



Australian Government

Civil Aviation Safety Authority

Part 101 (Unmanned Aircraft and Rockets) Manual of Standards 2019 (as amended)

made under regulation 101.028 of the *Civil Aviation Safety Regulations 1998*.

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Note This Table of Contents is for guidance only. It is not a formal part of the Part 91 Manual of Standards.

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CHAPTER 1 PRELIMINARY

1.01 Name of instrument

- (1) This instrument is the *Part 101 (Unmanned Aircraft and Rockets) Manual of Standards 2019*.
- (2) This instrument may also be cited as the Part 101 MOS.
- (3) In this instrument, unless the contrary intention appears, references to “the MOS” or “this MOS” are references to the Part 101 MOS.

1.02 Commencement

- (1) Subject to subsections (2) and (3), this MOS commences on the day of registration.
- (2) The provisions of this MOS, other than those mentioned in section 1.03 take effect on the day after registration.
- (3) The provisions mentioned in section 1.03 take effect in accordance with section 1.03.

1.03 Provisions which take effect later than on commencement

A provision of this MOS mentioned in column 1 of an item in the following Table takes effect on the day mentioned in column 2 for the item.

Item	This provision: (Column 1)	Takes effect on: (Column 2)
1	Chapter 2	10 October 2020
2	Chapter 4	10 April 2020
3	Chapter 9, except Division 9.2	10 April 2020
4	Chapter 10, except Divisions 10.1 and 10. 4	10 October 2020

Note 1 Each item in this Table sets out the date on which the corresponding relevant provisions of this MOS take effect.

Note 2 Chapters 1 and 5, Division 9.2 of Chapter 9, Divisions 10.1 and 10.4 of Chapter 10, and Chapter 11 took effect on 10 April 2019, the day after registration of this MOS. Chapters 3, 6, 7 and 8 are reserved.

1.04 Definitions

- (1) In this MOS, words and phrases have the same meaning as in CASR, unless a contrary intention appears.

Note Some CASR definitions are included in subsection (2) for ease of reference.

- (2) Without affecting subsection (1), in this MOS:

AA means Airservices Australia.

AC means Advisory Circular.

AC 101-10 means the *AC 101-10, Remotely piloted aircraft systems — operation of excluded RPA*.

Note 1 AC 101-10 was first published by CASA in September 2016 and is relevant as it exists from time to time.

Note 2 All references to documents are to the particular document as it exists, or is in force, from time to time. See section 1.05.

ADF means the Australian Defence Force.

aeronautical knowledge component: see paragraph 2.02 (1) (a) of this MOS.

aeronautical knowledge standards means the standards and requirements for the aeronautical knowledge component of a RePL training course.

Note See also section 2.02 of this MOS.

AGL means above ground or water level.

AIP ERSA means the *Aeronautical Information Package, En Route Supplement Australia*, as published by AA.

applicant means a person who applies for, or undergoes training for, a RePL.

approach or departure path, for a controlled aerodrome, has the meaning given in Chapter 4 of this MOS.

approved means approved in writing by CASA, unless a contrary intention is expressly stated.

approved educational institution means an educational institution approved by a State or Territory government for training to the Certificate IV level of the Australian Qualifications Framework (AQF).

ARN means aviation reference number.

AROC means aeronautical radio operator certificate.

as safely possible, in relation to the landing of an RPA as soon as safely possible, refers to the safety of people, manned aircraft and property other than the RPA itself.

ATC means air traffic control.

automated operation, for an RPA, means that after take-off and until it lands, the RPA:

(a) either:

- (i) flies a predetermined flight path programmed into the RPAS before take-off; or
- (ii) changes its flight path or configuration in flight solely because of dynamic updating of pre-programmed turning, way point data, or configuration settings; and

Note Dynamic updating involves electronically changing an RPA's flight path without the manual operation of command and control levers or switches.

(b) is not subject to any manual operation.

AWIS means the aerodrome weather information service of the BOM.

BOM means the Bureau of Meteorology.

CAO means Civil Aviation Order.

CAR means the *Civil Aviation Regulations 1988*.

CASA RePL Upgrade Supplement for the Part 101 MOS is the CASA document of that name, as it exists from time to time.

Note CASA RePL Upgrade Supplement for the Part 101 MOS is available on the CASA website.

CASR means the *Civil Aviation Safety Regulations 1998*.

CASR Dictionary means the dictionary mentioned in regulation 1.4 of CASR.

category, for an RPA, means 1 of the following:

- (a) the aeroplane category;
- (b) the helicopter (multirotor class) category;
- (c) the helicopter (single rotor class) category;
- (d) the powered-lift category.

chief remote pilot has the same meaning as in subregulation 101.340 (1) of CASR.

civil aviation legislation has the meaning given in section 3 of the *Civil Aviation Act 1988*.

controlled aerodrome has the same meaning as in Part 139 of CASR.

documented practices and procedures, for a certified RPA operator, means the written practices and procedures of the operator, as existing or in force from time to time, that have been approved in writing by CASA.

Note See also subsection 1.04 (3). An operator is required to have suitable documented practices and procedures. Documented practices and procedures are considered suitable only if CASA approves them.

emergency and collision avoidance procedures means a certified RPA operator's documented practices and procedures designed to ensure that an RPA in an RPA operation does not become a hazard to any aircraft, person or property during the operation.

employed means employed under a contract of service or a contract for services.

essential duties means tasks whose performance is essential to the safe operation of an RPA.

EVLOS means extended visual line of sight.

Note See also the definitions in section 5.04 for Chapter 5.

examiner, for a medium or large RPA, means 1 of the following:

- (a) the chief remote pilot of a certified RPA operator who is qualified as a RePL training instructor;
- (b) a RePL training instructor who is authorised by the chief remote pilot in accordance with the RPA operator's documented practices and procedures; provided that he or she:
- (c) is identified in the operator's documented practices and procedures as an examiner for a medium or large RPA (a **relevant examiner**); and
- (d) has the length of experience in RPA operations stated in the operator's documented practices and procedures as required to be a relevant examiner; and
- (e) meets the other requirements stated in the operator's documented practices and procedures as necessary to be a relevant examiner; and
- (f) has not been the RePL training instructor for the applicant.

examiner, for a small or very small RPA, means 1 of the following:

- (a) the chief remote pilot of a certified RPA operator who is qualified as a RePL training instructor;
- (b) a RePL training instructor who is authorised by the chief remote pilot in accordance with the RPA's documented practices and procedures; provided that he or she:
- (c) is identified in the operator's documented practices and procedures as an examiner for a small or very small RPA (a **relevant examiner**); and
- (d) has the length of experience in RPA operations stated in the operator's documented practices and procedures as required to be a relevant examiner; and
- (e) meets the other requirements stated in the operator's documented practices and procedures as necessary to be a relevant examiner.

flight time, for an RPA operation, means:

- (a) for the flight of an RPA that is an aeroplane — the time from the moment the aeroplane begins to move under the control of the remote pilot in preparation for flight, until the moment the aeroplane comes to rest at the end of the flight; and
- (b) for the flight of an RPA that is an aircraft in 1 of the following categories, namely, helicopter (multirotor class) category, helicopter (single rotor class) category, or RPA powered-lift category — the time from the moment the aircraft's rotor blades start turning under the control of the remote pilot in preparation for flight, until the moment the rotor blades stop turning after the aircraft comes to rest at the end of the flight; and
- (c) for the flight of an airship — the time from the moment the airship is released from its mooring under the control of the remote pilot in preparation for flight, until the moment the airship is tethered at the end of the flight.

gross weight, for an RPA, means the total weight of the RPA at take-off, including fuel, equipment, payloads (if any) and anything attached to the RPA.

helicopter, when used to describe a kind of RPA, means an RPA with 1 or more main rotors.

Note See also subsection 1.04 (4).

HLS or helicopter landing site means an area of land or water, or a defined area on a structure, intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

indoors operation means use of an RPA in circumstances which meet all of the following requirements:

- (a) the RPA is flown within a building, or another structure, or a naturally occurring or man-made space underground (a **containment area**);
- (b) the containment area is such that it is physically impossible for the RPA to escape and fly away during normal, abnormal or emergency operations;
- (c) entry of people to, and exit of people from, the containment area is controlled in such a way that in flying an RPA in the containment area a remote pilot will not infringe any provision of Part 101 of CASR concerning proximity of an RPA to people within or outside the containment area;
- (d) in the event that an RPA collides with any part of the containment area, no material from the RPA or the containment area can move or escape and cause injury to a person outside the containment area.

Note An example of a man-made space underground is a mine.

job safety assessment, for an operation of an RPA, other than excluded RPA, by a certified RPA operator, means a procedure undertaken in accordance with the RPA operator's documented practices and procedures to:

- (a) assess the safety of the operation; and
- (b) identify safety risks arising from the operation; and
- (c) formulate risk mitigation measures for the operation, including risk management plans.

maintenance controller has the same meaning as in paragraph 101.340 (1) (d) of CASR.

manual operation, for an RPA, means the use, by the remote pilot, of a manual mechanism that is part of the RPAS, in order to exercise control over the RPA, including by reconfiguring the RPA.

MOS means Manual of Standards.

movement area has the same meaning as in regulation 2 of CAR.

Note For ease of reference, **movement area** means that part of an aerodrome to be used for the surface movement of (manned) aircraft, including manoeuvring areas and aprons.

NAIPS means the National Aeronautical Information Processing System administered by AA.

non-controlled aerodrome means a place that is:

- (a) a helicopter landing site not located at a controlled aerodrome; or
- (b) an aerodrome that is not a controlled aerodrome.

Part 139 Manual of Standards means the Manual of Standards made under regulation 139.005 of CASR.

person, includes a certified RPA operator.

practical competency component: see paragraph 2.02 (1) (b) of this MOS.

practical competency standards means the standards and requirements for the practical competency component of a RePL training course.

Note See also section 2.02 of this MOS.

RAIM means receiver autonomous integrity monitoring, which is a technology developed to assess the integrity of GPS signals.

remote pilot means the holder of a remote pilot licence. However, in Schedule 5 a reference (however expressed) to a remote pilot demonstrating a behaviour is taken to be a reference to an applicant for a RePL.

Note See also the definition of **RePL holder**.

remote pilot in command, for an RPA operation, means the pilot designated by an RPA operator, in accordance with the operator's documented practices and procedures, as being in command of the RPA operation and charged with the safe conduct of the operation.

remote pilot licence has the same meaning as in Division 101.F.3 of CASR.

remote pilot log: see section 10.06 of this MOS.

remote pilot station means the place from which an RPA is operated by a RePL holder.

RePL means remote pilot licence.

RePL holder means the holder of a remote pilot licence.

RePL training course is the expression used in this MOS to denote an RPL training course as defined in the CASR Dictionary.

Note **RPL training course** means "training in the operation of RPA for the grant of a remote pilot licence that is conducted: (a) by a person who is certified under regulation 101.335 and whose operations include conducting training; and (b) in accordance with any standards or requirements prescribed by the Part 101 Manual of Standards". The intention behind use of the RePL abbreviation is to avoid confusion with a recreational pilot licence which is also abbreviated elsewhere to "RPL".

RePL training course instructor: see section 2.30 of this MOS.

RePL training organisation means a person certified as an RPA operator under regulation 101.335 of CASR whose operations include the conduct of a RePL training course.

RePL training organisation's procedures means a RePL training organisation's documented practices and procedures for paragraph 101.335 (1) (d) of CASR.

RePL training unit means a unit of aeronautical knowledge or a unit of practical competency for a RePL training course:

- (a) prescribed in Schedules 2 and 3 of this MOS, for the purposes of the definition of **RPL training course** in Part 1 of the CASR Dictionary; and
- (b) contained in Schedules 4 and 5 respectively.

RePL training unit content, for a RePL training unit, means the content for the RePL training unit:

- (a) mentioned in column 2 of an item in an Appendix of Schedules 2 and 3; and
- (b) described for the corresponding unit in Schedules 4 and 5, respectively.

RPA means a remotely piloted aircraft, other than a balloon or a kite, which may be identified by the following:

- (a) category (for example, the aeroplane category);
- (b) size (for example, medium, large);
- (c) complexity (for example, automated, manual, liquid-fuel system).

RPA operator means a person who is certified as an RPA operator in accordance with regulation 101.335 of CASR.

Note Most provisions of this MOS are expressed to apply to RPA operators. However, some provisions are expressed to apply more broadly to a person. Reference to a person includes a certified RPA operator, unless the contrary intention appears.

RPAS means remote pilot aircraft system and has the same meaning as in the CASR Dictionary.

Note **RPAS** means a set of configurable elements consisting of a remotely piloted aircraft, its associated remote pilot station (or stations), the required command and control links and any other system elements that may be required at any point during the operation of the aircraft.

RPAS operational log: see section 10.05 of this MOS.

RPAS operational release: see section 10.04 of this MOS.

RPAS technical log: see section 10.07 of this MOS.

RPIC means remote pilot in command.

Note **Pilot in command** is defined in the CASR Dictionary as the pilot designated by the operator of an aircraft as being in command and charged with the safe conduct of the flight.

RPL training course: see **RePL training course**.

runway has the same meaning as in the Part 139 Manual of Standards.

runway strip has the same meaning as in the Part 139 Manual of Standards.

runway threshold has the same meaning as in the Part 139 Manual of Standards.

student has the same meaning as applicant.

tethered operation means use of an RPA in circumstances in which an RPA is flown:

- (a) while securely attached to a lead that:
 - (i) is no longer than 150 ft, unless a provision of this MOS provides for a longer lead; and
 - (ii) makes it impossible for the RPA to escape and fly away during normal, abnormal or emergency operations; and
- (b) at least 500 m from the movement area of an aerodrome unless a provision of this MOS provides for a different distance.

theory component of a RePL training course means the aeronautical knowledge component of the course.

Note See also subsection 2.02 (1) of this MOS.

type, for an RPA, means an RPA of a particular category, size and complexity, where:

- (a) category refers to whether the RPA is in the aeroplane category, the helicopter (multirotor class) category, the helicopter (single rotor class) category or the powered-lift category; and
- (b) size refers to whether the RPA is of a particular size (for example, medium, large); and
- (c) complexity refers to whether the RPA:
 - (i) is generally operated in automated mode, or manual mode, or has a liquid-fuel system; and
 - (ii) is of a particular design and make, including of a design and make that:
 - (A) stems from a common basic design; and
 - (B) is essentially similar in different models.

unit code, for a RePL training unit, means the unit code mentioned:

- (a) in an item of Schedule 2 or Schedule 3 for the RePL training unit; and
- (b) in the corresponding Appendix in Schedule 4 or 5.

VLOS means visual line of sight.

Note See also the definitions in section 5.04 for Chapter 5.

- (3) The following requirements apply for a certified RPA operator's **documented practices and procedures**:
 - (a) the RPA operator must provide documented practices and procedures, as required by a provision of this MOS, for the use and guidance of the operator's remote pilots and other operations personnel (including trainees) (the **operations personnel**);
 - (b) the documented practices and procedures must contain such information, procedures and instructions with respect to the flight operations of all types of RPA operated by the RPA operator as are required or necessary under this MOS to ensure the safe conduct of the RPA operations;
 - (c) the documented practices and procedures must be amended from time to time, where necessary, as the result of changes in the operator's operations, aircraft or equipment, or in the light of experience;

Note Documented practices and procedures do not comply with this MOS unless they have been approved in writing by CASA. See the definition of **documented practices and procedures**. Amendments to documented practices and procedures do not become part of the documented practices and procedures until they have been approved in writing by CASA.

- (d) a copy of the documented practices and procedures must:
 - (i) be given to the operator's remote pilots; and
 - (ii) be given to each member of the operations personnel, as the RPA operator considers necessary; and
 - (iii) be given to CASA; and
 - (iv) be accessible for use by all operations personnel of the RPA operator who have not been given a copy;

- (e) a copy of any approved amendments to the documented practices and procedures must be forwarded, or made accessible (as the case requires), to the persons mentioned in paragraph (d);
 - (f) the documented practices and procedures must contain a statement that the RPA operator requires each remote pilot and each member of the operations personnel to comply with the documented practices and procedures insofar as they relate to his or her duties or activities for the RPA operator.
- (4) Under this MOS, a helicopter must be in 1 of the following categories:
- (a) helicopter (single rotor class) category;
 - (b) helicopter (multirotor class) category.

1.05 References to documents

- (1) In this MOS, unless the contrary intention appears, a reference to a document that is applied, adopted or incorporated (however described) is a reference to the document as it exists from time to time.
- (2) In this MOS, a reference to any legislative instrument is a reference to the instrument as in force from time to time.

1.06 Abbreviations

- (1) In this MOS, unless a contrary intention appears, an acronym or abbreviation mentioned in Schedule 1 has the meaning given to it by Schedule 1.
- (2) Unless a contrary intention appears, if an acronym or abbreviation used in this MOS is not given a meaning under Schedule 1, the acronym or abbreviation has the meaning that is given to it by:
 - (a) the Act or the regulations; or
 - (b) if paragraph (a) does not apply — the prevalent usage, custom and practice of the unmanned aviation industry.
- (3) To avoid doubt, in this MOS, neither a unit code nor an examination code is an acronym or abbreviation within the meaning of this section.

1.07 Tables, Figures and Notes

In this instrument:

- (a) if a numbered Figure in the form of a drawing, diagram or similar representation is expressed as *illustrating matters*, it is guidance that is to be taken into account in interpreting the provision which refers to the Figure; and
- (b) if a numbered Figure in the form of a drawing, diagram or similar representation is expressed as *showing matters*, it is to be read with, and may supplement, the information in the provision which refers to the Figure; and
- (c) a Note provides information and does not contain standards unless the contrary intention is expressed in a provision for the Note.

Note Figures and Tables (other than those in Schedules) are not numbered sequentially. For ease of reference, they are numbered by reference to the section or subsection which first refers to the Figure or Table.

1.08 Table of Contents

The Table of Contents for this MOS:

- (a) is not part of this MOS; and
- (b) is for guidance only; and
- (c) may be modified or edited in any published version of this MOS.

CHAPTER 2 RePL TRAINING COURSE

Division 2.1 General

2.01 Purpose

For paragraph (b) of the definition of ***RPL training course*** in the CASR Dictionary, this Chapter prescribes the standards and requirements for the conduct of training in the operation of RPA for the grant of a RePL.

Note 1 An RPL training course may only be conducted by a person who is certified under regulation 101.335 of CASR and whose operations include conducting training.

Note 2 The requirement to hold a RePL authorising a person to operate an RPA does not apply in relation to the operation of an excluded RPA: see subregulation 101.252 (1) of CASR.

2.02 Application

- (1) The standards and requirements prescribed by this Chapter apply, in accordance with this Chapter, to:
 - (a) the theory component of a RePL training course, as mentioned in subparagraph 101.295 (2) (a) (iii) of CASR (the ***aeronautical knowledge component***); and
 - (b) the component of a RePL training course for the manual or automated operation of a category of RPA that an applicant for a RePL proposes to operate, as mentioned in subparagraph 101.295 (2) (b) (i) of CASR (the ***practical competency component***).

Note The more commonly used expressions ***aeronautical knowledge component*** and ***practical competency component*** are used in this MOS as provided for in subsection 2.02 (1).

- (2) Training which does not comply with the standards and requirements prescribed by this Chapter is not training that is a RePL ***training course***.

Note Generally speaking, eligibility for the grant of a RePL is dependent on: (1) passing the theory component of a RePL training course (that is, meeting the aeronautical knowledge standards): see subparagraph 101.295 (2) (a) (iii) of CASR; and (2) completing a RePL training course in the manual or automated operation of a category of RPA that the applicant proposes to operate (that is, satisfying the practical competency standards): see subparagraph 101.295 (2) (b) (i).

CHAPTER 2 RePL TRAINING COURSE

Division 2.2 Aeronautical knowledge and practical competency standards

2.03 General English language proficiency standards under Part 61

- (1) Without affecting any other provision of this Chapter, subject to subsection (4), a RePL training course may include, as part of the practical competency component, training and assessment in general English language proficiency in accordance with this section.

Note An applicant for a RePL must have general English language proficiency. A RePL training course may specifically include general English language proficiency training in accordance with subsections (2) and (3) of this section. Otherwise, RePL applicants must obtain their general English language proficiency by virtue of holding, or having held, a flight crew licence issued by CASA.

- (2) The general English language proficiency standards and evidence for the training are as set out in *Section 1: English Language Proficiency, GEL — General English language proficiency*, in Schedule 2 of the Part 61 MOS, which is hereby incorporated into this MOS.

Note All of the requirements under GEL — General English language proficiency must be met. See the Table of Contents at the front of Schedule 2 of the Part 61 MOS to find unit code GEL.

- (3) Despite subclause 5.1.1 of Section 1 of Schedule 2 of the Part 61 MOS, the assessment mentioned in subclause 5.1.1 must be made by an examiner.
- (4) For this Chapter, an applicant is deemed to have been trained, and assessed as competent, in the practical competency component requirement for general English language proficiency mentioned in *Appendix 1, Practical competency standards — Common units*, in Schedule 3 of this MOS if the applicant:
 - (a) satisfies the standards and assessment of a RePL training course in accordance with subsections (2) and (3); or
 - (b) holds, or has held, a flight crew licence issued by CASA; or
 - (c) holds, or has held, a flight crew qualification granted by the ADF that CASA is satisfied is equivalent to a flight crew licence; or
 - (d) holds an overseas flight crew licence that:
 - (i) CASA is satisfied is equivalent to a flight crew licence; and
 - (ii) states that the applicant meets ICAO level 4, 5 or 6 aviation English language proficiency standards; or
 - (e) both:
 - (i) holds an overseas flight crew licence that CASA is satisfied is equivalent to a flight crew licence; and
 - (ii) has a current aviation English language proficiency assessment.

2.04 Aeronautical radio operator — knowledge and competency standards

- (1) A RePL training course may include training and assessment in the operation of an aeronautical radio.
- (2) The aeronautical radio operator knowledge standards are as set out in Unit 1.2.1 — RARO, in Section 1.2 of Appendix 1 in Schedule 3 of the Part 61 MOS, which is hereby incorporated into this MOS.
- (3) The aeronautical radio operator competency standards are as set out in Part C3 in Section 2: Common Standards, in Schedule 2 of the Part 61 MOS, which is hereby incorporated into this MOS.

- (4) A person is eligible for the grant of an AROC only if each of the requirements in Subpart 64.B of CASR are complied with as if they applied to an applicant for a RePL.

2.05 Aeronautical knowledge standards

- (1) A RePL training course for a category of RPA must include training and assessment in the units of aeronautical knowledge (including common units) that are for the category in accordance with the standards and requirements in Schedule 2.
- (2) For a Table with the heading “Aeronautical knowledge standards” in an Appendix of Schedule 2, each unit of knowledge mentioned in a cell in column 2 of the Table (the *unit of knowledge*) has the unit code mentioned in the corresponding cell in column 1 (the *unit code*).
- (3) The unit coded document containing the requirements of a unit of knowledge is the document in an Appendix of Schedule 4 which has the same unit code.
- (4) A RePL training course for a category of RPA must require the applicant to complete all of the matters, in all of the items, of the following units of knowledge:
- (a) for any RPA category — the units in Appendix 1 of Schedule 4, Common units, except when the RePL training course is for a RePL upgrade provided for in section 2.21, 2.23 or 2.25;
 - (b) for an RPA that is in the aeroplane category — the units in Appendix 2 of Schedule 4;
 - (c) for an RPA that is in the helicopter (multirotor class) category — the units in Appendix 3 of Schedule 4;
 - (d) for an RPA that is in the helicopter (single rotor class) category — the units in Appendix 4 of Schedule 4;
 - (e) for an RPA that is in the powered-lift category — the units in Appendix 5 of Schedule 4;
 - (f) for any RPA in any RPA category, whether operated under a manual or an automated flight management system — the units in Appendix 6 of Schedule 4;
 - (g) for any medium or large RPA in any RPA category, with a liquid-fuel system — the units in Appendix 7 of Schedule 4.
- (5) To avoid any doubt, the requirements under the following:
- (a) paragraph (4) (a);
 - (b) paragraphs (4) (f) and (g);
- are in addition to any requirements expressed in paragraphs (4) (b) to (4) (e), as the case requires.
- (6) If:
- (a) on a particular date — a person was granted a RePL in a category of RPA; and
 - (b) not more than 3 years after the particular date — the person is an applicant for a RePL in a different category or for a medium or large RPA;
- then, the person is deemed to have completed training and assessment in the common units of the aeronautical knowledge component for the RePL training course.
- (7) If:
- (a) on a particular date — a person was granted a RePL in a category of RPA; and
 - (b) more than 5 years after the particular date — the person is an applicant for a RePL in a different category or for a medium or large RPA; and

(c) the person is an involved RPA participant;

then, the person is deemed to have completed training and assessment in the common units of the aeronautical knowledge component for the RePL training course.

(8) For subsection (7):

involved RPA participant means a person whose logbooks and RPA operator records show that the person, as a chief remote pilot or RePL holder, has performed chief remote pilot duties or flown RPA, during not less than 50% of the total number of completed weeks between:

(a) first qualifying for the RePL; and

(b) the date of application for a RePL in a different category or for a medium or large RPA.

2.06 Practical competency standards

(1) The practical competency component of a RePL training course for a category of RPA (including with a liquid-fuel system or otherwise) must be for 1 of the following:

(a) the automated operation mode — for an applicant for a RePL for automated operation mode only;

(b) both the automated operation mode and the manual mode — for an applicant for a RePL for the manual operation mode.

Note A condition to the effect of the relevant operational mode limitation will be imposed on the RePL under regulation 11.056 and paragraph 101.300 (2) (a) of CASR. If a RePL for a category of RPA is granted with a condition limiting RPA operations to automated operation only, the condition may be removed and the limitation lifted only if the applicant successfully completes the practical competency component of a RePL training course for the same RPA category.

(2) Without affecting anything else in this section, the practical competency component of a RePL training course for a particular medium or large RPA for which the applicant seeks the RePL must be conducted and assessed with respect to the particular medium or large RPA only.

(3) A RePL training course for a category of RPA must include training and assessment in the units of practical competency that are for the category in accordance with the standards and requirements in Schedule 3.

(4) For a Table with the heading “Practical competency standards” in an Appendix of Schedule 3, each unit of competency mentioned in a cell in column 2 of the Table (the ***unit of practical competency***) has the unit code mentioned in the corresponding cell in column 1 (the ***unit code***).

(5) The unit coded document containing the requirements of a unit of practical competency is the document in an Appendix of Schedule 5 which has the same unit code.

(6) A RePL training course for a category of RPA must require the applicant to complete the following units of practical competency:

(a) for any RPA category — the units in Appendix 1 of Schedule 5, Common units, except when the RePL training course is for a RePL upgrade provided for in section 2.21, 2.23 or 2.25;

(b) for an RPA that is in the aeroplane category — the units in Appendix 2 of Schedule 5;

(c) for an RPA that is in the helicopter (multicopter class) category — the units in Appendix 3 of Schedule 5;

- (d) for an RPA that is in the helicopter (single rotor class) category — the units in Appendix 4 of Schedule 5;
 - (e) for an RPA that is in the powered-lift category — the units in Appendix 5 of Schedule 5;
 - (f) for any medium or large RPA in any RPA category, with a liquid-fuel system — all of the units in Appendix 6 of Schedule 5.
- (7) For an item mentioned in a Table of an Appendix of Schedule 5 (the ***practical competency units***), the training and assessment of the subject matter mentioned in column 2 of the item must be within the tolerances mentioned in column 3 of the item, and across the range of variables mentioned in column 4 of the item.
- (8) To avoid any doubt, the requirements under the following:
- (a) paragraph (6) (a);
 - (b) paragraph (6) (f);
- are in addition to any requirement expressed in paragraphs (6) (b) to (e), as the case requires.

CHAPTER 2 RePL TRAINING COURSE

Division 2.3 Examinations — RePL training course theory component

2.07 Aeronautical knowledge examinations for a RePL training course

This Division is for subparagraph 101.295 (2) (a) (iii) of CASR and the definition of *RPL training course* in the CASR Dictionary, in relation to the issue of an initial RePL.

2.08 Aeronautical knowledge examinations for a RePL training course

- (1) To pass the theory component of a RePL training course (the *aeronautical knowledge component*), an applicant must pass an examination (the *aeronautical knowledge examination*, or the *examination*).
- (2) The examination must be a closed-book examination except for any documents concerning the RPAS:
 - (a) authored by CASA and published on its website; or
 - (b) authored by AA and published on its website.

Note The examination is one in which the candidate must not use any RePL training course document or material, separate from the examination text, to assist in answering examination questions. However, official, online CASA and AA documents may be used.

2.09 Examination pass mark, examiner and resits

- (1) The pass mark for the examination is 85%.
- (2) The examination must be assessed by:
 - (a) a RePL training instructor; or
 - (b) the chief remote pilot for the RePL training organisation.
- (3) If an applicant does not pass the examination at the first attempt, or at a second attempt, or at a third attempt, he or she must not make a fourth attempt to pass the examination unless:
 - (a) he or she has repeated the aeronautical knowledge component of the RPL training course; and
 - (b) at least 14 days have elapsed since the third attempt.

2.10 Examination questions

- (1) The examination must be a set of at least 80 multiple-choice questions covering all of the aeronautical knowledge units in Schedule 4 that are for the relevant category of RPA, including for automated flight management systems and liquid-fuel systems if required (the *relevant units*), for which the applicant is applying for a RePL (the *relevant RePL*).
- (1A) If the number of correctly answered questions that would be exactly 85% of the total number set would otherwise involve a decimal point, the number must be rounded upwards or downwards to the nearest whole number, as the case requires, to achieve 85% for the purposes of this MOS.

Note To achieve a pass mark of 85%, the applicant must have at least 68 correct answers for an examination of 80 questions; at least 73 correct answers for an examination of 85 questions; at least 77 correct answers for an examination of 90 questions (despite the fact that 85% of 90 is 76.5) and so on.

- (2) The examination questions must be compiled as follows, based on the items in the relevant units for the relevant RePL:

- (a) for each Priority A item in the relevant units for the relevant RePL — there must be at least 2 questions;
 - (b) for each Priority B item in the relevant units for the relevant RePL — there must be at least 1 question;
 - (c) for every 2 Priority C items in the relevant units — there must be at least 1 question.
- (3) The number of examination questions must be such as to ensure that the requirements of subsections (1) and (2) are met.

Note Depending on the relevant RePL sought, more than 80 questions may have to be formulated to ensure that the requirements of subsections (1) and (2) are met.

2.11 Examination duration

The examination must be a continuous examination that is to be completed within the period that is the sum of 15 minutes and the number of the set of questions as if that number were also minutes.

2.12 Examination question sets

- (1) The examination must be 1 of at least 4 unique sets of questions used by the RePL training organisation and, subject to subsection (5), approved in writing by CASA.
- (2) For subsection (1), each unique set of questions must:
 - (a) be comprised of at least 80 multiple-choice questions; and
 - (b) be such that, while the same topics may be the subject of questions in some or all of the sets, no questions may appear in a set:
 - (i) in exactly the same form or presentation as in any other set; or
 - (ii) as requiring exactly the same answer, from exactly the same range of choices, as in any other set.
- (3) Each set of the 4 unique sets of questions must have a unique identification code number.
- (4) Examinations, each comprising one of the unique sets of questions, must be randomly rotated:
 - (a) for each RePL training course; and
 - (b) for each examination which an applicant is resitting.
- (5) Despite subsection (1), a RePL training organisation:
 - (a) may, without CASA approval, modify not more than 10% of the total number of multiple-choice questions in any unique set in any 12-month period, to make the questions more effective for the examination; and
 - (b) must keep for 5 years written records recording:
 - (i) how any question has been modified under paragraph (a); and
 - (ii) the date of the modification; and
 - (iii) the reason for the modification.
- (6) CASA may, in writing, direct a RePL training organisation to modify any question, including a question modified by the organisation under subsection (5).

2.13 Examination results

Not later than 1 week after an examination, the RePL training organisation must inform each applicant in writing:

- (a) of his or her examination mark and whether or not he or she has passed the examination; and
- (b) if the applicant has not passed the examination — that the examination may be resat only once without having to repeat the aeronautical knowledge component of the RePL training course.

2.14 Examination records

- (1) The RePL training organisation must retain for not less than 12 months, the examination as completed by each applicant and assessed by the RePL instructor or chief remote pilot.
- (2) The RePL training organisation must make, and keep for at least 7 years, a record of the following for each examination that is attempted by an applicant:
 - (a) the applicant's name;
 - (b) the date of the examination;
 - (c) whether the examination was a resit;
 - (d) the unique identification code number of the examination;
 - (e) the applicant's mark in the examination and whether the applicant passed the examination;
 - (f) the name and position of the person who assessed the examination.

2.15 Examination security

- (1) To deliver a RePL training course, a RePL training organisation must comply with this section.
- (2) The RePL training organisation must ensure that the 4 unique sets of questions for examinations, and each examination question within a set:
 - (a) is subject to secure handling and custody procedures set out in the organisation's documented practices and procedures (*examination security procedures*); and
 - (b) before and after an examination commences — is not disclosed to:
 - (i) any applicant sitting the examination; or
 - (ii) any person who has not undertaken in writing to comply with the examination security procedures; and
 - (c) immediately after the examination — cannot be physically retained or electronically recorded by the applicant; and
 - (d) subject to subsection (3), at all times after the examination — cannot be obtained by any person who has not undertaken in writing to comply with the examination security procedures.
- (3) Paragraph (2) (d) does not apply in respect of a request for a copy of the examination or any question, made in writing by CASA.
- (4) The RePL training organisation must ensure that each examination is conducted in accordance with subsection (5).
- (5) For subsection (4), the conduct of the examination must:
 - (a) comply with the procedures set out in the organisation's documented practices and procedures for the conduct of examinations (*conduct of examination procedures*); and
 - (b) prevent a student who is taking the examination from:
 - (i) using any means to answer a question that is not:

- (A) in accordance with section 2.08; or
- (B) approved in the conduct of examination procedures; or

Note See subsection 2.08 (2): apart from documents concerning the RPAS authored by CASA or AA and published on their website, the examination is not an open-book examination.

- (ii) being coached or prompted by any person during the examination.

2.16 Post-examination knowledge deficiency reports (KDRs)

- (1) This section applies if a candidate for an aeronautical knowledge examination passes the examination, but with a score of less than 100%.

Note The pass mark is 85%: see subsection 2.09 (1).

- (2) The RePL training organisation must, as soon as practicable:
 - (a) inform the candidate of the items of the aeronautical knowledge units with respect to which the candidate answered examination questions incorrectly (the **knowledge deficiency**), with a view to the candidate remedying the knowledge deficiency; and
 - (b) prepare a written report (the **knowledge deficiency report** or **KDR**) confirming the knowledge deficiency; and
 - (c) give a copy of the KDR to the candidate.

Note The actual questions must not be provided to the candidate — see paragraph 2.15 (2) (b).

- (3) Knowledge deficiency is remedied only if, after an oral examination:
 - (a) the student has satisfied either the RePL training course instructor or the chief remote pilot (the **examiner**) that the knowledge that was the subject of the KDR has been remedied; and
 - (b) this satisfaction has been recorded in writing by the examiner.

Note A person will not be issued with a RePL unless and until the knowledge deficiency is remedied: see section 2.29.

2.17 Documented practices and procedures for examinations, KDRs etc.

The RePL training organisation must set out in its documented practices and procedures, the procedures, including timeframes where relevant, to be followed to ensure compliance with this Division.

CHAPTER 2 RePL TRAINING COURSE

Division 2.4 Practical competencies — completion of RePL training course for manual or automated operation component

2.18 Assessment of practical competencies for a RePL training course

- (1) This Division is for subparagraph 101.295 (2) (b) (i) of CASR and the definition of ***RPL training course*** in the CASR Dictionary, in relation to the issue of an initial RePL.
- (2) To complete the RePL training course component for the operation of a category of RPA (the ***practical competencies***), the applicant must be assessed as competent in each of the units in Schedule 5 (the ***relevant practical competency units***) that is:
 - (a) for the relevant RPA category (including with or without a liquid-fuel system, as the case requires); and
 - (b) conducted:
 - (i) for the automated operation mode; or
 - (ii) for both the automated operation mode and the manual mode;as the case requires for the RePL that the applicant is applying for (the ***relevant RePL***).
- (3) To be assessed as competent, the applicant must:
 - (a) demonstrate to a RePL training instructor all of the behaviours mentioned in each item of the relevant practical competency unit; and
 - (b) satisfy the RePL training instructor that each of the behaviours referred to in paragraph (a) has been demonstrated within the relevant tolerances, and across the range of variables, (if any), mentioned for the item; and
 - (c) having satisfied the requirements of paragraphs (a) and (b), pass a RePL training course flight test in the relevant RPA, conducted in accordance with the RePL training organisation's documented practices and procedures by an examiner.
- (4) Subject to subsection (5), for subsection (3), a behaviour must be demonstrated:
 - (a) for the relevant RPA category and the relevant RePL; and
 - (b) across as many of the range of variables as the operating conditions reasonably permit.
- (5) If a variable was not selected for demonstration because operating conditions made it impossible in practice to demonstrate the variable, the RePL training instructor must:
 - (a) require the applicant to provide:
 - (i) a satisfactory computerised simulation of the flight characteristics of the RPA under the variable, using a computerised simulation system that meets the standards and requirements set out in the operator's documented practices and procedures; or
 - (ii) a detailed oral explanation of the variable, accompanied by indicative manual use of the RPA's functional elements, or a description of such use; and
 - (b) certify in writing to the RePL training organisation, in accordance with the organisation's documented practices and procedures, that:

- (i) operating conditions made it impossible in practice to demonstrate the variable; and
 - (ii) for reasons stated in the certification, it would be unreasonable to require that the variable be demonstrated on another occasion.
- (6) For paragraph (3) (b), a behaviour demonstrated outside a relevant tolerance may be considered to have been demonstrated within the tolerance if the RePL training instructor:
 - (a) is satisfied that:
 - (i) the only reason for failure to demonstrate the behaviour is the unavoidable impact of the relevant operating conditions; and
 - (ii) in the circumstances, the behaviour that was demonstrated was not so far outside the tolerance as to indicate a lack of competence in the relevant operating conditions; and
 - (b) certifies to the RePL training organisation, in accordance with the organisation's documented practices and procedures, that paragraph (a) was the case.
- (7) The training course flight test for the relevant RPA mentioned in paragraph (3) (c) must be in accordance with the flight test standards in Schedule 6.

CHAPTER 2 RePL TRAINING COURSE

Division 2.5 RePL training course to upgrade a RePL

2.19AA Aeronautical knowledge examinations and assessment of practical competencies for a RePL training course to upgrade a RePL

This Division is for subparagraphs 101.295 (2) (a) (iii) and 101.295 (2) (b) (i) of CASR and the definition of *RPL training course* in the CASR Dictionary, in relation to the issue of an upgraded RePL.

2.19 Meaning of relevant RPA

- (1) In a section of this Chapter, reference to a *relevant RPA* means the particular type of RPA for which the applicant seeks an upgraded RePL.
- (2) Without affecting anything else in this Division, for a particular type of medium or large RPA for which the applicant seeks the upgraded RePL, the following:
 - (a) the practical competency component of a RePL training course;
 - (b) the training course flight test;must be for the particular type of medium or large RPA only.

2.20 RePL training course — upgrade a RePL for a small RPA whose gross weight is less than 7 kg to include another small RPA of the same category whose gross weight is 7 kg or more

- (1) This section prescribes the standards and requirements for a RePL training course for the holder of a RePL:
 - (a) in a category of small RPA whose gross weight is less than 7 kg; and
 - (b) who applies to be a RePL holder for another small RPA in the same category whose gross weight is 7 kg or more (a *relevant RPA*).

Note There are no additional aeronautical knowledge requirements.
- (2) The practical competency component of the RePL training course must require the applicant to do the following:
 - (a) complete flying training operating a relevant RPA; and
 - (b) be assessed as competent in all of the units of practical competency (other than the common units) that are required for the relevant RPA under Schedule 5 (including in the manual mode of operation if the case so requires).
- (3) The person who supervises the flying mentioned in paragraph (2) (a) must be the same person who performs the assessment of competence for paragraph (2) (b).
- (4) The person who supervises flying and assesses competency for subsections (2) and (3) must be:
 - (a) for an RPL training organisation — 1 of the following who has a RePL which permits operations in the RPA category with a gross weight of 7 kg or more:
 - (i) the chief remote pilot;
 - (ii) a RePL training instructor; or
 - (b) if not for an RPL training organisation — the chief remote pilot of a certified RPA operator who has documented practices and procedures for the purposes of this section.

2.21 RePL training course — upgrade a RePL for a small RPA to include a different category of small RPA

- (1) This section prescribes the standards and requirements for a RePL training course for the holder of a RePL in a category of small RPA who applies to be a RePL holder for a different category of small RPA (the **relevant RPA**).

Note CASA will issue a RePL with a condition that limits operations in a new category to RPA with a gross weight of less than 7 kg unless the practical component of the RePL training course is completed on an RPA in the relevant category that has a gross weight of more than 7 kg.

- (2) Subject to subsection (3), the aeronautical knowledge component of the RePL training course must require the applicant to complete training, and pass an examination, in all of the units of knowledge that are required for the relevant RPA under Schedule 4, except:
 - (a) for an applicant who successfully completed the Common units to obtain an initial RePL — the Common units; and
 - (b) for an applicant:
 - (i) who was issued with an initial RePL at least 3 years before 10 April 2020; and
 - (ii) whose initial RePL has not been cancelled or suspended; and
 - (iii) who is an involved participant; the Common units; and
 - (c) for all applicants — those units for which the holder passed the aeronautical knowledge examination:
 - (i) not more than 3 years before applying for a RePL for the relevant RPA; or
 - (ii) more than 5 years before applying for a RePL for the relevant RPA provided the applicant is an involved RPA participant.

Note **Involved RPA participant** is defined in subsection (7).

- (3) An applicant who holds 1 of the following:
 - (a) a flight crew licence;
 - (b) an overseas flight crew licence, or a flight crew qualification granted by the ADF, that CASA is satisfied is equivalent to a flight crew licence;that is for a category of manned aircraft that is similar to the category of the relevant RPA, is taken to satisfy the aeronautical knowledge component of the training mentioned in subsection (2).
- (4) For subsection (2), the examination must:
 - (a) be carried out by the person who conducts the applicant's training course flight test for the relevant RPA; and
 - (b) comply with the requirements set out in the operator's documented practices and procedures dealing with the following for the examination:
 - (i) the content, including the variation and security of relevant questions;
 - (ii) the pass mark, including procedures for knowledge deficiency reporting and re-examination;
 - (iii) notifications and certifications for applicants, and record keeping.

Note Examinations may be oral or written, but must be supported by appropriate records in accordance with the operator's documented practices and procedures.

- (5) The practical competency component of the RePL training course must require the applicant to complete training, and be assessed as competent, in all of the units of

practical competency that are required for the relevant RPA under Schedule 5 (including in the manual mode of operation if the case so requires), except:

- (a) for an applicant who successfully completed the Common units to obtain an initial RePL — the Common units; and
- (b) for an applicant:
 - (i) who was issued with an initial RePL at least 3 years before 10 April 2020; and
 - (ii) whose initial RePL has not been cancelled or suspended; and
 - (iii) who is an involved participant; the Common units; and
- (c) for all applicants — those units of practical competency for which the holder was assessed as competent:
 - (i) not more than 3 years before applying for a RePL for the relevant RPA; or
 - (ii) more than 5 years before applying for a RePL for the relevant RPA provided the applicant is an involved RPA participant.
- (6) For subsection (5), the practical competency component of the RePL training course must also require the applicant to pass the training course flight test for the relevant RPA, conducted by an examiner in accordance with the relevant flight test standards in Schedule 6.
- (7) For subsection (2):

involved RPA participant means a person whose logbooks and RPA operator records show that the person, as a chief remote pilot or RePL holder, has performed chief remote pilot duties or flown RPA, during not less than 50% of the total number of completed weeks between:

 - (a) first qualifying for the RePL in a category of small RPA; and
 - (b) the date of application to be a RePL holder in a different category of small RPA.

2.22 RePL training course — upgrade a RePL for a small RPA to include a medium or large RPA of the same category

- (1) This section prescribes the standards and requirements for a RePL training course for the holder of a RePL in a category of small RPA who applies to be a RePL holder for a medium or large RPA in the same category (the ***relevant RPA***).
- (2) Without affecting subsection (3), if the holder is applying for the first time to be a RePL holder for an RPA with a liquid-fuel system, the relevant aeronautical knowledge and practical components of the RePL training course must require the applicant to:
 - (a) complete training in, and pass the examination for, the units of knowledge required for the relevant RPA with a liquid-fuel system under Schedule 4; and
 - (b) complete training in, and demonstrate the practical competencies required for, the relevant RPA with a liquid-fuel system under Schedule 5.
- (3) The aeronautical knowledge and practical competency components of the RePL training course (including examination and assessment) must comply with the requirements in *CASA RePL Upgrade Supplement for the Part 101 MOS* for the relevant RPA, as in force from time to time.

Note CASA RePL Upgrade Supplement for the Part 101 MOS may be freely accessed through the CASA website: www.casa.gov.au.

- (4) The practical competency component of the RePL training course must require the applicant to pass the training course flight test for the relevant RPA, conducted by an examiner in accordance with the relevant flight test standards in Schedule 6.

2.23 RePL training course — upgrade a RePL for a small RPA to include a medium or large RPA of a different category

- (1) This section prescribes the standards and requirements for a RePL training course for the holder of a RePL in a category of small RPA who applies to be a RePL holder for a medium or large RPA in a different category, with or without a liquid-fuel system, as the case requires (the *relevant RPA*).
- (2) Subject to subsection (3), the aeronautical knowledge component of the RePL training course must require the applicant to complete training, and pass an examination, in all of the units of knowledge that are required for the relevant RPA under Schedule 4, except:
 - (a) for an applicant who successfully completed the Common units to obtain an initial RePL — the Common units; and
 - (b) for an applicant:
 - (i) who was issued with an initial RePL at least 3 years before 10 April 2020; and
 - (ii) whose initial RePL has not been cancelled or suspended; and
 - (iii) who is an involved participant; the Common units; and
 - (c) for all applicants — those units for which the holder passed the aeronautical knowledge examination:
 - (i) not more than 3 years before applying for a RePL for the relevant RPA; or
 - (ii) more than 5 years before applying for a RePL for the relevant RPA provided the applicant is an involved RPA participant.

Note **Involved RPA participant** is defined in subsection (8).

- (3) An applicant who holds 1 of the following:
 - (a) a flight crew licence;
 - (b) an overseas flight crew licence, or a flight crew qualification granted by the ADF, that CASA is satisfied is equivalent to a flight crew licence;that is for a category of manned aircraft that is similar to the category of the relevant RPA, is taken to satisfy the aeronautical knowledge component of the training mentioned in subsection (2).
- (4) For subsection (2), the examination must comply with the requirements set out in the operator's documented practices and procedures dealing with the following for the examination:
 - (a) the content, including the variation and security of relevant questions;
 - (b) the pass mark, including procedures for knowledge deficiency reporting and re-examination;
 - (c) notifications and certifications for applicants, and record keeping.

Note Examinations may be oral or written but must be supported by appropriate records in accordance with the operator's documented practices and procedures.

- (5) The practical competency component of the RePL training course must require the applicant to complete training, and be assessed as competent, in all of the units of

practical competency that are required for the relevant RPA under Schedule 5 (including in the manual mode of operation if the case so requires), except:

- (a) for an applicant who successfully completed the Common units to obtain an initial RePL — the Common units; and
- (b) for an applicant:
 - (i) who was issued with an initial RePL at least 3 years before 10 April 2020; and
 - (ii) whose initial RePL has not been cancelled or suspended; and
 - (iii) who is an involved participant; the Common units; and
- (c) for all applicants — those units of practical competency for which the holder was assessed as competent:
 - (i) not more than 3 years before applying for a RePL for the relevant RPA; or
 - (ii) more than 5 years before applying for a RePL for the relevant RPA provided the applicant is an involved RPA participant.
- (6) Without affecting subsection (5), if the holder is applying for the first time to be a RePL holder for RPA with liquid-fuel system, the relevant aeronautical knowledge and practical components of the RePL training course must require the applicant to:
 - (a) complete training in, and pass the examination for, the units of knowledge required for RPA with a liquid-fuel system under Schedule 4; and
 - (b) complete training in, and demonstrate the practical competencies required for, RPA with a liquid-fuel system under Schedule 5.
- (7) The relevant practical competency component of the RePL training course must require the applicant to pass the training course flight test for the relevant RPA, conducted by an examiner in accordance with the relevant flight test standards in Schedule 6.
- (8) For subsection (2):
involved RPA participant means a person whose logbooks and RPA operator records show that the person, as a chief remote pilot or RePL holder, has performed chief remote pilot duties or flown RPA, during not less than 50% of the total number of completed weeks between:
 - (a) first qualifying for the RePL in a category of small RPA; and
 - (b) the date of application to be a RePL holder for a medium or large RPA in a different category, with or without a liquid-fuel system, as the case requires.

2.24 RePL training course — upgrade a RePL for a medium or large RPA to include another medium or large RPA of the same category

- (1) This section prescribes the standards and requirements for a RePL training course for the holder of a RePL in a category of medium or large RPA who applies to be a RePL holder for another medium or large RPA of the same category (the ***relevant RPA***).
- (2) Without affecting subsection (3), if the holder is applying for the first time to be a RePL holder for RPA with liquid-fuel system, the relevant aeronautical knowledge and practical components of the RePL training course must require the applicant to:
 - (a) complete training in, and pass the examination for, the units of knowledge required for RPA with a liquid-fuel system under Schedule 4; and

- (b) complete training in, and demonstrate the practical competencies required for, RPA with a liquid-fuel system under Schedule 5.
- (3) The aeronautical knowledge and practical competency components of the RePL training course (including examination and assessment) must comply with the requirements in *CASA RePL Upgrade Supplement for the Part 101 MOS* for the relevant RPA, as in force from time to time.

Note *CASA RePL Upgrade Supplement for the Part 101 MOS* may be freely accessed through the CASA website: www.casa.gov.au.

- (4) The relevant practical competency component of the RePL training course must require the applicant to pass the training course flight test for the relevant RPA, conducted by an examiner in accordance with the relevant flight test standards in Schedule 6.

2.25 RePL training course — upgrade a RePL for a medium or large RPA to include another medium or large RPA of a different category

- (1) This section prescribes the standards and requirements for a RePL training course for the holder of a RePL in a category of medium or large RPA who applies to be a RePL holder for medium or large RPA in a different category, with or without a liquid-fuel system (the *relevant RPA*).
- (2) Subject to subsection (3), the aeronautical knowledge component of the RePL training course must require the applicant to complete training, and pass an examination, in all of the units of knowledge that are required for the relevant RPA under Schedule 4, except:
 - (a) for an applicant who successfully completed the Common units to obtain an initial RePL — the Common units; and
 - (b) for an applicant:
 - (i) who was issued with an initial RePL at least 3 years before 10 April 2020; and
 - (ii) whose initial RePL has not been cancelled or suspended; and
 - (iii) who is an involved participant; the Common units; and
 - (c) for all applicants — those units for which the holder passed the aeronautical knowledge examination:
 - (i) not more than 3 years before applying for a RePL for the relevant RPA; or
 - (ii) more than 5 years before applying for a RePL for the relevant RPA provided the applicant is an involved RPA participant.

Note 1 **Involved RPA participant** is defined in subsection (7).

Note 2 Under subsection 2.25 (2), the aeronautical knowledge component would include training and examination in a liquid-fuel system if the holder is applying for the first time to be a RePL holder for RPA with a liquid-fuel system.

- (3) An applicant who holds 1 of the following:
 - (a) a flight crew licence;
 - (b) an overseas flight crew licence, or a flight crew qualification granted by the ADF, that CASA is satisfied is equivalent to a flight crew licence;
 that is for a category of manned aircraft that is similar to the category of the relevant RPA, is taken to satisfy the aeronautical knowledge component of the training mentioned in subsection (2).

- (4) For subsection (2), the examination must comply with the requirements set out in the operator's documented practices and procedures dealing with the following for the examination:

- (a) the content, including the variation and security of relevant questions;
- (b) the pass mark, including procedures for knowledge deficiency reporting and re-examination;
- (c) notifications and certifications for applicants, and record keeping.

Note Examinations may be oral or written but must be supported by appropriate records in accordance with the operator's documented practices and procedures.

- (5) The practical competency component of the RePL training course must require the applicant to complete training, and be assessed as competent, in all of the units of practical competency that are required for the relevant RPA under Schedule 5 (including in the manual mode of operation if the case so requires), except:

- (a) for an applicant who successfully completed the Common units to obtain an initial RePL — the Common units; and
- (b) for an applicant:
 - (i) who was issued with an initial RePL at least 3 years before 10 April 2020; and
 - (ii) whose initial RePL has not been cancelled or suspended; and
 - (iii) who is an involved participant;the Common units; and
- (c) for all applicants — those units of practical competency for which the holder was assessed as competent:
 - (i) not more than 3 years before applying for a RePL for the relevant RPA; or
 - (ii) more than 5 years before applying for a RePL for the relevant RPA provided the applicant is an involved RPA participant.

Note Under subsection 2.25 (5), the practical competencies component would include training and demonstration of competence in a liquid-fuel system if the holder is applying for the first time to be a RePL holder for RPA with a liquid-fuel system.

- (6) The relevant practical competency component of the RePL training course must require the applicant to pass the training course flight test for the relevant RPA, conducted by an examiner in accordance with the relevant flight test standards in Schedule 6.

- (7) For subsection (2):

involved RPA participant means a person whose logbooks and RPA operator records show that the person, as a chief remote pilot or RePL holder, has performed chief remote pilot duties or flown RPA, during not less than 50% of the total number of completed weeks between:

- (a) first qualifying for the RePL in a category of medium or large RPA; and
- (b) the date of application to be a RePL holder for a medium or large RPA in a different category, with or without a liquid-fuel system, as the case requires.

CHAPTER 2 RePL TRAINING COURSE

Division 2.6 RePL training course — administration

2.26 Student class time

- (1) Subject to subsection (2), to deliver the *aeronautical knowledge component* of a RePL training course for a category of RPA, a RePL training organisation must ensure that each student has not less than 15 hours of contact time with a RePL training instructor.
- (2) For a student who is receiving the *aeronautical knowledge component* of a RePL training course simultaneously for 1 category of RPA and for 1 or more additional categories, the RePL training organisation must ensure that the student has not less than the following hours of contact time with a RePL training instructor:
 - (a) 15 hours; and
 - (b) 4 additional hours for each additional category.
- (3) For subsections (1) and (2), *contact time* with a student is accumulated through 1 or both of the following, namely, the instructor being:
 - (a) physically present, instructing and responding in a class room;
 - (b) virtually present, instructing and responding online in real time.

Note The minimum of 15 hours' contact time may be reached through an accumulation of physical presence, virtual presence or a mixture of both. However, CASA will not certify a person to be a certified RPA operator for the purpose of conducting a RePL training course unless CASA is satisfied that the operator's documented practices and procedures ensure that the minimum of 15 hours focuses on Priority A syllabus items.

- (4) No part of the *practical competency component* of a RePL training course may be delivered by a RePL training instructor who is not in the physical presence of the person being trained.

2.27 Student ratios

- (1) To deliver a RePL training course, a RePL training organisation must ensure that the ratio of students to RePL training instructors is not greater than:
 - (a) for the theoretical component (aeronautical knowledge component) — 10 students to 1 instructor, unless CASA approves otherwise, in writing, in accordance with subsection (2); and
 - (b) for the practical component (practical competencies component):
 - (i) subject to subparagraph (ii), 5 students to 1 instructor — for a RePL for an RPA that the RPA training organisation specifies in its documented practices and procedures, with the written agreement of CASA, is not complex (a *non-complex RPA*); and
 - (ii) 3 students each actually flying a non-complex RPA to 1 instructor provided that not more than 2 other students are observing; and
 - (iii) 2 students to 1 instructor — for a RePL for an RPA that the RPA training organisation specifies in its documented practices and procedures is complex.
- (2) For paragraph (a), CASA may approve otherwise only if CASA is satisfied, on application, that:

- (a) the relevant instructor has the qualifications and experience to ensure the effective delivery of the theoretical component to a larger number of students; and
- (b) the RePL training organisation's structure and management is appropriate to support the instructor's delivery of the component to the larger number of students.

2.28 Means of achieving or simulating the flight conditions

To deliver a RePL training course for any type of RPA, including with a liquid-fuel system as the case requires (the **relevant RPA**), a RePL training organisation must ensure that there is available to each student a means of achieving or simulating the flight conditions and variables:

- (a) mentioned in each item of the practical competency units in Schedule 5 that are for the relevant RPA; and
- (b) that cannot otherwise be reasonably demonstrated.

Note The applicant must accumulate sufficient practical flying experience on the relevant category of RPA, commensurate with the size of the RPA and the complexity of the RPAS, but, in any case, not less than 5 hours' flight time under standard RPA operating conditions (in accordance with paragraph 101.295 (2) (c) of CASR). The amount of flying required for a category, size or complexity of RPA is to be as specified in the training organisation's documented practices and procedures.

2.29 Certification of RePL training course completion

- (1) An RPA training organisation must give each student who successfully completes a RePL training course a certificate of course completion which:
 - (a) identifies the RPA training organisation and the student; and
 - (b) identifies the RePL training course, and when it was completed by the student; and
 - (c) is signed and dated by the chief remote pilot of the organisation.
- (2) An RPA training organisation must not give a student a certificate of course completion until the student has, for the relevant RPA:
 - (a) passed the aeronautical knowledge examination; and
 - (b) been assessed as competent in the relevant practical competency units; and
 - (c) passed the relevant flight test; and
 - (d) remedied any knowledge deficiency.

Note For knowledge deficiency, see section 2.16.

- (3) A RePL training course, on the basis of which a person applies for a RePL, is not completed until the relevant RPA training organisation notifies CASA, in the form and manner approved in writing by CASA, that the certificate of course completion, has been issued.

Note CASA will not issue a RePL to an applicant unless CASA has received the notification.

CHAPTER 2 RePL TRAINING COURSE

Division 2.7 RePL training course instructors

2.30 Requirements for RePL training instructors

- (1) A RePL training course for a type of RPA may only be conducted by a RePL training instructor who satisfies the requirements of this section.
- (2) The RePL training instructor must comply with the following requirements:
 - (a) be employed by the RPA training organisation which is delivering the RePL training course;
 - (b) hold a RePL for the type of RPA for which he or she instructs;

Note Under regulation 202.455 and subregulation 202.461 (3) of CASR, if before 29 September 2016, a person was certified as a UAV controller, the certification has effect as if it were the grant of a RePL.

- (c) have 1 or more of the following:
 - (i) a pilot instructor rating issued under Part 61 of CASR;
 - (ii) a Certificate IV in Training and Assessment issued by an approved educational institution;
 - (iii) a tertiary level qualification in teaching that is recognised as such by a State or Territory government;
 - (iv) a certificate of successful completion of a training program in the principles of instruction issued by a person approved in writing by CASA.

Note In approving a person to deliver a program and issue a certificate under subparagraph (2) (c) (iv), CASA will be guided by the extent to which the program satisfies the requirements of clause 3, *Principles and methods of instruction*, in Section 2.4 of Schedule 3 of the Part 61 Manual of Standards.

- (d) for delivery of the practical competency component of an RPL training course — have at least the number of hours of experience in the operation of unmanned aircraft required for the RePL training course under the RPA training organisation's documented practices and procedures;

Note Unmanned aircraft include model aircraft but not rockets, fireworks or balloons. See regulation 101.005 of CASR.

- (e) for delivery of the practical competency component of an RPL training course — have satisfied any currency and recency requirements for operation of the relevant RPA in accordance with the RePL training organisation's documented practices and procedures;
- (f) for delivery of the practical competency component of an RPL training course — have at least 20 hours of non-training operational experience in RPA operations, for an ReOC holder, in the same category of RPA as that for which the practical competencies are to be delivered.

CHAPTER 2 RePL TRAINING COURSE

Division 2.8 RePL flight tests — standards and repeats

2.31 Flight tests — competency standards

- (1) A student enrolled with an RPA training organisation may attempt the flight test for a RePL at any time during the RePL training course, provided the attempt is in accordance with the requirements of this section.
- (2) The competency standards for a flight test for a RePL in an aircraft category are as set out in the Appendix in Schedule 6 that is for the licence in the relevant category (the *relevant Appendix*).
- (3) For subsection (1), the competency standards for a flight test mentioned in an Appendix in Schedule 6 comprise the following:
 - (a) the flight test requirements mentioned in the Appendix for the test;
 - (b) the knowledge requirements mentioned in the Appendix for the test;
 - (c) the practical flight standards mentioned in the Appendix for the test.

Note For paragraph (c), the aircraft category for a licence is identified in the title of the relevant Appendix in Schedule 6.

- (4) For a flight test, the knowledge required of a person is a satisfactory level of knowledge of the items in clause 2 of the relevant Appendix.

Note The knowledge is tested through a series of oral questions and answers before the flight test begins. The examiner may ask as many questions relevant to the items in clause 2 as he or she considers appropriate and necessary to determine whether the candidate has the required level of knowledge of the items.

- (5) For subsection (4), specific questioning for every item of the relevant knowledge requirements is not required, provided the examiner is satisfied, from the answers to the questions that are asked, that the candidate has a satisfactory knowledge of the items about which questions are not asked.

Note The examiner should consider the candidate's aeronautical knowledge examination results to determine which questions would be appropriate to ensure that the candidate has a full range of relevant knowledge.

- (6) For a flight test, the practical competency required of a person is:

that for each unit of competency mentioned in columns 1 and 2 of a row of the Table in clause 3 of the relevant Appendix in Schedule 6, the person has the ability to perform each of the items or manoeuvres mentioned in column 3 of the row, subject to the accuracy and tolerance mentioned in column 4 of the row.
- (7) To determine if a candidate has passed the flight test, the examiner conducting the flight test must be satisfied that the candidate has demonstrated:
 - (a) the knowledge required under subsection (4); and
 - (b) the competency required under subsection (6).
- (8) The examiner conducting the flight test must keep the following records for at least 7 years after the flight test:
 - (a) the list of questions asked of the candidate to demonstrate his or her knowledge of the items mentioned under clause 2 of the relevant Appendix (the *items*);
 - (b) for each question in the list, a record of whether the candidate did, or did not, demonstrate a satisfactory level of knowledge;

- (c) if the examiner relied on subsection (5) with respect to any particular item, a record that this was the case for the item;
 - (d) the overall assessment of the candidate's level of knowledge;
 - (e) against the list of units of competency, items and manoeuvres, and accuracies and tolerances in the practical flight standards in clause 3 of the relevant Appendix, an indication of whether the candidate did, or did not, demonstrate competency;
 - (f) the overall assessment of the candidate's level of practical competency.
- (9) If an applicant fails a flight test mentioned in this Chapter, he or she may repeat the flight test but only after completing such additional training as is specified in writing by the examiner.
 - (10) For subsection (9), the specified additional training must be based on such of the practical competencies mentioned in subsection 2.18 (2) as are relevant to any deficiency which resulted in the applicant failing the flight test.
 - (11) If subsection (9) applies to an applicant, copies of the written specification must be kept with the records referred to in subsection (8).

CHAPTER 3 RESERVED

CHAPTER 4 OPERATIONS IN CONTROLLED AIRSPACE — CONTROLLED AERODROMES

4.01 Purpose

For subsection 101.072 (1) of CASR, this Division prescribes the requirements relating to the operation in controlled airspace, below 400 ft, of an unmanned aircraft.

Note Any operation above 400 ft within 3 NM of an aerodrome, would be subject to the restrictions and permission requirements under regulations 101.070 and 101.075.

4.02 Definitions

In this Division:

area that is crosshatched has the same meaning as in section 4.06.

area that is shaded black has the same meaning as in section 4.06.

area that is shaded grey has the same meaning as in section 4.06.

defined unmanned aircraft means an unmanned aircraft operated in accordance with:

- (a) an approval of an approved area under regulation 101.030 of CASR; or
- (b) a permission mentioned in regulation 101.075 that permits operation of the aircraft within the no-fly zone of a controlled aerodrome.

no-fly zone of a controlled aerodrome means any areas and airspace that are below 400 ft and:

- (a) within 3 NM of the movement area of a controlled aerodrome; or
- (b) within the approach and departure paths referred to in section 4.05, whether or not they extend beyond 3 NM of the movement area of the controlled aerodrome.

RPA, for the purposes of this Division, means an RPA that is not a defined unmanned aircraft.

4.03 RPA flight in the no-fly zone of a controlled aerodrome

- (1) Subject to this section, a person must not:
 - (a) conduct RPA operations; or
 - (b) fly an RPA;in the no-fly zone of a controlled aerodrome.
- (2) A person who is:
 - (a) a certified RPA operator; or
 - (b) the remote pilot of a certified RPA operator;may conduct, or fly as the remote pilot in, an RPA operation in the no-fly zone of a controlled aerodrome if the operation is a tethered operation in accordance with section 4.04.
- (3) A person may fly an RPA in the no-fly zone of a controlled aerodrome if the flight is exclusively an indoors operation.
- (4) A person may fly a micro RPA in the no-fly zone of a controlled aerodrome if the aircraft does not enter an approach and departure path described in paragraph (b) of the definition of ***no-fly zone of a controlled aerodrome***.
- (5) A person must not fly a model aircraft that has a gross weight of more than 250 g in the no-fly zone of a controlled aerodrome.

- (6) A person may fly a model aircraft that has a gross weight of no more than 250 g in the no-fly zone of a controlled aerodrome if the aircraft does not enter an approach and departure path described in paragraph (b) of the definition of ***no-fly zone of a controlled aerodrome***.
- (7) A person may fly a defined unmanned aircraft in the no-fly zone of a controlled aerodrome.

4.04 Approval to operate an RPA in a no-fly zone of a controlled aerodrome

- (1) A certified RPA operator is approved to conduct an RPA operation in the no-fly zone of a controlled aerodrome if the requirements of this section are complied with.

Note A certified RPA operator means a person who is certified as a certified RPA operator in accordance with regulation 101.335 of CASR. See the definitions in subsection 1.04 (2) of this MOS.

- (2) The requirements are that the RPA may only be operated in:
 - (a) an indoors operation; or
 - (b) a tethered operation in accordance with subsection (3).
- (3) For paragraph (2) (b):
 - (a) the tether must be 1 of the following:
 - (i) if the RPA is flown below 150 ft in the area that is shaded grey for the aerodrome — no longer than 150 ft;
 - (ii) if the RPA is flown within the area that is shaded black for the aerodrome and at least 3 NM away from the aerodrome — no longer than 150 ft;
 - (iii) if the RPA is flown within the area that is crosshatched for the aerodrome — no longer than 300 ft;
 - (iv) if the RPA is flown within the area that is within 3 NM from the aerodrome but outside the approach and departure paths — 150 ft; and
 - (b) the RPA must be flown within:
 - (i) the area that is shaded grey for the aerodrome and below 150 ft; or
 - (ii) the area that is shaded black for the aerodrome, provided that the flight is at least 3 NM from the aerodrome; or
 - (iii) the area that is crosshatched for the aerodrome; or
 - (iv) the area that is within 3 NM from the aerodrome but outside the approach and departure paths; and
 - (c) the RPA flight must be conducted within VLOS; and
 - (d) the RPA flight must be conducted in accordance with the certified RPA operator's documented practices and procedures for operations under this Division; and
 - (e) ATC clearance must be obtained before the RPA takes off, and the RPA flight must be flown in accordance with the clearance and any related ATC instructions.

Note 1 Controlled aerodromes are in controlled airspace and have instrument approach procedures.

Note 2 The designation of controlled aerodromes and controlled airspace is made in the *Determination of airspace and controlled aerodromes etc.*, as in force from time to time. This is a legislative instrument revised and reissued by CASA approximately every 6 months. Controlled aerodrome information in the Determination in force at any particular time is also published by Airservices Australia in the *Designated Airspace Handbook*.

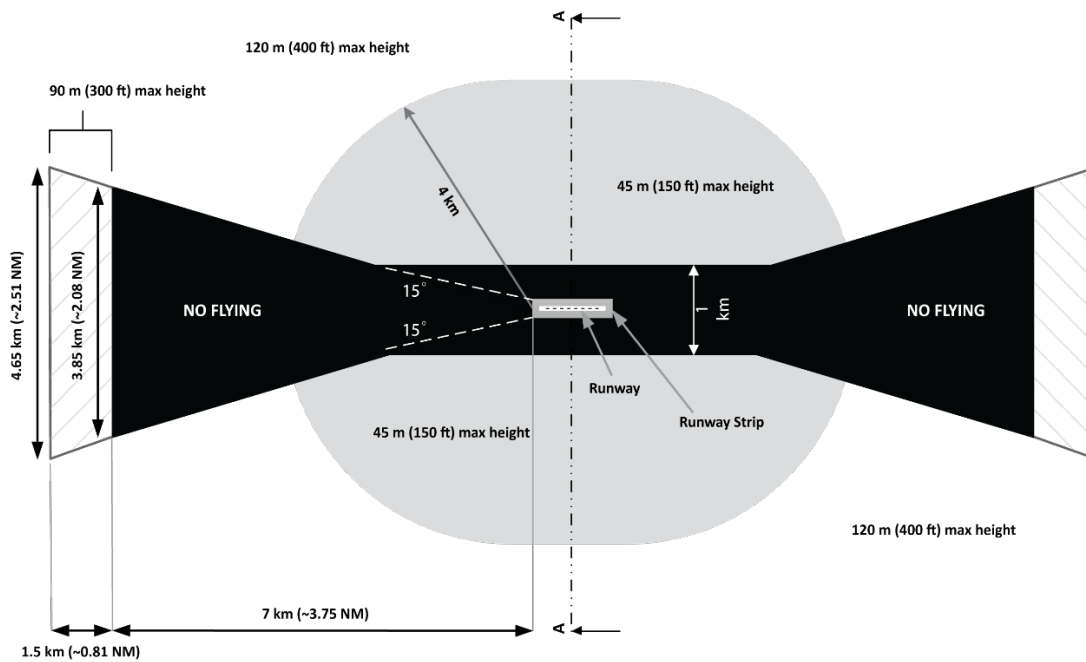
4.05 Approach and departure paths — controlled aerodromes

- (1) Figure 4.05 (1)-1 shows the approach and departure paths of a controlled aerodrome.

Note 1 Figure 4.05 (1)-2 also illustrates a cross-section of part of Figure 4.05 (1).

Note 2 Figure 4.05 (1)-3 illustrates 1 example of a multi-runway scenario to which the requirements in this Division apply in the same way as for a single runway. Application of the requirements does not affect the black-shaded areas but produces overlapping grey-shaded areas, and what would otherwise be a grey-shaded area becomes a black-shaded area because of the intersection of the runways.

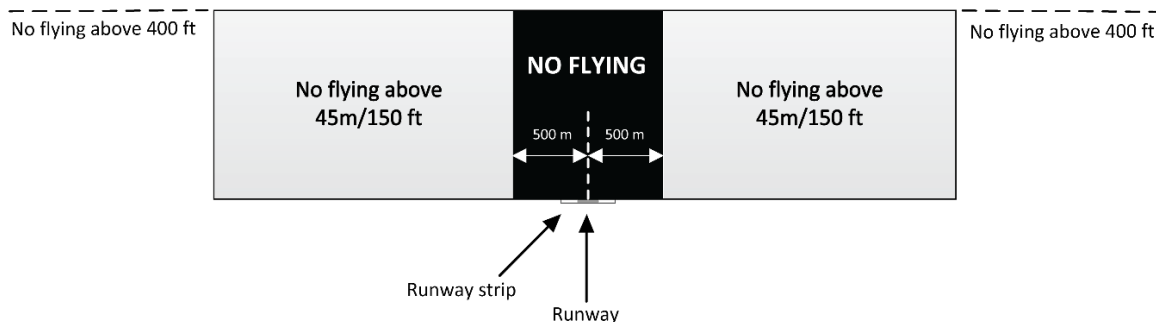
- (2) As shown in Figure 4.05 (1), the approach and departure path is up to 400 ft, as follows:
 - (a) anywhere on or from the ground upwards in the area that is the runway or the runway strip;
 - (b) anywhere in the following areas which are the approach and departure paths for the controlled aerodrome:
 - (i) subject to subparagraph (ii) — on or from the ground upwards in the area that is shaded black:
 - (A) to a distance of 7 km from the end of the runway strip; and
 - (B) to a width that is initially 1 km until the splay exceeds 1 km, and then to the width of the splay up to 3.85 km;
 - (ii) anywhere from 300 ft (90 m) above the ground (referenced to the aerodrome elevation) in the area that is between 7 km and 8.5 km from the end of the runway strip, with an initial splay width of 3.85 km and a final splay width of 4.65 km (the *area that is crosshatched*);
 - (c) anywhere from 150 ft (45 m) above the ground (referenced to the aerodrome elevation) in the area that is shaded grey.
- (3) The area that is shaded black, which shows the approach and departure paths and the ground below them, is described as follows:
 - (a) symmetrical trapezoids with the shorter side coincident with the ends of a nominal 100 m wide runway strip and extending out at an angle of 15 degrees on either side to a distance of 8.5 km, the width of the splay at that distance being no greater than 3.85 km);
 - (b) a rectangle extending 500 m on either side of the runway centreline and overlying the runway strip until it intersects the trapezoids at a distance of approximately 1.68 km from the end of the runway strip.
- (4) The area that is shaded grey is described as the racetrack shape comprised of 2 semi-circles each:
 - (a) with a radius of 4 km from the point on the centreline at each end of the runway in the direction of the closest threshold (*point 1*); and
 - (b) ending at the point that is perpendicular to point 1; and
 - (c) extending in lines parallel to the centreline until the lines extended from 1 semi-circle meet the lines extended from the other semi-circle.



Controlled aerodromes approach and departure paths

Figure 4.05 (1)-1: Controlled aerodromes approach and departure paths (shows matters)

Note The diagram is not to scale.



Section through A-A

Figure 4.05 (1)-2: Controlled aerodromes approach and departure paths cross-section (illustrates matters)

Note The diagram is not to scale.

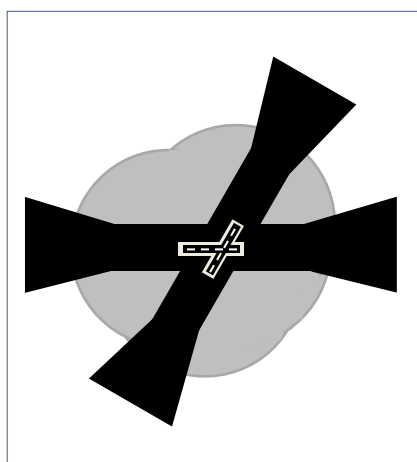


Figure 4.05 (1)-3: Intersecting runways (illustrates matters)

CHAPTER 5 RPA OPERATIONS BEYOND VLOS

5.01 Application

- (1) This Chapter applies only for RPA operations of a certified RPA operator.
- (2) Only a certified RPA operator may be granted an approval under paragraph 101.029 (2) (b) of CASR:
 - (a) for subparagraph 101.300 (4) (b) (i) — to operate an unmanned aircraft beyond the operator's visual line of sight; or
 - (b) for subparagraph 101.300 (4) (b) (ii) — for a RePL holder who is a member of the operator's personnel to operate an unmanned aircraft beyond the RePL holder's visual line of sight.

Note An approval would be granted to the certified RPA operator only if the requirements of Chapter 5 are met — see paragraph 101.029 (2) (b) of CASR.

- (3) Only a RePL holder:
 - (a) who is a certified RPA operator holding an approval for paragraph (2) (a); or
 - (b) who is a member of the personnel of a certified RPA operator holding an approval for paragraph (2) (b);may be granted an approval under paragraph 101.029 (2) (b) of CASR for subregulation 101.073 (2) to operate an unmanned aircraft beyond the RePL holder's visual line of sight.

Note An approval for a RePL holder would only be granted in association with the grant of a relevant approval for a certified RPA operator.

5.02 Requirements for RPA operations do not apply in certain approved areas

- (1) Subject to subsection (2), this Chapter applies to any area that is an area approved by CASA for regulation 101.030 of CASR.
- (2) This Chapter does not apply to an EVLOS operation if the area approval permits an EVLOS operation that is in accordance with alternative requirements specified in the approval.

5.03 Requirements for an approval to operate an RPA beyond VLOS

- (1) For paragraph 101.073 (2) (a) of CASR, this Chapter prescribes the requirements for the grant of an approval by CASA under paragraph 101.029 (2) (b) of CASR (an **approval**), for a person to operate an RPA, other than a large RPA, beyond the person's VLOS.

Note See also paragraph 101.300 (4) (b) of CASR.

- (2) In this Chapter, the approval mentioned in subsection (1) is referred to as:
 - (a) an EVLOS operation approval; or
 - (b) an EVLOS operation class 1 approval; or
 - (c) an EVLOS operation class 2 approval.
- (3) For the grant of an approval, the Certified RPA operator's documented practices and procedures must:
 - (a) provide for the matters mentioned in this Chapter; and
 - (b) be in accordance with the requirements of this Chapter; and
 - (c) ensure that RPA operations are conducted in accordance with the approval.

5.04 Definitions for this Chapter

In this Chapter:

EVLOS means extended visual line of sight.

EVLOS operation class 1 means an RPA operation that is beyond VLOS, and in which:

- (a) at least 1 trained visual observer class 1 (the **observer**) is used; and
- (b) the location of the RPA, and the ground beneath and the airspace surrounding, the RPA, is:
 - (i) located within VLOS for each relevant observer throughout the operation; or
 - (ii) beyond VLOS but with the relevant observer knowing the exact location of the RPA; and
- (c) the observer is in the same location as the remote pilot; and
- (d) an FPV system may be used, but not as a substitute for any observer; and
- (e) the observer's duty is to:
 - (i) either:
 - (A) keep the RPA constantly within VLOS; or
 - (B) know the exact location of the RPA; and
 - (ii) maintain constant situational awareness of the airspace surrounding, and the ground below, the RPA; and
 - (iii) remain in continual, direct, verbal communication with the remote pilot without the use of any device; and
 - (iv) do the following:
 - (A) advise the remote pilot if the RPA is likely to become a hazard to any other aircraft, or any person or property;
 - (B) direct the remote pilot on the action required to ensure that the RPA does not become a hazard to another aircraft, person or property;
 - (C) immediately direct the safe termination of the operation if:
 - (I) the exact location of the RPA is lost to the relevant observer's direct sight or knowledge; or
 - (II) the RPA becomes a hazard to another aircraft, person or property and termination of the operation is the only safe course of action.

Note 1 A flight may be ended by means of controlled flight into terrain, if this is possible without creating a hazard to other aircraft, people or property, and all other options are exhausted.

Note 2 An EVLOS operation extends the distance of operation of an RPA. However, by virtue of the definition, the remote pilot, while operating the RPA using FPV, cannot be the observer for an EVLOS class 1 operation.

EVLOS operation class 2 means an RPA operation that is beyond VLOS in which:

- (a) at least 1 trained visual observer class 2 (the **observer**) is used; and
- (b) the RPA, and the ground beneath and the airspace surrounding the RPA, is:
 - (i) located within VLOS for each relevant observer throughout the operation; or
 - (ii) beyond VLOS but with the relevant observer knowing the exact location of the RPA; and
- (c) the observer is in a different location from the remote pilot; and
- (d) an FPV system may be used, but not as a substitute for any observer; and

- (e) the observer's duty is to:
 - (i) either:
 - (A) keep the RPA constantly within VLOS; or
 - (B) know the exact location of the RPA; and
 - (ii) maintain constant situational awareness of the air space surrounding, and the ground below, the RPA operation; and
 - (iii) remain in continual direct, verbal communication with the remote pilot using a radio or telephone communication system; and
 - (iv) do the following:
 - (A) advise the remote pilot if the RPA is likely to become a hazard to any other aircraft, or any person or property;
 - (B) direct the remote pilot on the action required to ensure that the RPA operation does not become a hazard to another aircraft, person or property;
 - (C) immediately direct the safe termination of the operation if:
 - (I) the exact location of the RPA is lost to the relevant observer's direct sight or knowledge; or
 - (II) the RPA becomes a hazard to another aircraft, person or property and termination of the operation is the only safe course of action.

Note 1 A flight may be ended by means of controlled flight into terrain, if this is possible without creating a hazard to other aircraft, people or property, and all other options are exhausted.

Note 2 An EVLOS operation extends the distance of operation of an RPA. By virtue of the definition, the remote pilot may be the initial EVLOS class 2 observer provided that he or she is not simultaneously using an FPV system.

EVLOS operation means:

- (a) an EVLOS operation class 1; or
- (b) an EVLOS operation class 2.

first person view system is a system that:

- (a) uses a camera on an RPA to produce a video display of the flight as it would be seen if a pilot were notionally on board the RPA in order to assist the remote pilot to navigate, orient, and avoid obstacles to the RPA; and
- (b) is sufficiently powerful, sensitive and robust to remain effective for the duration of the EVLOS operation; and
- (c) is approved by CASA for the EVLOS operation.

Note Use of an FPV may assist a remote pilot but its use cannot transform the remote pilot into an observer for an EVLOS operation. A remote pilot cannot simultaneously use an FPV and be an observer.

FPV system means first person view system.

observer means:

- (a) a trained visual observer class 1; or
- (b) a trained visual observer class 2.

trained visual observer class 1 means a person who has been:

- (a) trained by a certified RPA operator, in accordance with the requirements in its documented practices and procedures, to observe and communicate about an RPA in an EVLOS operation class 1; and

- (b) certified by the RPA operator to have successfully completed the training in accordance with the documented practices and procedures.

trained visual observer class 2 means a person who has been:

- (a) trained by a certified RPA operator, in accordance with the requirements in its documented practices and procedures, to observe, and communicate about, an RPA in an EVLOS operation class 1 or class 2; and
- (b) certified by the RPA operator to have successfully completed the training in accordance with the documented practices and procedures.

VLOS means visual line of sight.

5.05 Documented practices and procedures for EVLOS operations

For an EVLOS operation approval, a certified RPA operator must have documented practices and procedures containing the following:

- (a) for each matter, activity or requirement mentioned in this Chapter — procedures and requirements that comply with this Chapter;
- (b) the operator's statement to its remote pilots and observers that the procedures and requirements for relevant operations must be complied with.

Note See also the definition of ***documented practices and procedures*** in subsection 1.04 (2) which requires documented practices and procedures to be approved by CASA.

5.06 Remote pilots for EVLOS operations

Before conducting an EVLOS operation, the remote pilot:

- (a) must have completed, in addition to the 5 hours' experience required under paragraph 101.295 (2) (c) of CASR, at least the number of hours of flight time, as relevantly specified in the operator's documented practices and procedures, operating in VLOS operations an RPA of the same type as the RPA that is to be used in the EVLOS operation; and
- (b) must have been trained and certified by the RPA operator, in accordance with its documented practices and procedures, as competent to carry out the particular EVLOS operation; and
- (c) must have successfully completed a proficiency check that was:
 - (i) conducted by:
 - (A) the chief remote pilot of the certified RPA operator; or
 - (B) a person certified to conduct an RPL training course which includes a proficiency check for the purpose of this section; or
 - (C) CASA; and
 - (ii) undertaken not more than:
 - (A) 12 months before the EVLOS operation; or
 - (B) 24 months before the EVLOS operation, provided the remote pilot has completed at least 3 EVLOS flights in each of the 12-month periods before the EVLOS operation; and
 - (iii) carried out in accordance with the relevant certified RPA operator's documented practices and procedures for proficiency checks under this section.

Note Under subregulation 101.300 (4), a RePL is subject to the condition that an RPA must be operated within VLOS unless the licence holder has met certain requirements set out in that subregulation.

5.07 Observers for EVLOS operations

- (1) An EVLOS operation class 1 may only be conducted using a trained visual observer class 1 or class 2, certified by the RPA operator as competent to carry out the particular EVLOS operation in accordance with the documented practices and procedures.
- (2) An EVLOS operation class 2 may only be conducted using a trained visual observer class 2, certified by the RPA operator as competent to carry out the particular EVLOS operation in accordance with the documented practices and procedures.
- (3) An observer for subsection (1) or (2) must have no duties during the operation of an RPA, other than those mentioned in paragraph (e) of the definition of **EVLOS operation class 1** or **EVLOS operation class 2**, as the case requires.
- (4) An observer for subsection (1) or (2) must not be required to observe more than 1 RPA for more than 1 remote pilot in any EVLOS operation unless the operation is:
 - (a) approved in writing by CASA; and
 - (b) operated in accordance with any conditions of the approval.
- (5) An observer for subsection (1) or (2) may use a device, for example, binoculars or a telescope, to assist in carrying out his or her duties, but must not use the device as the primary means of keeping the surrounding airspace and ground in sight.
- (6) For subsection (4), the duties mentioned in paragraph (e) of the definition of **EVLOS operation class 1** or **EVLOS operation class 2** are to be read as also referring to more than 1 RPA or more than 1 remote pilot, as the case requires.

5.08 Handover procedures between 1 remote pilot and another remote pilot for EVLOS operations

- (1) Control of an RPA must not be transferred (**handed over**) from the remote pilot (the **handing-over remote pilot**) to another person (the **new remote pilot**) unless:
 - (a) the other person is also a remote pilot who complies with section 5.06; and
 - (b) the handover is in accordance with the certified RPA operator's documented practices and procedures.
- (2) After a handover occurs, the new remote pilot is:
 - (a) the remote pilot of the RPA; and
 - (b) responsible and accountable for ensuring that the EVLOS operation complies with all requirements of the relevant civil aviation legislation as if the operation were first commencing from the time, date and location at which the new remote pilot assumes control of the RPA.

5.09 Pre-flight briefing for an EVLOS operation

The certified RPA operator must ensure that each remote pilot and each observer who is to be involved in an EVLOS operation is briefed, before the operation commences, on the emergency and collision avoidance procedures relevant to the operation.

5.10 Radio and telephone communications in an EVLOS operation class 2

- (1) For an EVLOS operation class 2, the radio or telephone communication system (the **primary communication system**) used by the remote pilot and each observer must be supported by an alternative or backup radio or telephone communication system (the **secondary communication system**) that is immediately activated if the primary communication system fails.

- (2) If a mobile telephone is the primary communication system, a second mobile telephone is not a secondary communication system.

5.11 Orientation, height and lateral distance of an RPA in an EVLOS operation

- (1) In an EVLOS operation, an RPA must not be flown at a distance from the remote pilot that is more than 80% of:
 - (a) the manufacturer's control link performance figure for flight below 500 ft; or
 - (b) another demonstrable control link performance figure that:
 - (i) takes account of the prevailing atmospheric conditions and applicable terrain of the operation; and
 - (ii) is recorded in the certified RPA operator's documented practices and procedures.
- (2) In an EVLOS operation:
 - (a) the RPA must not be flown at a distance that is more than 1 500 m from the relevant observer whose duty it is to keep the RPA constantly within VLOS or to know the exact location of the RPA (the *relevant observer*); and
 - (b) the location, direction of flight and approximate height of the RPA must be known to the relevant observer and the remote pilot at all stages of the operation; and
 - (c) if any part of the operation is conducted within 3 NM of the movement area of an aerodrome, including an aerodrome that is an HLS — the height of the RPA must be referenced to the aerodrome or HLS elevation as published in the AIP from time to time; and
 - (d) the minimum number of GPS satellite locks for the RPAS, as specified in the certified RPA operator's documented practices and procedures for the EVLOS operation, must be continuously available before and during the operation; and
 - (e) if any of the requirements mentioned in paragraphs (a) to (d) are not met or complied with, the EVLOS operation must not commence or continue, as the case requires.

Note The online AIP may be freely accessed through the AA website at:
<https://www.airservicesaustralia.com/aip/aip.asp>.

5.12 Weather and visibility conditions for an EVLOS operation

- (1) An RPA may only be flown in an EVLOS operation:
 - (a) if the remote pilot, and any observer, each has visual acuity (including when corrected) that complies with the Austroads standard for private motor vehicle licensing visual acuity, as in force from time to time; and
- Note* The Austroads standard can be found here:
https://austroads.com.au/_data/assets/pdf_file/0022/104197/AP-G56-17_Assessing_fitness_to_drive_2016_amended_Aug2017.pdf.
- (b) in conditions with a visibility minimum of 5 000 m.
- (2) If, during an operation, visibility falls below 5 000 m, the EVLOS operation must be terminated and the RPA landed, as soon as safely possible.

5.13 Controlled airspace and EVLOS operations

An approval of an EVLOS operation conducted in controlled airspace applies only if the operation is conducted in accordance with:

- (a) the requirements of Part 101 of CASR and of this MOS; and

Note See, for example, Chapter 4 of this MOS and regulations 101.070, 101.072 and 101.075 of CASR.

- (b) any other conditions in any approval from CASA, and any permission from the air traffic control service for the aerodrome, for operations in the relevant controlled airspace.

5.14 Night EVLOS operations

For an approval of an EVLOS operation to be conducted at night, the certified RPA operator must:

- (a) be approved for night RPA operations under instrument CASA 01/17, or any replacement instrument in force from time to time unless the replacement instrument expressly applies otherwise; and
- (b) satisfy CASA that he or she can and will comply with the conditions of the instrument.

Note Chapter 6 of this MOS is reserved for more general requirements relating to night operations.

5.15 If manned aircraft are active in the airspace

- (1) If, during an EVLOS operation, a manned aircraft is:
 - (a) flying in the relevant airspace of the operation (the *relevant airspace*); or
 - (b) likely to be flying in the relevant airspace;then, the remote pilot for the EVLOS operation must ensure that the operation does not become a hazard to the manned aircraft, by using, or, subject to subsection (1A), by directing a certified and appropriately trained visual observer to use, the relevant aeronautical VHF channel for:
 - (c) regular broadcasts; or
 - (d) direct radiocommunication with the pilot of the manned aircraft.
- (1A) Despite a direction given under subsection (1), the remote pilot for the EVLOS operation is at all times responsible for ensuring that the operation of the RPA complies with regulation 101.055 — Hazardous operation prohibited.
- (2) Without affecting subsection (1), a person who is a remote pilot for the EVLOS operation must take reasonable steps to make and keep in direct radiocommunication with the pilot of a manned aircraft while the RPA and the manned aircraft are in relevant airspace.
- (3) In this section:
relevant airspace means any point of non-controlled airspace into which the manned aircraft is flying at a particular time that is both less than 3 NM in distance and less than 1 500 ft in height from any point of the airspace in which the RPA is flying at the same time.

5.16 Procedures for loss of control of an RPA in an EVLOS operation

- (1) For an RPA in an EVLOS operation, the certified RPA operator's documented practices and procedures must have procedures for the remote pilot to resolve a loss of control over the RPA.
- (2) For subsection (1), the procedures must be such as to ensure that the remote pilot can:
 - (a) re-establish control over the RPA; or
 - (b) end the flight without creating an unreasonable hazard to another aircraft, or to people or property.

Note A flight may be ended by means of controlled flight into terrain, if this is possible without creating a hazard to other aircraft, people or property, and all other options for the continuation of safe, observed, flight are exhausted.

5.17 Procedures for loss of radio and telephone communications in an EVLOS operation class 2

- (1) For an RPA in an EVLOS operation class 2, the certified RPA operator's documented practices and procedures must have procedures for the remote pilot to resolve:
 - (a) any radio or telephone communication system failure relating to the observation of the RPA; or
 - (b) any breakdown in communication procedures relating to the observation of the RPA; or
 - (c) any loss of situational awareness by the relevant observer of the RPA for any reason.
- (2) For subsection (1), the procedures must be such as to ensure that the remote pilot must:
 - (a) for a loss of communications with an observer — immediately use the secondary communication system; or
 - (b) for a loss of situational awareness by the relevant observer — immediately implement the certified RPA operator's procedures for loss of situational awareness by an observer to return the RPA to VLOS or EVLOS; or
 - (c) end the flight without creating an unreasonable hazard to another aircraft, or to people or property.

Note A flight may be ended by means of controlled flight into terrain, if this is possible without creating a hazard to other aircraft, people or property, and all other options for the continuation of safe flight are exhausted.

5.18 Conflict between the requirements of this Chapter and the documented practices and procedures

- (1) A certified RPA operator must ensure that there is no conflict or inconsistency between the requirements of this Chapter and the documented practices and procedures.
- (2) If there is any conflict or inconsistency:
 - (a) the requirements of this Chapter must prevail; and
 - (b) the documented practices and procedures must be immediately revised and corrected.

Note See also the definition of **documented practices and procedures** in subsection 1.04 (2) of this MOS which requires documented practices and procedures to be approved by CASA.

CHAPTER 6 RESERVED

CHAPTER 7 RESERVED

CHAPTER 8 RESERVED

CHAPTER 9 OPERATIONS OF RPA IN PRESCRIBED AREAS

Division 9.1 RPAS operations at or near non-controlled aerodromes

9.01 Prescribed areas

- (1) Without affecting Division 9.2, for subregulation 101.247 (1) of CASR, this Division prescribes the requirements relating to the operation of an RPA in a prescribed area.
- (2) For subsection (1), the no-fly zone of a non-controlled aerodrome is a prescribed area for this Division.

9.02 Definitions

In this Division:

area that is shaded black has the same meaning as in section 9.05.

area that is shaded grey has the same meaning as in section 9.05.

defined unmanned aircraft means any of the following:

- (a) a micro RPA;
- (b) an unmanned aircraft operated in accordance with an authorisation (however called) or exemption, granted under CASR, that permits operation of the aircraft within the no-fly zone of a non-controlled aerodrome during a relevant event;
- (c) an unmanned aircraft operated in accordance with an approval of an approved area under regulation 101.030 of CASR.

no-fly zone of an HLS means the area and airspace that is a cylinder:

- (a) whose centre is the centre of the HLS; and
- (b) which has a diameter of 1.5 NM; and
- (c) which has a vertical height of 400 ft.

no-fly zone of a non-controlled aerodrome means any areas and airspace that are:

- (a) within 3 NM of the movement area of the non-controlled aerodrome; or
- (b) within the approach and departure paths referred to in section 9.05, whether or not they extend beyond 3 NM of the movement area of the non-controlled aerodrome.

relevant airspace means each of the following:

- (a) the no-fly zone of a non-controlled aerodrome;
- (b) the no-fly zone of an HLS.

relevant event means that a manned aircraft is within relevant airspace, including when the aircraft is in the course of approaching, landing at, taking off from, or manoeuvring on the movement area of, the aerodrome.

RPA, for the purposes of this Division, means an RPA that is not a defined unmanned aircraft.

9.03 RPA flight in the no-fly zone of a non-controlled aerodrome

- (1) Subject to this section, a person may fly an RPA, or conduct RPA operations, in relevant airspace provided:
 - (a) the flight or operation does not occur during a relevant event; and
 - (b) the person complies with section 9.04.

- (2) A person who is a certified RPA operator may conduct RPA operations in relevant airspace during a relevant event if the RPA operation is exclusively an indoors operation or a tethered operation in accordance with section 9.05.
- (3) A person who is not a certified RPA operator may fly an RPA in relevant airspace during a relevant event only if the flight is exclusively an indoors operation.
- (4) Subject to subsection (3), a person may fly a defined unmanned aircraft in relevant airspace during a relevant event.

Note By virtue of subregulation 101.075 (4) of CASR, a person must not fly a model aircraft in the no-fly zone of relevant airspace during a relevant event at a non-controlled aerodrome. On becoming aware that a relevant event is occurring, or is about to occur, a person flying a model aircraft must take immediate action to safely manoeuvre away from the path of the manned aircraft and land as soon as safely possible.

9.04 Action on becoming aware of a relevant event

- (1) If the person who is flying an RPA within relevant airspace becomes aware that a relevant event is occurring, or is about to occur, the person must:
 - (a) if the RPA is airborne:
 - (i) act immediately to ensure that the RPA is safely manoeuvred away from the path of the manned aircraft; and
 - (ii) land the RPA as soon as safely possible; or
 - (b) if the RPA is on the ground, on water, or on any object or structure on the ground or water — not launch the unmanned aircraft.
- (2) For subsection (1), awareness that a relevant event is occurring, or is about to occur, is taken to be present where a reasonable person would have been aware that the relevant event was occurring, or was about to occur.

Note A remote pilot with a relevant radio qualification must monitor the aerodrome radio frequency and communicate with manned aviation using the aerodrome.

9.05 Approval to operate an RPA in a no-fly zone of a non-controlled aerodrome

- (1) A certified RPA operator is approved to conduct RPA operations in relevant airspace, during a relevant event, subject to the certified RPA operator ensuring that the requirements mentioned in subsection (2) are complied with.

Note A **certified RPA operator** means a person who is certified as a certified RPA operator in accordance with regulation 101.335 of CASR. See the definitions in subsection 1.04 (2) of this MOS.

- (2) For subsection (1), the requirements are that the RPA operation is exclusively 1 of the following:
 - (a) an indoors operation; or
 - (b) a tethered operation, provided the conditions in subsection (3) are complied with.
- (3) For paragraph (2) (b), the requirements for the no-fly zone of a non-controlled aerodrome are as follows:
 - (a) the tether must be 1 of the following:
 - (i) if the RPA is flown below 150 ft in the area that is shaded grey for the aerodrome and within 3 NM of the aerodrome — no longer than 150 ft;
 - (ii) if the RPA is flown within the area that is shaded black for the aerodrome and at least 3 NM away from the aerodrome — no longer than 150 ft;
 - (iii) if the RPA is flown within the area that is within 3 NM from the aerodrome but outside the approach and departure paths — 150 ft;

- (b) the RPA must be flown within:
 - (i) the area that is shaded grey for the aerodrome and below 150 ft; or
 - (ii) the area that is shaded black for the aerodrome, provided that the flight is at least 3 NM from the aerodrome; or
 - (iii) the area that is within 3 NM from the aerodrome but outside the approach and departure paths;
 - (c) the RPA flight must be conducted within VLOS;
 - (d) the RPA flight must be conducted in accordance with the certified RPA operator's documented practices and procedures for operations under this Division.
- (4) For paragraph (2) (b), the requirements for the no-fly zone of an HLS are as follows:
- (a) the tether must be no longer than 150 ft;
 - (b) the RPA must always be at least 465 m from the central axis of the no-fly zone of the HLS;
 - (c) the RPA flight must be conducted within VLOS;
 - (d) the RPA flight must be conducted in accordance with the certified RPA operator's documented practices and procedures for operations under this Division.

9.06 Non-controlled aerodromes — approach and departure paths

- (1) Figure 9.06 (1) shows the approach and departure paths of a non-controlled certified or restricted aerodrome.

Note 1 Figure 9.06 (1)-2) also illustrates a cross-section of part of Figure 9.06 (1)-1.

Note 2 Figure 9.06 (1)-3) illustrates a cross-runways scenario to which the requirements in this Division apply in the same way as for a single runway. Application of the requirements does not affect the black-shaded areas but produces overlapping grey-shaded areas, and what would otherwise be a grey-shaded area being black because of the intersection of the runways.

- (2) As shown in Figure 9.06 (1)-1, the approach and departure path is up to 400 ft, as follows:
- (a) anywhere on or from the ground upwards in the area that is the runway or the runway strip;
 - (b) anywhere in the following areas:
 - (i) on or from the ground upwards in the area that is shaded black:
 - (A) to a distance of 7 km from the end of the runway strip; and
 - (B) to a width that is initially 1 km until the splay exceeds 1 km, and then to the width of the splay up to 3.85 km;
 - (ii) anywhere from 150 ft (45 m) above the ground (referenced to the aerodrome elevation) in the area that is shaded grey.
- (3) The area that is shaded black is described as follows:
- (a) symmetrical trapezoids with the shorter side coincident with the ends of a nominal 100 m wide runway strip and extending out at an angle of 15 degrees on either side to a distance of 8.5 km, the width of the splay at that distance being no greater than 3.85 km);
 - (b) a rectangle extending 500 m on either side of the runway centreline and overlying the runway strip until it intersects the trapezoids at a distance of approximately 1.68 km from the end of the runway strip.

- (4) The area that is shaded grey is described as the racetrack shape comprised of 2 semi-circles each:
- with a radius of 4 km from the point on the centreline at each end of the runway in the direction of the closest threshold (*point 1*); and
 - ending at the point that is perpendicular to point 1; and
 - extending in lines parallel to the centreline until the lines extended from 1 semi-circle meet the lines extended from the other semi-circle.

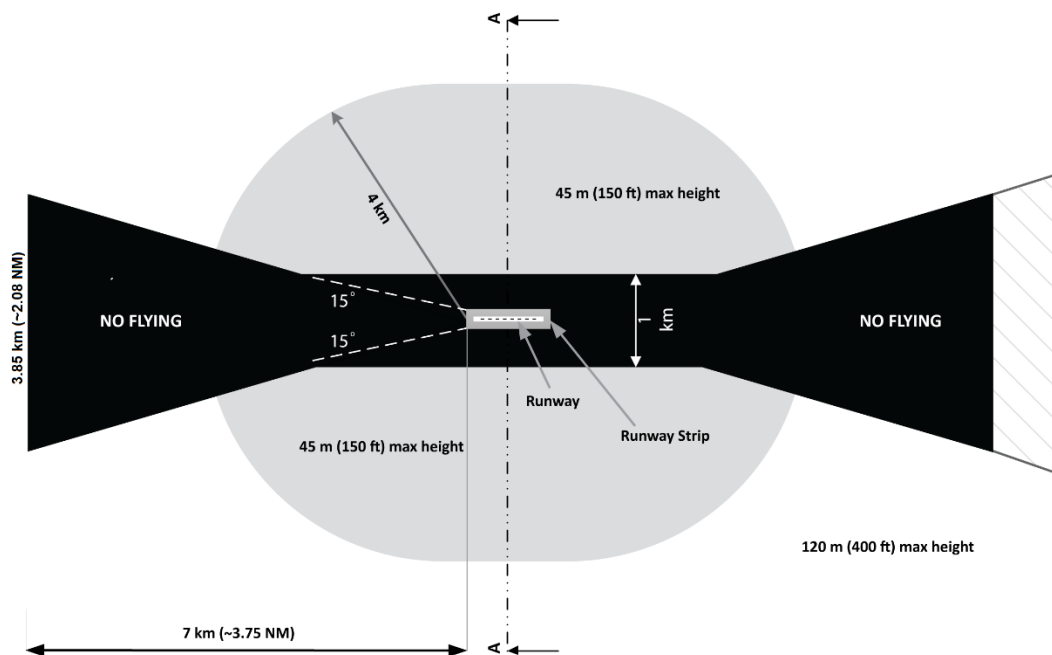


Figure 9.06 (1)-1 Non-controlled aerodromes approach and departure paths (shows matters)

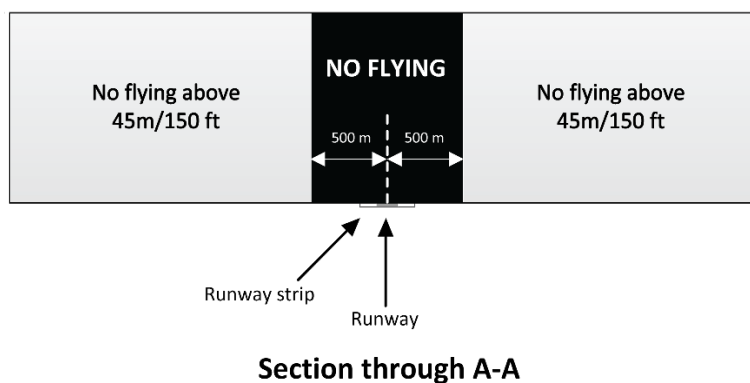


Figure 9.06 (1)-2 Non-controlled aerodromes approach and departure paths cross section (illustrates matters)

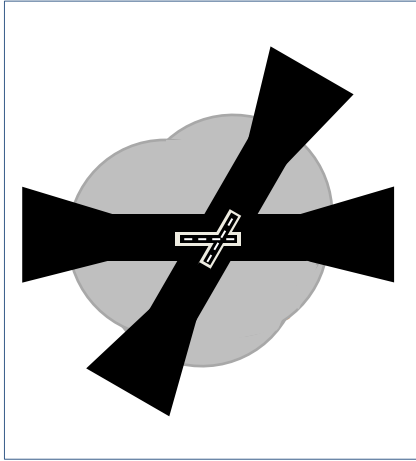


Figure 9.06 (1)-3 Intersecting runways (illustrates matters)

CHAPTER 9 OPERATIONS OF RPA IN PRESCRIBED AREAS

Division 9.2 No-fly zones in certain non-controlled airspace

9.07 Prescribed areas and requirements

- (1) For subregulation 101.247 (1) of CASR, this Division prescribes the requirements relating to the operation of an RPA in a prescribed area.
- (2) For subsection (1), the no-fly zone of non-controlled airspace is a prescribed area for this Division.
- (3) If:
 - (a) controlled airspace overlies non-controlled airspace (the *overlying controlled airspace*); and
 - (b) the lower limit of the overlying controlled airspace is less than 500 ft AGL; then, the airspace that is within 100 ft of the lower limit of the overlying controlled airspace is the *no-fly zone of non-controlled airspace*.

9.08 Definitions

In this Division:

no-fly zone of non-controlled airspace means the airspace that is within 100 ft of the lower limit of overlying controlled airspace.

overlying controlled airspace means controlled airspace:

- (a) that overlies non-controlled airspace; and
- (b) whose lower limit is less than 500 ft AGL.

9.09 Approval to operate an RPA in a prescribed area

A person must not operate an RPA in the no-fly zone of non-controlled airspace unless CASA has approved the operation in writing for this Division.

CHAPTER 10 RECORD KEEPING FOR CERTAIN RPA

Division 10.1 Preliminary

10.01 Definitions for the Chapter

In this Chapter:

configuration of an RPA mentioned in this Chapter is comprised of the particular RPA's airframe, engines and motors, and all of the flight control system hardware for the RPA.

Note The configuration of an RPA for its **unique identification mark** does not include propellers, rotors or batteries.

medium excluded RPA means an RPA within the meaning of subregulation 101.237 (7) of CASR.

Note A medium RPA (that is not an airship) has a gross weight of at least 25 kg but less than 150 kg.

operation, for an RPA, means a single flight of the RPA, or a series of similar or related flights of the RPA on the same day.

record includes an electronic record but only when:

- (a) the electronic record is created in a form that makes the record unalterable after the record has been made; and
- (b) if an erroneous electronic record is created — the correction of the electronic record is in the form of an electronic record which identifies the error and corrects it.

small excluded RPA means an RPA within the meaning of subregulation 101.237 (4) of CASR;

Note A small RPA has a gross weight of at least 2 kg but less than 25 kg.

unique identification mark, for an RPAS for an RPA mentioned in this Chapter, is the number (and letters, if any) that the certified RPA operator or other operator, as the case may be, ascribes to each configuration of the RPA that he or she operates.

CHAPTER 10 RECORD KEEPING FOR CERTAIN RPA

Division 10.2 Record-keeping requirements — RPA other than excluded RPA

10.02 Purpose

For paragraph 101.272 (1) (a) of CASR, this Division prescribes record-keeping requirements for a certified RPA operator of an RPA, other than an excluded RPA.

Note For a certified RPA operator, see regulation 101.335. For excluded RPA, see regulation 101.237.

10.03 Chief remote pilot records

- (1) A certified RPA operator must ensure that its chief remote pilot keeps the following records:

- (a) records which reasonably demonstrate that the chief remote pilot is regularly and consistently performing his or her functions and duties mentioned in paragraphs 101.342 (a), (b), (c) and (d) of CASR (*chief remote pilot's duties records*);

Note Regulation 101.342 of CASR refers to the chief remote pilot: (a) ensuring the operator's RPA operations are conducted in accordance with the civil aviation legislation; (b) maintaining a record of the qualifications held by each person operating an RPA for the operator; (c) monitoring the operational standards and proficiency of each person operating RPA for the operator; and (d) maintaining a complete and up-to-date reference library of certain relevant operational documents.

- (b) the following *RPAS operational record* in relation to an RPA operation:
- (i) if a job safety assessment is carried out in relation to the operation — a copy of the assessment;
 - (ii) if a risk management plan is produced for the operation — a copy of the plan;
 - (iii) if an operational flight plan is issued for the operation — a copy of the plan;
 - (iv) a copy of any NAIPS, NOTAM, or AIS briefing, document produced for the operation;
 - (v) if the operation involves the carriage of cargo or payloads requiring special or unusual handling — a description of:
 - (A) the cargo or payloads; and
 - (B) the requirements for special or unusual handling of the cargo or payload;
- (c) if the certified RPA operator is a RePL training organisation — a record of the training course delivered (*RePL training course records*), including the following:
- (i) the full name of each individual who attended the training course;
 - (ii) the dates on which the training course was conducted;
 - (iii) the RePL training units covered in the training course;
 - (iv) the outcome of the course for each individual attending it;
 - (v) the chief remote pilot's certification that the RePL training course, and RePL training units covered, complied with this MOS.

- (d) if the certified RPA operator is not a RePL training organisation and conducts training that is not a RePL training course — a record of the training delivered and its outcome, including the following:
 - (i) the full name of each individual who attended the training;
 - (ii) the dates on which the training was conducted;
 - (iii) the nature and outcome of the training covered.
- (2) The certified RPA operator must keep the following records for the period stated for the record:
 - (a) chief remote pilot's duties records — for at least 7 years after the day the record is made;
 - (b) RPA operational record — for at least 7 years after the day the operation ends;
 - (c) RePL training course records — for at least 7 years after the day the course ends.

10.04 RPAS operational release

- (1) Subject to subsection (5), before commencing an RPA operation, a certified RPA operator must make and keep a record of the following information (an ***RPAS operational release***) for the operation:
 - (a) the nature and purpose of the operation;
 - (b) information identifying the relevant RPA, including the type, model, and unique identification mark;
 - (c) the remote pilot station for the operation;
 - (d) the dates and times of the operation;
 - (e) the following:
 - (i) the places from which the RPA is to be:
 - (A) launched for the operation; and
 - (B) landed and recovered at the end of the operation;
 - (ii) the height (AGL):
 - (A) at which the RPA operation is to take place; and
 - (B) that is the maximum permitted height for the operation in accordance with the regulations and this MOS;
 - (f) the full name and ARN of:
 - (i) the remote pilot in command; and
 - (ii) each other remote pilot involved in the operation (if any);
 - (g) if an individual who is not a remote pilot for the operation is assigned duty in relation to the operation — the individual's full name and the duties assigned to the individual;
 - (h) whether the RPA is to be operated within VLOS, or within EVLOS, or beyond VLOS during the operation;
 - (i) whether or not CASA has issued any instrument of approval, authorisation, direction, instruction, permission or exemption (however described) for the operation, and the full details of the instrument;

Note The requirement to record full details of the instrument is met by including a copy of the instrument with the record.
 - (j) the certification:
 - (i) by the RPA's maintenance controller (if any); or

- (ii) by a person within the meaning of subparagraph 101.340 (1) (c) (ii) of CASR;

that the RPA for the operation is serviceable for the purpose of the operation.

Note The requirement to record full details of the certification is met by including a copy of the certification with the record or identifying the relevant certification and its location.

- (2) An RPA operation must not commence until a copy of the approved RPAS operational release has been provided to the remote pilot of the RPA.
- (3) The certified RPA operator must keep the RPA operational release for at least 7 years after the day the operation ends.
- (4) For subsection (2):
approved RPAS operational release means the RPA operational release approved in writing by the certified RPA operator or the chief remote pilot.
- (5) Subsection (1) does not apply if the RPA is operated by an ReOC holder who is the sole remote pilot for the RPA in any operation under the ReOC.
- (6) Paragraphs (1) (g) to (i) do not apply to an RPA whose gross weight is less than 2 kg in a VLOS operation.

10.05 RPAS operational log

- (1) The certified RPA operator must ensure that the remote pilot in command of an RPA flight maintains an operational record (the ***RPAS operational log***) in which the following is recorded as soon as practicable after the remote pilot ceases to operate the RPA:
 - (a) the nature and purpose of the operation;
 - (b) information identifying the RPA, including the type, model and unique identification mark;
 - (c) the remote pilot station for the operation;
 - (d) the dates and times of the operation;
 - (e) the places, identified by specific location or global Cartesian coordinates, from which the RPA was:
 - (i) launched for the operation; and
 - (ii) landed and recovered at the end of the operation;
 - (f) the name and ARN of the remote pilot in command;
 - (g) the names, roles, and ARNs, if applicable, of other crew members responsible for the safe operation of the RPA for the operation;
 - (h) whether the RPA was operated within VLOS, within EVLOS 1, EVLOS 2 or beyond VLOS during the operation;
 - (i) if the RPA was operated beyond VLOS — the route flown, including the turning points, identified by specific location or global Cartesian coordinates;
 - (j) details of the relevant flight segments and the heights (AGL) at which each segment was flown, clearly indicating if and when the RPA was flown above 400 ft for any part of the operation;
 - (k) whether the RPA was serviceable after the final flight of the day, and the nature of any unserviceability;
 - (l) where the RPAS operational log is not part of the RPAS operational record and the RPAS operational release — appropriate references to identify the RPAS operational record and the RPAS operational release.

Note The RPAS operational release under subsection 10.04 (1), and the RPAS operational log under subsection 10.05 (1), may all be kept in a single document. Elements of the RPAS operational record under paragraph 10.03 (1) (b) may also be in, or attached to, that document.

- (2) Paragraphs (1) (h) and (j) do not apply to an RPA whose gross weight is less than 2 kg in a VLOS operation.
- (3) The certified RPA operator must ensure that the remote pilot operational log for an RPA operation is kept until the day that is at least 7 years after the last time the RPA is operated by the operator.

10.06 Remote pilot log — for flight time

- (1) The certified RPA operator must ensure that each of the operator's remote pilots keeps a remote pilot log to record his or her accumulated flight time operating RPA.
- (2) The remote pilot log must also record the following for the remote pilot:
 - (a) information identifying each RPAS operation, including the type, model and unique identification mark of each RPA that is flown by the remote pilot;
 - (b) the date, location and duration of each RPA flight;
 - (c) separate accumulated flight times for operations that are:
 - (i) at night; or
 - (ii) within VLOS; or
 - (iii) within EVLOS; or
 - (iv) beyond VLOS;
 - (d) accumulated flight time in simulated operation of the RPAS, including details of the type of RPAS operations simulated.
- (3) The certified RPA operator must ensure that the remote pilot log for an RPA operation is kept until the day that is at least 7 years after the last time the RPA is operated by the operator.

10.07 RPAS technical log

- (1) The certified RPA operator must ensure that 1 of the following:
 - (a) the operator's maintenance controller (if any);
 - (b) a person within the meaning of subparagraph 101.340 (1) (c) (ii) of CASR;keeps a record (the ***RPAS technical log***) of the following information in relation to the maintenance of the RPAS:
 - (c) information identifying the RPAS, including:
 - (i) the type, model and unique identification mark of the RPA; and
 - (ii) the unique identification mark of the RPA in any previous configuration (if applicable); and
 - (iii) the maximum and the minimum gross weight of the RPA for operations (including with payload where applicable);
 - (d) information relating to the continuing airworthiness of the RPAS, including:
 - (i) the total flight time the RPA has been operated;
 - (ii) for an RPA whose gross weight is more than 25 kg — individual in-service times for engines, motors, rotors and propellers;
 - (v) for an RPA whose gross weight is more than 2 kg — the maintenance schedule for the RPAS;

- (vi) for an RPA whose gross weight is more than 2 kg — the maintenance carried out on the RPA in accordance with the operator's documented practices and procedures;
- (vii) the date or operational time for the next maintenance action;
- (viii) for an RPA whose gross weight is more than 2 kg — the results of any rectification of defective equipment essential to the safety of the RPAS operation;
- (ix) if fail-safe equipment that is fitted to the RPA is unserviceable:
 - (A) a description of each piece of such equipment; and
 - (B) an explanation for its unserviceability; and
 - (C) the precautions required, or limitations imposed, when operating the RPA with the unserviceable fail-safe equipment;
- (x) certification by the person mentioned in paragraph (1) (a) or (1) (b) (as the case requires) that all maintenance required for the RPAS to be serviceable for operations has been completed.

Note A requirement to record a certification is met by including a copy of the certificate with the record.

- (2) The certified RPA operator must keep the RPA technical log until the day that is at least 7 years after the last time the RPA is operated by the operator.
- (3) Within the period of 7 years after the last time the RPA is operated by the certified RPA operator, he or she must, as soon as practicable, provide a copy of the RPA technical log to CASA upon written request.
- (4) Within the period of 7 years after the last time the RPA is operated by the certified RPA operator, he or she must, as soon as practicable, provide a copy of the RPA technical log to a person who:
 - (a) makes a written request for the log; and
 - (b) provides reasonable evidence that he or she is the new operator of the RPA; and
 - (c) provides payment for preparation and provision of the log, based on a reasonable cost recovery for such preparation and provision.

Note The complete technical history of an RPAS is of vital importance to the safety of future RPA operations by the new certified RPA operator.

10.08 Records of qualification and competency

- (1) This section applies if a person (the *candidate*):
 - (a) is employed by a certified RPA operator; and
 - (b) performs duties other than those of the remote pilot, in relation to the safety of RPA operations; and
 - (c) obtains a qualification or a competency in relation to the safe operation of an RPA.
- (2) The certified RPA operator must:
 - (a) make a record (the *record*) of the person obtaining the qualification or competency; and
 - (b) provide a copy of the record to the person before the person exercises any privileges attributable to the qualification or competency; and
 - (c) keep the record for at least 7 years after the day the person ceases to be employed by the operator.

Note Observers, ground handlers and loading staff who have a direct role in ensuring the safety of RPA operations are examples of persons for whom this section would apply.

CHAPTER 10 RECORD KEEPING FOR CERTAIN RPA

Division 10.3 Record-keeping requirements — excluded RPA

10.09 Purpose

- (1) For paragraph 101.272 (1) (a) of CASR, record-keeping requirements for an operator of an excluded RPA are prescribed in accordance with the provisions of this Division.
- (2) For subsection (1), “an operator” of an excluded RPA is the person who makes the relevant RPA available to the remote pilot.

10.10 RPAS operational log

- (1) This section applies to any of the following (an *applicable RPA*):
 - (a) a small excluded RPA; and
 - (b) a medium excluded RPA.
- (2) The operator must ensure that the remote pilot in command of the applicable RPA flight maintains an operational record (the *RPAS operational log*) in which the following is recorded as soon as practicable after the pilot ceases to operate the RPA:
 - (a) the nature and purpose of the operation;
 - (b) the specific location of the operation and the maximum height at which the RPA was flown;
 - (c) information identifying the RPA, including the type, model and unique identification mark;
 - (d) the remote pilot station for the operation;
 - (e) the dates and times of the operation;
 - (f) the name and ARN of the remote pilot in command;
 - (g) whether the RPA was serviceable after the final flight of the day, and the nature of any unserviceability.
- (3) The operator must ensure that the remote pilot operational log for the applicable RPA operation is kept until the day that is at least 3 years after the last time the RPA is operated by the operator.

10.11 Remote pilot log — for flight time

- (1) This section applies only to a medium excluded RPA (the *applicable RPA*).
- (2) The operator must ensure that each of the operator’s remote pilots flying an applicable RPA keeps a remote pilot log to record his or her accumulated flight time operating excluded RPA.
- (3) The remote pilot log must also record the following for the remote pilot:
 - (a) information identifying each RPAS operation, including the type, model and unique identification mark of each RPA that is flown by the pilot;
 - (b) the date, location and duration of each RPA flight.

Note A remote pilot who flies for the operator of an excluded RPA and also for a certified RPA operator may record the information in the same log/record provided that the different types of operators are identified.

- (4) The operator of the applicable RPA must ensure that the remote pilot log for an RPA operation is kept until the day that is at least 3 years after the last time the RPA is operated by the operator.

10.12 RPAS technical log

- (1) This section applies only to a medium excluded RPA (the *applicable RPA*).
- (2) For the applicable RPA, the operator must keep a record (the *RPA technical log*) of the following information in relation to the operation and maintenance of the RPAS for the applicable RPA:
 - (a) information identifying the RPAS, including:
 - (i) the type, model and unique identification mark of the RPA; and
 - (ii) the unique identification mark of the RPA in any previous configuration (if applicable); and
 - (iii) the maximum and the minimum gross weight of the RPA for operations (including with payload where applicable);
 - (b) the following information relating to the continuing airworthiness of the RPAS:
 - (i) the total flight time the RPA has been operated;
 - (ii) where applicable to the airworthiness of the RPA — individual in-service times for engines, motors, rotors and propellers;
 - (iii) the date or operational time for the next maintenance action;
 - (iv) any maintenance carried out on the RPA;
 - (v) certification by the operator that all maintenance required by the manufacturer for the RPAS to be serviceable for operations has been completed.

Note A requirement to record a certification is met by including a copy of the certificate with the record.

- (3) The operator of the RPA must keep the RPA technical log until the day that is at least 7 years after the last time the RPA is operated by the operator.
- (4) Within the period of 7 years after the last time the RPA is operated by the operator, he or she must, as soon as practicable, provide a copy of the RPA technical log to CASA upon written request.
- (5) Within the period of 7 years after the last time the RPA is operated by the operator, he or she must, as soon as practicable, provide a copy of the RPA technical log to a person who:
 - (a) makes a written request for the log; and
 - (b) provides reasonable evidence that he or she is the new operator of the RPA; and
 - (c) provides payment for preparation and provision of the log, based on a reasonable cost recovery for such preparation and provision.

Note The complete technical history of an RPAS is of vital importance to the safety of future RPA operations by the new operator.

CHAPTER 10 RECORD KEEPING FOR CERTAIN RPA

Division 10.4 Requirements for giving information to CASA

10.13 Purpose

- (1) For paragraph 101.272 (1) (b) of CASR, this Division prescribes requirements for certain persons who operate, or propose to operate, an RPA (the ***RPA operator***) to give information to CASA.
- (2) For subsection (1), the “RPA operator” is the person who makes the relevant RPA available to the remote pilot.

10.14 Particular small and medium excluded RPA — information about operation

- (1) This section applies to an RPA operator if he or she is the operator of any of the following (the ***applicable RPA***):
 - (a) a small excluded RPA;
 - (b) a medium excluded RPA.
- (2) Before the first operation of the applicable RPA, the person must give CASA the information mentioned in subsection (3) unless he or she has previously given CASA the same information for the same or a different RPA.

Note A person who has notified CASA under subsection 10.09 (2) is not required to notify CASA again before the first operation of a different RPA. For the different RPA, subsection 10.09 (4) applies.

- (3) For subsection (2), the person must:
 - (a) give CASA the following information:
 - (i) if the person is an individual — the person’s full name;
 - (ii) if the person has an operating or trading name — the operating or trading name;
 - (iii) the person’s street, postal and email addresses;
 - (iv) whether the RPA is:
 - (A) a small RPA that is an excluded RPA for subregulation 101.237 (4) of CASR; or
 - (B) a medium RPA that is an excluded RPA for subregulation 101.237 (7) of CASR; and
 - (v) each street address of the land or locality over which the RPA will be operated;

Note A locality is a geographical area name that is in common usage to describe the area, for example, the name of a State or Territory, the name of a local government area, the name of a city or metropolitan suburb or collection of suburbs.
 - (vi) the nature and purpose of operating the RPA;
 - (vii) the full name and ARN of each person who flies the RPA for the operation; and
 - (b) give CASA a written statement, in the form and manner approved by CASA, declaring that the operator has read and is familiar with *AC 101-10, Remotely piloted aircraft systems — operation of excluded RPA*, as existing at the time of making the particular statement.

- (4) If:
 - (a) the person has given CASA the information mentioned in paragraph (3) (a); and
 - (b) any of that information changes;then the person must notify CASA in writing of the change not more than 21 days after the change.
- (5) For subsection (3), unless CASA agrees otherwise, the information must be given to CASA through the approved online notification system.

Note The online notification system may be freely accessed through www.casa.gov.au.
- (6) To avoid doubt, subsection (2) does not apply to a certified RPA operator.

10.15 Particular small and medium excluded RPA — information required every 3 years

- (1) This section applies to a person who:
 - (a) has given CASA information in accordance with subsection 10.14 (2) (the *initial notification*); and
 - (b) continues to conduct RPA operations to which section 10.14 applies.
- (2) Subject to subsection (3), every 3 years after the date of initial notification (the *triennial due date*), the person must resubmit to CASA the information mentioned in paragraph 10.09 (3) (a), updated to the date of resubmission (the *updated information*).
- (3) For subsection (2), but subject to subsection (4), the updated information must be submitted to CASA not earlier than 1 month before, and not later than 1 month after, the biennial due date.

Note The effect of subsections (2) and (3) is that updated information must be correct as of the date of resubmission.
- (4) If, on a date (the *relevant date*) during a 3-year period mentioned in subsection (2):
 - (a) the person gives CASA some new information; and
 - (b) no other information already given to CASA has changed;then, calculation of the next triennial due date is from the relevant date.
- (5) Subsections 10.14 (4) and (5) apply to the updated information in the same way as they apply to the information mentioned in paragraph 10.14 (3) (a).

10.16 Very small RPA for hire or reward — information required every 3 years

- (1) This section applies to a person who:
 - (a) has notified CASA under regulation 101.372 of CASR; and
 - (b) continues to operate, or conduct operations using, very small RPA for hire or reward.
- (2) Every 3 years after the date of initial notification (the *triennial due date*), the person must submit to CASA the following information updated to the date of submission (the *updated information*):
 - (a) if the person is an individual — any change to the person's full name;
 - (b) if the person has a trading name — any change to the person's trading name;
 - (c) any change to the person's street, postal or email addresses;
 - (d) any change to the kind of very small RPA the person operates, from that mentioned in the notice given under regulation 101.372 of CASR.

- (3) For subsection (2), but subject to subsection (4), the information must be submitted to CASA not earlier than 1 month before, and not later than 1 month after, the triennial due date.

- (4) If:

- (a) the person has given CASA the information mentioned in subsection (2); and
- (b) any of that information changes within the 3-year period mentioned in subsection (2);

then, unless the person has previously notified CASA of the change under subregulation 101.373 (1), the person must notify CASA in writing of the change not more than 21 days after the change.

Note Changes to certain notified information must be reported to CASA under subregulation 101.373 (1); see section 11.01 of this MOS.

- (5) For subsections (2) and (4), unless CASA agrees otherwise, the information must be given to CASA through the approved online notification system.

Note The online notification system may be freely accessed through www.casa.gov.au.

- (6) If, on a date (the **relevant date**) during a 3-year period mentioned in subsection (2):

- (a) the person gives CASA some new information; and
- (b) no other information already given to CASA has changed;

then, the relevant date becomes the new triennial due date.

- (7) To avoid doubt, subsection (2) does not apply to a certified RPA operator.

10.17 Certified RPA operator — changes to information already given to CASA

- (1) This section applies to a certified RPA operator who is certified under regulation 101.335 of CASR to operate an RPA other than an excluded RPA.
- (2) The certified RPA operator must inform CASA in writing of any change in the information given to CASA for the purposes of the operator's certification.
- (3) For subsection (2), the information includes changes to any of the following:
 - (a) if the certified RPA operator is an individual — the person's name;
 - (b) if the certified RPA operator has an operating or trading name — the operating or trading name;
 - (c) the certified RPA operator's street, postal and email addresses;
 - (d) the identity of the chief remote pilot;
 - (e) the identity of:
 - (i) the maintenance controller (if any); or
 - (ii) the person within the meaning of subparagraph 101.340 (1) (c) (ii) of CASR;
 - (f) the kinds of RPA operated by the certified RPA operator;

Note See paragraph (b) of the definition of **kind** in the CASR Dictionary.

- (g) the certified RPA operator's documented practices and procedures.
- (4) The certified RPA operator must give CASA the information mentioned in subsections (2) and (3) not later than 21 days after the day the change occurred.
- (5) For subsections (2), (3) and (4):
 - (a) CASA may approve in writing the form and the manner in which the information is to be given to CASA; and

- (b) if paragraph (a) applies, the information must be given to CASA in accordance with the approval.

Note The effect of subsection (5) is that the relevant information must be given to CASA whether or not CASA has issued an approval; if CASA has issued an approval, the giving of the information must comply with the approval.

CHAPTER 11 NOTIFICATION OF CHANGE TO OPERATE EXCLUDED RPA

11.01 Notice to CASA of operation of excluded RPA

For paragraph 101.028 (b) of CASR, the following form and manner of a notification for subregulation 101.372 (1) are approved:

- (a) the notification to CASA must be made through the CASA online notification system for excluded RPA;
- (b) the notification must contain the following information:
 - (i) if the person is an individual — the person's full name;
 - (ii) if the person has a trading name — the person's trading name;
 - (iii) the person's street, postal and email addresses;
 - (iv) a description of the kind of excluded RPA that are the subject of the notification.

Note Under subregulation 101.372 (1) of CASR, before the first operation of the excluded RPA, the operator must notify CASA of the operation in accordance with subsection 11.01.

11.02 Change relating to operating excluded RPA

For paragraph 101.373 (1) (b) of CASR, the following kinds of changes are prescribed for a person who has given notice, in accordance with regulation 101.372 of CASR, in relation to an excluded RPA mentioned in regulation 101.371:

- (a) if the person is an individual — any change to the person's full name;
- (b) if the person has a trading name — any change to the person's trading name;
- (c) any changes to the person's street, postal or email addresses;
- (d) any changes to the excluded RPA that were the subject of the notice given under subregulation 101.372 (1) of CASR.

Schedule 1 Acronyms and abbreviations

Abbreviation	Meaning
AC	Advisory Circular
AGL	above ground level
AIP	aeronautical information package
ATC	air traffic control
AWIS	aerodrome weather information service
CASA	Civil Aviation Safety Authority
CASR	<i>Civil Aviation Safety Regulations 1998</i>
CTA	controlled airspace
EMI	electromagnetic interference
ERSA	En Route Supplement Australia
EVLOS	extended visual line of sight
FPV	first person view
ft	feet
g	gravitational force
GPS	global positioning system
HF	high frequency
K _v	motor velocity constant (RPM per volt)
m	metres
MF	medium frequency
MOS	manual of standards
NM	nautical miles
NOTAM	notice to airmen
PRD	prohibited/restricted/danger areas
RAIM	receiver autonomous integrity monitoring
RePL	remote pilot licence
RPA	remotely piloted aircraft
RPAS	remotely piloted aircraft system
RPM	revolutions per minute

Abbreviation	Meaning
RPS	remote pilot station
UHF	ultra-high frequency
UTC	universal time coordinate
V	volts
VHF	very high frequency
VLOS	visual line of sight

Schedule 2 Directory for aeronautical knowledge standards for a RePL training course

Appendix 1 Aeronautical knowledge standards — Common units

Unit code	Unit of knowledge
RBAK	Basic aviation knowledge for RPAS
RACP	Airspace, charts and aeronautical publications for RPAS
RBMO	Basic meteorology for RPAS operations
REES	Electrical and electronic systems for RPAS
RHPF	Human performance for RPAS
RKOP	RPAS knowledge — operations and procedures
RORA	Operational rules and air law for RPAS
RAFM	Automated flight management systems for RPAS — knowledge

Appendix 2 Aeronautical knowledge standards — Aeroplane category

Unit code	Unit of knowledge
RBKA	RPA that is an aeroplane — aircraft knowledge and operation principles

Appendix 3 Aeronautical knowledge standards — Helicopter (multirotor class) category

Unit code	Unit of knowledge
RBKM	RPA that is a multirotor — aeronautical knowledge and operation principles

Appendix 4 Aeronautical knowledge standards — Helicopter (single rotor class) category

Unit code	Unit of knowledge
RBKH	RPA that is a helicopter — aeronautical knowledge and operation principles

Appendix 5 Aeronautical knowledge standards — powered-lift category

Unit code	Unit of knowledge
RBKP	RPA that is a powered-lift aircraft — aircraft knowledge and operation principles

Appendix 6 Aeronautical knowledge requirement — RPA with a liquid-fuel system

Unit code	Unit of knowledge
REFE	RPA with liquid-fuel system — knowledge

Schedule 3 Directory for practical competency standards for a RePL training course

Appendix 1 Practical competency standards — Common units

Unit code	Unit of practical competency
GEL	General English language proficiency
RC1	Perform pre- and post-operation actions and procedures for RPAS
RC2	Energy management for RPAS
RC3	Manage crew, payload and bystanders for RPAS operation
RC4	Navigation and operations of RPAS
RNT	Non-technical skills for operation of RPAS
RAF	Automated flight management systems for RPAS — operation

Appendix 2 Practical competency standards — Aeroplane category

Unit code	Unit of practical competency
RA1	RPA that is an aeroplane — ground operation and launch
RA2	RPA that is an aeroplane — normal operation
RA3	RPA that is an aeroplane — land and recover
RA4	RPA that is an aeroplane — advanced manoeuvres
RA5	RPA that is an aeroplane — abnormal and emergency operations

Appendix 3 Practical competency standards — Helicopter (multirotor class) category

Unit code	Unit of competency
RM1	RPA that is a multirotor — control on ground, launch, hover and landing
RM2	RPA that is a multirotor — normal operations
RM3	RPA that is a multirotor — advanced manoeuvres
RM4	RPA that is a multirotor — abnormal situations and emergencies

Appendix 4 Practical competency standards — Helicopter (single rotor class) category

Unit code	Unit of competency
RH1	RPA that is a helicopter — control on ground
RH2	RPA that is a helicopter — launch, hover and landing
RH3	RPA that is a helicopter — normal operation
RH4	RPA that is a helicopter — advanced manoeuvres
RH5	RPA that is a helicopter — abnormal situations and emergencies

Appendix 5 Practical competency standards — powered-lift category

Unit code	Unit of competency
RP1	RPA that is a powered-lift category aircraft — control on ground, launch, hover and landing
RP2	RPA that is a powered-lift category aircraft — transition to and from vertical flight
RP3	RPA that is a powered-lift category aircraft — climb, cruise & descent
RP4	RPA that is a powered-lift category aircraft — advanced manoeuvres
RP5	RPA that is a powered-lift category aircraft — manage abnormal situations at altitude and near the ground

Appendix 6 Practical competency standards — RPA with a liquid-fuel system

Unit code	Unit of competency
RLF	Medium or large RPA with a liquid-fuel system — operation

Schedule 4 Aeronautical knowledge units**Appendix 1 Any RPA — Common units****Unit 1 RBAK — Basic aviation knowledge for RPAS**

Item	Aeronautical knowledge topics	Priority
1	<i>Direction of flight and wind</i> (a) expressing direction of flight: (i) as a 3-figure group; (ii) in the clock code; (iii) as cardinal and ordinal compass points; (b) difference between aircraft heading and track; (c) wind velocity; (d) the relationship between true and magnetic heading.	A
2	<i>Time</i> (a) time as a 4, 6 and 8-figure group; (b) UTC; (c) converting local and standard time to and from UTC.	B
3	<i>Units of measurement for aeronautics</i> (a) differences between height, altitude and elevation; (b) units of measurement for: (i) horizontal distance; (ii) vertical distance; (iii) speeds; (iv) visibility; (v) temperature; (vi) atmospheric pressure; (vii) weight; (c) converting between different units of measurement.	A
4	<i>Energy</i> Aircraft energy, including: (a) potential energy; (b) kinetic energy; (c) inertia.	B
5	<i>Aerodynamics, weight and balance</i> (a) terminology: (i) aerofoil, angle of attack and relative airflow; (ii) centre of pressure and centre of gravity; (iii) lift, weight, thrust and drag; (b) “Bernoulli’s principal”, “Coandra effect” and “Newton’s third law”;	A

Item	Aeronautical knowledge topics	Priority
	(c) basic weight and balance principles; <ul style="list-style-type: none"> (i) empty weight; (ii) operating weight; (iii) maximum gross weight; (iv) arm, moment, datum, station and index unit; (v) centre of gravity limits; (vi) loading limits. 	
6	<i>Lift and drag</i> <ul style="list-style-type: none"> (a) changes to lift and drag resulting from: <ul style="list-style-type: none"> (i) airspeed changes; (ii) angle of attack changes; (b) types of drag, including: <ul style="list-style-type: none"> (i) parasite (zero lift), form, interference and skin friction; (ii) induced (lift dependent). 	B
		C
7	<i>Propellers and rotors</i> <ul style="list-style-type: none"> (a) terminology; (b) blade angle, helix angle or pitch; (c) propeller/rotor thrust and torque; (d) propeller/rotor principles. 	B
8	<i>Principles of operation — flight control</i> <ul style="list-style-type: none"> (a) longitudinal, lateral and vertical axes; (b) pitch, roll and yaw; (c) skid and slip; (d) effect of changes in power on vertical and horizontal speed; (e) relationship between control inputs and aircraft movements; (f) angle of climb and rate of climb; (g) trim controls. 	A
9	<i>Principles of operation — remote pilot station</i> <p>Features of a remote pilot station:</p> <ul style="list-style-type: none"> (a) transmitter; (b) command and control link; (c) flight controls; (d) other controls; (e) antennas/aerials; (f) software, including firmware and updates; (g) telemetry; (h) non-payload communications; (i) power supply. 	C

Schedule 4 Aeronautical knowledge units

Appendix 1 Any RPA — Common units (contd.)

Unit 2 RACP — Airspace, charts and aeronautical publications for RPAS

Item	Aeronautical knowledge topics	Priority
1	<p><i>Airspace</i></p> <ul style="list-style-type: none"> (a) classification of airspace; (b) airspace depiction on aeronautical charts, including: <ul style="list-style-type: none"> (i) flight information area; (ii) Class G airspace; (iii) controlled aerodromes; (iv) control area; (v) control zone; (vi) VFR route and lane of entry; (vii) prohibited areas; (viii) restricted areas; (ix) danger areas; (x) common traffic advisory frequencies and associated airspace; (xi) radio frequency boundaries; (c) airspace in relation to the circumstances in which an aeronautical radio qualification is required: <ul style="list-style-type: none"> (i) Air Traffic Control (ATC); (ii) in the vicinity of non-controlled aerodromes. 	A
2	<p><i>Obtaining information or approval</i></p> <ul style="list-style-type: none"> (a) permissions for RPA operations in restricted areas; (b) aeronautical information publications, including: <ul style="list-style-type: none"> (i) AIP; (ii) ERSA; (iii) NOTAM. 	A
3	<p><i>NOTAMs 1</i></p> <ul style="list-style-type: none"> (a) obtaining NOTAMs for operational areas; (b) decoding NOTAMs. 	A
	<p><i>NOTAMs 2</i></p> <p>Submitting a NOTAM for publication.</p>	C

Item	Aeronautical knowledge topics	Priority
4	<i>Form of the earth, aeronautical charts and maps</i> (a) features on an aeronautical chart (other than airspace); (b) cardinal and ordinal points of the compass; (c) latitude and longitude; (d) depiction of height and elevation on charts; (e) distance on the earth and in charts; (f) magnetic variation; (g) relationship between magnetic heading and magnetic bearing.	A
	<i>Form of the earth, aeronautical charts and maps 2</i> (a) electronic maps and charts; (b) CASA's RPA/Drone app.	C

Schedule 4 Aeronautical knowledge units

Appendix 1 Any RPA — Common units (contd.)

Unit 3 RBMO — Basic meteorology for RPA operations

Item	Aeronautical knowledge topics	Priority
1	<i>Weather phenomena</i> (a) causes and effects of the following weather phenomena in relation to RPA operations: (i) thunderstorms; (ii) low cloud; (iii) poor visibility (fog, mist, dust, haze); (iv) turbulence; (v) extreme heat and cold; (vi) strong winds and windshear; (vii) rain and humidity; (viii) convection; (ix) precipitation static; (b) the meaning of symbols used on weather maps.	B
2	<i>Weather observations</i> Indications of the presence of: (a) turbulence, thermals or dust devils; and (b) wind gradient and wind shear.	B
3	<i>Aeronautical forecasts</i> (a) obtaining aeronautical forecasts for the area of operations; (b) decoding an aeronautical forecast; (c) using public weather forecasts and reports.	B

Schedule 4 Aeronautical knowledge units**Appendix 1 Any RPA — Common units (contd.)****Unit 4 REES — Electrical and electronic systems for RPAS**

Item	Aeronautical knowledge topics	Priority
1	<i>Electrical terms</i> (a) volts; (b) amps; (c) watts; (d) ohms; (e) hertz.	B
2	<i>Function of electrical components</i> (a) electrical components of an RPA: (i) electronic speed controller; (ii) battery eliminator circuit; (iii) receiver and remote receivers; (iv) telemetry module; (v) flight batteries; (vi) receiver battery; (vii) circuit breakers and fuses; (viii) servomechanisms; (ix) aerials/antennas; (x) GPS receivers; (xi) altimeters (radio, radar, laser, acoustic); (xii) collision avoidance sensors; (b) equipment redundancy; (c) malfunctions and system back-ups; (d) consequences of a malfunction; (e) remedial actions in the event of failure.	A
3	<i>Electric motors</i> (a) current draw through the motor in relation to rotor or propeller diameter or pitch; (b) current draw through the motor in relation to rotor or propeller loads; (c) determination of appropriate “Kv”.	A
4	<i>Batteries</i> (a) types of batteries: (i) nickel metal hydride batteries; (ii) lithium polymer batteries; (iii) alkaline batteries; (iv) nickel cadmium batteries;	A

Item	Aeronautical knowledge topics	Priority
	<ul style="list-style-type: none"> (v) fuel cells; (b) battery specifications and abbreviations (types, voltage; amperage etc); (c) characteristics of batteries used as an energy source for the RPA: <ul style="list-style-type: none"> (i) cell count; (ii) nominal voltage; (iii) battery configuration: <ul style="list-style-type: none"> (A) parallel; (B) series; (iv) battery capacity; (v) maximum current draw; (vi) discharge rate; (vii) main power plug; (viii) balance plug; (d) batteries classified as dangerous goods for air transportation. 	
5	<p><i>Charging/discharging batteries</i></p> <ul style="list-style-type: none"> (a) charging procedures for batteries; (b) discharging procedures for batteries; (c) cell balancing in multi-cell batteries; (d) state of charge of a battery with reference to capacity and voltage. 	A
6	<p><i>Battery limitations</i></p> <ul style="list-style-type: none"> (a) “continuous C-rating” and “maximum burst C-rating”; (b) trade-off between battery size and flight endurance of an electrically-powered RPA; (c) battery serviceability; (d) battery checkers. 	B
7	<p><i>Electromagnetic radiation</i></p> <ul style="list-style-type: none"> (a) radio waves; (b) characteristics of radio waves, wave propagation, transmission including: <ul style="list-style-type: none"> (i) the radio frequency band ranges (MF, HF, VHF, UHF); (ii) effective range of transmissions; (iii) factors affecting the propagation of radio waves, including: <ul style="list-style-type: none"> (A) terrain; (B) ionosphere; (C) sun spot activity; (D) interference from electrical equipment; (E) thunderstorms; (c) radio characteristics, optimisation and shielding: <ul style="list-style-type: none"> (i) digital and analogue signals; 	A

Item	Aeronautical knowledge topics	Priority
	<ul style="list-style-type: none"> (ii) command and control link range testing; (iii) radio frequencies for RPA operations. 	
8	<p><i>Global Positioning System (GPS)</i></p> <ul style="list-style-type: none"> (a) components of a GPS; (b) how GPS works, including accuracy of different systems; (c) factors that affect the performance of GPS, including the following: <ul style="list-style-type: none"> (i) number of satellites available; (ii) path interference; (iii) type of software; (iv) signal availability; (v) indications of faulty GPS equipment. 	A
9	<p><i>Electromagnetic signal reliability and hazards</i></p> <ul style="list-style-type: none"> (a) electromagnetic interference (EMI); (b) powerlines; (c) LTE and Wi-Fi. 	B

Schedule 4 Aeronautical knowledge units**Appendix 1 Any RPA — Common units (contd.)****Unit 5 RHPF — Human performance for RPAS**

Item	Aeronautical knowledge topics	Priority
1	<p><i>General</i></p> <ul style="list-style-type: none">(a) airmanship (including, “aviate”, “navigate”, “communicate”);(b) differences between the sensory information available to a person operating an RPA compared to the pilot of manned aircraft;(c) situational awareness during RPA operations;(d) information processing and decision making in relation to the following factors:<ul style="list-style-type: none">(i) personality traits;(ii) pride, peer pressure or employer pressure;(iii) desire to get the task done;(iv) anxiety, overconfidence, boredom or complacency;(v) long- or short-term memory;(vi) memory limitations;(vii) <i>aide-memoires</i> and rules of thumb;(viii) workload and overload;(ix) skill, experience and recency;(e) methods of enhancing decision-making skills;(f) temporal factors relating to system latency.	C
2	<p><i>Basic health</i></p> <p>Medical and psychological factors that may affect pilot performance in relation to operating RPA:</p> <ul style="list-style-type: none">(a) upper respiratory tract infections, including colds, hay fever, congestion of air passages and sinuses;(b) a headache, including a migraine;(c) an injury;(d) ageing;(e) dehydration and heat stroke;(f) fatigue;(g) alcohol use and smoking;(h) drug use, including prescription and over-the-counter medications;(i) emotions, including anger, anxiety, depression and fear.	C

Item	Aeronautical knowledge topics	Priority
3	<p><i>Vision, spatial disorientation, illusions</i></p> <ul style="list-style-type: none"> (a) anatomy of the eye and its functioning during the day and at night; (b) limitations of the eye: <ul style="list-style-type: none"> (i) the ability to discern objects/aircraft at a distance and height; (ii) empty field myopia; (iii) glare; (iv) colour discrimination; (v) myopia, hyperopia, astigmatism, presbyopia and parallax; (c) enhancing vision within the definition of VLOS: <ul style="list-style-type: none"> (i) prescription spectacles; (ii) suitable sunglasses; (d) disorientation during RPA operations; (e) visual illusions: <ul style="list-style-type: none"> (i) typical illusions, including relative motion; (ii) conditions under which visual illusions may occur; (iii) how to overcome sensory illusions. 	B
4	<p><i>Stress in relation to operating RPA</i></p> <ul style="list-style-type: none"> (a) the effects of short- and long-term stress on the performance and health of a person operating an RPA; (b) symptoms of stress in an excessively hot, cold, windy, vibrating or noisy environment; (c) causes and effects of domestic or work-related stress; (d) principles of stress management, including: <ul style="list-style-type: none"> (i) cognitive or behavioural techniques for managing stress; (ii) relaxation; (iii) time management. 	C
5	<p><i>Threat and error management</i></p> <ul style="list-style-type: none"> (a) principles of threat and error management in relation to operating RPA; (b) processes to identify and manage threats and errors during RPA operations; (c) the use of checklists and standard operating procedures to prevent errors; (d) crew resource management; (e) risk perception when remote from the location of RPA operation; (f) strategic versus tactical risk management. 	B
6	<p><i>Coordinating crew</i></p> <ul style="list-style-type: none"> (a) verbal and non-verbal communication, including the following factors: <ul style="list-style-type: none"> (i) barriers to communication; 	C

Item	Aeronautical knowledge topics	Priority
	<ul style="list-style-type: none"> (ii) listening skills; (iii) assertion skills; (b) aspects of individuals that may affect the safe operation of the RPA: <ul style="list-style-type: none"> (i) personality; (ii) judgement; (iii) leadership style. 	

Schedule 4 Aeronautical knowledge units**Appendix 1 Any RPA — Common units (contd.)****Unit 6 RKOP RPAS knowledge — operations and procedures**

Item	Aeronautical knowledge topics	Priority
1	<i>General operations</i> (a) general considerations relating to: (i) starting and ground running of motors/engines; (ii) bystanders; (iii) crew briefing; (b) responsibilities of the remote pilot: (i) under Part 101 of CASR; (ii) in relation to the operator's documented practices and procedures; (iii) keeping operational, remote pilot and technical logs in accordance with MOS sections 10.05 to 10.06; (c) considerations: (i) after an operation has ended; (ii) in relation to aircraft noise and wildlife.	A
2	<i>Risk assessment and management</i> (a) the strategic risk assessment process relevant to RPAS operations, including: (i) hazard identification; (ii) risk identification; (iii) risk mitigation measures; (b) elements of a job safety assessment for the operation of an RPA; (c) completing a job safety assessment for the operation of an RPA.	A
3	<i>Airworthiness — general</i> (a) determine RPAS serviceability for a specific operation; (b) use of the RPA technical log; (c) responsibilities of the holder of a remote pilot licence in relation to the continuing airworthiness of the RPA, including: (i) conducting inspections of the RPA; (ii) reporting defects or unserviceability in relation to the RPAS.	A
4	<i>Role equipment or sensors</i> Safety and performance implications of various payloads, including cameras and other sensors.	B

Item	Aeronautical knowledge topics	Priority
5	<p><i>Accident and incident reporting</i></p> <p>(a) definitions of accident and incidents;</p> <p>(b) requirements for accident and incident reporting (however described) mentioned in the <i>Transport Safety Investigation Regulations 2003</i> and the <i>Transport and Safety Investigation (Voluntary and Confidential Reporting Scheme) Regulation 2012</i>.</p>	A
6	<p><i>Abnormal operations</i></p> <p>Considerations in the event of the following:</p> <p>(a) if the engine or motors of an RPA fails in the following circumstances:</p> <ul style="list-style-type: none"> (i) immediately after launch; (ii) on approach to landing; (iii) when operating within controlled airspace under ATC control; (iv) in a built-up area; (v) in the vicinity of bystanders; <p>(b) a control link failure;</p> <p>(c) a remote pilot station failure;</p> <p>(d) if a fire takes hold on the RPA during flight or on the ground;</p> <p>(e) if the RPA is attacked by a bird.</p>	A
7	<p><i>Fail-safe procedures and emergency actions</i></p> <p>Fail-safe systems and emergency actions, including:</p> <p>(a) the “return to home” system;</p> <p>(b) regain link holding pattern;</p> <p>(c) the RPA flies to a predetermined holding point;</p> <p>(d) emergency parachute deployment;</p> <p>(e) immediate landing;</p> <p>(f) flight termination;</p> <p>(g) carbon fibre containment in the event of a crash.</p>	A
8	<p><i>Operation of RPA near aerodrome</i></p> <p>(a) considerations in relation to operating an RPA near an aerodrome:</p> <ul style="list-style-type: none"> (i) the location of the movement area of the aerodrome; (ii) the structure of the approach and departure paths for aerodromes and helicopter landing sites (HLS); <p>(b) the prohibitions in Part 101 of CASR relating to operating an RPA at or near aerodromes and HLS;</p> <p>(c) the process to obtain a permission, approval or exemption (however described) under CASR in relation to operating an RPA at or in the approach and departure paths of a particular aerodrome;</p> <p>(d) determining the runway or runways in use at an aerodrome;</p> <p>(e) traffic patterns at aerodromes;</p> <p>(f) limitations on the operation of an RPA near an aerodrome if the</p>	A

Item	Aeronautical knowledge topics	Priority
	aerodrome has more than 1 runway; (g) limitations imposed by the Part 101 MOS with respect to operations in controlled and non-controlled airspace.	
9	<i>Operations of RPA above 400 ft AGL</i> Considerations relating to operations of an RPA above 400 ft AGL: (a) airspace classification; (b) aeronautical radio use and qualifications; (c) identifying the location of non-controlled aerodromes; (d) use of RPA observers; (e) the process to obtain a permission, approval or exemption (however described) under CASR in relation to operating an RPA above 400 ft AGL.	A

Schedule 4 Aeronautical knowledge units

Appendix 1 Any RPA — Common units (contd.)

Unit 7 RORA — Operational rules and air law for RPAS

Item	Aeronautical knowledge topics	Priority
1	<i>Aviation legislation and information</i> (a) documents that contain aviation legislation, aeronautical information and general operating rules that apply to the operation of RPA; (b) obtaining the documents and ensuring that the information is up to date; (c) guidance materials and information sources relating to RPAS operations.	A
2	<i>Remote pilot licence</i> (a) conditions that apply to a remote pilot licence under Part 101 of CASR; (b) conditions that may apply to a remote pilot licence under other legislation; (c) conditions that apply to a certified RPA operator under Part 101 of CASR.	B

Schedule 4 Aeronautical knowledge units

Appendix 1 Any RPA operated under an automated flight management system

Unit 8 RAFM — Automated flight management systems knowledge

Item	Aeronautical knowledge topics	Priority
1	<p><i>General</i></p> <ul style="list-style-type: none">(a) use of automated flight management systems for RPA;(b) limitations of an automated flight management system;(c) identifying faults with automated flight management system;(d) automated flight management system in abnormal and emergency situations (for example, loss of control, loss of thrust);(e) precautions when programming an automated flight management system;(f) degraded automated flight management systems (for example, no GPS, IMU failure).	A

Schedule 4 Aeronautical knowledge units**Appendix 2 Category specific units — Aeroplane category****Unit 9 RBKA — Aircraft knowledge and operation principles: Aeroplanes**

Item	Aeronautical knowledge topics	Priority
1	<p><i>RPA components</i></p> <p>(a) typical components found on the fuselage of the RPA:</p> <ul style="list-style-type: none">(i) hatches;(ii) vents;(iii) drains;(iv) aerials/antennas;(v) catapult attachment;(vi) airdrop launch attachment;(vii) fail-safe equipment; <p>(b) typical features of the wings of the RPA:</p> <ul style="list-style-type: none">(i) leading and trailing edges;(ii) ailerons;(iii) flaps;(iv) elevon/flaperons;(v) servomechanisms; <p>(c) typical components found on the tail of the RPA:</p> <ul style="list-style-type: none">(i) vertical stabiliser;(ii) elevator/stabilator;(iii) rudder; <p>(d) undercarriage and recovery fittings of the RPA:</p> <ul style="list-style-type: none">(i) wheeled undercarriage;(ii) floats;(iii) brakes;(iv) steering mechanism;(v) hook/skid.	B
2	<p><i>Aeroplane aerodynamics</i></p> <p>Characteristics of an aerofoil:</p> <ul style="list-style-type: none">(a) chord;(b) span;(c) aspect ratio;(d) camber;(e) aerodynamic stall;(f) wing loading.	B

Item	Aeronautical knowledge topics	Priority
3	<p><i>Launch</i></p> <p>(a) effects of cross-wind on high- and low-wing aeroplanes during launch and control technique;</p> <p>(b) effects of cross-wind on tail-wheel equipped aeroplanes and control techniques;</p> <p>(c) advantages of launching into wind.</p>	A
4	<p><i>Climbing</i></p> <p>Effect on climb rate and angle resulting from changes in the following:</p> <p>(a) weight;</p> <p>(b) power;</p> <p>(c) airspeed (changed from recommended);</p> <p>(d) flap deflection;</p> <p>(e) headwind/tailwind component, windshear;</p> <p>(f) bank angle;</p> <p>(g) altitude and density altitude.</p>	A
5	<p><i>Straight and level</i></p> <p>Relationship between attitude, angle of attack and airspeed in level flight.</p>	A
6	<p><i>Turning</i></p> <p>(a) concept of balanced turns;</p> <p>(b) effect of increasing or decreasing bank angle on:</p> <p>(i) stall airspeed, including the rate of increase of stall speed with increasing bank;</p> <p>(ii) the aircraft's structure (load factor);</p> <p>(c) precautions during steep turns:</p> <p>(i) shortly after launch; and</p> <p>(ii) during a glide, particularly on approach to land;</p> <p>(d) visual illusions during level turns at low level when turning downwind or into wind.</p>	A
7	<p><i>Stalling, spinning and spiral dives</i></p> <p>(a) the characteristics of a stall;</p> <p>(b) visual signs from the ground when the RPA is approaching a stall;</p> <p>(c) stall recovery:</p> <p>(i) the effect of using ailerons when approaching, and during, the stall; and</p> <p>(ii) why the RPA may stall at different speeds;</p> <p>(d) effects of the following on the stall airspeed:</p> <p>(i) power;</p> <p>(ii) flap;</p> <p>(iii) manoeuvres;</p> <p>(iv) weight;</p>	A

Item	Aeronautical knowledge topics	Priority
	(v) airframe frost and ice; (vi) air density; (e) manoeuvres during which the RPA may stall at an angle which appears to be different to the true stalling angle; (f) differences between a spin and a spiral dive; (g) spiral dive recovery.	
8	<i>Descent</i> (a) angle of descent and attitude relating to: (i) power; (ii) flap; (iii) aircraft nose position; (b) effect of headwind/tailwind; (c) rate and angle of descent.	A
9	<i>Landing/recovery</i> (a) achieving a smooth landing; (b) effects of a cross-wind on high- and low-wing aeroplanes during landing/recovery; (c) advantages of landing into the wind; (d) differences between a flapless approach and an approach with flap in terms of: (i) approach path angle; and (ii) threshold and touchdown speeds; and (iii) landing distance required; (e) deep stall landings; (f) use of a recovery net.	A

Schedule 4 Aeronautical knowledge units**Appendix 3 Category specific units — Helicopter (multirotor class) category****Unit 10 RBKM — Aeronautical knowledge and operation principles:
Multirotor**

Item	Aeronautical knowledge topics	Priority
1	<i>RPA components</i> (a) typical components of the RPA: (i) the centre body; (ii) the arm attachments; (iii) the battery mounting; (iv) the motors and motor attachments; (v) the landing gear; (vi) other components of the RPA; (b) location and function of electrical components of the RPA: (i) its electronic speed controller(s); (ii) its receiver and antenna; (iii) its gyros/Inertial Management Unit; (iv) its flight controller; (v) its battery; (vi) its battery eliminator circuit; (vii) its GPS sensor/antenna.	B
2	<i>Weight and balance — launch and landing and recovery</i> Effects of the following changes to the performance of the RPA: (a) weight; (b) power; (c) ground effect; (d) wind.	A
3	<i>Aerodynamics — multirotor lift and drag</i> (a) aerodynamic properties of a rotor blade: (i) aerofoil shape; (ii) blade twist; (iii) blade taper; (b) definitions of the following terms: (i) rotor thrust; (ii) rotor drag; (iii) relative airflow; (iv) rotational airflow; (v) induced airflow; (vi) torque reaction.	B

Item	Aeronautical knowledge topics	Priority
4	<p><i>Aerodynamics — hovering and forward flight</i></p> <p>(a) definitions of the terms:</p> <p>(i) ground effect;</p> <p>(ii) recirculation;</p> <p>(b) translational lift;</p> <p>(c) drag in forward flight.</p>	A
5	<p><i>Principles of operation — flight controls</i></p> <p>(a) primary flight controls and how they affect the movement of a multirotor about its longitudinal, lateral and normal vertical axes, including:</p> <p>(i) hover;</p> <p>(ii) yaw control;</p> <p>(iii) forward operation;</p> <p>(iv) ascent and descent;</p> <p>(v) lateral horizontal operation;</p> <p>(b) stabilisation;</p> <p>(c) GPS hold.</p>	A
6	<p><i>Aerodynamics — abnormal operations</i></p> <p>(a) direction of rotation of a rotor and the implications of incorrect installation;</p> <p>(b) effects on the operation of the RPA if a motor of the RPA fails.</p>	A
7	<p><i>Launch</i></p> <p>(a) pre-launch checks;</p> <p>(b) post-launch checks.</p>	B
8	<p><i>Climbing</i></p> <p>Effect on climb rate and angle from changes in the following:</p> <p>(a) weight;</p> <p>(b) power;</p> <p>(c) airspeed;</p> <p>(d) a headwind or tailwind or windshear;</p> <p>(e) bank angle;</p> <p>(f) temperature;</p> <p>(g) altitude.</p>	A
9	<p><i>Turning</i></p> <p>(a) banked turns;</p> <p>(b) rotations or flat turns;</p> <p>(c) limitations on steep turns.</p>	B

Item	Aeronautical knowledge topics	Priority
10	<p><i>Descending, landing and recovery</i></p> <ul style="list-style-type: none"> (a) avoiding vortex ring state when operating the RPA; (b) recovery actions to escape vortex ring state; (c) advantages of landing/recovery into the wind; (d) pre-landing checks. 	A

Schedule 4 Aeronautical knowledge units

Appendix 4 Category specific units — Helicopter (single rotor) category

Unit 11 RBKH — Aeronautical knowledge and operation principles: Single rotor

Item	Aeronautical knowledge topics	Priority
1	<i>RPA components</i> (a) typical components of the fuselage of the RPA, including: (i) inspection hatches; (ii) vents; (iii) drains; (iv) antennas/aerials; (v) the boom; (vi) the tail rotor; (b) typical components of the landing gear: (i) skids; (ii) floats; (c) other helicopter configurations: (i) contra-rotating main rotors; (ii) horizontal tail rotor; (iii) other solutions to centrifugal reaction.	B
2	<i>Helicopter key lift components</i> Typical components of the rotor system: (a) the flybar; (b) the swash plate; (c) the clutch.	A
3	<i>Aircraft performance</i> Effects of the following on aircraft performance: (a) the gross weight of the RPA; (b) engine power; (c) ground effect.	A
4	<i>Aerodynamics — lift and drag</i> (a) aerodynamic properties of a rotor blade: (i) aerofoil shape; (ii) blade twist; (iii) blade taper; (b) definitions of the following terms: (i) rotor thrust; (ii) rotor drag;	B

Item	Aeronautical knowledge topics	Priority
	<ul style="list-style-type: none"> (iii) total reaction; (iv) relative airflow; (v) centrifugal reaction; (vi) rotor disc; (vii) coning angle; (c) terminology in relation to an operating rotor blade: <ul style="list-style-type: none"> (i) feathering; (ii) flapping; (iii) flapping to equality; (iv) dragging; (v) advance angle. 	
5	<p><i>Aerodynamics of hovering</i></p> <ul style="list-style-type: none"> (a) aerodynamic vectors of a rotor blade during hover; (b) terminology relating to hovering: <ul style="list-style-type: none"> (i) ground effect; (ii) tail rotor drift; (iii) rotor shaft tilt effect; (iv) recirculation; (c) abnormal operations: <ul style="list-style-type: none"> (i) vortex ring state (settling with power); (ii) loss of tail-rotor effectiveness; (iii) the appropriate recovery actions to (i) to (ii); (d) effects of the following on hovering: <ul style="list-style-type: none"> (i) the gross weight of the RPA; (ii) pressure altitude; (iii) temperature. 	A
6	<p><i>Aerodynamics — forward operation</i></p> <p>Terminology in relation to forward flight:</p> <ul style="list-style-type: none"> (a) dissymmetry of lift; (b) flapback; (c) cyclic limits; (d) airflow reversal; (e) retreating blade stall; (f) compressibility; (g) inflow roll; (h) translational lift; (i) aerodynamic vectors of a rotor blade during forward flight. 	B

Item	Aeronautical knowledge topics	Priority
7	<p><i>Aerodynamics — power requirements</i></p> <p>(a) power available and power required in relation to the following:</p> <ul style="list-style-type: none"> (i) best speed for range; (ii) best speed for endurance; (iii) best rate of climb; (iv) best angle of climb; <p>(b) “overpitching” — causes and recovery actions.</p>	A
8	<p><i>Principles of flight — helicopter controls</i></p> <p>(a) flight controls:</p> <ul style="list-style-type: none"> (i) cyclic and collective; (ii) trim systems; (iii) tail gyroscope; <p>(b) aerodynamic enhancements:</p> <ul style="list-style-type: none"> (i) a canted tail rotor; (ii) sweep back on tips; (iii) a shrouded tail rotor; (iv) tail surfaces, fins, end plates and stabilators. 	A
9	<p><i>Autorotative flight</i></p> <p>(a) the meaning of the following terms in relation to an RPA that is capable of autorotative flight:</p> <ul style="list-style-type: none"> (i) autorotative force; (ii) autorotative section; <p>(b) the effect on autorotation of the RPA if the following are varied:</p> <ul style="list-style-type: none"> (i) all-up weight; (ii) density altitude; (iii) airspeed; (iv) rotor RPM. 	A
10	<p><i>Effects of particular conditions</i></p> <p>(a) undesirable aircraft states:</p> <ul style="list-style-type: none"> (i) ground resonance; (ii) mast bumping; (iii) dynamic roll-over; <p>(b) avoiding undesirable aircraft states.</p>	A

Schedule 4 Aeronautical knowledge units

Appendix 5 Category specific units — powered-lift category

**Unit 12 RBKP — Aircraft knowledge and operation principles:
Powered-lift**

Item	Aeronautical knowledge topics	Priority
1	<p><i>RPA components</i></p> <p>(a) typical physical components of the RPA:</p> <ul style="list-style-type: none">(i) the fuselage;(ii) the motor attachments, including booms;(iii) hatches;(iv) vents;(v) drains;(vi) aerals;(vii) fail-safe equipment;(viii) the battery compartment/mounting;(ix) the motors/engines(s);(x) the landing gear;(xi) protective components of the RPA;(xii) rotors and propellers; <p>(b) typical features of the wings of the RPA:</p> <ul style="list-style-type: none">(i) leading and trailing edges;(ii) ailerons;(iii) flaps;(iv) elevon/flaperon;(v) servomechanisms; <p>(c) typical components found on the tail of the RPA:</p> <ul style="list-style-type: none">(i) vertical stabiliser;(ii) elevator/stabiliser/stabilator;(iii) rudder; <p>(d) location and function of electrical components of the RPA:</p> <ul style="list-style-type: none">(i) its electronic speed controller(s);(ii) its receiver and antenna;(iii) its gyros/Inertial Management Unit;(iv) its flight controller;(v) its battery or batteries;(vi) its battery eliminator circuit;(vii) its GPS sensor and antenna.	B

Item	Aeronautical knowledge topics	Priority
2	<i>Aeroplane aerodynamics</i> Characteristics of an aerofoil: (a) chord; (b) span; (c) aspect ratio; (d) camber; (e) aerodynamic stall; (f) wing loading.	B
3	<i>Aerodynamics — vertical flight</i> Definitions of the following terms: (a) rotor thrust; (b) rotor drag; (c) relative airflow; (d) rotational airflow; (e) induced airflow; (f) ground effect; (g) recirculation.	B
4	<i>Principles of operation — flight controls</i> Primary flight controls and how they affect the movement of the aircraft about its longitudinal, lateral and vertical axes, including: (a) yaw control; (b) roll control; (c) pitch control; (d) forward flight and turning using vertical motors; (e) vertical ascent and descent; (f) secondary flight controls — trim controls; (g) stabilisation; (h) GPS hold.	A
5	<i>Launch, landing and recovery</i> (a) effects of changes to the following on the performance of the RPA: (i) weight; (ii) power; (iii) ground effect; (iv) wind and windshear; (v) translational lift; (vi) pre-launch and pre-landing; (b) avoiding vortex ring state when launching/landing the RPA; (c) recovery actions to escape vortex ring state.	A
6	RESERVED	

Item	Aeronautical knowledge topics	Priority
7	<p><i>Aerodynamics — transitional flight and forward flight</i></p> <p>(a) aerodynamics of transition from vertical flight to horizontal/climbing flight;</p> <p>(b) aerodynamics of transition from horizontal flight/descent to vertical flight;</p> <p>(c) aircraft configuration changes during transitional flight;</p> <p>(d) relationship between attitude, angle of attack and airspeed in level flight;</p> <p>(e) drag in forward flight;</p> <p>(f) airspeed and ground speed.</p>	A
8	<p><i>Climbing — aeroplane mode</i></p> <p>Effect on climb rate and angle from changes in the following:</p> <p>(a) weight;</p> <p>(b) power;</p> <p>(c) airspeed;</p> <p>(d) a headwind or tailwind;</p> <p>(e) bank angle;</p> <p>(f) temperature;</p> <p>(g) pressure altitude.</p>	A
9	<p><i>Turning</i></p> <p>(a) concept of balanced turns;</p> <p>(b) effect of increasing or decreasing bank angle on:</p> <p>(i) stall airspeed, including the rate of increase of stall speed with increasing bank;</p> <p>(ii) the aircraft's structure (load factor);</p> <p>(c) precautions during steep turns:</p> <p>(i) shortly after launch;</p> <p>(ii) during a glide, particularly on approach to land;</p> <p>(d) visual illusions during balanced level turns at low level when turning downwind or into wind;</p> <p>(e) rotations or flat turns in vertical mode.</p>	A
10	<p><i>Descent</i></p> <p>(a) angle of descent and attitude relating to:</p> <p>(i) power;</p> <p>(ii) flap;</p> <p>(iii) aircraft nose position;</p> <p>(b) effect of headwind/tailwind.</p>	A

Item	Aeronautical knowledge topics	Priority
11	<p><i>Aerodynamics — abnormal operations vertical flight</i></p> <p>(a) direction of rotation of a rotor and the implication of incorrect installation;</p> <p>(b) effects on the operation of the RPA if a motor of the RPA fails.</p>	A
12	<p><i>Stalling, spinning and spiral dives — aeroplane mode</i></p> <p>(a) the characteristics of a stall;</p> <p>(b) visual signs from the ground when the RPA is approaching a stall;</p> <p>(c) effects of the following on the stall airspeed:</p> <ul style="list-style-type: none"> (i) horizontally/vertically-vectoring power; (ii) flap; (iii) manoeuvres; (iv) weight; (v) airframe frost and ice; (vi) air density; <p>(d) manoeuvres during which the RPA may stall at an angle which appears to be different to the true stalling angle;</p> <p>(e) differences between a spin and a spiral dive;</p> <p>(f) spin and spiral dive recovery.</p>	A

Schedule 4 Aeronautical knowledge units

Appendix 6 RPA with a liquid-fuel system

Unit 13 REFE — Medium or large RPA with a liquid-fuel system knowledge

Item	Aeronautical knowledge topics	Priority
1	<p><i>Knowledge requirements</i></p> <p>Characteristics and operation of liquid-fuel systems:</p> <ul style="list-style-type: none">(a) the way a liquid-fuel system works;(b) systems associated with a liquid-fuel system;(c) the differences between 2 and 4-stroke engines;(d) the effect of increasing altitude and temperature on engine performance;(e) mixture leaning procedures and effects;(f) the effects and limitations of turbo- and super-charging in relation to the RPA;(g) the kinds of abnormal and emergency situations that may arise;(h) the effect of fuel burn on weight and balance;(i) different types of liquid fuel and engines.	A

Schedule 5 Practical competency units

Appendix 1 Any RPA — Common units

Unit 14 RC1 — Pre- and post-operation actions and procedures for RPAS

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
1	<i>Launch and landing areas</i> Explain considerations in locating and setting-up a launch and recovery area.	[No tolerances]	Areas suitable for aeroplanes and rotorcraft.
2	<i>Pre-operation actions and procedures</i> (a) obtain, interpret and apply information contained in the RPA operator's documented practices and procedures mentioned in paragraph 101.370 (b) of CASR, including information relating to the following: (i) weather forecasts; (ii) local observations; (iii) NOTAMs; (iv) area approvals; (v) other aeronautical information such as information from ERSA and CASA; (b) decide whether the current and forecast weather conditions are suitable for the proposed operation; (c) decide whether the RPA's equipment is serviceable for the proposed operation; (d) decide whether the aircraft batteries or fuel are the correct kind for the RPA and are	(a) within a reasonable period of time; (b) demonstrating dexterity in handling the RPA.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) type of RPA; (c) weather forecast types; (d) single or multiple RPA operations in a day; (e) location of RPA operations; (f) with and without checklists; (g) day and night operations; (h) electric and liquid-fuel system powered.

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
	serviceable.		
3	<i>Perform pre-flight inspection</i> (a) assemble and prepare the RPA for operation; (b) conduct a post-assembly inspection of the RPA; (c) ensure locking and securing devices, covers and bungs for the RPA are removed; (d) complete a pre-operation inspection as set out in the RPA operator's documented practices and procedures; (e) start the RPA's engine or motor in accordance with the RPA operator's documented practices and procedures for the operation of the RPA.	(a) within a reasonable period of time; (b) demonstrating dexterity in handling the RPA; (c) no locking or securing devices, bungs or covers left in place.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) type of RPA.
4	<i>Weight and balance</i> (a) ensure aircraft is loaded within limits; (b) ensure that centre of gravity is within limits.	Aircraft loaded within manufacturer/operator limits.	Loading and limits relevant to aircraft type.
5	<i>Post-operation actions and procedures</i> (a) shut down aircraft in accordance with the operations manual; (b) conduct post-operation inspection and secure the aircraft (if applicable); (c) complete all required post-operation administration documentation;	(a) within a reasonable period of time; (b) demonstrating familiarity with the RPA and the RPA operator's documented practices and procedures; (c) demonstrating dexterity in handling the RPA; (d) all locking or securing devices, bungs or covers are in place.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) kind of RPA; (c) dry and wet weather.

Item	Topic and requirement	Tolerances	Range of variables
	If operating an RPA, the applicant must be able to...		
	(d) disassemble aircraft for transport.		

Schedule 5 Practical competency units

Appendix 1 Any RPA — Common units (contd.)

Unit 15 RC2 — Energy reserves management for RPAS

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
1	<i>Plan energy requirements</i> (a) work out the duration of the flight taking into account operational environment and relevant abnormal or emergency conditions, contingencies; (b) where applicable, calculate or identify the endurance for the RPA with designated reserve.	(a) demonstrating familiarity with the RPA and the RPA operator's documented practices and procedures; (b) the calculated RPA operation endurance for the flight is within +/- 10% or within the reserve limits of the energy source.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) length and type of operation; (c) type of energy source for the RPA; (d) various wind and temperature conditions; (e) variation in operating weight and aircraft configuration.
2	<i>Manage battery system or systems</i> (a) if the energy source for the RPA is a battery or battery systems: (i) prior to launch, verify the time available for the flight given the current battery charge; (ii) ensure the batteries are secured to the RPA for the operation; (iii) ensure the battery connectors are connected properly and secure for the operation; (iv) monitor energy usage during the	(a) within a reasonable period of time; (b) demonstrating familiarity with the RPA; (c) demonstrating dexterity in handling the RPA and the batteries; (d) the RPA is not operated below the minimum voltage, as stated in the operator's documented practices and procedures; (e) not operating above maximum current draw for the RPA systems, as stated in the operator's documented practices and procedures.	(a) old and new batteries; (b) battery connector types; (c) types of battery; (d) with and without telemetry.

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
	<p>operation;</p> <p>(v) maintain a battery log for the operation;</p> <p>(vi) perform battery changes correctly;</p> <p>(b) if the energy source of the remote pilot station for the RPA is a battery or battery systems — manage the remote pilot station power supply to ensure sufficient energy to complete an operation with a suitable reserve.</p>		
3	<p><i>Recharge battery or batteries</i></p> <p>(a) inspect the battery to ensure it is safe to be recharged;</p> <p>(b) ensure the battery charger is setup correctly for the type of battery;</p> <p>(c) correctly connect and disconnect a battery to the battery charger;</p> <p>(d) perform battery quality and quantity checks after charging;</p> <p>(e) calculate the time it would take to use and recharge a battery for a particular operation;</p> <p>(f) if a battery is unsafe for an operation — recognise that the battery is unsafe for the operation;</p> <p>(g) check that the battery has sufficient charge</p>	<p>(a) within a reasonable period of time;</p> <p>(b) demonstrating familiarity with the RPA;</p> <p>(c) demonstrating care in handling the batteries;</p> <p>(d) battery is charged to the desired level;</p> <p>(e) does not exceed the charging limitations for the batteries.</p>	<p>(a) types of battery;</p> <p>(b) types of chargers;</p> <p>(c) battery management is performed in accordance with operator's documented practices and procedures.</p>

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
	for storage.		
4	<p>Manage fuel system (very small and small RPA)</p> <p>(a) if the RPA is a very small or small RPA and the energy source for the RPA is liquid fuel:</p> <p>(i) calculate fuel required for the flight;</p> <p>(ii) identify the quantity of fuel on board the RPA before the operation;</p> <p>(iii) ensure the fuel cap or caps are closed and locked before flight;</p> <p>(iv) operate the RPA's fuel pumps and engine controls correctly during the operation;</p> <p>(v) monitor fuel use during the operation;</p> <p>(b) ensure the RPA lands at the end of the operation and is recovered with at least the correct amount of reserve fuel;</p> <p>(c) defuel the aircraft if required for storage or transport.</p>	<p>(a) within a reasonable period of time;</p> <p>(b) demonstrating familiarity with the RPA;</p> <p>(c) demonstrating dexterity in handling the RPA and the batteries:</p> <p>(i) for (i), in column 2, fuel calculation is within 10% (but not below);</p> <p>(ii) for (ii) in column 2, quantity is within +/- 10% accuracy;</p> <p>(iii) for (b) in column 2, calculated reserve is within of 10% actual reserve at end of flight.</p>	<p>(a) kind of RPA;</p> <p>(b) kind of liquid fuel;</p> <p>(c) method used to calculate the fuel needed for an operation;</p> <p>(d) method used to calculate the fuel burn rate;</p> <p>(e) method used to check fuel quantity on board;</p> <p>(f) method used to check fuel quality.</p>
5	<p>Refuel RPA (very small and small RPA)</p> <p>If the RPA is a very small or small and liquid fuel is the source of the energy for the RPA — before the operation:</p> <p>(a) identify the correct</p>	<p>(a) within a reasonable period of time;</p> <p>(b) demonstrating familiarity with the RPA;</p> <p>(c) demonstrating dexterity in handling the RPA and the fuel;</p>	<p>(a) refuelling procedures according to operator's documented procedures;</p> <p>(b) types of liquid fuels;</p> <p>(c) factors which affect fuel-oil mix ratios.</p>

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
	kind of fuel to be used; (b) if the fuel of the RPA must be mixed — mix the fuel correctly; (c) correctly fuel or refuel the RPA; (d) perform a fuel quality check; (e) ensure the RPA's fuel cap is closed and secured after the RPA has been fuelled.	(d) safe handling of fuel and equipment.	

Schedule 5 Practical competency units

Appendix 1 Any RPA — Common units (contd.)

Unit 16 RC3 — Manage crew, payload and bystanders for RPAS operations

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
1	<i>Manage bystanders</i> (a) ensure that bystanders remain a safe distance away from the operation; (b) ensure bystanders are aware of, and avoid interference with, the operation and the systems controls used in the operation such as the remote pilot station; (c) manage bystander safety in the event of abnormal or emergency situation arising as a result of the operation; (d) demonstrate effective oral communication to bystanders in a clear, effective manner.	Clear and effective communication.	(a) co-operative bystanders; (b) non-cooperative bystanders.
2	<i>Manage people involved in the operation</i> (a) establish and maintain clear communication with crew members, with a particular view to ensuring the safe operation of the RPA; (b) carry-out effective and safe handovers of remote pilot responsibilities before, during and after an RPA operation.	Clear, effective communication.	(a) communication face-to-face; (b) communication over a radio; (c) operations with and without visual observers (spotters).
3	<i>Manage payloads and dangerous goods</i> (a) manage loading,	(a) within a reasonable period of time; (b) demonstrating	(a) different kinds of payload; (b) internal and external

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
	unloading and security of payload during an operation of the RPA; (b) identify dangerous goods and apply operator procedures to ensure safety of the operation.	familiarity with the RPA; (c) demonstrating dexterity in handling the RPA.	payloads; (c) activities are performed in accordance with operator's documented practices and procedures.

Schedule 5 Practical competency units

Appendix 1 Any RPA — Common units (contd.)

Unit 17 RC4 — Navigation and operation of RPAS

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
1	<i>Operational “rules”</i> (a) operate the RPA in compliance with the requirements relating to operating the RPA mentioned in Part 101 of CASR and this MOS; (b) identify the location and relevant parts of the RPA operator’s documented practices and procedures mentioned in paragraph 101.370 (b) of CASR relating to the operation of the RPA.	[No tolerances]	Activities are performed in accordance with the operator’s documented practices and procedures.
2	<i>Operational basics</i> (a) describe different traffic patterns of manned aircraft at aerodromes; (b) describe suitable vertical and horizontal separation distances between the RPA and other aircraft; (c) respond and take preventative actions to maintain the safety of the operation during simulated interactions with manned aircraft near aerodromes; (d) explain when an incident or accident report must be	[No tolerances]	(a) traffic patterns at aerodromes; (b) controlled and non-controlled aerodromes; (c) flight separation considerations; (d) types of incident; (e) manual and automated flight.

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
	submitted in relation to an operation of the RPA.		
3	<p><i>Orientation</i></p> <p>(a) interpret a given map or chart in relation to a proposed operation of the RPA and work out its implications for the operation;</p> <p>(b) in relation to any kind of aerodrome (including HLS) — point out the approach and departure paths and movement areas;</p> <p>(c) explain the significance of track and ground speed in relation to an operation of the RPA;</p> <p>(d) state the relevance of height, altitude and elevation in relation to different circumstances in which the RPA is operated.</p>	[No tolerances]	<p>(a) type of map projection;</p> <p>(b) various map scales;</p> <p>(c) digital or paper map;</p> <p>(d) different aerodromes and HLS;</p> <p>(e) at, near and away from aerodromes and HLS.</p>
4	<p><i>Use of aeronautical charts</i></p> <p>On a visual navigation chart — identify, without reference to the chart legend:</p> <p>(a) major features, including roads, rivers, lakes;</p> <p>(b) obstacles, spot heights, including elevation or height above terrain;</p> <p>(c) CTA, CTR, PRDs and aerodrome</p>	Quickly identifies major features, obstacles, heights and prescribed airspace boundaries.	Paper and digital maps and charts.

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
	information; (d) secondary controlled aerodromes; (e) identify airspace boundaries and symbols; (f) interpret other symbols with reference to the chart legend.		
5	<i>Use of ERSA</i> Use an ERSA to extract: (a) information for a particular aerodrome or airspace; (b) information and data about PRD areas.	[No tolerances]	[No variables]
6	<i>Operations preparation</i> (a) identify the operational documentation required for a planned operation; (b) read and interpret a NOTAM, using NOTAM decode information; (c) obtain and comply with ATC clearances; (d) be aware of “fly neighbourly” areas and environmental protection; (e) read and interpret a local weather forecast and determine whether it would be suitable to operate the RPA for the operation given the forecast; (f) read and interpret an aeronautical weather forecast and determine whether it	(a) all necessary documents identified; (b) understanding of NOTAMs is accurate; (c) makes informed decisions about whether to carry out the operation.	(a) operational documentation; (b) complexity of NOTAM; (c) area approval; (d) type of weather forecast.

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
	would be suitable to operate the RPA for the operation given the forecast.		

Schedule 5 Practical competency units

Appendix 1 Any RPA — Common units (contd.)

Unit 18 RNT — Non-technical skills for operation of RPAS

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
1	<i>Maintain effective lookout</i> Maintain obstacle and traffic separation using a systematic visual scan technique at a rate determined by location, visibility and terrain.	[No tolerances]	(a) various weather conditions; (b) surrounding terrain and obstacles.
2	<i>Maintain situational awareness</i> (a) collect information to ensure the continued safe operation of the RPA; (b) non-weather hazards to operations (for example, thermal plumes, powerlines, animals).	Makes decisions in a timely manner.	Location of the RPA operation (for example, urban, suburban, park, beach).
3	<i>Assess situations and make decisions</i> (a) identify problems that may affect the safe operation of the RPA; (b) analyse the problems; (c) identify solutions to the problems; (d) assess the solutions and risks of the solutions; (e) decide on a course of action; (f) if appropriate — communicate the proposed course of action; (g) if appropriate — allocate tasks relating to the proposed course of action;	Makes decisions in a timely manner.	Various operational scenarios.

Item	Topic and requirement	Tolerances	Range of variables
	If operating an RPA, the applicant must be able to...		
	(h) take actions to achieve optimum outcomes for the operation; (i) monitor progress of the course of action; (j) adjust the course of action to achieve the optimum outcomes for the operation.		
4	<i>Set priorities and manage tasks</i> (a) organise workload and priorities to ensure safe operation of the RPA; (b) anticipate events and tasks that may occur during the operation; (c) plan events and tasks for the operation so that the events and task occur sequentially; (d) use technology to reduce workload and improve cognitive and manipulative activities during the operation.	[No tolerances]	[No variables]
5	<i>Maintain effective communications and interpersonal relationships</i> (a) establish and maintain effective and efficient communications and interpersonal relationships with all stakeholders to ensure the optimum outcome of the operation; (b) define and explain objectives to stakeholders; (c) recognise hazardous attitudes and mindsets; (d) demonstrate a level of	[No tolerances]	[No variables]

Item	Topic and requirement If operating an RPA, the applicant must be able to...	Tolerances	Range of variables
	assertiveness that ensures the optimum completion of the operation.		
6	<i>Recognise and manage threats</i> (a) identify environmental or operational threats likely to affect the safety of the operation; (b) identify if competing priorities and demands may represent a threat to the safety of the operation; (c) develop and implement countermeasures to manage threats; (d) during the operation, monitor and assess the progress of the operation to ensure a safe outcome and modify actions accordingly; (e) identify and manage fatigue.	Quickly identifies threats and makes and implements suitable countermeasures in a timely way.	(a) types of threat; (b) types of fire and material hazards; (c) various risk mitigations to minimise threat.
7	<i>Recognise and manage errors</i> (a) apply the RPA operator's documented practices and procedures mentioned in regulation 101.370 of CASR; (b) prevent aircraft handling, procedural or communication errors; (c) during the operation, identify errors in the operation of the RPA before the safety of the operation is	Minimises the consequences of an error in a timely manner.	Type of errors.

Item	Topic and requirement	Tolerances	Range of variables
	If operating an RPA, the applicant must be able to...		
	<p>affected;</p> <p>(d) during the operation, monitor the following to identify potential or actual errors:</p> <p>(i) in the RPA systems using a systematic scan technique;</p> <p>(ii) caused by the environment in which the RPA is operating;</p> <p>(iii) by the other individuals who have been assigned duty.</p>		
8	<p><i>Considerations for indoor and underground operations</i></p> <p>Show awareness of risks associated with indoor and underground operations.</p>	[No tolerances]	<p>(a) large and small spaces;</p> <p>(b) different fire hazards;</p> <p>(c) populated and unpopulated spaces.</p>

Schedule 5 Practical competency units

Appendix 1 Any RPA — Common units (contd.)

Unit 19 RAF — Automated flight management systems for RPAS

Item	Topic and requirement If operating an RPA under an automated flight management system, the applicant must be able to...	Tolerances	Range of variables
1	<i>Pre-operation preparation</i> (a) check the automated flight management system software is current and up to date; (b) load a flight plan for the automated operation of the RPA.	[No tolerances]	(a) various meteorological conditions; (b) size of operation area; (c) category of RPA.
2	<i>Automated operation control</i> (a) demonstrate an automated launch and initial climb of the RPA; (b) modify the pre-programmed flight path while the RPA is in flight; (c) demonstrate an automated approach and landing/recovery of an RPA.	(a) initial climb is made after post-launch checks are complete; (b) modifications made in a reasonable amount of time; (c) the RPA lands within designated/predicted area/limits.	(a) various meteorological conditions; (b) size of operation area; (c) category of RPA.
3	<i>Emergency procedures</i> (a) interrupt an automated operation of the RPA and redirect the RPA to a safe point; (b) demonstrate a baulked landing procedure; (c) demonstrate the procedure to terminate the automated operation of the RPA.	(a) error-free and timely reprogramming; (b) the RPA is handled with dexterity and actions performed or simulated in a timely way; (c) for the baulked landing, the aircraft does not descend below a nominated height and maintains a nominated track; (d) safe termination procedure.	(a) operations in both dark conditions and under artificial illumination; (b) various weather conditions; (c) urban, suburban and unpopulated areas; (d) category of RPA.

Schedule 5 Practical competency units

Appendix 2 Category specific units — Aeroplane category

Unit 20 RA1 — Ground operations and launch

Item	Topic and requirement If operating an RPA that is an aeroplane, the applicant must be able to...	Tolerances	Range of variables
1	<p>Ground operations taxiing</p> <p>When taxiing on the ground or water:</p> <ul style="list-style-type: none"> (a) perform applicable taxi checks, including instrument checks as required; (b) maintain safe taxi speed and control of the RPA; (c) maintain safe spacing from obstructions, and persons; (d) avoid causing a hazard to another aircraft, objects or persons; (e) apply correct handling techniques to take wind into account; (f) use checklists at appropriate times during ground operations. 	<ul style="list-style-type: none"> (a) demonstrates dexterity with equipment; (b) sets-up the RPA for launch in a timely way; (c) maintains safe control of the RPA at all times. 	<ul style="list-style-type: none"> (a) activities are performed in accordance with operator's documented practices and procedures; (b) distance from obstacles, people and aircraft; (c) with and without checklists; (d) types of undercarriage.
2	<p>Ground operations — launch</p> <p>For hand launching of the RPA:</p> <ul style="list-style-type: none"> (a) demonstrate the correct way to hold the RPA pre-launch; (b) demonstrate the necessary precautions when hand launching; (c) ensure the flight path for launching the RPA is clear of other aircraft, people and other hazards before 	<ul style="list-style-type: none"> (a) demonstrates confidence in positioning and handling the RPA; (b) handles the RPA with skill and precision; (c) throwing action is controlled and safe; (d) the RPA is launched safely. 	<ul style="list-style-type: none"> (a) kind of RPA; (b) launch location; (c) remote pilot launch or launch by assistant; (d) different launch methods; (e) populated or unpopulated launch areas.

Item	Topic and requirement	Tolerances	Range of variables
	If operating an RPA that is an aeroplane, the applicant must be able to...		
	<p>launch;</p> <p>(d) work out a plan of action, in advance, to ensure the safest outcome in the event of abnormal operation.</p>		
3	<p><i>Launch actions</i></p> <p>If performing the launch of an RPA:</p> <p>(a) demonstrate correct launch technique;</p> <p>(b) perform the post-launch checks mentioned in the RPA checklist set out in operator's operations manual;</p> <p>(c) demonstrate smooth application of power and a controlled initial climb.</p>	Initial climb is without major deviations in heading or attitude.	<p>(a) kind of RPA;</p> <p>(b) launch location;</p> <p>(c) remote pilot launch and launch by assistant;</p> <p>(d) different launch methods;</p> <p>(e) populated and unpopulated launch areas.</p>

Schedule 5 Practical competency units

Appendix 2 Category specific units — Aeroplane category (contd.)

Unit 21 RA2 — Normal operations

Item	Topic and requirement If operating an RPA that is an aeroplane, the applicant must be able to...	Tolerances	Range of variables
1	<i>Straight and level</i> (a) operate the RPA in straight and level flight at the desired altitude; (b) identify and avoid terrain and traffic when operating the RPA.	(a) the RPA to maintain a constant height and heading; (b) the RPA is operated within its performance limitations.	(a) various meteorological conditions; (b) undulating terrain; (c) near aerodromes and away from aerodromes; (d) daytime and night.
2	<i>Climb</i> (a) operate the RPA at a constant angle of climb; (b) operate the RPA at a constant rate of climb.	The RPA maintains: (a) an even rate of climb; (b) a constant airspeed; (c) a consistent climb angle.	(a) various meteorological conditions; (b) daytime and night.
3	<i>Trim</i> If required, trim the RPA to maintain the desired flight path for the flight.	Trims the RPA to maintain a constant heading and height for approximately 10 seconds.	(a) various meteorological conditions; (b) daytime and night.
4	<i>Turns</i> (a) operate the RPA to perform turns that are properly co-ordinated; (b) operate the RPA to perform turns that are conducted within a nominated area; (c) operate the RPA so that level turns are at a constant altitude.	(a) the RPA remains within the nominated area; (b) turns are conducted at a constant altitude and radius; (c) the RPA sink/skid is minimised during the turns; (d) completes turn within 15 degrees of stated final heading.	(a) various meteorological conditions; (b) daytime and night.
5	<i>Descent</i> (a) descend the RPA at a constant angle of descent; (b) descend the RPA at a	The RPA maintains: (a) an even rate of descent; (b) a constant airspeed; (c) a consistent descent	(a) various meteorological conditions; (b) daytime and night.

Item	Topic and requirement	Tolerances	Range of variables
	If operating an RPA that is an aeroplane, the applicant must be able to...		
	<p>constant rate of descent;</p> <p>(c) use lift/drag devices appropriately during the descent of the RPA.</p>	<p>angle;</p> <p>(d) consistent aircraft attitude.</p>	

Schedule 5 Practical competency units

Appendix 2 Category specific units — Aeroplane category (contd.)

Unit 22 RA3 — Land/recover RPA

Item	Topic and requirement If operating an RPA that is an aeroplane, the applicant must be able to...	Tolerances	Range of variables
1	<i>Recover RPA</i> (a) perform a rectangular circuit, minimum width 100 m, minimum length 200 m, followed by a straight-line approach to a nominated point and landing; (b) allow sufficient space to align the RPA for a stabilised approach to the place at which the RPA will land or be recovered; (c) maintain a constant landing position aim point for the RPA; (d) if applicable, achieve a smooth, positively-controlled transition from final approach to touchdown, including the following: (i) minimise ballooning during flare; (ii) touchdown at a controlled rate of descent, in the specified touchdown zone; (iii) maintain positive directional control and cross-wind correction after landing, where applicable; (e) perform cross-wind landings.	(a) stable and controlled approach to land; (b) lands within the nominated area; (c) minimal deviations after landing; (d) keeps the RPA within approach area during a cross-wind landing; (e) landing speeds within 10% of recommended speed.	(a) meteorological conditions; (b) landing surface type; (c) undercarriage type; (d) aeroplane landing configuration; (e) different recovery methods.
2	<i>Conduct a missed approach</i> (a) recognise the conditions	(a) maintains the RPA within nominated area;	(a) activities are performed in accordance with

Item	Topic and requirement If operating an RPA that is an aeroplane, the applicant must be able to...	Tolerances	Range of variables
	<p>when a missed approach should be executed;</p> <p>(b) make the decision to execute a missed approach in a timely way;</p> <p>(c) carry out a missed approach and reposition for landing by doing the following:</p> <p>(i) select power, attitude and configuration to safely control the RPA;</p> <p>(ii) manoeuvre the RPA clear of the ground and conduct after launch procedures;</p> <p>(iii) make allowance for wind velocity during go-around.</p>	<p>(b) shows dexterity in configuring the RPA for go-around;</p> <p>(c) the RPA does not descend below nominated height.</p>	<p>operator's documented practices and procedures;</p> <p>(b) various meteorological conditions.</p>

Schedule 5 Practical competency units

Appendix 2 Category specific units — Aeroplane category (contd.)

Unit 23 RA4 — Advanced manoeuvres

Item	Topic and requirement If operating an RPA that is an aeroplane, the applicant must be able to...	Tolerances	Range of variables
1	<p><i>Enter and recover from stall</i></p> <p>(a) perform pre-manoeuvre checks for stalling the RPA;</p> <p>(b) recognise stall signs and symptoms;</p> <p>(c) control the RPA by applying the required power and pitch, roll and yaw inputs as appropriate in a smooth, coordinated manner to recover from the following manoeuvres:</p> <ul style="list-style-type: none"> (i) incipient stall; (ii) stall with full power applied; (iii) stall without power; (iv) stall when climbing, when descending, during an approach to land configuration and when turning; <p>(d) perform stall recovery with the RPA as follows:</p> <ul style="list-style-type: none"> (i) positively reduce angle of attack; (ii) use power available and available height to maximise the aircraft energy state; (iii) minimise height 	<p>(a) minimal height loss;</p> <p>(b) performs recovery procedures in a timely manner;</p> <p>(c) control movements are made in a positive and precise manner;</p> <p>(d) desired flight path is quickly re-established;</p> <p>(e) the RPA performance limits are not exceeded during the stall recovery.</p>	<p>(a) activities are performed in accordance with operator's documented practices and procedures;</p> <p>(b) various stall characteristics;</p> <p>(c) the RPA at high and low heights.</p>

Item	Topic and requirement If operating an RPA that is an aeroplane, the applicant must be able to...	Tolerances	Range of variables
	loss for simulated low altitude condition; (iv) re-establish desired flight path, and controlled and balanced operation of the RPA.		
2	Figure of 8 Operate the RPA to demonstrate a figure of 8, without loss of height and with the crossover point in front of the operator.	(a) turns are smooth and controlled; (b) turn radius is consistent; (c) height is maintained and sink is minimised during the turns; (d) the crossover point is within 5 m either side of the remote pilot; (e) the figure of 8 loops are of similar size and radius.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) size of flight area; (c) various meteorological conditions.
3	Sideslip RPA (simulated, or if permitted for the RPA by its manufacturer) (a) perform a straight, forward sideslip by: (i) inducing slip to achieve increased rate of descent while maintaining track and airspeed; and (ii) adjusting the rate of descent by coordinating the angle of bank and applied rudder; (b) recover the RPA from a sideslip and return it to controlled and balanced flight.	(a) sideslip is done in a controlled manner; (b) smooth control inputs, the RPA remains stable during the manoeuvre; (c) the RPA is transitioned from a sideslip to controlled and balanced flight without delay and with confidence; (d) flight profile is maintained within the RPA performance limits.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) various slip characteristics; (c) the RPA at high and low heights.
4	Control at a distance (a) demonstrate accurate control and navigation	(a) the RPA maintains a constant height; (b) the RPA turns are	(a) activities are performed in accordance with

Item	Topic and requirement If operating an RPA that is an aeroplane, the applicant must be able to...	Tolerances	Range of variables
	<p>at a distance of at least 200 m;</p> <p>(b) perform a horizontal rectangular pattern at a distance of 200 m;</p> <p>(c) demonstrate re-orientation of the RPA after it has been re-oriented by the instructor without the student watching.</p>	<p>smooth;</p> <p>(c) heading corrections are minimised;</p> <p>(d) remote pilot shows coordination when flying the RPA towards him/herself;</p> <p>(e) the RPA is reoriented successfully in a timely way.</p>	<p>operator's documented practices and procedures;</p> <p>(b) various sizes of the RPA;</p> <p>(c) the RPA at high and low heights.</p>

Schedule 5 Practical competency units

Appendix 2 Category specific units — Aeroplane category (contd.)

Unit 24 RA5 — Abnormal and emergency operations

Item	Topic and requirement If operating an RPA that is an aeroplane, the applicant must be able to...	Tolerances	Range of variables
1	<i>Manage loss of thrust — launch</i> (a) correctly identify loss of thrust after the RPA has been launched; (b) apply the highest priority to taking action to control the RPA; (c) maintain control of the RPA; (d) perform initial actions from memory consistent with the operator's documented practices; (e) manoeuvre the RPA to achieve the safest possible outcome; (f) confidently state the actions being performed.	(a) identifies the problem in a timely way; (b) the RPA is configured correctly and in a timely manner for a forced landing; (c) best glide speed maintained; (d) the RPA remains within the nominated area; (e) safe landing achieved, or guaranteed before resuming normal powered flight.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) location of operation; (c) loss of thrust at different stages of flight; (d) various metrological conditions.
2	<i>Recover from unusual aircraft attitudes</i> (a) identify unusual attitude of the RPA during flight — for example, whether it is nose-high or excessively banked; (b) recover the RPA from unusual attitudes and return to controlled and balanced operation.	(a) recovers in a timely manner; (b) uses efficient; control inputs; (c) minimal loss of height; (d) airspeeds are consistent with published aircraft performance information.	(a) location of operation; (b) various metrological conditions; (c) various combinations of nose attitude and bank angle.
3	<i>Loss of control link</i> Operate the RPA to demonstrate the loss of link	(a) identifies the problem in a timely way; (b) timely application of	(a) activities are performed in accordance with operator's documented

Item	Topic and requirement If operating an RPA that is an aeroplane, the applicant must be able to...	Tolerances	Range of variables
	procedures.	procedures.	practices and procedures; (b) various options for loss of command link.
4	<i>Other emergency situations</i> Perform simulated emergency manoeuvres with the RPA to avoid a collision with another aircraft.	The RPA is manoeuvred correctly, confidently and without delay.	(a) by day and night; (b) various collision angles; (c) operations near and away from remote pilot.

Schedule 5 Practical competency units

Appendix 3 Category specific units — Helicopter (multirotor class) category

Unit 25 RM1 — Control on ground, launch, hover and landing

Item	Topic and requirement If operating an RPA that is a multirotor, the applicant must be able to...	Tolerances	Range of variables
1	<i>Control multirotor on the ground</i> Demonstrate control of the multirotor that is on the ground and has its rotors spinning.	No tipping, moving or sliding of the RPA.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) type of multirotor; (c) calm and windy conditions.
2	<i>Launch and hover</i> (a) launch the RPA to above eye-level, hover for 10 seconds; (b) perform a full pirouette, and then reverse to stop facing a predetermined direction.	(a) hover must be stable, over a designated point with heading and altitude reasonably constant; (b) post-launch checks completed in accordance with documented procedures; (c) the RPA must complete full circles and stop within 20 degrees of predetermined point.	(a) various meteorological conditions; (b) daytime and night; (c) the RPA automation aids on or off.
3	<i>Landing</i> (a) perform a landing from a height of 10 m directly above the landing point; (b) perform an approach and landing with the RPA moving towards the remote pilot who is operating the RPA; (c) land the RPA from a 45-degree sideways descent; (d) demonstrate a	(a) the RPA must land within the nominated landing area; (b) stable approach to landing; (c) minimal bouncing on touchdown; (d) no damage to the RPA or its payload.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) various meteorological conditions; (c) open and confined landing area.

Item	Topic and requirement If operating an RPA that is a multirotor, the applicant must be able to...	Tolerances	Range of variables
	baulked landing procedure to a nominated hold point; (e) perform a rectangular circuit, minimum width 100 m, minimum length 200 m, of the RPA; (f) perform a landing in a cross- or tail-wind conditions.		

Schedule 5 Practical competency units

Appendix 3 Category specific units — Helicopter (multirotor class) category (contd.)

Unit 26 RM2 — Normal operations

Item	Topic and requirement If operating an RPA that is a multirotor, the applicant must be able to...	Tolerances	Range of variables
1	<p><i>Control multirotor during normal operation</i></p> <p>(a) perform straight and level forwards operation to a 20 m distant marker, hold for 10 seconds and return “tail” first;</p> <p>(b) perform a vertical rectangle, at least 5 m high and 20 m wide, with clockwise and counter clockwise 360-degree pirouettes at each alternate corner;</p> <p>(c) perform a vertical circle, as if inspecting the span of a bridge, turning 180 degrees at the top;</p> <p>(d) perform a figure 8 at a constant altitude with a crossover point in front of the remote pilot and even-sized loops with the nose pointing in the direction of travel;</p> <p>(e) demonstrate flight to the left and right and towards and away from the remote pilot in different orientations.</p>	<p>(a) reasonably straight line out and back;</p> <p>(b) stable hover (heading and height) with minimal drift;</p> <p>(c) vertical circle must have an even radius and be completed at an even speed;</p> <p>(d) constant radius turns;</p> <p>(e) the RPA must come to a complete stop, before changing direction;</p> <p>(f) vertical flight manoeuvres with minimal drift.</p>	<p>(a) various meteorological conditions;</p> <p>(b) size of vertical circle;</p> <p>(c) size of vertical rectangle;</p> <p>(d) size of flat 8;</p> <p>(e) inwards or outwards facing flat 8;</p> <p>(f) with and without the RPA automation aids (for example, without “headless mode”).</p>

Schedule 5 Practical competency units

Appendix 3 Category specific units — Helicopter (multirotor class) category (contd.)

Unit 27 RM3 — Advanced manoeuvres

Item	Topic and requirement If operating an RPA that is a multirotor, the applicant must be able to...	Tolerances	Range of variables
1	<p><i>Control multirotor in advanced manoeuvres</i></p> <p>(a) perform a straight and level forwards operation to a 100 m distant marker, hover, turn 180 degrees, and fly back nose-in;</p> <p>(b) perform a nose-in turn about the nose;</p> <p>(c) perform a nose-out turn about the “tail”;</p> <p>(d) reorient the RPA from a simulated loss of orientation;</p> <p>(e) perform an 8-point pirouette pausing at each point in “attitude mode”;</p> <p>(f) perform a 360-degree level turn in “attitude mode”.</p>	<p>(a) reasonably straight line out and back;</p> <p>(b) consistent height;</p> <p>(c) reorientation of the RPA to be achieved in a timely manner;</p> <p>(d) the RPA must remain at least 100 m away from remote pilot, unless otherwise stated;</p> <p>(e) for the turn about the nose manoeuvre, the nose of the RPA must point generally to the centre of the circle.</p>	<p>(a) various meteorological conditions;</p> <p>(b) with and without RPA automation aids.</p>
2	<p><i>Tethered operation</i></p> <p>Perform a simulated inspection or photography operation with the RPA tethered to the ground.</p>	[No tolerances]	[Variables at instructor’s discretion]

Schedule 5 Practical competency units

Appendix 3 Category specific units — Helicopter (multirotor class) category (contd.)

Unit 28 RM4 — Operation in abnormal situations and emergencies

Item	Topic and requirement If operating an RPA that is a multirotor, the applicant must be able to...	Tolerances	Range of variables
1	<i>Return to home and parachute deployment</i> (a) demonstrate the “return-to-home” fail-safe function if such a function is fitted to the RPA; (b) demonstrate or simulate a parachute deployment recovery system if such a system is fitted to the RPA.	(a) the remote pilot carries out the correct procedure, including ensuring that the return path can be flown safely; (b) parachute deployment procedure timely and safe.	(a) various meteorological conditions; (b) various flight modes; (c) various events leading to the need for the safety actions.
2	<i>Manage abnormal situations</i> (a) demonstrate operating the RPA to avoid a vortex ring state; (b) identify conditions likely to lead to a vortex ring state; (c) simulate a recovery from a vortex ring state to a safe landing.	(a) no damage to the RPA; (b) the RPA handled with dexterity; (c) the RPA lands in the nominated area.	Various meteorological conditions.
3	<i>Control link corruption</i> Demonstrate the loss of command and control link procedures in accordance with the RPA operator’s documented practices and procedures.	Timely application of procedures.	Activities are performed in accordance with operator’s documented practices and procedures.
4	<i>Safe forced landing and collision avoidance</i> Simulate emergency manoeuvres: (a) to avoid a collision	(a) no damage to the RPA; (b) manoeuvres completed with a suitable safety margin.	Activities are performed in accordance with operator’s documented practices and procedures.

Item	Topic and requirement	Tolerances	Range of variables
	If operating an RPA that is a multirotor, the applicant must be able to...		
	<p>with another aircraft;</p> <p>(b) to avoid other risks to the safe operation of the RPA (including bird attack);</p> <p>(c) to land the RPA safely in a confined landing area.</p>		

Schedule 5 Practical competency units

Appendix 4 Category specific units — Helicopter (single rotor class) category

Unit 29 RH1 — Control on ground

Item	Topic and requirement If operating an RPA that is a single rotor, the applicant must be able to...	Tolerances	Range of variables
1	<p><i>Start and stop engine or motor</i></p> <p>(a) ensure the RPA is in a suitable location for starting the engine and rotors of the RPA;</p> <p>(b) perform pre-start and start actions for the operation of the RPA;</p> <p>(c) perform shutdown and after-shutdown actions for the operation of the RPA;</p> <p>(d) control blade sailing during start and shutdown of the operation of the RPA by appropriately positioning the RPA and using cyclic pitch;</p> <p>(e) comply with the RPA operator's documented practices and report deviations from the procedures as required under the procedures;</p> <p>(f) manage emergencies appropriately (including simulated emergencies).</p>	<p>(a) start and stop the engine or motor in a timely manner;</p> <p>(b) show dexterity with engine or motor controls;</p> <p>(c) minimal blade sailing during start-up and shutdown;</p> <p>(d) emergency actions taken in a timely way.</p>	<p>(a) activities are performed in accordance with operator's documented practices and procedures;</p> <p>(b) type of helicopter.</p>
2	<p><i>Engage rotor</i></p> <p>(a) if applicable — set the engine or motor RPM within limits before rotor engagement for the RPA for the operation;</p>	<p>(a) engine/motor and rotor systems operated within the RPA performance limits;</p> <p>(b) demonstrates dexterity in handling controls.</p>	<p>(a) activities are performed in accordance with operator's documented practices and procedures;</p> <p>(b) type of helicopter.</p>

Item	Topic and requirement If operating an RPA that is a single rotor, the applicant must be able to...	Tolerances	Range of variables
	(b) if applicable — engage the rotor correctly for the RPA for the operation; (c) maintain motor or engine RPM within limits during rotor engagement when the RPA is being operated for the operation; (d) if applicable — operate the rotor brake for the RPA correctly during the operation.		
3	<i>Control main rotor disc and anti-torque system</i> (a) maintain the correct main rotor disc attitude, RPM and loads during the operation of the RPA; (b) if applicable, set the correct anti-torque trim position to compensate for main rotor torque for the RPA for the operation.	(a) engine/motor and rotor systems operated within the RPA performance limits; (b) demonstrates dexterity in handling controls.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) type of helicopter control systems; (c) calm and windy conditions.

Schedule 5 Practical competency units

Appendix 4 Category specific units — Helicopter (single rotor class) category (contd.)

Unit 30 RH2 — Launch, hover and landing

Item	Topic and requirement If operating an RPA that is a single rotor, the applicant must be able to...	Tolerances	Range of variables
1	<p><i>Launch, hover and landing</i></p> <p>(a) launch the RPA to above eye level, hover for 10 seconds;</p> <p>(b) perform a full pirouette, and then reverse to stop facing a predetermined direction;</p> <p>(c) perform a landing from a height of 10 m directly above the landing point;</p> <p>(d) perform an approach and landing with the RPA moving towards the remote pilot who is operating the RPA;</p> <p>(e) perform a landing with the RPA from a 45-degree sideways descent;</p> <p>(f) demonstrate a baulked landing procedure to a nominated hold point;</p> <p>(g) perform a rectangular circuit, minimum width 100 m; minimum length 200 m, of the RPA.</p>	<p>(a) hover must be stable with heading and altitude reasonably constant;</p> <p>(b) the RPA must remain over the selected take-off position for at least 10 seconds, with no drift;</p> <p>(c) the RPA must land within 1 metre of the nominated landing position;</p> <p>(d) landing to be controlled with even rate of descent consistent with a safe landing;</p> <p>(e) minimal bouncing on touchdown;</p> <p>(f) no damage to the RPA or its payload;</p> <p>(g) height is consistent during rectangle manoeuvre.</p>	<p>(a) various meteorological conditions;</p> <p>(b) daytime and night;</p> <p>(c) daytime and night for landing manoeuvres.</p>

Schedule 5 Practical competency units

Appendix 4 Category specific units — Helicopter (single rotor class) category (contd.)

Unit 31 RH3 — Normal operation

Item	Topic and requirement If operating an RPA that is a single rotor, the applicant must be able to...	Tolerances	Range of variables
1	<p><i>Control helicopter in normal operation</i></p> <p>(a) perform straight and level forwards operation to a 20 m distant marker, hold for 10 seconds and return “tail” first;</p> <p>(b) perform a vertical rectangle, at least 5 m high and 20 m wide, with clockwise and counter clockwise 360-degree pirouettes at each alternate corner;</p> <p>(c) perform a vertical circle, as if inspecting the span of a bridge, turning 180 degrees at the top;</p> <p>(d) perform a figure 8 at a constant altitude with a crossover point in front of the remote pilot and even-sized loops with the nose pointing in the direction of travel;</p> <p>(e) demonstrate flight to the left and right and towards and away from the remote pilot in different orientations.</p>	<p>(a) the RPA must come to a complete stop, before changing direction;</p> <p>(b) flight is a reasonably straight line out and back, with minimal drift throughout exercise;</p> <p>(c) vertical circle must have an even radius and be completed at a consistent speed;</p> <p>(d) horizontal flight manoeuvres must be completed at a constant altitude;</p> <p>(e) vertical flight manoeuvres must minimize drift;</p> <p>(f) minimal variations in height, constant radius turns and loops of equal size during the flat 8;</p> <p>(g) for (c), the RPA must be at least 100 m away from the remote pilot;</p> <p>(h) flying must be smooth with few undulations in the flight path.</p>	<p>(a) various meteorological conditions;</p> <p>(b) size of vertical circle;</p> <p>(c) size of vertical rectangle;</p> <p>(d) size of flat 8;</p> <p>(e) inwards or outwards facing flat 8.</p>

Schedule 5 Practical competency units

**Appendix 4 Category specific units — Helicopter (single rotor class)
category (contd.)**

Unit 32 RH4 — Advanced manoeuvres

Item	Topic and requirement If operating an RPA that is a single rotor, the applicant must be able to...	Tolerances	Range of variables
1	<p><i>Advanced manoeuvres</i></p> <p>(a) perform a straight and level forwards operation to a 100 m distant marker, hover, turn 180 degrees, and fly back nose-in;</p> <p>(b) perform a nose-in turn about the nose;</p> <p>(c) perform a nose-out turn about the “tail”;</p> <p>(d) reorient the RPA from a simulated loss of orientation;</p> <p>(e) perform an 8-point pirouette pausing at each point in “attitude mode”;</p> <p>(f) perform an upside-down triangle with a 45-degree ascent and descent to and from a minimum height of 5 m;</p> <p>(g) perform a 360-degree level turn in “attitude mode”.</p>	<p>(a) each point in the pirouette must be held for at least 2 seconds;</p> <p>(b) keeping a constant height during the pirouette and nose-about turns;</p> <p>(c) for nose-in circle, the nose of the RPA must generally point into the centre of the circle;</p> <p>(d) stable hover (heading and height) with minimal drift;</p> <p>(e) reorientation of the RPA to be achieved in a timely manner;</p> <p>(f) the RPA must be at least 100 m away from remote pilot.</p>	<p>(a) activities are performed in accordance with operator’s documented practices and procedures;</p> <p>(b) various sizes of the RPA;</p> <p>(c) the RPA at high and low heights.</p>

Schedule 5 Practical competency units

Appendix 4 Category specific units — Helicopter (single rotor class) category (contd.)

Unit 33 RH5 — Operation in abnormal situations and emergencies

Item	Topic and requirement If operating an RPA that is a single rotor, the applicant must be able to...	Tolerances	Range of variables
1	<i>Return to home</i> Demonstrate the “return to home” fail-safe function if such a function is fitted to the RPA.	The RPA must return home to the nominated location via the nominated path.	(a) various meteorological conditions; (b) selected flight mode.
2	<i>Manage abnormal situations</i> (a) identify conditions likely to lead to a vortex ring state; (b) demonstrate operating the RPA to avoid a vortex ring state; (c) simulate a recovery from a vortex ring state to a safe landing; (d) simulate operating the RPA to perform an autorotation to a safe landing; (e) simulate operating the RPA to avoid loss of tail effectiveness; (f) simulate operating the RPA to avoid ground resonance.	(a) no damage to the RPA; (b) the RPA handled with dexterity; (c) the RPA lands in the nominated area.	Various meteorological conditions.
3	<i>Control link corruption</i> Demonstrate the loss of command and control link procedures in accordance with the RPA operator’s documented practices and procedures mentioned in paragraph 101.370 (b) of CASR.	Timely application of procedures.	Activities are performed in accordance with operator’s documented practices and procedures.

Item	Topic and requirement If operating an RPA that is a single rotor, the applicant must be able to...	Tolerances	Range of variables
4	<p><i>Safe forced landing and collision avoidance</i></p> <p>Simulate emergency manoeuvres:</p> <p>(a) to avoid a collision with another aircraft; and to avoid other risks to the safe operation of the RPA (including bird attack);</p> <p>(b) to land the RPA safely in a confined landing area.</p>	<p>(a) no damage to the RPA;</p> <p>(b) manoeuvres completed with a suitable safety margin.</p>	<p>Activities are performed in accordance with operator's documented practices and procedures.</p>

Schedule 5 Practical competency units

Appendix 5 Category specific units — powered-lift category

Unit 34 RP1 — Control on ground, launch, hover and landing

Item	Topic and requirement If operating an RPA that is in the powered-lift category, the applicant must be able to operate the RPA to...	Tolerances	Range of variables
1	<i>Control the RPA on the ground</i> Demonstrate control of the RPA that is on the ground and has its rotors spinning.	(a) no tipping, moving or sliding of the RPA; (b) activities are performed in accordance with the operator's documented practices and procedures.	(a) type of powered-lift; (b) calm and windy conditions.
2	<i>Launch and hover</i> Launch the RPA to above eye level, hover for 10 seconds.	(a) hover must be stable with heading and altitude reasonably constant; (b) the RPA must remain over the selected take-off position for at least 10 seconds, with no drift; (c) post-launch checks completed.	(a) various meteorological conditions; (b) daytime and night; (c) RPA automation aids on and off.
3	<i>Landing</i> (a) perform an approach and landing; (b) perform an approach and landing when the RPA is moving towards the remote pilot; (c) perform a landing from approach, when the RPA is in a sideways orientation; (d) demonstrate a baulked landing procedure nominated hold point; (e) demonstrate a landing in cross- or tail-wind	(a) stable approach to landing; (b) minimal bouncing on touchdown; (c) no damage to the RPA or its payload; (d) the RPA must land within 2 m of the nominated landing position; (e) for the cross- or tail-wind landing, the aircraft is landed within the nominated landing area.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) various meteorological conditions; (c) open and confined landing area; (d) the RPA automation aids on and off.

Item	Topic and requirement	Tolerances	Range of variables
	If operating an RPA that is in the powered-lift category, the applicant must be able to operate the RPA to...		
	conditions.		

Schedule 5 Practical competency units

Appendix 5 Category specific units — powered-lift category (contd.)

Unit 35 RP2 — Transitional flight

Item	Topic and requirement If operating an RPA that is in the powered-lift category, the applicant must be able to...	Tolerances	Range of variables
1	<i>Manual transitional flight</i> (a) accurately and safely transition the RPA from vertical flight to horizontal flight; (b) accurately and safely transition the RPA from horizontal flight to vertical flight.	(a) the RPA remains at a safe distance from people and obstacles during all manoeuvres; (b) airspeeds maintained within manufacturer's limits for the transitions where applicable.	(a) various meteorological conditions; (b) undulating terrain; (c) daytime and at night.
2	<i>Abnormal manual transitional flight</i> (a) articulate a suitable and achievable plan to recover the RPA from abnormal transition; (b) recover the RPA from abnormal transition from vertical to horizontal flight; (c) recover the RPA from abnormal transition from horizontal to vertical flight.	(a) implements recovery plan in a timely way; (b) demonstrates dexterity in controlling the aircraft.	(a) various meteorological conditions; (b) daytime and at night.
3	<i>Abnormal automated transitional flight</i> (a) articulate suitable and achievable plan to recover the RPA from abnormal transition; (b) monitor transition to ensure safe flight; (c) implement recovery plan to ensure safe outcome.	Implements recovery plan in a timely way.	(a) various meteorological conditions; (b) daytime and at night.

Schedule 5 Practical competency units

Appendix 5 Category specific units — powered-lift category (contd.)

Unit 36 RP3 — Climb, cruise and descent

Item	Topic and requirement If operating an RPA that is in the powered-lift category, the applicant must be able to...	Tolerances	Range of variables
1	<i>Straight and level</i> (a) operate the RPA in straight and level flight; (b) identify and avoid simulated terrain, obstacles and traffic when operating the RPA.	(a) the RPA to maintain a constant height and heading; (b) the RPA is operated within its performance limitations.	(a) various meteorological conditions; (b) undulating terrain; (c) near aerodromes and away from aerodromes; (d) daytime and night.
2	<i>Climb</i> (a) operate the RPA at a constant angle of climb; (b) operate the RPA at a constant rate of climb.	The RPA maintains: (a) a consistent climb angle; (b) an even rate of climb.	(a) various meteorological conditions; (b) daytime and night.
3	<i>Trim</i> If required, trim the RPA to maintain the desired flight path for the operation.	Trims the RPA to maintain a constant heading and height for approximately 10 seconds.	(a) various meteorological conditions; (b) daytime and night.
4	<i>Turns</i> (a) operate the RPA to perform co-ordinated turns in horizontal flight; (b) operate the RPA to perform turns that are conducted within a nominated area; (c) operate the RPA so that level turns are at a constant altitude; (d) demonstrate pirouettes while in the hover.	(a) the RPA remains within the nominated area; (b) turns are conducted at a constant altitude and radius; (c) the RPA sink/skid is minimised during the turns; (d) completes turn within 15 degrees of stated final heading.	(a) various meteorological conditions; (b) daytime and night.

Item	Topic and requirement	Tolerances	Range of variables
	If operating an RPA that is in the powered-lift category, the applicant must be able to...		
5	<p><i>Descent</i></p> <p>(a) descend the RPA at a constant angle of descent;</p> <p>(b) descend the RPA at a constant rate of descent;</p> <p>(c) use lift/drag devices appropriately during the descent of the RPA.</p>	<p>The RPA maintains:</p> <p>(a) a consistent descent angle;</p> <p>(b) an even rate of descent;</p> <p>(c) consistent attitude.</p>	<p>(a) various meteorological conditions;</p> <p>(b) daytime and night.</p>

Schedule 5 Practical competency units

Appendix 5 Category specific units — powered-lift category (contd.)

Unit 37 RP4 — Advanced manoeuvres

Item	Topic and requirement If operating an RPA that is powered-lift category, the applicant must be able to...	Tolerances	Range of variables
1	<p><i>Enter and recover from stall in other than vertical flight</i></p> <p>(a) perform pre-manoeuvre checks for stalling the RPA;</p> <p>(b) recognise stall signs and symptoms when operating the RPA;</p> <p>(c) recover from the following conditions:</p> <p>(i) incipient stall;</p> <p>(ii) stall with full power;</p> <p>(iii) stall without power;</p> <p>(iv) stall during other flight phases;</p> <p>(d) perform stall recovery with the RPA as follows:</p> <p>(i) positively reduce angle of attack;</p> <p>(ii) use power available and excess height to increase the RPA's energy state;</p> <p>(iii) recover using vertical power.</p>	<p>(a) minimal height loss;</p> <p>(b) the RPA performance limits are not exceeded during the stall recovery;</p> <p>(c) performs recovery procedures in a timely manner;</p> <p>(d) control movements are made in a positive and precise manner;</p> <p>(e) desired flight path is quickly re-established.</p>	<p>(a) activities are performed in accordance with operator's documented practices and procedures;</p> <p>(b) various stall characteristics;</p> <p>(c) the RPA at high and low heights.</p>
2	<p><i>Figure of 8</i></p> <p>Operate the RPA to demonstrate a figure of 8, without loss of height and with the crossover directly in front of the operator and</p>	<p>(a) turns are smooth and balanced;</p> <p>(b) turn radius is consistent;</p> <p>(c) height is maintained and sink is minimised</p>	<p>(a) activities are performed in accordance with operator's documented practices and procedures;</p> <p>(b) size of flight area;</p>

Item	Topic and requirement If operating an RPA that is powered-lift category, the applicant must be able to...	Tolerances	Range of variables
	even-sized loops.	during the turns; (d) the crossover point is within 5 m either side of the remote pilot; (e) the figure of 8 loops are of similar size and radius.	(c) various meteorological conditions.
3	<i>Sideslip RPA (if permitted for the RPA)</i> (a) perform a straight, forward sideslip by: (i) inducing slip to achieve increased rate of descent while maintaining track and airspeed; (ii) adjusting the rate of descent by coordinating the angle of bank and applied rudder; (b) recover the RPA from a sideslip and return it to controlled and balanced flight.	(a) sideslip is done in a controlled manner; (b) smooth control inputs; (c) the RPA remains stable during the manoeuvre; (d) the RPA is transitioned from a sideslip to controlled and balanced flight without delay and with confidence; (e) flight profile is maintained within the RPA performance limits.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) various slip characteristics; (c) the RPA at high and low heights.
4	<i>Control at a distance</i> (a) demonstrate accurate control and navigation at a distance of at least 200 m; (b) perform a horizontal rectangular pattern at a distance of 200 m; (c) reorient the RPA after a simulated loss of orientation.	(a) the RPA maintains a constant height; (b) the RPA turns are smooth; (c) heading corrections are minimised; (d) remote pilot shows coordination when flying the RPA towards him/herself.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) various sizes of the RPA; (c) the RPA at high and low heights.

Schedule 5 Practical competency units

Appendix 5 Category specific units — powered-lift category (contd.)

Unit 38 RP5 — Operation in abnormal situations and emergencies

Item	Topic and requirement If operating an RPA that is powered-lift category the applicant must be able to...	Tolerances	Range of variables
1	<i>Manage loss of thrust in other than vertical flight</i> (a) correctly identify loss of thrust after the RPA has been launched; (b) apply the highest priority to taking action to control the RPA; (c) maintain control of the RPA; (d) perform initial actions from memory, consistent with the operator's documented practices and procedures; (e) manoeuvre the RPA to achieve the safest possible outcome; (f) confidently state the actions being performed.	(a) identifies the problem in a timely way; (b) the RPA is configured correctly and in a timely manner for a forced landing; (c) best glide speed maintained; (d) the RPA remains within the nominated area.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) location of operation; (c) loss of thrust at different stages of flight; (d) various metrological conditions.
2	<i>Recover from unusual aircraft attitudes in other than vertical flight</i> (a) identify unusual attitude of the RPA during an operation, for example, whether it is nose-high or nose-low; (b) recover the RPA from nose-low or excessive bank angle; (c) apply controlled corrective action while maintaining the RPA within performance	(a) recovers in a timely manner; (b) uses efficient control inputs; (c) minimal loss of height; (d) airspeeds are consistent with published aircraft performance information where applicable.	(a) location of operation; (b) various metrological conditions.

Item	Topic and requirement If operating an RPA that is powered-lift category the applicant must be able to...	Tolerances	Range of variables
	limits.		
3	<i>Loss of control link</i> Operate the RPA to demonstrate the lost link procedure.	(a) identifies the problem in a timely way; (b) timely application of procedures.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) various options for loss of command link.
4	<i>Other abnormal situations</i> (a) perform a safe gliding forced landing of the RPA; (b) land the RPA safely in a confined landing area; (c) perform emergency manoeuvres with the RPA to avoid a simulated collision with another aircraft or obstacle.	(a) no damage to the RPA; (b) manoeuvres completed with a suitable safety margin; (c) the RPA is manoeuvred correctly, confidently and without delay; (d) airspeeds are consistent with any published aircraft performance information.	(a) activities are performed in accordance with operator's documented practices and procedures; (b) by day and night; (c) various collision angles; (d) operations near and away from remote pilot.
5	<i>Parachute deployment in vertical flight</i> Simulate a parachute deployment recovery system if such a system is fitted to the RPA.	Parachute deployment procedures carried out in a timely and safe way.	(a) various meteorological conditions; (b) various flight modes.
6	<i>Manage abnormal situations</i> (a) identify conditions that may lead to a vortex ring state; (b) demonstrate operating the RPA to avoid a vortex ring state; (c) demonstrate or simulate recovery from a vortex ring state to a safe landing.	(a) no damage to the RPA; (b) the RPA handled with dexterity; (c) the RPA lands in the nominated area.	Various meteorological conditions.

Schedule 5 Practical competency units

Appendix 6 Any RPA with a liquid-fuel system

Unit 39 REF — Medium or large RPA with liquid-fuel system

Item	Topic and requirement	Tolerances	Range of variables
	If operating a large or medium RPA with a liquid-fuel system, the applicant must be able to...		
1	<p>Practical operation standards</p> <p>(a) before the operation:</p> <p>(i) conduct fuel checks of the RPA before the RPA is operated;</p> <p>(ii) confirm the required amount of fuel is on board the RPA to complete the operation safely with a reasonable reserve;</p> <p>(b) manage engine handling, temperature and oil pressures when the RPA is on the ground and during an operation of the RPA;</p> <p>(c) monitor fuel use during an operation of the RPA and manage the RPA to ensure that the RPA does not land without required reserves;</p> <p>(d) if available, adjust the fuel mixture when the RPA is on the ground and during an operation of the RPA to achieve stated fuel burn rates or optimal engine performance;</p> <p>(e) refuel aircraft safely</p>	<p>(a) operates engine and the RPA within performance limits as set out in manuals;</p> <p>(b) lands with sufficient fuel reserves relative to flight duration;</p> <p>(c) manages fuel burn to within expected range;</p> <p>(d) takes timely action to remedy engine problems;</p> <p>(e) makes calculations accurately and within a reasonable time.</p>	<p>(a) type of RPA liquid-fuel system;</p> <p>(b) activities are performed in accordance with operator's documented practices and procedures.</p>

Item	Topic and requirement	Tolerances	Range of variables
	If operating a large or medium RPA with a liquid-fuel system, the applicant must be able to...		
	<p>and complete post-fuelling checks;</p> <p>(f) complete operational and technical log;</p> <p>(g) make required calculations, or use system functions, to simulate a diversion from the original planned operation/destination;</p> <p>(h) remedy simple engine problems;</p> <p>(i) defuel aircraft.</p>		

Schedule 6 Flight Test Standards

Remote pilot licence — (RePL)

Appendix 1 Aeroplane category flight test

1. Flight test requirements

- 1.1 An applicant for a remote pilot licence in the aeroplane category must demonstrate his or her competency as follows: for each unit of competency mentioned in a unit coded item in a row of column 1 of the Table in clause 3, he or she must perform all of the manoeuvres for the RPA mentioned in column 2 of the item, within the relevant accuracy/tolerances specified in column 3 of the item for the manoeuvre.
- 1.2 For subclause 1.1, a sustained deviation outside the applicable flight tolerance is not permitted.
- 1.3 For topic/requirement RA3 – Land and recover, in the Table in clause 3, if sufficient cross-wind conditions do not exist at the time of the flight test then, the element may be excluded from the flight test provided the flight test examiner (the *examiner*) is satisfied that the applicant's training records indicate that relevant competency has been achieved during training.
- 1.4 Manoeuvres may be completed in automated flight mode if:
 - (a) there is no option for manual flight; or
 - (b) the applicant chooses to qualify with an “automated only” restriction on his or her RePL.

2. Knowledge requirements

The applicant may be required by the examiner to demonstrate his or her knowledge of the following with respect to the operation of an RPA in the aeroplane category:

- (a) the limitations of the licence;
- (b) normal, abnormal and emergency flight procedures;
- (c) operating limitations;
- (d) weight and balance limitations;
- (e) aircraft performance data, including take-off and landing performance data;
- (f) flight planning and risk assessment;
- (g) applicability of drug and alcohol regulations;
- (h) in-flight data;
- (i) emergency equipment;
- (j) energy planning for the flight;
- (k) managing payload and bystanders;
- (l) energy source (fuel, battery charge) management;
- (m) RPAS functions and features, including the meaning of any audible or visual indications.

3. Practical flight standards

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
1	RC1	Pre- and post-flight actions and procedures	Complete a JSA for a theoretical operation, relevant to the type of operations that the candidate will undertake when licensed, in accordance with an operational scenario provided by the examiner.	The JSA addresses the safety of the operation; identifies safety risks arising from the operation; and has formulated risk mitigation measures for the operation, including a risk management plan.
			(a) assembly, inspection and preparation of the aircraft and ground station for flight, referring to the operator's procedures manual as required; (b) disassembly and post-flight procedures.	(a) familiarisation with equipment and manuals to successfully assemble and disassemble the system; (b) all pre- and post-flight procedures completed correctly; (c) dexterity with equipment/tooling; (d) completes a post-flight damage inspection.
2	RC2	Energy management	<i>Electric-powered RPA</i> (a) identifies the amount of energy required and available for each flight stage, including reserves; (b) changes batteries within reserve limits (as required); (c) ensures RPS power within limits.	(a) the calculated RPA operation endurance is within +/- 10%; (b) sufficient reserves are available to cover variations and contingencies; (c) the RPA is operated within the manufacturer's or operator's voltage and current limits.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
			<i>Very small or small RPA with liquid-fuel system</i> (a) identifies the amount of energy available for each flight stage, including reserves; (b) confirms correct amount of fuel is on aircraft; (c) fuels and refuels as required; (d) ensures RPS power within limits; (e) carries out fuel quality and contamination checks.	(a) the calculated RPA operation endurance is within +/- 10%; (b) sufficient reserves are available to cover variations and contingencies; (c) safe fuelling and refuelling procedures; (d) identifies correct fuel grade.
3	RC3	Manage crew, payload and bystanders	(a) communicates effectively with simulated crew and bystanders; (b) ensures payloads are correctly attached and suitable for the RPA (as applicable).	[No tolerances.]
4	RNT	Non-technical skills for the RPAS	(a) maintains effective lookout for other aircraft and hazards; (b) maintains situational awareness; (c) sets priorities and makes good decisions.	(a) identifies and effectively manages hazards associated with the flight of the RPA; (b) chooses safest option when confronted with hazardous situation.
5	RAF	Autoflight systems for the RPAS	(a) performs examiner-selected items/manoeuvres in flight test schedule using automated flight controls; (b) programs the RPAS to complete an amendment to the planned flight; (c) safely manages the RPA in an emergency situation.	(a) demonstrates good understanding of automated flight modes; (b) programs flight and amendment to plan in a timely way; (c) flies the RPA accurately during manoeuvres.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
6	RA1	Ground operation and launch	(a) where applicable, taxi aircraft to take-off commencement point; (b) launch the aircraft or take-off and fly a circuit pattern; (c) where applicable, trim aircraft.	(a) aircraft taxied safely, and taxi/pre-take-off checks completed; (b) safe and stable launch/take-off; (c) even rate of climb; (d) maintains nominated circuit height; (e) where applicable, aircraft trimmed correctly for each stage of flight; (f) lateral distances should be sufficient to allow stabilised final approach segment.
7	RA2	Normal operations	Complete standard turns both left and right.	(a) turns should be straight and level with minimal variation in height; (b) turns should be of an equal radius, independent of wind direction.
			Complete steep turns in different directions.	(a) turns should be straight and level with minimal variation in height; (b) turns should be of a constant radius, independent of wind direction.
8	RA3	Land or recover	(a) overfly the landing area at circuit height and then complete a landing with touch and go (remain 5 m off the ground if no undercarriage); (b) repeat in opposite direction; (c) demonstrate cross-wind landing technique.	(a) approach attitude controlled by elevator and power; (b) stabilised descent controlled by power; (c) aircraft accurately positioned for landing; (d) constant climb-away angle.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
9	RA4	Advanced manoeuvres	<i>Inward and outward figure of 8</i> Fly at nominated height away from pilot and turn left or right 90 degrees, fly 30 m at a constant height turn left or right 180 degrees and fly back past the pilot for a further 30 m; then turn in the opposite direction 180 degrees again and then fly back to centre point opposite pilot and repeat.	(a) accurate altitude control; (b) equal circle size and crossover point directly in front of pilot.
			Demonstrate the use of all available flight modes.	Familiar with all modes and demonstrates competent ability to use them.
			Simulate a typical complex task the applicant will be performing when qualified, using appropriate control method/s, radio procedures where applicable. [The manoeuvre must assume full crew/team availability with examiner as an informed participant requiring briefing if applicable.]	(a) maintains safe distance from obstacles; (b) other relevant tolerances at examiner's discretion; (c) conducts suitable team briefing, including intent of operation, emergency plans, any other specific relevant tasking for team members.
10	RA5	Abnormal situations and emergencies	<i>Glide approach/simulated "dead stick"</i> The manoeuvre must: (a) simulate zero power landing by bringing throttle to idle on command; (b) land/recover the aircraft without using engine/motor power from circuit height at a position over the landing area;	(a) uses elevators to maintain slight nose-down attitude; (b) manoeuvres the aircraft to a suitable position to land/recover in the landing/recovery area; (c) maintains safe control of the aircraft; (d) completes pre-landing/recovery checks; (e) lands safely and without damage to the aircraft.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
			Demonstrate/simulate the use of all available fail-safe equipment and modes.	(a) familiar with fail-safe features and how to use them effectively in flight; (b) ensures safe outcome from abnormal/emergency scenarios.
			Recover from aerodynamic stall in different configurations.	(a) correct recovery technique used; (b) returns to safe level flight.

Schedule 6 Flight test standards

Remote pilot licence — (RePL)

Appendix 2 Helicopter category (multirotor class) flight test

1. Flight test requirements

- 1.1 An applicant for a remote pilot licence in the Helicopter category (multirotor class) must demonstrate his or her competency as follows: for each unit of competency mentioned in a unit coded item in a row of column 1 of the Table in clause 3, he or she must perform all of the manoeuvres for the RPA mentioned in column 2 of the item, within the relevant accuracy/tolerances specified in column 3 of the item for the manoeuvre.
- 1.2 For subclause 1.1, a sustained deviation outside the applicable flight tolerance is not permitted.
- 1.3 For Unit code RM1 in the Table in clause 3, if sufficient cross-wind conditions do not exist at the time of the flight test then, the element may be excluded from the flight test provided the flight test examiner (the *examiner*) is satisfied that the applicant's training records indicate that relevant competency has been achieved during training.
- 1.4 Manoeuvres may be completed in automated flight mode if:
 - (a) there is no option for manual flight; or
 - (b) the applicant chooses to qualify with an “automated only” restriction on his or her RePL.

2. Knowledge requirements

The applicant may be required by the examiner to demonstrate his or her knowledge of the following with respect to the operation of an RPA in the Helicopter category (multirotor class):

- (a) the limitations of the licence;
- (b) normal, abnormal and emergency flight procedures;
- (c) operating limitations;
- (d) weight and balance limitations;
- (e) aircraft performance data, including take-off and landing performance data;
- (f) flight planning and risk assessment;
- (g) applicability of drug and alcohol regulations;
- (h) in-flight data;
- (i) emergency equipment;
- (j) energy planning for the flight;
- (k) managing payload and bystanders;
- (l) energy source (fuel, battery charge) management;
- (m) RPAS functions and features, including the meaning of any audible or visual indications.

3. Practical flight standards

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerances
1	RC1	Pre- and post-flight actions and procedures	Complete a JSA for a theoretical operation, relevant to the type of operations that the candidate will undertake when licensed, in accordance with an operational scenario provided by the examiner.	The JSA addresses the safety of the operation; identifies safety risks arising from the operation; and has formulated risk mitigation measures for the operation, including a risk management plan.
			(a) assembly and preparation of the aircraft and ground station for flight, referring to the operator's procedures manual as required; (b) disassembly and post-flight procedures.	(a) familiar with equipment and manuals to successfully assemble and disassemble the system; (b) all pre- and post-flight procedures completed correctly; (c) dexterity with equipment/tooling.
2	RC2	Energy management	<i>Electric-powered RPA</i> (a) identifies the amount of energy required and available for each flight stage, including reserves; (b) changes batteries within reserve limits (as required); (c) ensures RPS power within limits.	(a) the calculated RPA operation endurance is within +/- 10%; (b) sufficient reserves are available to cover variations and contingencies; (c) the RPA is operated within the manufacturer's or operator's voltage and current limits.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerances
			<i>Very small or small RPA with liquid-fuel system</i> (a) identifies the amount of energy available for each flight stage, including reserves; (b) confirms correct amount of fuel is on aircraft; (c) fuels and refuels as required; (d) ensures RPS power within limits; (e) carries out fuel quality and contamination checks.	(a) the calculated RPA operation endurance is within +/- 10%; (b) sufficient reserves are available to cover variations and contingencies; (c) safe fuelling and refuelling procedures; (d) identifies correct fuel grade.
3	RC3	Manage crew, payload and bystanders	(a) communicates effectively with simulated crew and bystanders; (b) ensures payloads are correctly attached and suitable for the RPA (as applicable).	[No tolerances.]
4	RAF	Autoflight systems for the RPAS	(a) performs examiner-selected items/ manoeuvres in flight test schedule using automated flight controls; (b) programs the RPAS to complete an amendment to the planned flight; (c) safely manages the RPA in an emergency situation.	(a) demonstrates good understanding of automated flight modes; (b) programs flight and amendment to plan in a timely way; (c) flies the RPA accurately in manoeuvres, including landings and hovers.
5	RNT	Non-technical skills for the RPAS	(a) maintains effective lookout for other aircraft and hazards; (b) maintains situational awareness; (c) sets priorities and makes good decisions.	(a) identifies and effectively manages hazards associated with the flight of the RPA; (b) chooses safest option when confronted with hazardous situation.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerances
6	RM1	Control on ground, launch, hover and landing	(a) start engines/motors and ready aircraft for lift-off; (b) lift-off to height of 2 m, hover for 10 seconds, land; (c) demonstrate cross- or tail-wind landing technique.	(a) controlled ascent and descent with minimal drift throughout exercise; (b) stable hover; (c) lands within the nominated landing area.
7	RM2	Normal operations	<i>Without GPS hold</i> (a) lift-off to height of 2 m and establish stable hover; (b) fly straight out for 10 m (over cone); (c) re-establish hover, return tail first; (d) re-establish hover and land on lift-off spot; (e) repeat above with “GPS hold” on.	(a) controlled ascent and descent with minimal drift (including height) throughout; (b) stable hover; (c) straight line out and back; (d) land accurately in take-off spot.
			(a) lift-off to height of 5 m and turn aircraft 90 degrees left or right, turn opposite direction 180 degrees, turn back 90 degrees; (b) land at lift-off spot.	(a) controlled ascent and descent with minimal drift (including height) throughout exercise; (b) stable hover; (c) accurate landing at lift-off position.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerances
8	RM3	Advanced manoeuvres	Figure of 8 (a) lift-off to height of 5 m, establish stable hover, turn left or right 90 degrees fly 10 m at a constant height; (b) without stopping, turn outward 180 degrees and fly back past pilot for a further 10 m; (c) without stopping turn outward 180 degrees again and then fly back to starting point; (d) turn outwards (tail towards pilot) hover and land.	(a) turns should be accurate and over nominated points [<i>Markers should be placed at the 180 degree turn points.</i>]; (b) smooth flying with even, balanced turns; (c) airspeed should be consistent from when the RPA departs the first hover until entering the final hover; (d) accurate landing at nominated spot.
			Vertical rectangle Lift-off to height of 2 m and hover and complete a vertical nose out rectangle climbing to 10 m high and 10 m wide. [First movement is sideways left or right; remote pilot should be at the middle of the 10-metre side; sides (vertical axis) should be above marker cones.]	(a) smooth flying with even and controlled ascent and descent rates; (b) no drift (especially forward or back); (c) accurately positions aircraft.
			Simulate a typical complex task the applicant will be performing when qualified, using all available control method/s, radio procedures where applicable. [Assume full crew/team available and assume examiner is an informed participant requiring briefing if applicable.]	(a) maintains safe distance from object of inspection/ photography; (b) other relevant tolerances at examiner's discretion; (c) conducts suitable team briefing, including intent of operation, emergency plans, any other specific relevant tasking for team members.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerances
9	RM4	Abnormal situations and emergencies	From normal flight at a position approximately 50 m away from the pilot, fly the RPA back to the take-off position and land keeping 5 m from remote pilot while in full manual mode (that is, no stabilisation or GPS).	Applicant manoeuvres and lands the RPA safely without GPS or other stabilisation.
			(a) simulated emergency, including activation of fail-safe functions/ equipment; (b) safe termination of flight in other degraded modes of operation at examiner's discretion.	Applicant demonstrates an understanding of failure modes and terminates flight safely.

Schedule 6 Flight Test Standards

Remote pilot licence — (RePL)

Appendix 3 Helicopter category (single rotor class) flight test

1. Flight test requirements

- 1.1 An applicant for a remote pilot licence in the Helicopter category (multirotor class) must demonstrate his or her competency as follows: for each unit of competency mentioned in a unit coded item in a row of column 1 of the Table in clause 3, he or she must perform all of the manoeuvres for the RPA mentioned in column 2 of the item, within the relevant accuracy/tolerances specified in column 3 of the item for the manoeuvre.
- 1.2 For subclause 1.1, a sustained deviation outside the applicable flight tolerance is not permitted.
- 1.3 For Unit code RH3 in the Table in clause 3, if sufficient cross-wind conditions do not exist at the time of the flight test then, the element may be excluded from the flight test provided the flight test examiner (the *examiner*) is satisfied that the applicant's training records indicate that relevant competency has been achieved during training.
- 1.4 Manoeuvres may be completed in automated flight mode if:
 - (a) there is no option for manual flight; or
 - (b) the applicant chooses to qualify with an “automated only” restriction on his or her RePL.

2. Knowledge requirements

The applicant may be required by the examiner to demonstrate his or her knowledge of the following with respect to the operation of an RPA in the Helicopter category (single rotor class):

- (a) the limitations of the licence;
- (b) normal, abnormal and emergency flight procedures;
- (c) operating limitations;
- (d) weight and balance limitations;
- (e) aircraft performance data, including take-off and landing performance data;
- (f) flight planning and risk assessment;
- (g) applicability of drug and alcohol regulations;
- (h) in-flight data;
- (i) emergency equipment;
- (j) energy planning for the flight;
- (k) managing payload and bystanders;
- (l) energy (fuel, battery charge) management;
- (m) RPAS functions and features, including the meaning of any audible or visual indications.

3 Practical flight standards

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
1	RC1	Pre- and post-flight actions and procedures	Complete a JSA for a theoretical operation, relevant to the type of operations that the candidate will undertake when licensed, in accordance with an operational scenario provided by the examiner.	The JSA addresses the safety of the operation; identifies safety risks arising from the operation; and has formulated risk mitigation measures for the operation, including a risk management plan.
			(a) assembly and preparation of the aircraft and ground station for flight, referring to the operator's procedures manual as required; (b) disassembly and post-flight procedures.	(a) familiar with equipment and manuals to successfully assemble and disassemble the system; (b) all pre- and post-flight procedures completed correctly; (c) dexterity with equipment/tooling.
2	RC2	Energy management	<i>Electric-powered RPA</i> (a) identifies the amount of energy required and available for each flight stage, including reserves; (b) changes batteries within reserve limits (as required); (c) ensures RPS power within limits.	(a) the calculated RPA operation endurance is within +/- 10%; (b) sufficient reserves are available to cover variations and contingencies; (c) the RPA operated within manufacturer's or operator's voltage and current limits.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
			<i>Very small or small RPA with liquid-fuel system</i> (a) identifies the amount of energy available for each flight stage, including reserves; (b) confirms correct amount of fuel is on aircraft; (c) fuels and refuels as required; (d) carries out fuel quality and contamination checks; (e) ensures RPS power within limits.	(a) the calculated RPA operation endurance is within +/- 10%; (b) sufficient reserves are available to cover variations and contingencies; (c) safe fuelling and refuelling procedures; (d) identifies correct fuel grade.
3	RC3	Manage crew, payload and bystanders	(a) communicates effectively with simulated crew and bystanders; (b) ensures payloads are correctly attached and suitable for the RPA (as applicable).	[No tolerances.]
4	RAF	Autoflight systems for the RPAS	(a) performs examiner-selected items/ manoeuvres in flight test schedule using automated flight controls; (b) programs the RPAS to complete an amendment to the planned flight; (c) safely manages the RPA in an emergency situation.	(a) demonstrates good understanding of automated flight modes; (b) programs flight and amendment to plan in a timely way; (c) flies the RPA accurately in manoeuvres, including landings and hovers.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
5	RNT	Non-technical skills for the RPAS	(a) maintains effective lookout for other aircraft and hazards; (b) maintains situational awareness; (c) sets priorities and makes good decisions.	(a) identifies and effectively manages hazards associated with the flight of the RPA; (b) chooses safest option when confronted with hazardous situation.
6	RH1	Control on ground	(a) start engines/motors and ready aircraft for lift-off; (b) lift-off to height of 2 m, hover for 10 seconds, land.	(a) controlled ascent and descent with minimal drift throughout exercise; (b) stable hover.
7	RH2	Launch, hover and landing	<i>Without GPS hold</i> (a) lift-off to height of 2 m and establish stable hover; (b) fly straight out for 10 m (over cone); (c) re-establish hover, return tail first; (d) re-establish hover and land on lift-off spot; (e) repeat above with "GPS hold" on.	(a) controlled ascent and descent with minimal drift (including height) throughout; (b) stable hover; (c) straight line out and back; (d) land accurately in take-off spot.
8	RH3	Normal operations	(a) lift-off to height of 5 m and turn aircraft 90 degrees left or right, turn opposite direction 180 degrees, turn back 90 degrees; (b) land at lift-off spot; (c) conduct a cross- or tail-wind landing.	(a) controlled ascent and descent with minimal drift (including height) throughout exercise; (b) stable hover; (c) accurate landing at lift-off position; (d) the aircraft lands accurately.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
			(a) lift-off to height of 5 m and turn aircraft 90 degrees left or right, turn opposite direction 180 degrees, turn back 90 degrees; (b) land at lift-off spot.	(a) controlled ascent and descent with minimal drift (including height) throughout exercise; (b) stable hover; (c) accurate landing at lift-off position.
9	RH4	Advanced manoeuvres	Figure of 8 (a) lift-off to height of 5 m, establish stable hover, turn left or right 90 degrees, fly 10 m at a constant height and without stopping, turn outward 180 degrees and fly back past pilot for a further 10 m and without stopping, turn outward 180 degrees again and then fly back to starting point; (b) turn outwards (tail towards pilot), hover and land.	(a) turns should be accurate and over nominated points [<i>Cones should be placed at the 180 degree turn points.</i>]; (b) smooth flying with even, balanced turns; (c) airspeed should be consistent from when the RPA departs the first hover until entering the final hover; (d) accurate landing at nominated spot.
			Vertical rectangle (a) lift-off to height of 2 m and hover; (b) complete a vertical nose out 10 m wide rectangle climbing to 10 m high. <i>Note</i> First movement is sideways left or right. Pilot should be at the middle of the 10-m side, and sides (vertical axis) should be above marker cones.	(a) smooth flying with even and controlled ascent and descent rates; (b) no drift (especially forward and back); (c) accurately positions aircraft.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
			<p>Simulate a typical complex task the applicant will be performing when qualified, using all available control method/s and radio procedures where applicable.</p> <p>[Assume full crew/team available, and assume examiner is an informed participant requiring briefing if applicable.]</p>	<p>(a) maintains safe distance from object of inspection/ photography;</p> <p>(b) other relevant tolerances at examiner's discretion;</p> <p>(c) conducts suitable team briefing, including intent of operation, emergency plans, any other specific relevant tasking for team members.</p>
10	RH5	Abnormal situations and emergencies	<p>From normal flight, at a position approximately 50 m away from the pilot, fly the RPA back to the take-off position and land, keeping 5 m from the remote pilot while in full manual mode (that is, no stabilisation or GPS).</p>	<p>Applicant manoeuvres and lands the RPA safely without GPS or other stabilisation.</p>
			<p>(a) simulated emergency, including activation of fail-safe functions/ equipment;</p> <p>(b) safe termination of flight in other degraded modes of operation at examiner's discretion.</p>	<p>Applicant demonstrates an understanding of failure modes and terminates flight safely.</p>

Schedule 6 Flight Test Standards

Remote pilot licence — (RePL)

Appendix 4 Powered-lift category flight test

1. Flight test requirements

- 1.1 An applicant for a remote pilot licence in the powered-lift category must demonstrate his or her competency as follows: for each unit of competency mentioned in a unit coded item in a row of column 1 of the Table in clause 3, he or she must perform all of the manoeuvres for the RPA mentioned in column 2 of the item, within the relevant accuracy/tolerances specified in column 3 of the item for the manoeuvre.
- 1.2 For subclause 1.1, a sustained deviation outside the applicable flight tolerance is not permitted.
- 1.3 For Unit code RP1 in the Table in clause 3, if sufficient cross-wind conditions do not exist at the time of the flight test then, the element may be excluded from the flight test provided the flight test examiner (the *examiner*) is satisfied that the applicant's training records indicate that relevant competency has been achieved during training.
- 1.4 Manoeuvres may be completed in automated flight mode if:
 - (a) there is no option for manual flight; or
 - (b) the applicant chooses to qualify with an “automated only” restriction on his or her RePL.
- 1.5 A non-vertical landing manoeuvre, otherwise required under Unit code RP5 in clause 3 to demonstrate the RPA landing, is not required if such a landing is likely to cause damage to the aircraft, provided that a successful go-around is conducted instead from a position where a non-vertical landing, if made, would otherwise be assured.

2. Knowledge requirements

The applicant may be required by the examiner to demonstrate his or her knowledge of the following with respect to the operation of an RPA in the powered-lift category:

- (a) the limitations of the licence;
- (b) normal, abnormal and emergency flight procedures;
- (c) operating limitations;
- (d) weight and balance limitations;
- (e) aircraft performance data, including take-off and landing performance data;
- (f) flight planning and risk assessment;
- (g) applicability of drug and alcohol regulations;
- (h) in-flight data requirements (for example, GPS height);
- (i) emergency equipment;
- (j) energy planning for the flight;
- (k) managing payload and bystanders;

- (l) battery management;
- (m) RPAS functions and features, including the meaning of any audible or visual indications.

3. Practical flight standards

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
1	RC1	Pre- and post-flight actions and procedures	Complete a JSA for a theoretical operation, relevant to the type of operation that the candidate will undertake when licensed, in accordance with an operational scenario provided by the examiner.	The JSA addresses the safety of the operation; identifies safety risks arising from the operation; and has formulated risk mitigation measures for the operation, including a risk management plan.
			(a) assembly and preparation of the aircraft and ground station for flight, referring to the operator's procedures manual as required; (b) disassembly and post-flight procedures.	(a) familiar with equipment and manuals to successfully assemble and disassemble the system; (b) all pre- and post-flight procedures completed correctly; (c) dexterity with equipment/tooling.
2	RC2	Energy management	<i>Electric-powered RPA</i> (a) identifies the amount of energy required and available for each flight stage, including reserves; (b) changes batteries within reserve limits; (c) ensures RPS power within limits; (d) ensures RPS power within limits.	(a) the calculated RPA operation endurance is within +/- 10%; (b) sufficient reserves are available to cover variations and contingencies; (c) the RPA operated within manufacturer's or operator's voltage and current limits.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
			<p><i>Very small or small RPA with liquid-fuel system</i></p> <p>(a) identifies the amount of energy available for each flight stage, including reserves;</p> <p>(b) confirms correct amount of fuel is on aircraft;</p> <p>(c) fuels and refuels as required;</p> <p>(d) ensures RPS power within limits;</p> <p>(e) carries out fuel quality and contamination checks.</p>	<p>(a) the calculated RPA operation endurance is within +/- 10%;</p> <p>(b) sufficient reserves are available to cover variations and contingencies;</p> <p>(c) safe fuelling and refuelling procedures;</p> <p>(d) identifies correct fuel grade.</p>
3	RC3	Manage crew, payload and bystanders	<p>(a) communicates effectively with simulated crew and bystanders;</p> <p>(b) ensures payloads are correctly attached and suitable for the RPA (as applicable).</p>	[No tolerances.]
4	RAF	Autoflight systems for the RPAS	<p>(a) performs examiner-selected items/ manoeuvres in flight test schedule using automated flight controls;</p> <p>(b) programs the RPAS to complete an amendment to the planned flight;</p> <p>(c) safely manages the RPA in an emergency situation.</p>	<p>(a) demonstrates good understanding of automated flight modes;</p> <p>(b) programs flight and amendment to plan in a timely way;</p> <p>(c) flies the RPA accurately in manoeuvres, including aeroplane-style landings and hovers.</p>

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
5	RNT	Non-technical skills for the RPAS	(a) maintains effective lookout for other aircraft and hazards; (b) maintains situational awareness; (c) sets priorities and makes good decisions.	(a) identifies and effectively manages hazards associated with the flight of the RPA; (b) chooses safest option when confronted with hazardous situation.
6	RP1	Control on ground, launch, hover and landing	(a) start engines/motors and ready aircraft for lift-off; (b) lift-off to height of 2 m, hover for 10 seconds, land; (c) conduct a cross- or tail-wind landing.	(a) controlled ascent and descent with minimal drift throughout exercise; (b) stable hover; (c) the aircraft lands accurately.
			<i>Without GPS hold</i> (a) lift-off to height of 2 m and establish stable hover; (b) fly straight out for 10 m (over cone); (c) re-establish hover, return tail first; (d) re-establish hover and land on lift-off spot; (e) repeat above with “GPS hold” on.	(a) controlled ascent and descent with minimal drift (including height) throughout; (b) stable hover; (c) straight line out and back; (d) land accurately in take-off spot.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
7	RP2	Transition to and from vertical flight	<i>Manual transitional flight (if relevant to the kind of RPA)</i> (a) accurately and safely transition the RPA from vertical flight to horizontal flight; (b) accurately and safely transition the RPA from horizontal flight to vertical flight.	(a) the RPA remains at a safe distance from people and obstacles during all manoeuvres; (b) airspeeds maintained within manufacturer's limits for the transitions where applicable.
			<i>Automated transitional flight</i> Demonstrate automated transitions to and from vertical flight.	(a) the RPA remains at a safe distance from people and obstacles during all manoeuvres; (b) airspeeds maintained within manufacturer's limits for the transitions where applicable.
8	RP3	Climb, cruise & descent	Climb the aircraft at best rate or angle climb speed, level off, fly horizontal to a distance of 300 m, fly back towards starting point and descend to nominated height.	(a) maintains correct airspeeds and tracks accurately; (b) accurately orientates the aircraft at a distance for return flight.
			Complete standard turns both left and right.	(a) turns should be straight and level with minimal variation in height; (b) turns should be of an equal radius, independent of wind direction.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
			Complete steep turns in different directions.	(a) turns should be straight and level with minimal variation in height; (b) turns should be of a constant radius, independent of wind direction.
9	RP4	Advanced manoeuvres	<i>Inward and outward figure of 8</i> Fly at nominated height away from pilot and turn left or right 90 degrees, then fly 30 m at a constant height and turn left or right 180 degrees, and fly back past pilot for a further 30 m, then turn in the opposite direction and fly back to centre point opposite pilot and repeat.	(a) accurate altitude control; (b) equal circle size and crossover point directly in front of pilot.
			Demonstrate the use of all available flight modes.	Familiar with all modes and demonstrates competent ability to use them.
			Simulate a typical complex task the applicant will be performing when qualified, using appropriate control method/s and radio procedures, where applicable. [Assume full crew/team availability and that the examiner is an informed participant requiring briefing if applicable.]	(a) maintains safe distance from obstacles; (b) other relevant tolerances at examiner's discretion; (c) conducts suitable team briefing, including intent of operation, emergency plans, any other specific relevant tasking for team members.

Item	Unit code	Unit of competency	Item/manoeuvre	Accuracy/tolerance
10	RP5	Manage abnormal situations at altitude and near the ground	Demonstrate/ simulate the use of all available fail-safe equipment and modes.	(a) familiar with fail-safe features and how to use them effectively in flight; (b) ensures safe outcome from abnormal/emergency scenarios.
			Recover from aerodynamic stall in different configurations.	(a) correct recovery technique used; (b) returns to safe level flight.
			(a) recover the RPA from abnormal transition to horizontal and vertical flight manually; (b) recover the RPA from abnormal transition to horizontal and vertical flight in automated mode.	(a) implements recovery plan in a timely way; (b) demonstrates dexterity in controlling the aircraft; (c) where available, initiates and completes recovery action through fail-safe procedures.
			<i>Glide approach/simulated “dead stick”</i> The manoeuvre must: (a) simulate zero power landing by bringing throttle to idle on command; (b) land/recover the aircraft without using engine/motor power from circuit height at a position over the landing area.	(a) uses elevators to maintain slight nose-down attitude; (b) manoeuvres the aircraft to a suitable position to land in the landing/recovery area; (c) maintains safe control of the aircraft; (d) completes pre-landing/recovery checks; (e) lands safely and without damage to the aircraft.

Schedule 6 Flight Test Standards

Remote pilot licence — (RePL)

Appendix 5 RePL upgrades

Liquid-fuel system flight test

1. Flight test requirements

- 1.1 An applicant for a RePL with liquid-fuel system privileges must demonstrate all of the competencies in the units of competency mentioned in clause 3, by operating an RPA in the category he or she wishes to operate.
- 1.2 For subclause 1.1, an examiner must pass the applicant only if the applicant demonstrates accurately, correctly and in a timely way, the practical competencies and responds to any knowledge questions to the examiner's satisfaction.
- 1.3 The flight test for liquid-fuel systems may be combined into a flight test for a RePL in any category of RPA.

2. Knowledge requirements

The applicant may be required to demonstrate his or her knowledge to the examiner of the privileges and limitations of the endorsement and of the following topics:

- (a) the components of a liquid-fuel system fitted to the RPA;
- (b) the way the type of liquid-fuel system fitted to the flight test RPA works;
- (c) the operation of systems associated with the type of liquid-fuel system fitted to the flight test RPA;
- (d) the differences between 2 and 4-stroke piston engines (where applicable);
- (e) the effect of increasing altitude and temperature on engine performance;
- (f) mixture leaning procedures and effects (where applicable);
- (g) abnormal and emergency procedures (for example, partial or complete loss of power);
- (h) the effects and limitations of turbo- and super-charging of piston engines (where applicable);
- (i) the effects of fuel burn on weight and balance;
- (j) general engine handling applicable to the type of liquid-fuel system fitted to the flight test RPA.

3. Practical flight standards

The applicant is required to demonstrate the following actions or procedures:

- (a) conducts all relevant fuel checks before flight;
- (b) confirms required amount of fuel is on board to complete the flight safely with a reasonable reserve;
- (c) manages engine handling, temperatures and oil pressures while on ground and in flight;

- (d) manages fuel competently while in flight;
- (e) adjusts mixture in flight to achieve stated fuel burn rates or optimal engine performance;
- (f) refuels aircraft safely and does relevant post-fuelling checks;
- (g) completes flight technical log accurately;
- (h) takes timely, appropriate action to remedy actual or simulated engine problems;
- (i) competently, and within a reasonable time, makes required fuel calculations to complete an amendment to the original planned flight.

Note to Part 101 (Unmanned Aircraft and Rockets) Manual of Standards 2019

The *Part 101 (Unmanned Aircraft and Rockets) Manual of Standards 2019* (MOS) (in force under the *Civil Aviation Safety Regulations 1998*) as shown in this compilation comprises Part 101 Manual of Standards amended as indicated in the Tables below.

Table of Manual of Standards and Amendments

Year and number	Date of registration on FRLI	Date of commencement	Application, saving or transitional provisions
Part 101 MOS	9 April 2019 (see F2019L00593)	9 April 2019 (see s.1.02) Chapters 1 and 5, Division 9.2 of Chapter 9, Divisions 10.1 and 10.4 of Chapter 10, and Chapter 11 take effect on commencement (see s.1.03). Chapters 2 (except Division 2.7), 4, 9 (except Division 9.2) and 10 (except Divisions 10.1 and 10.4) take effect 12 months after commencement (see s.1.03). Chapter 2, Division 2.7, takes effect 18 months after commencement (see s.1.03).	—
Part 101 MOS (Miscellaneous Amdts) Instrument 2019 (No. 1)	20 December 2019 (see F2019L01686)	20 December 2019 (see s. 2)	—
Part 101 MOS (Extensions of Time Due to COVID-19) Amdt Instrument 2020 (No. 1)	3 April 2020 (see F2020L00394)	3 April 2020	—

Table of Amendments

ad. = added or inserted am. = amended rep. = repealed rs. = repealed and substituted

Provision affected	How affected
s. 1.03	rs. F2020L00394
s. 1.04	am. F2019L01686
s. 2.05	am. F2019L01686
s. 2.06	am. F2019L01686
s. 2.07	am. F2019L01686
s. 2.10	am. F2019L01686
s. 2.15	am. F2019L01686
s. 2.17	am. F2019L01686
s. 2.18	am. F2019L01686
s. 2.19AA	ad. F2019L01686
s. 2.20	am. F2019L01686
s. 2.21	am. F2019L01686
s. 2.23	am. F2019L01686
s. 2.25	am. F2019L01686

Table of Amendments

ad. = added or inserted am. = amended rep. = repealed rs. = repealed and substituted

Provision affected	How affected
s. 2.30	am. F2019L01686
s. 4.02	rs. F2019L01686
s. 4.03	rs. F2019L01686
s. 5.01	rs. F2019L01686
s. 5.02	rs. F2019L01686
s. 5.06	am. F2019L01686
s. 5.15	am. F2019L01686
s. 9.03	am. F2019L01686
s. 10.07	am. F2019L01686
s. 10.12	am. F2019L01686
s. 11.01	rs. F2019L01686
s. 11.02	rs. F2019L01686
Schedule 4, Appendix 1	am. F2019L01686
Schedule 4, Appendix 5	am. F2019L01686
Schedule 6, Appendix 1	am. F2019L01686
Schedule 6, Appendix 2	am. F2019L01686
Schedule 6, Appendix 3	am. F2019L01686
Schedule 6, Appendix 4	am. F2019L01686