International Civil Aviation Organization

SEVENTEENTH MEETING OF THE METEOROLOGY SUB-GROUP (MET SG/17) OF APANPIRG

Bangkok, Thailand, 13 – 16 May 2013

Agenda Item 11: Other MET issues (e.g. QMS, Competency & Training)

STATUS AND HIGHLIGHTS OF AMENDMENT 76 TO ANNEX 3

(Presented by the Secretariat)

SUMMARY

This paper presents an overview of the current status and highlights of Amendment 76 to ICAO Annex 3 – *Meteorological Service for International Air Navigation.*

1. Introduction

1.1 The Standards and Recommended Practices (SARPs) relating to meteorology, and adopted by the Council under the provisions of the Convention, are designated as Annex 3 – *Meteorological Service for International Air Navigation.*

1.2 The meeting is reminded that the SARPs contained in Annex 3 were first adopted by the Council on 16 April 1948, pursuant to the provisions of Article 37 of the Convention on International Civil Aviation (Chicago, 1944).

1.3 Table A in Annex 3 shows the origin of subsequent amendments to Annex 3, together with a list of the principal subjects involved and the dates on which the Annex and the amendments were adopted or approved by the Council, when they became effective and when they became applicable.

1.4 The meeting will recall that the most recent, previous amendment to Annex 3 was Amendment 75, which became effective on 12 July 2010 and applicable on 18 November 2010 (15 November 2012 for 2.2.3).

2. Discussion

2.1 The meeting will be pleased to note that Amendment 76 to Annex 3 was adopted by the Council at the fifth meeting of its 198th Session on 27 February 2013. Subject to there being no notifications of disapproval expressed, the Amendment will become effective on 15 July 2013 and applicable on 14 November 2013.

2.4 Significant changes introduced by Amendment 76 to Annex 3 include:

a) a revised definition of "alternate aerodrome" in relation to extended diversion time operations (EDTO);

b) proposed changes to WAFS-related provisions that will have a positive effect on efficiency and cost-effectiveness by improving the accuracy of the flight planning information provided by the system;

c) changes to provisions related to aerodrome observations and forecasts, meteorological warnings and ATM requirements that will contribute to greater levels of safety and provide a basis for the migration to digital information exchange within the future system-wide information management (SWIM) environment; and

d) changes developed by the IAVWOPSG that will have a positive effect on safety by improving the content of volcanic ash safety-related information.

2.2 Further information concerning the adoption of Amendment 76 to Annex 3, including details of the Amendment, were promulgated in State letter reference: AN 10/1.1-13/39, dated 12 April 2013. A copy of the State letter is provided in the **Appendix** to this paper for the meeting to review.

3. Action by the Meeting

3.1 The meeting is invited to:

a) note the information contained in this paper and the Appendix; and

b) discuss any relevant implementation matters as appropriate.

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Tel.: +1 514 954-8194

Ref.: AN 10/1.1-13/39 12 April 2013

Subject: Adoption of Amendment 76 to Annex 3

Action required: a) Notify any disapproval before 15 July 2013; b) Notify any differences and compliance before 14 October 2013 and 13 October 2014; c) Consider the use of the Electronic Filing of Differences System (EFOD) for notification of differences and compliance

Sir/Madam,

1. I have the honour to inform you that Amendment 76 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 fifth meeting of its 198th Session on 27 February 2013. 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 15 July 2013 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 76, to the extent it becomes effective, will become applicable on 14 November 2013 (13 November 2014 for Appendix 3, paragraphs 2.3.1 e) and 4.1.5.2 c) 1)).

3. Amendment 76 arises from:

a) a proposal arising from the Secretariat, with the assistance of the Special Operations Task Force (SOTF), regarding extended diversion time operations (EDTO);

b) a proposal developed by the World Area Forecast System Operations Group (WAFSOPSG) related to the world area forecast system (WAFS);

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c) a proposal developed by the Secretariat with the assistance of the Aerodrome Meteorological Observation and Forecast Study Group (AMOFSG) and the Meteorological Warnings Study Group (METWSG) regarding provisions related to aerodrome observations and forecasts, meteorological warnings and ATM requirements; and

d) a proposal developed by the International Airways Volcano Watch Operations Group (IAVWOPSG) related to the international airways volcano watch (IAVW).

4. The amendment regarding extended diversion time operations (EDTO) stems from new air traffic services (ATS) routes across the polar regions and developments in States which in the year 2000 gave rise to the need to review Standards and Recommended Practices (SARPs) and guidance material concerning the conduct of extended range operations (ETOPS) by aeroplanes with two or more turbine power units and to develop proposals for amendments. Amendment 36 to Annex 6 — *Operation of Aircraft*, Part I, which became applicable on 15 November 2012, introduced new provisions based on best practices and lessons learned from ETOPS to ensure that all operators and new entrants operate at the same level of safety in order to maintain the safety of long-range operations. This amendment to Annex 6, Part I — *International Commercial Air Transport — Aeroplanes* gave rise to a revised definition of "alternate aerodrome" in Annex 3.

5. The proposed changes to WAFS-related provisions will have a positive effect on efficiency and cost-effectiveness by improving the accuracy of the flight planning information provided by the system. Changes to provisions related to aerodrome observations and forecasts, meteorological warnings and ATM requirements will contribute to greater levels of safety and provide a basis for the migration to digital information exchange within the future system-wide information management (SWIM) environment. The proposed changes to IAVW-related provisions will have a positive effect on safety by improving the content of volcanic ash safety-related information.

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

a) that before 15 July 2013 you inform me if there is any part of the adopted Standards and Recommended Practices (SARPs) amendments in Amendment 76 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 14 October 2013[1] you inform me of the following, using the form in Attachment C for this purpose:

1) any differences that will exist on 14 November 2013[2] 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 76, 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 76.

[1] 13 October 2014 for Appendix 3, paragraphs 2.3.1 e) and 4.1.5.2 c) 1).
[2] 13 November 2014 for Appendix 3, paragraphs 2.3.1 e) and 4.1.5.2 c) 1).

7. With reference to the request in paragraph 6 a) above, it should be noted that a registration of disapproval of Amendment 76 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 6 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.

8. With reference to the request in paragraph 6 b) above, it should be also noted that the Council, at the third meeting of its 192nd Session on 4 March 2011, agreed that pending the development of a concrete policy and operational procedures governing the use of EFOD, this system be used as an alternative means for filing of differences to all Annexes, except for Annex 9 — *Facilitation* and Annex 17 — *Security — Safeguarding International Civil Aviation against Acts of Unlawful Interference*. EFOD is currently available on the USOAP restricted website (http://www.icao.int/usoap) which is accessible by all Member States (AN 1/1-11/28 refers) and you are invited to consider using this for notification of compliance and differences.

9. Guidance on the determination and reporting of differences is given in the Note on the Notification of Differences in Attachment D.

10. 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.

11. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 6 b) above, to the ICAO Regional Office accredited to your Government.

12. As soon as practicable after the amendment becomes effective, on 15 July 2013, replacement pages incorporating Amendment 76 will be forwarded to you.

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

Raymond Benjamin
Secretary General

Enclosures:

A — Amendment to the Foreword of Annex 3
B — Form on notification of disapproval of all or part of Amendment 76 to Annex 3
C — Form on notification of compliance with or differences from Annex 3
D — Note on the Notification of Differences

ATTACHMENT A to State letter AN 10/1.1-13/39

AMENDMENT TO THE FOREWORD OF ANNEX 3

Add the following at the end of Table A:

Amendment	***Source(s)***	***Subject***	***Adopted/Approved Effective Applicable***
76	Special Operations Task Force (SOTF). Aerodrome Meteorological Observation and Forecast Study Group (AMOFSG). Meteorological Warnings Study Group (METWSG). International Airways Volcano Watch Operations Group (IAVWOPSG). World Area Forecast System Operations Group (WAFSOPSG). Secretariat.	Amendment to the definition of "alternate aerodrome"; clarification of terminology used for meteorological offices; amendment of provisions related to automatic meteorological observing systems; clarification of the required domain for the reporting of clouds in local routine and special reports; standardization of the lead time for the issuance of aerodrome forecasts (TAF); inclusion of a requirement for take-off forecasts at all aerodromes; amendment of requirement for the exchange of OPMET information (METAR/SPECI, TAF and SIGMET) to the use of extensible markup language (XML)/geography markup language (GML); simplification of runway visual range reporting including aligning the SPECI criteria with the operational thresholds used in Annex 6; deletion of the requirement to report ice crystals; amendment of the requirement for reporting of meteorological elements in METAR/SPECI and local reports when automatic sensors fail (missing data); deletion of the requirement for reporting recent weather in cases where SPECI are issued at the discretion of States; amendment to the requirement for reporting state of the sea to allow reporting of wave height as an alternative; alignment of TAF change group criteria with those for the issuance of SPECI; amendment of SIGMET for the observing and forecasting of sandstorm/duststorm intensity; clarification of the location of hazardous phenomena in SIGMET documentation; elimination of the reference to the accidental nature of a release of radioactive materials into the atmosphere; deletion of web addresses in certain provisions; introduction of the requirement to monitor potentially active volcanoes by concerned States; improvements of the explanation of the symbols for volcanic eruption and radioactive materials (for significant weather used in flight documentation); inclusions of a reference to the volcano observatory notice for aviation (VONA); introduction of the requirement regarding the notification of volcanic eruption cessation by State volcano observatories; introduction of the concept of estimation of volcanic ash in Table A2-1; introduction of the concept of an entire FIR or entire CTA being covered by a volcanic ash cloud and other new requirements in Table A6-1 and related examples; inclusion of provisions enabling concatenated route-specific wind/temperature forecasts; addition of wind and temperature data for flight level (FL) 410 (175 hPa) and geopotential altitude data for FL 270 (350 hPa) and FL 410 (175 hPa) in grid point forecasts	27 February 2013 15 July 2013 14 November 2013 13 November 2014 (for Appendix 3, paragraphs 2.3.1 e) and 4.1.5.2 c) 1))

		prepared by world area forecast centres (WAFCs); deletion of notes related to trial nature of gridded world area forecasts system (WAFS) forecasts for icing, turbulence and cumulonimbus clouds; and revision of the latitude and longitude coordinates for the corners of charts generated from the digital forecasts provided by the WAFS for fixed areas of coverage.	

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ATTACHMENT B to State letter AN 10/1.1-13/39

NOTIFICATION OF DISAPPROVAL OF ALL OR PART OF AMENDMENT 76 TO ANNEX 3

To: The Secretary General
International Civil Aviation Organization
999 University Street
Montreal, Quebec
Canada H3C 5H7

(State) ———————————————— hereby wishes to disapprove the following parts of Amendment 76 to Annex 3:

Signature ————————————————

Date ————————————

NOTES

1) If you wish to disapprove all or part of Amendment 76 to Annex 3 please dispatch this notification of disapproval to reach ICAO Headquarters by 15 July 2013. 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 76, 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.

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ATTACHMENT C to State letter AN 10/1.1-13/39

NOTIFICATION OF COMPLIANCE WITH OR DIFFERENCES FROM ANNEX 3
(Including all amendments up to and including Amendment 76)

To: The Secretary General
International Civil Aviation Organization
999 University Street
Montreal, 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 76.

2. The following differences will exist on ———————————————— between the regulations and/or practices of **(State)** ———————————————— and the provisions of Annex 3, including Amendment 76 (Please see Note 3) below.)

a) **Annex Provision** (Please give exact paragraph reference)	**b)** **Difference Category** (Please indicate A, B, or C)	**c)** **Details of Difference** (Please describe the difference clearly and concisely)	**d)** **Remarks** (Please indicate reasons for the difference)

(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 76 for which differences have been notified in 2 above.

a) **Annex Provision** (Please give exact paragraph reference)	**b)** **Date**	**c)** **Comments**

(Please use extra sheets as required)

Signature ———————————————— Date ————————————

NOTES

1) If paragraph 1 above is applicable to you, 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) Please dispatch the form to reach ICAO Headquarters by 14 October 2013[1].

3) A detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

4) Guidance on the notification of differences from Annex 3 is provided in the Note on the Notification of Differences at Attachment D.

5) Please send a copy of this notification to the ICAO Regional Office accredited to your Government.

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[1] 13 October 2014 for Appendix 3, paragraphs 2.3.1 e) and 4.1.5.2 c) 1).

ATTACHMENT D to State letter AN 10/1.1-13/39

NOTE ON THE NOTIFICATION OF DIFFERENCES TO ANNEX 3 AND FORM OF NOTIFICATION

(*Prepared and issued in accordance with instructions of the Council)*

1. *Introduction*

1.1 The Assembly and the Council, when reviewing the notification of differences by States in compliance with Article 38 of the Convention, have repeatedly noted that the state of such reporting is not entirely satisfactory.

1.2 With a view to achieving a more comprehensive coverage, this note is issued to facilitate the determination and reporting of such differences and to state the primary purpose of such reporting.

1.3 The primary purpose of reporting of differences is to promote safety 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 ICAO Standards.

1.4 Contracting States are, therefore, requested to give particular attention to the notification before 14 October p[1] of differences with respect to Standards in Annex 3. The Council has also urged Contracting States to extend the above considerations to Recommended Practices.

1.5 Contracting States are asked to note further that it is necessary to make an explicit statement of intent to comply where such intent exists, or where such is not the intent, of the difference or differences that will exist. This statement should be made not only to the latest amendment but to the whole Annex, including the amendment.

1.6 If previous notifications have been made in respect of this Annex, detailed repetition may be avoided, if appropriate, by stating the current validity of the earlier notification. States are requested to provide updates of the differences previously notified after each amendment, as appropriate, until the difference no longer exists.

2. *Notification of differences to Annex 3, including Amendment 76*

2.1 Past experience has indicated that the reporting of differences to Annex 3 has in some instances been too extensive since some appear merely to be a different manner of expressing the same intent.

2.2 Guidance to Contracting States in the reporting of differences to Annex 3 can only be given in very general terms. Where the national regulations of States call for compliance with procedures that are not identical but essentially similar to those contained in the Annex, no difference should be reported since the details of the procedures existing are the subject of notification through the medium of aeronautical information publications. Although differences to Recommended Practices are not notifiable under Article 38 of the Convention, Contracting States are urged to notify the Organization of the differences between their national regulations and practices and any corresponding Recommended

[1] 13 October 2014 for Appendix 3, paragraphs 2.3.1 e) and 4.1.5.2 c) 1).

Practices contained in an Annex. States should categorize each difference notified on the basis of whether the corresponding national regulation is:

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

b) ***Different in character or other means of compliance (Category B)***[*]. This category applies when the national regulation is different in character from the corresponding ICAO SARP, or when the national regulation differs in principle, type or system from the corresponding SARP, without necessarily imposing an additional obligation; and

c) ***Less protective or partially implemented/not implemented (Category C)***. This category applies when the national regulation is less protective than the corresponding SARP; or when no national regulation has been promulgated to address the corresponding SARP, in whole or in part.

2.3 When a Contracting State deems an ICAO Standard 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 to Annex 8 provisions related to the design and construction of an aircraft.

2.4 For States that have already fully reported differences from Annex 3 or have reported that no differences exist, the reporting of any further differences occasioned by the amendment should be relatively straightforward; however, attention is called to paragraph 1.5 wherein it is indicated that this statement should be not only to the latest amendment but to the whole Annex, including the amendment.

3. *Form of notification of differences*

3.1 Differences should be notified in the following form:

a) *Reference*: The number of the paragraph or subparagraph in Annex 3 as amended which contains the Standard or Recommended Practice to which the difference relates;

b) *Category*: Indicate the category of the difference as A, B or C in accordance with paragraph 2.2 above;

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

c) *Description of the difference*: Clearly and concisely describe the difference and its effect; and

d) *Remarks*: Under “Remarks” indicate reasons for the difference and intentions including any planned date for implementation.

3.2 The differences notified will be recorded in a Supplement to the Annex, normally in the terms used by the Contracting State when making the notification. In the interest of making the supplement as useful as possible, please make statements as clear and concise as possible and confine remarks to essential points. Comments on implementation, in accordance with paragraph 4 b) 2) of the Resolution of Adoption, should not be combined with those concerning differences. The provision of extracts from national regulations cannot be considered as sufficient to satisfy the obligation to notify differences. General comments that do not relate to specific differences will not be published in Supplements.

— END —

AMENDMENT No. 76

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 **27 February 2013**. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before **15 July 2013** will become effective on that date and will become applicable on **14 November 2013** and **13 November 2014** as specified in the Resolution of Adoption. (State letter AN 10/1.1-13/39 refers.)

FEBRUARY 2013

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AMENDMENT 76 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 27 February 2013 Amendment 76 to the International Standards 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* 15 July 2013 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 14 November 2013[1].

4. *Requests the Secretary General*:

a) to notify each Contracting State immediately of the above action and immediately after 15 July 2013 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 14 November 2013[1] between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 14 October 2013[2], and thereafter to notify the Organization of any further differences that arise;

2) to notify the Organization before 14 October 2013[2] 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, when the notification of such differences is important for the safety of air navigation, following the procedure specified in subparagraph b) above with respect to differences from Standards.

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[1] 13 November 2014 for Appendix 3, paragraphs 2.3.1 e) and 4.1.5.2 c) 1)
[2] 13 October 2014 for Appendix 3, paragraphs 2.3.1 e) and 4.1.5.2 c) 1)

NOTES ON THE PRESENTATION OF THE AMENDMENT

1. 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 new text which is highlighted with grey shading	new text to replace existing text

TEXT OF AMENDMENT 76 TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

METEOROLOGICAL SERVICE
FOR INTERNATIONAL AIR NAVIGATION

ANNEX 3
TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

SEVENTEENTH EDITION — JULY 2010

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PART I. CORE SARPs

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CHAPTER 1. DEFINITIONS

. . .

Aerodrome meteorological office. An office~~, located at an aerodrome,~~ designated to provide meteorological service for aerodromes serving international air navigation.

. . .

Alternate aerodrome. An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate aerodromes include the following:

Take-off alternate. An alternate aerodrome at which an aircraft ~~can~~ would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

En-route alternate. An alternate aerodrome at which an aircraft would be able to land ~~after experiencing an abnormal or emergency condition~~ in the event that a diversion becomes necessary while en route.

~~*ETOPS en-route alternate.* A suitable and appropriate alternate aerodrome at which an aeroplane would be able to land after experiencing an engine shutdown or other abnormal or emergency condition while en route in an ETOPS operation.~~

Destination alternate. An alternate aerodrome ~~to~~ at which an aircraft ~~may proceed~~ would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing.

Note.— The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight.

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CHAPTER 2. GENERAL PROVISIONS

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2.2 Supply, use and quality management of meteorological information

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~~2.2.2 **Recommendation.—** *Until 14 November 2012, in order to meet the objective of meteorological service for international air navigation, the Contracting State should ensure that the designated meteorological authority referred to in 2.1.4 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.~~

~~2.2.3~~2.2.2 ~~From 15 November 2012, each~~Each Contracting State shall ensure that the designated meteorological authority referred to in 2.1.4 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.

Editorial Note.— Renumber subsequent paragraphs accordingly.

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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 or the aerodrome meteorological office~~(s)~~ concerned. The minimum amount of advance notice required shall be as agreed between the meteorological authority or aerodrome meteorological office~~(s)~~ and the operator.

. . .

2.3.3 The ~~aerodrome meteorological office, or the meteorological office concerned, shall be notified by the~~ operator or a flight crew member shall ensure that, where required by the meteorological authority 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.

2.3.4 **Recommendation.—** *The notification to the aerodrome meteorological office~~, or the meteorological office concerned,~~ of individual flights should contain the following information except that, in the case of scheduled flights, the requirement for some or all of this information may be waived by agreement between the aerodrome meteorological office and the operator:*

. . .

CHAPTER 3. WORLD AREA FORECAST SYSTEM AND METEOROLOGICAL OFFICES

. . .

3.2 World area forecast centres

3.2.1 A Contracting State, having accepted the responsibility for providing a WAFC within the framework of the world area forecast system, shall arrange for that centre:

a) to prepare gridded global forecasts of:

. . .

~~*Note.— Gridded global forecasts of cumulonimbus clouds, icing and turbulence are currently of an experimental nature, labelled as "trial forecasts" and distributed only through the Internet-based file transfer protocol (FTP) services.*~~

. . .

d) to receive information concerning the ~~accidental~~ release of radioactive materials into the atmosphere from its associated WMO regional specialized meteorological centre (RSMC) for the provision of transport model products for radiological environmental emergency response, in order to include the information in SIGWX forecasts; and

. . .

3.2.2 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 World Area Forecast System Operations Group (WAFSOPSG) as necessary; the latest revision can be found ~~at~~ on the ICAO WAFSOPSG website ~~at www.icao.int/anb/wafsopsg~~.

. . .

3.3 ~~Meteorological~~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:

. . .

g) exchange meteorological information with other aerodrome meteorological offices; and

. . .

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

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

. . .

3.4 Meteorological watch offices

. . .

3.4.2 A meteorological watch office shall:

. . .

g) supply information received concerning the ~~accidental~~ 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 and ATS authorities concerned, and to aeronautical information service units, as agreed between the meteorological and appropriate civil aviation authorities concerned. The information shall comprise location, date and time of the ~~accident~~ release, and forecast trajectories of the radioactive materials.

. . .

3.5 Volcanic ash advisory centres

3.5.1 A Contracting State, having accepted, by regional air navigation agreement, the responsibility for providing a VAAC within the framework of the international airways volcano watch, shall arrange for that centre to respond to a notification that a volcano has erupted, or is expected to erupt or volcanic ash is reported in its area of responsibility, by arranging for that centre to:

. . .

c) issue advisory information regarding the extent and forecast movement of the volcanic ash "cloud" to:

. . .

4) airlines requiring the advisory information through the AFTN address provided specifically for this purpose; and

Note.— The AFTN address to be used by the VAACs is given in the Handbook on the International Airways Volcano Watch (IAVW) *(Doc 9766)~~— and at http://www.icao.int/icao/en/anb/met/index.html~~ which is available on the ICAO IAVWOPSG website*.

. . .

3.6 State volcano observatories

Contracting States ~~that maintain volcano observatories monitoring~~ with active or potentially active volcanoes shall arrange that selected State volcano observatories, as designated by regional air navigation agreement, monitor these volcanoes and when observing:

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

b) a volcanic eruption, or a cessation thereof; and/or

c) volcanic ash in the atmosphere

shall send this information as quickly as practicable to their associated ACC, 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.— Doc 9766 contains guidance material about active or potentially active volcanoes.

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CHAPTER 4. METEOROLOGICAL OBSERVATIONS AND REPORTS

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4.6 Observing and reporting meteorological elements

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4.6.4 Present weather

4.6.4.1 The present weather occurring at the aerodrome ~~and/or its vicinity~~ shall be observed and reported as necessary. The following present weather phenomena shall be identified, as a minimum: ~~precipitation~~ rain, drizzle, snow and freezing precipitation (including intensity thereof), haze, mist, fog, freezing fog and thunderstorms (including thunderstorms in the vicinity).

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4.6.5 Clouds

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4.6.5.2 **Recommendation.—** *Cloud observations for local routine and special reports should be representative of the ~~approach area~~ runway threshold(s) in use.*

. . .

CHAPTER 6. FORECASTS

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6.1 Interpretation and use of forecasts

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6.1.2 The issue of a new forecast by ~~a~~ an aerodrome meteorological office, such as a routine aerodrome forecast, shall be understood to cancel automatically any forecast of the same type previously issued for the same place and for the same period of validity or part thereof.

6.2 Aerodrome forecasts

6.2.1 An aerodrome forecast shall be prepared, on the basis of 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).

6.2.2 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.

. . .

6.2.4 ~~Meteorological~~ 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.

. . .

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

6.3 Landing forecasts

6.3.1 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.

. . .

6.4 Forecasts for take-off

6.4.1 A forecast for take-off shall be prepared by the aerodrome meteorological office designated by the meteorological authority concerned if required by agreement between the meteorological authority and operators.

. . .

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

6.5 Area forecasts for low-level flights

. . .

6.5.3 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.

CHAPTER 7. SIGMET AND AIRMET INFORMATION, AERODROME WARNINGS AND WIND SHEAR WARNINGS AND ALERTS

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7.3 Aerodrome warnings

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

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7.4 Wind shear warnings and alerts

. . .

7.4.1 Wind shear warnings shall be prepared 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 ATS unit and 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.

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CHAPTER 9. SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

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9.1 General provisions

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9.1.10 Meteorological information shall be supplied to operators and flight crew members at the location to be determined by the meteorological authority, after consultation with the operators and at the time to be agreed upon 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 ~~a~~ an aerodrome meteorological office at the aerodrome, arrangements for the supply of meteorological information shall be as agreed upon between the meteorological authority and the operator concerned.

9.2 Briefing, consultation and display

. . .

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 upon between the meteorological authority 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 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 upon 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.*

9.3 Flight documentation

. . .

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 re-planning, 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.*

. . .

9.5 Information for aircraft in flight

9.5.1 Meteorological information for use by aircraft in flight shall be supplied by ~~a~~ 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.

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

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10.1 Information for air traffic services units

10.1.1 The meteorological authority shall designate ~~a~~ 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.

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

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

10.1.4 **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 in consultation with the appropriate ATS authority.*

. . .

10.2 Information for search and rescue services units

~~Meteorological~~ Aerodrome meteorological offices or meteorological watch offices designated by the meteorological authority 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.

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CHAPTER 11. REQUIREMENTS FOR AND USE OF COMMUNICATIONS

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11.1 Requirements for communications

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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 to aerodrome meteorological offices, meteorological authorities and other users.

11.1.4 Telecommunications facilities between aerodrome meteorological offices and, as necessary, aeronautical meteorological stations and aerodrome control towers or approach control units shall

permit communications by direct speech, the speed with which the communications can be established being such that the required points may normally be contacted within approximately 15 seconds.

11.1.5 **Recommendation.—** *Telecommunications facilities between aerodrome meteorological offices or meteorological watch offices and flight information centres, area control centres, rescue coordination centres and aeronautical telecommunications stations should permit:*

. . .

PART II. APPENDICES AND ATTACHMENTS

APPENDIX 1. FLIGHT DOCUMENTATION — MODEL CHARTS AND FORMS

(See Chapter 9 of this Annex.)

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1. Symbols for significant weather

	Tropical cyclone		Drizzle
	Severe squall line*		Rain
	Moderate turbulence		Snow
	Severe turbulence		Shower Hail
	Mountain waves		Widespread blowing snow
	Moderate aircraft icing		Severe sand or dust haze
	Severe aircraft icing		Widespread sandstorm or duststorm
	Widespread fog		Widespread haze
	Radioactive materials in the atmosphere**		Widespread mist
	Volcanic eruption***		Widespread smoke
	Mountain obscuration		Freezing precipitation****

. . .

** The following information should be included in a separate text box on ~~at the side of~~ the chart: radioactive materials in the atmosphere symbol; latitude/longitude of ~~accident~~release site; ~~date and time of accident; check NOTAM for further information.~~ and (if known) the name of the site of the radioactive source. In addition, the legend of SIGWX charts on which a release of radiation is indicated should contain "CHECK SIGMET AND NOTAM FOR RDOACT CLD". The centre of the radioactive materials in the atmosphere symbol should be placed on significant weather charts at the latitude/longitude site of the radioactive source.

*** The following information should be included in a separate text box on ~~at the side of~~ the chart: volcanic eruption symbol; the name ~~and international number~~ of the volcano (if known); and the latitude/longitude of the eruption. ~~date and time of the first eruption (if known); check SIGMETs and NOTAM or ASHTAM for volcanic ash.~~ In addition, the legend of SIGWX charts should indicate "CHECK SIGMET, ADVISORIES FOR TC AND VA, AND ASHTAM AND NOTAM FOR VA". The dot on the base of the volcanic eruption symbol should be placed on significant weather charts at the latitude/longitude site of the volcanic event.

. . .

APPENDIX 2. TECHNICAL SPECIFICATIONS RELATED TO WORLD AREA FORECAST SYSTEM AND METEOROLOGICAL OFFICES

(See Chapter 3 of this Annex.)

1. WORLD AREA FORECAST SYSTEM

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1.2 Upper-air gridded forecasts

. . .

1.2.2 The grid point forecasts prepared by a WAFC shall comprise:

a) wind and temperature data for flight levels 50 (850 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa), 270 (350 hPa), 300 (300 hPa), 320 (275 hPa), 340 (250 hPa), 360 (225 hPa), 390 (200 hPa), 410 (175 hPa), 450 (150 hPa) and 530 (100 hPa);

. . .

h) in-cloud turbulence for layers centred at flight levels 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa) and 300 (300 hPa); and

~~*Note 1.— Forecasts referred to in e) to h) are currently of an experimental nature, labelled as "trial forecasts" and only distributed through the Internet-based FTP services.*~~

Note ~~2~~1.— Layers centred at a flight level referred to in f) and h) have a depth of 100 hPa.

Note ~~3~~2.— Layers centred at a flight level referred to in g) have a depth of 50 hPa.

i) geopotential altitude data for flight levels 50 (850 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa), 270 (350 hPa), 300 (300 hPa), 320 (275 hPa), 340 (250 hPa), 360 (225 hPa), 390 (200 hPa), 410 (175 hPa), 450 (150 hPa) and 530 (100 hPa).

. . .

1.3 Significant weather (SIGWX) forecasts

. . .

1.3.3 Items included in SIGWX forecasts

SIGWX forecasts shall include the following items:

. . .

i) information on the location of volcanic eruptions that are producing ash clouds of significance to aircraft operations, comprising: volcanic eruption symbol at the location of the volcano and, in a separate text box on ~~at the side of~~ the chart, the ~~volcano~~ volcanic eruption symbol, the name of the volcano~~,~~ (if known) and the latitude/longitude of the eruption.~~, the date and time of first eruption, if known, and a reference to SIGMET and NOTAM or ASHTAM issued for the area concerned; and~~ In addition, the legend of SIGWX charts should

indicate “CHECK SIGMET, ADVISORIES FOR TC AND VA, AND ASHTAM AND NOTAM FOR VA”.

j) information on the location of ~~an accidental~~ a release of radioactive materials into the atmosphere of significance to aircraft operations, comprising: the ~~radioactivity~~ radioactive materials in the atmosphere symbol at the ~~site~~ location of the ~~accident~~release and, in a separate text box on ~~at the side of~~ the chart, the ~~radioactivity~~ radioactive materials in the atmosphere symbol, latitude/longitude of the site of the ~~accident~~release, ~~date and time of the accident and a reminder to users to check NOTAM for the area concerned.~~ and (if known) the name of site of the radioactive source. In addition, the legend of SIGWX charts on which a release of radiation is indicated should contain “CHECK SIGMET AND NOTAM FOR RDOACT CLD”.

. . .

1.3.4 Criteria for including items in SIGWX forecasts

The following criteria shall be applied for SIGWX forecasts:

. . .

d) where a volcanic eruption or ~~an accidental~~ a release of radioactive materials into the atmosphere warrants the inclusion of the volcanic ~~activity~~ eruption symbol or the ~~radioactivity~~ radioactive materials in the atmosphere symbol in SIGWX forecasts, the symbols shall be included on SIGWX forecasts irrespective of the height to which the ash column or radioactive material is reported or expected to reach; and

. . .

2. AERODROME METEOROLOGICAL OFFICES

. . .

2.2 Notification of WAFC concerning significant discrepancies

~~Meteorological~~ Aerodrome meteorological offices using WAFS BUFR data shall notify the WAFC concerned immediately if significant discrepancies are detected or reported in respect of WAFS SIGWX forecasts concerning:

. . .

b) volcanic eruptions or ~~an accidental~~ a release of radioactive materials into the atmosphere, of significance to aircraft operations.

. . .

4.1 Information from State volcano observatories

Recommendation.— *The information required to be sent by State volcano observatories to their associated ACCs, MWO and VAAC should comprise:*

. . .

b) for volcanic eruption: the date/time (UTC) of report and time of eruption (UTC) if different from time of report; name and, if known, number of the volcano; location (latitude/longitude); and description of the eruption including whether an ash column was ejected and, if so, an estimate of height of ash column and the extent of any visible volcanic ash cloud, during and following an ~~eruption.~~ eruption; and

c) for volcanic eruption cessation: the date/time (UTC) of report and time of eruption cessation (UTC); name and, if known, number of the volcano; and location (latitude/longitude).

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

Note 2.— The State volcano observatories may use the Volcano Observatory Notice for Aviation (VONA) format to send information to its associated ACCs, MWO and VAAC. The VONA format is included in the Handbook on the International Airways Volcano Watch (IAVW) *(Doc 9766) which is available on the ICAO IAVWOPSG website.*

. . .

Table A2-1. Template for advisory message for volcanic ash

Key: M = inclusion mandatory, part of every message;
O = inclusion optional;
= = a double line indicates that the text following it should be placed on the subsequent line.

Note 1.— The ranges and resolutions for the numerical elements included in advisory messages for volcanic ash are shown in Appendix 6, Table A6-4.

Note 2.— The explanations for the abbreviations can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes *(PANS-ABC, Doc 8400).*

Note 3.— Inclusion of a "colon" after each element heading is mandatory.

Note 4.— The numbers 1 to 18 are included only for clarity and they are not part of the advisory message, as shown in the example.

Element		*Detailed content*	*Template(s)*	*Examples*
	. . .			
12	Time of observation (*or* estimation) of ash (M)	Day and time (in UTC) of observation (*or* estimation) of volcanic ash	OBS (*or* EST) VA DTG: nn/nnnnZ	OBS VA DTG: 23/0100Z

Element		Detailed content	Template(s)		Examples	
13	Observed *or* estimated ash cloud (M)	Horizontal (in degrees and minutes) and vertical extent at the time of observation of the observed *or* estimated ash cloud *or*, if the base is unknown, the top of the observed *or* estimated ash cloud; Movement of the observed *or* estimated ash cloud	OBS VA CLD *or* EST VA CLD:	TOP FLnnn *or* SFC/FLnnn *or* FLnnn/nnn [nnKM WID LINE[2] BTN (nnNM WID LINE BTN)] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn][– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]][3] ~~*or*~~ ~~TOP FLnnn *or* SFC/FLnnn *or* FLnnn/nnn~~ MOV N nnKMH (*or* KT) *or* MOV NE nnKMH (*or* KT) *or* MOV E nnKMH (*or* KT) *or* MOV SE nnKMH (*or* KT) *or* MOV S nnKMH (*or* KT) *or* MOV SW nnKMH (*or* KT) *or* MOV W nnKMH (*or* KT) *or* MOV NW nnKMH (*or* KT)[43] *or* VA NOT IDENTIFIABLE FM SATELLITE DATA WIND FLnnn/nnn nnn/nn[n]MPS (*or* KT)[4] *or* WIND FLnnn/nnn VRBnnMPS (*or* KT) *or* WIND SFC/FLnnn nnn/nn[n]MPS (*or* KT) *or* WIND SFC/FLnnn VRBnnMPS (*or* KT)	OBS VA CLD:	FL250/300 N5400 E15930 – N5400 E16100 – N5300 E15945 MOV SE 20KT SFC/FL200 N5130 E16130 – N5130 E16230 – N5230 E16230 – N5230 E16130 MOV SE 15KT TOP FL240 MOV W 40KMH VA NOT IDENTIFIABLE FM SATELLITE DATA WIND FL050/070 180/12MPS
14	Forecast height and position of the ash clouds (+6 HR) (M)	Day and time (in UTC) (6 hours from the "Time of observation (*or* estimation) of ash" given in Item 12); Forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	FCST VA CLD +6 HR:	nn/nnnnZ SFC *or* FLnnn/[FL]nnn [nnKM WID LINE[2] BTN (nnNM WID LINE BTN)] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn][– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]][3] *or* NO VA EXP *or* NOT AVBL *or* NOT PROVIDED	FCST VA CLD +6 HR:	23/0700Z FL250/350 N5130 E16030 – N5130 E16230 – N5330 E16230 – N5330 E16030 SFC/FL180 N4830 E16330 – N4830 E16630 – N5130 E16630 – N5130 E16330 NO VA EXP NOT AVBL NOT PROVIDED

Element		*Detailed content*	*Template(s)*		*Examples*	
15	Forecast height and position of the ash clouds (+12 HR) (M)	Day and time (in UTC) (12 hours from the "Time of observation (or estimation) of ash" given in Item 12); Forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	FCST VA CLD +12 HR:	nn/nnnnZ SFC *or* FLnnn/[FL]nnn [nnKM WID LINE[2] BTN (nnNM WID LINE BTN)] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn][– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]][3] *or* NO VA EXP *or* NOT AVBL *or* NOT PROVIDED	FCST VA CLD +12 HR:	23/1300Z SFC/FL270 N4830 E16130 – N4830 E16600 – N5300 E16600 – N5300 E16130 NO VA EXP NOT AVBL NOT PROVIDED
16	Forecast height and position of the ash clouds (+18 HR) (M)	Day and time (in UTC) (18 hours from the "Time of observation (or estimation) of ash" given in Item 12); Forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	FCST VA CLD +18 HR:	nn/nnnnZ SFC *or* FLnnn/[FL]nnn [nnKM WID LINE[2] BTN (nnNM WID LINE BTN)] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn][– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]][3] *or* NO VA EXP *or* NOT AVBL *or* NOT PROVIDED	FCST VA CLD +18 HR:	23/1900Z NO VA EXP NOT AVBL NOT PROVIDED
	. . .					

Notes.—

1. International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI).
2. A straight line between two points drawn on a map in the Mercator projection or a straight line between two points which crosses lines of longitude at a constant angle.
3. Up to 4 selected layers.
4. If ash reported (e.g. AIREP) but not identifiable from satellite data.

. . .

APPENDIX 3. TECHNICAL SPECIFICATIONS RELATED TO METEOROLOGICAL OBSERVATIONS AND REPORTS

(See Chapter 4 of this Annex.)

. . .

2. GENERAL CRITERIA RELATED TO METEOROLOGICAL REPORTS

2.1 Format of meteorological reports

. . .

2.1.3 **Recommendation**.— *METAR and SPECI should be disseminated, under bilateral agreements between States in a position to do so, in ~~the WMO BUFR code~~digital form, in addition to the dissemination of the METAR and SPECI in accordance with 2.1.2.*

~~Note. — The BUFR code form is contained in WMO Publication No. 306,~~ ~~Manual on Codes, *Volume I.2, Part B — Binary Codes.*~~

2.1.4 METAR and SPECI if disseminated in digital form shall be formatted in accordance with a globally interoperable information exchange model and shall use extensible markup language (XML)/geography markup language (GML).

2.1.5 METAR and SPECI if disseminated in digital form shall be accompanied by the appropriate metadata.

Note.— Guidance on the information exchange model, XML/GML and the metadata profile is provided in the Manual on the Digital Exchange of Aeronautical Meteorological Information *(Doc 10003).*

2.2 Use of CAVOK

When the following conditions occur simultaneously at the time of observation:

. . .

c) no weather of significance to aviation as given in 4.4.2.3, 4.4.2.5 and 4.4.2.6;

information on visibility, runway visual range, present weather and cloud amount, cloud type and height of cloud base shall be replaced in all meteorological reports by the term “CAVOK”.

2.3 Criteria for issuance of local special reports and SPECI

2.3.1 The list of criteria for the issuance of local special reports shall include the following:

. . .

d) the available supplementary information concerning the occurrence of significant meteorological conditions in the approach and climb-out areas as given in Table A3-1; ~~and~~

e) from 13 November 2014, when noise abatement procedures are applied in accordance with 7.2.7 of the PANS-ATM (Doc 4444) and the variation from the mean surface wind speed (gusts) has changed by 2.5 m/s (5 kt) or more from that at the time of the latest report, the mean speed before and/or after the change being 7.5 m/s (15 kt) or more; and

~~e)~~f) those values which constitute criteria for SPECI.

2.3.2 Where required in accordance with Chapter 4, 4.4.2 b), SPECI shall be issued whenever changes in accordance with the following criteria occur:

. . .

c) when the variation from the mean surface wind speed (gusts) has ~~increased~~changed by 5 m/s (10 kt) or more from that at the time of the latest report, the mean speed before and/or after the change being 7.5 m/s (15 kt) or more;

. . .

2.3.3 **Recommendation.—** *Where required in accordance with Chapter 4, 4.4.2 b), SPECI should be issued whenever changes in accordance with the following criteria occur:*

. . .

c) when the runway visual range is improving and changes to or passes through one or more of the following values, or when the runway visual range is deteriorating and passes through one or more of the following values: ~~150~~50, 175, ~~350~~300, ~~600~~550 or 800 m;

. . .

e) when the onset or cessation of any of the following weather phenomena occurs:

~~*ice crystals*~~

. . .

4. OBSERVING AND REPORTING OF METEOROLOGICAL ELEMENTS

. . .

4.1 Surface wind

. . .

4.1.5 Reporting

. . .

4.1.5.2 In local routine and special reports and in METAR and SPECI:

. . .

c) variations from the mean wind speed (gusts) during the past 10 minutes shall be reported when the maximum wind speed exceeds the mean speed by:

1) from 13 November 2014, 2.5 m/s (5 kt) or more in local routine and special reports when noise abatement procedures are applied in accordance with paragraph 7.2.~~6~~7 of the PANS-ATM (Doc 4444); or

. . .

4.3 Runway visual range

4.3.1 Siting

4.3.1.1 **Recommendation.—** *Runway visual range should be assessed at a height of approximately 2.5 m (7.5 ft) above the runway for instrumented systems or assessed at a height of approximately 5 m (15 ft) above the runway by a human observer.*

. . .

4.3.2 Instrumented systems

Note.— Since accuracy can vary from one instrument design to another, performance characteristics are to be checked before selecting an instrument for assessing ~~RVR~~runway visual range. The calibration of a forward-scatter meter has to be traceable and verifiable to a transmissometer standard, the accuracy of which has been verified over the intended operational range. Guidance on the use of transmissometers and forward-scatter meters in instrumented ~~RVR~~runway visual range systems is given in the Manual of Runway Visual Range Observing and Reporting Practices *(Doc 9328).*

. . .

4.3.4 Averaging

Where instrumented systems are used for the assessment of runway visual range, their output shall be updated at least every 60 seconds to permit the provision of current, representative values. The averaging period for runway visual range values shall be:

. . .

b) 10 minutes for METAR and SPECI, except that when the 10-minute period immediately preceding the observation includes a marked discontinuity in runway visual range values, only those values occurring after the discontinuity shall be used for obtaining mean values.

Note.— A marked discontinuity occurs when there is an abrupt and sustained change in runway visual range, lasting at least 2 minutes, which reaches or passes through the values 800, 550, 300 and 175 m ~~included in criteria for the issuance of SPECI reports given in 2.3.3 c)~~.

4.3.5 Runway light intensity

Recommendation.— *When instrumented systems are used for the assessment of runway visual range, computations should be made separately for each available runway. ~~RVR~~ Runway visual range should not be computed for a light intensity of 3 per cent or less of the maximum light intensity available*

on a runway. For local routine and special reports, the light intensity to be used for the computation should be:

. . .

4.3.6 Reporting

. . .

4.3.6.6 **Recommendation.—** *In METAR and SPECI when instrumented systems are used for the assessment of runway visual range, the variations in runway visual range during the 10-minute period immediately preceding the observation should be included ~~as follows:~~*

~~a)~~ if the runway visual range values during the 10-minute period have shown a distinct tendency, such that the mean during the first 5 minutes varies by 100 m or more from the mean during the second 5 minutes of the period~~, this should be indicated~~. When the variation of the runway visual range values shows an upward or downward tendency, this should be indicated by the abbreviation "U" or "D", respectively. In circumstances when actual fluctuations during the 10-minute period show no distinct tendency, this should be indicated using the abbreviation "N". When indications of tendency are not available, no abbreviations should be included~~; and~~.

~~b) if the 1-minute runway visual range values during the 10-minute period vary from the mean value by more than 50 m or more than 20 per cent of the mean value, whichever is greater, the 1-minute mean minimum and the 1-minute mean maximum values should be reported instead of the 10-minute mean value. If the 10-minute period immediately preceding the observation includes a marked discontinuity in runway visual range values, only those values occurring after the discontinuity should be used to obtain variations.~~

~~Note.— A marked discontinuity occurs when there is an abrupt and sustained change in runway visual range, lasting at least 2 minutes, which reaches or passes through criteria for the issuance of SPECI given in 2.3.3 c).~~

4.4 Present weather

4.4.1 Siting

Recommendation.— *When instrumented systems are used for observing present weather phenomena listed under 4.4.2.3, 4.4.2.5 and 4.4.2.6, representative information should be obtained by the use of sensors appropriately sited.*

4.4.2 Reporting

. . .

4.4.2.3 **Recommendation.—** *In local routine and special reports and in METAR and SPECI, the following types of present weather phenomena should be reported, using their respective abbreviations and relevant criteria, as appropriate:*

b) Precipitation

. . .

~~*Ice crystals (very small ice crystals in suspension, also known as diamond dust)* IC~~
~~*Reported only when associated visibility is 5 000 m or less.*~~

. . .

4.4.2.7 **Recommendation.—** *In local routine and special reports and in METAR and SPECI, the relevant intensity or, as appropriate, the proximity to the aerodrome of the reported present weather phenomena should be indicated as follows:*

. . .

Vicinity *VC*
— *Between approximately 8 and 16 km of the aerodrome reference point and used only in METAR and SPECI with present weather in accordance with the template shown in Table A3-2 when not reported under 4.4.2.5 and 4.4.2.6.*

4.4.2.8 In local routine and special reports and in METAR and SPECI:

a) one or more, up to a maximum of three, of the present weather abbreviations given in 4.4.2.3 ~~and~~, 4.4.2.5 and 4.4.2.6 shall be used, as necessary, together with an indication, where appropriate, of the characteristics and intensity or proximity to the aerodrome, so as to convey a complete description of the present weather of significance to flight operations;

. . .

4.4.2.9 **Recommendation.—** *In automated local routine and special reports and METAR and SPECI, the present weather should be replaced by "//" when the present weather cannot be observed by the automatic observing system due to a temporary failure of the system/sensor.*

4.5 Clouds

. . .

4.5.4 Reporting

. . .

4.5.4.5 **Recommendation.—** *In automated local routine and special reports and METAR and SPECI:*

. . .

c) when cumulonimbus clouds or towering cumulus clouds are detected by the automatic observing system and the cloud amount and/or the height of cloud base cannot be observed, the cloud amount and/or the height of cloud base should be replaced by "~~#~~////".

d) the vertical visibility should be replaced by "///" when the sky is obscured and the value of the vertical visibility cannot be determined by the automatic observing system due to a temporary failure of the system/sensor.

. . .

4.8 Supplementary information

4.8.1 Reporting

4.8.1.1 **Recommendation.**— *In local routine and special reports and in METAR and SPECI, the following recent weather phenomena, i.e. weather phenomena observed at the aerodrome during the period since the last issued routine report or last hour, whichever is the shorter, but not at the time of observation, should be reported, up to a maximum of three groups, in accordance with the templates shown in Tables A3-1 and A3-2, in the supplementary information:*

. . .

Note.— The meteorological authority, in consultation with users, may agree not to provide recent weather information where SPECI are issued.

. . .

4.8.1.3 **Recommendation.—** *In automated local routine and special reports and METAR and SPECI, in addition to the recent weather phenomena listed under 4.8.1.1, recent unknown precipitation should be reported in accordance with the template shown in Table A3-2 when the type of precipitation cannot be identified by the automatic observing system.*

Note.— The meteorological authority, in consultation with users, may agree not to provide recent weather information where SPECI are issued.

. . .

4.8.1.5 **Recommendation.—** *In METAR and SPECI, the following information should be included in the supplementary information, in accordance with regional air navigation agreement:*

a) information on sea-surface temperature, and the state of the sea or the significant wave height from aeronautical meteorological stations established on offshore structures in support of helicopter operations; and

. . .

Table A3-1. Template for the local routine (MET REPORT) and local special (SPECIAL) reports

Key: M = inclusion mandatory, part of every message;
C = inclusion conditional, dependent on meteorological conditions;
O = inclusion optional.

Note 1.— The ranges and resolutions for the numerical elements included in the local routine and special reports are shown in Table A3-4 of this appendix.

Note 2.— The explanations for the abbreviations can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes *(PANS-ABC, Doc 8400).*

Element as specified in Chapter 4	*Detailed content*	*Template(s)*			*Examples*
. . .					
Visibility (M)	Name of the element (M)	VIS		C A V O K	VIS 350M CAVOK VIS 7KM VIS 10KM
	Runway (O)[2]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			VIS RWY 09 TDZ 800M END 1200M
	Runway section (O)[3]	TDZ			
	Visibility (M)	n[n][n][n]M *or* n[n]KM			
	Runway section (O)[3]	MID			
	Visibility (O)[3]	n[n][n][n]M *or* n[n]KM			
	Runway section (O)[3]	END			VIS RWY 18C TDZ 6KM RWY 27 TDZ 4000M
	Visibility (O)[3]	n[n][n][n]M *or* n[n]KM			
~~RVR~~ Runway visual range (C)[6]	Name of the element (M)	RVR			RVR RWY 32 400M RVR RWY 20 1600M
. . .					
Present weather (C)[9, 10]	Intensity of present weather (C)[9]	FBL *or* MOD *or* HVY	—		
	Characteristics and type of present weather (C)[9,11]	DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZUP[12] *or* FC[13] *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* SHUP[12] *or* TSGR *or* TSGS *or* TSRA *or* TSSN *or* TSUP[12] *or* UP[12]	~~IC *or*~~ FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG *or* //[12]		MOD RA HVY TSRA HVY DZ FBL SN HZ FG VA MIFG HVY TSRASN FBL SNRA FBL DZ FG HVY SHSN BLSN HVY TSUP //

Element as specified in Chapter 4	*Detailed content*	*Template(s)*					*Examples*
Cloud (M)[14]	Name of the element (M)	CLD					
	Runway (O)[2]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]					CLD NSC
	Cloud amount (M) *or* vertical visibility (O)[9]	FEW *or* SCT *or* BKN *or* OVC *or* ///[12]	OBSC	NSC *or* NCD[12]			CLD SCT 300M OVC 600M (CLD SCT 1000FT OVC 2000FT) CLD OBSC VER VIS 150M (CLD OBSC VER VIS 500FT)
	Cloud type (C)[9]	CB *or* TCU *or* ///[12]	—				CLD BKN TCU 270M (CLD BKN TCU 900FT)
	Height of cloud base *or* the value of vertical visibility (C)[9]	n[n][n][n]M (*or* n[n][n][n]FT) *or* ///M (*or* ///FT)[12]	[VER VIS n[n][n]M (*or* VER VIS n[n][n][n]FT)] *or* VER VIS ///M (*or* VER VIS ///FT)[12]				CLD RWY 08R BKN 60M RWY 26 BKN 90M (CLD RWY 08R BKN 200FT RWY 26 BKN 300FT) CLD /// CB ///M (CLD /// CB ///FT) CLD /// CB 400M (CLD /// CB 1200FT) CLD NCD
. . .							
Supplementary information (C)[9]	Significant meteorological phenomena (C)[9]	CB *or* TS *or* MOD TURB *or* SEV TURB *or* WS *or* GR *or* SEV SQL *or* MOD ICE *or* SEV ICE *or* FZDZ *or* FZRA *or* SEV MTW *or* SS *or* DS *or* BLSN *or* FC[15]					FC IN APCH WS IN APCH 60M- ~~WIND:~~WIND 360/13MPS WS RWY 12
	Location of the phenomena (C)[9]	IN APCH [n[n][n][n]M-WIND nnn/n[n]MPS] *or* IN CLIMB-OUT [n[n][n][n]M-WIND nnn/n[n]MPS] (IN APCH [n[n][n][n]FT-WIND nnn/n[n]KT] *or* IN CLIMB-OUT [n[n][n][n]FT-WIND nnn/n[n]KT]) *or* RWY ~~nn[n]~~ nn[L] *or* RWY nn[C] *or* RWY nn[R]					
. . .							
Trend forecast (O)[16]	Name of the element (M)	TREND					
. . .							
	Visibility (C)[9]	NOSIG	VIS n[n][n][n]M *or* VIS n[n]KM			C A V O K	TREND BECMG AT1800 VIS 10KM NSW TREND BECMG TL1700 VIS 800M FG TREND BECMG FM1030 TL1130 CAVOK
	Weather phenomenon: characteristics and type (C)[9, 10, 11]		DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* TSGR *or* TSGS *or* TSRA *or* TSSN	~~IC *or*~~ FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG		TREND TEMPO TL1200 VIS 600M BECMG AT1230 VIS 8KM NSW CLD NSC TREND TEMPO FM0300 TL0430 MOD FZRA TREND BECMG FM1900 VIS 500M HVY SNRA TREND BECMG FM1100 MOD SN TEMPO FM1130 BLSN
	Name of the element (C)[9]			CLD			
	Cloud amount and vertical visibility (C)[9,14]		FEW *or* SCT *or* BKN *or* OVC	OBSC	NSC		TREND BECMG AT1130 CLD OVC 300M (TREND BECMG AT1130 CLD OVC 1000FT)
	Cloud type (C)[9,14]		CB *or* TCU	—			TREND TEMPO TL1530 HVY SHRA CLD BKN CB 360M (TREND TEMPO TL1530 HVY SHRA CLD BKN CB 1200FT)
	Height of cloud base *or* the value of vertical visibility (C)[9,14]		n[n][n][n]M (*or* n[n][n][n]FT)	[VER VIS n[n][n]M (*or* VER VIS n[n][n][n]FT)]			

Notes.—

. . .

2. Optional values for one or more runways.
3. Optional values for one or more sections of the runway.

. . .

6. To be included if visibility or ~~RVR~~runway visual range < 1 500 m.

. . .

9. To be included whenever applicable.
10. One or more, up to a maximum of three groups, in accordance with 4.4.2.8 a), 4.8.1.1 and Appendix 5, 2.2.4.3.
11. Precipitation types listed under 4.4.2.3 a) may be combined in accordance with 4.4.2.8 c) and Appendix 5, 2.2.4.1. Only moderate or heavy precipitation to be indicated in trend forecasts in accordance with Appendix 5, 2.2.4.1.
12. For automated reports only.
13. Heavy used to indicate tornado or waterspout; moderate used to indicate funnel cloud not reaching the ground.
14. Up to four cloud layers in accordance with 4.5.4.3 e).
15. Abbreviated plain language may be used in accordance with 4.8.1.2.
16. To be included in accordance with Chapter 6, 6.3.2.

. . .

Table A3-2. Template for METAR and SPECI

Key: M = inclusion mandatory, part of every message;
C = inclusion conditional, dependent on meteorological conditions or method of observation;
O = inclusion optional.

Note 1.— The ranges and resolutions for the numerical elements included in METAR and SPECI are shown in Table A3-5 of this appendix.

Note 2.— The explanations for the abbreviations can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes *(PANS-ABC, Doc 8400).*

Element as specified in Chapter 4	*Detailed content*	*Template(s)*				*Examples*
. . .						
~~RVR~~Runway visual range (C)[7]	Name of the element (M)	R			C A V O K	R32/0400 R12R/1700 R10/M0050 R14L/P2000
	Runway (M)	nn[L]/*or* nn[C]/ *or* nn[R]/				
	~~RVR~~Runway visual range (M)	[P *or* M]nnnn				R16L/0650 R16C/0500 R16R/0450 R17L/0450
	~~RVR variations (C)[8]~~	~~V[P *or* M]nnnn~~				~~R20/0700V1200~~ ~~R19/0350VP1200~~
	~~RVR~~runway visual range past tendency (C)[~~9~~8]	U, D *or* N				R12/1100U R26/0550N R20/0800D R12/0700 ~~R09/0375V0600U~~ ~~R10/M0150V0500D~~
Present weather (C)[2, ~~10~~9]	Intensity *or* proximity of present weather (C)[~~11~~10]	– *or* +	—	VC		
	Characteristics and type of present weather (M)[~~12~~11]	DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZRA *or* FZUP[~~13~~12] *or* FC[~~14~~13] or SHGR *or* SHGS *or* SHRA *or* SHSN *or* SHUP[~~13~~12] *or* TSGR *or* TSGS *or* TSRA *or* TSSN *or* TSUP[~~13~~12] *or* UP[~~13~~12]	~~IC *or*~~ FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG *or* //[12]	FG *or* PO *or* FC *or* DS *or* SS *or* TS *or* SH *or* BLSN *or* BLSA *or* BLDU *or* VA		RA HZ VCFG +TSRA FG VCSH +DZ VA VCTS –SN MIFG VCBLSA +TSRASN –SNRA DZ FG +SHSN BLSN UP FZUP TSUP FZUP //
Cloud (M)[14]	Cloud amount and height of cloud base *or* vertical visibility (M)	FEWnnn *or* SCTnnn *or* BKNnnn *or* OVCnnn *or* FEW///[12] *or* SCT///[12] *or* BKN///[12] *or* OVC///[12] *or* ///nnn[12] *or* /////[~~13~~12]	VVnnn *or* VV///[12]	NSC *or* NCD[~~13~~12]		FEW015 VV005 OVC030 VV/// NSC SCT010 OVC020 BKN/// ///015 BKN009TCU NCD SCT008 BKN025CB BKN025/// /////CB
	Cloud type (C)[2]	CB or TCU *or* ///[~~13~~12]	—			
. . .						

Element as specified in Chapter 4	*Detailed content*	*Template(s)*					*Examples*
Supplementary information (C)	Recent weather (C)[2, ~~10~~9]	REFZDZ *or* REFZRA *or* REDZ *or* RE[SH]RA *or* RERASN *or* RE[SH]SN *or* RESG *or* RESHGR *or* RESHGS *or* REBLSN *or* RESS *or* REDS *or* RETSRA *or* RETSSN *or* RETSGR *or* RETSGS *or* RETS *or* REFC *or* REVA *or* REPL *or* REUP[~~13~~12] *or* REFZUP[~~13~~12] *or* RETSUP[~~13~~12] *or* RESHUP[~~13~~12]					REFZRA RETSRA
	Wind shear (C)[2]	WS Rnn[L] *or* WS Rnn[C] *or* WS Rnn[R] *or* WS ALL RWY					WS R03 WS ALL RWY WS R18C
	Sea-surface temperature and state of the sea or significant wave height (C)[15]	W[M]nn/Sn or W[M]nn/Hn[n][n]					W15/S2 W12/H75
. . .							
Trend forecast (O)[17]	. . .						
	Weather phenomenon: intensity (C)[~~11~~10]		– *or* +	—	N S W		
	Weather phenomenon: characteristics and type (C)[2, ~~10~~9, ~~12~~11]		DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* TSGR *or* TSGS *or* TSRA *or* TSSN	~~IC *or*~~ FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG			
	Cloud amount and height of cloud base *or* vertical visibility (C)[2, 14]		FEWnnn *or* SCTnnn *or* BKNnnn *or* OVCnnn	VVnnn *or* VV///	N S C		TEMPO TL1200 0600 BECMG AT1200 8000 NSW NSC BECMG AT1130 OVC010
	Cloud type (C)[2,14]		CB *or* TCU	—			TEMPO TL1530 +SHRA BKN012CB

Notes.—

1. Fictitious location.
2. To be included whenever applicable.
3. To be included in accordance with 4.1.5.2 c).
4. To be included in accordance with 4.1.5.2 b) 1).
5. To be included in accordance with 4.2.4.4 b).
6. To be included in accordance with 4.2.4.4 a).
7. To be included if visibility or ~~RVR~~runway visual range < 1 500 m; for up to a maximum of four runways in accordance with 4.3.6.5 b).
8. ~~To be included in accordance with 4.3.6.6 b).~~
9. ~~8.~~ To be included in accordance with 4.3.6.6 ~~a)~~.
10. ~~9.~~ One or more, up to a maximum of three groups, in accordance with 4.4.2.8 a), 4.8.1.1 and Appendix 5, 2.2.4.1.
11. ~~10.~~ To be included whenever applicable; no qualifier for *moderate* intensity in accordance with 4.4.2.7.
12. ~~11.~~ Precipitation types listed under 4.4.2.3 a) may be combined in accordance with 4.4.2.8 c) and Appendix 5, 2.2.4.1. Only moderate or heavy precipitation to be indicated in trend forecasts in accordance with Appendix 5, 2.2.4.1.
13. ~~12.~~ For automated reports only.
14. ~~13.~~ Heavy used to indicate tornado or waterspout; moderate (no qualifier) to indicate funnel cloud not reaching the ground.
15. ~~14.~~ Up to four cloud layers in accordance with 4.5.4.3 e).
16. ~~15.~~ To be included in accordance with 4.8.1.5 a).
17. ~~16.~~ To be included in accordance with 4.8.1.5 b).
18. ~~17.~~ To be included in accordance with Chapter 6, 6.3.2.
19. ~~18.~~ Number of change indicators to be kept to a minimum in accordance with Appendix 5, 2.2.1, normally not exceeding three groups.

• • •

Table A3-4. Ranges and resolutions for the numerical elements included in local reports

Element as specified in Chapter 4		*Range*	*Resolution*
. . .			
~~RVR~~Runway visual range:	M M M	0 – 375 400 – 750 800 – 2 000	25 50 100
. . .			

* There is no aeronautical requirement to report surface wind speeds of 50 m/s (100 kt) or more; however, provision has been made for reporting wind speeds up to 99 m/s (199 kt) for non-aeronautical purposes, as necessary.
** Under circumstances as specified in 4.5.4.3; otherwise a resolution of 30 m (100 ft) is to be used.

Table A3-5. Ranges and resolutions for the numerical elements included in METAR and SPECI

Element as specified in Chapter 4		*Range*	*Resolution*
. . .	(no units)	01 – 36	1
~~RVR~~Runway visual range:	M M M	0000 – 0375 0400 – 0750 0800 – 2 000	25 50 100
. . .			
State of the sea:	(no units)	0 – 9	1
Significant wave height:	M	0 – 999	0.1
. . .			

Example A3-1. Routine report

. . .

Meaning of both reports:

Routine report for Donlon/International* issued on the 22nd of the month at 1630 UTC; surface wind direction 240 degrees; wind speed 4 metres per second; visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) 600 metres; runway visual range representative of the touchdown zone for runway 12 is 1 000 metres and the runway visual range values have shown an upward tendency during previous 10 minutes (~~RVR~~runway visual range tendency to be included in METAR only); and moderate drizzle and fog; scattered cloud at 300 metres; overcast at 600 metres; air temperature 17 degrees Celsius; dew-point temperature 16 degrees Celsius; QNH 1 018 hectopascals; trend during next 2 hours, visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) becoming 800 metres in fog by 1700 UTC; at 1800 UTC visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) becoming 10 kilometres or more and nil significant weather.

* Fictitious location

. . .

Example A3-2. Special report

. . .

Meaning of both reports:

Special report for Donlon/International* issued on the 15th of the month at 1115 UTC; surface wind direction 050 degrees; wind speed 25 knots gusting between 10 and 37 knots (minimum wind speed not to be included in SPECI) visibility 1 200 metres (along the runway(s) in the local special report); prevailing visibility 3 000 metres (in SPECI) with minimum visibility 1 200 metres to north east (directional variations to be included in SPECI only); ~~RVR~~runway visual range above 1 800 metres on runway 05 (~~RVR~~runway visual range not required in SPECI with prevailing visibility of 3 000 metres); thunderstorm with heavy rain; broken cumulonimbus cloud at 500 feet; air temperature 25 degrees Celsius; dew-point temperature 22 degrees Celsius; QNH 1 008 hectopascals; trend during next 2 hours, visibility (along the runway(s) in the local special report; prevailing visibility in SPECI) temporarily 600 metres from 1115 to 1200, becoming at 1200 UTC visibility (along the runway(s) in the local special report; prevailing visibility in SPECI) 8 kilometres, thunderstorm ceases and nil significant weather and nil significant cloud.

* Fictitious location

. . .

APPENDIX 4. TECHNICAL SPECIFICATIONS RELATED TO AIRCRAFT OBSERVATIONS AND REPORTS

(See Chapter 5 of this Annex.)

. . .

4. SPECIFIC PROVISIONS RELATED TO REPORTING WIND SHEAR AND VOLCANIC ASH

. . .

4.2 Post-flight reporting of volcanic activity

. . .

4.2.2 The completed report of volcanic activity received by ~~a~~ an aerodrome meteorological office shall be transmitted without delay to the meteorological watch office responsible for the provision of meteorological watch for the flight information region in which the volcanic activity was observed.

. . .

APPENDIX 5. TECHNICAL SPECIFICATIONS RELATED TO FORECASTS

(See Chapter 6 of this Annex.)

1. CRITERIA RELATED TO TAF

1.1 TAF format

. . .

1.1.2 **Recommendation**.— *TAF should be disseminated, under bilateral agreements between States in a position to do so, in ~~the WMO BUFR code~~digital form, in addition to the dissemination of the TAF in accordance with 1.1.1.*

~~*Note.— The BUFR code form is contained in WMO Publication No. 306,* Manual on Codes, *Volume I.2, Part B — Binary Codes.*~~

1.1.3 TAF if disseminated in digital form shall be formatted in accordance with a globally interoperable information exchange model and shall use extensible markup language (XML)/geography markup language (GML).

1.1.4 TAF if disseminated in digital form shall be accompanied by the appropriate metadata.

Note.— Guidance on the information exchange model, XML/GML and the metadata profile is provided in the Manual on the Digital Exchange of Aeronautical Meteorological Information *(Doc 10003).*

. . .

1.3 Use of change groups

. . .

1.3.1 The criteria used for the inclusion of change groups in TAF or for the amendment of TAF shall be based on any of the following weather phenomena or combinations thereof being forecast to begin or end or change in intensity:

— ~~—~~ freezing fog
— freezing precipitation
— moderate or heavy precipitation (including showers thereof)
— thunderstorm ~~(with precipitation)~~
— duststorm
— sandstorm.

1.3.2 **Recommendation.**— *The criteria used for the inclusion of change groups in TAF or for the amendment of TAF should be based on the following:*

. . .

c) when the variation from the mean surface wind speed (gusts) is forecast to ~~increase~~ change by 5 m/s (10 kt) or more, the mean speed before and/or after the change being 7.5 m/s (15 kt) or more;

. . .

f) when any of the following weather phenomena or combinations thereof are forecast to begin or end:

~~*— ice crystals*~~
~~*— freezing fog*~~

. . .

~~*— thunderstorm (without precipitation)*~~

. . .

1.3.6 **Recommendation.—** *Where one set of prevailing weather conditions is expected to change significantly and more or less completely to a different set of conditions, the period of validity should be subdivided into self-contained periods using the abbreviation "FM" followed immediately by a ~~four~~six-figure time group in ~~whole~~ days, hours and minutes UTC indicating the time the change is expected to occur. The subdivided period following the abbreviation "FM" should be self-contained and all forecast conditions given before the abbreviation should be superseded by those following the abbreviation.*

. . .

2. CRITERIA RELATED TO TREND FORECASTS

. . .

2.2 Inclusion of meteorological elements in trend forecasts

. . .

2.2.4 Weather phenomena

. . .

2.2.4.2 The trend forecast shall indicate the expected onset or cessation of one or more of the following weather phenomena or combinations thereof:

~~ice crystals~~
. . .

4. CRITERIA RELATED TO AREA FORECASTS FOR LOW-LEVEL FLIGHTS

. . .

4.4 Exchange of area forecasts for low-level flights

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.

Table A5-1. Template for TAF

Key: M = inclusion mandatory, part of every message;
C = inclusion conditional, dependent on meteorological conditions or method of observation;
O = inclusion optional.

Note 1.— The ranges and resolutions for the numerical elements included in TAF are shown in Table A5-4 of this appendix.

Note 2.— The explanations for the abbreviations can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes *(PANS-ABC, Doc 8400).*

Element as specified in Chapter 6	*Detailed content*	*Template(s)*				*Examples*
. . .						
Weather (C)[4, 5]	Intensity of weather phenomena (C)[6]	*– or +*		—		
	Characteristics and type of weather phenomena (C)[7]	DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* TSGR *or* TSGS *or* TSRA *or* TSSN		~~IC *or*~~ FG *or* BR *or* SA*or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG	RA HZ +TSRA FG –FZDZ PRFG +TSRASN SNRA FG
. . .						
Expected significant changes to one or more of the above elements during the period of validity (C)[4, 10]	. . .					
	Period of occurrence or change (M)	nnnn/nnnn or nnnnnn[11]				
	. . .					
	Weather phenomenon: characteristics and type (C)[4, 7]	DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* TSGR *or* TSGS *or* TSRA *or* TSSN		~~IC *or*~~ FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG	
. . .						

4. To be included whenever applicable.

5. One or more, up to a maximum of three, groups in accordance with 1.2.3.
6. To be included whenever applicable in accordance with 1.2.3. No qualifier for *moderate* intensity.
7. Weather phenomena to be included in accordance with 1.2.3.

. . .

10. To be included in accordance with 1.3, 1.4 and 1.5.
11. To be used with FM only.

. . .

Table A5-3. Template for GAMET

Key: M = inclusion mandatory, part of every message;
C = inclusion conditional, dependent on meteorological conditions;
O = inclusion optional;
= = a double line indicates that the text following it should be placed on the subsequent line.

Element	*Detailed content*	*Template(s)*	*Examples*
. . .			
Location indicator of aerodrome meteorological office or meteorological watch office (M)	Location indicator of aerodrome meteorological office or meteorological watch office originating the message with a separating hyphen (M)	nnnn–	YUDO–[1]
. . .			

Notes.—

1. Fictitious location.

. . .

Example A5-3. GAMET area forecast

. . .

Meaning: An area forecast for low-level flights (GAMET) issued for sub-area two of the Amswell* flight information region (identified by YUCC Amswell area control centre) for below flight level 120 by the Donlon/International* aerodrome meteorological office (YUDO); the message is valid from 0600 UTC to 1200 UTC on the 22nd of the month.

* Fictitious location

APPENDIX 6. TECHNICAL SPECIFICATIONS RELATED TO SIGMET AND AIRMET INFORMATION, AERODROME WARNINGS AND WIND SHEAR WARNINGS AND ALERTS

(See Chapter 7 of this Annex.)

. . .

1. SPECIFICATIONS RELATED TO SIGMET INFORMATION

1.1 Format of SIGMET messages

. . .

1.1.6 **Recommendation.**— *Meteorological watch offices in a position to do so should issue SIGMET information in ~~graphical format using~~ ~~the WMO BUFR code~~digital form, in addition to the issuance of this SIGMET information in abbreviated plain language in accordance with 1.1.1.*

~~*Note.— The BUFR code form is contained in WMO Publication No. 306,* Manual on Codes, *Volume I.2, Part B — Binary Codes.*~~

1.1.7 SIGMET if disseminated in digital form shall be formatted in accordance with a globally interoperable information exchange model and shall use extensible markup language (XML)/geography markup language (GML).

1.1.8 SIGMET if disseminated in digital form shall be accompanied by the appropriate metadata.

Note.— Guidance on the information exchange model, XML/GML and the metadata profile is provided in the Manual on the Digital Exchange of Aeronautical Meteorological Information *(Doc 10003).*

~~1.1.7~~1.1.9 **Recommendation.**— *SIGMET, when issued in graphical format, should be as specified in Appendix 1.*

. . .

2. SPECIFICATIONS RELATED TO AIRMET INFORMATION

. . .

2.2 Dissemination of AIRMET messages

2.2.1 **Recommendation.—** *AIRMET messages should be disseminated to meteorological watch offices in adjacent flight information regions and to other meteorological watch offices or aerodrome meteorological offices, as agreed by the meteorological authorities concerned.*

. . .

4. DETAILED CRITERIA RELATED TO SIGMET AND AIRMET MESSAGES AND SPECIAL AIR-REPORTS (UPLINK)

. . .

4.2 Criteria related to phenomena included in SIGMET and AIRMET messages and special air-reports (uplink)

. . .

4.2.9 **Recommendation.—** *Sandstorm/duststorm should be considered:*

a) heavy whenever the visibility is below 200 m and the sky is obscured; and

b) moderate whenever the visibility is:

1) below 200 m and the sky is not obscured; or

2) between 200 m and 600 m.

5. SPECIFICATIONS RELATED TO AERODROME WARNINGS

. . .

5.2 Quantitative criteria for aerodrome warnings

Recommendation.— *When quantitative criteria are necessary for the issue of aerodrome warnings covering, for example, the expected maximum wind speed or the expected total snowfall, the criteria should be established by agreement between the aerodrome meteorological office and the users of the warnings.*

. . .

Table A6-1. Template for SIGMET and AIRMET messages and special air-reports (uplink)

Key: M = inclusion mandatory, part of every message;
C = inclusion conditional, included whenever applicable;
= = a double line indicates that the text following it should be placed on the subsequent line.

Note.— The ranges and resolutions for the numerical elements included in SIGMET/AIRMET messages and in special air-reports are shown in Table A6-4 of this appendix.

Element as specified in Chapter 5 and Appendix 6	*Detailed content*	*Template(s)*			*Examples*
		SIGMET	*AIRMET*	*SPECIAL AIR-REPORT*[1]	
. . .					
Location (C)[21]	Location (referring to latitude and longitude (in degrees and minutes) ~~*or* locations *or* geographic features well known internationally)~~	Nnn[nn] Wnnn[nn] *or* Nnn[nn] Ennn[nn] *or* Snn[nn] Wnnn[nn] *or* Snn[nn] Ennn[nn] *or* N OF Nnn[nn] *or* S OF Nnn[nn] *or* N OF Snn[nn] *or* S OF Snn[nn] *or* [AND] W OF Wnnn[nn] *or* E OF Wnnn[nn] *or* W OF Ennn[nn] *or* E OF Ennn[nn] *or* [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF] [LINE] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] ~~*or*~~ ~~[N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF, AT] nnnnnnnnnnn~~ *or* WI[27] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – [Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] *or* ENTIRE FIR[24] *or* ENTIRE CTA[24]		NnnnnWnnnnn *or* NnnnnEnnnnn *or* SnnnnWnnnnn *or* SnnnnEnnnnn	S OF N54 N OF N50 N2020 W07005 ~~AT YUSB[3]~~ N2706 W07306 N48 E010 N OF N1515 AND W OF E13530 W OF E1554 N OF LINE S2520 W11510 – S2520 W12010 WI N6030 E02550 – N6055 E02500 – N6050 E02630 ENTIRE FIR ENTIRE CTA
. . .					

Element as specified in Chapter 5 and Appendix 6	*Detailed content*	*Template(s)*			*Examples*
		SIGMET	*AIRMET*	*SPECIAL AIR-REPORT*[1]	
Forecast position (C)[21, 22, 31]	Forecast position of volcanic ash cloud *or* the centre of the TC *or* other hazardous phenomena[29] at the end of the validity period of the SIGMET message (C)	FCST nnnnZ TC CENTRE Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] *or* FCST nnnnZ VA CLD APRX [nnKM WID LINE[25] BTN (nnNM WID LINE BTN)] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [– Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] [AND][26] *or* FCST nnnnZ ENTIRE FIR[24] *or* FCST nnnnZ ENTIRE CTA[24] *or* FCST nnnnZ NO VA EXP *or*[29] [FCST nnnnZ Nnn[nn] Wnnn[nn] *or* Nnn[nn] Ennn[nn] *or* Snn[nn] Wnnn[nn] *or* Snn[nn] Ennn[nn] *or* N OF Nnn[nn] *or* S OF Nnn[nn] *or* N OF Snn[nn] *or* S OF Snn[nn] [AND] W OF Wnnn[nn] *or* E OF Wnnn[nn] *or* W OF Ennn[nn] *or* E OF Ennn[nn] *or* [N OF, NE OF, E OF, SE OF, S OF, SW OF, W OF, NW OF] [LINE] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – N[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] *or* WI[27] Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] – Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]]	—	—	FCST 2200Z TC CENTRE N2740 W07345 FCST 1700Z VA CLD APRX S15 E075 – S15 E081 – S17 E083 – S18 E079 – S15 E075 FCST 0500Z ENTIRE FIR FCST 0500Z ENTIRE CTA FCST 0500Z NO VA EXP

OR

Element as specified in Chapter 5 and Appendix 6	*Detailed content*	*Template(s)*			*Examples*
		SIGMET	*AIRMET*	*SPECIAL AIR-REPORT*[1]	
Cancellation of SIGMET/ AIRMET (C)[2730]	Cancellation of SIGMET/AIRMET referring to its identification	CNL SIGMET [nn]n nnnnnn/nnnnnn *or* CNL SIGMET [nn]n nnnnnn/nnnnnn [VA MOV TO nnnn FIR][24]	CNL AIRMET [nn]n nnnnnn/nnnnnn	—	CNL SIGMET 2 101200/101600[2730] CNL SIGMET 3 251030/251430 VA MOV TO YUDO FIR[2730] CNL AIRMET 151520/151800[2730]

Notes.—

. . .

21. In the case of the same phenomenon covering more than one area within the FIR, these elements can be repeated, as necessary.
22. Only for SIGMET messages for volcanic ash cloud and tropical cyclones.

. . .

24. Only for SIGMET messages for volcanic ash.
25. A straight line between two points drawn on a map in the Mercator projection or a straight line between two points which crosses lines of longitude at a constant angle.
26. To be used for two volcanic ash clouds or two centres of tropical cyclones simultaneously affecting the FIR concerned.
27. The number of coordinates should be kept to a minimum and should not normally exceed seven.
28. Optionally can be used in addition to Movement or Expected Movement.
29. To be used for hazardous phenomena other than volcanic ash cloud and tropical cyclones.
2730. End of the message (as the SIGMET/AIRMET message is being cancelled).
31. The levels of the phenomena remain fixed throughout the forecast period.

Note.— In accordance with 1.1.5 and 2.1.5, severe or moderate icing and severe or moderate turbulence (SEV ICE, MOD ICE, SEV TURB, MOD TURB) associated with thunderstorms, cumulonimbus clouds or tropical cyclones should not be included.

. . .

Example A6-1. SIGMET and AIRMET message and the corresponding cancellations

SIGMET YUDD SIGMET 2 VALID 101200/101600 YUSO – YUDD SHANLON FIR/UIR OBSC TS FCST S OF N54 AND E OF W012 TOP FL390 MOV E WKN FCST 1600Z S OF N54 AND E OF W010	**Cancellation of SIGMET** YUDD SIGMET 3 VALID 101345/101600 YUSO – YUDD SHANLON FIR/UIR CNL SIGMET 2 101200/101600
AIRMET YUDD AIRMET 1 VALID 151520/151800 YUSO – YUDD SHANLON FIR ISOL TS OBS N OF S50 TOP ABV FL100 STNR WKN	**Cancellation of AIRMET** YUDD AIRMET 2 VALID 151650/151800 YUSO – YUDD SHANLON FIR CNL AIRMET 1 151520/151800

. . .

Example A6-3. SIGMET message for volcanic ash

YUDD SIGMET 2 VALID 211100/211700 YUSO –
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL PSN S1500 E07348 VA CLD OBS AT 1100Z ~~FL310/450~~ APRX 220KM BY 35KM S1500 E07348 – S1530 E07642 FL310/450 MOV SE 65KMH FCST 1700Z VA CLD APRX S1506 E07500 – S1518 E08112 – S1712 E08330 – S1824 E07836

Meaning:

The second SIGMET message issued for the SHANLON* flight information region (identified by YUDD Shanlon area control centre/upper flight information region) by the Shanlon/International* meteorological watch office (YUSO) since 0001 UTC; the message is valid from 1100 UTC to 1700 UTC on the 21st of the month; volcanic ash eruption of Mount Ashval* located at 15 degrees south and 73 degrees 48 minutes east; volcanic ash cloud observed at 1100 UTC ~~between flight levels 310 and 450~~ in an approximate area of 220 km by 35 km between 15 degrees south and 73 degrees 48 minutes east, and 15 degrees 30 minutes south and 76 degrees 42 minutes east; between flight levels 310 and 450, the volcanic ash cloud is expected to move southeastwards at 65 kilometres per hour; at 1700 UTC the volcanic ash cloud is forecast to be located approximately in an area bounded by the following points: 15 degrees 6 minutes south and 75 degrees east, 15 degrees 18 minutes south and 81 degrees 12 minutes east, 17 degrees 12 minutes south and 83 degrees 30 minutes east, and 18 degrees 24 minutes south and 78 degrees 36 minutes east.

* Fictitious location

Editorial Note.— Insert the following new example.

Example A6-4. SIGMET message for radioactive cloud

YUCC SIGMET 2 VALID 201200/201600 YUDO –
YUCC AMSWELL FIR RDOACT CLD OBS AT 1155Z WI S5000 W14000 – S5000 W13800 – S5200 W13800 – S5200 W14000 – S5000 W14000 SFC/FL100 STNR WKN

Meaning:

The second SIGMET message issued for the AMSWELL* flight information region (identified by YUCC Amswell area control centre) by the Donlon/International* meteorological watch office (YUDO) since 0001 UTC; the message is valid from 1200 UTC to 1600 UTC on the 20th of the month; radioactive cloud was observed at 1155 UTC within an area bounded by 50 degrees 0 minutes south 140 degrees 0 minutes west to 50 degrees 0 minutes south 138 degrees 0 minutes west to 52 degrees 0 minutes south 138 degrees 0 minutes west to 52 degrees 0 minutes south 140 degrees 0 minutes west to 50 degrees 0 minutes south 140 degrees 0 minutes west and between the surface and flight level 100; the radioactive cloud is expected to remain stationary and to weaken in intensity.

* Fictitious location

Example ~~A6-4.~~A6-5. SIGMET message for severe turbulence

YUCC SIGMET 5 VALID 221215/221600 YUDO –
YUCC AMSWELL FIR SEV TURB OBS AT 1210Z ~~AT YUSB~~N2020 W07005 FL250 MOV E 40KMH WKN FCST 1600Z S OF N2020 E OF W06950

Meaning:

The fifth SIGMET message issued for the AMSWELL* flight information region (identified by YUCC Amswell area control centre) by the Donlon/International* meteorological watch office (YUDO) since 0001 UTC; the message is valid from 1215 UTC to 1600 UTC on the 22nd of the month; severe turbulence was observed at 1210 UTC ~~over Siby/Bistock* aerodrome (YUSB)~~ 20 degrees 20 minutes north and 70 degrees 5 minutes west at flight level 250; the turbulence is expected to move eastwards at 40 kilometres per hour and to weaken in intensity; forecast position at 1600 UTC south of 20 degrees 20 minutes north and east of 69 degrees 50 minutes west.

* Fictitious location

Example ~~A6-5.~~A6-6. AIRMET message for moderate mountain wave

. . .

APPENDIX 8. TECHNICAL SPECIFICATIONS RELATED TO SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

(See Chapter 9 of this Annex.)

. . .

1. MEANS OF SUPPLY AND FORMAT OF METEOROLOGICAL INFORMATION

1.1 Meteorological information shall be supplied to operators and flight crew members by one or more of the following, as agreed between the meteorological authority and operator concerned, and with the order shown below not implying priorities:

. . .

f) in lieu of a) to e), by means of an automated pre-flight information system providing self-briefing and flight documentation facilities while retaining access by operators and aircrew members to consultation, as necessary, with the aerodrome meteorological office, in accordance with 5.1.

. . .

4. SPECIFICATIONS RELATED TO FLIGHT DOCUMENTATION

4.1 Presentation of information

. . .

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

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

Editorial Note.— Renumber subsequent paragraphs accordingly.

. . .

5. SPECIFICATIONS RELATED TO AUTOMATED PRE-FLIGHT INFORMATION SYSTEMS FOR BRIEFING, CONSULTATION, FLIGHT PLANNING AND FLIGHT DOCUMENTATION

5.1 Access to the systems

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

. . .

6. SPECIFICATIONS RELATED TO INFORMATION FOR AIRCRAFT IN FLIGHT

6.1 Supply of information requested by an aircraft in flight

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.*

. . .

Editorial Note.— Replace Figures A8-1, A8-2 and A8-3 and the corresponding tables with the following new figures and tables.

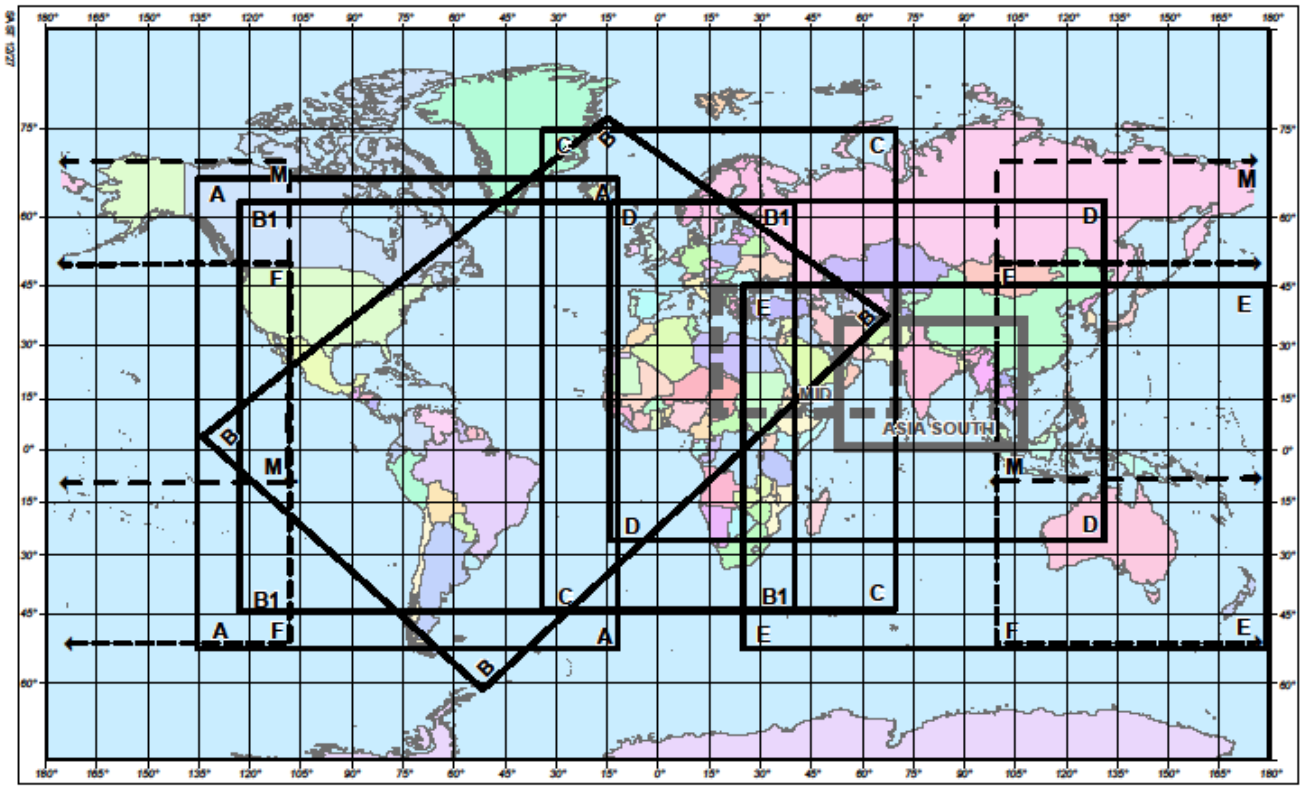

CHART	LATITUDE	LONGITUDE	CHART	LATITUDE	LONGITUDE
A	N6700	W13724	D	N6300	W01500
A	N6700	W01236	D	N6300	E13200
A	S5400	W01236	D	S2700	E13200
A	S5400	W13724	D	S2700	W01500
ASIA	N3600	E05300	E	N4455	E02446
ASIA	N3600	E10800	E	N4455	E18000
ASIA	0000	E10800	E	S5355	E18000
ASIA	0000	E05300	E	S5355	E02446
B	N0304	W13557	F	N5000	E10000
B	N7644	W01545	F	N5000	W11000
B	N3707	E06732	F	S5242	W11000
B	S6217	W05240	F	S5242	E10000
B1	N6242	W12500	M	N7000	E10000
B1	N6242	E04000	M	N7000	W11000
B1	S4530	E04000	M	S1000	W11000
B1	S4530	W12500	M	S1000	E10000
C	N7500	W03500	MID	N4400	E01700
C	N7500	E07000	MID	N4400	E07000
C	S4500	E07000	MID	N1000	E07000
C	S4500	W03500	MID	N1000	E01700

Figure A8-1. Fixed areas of coverage of WAFS forecasts in chart form — Mercator projection

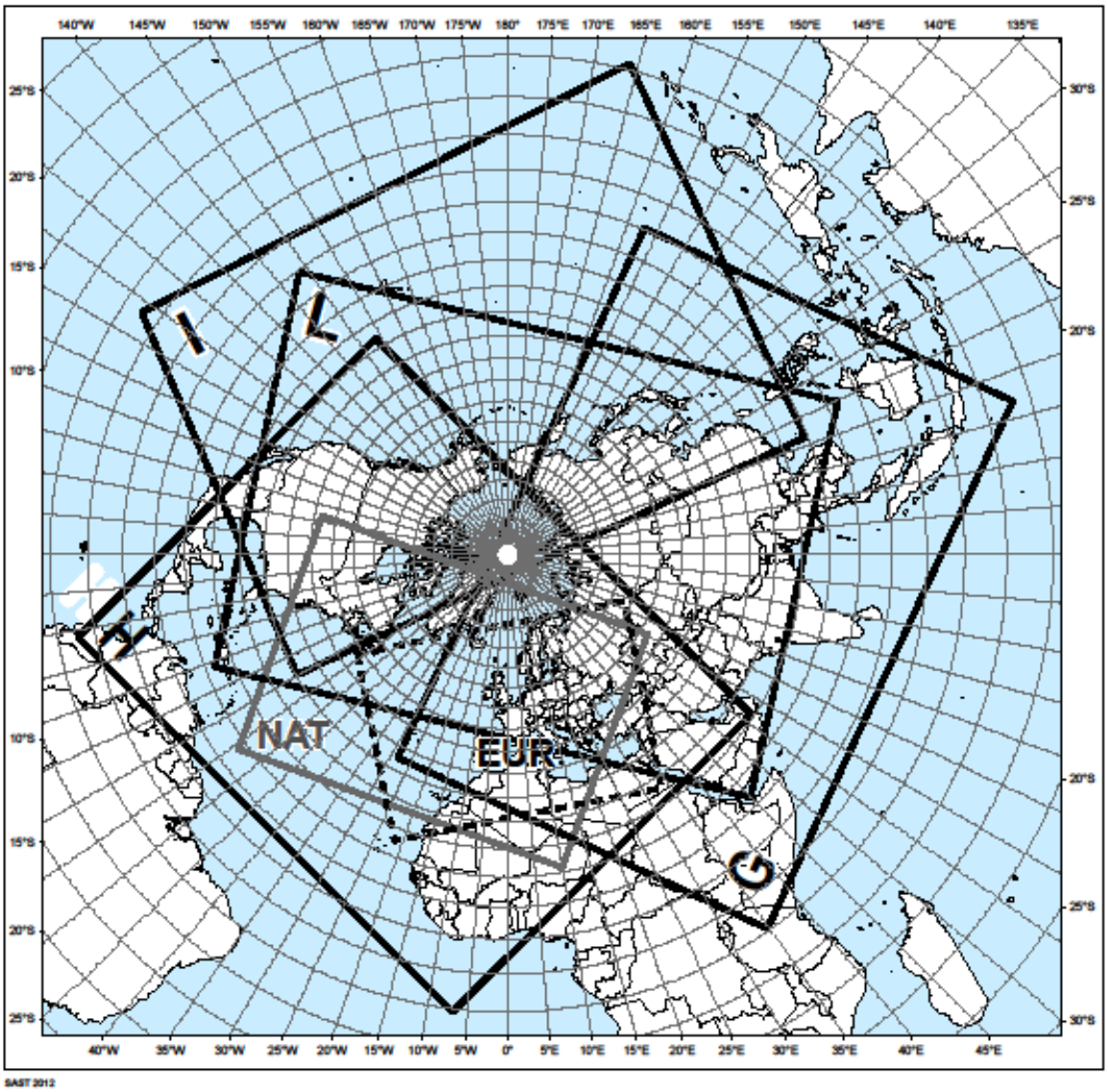

CHART	LATITUDE	LONGITUDE	CHART	LATITUDE	LONGITUDE
EUR	N4633	W05634	I	N1912	E11130
EUR	N5842	E06824	I	N3330	W06012
EUR	N2621	E03325	I	N0126	W12327
EUR	N2123	W02136	I	S0647	E16601
G	N3552	W02822	L	N1205	E11449
G	N1341	E15711	L	N1518	E04500
G	S0916	E10651	L	N2020	W06900
G	S0048	E03447	L	N1413	W14338
H	N3127	W14836	NAT	N4439	W10143
H	N2411	E05645	NAT	N5042	E06017
H	S0127	W00651	NAT	N1938	E00957
H	N0133	W07902	NAT	N1711	W05406

Figure A8-2. Fixed areas of coverage of WAFS forecasts in chart form — Polar stereographic projection (northern hemisphere)

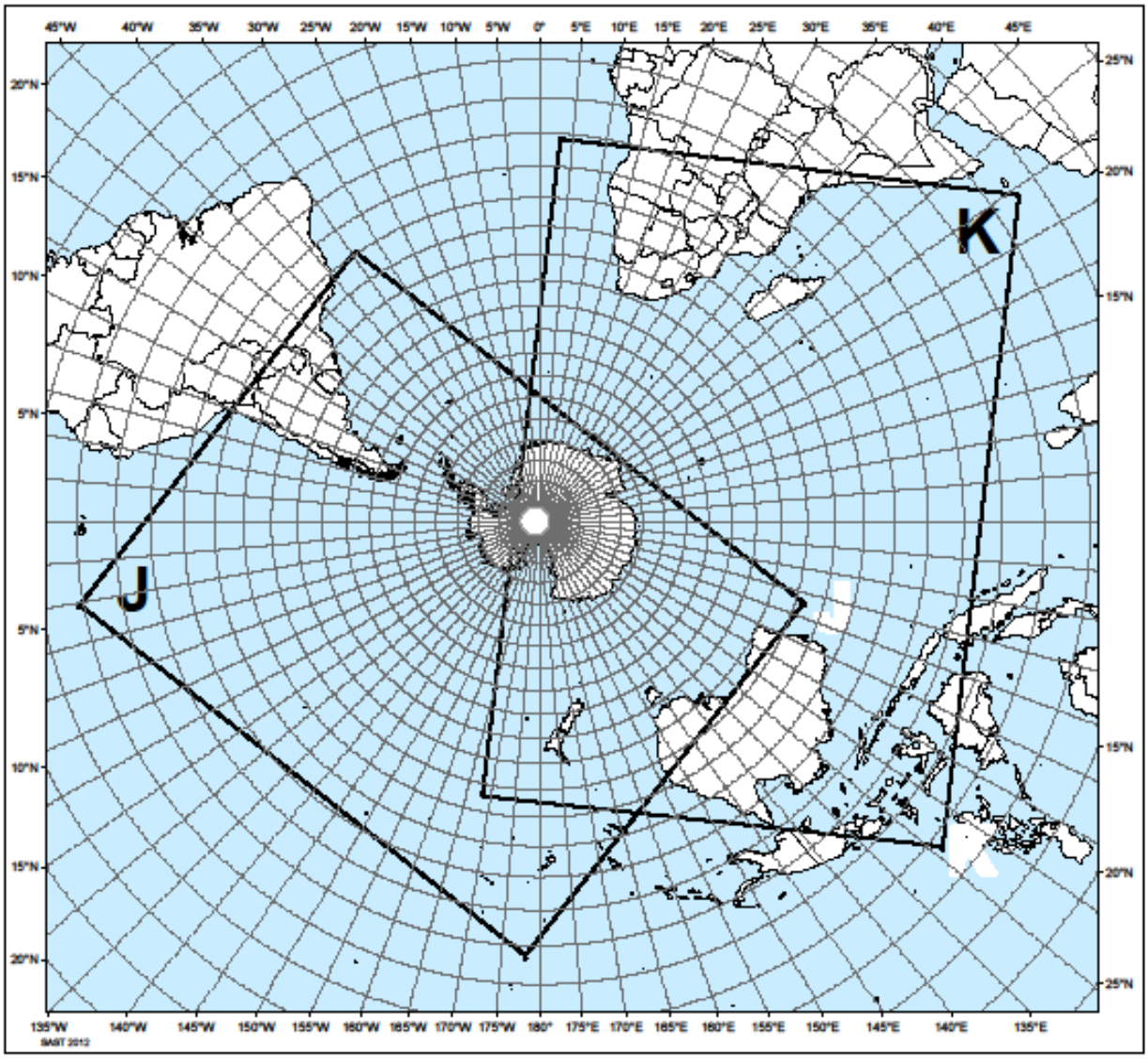

CHART	LATITUDE	LONGITUDE
J	S0318	W17812
J	N0037	W10032
J	S2000	W03400
J	S2806	E10717
K	N1255	E05549
K	N0642	E12905
K	S2744	W16841
K	S1105	E00317

Figure A8-3. Fixed areas of coverage of WAFS forecasts in chart form — Polar stereographic projection (southern hemisphere)

APPENDIX 9. TECHNICAL SPECIFICATIONS RELATED TO INFORMATION FOR AIR TRAFFIC SERVICES, SEARCH AND RESCUE SERVICES AND AERONAUTICAL INFORMATION SERVICES

(See Chapter 10 of this Annex.)

1. INFORMATION TO BE PROVIDED FOR AIR TRAFFIC SERVICES UNITS

. . .

1.3 List of information for the area control centre and flight information centre

The following meteorological information shall be supplied, as necessary, to an area control centre or a flight information centre by its associated meteorological watch office:

. . .

e) information received concerning the ~~accidental~~ release of radioactive material into the atmosphere, as agreed between the meteorological and ATS authorities concerned;

. . .

1.5 Format of information

1.5.1 **Recommendation.—** *Local routine and special reports, METAR and SPECI, TAF and trend forecasts, SIGMET and AIRMET information, upper wind and upper-air temperature forecasts and amendments thereto should be supplied to air traffic services units in the form in which they are prepared, disseminated to other aerodrome meteorological offices or meteorological watch offices received from other aerodrome meteorological offices or meteorological watch offices, unless otherwise agreed locally.*

. . .

2. INFORMATION TO BE PROVIDED FOR SEARCH AND RESCUE SERVICES UNITS

. . .

2.2 Information to be provided on request

2.2.1 **Recommendation.—** *On request from the rescue coordination centre, the designated aerodrome meteorological office or meteorological watch office should arrange to obtain details of the flight documentation which was supplied to the missing aircraft, together with any amendments to the forecast which were transmitted to the aircraft in flight.*

2.2.2 **Recommendation.—** *To facilitate search and rescue operations the designated aerodrome meteorological office or meteorological watch office should, on request, supply:*

. . .

2.2.3 **Recommendation.—** *On request from the rescue coordination centre, the designated aerodrome meteorological office or meteorological watch office should supply or arrange for the supply of meteorological information required by ships undertaking search and rescue operations.*

3. INFORMATION TO BE PROVIDED FOR AERONAUTICAL INFORMATION SERVICES UNITS

3.1 List of information

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

. . .

b) information necessary for the preparation of NOTAM or ASHTAM including, in particular, information on:

. . .

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

. . .

APPENDIX 10. TECHNICAL SPECIFICATIONS RELATED TO REQUIREMENTS FOR AND USE OF COMMUNICATIONS

(See Chapter 11 of this Annex.)

. . .

2. USE OF AERONAUTICAL FIXED SERVICE COMMUNICATIONS AND THE PUBLIC INTERNET

2.1 Meteorological bulletins in alphanumeric format

. . .

2.1.2 Filing times of bulletins

Recommendation.— *Meteorological bulletins required for scheduled transmissions should be filed regularly and at the prescribed scheduled times. METAR should be filed for transmission not later than 5 minutes after the actual time of observation. TAF should be filed for transmission ~~at least~~ not earlier than one hour ~~before the commencement~~ prior to the beginning of their ~~period of~~ validity period~~, unless otherwise determined by regional air navigation agreement~~.*

. . .

4. USE OF AERONAUTICAL DATA LINK SERVICE — D-VOLMET

. . .

4.2 Criteria related to information to be available for D-VOLMET

. . .

4.2.2 **Recommendation.—** *TAF included in the D-VOLMET should be amended as necessary to ensure that a forecast, when made available for uplink to aircraft in flight, reflects the latest opinion of the aerodrome meteorological office concerned.*

. . .

5. USE OF AERONAUTICAL BROADCASTING SERVICE — VOLMET BROADCASTS

. . .

5.2 Criteria related to information to be included in VOLMET broadcasts

. . .

5.2.2 **Recommendation.—** *TAF included in scheduled VOLMET broadcasts should be amended as necessary to ensure that a forecast, when transmitted, reflects the latest opinion of the aerodrome meteorological office concerned.*

. . .

ATTACHMENT C. SELECTED CRITERIA APPLICABLE TO AERODROME REPORTS

(The guidance in this table relates to Chapter 4 and Appendix 3.)

	Surface wind				*Visibility (VIS)*			~~RVR~~Runway visual range[1] *A* / *B* (*OBS TIME*) *–10* / *–5* (*Time, MIN*)			*Present weather*	*Cloud*					*Temperature*	*Pressure (QNH, QFE)*		*Supplementary information*
												Amount				*Type*[2]			
Specifications	Directional variations[3] ≥ 60° and < 180° Mean speed		≥ 180°	Speed variations[3]	Directional variations[4]	Special cases Minimum VIS ≠ prevailing VIS		Past tendency[5]		~~Variations~~[5]		Layers reported if coverage							
	< 1.5 m/s (3 kt)	≥ 1.5 m/s (3 kt)		Exceeding the mean speed by ≥ 5 m/s (10 kt)	General rule	Minimum VIS < 1 500 m or < 0.5 × prevailing VIS	VIS fluctuating and prevailing VIS cannot be determined	< 100 m	≥ 100 m			Lowest layer	Next layer >	Next higher layer >	CB[6] or TCU	Identification		Parameters reported	Updated if changes > agreed magnitude	Parameter to be included
Local routine and special report	~~2~~/10 min VRB + 2 extreme directions[8]	~~2~~/10 min mean + 2 extreme directions[8]	2 min VRB (no extremes)[8]	~~2~~10 min Minimum and maximum speed	1 min VIS along the runway(s)	N/A	N/A	1 min N/A[9]			No general criteria applicable to all the WX phenomena (for specific criteria, see Appendix 3, 4.4.2)	Always	2/8	4/8	Always	CB TCU	No criteria	QNH QFE[10]	Yes	All[11]
METAR/ SPECI	10 min VRB (no extremes)	10 min mean + 2 extreme directions	10 min VRB (no extremes)	10 min Maximum speed[8]	10 min Prevailing VIS	Prevailing VIS and minimum VIS + direction	Minimum VIS	10 min No tendency observed ("N")	Upward ("U") or downward ("D")	~~1 min Minimum and maximum (instead of 10-minute mean)~~		Always	2/8	4/8	Always	CB TCU		QNH	No	Recent WX of operational significance and wind shear[12]
								No tendency available, the tendency is to be omitted												
Relevant reporting scales for all messages	Direction in three figures rounded off to the nearest 10 degrees (degrees 1 – 4 down, degrees 5 – 9 up)			Speed in 1 m/s or 1 kt Speed < 0.5 m/s (1 kt) indicated as CALM	*If* / *Step applicable*: VIS < 800 m :50 m; 800 m ≤ [V]S < 5 000 m :100 m; 5 000 m ≤ [V]S < 10 km :1 km; VIS ≥ 10 km :None, given as 10 km or covered under CAVOK			*If* / *Step applicable*: RVR < 400 m : 25 m; 400 m ≤ RVR ≤ 800 m : 50 m; 800 m < RVR < 2 000 m : 100 m[13]			N/A	*If* / *Step applicable*: Base ≤ 3 000 m (10 000 ft) : 30 m (100 ft) (Reference level: Aerodrome elevation[14] or mean sea level for offshore structures)					Rounded off to whole degrees: up for decimal 5	In whole hPa[15] rounding down for decimals 1 – 9		N/A

Notes.—

1. Considered for the past 10 minutes (exception: if the 10-minute period includes a *marked discontinuity* (i.e. ~~RVR~~Runway visual range changes or passes ~~150~~175, ~~350~~300, ~~600~~550 or 800 m, lasting ≥ 2 minutes), only data after the discontinuity to be used). A simple diagrammatic convention is used to illustrate those parts of the 10-minute period prior to the observation relevant to ~~RVR~~runway visual range criteria, i.e. AB, BC and AC.
2. Layer composed of CB and TCU *with a common base* should be reported as "CB".
3. Considered for the past 10 minutes (exception: if the 10-minute period includes a *marked discontinuity* (i.e. the direction changes ≥ 30° with a speed ≥ 5 m/s *or* the speed changes ≥ 5 m/s lasting ≥ 2 minutes), only data after the discontinuity to be used).
4. If several directions, the most operationally significant direction used.

5. Let ~~$\bar{R}_1$ = any 1-minute mean RVR value during period AC,~~ ~~$\bar{R}_{10}$ = 10-minute mean RVR value during period AC,~~ $\bar{R}_{5(AB)}$ = 5-minute mean ~~RVR~~runway visual range value during period AB and $\bar{R}_{5(BC)}$ = 5-minute mean ~~RVR~~runway visual range value during period BC.
6. CB (cumulonimbus) and TCU (towering cumulus = cumulus congestus of great vertical extent) if not already indicated as one of the other layers.
7. Time averaging, for mean values and, if applicable, referring period for extreme values, indicated in the upper left-hand corner.
8. According to the WMO *Manual on Codes* (WMO-No. 306), Volume I.1, Part A — Alphanumeric Codes, paragraph 15.5.5, "it is recommended that the wind measuring systems should be such that peak gusts should represent a three-second average".
9. N/A = not applicable.
10. QFE is to be included if required. Reference elevation for QFE should be aerodrome elevation except for precision approach runways, and non-precision approach runways with threshold ≥ 2 m (7 ft) below or above aerodrome elevation, where the reference level should be the relevant threshold elevation.
11. As listed in Appendix 3, 4.8.
12. Also sea-surface temperature, and state of the sea or the significant wave height from offshore structures in accordance with regional air navigation agreement.
13. Report if RVR and/or VIS < 1 500 m, limits for assessments 50 and 2 000 m.
14. For landing at aerodromes with precision approach runways and with the threshold elevation ≥ 15 m below the aerodrome elevation, the *threshold elevation* to be used as a reference.
15. Measured in 0.1 hPa.

— END —