This is very new, but has potential for large growth (into a routine activity). Future research may include: wetland responses to inundation; stream flows; and riparian vegetation responses.

Remotely Piloted Aircraft Systems represent a new frontier in environmental research, including in **Antarctic settings**. Their use has the potential to revolutionise the collection of scientific and spatial data, through both an improvement of data quality and by making the collection of relevant data more cost-effective. Small civilian Remotely Piloted Aircraft Systems provide a practical, efficient and effective tool for ecology researchers and environmental managers in some settings. Remotely Piloted Aircraft Systems have demonstrated that they are particularly useful for ecological observation and monitoring, as they can produce systematic data of high spatial and temporal resolution. This makes Remotely Piloted Aircraft Systems a powerful tool, particularly in remote environments. For example, in East Antarctica images from Remotely Piloted Aircraft Systems have been used to construct ultra-high

resolution 3D models of moss beds to monitor the health and spatial distribution of the moss beds non-destructively.

The technology is also useful for Antarctic wildlife monitoring at a range of locations, with Remotely Piloted Aircraft Systems-derived counts of colonial nesting seabirds known to be more precise than traditional ground counts, and less expensive than other aerial survey approaches. Larger scale projects, such as those examining ice sheets and their response to changing geometric and geologic conditions, are looking to employ larger Remotely Piloted Aircraft Systems (eight metre wing span and 550 kg payload capacity) with a range of approximately 5000 km, in favour of traditional fixed-wing, aircraft-based survey operations. Remotely Piloted Aircraft Systems and their sensor payloads are becoming increasingly sophisticated, and their value for mapping and scientific studies will continue to grow including using visible imagery, i.e. aerial photography, as well as other sensors, such as infrared and light detection and ranging.

There are environmental and safety considerations that arise in remote and inhospitable environs that exacerbate the hazards concerning the operation of Remotely Piloted Aircraft Systems, and may increase the likelihood of a loss of control or loss of equipment. These hazards in Antarctic settings include, but are not limited to: strong wind conditions, effect of high magnetic variability experienced near the magnetic poles on navigation or stabilisation systems, interference caused by nearby communication systems, and effect of cold temperatures on reducing battery life.

Outside of Portfolio use, there is an increasing use of Remotely Piloted Aircraft Systems by **recreational and commercial users of Commonwealth reserves** for filming and photography, giving the ability to capture images of reserves at or from previously inaccessible locations, or locations not generally open to the public for environmental, indigenous cultural or safety reasons. This raises the risk of culturally inappropriate images being captured. Use of Remotely Piloted Aircraft Systems in Commonwealth reserves also has the potential to impact on enjoyment of the reserve by other visitors (noise, visual amenity).

(g) insurance requirements of both private and commercial users/operators, including consideration of the suitability of existing data protection, liability and insurance regimes, and whether these are sufficient to meet growing use of RPAS;

If a person wishes to carry out a commercial Remotely Piloted Aircraft Systems activity in a Commonwealth reserve (including the remote Heard Island and McDonald Islands Marine Reserve) under a permit issued by the Director of National Parks, the person must have public liability insurance for an amount of at least \$20 million.

Holders of permits for Remotely Piloted Aircraft Systems use issued under the *Great Barrier Reef Marine Park Zoning Plan 2003* are required to take out and maintain:

- public liability insurance for not less than \$10 million arising from any one event in respect of the death of, or injury to persons, or loss or damage to property; and
- insurance under the *Worker's Compensation and Rehabilitation Act 2003* to cover workers, eligible persons, self-employed contractors, directors, trustees and partners.

Measures adopted under the Antarctic Treaty concerning matters including insurance requirements for commercial and non-governmental activities in the Antarctic, including the Australian Antarctic Territory, are not yet in force. The entry into force of the Measures

depends on Antarctic Treaty Parties accepting each Measure. When in force, insurance and contingency planning requirements will apply.

(i) any other related matters.

The Bureau of Meteorology anticipates there is likely to be demand for meteorological services related to the conditions suitable to operate Remotely Piloted Aircraft Systems as public and professional usage expands. For example, Area Forecasts are currently designed to meet the needs of general aviation pilots but may not meet the needs of Remotely Piloted Aircraft Systems users. These users have an interest in conditions at a different altitude range and at higher areal resolutions. In addition, the Area Forecasts format is provided in coded rather than plain language and thus not suited to the broad spectrum of Remotely Piloted Aircraft Systems users. The Bureau also anticipates that specific services (observations, forecasts and/or warnings) might be required as part of a future regulatory environment to ensure continued aeronautical safety in a future of vastly expanded Remotely Piloted Aircraft Systems operations.

Summary

The use of Remotely Piloted Aircraft Systems for environmental assessment, monitoring and protection has been embraced by the Portfolio, and its use and application is growing.

The extent of use of remotely piloted aircraft will become clearer as capabilities of aircraft are further used and tested in the field. There is substantial movement in the commercial sector targeting improvements in aircraft and related software to enhance the potential usefulness in environmental applications. Aircraft with extended flight time, advanced cameras and sensors, vertical take-off and landing platforms, and computer hardware for software applications and image management will be key to moving forward.

Proper regulation of Remotely Piloted Aircraft Systems use remains a key consideration for the Portfolio to ensure that both environmental and safety concerns are addressed.