

ANNEX C

Draft Advisory Circulars:

- 101-1 – Remotely piloted aircraft systems -
general,**
- 101-4 – Remotely piloted aircraft systems -
training and certification, and**
- 101-5 – Remotely piloted aircraft systems -
operations**



Australian Government

Civil Aviation Safety Authority

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ADVISORY CIRCULAR

AC 101-1

**Remotely piloted aircraft systems -
general**

Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

Advisory Circulars should always be read in conjunction with the relevant regulations.

Audience

This Advisory Circular (AC) applies to:

- Unmanned Aircraft System Operator's Certificate (UOC) holders
- Remote pilots, other remote crew members
- Ground support personnel involved in Remotely Piloted Aircraft Systems (RPAS) operations.

Purpose

This Advisory Circular (AC) describes the overall requirements for non-recreational use of Remotely Piloted Aircraft (RPA). It is consistent with the work currently being developed by the International Civil Aviation Organization (ICAO) and that of other regulatory bodies. To this end, the terms and definitions are consistent with those used by ICAO as found in Annex 2 to the Convention on International Civil Aviation - Rules of the Air. The term Unmanned Aerial Vehicle (UAV) is being replaced with the more correct terms of Unmanned Aircraft System (UAS), Remotely Piloted Aircraft Systems (RPAS) and Remotely Piloted Aircraft (RPA), as appropriate.

This AC is an introduction to RPAS generally and is a part of a suite of ACs aimed at providing better guidance to RPAS operators, crew, manufacturers and maintainers, and the means whereby they may safely and legally operate an RPA. While these documents describe a means of compliance with the legislation, alternative procedures demonstrating an equivalent or greater level of safety would be considered on a case-by-case basis.

It is essential that operators and crew associated with RPAS realise that they are operating within the aviation industry and have an obligation to be aware of related information and regulatory requirements affecting aviation. Such information is not limited to CASR Part 101 it also includes all requirements under the Civil Aviation Act 1988, Civil Aviation Orders, Civil Aviation Regulations 1988 (CAR 1988), Civil Aviation Safety Regulations 1998 (CASR 1998), the Airspace Act 2007 and the Airspace Regulations 2007.

Status

This is the second AC to be published on this subject and replaces AC 101-1(0) dated July 2002. Related ACs include:

- AC 101-4 – Remotely Piloted Aircraft Systems - Training and Remote Pilot Certification
- AC 101-5 – Remotely Piloted Aircraft Systems - Operations

Other related published ACs:

- AC 101-2 – Rockets
- AC 101-3 – Model Aircraft.

Note: AC 101-2 and AC 101-3 will be reviewed at a later stage and may be renumbered when the whole document set is finalised.

For further information

For further information on this AC, contact CASA's Standards Development and Quality Assurance Branch (telephone 131 757).

Unless specified otherwise, all subregulations, regulations, subparts, parts and divisions referenced in this AC are references to the Civil Aviation Safety Regulations 1998 (CASR).

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1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

Acronym	Description
AC	Advisory Circular
AIP	Aeronautical Information Publication
ASIC	Aviation Security Identification Card
ATSB	Australian Transport Safety Bureau
ATC	Air Traffic Control
ATM	Air Traffic Management
ATS	Air Traffic Services
CAR	Civil Aviation Regulations 1988
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations 1998
DAMP	Drug and Alcohol Management Plan
ICAO	International Civil Aviation Organization
RP	Remote Pilot
RPA	Remotely piloted aircraft
RPAS	Remotely piloted aircraft system
SMS	Safety Management System
UA	Unmanned aircraft
UAS	Unmanned aircraft system(s)
UAV	Unmanned aerial vehicle (obsolete term)
UOC	UAS Operator's Certificate

Other acronyms in general use within the aviation industry can be found in the Aeronautical Information Publication (AIP) at General (GEN 2.2 DEFINITIONS AND ABBREVIATIONS). All operators, remote pilots and crew associated with remotely piloted aircraft should familiarise themselves with that information.

1.2 Definitions

Terms that have specific meaning within this AC are defined in the table below.

Term	Definition
Autonomous aircraft	An unmanned aircraft that does not allow pilot intervention in the management of the flight.
Autonomous operation	An operation during which an unmanned aircraft is operating without pilot intervention in the management of the flight.
Command and control link	The data link between the remotely piloted aircraft and the remote pilot station for the purposes of managing the flight.
Controlled Airspace	An airspace of defined dimension within which air traffic control service is provided to flights in accordance with the airspace classification.
Detect and avoid	The capability to see, sense or detect conflicting traffic or other hazards and take the appropriate action to comply with the applicable rules of flight.
Hand-over	The act of passing piloting control from one remote pilot station to another or to another remote pilot at the same remote pilot station.
Lost link	The loss of command and control link contact with the remotely piloted aircraft such that the remote pilot can no longer manage the aircraft's flight.
Operational control	The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of safety of the aircraft and the regularity and efficiency of the flight.
Operator	A person, organisation or enterprise engaged in or offering to engage in an aircraft operation.
Pilot (verb.)	To manipulate the flight controls of an aircraft during flight time.
Pre-flight Inspection	Set of manufacturer recommended functional tests of systems and components to be performed prior to any launch.
Remote crew member	A crew member charged with duties essential to the operation of a remotely piloted aircraft system, during flight time.
Remote Pilot	The person who manages the flight controls of a remotely piloted aircraft during flight time.
Remote pilot station	The station at which the remote pilot manages the flight of an unmanned aircraft.
Remotely piloted	Control of an aircraft from a remote pilot station which is not on board the aircraft.
Remotely piloted aircraft	An unmanned aircraft where the flying pilot is not on board the aircraft.
Remotely piloted aircraft system	A set of configurable elements consisting of a remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other system elements as may be required at any point during flight operation.
RPA observer	A remote crew member who, by visual observation of the remotely-piloted aircraft, assists the Remote Pilot in the safe conduct of the flight in the area of operations.
Segregated airspace	Airspace of specified dimensions allocated for exclusive use to a specific user(s).
Unmanned Aerial	Obsolete term - refer to 'remotely-piloted aircraft' definition above.

Vehicle (UAV)

UAV Control Station or Ground Control Station Obsolete term – refer to ‘remote pilot station’: The station at which the remote pilot/UAV Controller manages the flight of an unmanned aircraft.

Visual line-of-sight operation An operation in which the remote crew maintains direct visual contact with the aircraft, aided only by spectacles or contact lenses (not binoculars or telescopes etc.) to manage its flight and meet separation and collision avoidance responsibilities.

1.3 References

CASR Part 101 – Unmanned Aircraft and Rocket Operations

ICAO Circular 328 – Unmanned Aircraft Systems, published March 2011

ICAO Annex 2 to the Convention on International Civil Aviation - Rules of the Air

1.4 Forms

CASA's forms are available at http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_91308

2 Background

ICAO refers to unmanned aircraft generally as remotely piloted aircraft, model aircraft, rockets and unmanned free flight balloons. Model aircraft and unmanned fully autonomous aircraft operations are not being considered in this AC, nor are unmanned free balloons or other types of aircraft which cannot be managed on a real-time basis during flight.

For further background and discussion on UAS, refer to ICAO Circular 328. The ICAO Classification Hierarchy, focusing on the UAS path, is shown in Figure 1.

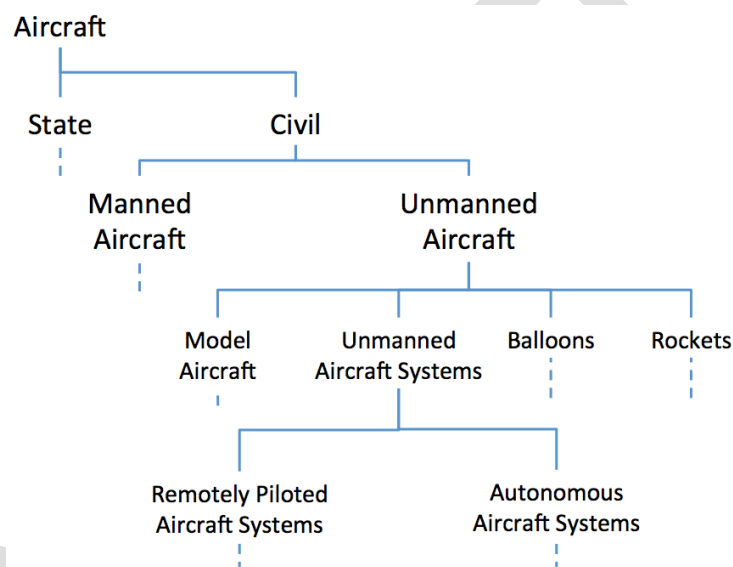


Figure 1 - ICAO Classification Hierarchy

Article 8 of the Convention on International Civil Aviation, stipulates that:

“No aircraft capable of being flown without a pilot shall be flown without a pilot over the territory of a contracting State without special authorization by that State and in accordance with the terms of such authorization....”

All UAS are subject to the provisions of Article 8 of the Convention on International Civil Aviation. However, only the RPA will be able to integrate into the international civil aviation system in the foreseeable future. Moreover, the remote pilot’s functions and responsibilities are essential to the safe and predictable operation of the aircraft as it interacts with other aircraft and the air traffic management (ATM) system.

2.1 Components of a RPAS

RPAS is a subset of UAS. RPAS include, but are not necessarily limited to, the RPA, a remote pilot station (RPS) and the command and control (C2) data-link, and are piloted by a remote pilot (RP). When considering requests for RPAS related functions, CASA will consider the total system, not just the aircraft.

2.2 RPA Commercial Operations

An RPA operation is an aerial work operation as referred to in CAR 2 (7B). For the purposes of RPA, aerial work operations are commercial activities (for hire or reward) and include, but not limited to:

- aerial surveying
- aerial spotting
- aerial photography
- agricultural operations
- research and development
- exhibitions and demonstrations.

2.3 Model aircraft

Model aircraft are used for sport and recreation, and are regulated under CASR Subpart 101.G, supported by guidance within AC 101-3. Model aircraft are not covered in this AC. Further information is also available from the Model Aircraft Association of Australia.

2.4 Autonomy and automation

While recognising that there are increasing degrees of autonomy in RPAS, no formal definitions of scale or recognised methods of certification exist. CASA's current focus is on RPAS operations, which are those operations that are not autonomous operations.

Automation, as opposed to autonomy, can assist in reducing the amount of human intervention required and can improve the quality, accuracy and precision of an RPA. The ability to automate some aspects of the RPAS operation can result in a safer overall operation. Automated operations will be considered on a case-by-case basis and will require the submission of a safety case to CASA.

3 RPA categorisation

RPA are divided into the following categories:

- Micro RPA - RPA with a gross weight of 100 grams or less
- Small RPA - RPA with a gross weight of 2 kg and below
- Medium RPA - RPA with a gross weight greater than 2 kg and less than or equal to 150 kg
- Large RPA - RPA with a gross weight greater than 150 kg.

The requirements for a Remote Pilot (RP) Certificate or an Unmanned Aircraft System Operator's Certificate (UOC) will not apply to RPA with a gross weight of 2 kg and below while they are being operated under the standard RPA operating conditions (outlined below) and do not apply to micro RPA at all.

The operation of an RPA with a gross weight above 2 kg, and all RPA operating outside of the standard RPA operating conditions, require an operational approval in the form of a UAS Operator's Certificate (UOC). CASA requires a risk assessment to be conducted by the applicant before CASA will grant the approval.

These standard operating conditions and the requirements for an operational approval do not apply to model aircraft being used for sport and recreational purposes.

3.1 Standard RPA operating conditions

- Visual Line of Sight (VLOS), i.e., an operation in which the remote crew aided only by spectacles or contact lenses (not binoculars or telescopes etc.) maintain direct visual contact with the aircraft, to manage its flight and meet separation and collision avoidance responsibilities
- at or below 400 feet above ground or water
- non-populous areas, including remaining more than 30 metres from any person not directly involved in the operation of the RPA
- Day Visual Meteorological Conditions (VMC)
- outside of controlled airspace (OCTA)
- Outside of prohibited, restricted and danger areas
- Greater than 3NM from an aerodrome boundary.

4 Training and certification requirements for remote pilots

Remote pilots flying RPA above 2 kg gross weight require approval in accordance with CASR 101.295, and the operating organisation (the operator) is required to hold a UOC. Refer to AC 101-4 - Remotely Piloted Aircraft Systems - Training and Remote Pilot Certification for details of training requirements for the conduct of safe and effective RPA operations and the steps for obtaining an RP certificate and a UOC.

5 UAS Operator's Certificate

A UAS Operator's Certificate (UOC) is similar in nature and intent to the existing Air Operator's Certificate for traditional aviation operations. Conditions relating to the physical areas in which the aircraft may be operated will be added to the UOC. Any proposed operations outside these conditions will require further CASA approval. Figure 2 details the steps required to apply for a UOC.

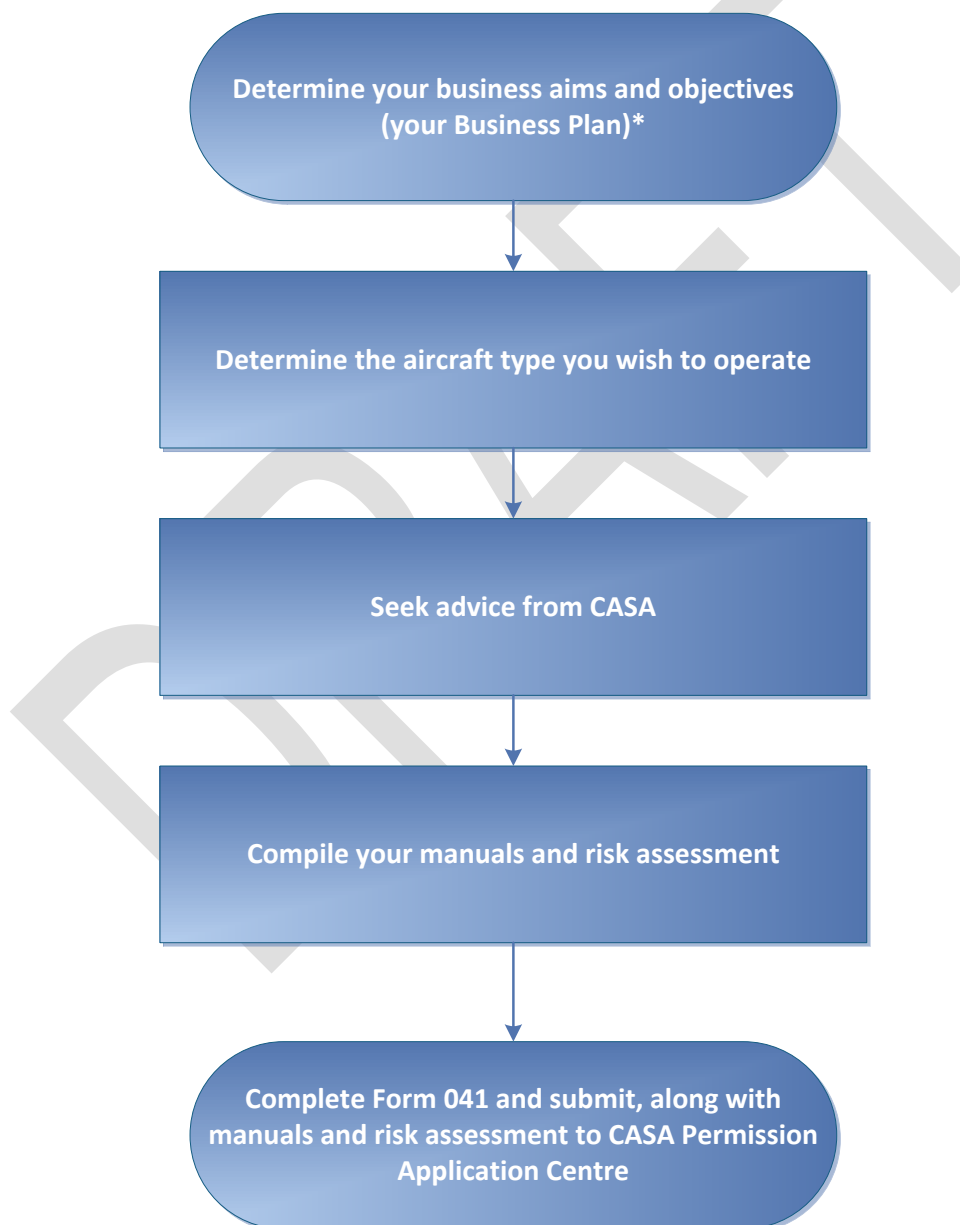


Figure 2 – UOC Applications

* This is not a safety requirement, but more of a plan of what to do in order to begin a dialogue with CASA.

6 RPAS operations

The operation of RPA above 2 kg gross weight requires CASA approval before the operation can be conducted.

The most important factors to be addressed when considering RPA operations are the safety of other aircraft in the airspace and of people and property on the ground. The requirements for operational practices are outlined in AC 101-5 – Remotely Piloted Aircraft System Operations. The steps required to gain approval to operate a RPA are shown in Figure 3 – RPA Operational Approvals.

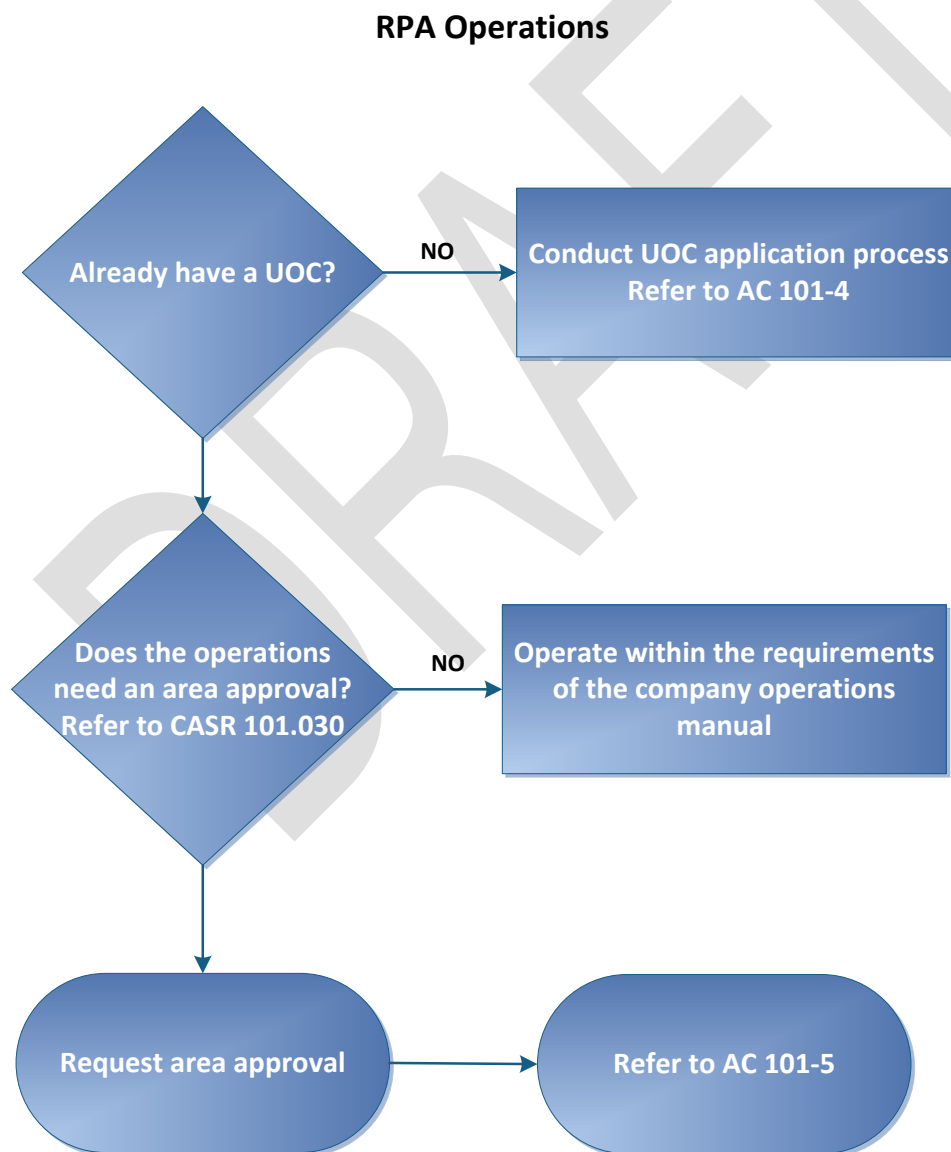


Figure 3 – RPA Operational Approvals

7 Manufacturing RPAS

Currently, there are no design standards, configuration requirements or airworthiness certificates that apply to RPAS. CASA, in consultation with industry, will develop guidance relating to manufacturing standards for RPAS.

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8 Continuing Airworthiness

Currently, there are no continuing airworthiness/maintenance standards or documentation requirements that apply to RPAS. CASA, in consultation with industry, will develop guidance for continuing airworthiness standards for RPAS.

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9 Safety management systems (SMS)

A Safety Management System (SMS) is used to manage all aspects of safety throughout an organisation. Currently CASR Part 101 does not require RPAS operators to have an SMS, however, RPA operations have the potential to create a hazard to other airspace users and members of the public and a risk assessment and safety management plan are to be submitted with all applications for a UOC.

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10 Drug and alcohol management program and testing

Currently RPAS operations are not required to have a Drug and Alcohol Management Program (DAMP). As remote crew are considered to be undertaking “safety sensitive aviation activities” they can be subject to random drug and alcohol testing under CASR Part 99. Further information on DAMPs can be found at:

http://www.casa.gov.au/scripts/nc.dll?WCMS:STANDARD::pc=PC_100957

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11 Frequency spectrum management

CASA does not regulate the electromagnetic spectrum. The Australian Communications and Media Authority (ACMA) should be contacted for any matters relating to command and control links or frequency spectrum issues (refer to <http://www.acma.gov.au>).

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12 Insurance

CASA strongly recommends that operators discuss with an insurer the potential liability for any damage to third parties resulting from the operation of the RPAS.

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13 Aviation Security

When operating an RPA from a security controlled airport, remote crew members should take into account the requirements for access to the airport operational areas and the aviation security requirements that apply to the security controlled airport. Refer to the following web site for further information: <http://www.infrastructure.gov.au/transport/security/aviation/asi/asics>.

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14 Surveillance and enforcement

RPAS operators, as with other sectors of the aviation industry will be subject to oversight, surveillance and enforcement by CASA.

Non-compliance with regulations will be investigated and operators found to be in breach may be subject to safety and/or enforcement action.

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15 Accident/incident reporting

To monitor the safety of RPA operations, errors, failures, incidents and accidents should be recorded for analysis and evaluation. All instances of failure of the aircraft to respond to flight commands from the RPS; failure of fly-away protection; failure of the lost link program, in-flight collisions with another aircraft, structure or person; equipment malfunction; structural failures and damage should be recorded by the operator for subsequent analysis and evaluation and reported by the RPA operator as per the following ATSB requirement.

Accidents and serious incidents are required to be immediately notified to the ATSB in accordance with [section 18](#) of the *Transport Safety Investigation Act 2003*.

Written notifications are required to be submitted within 72 hours of an accident, serious incident or incident in accordance with [section 19](#) of the *Transport Safety Investigation Act 2003* and Regulation 2.6 of the *Transport Safety Investigation Regulations 2003*. The written notification should contain as much information about the accident, serious incident or incident as is within the knowledge of the person at the time of submitting the notification.

16 Noise abatement

RPAS operators are subject to the applicable local noise abatement procedures (such as operating hours, flight paths/altitudes etc.) at their RPA launch and recovery sites and in the area of operations, consistent with safe operation of the RPA. Details of noise abatement procedures are published in ERSA. Note: Local authorities may have their own, additional requirements.

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17 Meteorological conditions

For RPAs operating in day VMC, weather conditions are as described in AIP–ENR 1.2.

Weather minima for RPA flight should be determined by the RPA operator and published in their Operations Manual, taking into account the equipment and capabilities of each specific RPAS, the qualifications of the RP in command and the class of airspace in which the flight is conducted.

CASR 101.095 permits the operations of an RPA in or into cloud, at night or in conditions other than VMC, **only** if permitted by another provision of CASR Part 101, or in accordance with an ATC direction – that is, within an Area Approval or a condition in the UOC.

18 Legal obligations

CASA approvals do not grant an RPAS operator any rights against the owner or occupier of any land on or over which the operations are conducted. Further, it does not prejudice the rights which a person may have in respect of any injury to persons or damage to property caused directly or indirectly by the RPAS. Also, CASA approvals do not absolve the operator from compliance with any other regulatory requirements, which may exist under Commonwealth, State or local law.

19 Privacy

CASA strongly recommends operators include relevant privacy provisions in their operations manuals. Refer to the Privacy Act 1988: <http://www.privacy.gov.au/law>

Related material can be found at:

- privacy and drone technology <http://www.oic.qld.gov.au/about/news/privacy-and-drone-technology>
- fact sheet 7 (ten steps to protect others' personal information) <http://www.oaic.gov.au/privacy/privacy-resources/privacy-fact-sheets/other/privacy-fact-sheet-7-ten-steps-to-protect-other-people-s-personal-information>
- guide to privacy impact assessments http://www.oaic.gov.au/publications/guidelines/privacy_impact_assessment_guide.html
- information sheet 18: taking reasonable steps to make individuals aware that personal information about them is being collected <http://www.privacy.gov.au/materials/types/infosheets/view/6550>
- privacy checklist for small business <http://www.privacy.gov.au/materials/types/brochures/view/6053>

20 Environment

CASA strongly recommends that operators include obligations under the [Environment Protection and Biodiversity Conservation Act 1999](#) in their operations manuals.

Executive Manager
Standards Division

May 2014

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Civil Aviation Safety Authority

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ADVISORY CIRCULAR

AC 101-4

**Remotely piloted aircraft systems -
training and remote pilot certification**

Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

Advisory Circulars should always be read in conjunction with the relevant regulations.

Audience

This Advisory Circular (AC) applies to:

- Unmanned Aircraft System Operator's Certificate (UOC) holders
- Remote pilots and other remote crew members
- Ground support personnel involved in Remotely Piloted Aircraft Systems (RPAS) operations.

Purpose

This Advisory Circular (AC) expands on CASR Part 101 to provide more specific guidance for Remote Pilots (RP), remote crew and Remotely Piloted Aircraft Systems (RPAS) operators on the basic remote pilot training and certification requirements for safe operations. It is consistent with the work currently being developed by the International Civil Aviation Organization (ICAO) and that of other regulatory bodies. To this end, the terms and definitions are consistent with those used by ICAO as found in Annex 2 to the Convention on International Civil Aviation - Rules of the Air. This AC provides guidance on the processes to enable those in the system to continue, and those who undertake the new training, to meet RPAS operational requirements, including remote pilot certification.

Status

This is the first AC to be published on this subject. Related ACs include:

- AC 101-1– Remotely Piloted Aircraft Systems - General
- AC 101-5 – Remotely Piloted Aircraft Systems - Operations

For further information

For further information on this AC, contact CASA's Standards Development and Quality Assurance Branch (telephone 131 757).

Unless specified otherwise, all subregulations, regulations, subparts, parts and divisions referenced in this AC are references to the Civil Aviation Safety Regulations 1998 (CASR).

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1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

Acronym	Description
AC	Advisory Circular
ADF	Australian Defence Force
AGL	Above Ground Level
AOD	Alcohol and Other Drugs
AROC	Aeronautical Radio Operator Certificate
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations 1998
DAMP	Drug and Alcohol Management Plan
FROL	Flight Radiotelephone Operator Licence
ICAO	International Civil Aviation Organization
MOS	Manual of Standards
OEM	Original Equipment Manufacturer
RP	Remote Pilot
RPA	Remotely Piloted Aircraft
RPAS	Remotely Piloted Aircraft System
RPS	Remote Pilot Station
RTO	Registered Training Organisation
TTMRA	Trans-Tasman Mutual Recognition Act 1997
UA	Unmanned aircraft
UAS	Unmanned Aircraft System
UAV	Unmanned Aerial Vehicle (obsolete term)
UOC	UAS Operator's Certificate
VLOS	Visual Line Of Sight

1.2 Definitions

Terms that have specific meaning within this AC are defined in the table below.

Term	Definition
Autonomous operation	An operation during which an unmanned aircraft is operating without pilot intervention in the management of the flight.
Controlled Airspace	An airspace of defined dimension within which air traffic control service is provided to flights in accordance with the airspace classification.
Remote crew member	A crew member charged with duties essential to the operation of a remotely piloted aircraft, during flight time.
Remote Pilot Station (RPS)	The station at which the remote pilot manages the flight of an unmanned aircraft.
Remote Pilot	The person who manipulates the flight controls of a remotely-piloted aircraft during flight time.
Remotely piloted aircraft	An unmanned aircraft where the flying pilot is not on board the aircraft.
RPA observer	A remote crew member who, by visual observation of the remotely piloted aircraft assists the RP in the safe conduct of the flight in the area of operations.
Unmanned Aerial Vehicle (UAV)	Obsolete term - refer to remotely piloted aircraft definition above.

1.3 References

CASR Part 101 - Unmanned Aircraft and Rocket Operations

ICAO Circular 328 – Unmanned Aircraft Systems, published March 2011

ICAO Annex 2 to the Convention on International Civil Aviation - Rules of the Air

2 Background

The development of technology and procedures and the acquisition of appropriate knowledge and skills will allow the unmanned aircraft community to take the necessary steps towards the safe operation of RPAs.

Comprehensive and appropriate training is essential to the establishment of safe and effective RPA operations. CASA together with industry has defined a set of remote pilot training requirements specifically designed for RPAS. This includes fundamental aviation knowledge and skills, and specialist RPAS knowledge and skills, together with a syllabus of training. Adoption of these requirements by those who are involved in RPAS training and operations will ensure that appropriate RPA flying standards are set, safety levels are maintained and public trust in RPAS is gained.

3 ICAO guidance for crew licensing

The following guidance material has been extracted from Unmanned Aircraft Systems (UAS) Circular 328:

"Licensing authorities and medical examiners will have to consider the configuration of the remote pilot station when issuing remote pilot licences. The type of RPA (e.g. aeroplane, helicopter, powered-lift etc.) a remote pilot is authorized to [fly] and any related privileges the licence holder may exercise will have to be stipulated".¹

"...The principal factors which should be considered are remote pilot skills, knowledge, training and medical fitness to ensure they are commensurate with the particular licence or rating being sought by the pilot candidate..."²

"...Licensing and training requirements will be developed similar to those for traditional aviation and include both the aeronautical knowledge and operational components. Specific adjustments may be needed considering the particular and unique nature/characteristics of the remote pilot station environment and RPA applications (from both a technical and flight operations perspective, e.g. VLOS or beyond VLOS) as well as aircraft type (e.g. aeroplane, helicopter, etc). In that context, it is submitted that qualifications for certain categories of remote crew (e.g.: VLOS helicopter) may be significantly different from those pertaining to the classical qualifications pertaining to traditional aviation...."³

"..... current and previous notional designations for personnel piloting RPA will be replaced with applicable terms as contained in Annex 1, appropriately modified to indicate their position being external to the aircraft, such as "remote pilot", "remote navigator" and/or "remote engineer", each of which is a member of the remote crew. A new crew position unique to some VLOS operations is "UA observer", an individual who, by visual observation of the RPA, assists the remote pilot in the safe conduct of the flight. Additional crew positions unique to remote pilot station/RPA operations may be identified over time. These new positions will need to be incorporated in Annex 1 for international standardization".

The principles outlined above form the basis for remote pilot training and certification in Australia. CASA will issue Remote Pilot Certificates until such time that ICAO develop Standards and Recommended Practices (SARPs) for Remote Pilot Licences and CASA will incorporate these SARPs in CASR Part 101 and its MOS.

¹ Unmanned Aircraft Systems (UAS) Circular – Cir 328 AN/200 – paragraph 7

² Unmanned Aircraft Systems (UAS) Circular – Cir 328 AN/200 – paragraph 7.7

³ Unmanned Aircraft Systems (UAS) Circular – Cir 328 AN/190 – paragraph 7.9

4 RP Certification

RPA used for commercial operations require authorisation in the form of a UAS Operator's Certificate (UOC). Refer to AC101-5 – Remotely Piloted Aircraft Systems - Operations. A CASA issued UOC authorises the operator to conduct activities with the approved conditions in the UOC without referral to CASA. A UOC holder will require either his/her own RP Certificate or will need to employ a suitably certificated remote pilot. RPA are divided into a number of categories depending on the weight and an individual will need an RP Certificate for all RPA with a gross weight greater than 2kg and for all RPA operating outside of the standard RPA operating conditions, as outlined in AC101-1 - Remotely Piloted Aircraft Systems - General.

4.1 Steps to obtaining certification

RP Certificate:

- Step 1 – apply for an Aviation Reference Number (ARN).
- Step 2 – complete the requirements for RPAS training.
- Step 3 – apply for an Aviation Security Identification Card (if required) (Refer AC101-1)
- Step 4 – apply for an RP Certificate, including supporting evidence.

UOC:

- Step 5 – compile RPAS operations, RPA flight and RPAS maintenance manuals, and a risk assessment of the planned operation.
- Step 6 – arrange and participate in a pre-application interview for a UOC.
- Step 7 – submit a UOC application, including supporting evidence (note that these steps are for a person who seeks to get an individual authorisation, then apply for UOC).

Note: An individual who only requires an RP Certificate and is planning to work for a UOC holder only needs to complete steps 1-4. An individual who requires a UOC must complete all 7 steps.

4.2 The RP Certificate

The RP Certificate provides the necessary privileges and the conditions for an RP to fly an RPA greater than 2kg. To obtain a RP Certificate, the applicant must meet the CASA certification requirements as detailed in CASR 101.295. This can be achieved by attending a CASA approved RPAS training program or the applicant can self-study and apply to CASA directly. If intending to operate from a security controlled aerodrome, applicants should take into account the requirements for access to the aerodrome operational areas and the aviation security requirements that apply to the security controlled aerodrome. Refer to the following web site further information. <http://www.infrastructure.gov.au/transport/security/aviation/asi/asics>.

4.2.1 Applying for an RP Certificate

To apply for an RP Certificate, an application on Form 1087 must be lodged with CLARC. The requirements for eligibility for application in accordance with CASR 101.295 are:

- been awarded a pass in an aviation theory examination,
- completed a training course in the operation of the type of RPA that the applicant proposes to operate conducted by the RPA's manufacturer, and
- passed a practical test on the competency requirements for operating the type of RPA that the applicant proposes to operate.

The completed Form 1087 (available at <http://www.casa.gov.au/manuals/regulate/fcl/form1087.pdf>) and any supporting evidence are to be sent to CLARC, email address CLARC@casa.gov.au.

4.3 Issue of a Remote Pilot Certificate

When a person has met the RPAS training requirements, he/she can apply to CASA for an RP certificate in one of the following levels:

- Level 1 – in the standard RPA operating conditions outlined in AC101-1
- Level 2 – beyond visual line of sight operations (BVLOS) in Australian airspace. This is very limited and will only be issued on a case by case basis following a rigorous risk assessment of the intended operation.

4.4 Obtaining a UOC

A generic operations manual has been introduced to allow UOC holders to develop their own operations manual by amending or adding additional information as required for their particular operation and RPA type. The following steps are required to apply for a UOC:

- Amend the generic operations manual. Contact the CASA RPAS Office for advice on Operations Manual requirements.
- Compile an RPA flight manual.
- Compile an RPAS maintenance manual.
- Obtain Form 041 from the CASA website – link: <http://www.casa.gov.au/manuals/regulate/misc/form041.pdf>
- Print and complete Form 041.

Note: The form should not be submitted at this stage.

- Contact the RPAS Office to arrange a pre-application interview.
- At the conclusion of the pre-application interview and once all other actions have been completed, submit the UOC application with the manuals noted above, in electronic form, to the Permissions Application Centre (PAC) email address: regservices@casa.gov.au
- PAC will conduct a 'non-technical' assessment and estimate the time and cost for processing and assessing the application.
- PAC will then send an invoice for payment based on the estimate.
- Make the payment to CASA.

Note: The formal assessment process will not commence until payment has been received.

- Once payment has been received, PAC will assign the application to the RPAS Office for assessment by a RPAS inspector.
- The assessment will include interviews with the person(s) who have been designated as the Chief RP and the RPAS Maintenance Controller, a demonstration/proving of the RPAS, an inspection of the facilities, documentation and the required maintenance activities.
- Once the assessor's recommendations are approved by the delegate, PAC will issue the UOC.

4.5 Applying for an aviation reference number

An ARN is similar to an account number or customer number and it should be quoted whenever CASA is contacted. It is a UOC or RP certificate holder's unique identifier. The number on an authorisation (eg licence or certificate), in most cases, is the ARN belonging to the entity that holds that authorisation.

Persons not holding an ARN, will need to complete an application form (Form 1162). The form should be forwarded together with a clear and legible copy of one item of identification to the CASA Licensing and Registration Centre (CLARC). These papers can be sent by mail to CLARC, CASA, GPO Box 2005, Canberra ACT 2601, by fax to 1300 737 187 (+61 2 6217 1899) if faxing from outside of Australia) or by scanning and emailing as a jpeg file to clarc@casa.gov.au.

Acceptable forms of identification are birth certificates (full or extract), passport identification pages or Australian Citizenship Certificates. The identification supplied is to be in English, be clear and legible. It is not necessary to supply certified copies of identification. Please note that a driver's licence is not acceptable.

4.6 Relationship with CASR Division 101.F.3

This AC is aimed at the criteria required to satisfy both:

- the existing requirements of CASR 101.295 for the application of a UAV Controller's Certificate
- a revised approach to training and RP certification.

The existing UAV Controller's Certificate requirements will remain and run in parallel with the RP Certificate until CASR Part 101 has been completely reviewed and re-published to take account of the ICAO SARPs. This will enable those applicants whose applications are still being processed to obtain the UAV Controller's Certificate and exercise those permissions associated with that certificate, subject to other operational approvals. UAV Controllers can transfer at any time on request. The UAV Controller's Certificate is expected to remain as a recognised authorisation for all those who have it at the time of promulgation of the replacement for CASR Part 101.

5 Identifying the remote crew

CASA will issue a RP certificate to a person who qualifies as an RP. Based on that person's experience and further training, the operating organisation can assign and name its crew to meet operational requirements. This information should be outlined in the company operations manual.

5.1 Remote Crew

Figure 1 shows the relationship between the chief remote pilot and the members of the remote crew.

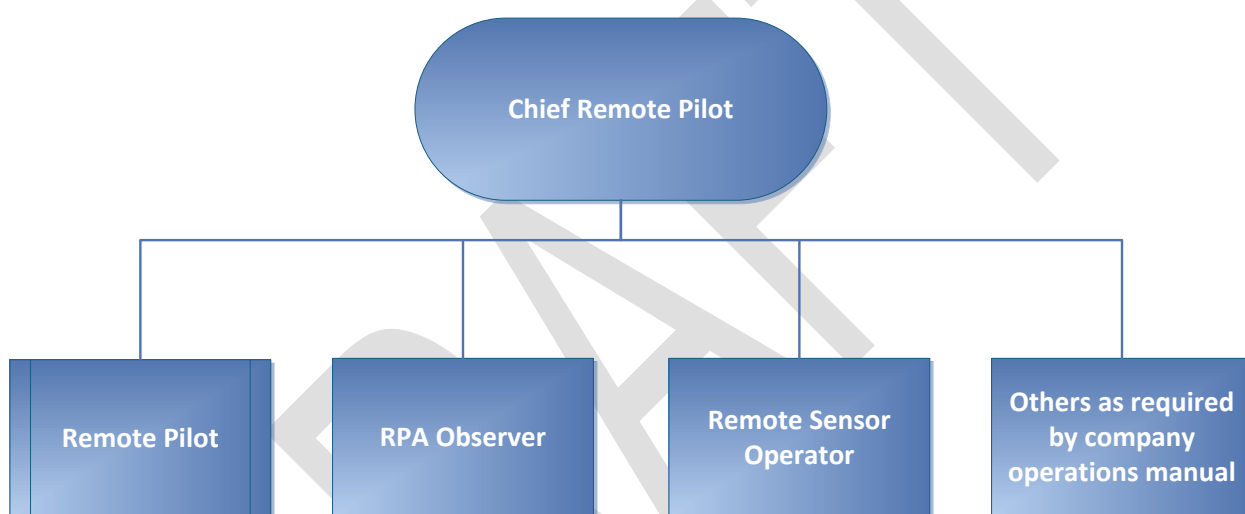


Figure 1 - Remote crew

This AC focuses on the training and certificates required for the RP. Other crew members are included to indicate the interrelationship of the RP with the remote crew. CASA anticipates that the RPA observer and other remote crew will be trained by the organisation, however, these persons will not be certificated by CASA.

6 Training requirements for remote pilots

6.1 General

CASA has adopted the remote pilot training and certification requirements for the RP as developed by CASA and industry. Applicants should undertake a series of both theoretical subjects and practical training covering aeronautical knowledge, appropriate skills and operational components to obtain a certificate in the first instance. Specific adjustments to training and certification requirements should take into account the unique nature and characteristics of the RPAS environment and RPA operations (from both a technical and flight operations perspective, e.g. VLOS or BVLOS) as well as aircraft type (e.g. aeroplane, helicopter, multi-rotor, airship).

6.2 Training Levels

The training competencies have been established to meet the knowledge and skills required for a set of operational conditions. In this regard, the sequence of training is similar to that required for traditionally piloted aircraft. Only the level 1 RP certificate has been developed to date.

6.2.1 Level 1 RP Certificate

This basic level applies to the operation of RPA of gross weight greater than 2 kg in standard RPA operating conditions. At this level of remote pilot training, the applicant should gain practical experience by flying his/her own RPA or a representative of the type. If the applicant conducts training on a different type, a 'type conversion' may be required as a part of the entry level training program. The applicant must pass the entry level training program in order to apply for an RP Certificate. The applicant will require the CASA approved RPAS training organisation to provide a recommendation to CASA for the issue of a RP Certificate.

6.3 Training Requirements

During an initial flight check, RPs are required to demonstrate adequate knowledge of ground and flight operations in oral and written examinations. Competencies will to be contextualised for RPAS, and customised for the type of system being used as the training platform. RP seeking to operate RPA in an instrument flight rules (IFR) environment will require a higher level of training and experience.

6.3.1 Remote Pilot Station Training

An RPS can take the form of a simple hand held controller to an elaborate fully equipped cockpit. Students are required to complete and pass the training program relating to the remote pilot station (RPS) in accordance with approved competencies and a syllabus of training for the type of RPA being operated (i.e., fixed wing, multi rotor, rotary wing, airship). This instruction should be delivered by personnel with appropriate experience and/or qualified in the relevant topic.

6.3.2 RPA Flight Training – Practical

Students should undertake thorough practical training in the operation and control of a RPA in flight. The training should enable the RP to demonstrate control of a specific RPA throughout its design parameters and potential operating conditions, including dealing correctly with emergencies and system/s malfunction.

6.3.3 Synthetic training devices

CASA encourages the use of synthetic training devices, simulators and part-task trainers applicable to the type of RPAS. Practical training should include simulated flight training, in particular to establish the response requirements for system operations, malfunctions and fault finding. Operational time gained in simulation should be recorded as a part of the training programme. However, CASA recommends that experience for competency assessment should be gained in actual flying training sorties, not just simulation. Operators planning to use simulators/synthetic training devices should consult CASA to determine their acceptability.

6.3.4 RPAS training organisations

Registered training organisations (RTO) or a CASA approved RPAS training organisation (non-RTO) are required to obtain an UAS Operator's Certificate (refer to AC 101-9 – Remotely Piloted Aircraft Systems - Applying for Remote Pilot Certification) and would be subject to similar conditions applying to traditional flying training schools.

6.4 Qualifications required for radio communication

Ground-to-ground radio communication by RPs is strongly encouraged for efficient, precise and clear communication even for small teams (e.g. two-person operations). RPs should obtain either a Aeronautical Radio Operator Certificate (AROC) or a Flight Radiotelephone Operator Licence (FROL) to operate an aeronautical radio. The RPA observer should be capable of operating a radio to be able to communicate with the RP.

6.4.1 Aeronautical Radio Operator Certificate (AROC)

The AROC or FROL training courses can be delivered by a traditional flying school and may also be available through an approved RPAS training provider. This certificate is incorporated in the basic training competencies, and required for the appropriate rating if the operation, still within the constraints of the default airspace, is near an airport or in controlled airspace.

7 Certification requirements for remote pilots

7.1 General

In keeping with the principles of traditional aviation, a certificate issued by CASA is required for the RP.

Each certificate will also be endorsed with the aircraft type and weight, e.g. Remote Pilot Certificate– Helicopter with a gross weight of 7kg or less.

7.2 Supporting evidence

The CASA approved RPAS training organisation must submit a Form 202 accompanied by an Aeronautical Radio Operator Certificate application to CASA Licensing and Registration Centre, email - clarc@casa.gov.au, for the issue of a RP Certificate. The RPAS training organisation is required to maintain records of:

- results from ground school theory examination –(as per the training outlined in Section 11 of this AC)
- results from the practical flight training element of the course
- accrued hours (recorded in a log book) on the RPA type used in the flying training.

7.3 Log books

A log book is a practical method of recording flight hours as evidence of currency and proficiency. RPs who choose to use a log book should record the hours against the task they have performed.

An example log book format can be found on the Unmanned Aircraft Systems landing-page of the CASA website at www.casa.gov.au. This format can be printed and formed into a 'hard-copy document' and maintained as evidence of hours accrued. A pilot's log book may be used and can be purchased from an aviation store and used as a permanent record of RPA hours.

RP hours could be logged in the column labelled 'Specialist/Instructor/or ICUS times' in the traditional pilot's log book.

Traditional and RPA hours cannot be aggregated.

8 Recognition of Australian defence force qualifications

If the applicant has a military aviation background as a pilot, navigator or air traffic controller, and has completed appropriate parts of the RP training program, the qualifications gained during Australian Defence Force (ADF) service may be recognised. Evidence of these qualifications are to be presented with the application.

ADF personnel who have completed a RPAS type conversion as a part of their preparation for deployment overseas but do not have evidence of aviation theory or other competencies will be required to complete the appropriate parts of the RP syllabus. ADF personnel who do not hold pilot, navigator or air traffic controller qualifications but have completed type conversion training that includes aviation theory subjects must pass those tests. An overseas aeronautical knowledge theory exam pass will not be recognised by CASA, however, recognition of prior learning principles will apply on presentation of the appropriate evidence.

9 Remote pilot type conversions and ratings

To ensure that the RP is competent to operate a particular RPA, CASA will require an approved type (and/or operational) conversion for each RPA type. All RPA type conversions should be conducted by either:

- the original equipment manufacturer (OEM)
- an approved agent of an OEM
- a UOC holder
- a CASA approved RPAS training organisation.

OEM and agents conducting aircraft type conversions will require a UOC.

9.1 Aircraft Type Ratings

An RPA type rating is the special authorisation to fly a particular RPA type, e.g. a ScanEagle, following the appropriate conversion training. For RPA less than 20kg, a generic grouping of the type is being applied (e.g., multi-rotor 7kg and less; fixed wing 7 kg and less).

9.2 Operational Ratings

A rating is a qualification relating to the approval to perform a particular task. To achieve the optimum capability of the RPA for a particular task e.g., aerial agriculture operations or flying at night, operational ratings may be required. The holder of a RP Certificate may be issued with an operational RPA rating following the appropriate training.

10 Proficiency/currency requirements

RPs should maintain their proficiency/currency by regular practice, which could consist of RPA flying supplemented by computer-based application and simulator time. These requirements should be addressed in the company operations manual. Operators should determine the training required to maintain an optimum level of performance for their RPA and detail this in their operations manual. If a RP does not fly within the currency timeframe deemed appropriate for the RPA that is operated, a program of ground school, simulator and flying should be conducted. In the absence of a regulation and guidance, operators should propose a level of reasonable activity that will suit their RPA type.

Details about the organisation's requirements to ensure optimum skills and knowledge are attained prior to re-starting operations should be included in an organisation's operations manual (Section C – Training; refer to AC 101-9 – Remotely Piloted Aircraft Systems - Applying for RP certification).

Currency for holders of both RP certificates and traditional pilot licences is not interchangeable.

11 Training requirements for remote crew

14.1 Through their safety case/risk assessment the RPAS operator should show that the level of competency, training, and currency of personnel in non-regulated roles are acceptable.

11.1.1 RPA Observers and other Remote Crew

CASA does not plan to certificate other remote crew members. RPA observers and other remote crew should complete a course of training appropriate to their function in accordance with competencies and a syllabus approved for RPAS as per company requirements. The depth of knowledge required will depend on the system being operated.

11.1.2 RPAS instructor qualifications

Instructor training programs should be completed by all who provide instruction to the RPAS industry sector. Instructors should be qualified to conduct RPAS training as deemed acceptable to CASA and may be appointed as ground or flight instructors, or both.

11.2 Criteria

To become qualified as an RPAS instructor, a person must hold a RP Certificate and have any of the following qualifications:

- a Certificate IV in Training and Assessment TAE40110 or equivalent
- Passed the Principles and Methods of Instruction (PMI) Course
- Be a military qualified flying instructor (QFI).

Dependent on the type of operation, the CEO on advice from the chief RP could approve personnel with lesser experience provided the relevant risk mitigation strategies are in place.

12 Recognition of overseas RPA qualifications

12.1 Verification of overseas licenses/ certificates and ratings

CASA will verify RP Certificates, type ratings or operational ratings authorised on an overseas licence or certificate with the issuing regulatory authority. This should be in writing by email or fax. CASA may then require further training before issuing an Australian equivalent.

Delays of a few weeks may be experienced while awaiting replies from overseas regulatory authorities. Applicants should take this into account when applying for certificates, recognition of qualifications or certificates of validation.

Log Books. An extract of the RPA log book showing the most recent history i.e. three months will be required in support of the application for recognition.

12.1.1 Prerequisites for Issue of a Remote Pilot Certificate

Under the provisions of CASR Part 61, recognition of overseas flight crew authorisations may be granted to pilots on the basis of their overseas qualifications. The same recognition may apply to RPs. In practice, this means that most RPs should satisfy the following prerequisites:

- holds an overseas licence/certificate that is at least equivalent to the one being applied for
- is deemed to be a fit and proper person to hold the qualification as defined in CASRs 5.09 (3) and (4)
- is competent in English—writing, speaking and understanding
- passed a security check and holds a Flight Crew Photo ID – refer to the Department of Infrastructure and Transport Security requirements
- pay the appropriate fee.

Refer to CASA's requirements for the Private Pilot (Aeroplane) Licence Overseas Conversion examination page of the CASA website www.casa.gov.au.

Note: CASA does not recognise any overseas aeronautical knowledge theory exam pass as a stand-alone qualification: the applicant must hold at least a PPL. Personnel who fall into this category are therefore required to pass the normal PPL (Aeroplane) exam (exam code PPLA) at local Australia flying training school, or undertake a RP certificate program.

Executive Manager
Standards Division

May 2014



Australian Government

Civil Aviation Safety Authority

DRAFT

ADVISORY CIRCULAR

AC 101-5

Remotely piloted aircraft systems - operations

Advisory Circulars are intended to provide advice and guidance to illustrate a means, but not necessarily the only means, of complying with the Regulations, or to explain certain regulatory requirements by providing informative, interpretative and explanatory material.

Advisory Circulars should always be read in conjunction with the relevant regulations.

Audience

This Advisory Circular (AC) applies to:

- Unmanned Aircraft System Operator's Certificate (UOC) holders
- Remote pilots and other remote crew members
- Ground support personnel involved in Remotely Piloted Aircraft Systems (RPAS) operations.

Purpose

This Advisory Circular (AC) expands CASR Part 101 to provide more specific guidance for Remote Pilots (RP), remote crew and Remotely Piloted Aircraft Systems (RPAS) operators on RPAS operations. It is consistent with the work currently being developed by the International Civil Aviation Organization (ICAO) and that of other regulatory bodies. To this end, the terms and definitions are consistent with those used by ICAO as found in Annex 2 to the Convention on International Civil Aviation - Rules of the Air . This AC provides guidance to operators and RPAS crew on the requirements for safe and legal operations in all classes of airspace.

Status

This is the first AC to be published on this subject. Related ACs include:

- AC 101-1 – Remotely Piloted Aircraft Systems - General
- AC 101-4 – Remotely Piloted Aircraft Systems - Training and Remote Pilot Certification.

For further information

For further information on this AC, contact CASA's Standards Development and Quality Assurance Branch (telephone 131 757).

Unless specified otherwise, all subregulations, regulations, subparts, parts and divisions referenced in this AC are references to the Civil Aviation Safety Regulations 1998 (CASR).

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1 Reference material

1.1 Acronyms

The acronyms and abbreviations used in this AC are listed in the table below.

Acronym	Description
AC	Advisory Circular
ADF	Australian Defence Force
ADS-B	Automatic Dependent Surveillance — Broadcast
AGL	Above Ground Level
ALARP	As Low as Reasonably Practicable
ATC	Air Traffic Control
ATS	Air Traffic Services
BVLOS	Beyond Visual Line of Sight
CAR	<i>Civil Aviation Regulations 1988</i>
CASR	<i>Civil Aviation Safety Regulations 1998</i>
CASA	Civil Aviation Safety Authority
CTA	Controlled Airspace
EVLOS	Extended Visual Line of Site
FPV	First Person View
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
NOTAM	Notice to Airmen
NAA	National Aviation Authority
OCTA	Outside Controlled Airspace
RPA	Remotely Piloted Aircraft
RPAS	Remotely Piloted Aircraft System
RPS	Remote Pilot Station
SARPs	Standards and Recommended Practices
SSR	Secondary Surveillance Radar
UA	Unmanned Aircraft
UAS	Unmanned Aircraft System(s)
UAV	Unmanned Aerial Vehicle (obsolete term)

Acronym	Description
UOC	UAS Operator's Certificate
VFR	Visual Flight Rules
VHF	Very High Frequency
VLOS	Visual Line of Sight
VMC	Visual meteorological conditions

Other acronyms in general use within the aviation industry can be found in the Aeronautical Information Publication (AIP) at General (GEN 2.2 DEFINITIONS AND ABBREVIATIONS). All operators, RPs and remote crew associated with RPA should familiarise themselves with that information.

1.2 Definitions

Terms that have specific meaning within this AC are defined in the table below.

Term	Definition
Autonomous aircraft	An unmanned aircraft that does not allow pilot intervention in the management of the flight.
Autonomous operation	An operation during which an unmanned aircraft is operating without pilot intervention in the management of the flight.
Beyond Visual line of sight (BVLOS) operation	An operation in which the remote crew does not have direct visual contact with the aircraft to manage its flight and meet separation and collision avoidance responsibilities; and relies on electronic means of tracking.
Command and control link	The data link between the remotely piloted aircraft and the remote pilot station for the purposes of managing the flight.
Controlled Airspace	An airspace of defined dimension within which air traffic control service is provided to flights in accordance with the airspace classification.
Detect and avoid	The capability to see, sense or detect conflicting traffic or other hazards and take the appropriate action to comply with the applicable rules of flight.
Extended Visual Line of Site (EVLOS)	An operation where the Remote Pilot (RP) does not have direct visual sight with the RPA. However, with the assistance from trained RPA observers, the RP is still able to ensure safe operation of the RPA by avoiding collisions with other traffic. At all times, at least one of the RPA observers is to have direct visual sight of the RPA and is to be able to communicate with the RP in order to manage the flight of the RPA and for the RP to meet his/her collision avoidance responsibilities.
First Person View (FPV)	A visual method used to control a RPA from the RPS via an on-board camera.
Handover	The act of passing piloting control from one remote pilot station to another or to another pilot at the same remote pilot station.
Lost link	The loss of command and control link contact with the remotely piloted aircraft such that the remote pilot can no longer manage the aircraft's flight.

Term	Definition
Operational control	The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of safety of the aircraft and the regularity and efficiency of the flight.
Operator	A person, organisation or enterprise engaged in or offering to engage in an aircraft operation.
Outside Controlled Airspace	An airspace of defined dimensions within which air traffic control service is not provided to flights (Class G airspace).
Pre-Flight Inspection	Set of manufacturer recommended systems and components functional tests to be performed prior to any launch.
Protected Airspace	Prohibited, Restricted and Danger areas (Refer to Airspace Regulations 2007).
Radio line of sight	An operation where the remote crew maintains control of the RPA by a direct electronic point-to-point contact between a transmitter and a receiver.
Remote crew member	A crew member charged with duties essential to the operation of a remotely piloted aircraft system, during flight time.
Remote pilot	The person who manipulates the flight controls of a remotely piloted aircraft during flight time.
Remote Pilot in command	The remote pilot designated by the operator, or the owner, as being in command and charged with the safe conduct of a flight of the RPA.
Remote pilot station	The station at which the remote pilot manages the flight of an unmanned aircraft.
Remotely piloted	Control of an aircraft from a pilot station which is not on board the aircraft.
Remotely piloted aircraft	An unmanned aircraft where the flying pilot is not on board the aircraft.
Remotely piloted aircraft system	A set of configurable elements consisting of a remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other system elements as may be required, at any point during flight operation.
RPA observer	A remote crew member who, by visual observation of the remotely piloted aircraft, assists the remote pilot in the safe conduct of the flight in the area of operations.
UAV Control Station	Obsolete term – refer to Remote Pilot Station.
Unmanned aircraft	An aircraft which is intended to operate with no pilot on board.
Unmanned aircraft system	An aircraft and its associated elements which are operated with no pilot on board.
Visual line of sight operation	An operation in which the remote crew maintains direct visual contact with the aircraft to manage its flight and meet separation and collision avoidance responsibilities.

1.3 References

Part 101 of CASR 1998 - Unmanned Aircraft and Rocket Operations

ICAO Circular 328 – Unmanned Aircraft Systems, published March 2011

ICAO Annex 2 to the Convention on International Civil Aviation - Rules of the Air

RTCA DO-320 - Operational Services and Environmental Definition (OSED) for Unmanned Aircraft Systems

RTCA DO-304 - Guidance Material and Considerations for Unmanned Aircraft Systems

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2 Background

The operation of an RPA pose safety hazards to other aircraft users and to the people and property over-flown. The risks associated with these hazards should be managed to an acceptable level. A suitable baseline level of risk is that demonstrated by the conventionally piloted/manned aircraft industry. However, in order to address social concerns it is acknowledged that the RPAS industry may be required to demonstrate a level of risk below that currently exhibited by conventionally piloted/manned aircraft.

The level of risk posed by RPA operations depends on the type and attributes of the RPA, the complexity of the system, the location and time of operation, the mission being performed, the experience of the crew, and the supporting policies and procedures established by the organisation.

CASA acknowledges that “a one size fits all” approach to the regulation of the RPAS industry is not appropriate; regulations and guidance material have been tailored to accommodate the diverse range of systems and their operations, primarily determined by the level of risk associated with the different classes of RPA operations.

The term ‘See and Avoid’ for manned aircraft is referred to as ‘Detect and Avoid’ for the purpose of RPA operations.

3 UAS operator's certificate (UOC)

For RPA with a gross weight above 2 Kg in all operating conditions and all RPA operating outside of the standard RPA operating conditions, conducting commercial operations, the operator requires an approval in the form of a UAS Operator's Certificate (UOC). A UOC is similar in nature and intent to the existing Air Operator's Certificate for traditional aviation operations. Commercial activities (for hire or reward), could include, but are not limited to:

- aerial surveying
- aerial spotting
- aerial photography
- agricultural operations
- research and development
- exhibitions and demonstrations.

The requirements for obtaining a UOC will vary depending on the category of the RPA and its intended operation.

The requirements for an UOC will not apply to RPA with a gross weight of 2 kg and below while they are being operated under the standard RPA operating conditions, as detailed in AC 101-1-Remotely Piloted Aircraft Systems - General. Additionally, model aircraft used for sport and recreation will not require a UOC.

Details that relate to an application for a UOC are covered in AC101-4 – Remotely Piloted Aircraft Systems - Training and Remote Pilot Certification.

4 Approval of operations

Before using an RPA for a particular task, the UOC holder should first assess whether the flight/mission is within the scope of their approved operations, or whether it will need CASA approval before it can be conducted. To gain approval, an 'Area Approval' submission is required in accordance with CASR 101.030 for operations other than those covered in the conditions of the UOC.

4.1 Remote Pilot Training Considerations

Operators will be required to obtain approval to conduct RPAS training as detailed in AC 101-4 – Remotely Piloted Aircraft Systems - Training and Remote Pilot Certification.

4.2 Extended Visual Line of Site

Extended Visual Line of Site (EVLOS) is where the RP does not have direct visual sight with the RPA, however, with the assistance from trained RPA observers, the RP is still able to ensure safe operation of the RPA by avoiding collisions with other traffic. At all times, at least one of the RPA observers is to have direct visual sight of the RPA and is to be able to communicate with the RP in order to manage the flight of the RPA and for the RP to meet his/her collision avoidance responsibilities.

4.3 EVLOS Approvals

UOC holders with the assistance of RPA observers working with the RP, may be accorded additional operational flexibility to operate in areas beyond the normal viewing distance of the RP with an EVLOS approval. In EVLOS operations, operators must satisfy themselves that all areas of the intended operational airspace will be visible at all times during the operation by one of the remote crew. This assessment should take into account physical obstacles and meteorological conditions. The RPA observers are to alert the RP to any incoming traffic and the RP is to take the necessary actions to manage the flight and avoid collision or incident. CASA will require a risk assessment to be conducted by the UOC holder before CASA will grant the approval. Approval for such operations is to be obtained from CASA and the risk assessment for the operation should include:

- the procedures for avoiding collisions
- aircraft size
- aircraft colour and markings
- aircraft aids to observation
- meteorological conditions and visibility, including background conditions (cloud /blue sky)
- the use of deployed observers
- operating range limits - suitable radio equipment must be fitted in order to be able to effect positive control over the RPA at all times.

4.3.1 Electronic Aids

Electronic aids, such as on-screen or moving map displays can be beneficial to improving situational awareness of the local airspace environment for the remote crew and where available, should be considered as risk mitigation tools. Such displays should be used as an additional aid to safety and should not be used instead of or to replace direct eye contact.

4.4 Beyond Visual Line of Sight Operations

For RPA operations beyond visual line of sight (BVLOS), CASA will require a risk assessment and mitigation strategy is to be conducted by the applicant and submitted to CASA as part of the applicant's safety case. Particular attention should be paid to aircraft controllability, fail-safe mechanisms, collision risk mitigation, navigation accuracy and height keeping accuracy. CASA will apply conditions as required to an approval for BVLOS.

4.5 First Person View

When CASR Part 101 was first drafted, First Person View (FPV) technology was not contemplated, therefore there are no technical specifications or performance standards for such equipment. CASA will require a risk assessment to be conducted by the applicant outlining the proposal to utilise this technology before CASA will grant an operational approval.

4.6 RPA Operations near Aerodromes

Permission is required to operate within 3NM of an aerodrome, for all RPA operations (refer CASR 101.080). Such aerodromes may also be shown on aeronautical charts. Other aerodromes may also be depicted on aeronautical charts, in particular the World Aeronautical Chart series. It is important to note that not all aerodromes are shown on charts. It is the responsibility of the RP and UOC holder to determine whether there are any aerodromes within 3NM of their proposed area of operation. This can be done through a review of the above aeronautical information products and through consultation with local government bodies and land holders in the area. The risk assessment of the planned operating area should include airfields, authorised landing areas and helicopter landing sites.

When an RPA is operated at an aerodrome normally used by manned aircraft, launch and recovery should be in accordance with the procedures established with the ATS.

4.7 Submission for an Area Approval

Area Approvals are required for all operations that are outside of the conditions expressed in the UOC. Requests for Area Approval should be submitted to the CASA RPAS Office – email: uas@casa.gov.au Applicants are required to contact CASA in a timely manner such that there is sufficient time for the application to be processed, assessed and payment made (this process can take up to four weeks). CASA is unable to make any assessment or provide any significant advice without first providing an estimate of costs involved and receiving payment. When payment has been made, a meeting with RPAS Office staff should take place as soon as practicable.

To ensure timely processing and that an accurate estimation of costs is provided, the following details should be included in the application:

- Purpose of the operation
- Scope of the operation
- Details of the operation
- A Risk Assessment of the planned operations.

Refer to Appendix A of this AC for the details of a Request for Area Approval.

CASA's Office of Airspace Regulation (OAR) will consider whether it is appropriate to designate a Temporary Danger Area (TDA) or Temporary Restricted Area (TRA) or to change the permanent airspace classification to address any residual risk of the activity after the application of mitigations imposed through the Area Approval Process. The OAR Airspace Change Proposal Process is defined in the OAR Operations Manual which can be accessed through the CASA website (www.casa.gov.au). CASA RPAS Office staff will coordinate with the OAR as required. When issuing approval, CASA may impose limitations on the operation of a RPA in order to ensure that the RPA will pose no greater threat to the safety of air navigation than that posed by a similar operation involving a manned aircraft. Such limitations may include, but are not limited to:

- altitude restrictions
- geographical restrictions
- operational restrictions
- broadcast requirements
- provision of observers
- timing of operations.

5 RPA operations – general

5.1 Communication Requirements

Clear communications for all RPA operations are required for the class of airspace in which the flight will occur. The RP should have a Very High Frequency (VHF) radio if the operation is within controlled airspace or within 10 NM of an aerodrome identified in ERSAs that is outside controlled airspace.

The operations manual should address how all aspects of communications between the RPA observer and the RP will be managed. It should also detail who has authority when communicating with other parties (e.g., ATC and other air traffic) when communications are lost between the RP and a RPA observer.

5.2 Broadcast Area Recommendation

The lateral and vertical boundaries are defined in AIP–MAP. The vertical boundaries of Broadcast Areas can be:

- Surface to 5,000FT AMSL
- Surface to the base of CTA if 8,500FT or less
- Surface to a nominated level.

RP operating within a broadcast area are to maintain a listening watch on the Broadcast Area CTAF depicted in the AIP–MAP. They may also be required to make broadcasts in accordance with standard aviation communications procedures when operating near aerodromes.

5.3 Recommendation for visibility

For maximum visibility, and for operations at night, RPA should be painted with high gloss, high visibility paint and, where practical, be fitted with strobe lights.

5.4 Transponders

If a transponder is required for the operation, it should be fitted in accordance with CAO 20.18. The RP should have the capability to turn the transponder on and off, manually select modes and secondary surveillance radar (SSR) codes, and squawk identification as directed, while the RPA is airborne. If fitted, the transponder should be switched to ON/ALT at all times that the RPA is airborne.

6 RPA operations in controlled airspace

When operating in controlled airspace (CTA), RPA must be operated in accordance with the rules governing the flights of manned aircraft. RPA must be able to comply with ATC clearances and equipment requirements applicable to the class of airspace within which they are operated (refer AIP ENR 1.1).

All flights BVLOS must be conducted:

- In accordance with conditions specified in an approval issued by CASA
- in accordance with regulations governing the flight of a manned aircraft in a known traffic environment.

6.1 Preparation for CTA Operations

As a part of the preparation process, the UOC holder should obtain an Area Approval from CASA. This approval will be developed by both CASA and Airservices Australia (if applicable), and it replaces the previous procedure of obtaining a Letter of Agreement (LOA). The conditions on the UOC will include the requirements for communications with Airservices, specifically the appropriate local ATS. A LOA is still required with the Australian Defence Force (ADF) for operations in military airspace. The Area Approval, or LOA as applicable, should outline the specific procedures for ground RPA operations, flight plan filing, integration of RPA into local traffic pattern, take-off and landing, local airspace restrictions, noise abatement procedures, traffic priority, communications requirements and RPA contingency procedures. Designated 'safe areas' will be established for emergency RPA holding and flight termination. A meeting between the operator, Airservices and CASA may be required to establish the specifics relating to departures, en route and arrival procedures.

6.2 Flight Authorisation Requests

In addition to the information required for the flight plan, procedures for RPA taxi, take off, separation, local traffic pattern restrictions, RP hand-over, departure, abort to recovery and flight termination should be prepared. Any performance requirements or limitations unique to the RPA should be provided to the ATC unit as appropriate prior to the flight. When RPA launch and recovery is to be accomplished by an RP under visual conditions, the RP in command should ensure airport/ATC personnel are briefed on the specific evolution of control to be conducted and are aware of the specific RPA operating procedures required.

6.3 Flight Clearance

The RP should not request any clearance (i.e. departure, precision approach, altitude, holding pattern) that the RPA is not capable of executing within its approved flight envelope. Standard procedures will need to be established with Airservices and CASA.

6.4 Abort Procedures

Specific abort and flight termination procedures developed by the UOC holder should be executed by the RP and provided to ATC as applicable/required. At a minimum, information regarding pre-programmed loss-of-link flight profile (including terminal actions should the control link not be re-established); flight termination capabilities and RPA performance under termination conditions should be briefed. RPA should not be operated within controlled airspace without an operable flight termination system or one which provides automated recovery to a predetermined recovery area. Standard procedures will need to be established with Airservices.

6.5 Flight notification

Where an RPA flight is to be conducted in airspace shared with manned aircraft, flight notification must be filed in accordance with the normal procedures. The flight plan should indicate that the aircraft is unmanned and provide as much detail as possible concerning the nature of the flight. The RPA should not enter controlled airspace or Restricted Areas without approval or an airways clearance from the controlling authority. RPA flights when operating within controlled airspace are as directed by the airways clearance from ATC.

6.6 Coordinating with air traffic services

6.6.1 Communications

Communication requirements for operations are as required for the class of airspace in which the flight will occur. These are described in AIP– ENROUTE. Before the start of the flight, the RP should establish communications with ATC authorities responsible for the area of flight. Depending on the procedure for small RPA operations agreed by Airservices Australia or the ADF communications may be established via mobile telephone.

6.6.2 Radio licences

All remote crew member/s communicating on aeronautical frequencies should hold an Aeronautical Radio Operator Certificate, or a Flight Radiotelephone Operator Licence in accordance with CASR 101.285.

6.6.3 RPA identification

Each RPA flight should have some means of informing ATC that the flight is piloted remotely. Therefore, all RPA call signs should be prefixed with the word 'UNMANNED' (for example: 'Unmanned Scan Eagle 4'). Flight plan call signs are to consist of seven characters and include the prefix UX with any aircraft type designator (for example 'UXSCE04' meaning 'Unmanned Scan Eagle 4').

6.6.4 Position reporting

RPAs operating in controlled airspace should be continuously monitored by the RP for adherence to the approved flight plan. The RP should make all position and other required reports to the appropriate ATC unit. Position reporting with ATC should be the RPA position (not the RP position) relative to an appropriate aerodrome, navigation aid, ground feature, etc.

6.6.5 Flight deviations

All requests for flight deviations should be made by established procedures to the appropriate ATS unit.

For RPA, which are manually controlled, local aerodrome pattern regulation, and VMC for the class of airspace will apply. For RPA equipped with automatic launch and recovery systems, the RP should monitor RPA system status and compliance with ATC clearances, performing flight path corrections as required and/or directed by ATC.

6.6.6 Procedures and authorisations

These procedures apply to those RPA that can be monitored and controlled in real-time from a RPS, however, nothing contained in this document is intended to preclude operation of an RPA in an automated or pre-programmed flight mode, provided that RPA performance and designated ATC communication channels are continuously monitored by the remote crew, and the RP is managing the flight profile of the RPA.

7 RPA operations outside controlled airspace

When operating outside controlled airspace (OCTA), RPA must be operated in accordance with the rules governing the flights of manned aircraft. RPA must be able to comply with ATS equipment requirements and operational procedures applicable to Class G airspace (refer AIP ENR 1.1).

All BVLOS flights must be conducted:

- in accordance with conditions specified in an approval issued by CASA
- in accordance with regulations governing the flight of a manned aircraft.

7.1 Communication Requirements

Communication requirements for operations are as required for the class of airspace in which the flight will occur and are described in AIP– EN ROUTE, specifically noting the requirements for CTAF and Broadcast Areas.

7.2 Flight notification

7.2.1 Flight Plan

Where a RPA flight is to be conducted in non-controlled airspace, flight notification, if required, should be filed in accordance with the normal procedures. The flight plan should indicate that the aircraft is unmanned and provide as much detail as possible concerning the nature of the flight. When the operation of a RPA does not involve flight higher than 400 ft. AGL or within 3NM of an aerodrome in Class G airspace, formal flight notification should not be required unless the operator is expecting air traffic services. The RPA is not to enter controlled airspace or Restricted Areas without approval from the controlling authority.

7.2.2 Position Reporting

Position reporting with ATC should be the RPA position (not the RP position) relative to an appropriate aerodrome, navigation aid, ground feature, etc.

When a RPA is operated at a non-controlled aerodrome normally used by manned aircraft, launch and recovery should comply, as appropriate, with normal procedures that apply to a non-controlled aerodrome.

8 IFR operations

8.1 Equipment Requirements

The following equipment must be fitted and operable prior to a flight under the IFR:

- Position Lights. Position lights must be turned on at all times the RPA is in motion including taxi, launch, flight, and recovery.
- Anti-Collision Lights. Anti-collision lights must be turned on at all times the RPA is in flight (unless otherwise directed by CASA or ATC).
- Landing Lights. Landing lights, as appropriate, must be turned on during recovery.
- Transponder. The RP should have the capability to turn the transponder on and off, manually select Modes, SSR codes, and squawk identification as directed, while the RPA is airborne. Paragraph 9C of CAO 20.18 specifies the standards for Mode S transponder equipment. If fitted, the transponder should be switched to ON/ALT at all times that the RPA is airborne.
- Radios. RPA communication architecture should allow the RP to have direct communications with the ATC facilities controlling the RPA regardless of its location. The normal published aeronautical VHF frequencies should be used for communications with ATS.
- Navigation. The RPA should have the navigation capability to comply with the tracking requirements of the airspace classification in which the RPA is being operated.

9 RPA operation over unpopulated areas

Provided that a small RPA is operated under the standard RPA operating conditions, there are no restrictions imposed upon its safe operation. The RP is responsible for ensuring that the RPA is operated safely and remains clear of potential low level traffic, structures, power lines etc. The operator should consider the benefit of a thorough reconnaissance of the proposed area of operations beforehand.

Where a person wishes to operate outside of the standard RPA operating conditions, that person should do so in accordance with any conditions imposed by CASA, specifically, an Area Approval will be required.

10 RPA operations over populous areas

10.1 Populous Areas

In accordance with CASR 101.025, a populous area is 'an area in relation to the operation of an unmanned aircraft.... if the area has a sufficient density of population for some aspect of the operation, or some event that might happen during the operation (in particular, a fault in, or failure of, the unmanned aircraft...) to pose an unreasonable risk to the life, safety or property of somebody who is in the area, but is not connected with the operation.'

An area within an urban environment may be deemed as 'unpopulous' for the term of a 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. However, it is the operator's responsibility to ensure that the demarcation zone is suitably placarded and an observer(s) is in place to ensure that there are no encroachments on that area.

When considering RPA operations over populous areas, the safety of people and property on the ground and water is paramount. The risk of injury or damage resulting from the operation of a RPA should be addressed through the operator's risk assessment.

10.2 Area of operation

Approval to operate over populous areas will be dependent on the safety case and risk assessment provided by the operator. The availability of comprehensive data that establishes the reliability of the RPA and contingency provisions for dealing with failure of any component of the system (such components could include but not be limited to engine, data link, loss of visual sight) should be included in the risk assessment provided to CASA. If approved, operations over a populous area must be conducted at an altitude which would allow the RPA to clear the area in the event of a failure. This is particularly important when planning to operate at large public events e.g., cricket, football, tennis, sports events, shows and exhibitions. The requirement for the RPA to clear the area will preclude multi rotors from overflight of crowds/groups of people

10.3 Flight Testing

RPA flight testing should not to be carried out over populous areas.

11 Emergency procedures

The RPA mission plan should include information and procedures regarding planned emergency flight profiles to be applied in the event of a loss of data link with the RPA. Dependent on system capabilities, these profiles could include:

- RPA automated transit to a pre-designated recovery area followed by an automated recovery
- RPA automated transit to a pre-designated recovery area followed by activation of a flight termination system.

In controlled airspace, specific abort and flight termination procedures should be briefed to ATC. At a minimum, information regarding pre-programmed loss-of-link flight profile (including termination actions should the control link not be re-established), flight termination capabilities, and RPA performance under termination conditions should be briefed.

The data link should be continuously and automatically checked and a real time warning should be displayed to the remote crew in the case of failure. In the case of loss of data link, other than intermittent loss of signal or during programmed periods of outage, ATC should be advised immediately and recovery procedures should be executed. The parameters which determine acceptable intermittent loss of signal and total loss will be pre-determined by the manufacturer. An RPA experiencing a lost data link and conducting a pre-programmed flight profile to termination or recovery should be handled as priority by ATC.

In the event of communications failure between the RP and ATC, the RP should select SSR code 7600, if applicable and attempt to establish alternative communications. Pending re-establishment of communications with ATC, the RPA will be controlled in accordance with the last acknowledged instruction, or the conditions contained in the Area Approval. If communications with ATC are not re-established, the RPA sortie should be aborted.

The RPA mission plan should detail the emergency procedures to be followed in the event of, among other things:

- engine failure
- loss of data link
- loss of control
- failure of navigation equipment
- airframe damage.

Emergency procedures may include the use of recovery or fail-safe devices, such as parachutes, that help to mitigate the risk to people or property. Such devices are encouraged as applicable to the RPA type.

Note: Where a RPA is fitted with a recovery device, such as a ballistic parachute system, including a pyro-technique charge, the area or panel should be clearly marked.

12 NOTAM

A Notice to Airmen (NOTAM) is used to alert pilots and crews about information that may be needed to ensure safe operations. The Manual of Air Traffic Services (MATS) states that authorities approved to promulgate NOTAMs in matters related to their operations can be individuals or organisations authorised in writing by CASA. In most cases, UOC holders seeking to have a NOTAM issued, are to provide the details to the CASA RPAS Office. The RPAS Office will then draft the NOTAM and pass to the NOTAM Office (NOF) for issue. If the operator has approval to issue a NOTAM request, the operator should state the Area Approval instrument number in Field E of the NOTAM and include details of a company contact in the release field. Operators are to forward a copy of the Area Approval instrument issued by CASA to the NOF in the first instance.

The text of the NOTAM for RPAS operations should include as much operational information as possible to convey the scope of the operation, including:

- the words 'unmanned' and the callsign
- latitudes and longitudes of the operating area
- operations area description e.g. East of Woop-Woop West, or bearing (magnetic) and distance (NM) from a significant feature (eg an airport)
- size of the aircraft and visibility provisions, e.g. small, low potential for visual sighting
- broadcast frequencies and times
- periods of activity
- planned operating levels.

For subsequent events, the operator should be ready to provide a copy of the instrument to the NOF if required.

CASA will advise Airservices Australia when an operator is to be considered as an Aeronautical Data Originator. To gain this approval, the operator will need to arrange and undertake the relevant training with CASA. Contact the RPAS Office for advice, email uas@casa.gov.au.

13 Dropping and dispensing operations

CASR 101.090 states 'A person must not cause a thing to be dropped or discharged from an RPA in a way that creates a hazard to another aircraft, a person, or property.' Operators proposing to use RPA for dropping or dispensing operations should therefore obtain the following minimum qualifications:

- Remote Pilots Certificate and a type and operational conversion onto the RPA being used for the operation
- a RPA aerial application rating
- sufficient flight experience under supervision in the RPA operation, and be assessed by a suitably qualified instructor as being competent to hold a RPA aerial application rating.

On gaining these qualifications, a CASA approval will be required to conduct dropping or dispensing operations. The approval will be listed in the conditions within the UOC.

Australian state and local government regulatory requirements should be met for the dropping or dispensing of chemicals or other materials. Individual States may issue their own chemical licences to cover this requirement even though the completion of chemical handling competencies are also required to obtain RPA aerial application rating. It is the responsibility of the operator to ensure that the appropriate approvals are obtained before conducting such operations.

14 Australian defence force RPAS and state aircraft

14.1 ADF Assets

ADF RPAs are considered to be 'State aircraft' and operate within Defence regulations. A 'Regulator-to-Regulator' agreement exists between CASA and the Defence Airworthiness Authority to ensure that both civil and Defence regulations are harmonised.

14.2 Civil operators who provide services to the ADF

Those civil operators who provide services to the ADF will require CASA approvals and appropriate certification. While the ADF will conduct airworthiness boards to determine issues relating to civil contractors, and the particular Service will exercise its own requirements, CASA's standards are expected in the first instance.

For those operations that are conducted by civil operators for the ADF in Australian civil airspace, the operator is required to have a CASA Area Approval. The development of the mission is a joint effort between the contractor, ADF and CASA, with CASA providing final approval.

15 International operations

15.1 ICAO Requirements

ICAO requires recognised airworthiness and pilot licensing standards for international operations. Annex 2 to the Convention on International Civil Aviation contains guidance in Chapter 3, Section 1.2 and Section 3 as follows:

- A RPA shall not be operated without appropriate authorisation from the State from which the departure is made.
- A RPA shall not be operated across the territory of another State, without special authorisation issued by each State in which the flight is to operate. This authorisation may be in the form of agreements between the States involved.
- A RPA shall not be operated over the high seas without prior coordination with the appropriate ATS authority.
- The authorisation and coordination referred to above (dot points 2 and 3) shall be obtained prior to departure if there is reasonable expectation, when planning the operation, that the aircraft may enter the airspace concerned.
- A RPA shall be operated in accordance with conditions specified by the State of registry and the State(s) in which the flight is to operate.

15.2 CASA's Territorial Jurisdiction

CASA will, where appropriate, follow the ICAO guidance. Although CASA's jurisdiction ceases at the territorial sea limit of 12NM from the coastline, operators will need an 'In and Out of Australia' approval in their UOC to fly outside the 12-mile territorial limit; this means that the operator is able to fly in the Australian FIR and not be restricted to Australian territory.

15.3 International Operators

For those international operators who wish to fly RPA into or from Australian territory, should contact the CASA RPAS Office – email uas@casa.gov.au in the first instance. The following information will be requested:

- information that is covered under the approval of Operations Section at Section 9 of this AC
- details of the aircraft to be flown – i.e. the performance characteristics
- a copy of the company operations manual and the flight and maintenance manual for the aircraft
- copy of the risk assessment for the event, based on ISO31000 principles
- copy of the RPs and company's RPAS credentials
- any National Aviation Authority (NAA) approvals that relate to the operations and crew that permitted the mission in that authority's jurisdiction.

This information will be verified with the appropriate NAA.

15.4 Verification and Scrutineering

CASA will conduct verification and scrutineering of international operators before any operations are conducted in Australian territory. To cover these requirements, international operators are requested to position their mission team in Australia with sufficient time to allow testing and demonstration flying, including emergency responses, before the final go/no-go decision is made.

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16 Flight test authorisation

Operators of RPA with a gross weight above 2 kg used for flight test and research and development require a flight test authorisation, and RPs will need an RP Certificate.

Areas for RPA flight test and certification flights should be approved by CASA under the conditions of a UOC, or by an Area Approval (refer CASR 101.030). Under the operating approval such flights will be required to be conducted within VLOS of the RP and be conducted in an operating area in accordance with an approval issued by CASA. These areas will normally be established outside of controlled airspace. Where possible, testing, research and development and certification flights should be conducted in an area designated for such RPA purposes. Contact the RPAS Office at email uas@casa.gov.au for information on these areas.

Executive Manager
Standards Division

May 2014

Appendix A

Framework for area approval submission for RPA operations

DRAFT
For CASA Staff Comment/Review Only

A.1 Area Approval

CASR 101.030 requires an Area Approval for operations of unmanned aircraft under Class 2 conditions.

Applicants are to submit a request for Area Approval to the RPAS Office – email uas@casa.gov.au

Applicants are required to establish a safety case to support the submission. a CASA will require a risk assessment to be conducted by the applicant before CASA will grant the approval.

It is incumbent upon the applicant to make contact with CASA in a timely manner such that there is sufficient time to make application, provide payment for same and leave sufficient time for CASA to assess the application. CASA requests that the optimum time for contact about an Area Approval is 30 days, with at least 10 working days prior to the event being planned. Please note that CASA is unable to make any assessment or provide any significant advice without first providing an estimate of costs involved and having received payment for same. As soon as payment has been made, an assigned CASA inspector will make the assessment, initiate further discussion if required and make recommendation to the delegate for decision.

Incomplete submissions will be rejected, so the details below, as applicable to the operations, are included.

In addition, submissions that are received within a few days of the activity that is planned will not be able to be processed.

To ensure an accurate estimation of costs is provided the following items must be covered in the application (see note 1 below):

- Executive Summary
- Purpose of the operation
- Scope of the operation, including:
 - Location - area described by lat/long for each corner
 - Date(s) and time(s) – not 'ASAP'
 - maps/Google earth (including airspace overlays eg VNC, VTC, TAC as applicable)
 - other charts eg WAC, google street map may also be required
 - Airspace requirements – planned operations height, classes of airspace (Please note that CASA will determine if a Temporary Danger Area, or Temporary Restricted Area needs to be established. An Airspace Change Proposal (ACP) is required to initiate this process.) See note 2 below regarding access to military restricted airspace.
- mission planning including:
 - Site identification
 - Stakeholders who are likely to be affected in/near the planned area of operations (see note 3. below)
 - Approvals as required – eg Air Traffic Services (ATS), CASA, landowners, airfield owner(s)
 - Flying program
 - Crewing:

- HF
- NOTAM (CASA will advise if this is a condition of the approval)
- Frequency management:
 - Communications equipment – radios (aircraft and ground-to-ground, ground-to-air, phones, transponders)
 - Line of sight, or
 - Beyond line of sight
- Radio frequencies for ATC
- Altimetry and method for height keeping compliance
- Broadcast schedules
- Risk Assessment of the operations as they impact safety (following ISO31000:2009 standard) – a comprehensive risk assessment is critical to the application
- Site Establishment:
 - To include a 'job safety assessment' before starting operations
- Ground Operations (diagram of locations of the factors below within, or in relationship, to the operating area):
 - Take-off/launch site(s) – shown on operations area map – with safety radius if applicable
 - Landing/Recovery site(s) – shown on operations area map – with safety radius if applicable
 - Crowd lines – if applicable
- Air Operations:
 - Post Launch Actions
 - Flight safety
 - Traffic deconfliction
 - Emergency procedure management, including loss of Data Link procedure
 - Landing/Recovery management
- Accident/ Incident Reporting

A.2 Operations within 3NM of a Military Controlled Aerodrome, in Military Controlled Airspace or Restricted Airspace

Operations planned in military airspace require approval from Defence CASRs 101.065, 101.070 and 101.080 refer. The first point of contact with Defence is ADF.Airspace@defence.gov.au

Defence will then arrange direct liaison authority with the unit that will provide the details and approval. Defence will also require a minimum of 10 working days to processing request.

A.3 Operations within 3NM of a Civil Controlled Aerodrome or within Civil Controlled Airspace

For operations within 3NM or under runway approach paths of an aerodrome that is controlled by an air traffic service, or above 400ft AGL in controlled airspace, Airservices Australia approval is required CASR 101.080 refers. This approval will be developed by both CASA and Airservices

Australia (if applicable), and it replaces the previous procedure of obtaining a Letter of Agreement (LOA). The conditions on the UOC will include the requirements for communications with Airservices, specifically the appropriate local ATS. A Letter of Agreement (LOA) is still required with the Australian Defence Force (ADF) for operations in military airspace. .

A.4 Operations in Controlled Airspace

Contact the RPAS office for approval, using the details as per above. Noting that Airservices Australia does not require contact if the operations are outside of 3NM of an aerodrome boundary that is controlled by an air traffic service, clear of the approach paths and below 400AGL.

A.4.1 In Doubt?

Any questions/doubts about the approval, please contact the RPAS Office to discuss prior to submitting an application.

A.4.2 Feedback

On completion of the operation, please contact CASA to arrange a Debrief. This will serve to help each of us to improve our processes and UAS understanding.

Notes:

1. The application maybe in matrix-form, for ease of completion and re-use if so desired – see Appendix 1.
2. For operations in Class G or Class E airspace consultation must be conducted and documented with those stakeholders who are likely to fly in the airspace in which are being planned for the operation.

A.5 Attachment 1 – Area approval requests

SUGGESTED MATRIX FORMAT

(please note applicants may wish to use a text-based format – say mission plan, instruction or the like)

Executive Summary

Purpose of the operation

Location	<ul style="list-style-type: none"> • Area described by lat/long for each corner • Expressed in degrees, minutes and decimal minutes
Date(s) and time(s)	Start date and times of operation (not 'immediately', 'now' or
Flight schedule	the planned flying program
Map(s) of area	include airspace overlays eg VNC, VTC, TAC, Google earth, WAC, etc as applicable – please add these as attachments to this request
Airspace requirements	Proposed maximum altitude
	Lowest limit of airspace over operations area
	Airspace classes

REMOTELY PILOTED AIRCRAFT SYSTEMS OPERATIONS

NOTAM required?	Seek advice
Stakeholders	List Have they been contacted and agree with the plans?
Approvals (as required)	eg Air Traffic Services (ATS),CASA, landowners, airfield owner(s); etc
Frequency management	Communications equipment – radios (aircraft and ground-to-ground, ground-to-air, phones, transponders
	Radio frequencies for ATC
	Broadcast schedules
Crewing	Appropriate Certification?
	Fatigue management
Ground operations	Take-off/launch site(s) Landing/Recovery site(s) Crowd lines – if applicable
Site identification	Include diagrams of locations of launch and recovery sites, people, boundaries
Air operations	Post Launch Actions Flight safety Traffic deconfliction Emergency procedure management Landing/Recovery management
Accident/ Incident Reporting	

A comprehensive Risk Assessment for the proposed operation is required IAW the ISO31000:2009 standard – attach as an annex.