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Unmanned aircraft systems —

Part 3:
Operational procedures

Aéronefs sans pilote —

Partie 3: Modes opératoires

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 16, *Unmanned aircraft systems*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document outlines requirements for unmanned aircraft (UA) operational procedures which, when applied together with any other current and future standard on unmanned aircraft systems (UAS) form a robust UA safety and quality standard. This document applies to all commercial UAS regardless of size, categorization, application or location and represents the international best practice for the safe operation of all commercial UAS. This document is structured in a way to provide a logical pathway from core principles to specific requirements, and the detail has been espoused in Annex A for reference.

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Unmanned aircraft systems —

Part 3:
Operational procedures

1   Scope

This document specifies the requirements for safe commercial UAS operations.

2   Normative references

There are no normative references in this document.

3   Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
crew resource management
CRM
utilisation of all resources available to the crew to manage human error

3.2
remote pilot in command
RPIC
pilot designated by the operator as being in command and charged with the safe conduct of a flight

3.3
safety management system
SMS
systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies and procedures

[SOURCE: ICAO Doc. 9859]

3.4
unmanned aircraft accident
occurrence associated with the operation of an unmanned aircraft which takes place between the time the aircraft is ready to move with the purpose of flight until 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 direct contact with any part or exposure to any emission of the UA or other component of the UAS, including parts which have become detached from the aircraft, or

b)   the aircraft sustains damage or structural failure which prevents safe operation

3.5
unmanned aircraft incident
occurrence, other than an *unmanned aircraft accident* (3.4), associated with the operation of an aircraft which affects or could affect the safety of operation, including the loss of unmanned aircraft

4 Abbreviated terms

AIS   aeronautical information service

ATS   air traffic service

CofA   certificate of airworthiness

DAL   design assurance level

FW   firmware

FOD   foreign object debris

GNSS   global navigation satellite system

MCM   maintenance control manual

MEL   minimum equipment list

NOTAM   notice to airmen

OEM   original equipment manufacturer

PIC   pilot in command

RF   radio frequency

RPS   remote pilot station

SORA   specific operation risk assessment

SRM   safety risk management

SW   software

UA   unmanned aircraft

UAS   unmanned aircraft system

UTM   UAS traffic management

VO   visual observer

5 Safety and security

5.1 General

Operators shall implement a safety management system (SMS) as standard practice regardless of the type of unmanned aircraft systems (UAS) operated or size of operation. An SMS is a comprehensive, process-oriented approach to managing safety throughout an organization.

NOTE   Safety management systems are defined in ISO 45001 and ICAO Doc. 9859.

5.2 Safety management system requirements

5.2.1 Safety policy

Management systems shall define policies, procedures, and organizational structures to accomplish their goals. Human error in unmanned aircraft (UA) operation and supporting system management can be controlled by a safety policy.

5.2.2 Safety risk management (SRM)

Safety risk management (SRM) uses task analysis, hazard identification, risk analysis, and risk assessment to develop risk controls.

SRM shall be performed on UA operation and supporting system management. ISO 12100 should be referred to for risk assessment.

NOTE   Further guidance on risk assessment for UAS operations is given in the JARUS guidelines on specific operations risk assessment (SORA).

5.2.3 Safety assurance

Safety assurance provides for system monitoring, measuring, assessment, and corrective action to assure the effectiveness of risk controls.

Safety assurance shall be continuously performed throughout UA operation and supporting system management, including for functions executed by third-party service providers.

5.2.4 Safety promotion

Safety promotion provides guidance for training and communication to promote safety as a core value in the organization.

Safety promotion shall be performed throughout operation of UA and UA supporting system management.

All requirements in this document are indispensable to implement an SMS.

Operators should determine what evidence of SMS compliance is acceptable to the countries of intended operation.

5.3 Security

The following security precautions shall be taken when operating UA.

a) Operators shall implement all reasonably practicable cyber security measures in all aspects of UAS operations.

b) Operators shall ensure that all personnel with access to any part of the UAS are suitably vetted.

6 Data protection — Operator requirements

Taking relevant data protection regulation into consideration, operators shall ensure that:

a) systems in place to protect data gathered during UA operations as far as reasonably practicable;

b) suitable procedures are in place to securely store or dispose of all data gathered during UA operations;

c) personnel involved in the handling of sensitive data are suitably vetted.

Privacy etiquette shall be in accordance with Annex A.

7 Operator

7.1 Documentation

7.1.1 Documents held by the UAS operator

7.1.1.1 General

Operators shall hold documents, manuals and information specific to the UAS operator. Taking local regulations into consideration, operators shall ensure that the following documents are available:

a) details of the operator;

b) flight manual of each model of UA, or equivalent document issued by manufacturer;

c) registration and serial number of each UA;

d) operations manual;

e) maintenance control manual (MCM);

f) contracts and service level agreements with third parties providing safety related services;

g) insurance certificate(s) in accordance with 7.2;

h) copies of personnel licences or competence attestations issued by the operator or by a qualified entity;

i) certificates of airworthiness or, where existing, declarations of conformity by manufacturer or qualified entity.

7.1.1.2 Operations manual

The operator shall establish, maintain and apply an up-to-date operations manual. Taking local regulations into consideration, the operator shall ensure that an operations manual is in place, containing the following documents, policies and procedures:

a) a risk assessment is conducted for every type of operation;

b) all personnel involved in the operations are professionally competent and psychologically and medically fit;

c) all UAS are maintained in accordance with the maintenance programme consistent with the manufacturer's instructions;

d) all operations are conducted according to Clause 10;

e) manufacturer and manufacturer's designation for each UAS;

f) registration and serial number of each UAS;

g) duties of assigned pilot in command (PIC) and other crewmembers for each general mission type;

h) emergency actions/checklists;

i) minimum equipment list by mission type;

j) normal and abnormal checklists (to include pre-flight inspection);

k) standard operating procedures (SOPs), if any.

7.1.2 Documents to be available at the point of operations

The operator shall ensure that required documents are available at the point of operations. Taking local regulations into consideration, the operator shall ensure that the following documents are available at the point of operations:

a) flight manual including predicted performance data;

b) journey log book;

c) 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/any other location designated for take-off and landing of UAS, or electronic access to it;

d) details of the filed, current, air traffic service (ATS) and operational flight plans, if applicable;

e) notice to airmen (NOTAM) and aeronautical information service (AIS) briefing documentation or electronic access to it;

f) operations manual or pertinent subset thereof, including applicable checklists and the minimum equipment list (MEL);

g) meteorological information or electronic access to it;

h) mass and balance documentation;

i) for UA carrying cargo: a manifest, information on dangerous goods and detailed declarations of the cargo;

j) risk assessment and details of the mitigations from the risk assessment;

k) the operator's contact information;

l) remote pilot certificate (copy).

7.2 Insurance

Operators shall have insurance. Taking local regulations into consideration, operators shall ensure that they have insurance appropriate to their operations and covering health and safety of personnel and risks to third parties.

8 Airspace

8.1 Compliance with airspace regulations

UA operators shall establish procedures to ensure that applicable rules of the air and regulations defining airspace areas or special zones are followed.

These procedures shall also cover how to obtain permission by the local air traffic service provider(s) to access airspace, or alternative coordination procedures in the context of UAS traffic management (UTM).

It is presupposed that operators ensure that UAS comply with defined technical or performance specifications, including mandatory equipment or functions that enable easy identification or automatically limit the airspace they are allowed to enter (e.g. geo-limitations).

8.2 Airspace information

UA operators shall ensure that involved personnel have access to airspace information on prohibited, restricted, danger and special zones for UA operations in electronic format and, where applicable in