



International
Civil Aviation
Organization

Organisation
de l'aviation civile
internationale

Organización
de Aviación Civil
Internacional

Международная
организация
гражданской
авиации

منظمة الطيران
المدني الدولي

国际民用
航空组织

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Ref.: AN 10/1.1-25/24

23 April 2025

Subject: Adoption of Amendment 82 to Annex 3

Action required: a) Notify any disapproval before 4 August 2025; b) Notify any differences and compliance before 27 October 2025¹; c) Consider the use of the Electronic Filing of Differences (EFOD) System for notification of differences and compliance

Sir/Madam,

1. I have the honour to inform you that Amendment 82 to the *International Standards and Recommended Practices, Meteorological Service for International Air Navigation* (Annex 3 to the Convention on International Civil Aviation) was adopted by the Council at the fourteenth meeting of its 234th Session on 2 April 2025. Copies of the Amendment and the Resolution of Adoption are available as attachments to the electronic version of this State letter on the ICAO-NET (<http://portal.icao.int>) where you can access all other relevant documentation.

2. When adopting the amendment, the Council prescribed 4 August 2025 as the date on which it will become effective, except for any part concerning which a majority of Contracting States have registered their disapproval before that date. In addition, the Council resolved that Amendment 82 to the extent it becomes effective, will become applicable on 27 November 2025² unless otherwise indicated.

3. Amendment 82 arises from recommendations developed by fifth meeting of the Meteorology Panel (METP/5) concerning the restructured Annex 3, space weather information services, quantitative volcanic ash information and the international airways volcano watch (IAVW), the ICAO meteorological information exchange model (IWXXM), the world area forecast system (WAFS), and improved definition of meteorological authority and introduction of a new definition of meteorological service provider.

4. The subjects are given in the amendment to the Foreword of Annex 3, a copy of which is in Attachment A.

5. In conformity with the Resolution of Adoption, may I request:

¹ 26 October 2026 for provisions indicating applicable as of 26 November 2026.

² 26 November 2026 for elements concerning quantitative volcanic ash information.

- a) that before 4 August 2025 you inform me if there is any part of the adopted Standards and Recommended Practices (SARPs) amendments in Amendment 82 concerning which your Government wishes to register disapproval, using the form in Attachment B for this purpose. Please note that only statements of disapproval need be registered and if you do not reply it will be assumed that you do not disapprove of the amendment;
- b) that before 27 October 2025¹ you inform me of the following, using the Electronic Filing of Differences (EFOD) System or the form in Attachment C for this purpose:
 - 1) any differences that will exist on 27 November 2025² between the national regulations or practices of your Government and the provisions of the whole of Annex 3, as amended by all amendments up to and including Amendment 82 and thereafter of any further differences that may arise; and
 - 2) the date or dates by which your Government will have complied with the provisions of the whole of Annex 3 as amended by all amendments up to and including Amendment 82.

6. With reference to the request in paragraph 5 a) above, it should be noted that a registration of disapproval of Amendment 82 or any part of it in accordance with Article 90 of the Convention does not constitute a notification of differences under Article 38 of the Convention. To comply with the latter provision, a separate statement is necessary if any differences do exist, as requested in paragraph 5 b) 1). It is recalled in this respect that international Standards in Annexes have a conditional binding force, to the extent that the State or States concerned have not notified any difference thereto under Article 38 of the Convention.

7. With reference to the request in paragraph 5 b) above, it should be also noted that the ICAO Assembly, at its 39th Session (27 September to 6 October 2016), resolved that Member States should be encouraged to use the EFOD System when notifying differences (Resolution A39-22 refers). The EFOD System is currently available on the Universal Safety Oversight Audit Programme (USOAP) restricted website (<http://www.icao.int/usoap>) which is accessible by all Member States. You are invited to consider using this for notification of compliance and differences.

8. Guidance on the determination and reporting of differences is given in the Note on the Notification of Differences in Attachment D. Please note that a detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

9. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 5 b) above, to the ICAO Regional Office accredited to your Government.

10. At the fifth meeting of its 204th Session, the Council requested that States, when being advised of the adoption of an Annex amendment, be provided with information on implementation and available guidance material, as well as an impact assessment. This is presented for your information in Attachments E and F, respectively. An overview of the approval process for Amendment 82 to Annex 3 is also included for your information in Attachment G.

¹ 26 October 2026 for provisions indicating applicable as of 26 November 2026.

² 26 November 2026 for provisions related to quantitative volcanic ash information.

11. As soon as practicable after the amendment becomes effective, on 4 August 2025, replacement pages incorporating Amendment 82 will be forwarded to you.

Accept, Sir/Madam, the assurances of my highest consideration.

Juan Carlos Salazar
Secretary General

Enclosures:

- A — Amendment to the Foreword of Annex 3
- B — Form on notification of disapproval of all or part of Amendment 82 to Annex 3
- C — Form on notification of compliance with or differences from Annex 3
- D — Note on the Notification of Differences
- E — Implementation task list and outline of guidance material in relation to Amendment 82 to Annex 3
- F — Impact assessment in relation to Amendment 82 to Annex 3
- G — Overview of approval process for Amendment 82 to Annex 3

ATTACHMENT A to State letter AN 10/1.1-25/24

AMENDMENT TO THE FOREWORD OF ANNEX 3

Add the following element at the end of Table A:

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject</i>	<i>Adopted/Approved Effective Applicable</i>
82	Fifth meeting of the Meteorology Panel (METP/5)	a) restructured Annex 3, space weather information services, the international airways volcano watch (IAVW), the ICAO meteorological information exchange model (IWXXM), the world area forecast system (WAFS), improved definition of meteorological authority and introduction of a new definition of meteorological service provider; and b) quantitative volcanic ash information as of 26 November 2026.	2 April 2025 4 August 2025 27 November 2025 26 November 2026

ATTACHMENT B to State letter AN 10/1.1-25/24

NOTIFICATION OF DISAPPROVAL OF ALL OR PART OF
AMENDMENT 82 TO ANNEX 3

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

(State) _____ hereby wishes to disapprove the following parts of
Amendment 82 to Annex 3:

Signature _____

Date _____

NOTES

- 1) If you wish to disapprove all or part of Amendment 82 to Annex 3, please dispatch this notification of disapproval to reach ICAO Headquarters by 4 August 2025. If it has not been received by that date it will be assumed that you do not disapprove of the amendment. **If you approve of all parts of Amendment 82, it is not necessary to return this notification of disapproval.**
- 2) This notification should not be considered a notification of compliance with or differences from Annex 3, Separate notifications on this are necessary. (See Attachment C.)
- 3) Please use extra sheets as required.

ATTACHMENT C to State letter AN 10/1.1-25/24

**NOTIFICATION OF COMPLIANCE WITH OR DIFFERENCES
FROM ANNEX 3
(Including all amendments up to and including Amendment 82)**

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

1. No differences will exist on _____ between the national regulations and/or practices of **(State)** _____ and the provisions of Annex 3, including all amendments up to and including Amendment 82.

2. The following differences will exist on _____ between the regulations and/or practices of **(State)** _____ and the provisions of Annex 3, including Amendment 82 (Please see Note 2) below.)

a) Annex Provision (Please give exact paragraph reference)	b) Details of Difference (Please describe the difference clearly and concisely)	c) Remarks (Please indicate reasons for the difference)
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(Please use extra sheets as required.)

3. By the dates indicated below, **(State)** _____ will have complied with the provisions of Annex 3, including all amendments up to and including Amendment 82 for which differences have been notified in 2 above.

a) Annex Provision (Please give exact paragraph reference)	b) Date	c) Comments
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(Please use extra sheets as required.)

Signature _____

Date _____

NOTES

- 1) If paragraph 1 above is applicable to your State, please complete paragraph 1 and return this form to ICAO Headquarters. If paragraph 2 is applicable to you, please complete paragraphs 2 and 3 and return the form to ICAO Headquarters.
- 2) A detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.
- 3) Guidance on the notification of differences is provided in the Note on the Notification of Differences and in the *Manual on Notification and Publication of Differences* (Doc 10055).
- 4) Please send a copy of this notification to the ICAO Regional Office accredited to your Government.

NOTE ON THE NOTIFICATION OF DIFFERENCES
(Prepared and issued in accordance with instructions of the Council)

1. *Introduction*

1.1 Article 38 of the Convention on International Civil Aviation (“Convention”) requires that a Contracting State notify ICAO any time it does not comply with a Standard in all respects, it does not bring its regulations or practices into full accord with any Standard, or it adopts regulations or practices differing in any particular respect from the Standard.

1.2 The Assembly and the Council, when reviewing the notification of differences by Contracting States in compliance with Article 38 of the Convention, have repeatedly noted that the timeliness and currency of such notifications is not entirely satisfactory. Therefore, this note is issued to reiterate the primary purpose of Article 38 of the Convention and to facilitate the determination and notification of differences.

1.3 The primary purpose of the notification of differences is to promote safety, regularity and efficiency in air navigation by ensuring that governmental and other agencies, including operators and service providers, concerned with international civil aviation are made aware of all national regulations and practices in so far as they differ from those prescribed in the Standards contained in Annexes to the Convention.

1.4 Contracting States are, therefore, requested to give particular attention to the notification of differences with respect to Standards in all Annexes, as described in paragraph 4 b) 1) of the Resolution of Adoption.

1.5 Although differences from Recommended Practices are not notifiable under Article 38 of the Convention, the Assembly has urged Contracting States to extend the above considerations to Recommended Practices contained in Annexes to the Convention, as well.

2. *Notification of differences from Standards and Recommended Practices (SARPs)*

2.1 Guidance to Contracting States in the notification of differences to Standards and Recommended Practices (SARPs) can only be given in very general terms. Contracting States are further reminded that compliance with SARPs generally extends beyond the issuance of national regulations and requires establishment of practical arrangements for implementation, such as the provision of facilities, personnel and equipment and effective enforcement mechanisms. Contracting States should take those elements into account when determining their compliance and differences. The following categories of differences are provided as a guide in determining whether a notifiable difference exists:

- a) *A Contracting State’s requirement is more exacting or exceeds a SARP (Category A).* This category applies when the national regulation and practices are more demanding than the corresponding SARP, or impose an obligation within the scope of the Annex which is not covered by the SARP. This is of particular importance where a Contracting State requires a higher standard which affects the operation of aircraft of other Contracting States in and above its territory;

- b) *A Contracting State's requirement is different in character or the Contracting State has established other means of compliance (Category B)**. This category applies, in particular, when the national regulation and practices are different in character from the corresponding SARP, or when the national regulation and practices differ in principle, type or system from the corresponding SARP, without necessarily imposing an additional obligation; and
- c) *A Contracting State's requirement is less protective, partially implemented or not implemented (Category C)*. This category applies when the national regulation and practices are less protective than the corresponding SARP; when no national regulation has been promulgated to address the corresponding SARP, in whole or in part; or when the Contracting State has not brought its practices into full accord with the corresponding SARP.

These categories do not apply to Not Applicable SARP. Please see the paragraph below.

2.2 **Not Applicable SARP.** When a Contracting State deems a SARP concerning aircraft, operations, equipment, personnel, or air navigation facilities or services to be not applicable to the existing aviation activities of the State, notification of a difference is not required. For example, a Contracting State that is not a State of Design or Manufacture and that does not have any national regulations on the subject, would not be required to notify differences from Annex 8 provisions related to the design and construction of an aircraft.

2.3 **Differences from appendices, tables and figures.** The material comprising a SARP includes not only the SARP itself, but also the appendices, tables and figures associated with the SARP. Therefore, differences from appendices, tables and figures are notifiable under Article 38. In order to file a difference against an appendix, table or figure, States should file a difference against the SARP that makes reference to the appendix, table or figure.

2.4 **Differences from definitions.** Contracting States should notify differences from definitions. The definition of a term used in a SARP does not have independent status but is an essential part of each SARP in which the term is used. Therefore, a difference from the definition of the term may result in there being a difference from any SARP in which the term is used. To this end, Contracting States should take into consideration differences from definitions when determining compliance or differences to SARPs in which the terms are used.

2.5 The notification of differences should be not only to the latest amendment but to the whole Annex, including the amendment. In other words, Contracting States that have already notified differences are requested to provide regular updates of the differences previously notified until the difference no longer exists.

2.6 Further guidance on the identification and notification of differences, examples of well-defined differences and examples of model processes and procedures for management of the notification of differences can be found in the *Manual on Notification and Publication of Differences* (Doc 10055).

* The expression "different in character or other means of compliance" in b) would be applied to a national regulation and practice which achieve, by other means, the same objective as that of the corresponding SARPs or for other substantive reasons so cannot be classified under a) or c).

3. *Form of notification of differences*

3.1 Differences can be notified:

- a) by sending to ICAO Headquarters a form on notification of compliance or differences;
or
- b) through the Electronic Filing of Differences (EFOD) System at www.icao.int/usoap.

3.2 When notifying differences, the following information should be provided:

- a) the number of the paragraph or subparagraph which contains the SARP to which the difference relates*;
- b) the reasons why the State does not comply with the SARP, or considers it necessary to adopt different regulations or practices;
- c) a clear and concise description of the difference; and
- d) intentions for future compliance and any date by which your Government plans to confirm compliance with and remove its difference from the SARP for which the difference has been notified.

3.3 The differences notified will be made available to other Contracting States, normally in the terms used by the Contracting State when making the notification. In the interest of making the information as useful as possible, Contracting States are requested to ensure that:

- a) statements be as clear and concise as possible and be confined to essential points;
- b) the provision of extracts from national regulations not be considered as sufficient to satisfy the obligation to notify differences; and
- c) general comments, unclear acronyms and references be avoided.

* This applies only when the notification is made under 3.1 a).

**IMPLEMENTATION TASK LIST AND OUTLINE OF GUIDANCE MATERIAL
IN RELATION TO AMENDMENT 82 TO ANNEX 3**

1. IMPLEMENTATION TASK LIST

1.1 Essential steps to be followed by a State to implement the amendment to Annex 3:

- a) identification of the rule-making process necessary to transpose the new ICAO provisions into national regulations;
- b) establishment of a national implementation plan that takes into account the new ICAO provisions;
- c) conducting of a gap analysis between the new ICAO provisions and national framework;
- d) drafting of the necessary modification(s) to the national regulations;
- e) official adoption of the national regulations and means of compliance;
- f) modification of the oversight framework according to the new national regulations;
- g) filing of State differences with ICAO, if necessary;
- h) publication of significant differences in the Aeronautical Information Publication (AIP);
- i) implementation of the new national regulations by meteorological authorities and meteorological service providers; and
- j) oversight by the State on the implementation of regulations.

1.2 Specifically, the below steps are to be followed by States in a position to do so:

- a) with regard to IWXXM, continuous coordination with users on advantages of implementation to assist them to identify necessary resources to cover the costs;
- b) with regard to quantitative volcanic ash information, volcanic ash advisory Centre (VAAC) provider States need to consider improving their capability of providing quantitative forecast of volcanic ash extension. Coordination with users is encouraged regarding the use of quantitative information in air traffic management and flight operation, in coordination with the relevant VAACs; and
- c) with regard to VONA, (if applicable) coordination with State volcano observatories (SVOs) is required for dissemination of VONA both in alphanumeric codes and IWXXM format.

2. STANDARDIZATION PROCESS

2.1 Effective date: 4 August 2025

2.2 Applicability date: 27 November 2025 for elements concerning the restructured Annex 3, space weather information services, and the international airways volcano watch (IAVW), the ICAO meteorological information exchange model (IWXXM), the world area forecast system (WAFS), improved definition of meteorological authority and introduction of a new definition of meteorological service provider.

2.3 Embedded date: 26 November 2026 for elements concerning quantitative volcanic ash information.

3. SUPPORTING DOCUMENTATION

3.1 ICAO documentation

Title	Type (PANS/TI/Manual/Circ)	Planned publication date
<i>Manual on Aeronautical Meteorological Practices</i> (Doc 8896)	Manual	Q4 2025
<i>Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds</i> (Doc 9691)	Manual	Q4 2025
<i>Handbook on the International Airways Volcano Watch (IAVW) – Operational Procedures and Contact List</i> (Doc 9766)	Manual	Q4 2025
<i>Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services</i> (Doc 9377)	Manual	Q4 2025
<i>Manual on the ICAO Meteorological Information Exchange Model (IWXXM)</i> (Doc 10003)	Manual	Q4 2025
<i>Manual on Space Weather Information in Support of International Air Navigation</i> (Doc 10100)	Manual	Q4 2025

3.2 External documentation

Title	External Organization	Publication date
Nil		

4. IMPLEMENTATION ASSISTANCE TASKS

Type	Global	Regional
Educational campaign		Regional seminars/workshops

5. UNIVERSAL SAFETY OVERSIGHT AUDIT PROGRAMME (USOAP)

5.1 No changes are envisaged in the Protocol Questions (existing PQs are considered sufficient to address existing provisions).

**IMPACT ASSESSMENT IN RELATION TO
AMENDMENT 82 TO ANNEX 3**

1. INTRODUCTION

1.1 Amendment 82 to Annex 3 is intended to:

- a) develop the restructured Annex 3 to facilitate the migration of the provision of aeronautical meteorological information from a "product-centric" to an "information-based" environment under the system-wide information management (SWIM), and the evolution of the provision of aeronautical meteorological service in line with the Global Air Navigation Plan (GANP). The restructuring also provides clearer separation of performance and functional requirements in Annex 3 from the technical specifications to be transferred to the PANS-MET;
- b) update existing provisions regarding space weather information services;
- c) introduce quantitative volcanic ash information, based on enhanced capabilities of quantitative monitoring and dispersion modelling of volcanic ash;
- d) introduce the issuance of volcanological notice for aviation (VONA) as a Recommended Practice;
- e) further develop IWXXM;
- f) further develop WAFS; and
- g) improve the definition of meteorological authority and introduce a new definition of meteorological service provider.

2. IMPACT ASSESSMENT

2.1 *Safety impact:* Positive. The amendment enhances safety of aircraft operations with improved information on current and forecast atmospheric conditions. This is expected to manifest in improved decision-making, particularly in the planning phase, to minimize potential negative safety impacts.

2.2 *Financial impact:* Some impact on resources will occur, since the restructured Annex 3 and a new PANS-MET may require some adjustments to national regulations. The upgraded WAFS information, quantitative volcanic ash information and IWXXM format may increase the cost related to the implementation and use of the information in the operating systems, depending on prevailing State or users' capabilities. In the long-term, efficiency and safety enhancements will reduce industry costs.

2.3 *Security impact:* No security impact is envisaged with the implementation of this amendment.

2.4 *Environmental impact:* Positive. The amendment enables more precise planning for mitigation of hazardous meteorological conditions, including space weather phenomena, which produce more efficient routes, less fuel burn, and reduction of emissions due to fewer ground hold/delay actions and environmentally optimized routing.

2.5 *Efficiency:* Positive. The amendment enhances efficiency of aircraft operations with more timely provision of digital meteorological information and its incorporation in flight planning, flow management and aircraft management.

2.6 *Expected implementation time:* For States, the restructured Annex 3 may require some adjustments to national regulations. For industry: a) minimal training and implementation will be required for one year with regards to the proposed updates for space weather advisory, volcanic ash advisory and WAFS information; b) implementation of IWXXM is expected to be promoted in a staged approach within planned SWIM implementation timeframes and c) implementation of quantitative volcanic ash information and upgrade of VONA may require more than one year, depending on the capabilities of provider States.

ATTACHMENT G to State letter AN 10/1.1-25/24

**OVERVIEW OF APPROVAL PROCESS FOR
AMENDMENT 82 TO ANNEX 3**

Amendment concerning	Source(s)	Preliminary review by the ANC	State letter and date	Final review by the ANC	No. of replies at final review	Adopted Effective Applicable
The restructured Annex 3, space weather information services, quantitative volcanic ash information and the international airways volcano watch (IAVW), the ICAO meteorological information exchange model (IWXXM), the world area forecast system (WAFS). improved definition of meteorological authority and introduction of a new definition of meteorological service provider (METP/5)	Fifth meeting of the Meteorology Panel (METP/5)	24 November 2022 (ANC 221-5)	AN 10/1-23/1 26 January 2023	2 November 2023 (ANC 224-6); 13 June 2024 (ANC 226-7 and ANC 226-8)	74 Contracting States 5 international organizations Total: 79 replies	2 April 2025 4 August 2025 27 November 2025 26 November 2026

— END —

AMENDMENT 82

TO THE

**INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

**METEOROLOGICAL SERVICE FOR
INTERNATIONAL AIR NAVIGATION**

ANNEX 3

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

The amendment to Annex 3, contained in this document was adopted by the Council of ICAO on **2 April 2025**. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before **4 August 2025** will become effective on that date and will become applicable on **27 November 2025** and **26 November 2026** as specified in the Resolution of Adoption. (State letter AN 10/1.1-25/24 refers.)

APRIL 2025

INTERNATIONAL CIVIL AVIATION ORGANIZATION

**AMENDMENT 82 TO THE INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

ANNEX 3 — METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION

RESOLUTION OF ADOPTION

The Council

Acting in accordance with the Convention on International Civil Aviation, and particularly with the provisions of Articles 37, 54 and 90 thereof,

1. *Hereby adopts* on 2 April 2025 Amendment 82 to the International Standards and Recommended Practices contained in the document entitled *International Standards and Recommended Practices, Meteorological Service for International Air Navigation* which for convenience is designated Annex 3 to the Convention;
2. *Prescribes* 4 August 2025 as the date upon which the said amendment shall become effective, except for any part thereof in respect of which a majority of the Contracting States have registered their disapproval with the Council before that date;
3. *Resolves* that the said amendment or such parts thereof as have become effective shall become applicable on 27 November 2025¹;
4. *Requests the Secretary General:*
 - a) to notify each Contracting State immediately of the above action and immediately after 4 August 2025 of those parts of the amendment which have become effective;
 - b) to request each Contracting State:
 - 1) to notify the Organization (in accordance with the obligation imposed by Article 38 of the Convention) of the differences that will exist on 27 November 2025 between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 27 October 2025², and thereafter to notify the Organization of any further differences that arise; and
 - 2) to notify the Organization before 27 October 2025² of the date or dates by which it will have complied with the provisions of the Standards in the Annex as hereby amended;
 - c) to invite each Contracting State to notify additionally any differences between its own practices and those established by the Recommended Practices following the procedure specified in subparagraph b) above with respect to differences from Standards.

¹ 26 November 2026 for provisions related to quantitative volcanic ash information.

² 26 October 2026 for provisions related to quantitative volcanic ash information.

**NOTES ON THE PRESENTATION OF THE
AMENDMENT TO ANNEX 3**

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

~~Text to be deleted is shown with a line through it.~~

text to be deleted

New text to be inserted is highlighted with grey shading.

new text to be inserted

~~Text to be deleted is shown with a line through it~~ followed by
the replacement text which is highlighted with grey shading.

new text to replace existing text

TEXT OF AMENDMENT 82

TO THE

**INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

**METEOROLOGICAL SERVICE
FOR INTERNATIONAL AIR NAVIGATION**

ANNEX 3

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

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Editorial Note.— Most of the provisions in the appendices are transferred to the new PANS-MET; those that are retained in the new edition of Annex 3 are singled out by an editorial note. Attachments A to E are transferred to the new PANS-MET without change, except for Attachment E, which is incorporated in Appendix 7 of the PANS-MET.

PART II.—APPENDICES AND ATTACHMENTS

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FOREWORD

...

Applicability

The Standards and Recommended Practices in this document govern the application of the *Procedures for Air Navigation Services — Meteorology* (PANS-MET, Doc 10157) and the *Regional Supplementary Procedures* (Doc 7030), in which latter document will be found ~~statements~~ subsidiary procedures of regional application choices, where such options are permitted by this Annex.

...

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

PART I

CORE SARPs

CHAPTER 1. DEFINITIONS

Note 1.— The designation (RR) in these definitions indicates a definition which has been extracted from the Radio Regulations of the International Telecommunication Union (ITU) (see Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies (Doc 9718)).

Note 2.— These Standards and Recommended Practices are to be used in conjunction with the Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157).

Editorial Note.— All definitions that are not used in this Annex have been deleted as redundant. The definition of minimum sector altitude aligned with Annex 4.

1.1 Definitions

When the following terms are used in the Standards and Recommended Practices for Meteorological Service for International Air Navigation, they have the following meanings:

...

Aerodrome elevation. The elevation of the highest point of the landing area.

...

Area navigation (RNAV). A method of navigation which permits aircraft operations on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

— *Note.*— *Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.*

...

Elevation. The vertical distance of a point or a level, on or affixed to the surface of the earth, measured from mean sea level.

Extended range operation. Any flight by an aeroplane with two turbine engines where the flight time at the one engine inoperative cruise speed (in ISA and still air conditions), from a point on the route to an adequate alternate aerodrome, is greater than the threshold time approved by the State of the Operator.

...

International airways volcano watch (IAVW). International arrangements for monitoring volcanic activity and providing notices, forecasts and warnings to aircraft of volcanic ash in the atmosphere.

Note.— The IAVW is based on the cooperation of aviation and non-aviation operational units using information derived from observing sources and networks that are provided by States. The watch is coordinated by ICAO with the cooperation of other concerned international organizations.

...

Meteorological authority. The authority entity providing or arranging for the provision of meteorological service for international air navigation on behalf of a Contracting State, and providing regulation and oversight of the meteorological service.

...

Meteorological satellite. An artificial Earth satellite making meteorological observations and transmitting these observations to Earth.

Meteorological service provider. The relevant entity designated to provide meteorological service for international air navigation on behalf of a Contracting State.

Meteorological watch office (MWO). An office designated to provide information concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations within its specified area of responsibility.

...

Minimum sector altitude (MSA). The lowest altitude which may be used which will provide a minimum clearance of 300 m (1 000 ft) above all objects located in an area contained within a sector of a circle of 46 km (25 NM) radius centred on a radio aid to navigation significant point, the aerodrome reference point (ARP) or the heliport reference point (HRP).

~~**Navigation specification.** A set of aircraft and flight crew requirements needed to support performance based navigation operations within a defined airspace. There are two kinds of navigation specifications:~~

~~—— **Required navigation performance (RNP) specification.** A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.~~

~~—— **Area navigation (RNAV) specification.** A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.~~

~~—— *Note.*— The Performance based Navigation (PBN) Manual (Doc 9613), Volume II, contains detailed guidance on navigation specifications.~~

...

~~**Operational planning.** The planning of flight operations by an operator.~~

Operator. The person, organization or enterprise engaged in or offering to engage in an aircraft operation.

Performance-based navigation (PBN). ~~Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.~~

Note. ~~Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.~~

...

Reporting point. ~~A specified geographical location in relation to which the position of an aircraft can be reported.~~

...

Space weather centre (SWXC). A global or regional centre designated by ICAO to monitor and provide advisory information regarding space weather phenomena expected to affect high-frequency radio communications, communications via satellite, GNSS-based navigation and surveillance systems and/or pose a radiation risk to aircraft occupants, under the framework of space weather information service.

Note. — A regional centre designated by ICAO supports global centres in the fulfilment of its responsibilities.

Note.—A space weather centre is designated as global and/or regional.

Space weather information service. A globally coordinated service where space weather centres provide information on space weather phenomena that may affect communications, navigation and surveillance systems and/or pose a radiation risk to aircraft occupants.

Standard isobaric surface. ~~An isobaric surface used on a worldwide basis for representing and analysing the conditions in the atmosphere.~~

State volcano observatory. A volcano observatory, designated by regional air navigation agreement, to monitor active or potentially active volcanoes within a State and to provide information on volcanic activity to its associated area control centre/flight information centre, meteorological watch office and volcanic ash advisory centre and/or volcanic ash in the atmosphere.

...

Upper air chart. A meteorological chart relating to a specified upper air surface or layer of the atmosphere.

...

1.2 Terms used with a limited meaning

For the purpose of this Annex, the following terms are used with a limited meaning as indicated below:

— a) to avoid confusion in respect of the term “service” between the meteorological service considered

~~as an administrative entity and the service which is provided, “meteorological authority” is used for the former and “service” for the latter;~~

- ~~ba)~~ “provide” is used solely in connection with the provision of service;
 - ~~eb)~~ “issue” is used solely in connection with cases where the obligation specifically extends to sending out the information to a user;
 - ~~ec)~~ “make available” is used solely in connection with cases where the obligation ends with making the information accessible to a user; and
 - ~~ed)~~ “supply” is used solely in connection with cases where either ~~eb)~~ or ~~ec)~~ applies.
-

CHAPTER 2. GENERAL PROVISIONS

2.1 Objective, determination and provision of meteorological service

...

2.1.4 Each Contracting State shall designate the ~~authority~~ **entity**, hereinafter referred to as the meteorological authority, ~~to provide or~~ to arrange for the provision of meteorological service for international air navigation on its behalf. Details of the meteorological authority so designated shall be included in the State aeronautical information publication, in accordance with Annex 15, Chapter 5.

2.1.5 Each Contracting State shall designate an **entity** (or several entities), hereinafter referred to as the meteorological service provider, to provide meteorological service for international air navigation on behalf of the Contracting State. Details of the meteorological service provider(s) so designated shall be included in the State aeronautical information publication, in accordance with Annex 15, Chapter 5.

Note.— Detailed specifications concerning presentation and contents of the aeronautical information publication is provided in the Procedures for Air Navigation Services — Aeronautical Information Management (PANS-AIM, Doc 10066), Appendix 2.

2.1.56 ~~Each Contracting State~~ **The meteorological authority** shall ensure that the designated meteorological ~~authority~~ **service provider** complies with the requirements of the World Meteorological Organization (WMO) in respect of qualifications, competencies, education and training of meteorological personnel providing service for international air navigation.

...

2.2 Supply, use, quality management and interpretation of meteorological information

...

2.2.2 ~~Each Contracting State~~ **The meteorological authority** shall ensure that the designated meteorological ~~authority~~ **service provider** referred to in 2.1.45 establishes and implements a properly organized quality system comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users listed in 2.1.2.

...

2.2.4 **Recommendation.**— *The quality system should provide the users with assurance that the meteorological information supplied complies with the stated requirements in terms of the geographical and spatial coverage, format and content, time and frequency of issuance and period of validity, as well as the accuracy of measurements, observations and forecasts. When the quality system indicates that meteorological information to be supplied to the users does not comply with the stated requirements, and automatic error correction procedures are not appropriate, such information should not be supplied to the users unless it is validated with the originator.*

Note.— Requirements concerning the geographical and spatial coverage, format and content, time and

frequency of issuance and period of validity of meteorological information to be supplied to aeronautical users are ~~given~~ contained in Chapters 3, 4, 6, 7, 8, 9 and 10 and Appendices 2, 3, 5, 6, 7, 8 and 9 of this Annex, Chapters 2, 4, 5, 6, 7, 8 and 9 of the PANS-MET (Doc 10157) and the relevant regional air navigation plans. Guidance concerning the accuracy of measurement and observation, and accuracy of forecasts is ~~given~~ contained in Attachments A and B, respectively, to ~~this Annex~~ the PANS-MET.

2.2.5 Recommendation.— In regard to the exchange of meteorological information for operational purposes, the quality system should include verification and validation procedures and resources for monitoring adherence to the prescribed transmission schedules for individual messages and/or bulletins required to be exchanged, and the times of their filing for transmission. The quality system should be capable of detecting excessive transit times of messages and bulletins received.

Note.— Requirements concerning the exchange of operational meteorological information are ~~given~~ contained in Chapter 11 of this Annex and ~~Appendix 10 of this Annex~~ and Chapter 10 of the PANS-MET (Doc 10157).

...

2.2.7 Owing to the variability of meteorological elements in space and time, to limitations of observing techniques and to limitations caused by the definitions of some of the elements, the specific value of any of the elements given in a report shall be understood by the recipient to be the best approximation of the actual conditions at the time of observation.

Note.— Guidance on the operationally desirable accuracy of measurement or observation is ~~given~~ contained in Attachment A to the PANS-MET (Doc 10157).

2.2.8 Owing to the variability of meteorological elements in space and time, to limitations of forecasting techniques and to limitations caused by the definitions of some of the elements, the specific value of any of the elements given in a forecast shall be understood by the recipient to be the most probable value which the element is likely to assume during the period of the forecast. Similarly, when the time of occurrence or change of an element is given in a forecast, this time shall be understood to be the most probable time.

Note.— Guidance on the operationally desirable accuracy of forecasts is ~~given~~ contained in Attachment B to the PANS-MET (Doc 10157).

...

2.3 Notifications required from operators

2.3.1 An operator requiring meteorological service or changes in existing meteorological service shall notify, sufficiently in advance, the meteorological ~~authority~~ service provider or the aerodrome meteorological office concerned. The minimum amount of advance notice required shall be as agreed between the meteorological ~~authority~~ service provider or aerodrome meteorological office and the operator concerned.

2.3.2 The meteorological ~~authority~~ service provider shall be notified by the operator requiring service when:

- a) new routes or new types of operations are planned;
- b) changes of a lasting character are to be made in scheduled operations; and

- c) other changes, affecting the provision of meteorological service, are planned.

Such information shall contain all details necessary for the planning of appropriate arrangements by the meteorological ~~authority~~ service provider.

2.3.3 The operator or a flight crew member shall ensure that, where required by the meteorological ~~authority~~ service provider in consultation with users, the aerodrome meteorological office concerned is notified:

- a) of flight schedules;
- b) when non-scheduled flights are to be operated; and
- c) when flights are delayed, advanced or cancelled.

...

CHAPTER 3. GLOBAL SYSTEMS, SUPPORTING CENTRES AND METEOROLOGICAL OFFICES

~~—Note.— Technical specifications and detailed criteria related to this chapter are given in Appendix 2.~~

...

3.1 World area forecast system

~~The objective of the world area forecast system (WAFS) shall be to supply meteorological authorities and other users with global aeronautical meteorological en-route forecasts in digital form. This objective shall be achieved through a comprehensive, integrated, worldwide and, as far as practicable, uniform system, and in a cost-effective manner, taking full advantage of evolving technologies.~~

Editorial Note.— Renumber subsequent sections 3.2 to 3.8 accordingly.

3.21 World area forecast centres within the framework of the world area forecast system

Note.— *The objective of the world area forecast system (WAFS) is to supply meteorological authorities and other users with global aeronautical meteorological en-route forecasts in digital form. This objective is achieved through a comprehensive, integrated, worldwide and, as far as practicable, uniform system, and in a cost-effective manner, taking full advantage of evolving technologies.*

Editorial Note.— In each chapter of Annex 3, the full term “world area forecast centre (WAFC)” is to be used at the first occurrence, followed by the use of the abbreviation “WAFC” at the subsequent occurrences.

3.21.1 A Contracting State, having accepted the responsibility for providing a world area forecast centre (WAFC) within the framework of the WAFS, shall arrange for that centre:

...

c) to issue the forecasts referred to in a) and b) in digital form to meteorological authorities service providers and other users, as approved arranged by the Contracting State on advice from the meteorological authority;

...

e) to ~~establish and maintain contact with~~ receive information on volcanic activity from volcanic ash advisory centres (VAACs) for the exchange of information on volcanic activity in order to coordinate the inclusion of such information on volcanic eruptions in SIGWX forecasts.

...

3.21.2 In case of interruption of the operation of a WAFC, its functions shall be carried out by the other WAFC.

~~—Note.—Back up procedures to be used in case of interruption of the operation of a WAFC are updated by the Meteorology Panel (METP) as necessary; the latest revision can be found on the ICAO METP website.~~

...

3.3 Aerodrome meteorological offices

...

3.3.2 An aerodrome meteorological office shall carry out all or some of the following functions as necessary to meet the needs of flight operations at the aerodrome:

...

- h) supply information received on pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud, to its associated air traffic services unit, aeronautical information service unit and meteorological watch office (MWO) as agreed between the meteorological service provider, aeronautical information service and appropriate ATS authorities authority concerned.

...

3.3.4 For an aerodrome without an aerodrome meteorological office located at the aerodrome:

- a) ~~the meteorological authority concerned~~ Contracting State shall designate one or more aerodrome meteorological office(s) to supply meteorological information as required; and

...

3.4 Meteorological watch offices

...

3.4.2 An MWO shall:

...

- e) when required by regional air navigation agreement, in accordance with ~~7.2.1~~ 7.5.1.1:
- f) supply information received on pre-eruption volcanic activity, a volcanic eruption and volcanic ash cloud for which a SIGMET has not already been issued, to its associated area control centre (ACC)/flight information centre (FIC), as agreed between the meteorological service provider and appropriate ATS authorities authority concerned, and to its associated VAAC as determined by regional air navigation agreement; and
- g) supply information received concerning the release of radioactive materials into the atmosphere, in the area for which it maintains watch or adjacent areas, to its associated ACC/FIC, as agreed between the meteorological service provider and appropriate ATS authorities authority concerned, and to aeronautical information service units, as agreed between the meteorological service provider and appropriate civil aviation authorities authority concerned. The information shall

comprise location, date and time of the release, and forecast trajectories of the radioactive materials.

...

3.4.4 Recommendation.— *An MWO should coordinate the content of SIGMET and the provision of harmonized SIGMET information with neighbouring MWO(s), especially when the en-route weather phenomenon extends or is expected to extend beyond the MWO's specified area of responsibility, in order to ensure the provision of harmonized SIGMET.*

...

3.5 Volcanic ash advisory centres

...

3.5.2 Recommendation.— *Until 25 November 2026, for significant volcanic ash "clouds", VAACs in a position to do so should issue forecasts of quantitative volcanic ash concentration information for a volcanic ash "cloud" to meteorological service providers and other users, as arranged by the meteorological authority.*

3.5.2 Recommendation.— *As of 26 November 2026, for significant volcanic ash "clouds", VAACs should issue forecasts of quantitative volcanic ash concentration information for a volcanic ash "cloud" to meteorological service providers and other users, as arranged by the meteorological authority.*

Note 1.— *The VAACs in a position to provide quantitative volcanic ash concentration information are included in the Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List (Doc 9766).*

Note 2.— *Significant volcanic ash "clouds" in this context means an ash "cloud" that poses a widespread impact to aircraft operations and air navigation. Guidance on the criteria is provided in the Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List (Doc 9766).*

3.5.2.3 VAACs shall maintain a 24-hour watch.

3.5.3.4 In case of interruption of the operation of a VAAC, its functions shall be carried out by another VAAC or another meteorological centre, as designated by the VAAC Provider State concerned.

Note.— *Back-up procedures to be used in case of interruption of the operation of a VAAC are included in the Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List (Doc 9766).*

3.6 State volcano observatories

3.6.1 Contracting States with active or potentially active volcanoes shall arrange, in accordance with regional air navigation agreement, that State volcano observatories monitor these volcanoes, ~~and when observing:~~

Note.— *The Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List (Doc 9766) contains guidance material about active or potentially active volcanoes.*

3.6.2 State volcano observatories shall send information on volcanic activity and/or volcanic ash in the atmosphere as quickly as practicable to their associated VAACs, MWOs, NOTAM offices, ACCs/FICs and, in accordance with regional air navigation agreement, international OPMET databanks, when observing:

- a) significant changes in pre-eruption volcanic activity, ~~or a cessation thereof;~~

Note.— *Pre-eruption volcanic activity in this context means unusual and/or increasing volcanic activity, which could presage a volcanic eruption.*

- b) a volcanic eruption, or a significant change in eruptive activity ~~cessation thereof;~~ and/or
- c) volcanic ash in the atmosphere.

~~shall send this information as quickly as practicable to their associated ACC/FIC, MWO and VAAC.~~

~~——— *Note 1.* — *Pre-eruption volcanic activity in this context means unusual and/or increasing volcanic activity which could presage a volcanic eruption.*~~

Note-2.1. — *Where capability exists, State volcano observatories may include re-suspended volcanic ash in the context of c) above. The Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List (Doc 9766) contains guidance material about ~~active or potentially active volcanoes~~ re-suspended volcanic ash.*

Note 2. — *A significant change in this context may entail an increase, a decrease or a cessation in pre-eruption volcanic activity or eruptive activity.*

3.7 Tropical cyclone advisory centres

A Contracting State having accepted the responsibility for providing a tropical cyclone advisory centre (TCAC) shall arrange for that centre to:

- a) monitor the development of tropical cyclones in its area of responsibility, using geostationary and polar-orbiting satellite data, radar data and other meteorological information;

Editorial Note.— Deleted text in sub-paragraph b) has been incorporated in the PANS-MET, paragraph 6.2.2.

- b) issue advisory information concerning the position of the cyclone centre, changes in its intensity at the time of observation, its direction and speed of movement, central pressure and maximum surface wind near the centre, ~~in abbreviated plain language to:~~
 - 1) MWOs in its area of responsibility;
 - 2) other TCACs whose areas of responsibility may be affected; and
 - 3) WAFCs, international OPMET databanks, and centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services; and

Editorial Note.— Words “to MWOs” deleted as misleading since TCACs issue advisories also to other centres in accordance with the above sub-paragraph b).

- c) issue updated advisory information ~~to MWOs~~ for each tropical cyclone, as necessary, but at least every six hours.

3.8 Space weather centres

3.8.1 A Contracting State, having accepted the responsibility for providing a global space weather centre (SWXC) within the framework of the space weather information service, shall arrange for that centre to ~~monitor and provide advisory information on space weather phenomena in its area of responsibility by arranging for that centre to:~~

...

- c) supply the advisory information referred to in b) to:

1) area control centres, flight information centres and aerodrome meteorological offices ~~in its area of responsibility which may be affected;~~

...

3) international OPMET databanks, ~~international NOTAM offices~~ and the aeronautical fixed service Internet-based services.

d) issue updated advisory information on space weather phenomena, as necessary, but at least every six hours until such time as the space weather phenomena are no longer detected and/or are no longer expected to have an impact.

...

3.8.3 In case of interruption of the operation of a SWXC, its functions shall be carried out by another SWXC ~~or another centre~~, as designated by the SWXC Provider State concerned.

3.8.4 A Contracting State, having accepted the responsibility for providing a regional space weather centre (SWXC) within the framework of the space weather information service, shall arrange for that centre to support the global SWXCs in their responsibilities under 3.8.1, 3.8.2 and 3.8.3.

Editorial Note.— Deleted note is transferred to the PANS-MET, under Section 6.3.

Note.— *Guidance on the provision of space weather advisory information, including the ICAO-designated provider(s) of space weather advisory information, is provided in the Manual on Space Weather Information in Support of International Air Navigation (Doc 10100).*

CHAPTER 4. AERODROME METEOROLOGICAL OBSERVATIONS AND REPORTS OBSERVATIONAL INFORMATION

Note.— Technical specifications and detailed criteria related to this chapter are given in Appendix 3. The Standards and Recommended Practices in this chapter are to be used in conjunction with the Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157), Chapter 2.

4.1 Aeronautical meteorological stations and observations

...

4.1.4 ~~Each Contracting State~~ The meteorological authority shall arrange for its the aeronautical meteorological stations to be inspected at sufficiently frequent intervals to ensure that a high standard of observation is maintained, that instruments and all their indicators are functioning correctly, and that the exposure of the instruments has not changed significantly.

...

Editorial Note.— New paragraphs 4.1.9 to 4.1.12 have been moved from Appendix 3, paragraphs 1.1 to 1.4, subject to no change, except for the replacement of the term “hazard” by “risk of damage” in the note under paragraph 4.1.9.

4.1.9 **Recommendation.**— *The meteorological instruments used at an aerodrome should be situated in such a way as to supply data which are representative of the area for which the measurements are required.*

Note.— Specifications concerning the siting of equipment and installations on operational areas, aimed at reducing the risk of damage to aircraft to a minimum, are contained in Annex 14, Volume I, Chapter 9.

4.1.10 **Recommendation.**— *Meteorological instruments at aeronautical meteorological stations should be exposed, operated and maintained in accordance with the practices, procedures and specifications promulgated by the World Meteorological Organization (WMO).*

Note.— Practices, procedures and specifications of WMO are contained in the Guide to Instruments and Methods of Observation (WMO-No. 8), Volume I— Measurement of Meteorological Variables, Volume II— Observing Systems; and Volume III— Quality Assurance and Management of Observing Systems.

4.1.11 **Recommendation.**— *The observers at an aerodrome should be located, in so far as is practicable, so as to supply data which are representative of the area for which the observations are required.*

4.1.12 **Recommendation.**— *Where automated equipment forms part of an integrated semi-automatic observing system, displays of data which are made available to the local air traffic services units should be a subset of and displayed in parallel to those available in the local meteorological service unit. In those displays, each meteorological element should be annotated to identify, as appropriate, the locations for which the element is representative.*

4.2 Agreement between meteorological ~~authorities~~ service provider and appropriate air traffic services ~~authorities~~ authority

Recommendation.— *An agreement between the meteorological ~~authority~~ service provider and the appropriate ATS authority should be established to cover, among other things:*

- a) *the provision in air traffic services units of displays related to integrated automatic systems;*

...

4.3 Routine observations and reports

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 2.1.1.

4.3.1 At aerodromes, routine observations shall be made throughout the 24 hours of each day, unless otherwise agreed between the meteorological ~~authority~~ service provider, the appropriate ATS authority and the operator concerned. Such observations shall be made at intervals of one hour or, if so determined by regional air navigation agreement, at intervals of one half-hour. At other aeronautical meteorological stations, such observations shall be made as determined by the meteorological ~~authority~~ service provider taking into account the requirements of air traffic services units and aircraft operations.

4.3.2 Reports of routine observations shall be issued as:

- a) local routine reports, only for dissemination at the aerodrome of origin (intended for arriving and departing aircraft); and

Note.— Technical specifications of the issuance of local routine reports are contained in the PANS-MET (Doc 10157), Chapter 2, 2.1.1.1.

- b) METAR for dissemination beyond the aerodrome of origin (mainly intended for flight planning, VOLMET broadcasts and D-VOLMET).

Note 1.— Technical specifications of the issuance and the dissemination of METAR are contained in the PANS-MET (Doc 10157), Chapter 2, 2.1.1.2 and 2.1.1.3.

Note 2.— Meteorological information used in ATIS (voice-ATIS and D-ATIS) is to be extracted from the local routine report, in accordance with Annex 11, 4.3.6.1 g).

4.3.3 At aerodromes that are not operational throughout 24 hours in accordance with 4.3.1, METAR shall be issued prior to the aerodrome resuming operations in accordance with regional air navigation agreement.

4.4 Special observations and reports

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Sections 2.1.1 and 2.1.2.

4.4.1 A list of criteria for special observations shall be established by the meteorological ~~authority~~ service provider, in consultation with the appropriate ATS authority, operators and others concerned.

4.4.2 Reports of special observations shall be issued as:

- a) local special reports, only for dissemination at the aerodrome of origin (intended for arriving and departing aircraft); and

Note.— Technical specifications of the issuance of local special reports are contained in the PANS-MET (Doc 10157) Chapter 2, 2.1.1.1.

- b) SPECI for dissemination beyond the aerodrome of origin (mainly intended for flight planning, VOLMET broadcasts and D-VOLMET) unless METAR are issued at half-hourly intervals.

Note 1.— Technical specifications of the issuance and the dissemination of SPECI are contained in the PANS-MET (Doc 10157) Chapter 2, 2.1.1.2 and 2.1.1.3.

Note 2.— Meteorological information used in ATIS (voice-ATIS and D-ATIS) is to be extracted from the local special report, in accordance with Annex 11, 4.3.6.1 g).

4.4.3 At aerodromes that are not operational throughout 24 hours in accordance with 4.3.1, following the resumption of the issuance of METAR, SPECI shall be issued, as necessary.

4.5 ~~Contents of~~ Characteristics of meteorological reports

Editorial Note.— The intent of the deleted text in 4.5.1 is incorporated in the PANS-MET, paragraphs 2.1.1.1 and 2.1.1.2, and associated notes.

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 2.1.1.

4.5.1 Local routine reports, local special reports, METAR and SPECI shall contain the following meteorological elements ~~in the order indicated:~~

- ~~— a) identification of the type of report;~~
- ~~— b) location indicator;~~
- ~~— c) time of the observation;~~
- ~~— d) identification of an automated or missing report, when applicable;~~
 - ea) surface wind direction and speed;
 - fb) visibility;
 - gc) runway visual range, when applicable;
 - hd) present weather;
 - ie) cloud amount, cloud type (only for cumulonimbus and towering cumulus clouds) and height of cloud base or, where measured, vertical visibility;

j) air temperature and dew-point temperature; and

k) QNH and, when applicable, QFE (QFE included only in local routine report and local special reports).

Note.— The location indicators referred to under b) and their significations are published in Location Indicators (Doc 7910).

4.5.2 **Recommendation.**— *In addition to elements listed under 4.5.1 a) to k)g), local routine reports, local special reports, METAR and SPECI should contain supplementary information to be placed after element k).*

4.5.3 Optional elements included under supplementary information shall be included in METAR and SPECI in accordance with regional air navigation agreement.

4.6 Observing and reporting meteorological elements

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 2.2.

...

4.6.2 Visibility

4.6.2.1 The visibility as defined in Chapter 1 shall be measured or observed, and reported in metres or kilometres.

Editorial Note.— Deleted note is transferred to the PANS-MET, under Section 2.2.2.

Note.— Guidance on the conversion of instrument readings into visibility is given in Attachment D.

4.6.2.2 **Recommendation.**— *When local routine report and local special reports are used for departing aircraft, the visibility observations for these reports should be representative of conditions along the runway; when local routine report and local special reports are used for arriving aircraft, the visibility observations for these reports should be representative of the touchdown zone of the runway.*

4.6.2.3 **Recommendation.**— *For METAR and SPECI, the visibility observations should be representative of the aerodrome.*

...

4.6.4 Present weather

Editorial Note.— No change to Section 4.6.4.1 except for the presentation of 4.6.4.1 (in order to highlight the critical present weather phenomena).

4.6.4.1 The present weather occurring at the aerodrome shall be observed and reported as necessary. The following present weather phenomena shall be identified, as a minimum:

a) precipitation: rain, drizzle, snow and freezing precipitation (including intensity thereof);

b) obscurations: haze, mist, fog, and freezing fog; and

c) thunderstorms (including thunderstorms in the vicinity).

4.6.4.2 **Recommendation.**— *For local routine report and local special reports, the present weather information should be representative of conditions at the aerodrome.*

...

4.7 Reporting meteorological information from automatic observing systems

4.7.1 **Recommendation.**— *METAR and SPECI from automatic observing systems should be used by States in a position to do so during non-operational hours of the aerodrome, and during operational hours of the aerodrome as determined by the meteorological authority service provider in consultation with users based on the availability and efficient use of personnel.*

Note.— *Guidance on the use of automatic meteorological observing systems is given contained in Doc 9837.*

4.7.2 **Recommendation.**— *Local routine report and local special reports from automatic observing systems should be used by States in a position to do so during operational hours of the aerodrome as determined by the meteorological authority service provider in consultation with users based on the availability and efficient use of personnel.*

...

4.8 Observations-ing and reportsing of volcanic activity

Note.— *Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 2.3.*

Editorial Note.— Deleted text is transferred to the PANS-MET, as Section 2.3.

Recommendation.— *The occurrence of pre-eruption volcanic activity, volcanic eruptions and volcanic ash cloud should be reported without delay to the associated air traffic services unit, aeronautical information services unit and meteorological watch office. The report should be made in the form of a volcanic activity report, comprising the following information in the order indicated:*

— *a) message type, VOLCANIC ACTIVITY REPORT;*

— *b) station identifier, location indicator or name of station;*

— *c) date/time of message;*

— *d) location of volcano and name if known; and*

— *e) concise description of event including, as appropriate, the level of intensity of volcanic activity, occurrence of an eruption and its date and time, and the existence of a volcanic ash cloud in the*

area together with direction of ash cloud movement and height.

Note.—Pre-eruption volcanic activity in this context means unusual and/or increasing volcanic activity which could presage a volcanic eruption.

Editorial Note.— New paragraphs 4.9.1.1 to 4.9.2.2 have been moved from Appendix 3, paragraphs 3.1.1 to 3.2.2, with no additional proposed change to the text except for the editorial change to the title of 4.9.2.

4.9 Dissemination of meteorological reports

4.9.1 METAR and SPECI

4.9.1.1 METAR and SPECI shall be disseminated to international OPMET databanks and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services, in accordance with regional air navigation agreement.

4.9.1.2 METAR and SPECI shall be disseminated to other aerodromes in accordance with regional air navigation agreement.

4.9.1.3 SPECI representing a deterioration in conditions shall be disseminated immediately after the observation. A SPECI representing a deterioration of one weather element and an improvement in another element shall be disseminated immediately after the observation.

4.9.1.4 **Recommendation.**— *A SPECI representing an improvement in conditions should be disseminated only after the improvement has been maintained for 10 minutes; it should be amended before dissemination, if necessary, to indicate the conditions prevailing at the end of that 10-minute period.*

4.9.2 Local routine report and local special report

4.9.2.1 Local routine reports shall be transmitted to local air traffic services units and shall be made available to the operators and to other users at the aerodrome.

4.9.2.2 Local special reports shall be transmitted to local air traffic services units as soon as the specified conditions occur. However, as agreed between the meteorological service provider and the appropriate ATS authority, they need not be issued in respect of:

- a) any element for which there is in the local air traffic services unit a display corresponding to the one in the meteorological station, and where arrangements are in force for the use of this display to update information included in local routine report and local special report; and
- b) runway visual range, when all changes of one or more steps on the reporting scale in use are being reported to the local air traffic services unit by an observer on the aerodrome.

Local special reports shall also be made available to the operators and to other users at the aerodrome.

CHAPTER 5. AIRCRAFT OBSERVATIONS AND REPORTS METEOROLOGICAL OBSERVATIONAL INFORMATION

Note.— Technical specifications and detailed criteria related to this chapter are given in Appendix 4. The Standards and Recommended Practices in this chapter are to be used in conjunction with the Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157), Chapter 3.

...

5.3 Routine aircraft observations — designation

...

5.3.2 **Recommendation.**— *For helicopter operations to and from aerodromes on offshore structures, routine observations should be made from helicopters at points and times as agreed between the meteorological authorities-service providers and the helicopter operators concerned.*

...

5.6 Other non-routine aircraft observations and reports

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 3.2.

When other meteorological conditions not listed under 5.5, e.g. wind shear, are encountered and which, in the opinion of the pilot-in-command, may affect the safety or markedly affect the efficiency of other aircraft operations, the pilot-in-command shall advise the appropriate air traffic services unit as soon as practicable.

Editorial Note.— Deleted note is transferred to the PANS-MET (Doc 10157), Section 3.1, subject to no change.

~~— *Note.*— *Iceing, turbulence and, to a large extent, wind shear are elements which, for the time being, cannot be satisfactorily observed from the ground and for which in most cases aircraft observations represent the only available evidence.*~~

5.7 Reporting of aircraft observations during flight

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 3.1.

...

Editorial Note.— The inserted list of phenomena is new text (added to align the provision with those related to METAR/SPECI and TAF).

5.7.3 Routine and special A-aircraft observations shall be reported as routine and special air-reports, respectively. Routine and special air-reports reported by air-ground data link shall contain, as a minimum,

the following meteorological information:

- a) wind direction;
- b) wind speed;
- c) air temperature; and
- d) condition prompting the issuance of the air-report (only applicable for special air-reports).

5.8 Relay of air-reports by air traffic services units

5.8.1 The meteorological ~~authority~~ service provider concerned shall make arrangements with the appropriate ATS authority to ensure that, on receipt by the air traffic services units of:

- a) special air-reports by voice communications, the air traffic services units relay them without delay to their associated meteorological watch office; and
- b) routine and special air-reports by data link communications, the air traffic services units relay them without delay to their associated meteorological watch office, the WAFCs and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services.

Editorial Note.— New paragraph 5.8.2 corresponds to Appendix 6, Section 3, included herein in toto, with the following changes: a) deletion of the note (redundant as this provision is now in Chapter 5 dealing with air-reports); and b) addition of the introductory text (alignment with paragraph 5.8.1).

5.8.2 **Recommendation.**— *The meteorological authority concerned should make arrangements with the appropriate ATS authority to ensure that:*

- a) *special air-reports be uplinked for 60 minutes after their issuance; and*
- b) *information on wind and temperature included in automated special air-reports not be uplinked to other aircraft in flight.*

Editorial Note.— Deleted paragraph 5.9 is transferred to the PANS-MET (Doc 10157), as paragraph 3.1.5.1, subject to no change.

~~5.9—Recording and post-flight reporting of aircraft observations of volcanic activity~~

~~Special aircraft observations of pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud shall be recorded on the special air report of volcanic activity form. A copy of the form shall be included with the flight documentation provided to flights operating on routes which, in the opinion of the meteorological authority concerned, could be affected by volcanic ash clouds.~~

Editorial Note.— New paragraphs 5.9.1 to 5.9.6 correspond to Appendix 4, Sections 3.1 to 3.4, subject to no change, except for the: a) adjustment of paragraph headings; b) update of the references; and c) replacement of the term “SIGMET messages” by “SIGMET information”.

5.9 Dissemination of air-reports

5.9.1 The meteorological watch office shall transmit without delay the special air-reports received by voice communications to the world area forecast centres (WAFCs) and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services.

5.9.2 The meteorological watch office shall transmit without delay special air-reports of pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud received to the associated volcanic ash advisory centres.

5.9.3 When a special air-report is received at the meteorological watch office but the forecaster considers that the phenomenon causing the report is not expected to persist and, therefore, does not warrant issuance of a SIGMET, the special air-report shall be disseminated in the same way that SIGMET information is disseminated in accordance with 7.4.2.1, i.e. to meteorological watch offices, WAFCs, and other meteorological offices in accordance with regional air navigation agreement.

Note.— *The template used for special air-reports which are uplinked to aircraft in flight is in the PANS-MET (Doc 10157), Appendix 3, Table A3-2.*

5.9.4 Air-reports received at WAFCs shall be further disseminated as basic meteorological data.

Note.— *The dissemination of basic meteorological data is normally carried out on the World Meteorological Organization (WMO) Global Telecommunication System.*

5.9.5 **Recommendation.**— *Where supplementary dissemination of air-reports is required to satisfy special aeronautical or meteorological requirements, arrangements for such dissemination should be agreed between the meteorological authorities concerned.*

5.9.6 Air-reports shall be exchanged in the format in which they are received.

CHAPTER 6. ~~FORECASTS~~ AERODROME AND EN-ROUTE METEOROLOGICAL FORECAST INFORMATION

Note.— ~~Technical specifications and detailed criteria related to this chapter are given in Appendix 5. The Standards and Recommended Practices in this chapter are to be used in conjunction with the Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157), Chapters 4 and 5.~~

...

6.2 Aerodrome forecasts meteorological forecast information

6.2.1 Aerodrome forecasts (TAF)

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 4.1.

6.2.1.1 An aerodrome forecast shall be prepared, in accordance with regional air navigation agreement, by the aerodrome meteorological office designated by the meteorological authority concerned.

Note.— The aerodromes for which aerodrome forecasts are to be prepared and the period of validity of these forecasts are listed in the relevant facilities and services implementation document (FASID) regional electronic air navigation plan (eANP), Volume II.

6.2.1.2 An aerodrome forecast shall be issued at a specified time not earlier than one hour prior to the beginning of its validity period and consist of a concise statement of the expected meteorological conditions at an aerodrome for a specified period.

Editorial Note.— The intent of the deleted text in 6.2.3 is incorporated in the PANS-MET, paragraph 4.1.1.1 and the associated notes.

6.2.1.3 Aerodrome forecasts and amendments thereto shall be issued as TAF, and include the following meteorological information elements in the order indicated:

- a) ~~identification of the type of forecast;~~
- b) ~~location indicator;~~
- e) ~~time of issue of forecast;~~
- d) ~~identification of a missing forecast, when applicable;~~
- e) ~~date and period of validity of forecast;~~
- f) ~~identification of a cancelled forecast, when applicable;~~
- ga) surface wind;
- hb) visibility;
- ic) weather;

jd) cloud; and

ke) expected significant changes to one or more of these elements during the period of validity.

Optional elements shall be included in TAF in accordance with regional air navigation agreement.

Note 1.— Technical specifications of the issuance of aerodrome forecast are contained in the PANS-MET (Doc 10157) Chapter 4, 4.1.1.1 and 4.1.1.2.

Note 2.— The visibility included in TAF refers to the forecast prevailing visibility.

6.2.1.4 Aerodrome meteorological offices preparing TAF shall keep the forecasts under continuous review and, when necessary, shall issue amendments promptly. The length of the forecast messages and the number of changes indicated in the forecast shall be kept to a minimum.

Note.— Guidance on methods to keep TAF under continuous review is given contained in Chapter 3 of the Manual of Aeronautical Meteorological Practice (Doc 8896).

6.2.1.5 TAF that cannot be kept under continuous review shall be cancelled.

6.2.1.6 **Recommendation.**— *The period of validity of a routine TAF should be not less than 6 hours and not more than 30 hours; the period of validity should be determined by regional air navigation agreement. Routine TAF valid for less than 12 hours should be issued every 3 hours and those valid for 12 to 30 hours should be issued every 6 hours.*

6.2.1.7 When issuing TAF, aerodrome meteorological offices shall ensure that not more than one TAF is valid at an aerodrome at any given time.

Editorial Note.— New paragraph 6.2.1.8 corresponds to Appendix 5, Section 1.6, subject to no change.

6.2.1.8 TAF and amendments thereto shall be disseminated to international OPMET databanks and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services, in accordance with regional air navigation agreement.

6.3.2.2 Landing forecasts (trend forecasts)

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 4.2.

6.3.2.1 A landing forecast shall be prepared by the aerodrome meteorological office ~~designated by the meteorological authority concerned~~ as determined by regional air navigation agreement; such forecasts are intended to meet the requirements of local users and of aircraft within about one hour's flying time from the aerodrome.

6.3.2.2 Landing forecasts shall be prepared in the form of a trend forecast.

Editorial Note.— Inserted note under paragraph 6.2.2.3 and new paragraph 6.2.2.4 correspond to Appendix 5, Section 2.1, subject to the following editorial changes: a) separation of local reports and METAR/SPECI for clarity; and b) update of the references.

6.32.2.3 A trend forecast shall consist of a concise statement of the expected significant changes in the meteorological conditions at that aerodrome to be appended to a local routine report, local special report, METAR or SPECI. The period of validity of a trend forecast shall be 2 hours from the time of the report which forms part of the landing forecast.

Note.— Technical specifications of the issuance of trend forecast are contained in the PANS-MET (Doc 10157) Chapter 4, 4.2.1.1 and 4.2.1.2.

6.2.2.4 The units and scales used in the trend forecast shall be the same as those used in the report to which it is appended.

6.4-2.3 Forecasts for take-off

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 4.3.

6.4-2.3.1 A forecast for take-off shall be prepared by the aerodrome meteorological office ~~designated by the meteorological authority concerned,~~ as agreed between the meteorological authority service provider and the operators concerned.

6.4-2.3.2 **Recommendation.**— *A forecast for take-off should refer to a specified period of time and should contain information on expected conditions over the runway complex in regard to surface wind direction and speed and any variations thereof, temperature, pressure (QNH), and any other elements as agreed locally.*

6.4-2.3.3 **Recommendation.**— *A forecast for take-off should be supplied to operators and flight crew members on request within the 3 hours before the expected time of departure.*

6.4-2.3.4 **Recommendation.**— *Aerodrome meteorological offices preparing forecasts for take-off should keep the forecasts under continuous review and, when necessary, should issue amendments promptly.*

6.3 En-route meteorological forecast information

6.3.1 Forecasts by world area forecast centres

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 5.1.

Editorial Note.— In new paragraph 6.3.1, the first few words (up to “(WAFCs)”) have been inserted to align the formulation to that dealing with volcanic ash, tropical cyclone and space weather advisory centres (7.1.1, 7.2 and 7.3 refer), while the intent of the last few words (starting from “uniform formats”) corresponds to Appendix 2, paragraph 1.1.

Global upper-air gridded and significant weather forecasts shall be issued by world area forecast centres (WAFCs) in uniform formats and codes for the supply of such forecasts.

6.5-3.2 Area forecasts for low-level flights (GAMET, and area forecasts in chart form)

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 5.2.

6.5-3.2.1 When the density of traffic operating below flight level 100 (or up to flight level 150 in mountainous areas, or higher, where necessary) warrants the routine issue and dissemination of area forecasts for such operations, the frequency of issue, the form and the fixed time or period of validity of those forecasts, the dissemination and the criteria for amendments thereto shall be ~~determined~~ established by the meteorological authority in consultation with the users.

Editorial Note.— Inserted note corresponds to Appendix 5, paragraph 4.1 (part thereof), the second sentence; deleted text in paragraph 6.5.2 is incorporated in the PANS-MET (Doc 10157), paragraph 5.2.2.

6.5-3.2.2 When the density of traffic operating below flight level 100 warrants the issuance of AIRMET information in accordance with ~~7.2.1~~ 7.5.1.1, area forecasts for such operations shall be prepared in a format as agreed between the meteorological authorities in the States concerned. When abbreviated plain language is used, the forecast shall be prepared as a GAMET area forecast ~~employing approved ICAO abbreviations and numerical values~~; when chart form is used, the forecast shall be prepared as a combination of forecasts of upper wind and upper-air temperature, and of SIGWX phenomena. The area forecasts shall be issued to cover the layer between the ground and flight level 100 (or up to flight level 150 in mountainous areas, or higher, where necessary) and shall contain information on en-route weather phenomena hazardous to low-level flights, in support of the issuance of AIRMET information, and additional information required by low-level flights.

Note.— Template of GAMET is contained in the PANS-MET (Doc 10157), Appendix 6, Table A6-1.

6.5-3.2.3 Area forecasts for low-level flights prepared in support of the issuance of AIRMET information shall be issued every 6 hours for a period of validity of 6 hours and transmitted to meteorological watch offices and/or aerodrome meteorological offices concerned not later than one hour prior to the beginning of their validity period.

Editorial Note.— New paragraph 6.3.2.4 and 6.3.2.5 correspond to Appendix 5, paragraphs 4.4.1 and 4.4.2, respectively, subject to one change: wording in 6.3.2.4 harmonized with 6.3.2.3 (a note added to highlight the fact that the provisions only concern forecasts prepared in accordance with regional air navigation agreement).

6.3.2.4 Area forecasts for low-level flights prepared in support of the issuance of AIRMET information shall be exchanged between aerodrome meteorological offices and/or meteorological watch offices responsible for the issuance of flight documentation for low-level flights in the flight information regions concerned.

6.3.2.5 **Recommendation.**— *Area forecasts for low-level flights prepared in support of the issuance of AIRMET information should be disseminated to the aeronautical fixed service Internet-based services.*

Note.— Area forecasts for low-level flights in 6.3.2.4 and 6.3.2.5 are prepared in accordance with regional air navigation agreement, similar to the corresponding AIRMET information.

6.3.3 Forecasts by volcanic ash advisory centres

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 5.3.

When issuing forecasts of quantitative volcanic ash concentration information for a volcanic ash “cloud” in accordance with 3.5.2, volcanic ash advisory centres shall adopt uniform formats and codes for their supply.

**CHAPTER 7. ~~SIGMET AND AIRMET INFORMATION,
AERODROME WARNINGS AND
WIND SHEAR WARNINGS AND ALERTS
METEOROLOGICAL INFORMATION~~
CONTAINING ADVISORIES, ALERTS, WARNINGS AND NOTICES**

Note.— Technical specifications and detailed criteria related to this chapter are given in Appendix 6. The Standards and Recommended Practices in this chapter are to be used in conjunction with the Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157), Chapter 6.

7.1 Volcanic ash advisory information and information from State volcano observatories

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 6.1.

7.1.1 The advisory information on volcanic ash shall be issued by a volcanic ash advisory centre.

7.1.2 **Recommendation.**— *Information on volcanic activity, and/or volcanic ash in the atmosphere should be issued by a State volcano observatory as a Volcano Observatory Notice for Aviation (VONA).*

7.2 Tropical cyclone advisory information

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 6.2.

The advisory information on tropical cyclones shall be issued by a tropical cyclone advisory centre.

7.3 Space weather advisory information

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 6.3.

The advisory information on space weather shall be issued by a global space weather centre (SWXC).

Editorial Note.— Inserted text corresponds to Appendix 6, paragraph 1.1.1 (part thereof); deleted text in paragraph 7.1.1 is incorporated in the PANS-MET (Doc 10157), as paragraph 6.4.1, subject to no change; and the inserted list of phenomena is new text (added to align the provision with those related to METAR/SPECI and TAF).

7.1-7.4 SIGMET information

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 6.4.

7.4.1 General provisions

~~7.1.1~~ ~~7.4.1.1~~ SIGMET information shall be issued by a meteorological watch office and shall give a concise description ~~in abbreviated plain language~~ concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations, and of the development of those phenomena in time and space. ~~One of the following phenomena shall be included in SIGMET information:~~

- 1) thunderstorm;
- 2) tropical cyclone;
- 3) turbulence;
- 4) icing;
- 5) mountain wave;
- 6) duststorm;
- 7) sandstorm;
- 8) volcanic ash; and
- 9) radioactive cloud.

~~7.1.2~~ ~~7.4.1.2~~ SIGMET information shall be cancelled when the phenomena are no longer occurring or are no longer expected to occur in the area.

~~7.1.3~~ ~~7.4.1.3~~ The period of validity of a SIGMET ~~message information~~ shall be not more than 4 hours. In the special case of SIGMET ~~messages information~~ for volcanic ash cloud and tropical cyclones, the period of validity shall be extended up to 6 hours.

~~7.1.4~~ ~~7.4.1.4~~ **Recommendation.**— *SIGMET ~~messages information~~ concerning volcanic ash cloud and tropical cyclones should be based on advisory information provided by VAACs and TCACs, respectively, designated by regional air navigation agreement.*

~~7.1.5~~ ~~7.4.1.5~~ Close coordination shall be maintained between the meteorological watch office and the associated area control centre/flight information centre to ensure that information on volcanic ash included in SIGMET and NOTAM ~~messages~~ is consistent.

~~7.1.6~~ ~~7.4.1.6~~ SIGMET ~~messages information~~ shall be issued not more than 4 hours before the commencement of the period of validity. In the special case of SIGMET ~~messages information~~ for volcanic ash cloud and tropical cyclones, ~~these messages~~ ~~this information~~ shall be issued as soon as practicable but not more than 12 hours before the commencement of the period of validity. SIGMET ~~messages information~~ for volcanic ash and tropical cyclones shall be updated at least every 6 hours.

Editorial Note.— New paragraph 7.4.1.7 (including the note) corresponds to Appendix 6, paragraph 4.1, subject to no change, except for “SIGMET message” and “the text of the message” in the note both of which have been replaced by “SIGMET information”.

7.4.1.7 Recommendation.— *In cases where the airspace is divided into an FIR and an upper flight information region (UIR), the SIGMET should be identified by the location indicator of the air traffic services unit serving the FIR.*

Note.— *SIGMET information applies to the whole airspace within the lateral limits of the FIR, i.e. to the FIR and to the UIR. The particular areas and/or flight levels affected by the meteorological phenomena prompting the issuance of the SIGMET are included in SIGMET information.*

Editorial Note.— New paragraphs 7.4.2.1 to 7.4.2.2 correspond to Appendix 6, paragraphs 1.2.1 to 1.2.2, subject to no change except for the term “SIGMET message” which has been replaced by “SIGMET information”.

7.4.2 Dissemination of SIGMET information

7.4.2.1 SIGMET information shall be disseminated to meteorological watch offices, WAFCs and to other meteorological offices in accordance with regional air navigation agreement. SIGMET information for volcanic ash shall also be disseminated to volcanic ash advisory centres.

7.4.2.2 SIGMET information shall be disseminated to international OPMET databanks and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services, in accordance with regional air navigation agreement.

~~7.2~~ 7.5 AIRMET information

Note.— *Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 6.5.*

7.5.1 General provisions

Editorial Note.— Inserted text corresponds to Appendix 6, paragraph 2.1.1 (part thereof); deleted text in paragraph 7.2.1 is incorporated in the PANS-MET (Doc 10157), paragraph 6.6.1, subject to no change; and the inserted list of phenomena is new text (added to align the provision with those related to METAR/SPECI and TAF).

~~7.2.1~~ 7.5.1.1 AIRMET information shall be issued by a meteorological watch office in accordance with regional air navigation agreement, taking into account the density of air traffic operating below flight level 100 (or below flight level 150 in mountainous areas, or higher, where necessary). AIRMET information shall give a concise description in abbreviated plain language concerning the occurrence and/or expected occurrence of specified en-route weather phenomena, which have not been included in Section I of the area forecast for low-level flights issued in accordance with Chapter 6, 6.5.3.2 and which may affect the safety of low-level flights, and of the development of those phenomena in time and space. One of the following phenomena shall be included in AIRMET information:

- 1) surface wind speed;
- 2) surface visibility;
- 3) thunderstorms;
- 4) mountain obscuration;
- 5) cloud;
- 6) icing;
- 7) turbulence; and
- 8) mountain wave.

Note.— Technical specifications of the issuance of AIRMET are contained in the PANS-MET (Doc 10157) Chapter 6, 6.5.1.

~~7.2.2~~**7.5.1.2** AIRMET information shall be cancelled when the phenomena are no longer occurring or are no longer expected to occur in the area.

~~7.2.3~~**7.5.1.3** The period of validity of an AIRMET ~~message information~~ shall be not more than 4 hours.

Editorial Note.— New paragraphs 7.5.2.1 to 7.5.2.2 correspond to Appendix 6, paragraphs 2.2.1 to 2.2.2, subject to no change except for the term “AIRMET message” which has been replaced by “AIRMET information”.

7.5.2 Dissemination of AIRMET information

7.5.2.1 Recommendation.— *AIRMET information should be disseminated to meteorological watch offices in adjacent FIRs and to other meteorological watch offices or aerodrome meteorological offices, as agreed between the meteorological authorities concerned.*

7.5.2.2 Recommendation.— *AIRMET information should be transmitted to international operational meteorological databanks and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services, in accordance with regional air navigation agreement.*

7.3-7.6 Aerodrome warnings

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 6.6.

7.6.1 General provisions

Editorial Note.— Inserted text corresponds to Appendix 6, paragraph 5.1.1, subject to editorial changes only.

~~7.3.1~~7.6.1.1 Aerodrome warnings shall be issued by the aerodrome meteorological office ~~designated by the meteorological authority concerned.~~ and Aerodrome warnings shall give concise information of meteorological conditions which could adversely affect aircraft on the ground, including parked aircraft, and the aerodrome facilities and services.

Note.— Template of aerodrome warnings is contained in the PANS-MET (Doc 10157), Appendix 7, Table A7-6.

Editorial Note.— Inserted paragraph 7.6.1.2 corresponds to Appendix 6, paragraph 5.1.3, subject to an editorial change only.

7.6.1.2 **Recommendation.**— *Aerodrome warnings should relate to the occurrence or expected occurrence of one or more of the following phenomena:*

- *tropical cyclone (to be included if the 10-minute mean surface wind speed at the aerodrome is expected to be 17 m/s (34 kt) or more)*
- *thunderstorm*
- *hail*
- *snow (including the expected or observed snow accumulation)*
- *freezing precipitation*
- *frost*
- *hoar frost or rime*
- *sandstorm*
- *duststorm*
- *rising sand or dust*
- *strong surface wind and gusts*
- *squall*
- *volcanic ash (including volcanic ash deposition)*
- *tsunami*
- *toxic chemicals*
- *other phenomena as agreed locally.*

Note.— Aerodrome warnings related to the occurrence or expected occurrence of tsunami are not required where a national public safety plan for tsunami is integrated with the “at risk” aerodrome concerned.

~~7.3.2~~7.6.1.3 **Recommendation.**— *Aerodrome warnings should be cancelled when the conditions are no longer occurring and/or no longer expected to occur at the aerodrome.*

Editorial Note.— New paragraph 7.6.2 corresponds to Appendix 6, paragraph 5.1.1, the last few words, subject to no change.

7.6.2 Dissemination of aerodrome warnings

Aerodrome warnings shall be disseminated in accordance with local arrangements to those concerned.

7.4.7.7 Wind shear warnings and alerts

Note.— *Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 6.7.*

7.7.1 General provisions

Editorial Note.— Deleted text is transferred to the PANS-MET (Doc 10157), as a note under Section 6.7, subject to no change.

Note.— *Guidance on the subject is contained in the Manual on Low level Wind Shear (Doc 9817). Wind shear alerts are expected to complement wind shear warnings and together are intended to enhance situational awareness of wind shear.*

~~7.4.1~~ 7.7.1.1 Wind shear warnings shall be prepared issued by the aerodrome meteorological office designated by the meteorological authority concerned for aerodromes where wind shear is considered a factor, in accordance with local arrangements with the appropriate air traffic services unit and the operators concerned. Wind shear warnings shall give concise information on the observed or expected existence of wind shear which could adversely affect aircraft on the approach path or take-off path or during circling approach between runway level and 500 m (1 600 ft) above that level and aircraft on the runway during the landing roll or take-off run. Where local topography has been shown to produce significant wind shears at heights in excess of 500 m (1 600 ft) above runway level, then 500 m (1 600 ft) shall not be considered restrictive.

Note.— *Template of wind shear warnings is contained in the PANS-MET (Doc 10157), Appendix 7, Table A7-7.*

~~7.4.2~~ 7.7.1.2 **Recommendation.**— *Wind shear warnings for arriving aircraft and/or departing aircraft should be cancelled when aircraft reports indicate that wind shear no longer exists or, alternatively, after an agreed elapsed time. The criteria for the cancellation of a wind shear warning should be defined locally for each aerodrome, as agreed between the meteorological authority service provider, the appropriate ATS authority and the operators concerned.*

Editorial Note.— Deleted text inserted in the PANS-MET (Doc 10157), paragraph 6.7.2.5, subject to no change.

~~7.4.3~~ 7.7.1.3 At aerodromes where wind shear is detected by automated, ground-based, wind shear remote-sensing or detection equipment, wind shear alerts generated by these systems shall be issued. Wind shear alerts shall give concise, up-to-date information related to the observed existence of wind shear involving a headwind/tailwind change of 7.5 m/s (15 kt) or more which could adversely affect aircraft on the final approach path or initial take-off path and aircraft on the runway during the landing roll or take-off run.

Editorial Note.— Deleted paragraph 7.4.4 is transferred to the PANS-MET (Doc 10157), as paragraph 6.7.2.6, subject to no change.

~~7.4.4 **Recommendation.**— *Wind shear alerts should be updated at least every minute. The wind shear alert should be cancelled as soon as the headwind/tailwind change falls below 7.5 m/s (15 kt).*~~

Editorial Note.— New paragraphs 7.7.2.1 and 7.7.2.2 correspond to Appendix 6, paragraphs 6.2.1 (part thereof) and 6.2.5, respectively; subject to no change.

7.7.2 Dissemination of wind shear warnings and alerts

7.7.2.1 The wind shear warnings shall be disseminated in accordance with local arrangements to those concerned.

7.7.2.2 The wind shear alerts shall be disseminated from automated, ground-based, wind shear remote-sensing or detection equipment in accordance with local arrangements to those concerned.

CHAPTER 8. AERONAUTICAL CLIMATOLOGICAL INFORMATION

Note.— ~~Technical specifications and detailed criteria related to this chapter are given in Appendix 7. The Standards and Recommended Practices in this chapter are to be used in conjunction with the Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157), Chapter 7.~~

8.1 General provisions

Note 1.— *Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 7.1.*

Note 2.— *In cases where it is impracticable to meet the requirements for aeronautical climatological information on a national basis, the collection, processing and storage of observational data may be effected through computer facilities available for international use, and the responsibility for the preparation of the required aeronautical climatological information may be delegated as agreed between the meteorological authorities concerned.*

8.1.1 Aeronautical climatological information required for the planning of flight operations shall be prepared in the form of aerodrome climatological tables and aerodrome climatological summaries. Such information shall be supplied to aeronautical users as agreed between the meteorological authority service provider and the user concerned.

Editorial Note.— Deleted note is transferred to the PANS-MET (Doc 10157), as a note under Section 7.1, subject to no change.

~~— *Note.*— Climatological data required for aerodrome planning purposes are set out in Annex 14, Volume I, 3.1.4 and Attachment A.~~

8.1.2 **Recommendation.**— *Aeronautical climatological information should normally be based on observations made over a period of at least five years and the period should be indicated in the information supplied.*

8.1.3 **Recommendation.**— *Climatological data related to sites for new aerodromes and to additional runways at existing aerodromes should be collected starting as early as possible before the commissioning of those aerodromes or runways.*

8.2 Aerodrome climatological tables

Note.— *Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 7.2.*

Recommendation.— *Each Contracting State should make arrangements for collecting and retaining the necessary observational data and have the capability:*

- a) *to prepare aerodrome climatological tables for each regular and alternate international aerodrome within its territory; and*

- b) to make available such climatological tables to an aeronautical user within a time period as agreed between the meteorological ~~authority~~ service provider and the user concerned.

8.3 Aerodrome climatological summaries

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 7.3.

...

Editorial Note.— New paragraph 8.5 corresponds to Appendix 7, Section 2; the words “authority responsible” have been replaced by “service provider responsible”.

8.5 Exchange of aeronautical climatological information

Recommendation.— Aeronautical climatological information should be exchanged on request between meteorological authorities. Operators and other aeronautical users desiring such information should contact the meteorological service provider responsible for its preparation.

CHAPTER 9. METEOROLOGICAL SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

Note.— ~~Technical specifications and detailed criteria related to this chapter are given in Appendix 8. The Standards and Recommended Practices in this chapter are to be used in conjunction with the Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157), Chapter 8.~~

9.1 General provisions

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 8.1.

9.1.1 Meteorological information shall be supplied to operators and flight crew members for:

- a) pre-flight planning by operators;
- b) in-flight replanning by operators using centralized operational control of flight operations;
- c) use by flight crew members before departure; and
- d) aircraft in flight.

Editorial Note.— New paragraph 9.1.2 corresponds to Appendix 8, paragraph 1.2; the word “authority” has been replaced by “service provider”.

9.1.2 The meteorological service provider, in consultation with the operator, shall determine:

- a) the type and format of meteorological information to be supplied; and
- b) methods and means of supplying that information.

9.1.2-3 Meteorological information supplied to operators and flight crew members shall cover the flight in respect of time, altitude and geographical extent. Accordingly, the information shall relate to appropriate fixed times, or periods of time, and shall extend to the aerodrome of intended landing, also covering the meteorological conditions expected between the aerodrome of intended landing and alternate aerodromes designated by the operator.

Editorial Note.— Deleted text is transferred to the PANS-MET (Doc 10157.), as paragraph 8.1.1.2, subject to no change.

9.1.3-4 Meteorological information supplied to operators and flight crew members shall be up to date and include the following information, as agreed between the meteorological authority and the operators concerned:

- a) aerodrome and en-route observational information; and
- b) aerodrome and en-route forecast information.
 - a) ~~forecasts of:~~

- ~~1) upper wind and upper air temperature;~~
- ~~2) upper air humidity;~~
- ~~3) geopotential altitude of flight levels;~~
- ~~4) flight level and temperature of tropopause;~~
- ~~5) direction, speed and flight level of maximum wind;~~
- ~~6) SIGWX phenomena; and~~
- ~~7) cumulonimbus clouds, icing and turbulence;~~

~~Note 1.— Forecasts of upper air humidity and geopotential altitude of flight levels are used only in automatic flight planning and need not be displayed.~~

~~Note 2.— Forecasts of cumulonimbus clouds, icing and turbulence are intended to be processed and, if necessary, visualized according to the specific thresholds relevant to user operations.~~

- ~~b) METAR or SPECI (including trend forecasts as issued in accordance with regional air navigation agreement) for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;~~
- ~~c) TAF or amended TAF for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;~~
- ~~d) forecasts for take-off;~~
- ~~e) SIGMET information and appropriate special air reports relevant to the whole route;~~

~~Note.— Appropriate special air reports will be those not already used in the preparation of SIGMET.~~

- ~~f) volcanic ash and tropical cyclone advisory information relevant to the whole route;~~
- ~~g) as determined by regional air navigation agreement, GAMET area forecasts and/or area forecasts for low level flights in chart form prepared in support of the issuance of AIRMET information, and AIRMET information for low level flights relevant to the whole route;~~
- ~~h) aerodrome warnings for the local aerodrome;~~
- ~~i) meteorological satellite images;~~
- ~~j) ground-based weather radar information; and~~
- ~~k) space weather advisory information relevant to the whole route.~~

~~Note.— The list of meteorological information to be supplied to operators and flight crew members is contained in the PANS-MET (Doc 10157), 8.1.1.2.~~

9.1.4-5 ~~En-route forecasts listed under 9.1.3 a)~~ information shall be generated from the digital forecasts provided by the WAFCs whenever these forecasts cover the intended flight path in respect of

time, altitude and geographical extent, unless otherwise agreed between the meteorological authority service provider and the operator concerned.

9.1.5-6 When forecasts are identified as being originated by the WAFCs, no modifications shall be made to their meteorological content.

Editorial Note.— Deleted paragraphs 9.1.6 and 9.1.7 are transferred to the PANS-MET (Doc 10157), as paragraphs 8.2.2.2 and 8.2.2.3, respectively, subject to no change, except for the: a) elimination of redundant words “listed under 9.1.3 a) 1)” and “listed under 9.1.3 a) 6)” in 9.1.7; and b) update of the references.

~~— 9.1.6 Charts generated from the digital forecasts provided by the WAFCs shall be made available, as required by operators, for fixed areas of coverage as shown in Appendix 8, Figures A8-1, A8-2 and A8-3.~~

~~— 9.1.7 When forecasts of upper wind and upper air temperature listed under 9.1.3 a) 1) are supplied in chart form, they shall be fixed time prognostic charts for flight levels as specified in Appendix 2, 1.2.2 a). When forecasts of SIGWX phenomena listed under 9.1.3 a) 6) are supplied in chart form, they shall be fixed time prognostic charts for an atmospheric layer limited by flight levels as specified in Appendix 2, 1.3.2 and Appendix 5, 4.3.2.~~

9.1.8-7 The forecasts of upper wind and upper-air temperature and of SIGWX phenomena above flight level 100 requested for pre-flight planning and in-flight replanning by the operator shall be supplied as soon as they become available, but not later than 3 hours before departure. Other meteorological information requested for pre-flight planning and in-flight replanning by the operator shall be supplied as soon as is practicable.

Editorial Note.— New paragraph 9.1.8 corresponds to Appendix 8, Section 2.3, the first sentence, subject to no change.

9.1.8 Recommendation.— *Meteorological information for pre-flight planning and in-flight replanning by operators of helicopters flying to offshore structures should include data covering the layers from sea level to flight level 100.*

9.1.9 When necessary, the meteorological authority of the State providing service arranging for the provision of meteorological service for operators and flight crew members shall initiate coordinating action with the meteorological authorities of other States with a view to obtaining from them the reports and/or forecasts required.

9.1.10 Meteorological information shall be supplied to operators and flight crew members at the location to be determined by the meteorological authority service provider, after consultation with the operators concerned and at the time agreed between the aerodrome meteorological office and the operator concerned. The service for pre-flight planning shall be confined to flights originating within the territory of the State concerned. At an aerodrome without an aerodrome meteorological office at the aerodrome, arrangements for the supply of meteorological information shall be as agreed between the meteorological authority service provider and the operator concerned.

9.2 Briefing, consultation and display

Note.— *The requirements for the use of automated pre-flight information systems in providing briefing, consultation and display are ~~given~~ contained in 9.4.*

9.2.1 Briefing and/or consultation shall be provided, on request, to flight crew members and/or other flight operations personnel. Its purpose shall be to supply the latest available information on existing and expected meteorological conditions along the route to be flown, at the aerodrome of intended landing, alternate aerodromes and other aerodromes as relevant, either to explain and amplify the information contained in the flight documentation, or as agreed between the meteorological ~~authority~~ ~~service provider~~ and the operator concerned, in lieu of flight documentation.

9.2.2 Meteorological information used for briefing, consultation and display shall include any or all of the information listed in 9.1.3-4.

9.2.3 If the aerodrome meteorological office expresses an opinion on the development of the meteorological conditions at an aerodrome which differs appreciably from the aerodrome forecast included in the flight documentation, the attention of flight crew members shall be drawn to the divergence. The portion of the briefing dealing with the divergence shall be recorded at the time of briefing and this record shall be made available to the operator.

9.2.4 The required briefing, consultation, display and/or flight documentation shall normally be provided by the aerodrome meteorological office associated with the aerodrome of departure. At an aerodrome where these services are not available, arrangements to meet the requirements of flight crew members shall be as agreed between the meteorological ~~authority~~ ~~service provider~~ and the operator concerned. In exceptional circumstances, such as an undue delay, the aerodrome meteorological office associated with the aerodrome shall provide or, if that is not practicable, arrange for the provision of a new briefing, consultation and/or flight documentation as necessary.

9.2.5 **Recommendation.**— *The flight crew member and/or other flight operations personnel for whom briefing, consultation and/or flight documentation has been requested should visit the aerodrome meteorological office at the time agreed between the aerodrome meteorological office and the operator concerned. Where local circumstances at an aerodrome make personal briefing or consultation impracticable, the aerodrome meteorological office should provide those services by telephone or other suitable telecommunications facilities.*

Editorial Note.— New paragraph 9.2.6 corresponds to Appendix 8, paragraph 3.1, subject to no change.

9.2.6 **Recommendation.**— *The material displayed should be readily accessible to the flight crew members or other flight operations personnel concerned.*

9.3 Flight documentation

Note 1.— *Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 8.2.*

Note 2.— *The requirements for the use of automated pre-flight information systems in providing flight documentation are ~~given~~ contained in 9.4.*

9.3.1 Flight documentation to be made available shall comprise information listed under 9.1.3 ~~4. a) 1) and 6), b), c), e), f) and, if appropriate, g) and k).~~ However, flight documentation for flights of two hours' duration or less, after a short stop or turnaround, shall be limited to the information operationally needed, as agreed between the meteorological authority and the operator concerned, but in all cases it shall at least comprise information on 9.1.3 ~~b), c), e), f) and, if appropriate, g) and k).~~

9.3.2 Whenever it becomes apparent that the meteorological information to be included in the flight documentation will differ materially from that made available for pre-flight planning and in flight replanning, the operator shall be advised immediately and, if practicable, be supplied with the revised information as agreed between the operator and the aerodrome meteorological office concerned.

9.3.3 **Recommendation.**— *In cases where a need for amendment arises after the flight documentation has been supplied, and before take-off of the aircraft, the aerodrome meteorological office should, as agreed locally, issue the necessary amendment or updated information to the operator or to the local air traffic services unit, for transmission to the aircraft.*

Editorial Note.— New paragraph 9.3.4 (including the note) corresponds to Appendix 8, paragraph 4.1.2, subject to one change: replacement of “authority” by “service provider”.

9.3.4 **Recommendation.**— *The flight documentation related to concatenated route-specific upper wind and upper-air temperature forecasts should be provided as agreed between the meteorological service provider and the operator concerned.*

Note.— *Guidance on the design, formulation and use of concatenated charts is contained in the Manual of Aeronautical Meteorological Practice (Doc 8896).*

Editorial Note.— New paragraph 9.3.5 corresponds to Appendix 8, paragraph 4.1.3, the second sentence, subject to an editorial change only.

9.3.5 Meteorological information received from other meteorological offices shall be included in flight documentation without ~~change~~ **modification**.

Editorial Note.— New paragraph 9.3.6 corresponds to Appendix 8, paragraph 4.2.1.1, the first sentence, subject to no change.

9.3.6 **Recommendation.**— *Charts included in flight documentation should have a high standard of clarity and legibility.*

Note.— *The details of the characteristics of charts to be included in flight documentation are contained in the Procedures for Air Navigation Services – Meteorology (PANS-MET, Doc 10157), Section 8.2.3.1.*

9.3.47 The meteorological authority shall ~~retain~~ ensure that the meteorological service provider ~~retains~~ information supplied to flight crew members, either as printed copies or in computer files, ~~be retained~~ for a period of at least 30 days from the date of issue. This information shall be made available, on request, for inquiries or investigations and, for these purposes, shall be retained until the inquiry or investigation is completed.

9.4 Automated pre-flight information systems for briefing, consultation, flight planning and flight documentation

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 8.3.

9.4.1 Where the meteorological authority-service provider uses automated pre-flight information systems to supply and display meteorological information to operators and flight crew members for self-briefing, flight planning and flight documentation purposes, the information supplied and displayed shall comply with the relevant provisions in 9.1 to 9.3 inclusive.

9.4.2 **Recommendation.**— *Automated pre-flight information systems providing for a harmonized, common point of access to meteorological information and aeronautical information services information by operators, flight crew members and other aeronautical personnel concerned should be as agreed between the meteorological-authority service provider and the civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with Annex 15, 2.1.1 c).*

Note.— The meteorological and aeronautical information services information concerned is specified in 9.1 to 9.3 and ~~Appendix 8~~ in the PANS-MET (Doc 10157), Chapter 8, and in the Procedures for Air Navigation Services — Aeronautical Information Management (PANS-AIM, Doc 10066), 5.5, respectively.

9.4.3 Where automated pre-flight information systems are used to provide for a harmonized, common point of access to meteorological information and aeronautical information services information by operators, flight crew members and other aeronautical personnel concerned, the meteorological authority concerned shall remain responsible for ensuring that the quality control and quality management of meteorological information are provided by the meteorological service provider by means of such systems, in accordance with Chapter 2, 2.2.2.

Note.— The responsibilities relating to aeronautical information services information and the quality assurance of the information are ~~given~~ contained in Annex 15, Chapters 1, 2 and 3.

Editorial Note.— New paragraph 9.4.4 corresponds to Appendix 8, paragraph 5.1, subject to no change.

9.4.4 Automated pre-flight information systems providing self-briefing facilities shall provide for access by operators and flight crew members to consultation, as necessary, with an aerodrome meteorological office by telephone or other suitable telecommunications means.

9.5 Meteorological Information for aircraft in flight

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 8.4.

9.5.1 Meteorological information for use by aircraft in flight shall be supplied by an aerodrome meteorological office or meteorological watch office to its associated air traffic services unit and through D-VOLMET or VOLMET broadcasts as determined by regional air navigation agreement. Meteorological information for planning by the operator for aircraft in flight shall be supplied on request, as agreed between the meteorological authority or authorities and the operator concerned.

9.5.2 Meteorological information for use by aircraft in flight shall be supplied to air traffic services units in accordance with the specifications of Chapter 10.

Editorial Note.— New paragraph 9.5.3 corresponds to Appendix 8, paragraph 6.1, subject to no change.

9.5.3 Recommendation.— *If an aircraft in flight requests meteorological information, the aerodrome meteorological office or meteorological watch office which receives the request should arrange to supply the information with the assistance, if necessary, of another aerodrome meteorological office or meteorological watch office.*

9.5.34 Meteorological information shall be supplied through D-VOLMET or VOLMET broadcasts in accordance with the specifications of Chapter 11.

CHAPTER 10. METEOROLOGICAL INFORMATION FOR AIR TRAFFIC SERVICES, SEARCH AND RESCUE SERVICES AND AERONAUTICAL INFORMATION SERVICES

Note.— Technical specifications and detailed criteria related to this chapter are given in Appendix 9. The Standards and Recommended Practices in this chapter are to be used in conjunction with the Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157), Chapter 9.

10.1 Information for air traffic services units

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 9.1.

10.1.1 General

10.1.1.1 ~~The meteorological authority~~ Contracting State shall designate an aerodrome meteorological office or meteorological watch office to be associated with each air traffic services unit. The associated aerodrome meteorological office or meteorological watch office shall, after coordination with the air traffic services unit, supply, or arrange for the supply of, up-to-date meteorological information to the unit as necessary for the conduct of its functions.

10.1.1.2 **Recommendation.**— *An aerodrome meteorological office should be associated with an aerodrome control tower or approach control unit for the provision of meteorological information.*

10.1.1.3 A meteorological watch office shall be associated with a flight information centre or an area control centre for the provision of meteorological information.

10.1.1.4 **Recommendation.**— *Where, owing to local circumstances, it is convenient for the duties of an associated aerodrome meteorological office or meteorological watch office to be shared between two or more aerodrome meteorological offices or meteorological watch offices, the division of responsibility should be determined by the meteorological authority service provider in consultation with the appropriate ATS authority.*

10.1.1.5 Any meteorological information requested by an air traffic services unit in connection with an aircraft emergency shall be supplied as rapidly as possible.

10.1.2 Supply, dissemination and transmission arrangements

Editorial Note.— New paragraph 10.1.2 corresponds to Appendix 9, paragraphs 1.4 and 1.5.2, subject to an editorial change and the replacement of “meteorological authority” by “meteorological service provider” in 10.1.2.2.

10.1.2.1 Where necessary for flight information purposes, current meteorological reports and forecasts shall be supplied to designated aeronautical telecommunication stations. A copy of such information shall be forwarded, if required, to the FIC or ACC.

10.1.2.2 **Recommendation.**— *When computer-processed upper-air grid point data in digital form is*

made available to air traffic services units for use by air traffic services computers the transmission arrangements should be as agreed between the meteorological service provider and the appropriate ATS authority. The data should be supplied as soon as is practicable after the processing of the forecasts has been completed.

10.2 Information for search and rescue services units

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 9.2.

10.2.1 General

Aerodrome meteorological offices or meteorological watch offices designated by ~~the meteorological authority~~ a Contracting State in accordance with regional air navigation agreement shall supply search and rescue services units with the meteorological information they require in a form established by mutual agreement. For that purpose, the designated aerodrome meteorological office or meteorological watch office shall maintain liaison with the search and rescue services unit throughout a search and rescue operation.

Editorial Note.— New paragraph 10.2.2 corresponds to Appendix 9, paragraph 2.1, subject to no change.

10.2.2 List of information

Information to be supplied to rescue coordination centres shall include the meteorological conditions that existed in the last known position of a missing aircraft and along the intended route of that aircraft with particular reference to:

- a) significant en-route weather phenomena;
- b) cloud amount and type, particularly cumulonimbus; height indications of bases and tops;
- c) visibility and phenomena reducing visibility;
- d) surface wind and upper wind;
- e) state of ground, in particular, any snow cover or flooding;
- f) sea-surface temperature, state of the sea, ice cover if any and ocean currents, if relevant to the search area; and
- g) sea-level pressure data.

10.3 Information for aeronautical information services units

10.3.1 General

The meteorological authority, in coordination with the appropriate civil aviation authority, shall arrange for the supply by the meteorological service provider concerned of up-to-date meteorological information to relevant aeronautical information services units, as necessary, for the conduct of their functions.

Editorial Note.— New paragraph 10.3.2 corresponds to Appendix 9, paragraph 3.1, subject to no change.

10.3.2 List of information

The following information shall be supplied, as necessary, to an aeronautical information services unit:

- a) information on meteorological service for international air navigation, intended for inclusion in the aeronautical information publication(s) concerned;

Note.— *Details of this information are contained in the Procedures for Air Navigation Services — Aeronautical Information Management (PANS-AIM, Doc 10066), Appendix 3, Part 1, GEN 3.5 and Part 3, AD 2.2, 2.11, 3.2 and 3.11.*

- b) information necessary for the preparation of NOTAM or ASHTAM including, in particular, information on:
 - 1) the establishment, withdrawal and significant changes in operation of aeronautical meteorological services. This information is required to be provided to the aeronautical information services unit sufficiently in advance of the effective date to permit issuance of NOTAM in compliance with Annex 15, 6.3.2.2 and 6.3.2.3;
 - 2) the occurrence of volcanic activity; and

Note.— *The specific information required is contained in Annex 3, Chapter 3, 3.3.2 h) and Chapter 4, 4.8.*

- 3) release of radioactive materials into the atmosphere, as agreed between the meteorological and appropriate civil aviation authorities concerned; and

Note.— *The specific information required is contained in Annex 3, Chapter 3, 3.4.2 g).*

- c) information necessary for the preparation of aeronautical information circulars including, in particular, information on:
 - 1) expected important changes in aeronautical meteorological procedures, services and facilities provided; and
 - 2) effect of certain weather phenomena on aircraft operations.
-

CHAPTER 11. REQUIREMENTS FOR AND USE OF COMMUNICATIONS TO EXCHANGE METEOROLOGICAL INFORMATION

Note 1.— Technical specifications and detailed criteria related to this chapter are Appendix 10. The Standards and Recommended Practices in this chapter are to be used in conjunction with the Procedures for Air Navigation Services — Meteorology (PANS-MET, Doc 10157), Chapter 10.

Note 2.— It is recognized that it is for each Contracting State to decide upon its own internal organization and responsibility for implementing the telecommunications facilities referred to in this chapter.

11.1 Requirements for communications

11.1.3 Suitable telecommunications facilities shall be made available to permit world area forecast centres to supply the required world area forecast system ~~products~~ forecasts to aerodrome meteorological offices, meteorological ~~authorities~~ service providers and other users.

...

11.1.7 **Recommendation.**— *As agreed between the meteorological ~~authority~~ service provider and the operators concerned, provision should be made to enable operators to establish suitable telecommunications facilities for obtaining meteorological information from aerodrome meteorological offices or other appropriate sources.*

Editorial Note.— New paragraphs 11.1.10 and 11.1.11 correspond to Appendix 10, paragraphs 1.2.1 and 1.2.2, respectively, except for the replacement of: a) “data for grid points in digital form are” by “grid point data in digital form is”, in line with the definition in Chapter 1; and b) “meteorological authority” by “meteorological service provider”.

...

11.1.10 **Recommendation.**— *When upper-air grid point data in digital form is made available for use by air traffic services computers, the transmission arrangements should be as agreed between the meteorological service provider and the appropriate ATS authority.*

11.1.11 **Recommendation.**— *When upper-air grid point data in digital form is made available to operators for flight planning by computer, the transmission arrangements should be as agreed between the world area forecast centre concerned, the meteorological service provider and the operators concerned.*

11.2 Use of aeronautical fixed service communications and the public Internet—~~meteorological bulletins~~

Note.— *Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 10.1.*

11.2.1 Meteorological bulletins

11.2.1.1 Meteorological bulletins containing operational meteorological information to be transmitted via the aeronautical fixed service or the public Internet shall be originated by the appropriate meteorological office or aeronautical meteorological station.

Note.— *Meteorological bulletins containing operational meteorological information authorized for transmission via the aeronautical fixed service are listed in Annex 10, Volume II, Chapter 4, together with the relevant priorities and priority indicators.*

Editorial Note.— New paragraph 11.2.1.2 corresponds to Appendix 10, paragraph 1.1, subject to no change.

11.2.1.2 Messages and bulletins containing operational meteorological information shall achieve transit times of less than 5 minutes, unless otherwise determined to be lower by regional air navigation agreement.

11.32.2 ~~Use of aeronautical fixed service communications~~— World area forecast system ~~products~~ forecasts

Editorial Note.— New paragraph 11.2.2.1 corresponds to Appendix 10, paragraph 2.2.1, subject to no change.

11.2.2.1 **Recommendation.**— *The telecommunications facilities used for the supply of WAFS forecasts should be the aeronautical fixed service or the public Internet.*

11.2.2.2 **Recommendation.**— *World area forecast system WAFS products in digital form forecasts should be transmitted using ~~binary~~ digital data communications techniques. The method and channels used for the dissemination of the ~~products~~ forecasts should be as determined by regional air navigation agreement.*

11.43 Use of aeronautical mobile service communications

Note.— *Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 10.2.*

Editorial Note.— No other change to Section 11.4.

11.54 Use of aeronautical data link service — ~~contents of D-VOLMET~~

Note.— *Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 10.3.*

Editorial Note.— No other change to Section 11.5.

**11.65 Use of aeronautical broadcasting service —
~~contents of VOLMET broadcasts~~**

Note.— Procedures and technical specifications related to this section are contained in the PANS-MET (Doc 10157), Section 10.4.

Editorial Note.— No other change to Section 11.6.

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