



PROCESS & APPLICATION: TRANSPORTATION OF DANGEROUS GOODS BY AIR Using RPAS

SECTION 1 GENERAL

The Ghana Civil Aviation Authority (GCAA) Advisory Circulars contain advice and guidance to illustrate a means of complying with the Ghana Civil Aviation Directives (GCADs) or to explain certain regulatory requirements by providing informative, interpretative, and explanatory material. Where an AC is referred to in a Note below a Directive, the AC remains as guidance material. ACs should always be read in conjunction with the referenced Directives.

PURPOSE

The purpose of this Advisory Circular is to provide specific guidance and advice to organisations preparing for and completion of the GCAA certification process for the transport of dangerous goods by air using RPAS.

1.2 STATUS OF THIS ADVISORY CIRCULAR

This document is the initial issue of this AC and has been approved by the Director-General of the GCAA.

1.3 BACKGROUND

- A. ICAO Standards in Annex 18, Safe Transportation of Dangerous Goods by Air, require that Ghana must complete an assessment of any individual, organisation or entity before issuing an authorisation allowing these entities to engage in the process of transportation of dangerous goods by air.
- B. In support of its international safety oversight obligations, Ghana has safety legislation and guidance regarding the requirements that apply to the safe transportation of dangerous goods, which include but are not limited to:
- 1) GCAD Part 18; and
 - 2) Dangerous goods Advisory Circulars.
- C. Ghana has established a certification process to ensure the completeness and standardisation for the issuance of authorisations to transport dangerous goods by air.

1.4 APPLICABILITY

This AC is applicable to all operators and organisations involved in the process of transportation of dangerous goods by air using Ghana registered RPAS Ghana or Aerial Work Certificate.

1.5 RELATED DIRECTIVES

The following GCAA Directives are directly applicable to the guidance contained in this advisory circular—

- Part 28 of the Ghana Civil Aviation (Remotely Piloted Aircraft Systems (RPAS)) Directives; and
- Part 18 of the Ghana Civil Aviation (Flight Standards) Directives – Safe Transport of Dangerous Goods by Air

1.6 RELATED READING MATERIAL

- A. ICAO Manual on Remotely Piloted Aircraft System (RPAS) (Doc 10019).
- B. ICAO Annex 18: Safe Transport of Dangerous Goods by Air.
- C. IATA Dangerous Goods Regulation
- D. AC 18-002, Guidance for Development of Dangerous Goods Manuals
- E. AC 18-003, Guidance for Development of Dangerous Goods Training Programs

Copies may be obtained from the GCAA Safety Regulation Department

1.7 ACRONYMS

The following acronyms and abbreviations are used in this advisory circular—

- 1) AGL above ground level
- 2) COMAT Company Materials
- 3) BVLOS beyond visual line-of-sight
- 4) DG Dangerous Goods
- 5) DGC Dangerous Goods Coordinator
- 6) DGR IATA Dangerous Goods Regulations
- 7) GCAA Ghana Civil Aviation Authority
- 8) GCADs Ghana Civil Aviation Directives
- 9) IAEA International Atomic Energy Agency
- 10) IATA International Air Transport Association (IATA)
- 11) ICAO International Civil Aviation Organisation
- 12) ICAO TI's International Civil Aviation Organisation Technical Instruction for the Safe Transport of Dangerous goods by Air
- 13) ROC RPAS Operator Certificate
- 14) RPA remotely piloted aircraft
- 15) RPAS remotely piloted aircraft system(s)
- 16) RPS Remotely Piloted Station
- 17) SARPs Standards and Recommended Practices
- 18) TC type certificate
- 19) UAS unmanned aircraft system

1.8 DEFINITIONS

The following definitions are used in this advisory circular—

- 1) **Remotely Piloted Aircraft System (RPAS):** A set of configurable elements consisting of a remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other system elements as may be required, at any point during flight operation.
- 2) **Dangerous goods.** Articles or substances which are capable of posing a risk to health, safety, property or the environment when transported by air and which are classified according to the International Civil Aviation Organisation Technical Instructions for the Safe Transport of Dangerous Goods by Air.
- 3) **Dangerous goods accident.** An occurrence associated with and related to the transport of dangerous goods by air which results in fatal or serious injury to a person or major property damage.
- 4) **Dangerous goods incident.** An occurrence, other than a dangerous goods accident, associated with and related to the transport of dangerous goods by air, not necessarily occurring on board an **RPA**, which results in injury to a person, property damage, fire, breakage, spillage, leakage of fluid or radiation or other evidence that the integrity of the packaging has not been maintained. Any occurrence relating to the transport of dangerous goods which seriously jeopardizes the RPA, or its occupants is also deemed to constitute a dangerous goods incident.
- 5) **Hazardous chemical** – Any chemical which has properties that present either physical or health hazards. Hazardous chemicals include both physical and health hazards.
- 6) **Hazardous materials** – A substance or material which is capable of posing an unreasonable risk to health, safety and property when transported. (See also the definition of “dangerous goods.”)
- 7) **Hazardous Occurrence:** accident or other occurrence arising in the course of or in connection with the employee’s work that has caused or is likely to cause injury to that employee or to any other person.
- 8) **Hazardous waste** – A discarded substance that because of its quantity, concentration, physical, chemical or infectious characteristics may cause or contribute to a serious illness or pose a substantial or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of.

SECTION 2 OPERATIONAL CERTIFICATION

2.1 PHASE ONE: PRE-APPLICATION

2.1.1 DECLARATION OF INTENT

- A. The organisation or individual intending to transport dangerous goods by air using RPAS should officially advise the GCAA that they intend to apply for authorisation to transport dangerous goods by air.
- B. This is normally accomplished by the submission of a formal letter of intent.

2.1.2 PRE-APPLICATION MEETING

- A. The operator is entitled to a pre-application meeting to provide more specific guidance regarding the submission of a complete formal application.
- B. The operator may, however, choose to submit their application without attending the meeting.

2.1.3 PRE-APPLICATION MEETING CONTENTS

This meeting will normally contain a discussion of the—

- 1) Provision of the application in paper copies and digital files.
- 2) Process and actions that will be followed to complete the certification include—
 - (a) Initial application review;
 - (b) Document conformance evaluations;
 - (c) Inspections and demonstrations; and
 - (d) Final certification actions by GCAA
- 3) Formal application checklist;
- 4) Dangerous Goods Manual;
- 5) Dangerous Goods Training Programme; and
- 6) Proposed service providers.

2.2 PHASE TWO: FORMAL APPLICATION PHASE

2.2.1 HANDLING OF THE FORMAL APPLICATION

- A. The submission of the formal application will not be treated by the GCAA as formal event.
- B. The organisation may request to have a meeting to present the application, but the GCAA will not comment on the quality of the application at that time.

2.2.2 INITIAL APPLICATION REVIEW MEETING

The GCAA will hold an internal meeting at a later date to determine if the contents of the application are acceptable for processing. The standard used will be that the application—

- A. Is complete (all required documents are contained therein); and
- B. Complies with the general requirements for such applications.

2.2.3 FORMAL REJECTION OR ACCEPTANCE

A. Shortly after the GCAA's internal meeting, a formal meeting will be held to officially—

- 1) Reject the application, or
- 2) Accept the application package for processing through the document conformance phase.

B. If the initial review and meeting are found to be acceptable, the GCAA will then accept the documents for processing

2.3 PHASE THREE: DOCUMENT CONFORMANCE

2.3.1 USE ALL AVAILABLE REFERENCES

The applicant should use the following documents during the development of its formal application submission—

- 1) Part 18 of the GCADs;
- 2) GCAA Dangerous Goods Advisory Circulars;
- 3) ICAO Technical Instructions;
- 4) IATA Dangerous Goods Regulations; and
- 5) Other relevant published international safety practices.

These references will be used by the GCAA to cross-compare with the documentation submitted by the applicant.

2.3.2 CONFORMANCE CHECKLIST

A. The most accurate indicator of the completeness of the dangerous goods certification is the Part 18 conformance checklist in its final form.

B. Usually, the initial conformance checklist submitted by an operator is very inaccurate with respect to the manual references and comments regarding the conformance of the company manuals to the applicable regulations.

- This conformance checklist must be accurate before the certification can be completed.
- The operator should make every effort to have it acceptable at the time of submission of the application.

- C. This checklist will be continually updated during this process to reflect the accurate or revised manual procedures.

Obtain a template copy of the Part 18 Conformance Checklist from the GCAA

- D. The final conformance checklist will be inserted in the Completed Certification Report binder as one of the primary “proofs” that, at the time of certification, the applicant was in conformance with the minimum standards of the applicable Directives.

2.3.3 ORGANISATION

- A. Evaluation of the applicant’s organisation and key personnel associated with the proposed dangerous goods will occur early in this phase.
- B. If the GCAA has any objections or reservations regarding the proposed organisation or key personnel, these will be shared with the applicant as soon as possible.
- C. This urgency will also apply to any service providers proposed for use in the dangerous goods process. The contractual arrangements with these personnel and the assigned responsibilities must be made known to and be accepted by the GCAA.

2.3.4 MANUALS

- A. The GCAA will evaluate the DG Operations Manual through comparisons of the proposed information, policy and procedure with the—

Refer the GCAA Advisory Circular AC 18-002 for more specific guidance for this documentation

- 1) Submitted conformance checklist;
- 2) ICAO Technical Instructions; and
- 3) Advisory circulars and other relevant manuals

- B. If the applicant has included accurate DG legislation references in the text of the manual this comparison process can be accelerated.
- C. The GCAA will also evaluate the applicant’s arrangements for ensuring that all persons involved in DG preparation or acceptance have direct and immediate access to the DG reference manuals.

2.3.5 TRANSPORT POLICIES

- A. The applicant must have very specific policies regarding the classes and quantities of dangerous goods that will be transported or forbidden.
- These policies should be evaluated with respect to the ICAO-TI and the applicant’s apparent capabilities.

- B. The applicant should have specific guidance to the RPAS pilots regarding their transport of articles that may be considered to be dangerous goods

DG guidance should be included in the DG Operations manual and as a chapter in the specific primary user manuals

2.3.6 PREPARATION & ACCEPTANCE

- A. The persons involved in the preparation or acceptance of dangerous goods for transport by air using RPAS are the most critical performers in this process.
- B. The instructions and guidance that are provided to them must be very complete and accurate.

2.3.7 STORAGE, HANDLING & SEGREGATION

- A. The storage, handling and segregation of the dangerous goods will be performed at almost every juncture in the transport process.
- B. Depending on the classes, divisions and subsidiary hazards of the dangerous goods proposed to be transported, these procedures can be critical. They must adhere closely to the ICAO-TI requirements.

2.3.8 INCIDENT PROCEDURES

- A. All goods involved in transportation are subject to damage depending on the manner in which they are handled
- B. Damage and possible leakage in the transportation of some dangerous goods can have catastrophic consequences.
- C. Proper reporting of these incidents is a GCAD requirement.

- There must be adequate guidance for handling and containing damage and leakage incidents.
- The reporting procedures should be sufficient to provide a good starting point for the investigation

2.3.9 LOADING & TRANSPORT

- A. The actual loading of the RPAS is also a critical point in the transport of dangerous goods by air. The location, segregation and securing of these articles, containers or overpacks must be done by knowledgeable persons using good procedures.
- B. The provision of the information regarding the dangerous goods classes and locations will ensure that the RPAS pilots are prepared to make correct decisions if incident occurs in flight. This document is also made available to ground personnel including responders. It is critical to safety.

2.3.10 FORMS & RECORDS

- A. The applicant will be using forms, records and other documents to ensure conformance with the applicable requirements.
- B. These documents must be easy to understand and use.

2.3.11 EMERGENCY PROVISIONS

- A. Emergency procedures that provide clear instructions to the participants in the process contribute to effective handling of incidents before they become emergencies.
- B. The emergency procedures will be carefully checked using the reference and RPA - specific documents.

2.3.12 TRAINING

- A. Dangerous Goods training is stressed as the most effective factor in safe transport by air.
- B. The requirements provided in the ICAO-TI will provide for a comprehensive training program.
- C. The submitted training program and curricula include all required training subjects and exercises will be thoroughly reviewed to meet the prescribed training objectives.

Refer the GCAA Advisory Circular AC 18-003 for more specific guidance for this documentation.

2.3.13 QUALITY ASSURANCE

- A. Most applicants do not perform all aspects of the dangerous goods process using company personnel.
- B. This is an area where the set-up of good quality audits by the operator will be vital to the continued conformance to the minimum standards for safe transport of dangerous goods.

2.4 PHASE FOUR: INSPECTION & DEMONSTRATION

In practice, the applicant will experience four identifiable groupings of inspections in this phase—

- 1) Training;
- 2) Preparatory;
- 3) Shipments; and
- 4) Operational Demonstration.

- This phase will sometimes overlap with the completion of the Document Conformance Phase due to corrections necessary to documents.
- This will be especially true if additional document revisions result from inspection findings.

2.4.1 TRAINING INSPECTIONS

- A. The participants will need to receive qualifying training early in the process.
- B. This may be done in a centralized class or done in several non-concurrent locations depending on the work functions of the participants
- C. The GCAA will conduct inspections on the training as necessary to validate the completeness and quality of the

The GCAA will review the training records of all participants to ensure documented qualification before conducting the inspections included in the shipping and operational groupings.

training related to the specific curriculum and objectives.

D. The performance of the instructors used in the DG training must be satisfactory.

2.4.2 PREPARATORY INSPECTIONS

A. The GCAA will conduct inspections at the facilities of the operator and service providers to ensure that the necessary infrastructure exists.

B. These inspections will include—

1) Facilities, including signage and equipment necessary for movement of DG;

The GCAA will not conduct the shipping and operational inspections until these preparatory inspections have been conducted for all identified entities.

2) Correct and sufficient copies of manuals necessary to the DG process;

3) Adequacy of the supplies necessary to the DG process; and

4) Adequacy for handling and storage of the classes of DG to be shipped.

5) Secure system for carrying the DG, protection and keeping in safe and secure manner

2.4.3 SHIPPING INSPECTIONS

The GCAA personnel will be present to monitor the actual—

1) Preparation and packaging of the first dangerous goods to be shipped as cargo on the required validation flight;

2) Acceptance of the dangerous goods packages by the operator or agent;

The GCAA will not authorize a validation flight unless all issues identified in the training, preparatory and shipping inspections have been resolved.

3) Completion of the shipping papers that accompany the dangerous goods package; and

4) Performance of the personnel at these critical steps in the dangerous goods process.

2.4.4 CARRY VALIDATION FLIGHT AUTHORISATION

A. When the previously identified issues are resolved, the GCAA will issue a letter authorizing the operator to conduct a validation first flight carrying dangerous goods under the supervision of the GCAA.

B. The applicant must have at the site of the RPS, a copy of this letter on the RPAS, located with the draft RPAS display Certificate and operations specifications, during the flight.

2.4.5 OPERATIONAL INSPECTIONS

The GCAA personnel will be present to monitor the actual—

The applicant should expect that one or more of the GCAA personnel will be on the validation flight.

- 1) Loading (and subsequent unloading) of the RPA;
- 2) Completion of the loading documents related to transport of DG by air, including the NOTOC;
- 3) RPAS pilot procedures relative to the presence of dangerous goods, understanding of the NOTOC, possible dangers and emergency procedures.

2.4.6 VALIDATION FLIGHT RESULTS

If the results are:

- Acceptable, the GCAA will proceed to the completion of the necessary operational authorisations.
- Not acceptable, the GCAA will ensure the correction of the issues before authorizing another validation flight.

2.5 PHASE FIVE: FINAL CERTIFICATION ACTIONS

2.5.1 ISSUANCE OF OPERATIONAL APPROVALS

- A. All documents previously granted interim approval during the certification will now be granted operational approval by the GCAA.
- B. At a minimum, these approvals will be given to—
 - 1) DG Operations manuals and/or supplements to other manuals:
 - 2) DG Training programs and/or curriculums; and
 - 3) DG Documents, such as forms, records.

2.5.2 AMENDMENT OF MASTER OPERATIONS SPECIFICATIONS

- A. For ROC holders, the master operations specifications will be amended to include the authorisation for transportation of dangerous goods by air.

- 1160D: Issue Revised Ops Specs Page
- B. A print-out of that amended operations specifications shall be circulated for GCAA and operator signatures.

2.5.3 AMENDMENT OF RPA DISPLAY OPERATIONS SPECIFICATIONS

An amended RPA display operations specification shall be issued for each RPAS make, model and series that the operator may use for transport of dangerous goods.

SECTION 3 CONTENTS OF FORMAL APPLICATION PACKAGE

3.1 GENERAL REQUIREMENTS

The following documents will be considered individually—

- 1) Formal Application Checklist;
- 2) Part 18 Conformance Checklist;
- 3) Dangerous Goods Manual(s);
- 4) Dangerous Goods Training Program with applicable curriculums
- 5) List of proposed services providers
- 6) Subscription to ICAO Technical Instructions in sufficient quantities for use by personnel
- 7) Subscription to IATA Dangerous Goods Regulations in sufficient quantities for use by personnel
- 8) Copies of all forms proposed to be used by company personnel and service providers, if applicable.

- GCAA inspectors shall have unobstructed ability to refer to these documents.
- If these criteria are not met, copies of these manuals will be required to be submitted to the GCAA offices as a part of the application.

3.2 AVAILABLE FOR CONSULTATION

The following documents must be available at the applicant's facilities for consultation—

- 1) ICAO Technical Instructions;
- 2) IATA Dangerous Goods Regulations

End of Advisory Circular