

Our Drone Future

- 2.1 Remotely piloted aircraft (RPAs) are being seen more often in Australian skies and, as they become cheaper and more capable, larger numbers of Australians are likely to utilise them. This chapter will briefly consider the rise in RPA use, and some of the applications and opportunities of RPA technology.
- 2.2 The term 'RPA' can apply to a huge range of vehicles, from small multi-rotor devices weighing less than a kilogram right through to fixed-wing craft weighing hundreds of kilograms. Smaller, consumer-level RPAs might have a maximum altitude of no more than 30 metres with a battery life of less than an hour, while the largest commercial RPAs currently operating in Australia are capable of staying airborne for more than 24 hours and can operate at altitudes of more than 5 000 metres (nearly 20 000 feet).
- 2.3 RPAs can carry a wide range of payloads. Consumer RPAs are often sold with a fixed, front-facing high definition video camera which can record or stream video to mobile devices or social media. Larger RPAs can be fitted with gimbals which may carry professional camera equipment, or may carry a range of sensors which can be used to make recordings or conduct measurements or surveys of one kind or another.
- 2.4 RPA sales and imports are unregulated, so it is difficult to estimate the number of RPAs that are currently being used in Australia. As at June 2014, the Civil Aviation Safety Authority (CASA) indicated that it had certified nearly 110 commercial RPA operators, with 40 more applications in process.¹ Australian RPA manufacturer MultiWiiCopter indicated that its local client base included more than 5 000 people; consumer RPA

1 Committee Hansard, 29 May 2014, p. 9.

vendor Parrot told the Committee that it has sold 500 000 RPAs globally, and characterised Australia as a 'strong' RPA market.²

- 2.5 It is clear that decreases in costs alongside improvements in capability have made RPAs affordable to a wider range of industry and recreational users. CASA is responsible for issuing certifications to commercial RPA operators. CASA's Terry Farquharson told the Committee that, as they become cheaper, RPA use is rapidly increasing:

The industry is booming ... It is the explosion of small technology - microtechnology - that has allowed small devices to proliferate... you can go down to your local store and for something in the order of \$650 buy a quad machine, and if you want to go into your iPad store you can buy something for a bit less.³

- 2.6 As RPAs become cheaper, they are also quickly becoming more capable. Dr Luis Mejias Alvares from the Australian Research Centre for Aerospace Automation (ARCAA) said:

we may have a new unmanned aircraft every six to 12 months - smarter, perhaps smaller and with longer lasting batteries and with different levels of autonomy, ranging from small toys to more advanced and more intelligent aircraft.⁴

Current and future drone applications

- 2.7 A range of government, commercial and industry groups participated in the Committee's roundtable discussions. The following section outlines the current and potential uses for RPA technology and the benefits they may bring to Australia.

Law enforcement and emergency services

- 2.8 A number of law enforcement and emergency services authorities have used, or have plans to use, RPAs. The Committee heard from the Australian Federal Police (AFP) and the Queensland Police Service (QPS)

2 Committee Hansard, 21 March 2014, p. 17; Committee Hansard, 28 February 2014, p. 20.

3 Committee Hansard, 28 February 2014, p. 1.

4 Committee Hansard, 28 February 2014, pp. 32.

that police use of RPAs remains limited. At present, the AFP only uses RPAs to assist in the forensic examination of crime scenes:

One could perhaps visualise the AFP's use of the UAV as no more and no less than how one would use a static cherry picker, which is what we previously have used. For expediency, cost effectiveness and mobility the process we now undertake is with the UAV.⁵

- 2.9 In relation to future RPA use, the AFP advised the Committee that it is 'exploring the benefits and opportunities for search and rescue and for missing persons', but that it has 'no plans, research or current activity' in relation to RPA surveillance.⁶
- 2.10 QPS currently has two RPAs in service, which are used to 'enhance [its] special emergency response team capabilities' at 'high-risk and significant operations'. QPS deployed RPAs operationally for the first time at a siege in Brisbane on 26 December 2013.⁷
- 2.11 While its current use of RPAs is limited, QPS is considering expanding its use of RPAs to enhance its capability in crime scene or road traffic crash investigations, disaster responses, and search and rescue operations.⁸ However, in relation to RPA surveillance, QPS told the Committee that it is not currently pursuing use of this capability. Inspector Brad Wright said:
- QPS is acutely aware of community concerns about the pervasiveness of drones. We have always gone into this project understanding that. Our use is limited to really overt activities ... It is noisy, it flies at low altitude, and it is very obvious to everyone involved that we are using that technology. There has been no effort or intention from us to do anything that is not overt.⁹
- 2.12 Mr Richard Alder from the Australasian Fire and Emergency Service Authorities Council told the Committee that, although RPAs are not yet widely used, fire and emergency services are interested in their potential applications:

5 Committee Hansard, 28 February 2014, p. 26.

6 Committee Hansard, 28 February 2014, p. 27.

7 Committee Hansard, 21 March 2014, p. 1.

8 Committee Hansard, 21 March 2014, p. 1.

9 Committee Hansard, 21 March 2014, p. 2.

Possibilities range from the small UAV that might be operated locally – a classic application is the sort of binocular-type application where a local firefighter or incident commander just needs to see over the trees and can put up something locally to get a better view of what they are tackling – right through to the strategic surveillance opportunities.¹⁰

- 2.13 The Queensland Fire and Emergency Service (QFES) likewise emphasised the benefits RPAs could provide in a rural fire context. QFES noted that RPAs could enhance its capability in an urban environment by permitting it to search or assess dangerous or unstable premises (where there is, for example, a risk of building collapse or hazardous fumes) which would otherwise be inaccessible.¹¹ In this context, RPA use could enhance emergency response by providing key information on unsafe areas and this could be achieved without endangering emergency services personnel.

Commercial and agricultural applications

- 2.14 RPAs have a wide range of commercial applications. The Australian Certified UAV Operators Association (ACUO) noted that RPA uses include:

everything from standard real estate aerial photography and video through to mining surveys and stockpile surveys ... there are agricultural applications for multispectral imagery, crop health, moisture content ... pipelines, power line inspections ... quite a broad range of activities.¹²

- 2.15 Mr Dale McDowall of Insitu Pacific, one of Australia's largest RPA companies, outlined a number of beneficial uses that RPAs can have. In addition to law enforcement and emergency management applications, RPAs may be useful in monitoring invasive species and weeds, monitoring marine life, inspecting resource industry stock and infrastructure, and in 'precision agriculture'.¹³
- 2.16 Mr Chris James of the Minerals Council of Australia characterised RPAs as an 'emerging technology', and said that they will be more widely used in
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10 Committee Hansard, 28 February 2014, p. 16.

11 Committee Hansard, 21 March 2014, pp. 5-6.

12 Committee Hansard, 28 February 2014, p. 4.

13 Committee Hansard, 21 March 2014, p. 16.

the resources sector as they become more cost effective. Mr James said their current and future uses:

range from stockpile surveying, environmental scanning/monitoring; fire monitoring; subsidence monitoring; pit wall mapping; infrastructure assessments; general aerial photography; blast monitoring – because the UAVs can fly through a blast cloud; and also spare parts transportation out to LNG rigs out off the North West Shelf.¹⁴

2.17 While expressing concern about the potential for misuse of RPA technology, AgForce Queensland noted the many beneficial uses RPAs may have for the agricultural sector, including:

[detecting] crop stress, disease surveillance, fire monitoring and search and rescue ... There is weed detection, there is land use infrastructure monitoring and property surveying and mapping. They are all great uses.¹⁵

2.18 Biosecurity QLD advised the Committee that RPAs may provide significantly more cost-effective means to detect invasive species and weeds, and control them with the precision application of pesticides. RPAs may also assist in certifying that Queensland is free of various pests, which is crucial for the agricultural industry's ongoing access to overseas markets.¹⁶

2.19 The capacity of RPAs to access remote areas and provide large scale monitoring offers opportunities across a range of commercial sectors. While some businesses in the mining, real estate and agriculture industries are already utilising RPAs, it is evident that as RPA capabilities increase, their commercial use will rapidly expand.

Media applications

2.20 Media organisations have or will soon use RPAs in a range of situations. Although widespread media use of RPAs has the potential to raise privacy issues (see chapter 4), they also have many useful applications. Journalist Mark Corcoran said that RPAs are already being used for sporting events and documentary filmmaking, and that they can be used to enhance

14 Committee Hansard, 28 February 2014, pp. 15-16.

15 Committee Hansard, 21 March 2014, p. 25.

16 Committee Hansard, 21 March 2014, p. 27.

reporters' safety in war or disaster zones. Mr Corcoran also noted that larger RPAs could give journalists novel newsgathering capabilities:

You have a capability of ranging many hundreds of kilometres away from your point of launch. So there are stories there. Things like the clashes between whalers and environmentalists in the Southern Ocean could be independently verified. We could see what is happening with asylum seeker boats 300 kilometres over the horizon. It gives you the potential to independently verify those issues.¹⁷

- 2.21 With community appetite for instantaneous access to news stories and the expectation of visual footage, the newsgathering uses of RPAs are expanding. In addition to the capacity to access difficult locations, the use of RPAs can enhance the safety of news reporters, particularly in conflict or emergency situations.

Scientific and research uses

- 2.22 RPAs have a range of scientific and research uses. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) has been using RPAs since 1999. Like many other organisations, CSIRO primarily uses RPAs where airborne imaging is useful; this has included crop monitoring in plant breeding experiments, beach surveys, monitoring of bushfire experiments, and simulating a flying fox to test a tracking device which would later be used to track real animals.¹⁸

- 2.23 In partnership with Murdoch University in Western Australia, Insitu Pacific has conducted trials using RPAs to monitor marine life near offshore gas and oil plants. Insitu's Mr Dale McDowall said the trials were intended:

to try to understand how we may be able to monitor the population numbers and the species types of various marine mammals, such as whales, dolphins, dugongs and turtles, and once again over time help that operator understand the impact of their operations on the marine environment.¹⁹

17 Committee Hansard, 28 February 2014, p. 29.

18 Committee Hansard, 28 February 2014, p. 17.

19 Committee Hansard, 21 March 2014, pp. 16-17.

- 2.24 Australian scientific organisations have already found a range of uses for RPA technology. The anticipated fall in price and increase in RPA capabilities makes it likely that RPAs will be used in a range of additional scientific survey and monitoring roles.

Interest groups and recreational uses

- 2.25 Some lobby groups have indicated interest in the potential of RPAs to monitor or expose activities. In particular, environmental groups see value in the capability of RPAs to monitor the discharge of waste in waterways. Similarly, RPAs have been used by animal protection groups to take footage of a commercial farming operation with the intention of exposing animal cruelty. Voiceless, a non-profit think tank focused on raising awareness of animals suffering in factory farming, argued that RPAs could provide an important tool in ensuring the effective enforcement of animal cruelty regulations:

[RPA] surveillance assists with reducing the rate of contravention of animal welfare regulations in our view, and it can be used not only by animal protection groups but also by enforcement arms like the police or the RSPCA in each state or territory, or the Animal Welfare League in New South Wales, to monitor and therefore enforce animal protection legislation.²⁰

- 2.26 Other commercial uses of RPAs are also increasing. The Committee heard from Parrot Pty Ltd, a company that designs and sells consumer-level RPAs that can be controlled by a smartphone. Parrot's RPAs come equipped with a forward-facing high definition camera, footage from which can be uploaded to social media directly from the smartphone.²¹ Event photographers, real estate agents, and tourism guides are some of the industries utilising this technology.
- 2.27 Sporting events are being recorded by RPAs, either to track the safety of participants or to provide footage for spectators. YouTube hosts an enormous array of video taken by RPAs to promote tourist destinations, promote extreme sports or for educational or environmental purposes. Much of this footage is taken by recreational RPA users with an interest in a particular field.

20 Committee Hansard, 28 February 2014, p. 22.

21 Committee Hansard, 28 February 2014, p. 20.

- 2.28 The range of users and uses of RPAs is set to expand. While this provides business potential for developers, efficiencies for a number of sectors, and applications for recreational users, these opportunities must not come at the cost of privacy or safety.
- 2.29 Many roundtable participants expressed concern at the potential privacy and safety concerns that may arise from widespread use of RPAs by members of the public who do not have an aviation background or appropriate training. These issues will be explored more fully in chapters 3 and 4.
- 2.30 It is clear that RPAs have a very broad range of civil and commercial applications, in addition to their interest as a consumer product. The evidence above suggests that RPAs will be used more and more often in circumstances where they can provide new capabilities, reduce the risk associated with a given job, or do the job more cheaply. As ARCAA's Dr Mejias noted:

The technology is here; we need to start thinking of embracing the technology and perhaps focusing on defining the guidelines for its responsible use ... and regulations for the safe use of the technology.²²

22 Committee Hansard, 28 February 2014, p. 32.