



**GHANA CIVIL AVIATION (SAFETY) DIRECTIVES,  
2016**

**PART 28- REMOTELY PILOTED AIRCRAFT SYSTEMS**

DRAFT

# CONTENTS

|  |    |
|--|----|
| GHANA CIVIL AVIATION (SAFETY) DIRECTIVES, 2016.....                            | 1  |
| INTRODUCTION .....   | 5  |
| ABBREVIATIONS AND ACRONYMS .....   | 6  |
| 1. GENERAL.....  | 9  |
| 1.1 PURPOSE .....  | 9  |
| 1.2 APPLICABILITY .....  | 10 |
| 1.3 DEFINITIONS.....   | 11 |
| 2. SPECIAL AUTHORISATION.....  | 22 |
| 3. TYPE CERTIFICATION AND AIRWORTHINESS APPROVALS.....                         | 23 |
| 3.1 Type Certification and Airworthiness Approvals .....                       | 23 |
| 3.2 Large RPAS —Requirement for Certificate.....                               | 23 |
| 3.3 Maintenance of Large RPAS .....  | 23 |
| 3.4 RPAS Operator’s Maintenance Responsibilities .....                         | 23 |
| 3.5 RPAS Operator’s Maintenance Control Manual (MCM).....                      | 24 |
| 3.6 Maintenance Programme.....   | 24 |
| 3.7 Maintenance Manuals .....  | 24 |
| 3.8 Continuing Airworthiness .....   | 24 |
| 4. RPA REGISTRATION.....   | 25 |
| 4.4 Classification of RPAS.....  | 25 |
| 6. SAFETY MANAGEMENT .....   | 26 |
| 6.1 Safety Management Systems (SMS) .....                                      | 26 |
| 6.2 Hazard Identification and Risk Analysis.....                               | 26 |
| 6.3 Emergency Response Planning.....   | 26 |
| 7. LICENSING AND COMPETENCIES .....  | 26 |
| 7.6 Obligation for Personnel to Carry Documents.....                           | 27 |
| 7.7 Language Proficiency .....   | 27 |
| 7.9 Privileges and Conditions .....  | 27 |
| 7.10 RPAS Instructor- General Prerequisites and Requirements .....             | 28 |
| 7.12 Record-keeping.....   | 29 |
| 7.13 Documents held by the RPAS operator .....                                 | 30 |
| 7.14 Documents at the RPS(s).....  | 30 |
| 7.15 Documents Carried on Board the RPA.....                                   | 31 |
| 7.16 Documents at Or In Close Proximity Of The RPA Ground Operations Area..... | 32 |
| 7.18 Operating Facilities.....   | 32 |
| 7.19 Maintenance records .....   | 33 |
| 7.20 Modifications and Repairs .....   | 33 |

|  |    |
|--|----|
| <b>8. RPAS OPERATIONS</b> .....  | 34 |
| <b>8.3 Operations Manual</b> .....   | 35 |
| <b>8.4 RPAS Operating Manual</b> .....   | 36 |
| <b>8.5 Environmental Considerations</b> .....  | 36 |
| <b>8.7 Operation in Populous Areas</b> .....   | 38 |
| <b>8.8 Take-Off, Launch, Landing and Recovery from Aerodromes</b> .....                  | 38 |
| <b>8.9 Take-Off, Launch, Landing and Recovery from Places Other Than Aerodromes</b> .... | 39 |
| <b>8.10 Recovery Equipment Preparation, Set-Up and Inspection</b> .....                  | 39 |
| <b>8.11 RPS Handover</b> .....   | 39 |
| <b>8.12 Emergencies and Contingencies</b> .....  | 39 |
| <b>8.13 Loss of C2 Link</b> .....  | 39 |
| <b>8.14 Remote Flight Crew</b> .....   | 40 |
| <b>8.15 Remote Flight Crew Members at Duty Stations</b> .....                            | 40 |
| <b>8.16 Accidents and Serious Incidents</b> .....  | 40 |
| <b>8.17 Security Requirements</b> .....  | 40 |
| <b>9 DETECT AND AVOID</b> .....  | 41 |
| <b>10 COMMAND AND CONTROL (C2) LINK</b> .....  | 41 |
| <b>11 ATC COMMUNICATIONS</b> .....   | 41 |
| <b>12 REMOTE PILOT STATION (RPS)</b> .....   | 41 |
| <b>13 USE OF AERODROMES</b> .....  | 41 |
| <b>14 ENFORCEMENT</b> .....  | 42 |
| <b>PART 2 IMPLEMENTING STANDARDS</b> .....   | 43 |
| <b>IS 8.8 Take-Off and Launch from Places Other Than Aerodromes</b> .....                | 44 |
| <b>IS 8.9 Landing and Recovery At Places Other Than Aerodromes</b> .....                 | 44 |
| <b>IS 8.10 Recovery Equipment Preparation, Set-Up and Inspection</b> .....               | 45 |
| <b>IS 8.13 Loss Of C2 Link</b> .....   | 46 |
| <b>IS 8.17 Security Requirements</b> .....   | 47 |
| <b>IS 9 Detect And Avoid (DAA)</b> .....   | 47 |
| <b>IS 12 REMOTE PILOT STATION (RPS)</b> .....  | 48 |
| <b>12.5 VLOS Control For Take-Off And/Or Landing With Handover To BVLOS</b> .....        | 49 |
| <b>12.6 Integration Of RPAS Operations Into ATM And ATM Procedures</b> .....             | 49 |
| <b>12.7 Take-off and Landing Phases</b> .....  | 49 |
| <b>IS 12.8 En-route Phase</b> .....  | 49 |
| <b>12.8 VFR</b> .....  | 49 |
| <b>12.9 IFR</b> .....  | 50 |
| <b>12.10 Communication, Navigation and Surveillance (CNS)</b> .....                      | 50 |
| <b>12.11 Transponder Operations</b> .....  | 50 |
| <b>IS 13.1 Controlled Aerodrome Environment</b> .....                                    | 50 |
| <b>13.2 Aerodrome Flight Information Service (AFIS)</b> .....                            | 51 |

DRAFT

## INTRODUCTION

Remotely Piloted Aircraft Systems (RPAS), originally are a new component of the aviation system, one which the International Civil Aviation Organization (ICAO), States and the industry are working to understand, define and ultimately integrate.

The safe integration of RPAS into Ghana's airspace is a long-term activity with many stakeholders adding their expertise on such diverse topics as licensing and medical qualification of remote pilots, technologies for detect and avoid systems, frequency spectrum (including its protection from unintentional or unlawful interference), separation standards from other aircraft and development of a robust regulatory framework.

Remotely piloted aircraft are one type of unmanned aircraft. All unmanned aircraft, whether remotely piloted, fully autonomous or combinations thereof, are subject to the provisions of Article 8 of the Convention on International Civil Aviation, signed at Chicago on 7th December 1944 (Chicago Convention).

The safe operation of aircraft necessitates compliance with a number of requirements which are established in the Annexes to the Chicago Convention and the Ghana Civil Aviation Regulations/ Directives (GCARs/ GCADs). These requirements apply equally to RPAS operations and are intended to mitigate risk to persons and property on the ground and other airspace users. Where differences occur from manned aviation, they are specified in these Directives.

The goal of Ghana Civil Aviation Authority (GCAA) in addressing RPAS is to provide a regulatory framework through Directives and supporting Procedures for Air Navigation Services (PANS) and Guidance Material, to underpin routine operation of RPAS throughout Ghana in a safe, harmonized and seamless manner comparable to that of manned operations. Most importantly, introduction of remotely piloted aircraft into Ghana's airspace, especially the approach corridor and at aerodromes, should in no way increase safety risks to manned aircraft, persons and properties.

In order for RPAS to be widely accepted, they will have to be integrated into the existing aviation system without negatively affecting manned aviation (e.g. safety or capacity reduction). If this cannot be achieved (e.g. due to intrinsic limitations of RPAS design), the RPA may be accommodated by being restricted to specific conditions or areas (e.g. visual line-of-sight (VLOS), segregated airspace or away from heavily populated areas).

## ABBREVIATIONS AND ACRONYMS

|       |  |
|-------|--|
| ACAS  | airborne collision avoidance system          |
| ACP   | Aeronautical Communications Panel            |
| ADS-B | automatic dependent surveillance — broadcast |
| AFIS  | aerodrome flight information service         |
| AGL   | above ground level                           |
| ANSP  | air navigation service provider              |
| ATC   | air traffic control                          |
| ATCO  | air traffic control officer                  |
| ATM   | air traffic management                       |
| ATPL  | airline transport pilot licence              |
| ATS   | air traffic services                         |
| BRLOS | beyond radio line-of-sight                   |
| BVLOS | beyond visual line-of-sight                  |
| C2    | command and control                          |
| CA    | collision avoidance                          |
| CDL   | configuration deviation list                 |
| CofA  | certificate of airworthiness                 |
| CNS   | communication, navigation and surveillance   |
| CPA   | closest point of approach                    |
| CPDLC | controller-pilot data link communications    |
| DAA   | detect and avoid                             |
| ELT   | emergency locator transmitter                |
| EM    | electromagnetic                              |
| FCC   | flight control computer                      |
| FMS   | flight management system                     |
| FRMS  | fatigue risk management system               |
| FSS   | fixed satellite service                      |
| FSTD  | flight simulation training device            |
| GCAA  | Ghana Civil Aviation Authority               |
| GCADs | Ghana Civil Aviation Directives              |
| GCARs | Ghana Civil Aviation Regulations             |
| GPWS  | ground proximity warning system              |
| HALE  | high-altitude, long-endurance                |
| HF    | high frequency                               |
| HMI   | human-machine interface                      |
| ICA   | instructions for continuing airworthiness    |
| IFR   | instrument flight rules                      |
| IMC   | instrument meteorological conditions         |
| LIDAR | light detection and ranging                  |
| MA    | manoeuvre advisories                         |
| MAC   | mid-air collision                            |
| MAWS  | minimum altitude warning system              |

|         |   |
|---------|---|
| MCM     | maintenance control manual                            |
| METAR   | aerodrome routine meteorological report               |
| MMEL    | master minimum equipment list                         |
| MPL     | multi-crew pilot license                              |
| MTOM    | maximum take-off mass                                 |
| NextGen | next generation air transportation system             |
| NM      | nautical mile   |
| NMAC    | near mid-air collision                                |
| NOTAM   | notice to airmen                                      |
| PBN     | performance-based navigation                          |
| PIC     | pilot-in-command                                      |
| PPL     | private pilot licence                                 |
| RCP     | required communication performance                    |
| RF      | radio frequency                                       |
| RLOS    | radio line-of-sight                                   |
| ROC     | remotely piloted aircraft system operator certificate |
| RPA     | remotely piloted aircraft                             |
| RPAS    | remotely piloted aircraft system(s)                   |
| RPASP   | Remotely Piloted Aircraft Systems Panel               |
| RPS     | remote pilot station(s)                               |
| RVSM    | reduced vertical separation minimum                   |
| RWC     | remain-well-clear                                     |
| SARPs   | Standards and Recommended Practices                   |
| SATCOM  | satellite communication                               |
| SIP     | structural integrity programme                        |
| SLA     | service level agreement                               |
| SLS     | service level specifications                          |
| SMS     | safety management system                              |
| SPECI   | aerodrome special meteorological report               |
| SSP     | State Safety Programme                                |
| SSR     | secondary surveillance radar                          |
| SWIM    | system-wide information management                    |
| TAWS    | terrain awareness warning system                      |
| TC      | type certificate                                      |
| TCDS    | type certificate data sheet                           |
| TEM     | threat and error management                           |
| TLS     | target level of safety                                |
| Tsloss  | time (sustained loss of link)                         |
| TSO     | technical standard order                              |
| UAS     | unmanned aircraft system                              |
| UAV     | unmanned aerial vehicle                               |
| VFR     | visual flight rules                                   |
| VHF     | very high frequency                                   |
| VLL     | very low level  |
| VLOS    | visual line-of-sight                                  |
| VMC     | visual meteorological conditions                      |

DRAFT



## **1. GENERAL**

### **1.1 PURPOSE**

- 1.1.1 The purpose of this Directive is to supplement the provisions of the Ghana Civil Aviation (Safety) Regulations, 2011, L.I. 2000.
- 1.1.2 To ensure safety in the operation of RPAS, this Directive shall address the protection of persons and property from mid-air collisions (MACs), accidents and incidents involving RPAS.
- 1.1.3 This Directive shall provide Remotely Piloted Aircraft Systems (RPAS) operators with the required rules and regulations needed to safely integrate RPAS operations into Ghana's airspace system.
- 1.1.4 A reference in this Directive to the GCARs shall be construed as a reference to the said GCARs for the time being amended by any provision in Technical Directives, Security Directives or a GCAD.
- 1.1.5 An RPA shall be operated in such a manner as to minimize hazards to persons, property or other aircraft and in accordance with the conditions specified in this Directive.
- 1.1.6 These hazards relate to all RPAS operations irrespective of the purpose of the operation.
- 1.1.7 No person shall control more than one RPA with an RPS at any given time unless otherwise authorised by the Authority.
- 1.1.8 No person shall operate an RPAS for commercial purposes unless the person holds an RPAS Operating Certificate (ROC) issued by the Authority.
- 1.1.9 Certification of RPAS Operators shall be done in accordance with Part 5 of the GCARs and or GCADs.

- 1.1.10 Operators of RPAS are forbidden from flying in restricted, prohibited, danger areas and Special Use Areas (SUA) as published in the Ghana Aeronautical Information Publication (AIP).
- 1.1.11 Operators of RPAS shall not fly above 400 feet without prior notification and approval by the Air Traffic Services.
- 1.1.12 Notwithstanding 1.1.10, RPAS shall not to be operated within 10 kilometres from an airport or helipad having operational control with published Instrument Flight Procedure, and 5 kilometres from an airport or helipad without a published Instrument Flight Procedure.
- 1.1.13 RPAS shall not be operated at night without prior authorisation by the Authority.
- 1.1.14 No person shall import, operate or provide maintenance services for an RPAS without the written approval of the Authority.
- 1.1.15 Operators shall comply with the appropriate noise control, emissions and privacy regulations. Approvals granted to operators of RPAS by the Authority shall not relieve the operator of his duty to comply with any other laws or regulations of other relevant governmental agencies.
- 1.1.16 Recreational RPAS operators are limited to Visual Line of Sight operations.

## **1.2 APPLICABILITY**

- 1.2.1 This Directive sets out the requirements for the operation of unmanned aircraft including model aircraft.
- 1.2.2 All unmanned aircraft, whether remotely piloted, fully autonomous or combinations thereof, are subject to the provisions of this Directive.
- 1.2.3 Nothing in this Directive applies to the operation of:
- a) a manned balloon or a hot air balloon; or

- b) a control-line aircraft (that is, a model aircraft that is constrained to fly in a circle, and is controlled in attitude and altitude, by means of inextensible wires attached to a handle held by the person operating the model); or
- c) an aircraft indoors; or
- d) an unmanned airship indoors; or
- e) a small balloon within 100 metres of a structure and not above the top of the structure; or
- f) an unmanned tethered balloon that remains below 400 feet above ground level.

1.2.4 For paragraphs (c) and (d), a flight does not take place indoors if the building in which it takes place has the roof, or one or more walls, removed.

1.2.5 This Directive, unless specified otherwise, applies equally to commercial air transport and general aviation, including aerial work operations conducted by RPAS.

1.2.6 All requirements for manned aircraft operations, unless otherwise specified in this Directive are applicable to RPAS operations.

### 1.3 DEFINITIONS

a. For the purpose of Part 28, the following definitions shall apply-

1.3.1 **Accident.** An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

- a) a person is fatally or seriously injured as a result of:
  - i. being in the aircraft, or

- ii. direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
- iii. direct exposure to jet blast,

*except* when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:

- i. adversely affects the structural strength, performance or flight characteristics of the aircraft, and
- ii. would normally require major repair or replacement of the affected component,

*except* for engine failure or damage, when the damage is limited to a single engine (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or

c) the aircraft is missing or is completely inaccessible.

1.3.2 ***Aerial work.*** An aircraft operation in which an aircraft is used for specialized services such as agriculture, construction, photography, surveying, observation and patrol, search and rescue, aerial advertisement.

1.3.3 ***Aerodrome.*** A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

1.3.4 ***Aeroplane.*** A power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight.

1.3.5 ***Airborne collision avoidance system (ACAS).*** An aircraft system based

- on secondary surveillance radar (SSR) transponder signals which operates independently of ground-based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponders.
- 1.3.6 **Aircraft.** Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.
- 1.3.7 **Aircraft category.** Classification of aircraft according to specified basic characteristics, e.g. aeroplane, helicopter, glider, free balloon.
- 1.3.8 **Air traffic.** All aircraft in flight or operating on the manoeuvring area of an aerodrome.
- 1.3.9 **Air traffic control clearance.** Authorization for an aircraft to proceed under conditions specified by an air traffic control unit.
- 1.3.10 **Air traffic control service.** A service provided for the purpose of:
- a) preventing collisions:
    - i. between aircraft, and
    - ii. on the manoeuvring area between aircraft and obstructions;  
and
  - b) expediting and maintaining an orderly flow of air traffic
- 1.3.11 **Air traffic control unit.** A generic term meaning variously, area control centre, approach control unit or aerodrome control tower.
- 1.3.12 **Air traffic service.** A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).
- 1.3.13 **Air traffic services unit.** A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.
- 1.3.14 **Automatic dependent surveillance — broadcast (ADS-B).** A means by which aircraft, aerodrome vehicles and other objects can automatically transmit and/or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link.

- 1.3.15 **Autonomous aircraft.** An unmanned aircraft that does not allow pilot intervention in the management of the flight.
- 1.3.16 **Autonomous operation.** An operation during which a remotely piloted aircraft is operating without pilot intervention in the management of the flight.
- 1.3.17 **Command and control (C2) link.** The data link between the remotely piloted aircraft and the remote pilot station for the purposes of managing the flight.
- 1.3.18 **Commercial RPAS operation.** All RPAS operation for remuneration or hire.
- 1.3.19 **Conspicuity.** Quality of an aircraft (e.g. lighting or paint scheme), allowing it to be easily seen or noticed by others (e.g. by pilots, ATCOs, aerodrome personnel).
- 1.3.20 **Continuing airworthiness.** The set of processes by which an aircraft, engine, propeller or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life.
- 1.3.21 **Control area.** A controlled airspace extending upwards from a specified limit above the earth.
- 1.3.22 **Controlled aerodrome.** An aerodrome at which air traffic control service is provided to aerodrome traffic.
- 1.3.23 **Controlled airspace.** An airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification.
- 1.3.24 **Controlled flight.** Any flight which is subject to an air traffic control clearance.
- 1.3.25 **Controller-pilot data link communications (CPDLC).** A means of communication between controller and pilot, using data link for ATC communications.
- 1.3.26 **Control zone.** A controlled airspace extending upwards from the surface of the earth to a specified upper limit.
- 1.3.27 **Data link communications.** A form of communication intended for the

- exchange of messages via a data link.
- 1.3.28 ***Detect and avoid.*** The capability to see, sense or detect conflicting traffic or other hazards and take the appropriate action.
- 1.3.29 ***Fatigue.*** A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety-related duties.
- 1.3.30 ***Fatigue risk management system (FRMS).*** A data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.
- 1.3.31 ***Flight data analysis.*** A process of analysing recorded flight data in order to improve the safety of flight operations.
- 1.3.32 ***Flight duty period.*** A period which commences when a remote crew member is required to report for duty that includes a flight or a series of flights and which finishes when the remote crew member's duty ends.
- 1.3.33 ***Flight plan.*** Specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft.
- 1.3.34 ***Flight recorder.*** Any type of recorder installed in the aircraft for the purpose of complementing accident/incident investigation. In the case of remotely piloted aircraft, it also includes any type of recorder installed in a remote pilot station for the purpose of complementing accident/incident investigation.
- 1.3.35 ***Flight time — aeroplanes.*** The total time from the moment an aeroplane first moves for the purpose of taking off until the moment it finally comes to rest at the end of the flight.
- 1.3.36 ***Flight time — helicopters.*** The total time from the moment a helicopter's rotor blades start turning until the moment the helicopter finally comes to rest at the end of the flight, and the rotor blades are

stopped.<sup>1</sup>

- 1.3.37 **Flight visibility.** The visibility forward from the cockpit of an aircraft in flight
- 1.3.38 **General aviation operation.** An aircraft operation other than a commercial air transport operation or an aerial work operation.<sup>2</sup>
- 1.3.39 **Handover.** The act of passing piloting control from one remote pilot station to another.
- 1.3.40 **Helicopter.** A heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.
- 1.3.41 **Human Factors principles.** Principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.
- 1.3.42 **Human performance.** Human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.
- 1.3.43 **IFR.** The symbol used to designate the instrument flight rules.
- 1.3.44 **IFR flight.** A flight conducted in accordance with the instrument flight rules.
- 1.3.45 **Incident.** An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.
- Note.— The types of incidents include the incidents listed in Annex 13.*
- 1.3.46 **Instructions for continuing airworthiness (ICA).** A set of descriptive data, maintenance planning and accomplishment instructions, developed by a design approval holder in accordance with the certification basis for the aeronautical product. The ICAs provide air operators with the necessary information to develop their own

---

<sup>1</sup>The Authority shall provide guidance in those cases where the definition of flight time does not describe or permit normal practices. Examples are: crew change without stopping the rotors and rotors running engine wash procedure following a flight. In any case, the time when rotors are running between sectors of a flight is included within the calculation of flight time.

This definition is intended only for the purpose of flight and duty time regulations.

<sup>2</sup>General aviation operation is applicable for manned aviation only.



maintenance programme and also for approved maintenance organizations to establish the accomplishment instructions.

- 1.3.47 ***Instrument meteorological conditions (IMC).*** Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.
- 1.3.48 ***Landing area.*** That part of a movement area intended for the landing or take-off of aircraft.
- 1.3.49 ***Maintenance.*** The performance of tasks required to ensure the continuing airworthiness of an aircraft, including any one or combination of overhaul, inspection, replacement, defect rectification and the embodiment of a modification or repair.
- 1.3.50 ***Maintenance organization's procedures manual.*** A document which details the maintenance organization's structure and management responsibilities, scope of work, description of facilities, maintenance procedures, and quality assurance, or inspection systems. This document is normally endorsed by the head of the maintenance organization.
- 1.3.51 ***Maintenance programme.*** A document which describes the specific scheduled maintenance tasks and their frequency of completion and related procedures, such as a reliability programme, necessary for the safe operation of those aircraft to which it applies.
- 1.3.52 ***Manoeuvring area.*** That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.
- 1.3.53 ***Master minimum equipment list (MMEL).*** A list established for a particular aircraft type by the organization responsible for the type design with the approval of the State of Design containing items, one or more of which is permitted to be unserviceable at the commencement of a flight. The MMEL may be associated with special operating conditions, limitations or procedures.
- 1.3.54 ***Minimum equipment list (MEL).*** A list which provides for the operation of aircraft, subject to specified conditions, with particular

- equipment inoperative, prepared by an operator in conformity with, or more restrictive than, the MMEL established for the aircraft type.
- 1.3.55 **Movement area.** That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).
- 1.3.56 **Night.** The hours between the sunset and sunrise.
- 1.3.57 **Operational control.** The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight.
- 1.3.58 **Operations manual.** A manual containing procedures, instructions and guidance for use by operational personnel in the execution of their duties.
- 1.3.59 **Operations specifications.** The authorizations, conditions and limitations associated with the RPAS operator certificate and subject to the conditions in the operations manual.
- 1.3.60 **Operator.** A person, organization or enterprise engaged in or offering to engage in an aircraft operation.<sup>3</sup>
- 1.3.61 **Populous Area.** Congested area of cities, towns or settlements or an open air assembly.
- 1.3.62 **Remote crew member.** A crew member charged with duties essential to the operation of a remotely piloted aircraft system during a flight duty period.
- 1.3.63 **Remote cruise relief pilot.** A remote flight crew member who is assigned to perform remote pilot tasks during cruise flight, to allow the remote pilot-in-command to obtain planned rest.
- 1.3.64 **Remote flight crew member.** A licensed crew member charged with duties essential to the operation of a remotely piloted aircraft system during a flight duty period.
- 1.3.65 **Remote pilot.** A person charged by the operator with duties essential to the operation of a remotely piloted aircraft and who manipulates the flight controls, as appropriate, during flight time.

---

<sup>3</sup> In the context of remotely piloted aircraft, an aircraft operation includes the remotely piloted aircraft system.

- 1.3.66 **Remote pilot-in-command.** The remote pilot designated by the operator as being in command and charged with the safe conduct of a flight.
- 1.3.67 **Remote Pilot Station (RPS).** The component of the remotely piloted aircraft system containing the equipment used to pilot the remotely piloted aircraft.
- 1.3.68 **Remotely piloted aircraft (RPA).** An unmanned aircraft which is piloted from a remote pilot station.
- 1.3.69 **Remotely piloted aircraft system (RPAS).** A remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other components as specified in the type design. (Also referred to as Unmanned Aircraft System (UAS)).
- 1.3.70 **Remotely piloted aircraft system operating manual.** A manual, acceptable to the State of the Operator, containing normal, abnormal and emergency procedures, checklists, limitations, performance information, details of the RPA and each associated RPS model and other material relevant to the operation of the remotely piloted aircraft system.<sup>4</sup>
- 1.3.71 **Required communication performance (RCP).** A statement of the performance requirements for operational communication in support of specific ATM functions.
- 1.3.72 **Required communication performance type (RCP type).** A label (e.g. RCP 240) that represents the values assigned to RCP parameters for communication transaction time, continuity, availability and integrity.
- 1.3.73 **Rest period.** A continuous and defined period of time, subsequent to and/or prior to duty, during which remote crewmembers are free of all duties.
- 1.3.74 **Risk mitigation.** The process of incorporating defences or preventive controls to lower the severity and/or likelihood of a hazard's projected consequence.
- 1.3.75 **Rotorcraft.** A power-driven heavier-than-air aircraft supported in flight

---

<sup>4</sup> The remotely piloted aircraft system operating manual is part of the operations manual.

- by the reactions of the air on one or more rotors.
- 1.3.76 **RPA observer.** A trained and competent person designated by the operator who, by visual observation of the remotely piloted aircraft, assists the remote pilot in the safe conduct of the flight.
- 1.3.77 **RPAS operator certificate (ROC).** A certificate authorizing an operator to carry out specified RPAS operations.
- 1.3.78 **Safety.** The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level.
- 1.3.79 **Safety management system (SMS).** A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.
- 1.3.80 **Safety performance.** The Authority's or a service provider's safety achievement as defined by its safety performance targets and safety performance indicators.
- 1.3.81 **Safety performance indicator.** A data-based safety parameter used for monitoring and assessing safety performance.
- 1.3.82 **Safety risk.** The predicted probability and severity of the consequences or outcomes of a hazard.
- 1.3.83 **Segregated airspace.** Airspace of specified dimensions allocated for exclusive use to a specific user(s).
- 1.3.84 **State of Design.** The State having jurisdiction over the organization responsible for the type design.
- 1.3.85 **State of Manufacture.** The State having jurisdiction over the organization responsible for the final assembly of the aircraft.
- 1.3.86 **State of Registry.** The State on whose register the aircraft is entered.
- 1.3.87 **State of the Operator.** The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.
- 1.3.88 **State safety programme (SSP).** An integrated set of regulations and activities aimed at improving safety.
- 1.3.89 **Target level of safety (TLS).** A generic term representing the level of

risk which is considered acceptable in particular circumstances.

1.3.90 **Traffic avoidance advice.** Advice provided by an air traffic services unit specifying manoeuvres to assist a pilot to avoid a collision.

1.3.91 **Traffic information.** Information issued by an air traffic services unit to alert a pilot to other known or observed air traffic which may be in proximity to the position or intended route of flight and to help the pilot avoid a collision.

1.3.92 **Type certificate.** A document issued by a State to define the design of an aircraft type and to certify that this design meets the appropriate airworthiness requirements of that State.

1.3.93 **Unmanned free balloon.** A non-power-driven, unmanned, lighter-than-air aircraft in free flight.

1.3.94 **VFR.** The symbol used to designate the visual flight rules.

1.3.95 **VFR flight.** A flight conducted in accordance with the visual flight rules.

1.3.96 **Visibility.** Visibility for aeronautical purposes is the greater of:

- a) the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background;
- b) the greatest distance at which lights in the vicinity of 1000 candelas can be seen and identified against an unlit background.

*Note 1.— The two distances have different values in air of a given extinction coefficient, and the latter b) varies with the background illumination. The former a) is represented by the meteorological optical range (MOR).*

*Note 2.— The definition applies to the observations of visibility in local routine and special reports, to the observations of prevailing and minimum visibility reported in the aerodrome routine meteorological report (METAR) and aerodrome special meteorological report (SPECI) and to the observations of ground visibility.*

1.3.97 **Visual line-of-sight (VLOS) operation.** An operation in which the remote pilot or RPA observer maintains direct unaided visual contact with the remotely piloted aircraft.

1.3.98 **Visual meteorological conditions (VMC).** Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.

## 2. SPECIAL AUTHORISATION

2.1 No person shall operate an RPAS in the following operations without special authorisation from the Authority:

- a) The carriage of goods;
- b) The carriage of dangerous goods;
- c) Night operations;
- d) Banner towing;
- e) Cross border operations;
- f) Hazardous operations;
- g) Dropping and discharging of things;
- h) Acrobatic and formation flights;
- i) Operations near aerodromes;
- j) Operations in areas of high RF transmission/interference (e.g. radar sites, high tension wires).<sup>5</sup>

2.2 A request for special authorization shall be made in a form and manner as prescribed by the Authority.

2.3 The request for authorization shall be made not less than thirty days before the date of intended operation.

---

<sup>5</sup> The Authority reserves the right to revise these operations as contained in this provision.

- 2.4 Copies of all pertinent certificates, the licences of the remote pilots and the Radio Station Licence shall be included with the request for special authorization.

### **3. TYPE CERTIFICATION AND AIRWORTHINESS APPROVALS**

#### **3.1 Type Certification and Airworthiness Approvals**

- 3.1.1 The original issuance of an aircraft Type Certification by the State of Design shall be deemed to be satisfactory evidence that the design and details of such aircraft type have been reviewed and found to comply with the applicable airworthiness standards. This shall apply for all RPAS, such as the RPA, the RPS, C2 links and other components of the RPAS.

#### **3.2 Large RPAS —Requirement for Certificate**

- 3.2.1 No person shall operate a large RPAS without a special certificate of airworthiness (restricted category), or an experimental certificate issued by the Authority.

#### **3.3 Maintenance of Large RPAS**

- 3.3.1 No person shall carry out maintenance on a large RPAS without authorisations from the Authority.

#### **3.4 RPAS Operator's Maintenance Responsibilities**

- 3.4.1 No person shall operate an RPAS unless the components of the RPAS are maintained in an airworthy condition.
- 3.4.2 No person shall operate an RPAS unless the operational and emergency equipment necessary for the intended flight are serviceable.
- 3.4.3 The RPAS operator shall establish and implement a maintenance programme in accordance with the manufacturer's recommendation and approved by the Authority.
- 3.4.4 An RPAS operator shall not operate an RPAS unless it is maintained and released to service by an approved maintenance organization or under an equivalent system, either of which shall be approved by the Authority. Where

the Authority accepts an equivalent system, the person signing the maintenance release shall be duly licensed.

3.4.5 For the purpose of this Directive, the term “maintenance organization” means either an approved maintenance organization or an equivalent system, either of which is acceptable to the Authority.

### **3.5 RPAS Operator’s Maintenance Control Manual (MCM)**

3.5.1 The operator shall provide for the use and guidance of personnel concerned, an MCM approved by the Authority.

### **3.6 Maintenance Programme**

3.6.1 The RPAS operator shall establish and provide, for the use and guidance of personnel concerned, a maintenance programme, approved by the Authority.

### **3.7 Maintenance Manuals**

3.7.1 No Operator shall be granted an Airworthiness Certificate, unless the Operator provides the Authority with Maintenance Manuals which provide guidance for the Operator’s technical personnel in carrying out maintenance, for approval.

3.7.2 The Maintenance Manual shall contain the maintenance instructions and associated checklists.

3.7.3 No Operator shall amend or modify its Maintenance Manual without the prior approval of the Authority.

### **3.8 Continuing Airworthiness**

3.8.1 No person shall operate an RPAS which has a Type Certificate without a Certificate of Airworthiness issued, approved or validated by the Authority.

3.8.2 The processes to maintain conformity to the type design and ensure continuing airworthiness through periodic maintenance and inspections as well as mandatory corrective actions (e.g. airworthiness directives) shall be deemed to be equally applicable to the individual components of the RPAS.



## **4. RPA REGISTRATION**

4.1 No person may operate an RPAS without having been registered by the Authority.

4.2 Registration and marking of RPAS shall be in accordance with Part 4 of the GCARs and or GCADs.

4.3 Measurements of the marks shall be determined by the Authority taking into account the size of the RPAS.

### **4.4 Classification of RPAS**

4.4.1 The following classifications shall apply in the operations of RPAS:

a) Small RPAS: Unmanned aircraft with maximum take-off weight up to 1.5 kg, and shall be flown only within the visual line of sight of the pilot.

b) Light RPAS: Unmanned aircraft with maximum take-off weight of more than 1.5 kg but less than or equal to 7 kg, and shall be flown only within the visual line of sight of the pilot.

c) Large RPAS: Unmanned aircraft with maximum take-off weight of more than 7 kg which shall be flown either within the visual line of sight of the pilot or beyond the visual line of sight of the pilot with prior authorisation of Air Traffic Services.

## **5. ISSUANCE OF PERMIT**

5.1 No person shall fly an RPAS without a permit issued by the Authority.

5.2 The Authority shall issue a permit in respect of an RPAS for operation. Such a permit shall enable the operator to fly the specified RPAS within the Republic of Ghana subject to the conditions given therein.

5.3 The permit shall be renewed by the Authority on an annual basis from the date of issuance.

- 5.4 The permit may be surrendered, suspended, revised or revoked in accordance with the provisions of the GCARs and or GCADs.
- 5.5 Non-conformity with the conditions of the permit or operations outside the limitations of the RPAS as described in the RPAS Operating Manual for the specific RPAS shall lead to suspension of the validity of the permit.

## **6. SAFETY MANAGEMENT**

### **6.1 Safety Management Systems (SMS)**

- 6.1.1 No person shall operate an RPAS without having an approved SMS which will allow an effective identification of systemic safety deficiencies found in RPAS operations, as well as the resolution of safety concerns.
- 6.1.2 For purposes of safety data collection, analysis and exchange, the Authority encourages RPAS Operators to participate in a non-punitive voluntary incident reporting system.
- 6.1.3 Notwithstanding 6.1.2, RPAS Operators shall promptly report to the Authority any occurrence which leads to an incident or accident or which has the potential of becoming an incident or accident.

### **6.2 Hazard Identification and Risk Analysis**

- 6.2.1 RPAS Operators shall maintain a hazard identification system as approved by the Authority.

### **6.3 Emergency Response Planning**

- 6.3.1 No person shall operate an RPAS without having established an effective emergency response plan.

## **7. LICENSING AND COMPETENCIES**

- 7.1 RPAS pilots shall have the same basic responsibilities as pilots of manned aircraft for the operation of the RPAS in accordance with the rules of the air, laws, regulations and procedures of Ghana.
- 7.2 An applicant for a remote pilot licence shall not be less than 18 years of age.

7.3 The Authority shall review the competencies of RPAS pilots to ensure that their knowledge, skills and attitude are appropriate for RPAS operations.

7.4 No person shall act as an RPAS Pilot unless he or she holds a current Medical Class III Certificate in accordance with Part 8 of the GCARs and or GCADs.

7.5 The period of validity of a Class III Medical Certificate shall be from the date of the medical examination for a period not greater than 48 months, reduced to 24 months when the licence holder has passed his/her 40th birthday.

## **7.6 Obligation for Personnel to Carry Documents**

7.6.1 No remote pilot shall operate an RPAS unless he/she has in his/her possession a valid Remote Pilot Licence approved by the Authority.

7.6.2 No person shall act as an RPA observer without having in his/ her possession proof of RPA observer competency issued by a training organization approved by the Authority.

7.6.3 The remote pilot shall meet the requirements for recency experience established by the Authority.

## **7.7 Language Proficiency**

7.7.1 An RPAS pilot whose operation will require the pilot to communicate, via VHF radio with ATS, shall provide the Authority with a Radiotelephony Licence and an English Language Proficiency Certificate.

7.8 No student remote pilot shall act as a solo remote pilot of an RPAS except under the supervision of, or with the authority of, an authorized RPAS instructor.

## **7.9 Privileges and Conditions**

7.9.1 No person shall operate an RPAS without a licence issued by the Authority.

7.9.2 No RPAS pilot shall operate an RPAS except in accordance with the ratings, limitations or endorsements of their licence.

7.9.3 The exercise of the privileges granted by a remote pilot licence shall depend on the validity of the licence, the medical certificate and if applicable, of the ratings contained in the licence.

7.9.4 An RPAS piloting licence shall be valid for a period of five (5) years, renewable every year upon proof of a valid medical certificate.

## **7.10 RPAS Instructor- General Prerequisites and Requirements**

7.10.1 No person shall act as an RPAS instructor unless authorized by the Authority.

7.10.2 No person shall be authorised by the Authority as an RPAS instructor unless he/ she:

- a) holds a Remote Pilot Licence with appropriate category, class and type rating(s) for which the privilege to instruct is being sought;
- b) has sufficient training and experience to attain the required level of proficiency in all of the required tasks, manoeuvres, operations and principles, and methods of instruction; and
- c) is entitled to act as remote Pilot In Command (PIC) of the RPAS during such RPAS instruction.

7.10.3 An RPAS instructor shall receive refresher training, and be reassessed using a documented training and assessment process approved by the Authority and implemented by a certificated or approved organization, at an interval of not more than two (2) years.

## **7.11 Staff positions and requirements**

7.11.1 Each ROC holder shall:

- a) appoint an accountable manager, who has the authority for ensuring that all activities can be financed and carried out in accordance with the applicable requirements. The accountable manager shall be responsible for establishing and maintaining an effective management system;
- b) nominate a person or group of persons with the responsibility of ensuring that the operator remains in compliance with the applicable regulations.

Such person(s) shall be ultimately responsible to the accountable manager;

- c) have sufficient qualified and competent personnel for the planned tasks and activities to be performed in accordance with the applicable requirements;
- d) maintain appropriate experience, qualification and training records to show compliance with c); and
- e) ensure that all personnel are familiar with the rules and procedures applicable to the performance of their duties;
- f) establish initial and recurrent training to ensure continuing competence of its personnel.

## **7.12 Record-keeping**

7.12.1 An ROC holder shall establish a system of record-keeping that allows adequate storage and reliable traceability of all activities developed, covering at a minimum:

- a) flight records;
- b) operator's organization;
- c) SMSs;
- d) personnel training and competence verification;
- e) documentation of all management system key processes;
- f) maintenance records; and
- g) security management records.

7.12.2 Records shall be maintained by the ROC holder in safe custody for a period as specified in Part 9 of the GCARs and or GCADs.

### **7.13 Documents held by the RPAS operator**

7.13.1 The following documents, manuals and information specific to the RPAS operator, shall be made available to the Authority, in their authentic form, at the location of the RPAS operator's operational management or any other location specified by the Authority:

- a) ROC;
- b) operations specifications relevant to the RPA and RPS models, associated with the ROC;
- c) operations manual, including the RPAS operating manual and the RPS manual;
- d) RPA/RPAS flight manual;
- e) maintenance control manual (MCM);
- f) third party liability insurance certificate(s);
- g) certificate of registration of each RPA;
- h) C of A/ permit of each RPA;
- i) certificates of any additional RPAS components, if applicable;
- j) all radio station licences, if applicable;
- k) all noise certificates, if applicable;
- l) notification of special loads, if applicable; and
- m) cargo manifests, if applicable.

### **7.14 Documents at the RPS(s)**

7.14.1 Documents, manuals and information, including, but not limited to the following, shall be available at the RPS(s) planned to be used during the flight:

- a) operations manual including the MEL, CDL, RPAS operating manual and RPS manual;

- b) RPA/RPAS flight manual;
- c) operations specifications relevant to the RPA and RPS models associated with the ROC;
- d) journey log book for the RPA;
- e) MCM, maintenance log book and technical log for the RPA;
- f) MCM, maintenance log book and technical log for the RPS;
- g) details of the filed, current, ATS and operational flight plans, if applicable;
- h) current and suitable aeronautical charts for the route of flight and all routes along which it is reasonable to expect that the flight may be diverted, including departure, arrival and approach charts for all relevant aerodromes/heliports;
- i) information concerning search and rescue services for the area of the intended flight;
- j) notice to airmen (NOTAM) and aeronautical information service (AIS) briefing documentation;
- k) meteorological information;
- l) fuel requirements, fuel load and records;
- m) cargo manifests and information on dangerous goods, if applicable;
- n) mass and balance documentation; and
- o) any other documentation that may be pertinent to the flight or required by the Authority and or any other state involved in the operation.

## **7.15 Documents Carried on Board the RPA**

- 7.15.1 The following documents shall be available on board each RPA where practicable:
- a) ROC (certified true copy);

- b) certificate of registration of the RPA (certified true copy);
- c) C of A/ permit of the RPA (certified true copy);
- d) licences of each remote pilot involved in the current flight (certified true copies);
- e) journey log book;
- f) operations specifications;
- g) cargo manifests and information on dangerous goods, if applicable;
- h) noise certificate, if applicable; and
- i) aircraft radio station licence (certified true copy).

7.15.2 Where the documents listed above cannot be carried on board the RPA due to design limitations, they shall be made available at the RPS or in close proximity of the RPA ground operations area(s).

## **7.16 Documents at or In Close Proximity Of The RPA Ground Operations Area**

7.16.1 Documents, manuals and information, including, but not limited to the following, shall be available at or in close proximity of the RPA ground operations area(s):

- a) RPA flight manual, or pertinent subset thereof; and
- b) cargo manifests and information on dangerous goods, if applicable.

7.17 The documents in the aforementioned lists may be submitted to the Authority in either hard or electronic copy formats.

## **7.18 Operating Facilities**

7.18.1 No flight shall be commenced by an RPAS operator unless it has been ascertained by every reasonable means available, that the ground, space, air and/or water facilities available and directly required on such flight, for the safe operation of the RPAS, are adequate for the type of operation under



which the flight is to be conducted and are adequately operated for this purpose.

- 7.18.2 An RPAS operator shall report any inadequacy of facilities observed during the course of operations to the concerned ATS provider, if applicable, without undue delay.

## **7.19 Maintenance records**

7.19.1 The RPAS operator shall ensure that records associated with the maintenance of all components of the RPAS are received from the maintenance organization and retained in accordance with the RPAS operator's approved procedures, MCM and the GCARs and or GCADs.

7.19.2 The following maintenance records shall be kept by the RPAS operator for a period as specified in the GCARs and or GCADs;

- a) the total time in service (hours, calendar time and cycles, as appropriate) of the RPA and all life-limited components:
- b) the current status of compliance with all mandatory continuing airworthiness information;
- c) appropriate details of modifications and repairs;
- d) the time in service (hours, calendar time and cycles, as appropriate) since the last overhaul of the RPA or its components subject to a mandatory overhaul life; and
- e) the current status of the RPA's compliance with the maintenance programme.

## **7.20 Modifications and Repairs**

7.20.1 No RPAS operator shall make modifications and or repairs to the RPAS components unless such modifications and or repairs are made in compliance with airworthiness requirements acceptable to the Authority.

- 7.20.2 The RPAS operator shall establish procedures to ensure that the substantiating data supporting compliance with the airworthiness requirements are retained in accordance with the GCARs and or GCADs.
- 7.20.3 The RPAS operator shall carry out maintenance of the RPAS in accordance with the approved maintenance programme.

## **8. RPAS OPERATIONS**

### **8.1 RPAS Operating Certificate (ROC)**

- 8.1.1 No person holding an ROC shall conduct its operations in contravention with the conditions and limitations detailed in the operations specifications attached to the ROC.
- 8.1.2 An applicant shall not be issued an ROC by the Authority unless the applicant demonstrates an adequate organization, method of control and supervision of flight operations, training programme as well as ground handling and maintenance arrangements consistent with the nature and extent of the operations specified and commensurate with the size, structure and complexity of the organization.
- 8.1.3 The scope of control and supervision by the Authority shall include all phases of RPA operations and use of one or more RPS located at one or more sites.
- 8.1.4 The Authority shall subject the commercial RPAS operator to continued surveillance to ensure that the required standards of operations are maintained.
- 8.1.5 Each ROC holder shall, at all times, operate in compliance with the ROC terms, conditions of issuance, and maintenance requirements in order to hold that certificate.
- 8.1.6 An RPAS Operator's ROC shall be revoked or suspended by the Authority if the RPAS Operator fails to comply with the terms, conditions of issuance, and maintenance requirements in accordance with the GCARs and or GCADs.

8.1.7 Where the ROC is revoked, varied or suspended, the RPAS operator shall return the Certificate to the Authority within 48 hours of receipt of the notice of revocation, variation or suspension.

8.1.8 The Operator's ROC shall be valid for a period of one (1) year unless revoked, varied or suspended by the Authority.

8.1.9 Each ROC holder shall apply for the renewal of its certificate on a yearly basis.

## **8.2 Operational Guidelines**

8.2.1 The provisions of the GCARs and GCADs in respect of Operational flight planning shall also apply to RPAS operations.

8.2.2 No ROC holder shall operate without established procedures to ensure a seamless operation throughout the duration of the flight, including remote pilots who can carry out the responsibilities for the different phases of the flight such as take-off, climb, cruise, approach and landing, all of which shall be included in the operations manual.

8.2.3 Notwithstanding 8.2.2, no persons shall fly an RPAS 400 feet Above Ground Level (AGL) without complying with the provisions of this section.

## **8.3 Operations Manual**

8.3.1 No person shall operate an RPAS in commercial operations without an Operations Manual approved by the Authority in accordance with Part 9 of the GCARs and GCADs.

8.3.2 Commercial RPAS Operators shall provide Operations Manuals for the use and guidance of the RPAS operations personnel concerned.

8.3.3 The Operations Manual shall be amended or revised as is necessary to ensure that the information contained therein is kept up to date.

8.3.4 No person shall amend or revise the Operations Manual without the prior approval and authorisation by the Authority.

8.3.5 The RPAS operator shall incorporate in the Operations Manual such mandatory material as the Authority shall authorise.

#### **8.4 RPAS Operating Manual**

8.4.1 The RPAS operator shall provide the remote flight crew and designated operations staff with an RPAS Operating Manual, for each RPA type operated, which includes each associated RPS model, containing the normal, abnormal and emergency procedures relating to the operation of all the relevant systems associated with the operation of each RPA and of the checklists to be used.

8.4.2 The RPAS Operating Manual shall be part of the Operations Manual.

#### **8.5 Environmental Considerations**

8.5.1 No person shall operate an RPAS without adhering to meteorological conditions consistent with its performance limitations.

8.5.2 The remote pilot shall review all available meteorological information pertaining to the operation and performance limitations of the RPAS. The RPAS Operator shall take into consideration conditions such as:

- a) surface visibility;
- b) wind direction/speed;
- c) hazardous meteorological conditions including cumulonimbus, icing and turbulence; and
- d) upper air temperature.

8.5.3 Flight into known or expected icing conditions shall not be conducted unless the system is certificated and equipped for flight into those conditions, with the icing protection systems operational in accordance with the MEL, and the remote pilot is current in, and qualified for, cold weather operations.

#### **8.6 Operations Considerations**

##### **8.6.1 Visual line-of-sight operations (VLOS)**

- 8.6.1.1 No RPAS Operator shall operate an RPAS for VLOS without maintaining a continuous unobstructed view of the RPA, allowing the remote pilot and/or RPA observer to monitor the RPA's flight path in relation to other aircraft, persons, obstacles (e.g. vehicles, vessels, structures, terrain), for the purpose of maintaining separation and avoiding collisions.
- 8.6.1.2 No RPAS Operator shall operate VLOS operations with visual aids such as telescope, binoculars, electro-optical reproduced or enhanced vision, other than corrective lenses.
- 8.6.1.3 No RPAS Operator operating VLOS operations shall operate in such meteorological conditions that the remote pilot or RPA observer is unable to avoid conflicting traffic and other safety risks related to the hazards present in the operating environment.

## **8.6.2 Beyond VLOS(BVLOS) Operations**

- 8.6.2.1 No RPAS Operator shall conduct flights beyond VLOS of the remote pilot or RPA observer, without a means available to the remote pilot to Detect And Avoid (DAA) traffic and all other hazards such as hazardous meteorological conditions, terrain and obstacles.
- 8.6.2.2 No RPAS Operator shall conduct a controlled BVLOS operation, without prior coordination with the ATC unit(s) involved regarding:
- a) any operational performance limitations or restrictions unique to the RPA (e.g. unable to perform standard rate turns);
  - b) any pre-programmed lost C2 link flight profile and/or flight termination procedures; and
  - c) direct telephone communication between the RPS and the ATC unit(s) for contingency use, unless otherwise approved by the ATC unit(s) involved.
- 8.6.2.3 Communication between the RPS and the ATC unit(s) shall be as required for the class of airspace in which operations occur and shall utilize standard ATC communications equipment and procedures, unless otherwise approved by the ATC unit(s) involved.
- 8.6.2.4 C2 link transaction time shall be minimized so as not to inhibit the remote pilot's ability to interface with the RPA compared to that of a manned aircraft.

8.6.2.5 No Operator shall conduct BVLOS operations under VFR unless the following conditions are met:

- a) the Authority or any other State in whose airspace the operation occurs has approved the operation;
- b) the RPA remains in VMC throughout the flight; and
- c) a DAA capability or other mitigation is used to assure the RPA remains well clear of all other traffic; or
- d) the area is void of other traffic; or
- e) the operation occurs in specifically delimited or segregated airspace.

## **8.7 Operation in Populous Areas**

8.7.1 Except where necessary for take-off and landing, or except with the permission of the Authority, RPAS shall not be flown over the congested areas of cities, towns or settlements or over an open air assembly of persons, unless at such a height as will permit, in the event of an emergency arising, a landing to be made without undue hazard to persons or property on the surface.

8.7.2 No RPAS Operator shall fly an RPAS within a radius of 30 meters from buildings, vehicles or people.

## **8.8 Take-Off, Launch, Landing and Recovery from Aerodromes**

8.8.1 No person shall operate an RPAS within and around an established aerodrome, without complying with the following:

- a) regulations pertaining to operations on or near an aerodrome;
- b) rules relating to the complexity and density of aircraft operations;
- c) rules relating to ground operations (e.g. taxiway width, condition, other ground traffic);
- d) C2 link continuity;

- e) payload considerations;
- f) wake turbulence;
- g) performance and capability related to take-off distance/run available and minimum obstruction climb requirements, departure procedures and any flight restricting conditions associated with operations to or from the aerodrome; and
- h) availability of emergency recovery areas.

## **8.9 Take-Off, Launch, Landing and Recovery from Places Other Than Aerodromes**

- 8.9.1 No person shall operate an RPAS from a place other than an established aerodrome without adhering to guidelines prescribed in the Implementing Standards.

## **8.10 Recovery Equipment Preparation, Set-Up and Inspection**

- 8.10.1 No RPAS Operator shall set-up, position and operate recovery equipment, except as specified in the Implementing Standards.

## **8.11 RPS Handover**

- 8.11.1 No RPAS Operator shall perform any handover except as specified in the Implementing Standards.

## **8.12 Emergencies and Contingencies**

### **8.12.1 Emergency landing and ditching locations**

- 8.12.1.1 No RPAS Operator shall perform an emergency landing in contravention of its flight planning provisions for emergency landing of the RPA in locations that minimize the safety risks to people or property on the ground.

- 8.12.1.2 RPAS Operators shall comply with provisions relating to emergency landing and ditching locations as specified in the Implementing Standards.

## **8.13 Loss of C2 Link**

8.13.1 No RPAS Operator shall deviate from flight planning procedures in respect of loss of the C2 link as specified in the Implementing Standards.

8.13.2 No RPAS Operator shall operate procedures for the loss of the C2 link without pre-approval by the ATC section of the Authority.

## **8.14 Remote Flight Crew**

### **8.14.1 Duties of The Remote Pilot-In-Command(PIC)**

8.14.1.1 No person shall act as a Remote PIC without adhering to the provisions specified in the Implementing Standards.

## **8.15 Remote Flight Crew Members at Duty Stations**

8.15.1 All remote flight crew members required to be on duty shall remain at their RPS as necessary for the safe operation of the RPAS, except when their absence is necessary for the performance of duties in connection with the operation of the system or for physiological needs.

8.15.2 In a single remote pilot operation, a relief remote pilot shall relieve the remote pilot if the latter needs to be absent from the RPS for any reason.

## **8.16 Accidents and Serious Incidents**

8.16.1 The provisions of Ghana Civil Aviation (Amendment) Act, 2015, Act 906, Schedule 1, and Part 13 of the GCARs and or GCADs shall apply to accidents and incident investigation in respect of RPAS with a design and or operational approval by the Authority.

## **8.17 Security Requirements**

8.17.1 No person shall operate an RPAS unless operated in accordance with the Ghana Civil Aviation (Security) Regulations.

8.17.2 The procedures outlined in the Implementing Standards shall equally be applicable for RPAS operations and storage.



## **9 DETECT AND AVOID**

- 9.1 RPAS Operators shall comply with the requirements on Detect And Avoid (DAA) as specified in the Implementing Standards.

## **10 COMMAND AND CONTROL (C2) LINK**

- 10.1 The RPAS operator shall have in place procedures acceptable to the Authority, to cater for the loss of C2 link.
- 10.2 No delay in data transfer shall affect the safe operation of the RPAS.

## **11 ATC COMMUNICATIONS**

- 11.1 No person shall operate an RPAS in controlled terrain without adhering to ATC instructions and communications in accordance with the GCARs and or GCADs.
- 11.2 In addition to Very High Frequency (VHF) voice, this shall also include the requirement to support ATC data link.
- 11.3 Where the ATC unit involved deems it necessary, this shall include a telephone backup.
- 11.4 No person shall operate an RPAS without an approved procedure to mitigate total loss of communication with ATC.

## **12 REMOTE PILOT STATION (RPS)**

- 12.1 A person shall not operate an RPS without adhering to the procedures in the Implementing Standards.

## **13 USE OF AERODROMES**

- 13.1 No remote pilot shall operate an RPAS from an aerodrome without having identified, in real-time, the physical layout of the aerodrome and associated equipment, such as aerodrome lighting and markings, so as to manoeuvre the aircraft safely and correctly, regardless of the location of the RPS.

13.1.1 No person shall operate an RPAS within an aerodrome or an RPAS only aerodrome without authorisation and adherence to the provisions of the Implementing Standards.

#### **14 ENFORCEMENT**

14.1 In accordance with Act 678 and Act 906, enforcement proceedings shall be taken against all who fail to comply with this Directive.

DRAFT

# GHANA CIVIL AVIATION (SAFETY) DIRECTIVES

## PART 2 – IMPLEMENTING STANDARDS

*For ease of reference, the number assigned to each implementing standard corresponds to its associated regulation. For example, IS 8.9 would reflect a standard required in subsection 8.9*

## **IMPLEMENTING STANDARDS**

### **IS 8.8 Take-Off and Launch from Places Other Than Aerodromes**

8.8.1 For operations from other than established aerodromes, the remote pilot shall consider the following:

- a) take-off/launch area and condition;
- b) location and height of all obstructions that could hinder launch and recovery;
- c) performance and capability related to obstacle clearance, departure procedures (if applicable) and any flight-restricting conditions;
- d) availability of emergency recovery areas;
- e) ATC communications, if required;
- f) C2 link continuity;
- g) payload considerations; and
- h) density and proximity of overflight traffic.

### **IS 8.9 Landing and Recovery At Places Other Than Aerodromes**

8.9 The remote pilot shall consider the following for operations at places other than aerodromes:

- a) landing/recovery area and condition;
- b) location and height of all obstructions that could hinder landing or recovery (e.g. cables, towers, trees);
- c) performance and capability related to obstacle clearance, arrival procedures (if applicable) and any flight-restricting conditions;
- d) availability of emergency recovery areas;
- e) ATC communications, if required;
- f) C2 link continuity;

g) payload considerations; and

h) density and proximity of overflight traffic.

### **IS 8.10 Recovery Equipment Preparation, Set-Up and Inspection**

8.10.1 Set-up, positioning and operation of recovery equipment, if applicable, shall be as recommended by the manufacturer and, if located at an aerodrome, shall be coordinated with the aerodrome operator.

8.10.2 The condition and operability of all recovery hardware, direction and positioning of the recovery crew, and ensuring persons not associated with recovery or landing of the RPA are well clear of the operational area, shall be assured.

8.10.3 The set-up, positioning and operation of recovery equipment shall not adversely affect aerodrome operations.

### **IS 8.11 RPS Handover**

8.11.1 All handovers shall be planned and coordinated as per the procedures in the Operations and or Flight Manual. Handover considerations shall include:

- a) confirmation of the availability of a reliable voice communication link between the transferring and receiving remote pilots in the RPS to support coordination of the handover (it is recommended that this communication is not relayed through the RPA);
- b) status of the receiving RPS (e.g. its readiness and availability, its software configuration and compatibility with the RPA to be handed over);
- c) compatibility of the C2 link (e.g. IP address, frequency);
- d) coordination between the respective remote pilots; and
- e) ATC coordination (e.g. emergency contact telephone number), as necessary.

### **IS 8.12.1 Emergency landing and ditching locations**

- 8.12.1.1 RPAS flight planning shall include provisions for emergency landing of the RPA in locations that minimize the safety risks to people or property on the ground.
- 8.12.1.2 When selecting emergency landing locations, the remote pilot shall consider the following conditions:
- a) terrain, ground obstructions, population density, open air assemblies of people; and
  - b) landing/ditching areas including accessibility for recovery or fire suppression.

### **IS 8.13 Loss Of C2 Link**

- 8.13.1 Flight planning shall include provisions for loss of the C2 link and shall be in accordance with guidance contained in the flight manual and/or operations manual.
- 8.13.2 Procedures for the loss of the C2 link for RPA conducting controlled flights shall be pre-approved by the ATC units involved in each portion of the flight planned route, if so stipulated by the ANSP(s).
- 8.13.3 Remote pilots shall notify the ATC unit immediately upon the procedures being activated for any flight under ATC control or any flight that may affect other ATC controlled flights, manned or unmanned.

### **IS 8.14 Duties of The Remote Pilot-In-Command(PIC)**

- 8.14.1.1 Each remote PIC shall be responsible for the operation and safety of the RPA and RPS for the respective segment of flight assigned by the RPAS operator.
- 8.14.1.2 Transfer of remote PIC responsibilities, if applicable, shall be effected in accordance with procedures established by the RPAS operator and approved by the Authority.
- 8.14.1.3 These procedures shall include a record identifying when the transfer occurred and the remote pilots involved.
- 8.14.1.4 The remote PIC shall be responsible for terminating the flight, in the event such an action is deemed necessary.

8.14.1.5 The remote PIC shall be assigned responsibility by the RPAS operator for ensuring that any handover from one RPS to another is completed in accordance with the procedures contained in the operations manual and/or flight manual, as applicable.

8.14.1.6 The remote PIC(s) shall be responsible for updating all documents for the respective segment of the flight (e.g. the journey log book, maintenance logs).

### **IS 8.17 Security Requirements**

8.17.1 For security purposes, the RPA shall be stored and prepared for flight in a manner that will prevent and detect tampering and ensure the integrity of vital components of the RPAS.

8.17.2 Remote pilots shall be subjected, at a minimum, to the same background check standards as persons granted unescorted access to security restricted areas of airports.

### **IS 9 Detect And Avoid (DAA)**

9.1 RPAS Operators shall comply with the requirements on DAA capabilities or other mitigations (e.g. operational procedures) are required for RPA to limit the risk from the following hazards:

- a) conflicting traffic;
- b) terrain and obstacles;
- c) hazardous meteorological conditions (i.e. thunderstorms, icing, turbulence);
- d) ground operations (aircraft, vehicles, structures or people on the ground);  
and
- e) other airborne hazards, including wake turbulence, wind shear, birds or volcanic ash.

9.2 Where the Authority determines it necessary, safety analyses shall be conducted to establish RPAS capabilities to mitigate consequences of each specific hazard that may be encountered.

### 9.3 Safety Considerations in The Total Aviation System

DAA capability in IFR/VFR operations of an RPAS shall be demonstrated to the Authority to meet the safety, performance and interoperability of this functionality with manned aviation.

## **IS 12 REMOTE PILOT STATION (RPS)**

- 12.1 The RPS shall provide the means for the remote pilots of the RPAS to monitor and control the operation of the RPA both on the ground and in the air. However, the interface between the remote pilot/RPS and the RPA shall be via a C2 link.
- 12.2 The fundamental requirements of the remote pilot/RPS interface shall remain the same as for manned aircraft.
- 12.3 Notwithstanding 12.2, for BVLOS RPS:
- a) adequate information on the environment in which the RPA is operating shall be available to provide the remote pilot sufficient situational awareness to enable the safe operation of the RPA. These displays shall include those necessary to support the DAA functions.
  - b) information on the quality of the C2 link shall be available to the remote pilot, particularly if the quality of service is degrading to a level at which remedial action shall be taken.
  - c) the remote pilot shall be provided with the means to identify proximity to terrain and obstacles unless the approved use of auto-flight systems and planned flight trajectories mitigates the risk from these hazards.
  - d) the RPS shall have the ability to display the location of all other traffic in the vicinity. In addition to the display, audible and visual alerts shall be provided to warn the remote pilot of any significant traffic.
- 12.4 The Authority shall accept BVLOS Category A (direct control) and BVLOS Category B (autopilot control) in Ghana's airspace. However, no BVLOS Category C (waypoint control) shall be accepted by the Authority.



## **12.5 VLOS Control For Take-Off And/Or Landing With Handover To BVLOS**

12.5.1 When VLOS control is used during take-off or landing, with handover to BVLOS control for the en-route segment, for example, when automatic take-off or landing is not available or approved by the aerodrome operator, the following points shall be considered:

- a) operational requirements may necessitate use of an RPA observer or additional remote pilot to maintain visual contact with the RPA; and
- b) VLOS operation of a BVLOS RPA may require use of a different RPS than for the en-route segment.

## **12.6 Integration of RPAS Operations Into ATM And ATM Procedures**

12.6.1 RPAS operations shall conform to the existing airspace requirements.

12.6.2 These airspace requirements shall include, but are not limited to, communication, navigation and surveillance requirements, separation from traffic and distances from clouds.

## **12.7 Take-off and Landing Phases**

12.7.3 RPAS shall be operated in either VMC or IMC, and the associated VFR and IFR restrictions applicable to manned aircraft shall apply.

## **IS 12.8 En-route Phase**

12.7.4 The operational, equipage and performance requirements imposed on the RPAS shall again depend upon the class of airspace through which the RPA will be transiting and any additional requirements prescribed for the airspace or operation (e.g. RVSM, PBN, 8.33 KHz channel spacing capable radio equipment).

## **12.8 VFR**

12.8.3 The remote pilot or RPAS operator shall be able to assess the meteorological conditions throughout the flight. In the event the RPA, on a VFR flight, encounters IMC, appropriate action shall be taken by the Authority.

## **12.9 IFR**

12.9.3 RPAS shall be equipped with suitable instruments and with navigation equipment appropriate to the route to be flown.

## **12.10 Communication, Navigation and Surveillance (CNS)**

12.10.3 Functionality and performance requirements for RPA shall be equivalent to those established for manned aircraft and appropriate to the airspace within which the RPA is operated and where ATS is being provided.

## **12.11 Transponder Operations**

12.11.3 RPA, shall to the highest extent possible, comply with existing transponder operating rules in the same way as manned aircraft and as required by the class of airspace within which they are operating.

12.11.4 RPA shall use Mode A code 7700 or equivalent ADS-B emergency mode for those emergencies that are common to manned aircraft (e.g. engine failure).

## **12.12 Right-of-way**

12.12.3 As with manned aircraft, RPAS shall comply with the Annex 2 right-of-way rules and RWC of other aircraft (manned or unmanned).

12.12.4 RPAS shall avoid passing over, under or in front of other aircraft, unless it passes well clear and takes into account the effect of aircraft wake turbulence.

## **IS 13.1 Controlled Aerodrome Environment**

13.1.1 For RPA integration into controlled aerodromes where ATC services are provided for safe, orderly and expeditious flow of aircraft and vehicular movement, the RPAS shall have the ability to communicate and manoeuvre in a similar manner to manned aircraft.

13.1.2 Remote pilots operating at controlled aerodromes shall maintain two-way communication with ATC and acknowledge and comply with ATC instructions in the air and on the surface.

13.1.3 Remote pilots shall be able to comply with all instructions during all phases of operations associated with aerodrome operations, e.g. take-off, approach and landing and manoeuvring on aprons, taxiways and runways.

13.1.4 RPA shall comply with airport markings, signage lighting and signals, and respond, as appropriate, to maintain safety as conditions on the aerodrome surface change.

13.1.5 Avoidance of people, aircraft, vehicles, buildings and obstacles on or near the designated surface movement areas will be required as well as avoidance of restricted or other areas not intended for aircraft.

## **13.2 Aerodrome Flight Information Service (AFIS)**

13.2.1 The RPA shall be able to operate in the same manner as manned aircraft to ensure the safe integration of RPA into uncontrolled AFIS aerodromes.

13.2.2 Remote pilots shall communicate with the AFIS officer in a timely and effective manner in order to pass and receive safety related traffic information.

13.2.3 Requirements for remote pilots to identify and comply with airport markings and signage and to safely and efficiently manoeuvre among other aircraft and other airport users shall be the same as the requirements for operations at controlled aerodromes.

## **13.3 RPAS-Only Aerodromes**

13.3.1 RPAS only aerodromes shall be subject to the same requirements as applicable to manned aircraft aerodromes.