

---

---

## Unmanned aircraft systems — Training for personnel involved in UAS operations

*Aéronefs sans pilote — Formation du personnel impliqué dans  
l'exploitation d'UAS*



## **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Abbreviated terms</b> .....	<b>2</b>
<b>5 Training organization</b> .....	<b>3</b>
5.1 Responsibilities.....	3
5.2 Documentation for staff members.....	3
5.3 Display of certificate.....	3
5.4 Records.....	3
5.5 Emergency procedures and equipment.....	4
5.6 Introductory information.....	4
<b>6 Training resources</b> .....	<b>4</b>
6.1 Teaching aids.....	4
6.2 Instructor requirements.....	5
6.3 Theoretical training.....	5
6.3.1 Theory knowledge delivery methods.....	5
6.3.2 Theory presentations.....	5
6.4 Flight training.....	5
6.4.1 Training environment.....	5
6.4.2 Training aircraft.....	5
6.4.3 Simulators.....	5
6.4.4 Risk management.....	6
<b>7 Training content delivery</b> .....	<b>6</b>
<b>8 Final qualification</b> .....	<b>6</b>
<b>9 Evaluation protocols</b> .....	<b>6</b>
<b>Annex A (normative) VLOS UAS pilot courses</b> .....	<b>7</b>
<b>Bibliography</b> .....	<b>42</b>

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 document 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](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

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

This second edition cancels and replaces the first edition (ISO 23665:2021), which has been technically revised.

The main changes are as follows:

- addition of normative references;
- addition of training requirements for low-risk VLOS operation pilot courses;
- changes to [Annex A](#): transfer of training requirements from continuous text to table format to accommodate the requirements for the training curriculum for both the VLOS UAS r-PIC course and the newly added low-risk VLOS operation pilot course.

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](http://www.iso.org/members.html).

## Introduction

Unmanned aircraft (UA) have been rapidly increased in number, application and type within recent decades. UA are commonly utilized for filming, agricultural spraying, inspection, security activities and are expected to be also employed for transportation.

However, the required knowledge, attitude and skill levels for personnel who are involved in unmanned aircraft system (UAS) operations need to be clearly defined. When unskilled persons operate a UA, the risk of a serious accident will increase. Discrepancies in qualification criteria among countries or organizations will also prevent the international exchange of workers and aircraft.

This document helps to ensure that personnel who are involved in UAS operations receive appropriate education and obtain essential knowledge and skill. Training organizations and individuals qualified according to this document will be internationally recognized. It will enhance the international operation of UAS, enable personal exchange, and encourage international trade.

The main body of this document defines the procedures for the operation of a training organization, which is the entity that delivers training to UAS remote pilots. The requirements for a specific course (VLOS UAS remote pilot-in-command) are in [Annex A](#). It is envisioned that further courses will be defined later and that these will be added as additional annexes in the future.



# Unmanned aircraft systems — Training for personnel involved in UAS operations

## 1 Scope

This document describes the procedures for training personnel who will be involved in the operation of unmanned aircraft systems (UAS).

This document defines:

- a) knowledge, skill, attitude and qualification criteria that are needed for UAS pilots and training organizations that provide training to UAS remote pilots and other personnel involved in UAS operations;
- b) training curriculum and contents for specific learning courses;
- c) qualification and confirmation criteria for the training organizations;
- d) general procedures for providing training of UAS personnel; the requirements for a specific course as described in [Annex A](#) can be more restrictive in some cases.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 21384-3:2019, *Unmanned aircraft systems — Part 3: Operational procedures*

ISO 21384-4, *Unmanned aircraft systems — Part 4: Vocabulary*

ISO 21895, *Categorization and classification of civil unmanned aircraft systems*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21384-4 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### **national aviation authority**

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

### 3.2

#### **visual observer**

remote crew member who, by visual observation of the remotely piloted aircraft, assists the *remote pilot* (3.3) in the safe conduct of the flight