Chapter 8

Committee view and recommendations

8.1 The advent and advance of RPAS technology presents a wealth of opportunities for the Australian community, and worldwide. The growth of commercial, scientific and security applications has facilitated the innovative use of RPAS in agriculture, mining, emergency services, medicine and across a range of industries. However, the proliferation of RPAS in Australia also presents a series of challenges, particularly to public and aviation safety, which require immediate address.

8.2 Of particular concern to the committee is the growing number of RPAS falling within the 'excluded' category of Part 101 of the CASR, including those used for recreational purposes and weighing less than 2kg. Contrary to CASA's assessment that these RPAS are 'lower risk',[1] the committee considers that even small RPA weighing less than 2kg are capable of causing damage to rotorcraft, aircraft, people and property. This concern was borne out of research conducted by the ATSB, UK Department for Transport, and the US FAA.[2]

8.3 Whilst it is apparent that the implementation of a blanket ban on the use of RPA would immediately 'eliminate the risks that are posed by untrained and unqualified drone operators',[3] the committee acknowledges that such an approach would not provide a constructive, practical solution to the issue. Such a ban would seriously jeopardise investment, innovation and advancement of RPAS technology in industries and sectors such as emergency services and agriculture.

8.4 The committee therefore recommends a series of measures to enhance public safety without stifling the myriad of innovative applications for RPAS technology. As a first step, reforms to Part 101 should be made in line with the evidence available about RPAS collision and risk. Following this, the committee recommends the introduction of a mandatory registration regime and education program for RPAS operators, combined with 'off-the-shelf' limitations on RPAS range and altitude, before exploring further initiatives such as airspace restriction and airworthiness standards. The committee strongly suggests the adoption of a whole of government policy approach, within which all RPAS-related measures can be considered. As the RPAS sector continues to transform and grow, ongoing evaluation and review of these measures will be required.

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1 Explanatory statement, Civil Aviation Legislation Amendment (Part 101) Regulation 2016, p. 1.

2 See Chapter 3.

3 Dr Jonathan Aleck, Civil Aviation Safety Authority, *Budget Estimates Hansard*, 23 May 2017, p. 109.

Evidence-based regulatory reform

8.5 Throughout the inquiry, the committee was repeatedly informed that the September 2016 amendments to Part 101 of the CASR were not supported by sufficient evidence and that they are out of step with the regulations imposed by many of CASA's international counterparts. The committee is firmly of the view that regulatory changes should be supported by a sound evidence base, particularly with regards to aviation safety standards.

8.6 The committee shares the view of ATSB's Aviation Commissioner and former chief pilot of Qantas, Mr Chris Manning, that '[a]nything in the air is a risk to an aircraft, whether it is a bird, an animal or an RPAS'.[4] Accordingly, the committee is concerned by evidence presented throughout the inquiry that RPAS falling under the excluded category (weighing less than 2kg) are able to do significant damage to passenger aircraft when mid-air collisions occur.

8.7 The committee was alarmed by CASA's apparent lack of due diligence prior to introducing the amendments. Rather than providing a comprehensive evidence-base, the research conducted by CASA to inform the amendments appears to have been limited to desktop research. In addition, questions were raised about the consultation period for the Part 101 amendments, which lasted only one month, then took two years to come into effect. This approach stands in direct contrast to that taken by the UK government which used laboratory collision testing and computer modelling to undertake a mid-air collision study before implementing regulations for small RPAS. Similarly, in the US, the Department of Transport and the FAA conducted risk assessments and a community consultation process before introducing registration requirements for RPAS over 250g.

8.8 There is a growing body of evidence, demonstrated by research undertaken in other jurisdictions, to suggest that the Part 101 amendments require urgent reconsideration. The committee appreciates that CASA recently completed a review into RPAS operations, and made considerable effort to engage with the aviation community as part of this process. However, CASA must also draw on the growing body of empirical evidence produced by other jurisdictions to provide an evidence-based approach to any regulatory change, and fulfil its primary statutory objective to ensure the 'safety of air navigation as the most important consideration'.[5]

8.9 As CASA acknowledged in its review paper, the sharing and leveraging of international research is highly beneficial to the development of RPAS regulation.[6] CASA should therefore continue to draw on the research already available through the Joint Authorities for Rulemaking on Unmanned Systems, as well as other

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4 Mr Chris Manning, Australian Transport Safety Bureau, *Budget Estimates Hansard*, 23 May 2017, p. 134.

5 *Civil Aviation Act 1988*, s. 9A.

6 Civil Aviation Safety Authority, *Review of aviation safety regulation of remotely piloted aircraft systems*, May 2018, p. 22.

jurisdictions, to inform Australian regulatory policy for RPAS operation and integration.

Recommendation 1

8.10 The committee recommends that the Civil Aviation Safety Authority draw on the growing body of international empirical research and collision testing on remotely piloted aircraft systems below 2kg to immediately reform Part 101 of the Civil Aviation Safety Regulations 1998.

Mandatory registration regime

8.11 Cognisant of the outcomes of the UK mid-air collision study, the committee recognises that even small RPAS are capable of causing considerable damage to rotorcraft and aircraft. However, under the current requirements for RPAS use, there is no way to identify the operator and owner of any RPAS involved in a near-miss incident or collision. The committee recognises that the registration of all RPAS, whether for recreational or commercial purposes, would allow enforcement agencies to monitor and penalise unlawful RPAS activity. Identification requirements for RPAS and their operators would discourage rule breaches and encourage responsible, safe RPAS use.

8.12 The development of a compulsory registration regime in Australia would align with regulations currently in force in jurisdictions across the world, including in the US and UK whereby RPAS over 250g are required to be registered prior to flight. Along with many stakeholders who provided evidence to the inquiry, the committee upholds the view that a similar requirement should be enshrined in the Australian regulations.

8.13 According to CASA's review of RPAS operations, there is abundant support from commercial, recreational, and non-users of RPAS for some form of registration.[7] A key preference was for registration to be determined by the weight of the RPA, with 250g being the most commonly nominated cut-off.

8.14 The committee recognises that some RPAS manufacturers have taken steps to introduce their own registration systems. As an example, DJI announced in May 2017 that firmware updates for all DJI drone models will require users to log onto its website to complete an application activation process.[8]

8.15 These are important initiatives. However, the committee also recognises that the implementation of a mandatory registration regime presents the opportunity to create more stringent criteria for those wishing to operate an RPAS and to educate

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7 CASA's review received 910 responses to a range of questions relating to registration, training and demonstrated proficiency, geo-fencing, counter-drone technology, and regulatory approaches. See: Civil Aviation Safety Authority, *Review of aviation safety regulation of remotely piloted aircraft systems*, May 2018.

8 Adam Clark Estes, 'DJI Will Cripple Your Drone If You Don't Register It On the Company's Website, *Gizmodo*, 23 May 2017, https://www.gizmodo.com.au/2017/05/dji-will-cripple-your-drone-if-you-dont-register-it-on-the-companys-website/ (accessed 20 February 2018).

prospective operators. Inquiry participants notified the committee that new operators may not fully comprehend or even be aware of the regulations applicable to RPAS, with many potentially operating their RPAS in breach of the regulations simply 'out of naivety'.[9]

8.16 The introduction of a mandatory registration regime provides an opportunity to reach and inform all RPAS users whilst also requiring of them a demonstrated understanding and awareness of safe RPAS use. In particular, new operators should be required to demonstrate basic knowledge of the rules pertaining to RPAS flights, such as the requirement to stay below 400 feet and maintain a distance of at least 30 metres from people. An understanding of the penalties applied for non-compliance should also be demonstrated.

8.17 The mandatory registration of RPAS is a sensible and logical step towards effective regulation. The committee appreciates, however, that the costs associated with establishing and administering a registration scheme would not be insignificant. The matter of cost recovery was noted in CASA's review of RPAS operations, with the regulator noting that recreational RPAS operation 'is already placing a significant burden on CASA's funding' due to the lack of a regulatory services income from non-commercial operators.[10] This reflects a broader discussion on the need to select an appropriate body (government or third party) to maintain the proposed register, with a suitable cost structure in place.

8.18 The committee notes that cost-effective registration regimes are already in place in many jurisdictions around the world. In the US, RPAS registration costs are offset by incorporating a minor fee for operators. The UK is proposing a similar regime, with the added requirement for operators to renew their registration each year, free of charge. In Australia, other recreational aircraft, such as hot air balloons and skydiving parachutes, are required to register through one of 10 Recreational Aviation Administration Organisations (RAAOs) authorised to self-administer sport and recreational flying activities on CASA's behalf.[11] Beyond aviation, registration regimes are also in place for maritime distress beacons,[12] and even prepaid mobile phones.[13]

8.19 The committee therefore suggests that the establishment and implementation of a mandatory registration regime need not entail onerous financial outlays. Instead,

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9 Mr Bradley Mason, Australian Certified UAV Operators, *Committee Hansard*, 28 June 2017, p. 14.

10 Civil Aviation Safety Authority, *Review of aviation safety regulation of remotely piloted aircraft systems*, May 2018, p. 14.

11 Civil Aviation Safety Authority, *Self-administering organisations*, https://www.casa.gov.au/standard-page/self-administering-organisations (accessed 2 May 2018).

12 Australian Maritime Safety Authority, *Beacons*, http://beacons.amsa.gov.au/ (accessed 24 April 2018).

13 Australian Communications and Media Authority, *ID checks for prepaid mobiles*, https://www.acma.gov.au/theACMA/id-checks-for-prepaid-mobiles (accessed 24 April 2018).

the models adopted in other jurisdictions and industries should be drawn on to establish a mandatory regime for RPAS that is both cost-effective and sustainable.

Recommendation 2

8.20 The committee recommends that the Australian Government introduce a mandatory registration regime for all remotely piloted aircraft systems (RPAS) weighing more than 250 grams. As part of registration requirements, RPAS operators should be required to successfully complete a basic competence test regarding the safe use of RPAS, and demonstrate an understanding of the penalties for non-compliance with the rules.

Tiered education program

8.21 The committee recognises that more should be done to ensure that all RPAS users, whether recreational or commercial, undertake some form of mandatory education and training before flying their RPAS. The committee was alarmed by numerous reports of reckless RPAS operations which had hindered emergency operations, flown close to commercial aircraft, or intruded upon restricted airspace. The committee was equally concerned by reports of inexperienced RPAS operators who, through obliviousness to the rules, have inadvertently threatened public safety in one way or another.

8.22 The committee acknowledges the models used for training, education and certification of sport and recreational aircraft pilots through self-administering organisations such as Recreational Aviation Australia and the Model Aeronautical Association of Australia. Specialist aircraft clubs such as these have assisted in fostering a culture of safety and awareness of aviation law, in the absence of a national education and registration system. In particular, the Model Aeronautical Association of Australia has demonstrated considerable leadership in devising and delivering its wings accreditation program to club members.

8.23 Drawing on these safety initiatives, the committee is supportive of a tiered education regime for all RPAS users. In accordance with evidence to the inquiry, the committee recognises that the level of training required should be geared to the level of risk posed by each operation. For example, RPAS purchased 'off-the-shelf' would have a base level limitation on range and altitude, such as 200 feet above ground level and 200 metres from the operator. Upon completion of a rudimentary education tier as described in Recommendation 2, users would then have additional capabilities unlocked on their device, commensurate with the current operating conditions stated in the Regulations. After successful completion of additional training, limitations could then be removed entirely for operators using RPAS for commercial or exempted purposes. The final tier would equate to the current training requirements for a commercial operator's licence.

8.24 A summary is provided in Table 8.1 below:

	Operation	**Limitations**
Tier 1	Beginner	200 feet (60 metres) AGL 200 metres from operator
Tier 2	Recreational use	400 feet (120 metres) AGL 500 metres from operator
Tier 3	Commercial and other exempted use	No limitations

8.25 The committee recognises that a large majority of incidents involving RPAS in the last few years are likely to have been due to a lack of knowledge about the relevant guidelines and regulations. It is therefore appropriate that educative programs focus on the risks associated with aircraft operation, and general principles of aviation. The education curriculum should also incorporate an explanation of basic aviation terms, and the differences between airspace classes, particularly those that prohibit RPAS operations, and those that may permit operations to a certain height or distance. As previously emphasised, the tiered education program should be introduced as part of the RPAS mandatory registration regime.

Recommendation 3

8.26 The committee recommends that the Australian Government develop a tiered education program whereby remotely piloted aircraft system (RPAS) users progressively unlock RPAS capabilities upon completion of each level of training. Three tiers are proposed as follows:

- **purchase of the RPAS – mandatory registration requires user to demonstrate knowledge the basic rules for flying RPAS, and the penalties for non-compliance (as described in Recommendation 2);**
- **recreational use of RPAS – second tier requires user to demonstrate an advanced understanding of aviation rules and safety before unlocking additional capabilities; and**
- **commercial use of RPAS – final tier requires user to demonstrate comprehensive aviation knowledge before obtaining commercial operator licence and unlocking full RPAS capability.**

Vulnerable airspace

8.27 Another matter that requires attention is that of the imposition of restrictions on RPAS over vulnerable airspace. The committee was alarmed by reports of unauthorised RPAS hampering emergency operations and flying close to hospital zones. These practices present a significant risk to low-flying helicopters and small aircraft performing essential, and at times life-saving, services.

8.28 In addition to these areas, the committee considered the airspace over public buildings and critical infrastructure to be particularly susceptible to RPAS misuse. Taking into account the security risks involved, the committee is firmly of the view that such areas should be subject to explicit RPAS restriction. It suggests that restriction of airspace over public buildings, emergency operations, hospitals and major cities is an appropriate preventative measure that is commensurate with the risk posed. Stronger enforcement measures should also be considered to ensure the public is aware of restrictions, and discouraged from breaching the rules.

Recommendation 4

8.29 The committee recommends that the Civil Aviation Safety Authority, in cooperation with the Australian Federal Police and other relevant authorities, prohibit the use of remotely piloted aircraft systems in the airspace above significant public buildings, critical infrastructure and other vulnerable areas.

8.30 Additionally, the committee considers that further measures are required to effectively prevent RPAS from flying in such vulnerable airspace. The recommended registration and education initiatives could assist in educating RPAS operators of the risks involved in flying in these areas, and the potential penalties applied. CASA's mobile app *Can I fly there?* provides a suitable platform to both notify and remind the public about such restrictions. However, 'off-the-shelf' RPAS should ultimately be fitted with technical restrictions to ensure compliance with the rules. The committee is of the view that this will ensure both oblivious and malicious users are prevented from breaching the rules and posing an aviation and public safety threat. In this regard, Defence commented that there should be 'electronic, physical or other measures' to prevent RPAS from being utilised unlawfully.[14]

Recommendation 5

8.31 The committee recommends that the Department of Infrastructure, Regional Development and Cities, in cooperation with the Civil Aviation Safety Authority, work with manufacturers of remotely piloted aircraft systems (RPAS) to develop future solutions to RPAS safety, including the implementation of technical restrictions on altitude and distance for 'off-the-shelf' RPAS.

Airworthiness standards

8.32 To allow RPAS to fully integrate into shared airspace, they must be subject to standards of airworthiness. Airworthiness standards for recreational and other RPAS would ensure that the devices are consistent across technical design, manufacture and maintenance requirements, as is the case with all other aircraft in Australia.

14 Department of Defence, answers to written questions on notice, 22 March 2018, p. 4 (received 24 April 2018).

8.33 The committee acknowledges the work CASA has done to consult with the aviation community regarding a UAS airworthiness framework.[15] The initiatives undertaken by the Joint Authorities for Rulemaking on Unmanned Systems and the European Aviation Safety Agency are also significant.

8.34 However, the committee remains concerned that the exemption of RPAS from airworthiness requirements, particularly those used by recreational operators, continues to diminish public safety through allowing unchecked devices to fly in civilian airspace. As pointed out in the 2016 RMIT study referred to by submitters, broken communication links between an RPAS and its controller, and other technical problems, account for more than half the number of reported RPAS accidents.[16] Yet, a nationally consistent standard of airworthiness for very small and small RPAS remains absent.

8.35 Therefore, the committee recommends that, at a minimum, prescribed standards for RPAS should include a number of fail-safe redundancies, such as return-to-home functionality and forced flight termination. In the case of a system error, these safety mechanisms will ensure that damage to people or property is minimised.

8.36 The committee is of the view that airworthiness standards should also extend to RPAS that arrive in the country through foreign imports. Just as model rockets and laser pointers are subject to import controls, so too should RPA devices be monitored at the border to ensure a consistent standard of quality and safety. Whilst complications may arise with regards to RPAS modification and part substitution, the committee suggests that the safety of the public should remain at the forefront of RPAS regulation in order to prevent all potential incidents and accidents associated with technical failure.

Recommendation 6

8.37 The committee recommends that the Department of Infrastructure, Regional Development and Cities, in cooperation with the Civil Aviation Safety Authority, develop appropriate airworthiness standards for remotely piloted aircraft of all sizes and operations. At a minimum, fail-safe functions such as 'return to home' and safe landing functionality, and forced flight termination, should be mandated.

Recommendation 7

8.38 The committee recommends that the Australian Government develop import controls to enforce airworthiness standards for foreign manufactured remotely piloted aircraft systems.

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15 Civil Aviation Safety Authority, *DP 1529US – UAS airworthiness framework*, https://www.casa.gov.au/standard-page/dp-1529us-uas-airworthiness-framework (accessed 12 November 2017).

16 Graham Wild, Glenn Baxter and John Murray, 'Exploring drone accidents and incidents to help prevent potential air disasters', *Aerospace*, vol. 3, no. 3, 2016, pp. 1–11.

Whole of government approach

8.39 The committee considers that the wealth of reforms required to effectively regulate and support the growing RPAS industry requires a holistic approach that draws in all levels of government, a range of industry stakeholders, and utilises cost-effective solutions. As a first step, a whole of government approach is needed to address the increasingly complex set of challenges arising from the multi-faceted nature of RPAS technology, and the diverse set of stakeholders involved.

8.40 The committee was pleased to hear that the Australian Government provides aviation policy leadership through quarterly meetings of the Aviation Policy Group. However, it was apparent that many submitters and witnesses were not aware of this government mechanism, nor felt that it was sufficient to deal comprehensively with matters relating to RPAS.

8.41 During the course of the inquiry, it became clear to the committee that RPAS regulation and safety instead requires a coordinated, holistic approach which encompasses matters including national security, importation, consumer protection, and technological innovation. To this end, the committee recognises the need for a whole of government approach, whereby departments and agencies work together across portfolio boundaries, to achieve RPAS safety.

8.42 For this reason, the committee recommends that the Department of Infrastructure, Regional Development and Cities, which has policy leadership on aviation matters, work with CASA and other key agencies to establish whole of government mechanisms to develop policies and implement programs directed at achieving RPAS safety in Australia. The establishment of such mechanisms will enable comprehensive consideration of matters and areas intersecting with RPAS technology.

8.43 To ensure that a comprehensive regulatory approach to RPAS is adopted, the committee further recommends that the Australian Government explore cost-effective options for the implementation and maintenance of registration, education, and compliance initiatives outlined in this report.

Recommendation 8

8.44 The committee recommends that the Department of Infrastructure, Regional Development and Cities, in collaboration with the Civil Aviation Safety Authority, develop a whole of government policy for remotely piloted aircraft safety in Australia, and establish appropriate coordination and implementation mechanisms with relevant departments and agencies to implement the policy.

8.45 As part of a whole of government policy approach, the committee further recommends that the Australian Government explore cost-effective models to develop and administer new regulatory initiatives for remotely piloted aircraft systems, including a mandatory registration regime and tiered education program. The harmonisation of state and territory privacy laws should also be considered.

Comprehensive research to inform policy and practice

8.46 Additional concerns in relation to the current RPAS regime include the lack of available data regarding RPAS operations, the limited information on RPAS incidents and occurrences, and the methodology applied to gather such information. These concerns were brought to the fore throughout the inquiry in evidence that the regulator has very little information about the number of RPAS in the sky, the characteristics of RPAS operators, where RPAS are flown, and the type of operations that are taking place.[17] The committee agrees that this wealth of 'unknowns' presents a key policy challenge that should be addressed.

8.47 Information captured through the National Aviation Occurrence Database has historically excluded many aviation breaches due to an overly narrow criterion for reportable activity. CASA's reporting and complaints system is also insufficient, relying heavily on witness reports and photographic evidence of RPAS that are neither identifiable nor traceable.

8.48 The committee believes that, as part of a whole of government policy approach to RPAS, a research and data gathering capability should be established. It would provide Airservices Australia, CASA, ATSB and other involved agencies access to more complex information relevant to the development of operating standards, geo-fencing, incident prevention, and the identification of commercial trends. The collection and analysis of such information would provide an evidence-base on which to assess the effectiveness of current regulatory measures, and inform future policy.

8.49 As stated earlier, the establishment of a registration regime is an essential step which would allow for the collection of much of the required data.

Recommendation 9

8.50 The committee recommends that, as part of a whole of government approach to remotely piloted aircraft systems (RPAS) safety, the Civil Aviation Safety Authority work with Airservices Australia and other relevant agencies to implement a comprehensive research and data gathering regime. Information should be collated and centralised in a way that allows for the examination of RPAS registrations, operations, trends and incidents, to provide an evidence base on which to assess the efficacy of current regulations, and to inform the development of future policy and regulations.

Consultation beyond the aviation sector

8.51 In addition to a whole of government mechanism established at the federal level, the committee believes that ongoing consultation with the RPAS sector will ensure that the aviation regulator understands the changing opportunities and challenges faced by RPAS operators, both commercial and otherwise.

17 See Chapter 4. Whilst some data is retained about commercial operations, recreational drone users are not required to provide the same information to CASA.

8.52 The committee is supportive of the existing consultation forums led by CASA, including the Aviation Safety Advisory Panel. However, as submitters and witnesses have suggested, stakeholders of RPAS technology are much broader than the traditional aviation sector.

8.53 As such, the committee recommends that regular input be sought from a range of industry stakeholders, such as airlines, manufacturers, insurers, emergency service bodies, agriculture representatives, air traffic control, recreational clubs, mobile networks, as well as recreational and commercial RPAS operators. Engagement with stakeholders should be guided by clear terms of reference, and focus on evolving trends in RPAS use, including the development of new technologies and capabilities such as beyond visual line of sight operations.

Future solutions

8.54 The committee recognises the evolving nature of RPAS technology and associated systems, and considers that a whole of government framework should take these advancements into account when setting policy.

8.55 In particular, the committee is interested in the array of technologies currently being developed to enhance the safety mechanisms built into RPAS, including geo-fencing, collision avoidance, and other transponder-based systems such as ADS-B. It is clear from the evidence presented to the committee that many of these systems are developing rapidly, and need to be seriously considered as regulatory tools to prevent unsafe RPAS use. This is demonstrated by the availability of safeguards such as 'return to home' and 'follow me' modes that are already available in many manufactured products. However, the committee recognises that questions remain about how the technology will be integrated with compliance regimes. For example, if an RPAS equipped with in-built restrictions on height and altitude breaches restricted airspace due to technical inaccuracy, the regulator would need to make a decision about who is legally responsible – the manufacturer or the operator.

8.56 Another outstanding matter is the need for in-built technical restrictions to keep pace with temporary or new restrictions, such as those put in place during the Commonwealth Games. Where airspace is temporarily restricted, manufacturers and regulators would need to ensure all RPAS are remotely updated and adhere to the new rules.

8.57 Recognising that geo-fencing is already available in a number of overseas jurisdictions, and in certain manufacturer's products, the committee supports the work currently being done by the Queensland University of Technology in conjunction with Airservices Australia to develop the necessary datasets to geo-fence RPAS in Australia through a web based service for digital mapping. The committee strongly encourages the government to continue to utilise the technical and industry expertise of stakeholders to develop future solutions to RPAS safety.

Addressing other policy challenges

8.58 Once a whole of government policy mechanism is in place, consideration should be given to other complex policy challenges, including the steps required to achieve a nationally consistent enforcement regime in relation to RPAS.

Nationally consistent regulations

8.59 The committee acknowledges the steps being taken by local and state governments to increase public safety and mitigate the risks posed by the growing number of recreational and amateur RPAS operators. However, the committee heard that such measures will be counterproductive if they lead to confusion about RPAS rules and how and where they apply. State-based surveillance laws, which dictate the use of optical surveillance devices and data surveillance tracking devices including RPAS, are one such example.[18]

8.60 The committee is mindful that the concerns raised in the 2014 House of Representatives report regarding surveillance laws pertaining to RPAS use remain largely unaddressed.[19] Therefore, the committee recognises that a whole of government approach to RPAS management provides an opportunity to address regulatory inconsistencies across local and federal RPAS laws.

8.61 A nationally consistent policy framework and collaborative approach would ensure that local and state government restrictions on RPAS complement federal regulations and provide a consistent message regarding safety for RPAS users and the general public. The committee strongly encourages local and state governments to work with federal counterparts for the purposes of harmonising RPAS regulations.

Delegation of police powers

8.62 Another issue that requires consideration is that of the prospect of CASA delegating some of its policing powers to local authorities. It is clear that, as the number of RPAS operators continues to rise, the burden placed on CASA to enforce the regulations will become untenable. Following the example of the US and UK, the committee believes that there is merit in considering the delegation of policing powers to local authorities who are often best placed to issue timely penalties. Consideration should be given to empowering local authorities to provide on-the-spot fines and report infringements directly to CASA. As part of a coordinated approach to RPAS safety, the prospect of applying counter-drone technology, such as jamming devices and GPS tracking should also be contemplated.

8.63 The committee strongly supports the development of a nationally consistent enforcement regime, and the delegation of police powers to local authorities. However, it takes the view that a registration system and whole of government policy approach to RPAS safety should remain the first priority. Once these initiatives are in place, other enforcement mechanisms can be considered as part of a coordinated response.

Recommendation 10

8.64 The committee recommends that, following the development of a whole of government policy approach to RPAS safety, including the establishment of a

18 See Chapter 7.

19 See: House of Representatives Standing Committee on Social Policy and Legal Affairs, *Eyes in the sky: Inquiry into drones and the regulation of air safety and privacy*, July 2014, pp. 33–50.

national registration system, the Civil Aviation Safety Authority (CASA) work with state and territory enforcement bodies to implement a nationally consistent enforcement regime for remotely piloted aircraft systems. Under this regime, enforcement bodies would be delegated powers to provide on-the-spot fines and report infringements of the regulations directly to CASA.

Concluding comments

8.65 The committee's inquiry into RPAS and associated systems has identified a multitude of benefits that RPAS technology has brought to many industries. However, the amendments to Part 101 of the CASR in September 2016 have shaken public confidence that RPAS can be effectively integrated into Australian airspace, without a significant number of regulatory reforms.

8.66 The evidence has clearly shown that, in order for Australia to balance the important challenges of ensuring public and aviation safety, and encouraging innovation, the regulations for RPAS use must be expanded to include a registration requirement, education and awareness training, additional enforcement and compliance measures, and technology-based solutions.

8.67 The committee believes that its recommendations, once implemented in full, will instil community confidence by contributing to public and aviation safety, and keeping Australia's skies safe.

Senator Glenn Sterle

Chair