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Qualification and approval of UAS operatives - UAS Pilot Level 1

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Summary of pages

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Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 31 October 2018. It was prepared by Technical Committee ACE/20, *Unmanned Aircraft Systems*. A list of organizations represented on this committee can be obtained on request to its secretary.

Information about this document

The requirements specified in this British Standard do not preclude the provision of additional training or the assessment by a service provider of additional competencies. This British Standard represents a tool for comparison of existing (or future) qualifications of unmanned aircraft systems (UAS) pilots.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. “organization” rather than “organisation”).

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This British Standard specifies requirements for UAS pilot training programmes and the competencies that a candidate is expected to meet in order to achieve a UAS pilot certification.

This standard specifies two stages of pilot training:

- a) theory knowledge (see [Clause 6](#)); and
 - b) practical skills (see [Clause 7](#)).
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2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 national aviation authority

government statutory authority in each country that oversees the approval and regulation of civil aviation

NOTE In the United Kingdom, the national aviation authority is the Civil Aviation Authority (CAA).

3.2 observer

remote crew member who, by visual observation of the unmanned aircraft, assists the remote pilot in the safe conduct of the flight

3.3 pilot in command (PIC)

pilot designated as being in command and charged with the safe conduct of a flight

3.4 remote pilot

person who manipulates the flight controls of an unmanned aircraft during flight time

3.5 unmanned aircraft (UA)

aircraft intended to operate with no pilot on board

NOTE This is sometimes also referred to as an unmanned aerial vehicle (UAV) or drone.

3.6 unmanned aircraft system (UAS)

aircraft and its associated elements which are operated with no pilot on board

NOTE Also referred to as remotely-piloted aircraft system (RPAS).

3.7 visual line-of-sight (VLOS)

maintenance of direct visual contact with the aircraft by the remote crew to manage its flight

NOTE 1 Direct visual contact is to be unaided (e.g. without the use of devices allowing a better view of the object, such as binoculars).

NOTE 2 Maintaining a VLOS also helps in meeting separation and collision avoidance responsibilities.

4 Competencies

A candidate who successfully completes the requirements of this British Standard shall be able to act as the pilot in command (PIC) of a small unmanned aircraft that is operated within their visual line-of-sight.

NOTE A small unmanned aircraft typically has a maximum take-off weight of not more than 25 kg.

5 Fitness to act as pilot in command

In order to operate the UAS in a safe manner, the candidate shall not have any health issues that are likely to impede their control of the aircraft. In particular, the candidate shall:

- a) be able to clearly see the aircraft at all times and be able to judge its orientation at any distance at which it is likely to be operated;
- b) be able to identify any other air users or obstructions that might pose a collision risk for the UAS;
- c) be able to read and interpret the telemetry and other data displayed on the UAS controller display unit;
- d) be able to hear sufficiently to be aware of the approach of other aircraft or to be warned verbally of a safety concern; and
- e) not have any known condition that could cause sudden loss of consciousness or concentration.

In the event that a candidate has a condition or disability that prevents them from meeting one or more of these requirements, it might be possible to achieve a safe working protocol by using an observer, back-up PIC or other additional crew member, in which case a risk assessment shall be carried out to ensure that such a protocol is effective.

6 Theory knowledge

6.1 Air law/responsibilities

6.1.1 Terminology

The candidate shall be able to demonstrate understanding of the relevant air law and regulatory terminology.

6.1.2 Legislation

6.1.2.1 Relevant articles and definitions

The candidate shall be able to demonstrate understanding of:

- a) the legal framework that governs airspace in the regulatory environment or jurisdiction of operation; and
- b) the legal articles or regulation relevant to UAS flight in that jurisdiction.

6.1.2.2 Rules of the air

6.1.2.2.1 General

The candidate shall be able to demonstrate understanding of the rules of the air relevant to UAS operation.

6.1.2.2.2 Avoidance of collisions ("See and avoid")

The candidate shall be able to demonstrate understanding of:

- a) the PIC's responsibility for "see and avoid" and how this relates to avoidance of collisions with manned/unmanned aircraft; and
- b) the conventions aircraft might follow in a collision or conflict situation.

6.2 UAS guidance or implementing rules issued in the jurisdiction of operation

The candidate shall be able to demonstrate understanding of:

- a) guidance and or implementing rules and their relationship with regulation;
- b) details of mass categories;
- c) details of categories of operation; and
- d) restrictions applicable in different operating environments or standardized risk-based scenarios.

6.3 Incident and accident reporting

6.3.1 General

The candidate shall be able to demonstrate understanding of:

- a) the definition of accident as regards to aviation;
- b) the definition of incident as regards to aviation;
- c) the responsibility of the PIC as regards reporting incidents and accidents;
- d) "just culture";
- e) the safety benefits of reporting as regards safety management systems (SMS);
- f) the time limits on reporting;
- g) the mechanisms for reporting;
- h) the types of reportable incidents and accidents; and
- i) the relevant agencies for different types of reports.

6.3.2 Airprox reporting

The candidate shall be able to demonstrate understanding of:

- a) the definition of an airprox; and
- b) the airprox reporting process.

6.3.3 Investigation handling/assistance

The candidate shall be able to demonstrate understanding of how to assist agencies with any investigation as regards presentation of logs, records and documentation.

6.4 Insurance

The candidate shall be able to demonstrate understanding of the need for insurance and be able to reference any specific national or international requirements relevant to UAS operations.

NOTE Attention is drawn to the requirement for all candidates to conform to a minimum liability limit under EU Regulation 785/2004 [1]. To demonstrate compliance, a copy of a valid certificate of insurance is to be submitted along with the operations manual, either at the time of first entry on the UK Register or when there is a change of registered ownership and at renewal.

6.5 UAS airspace operating principles

6.5.1 Flight information region (FIR)

The candidate shall be able to demonstrate understanding of the relevance of the following with respect to UAS:

- a) overall airspace designations;
- b) airspace sovereignty; and
- c) International Civil Aviation Organization (ICAO) definitions.

6.5.2 Airspace classifications

6.5.2.1 General

The candidate shall be able to demonstrate understanding of:

- a) classes of airspace;
- b) airspace restrictions;
- c) airspace structure and limits;
- d) likely vertical extent; and
- e) 3D nature of airspace.

6.5.2.2 Differing considerations

The candidate shall be able to demonstrate understanding of:

- a) operating restrictions in different classes of airspace;
- b) likely traffic considerations for the UAS pilot to be concerned about; and
- c) responsibility of other visual flight rules (VFR) traffic.

6.5.2.3 Controlled airspace

The candidate shall be able to demonstrate understanding of:

- a) how airspace ownership is assigned;
- b) when liaison with air traffic control is appropriate; and
- c) unmanned traffic management (UTM) principles and their likely evolution.

6.6 Specific airspace types

The candidate shall be able to demonstrate understanding of the key features of the following airspace types.

- a) Aerodrome Traffic Zone (ATZ).
 - 1) What factors to consider when operating in liaison with airspace owners.
 - 2) Typical or likely traffic flow or operations close to airfields.
 - 3) How to recognize ATZs on airspace charts.
- b) Control zone (CTR).
 - 1) How to act in high-traffic areas.
 - 2) Likely traffic flow in high-traffic areas.
 - 3) The expected changes in respect of UTM and the importance of staying updated in respect of these.

- c) Gliding/parachuting sites.
 - 1) How to integrate with VFR traffic.
 - 2) UAS handling in uncontrolled airspace, traffic flow and yielding.
 - 3) The importance of a good look-out given that gliders emit minimal sound.

6.7 Airspace reservations

The candidate shall be able to demonstrate understanding of:

- a) the definitions, avoidance criteria and risks associated with danger areas and where to find information on them;
- b) the definition of prohibited areas and the meaning of them for UAS pilots and where to find information on them;
- c) the definition of restricted areas and the meaning of them for UAS pilots and where to find information on them; and
- d) when temporary airspace reservations can be applied, their purpose and interpretation.

6.8 Obtaining information/approvals

The candidate shall be able to demonstrate understanding of:

- a) the interpretation and use of the UK Aeronautical Information Publication (AIP);
- b) the purpose, interpretation and use of Aeronautical Information Circulars (AICs);
- c) Notices to Airmen (NOTAMs):
 - 1) how to obtain and interpret NOTAMs;
 - 2) how to request the addition of information regarding a UAS flight plan into a NOTAM;
- d) chart interpretation:
 - 1) how to interpret aeronautical charts (see also [6.13](#));
 - 2) how to interpret surface maps (e.g. Ordnance Survey maps);
 - 3) how charts and maps are amended;
- e) when it is appropriate to contact other parties and the information needed, for example:
 - 1) air traffic control (ATC);
 - 2) Civil Aviation Authority;
 - 3) police;
 - 4) landowner;
 - 5) neighbouring property owners; and
 - 6) bystanders.

6.9 UAS operations

The candidate shall be able to demonstrate understanding of:

- a) the meaning of each of these terms and their operating limitations:
 - 1) visual line-of-sight (VLOS);
 - 2) extended visual line-of-sight (EVLOS);
 - 3) beyond visual line-of-sight (BVLOS); and

- b) how segregated airspace is established and controlled.

6.10 Airmanship and aviation safety

6.10.1 Good airmanship principles

6.10.1.1 General

The candidate shall be able to demonstrate understanding of:

- a) how airmanship is a range of skills, knowledge and disciplines and is not limited to the motor skills of flying an aircraft;
- b) how airmanship principles can contribute to aviation safety in the unmanned aircraft environment;
- c) how to put into practice good airmanship principles in real operational situations; and
- d) how concepts such as threat and error management (TEM) and crew resource management (CRM) can form a part of good airmanship.

6.10.1.2 Aircraft safe to operate

The candidate shall be able to demonstrate understanding of:

- a) the requirement to conduct appropriate maintenance checks on the aircraft;
- b) the requirement to develop a maintenance schedule to ensure the aircraft is properly maintained and safe to operate;
- c) the appropriate action when an aircraft requires repairs or maintenance;
- d) the recording of maintenance and repairs; and
- e) the need to stop the operation if the aircraft is not safe to operate at any point in the operation (go/no go decision).

The candidate shall be able to demonstrate how to conduct pre-flight checks to ensure the aircraft is safe to operate and airworthy before each flight.

6.10.1.3 Remote pilot fit to operate aircraft

The candidate shall be able to demonstrate understanding of:

- a) how remote pilot fitness is a key part of operational safety;
- b) appropriate medical fitness levels for the remote pilot;
- c) self-check of pilot medical fitness before each flight and methods of accomplishing this; and
- d) monitoring of remote pilot fitness.

6.10.1.4 Planning

The candidate shall be able to demonstrate the following abilities:

- a) planning and preparation to identify operational hazards, risks and, where appropriate, mitigating measures to perform the UAS flight successfully;
- b) building situational awareness using thorough planning prior to the UAS flight;
- c) determining the workload of a particular operation prior to the flight and allocating correct resources; and
- d) conducting effective briefing of normal and emergency actions immediately prior to the flight to help perform the UAS flight successfully.