

Safety in the air

- 3.1 The previous chapter outlined the current and future uses remotely piloted aircraft (RPAs) may have in a range of industries. However, as a result of air safety concerns it holds in relation to RPAs, the Civil Aviation Safety Authority (CASA) does not permit RPAs to use shared airspace, and substantial restrictions on commercial RPA operators remain in place.
- 3.2 This chapter will examine the risks to air safety raised by CASA and other roundtable participants, which arise both from the technology used to build and control RPAs, and from non-certified or unsafe RPA use. It examines the complexities of regulating RPA use due to the rapid development of technology, the enormous range in size and capability of RPAs, and the breadth of RPA users, from hobbyists to large scale commercial operators.

Safety concerns arising from RPA technology

- 3.3 RPAs are an emerging technology and have not yet achieved the reliability expected of mature technologies. In particular, roundtable participants drew the Committee's attention to two aspects of RPA technology which give rise to safety concerns – the quality and durability of the material from which RPAs are constructed, and the technology that controls how they behave.
- 3.4 In relation to the quality of materials, roundtable participants noted that while commercial aircraft are built to very stringent standards that provide relative certainty about their airworthiness, the same cannot be

said for RPAs. CASA's Director of Aviation Safety, Mr John McCormick, said that:

The difficulty with the proliferation of these UASs ... is that they are not built to any standard. There is no international standard at this stage. So their ability to maintain altitude, their ability to maintain heading, their ability to suffer equipment failure and then not crash, have not been established.¹

3.5 CASA's concerns about the general build quality of RPAs were echoed by VidiAir, an Australian RPA company that specialises in aerial surveillance solutions. VidiAir's Managing Director Mr Anthony Hoy told the Committee that:

The primary concern for me and my colleagues has been systems reliability - which is difficult to regulate and is unregulated, as things stand - to the point where we have engaged our own microelectronics engineer because of our concerns. I think it is fair to say that the general consensus on the part of insurers and many other operators is that critical systems failure is significantly under-reported, particularly on the part of the unauthorised users.²

3.6 VidiAir conducted an audit on the microelectronic componentry of an RPA valued at \$12 000, and said its findings were 'of some considerable concern':

A lot of the machines fail because the standard of componentry in even the premium brands is of a hobbyist standard in a lot of cases. We found vital components missing, such as decoupling capacitors. We replaced batteries with lower internal resistance and significantly higher amperage. There was just inadequate fit-out. There were battery connector plugs that were inadequate for the power required for the unit. Each of these things is capable of causing a fly-away or a crash, as does happen and is happening, I can assure you.³

1 Committee Hansard, 28 February 2014, p. 2.

2 Committee Hansard, 28 February 2014, p. 8.

3 Committee Hansard, 28 February 2014, p. 8.

Text Box 3.1

Sydney, New South Wales – October 2013

On Wednesday 2 October 2013, an RPA crashed into the Sydney Harbour bridge, sparking safety concerns. The RPA, a quad-copter piloted by a recreational RPA user, collided with a bridge pylon and landed on the bridge's train line after its pilot lost control of the vehicle.

The RPA's pilot, Mr Edward Prescott, said he was testing new equipment on the RPA when he lost control of the vehicle. Mr Prescott said that he had assumed the RPA had crashed into Sydney Harbour, and it was only when he read news stories about an incident involving a 'mystery drone' that he realised it had not.

Mr Prescott said he had no intention of flying the RPA into the bridge. Video from the RPA's camera has been posted to the internet, and shows Sydney transport workers retrieving the RPA.

Mr Prescott was fined \$850 as a result of the incident.

Sources C Cosier, "I don't know whether it's a bomb or not": Train driver flummoxed after drone hits Sydney Harbour Bridge", Sydney Morning Herald, 26 November 2013; L. Silmalis, "Backyard drone operators to be handed guidelines after one crashed into the Harbour Bridge", The Daily Telegraph, 3 May 2014.

- 3.7 Even RPAs built to military standards – which are much higher standards than current civil and recreational RPAs are built to – may require improvements before CASA would consider integrating them into Australian airspace:

the military is prepared to accept losses and in the operational sphere they do accept that some of these will not come back, as we have seen reported often in the newspapers. Of course, to the civilian world that is intolerable. We would like to get that risk as low as reasonably practicable.⁴

- 3.8 Professor Duncan Campbell, Director of the Australian Research Centre for Aerospace Automation (ARCAA), noted that confidence in the build quality of an aircraft is vital when that craft shares the skies with other vehicles:

The fact is that the police, the Queensland fire service, farmers with precision ag[riculture] and so forth are more likely to be flying in airspace that could be shared with other airspace users, and this is where this whole notion of airworthiness comes in. So you do not want a cheap \$100 machine up there that is likely to break and cause some sort of hazard for other airspace users.⁵

- 3.9 In addition to problems with build quality, the systems and technologies that enable unpowered aircraft to function safely in shared airspace are yet

4 Committee Hansard, 28 February 2014, p. 8.

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

to reach full maturity. A range of technologies must be in place to ensure that remotely piloted aircraft can operate without risk to vehicles in their vicinity, and although substantial progress has been made in recent years, more work is required to reach a sufficiently safe operating environment.

- 3.10 The Queensland government has taken a particularly active interest in facilitating the growth of a viable RPA industry. Much of its focus has been on sponsoring research into technologies that work to make RPAs safer, with the goal of fully integrating RPAs into Australian airspace. Mr Lindsay Pears of the Queensland Department of State Development, Infrastructure and Planning (DSDIP) said the government's focus has been on:

ensuring that the barriers to safety of UAV operations were dealt with by way of technology. That includes see-and-avoid [and] safety of flight technologies, as well as sensors for commercial applications, autonomous systems to improve navigation and the like.⁶

- 3.11 Mr Pears said the Queensland government had funded a number of joint projects with this goal in mind:

Two major projects have been co-funded by the state government with Boeing, Insitu and others. One is called SmartSkies, which is now completed. The objective of that program was to deal with the see-and-avoid and air space management issues associated with safe operation of UAVs. The other, which is ongoing, is Project ResQ, which is about extension of that SmartSkies technology into commercial applications.⁷

- 3.12 However, Mr Pears noted that more research is required to develop the necessary technical capability:

There is more to be done, on the research front in particular, and we will be working with ARCAA and others to do that, particularly around things like improved navigation, autopilots, onboard processing systems, control systems, secure data link, which cannot be jammed, and also image processing and enhanced extraction of information and dissemination to a wide front.⁸

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

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

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

- 3.13 The recent safety incident in Geraldton involving injury to a participant in a sporting event allegedly caused by a nearby RPA (see Text box 3.2) highlights the safety issues associated with RPA technology. Witnesses suggested that the RPA operator either lost control of the aircraft or suffered a component failure, which caused the craft to crash; the RPA operator suggested that someone had ‘hijacked’ the RPA by taking over the remote control link.
- 3.14 That the incident may have arisen from any or a combination of these factors highlights the serious safety issues of RPA technology, and the lack of standards in RPA design and operation. A failure of RPA technology in a larger size RPA, leading to either a ‘hijacked’ craft or the descent of an uncontrolled RPA poses serious safety and security concerns.

Text Box 3.2

Geraldton, Western Australia – April 2014

On 6 April 2014, a triathlete was allegedly struck by an RPA while competing in a race in Geraldton, Western Australia. The RPA was being used to take footage of the competition.

Triathlete Raija Ogden was treated for head injuries by paramedics at the scene of the race before being taken to hospital in a stable condition. The RPA operator lost control of the vehicle and it dropped 10 metres at which point, according to Mrs Ogden, it struck her in the head.

The RPA operator, Mr Warren Abrams, claimed that the vehicle crashed near Ms Ogden, startling her and causing her to fall. He said that his initial investigation indicated that control over the RPA was hijacked by someone nearby using a technique Mr Abrams referred to as ‘channel hopping’.

CASA regulations specify that RPA operators must ensure that their vehicles remain more than 30m away from people not directly involved in using the craft.

CASA referred the matter to the Commonwealth Director of Public Prosecutions (DPP) in June 2014. The DPP will determine whether Mr Abrams will face prosecution.

Source S Taillier, “Triathlete injured as drone filming race falls to ground”, ABC News, 8 April 2014; L Thomas ‘Drone operator confident of “accident” finding’, The West Australian, 26 June 2014.

CASA regulations – commercial and recreational use

- 3.15 The lack of a standard build quality and the technological limitations of RPAs have given rise to a number of restrictions on when and where RPAs can operate. The Commonwealth regulates air safety through the *Civil Aviation Act 1988*, made under the trade and commerce power of the Constitution. CASA is the agency responsible for regulating the use of

RPA in Australia. Mr McCormick explained that CASA must, by law, focus primarily on aviation safety:

There is no doubt whatsoever that if a large UAV crashes, it will not be without harm. That is one of the issues which we always have in the back of our minds ... the Civil Aviation Act says at section 3A that our prime purpose is that maximum emphasis has to be on aviation safety - protecting the public.⁹

3.16 Airservices Australia, the government agency responsible for air traffic control, has a similar focus. Mr Sean Lake from Airservices Australia said:

we are acutely aware of the rapid proliferation of UAV operations. We are working closely with CASA and our focus is very much the same as CASA – it is on safety, totally ... The question of integrating operations into controlled airspace, as opposed to the segregation which we have been doing up until now, is probably our primary focus.¹⁰

3.17 Professor Campbell noted that the challenge of integrating RPAs into Australian airspace could be particularly difficult. In his view, the difficulty faced by regulators, and by RPA companies was:

how to open up the skies for applications. The challenge is, of course, that our skies are very cluttered. I think we can all relate to the US skies. Indeed, if we look at Brisbane, Sydney, Melbourne and Adelaide, that is referred to as the J curve around Australia. Our air space in that corridor is just as dense as it would be overseas.¹¹

3.18 Mr McCormick expressed CASA's view that, at present, the reliability and control limitations of RPAs remain sufficiently serious that they cannot be safely integrated into shared airspace:

Integration into controlled airspace becomes a problem both for our services and for us from the point of view of knowing just how that vehicle will react and how it will behave. So there is a risk of interference with other vehicles, interference with other aircraft, and the possibility of crashing in public areas, with the obvious response.¹²

9 Committee Hansard, 28 February 2014, p. 3

10 Committee Hansard, 28 February 2014, p. 7.

11 Committee Hansard, 21 March 2014, p. 10

12 Committee Hansard, 28 February 2014, p. 2.

- 3.19 RPA use is regulated under Part 101 of Australia's Civil Aviation Safety Regulations (CASR 101). CASR 101 distinguishes between commercial and recreational RPA use – at present, commercial RPA use of any kind can only be carried out with CASA certification.
- 3.20 Recreational use is governed by the same regulations that apply to model aircraft. While recreational RPA users do not have to seek CASA certification or training before they use their RPAs, there are a number of rules to ensure that the risk of a safety incident is minimised. These rules, referred to as the 'standard operating conditions', require that RPAs:
- may only be operated in visual line of sight (that is, the RPA can be directly seen by its pilot without the aid of binoculars or a telescope)
 - may only be operated below 400 feet above ground level, in visual meteorological conditions, by day
 - may not be operated over populous areas, or within 3 nautical miles (about 5km) of an aerodrome, in controlled airspace, or over prohibited areas
 - may not be operated within 30 metres of a person not directly associated with the operation of the RPA (that is, a person in the operating team).¹³
- 3.21 At present, commercial RPA use of any kind requires CASA certification. CASA defines 'commercial use' as 'any RPA operated for a commercial reason', whether that be for hire and reward, remuneration, or any other consideration.¹⁴ CASA's Mr Grant Mazowita said:

If it is not recreational/sport-type activity, generally you are caught by the regulatory standards that we apply. Now, there are certain places in our regulations where we refer to research and development and scientific-type things but, by and large, the recreational operations are treated as model aircraft and the commercial operations are treated as RPAs.¹⁵

- 3.22 CASA's RPA certification process has two components – a remote piloting certificate and an operating certificate. CASA's Mr Terry Farquharson described the certification process in this way:

There are two aspects of certification. One is the pilot, the controller, certificate. They are assessed against a knowledge

13 Committee Hansard, 29 May 2014, p. 2

14 Committee Hansard, 29 May 2014, p. 5.

15 Committee Hansard, 29 May 2014, p. 5.

standard and a competency standard. The second part of the assessment is in relation to the operating certificate. There is an operations manual and appropriate controls put in place that the organisation has the right set of resources to do what it is intending to do. At the end of that, the person can be certified individually as a controller or an organisation receives an operating certificate.¹⁶

- 3.23 Mr Brad Mason from the Australian Certified UAV Operators Association (ACUO) said that certified RPA operators face substantial limits on their activities:

we are quite heavily limited in what we can do and where we can go. It is not like we can just put an aircraft up in the air anywhere at any time. We have to go through very strict procedures, quite strict safety and risk management assessments, before we put an aircraft in the air.¹⁷

- 3.24 The operating certificate specifies when and where RPAs may be used, and variations to that use must be approved by the regulator. Mr Farquharson said:

Each certificate is issued with a number of things that the operator can do, and that is all they are authorised to do. If they want to expand that or remove something then we amend the certificate through a process.¹⁸

Non-certified RPA use

- 3.25 CASA's restrictions on the commercial use of RPAs aim to maintain air safety and minimise the risk of a serious RPA crash. However, recent improvements in RPA piloting and control technologies, combined with drastic reductions in price have led to a substantial increase in the number of RPAs sold, both to consumers and potential business operators. The Committee has heard that this has led to a large increase in the number of untrained RPA operators, many of whom are either unaware of, or do not follow, CASA's regulations. This presents a substantial risk to air safety.

16 Committee Hansard, 28 February 2014, p. 9.

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

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

3.26 As stated above, currently RPAs used for recreational purposes, and within standard operating conditions, do not require a certification process. Professor Duncan Campbell from ARCAA said that it was important to distinguish between RPA users who are aware of and comply with CASA regulations and those who do not:

I think we can identify there are two groups of people. There are the hobbyists – that is too great a generalisation, but those who enter this area and are not aware of any of the laws, whether it be privacy or air safety regulations – and there are those who come in very much from an airmanship point of view and are very aware of air safety.¹⁹

3.27 Similarly, Mr Quinton Marais, Director of Australian RPA manufacturer MultiWiiCopter, said:

I think you have to split this off into consumers and professionals. The classic real estate agent looking to photograph suburbia is a consumer. He is not an aviator and does not understand aviation culture. He does not know how the aviation system or airspace works and he certainly does not understand risk.²⁰

3.28 Industry groups suggested that commercial RPA use without the appropriate certification is becoming increasingly common. Mr Mason from ACUO told the Committee that:

what we are seeing is that there is a lot of illegal and unauthorised use of UAVs. We understand that the regulator is doing its best to try and combat that but ... they are so easily available and so cheap to buy these days that anybody can buy one and anyone can go out and operate one. It is really difficult to regulate, manage and catch those people.²¹

3.29 According to Mr Mason:

A lot of those people are coming from a non-aviation background, too, so they do not have an aviation knowledge set. They are coming from a commercial business background, so they are not really aware of some of the things they are doing and some of the safety implications of what they are doing ... the greatest threat,

19 Committee Hansard, 21 March 2014, p. 10.

20 Committee Hansard, 21 March 2014, p. 20.

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

from both a safety and a privacy issue, is more so from the illegal and unauthorised operators than the certified operators.²²

- 3.30 Mr Marais told the Committee that feedback from MultiWiiCopter's customers indicated that some consumers who purchase RPAs do not understand how to use them safely:

But the consumers, on the other hand, are able to purchase products which are able to fly away. They do not even understand why they fly away, so they will ring us up and say, 'It's flown away.' We will say, 'Have you reported this incident to the aviation authorities?' They do not know that they should report incidents to the aviation authorities.²³

Text Box 3.3

Newcastle, New South Wales – March 2014.

On Saturday 22 March 2014, a rescue helicopter in Newcastle was forced to take evasive action to avoid colliding with an RPA.

At approximately 10pm, while returning to base after delivering a patient to the John Hunter Hospital, the helicopter's crew saw lights at about 1000ft (300m) above ground. The crew initially thought the lights belonged to a larger aircraft in the distance, but soon realized the object was an RPA, much closer than they had thought, and took evasive action to avoid it.

Mr Glenn Ramplin from the Rescue Helicopter service said the results of a collision with the RPA could have been very serious, as the incident occurred over a residential area: 'Even things like birds can damage an aircraft so to run into the UAV (unmanned aerial vehicle) or the RPA if you will, you know, that could have been catastrophic.'

CASA regulations forbid recreational RPA users from sending their craft higher than 400 feet or from flying RPAs over populous areas. They also forbid RPA operators from flying them within five kilometres of an aerodrome.

The operator of the RPA has not been identified.

Source ABC Radio National, 'Mid-air near miss raises concerns over regulation of drones', AM Transcript, April 4 2014.

- 3.31 The Queensland Police Service operates a number of RPAs in tightly regulated circumstances. Inspector Brad Wright expressed concern that untrained RPA users may not be sufficiently mindful of safety:

I am never going to fly one of my devices over a road with moving traffic; even though it is only light, it could be terrible if it hit a car. I worry about people doing that. At the moment, we have not seen it, but, yes, I certainly have concerns, because we are, as I said,

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

23 Committee Hansard, 21 March 2014, p. 20.

very careful. In the police services, we understand risk; I worry about people who do not.²⁴

- 3.32 Members of the RPA industry are concerned that unsafe RPA use by recreational users and uncertified commercial operators could potentially harm the development of the industry. Mr Lindsay Pears from the Queensland Department of State Development, Industry and Planning told the Committee that:

A lot of the professional operators in the industry are really concerned about that. That is primarily, as you said, from the point of view that it could totally disrupt the market at an embryonic stage of growth.²⁵

- 3.33 Mr Quinton Marais also expressed concern about the impact of unsafe RPA use by untrained or unaware operators:

I think consumers have the ability to damage the potential of this technology through lack of understanding and lack of training. Professionals are wanting to access it and keen to comply with every regulation that they are told.²⁶

- 3.34 Roundtable participants made a number of suggestions as to how the risk from untrained and unauthorised RPA operators could be reduced. Professor Campbell said that safety could be improved if more RPA users were made aware of how to minimise safety risks:

There are those who are aware of the regulations – ‘No, they don’t apply to me’ or ‘I choose not to comply’ – and those who simply do not know. Education was touched on just previously. I think that is one key element. I have had social conversations with hobbyists and even stores that sell these things. I ask them, ‘Are you aware that there are CASA regulations?’ And some of them have said, ‘No, I didn’t know that.’ So there is an education element that goes with all of that.²⁷

- 3.35 In the same vein, Mr Pears said that education could be useful in reducing the risk from the non-certified use of RPAs:

It is more about education and awareness – trying to capture kids as early as you possibly can – and understanding that the technology has a wide application. This can be through social

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

25 Committee Hansard, 21 March 2014, p. 22.

26 Committee Hansard, 21 March 2014, p. 21.

27 Committee Hansard, 21 March 2014, p. 10.

media and education and training through the school system. Queensland also has aviation high schools where these sorts of issues can be dealt with.

So over time it is just increasing public awareness and perhaps engaging some of the vendors ... to actually make sure ... that when you go onto a website or go to a physical shop to buy these things there is public information available to warn you of the issues, to make you aware and to cause you to ask the questions.²⁸

3.36 In the wake of a number of recent safety incidents involving RPAs, many of which were being used illegally (see the text boxes throughout this chapter), CASA has reached an agreement with RPA distributors and retailers to include a flyer with information on RPA safety regulations with RPAs at the time of purchase. The flyer outlines the basic safety procedures recreational RPA users must follow and the conditions within which they are permitted to operate. A copy of the flyer is included as Appendix C of this report. Mr Terry Farquharson said that CASA has:

a very active program of going out to the distributors and even the manufacturers of these machines ... It is actually trying to catch the problem at the lowest level possible and it guides people to their responsibilities, to the things that they should be considering.²⁹

3.37 Final responsibility for the safe usage of RPAs rests with RPA operators. Mr Chris Roberts from Parrot, a company that sells RPAs to the consumer market, said that the pilot of the RPA must take responsibility for ensuring that it is used safely:

in a consumer-user environment the user has got to be responsible for where they are using the product. That is exactly the same with a remote control helicopters or planes, which have been around for 20, 30, or 40 years. It is the same ethos: the user needs to be responsible about where they fly the product.³⁰

3.38 While users are ultimately responsible for the safe operation of the craft they fly, establishing what constitutes safe parameters of operation and ensuring product safety and reliability requires a regulatory framework and a more coordinated national approach.

28 Committee Hansard, 21 March 2014, p. 22.

29 Committee Hansard, 29 May 2014, p. 7.

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

Review of the regulations

3.39 RPA use is regulated by part 101 of the Civil Aviation Safety Regulations (CASR 101), which came into force in 2002. In mid-2011, after a substantial increase in the number of RPA users, CASA began a review of the section. As part of that review, in May 2014 CASA published for public comment a Notice of Proposed Rule Making (NPRM). This notice contains proposed amendments to CASR 101.

3.40 The period for public comment ended on 16 June 2014, having been open for approximately one month. CASA will publish its final regulatory changes in a Notice of Final Rule Making (NFRM) after taking public comment into account. CASA hopes to publish its NFRM in the third quarter of 2014.

3.41 CASA told the Committee that it frequently provides further opportunities to provide input if requested. CASA's Mr Grant Mazowita said that:

If we are petitioned to extend that period, I think we invariably have provided those extensions to the industry. If the industry seeks additional opportunities to discuss issues with us, we entertain those requests and almost invariably agree to them.³¹

3.42 Mr Mazowita noted that the International Civil Aviation Organisation (ICAO) is currently working on model RPA regulations, and that future CASA reviews of CASR 101 will take the ICAO's work into account:

Much of this will be driven by the work being undertaken by the International Civil Aviation Organization. They are in the process of developing and publishing international standards and recommended practices. Typically, we try not to get too far out ahead of ICAO. We like to keep in step with what is happening internationally and with our major trading partners.³²

3.43 However, Mr Jim Coyne from CASA noted that the ICAO regulations may not be finalised for a number of years. CASA took the view that it was necessary to amend Australia's regulations more quickly than that:

the process for developing what we call 'standards and recommended practice' is about a five- or six-year period, and we

31 Committee Hansard, 29 May 2014, p. 3.

32 Committee Hansard, 29 May 2014, p. 4.

feel that people cannot wait that long for the ICAO system. So we need to get guidance out there quickly.³³

- 3.44 The new regulations proposed by the NPRM would not change the rules in relation to recreational RPA use, provided that the RPA is operated according to the 'standard operating conditions' outlined above. Therefore, any recreational RPA users will not require CASA training or certification. CASA's John McCormick said:

The proposed changes do not apply to amateur or privately operated drones for recreational purposes. These are model aircraft and are not included in the NPRM change proposals.³⁴

- 3.45 CASA said that in the future it may separate the rules relating to recreational RPA use from those governing model aircraft so that it can formulate rules that are better suited to each of those categories. Mr McCormick said:

Part 101 – which originated in balloons and model aircraft – still has some role and some weight to carry in that realm. We will eventually move the RPA into another rule set of 102, so that we clearly separate the model aircraft private activities from the RPA activities. We are not sufficiently advanced to be able to do that at this stage, so we feel an amendment to 101 is a more pressing need rather than go through the process of developing 102.³⁵

- 3.46 Consequently the amendments proposed in the NPRM relate to commercial RPA use. Most notably, the NPRM would create a new weight class of 'small' RPAs under two kilograms which could be used commercially without CASA certification in limited circumstances. Mr McCormick said:

A key part of this amendment acknowledges the existence of a low-risk class of RPA operations, which is determined as 'small RPA' with a gross weight of two kilograms and below while – and I will stress this – they are being operated under the standard RPA operating conditions as defined and discussed in the NPRM.

For these types of RPA operations under these conditions CASA proposes that the requirement for a remote pilot certificate, or an unmanned aircraft systems operator certificate, will not apply.³⁶

33 Committee Hansard, 29 May 2014, p. 4.

34 Committee Hansard, 29 May 2014, p. 3.

35 Committee Hansard, 29 May 2014, p. 4.

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

- 3.47 CASA emphasised that all RPAs weighing more than two kilograms, and all RPAs operating outside of the standard operating conditions, will still require a remote pilot certificate and an operating certificate:

Any suggestions that operations of this type will become unregulated is not correct. RPAs with a gross weight above two kilograms, in all operating conditions, and all RPA operating outside of the standard RPA operating conditions, will require an operation approval from CASA. The operational approval process must include a documented risk assessment and treatment plan describing how identified safety risks will be managed to an acceptable level.³⁷

- 3.48 In addition, the NPRM contains updated guidance on what constitutes a 'populous area' for the purposes of uncertified commercial RPA use. As stated above, RPAs cannot be operated in a populous area without CASA approval. However, the NPRM notes that:

An area within an urban environment may be deemed as 'unpopulous' for the term of an RPA operation if suitable conditions are met. For example, an oval devoid of people could be utilised to photograph real estate from across the road through the use of oblique photography; or the area around a power pole within an urban area, set up as a demarcation zone with the appropriate 'temporary workplace' conditions could be approved.³⁸

- 3.49 This guidance clarifies CASA's view that a range of uncertified commercial RPA operations could be possible in an urban environment as long as the RPA operator adheres to the standard operating conditions.
- 3.50 The NPRM also proposes a number of supplementary changes to CASR 101 which would update the terminology used to describe RPAs, clarify the requirements for pilot training and certification, and streamline the process for approval.³⁹
- 3.51 Under the proposed changes to CASR 101, commercial RPA use would remain relatively tightly regulated in situations where RPAs could pose a serious safety risk. However, CASA meets frequently with government agencies, researchers and RPA industry groups to keep informed of technological developments in the field, so that the restrictions on RPA

37 Committee Hansard, 29 May 2014, pp. 1-2.

38 CASA, *Draft Advisory Circular AC101-1 - Remotely piloted aircraft systems – general*, May 2014, p. 20.

39 Committee Hansard, 29 May 2014, p. 2.

use imposed for safety reasons may be revised when RPA technology has developed sufficiently. Mr McCormick said:

From our point of view, we are committed to working with the commercial operators ... It is the reality that these things are here; we cannot turn back the tide.⁴⁰

3.52 ARCAA is one of Australia's leading RPA research centres. Professor Campbell told the Committee that CASA personnel receive frequent briefings on the progress of ARCAA research projects:

we have very open and frequent discussions with them. That includes with John McCormick, the Director of Aviation Safety, and a few other senior people within CASA ...we hold regular workshops with the key CASA personnel; they literally come down to our research centre and we brief them on where we are at.⁴¹

3.53 Industry engagement of this sort will help CASA identify when safety has improved to the extent that fewer restrictions on RPA use are required. As Professor Campbell noted:

The regulations are there to uphold air safety, and I think we have all identified that there is a domain here where there is a question mark over air safety with people who do not understand or who choose to not understand. Some of the work we are doing is trying to identify to the regulator: for this sort of aircraft in this sort of scenario with low risk, we can change the bounds of the regulations. So we are working closely with the regulator there.⁴²

3.54 While CASA's engagement with industry helps it track developments in relation to RPA safety, its consultation process does not appear to include the broader community of RPA users. Halfway through the NPRM's consultation process, CASA reported that 14 responses had been received, all from within the aviation community.⁴³ The broader community of commercial RPA users, including those in industries the Committee heard from in the course of its inquiry, had not participated.

3.55 The narrow range of feedback to CASA's NPRM may be related to the limited notification processes it follows. Mr Grant Mazowita, CASA's manager of standards development and quality assurance, said:

40 Committee Hansard, 28 February 2014, p. 9.

41 Committee Hansard, 21 March 2014, p. 12.

42 Committee Hansard 21 March 2014, p. 11.

43 Committee Hansard, 29 May 2014, p. 3.

The public is notified principally through the CASA website and the notification in *The Australian* that this NPRM has been published.⁴⁴

- 3.56 Mr McCormick said that CASA had not actively sought input from the wider community of RPA users:

apart from putting the ad in the aviation supplement in Friday's *The Australian* and posting on our website that we have this out for consultation, we do not particularly go out and target the other groups unless we have to – in other words, unless we are specifically required to do so, because we don't know where to stop or start. It is very difficult to understand who all the stakeholders are in these issues.⁴⁵

- 3.57 CASA did, however, note that it is attempting to broaden its communication methods:

We are spending a considerable amount of time ... in our general communications activities on how we can reach specific stakeholder groups throughout not only the industry but the broader aviation community. We have stepped into the newer communications medium. We have our own Twitter account and we are investigating other mechanisms by which we can pull people into specific topic areas on our website.⁴⁶

- 3.58 Regulating for the safe use of RPAs by recreational and commercial users poses difficult challenges. Larger commercial and civil operators appear aware of air safety and certification restrictions, and are engaging with CASA to ensure that general air safety is not compromised. However, informing the wider community of recreational and commercial RPA users about CASA regulations and involving them in its regulation development processes represents an ongoing challenge.

Committee comment

- 3.59 The Committee notes the ongoing safety concerns associated with RPA technologies, in particular the evidence it has received about the deficiencies that may exist in the materials and components used to build

44 Committee Hansard, 29 May 2014, p. 3.

45 Committee Hansard, 29 May 2014, pp. 3-4.

46 Committee Hansard, 29 May 2014, p. 9

RPAs. The Committee also notes that the technologies used to control RPAs in flight are still developing. The Committee therefore takes the view that the restrictions CASA currently places on commercial RPA operations over a certain size are appropriate and necessary.

- 3.60 The Committee also notes that RPA technology is developing rapidly. The technical problems and safety risks which prevent RPAs from fully integrating into Australian airspace may well be surmountable. Given CASA's ongoing engagement with researchers and RPA industry groups, CASA should be well-informed about developments in RPA technology and the effectiveness of current regulations to maintain appropriate safety standards in Australian skies.
- 3.61 However, the Committee is concerned that CASA may not be receiving input into its regulatory review processes from the diverse range of RPA users. Its consultation processes are well suited to an aviation industry composed of a small number of identifiable expert stakeholders. However, RPA regulations affect a vastly higher number of stakeholders, many of whom do not have an aviation background. Their views should be heard during the process of regulatory review, particularly as they represent the fastest growing group of RPA operators.

Recommendation 1

The Committee recommends that the Australian Government, through the Civil Aviation Safety Authority, broaden future consultation processes it undertakes in relation to remotely piloted aircraft regulations so as to include industry and recreational users from a non-aviation background.

Future consultation processes should identify and seek comment from peak bodies in industries where remotely piloted aircraft use is likely to expand such as real estate, photography, media, and agriculture, amongst others.

- 3.62 The Committee notes the safety risks posed by untrained RPA operators. Although RPAs are becoming more capable as time passes, even substantial improvements in RPA guidance and safety technologies will not remove the risk posed by untrained or unsafe RPA operators. It is important that every commercial and consumer RPA operator is aware of their responsibility to use RPAs safely. The Committee notes with

approval CASA's attempts to ensure that Australian RPA operators are better educated about the relevant safety regulations, such as its recent initiative to distribute pamphlets outlining safety issues and regulatory information to RPA purchasers.

- 3.63 The Committee notes CASA's ongoing process to amend the RPA regulations contained in CASR 101. The Committee notes the NPRM updated guidance on what may constitute a non-populous area, and considers this guidance useful and appropriate. Similarly, the Committee considers that the creation of a class of commercial RPA operations that does not require certification is appropriate, considering the low risk of these small craft when used in standard operating conditions.
- 3.64 Therefore, the Committee takes the view that CASA's proposed amendments to CASR 101 strike a suitable balance between minimising safety risks on the one hand and facilitating the development of Australia's RPA industry on the other. For operators wishing to employ any RPA outside of the standard operating conditions, for example beyond line of sight or within 30 metres of persons, an exemption may be sought from CASA. The Committee notes that an exemption may be restricted to a single flight event or may be granted to an operator for any specified type of event (such as sports matches or music concerts). Such an exemption requires CASA to be satisfied of the operator's expertise and further conditions may be placed on the type of craft, safety features and environmental conditions.
- 3.65 It is the Committee's view that the NPRM proposes greater flexibility while maintaining a clear safety regime. However, the Committee has a number of concerns in relation to the proposed system:
- the growth of the RPA industry has led to a steep increase in the number of RPA operators seeking certification. While permitting uncertified commercial RPA operations under 2 kilograms may reduce CASA's administrative burden temporarily, assigning sufficient resources to provide timely operator approvals and exemptions will remain an ongoing concern for CASA,
 - the regulations which determine whether uncertified RPA use is permissible are complex. Many RPA operators, particularly those that do not have an aviation background, may find the regulations confusing or burdensome, or may lack the capacity to adequately assess whether a given situation permits uncertified commercial use,
 - compliance with CASR 101 is entirely reliant on operator awareness of the regulations. A pamphlet outlining the standard RPA operating

conditions may be sufficient for recreational users, but commercial operators require more comprehensive information, and

- in future, the pace of technological development may render the standard operating conditions more onerous than necessary for air safety. Active and ongoing review processes will be required to ensure that the regulations remain appropriate.