



ICAO

Doc 10163

Manual on High Elevation Aerodrome Operations

First Edition, 2022



Approved by and published under the authority of the Secretary General

INTERNATIONAL CIVIL AVIATION ORGANIZATION **Documents**
AVA Document Sharing Hub



国际民航组织

اىكاو



Doc XXXX3

Doc XXXX

XXXXXXXXXXXXXXXXXXXX
Manual on High Elevation
XXXXXXXX
Aeroborne Operations

XXXXX

Volume X — XXXXXXXX
First Edition, 2022
XXXX Edition, 20XX

الطبعة ٢٠xx — xxx

Approved by the Council and adopted by the Assembly of the Organization
اعتمدته الجمعية العامة واعتمدتها الهيئة العامة

ORGANISATION DE L'AVIATION INTERNATIONALE Documents



Document Sharing Hub

Published in separate English, Arabic, Chinese, French, Russian
and Spanish editions by the
INTERNATIONAL CIVIL AVIATION ORGANIZATION
999 Robert-Bourassa Boulevard, Montréal, Quebec, Canada H3C 5H7

For ordering information and for a complete listing of sales agents
and booksellers, please go to the ICAO website at www.icao.int

First Edition, 2022

Doc 10163, *Manual on High Elevation Aerodrome Operations*

Order Number: 10163

ISBN 978-92-9265-837-3 (print version)

© ICAO 2022

All rights reserved. No part of this publication may be reproduced, stored in a
retrieval system or transmitted in any form or by any means, without prior
permission in writing from the International Civil Aviation Organization.

AMENDMENTS

Amendments are announced in the supplements to the *Products and Services Catalogue*; the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

[illegible][illegible]

FOREWORD

At the 39th Session of the Assembly (27 September to 6 October 2016), the Technical Commission deliberated A39-WP/336 Revision No. 1, presented by China on the *Operations at Plateau Airports*. This paper introduced the difficulties faced by aeroplane operations into or out of high elevation aerodromes (usually in mountainous areas) and recommended that appropriate considerations be given to the challenges presented by the operating environments of these aerodromes. The Technical Commission submitted the proposal included in the working paper to the Council for further deliberation in A39-WP/476, *Draft text for the Report on Agenda Item 35*. At the 40th Session of the Assembly (24 September to 4 October 2019), China presented A40-WP/304, *Updates on the Operation at High Elevation Aerodromes* to the Technical Commission, calling for support for ICAO in working with States, industry and other stakeholders for the standardization of optimum practices in high elevation aerodrome (HEA) operations and the development of globally harmonized Standards and Recommended Practices (SARPs).

The Flight Operations Panel discussed generic difficulties faced by the State of the Operator in regulating HEA operations and the challenges posed to the State of the Operator in HEA operational oversight, and potential safety risks to operators in HEA operations due to the lack of harmonized standards and guidelines worldwide. The panel agreed on the necessity for the State of the Operator to accept or authorize HEA operations, as applicable, due to their special nature.

This manual is intended to provide guidance to commercial operations in accordance with Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes* and is therefore focused on the operation of aeroplanes to high elevation aerodromes, by operators who are assumed to have a Safety Management System as required by Annex 19 — *Safety Management*.

Comments on this manual, particularly with respect to its application and usefulness, are appreciated. These comments will be taken into consideration in the preparation of subsequent editions. Comments concerning this manual should be addressed to:

The Secretary General
International Civil Aviation Organization
999 Robert-Bourassa Boulevard
Montréal, Quebec, Canada H3C 5H7

CONTENTS

	<i>Page</i>
Glossary	(ix)
Chapter 1. Introduction	1-1
1.1 Background	1-1
1.2 Purpose	1-1
1.3 Applicability	1-1
1.4 Characteristics of HEA operations.....	1-1
1.5 HEA classification.....	1-3
Chapter 2. Safety risk assessment	2-1
Chapter 3. Operational personnel requirements	3-1
3.1 Aviation medicine	3-1
3.2 Fatigue management.....	3-1
3.3 Training and qualification.....	3-1
3.4 Pilot-in-command (PIC) recent experience.....	3-3
Chapter 4. Operator requirements	4-1
4.1 Safety management	4-1
4.2 Aeroplane configuration.....	4-1
4.3 HEA operations manual.....	4-2
4.4 Aeroplane performance	4-2
4.5 Supplementary aeroplane operating procedures.....	4-2
Chapter 5. Flight operations requirements	5-1
5.1 Operational personnel	5-1
5.2 Supplementary briefing cards and checklists	5-1
5.3 Operational control	5-1
Chapter 6. Maintenance and reliability requirements.....	6-1
6.1 Maintenance programme for HEA operations	6-1
6.2 Maintenance management procedures	6-2
6.3 Control of the significant systems for HEA operations.....	6-2
6.4 Aeroplane maintenance programme for HEA operations	6-3
6.5 Reliability programme for HEA operations.....	6-5
6.6 Engine condition monitoring programme	6-5
6.7 Minimum equipment list (MEL)	6-6

Chapter 7. Authorization process	7-1
7.1 Requirements for the State of the Operator.....	7-1
7.2 Requirements for the operator.....	7-1
7.3 Application documents	7-2
7.4 Required technical safety evaluations	7-2

GLOSSARY

When the following terms are used in this manual, they have the following meanings:

Extremely high elevation aerodrome (EHEA). An aerodrome at or above an elevation of 3 650 m (12 000 ft).

Hazard. A condition or an object with the potential to cause or contribute to an aircraft incident or accident.

High elevation aerodrome (HEA). An aerodrome at or above an elevation of 2 450 m (8 000 ft).

High elevation aerodrome (HEA) operation. An operation departing from and/or arriving at an HEA.

Risk mitigation. The process of incorporating defences, preventive controls or recovery measures to lower the severity and/or likelihood of a hazard's projected consequence.

Safety management system. A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

Safety risk. The predicted probability and severity of the consequences or outcomes of a hazard.

Significant system for high elevation aerodrome (HEA) operations. An aeroplane system whose failure or degradation could adversely affect safety, particularly during an HEA operation, or whose continuous functioning is specifically important for the flight safety and landing of an aeroplane during a diversion of an HEA operation.

State of the Operator. The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

Ultra high elevation aerodrome (UHEA). An aerodrome at or above an elevation of 3 050 m (10 000 ft) but below 3 650 m (12 000 ft).

Very high elevation aerodrome (VHEA). An aerodrome at or above an elevation of 2 450 m (8 000 ft) but below 3 050 m (10 000 ft).

ACRONYMS AND ABBREVIATIONS

APU	Auxiliary power unit
CFIT	Controlled flight into terrain
EGT	Exhaust gas temperature
EHEA	Extremely high elevation aerodrome
HEA	High elevation aerodrome
hPa	Hectopascal
IFSD	In-flight shutdown
MEA	Minimum en-route altitude
MEL	Minimum equipment list
PIC	Pilot-in-command
SMS	Safety management system
UHEA	Ultra high elevation aerodrome
VHEA	Very high elevation aerodrome

