MAURITIUS CIVIL AIRWORTHINESS REQUIREMENT

CHAPTER 24

1. INTRODUCTION

The Regulations related to all flying operations within Mauritius airspace are contained within the Civil Aviation Regulations 2007 as amended and the Civil Air Navigation Requirements as published by the Authority.

The overriding and all-encompassing Regulation within the legislation is Regulation 70, which covers the subject of endangerment and applies to all aviation activity in Mauritius at all times:

Regulation 70 Endangering safety of any person or property;

No person shall cause or permit an aircraft to endanger any person or property.

With regard to the operation of remotely piloted aircraft at the smaller end of the market, it is the aircraft's mass which is the deciding factor with regard to the permissions/approvals that are required, and in Mauritius 20kg is the significant number.

If the mass is above 20kg then there are a number of significant hurdles to jump (particularly with regard to airworthiness) but if it is 20kg or less then it is classed as a ' remotely piloted aircraft ', for which the requirements are a little less stringent and are covered within Regulations 91, 91A, 91B and 91C of the Civil Aviation Regulations and reproduced below.

Regulation 91 Remotely piloted aircraft

(1) No person shall cause or permit any article or animal, whether or not that article or animal is attached to a parachute, to be dropped from a remotely piloted aircraft.

(2) No person in charge of a remotely piloted aircraft shall fly the aircraft unless he is reasonably satisfied that the flight may safely be made.

(3) A person in charge of a remotely piloted aircraft shall, for the purpose of avoiding collisions, maintain direct and unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures.

(4) No person in charge of a remotely piloted aircraft shall fly the aircraft –

(a) in Class A airspace, Class C airspace, Class D airspace or Class E airspace without the permission of the Authority;

(b) within an aerodrome traffic zone during the notified hours of watch of the air traffic control unit at that aerodrome unless permission of the air traffic control unit is obtained; or

(c) at a height of more than 400 feet above the surface unless it is flying in airspace specified in subparagraph (a) or (b) and in accordance with the requirements for that airspace.

(5) Where a person intends to fly a remotely piloted aircraft –

(a) in an airspace referred to in paragraph (4)(a), he shall make an application seeking the permission of the Authority in such manner as the Authority may determine;

(b) in a zone and during the time referred to in paragraph (4)(b), he shall make an application to the air traffic control unit in such manner as the air traffic control unit may determine.

(6) (a) Where the applicant meets the conditions set out in the civil airworthiness requirements specified in regulation 135 for flying a remotely piloted aircraft in the airspace referred to in paragraph (5)(a), the Authority shall, on payment of the appropriate fee specified in the Sixteenth Schedule, grant permission to the applicant.

(b) Where the air traffic control unit considers that the applicant may fly a remotely piloted aircraft in a zone and during the time referred to in paragraph (5)(b) without threat to flight safety, the air traffic control unit shall, on payment of the appropriate fee specified in the Sixteenth Schedule, grant permission to the applicant.

Regulation 91A Remotely piloted surveillance aircraft

(1) No person in charge of a remotely piloted surveillance aircraft shall, except with the permission of the Authority, fly the aircraft –

(a) over a congested area or within 150 metres of that area;

(b) over an organised open-air assembly of more than 500 persons or within 150 metres of that assembly;

(c) within 50 metres of any vessel, vehicle or structure which is not under the control of the person in charge of the aircraft; or

(d) subject to paragraphs (2) and (3), within 50 metres of any person.

(2) Subject to paragraph (3), no remotely piloted surveillance aircraft shall be flown within 30 metres of a person during take-off or landing.

(3) Paragraphs (1) (d) and (2) shall not apply to a person in charge of a remotely piloted surveillance aircraft or a person under the control of the person in charge of the aircraft.

(4) Nothing in this regulation shall be construed as a derogation to the Data Protection Act.

(5) This regulation shall be in addition to, and not in derogation from, regulation 91.

(6) Where a person intends to fly a remotely piloted surveillance aircraft in an area referred to in paragraph (1), he shall make an application seeking the permission of the Authority in such manner as the Authority may determine.

(7) Where the applicant meets the conditions set out in the civil airworthiness requirements specified in regulation 135 for flying a remotely piloted surveillance aircraft in the area referred to in paragraph (1), the Authority shall, on payment of the appropriate fee specified in the Sixteenth Schedule, grant permission to the applicant.

Regulation 91B Remotely piloted aircraft or remotely piloted surveillance aircraft used for aerial work

(1) No person in charge of a remotely piloted aircraft or a remotely piloted surveillance aircraft shall use the aircraft for the purpose of aerial work except in accordance with a permission granted by the Authority.

(2) Where a person intends to use a remotely piloted aircraft or remotely piloted surveillance aircraft for the purpose of aerial work, he shall make an application seeking the permission of the Authority in such manner as the Authority may determine.

(3) Where the applicant meets the conditions set out in the civil airworthiness requirements specified in regulation 135 for using a remotely piloted aircraft or remotely piloted surveillance aircraft for the purpose of aerial work, the Authority shall, on payment of the appropriate fee specified in the Sixteenth Schedule, grant permission to the applicant.

Regulation 91C. Remotely piloted aircraft or remotely piloted surveillance aircraft used for leisure or recreational purposes

(1) Regulations 91 and 91A shall not apply to a remotely piloted aircraft or a remotely piloted surveillance aircraft weighing not more than 7 kilogrammes, which is flown strictly for leisure or recreational purposes, provided that the aircraft is not flown –

(a) in Class A airspace, Class C airspace, Class D airspace or Class E airspace without the permission of the Authority;

(b) within an aerodrome traffic zone during the notified hours of watch of the air traffic control unit at that aerodrome unless permission of the air traffic control unit is obtained;

(c) at a height exceeding 400 feet above the surface unless it is flying in airspace specified in subparagraph (a) or (b) and in accordance with the requirements for that airspace;

(d) over the property of any person unless the permission of that person has been obtained;

(e) over any area to which the public has access; or

(f) at night.

(2) No person shall fly, for leisure or recreational purposes, a remotely piloted aircraft or a remotely piloted surveillance aircraft which weighs more than 7 kilogrammes but less than 20 kilogrammes without its fuel, but including any article or equipment installed in or attached to the aircraft at the commencement of its flight.

(3) Where a person intends to fly, for leisure or recreational purposes, a remotely piloted aircraft or a remotely piloted surveillance aircraft in an airspace specified in paragraph 1(a) or in a zone and at a time specified in paragraph 1(b), he shall make an application seeking the permission of the Authority in such manner as the Authority may determine.

(4) Where the applicant meets the conditions set out in the civil airworthiness requirements specified in regulation 135 for flying a remotely piloted aircraft or a remotely piloted surveillance aircraft weighing not more than 7 kilogrammes for leisure or recreational purposes, the Authority shall, on payment of the appropriate fee specified in the Sixteenth Schedule, grant permission to the applicant.

2. For the purpose of the above quoted regulations

"remotely piloted aircraft" means a remotely piloted aerial vehicle without persons on board;

"remotely piloted surveillance aircraft" means a remotely piloted aircraft which is equipped to undertake any form of surveillance or data acquisition;

It should also be noted that for electrically propelled vehicles, the battery itself is considered to be a part of the aircraft - it is the battery's *charge* that is the fuel. The logic for this is that the battery is basically the 'fuel tank' or, in other words, when the battery has run out of fuel, it still weighs the same.

Additional requirements

(a) The person in charge of the aircraft must maintain direct unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions

(b) For an aircraft being controlled in this manner (which is termed 'Line of Sight') the unmanned aircraft should be kept within a distance of 500m horizontally and 400ft vertically of the 'pilot'.

(c) The flight should not be conducted within a specified distance, normally 150 metres, of any congested area of a city, town or settlement

(d) The aircraft should not be flown within a specified distance, normally 50 metres, of any person, vessel, vehicle or structure not under the control of the aircraft operator except that during the take-off or landing an aircraft to which this sub-paragraph applies shall not fly within 30 metres of any person other than the person in charge of the said aircraft or a person in charge of any other small aircraft or a person necessarily present in connection with the operation of such an aircraft.

In essence therefore, provided the aircraft has a mass of 20kg or less, the current regulations state,

1 The operation must not endanger anyone or anything

2 If the flight is to be conducted within 'Controlled' Airspace, 15 from the radius of the airfield permission to fly must be obtained from the ATC unit/authority and the flight must be operated in accordance with that permission and any additional restrictions required by ATC. Obviously

therefore, there is an inference that the 'pilot' needs to have a degree of awareness about the airspace that he/she wishes to fly in.

3 The aircraft must be kept within the line of sight (500m horizontal, 400ft vertical) of its pilot'. Operations beyond these distances must be approved by the Authority (the basic premise being for the operator to prove that he/she can do this safely).

4 Remotely piloted aircraft (irrespective of their mass) that are being used for surveillance purposes are subject to tighter restrictions, which invariably will require permission from the Authority before operations are commenced

5 The Authority permission is also required for all flights that are being conducted for aerial work (i.e. you are getting paid for doing it)

6 The 'pilot' has the responsibility for satisfying himself that the flight can be conducted safely

3.0 Approvals, Permissions and Exemptions

The Authority may issue an exemption or permission for remotely piloted aircraft to operate if the applicability criteria detailed in Table 1 below are met and the Authority is satisfied that the remotely piloted aircraft will be operated within the constraints stipulated. If a remotely piloted aircraft is intended for operation outside these constraints, the applicant should submit a safety case and discuss these issues directly with the Authority.

NOTES:

1 Applicable for aircraft used for Aerial Work purposes or if flown within a congested area or close to people or property.

Table 1 Pre-requisites for Operating a remotely piloted aircraft

Regime:	Explanation:
Case 0	One or more risk mitigating factors apply, therefore reduced or flexible remotely piloted aircraft. Remote Pilot qualification requirements apply.

Case 1	No risk mitigating factors apply, therefore equivalent remotely piloted aircraft and Remote Pilot qualification requirements apply.

NOTE: An acceptable Detect and Avoid system is not considered a risk mitigation factor, but a pre-requisite for Case 1 operations. Consequently, all civil remotely piloted aircraft operations without an acceptable Detect and Avoid system, including those undertaken for the development of remotely piloted aircraft , are by definition Case 0 operations.

Table 2 Table of Risk Mitigating Factors in remotely piloted aircraft Operations

Factor:	**Effect:**
Airspace Segregation	Airspace segregation ensures separation of the remotely piloted aircraft operation from other airspace users and third parties. Risk of collision, airprox or separation infringement is eliminated, except in the case of incursion by other airspace users into segregated airspace, or uncommanded excursion by the aircraft.
Visual Line-of-Sight Operation	Operation within the unaided direct line-of-sight of the aircraft pilot (accepted as within 500 metres horizontally and at a height not exceeding 400 feet vertically above the surface) permits the Remote Pilot to respond to and avoid other airspace users.
Low Aircraft Mass	Aircraft mass below a specified limit reduces risk to other airspace users and third parties, by reducing maximum kinetic energy damage potential below a significant level. This mass limit is determined by DCA Airworthiness Division.

3.1 Maximum Operating Mass

The certification basis of any aircraft has some bearing on the flight crew qualification requirements for that aircraft, and remotely piloted aircraft are no exception. remotely piloted aircraft are certificated in four categories relating to aircraft mass, and the flight crew qualification requirements are related to

these. Table 3 states the anticipated qualification level requirement for pilots of remotely piloted aircraft in the relevant mass category.

Table 3 - remotely piloted aircraft Mass-Related Licensing Requirements

Operating Mass (maximum)	**Case 0**	**Case 1**
7 kg or less	None, or BNUC-S™ or equivalent	BNUC-S™ or equivalent
More than 7 kg to 20 kg	None, or BNUC-S™ or equivalent	CPL(U) or equivalent
More than 20 kg to 150 kg	BNUC™ or equivalent	CPL(U) or equivalent
More than 150 kg	Industry Code of Practice, CPL(U) or ATPL(U) or equivalent	CPL(U) or ATPL(U) or equivalent

NOTE: The DCA has accepted the Basic National UAS Certificate (BNUC™) and the BNUC-S™ (for Small remotely piloted aircraft) which, although not a licence, demonstrates pilot competency in the absence of any world-wide standard being available. It is a type-specific certificate for VLOS operations, which takes into account the operating modes and procedures of the remotely piloted aircraft. Any Certificate meeting the requirements of a BNUC, issued by any approved organisation which enables the holder to fly the remotely piloted aircraft will be validated by DCA.

3.2 The following permissions and exemptions are required prior to operation:

(a) Operators who intend to conduct aerial work using remotely piloted aircraft are required to apply for permission from the Authority in accordance with Regulation 91 of the Civil Aviation Regulations.

(b) Operators of remotely piloted aircraft over 20 kg are required to apply for an exemption from the Authority. Any aerial work aspects will also be covered within this exemption.

(c) Operators who intend to fly a remotely piloted aircraft within the separation criteria of Regulation 91 (2) are required to apply for a permission from the Authority and should submit a safety case including a risk assessment of the operation.

3.3 Applications should be supported by the submission of an operations manual based on the guidance contained within Annex 1 to this Chapter.

3.4 The provision of images or other data solely for the use of controlling or monitoring the aircraft is not considered to be applicable to the meaning of 'Surveillance or Data Acquisition' covered at Regulation 91A of the Civil Aviation Regulations for remotely piloted aircraft.

4 Meaning of Aerial Work

4.1 'Meaning of Aerial Work' details that a flight is for the purpose of aerial work if valuable consideration is given or promised in respect of the flight or the purpose of the flight.

4.2 The requirement should be carefully consulted to determine if indeed any flight will be considered as aerial work.

4.3 Flying operations such as research or development flights conducted ‘in house’ may, in some circumstances, not be considered as aerial work provided there is no valuable consideration given or promised in respect of that particular flight.

5 Operations

5.1 Visual Line of Sight (VLOS)

5.1.1 Operating within Visual Line of Sight means that the Remote Pilot is able to maintain direct, unaided (other than corrective lenses) visual contact with the remotely piloted aircraft which is sufficient to monitor its flight path in relation to other aircraft, persons, vessels, vehicles and structures for the purpose of avoiding collisions. Within the Mauritius Airspace, VLOS operations are normally accepted out to a maximum distance of 500 m horizontally and 400 ft vertically from the Remote Pilot. Operations at a greater distance from the Remote Pilot may be permitted if an acceptable safety case is submitted.

For example, if the aircraft is large it may be justifiable that its flight path can be monitored visually at a greater distance than 500 m. Conversely, for some small aircraft, operations out to a distance of 500 m may be impractical.

5.2 Extended Visual Line of Sight (EVLOS)

5.2.1 EVLOS operations are operations, either within or beyond 500 m / 400 ft, where the Remote Pilot is still able to comply with his collision avoidance

responsibilities, but the requirement for the Remote Pilot to maintain direct visual contact with the remotely piloted aircraft is addressed via other methods or procedures. It is important to note, however, that collision avoidance is still achieved through 'visual observation' (by the Remote Pilot and/or RPA Observers).

5.2.2 The operator should submit a safety case including a risk assessment for the operation. Factors taken into consideration should include:

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

5.3 Beyond Visual Line of Sight (BVLOS)

5.3.1 Operation of a remotely piloted aircraft beyond a distance where the Remote Pilot is able to respond to or avoid other airspace users by visual means is considered to be a BVLOS operation remotely piloted aircraft intended for operation beyond visual range of the pilot will require an approved method of aerial separation and collision avoidance that ensures compliance with Civil Aviation Regulations on the Rules of the Air (Rules for avoiding aerial collisions), or will be restricted to operations within segregated airspace Note that collision avoidance applies to all flights conducted under IFR and to flights made with an ATC clearance, as well as to flights under VFR.

6 Registration

6.1 Remotely piloted aircraft with an operating mass in excess of 20 kg are required to be registered unless they are flying under an exemption remotely piloted aircraft with an operating mass of more than 150 kg must be registered with the Authority. Once the Authority has processed the application, the aircraft will be issued with a registration ID consisting of five characters starting '3B-' (e.g. 3B-XAA) and the details will be entered into the aircraft register. The registration must be displayed permanently on the aircraft in accordance with the Civil Aviation Regulations.

7 Pilot Qualifications

7.1 Evidence of pilot competency is required when making an application for permission to operate a remotely piloted aircraft but currently there are no pilot licences for the operation of UA (refer to Section 2, Chapter 5). Until such licences are available, the Authority has decided to recognise as acceptable Basic National (remotely piloted aircraft) Certificate (BNUCTM) and Basic National (remotely piloted aircraft) Certificate – Small Unmanned Aircraft (BNUC-STM), as evidence of Remote Pilot competency. These certificates are type-specific qualifications which take into account the specific operating capabilities of the. remotely piloted aircraft

8 Insurance

8.1 remotely piloted aircraft Operators must comply with Insurance Requirements for Air Carriers and Aircraft Operators. Operators of remotely piloted aircraft are advised to consult the Regulation to determine a minimum suitable level of insurance

9 Areas of Operation

9.1 Congested Areas

9.1.1 From the definition of the meaning of 'Congested Areas'. The definition states that a 'Congested Area' means any area in relation to a city, town or settlement which is substantially used for residential, industrial, commercial or recreational purposes. Operations of remotely piloted aircraft within congested areas may be permitted in specific locations on the basis of a safety case and suitable operational procedures being submitted as part of an application for aerial work. Separation distances from persons, vessels, vehicles and structures (dependent on whether or not they are under the control of the Remote Pilot) must be specified in the operations manual.

9.2 Site Survey Assessment

9.2.1 The use of non-established sites for flying remotely piloted aircraft requires an assessment of the suitability of that site to be made prior to commencing operations. Such an assessment should be made using a site visit and available information from at least the aeronautical charts, as well as other sources of information such as the Mauritius Aeronautical Information Service digital imagery (Google Earth/ Maps etc.), Survey maps etc.

9.2.2 Typical elements of an assessment that could affect the safety of the flight would include:

- the type of airspace and specific provisions (e.g. Controlled Airspace);
- other aircraft operations (local aerodromes or operating sites);

- hazards associated with industrial sites or such activities as live firing, gas venting, high-intensity radio transmissions etc.;
- local by-laws;
- obstructions (wires, masts, buildings etc.);
- extraordinary restrictions such as segregated airspace around prisons, power plant establishments etc. (suitable permission may be needed);
- habitation and recreational activities;
- public access;
- permission from landowner;
- likely operating site and alternative sites;
- weather conditions for the planned flight; and
- minimum separation distances from persons, vessels, vehicles and structures.

10 Overflight of People

10.1 In the absence of airworthiness certification, the overflight of persons not under the control of the pilot is restricted and described in the conditions of the Permission issued by the Authority. For remotely piloted aircraft of 20 kg and below, The Civil Aviation Regulations 91 and 91A, 91B and 91C define the separation distances that must be applied. For remotely piloted aircraft operations over 20 kg, the overflight of persons may be allowed subject to the degree of airworthiness certification and appropriate operational procedures such as Ballistic Recovery Systems (BRS) (e.g. parachutes).

10.2 The safety case for the overflight of people should include an assessment of the Kinetic Energy Limits and the method of flight termination (e.g. BRS). Two crash scenarios should be considered in determining the impact kinetic energy of the remotely piloted aircraft, as follows:

(a) a free-fall from 400 ft for all; remotely piloted aircraft and

(b) additionally, for a remotely piloted aircraft capable of high forward speed, a maximum impact speed (set as 1.4 x maximum achievable steady speed in level flight).

10.2.1 Assuming negligible aerodynamic drag, an object dropped from 400 ft will hit the surface at 95 kt and the kinetic energy at impact will be 95 kJ if the mass of the object is 80 kg. Should the object in fact exhibit significant aerodynamic drag (without reliance upon any on-board

parachute deployment system), the impact velocity will be less and a higher mass may be permissible without exceeding a calculated 95 kJ.

10.2.2 In the second scenario and with a maximum speed of 70 kt, 95 kJ equates to a mass of 75 kg. The mass can be increased up to a maximum of 150 kg, provided the maximum achievable steady level flight speed is sufficiently low that the energy limit is not exceeded (e.g. at 150 kg a maximum speed of 49 kt is permitted).

11 Operational Limitations

11.1 A permission or exemption for remotely piloted aircraft conducting aerial work or equipped to undertake any form of surveillance or data acquisition will include a number of operational limitations.

11.2 For remotely piloted aircraft, these limitations will normally include a prohibition on flight:

- at a height exceeding 400 feet above ground level;
- at a distance beyond the visual range of the Remote Pilot, or a maximum range of 500 metres (see paragraphs 5.1 and 5.2 of this chapter);
- over, or within 150 metres of, any congested area of a city, town or settlement;
- within 50 metres of any person, vessel, vehicle or structure not under the control of the person in charge except that during the take-off or landing the remotely piloted aircraft shall not fly within 30 metres of any person other than the person in charge of the remotely piloted aircraft or a person in charge of any other remotely piloted aircraft or a person necessarily present in connection with the operation of such a remotely piloted aircraft;
- unless it is equipped with a mechanism that will cause the remotely piloted aircraft to land in the event of disruption to or a failure of any of its control systems, including the radio link, and the person in charge of the remotely piloted aircraft has satisfied himself that such mechanism is in working order before the remotely piloted aircraft commences its flight;
- unless the person in charge of the remotely piloted aircraft has reasonably satisfied himself that any load carried by the remotely piloted aircraft is properly secured, that the remotely piloted aircraft is in an airworthy condition and that the flight can safely be made taking into account the wind and other significant weather conditions;
- unless the operator maintains records of each flight made pursuant to the permission and makes such records available to the Authority on request;

- unless a site safety assessment has been completed by the operator and these site safety assessments are made available to the Authority on request;

- unless the permission of the landowner on whose land the remotely piloted aircraft is intended to take off and land has been obtained; and

- unless, in accordance with the operations manual submitted to the Authority.

11.3 remotely piloted aircraft with a mass of more than 7 kg may be subject to additional operational limitations to those stated above, in accordance with Regulation 91(4) of the Civil Aviation Regulations; these operational limitations will normally include a prohibition on flight:

(a) in Class A, C, D or E airspace unless the permission of the appropriate ATC unit has been obtained;

(b) within an aerodrome traffic zone during the notified hours of watch of the ATC unit (if any) at that aerodrome unless the permission of any such ATC unit has been obtained; or

(c) at a height exceeding 400 ft above the surface unless it is flying in airspace described in sub-paragraphs (a) or (b) and in accordance with the requirements thereof.

11.4 The Authority may also impose additional limitations as it thinks fit; such constraints will normally include a prohibition on:

- flights that have not been notified to the local Police prior to the flights taking place;

- flights where the maximum achievable steady speed in level flight is greater than 70 knots;

- aerobatic flight;

- tasks that involve aerial inspection of, or flight close to, any object or installation that would present a risk to safety in the event of damage due to any impact by the remotely piloted aircraft (e.g. chemical/gas storage areas); and

- participation in any public flying display (except with the written permission of the Authority).

12 Operations Manuals

12.1 The inclusion of an operations manual covering the procedures to be followed for all envisaged operations of the remotely piloted aircraft is a key

requirement to enable the Authority to accurately assess the application and the safety case, before deciding whether to grant an exemption or permission.

12.2 Guidance for the compilation of remotely piloted aircraft operations manuals can be found at Annex 1 to this Chapter.

13 Application Process

13.1 In order to ensure that sufficient safety measures have been put in place, operators that are required to apply for permission from the Authority will be asked to demonstrate that they have considered the safety implications and taken the steps necessary to ensure that the remotely piloted aircraft will not endanger anybody. This may be as simple as preparing a safety case for a one-off flight. For regular operators, the submission of an operations manual for approval will allow them greater freedom to operate regularly without the need to seek further approval from the Authority.

13.2 It is vital to be clear that it is the operator (defined in the Civil Aviation Regulations 91 and 91A, 91B and 91C - i.e. the person having management of the remotely piloted aircraft

Remotely piloted aircraft and not another person who may, for example, have contracted with the operator to have work done) who should apply for an exemption or permission.

13.3 Applications for an exemption or permission should be made using the DCA application form DCA-RPA-2016.