



NOTICE OF PROPOSED AMENDMENT 2017-06

Issue 01

Date of issue: 20th July 2017

SUBJECT:

PASSENGER-CARRYING AUTONOMOUS UNMANNED AIRCRAFT SYSTEM (UAS) EXPERIMENTAL OPERATIONS CAR-AutoUAS

REFERENCE PUBLICATIONS:

N/A

REASON:

The General Civil Aviation Authority (GCAA) has concluded that there is a need to create a new regulation for passenger-carrying autonomous Unmanned Aircraft System (UAS) Experimental Operations

RECOMMENDATIONS:

This notice is published to announce to the public this regulation and to entitle all concerned parties to:

1. Review the attached proposed regulation; and
2. Agree on the date of applicability for those changes set to 20th September 2017; and
3. Submit their comments on the changes and date of applicability online through the GCAA website by 20th August 2017.

Comments must be submitted through the GCAA Website – E-Publication – Notice of Proposed Amendment, using the Action of “Submit NPA Feedback Request.”

Comments and Responses may be viewed in the Comments Response Document CRD pertaining to this NPA on the GCAA website.

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CAR PART IV OPERATIONAL REGULATIONS

PASSENGER-CARRYING AUTONOMOUS UNMANNED AIRCRAFT SYSTEM (UAS) EXPERIMENTAL OPERATIONS – CAR-AutoUAS



TABLE OF CONTENTS

1. FOREWORD	4
2. PURPOSE	4
3. ABBREVIATION AND DEFINITIONS	4
4. LAWS, REGULATIONS, AND PROCEDURES	4
5. SECURITY	4
6. INSURANCE	5
7. AUTONOMOUS UAS REGISTRATION	5
8. OPERATIONS	5
9. PORTABLE ELECTRONIC DEVICES	7
10. BATTERIES FOR POWERING MOTORS	7
11. AUTONOMOUS UAS AIRWORTHINESS	7
12. MASS & BALANCE	8
13. DAILY FLIGHT RECORDS	8
14. TAKE-OFF AND LANDING AREA SITES SELECTION	8
15. METEOROLOGICAL INFORMATION	9
16. OCCUPANT REQUIREMENTS	9
17. SURVEILLANCE AND COMMUNICATION EQUIPMENT	10
18. EMERGENCY ALERTING PROCEDURES	10
19. OCCUPANT INFORMATION SIGNS	10
20. AUTONOMOUS UAS MINIMUM INSTRUMENTS AND EQUIPMENT	10
21. AUTONOMOUS UAS CONTROL / MONITORING STATION MINIMUM EQUIPMENT REQUIREMENTS	11
22. EMERGENCY EQUIPMENT	12



1. FOREWORD

- 1.1. This regulation sets out the rules and the requirements for passenger-carrying autonomous UAS experimental operations.
- 1.2. For the purpose of this regulation, the competent authority is the General Civil Aviation Authority designated by the United Arab Emirates Federal government, and known in this regulation as the “GCAA”.

2. PURPOSE

- 2.1. This CAR-AutoUAS prescribes operating regulations for experimental operation of autonomous UAS in the United Arab Emirates.
- 2.2. No organisation or person shall conduct experimental operation with autonomous UAS unless approved by GCAA under this regulation.

3. ABBREVIATION AND DEFINITIONS

- 3.1. UAS: Unmanned Aerial System
- 3.2. RPAS: Remotely Piloted Aircraft System
- 3.3. VMC: Visual Meteorological Conditions.
- 3.4. ELT: Emergency Locater Transmitter.
- 3.5. Autonomous UAS Operator: A person or a company holding approval for conducting autonomous UAS operations in the UAE.
- 3.6. Autonomous UAS: An UAS which controls and navigates the aircraft either fully or partly, with preprogrammed software and onboard sensors, without being remotely piloted from a ground station.
- 3.7. Experimental Operation: Trial flights of any UAS which does not have a design approval accepted by the GCAA, for the objective of verifying that the said UAS can be operated in a safe and secure manner to meet UAS Operator operational objectives and satisfy GCAA that an acceptable level of safety and security is maintained.

4. LAWS, REGULATIONS, AND PROCEDURES

- 4.1. An autonomous UAS operator shall ensure that all persons engaged in autonomous UAS experimental operations are familiar with applicable laws, regulations and procedures.

5. SECURITY

- 5.1. An autonomous UAS operator shall obtain security clearance prior to starting experimental operations.
- 5.2. All persons engaged in the experimental operation of the autonomous UAS shall undergo the background check.
- 5.3. Systems for controlling access to the control / monitoring station and autonomous UAS shall be put in place in order to prevent unauthorized entry and protection from unlawful interference.



- 5.4. The data link shall be protected against hacking, spoofing and other forms of interference or hijack.
- 5.5. The control / monitoring station hardware shall utilize logon and logoff functions.
- 5.6. Autonomous UAS are not permitted to conduct flights over sensitive areas unless special permission is granted by the GCAA.
- 5.7. No person is allowed to capture images / video on-board autonomous UAS while flying over sensitive area, unless specifically authorized by the competent authority.

6. INSURANCE

- 6.1. The autonomous UAS operator shall have insurance acceptable to the GCAA to cover the occupants and third party liability.

7. AUTONOMOUS UAS REGISTRATION

- 7.1. An autonomous UAS operator shall register with the GCAA and display nationality (A6). The size of the registration mark and the location on the UAS to be approved by the GCAA.
- 7.2. An autonomous UAS registration mark will consist of four alphabets starting with capital letter for example: A6-DABC
- 7.3. Notwithstanding with point 7.1, an autonomous UAS may display overseas registration.

8. OPERATIONS

- 8.1. The experimental operations shall be approved by the GCAA. The following shall be provided by the autonomous UAS Operator for experimental operations:
 - a. Purpose and objectives.
 - b. Detailed description of the intended operation / performance.
 - c. Outline of the methodology and procedures.
 - d. Identified key personnel, their role and responsibilities and appropriate facilities.
 - e. Schedule / timescales.
 - f. Criteria to be used to assess the success of the experimental operations.
 - g. Safety / security risk assessment.



- 8.2. An autonomous UAS experimental operations shall be conducted as per the operations manual approved by the GCAA. The operations manual shall cover how the autonomous UAS operator shall comply with the applicable regulations.
- 8.3. An autonomous UAS shall be operated in compliance with the operating limitations specified in the autonomous UAS flight manual or operations manual.
- 8.4. An autonomous UAS operator shall not operate an autonomous UAS unless it is equipped with the type and number of instruments and equipment required by this regulation.
- 8.5. An autonomous UAS shall not be operated unless all equipments are operative. In case experimental flight is required with inoperative equipment, specific approval is required from the GCAA prior to the next flight.
- 8.6. An autonomous UAS shall only be operated in the areas designated for experimental operations under the conditions promulgated by the GCAA.
- 8.7. Unless on departure or approach route segment, the autonomous UAS shall not be operated below 1000 feet over built up areas or 500 feet over non-built up areas.
- 8.8. An autonomous UAS shall remain clear of all obstructions and buildings, unless the building is the authorized site of an autonomous UAS take-off and landing.
- 8.9. An Autonomous UAS shall not be operated over water unless prior approval has been obtained from the GCAA.
- 8.10. If any flight of an autonomous UAS operates over water for short periods of time, the altitude should be sufficient that in the event of any emergency situation the autonomous UAS is capable of making an emergency landing clear of the water on dry land.
- 8.11. The autonomous UAS shall be checked for airworthiness, security and safety. The take-off and landing areas shall also be checked for sterilization.
- 8.12. The take-off and landings areas shall be manned appropriately for carrying out the autonomous UAS operators responsibilities for safety, security and airworthiness
- 8.13. Autonomous UAS shall not be operated close to each other as to create a collision hazard.
- 8.14. An autonomous UAS operator shall ensure compliance with any ATC clearances and instructions.
- 8.15. An autonomous UAS operator shall, on becoming aware of any condition that is a hazard to safe operations, restrict or suspend operations as necessary until the hazard is removed.
- 8.16. An autonomous UAS operator shall submit to the GCAA a comprehensive post-experimental operations report detailing the outcome of an experimental operations with the objective that the experimental operations have demonstrated the ability for the autonomous UAS to operate safely and securely and meet operational objectives.
- 8.17. An autonomous UAS operator shall provide access to the GCAA to the: facilities, autonomous UAS and records.
- 8.18. All accidents and serious incidents shall be reported immediately to the GCAA Duty Investigator contact which is available on GCAA website. All incidents involving autonomous UAS shall be investigated by the autonomous UAS operator and an investigation report shall be sent to the GCAA within 72 hours.



9. PORTABLE ELECTRONIC DEVICES

- 9.1. No occupant of autonomous UAS shall operate a cellphone or other portable electronic devices that is designed to transmit electro-magnetic energy.
- 9.2. Notwithstanding Para 9.1 above, the GCAA may permit use of cellphone or other portable electronic devices designed to transmit electro-magnetic energy.
- 9.3. Any portable electronic devices shall only be allowed to operate in an autonomous UAS with prior permission of the GCAA.

10. BATTERIES FOR POWERING MOTORS

- 10.1. An autonomous UAS flight shall only start if batteries have sufficient power for the flight, plus 25% reserve.
- 10.2. The batteries shall be charged in the approved facilities / stations as per the GCAA approved procedures.

11. AUTONOMOUS UAS AIRWORTHINESS

- 11.1. An autonomous UAS shall not operate unless:
 - a. The autonomous UAS has been designed and manufactured as per the acceptable overseas authority approval.
 - b. The modifications and repairs are approved and accepted by the acceptable overseas authority.
 - c. An autonomous UAS comply with the ICAO Annex 16 Volume I Chapter 11 or other best noise requirements.
 - d. The autonomous UAS has a current permit to fly issued by the GCAA or equivalent permit issued by an acceptable overseas authority.
 - e. The autonomous UAS is in airworthy condition and safe for flight.
 - f. The ground facilities required for operation of autonomous UAS are available and in working condition.
- 11.2. The GCAA approval holder of the experimental operations of an autonomous UAS is responsible for the airworthiness of the autonomous UAS and shall ensure the following:
 - a. the autonomous UAS is maintained in an airworthy condition and required ground facilities are operative.
 - b. Applicable airworthiness directive(s) or equivalent is complied with.
 - c. Maintenance on the autonomous UAS, installed equipment and instruments are performed in accordance with the instructions approved / accepted by the acceptable overseas authority.



- d. Maintenance personnel and facilities are approved / accepted by the acceptable overseas authority.
- e. Pre-flight and post-flight are carried out.

12. MASS & BALANCE

- 12.1. An autonomous UAS operator shall ensure that:
- 12.2. The autonomous UAS operations are conducted within maximum mass limit approved by the GCAA.
- 12.3. The autonomous UAS center of gravity is within the limits approved / accepted by the GCAA.

13. DAILY FLIGHT RECORDS

- 13.1. The daily flight record shall contain following for each flight:
 - a. Name(s) of the occupant(s).
 - b. Registration markings of the autonomous UAS.
 - c. Date and commencement time of the flight.
 - d. Departure and arrival destinations.
 - e. The flight time.
 - f. List of defects.
- 13.2. The above records shall be supplied to the GCAA for the entire experimental operations period.

14. TAKE-OFF AND LANDING AREA SITES SELECTION

- 14.1. An autonomous UAS operator shall be able to demonstrate, document the process and competency of personnel to authorize the use of an autonomous UAS landing site (facility, location or other such wording) for the landing or take-off of an autonomous UAS that is adequate for the type of UAS and types of operation(s) concerned.
- 14.2. When defining a site for use as a landing area, the autonomous UAS operator shall take into account the following:
 - a. Selection of a site which the operator considers to be satisfactory, taking account of the applicable autonomous UAS performance requirements and site characteristics (for example: physical size, markings, lighting, obstacle restrictions).



- b. Approach and take-off flight paths.
- c. Surface conditions.
- d. Public protection and security.
- e. Rescue and fire emergency response.
- f. Site Management including site selection, routine inspections, maintenance and incident reporting process.

15. METEOROLOGICAL INFORMATION

- 15.1. An autonomous UAS is operated within the Manufacturer Operating Limitations, based on the weather forecast received from appropriate meteorological sources.
- 15.2. An autonomous UAS operator shall plan, perform, and control the flight using meteorological information of a sufficient reliability and accuracy provided from a source considered acceptable to the GCAA.
- 15.3. An autonomous UAS operator shall ensure that autonomous UAS operations are only conducted in Visual Meteorological Conditions (VMC) unless prior approval is obtained from GCAA.

16. OCCUPANT REQUIREMENTS

- 16.1. No person other than those required for the Experimental flight must be onboard.
- 16.2. An occupant of autonomous UAS shall comply with any instruction given by the autonomous UAS operator.
- 16.3. An occupant of autonomous UAS shall occupy a seat and fasten safety belt at all times while inside the autonomous UAS.
- 16.4. An occupant shall not drop any object from an autonomous UAS.
- 16.5. An autonomous UAS operator shall ensure that each occupant has been briefed on:
 - a. The location and means for opening the occupant entry doors and emergency exits, and their use.
 - b. The location and use of survival and emergency equipment for occupant use.
 - c. The location and use of portable electronic devices.
 - d. Procedures in the case of an emergency landing.
 - e. Emergency communication with the control facilities.



17. SURVEILLANCE AND COMMUNICATION EQUIPMENT

- 17.1. When operating in non-segregated airspace appropriate surveillance and communication equipment which is integrate-able with current ATM system shall be required.
- 17.2. For operations in segregated airspace, Para 17.1 above is recommended.
- 17.3. The above equipment shall be approved by the GCAA.

18. EMERGENCY ALERTING PROCEDURES

- 18.1. An autonomous UAS operator shall have a procedure in place to monitor the autonomous UAS operation at all times during a flight.
- 18.2. In the event that an emergency situation does or may exist, the relevant search and rescue units shall be notified immediately with the following information:
 - a. The autonomous UAS registration mark.
 - b. The type of autonomous UAS.
 - c. The route including, departure point, intended landing point, and last known position of autonomous UAS.
 - d. Details of the emergency.
 - e. The total number of occupants.
 - f. Any additional information that may assist search and rescue operations.

19. OCCUPANT INFORMATION SIGNS

- 19.1. Each autonomous UAS shall be equipped with the following signs visible to the occupants:
 - a. Smoking is prohibited,
 - b. Fasten safety belts.
 - c. Emergency breaking location
 - d. Any restrictions and prohibitions.

20. AUTONOMOUS UAS MINIMUM INSTRUMENTS AND EQUIPMENT

- 20.1. An autonomous UAS operator shall have a communication system capable of providing continuous two-way communications between the occupant and the autonomous UAS control / monitoring station.
- 20.2. An autonomous UAS shall be equipped with:
 - a. Instruments and equipment required by applicable airworthiness design standards.
 - b. An appropriate system to monitor the occupant during flight.
 - c. Providing present location information of the autonomous UAS to the control / monitoring station.



- d. Position lights.
- e. Anti-collision lights.
- f. Landing lights for night and low visibility operations.
- g. Occupant compartment lights.
- h. Occupant cabin temperature indicator and control.
- i. Record of time in hours, minutes, and seconds.
- j. Means to provide autonomous UAS battery status to the autonomous UAS control / monitoring station
- k. Seats with seat belt provision for each occupant.
- l. A lockable door with an unlocking mechanism operate-able on ground only.

21. AUTONOMOUS UAS CONTROL / MONITORING STATION MINIMUM EQUIPMENT REQUIREMENTS

- 21.1. An autonomous UAS control / monitoring station shall be appropriately manned at all times during an autonomous UAS operation.
- 21.2. An Autonomous UAS operator is responsible for providing and maintaining facilities for monitoring / control station.
- 21.3. An autonomous UAS control / monitoring station shall be equipped with a means of:
 - a. Monitoring and recording the actual position of autonomous UAS.
 - b. Monitoring and recording the autonomous UAS battery status.
 - c. Providing an alert to UAS Operator if the battery status falls below operational requirements.
 - d. Monitoring system for autonomous UAS occupants.
 - e. Effective communications with: Police, and Search and Rescue units.
 - f. Autonomous UAS flight control monitoring and recording system.
 - g. Emergency autonomous over-ride, remote pilot control system (If deemed operationally necessary).



22. EMERGENCY EQUIPMENT

22.1. An autonomous UAS shall be equipped with:

- a. First aid kits specified in [GCAA regulations CAR OPS 1](#) readily accessible to the occupant for the treatment of injuries likely to occur in flight or in minor accidents.
- b. A hand-held fire extinguisher.
- c. An appropriate tool as mean for breaking out of autonomous UAS for emergency evacuation.
- d. Life preserver for each occupant for flights over water.
- e. Portable Emergency Locator Transmitter (ELT).