STATE OF KUWAIT
DIRECTORATE GENERAL OF CIVIL AVIATION
AVIATION SAFETY

دولة الكويت
الإدارة العامة للطيران المدني
سلامة الطيران

2025/6/2

2025/54/SUPDT-R/41

All KCASR Stockholders and Users

Subject.: ***Notice of Proposed Amendment's (NPA) No. 2025-07 to Kuwait Civil Aviation Safety Regulations KCASR 3 – METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION Rev 5.***

Dear Sir,

Purpose:

The purpose of this NPA is to announce to the KCASR users the intention of the Directorate General of Civil Aviation to amend ***KCASR 3 – METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION*** (issue 4) to comply with ICAO standers and recommended practices up to amendment (82).

Action Required:

All users of KCASR are required to refer to DGCA/ASD website (https://kcasr.dgca.gov.kw) for reviewing the NPA and mail or email (safety@dgca.gov.kw) their comments to DGCA by 10/Jul/2025 using the attached NPA Response Sheet Forms No. 1500 or using NPA comments & feedback form on the website. If we do not receive your response by this date, it will be assumed that you do not have any comments on the proposal.

If required, the DGCA/Aviation Safety Department personnel are available to answer your questions on the interpretation and intended implementation of the proposed amendments.

This is for your information and distribution to the concerned parties.

Yours Sincerely,

President of Civil Aviation

Abdullah F. Alrajhi
Acting / Deputy Director General
for Aviation Safety, Air Transport & Aviation Security

CC: Director General of Civil Aviation.
Dy. Dir. Gen. Kuwait. Intel. Airport Affairs.
Dy. Dir. Gen. for Air Navigation Services Affairs.
Safety Management Coordination Center (SMCC).
Head of Technical Office.
Civil Aviation Security Department.
Aviation Safety Director.
Air Transport Director.
Inspection & oversight Superintendent.
Head of Standards & Aviation Safety Regulations Division.

Notes on the presentation of the Amendment
Notice Of Proposed Amendment
(NPA)

The text of the amendment is arranged to show deleted text in Red Color and with a line through it, new text to be inserted is in Blue color as shown below:

~~Text to be deleted is in Red and shown with a line through it.~~	**Text to be deleted**
New text to be inserted is in Blue Color.	**New text to be inserted**
~~Text to be deleted is in Red and shown with a line through it~~, followed by the replacement text which is in Blue Color.	**New text to replace existing text**
. . . Indicates that remaining text is unchanged in front or following the reflected amendment.	**Text is unchanged**

Notice Of Safety Regulation Amendment
(NPA, NSRA and Revisions)

Side bar indicates that text is changed or added.

NPA RESPONSE FORM

NPA 2025-07

Please add your comments on the proposal by ticking [✓] the appropriate box below.

Any additional constructive comments, suggested amendments or alternative action will be welcome and may be provided on this response sheet or by separate correspondence.

☐ No comments on the proposal.

☐ Comments on the proposal. (Please provide explanatory comment).

Name:	Organization:
Address/Contact No:	
E-Mail:	
Signature:	Date:

الطيران المدني
Civil Aviation
State of Kuwait - دولة الكويت

Kuwait Civil Aviation Safety Regulations

KCASR 3 – METEOROLOGICAL SERVICE FOR INTERNATIONAL AIR NAVIGATION

Contents

Amendment Record

Amendment No	Date of Issue	Remarks
1	June 2018	Part Rename
2	September 2018	Reg Circular 2018-23 (ICAO Amendment 78) NPA 2018-15
3	Aug 2020	NPA 2020-05 Updated to ICAO Annex 3 (Amendment 79)
4	Aug 2021	Updated to ICAO Annex 3 (Amendment 80)
5	Aug 2024	Based on NPA 2024-04 - Updated to ICAO Annex 3 (Amendment 81)
5	Oct 2025	Based on NPA 2025-07 - Updated to ICAO Annex 3 (Amendment 82)

CHAPTER 1. DEFINITIONS

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

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

1.1 Definitions

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

Aerodrome. A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.

Aerodrome climatological summary. Concise summary of specified meteorological elements at an aerodrome, based on statistical data.

Aerodrome climatological table. Table providing statistical data on the observed occurrence of one or more meteorological elements at an aerodrome.

Aerodrome control tower**.** A unit established to provide air traffic control service to aerodrome traffic.

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

Aerodrome meteorological office. An office designated to provide meteorological service for aerodromes serving international air navigation.

Aerodrome reference point. The designated geographical location of an aerodrome.

Aeronautical fixed service (AFS). A telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services.

Aeronautical fixed telecommunication network (AFTN). A worldwide system of aeronautical fixed circuits provided, as part of the aeronautical fixed service, for the exchange of messages and/or digital data between aeronautical fixed stations having the same or compatible communications characteristics.

Aeronautical meteorological station. A station designated to make observations and meteorological reports for use in international air navigation.

Aeronautical mobile service (RR S1.32). A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies.

Aeronautical telecommunication station. A station in the aeronautical telecommunication service.

Aircraft. Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.

Aircraft observation. The evaluation of one or more meteorological elements made from an aircraft in flight.

AIRMET information. Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of low-level aircraft operations and which was not already included in the forecast issued for low-level flights in the flight information region concerned or sub-area thereof.

Air-report. A report from an aircraft in flight prepared in conformity with requirements for position, and operational and/or meteorological reporting.

Note.- *Details of the AIREP form are given in the PANS-ATM (Doc 4444).*

Air traffic services unit. A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

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 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 in the event that a diversion becomes necessary while en route.

Destination alternate. An alternate aerodrome at which an aircraft 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.*

Altitude. The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).

Approach control unit. A unit established to provide air traffic control service to controlled flights arriving at, or departing from, one or more aerodromes.

Appropriate ATS authority. The relevant authority designated by the State responsible for providing air traffic services in the airspace concerned.

Area control centre. A unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction.

~~***Area navigation (RNAV).*** A method of navigation which permits aircraft operations on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the~~

~~capability of self-contained aids, or a combination of these.~~

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

Automatic dependent surveillance — contract (ADS-C). A means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated, and what data would be contained in the reports.

Note.— *The abbreviated term "ADS contract" is commonly used to refer to ADS event contract, ADS demand contract, ADS periodic contract or an emergency mode*

Briefing**.** Oral commentary on existing and/or expected meteorological conditions.

Cloud of operational significance. A cloud with the height of cloud base below 1500 m (5000 ft) or below the highest minimum sector altitude, whichever is greater, or a cumulonimbus cloud or a towering cumulus cloud at any height.

Consultation**.** Discussion with a meteorologist or another qualified person of existing and/or expected meteorological conditions relating to flight operations; a discussion includes answers to questions.

Control area. A controlled airspace extending upwards from a specified limit above the earth.

Cruising level**.** A level maintained during a significant portion of a flight.

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

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

Flight crew member**.** A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.

Flight documentation. Written or printed documents, including charts or forms, containing meteorological information for a flight.

Flight information centre. A unit established to provide flight information service and alerting service.

Flight information region**.** An airspace of defined dimensions within which flight information service and alerting service are provided.

Flight level**.** A surface of constant atmospheric pressure which is related to a specific pressure datum, 1 013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals.

Note 1:- *A pressure type altimeter calibrated in accordance with the Standard Atmosphere:*

a) when set to a QNH altimeter setting, will indicate altitude;

b) *when set to a QFE altimeter setting, will indicate height above the QFE reference datum;*

c) *when set to a pressure of 1 013.2 hPa, may be used to indicate flight levels.*

***Note 2**:- The terms "height" and "altitude", used in Note 1, indicate altimetric rather than geometric heights and altitudes.*

Forecast. A statement of expected meteorological conditions for a specified time or period, and for a specified area or portion of airspace.

GAMET area forecast. An area forecast in abbreviated plain language for low-level flights for a flight information region or sub-area thereof, prepared by the meteorological office designated by the meteorological authority concerned and exchanged with meteorological offices in adjacent flight information regions, as agreed between the meteorological authorities concerned.

***Grid point data in digital form*.** Computer processed meteorological data for a set of regularly spaced points on a chart, for transmission from a meteorological computer to another computer in a code form suitable for automated use.

***Note:-** In most cases, such data are transmitted on medium- or high-speed telecommunications channels.*

Height. The vertical distance of a level, a point or an object considered as a point, measured from a specified datum.

Human Factors principles. Principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.

ICAO meteorological information exchange model (IWXXM). A data model for representing aeronautical meteorological information.

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

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

***Level*.** A generic term relating to the vertical position of an aircraft in flight and meaning variously height, altitude or flight level.

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

Meteorological bulletin. A text comprising meteorological information preceded by an appropriate heading.

Meteorological information. Meteorological report, analysis, forecast, and any other statement relating to existing or expected meteorological conditions.

Meteorological office. An office designated to provide meteorological service for international air navigation.

Meteorological report. A statement of observed meteorological conditions related to a specified time and location.

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

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

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

Minimum sector altitude (MSA). The lowest altitude which may be used which will provide a minimum clearance of 300 m (1000 ft) above all objects located in an area contained within a sector of a circle of 46 km (25 NM) radius significant point, the aerodrome reference point (ARP) or the heliport reference point (HRP).~~centred on a radio aid to navigation~~.

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

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

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

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

Observation (meteorological). The evaluation of one or more meteorological elements.

Operational control. The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight.

Operational flight plan. The operator's plan for the safe conduct of the flight based on considerations of aeroplane performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes concerned.

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

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

~~***Performance-based navigation (PBN).*** Area navigation based on performance requirements for~~

~~aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.~~

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

Pilot-in-command. The pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight.

Prevailing visibility. The greatest visibility value, observed in accordance with the definition of "visibility", which is reached within at least half the horizon circle or within at least half of the surface of the aerodrome. These areas could comprise contiguous or non-contiguous sectors.

Note:- *This value may be assessed by human observation and/or instrumented systems. When instruments are installed, they are used to obtain the best estimate of the prevailing visibility.*

***Prognostic chart*.** A forecast of a specified meteorological element(s) for a specified time or period and a specified surface or portion of airspace, depicted graphically on a chart.

Quality assurance. Part of quality management focused on providing confidence that quality requirements will be fulfilled (ISO 9000*).

Quality control. Part of quality management focused on fulfilling quality requirements (ISO 9000*).

***Quality management*.** Coordinated activities to direct and control an organization with regard to quality (ISO 9000*).

Regional air navigation agreement. Agreement approved by the Council of ICAO normally on the advice of a regional air navigation meeting.

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

Rescue coordination centre. A unit responsible for promoting efficient organization of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

***Runway*.** A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

* ISO Standard 9000 - Quality Management Systems - Fundamentals and Vocabulary.

Runway visual range (RVR). The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

Search and rescue services unit. A generic term meaning, as the case may be, rescue coordination centre, rescue subcentre or alerting post.

***SIGMET information*.** Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations.

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

Note. — A regional centre designated by ICAO supports global centres in the fulfilment of its responsibilities. ~~Note. — A space weather centre is designated as global and/or regional.~~

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

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

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

***Threshold*.** The beginning of that portion of the runway usable for landing.

Touchdown zone. The portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway.

Tropical cyclone. Generic term for a non-frontal synoptic-scale cyclone originating over tropical or sub-tropical waters with organized convection and definite cyclonic surface wind circulation.

Tropical cyclone advisory centre (TCAC). A meteorological centre designated by regional air navigation agreement to provide advisory information to meteorological watch offices, world area forecast centres and international OPMET databanks regarding the position, forecast direction and speed of movement, central pressure and maximum surface wind of tropical cyclones.

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

***Visibility*.** Visibility for aeronautical purposes is the greater of:

a) the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background;

b) the greatest distance at which lights in the vicinity of 1000 candelas can be seen and identified against an unlit background.

Note:- *The two distances have different values in air of a given extinction coefficient, and the latter b) varies with the background illumination. The former a) is represented by the meteorological optical range (MOR).*

Volcanic ash advisory centre (VAAC). A meteorological centre designated by regional air navigation

agreement to provide advisory information to meteorological watch offices, area control centres, flight information centres, world area forecast centres and international OPMET databanks regarding the lateral and vertical extent and forecast movement of volcanic ash in the.

VOLMET. Meteorological information for aircraft in flight.

Data link-VOLMET (D-VOLMET). Provision of current aerodrome routine meteorological reports (METAR) and aerodrome special meteorological reports (SPECI), aerodrome forecasts (TAF), SIGMET, special air-reports not covered by a SIGMET and, where available, AIRMET via data link.

VOLMET broadcast. Provision, as appropriate, of current METAR, SPECI, TAF and SIGMET by means of continuous and repetitive voice broadcasts.

World area forecast centre (WAFC). A meteorological centre designated to prepare and issue significant weather forecasts and upper-air forecasts in digital form on a global basis direct to States using the aeronautical fixed service Internet-based services.

World area forecast system (WAFS). A worldwide system by which world area forecast centres provide aeronautical meteorological en-route forecasts in uniform standardized formats.

1.2 Terms used with a limited meaning

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

~~a) to avoid confusion in respect of the term "service" between the meteorological service considered as an administrative entity and the service which is provided, "meteorological authority" is used for the former and "service" for the latter;~~

~~b)~~ a) "provide" is used solely in connection with the provision of service;

~~c)~~b) "issue" is used solely in connection with cases where the obligation specifically extends to sending out the information to a user;

~~d)~~c) "make available" is used solely in connection with cases where the obligation ends with making the information accessible to a user; and

~~e)~~d) "supply" is used solely in connection with cases where either c) or d) applies.

meteorological authority, ~~to provide or~~ to arrange for the provision of meteorological service for international air navigation on its behalf. Details of the meteorological authority so designated shall be included in the State aeronautical information publication, in accordance with KCASR 15, Chapter 5.

***Note**. Detailed specifications concerning presentation and contents of the aeronautical information publication is provided in PANS-AIM (Doc 10066), Appendix 2.*

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

2.1.~~5~~6 The Kuwait DGCA ASD shall ensure that the designated meteorological ~~authority~~ service provider complies with the requirements of the World Meteorological Organization (WMO) in respect of competencies, education and qualifications, training of meteorological personnel providing service for international air navigation.

Note:- Requirements concerning qualifications competencies, education and training of meteorological personnel in aeronautical meteorology are given in (WMO Publication No. 49), Technical Regulations, Volume I - General Meteorological Standards and Recommended Practices, Part V — Qualifications and Competencies of Personnel Involved in the Provision of Meteorological (Weather and Climate) and Hydrological Services, Part VI — Education and Training of Meteorological Personnel, and Appendix A — Basic Instruction Packages.

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

2.2.1 Close liaison shall be maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of meteorological service for international air navigation.

2.2.2 The Kuwait DGCA ASD shall ensure that the designated meteorological service provider ~~authority~~ referred to in 2.1.~~4~~5 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 The quality system established in accordance with 2.2.2 should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and should be certified by an approved organization.

***Note.**:* The International Organization for Standardization (ISO) 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme. The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization. Guidance on the establishment and implementation of quality management system is given in the Guide to the Implementation of Quality Management Systems for National Meteorological and Hydrological Services and Other Relevant Service Providers (WMO-No. 1100).

2.2.4 The quality system should provide the users with assurance that the meteorological information supplied complies with the stated requirements in terms of the geographical and spatial

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

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

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

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

2.2.6 Demonstration of compliance of the quality system applied should be by audit. If non-conformity of the system is identified, action should be initiated to determine and correct the cause. All audit observations shall be evidence-based and properly documented.

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

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

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

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

2.2.9 The meteorological information supplied to the users listed in 2.1.2 shall be consistent with Human Factors principles and shall be in forms which require a minimum of interpretation by these users, as specified in the following chapters.

Note.- *Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).*

2.2.10 Air Navigation Services should ensure that the meteorological information supplied to the users

listed in 2.1.2 is provided through information services.

***Note 1**. In the context of system-wide information management (SWIM), the notion of information service addresses machine-to-machine interaction in a service-oriented architecture.*

***Note 2.** Procedures on information services are contained in the Procedures for Air Navigation Services Information Management (PANS-IM, Doc 10199).*

***Note 3.** Guidance material on information services can be found in the Manual on System-wide Information Management Implementation (Doc 10203).*

2.3 Notifications required from operators

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

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

a) new routes or new types of operations are planned;

b) changes of a lasting character are to be made in scheduled operations; and

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

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

2.3.3 The operator or a flight crew member shall ensure that, where required by the meteorological service provider~~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 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 as agreed between the aerodrome meteorological office and the operator concerned:

a) aerodrome of departure and estimated time of departure;

b) destination and estimated time of arrival;

c) route to be flown and estimated times of arrival at, and departure from, any intermediate

CHAPTER 3. GLOBAL SYSTEMS, SUPPORTING CENTRES AND METEOROLOGICAL OFFICES

Note.:- *Technical specifications and detailed criteria related to this chapter are given in Appendix 2.*

~~3.1 Objective of the world area forecast system~~

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

3.~~2~~1 World area forecast centres within the framework of the world area forecast system

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

~~3.2.1~~ 3.1.1 the state of Kuwait **when** , 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:

1) upper wind;

2) upper-air temperature and humidity;

3) geopotential altitude of flight levels;

4) flight level and temperature of tropopause;

5) direction, speed and flight level of maximum wind;

6) cumulonimbus clouds;

7) icing; and

8) turbulence;

b) to prepare global forecasts of significant weather (SIGWX) phenomena;

c) to issue the forecasts referred to in a) and b) in digital form to meteorological ~~authorities~~ service providers and other users, as ~~approved~~ arranged by the state of ~~Kuwait on~~Kuwait on advice from the ~~meteorological authority~~DGCA ASD;

d) to receive information concerning the 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

e) to receive information on volcanic activity from ~~establish and maintain contact with~~ VAACs

for the ~~exchange of information on volcanic activity in order to coordinate the~~ inclusion of such information ~~on volcanic eruptions~~ in SIGWX forecasts.

3.~~2~~1.2 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 on the ICAO WAFSOPSG website.~~

3.~~3~~2 Aerodrome meteorological offices

~~3.3.1~~ 3.2.1 The state of Kuwait shall establish one or more aerodrome and/or other meteorological offices which shall be adequate for the provision of the meteorological service required to satisfy the needs of international air navigation.

~~3.3.2~~ 3.2.2 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:

a) prepare and/or obtain forecasts and other relevant information for flights with which it is concerned; the extent of its responsibilities to prepare forecasts shall be related to the local availability and use of en-route and aerodrome forecast material received from other offices;

b) prepare and/or obtain forecasts of local meteorological conditions;

c) maintain a continuous survey of meteorological conditions over the aerodromes for which it is designated to prepare forecasts;

d) provide briefing, consultation and flight documentation to flight crew members and/or other flight operations personnel;

e) supply other meteorological information to aeronautical users;

f) display the available meteorological information;

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

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

~~3.3.3~~ 3.2.3 The aerodromes for which landing forecasts are required shall be determined by regional air navigation agreement.

~~3.3.4~~ 3.2.4 For an aerodrome without an aerodrome meteorological office located at the aerodrome:

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

b) the competent authorities shall establish means by which such information can be supplied to the aerodromes concerned.

3.43 Meteorological watch offices

~~3.4.1~~ 3.3.1 The state of Kuwait when accepting the responsibility for providing air traffic services within a flight information region or a control area, shall establish, in accordance with regional air navigation agreement, one or more meteorological watch offices, or arrange for another Contracting State to do so.

***Note**. Guidance on the bilateral or multilateral arrangements between Contracting States for the provision of meteorological watch office services, including for cooperation and delegation, can be found in the Manual of Aeronautical Meteorological Practice (Doc 8896).*

~~3.4.2~~ 3.3.2 A meteorological watch office (MWO) shall:

a) maintain continuous watch over meteorological conditions affecting flight operations within its area of responsibility;

b) prepare SIGMET and other information relating to its area of responsibility;

c) supply SIGMET information and, as required, other meteorological information to associated air traffic services units;

d) disseminate SIGMET information;

e) when required by regional air navigation agreement, in accordance with 7.2.1:

1) prepare AIRMET information related to its area of responsibility;

2) supply AIRMET information to associated air traffic services units; and

3) disseminate AIRMET information;

f) supply information received on pre-eruption volcanic activity, a volcanic eruption and volcanic ash cloud for which a SIGMET has not already been issued, to its associated ACC/FIC, as agreed between the meteorological service provider and ~~ATS~~appropriate ATS ~~authorities~~ authority concerned, and to its associated VAAC as determined by regional air navigation agreement; and

g) supply information received concerning the release of radioactive materials into the atmosphere, in the area for which it maintains watch or adjacent areas, to its associated ACC/FIC, as agreed between the meteorological service provider and appropriate ATS ~~authorities~~ authority concerned, and to aeronautical information service units, as agreed between the meteorological service provider and appropriate civil aviation ~~authorities~~ authority concerned. The information shall comprise location, date and time of the release, and forecast trajectories of the radioactive materials.

***Note:-** The information is provided by WMO regional specialized meteorological centres (RSMC) for the provision of transport model products for radiological environmental emergency response, at the request of the delegated authority of the State in which the radioactive material was released into the atmosphere, or the International Atomic Energy Agency (IAEA). The information is sent by the RSMC to a single contact point of the national meteorological service in each State. This contact point has the responsibility of redistributing the RSMC products within the State concerned. Furthermore, the information is provided by*

IAEA to RSMC co-located with VAAC London (designated as the focal point) which in turn notifies the ACCs/FICs concerned about the release.

3.43.3 The boundaries of the area over which meteorological watch is to be maintained by a meteorological watch office should be coincident with the boundaries of a flight information region or a control area or a combination of flight information regions and/or control areas.

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

***Note**.— Guidance on the bilateral or multilateral coordination between MWOs of Contracting States for the provision of SIGMET can be found in the Manual of Aeronautical Meteorological pactice (Doc 8896).*

3.45 Volcanic ash advisory centres

~~3.5.1~~ 3.4.1 The State of Kuwait when accepted, 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:

a) monitor relevant geostationary and polar-orbiting satellite data and, where available, relevant ground-based and airborne data, to detect the existence and extent of volcanic ash in the atmosphere in the area concerned;

***Note.—** Relevant ground-based and airborne data includes data derived from Doppler weather radar, ceilometers, lidar and passive infrared sensors.*

b) activate the volcanic ash numerical trajectory/dispersion model in order to forecast the movement of any ash "cloud" which has been detected or reported;

***Note:-** The numerical model may be its own or, by agreement, that of another VAAC.*

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

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

2) other VAACs whose areas of responsibility may be affected;

3) world area forecast centres, international OPMET databanks, international NOTAM offices, and centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services; and

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) which is available on the ICAO IAVWOPSG website.*

d) issue updated advisory information to the meteorological watch offices, area control centres, flight information centres and VAACs referred to in c), as necessary, but at least every six hours until such time as:

1) the volcanic ash "cloud" is no longer identifiable from satellite data and, where available, ground-based and airborne data.
2) no further reports of volcanic ash are received from the area; and
3) no further eruptions of the volcano are reported.

~~3.5.2~~ 3.4.3 Volcanic ash advisory centres shall maintain a 24-hour watch.

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

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

3.~~6~~5 State volcano observatories

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

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

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

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

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

b) a volcanic eruption, or a significant change in eruptive activity~~cessation thereof~~; and/or

c) volcanic ash in the atmosphere ~~shall send this information as quickly as practicable to their associated ACC/FIC, MWO and VAAC.~~

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

Note ~~2~~1.- Where capability exists, State volcano observatories may include re-suspended volcanic ash in the context of c) above. The Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List *Doc 9766 contains guidance material about ~~active or potentially active volcanoes~~re-suspended volcanic ash. .*

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

3.6~~7~~ Tropical cyclone advisory centres

The State of Kuwait when accepted, the responsibility for providing a TCAC shall arrange for that centre to:

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

b) issue advisory information concerning the position of the cyclone centre, changes in its intensity attime of observation, its direction and speed of movement, central pressure and maximum surface wind near the centre, ~~in abbreviated plain language~~ to:

1) meteorological watch offices in its area of responsibility;

2) other TCACs whose areas of responsibility may be affected; and

3) world area forecast centres, international OPMET databanks, and centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services; and

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

3.~~8~~ 7 Space weather centres (SWXC)

3.~~8~~7.1 The State of Kuwait when accepted the responsibility for providing the responsibility for providing a SWXC within the framework of the space weather information service, shall arrange for that centre to ~~monitor and provide advisory information on space weather phenomena in its area of responsibility by arranging for that centre to~~:

a) Monitor relevant ground-based, airborne and space-based observations to detect, and predict when possible, the existence of space weather phenomena that have an impact in the following areas:

1) high frequency (HF) radio communications;

2) communications via satellite;

3) GNSS-based navigation and surveillance; and

4) radiation exposure at flight levels;

b) Issue advisory information regarding the extent, severity and duration of the space weather phenomena that have an impact referred to in a);

c) Supply the advisory information referred to in b) to:

1) Area control centres, flight information centres and aerodrome meteorological offices ~~in its area of responsibility which may be affected~~;
2) Other SWXCs; and
3) International OPMET databanks, ~~international NOTAM offices~~ and aeronautical fixed service Internet-based services.
d) issue updated advisory information on space weather phenomena, as necessary, but at least every six hours until such time as the space weather phenomena are no longer detected and/or are no longer expected to have an impact.

3.7~~8~~.2 SWXC shall maintain a 24-hour watch.

3.7~~8~~.3 In case of interruption of the operation of a SWXC, its functions shall be carried out by another SWXC ~~or another centre~~, as designated by the SWXC Provider State concerned.

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

3.7.4 A Contracting State, having accepted the responsibility for providing a regional space weather centre (SWXC) within the framework of the space weather information service, shall arrange for that centre to support the global SWXCs in their responsibilities under 3.7.1, 3.7.2 and 3.7.3.

CHAPTER 4. AERODROME METEOROLOGICAL OBSERVATIONAL INFORMATION ~~OBSERVATIONS AND REPORTS~~

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

4.1 Aeronautical meteorological stations and observations

4.1.1 The state of Kuwait shall establish, at aerodromes in its territory, such aeronautical meteorological stations as it determines to be necessary. An aeronautical meteorological station may be a separate station or may be combined with a synoptic station.

Note.- Aeronautical meteorological stations may include sensors installed outside the aerodrome, where considered justified, by the meteorological authority to ensure the compliance of meteorological service for international air navigation with the provisions of this Regulation.

4.1.2 The state of Kuwait shall establish, or arrange for the establishment of, aero-nautical meteorological stations on offshore structures or at other points of significance in support of helicopter operations to offshore structures, if required by regional air navigation agreement.

4.1.3 Aeronautical meteorological stations shall make routine observations at fixed intervals. At aerodromes, the routine observations shall be supplemented by special observations whenever specified changes occur in respect of surface wind, visibility, runway visual range, present weather, clouds and/or air temperature.

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

Note.- *Guidance on the inspection of aeronautical meteorological stations including the frequency of inspections is given in the* Manual on Automatic Meteorological Observing Systems at Aerodromes *(Doc 9837).*

4.1.5 At aerodromes with runways intended for Category II and III instrument approach and landing operations, automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure shall be installed to support approach and landing and take-off operations. These devices shall be integrated automatic systems for acquisition, processing, dissemination and display in real time of the meteorological parameters affecting landing and take-off operations. The design of integrated automatic systems shall observe Human Factors principles and include back-up procedures.

Note 1.- *Categories of precision approach and landing operations are defined in KCASR 6*

Note 2.- *Guidance material on the application of Human Factors principles can be found in the* Human Factors Training Manual *(Doc 9683).*

4.1.6 At aerodromes with runways intended for Category I instrument approach and landing

operations, automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure should be installed to support approach and landing and take-off operations. These devices should be integrated automatic systems for acquisition, processing, dissemination and display in real time of the meteorological parameters affecting landing and take-off operations. The design of integrated automatic systems should observe Human Factors principles and include back-up procedures.

4.1.7 Where an integrated semi-automatic system is used for the dissemination/display of meteorological information, it should be capable of accepting the manual insertion of data covering those meteorological elements which cannot be observed by automatic means.

4.1.8 The observations shall form the basis for the preparation of reports to be disseminated at the aerodrome of origin and of reports to be disseminated beyond the aerodrome of origin.

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

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

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

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

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

~~4.1.8~~4.1.12 Where automated equipment forms part of an integrated semi-automatic observing system, displays of data which are made available to the local air traffic services units should be a subset of and displayed in parallel to those available in the local meteorological service unit. In those displays, each meteorological element should be annotated to identify, as appropriate, the locations for which the element is representative.

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

An agreement between the meteorological ~~authority~~ service provider and the appropriate ATS authority should be established to cover, amongst other things:

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

b) the calibration and maintenance of these displays/instruments;

c) the use to be made of these displays/instruments by air traffic services personnel;

d) as and where necessary, supplementary visual observations (for example, of meteorological phenomena of operational significance in the climb-out and approach areas) if and when made by air traffic services personnel to update or supplement the information supplied by the meteorological station;

e) meteorological information obtained from aircraft taking off or landing (for example, on wind shear); and

f) if available, meteorological information obtained from ground weather radar.

Note.- *Guidance on the subject of coordination between ATS and aeronautical meteorological services is contained in the* Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services *(Doc 9377)*.

4.3 Routine observations and reports

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

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

4.3.2 Reports of routine observations shall be issued as:

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

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

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

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

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

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

4.4 Special observations and reports

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

4.4.1 A list of criteria for special observations shall be established by the meteorological

~~authority~~service provider, in consultation with the appropriate ATS authority, operators and others concerned.

4.4.2 Reports of special observations shall be issued as:

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

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

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

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

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

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

4.5 Characteristics of meteorological ~~Contents of~~ reports

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

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

~~a) identification of the type of report;~~

~~b) location indicator;~~

~~c) time of the observation;~~

~~d) identification of an automated or missing report, when applicable;~~

~~e)~~a) surface wind direction and speed;

~~f)~~b) visibility;

~~g)~~ c) runway visual range, when applicable;

~~h)~~ d) present weather;

~~i)~~ e) cloud amount, cloud type (only for cumulonimbus and towering cumulus clouds) and height of cloud base or, where measured, vertical visibility;

~~j)~~ f) air temperature and dew-point temperature; and

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

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

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

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

4.6 Observing and reporting meteorological elements

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

4.6.1 Surface wind

4.6.1.1 The mean direction and the mean speed of the surface wind shall be measured, as well as significant variations of the wind direction and speed, and reported in degrees true and metres per second (or knots), respectively.

4.6.1.2 When local routine and special reports are used for departing aircraft, the surface wind observations for these reports should be representative of conditions along the runway; when local routine and special reports are used for arriving aircraft, the surface wind observations for these reports should be representative of the touchdown zone.

4.6.1.3 For METAR and SPECI, the surface wind observations should be representative of conditions above the whole runway where there is only one runway and the whole runway complex where there is more than one runway.

4.6.2 Visibility

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

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

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

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

4.6.3 Runway visual range

Note.- Guidance on the subject of runway visual range is contained in the Manual of Runway Visual Range Observing and Reporting Practices (Doc 9328).

4.6.3.1 Runway visual range as defined in Chapter 1 shall be assessed on all runways intended for Category II and III instrument approach and landing operations.

4.6.3.2 Runway visual range as defined in Chapter 1 should be assessed on all runways intended for use during periods of reduced visibility, including:

a) precision approach runways intended for Category I instrument approach and landing operations; and

b) runways used for take-off and having high-intensity edge lights and/or centre line lights.

Note.- *Precision approach runways are defined in KCASR 14, Volume I, Chapter 1, under "Instrument runway".*

4.6.3.3 The runway visual range, assessed in accordance with 4.6.3.1 and 4.6.3.2, shall be reported in meters throughout periods when either the visibility or the runway visual range is less than 1500 m.

4.6.3.4 Runway visual range assessments shall be representative of:

a) the touchdown zone of the runway intended for non-precision or Category I instrument approach and landing operations;

b) the touchdown zone and the mid-point of the runway intended for Category II instrument approach and landing operations; and

c) the touchdown zone, the mid-point and stop-end of the runway intended for Category III instrument approach and landing operations.

4.6.3.5 The units providing air traffic service and aeronautical information service for an aerodrome shall be kept informed without delay of changes in the serviceability status of the automated equipment used for assessing runway visual range.

4.6.4 Present weather

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

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

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

c) thunderstorms (including thunderstorms in the vicinity).

~~4.6.4.1~~

4.6.4.2 For local routine report and local special report~~s~~, the present weather information should be representative of conditions at the aerodrome.

4.6.4.3 For METAR and SPECI, the present weather information should be representative of conditions at the aerodrome and, for certain specified present weather phenomena, in its vicinity.

4.6.5 Clouds

4.6.5.1 Cloud amount, cloud type and height of cloud base shall be observed and reported as necessary to describe the clouds of operational significance. When the sky is obscured, vertical visibility shall be observed and reported, where measured, in lieu of cloud amount, cloud type and height of cloud base. The height of cloud base and vertical visibility shall be reported in meters (or feet).

4.6.5.2 Cloud observations for local routine and special reports should be representative of the runway threshold(s) in use.

4.6.5.3 Cloud observations for METAR and SPECI should be representative of the aerodrome and its vicinity.

4.6.6 Air temperature and dew-point temperature

4.6.6.1 The air temperature and the dew-point temperature shall be measured and reported in degrees Celsius.

4.6.6.2 Observations of air temperature and dew-point temperature for local routine reports, local special reports, METAR and SPECI should be representative of the whole runway complex.

4.6.7 Atmospheric pressure

The atmospheric pressure shall be measured, and QNH and QFE values shall be computed and reported in hectopascals.

4.6.8 Supplementary information

Observations made at aerodromes should include the available supplementary information concerning significant meteorological conditions, particularly those in the approach and climb-out areas. Where practicable, the information should identify the location of the meteorological condition.

4.7 Reporting meteorological information from automatic observing systems

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

Note.- *Guidance on the use of automatic meteorological observing systems is ~~given~~ contained in ~~the Manual on Automatic Meteorological Observing Systems at Aerodromes~~ (Doc 9837).*

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

4.7.3 Local routine reports, and local special reports, METAR and SPECI from automatic observing systems shall be identified with the word “AUTO”.

4.8 ~~Observations~~ Observing and ~~reports~~ reporting ~~of~~ volcanic activity

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

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

~~a) message type, VOLCANIC ACTIVITY REPORT;~~

~~b) station identifier, location indicator or name of station;~~

~~c) date/time of message;~~

~~d) location of volcano and name if known; and~~

~~e) concise description of event including, as appropriate, level of intensity of volcanic activity, occurrence of an eruption and its date and time, and the existence of a volcanic ash cloud in the area together with direction of ash cloud movement and height.~~

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

4.9 Dissemination of meteorological reports

4.9.1 METAR and SPECI

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

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

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

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

4.9.2 Local routine report and local special report

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

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

a) any element for which there is in the local air traffic services unit a display corresponding to the one in the meteorological station, and where arrangements are in force for the use of this display to update information included in local routine report and local special report; and

b) runway visual range, when all changes of one or more steps on the reporting scale in use are being reported to the local air traffic services unit by an observer on the aerodrome.

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

CHAPTER 5. AIRCRAFT OBSERVATIONS AND REPORTS

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

5.1 Obligations of the State of Kuwait

The State of Kuwait shall arrange, according to the provisions of this chapter, for observations to be made by aircraft of its registry operating on international air routes and for the recording and reporting of these observations.

5.2 Types of aircraft observations

The following aircraft observations shall be made:

a) routine aircraft observations during en-route and climb-out phases of the flight; and

b) special and other non-routine aircraft observations during any phase of the flight.

5.3 Routine aircraft observations - designation

5.3.1 When air-ground data link is used and automatic dependent surveillance – contract (ADS-C) or secondary surveillance radar (SSR) Mode S is being applied, automated routine observations should be made every 15 minutes during the en-route phase and every 30 seconds during the climb-out phase for the first 10 minutes of the flight.

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

5.3.3 In the case of air routes with high-density air traffic (e.g. organized tracks), an aircraft from among the aircraft operating at each flight level shall be designated, at approximately hourly intervals, to make routine observations in accordance with 5.3.1. The designation procedures shall be in accordance with regional air navigation agreement.

5.3.4 In the case of the requirement to report during the climb-out phase, an aircraft shall be designated, at approximately hourly intervals, at each aerodrome to make routine observations in accordance with 5.3.1.

5.4 Routine aircraft observations - exemptions

Aircraft not equipped with air-ground data link shall be exempted from making routine aircraft observations.

5.5 Special aircraft observations

Special observations shall be made by all aircraft whenever the following conditions are encountered or observed:

a) moderate or severe turbulence; or

b) moderate or severe icing; or

c) severe mountain wave; or

d) thunderstorms, without hail, that are obscured, embedded, widespread or in squall lines; or

e) thunderstorms, with hail, that are obscured, embedded, widespread or in squall lines; or

f) heavy dust storm or heavy sandstorm; or

g) volcanic ash cloud; or

h) pre-eruption volcanic activity or a volcanic eruption; or

i) as of 4 November 2021, runway braking action encountered is not as good as reported.

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

5.6 Other non-routine aircraft observations and reports

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

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

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

5.7 Reporting of aircraft observations ~~during flight~~

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

5.7.1 Aircraft observations shall be reported by air-ground data link. Where air-ground data link is not available or appropriate, special and other non-routine aircraft observations during flight shall be reported by voice communications.

5.7.2 Aircraft observations shall be reported during flight at the time the observation is made or as soon thereafter as is practicable.

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

the following meteorological information:

a) wind direction;

b) wind speed;

c) air temperature; and

d) condition prompting the issuance of the air-report (only applicable for special air-reports).

~~5.7.3~~

5.8 Relay of air-reports by air traffic services units

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

a) special air-reports by voice communications, the air traffic services units relay them without delay to their associated meteorological watch office; and

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

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

a) special air-reports be uplinked for 60 minutes after their issuance; and

~~b)~~ b) information on wind and temperature included in automated special air-reports not be uplinked to other aircraft in flight.

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

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

5.9 Dissemination of air-reports

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

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

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

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

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

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

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

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

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

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

6.1 Use of forecasts

The issue of a new forecast by 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~~ meteorological forecast information

6.2.1 Aerodrome forecasts (TAF)

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

~~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 relevantregional electronic air navigation plan (eANP), Volume II. ~~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).~~

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

~~validity period and consist of a concise statement of the expected meteorological conditions at an aerodrome for a specified~~

~~period.~~

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

~~the order indicated:~~

~~a) identification of the type of forecast;~~

~~b) location indicator;~~

~~c) time of issue of forecast;~~

~~d) identification of a missing forecast, when applicable;~~

~~e) date and period of validity of forecast;~~

~~f) identification of a cancelled forecast, when applicable;~~

a~~g~~) surface wind;

b~~h~~) visibility;

c~~i~~) weather;

d) cloud; and

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

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

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

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

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

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

~~6.2.5~~ 6.2.1.5 TAF that cannot be kept under continuous review shall be cancelled.

~~6.2.6~~ 6.2.1.6 The period of validity of a routine TAF should be not less than 6 hours and not more than 30 hours; the period of validity should be determined by regional air navigation agreement. Routine TAF valid for less than 12 hours should be issued every 3 hours and those valid for 12 to 30 hours should be issued every 6 hours. ~~The period of validity of a routine TAF should be not less than 6 hours nor more than~~

~~hours; the period of validity should be determined by regional air navigation agreement. Routine TAF valid for less than~~

~~hours should be issued every 3 hours and those valid for 12 to 30 hours should be issued every 6 hours.~~

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

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

~~6.2.7~~

6.~~3~~2.2 Landing forecasts (trend forecasts)

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

~~6.3.1~~ 6.2.2.1 A landing forecast shall be prepared by the aerodrome meteorological office ~~designated by the meteorological authority concerned~~ as determined by regional air navigation agreement; such forecasts are intended to meet the requirements of local users and of aircraft within about one hour's flying time from the aerodrome.

~~6.3.2~~ 6.2.2.2 Landing forecasts shall be prepared in the form of a trend forecast.

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

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

~~6.3.3~~ 6.2.2.4 The units and scales used in the trend forecast shall be the same as those used in the report to which it is appended.

6.2.3~~4~~ Forecasts for take-off

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

6.~~4~~2.3.1 A forecast for take-off shall be prepared by the aerodrome meteorological office ~~designated by the meteorological authority concerned~~, as agreed between the meteorological ~~authority~~ service provider and operators concerned.

~~6.4.2~~ 6.2.3.2 A forecast for take-off should refer to a specified period of time and should contain information on expected conditions over the runway complex in regard to surface wind direction and speed and any variations thereof, temperature, pressure (QNH), and any other elements as agreed locally.

~~6.4.3~~ 6.2.3.3 A forecast for take-off should be supplied to operators and flight crew members on request within the 3 hours before the expected time of departure.

6.2.3.4 Aerodrome meteorological offices preparing forecasts for take-off should keep the forecasts under continuous review and, when necessary, should issue amendments promptly.

6.3 En-route meteorological forecast information

6.3.1 Forecasts by world area forecast centres

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

~~6.4.4~~ Global upper-air gridded and significant weather forecasts shall be issued by world area forecast centres (WAFCs) in uniform formats and codes for the supply of such forecasts.

6.3.2~~5~~ Area forecasts for low-level flights (GAMET, and area forecasts in chart form)

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

~~6.5.1~~ 6.3.2.1 When the density of traffic operating below flight level 100 (or up to flight level 150 in mountainous areas, or higher, where necessary) warrants the routine issue and dissemination of area forecasts for such operations, the frequency of issue, the form and the fixed time or period of validity of those forecasts, the dissemination and the criteria for amendments thereto shall be ~~determined~~ established by the meteorological authority in consultation with the users.

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

~~6.5.2~~ *Note.— Template of GAMET is contained in the PANS-MET (Doc 10157), Appendix 6, Table A6-1.*

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

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

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

~~6.5.3~~ *Note.— Area forecasts for low-level flights in 6.3.2.4 and 6.3.2.5 are prepared in accordance with regional air navigation agreement, similar to the corresponding AIRMET information.*

6.3.3 Forecasts by volcanic ash advisory centres

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

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

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

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

7.1 Volcanic ash advisory information and information from State volcano observatories

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

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

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

7.2 Tropical cyclone advisory information

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

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

7.3 Space weather advisory information

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

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

7.~~1~~4 SIGMET Information

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

7.4.1 General provisions

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

1) thunderstorm;

2) tropical cyclone;

3) turbulence;

4) icing;

5) mountain wave;

6) duststorm;

7) sandstorm;

8) volcanic ash; and

9) radioactive cloud.

~~7.1.1~~

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

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

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

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

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

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

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

7.4.2 Dissemination of SIGMET information

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

~~7.1.6~~ 7.4.2.2 SIGMET information shall be disseminated to international OPMET databanks and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services, in accordance with regional air navigation agreement.

7.~~2~~5 AIRMET information

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

7.5.1 General provisions

7.5.1.1 AIRMET information shall be issued by a meteorological watch office in accordance with regional air navigation agreement, taking into account the density of air traffic operating below flight level 100. (or below flight level 150 in mountainous areas, or higher, where necessary). AIRMET information . ~~AIRMET information~~ shall give a concise description in abbreviated plain language concerning the occurrence and/or expected occurrence of specified en-route weather phenomena, which have not been included in Section I of the area forecast for low-level flights issued in accordance with Chapter 6, Section 6.5 and which may affect the safety of low-level flights, and of the development of those phenomena in time and space. One of the following phenomena shall be included in AIRMET information:

1) surface wind speed;

2) surface visibility;

3) thunderstorms;

4) mountain obscuration;

5) cloud;

6) icing;

7) turbulence; and

8) mountain wave.

~~7.2.1~~ *Note.— Technical specifications of the issuance of AIRMET are contained in the PANS-MET (Doc 10157) Chapter 6, 6.5.1.*

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

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

7.5.2 Dissemination of AIRMET information

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

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

~~7.2.3~~

7.6~~3~~ Aerodrome Warnings

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

7.6.1 General provisions

7.6.1.1 Aerodrome warnings shall be issued by the aerodrome meteorological office. Aerodrome warnings ~~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.

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

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

— *tropical cyclone (to be included if the 10-minute mean surface wind speed at the aerodrome is expected to be 17 m/s (34 kt) or more)*

— thunderstorm

— hail

— snow (including the expected or observed snow accumulation)

— freezing precipitation

— *frost*

— *hoar frost or rime*

— sandstorm

— duststorm

— rising sand or dust

— strong surface wind and gusts

— squall

— volcanic ash (including volcanic ash deposition)

— tsunami

— toxic chemicals

— other phenomena as agreed locally.

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

~~7.3.1~~

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

7.6.2 Dissemination of aerodrome warnings

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

~~7.3.2~~

7.74 Wind shear warnings and alerts

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

7.7.1 General provisions

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

7.7.1.1 Wind shear warnings shall be ~~prepared~~ issued by the aerodrome meteorological office designated by the meteorological authority concerned for aerodromes where wind shear is considered a factor, in accordance with local arrangements with the appropriate air traffic services unit and 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 (1600 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 (1600 ft) above runway level, then 500 m (1600 ft) shall not be considered restrictive.

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

~~7.4.1~~

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

~~7.4.2~~

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

~~7.4.3~~

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

7.7.2 Dissemination of wind shear warnings and alerts

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

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

CHAPTER 8. AERONAUTICAL CLIMATOLOGICAL INFORMATION

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

8.1 General provisions

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

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

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

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

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

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

8.2 Aerodrome climatological tables

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

The state of Kuwait should make arrangements for collecting and retaining the necessary observational data and have the capability:

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

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

8.3 Aerodrome climatological summaries

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

Aerodrome climatological summaries should follow the procedures prescribed by the World Meteorological Organization. Where computer facilities are available to store, process and retrieve the information, the summaries should be published or otherwise made available to

aeronautical users on request. Where such computer facilities are not available, the summaries should be prepared using the models specified by the World Meteorological Organization and should be published and kept up to date as necessary.

8.4 Copies of meteorological observational data

Each meteorological authority, on request and to the extent practicable, shall make available to any other meteorological authority, to operators and to others concerned with the application of meteorology to international air navigation, meteorological observational data required for research, investigation or operational analysis.

8.5 Exchange of aeronautical climatological information

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

CHAPTER 9. METEOROLOGICAL SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

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

9.1 General Provisions

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

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

a) pre-flight planning by operators;

b) in-flight replanning by operators using centralized operational control of flight operations;

c) use by flight crew members before departure; and

d) aircraft in flight.

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

a) the type and format of meteorological information to be supplied; and

b) methods and means of supplying that information.

~~9.1.2~~ 9.1.3 Meteorological information supplied to operators and flight crew members shall cover the flight in respect of time, altitude and geographical extent. Accordingly, the information shall relate to appropriate fixed times, or periods of time, and shall extend to the aerodrome of intended landing, also covering the meteorological conditions expected between the aerodrome of intended landing and alternate aerodromes designated by the operator.

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

a) aerodrome and en-route observational information; and

b) aerodrome and en-route forecast information.

~~9.1.3~~

~~a) forecasts of~~

~~1) upper wind and upper-air temperature;~~

~~2) upper-air humidity;~~

~~3) geopotential altitude of flight levels;~~

~~4) flight level and temperature of tropopause;~~

~~5) direction, speed and flight level of maximum wind; and~~

~~6) SIGWX phenomena; and~~

~~7) Cumulonimbus clouds, icing and turbulence.~~

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

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

~~b) METAR or SPECI (including trend forecasts as issued in accordance with regional air navigation agreement) for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;~~

~~c) TAF or amended TAF for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;~~

~~d) forecasts for take-off;~~

~~e) SIGMET information and appropriate special air-reports relevant to the whole route;~~

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

~~f) volcanic ash and tropical cyclone advisory information relevant to the whole route;~~

~~g) as determined by regional air navigation agreement, GAMET area forecast and/or area forecasts for low-level flights in chart form prepared in support of the issuance of AIRMET information, and AIRMET information for low-level flights relevant to the whole route;~~

~~h) aerodrome warnings for the local aerodrome;~~

~~i) meteorological satellite images;~~

~~j) ground-based weather radar information, and~~

~~k) space weather advisory information relevant to the whole route.~~

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

~~9.1.4~~ 9.1.5 En-route Forecast~~s listed under 9.1.3 a)~~ shall be generated from the digital forecasts provided by the WAFCs whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, unless otherwise agreed between the meteorological ~~authority~~ service provider and the operator concerned.

~~9.1.5~~ 9.1.6 When forecasts are identified as being originated by the WAFCs, no modifications shall be made to their meteorological content.

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

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

9.1.7 The forecasts of upper wind and upper-air temperature and of SIGWX phenomena above flight level 100 requested for pre-flight planning and in-flight replanning by the operator shall be

supplied as soon as they become available, but not later than 3 hours before departure. Other meteorological information requested for pre-flight planning and in-flight replanning by the operator shall be supplied as soon as is practicable.

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

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

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

9.2 Briefing, consultation and display

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

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

9.2.2 Meteorological information used for briefing, consultation and display shall include any or all of the information listed in 9.1.~~3~~4.

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

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

9.2.5 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 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.

~~9.2.5~~9.2.6 The material displayed should be readily accessible to the flight crew members or other flight operations personnel concerned.

9.3 Flight documentation

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

Note2.- *The requirements for the use of automated pre-flight information systems in providing flight documentation are ~~given~~ contained in 9.4.*

9.3.1 Flight documentation to be made available shall comprise information listed under 9.1.4~~3~~ ~~a) 1) and 6), b), c), e), f) and, if appropriate, g) and k). However, flight documentation for flights of two hours' duration or less, after a short stop or turnaround, shall be limited to the information operationally needed, as agreed between the meteorological authority and operator concerned, but in all cases the flight documentation shall at least comprise information on 9.1.3 b), c), e), f) and, if appropriate, g) and k)~~

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

9.3.3 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.

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

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

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

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

~~9.3.3~~ *Note. The details of the characteristics of charts to be included in flight documentation are contained the* Procedures for Air Navigation Services – Meteorology *(PANS-MET, Doc 10157), Section 8.2.3.1.*

~~9.3.4~~ 9.3.7 The meteorological authority shall ensure that the meteorological service provider retains ~~retain~~ information supplied to flight crew members, either as printed copies or in computer files, for a period of at least 30 days from the date of issue. This information shall be made available, on request, for inquiries or investigations and, for these purposes, shall be retained until the inquiry or investigation is completed.

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

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

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

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

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

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

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

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

9.5 Meteorological Information for aircraft in flight

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

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

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

~~9.5.2~~9.5.3 If an aircraft in flight requests meteorological information, the aerodrome meteorological office or meteorological watch office which receives the request should arrange to supply the information with the assistance, if necessary, of another aerodrome meteorological office or meteorological watch office.

~~9.5.3~~9.5.4 Meteorological information shall be supplied through D-VOLMET or VOLMET broadcasts in accordance with the specifications of Chapter 11.

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

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

10.1 Information for air traffic services units

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

10.1.1 General

~~10.1.1~~ ~~The~~10.1.1.1 The ~~meteorological authority~~kuwait DGCA/ASD shall designate an aerodrome meteorological office or meteorological watch office to be associated with each air traffic services unit. The associated aerodrome meteorological office or meteorological watch office shall, after coordination with the air traffic services unit, supply, or arrange for the supply of, up-to-date meteorological information to the unit as necessary for the conduct of its functions.

~~10.1.2~~ 10.1.1.2 An aerodrome meteorological office should be associated with an aerodrome control tower or approach control unit for the provision of meteorological information.

~~10.1.3~~ 10.1.1.3 A meteorological watch office shall be associated with a flight information centre or an area control centre for the provision of meteorological information.

~~10.1.4~~ 10.1.1.4 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 service provider ~~authority~~ in consultation with the appropriate ATS authority.

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

10.1.2 Supply, dissemination and transmission arrangements

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

10.1.2.2 When computer-processed upper-air grid point data in digital form is made available to air traffic services units for use by air traffic services computers the transmission arrangements should be as agreed between the meteorological service provider and the appropriate ATS authority. The data should be supplied as soon as is practicable after the processing of the forecasts has been completed.

~~10.1.5~~

10.2 Information for search and rescue services units

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

10.2.1 General

Aerodrome meteorological offices or meteorological watch offices designated by the ~~meteorological authority~~KUWAIT dgca/asd 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.

10.2.2 List of information

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

a) significant en-route weather phenomena;

b) cloud amount and type, particularly cumulonimbus; height indications of bases and tops;

c) visibility and phenomena reducing visibility;

d) surface wind and upper wind;

e) state of ground, in particular, any snow cover or flooding;

f) sea-surface temperature, state of the sea, ice cover if any and ocean currents, if relevant to the search area; and

g) sea-level pressure data.

10.3 Information for aeronautical information services units

10.3.1 General

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

10.3.2 List of information

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

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

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

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

1) the establishment, withdrawal and significant changes in operation of aeronautical meteorological services. This information is required to be provided to the aeronautical information services unit sufficiently in advance of the effective date to permit issuance of NOTAM in compliance with Annex 15, 6.3.2.2 and 6.3.2.3;

2) the occurrence of volcanic activity; and

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

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

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

c) information necessary for the preparation of aeronautical information circulars including, in particular, information on:

1) expected important changes in aeronautical meteorological procedures, services and facilities provided; and

2) effect of certain weather phenomena on aircraft operations.

~~CHAPTER 11. REQUIREMENTS FOR AND USE OF COMMUNICATIONS~~

CHAPTER 11. USE OF COMMUNICATIONS TO EXCHANGE METEOROLOGICAL INFORMATION

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

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

11.1 Requirements for communications

11.1.1 Suitable telecommunications facilities shall be made available to permit aerodrome meteorological offices and, as necessary, aeronautical meteorological stations to supply the required meteorological information to air traffic services units on the aerodromes for which those offices and stations are responsible, and in particular to aerodrome control towers, approach control units and the aeronautical telecommunications stations serving these aerodromes.

11.1.2 Suitable telecommunications facilities shall be made available to permit meteorological watch offices to supply the required meteorological information to air traffic services and search and rescue services units in respect of the flight information regions, control areas and search and rescue regions for which those offices are responsible, and in particular to flight information centres, area control centres and rescue coordination centres and the associated aeronautical telecommunications stations.

11.1.3 Suitable telecommunications facilities shall be made available to permit world area forecast centres to supply the required world area forecast system ~~products~~ forecasts to aerodrome meteorological offices, meteorological ~~authorities~~ department 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 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:

a) 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; and

b) printed communications, when a record is required by the recipients; the message transit time should not exceed 5 minutes.

Note.- *In 11.1.4 and 11.1.5, "approximately 15 seconds" refers to telephony communications involving switchboard operation and "5 minutes" refers to printed communications involving retransmission.*

11.1.6 The telecommunications facilities required in accordance with 11.1.4 and 11.1.5 should be

supplemented, as and where necessary, by other forms of visual or audio communications, for example, closed-circuit television or separate information processing systems.

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

11.1.8 Suitable telecommunications facilities shall be made available to permit meteorological offices to exchange operational meteorological information with other meteorological offices.

11.1.9 The telecommunications facilities used for the exchange of operational meteorological information should be the aeronautical fixed service or, for the exchange of non-time critical operational meteorological information, the public Internet, subject to availability, satisfactory operation and bilateral/multilateral and/or regional air navigation agreements.

Note 1.-*Aeronautical fixed service Internet-based services, operated by the World Area Forecast Centres, providing for global coverage are used to support the global exchanges of operational meteorological information.*

Note 2.*- Guidance material on non-time-critical operational meteorological information and relevant aspects of the public Internet is provided in the Guidelines on the Use of the Public Internet for Aeronautical Applications (Doc 9855).*

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

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

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

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

11.2.1 Meteorological bulletins

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

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

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

11.32.2 ~~Use of aeronautical fixed service communications -~~ world area forecast system ~~products~~forecasts

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

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

11.43 Use of aeronautical mobile service communications

The content and format of meteorological information transmitted to aircraft and by aircraft shall be consistent with the provisions of this Regulation.

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

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

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

D-VOLMET shall contain current METAR and SPECI, together with trend forecasts where available, TAF and SIGMET, special air-reports not covered by a SIGMET and, where available, AIRMET.

Note.- *The requirement to provide METAR and SPECI may be met by the data link-flight information service (D-FIS) application entitled "Data link-aerodrome routine meteorological report (D-METAR) service"; the requirement to provide TAF may be met by the D-FIS application entitled "Data link-aerodrome forecast (D-TAF) service"; and the requirement to provide SIGMET and AIRMET messages may be met by the D-FIS application entitled "Data link-SIGMET (D-SIGMET) service". The details of these data link services are specified in the* Manual of Air Traffic Services Data Link Applications *(Doc 9694)*.

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

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

11.5.1 Continuous VOLMET broadcasts, normally on very high frequencies (VHF), shall contain current METAR and SPECI, together with trend forecasts where available.

~~11.6.1~~

11.5.2 Scheduled VOLMET broadcasts, normally on high frequencies (HF), shall contain current METAR and SPECI, together with trend forecasts where available and, where so determined by regional air navigation agreement, TAF and SIGMET.

~~11.6.2~~

~~APPENDIX 1. FLIGHT DOCUMENTATION - MODEL CHARTS AND FORMS~~

~~*(See Chapter 9 of this Regulation.)*~~

~~MODEL A OPMET information~~

~~MODEL IS Upper wind and temperature chart for standard isobaric surface~~

~~Example 1. Arrows, feathers and pennants (Mercator projection)~~

~~Example 2. Arrows, feathers and pennants (Polar stereographic projection)~~

~~MODEL SWH Significant weather chart (high level)~~

~~Example. Polar stereographic projection (showing the jet stream vertical extent)~~

~~MODEL SWM Significant weather chart (medium level)~~

~~MODEL SWL Significant weather chart (low level)~~

~~Example 1~~

~~Example 2~~

~~MODEL TCG Tropical cyclone advisory information in graphical format~~

~~MODEL VAG Volcanic ash advisory information in graphical format~~

~~Example 1. Mercator projection~~

~~Example 2. Polar stereographic projection~~

~~MODEL STC SIGMET for tropical cyclone in graphical format~~

~~MODEL SVA SIGMET for volcanic ash in graphical format~~

~~Example 1. Mercator projection~~

~~Example 2. Polar stereographic projection~~

~~MODEL SGE SIGMET for phenomena other than tropical cyclone and volcanic ash in graphical format~~

~~MODEL SN Sheet of notations used in flight documentation~~

~~OPMET INFORMATION MODEL A~~

ISSUED BY ..... METEOROLOGICAL OFFICE (DATE, TIME UTC) .....

INTENSITY

" – " (light); no indicator (moderate); " + " (heavy, or a tornado/waterspout in the case of funnel cloud(s)) are used to indicate the intensity of certain phenomena

DESCRIPTORS

MI – shallow	PR – partial	BL – blowing	TS – thunderstorm
BC – patches	DR – low drifting	SH – shower(s)	FZ – freezing (supercooled)

PRESENT WEATHER ABBREVIATIONS

DZ – drizzle	GS – small hail and/or snow pellets	SA – sand
RA – rain	BR – mist	HZ – haze
SN – snow	FG – fog	PO – dust/sand whirls (dust devils)
SG – snow grains	FU – smoke	SQ – squall
IC – ice crystals (diamond dust)	VA – volcanic ash	FC – funnel cloud(s) (tornado or waterspout)
PL – ice pellets	DU – widespread dust	SS – sandstorm
GR – hail		DS – duststorm

EXAMPLES

+SHRA – heavy shower of rain

FZDZ – moderate freezing drizzle

+TSSNGR – thunderstorm with heavy snow and hail

TSSN – thunderstorm with moderate snow

SNRA – moderate snow and rain

SELECTED ICAO LOCATION INDICATORS

CYUL	Montreal Pierre Elliot Trudeau/Intl	HECA	Cairo/Intl	OBBI	Bahrain Intl
EDDF	Frankfurt/Main	HKJK	Nairobi/Jomo Kenyatta	RJTT	Tokyo Intl
EGLL	London/Heathrow	KJFK	New York/John F. Kennedy Intl	SBGL	Rio de Janeiro/Galeão Intl
GMMC	Casablanca/Anfa	LFPG	Paris/Charles de Gaulle	YSSY	Sydney/Kingsford Smith Intl
		NZAA	Auckland Intl	ZBAA	Beijing/Capital

METAR CYUL 240700Z 27018G30KT 5000 SN FEW020 BKN045 M02/M07 Q0995=

METAR EDDF 240950Z 05015KT 9999 FEW025 04/M05 Q1018 NOSIG=

METAR LFPG 241000Z 07010KT 5000 SCT010 BKN040 02/M01 Q1014 NOSIG=

SPECI GMMC 220530Z 24006KT 5000 –TSGR BKN016TCU FEW020CB SCT026 08/07 Q1013=

TAF AMD NZAA 240855Z 2409/2506 24010KT 9999 FEW030 BECMG 2411/2413 VRB02KT 2000 HZ FM 242200 24010KT CAVOK=

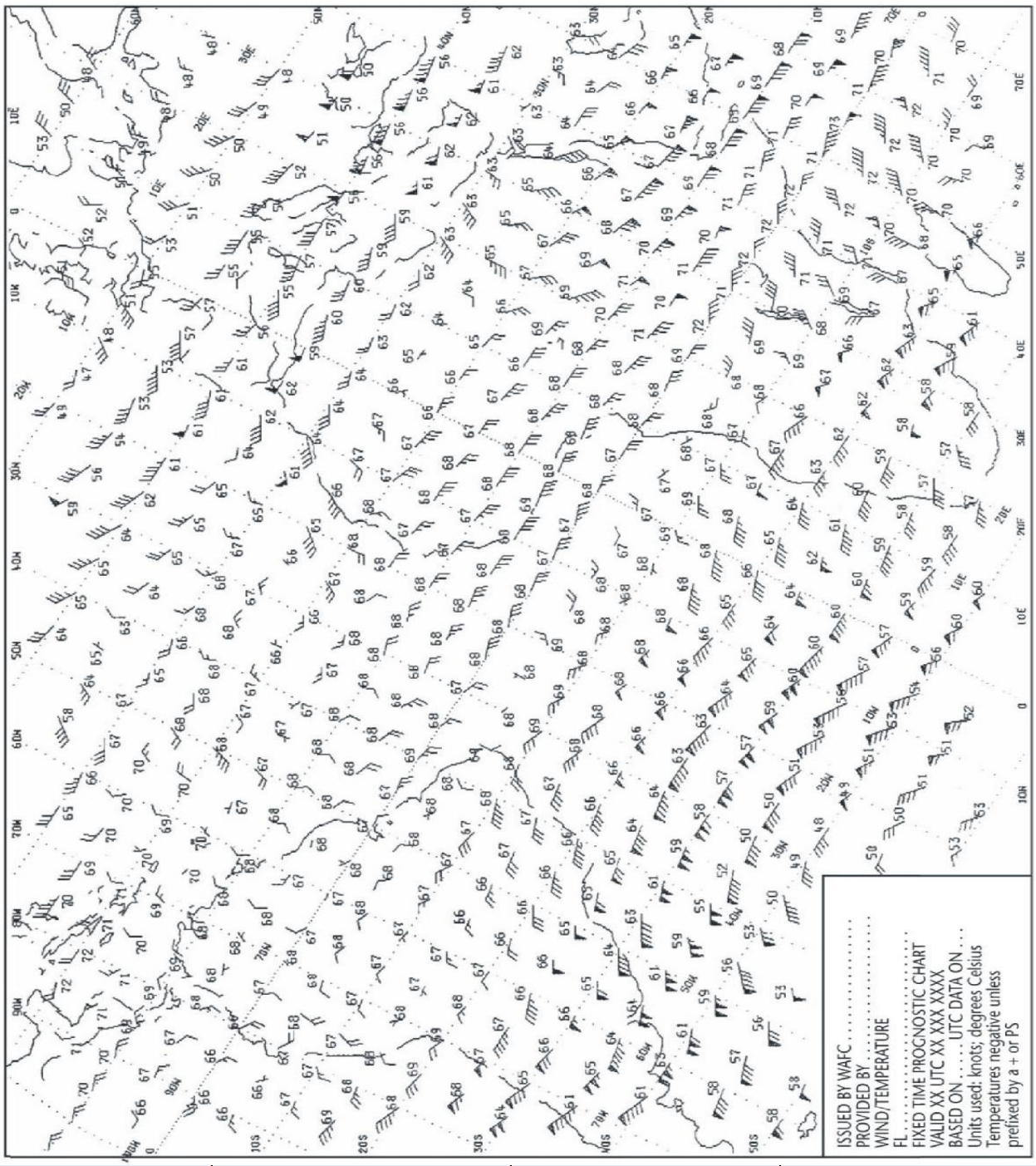
TAF ZBAA 240440Z 2406/2506 13004MPS 6000 NSC BECMG 2415/2416 2000 SN OVC040 TEMPO 2418/24211000 SN BECMG 2500/2501 32004MPS 3500 BR NSC BECMG 2503/2504 32010G20MPS CAVOK=

TAF YSSY 240443Z 2406/2506 05015KT 3000 BR SCT030 BECMG 2414/2416 33008KT FM 2422 04020KT CAVOK=

HECC SIGMET 2 VALID 240900/241200 HECA-
HECC CAIRO FIR SEV TURB OBS N OF N27 FL 390/440 MOV E 25KMH NC.

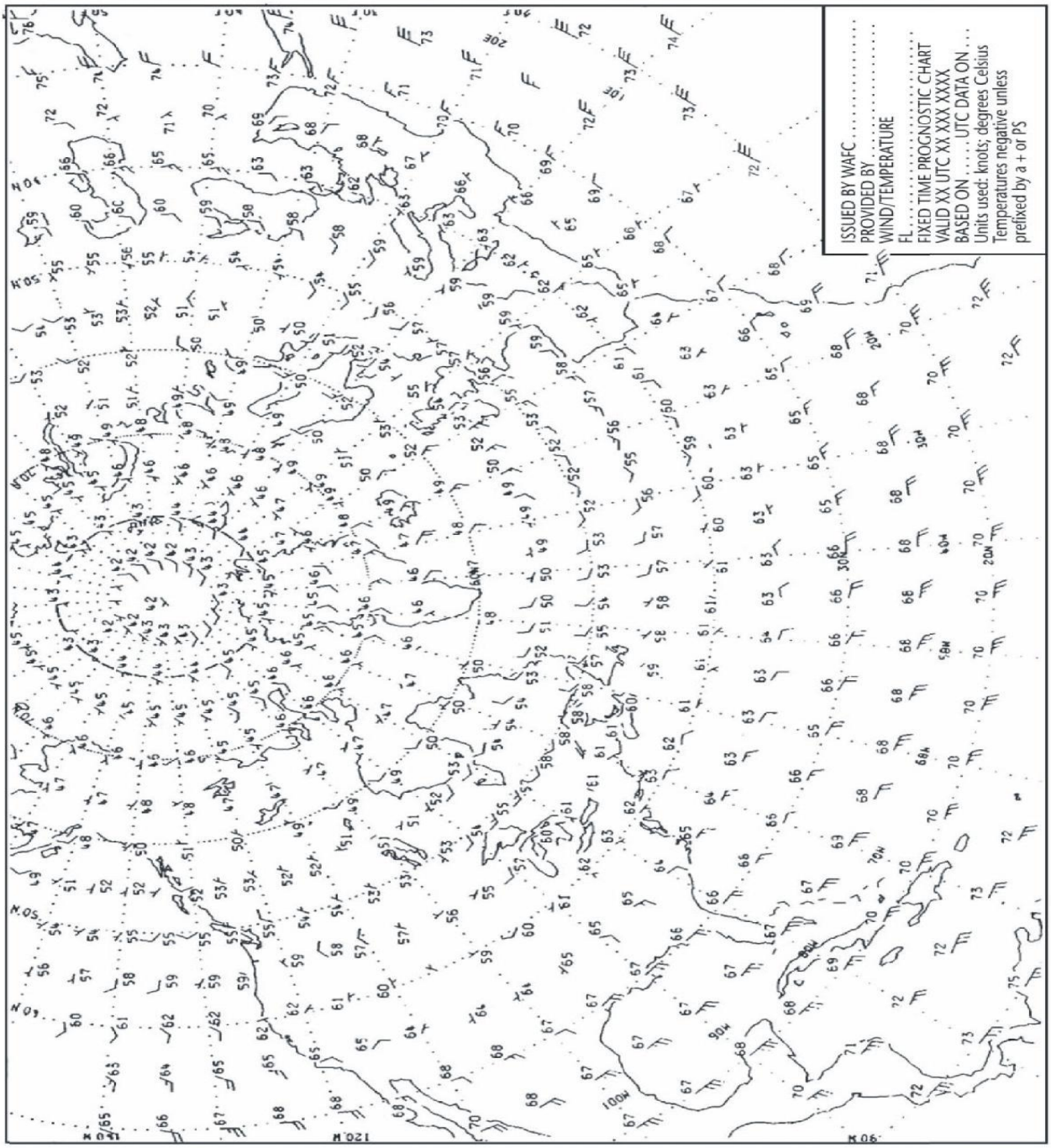
~~UPPER WIND AND TEMPERATURE CHART FOR STANDARD ISOBARIC SURFACE~~

~~Example 1. Arrows, feathers and pennants (Mercator projection) MODEL IS~~



~~UPPER WIND AND TEMPERATURE CHART FOR STANDARD ISOBARIC SURFACE~~

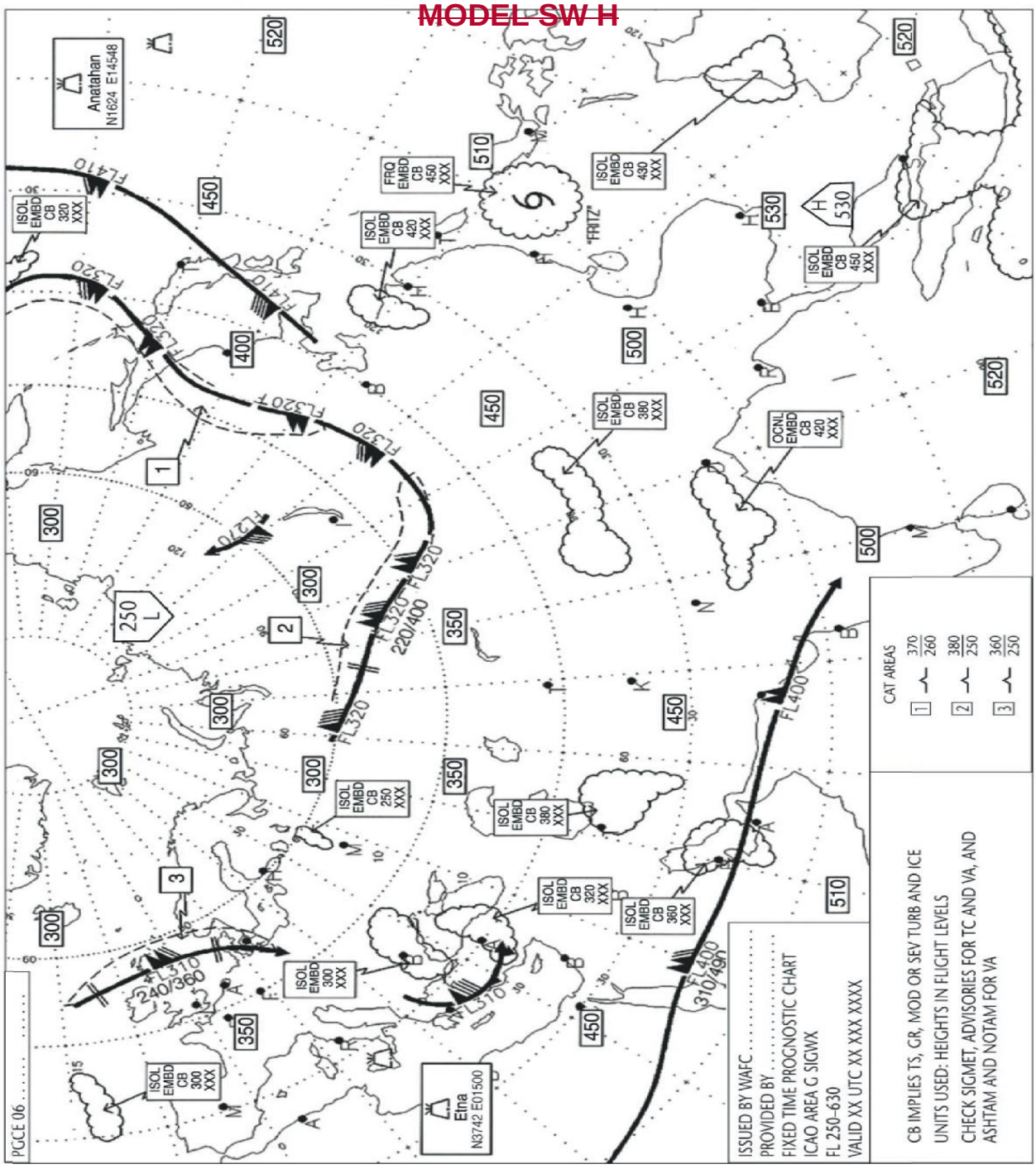
~~Example 2. Arrows, feathers and pennants (Polar stereo graphic project ion) MODEL IS~~



~~SIGNIFICANT WEATHER CHART (HIGH LEVEL)~~

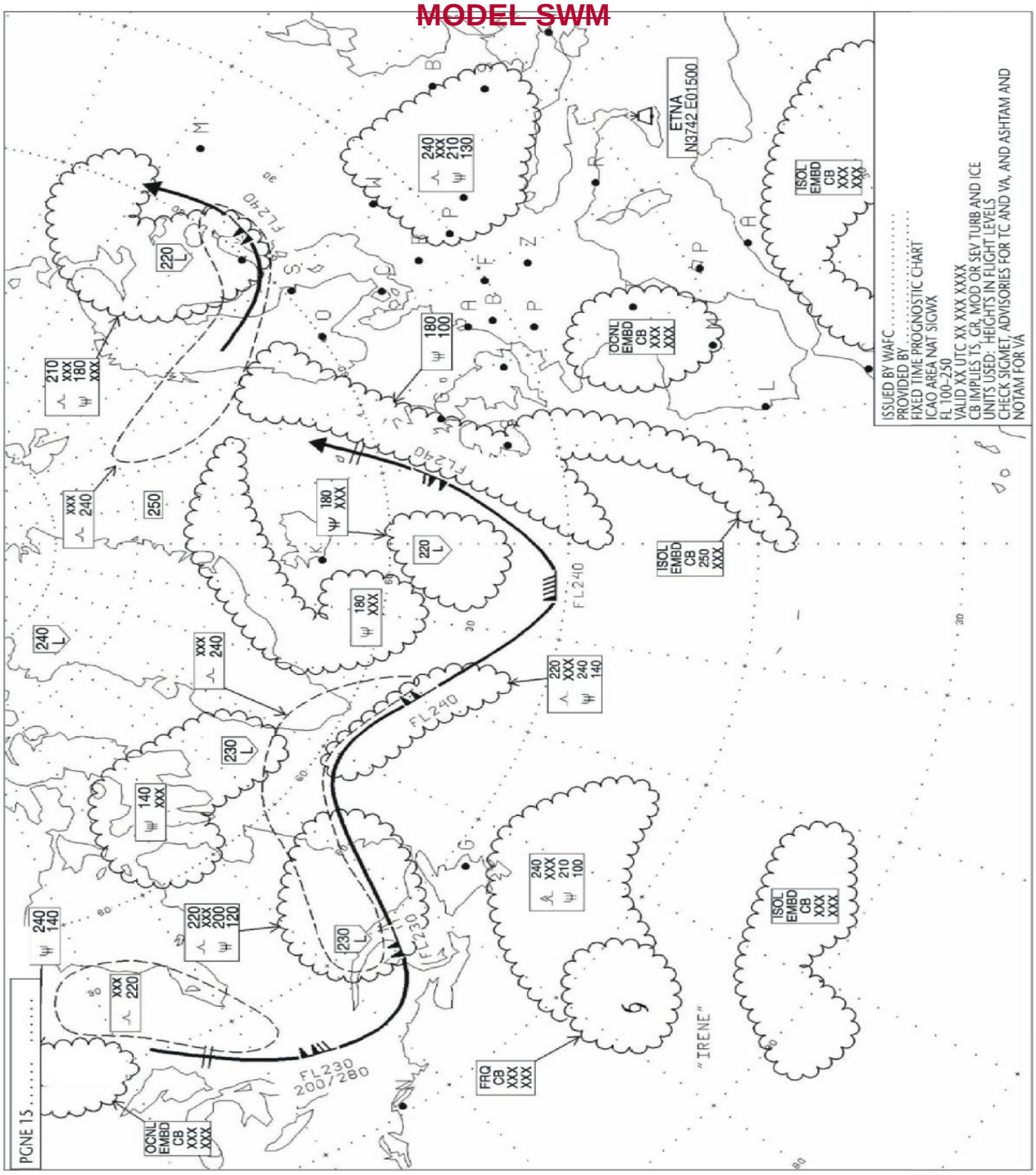
~~Example. Polar stereographic projection showing the jet stream vertical extent~~

~~MODEL SW H~~



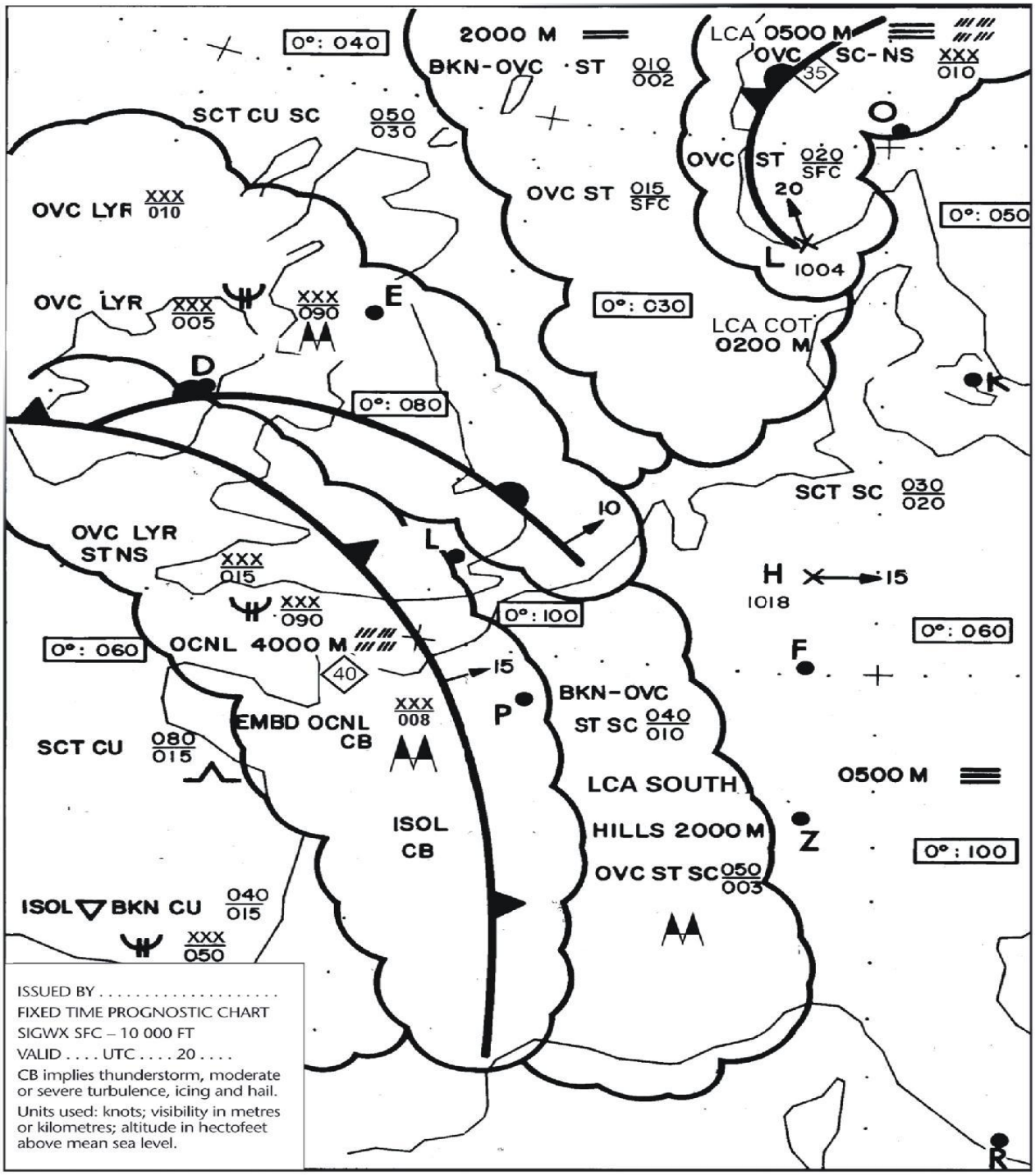
~~SIGNIFICANT WEATHER CHART (MEDIUM LEVEL)~~

~~MODEL SWM~~



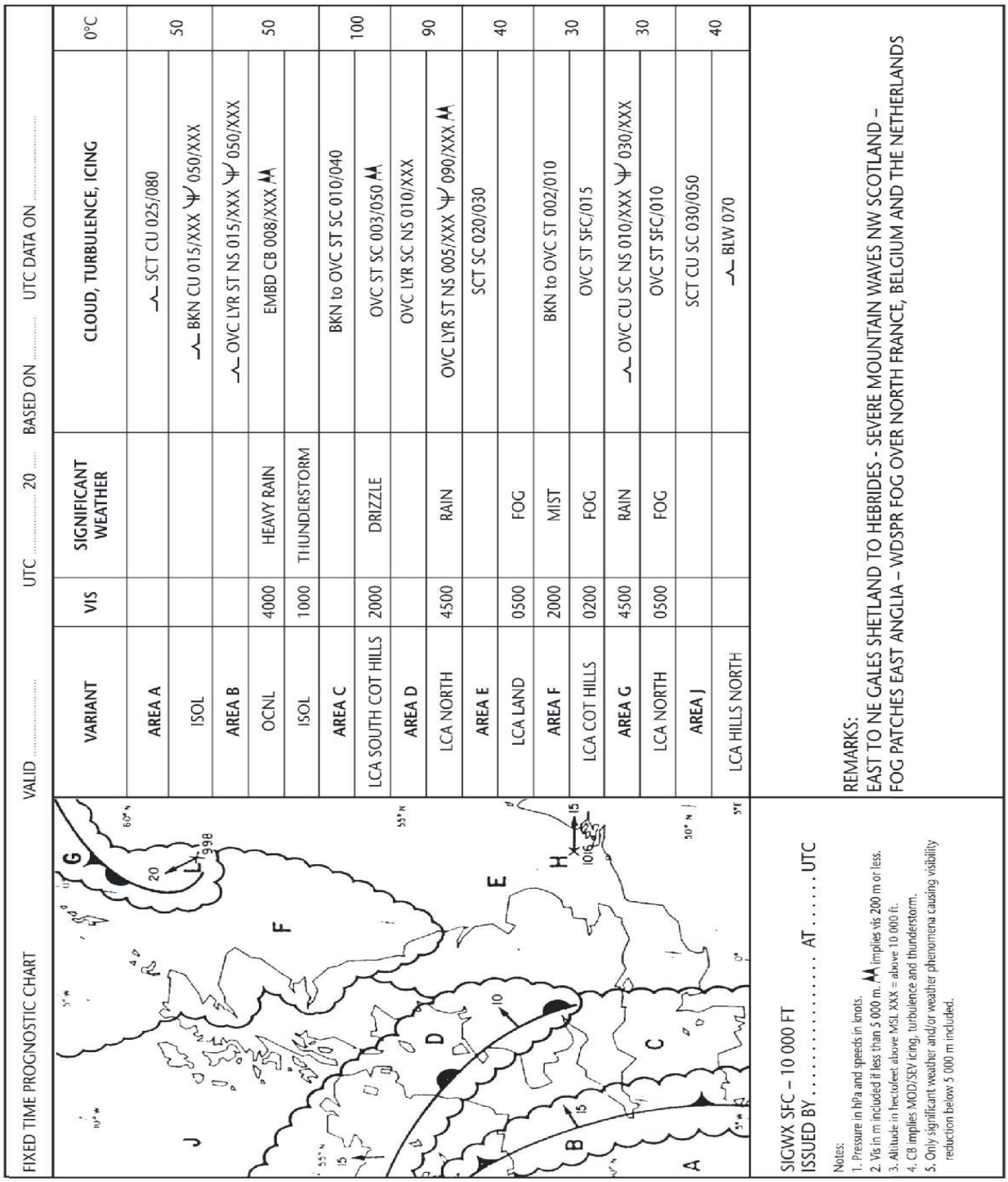
~~SIGNIFICANT WEATHER CHART (LOW LEVEL)~~

~~Example 1 MODEL S WL~~



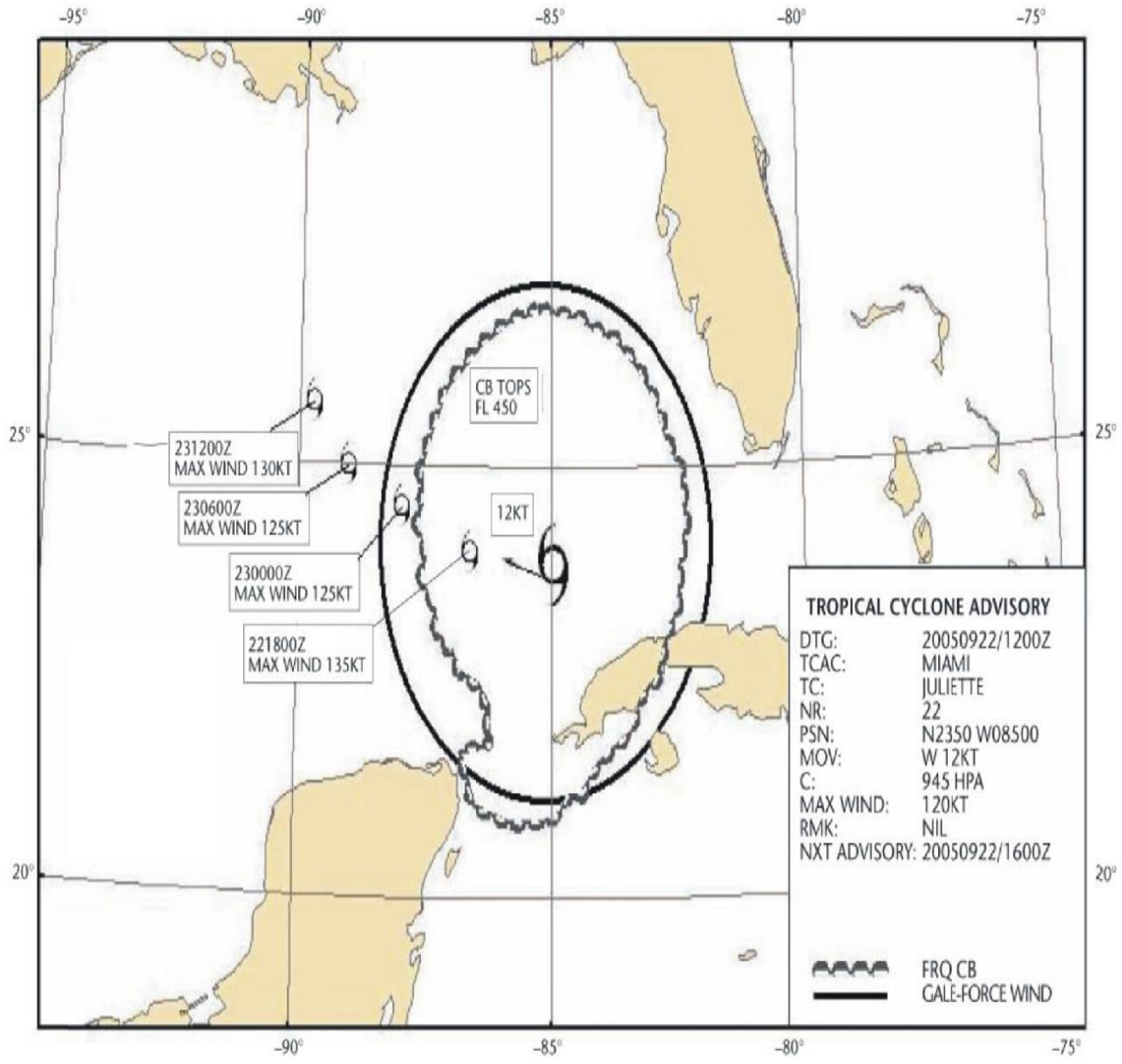
~~SIGNIFICANT WEATHER CHART (LOW LEVEL)~~

~~Example 2 MODEL S WL~~



~~TROPICAL CYCLONE ADVISORY INFORMATION IN GRAPHICAL FORMAT~~

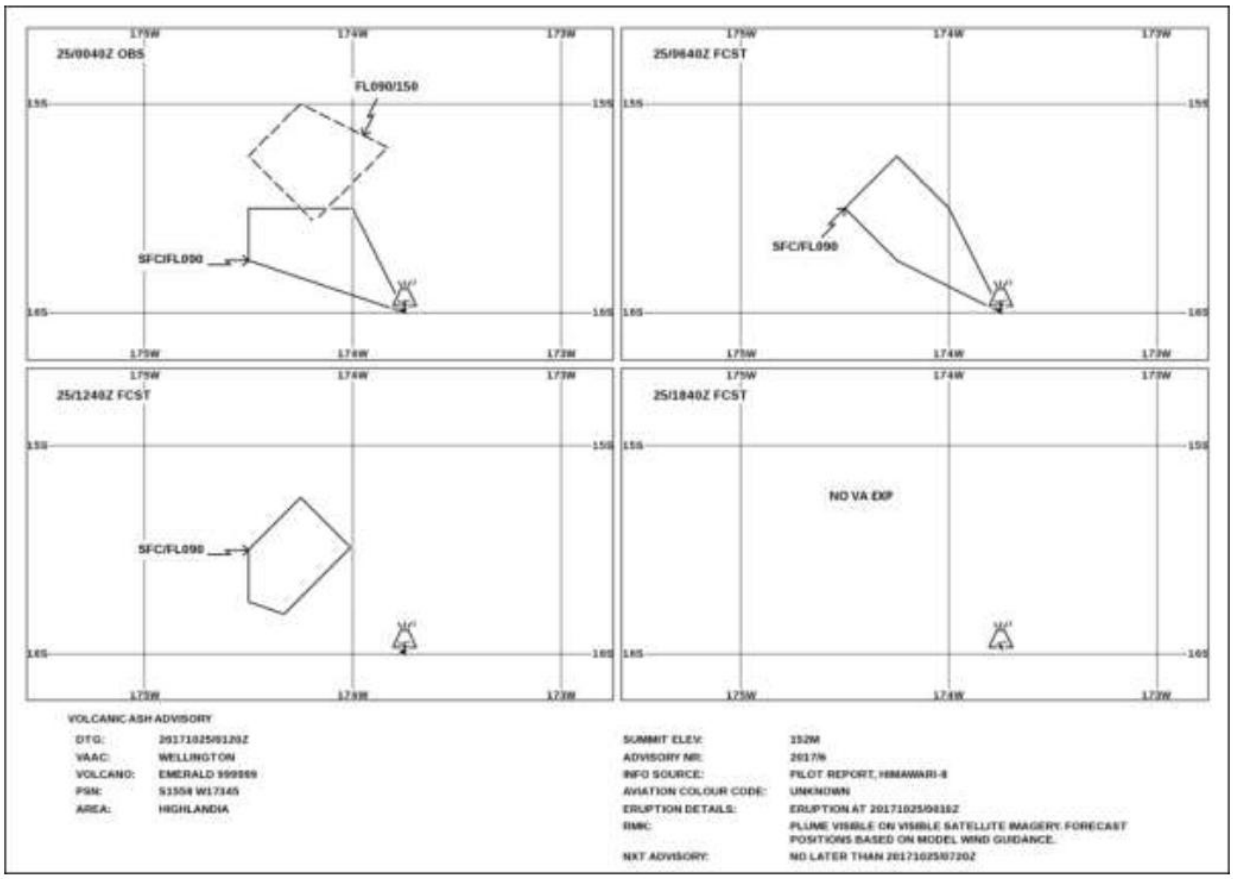
~~MODEL TCG~~



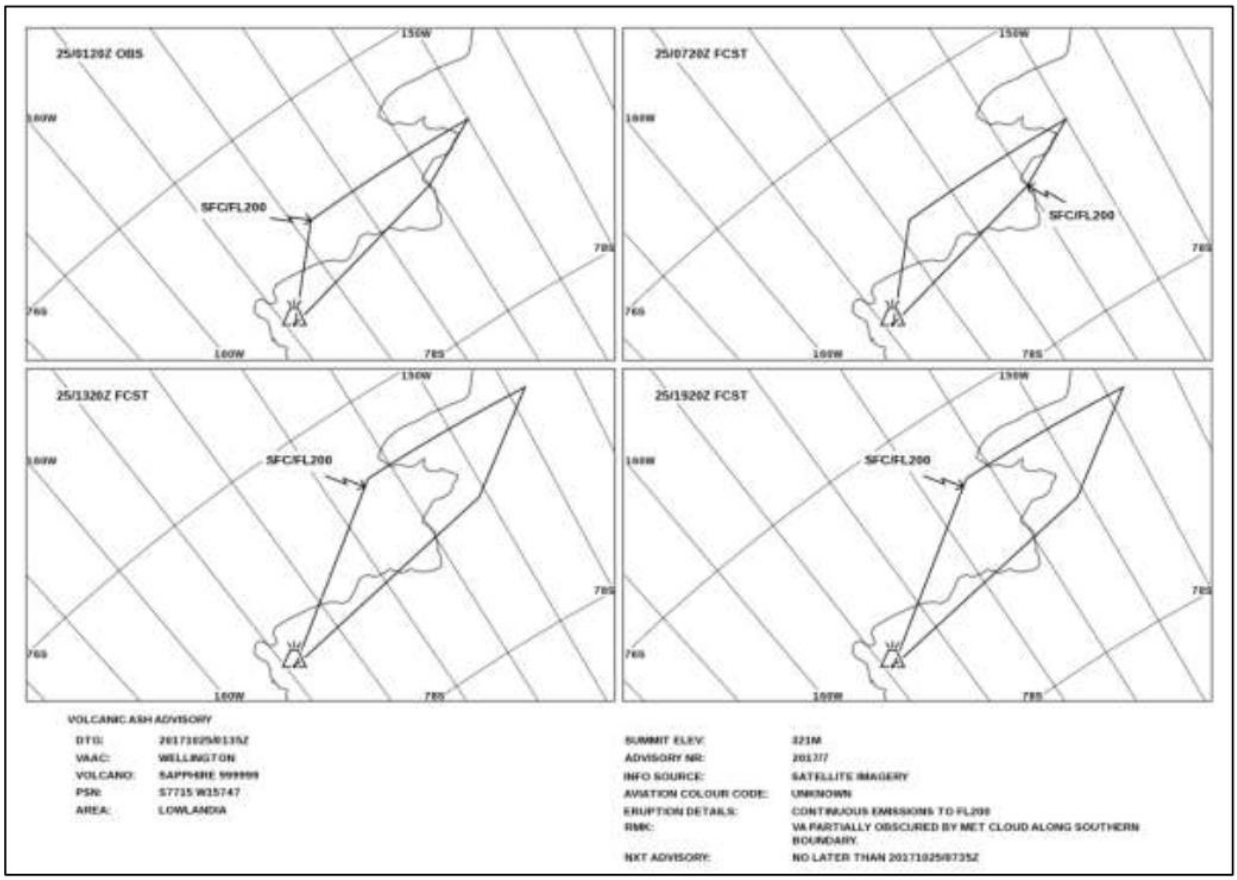
~~VOLCANIC ASH ADVISORY INFORMATION IN GRAPHICAL FORMAT~~

~~Example 1. Mercator projection~~

~~MODEL VA G~~

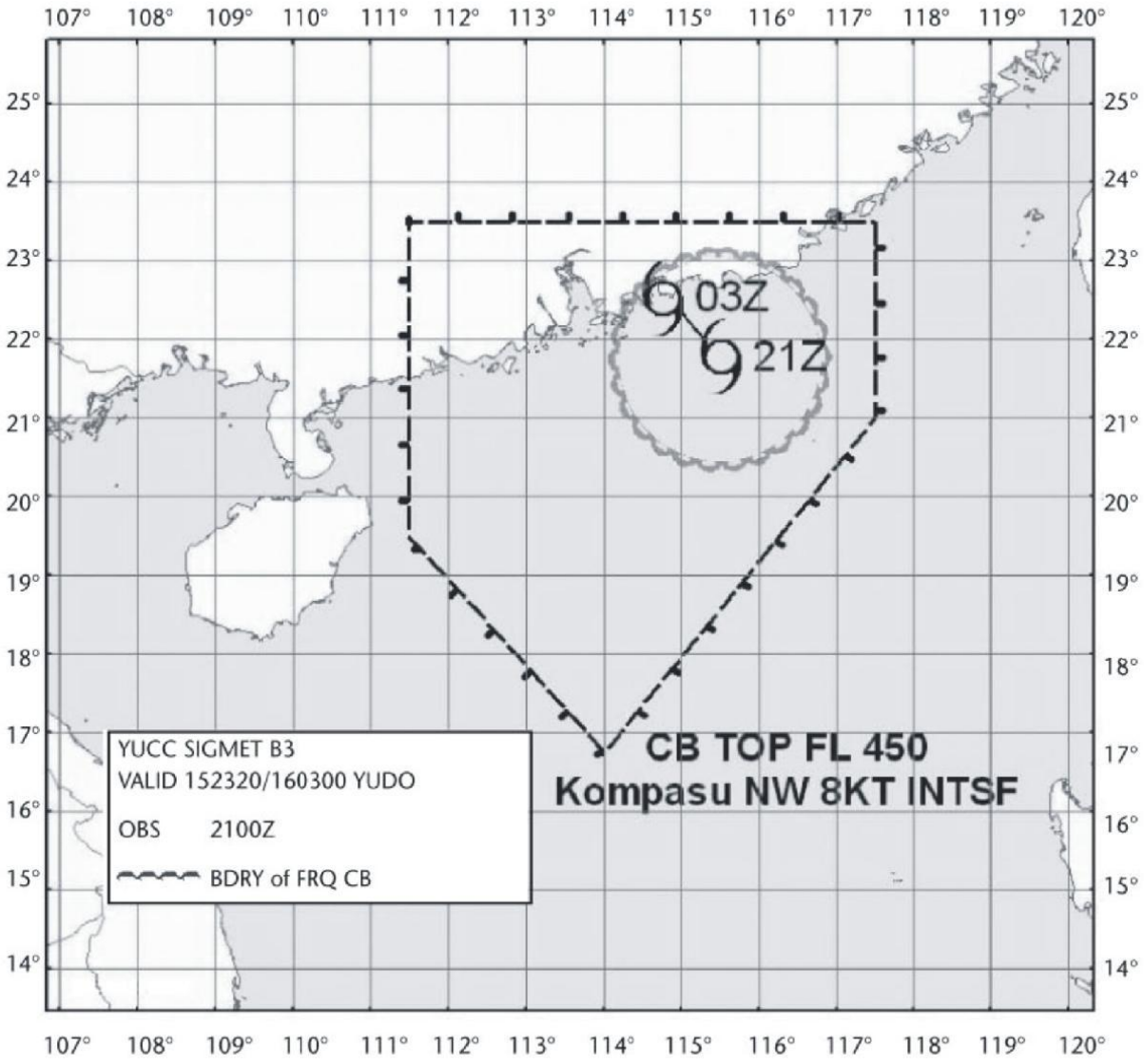

25/0040Z OBS
FL090/150
SFC/FL090
25/0640Z FCST
SFC/FL090
25/1240Z FCST
SFC/FL090
25/1840Z FCST
NO VA EXP
VOLCANIC ASH ADVISORY
DTG: 20171025/0120Z
VAAC: WELLINGTON
VOLCANO: EMERALD 999999
PSN: S1558 W17345
AREA: HIGHLANDIA
SUMMIT ELEV: 152M
ADVISORY NR: 2017/6
INFO SOURCE: PILOT REPORT, HIMAWARI-8
AVIATION COLOUR CODE: UNKNOWN
ERUPTION DETAILS: ERUPTION AT 20171025/0010Z
RMK: PLUME VISIBLE ON VISIBLE SATELLITE IMAGERY. FORECAST POSITIONS BASED ON MODEL WIND GUIDANCE.
NXT ADVISORY: NO LATER THAN 20171025/0720Z

Example 2. Polar stereographic projection



~~SIGMET FOR TROPICAL CYCLONE IN GRAPHICAL FORMAT~~

~~MODEL ST C~~

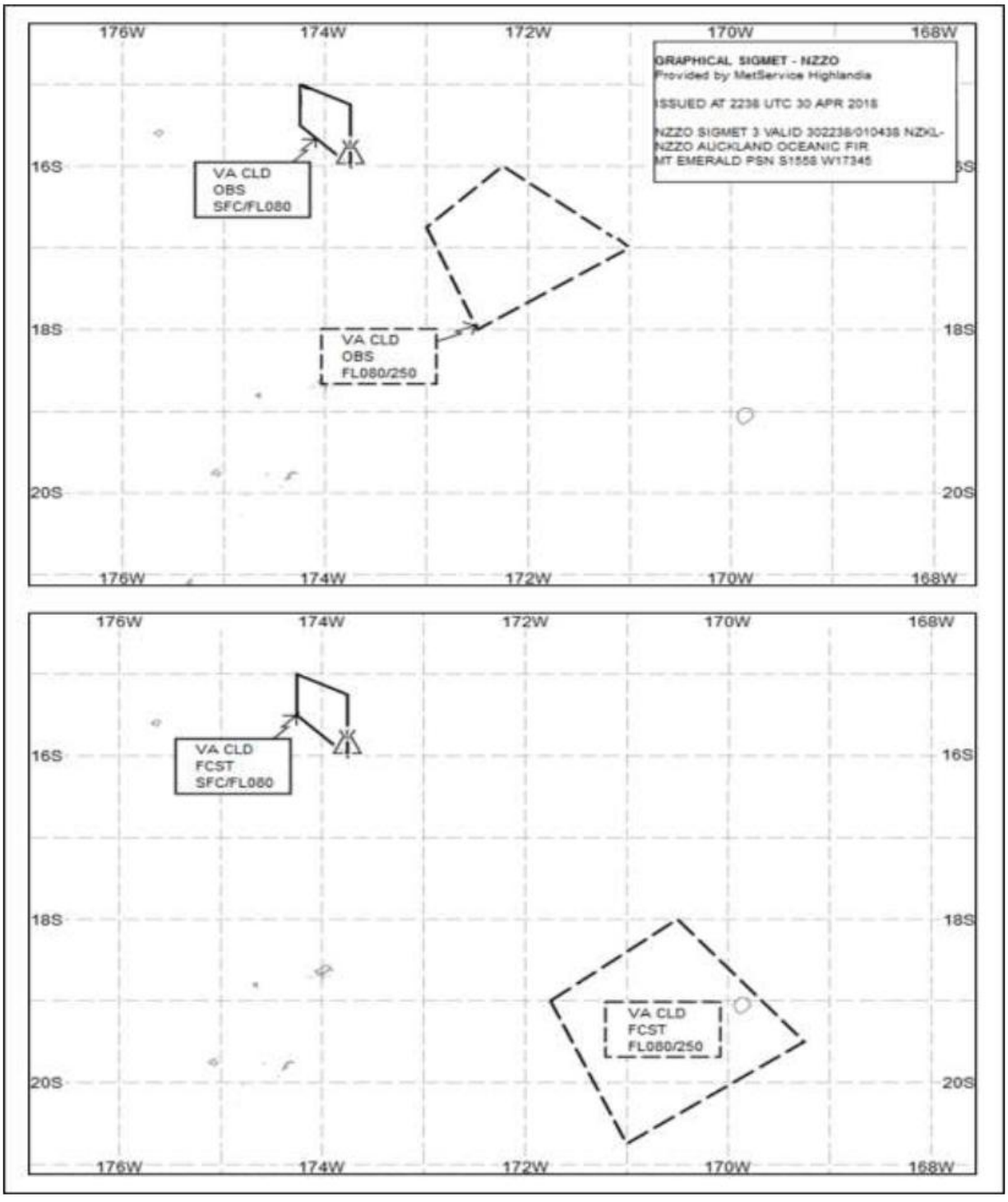


Note: Fictitious FIR.

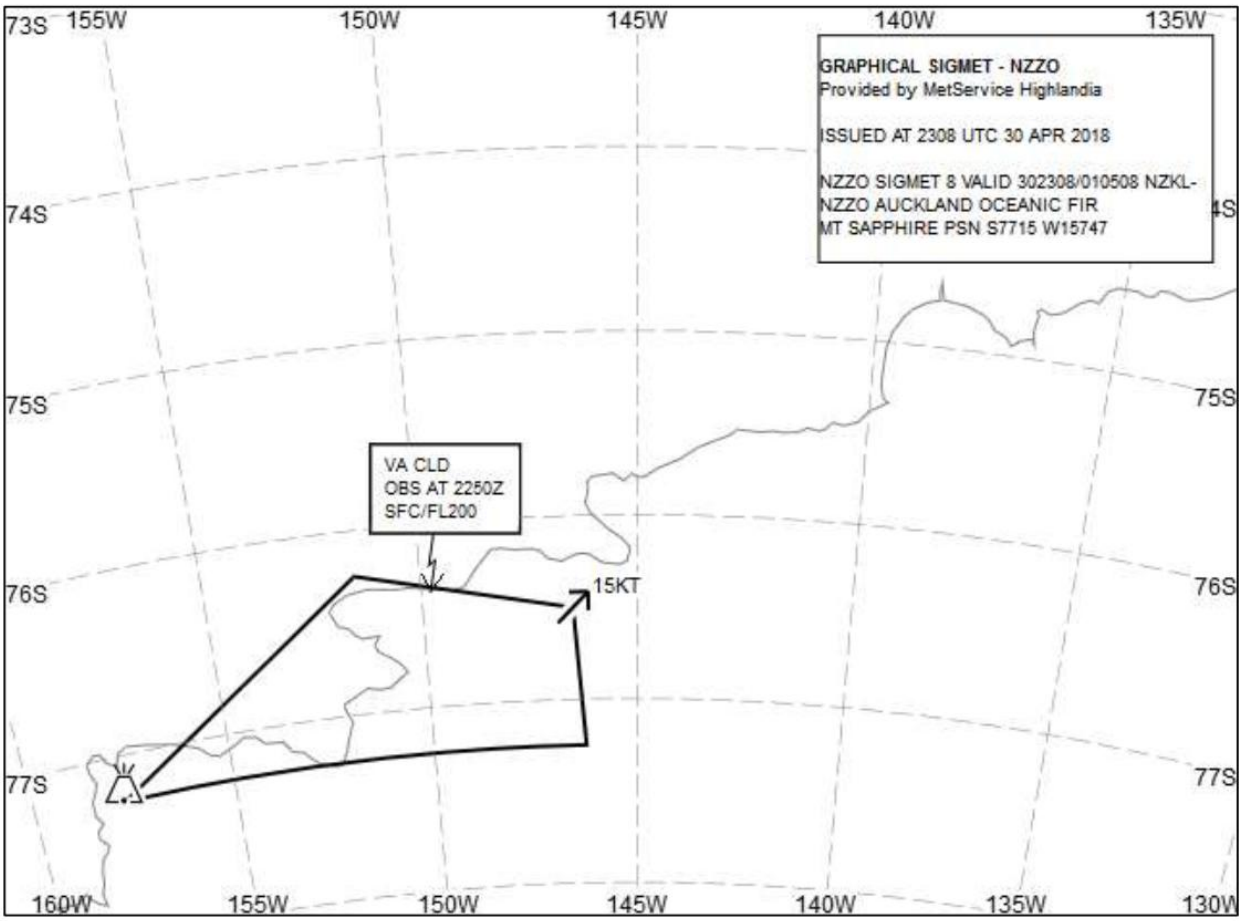
~~SIGMET FOR VOLCANIC ASH IN GRAPHICAL FORMAT~~

~~MODEL SVA~~

~~Example 1. Mercator projection~~

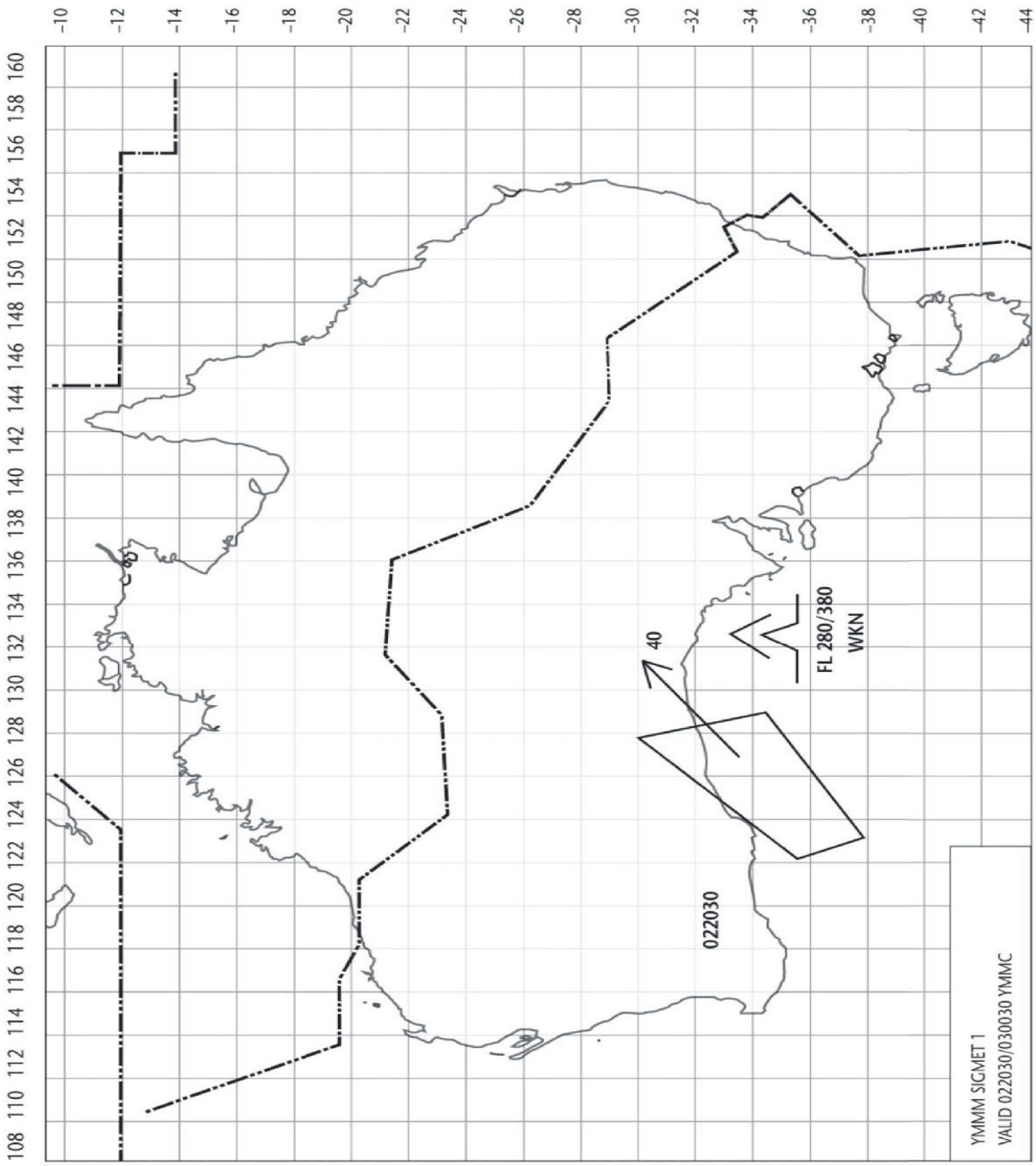

176W
174W
172W
170W
168W
16S
18S
20S
GRAPHICAL SIGMET - NZZO
Provided by MetService Highlandia
ISSUED AT 2238 UTC 30 APR 2018
NZZO SIGMET 3 VALID 302238/010438 NZKL-
NZZO AUCKLAND OCEANIC FIR
MT EMERALD PSN S1558 W17345
VA CLD
OBS
SFC/FL080
VA CLD
OBS
FL080/250
VA CLD
FCST
SFC/FL080
VA CLD
FCST
FL080/250

~~Example2. Polar stereographic projection~~



~~SIGMET FOR PHENOMENA OTHER THAN TROPICAL CYCLONE~~

~~MODEL SGEAND VOLCANIC ASH IN GRAPHICAL FORMAT~~



~~SHEET OF NOTATIONS USED IN FLIGHT DOCUMENTATION~~

~~MODEL S.N~~

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	S	Severe sand or dust haze
	Severe aircraft icing	S	Widespread sandstorm or duststorm
	Widespread fog	∞	Widespread haze
	Radioactive materials in the atmosphere**	=	Widespread mist
	Volcanic eruption***	~	Widespread smoke
	Mountain obscuration	~	Freezing precipitation****

* In-flight documentation for flights operating up to FL 100. This symbol refers to "squall line".

** The following information should be included in a separate text box on the chart: radioactive materials in the atmosphere symbol; latitude/longitude of release site; 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 the chart: volcanic eruption symbol; the name of the volcano (if known); and the latitude/longitude of the eruption.

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.

**** This symbol does not refer to icing due to precipitation coming into contact with an aircraft which is at a very low temperature.

Note: Height indications between which phenomena are expected, top above base as per chart legend.

2. Fronts and convergence zones and other symbols used

	Cold front at the surface	FL 270	Position, speed and level of maximum wind
	Warm front at the surface		Convergence line
	Occluded front at the surface	0°:100	Freezing level
	Quasi-stationary front at the surface		Intertropical concergence zone
H 460	Tropopause high	10	State of the sea
270	Tropopause low	18	Sea-surface temperature
380	Tropopause level	40	Widespread strong surface wind*

FL 320 220/400 FL 310

Wind arrows indicate the maximum wind in jet and the flight level at which it occurs. If the maximum wind speed is 60 m/s (120 kt) or more, the flight levels between which winds are greater than 40 m/s (80 kt) is placed below the maximum wind level. In the example, winds are greater than 40 m/s (80 kt) between FL 220 and FL 400.

The heavy line delineating the jet axis begins/ends at the points where a wind speed of 40 m/s (80 kt) is forecast.

‡ Symbol used whenever the height of the jet axis changes by +/–3000 ft or the speed changes by +/–20 kt

* This symbol refers to widespread surface wind speeds exceeding 15 m/s (30 kt).

3. Abbreviations used to describe clouds

3.1 Type

CI	= Cirrus	AS	= Altostratus	ST	= Stratus
CC	= Cirrocumulus	NS	= Nimbostratus	CU	= Cumulus
CS	= Cirrostratus	SC	= Stratocumulus	CB	= Cumulonimbus
AC	= Altocumulus				

3.2 Amount

Clouds except CB

FEW	= few (1/8 to 2/8)	BKN	= broken (5/8 to 7/8)
SCT	= scattered (3/8 to 4/8)	OVC	= overcast (8/8)

CB only

ISOL	= individual CBs (isolated)
OCNL	= well-separated CBs (occasional)
FRQ	= CBs with little or no separation (frequent)
EMBD	= CBs embedded in layers of other clouds or concealed by haze (embedded)

3.3 Heights

Heights are indicated on SWH and SWM charts in flight levels (FL), top over base. When XXX is used, tops or bases are outside the layer of the atmosphere to which the chart applies.

In SWL charts:

(a) Heights are indicated as altitudes above mean sea level;

(b) The abbreviation SFC is used to indicate ground level.

4. Depicting of lines and systems on specific charts

4.1 Models SWH and SWM – Significant weather charts (high and medium)

Scalloped line	=	demarcation of areas of significant weather
Heavy broken line	=	delineation of area of CAT
Heavy solid line interrupted by wind arrow and flight level	=	position of jet stream axis with indication of wind direction, speed in kt or m/s and height in flight levels. The vertical extent of the jet stream is indicated (in flight levels), e.g. FL 270 accompanied by 240/290 indicates that the jet extends from FL 240 to FL 290.
Flight levels inside small rectangles	=	height in flight levels of tropopause at spot locations, e.g. 340. Low and high points of the tropopause topography are indicated by the letters L or H, respectively, inside a pentagon with the height in flight levels. Display explicit FL for jet depths and tropopause height even if outside forecast bounds.

4.2 Model SWL – Significant weather chart (low level)

X	=	position of pressure centres given in hectopascals
L	=	centre of low pressure
H	=	centre of high pressure
Scalloped lines	=	demarcation of area of significant weather
Dashed lines	=	altitude of 0°C isotherm in feet (hectofeet) or metres Note: 0°C level may also be indicated by 0°:060, i.e. 0°C level is at an altitude of 6000 ft.
Figures on arrows	=	speed in kt or km/h of movement of frontal systems, depressions or anticyclones
Figure inside the state of the sea symbol	=	total wave height in feet or metres
Figure inside the sea-surface temperature	=	sea-surface temperature in °C
Figures inside the strong surface wind symbol	=	wind in kt or m/s

4.3 Arrows, feathers and pennants

Arrows indicate direction. Number of pennants and/or feathers correspond to speed.

Example: 270°/115 kt (equivalent to 57.5 m/s)
Pennants correspond to 50 kt or 25 m/s
Feathers correspond to 10 kt or 5 m/s
Half-feathers correspond to 5 kt or 2.5 m/s

* A conversion factor of 1 to 2 is used.

~~APPENDIX 2. TECHNICAL SPECIFICATIONS RELATED TO GLOBAL SYSTEMS, SUPPORTING CENTRES AND METEOROLOGICAL OFFICES~~

~~(See Chapter 3 of this Regulation.)~~

~~1. WORLD AREA FORECAST SYSTEM~~

~~1.1 Formats and codes~~

~~WAFCs shall adopt uniform formats and codes for the supply of forecasts.~~

~~1.2 Upper-air gridded forecasts~~

~~1.2.1~~ **~~The forecasts of upper wind; upper-air temperature; and humidity; direction, speed and flight level of maximum wind; flight level and temperature of tropopause, areas of cumulonimbus clouds, icing, and geopotential altitude of flight levels shall be prepared four times a day by a WAFC and shall be valid for fixed valid times at 6, 9, 12, 15, 18, 21, 24, 27, 30, 33 and 36 hours after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based. Each forecast shall be as soon as technically feasible but not later than 5 hours after standard time of observation.~~**

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

~~a) wind and temperature data for flight levels 50 (850 hPa), 80 (750 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 210 (450 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) 480 (125 hPa) and 530 (100 hPa);~~

~~b) flight level and temperature of tropopause;~~

~~c) direction, speed and flight level of maximum wind;~~

~~d) humidity data for flight levels 50 (850 hPa), 80 (750 hPa), 100 (700 hPa), 140 (600 hPa) and 180 (500 hPa);~~

~~e) horizontal extent and flight levels of base and top of cumulonimbus clouds;~~

~~f) icing for layers centred at flight levels 60 (800 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa) and 300 (300 hPa);~~

~~*Note. — Layers centred at a flight level referred to in f) have a depth of 100 hPa.*~~ ~~turbulence for layers centred at flight levels 100 (700 hPa), 140 (600 hPa), 180 (500 hPa),240 (400 hPa), 270 (350 hPa), 300 (300 hPa), 340 (250 hPa), 390 (200 hPa) and 450 (150 hPa); and~~

~~*Note 1. - Layers centred at a flight level referred to in g) have a depth of 100 hPa for flight levels below 240, then 50 hPa for flight levels 240 and above .*~~

~~*Note 2. — Turbulence referred to in g) above encompasses all types of turbulence, including clear-air and in-cloud turbulence*~~

~~h) geopotential altitude data for flight levels 50 (850 hPa), 80 (750 hPa), 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 210 (450 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), 480 (125 hPa) and 530 (100 hPa).~~

Note.— The exact pressure levels (hPa) for a), d), f), g), and h) are provided in the Manual of Aeronautical Meteorological Practice (Doc 8896).

1.2.3 The foregoing grid point forecasts shall be issued by a WAFC in binary code form using the GRIB code form prescribed by WMO.

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

1.2.4 The foregoing grid point forecasts a), b), c), d) and h) shall be prepared by a WAFC in a regular grid with a horizontal resolution of 1.25° of latitude and longitude.

1.2.5 The foregoing grid point forecasts e), f) and g) shall be prepared by a WAFC in a regular grid with a horizontal resolution of 0.25° of latitude and longitude

1.3 Significant weather (SIGWX) forecasts

1.3.1 General provisions

1.3.1.1 Forecasts of significant en-route weather phenomena shall be prepared as SIGWX forecasts four times a day by a WAFC and shall be valid for fixed valid times at 24 hours after the time (0000, 0600, 1200 and 1800 UTC) of the synoptic data on which the forecasts were based. Each forecast shall be disseminated as soon as technically feasible but not later than 7 hours after standard time of observation under normal operations and not later than 9 hours after standard time of observation during backup operations..

1.3.1.2 SIGWX forecasts shall be issued in binary code form using the BUFR code form prescribed by WMO.

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

1.3.1.3 As of 4 November 2021, in addition to 1.3.1.2, SIGWX forecasts should be disseminated in IWXXM GML form.

Note 1*. — Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003).*

Note 2*. — Geography markup language (GML) is an encoding standard of the Open Geospatial Consortium (OGC).*

1.3.2 Types of SIGWX forecasts

SIGWX forecasts shall be issued as high-level SIGWX forecasts for flight levels between 250 and 630.

Note. *- Medium-level SIGWX forecasts for flight levels between 100 and 250 for limited geographical areas will continue to be issued until such time that flight documentation to be generated from the gridded forecasts of cumulonimbus clouds, icing and turbulence fully meets user requirements.*

1.3.3 Items included in SIGWX forecasts

SIGWX forecasts shall include the following items:

a) tropical cyclone provided that the maximum of the 10-minute mean surface wind speed is expected to reach or exceed 17 m/s (34 kt);

b) severe squall lines;

c) moderate or severe turbulence (in cloud or clear air);

d) moderate or severe icing;

e) widespread sandstorm/duststorm;

f) cumulonimbus clouds associated with thunderstorms and with a) to e);

Note: *- Non-convective cloud areas associated with in-cloud moderate or severe turbulence and/or moderate or severe icing are to be included in the SIGWX forecasts.*

g) flight level of tropopause;

h) jet streams;

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 the chart, the volcanic eruption symbol, the name of the volcano (if known) and the latitude/longitude of the eruption. 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 a release of radioactive materials into the atmosphere of significance to aircraft operations, comprising: the radioactive materials in the atmosphere symbol at the location of the release and, in a separate text box on the chart, the radioactive materials in the atmosphere symbol, latitude/longitude of the site of the release, 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".

Note 1.- *Medium-level SIGWX forecasts include all the items above.*

Note 2.- *Items to be included in low-level SIGWX forecasts (i.e. flight levels below 100) are included in Appendix 5.*

1.3.4 Criteria for including items in SIGWX forecasts the following criteria shall be applied for SIGWX forecasts:

a) items a) to f) in 1.3.3 shall only be included if expected to occur between the lower and upper levels of the SIGWX forecast;

b) the abbreviation "CB" shall only be included when it refers to the occurrence or expected occurrence of cumulonimbus clouds:

1) affecting an area with a maximum spatial coverage of 50 per cent or more of the area concerned;

2) along a line with little or no space between individual clouds; or

3) embedded in cloud layers or concealed by haze;

c) the inclusion of "CB" shall be understood to include all weather phenomena normally associated with cumulonimbus clouds, i.e. thunderstorm, moderate or severe icing, moderate or severe turbulence and hail;

d) where a volcanic eruption or a release of radioactive materials into the atmosphere warrants the inclusion of the volcanic eruption symbol or the 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

e) in the case of co-incident or the partial overlapping of items a), i) and j) in 1.3.3, the highest priority shall be given to item i), followed by items j) and a). The item with the highest priority shall be placed at the location of the event, and an arrow shall be used to link the location of the other item(s) to its associated symbol or text box.

2. AERODROME METEOROLOGICAL OFFICES

2.1 Use of WAFS products

2.1.1 Aerodrome meteorological offices shall use forecasts issued by the WAFCs in the preparation of flight documentation, whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, unless otherwise agreed between the meteorological authority and the operator concerned.

2.1.2 In order to ensure uniformity and standardization of flight documentation, the WAFS GRIB and BUFR data received and, as of 4 November 2021, IWXXM data received, shall be decoded into standard WAFS charts in accordance with relevant provisions in this Regulation, and the meteorological content and identification of the originator of the WAFS forecasts shall not be amended.

2.2 Notification of WAFC concerning significant discrepancies

Aerodrome meteorological offices using WAFS BUFR or, as of 4 November 2021, IWXXM data shall notify the WAFC concerned immediately if significant discrepancies are detected or reported in respect of WAFS SIGWX forecasts concerning:

a) icing, turbulence, cumulonimbus clouds that are obscured, frequent, embedded or occurring at a squall line, and sandstorms/duststorms; and

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

The WAFC receiving the message shall acknowledge its receipt to the originator, together with a brief comment on the report and any action taken, using the same means of communication employed by the originator.

Note: *Guidance on reporting significant discrepancies is provided in the* Manual of Aeronautical Meteorological Practice *(Doc 8896).*

3. VOLCANIC ASH ADVISORY CENTRES (VAAC)

3.1 Volcanic ash advisory information

3.1.1 The advisory information on volcanic ash issued in abbreviated plain language, using approved ICAO abbreviations and numerical values of self-explanatory nature, shall be in accordance with the template shown in Table A2-1. When no approved ICAO abbreviations are available, English plain language text, to be kept to a minimum, shall be used.

3.1.2 As of 5 November 2020, volcanic ash advisory information shall be disseminated in IWXXM GML form in addition to the issuance of this advisory information in accordance with 3.1.1.

Note. The technical specifications for IWXXM are contained in the Manual on Codes (WMO-No. 306), Volume I.3, Part D — Representation Derived from Data Models. Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003).

3.1.5 The volcanic ash advisory information listed in Table A2-1, when prepared in graphical format, shall be as specified in Appendix 1 and issued using the portable network graphics (PNG) format.

4. STATE VOLCANO OBSERVATORIES

4.1 Information from State volcano observatories

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

a) for significant pre-eruption volcanic activity: the date/time (UTC) of report; name and, if known, number of the volcano; location (latitude/longitude); and description of volcanic activity; and

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; 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 their associated ACCs/FICs, MWO and VAAC. The VONA format is included in the* Handbook on the International Airways Volcano Watch (IAVW) — Operational Procedures and Contact List *(Doc 9766) which is available on the ICAO IAVWOPSG website.*

5.1 Tropical cyclone advisory information

5.1.1 The advisory information on tropical cyclones shall be issued for tropical cyclones when the maximum of the 10-minute mean surface wind speed is expected to reach or exceed 17 m/s (34 kt) during the period covered by the advisory.

5.1.2 The advisory information on tropical cyclones disseminated in abbreviated plain language, using approved ICAO abbreviations and numerical values of self-explanatory nature, shall be in accordance with the template shown in Table A2-2.

5.1.3 Until 4 November 2020, tropical cyclone advisory information in IWXXM GML form in addition to the issuance of this advisory information in accordance with 5.1.2 .

5.1.4 As of 5 November 2020, tropical cyclone advisory centres shall disseminate tropical cyclone advisory information in IWXXM GML form in addition to the dissemination of this advisory information in abbreviated plain language in accordance with 5.1.2.

~~6. SPACE WEATHER CENTRES~~

~~6.1 Space weather advisory information~~

~~6.1.1 Advisory information on space weather should be issued in abbreviated plain language, using approved ICAO abbreviations and numerical values of self-explanatory nature, and should be in accordance with the~~

~~template shown in Table A2-3. When no approved ICAO abbreviations are available, English plain language text, to be kept to a minimum, should be used.~~

~~6.1.2 As of 7 November 2019 until 4 November 2020, space weather advisory information should be made available in IWXXM GML form, in addition to the dissemination of space weather advisory information in abbreviated plain language in accordance with 6.1.1.~~

~~6.1.2 As of 5 November 2020, space weather advisory information shall be disseminated in IWXXM GML form, in addition to the dissemination of this advisory information in abbreviated plain language in accordance with 6.1.1.~~

~~*Note.— The technical specifications for IWXXM are contained in the Manual on Codes (WMO – No.306), Volume I.3, Part D — Representations Derived from Data Models. Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003).*~~

~~6.1.3 One or more of the following space weather effects should be included in the space weather advisory information, using their respective abbreviations as indicated below:~~

~~- HF communications (propagation, absorption) HF COM~~

~~- Communications via satellite (propagation, absorption) SATCOM~~

~~- GNSS based navigation and surveillance (degradation) GNSS~~

~~- Radiation at flight levels (increased exposure) RADIATION~~

~~6.1.4 The following intensities should be included in space weather advisory information, using their respective abbreviations as indicated below:~~

~~- moderate MOD~~

~~- severe SEV~~

~~*Note.— Guidance on the use of these intensities is provided in the Manual on Space Weather Information in Support of International Air Navigation (Doc 10100).*~~

~~6.1.5 Updated advisory information on space weather phenomena should be issued as necessary but at least every six hours until such time as the space weather phenomena are no longer detected and/or are no longer expected to have an impact.~~

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

Key: M = inclusion mandatory, part of every message;

O = inclusion optional;

C = inclusion conditional, included whenever applicable;

= = 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*
1	Identification of the type of message (M)	Type of message	VA ADVISORY	VA ADVISORY
2	Status indicator (C) 1	Indicator of test or exercise	STATUS: TEST or EXER	STATUS TEST STATUS: EXER
3	Time of origin (M)	Year, month, day, time in UTC	DTG: nnnnnnnn/nnnnZ	DTG: 20080923/0130Z
4	Name of VAAC (M)	Name of VAAC	VAAC: nnnnnnnnnnn	VAAC: TOKYO
5	Name of volcano (M) (M)	Name and IAVCEI[1] number of volcano	VOLCANO: nnnnnnnnnnnnnnnnnnnnnn [nnnnnn] *or* UNKNOWN *or* UNNAMED	VOLCANO : KARYMSKY 300130 VOLCANO : UNNAMED UNKNOWN
6	Location of volcano (M)	Location of volcano in degrees and minutes	PSN: nnnnn *or* Snnnn Wnnnnn *or* Ennnnn *or* UNKNOWN	PSN: N5403 E15927 PSN:
7	State *or* region (M)	State, *or* region if ash is not reported over a State	AREA: nnnnnnnnnnnnnnnn Or UNKNOWN	AREA: RUSSIA UNKNOWN
8	Summit elevation (M)	Summit elevation in m (*or* ft)	SUMMIT ELEV: nnnnM (*or* nnnnnFT)	SUMMIT ELEV: 1536M

9	Advisory number (M)	Advisory number: year in full and message number (separate sequence for each volcano)	ADVISORY NR:	nnnn/nnnn	ADVISORY NR:	2008/4
10	Information source (M)	Information source using free text	INFO SOURCE:	*Free text up to 32 characters*	INFO SOURCE:	HIMAWARI-8 KVERT KEMSD
11	Colour code (O)	Aviation colour code	AVIATION COLOUR CODE:	RED *or* ORANGE *or* YELLOW *or* GREEN *or* UNKNOWN *or* NOT GIVEN *or* NIL	AVIATION COLOUR CODE:	RED

Element		*Detailed content*	*Template(s)*		*Examples*	
12	Eruption details (M)	Eruption details (including date/time of eruption(s))	ERUPTION DETAILS:	*Free text up to 64 characters* *or* UNKNOWN	ERUPTION DETAILS:	ERUPTION AT 20080923/0000Z FL300 REPORTED NO ERUPTION – RESUSPENDED VA6 UNKNOWN
13	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
14	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]]	OBS VA CLD:	FL250/300 N5 E15930 – 400 N5 E16100 – 400 N5 E15945 300 MOV SE 20KT SFC/FL200 N5 E16130 – 130 N5 E16230 – 130 N5 E16230 – 230 N5 E16130 230 MOV SE 15KT TOP FL240 MOV W 40KMH

			~~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)[3] *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)~~	~~VA NOT IDENTIFIABLE FM SATELLITE DATA WIND FL050/070 180/12MPS~~

Element		Detailed content	Template(s)		Examples	
15	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 N5 E16030 – 130 N5 E16230 – 130 N5 E16230 – 330 N5 E16030 330 SFC/FL180 N4 E16330 – 830 N4 E16630 – 830 N5 E16630 – 130 N5 E16330 130 NO VA EXP NOT AVBL NOT PROVIDED
16	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

Element		Detailed content	Template(s)		Examples	
17	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
18	Remarks (M)	Remarks, as necessary	RMK:	*Free text up to 256 characters* *or* NIL	RMK:	LATEST REP FM KVERT (0120Z) INDICATES ERUPTION HAS CEASED. TWO DISPERSING VA CLD ARE EVIDENT ON SATELLITE IMAGERY RE-SUSPENDED VA[6,7] NIL
19	Next advisory (M)	Year, month, day and time in UTC	NXT ADVISORY:	nnnnnnnn/nnnnZ *or* NO LATER THAN nnnnnnnn/nnnnZ *or* NO FURTHER ADVISORIES *or* WILL BE ISSUED BY nnnnnnnn/nnnnZ	NXT ADVISORY:	20080923/0730Z NO LATER THAN nnnnnnnn/nnnnZ NO FURTHER ADVISORIES WILL BE ISSUED BY nnnnnnnn/nnnnZ

Notes.—

1. Used only when the message issued to indicate that a test or an exercise is taking place. When the word "TEST" or the abbreviation "EXER" is included, the message may contain information that should not be used operationally or will otherwise end immediately after the word "TEST". [Applicable 7 November 2019]

2. International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI).

3. 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.

4. Up to 4 selected layers.

5. If ash reported (e.g. AIREP) but not identifiable from satellite data.

6. To be included (as free text) only for those situations where volcanic ash has been re-suspended.

7. To be included (as free text) where space in the remarks section allows.

Example A2-1. Advisory message for volcanic ash

FVFE01 RJTD 230130	
VA ADVISORY	
DTG:	20080923/0130Z
VAAC:	TOKYO
VOLCANO:	KARYMSKY 300130
PSN:	N5403 E15927
AREA:	RUSSIA
SUMMIT ELEV:	1536M
ADVISORY NR:	2008/4
INFO SOURCE:	HIMAWARI-8 KVERT KEMSD
AVIATION COLOUR CODE:	RED
ERUPTION DETAILS:	ERUPTION AT 20080923/0000Z FL300 REPORTED
OBS VA DTG:	23/0100Z
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
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
FCST VA CLD +12 HR:	23/1300Z SFC/FL270 N4830 E16130 – N4830 E16600 – N5300 E16600 – N5300
	E16130
FCST VA CLD +18 HR:	23/1900Z NO VA EXP
RMK:	LATEST REP FM KVERT (0120Z) INDICATES ERUPTION HAS CEASED.
	TWO DISPERSING VA CLD ARE EVIDENT ON SATELLITE IMAGERY
NXT ADVISORY:	20080923/0730Z

Table A2-2. Template for advisory message for tropical cyclones

Key: M = inclusion mandatory, part of every message;

C = inclusion conditional, included whenever applicable;

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 tropical cyclones 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 21 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*
1	Identification of the type of message (M)	Type of message	TC ADVISORY	TC ADVISORY
2	Status indicator (C)[1]	Indicator of test or exercise	STATUS: TEST or EXER	STATUS: TEST STATUS: EXER
3	Time of origin (M)	Year, month, day and time in UTC of issue	DTG: nnnnnnnn/nnnnZ	DTG: 040925/1600Z
4	Name of TCAC (M)	Name of TCAC (location indicator *or* full name	TCAC: nnnn *or* nnnnnnnnnn	TCAC: YUFO[1] TCAC: MIAMI
5	Name of tropical Cyclone (M)	Name of tropical cyclone *or* "NN" for unnamed tropical cyclone	TC: nnnnnnnnnnnn *or* NN	TC: GLORIA
6	Advisory number (M)	Advisory number: Year in full and message number separate sequence (for each cyclone)	ADVISARY NR: Nnnn(n)(n)nn	ADVISARYNR: 2004/13
7	Observed position of the centre (M)	Day and time (in UTC) and position of the centre of the tropical cyclone (in degrees and minutes)	OBS PS Nn/nnnnZ Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]	OBS PSN: CB:25/1800z N2706 W07306

8	bserved CB cloud3 (O)	Location of CB cloud (referring to latitude and longitude (in degrees and minutes)) and vertical extent (flight level)	CB: WI nnnKM (or nnnNM) OF TC CENTRE or WI4 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]] TOP [ABV or BLW] FLnnn	WI 250NM OF TC CENTRE TOP FL500 NIL
9	Direction and speed of movement (M)	Direction and speed of movement given in sixteen compass points and km/h (*or* kt), respectively, *or* moving slowly (< 6 km/h (3 kt)) *or* stationary (< 2 km/h (1 kt))	MOV: N nnKMH (*or* KT) *or* NNE nnKMH (*or* KT) *or* NE nnKMH (*or* KT) *or* ENE nnKMH (*or* KT) *or* E nnKMH (*or* KT) *or* ESE nnKMH (*or* KT) *or* SE nnKMH (*or* KT) *or* SSE nnKMH (*or* KT) *or* S nnKMH (*or* KT) *or* SSW nnKMH (*or* KT) *or* SW nnKMH (*or* KT) *or* WSW nnKMH (*or* KT) *or* W nnKMH (*or* KT) *or* WNW nnKMH (*or* KT) *or* NW nnKMH (*or* KT) *or* NNW nnKMH (*or* KT) *or* SLW *or* STNR	MOV: NW 20KMH
10	Changes in intensity (M)	Changes of maximum surface wind speed at time of observation	INTST CHANGE: INTSF or WKN or NC	NTST CHANGE: INTSF
11	Central pressure (M)	Central pressure (in hPa)	C: nnnHPA	C: 965HPA
12	Maximum surface Wind (M)	Maximum surface wind near the centre (mean over 10 minutes, in m/s (*or* kt))	MAX WIND: nn[n]MPS (*or* nn[n]KT)	MAX WIND: 22MPS
13	Forecast of centre position (+6 HR) (M)	Day and time (in UTC) (6 hours from the "DTG" given in Item 2); Forecast position (in degrees and minutes) of the centre of the tropical cyclone	FCST PSN +6 HR: nn/nnnnZ Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]	FCST PSN +6 HR: 25/2200Z N2748 W07350

14	Forecast of maximum surface wind (+6 HR) (M)	Forecast of maximum surface wind (6 hours after the "DTG" given in Item 2)	FCST MAX WIND +6 HR:	nn[n]MPS (or nn[n]KT)	FCST MAX WIND +6 HR:	22MPS
15	Forecast of centre position (+12 HR) (M)	Day and time (in UTC) (12 hours from the "DTG" given in Item 2); Forecast position (in degrees and minutes) of the centre of the tropical cyclone	FCST PSN +12 HR:	nn/nnnnZ Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]	FCST PSN +12 HR:	26/0400Z N2830 W07430
16	Forecast of maximum surface wind (+12 HR)	Forecast of maximum surface wind (12 hours after the "DTG" given in Item 2)	FCST MAX WIND +12 HR:	nn[n]MPS (or nn[n]KT)	FCST MAX WIND +12 HR:	22MPS
17	Forecast of centre position (+18 HR) (M)	Day and time (in UTC) (18 hours from the "DTG" given in Item 2); Forecast position (in degrees and minutes) of the centre of the tropical cyclone	FCST PSN +18 HR:	nn/nnnnZ Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]	FCST PSN +18 HR:	26/1000Z N2852 W07500
18	Forecast of maximum surface wind (+18 HR) (M)	Forecast of maximum surface wind (18 hours after the "DTG" given in Item 2)	FCST MAX WIND +18 HR:	nn[n]MPS (or nn[n]KT)	FCST MAX WIND +18 HR:	21MPS

Element		Detailed content	Template(s)		Examples	
19	Forecast of centre position (+24 HR) (M)	Day and time (in UTC) (24 hours from the "DTG" given in Item 2); Forecast position (in degrees and minutes) of the centre of the tropical cyclone	FCST PSN +24 HR:	nn/nnnnZ Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]	FCST PSN +24 HR:	26/1600Z N2912 W07530
20	Forecast of maximum surface wind (+24 HR) (M)	Forecast of maximum surface wind (24 hours after the "DTG" given in Item 2)	FCST MAX WIND +24 HR:	nn[n]MPS (*or* nn[n]KT)	FCST MAX WIND +24 HR:	20MPS
21	Remarks (M)	Remarks, as necessary	RMK:	*Free text up to 256 characters* *or* NIL	RMK:	NIL
22	Expected time of issuance of next advisory (M)	Expected year, month, day and time (in UTC) of issuance of next advisory	NXT MSG:	[BFR] nnnnnnnn/nnnnZ *or* NO MSG EXP	NXT MSG:	20040925/2000Z

Note.—

1. *Used only when the message issued to indicate that a test or an exercise is taking place. When the word "TEST" or the abbreviation "EXER" is included, the message may contain information that should not be used operationally or will otherwise end immediately after the word "TEST". [Applicable 7 November 2019]*
2. *Fictitious location.*
3. *In the case of CB clouds associated with a tropical cyclone covering more than one area within the area of responsibility, this element can be repeated, as necessary*
4. *The number of coordinates should be kept to a minimum and should not normally exceed seven.*

~~Example A2-2. Advisory message for tropical cyclones~~

~~TC ADVISORY~~

~~DTG:~~	~~20040925/1900Z~~
~~TCAC:~~	~~YUFO~~
~~TC:~~	~~GLORIA~~
~~ADVISARY NR:~~	~~2004/13~~
~~OBS PSN:~~	~~25/1800Z N2706 W07306~~
~~CB:~~	~~WI 25NM OF TC CENTRE~~
~~MOV:~~	~~NW 20KMH~~
~~INTST CHANGE:~~	~~INTSF~~
~~C:~~	~~965HPA~~
~~MAX WIND:~~	~~25MPS~~
~~FCST PSN +6 HR:~~	~~25/2200Z N2748 W07350~~
~~FCST MAX WIND +6 HR:~~	~~22MPS~~
~~FCST PSN +12 HR:~~	~~26/0400Z N2830 W07430~~
~~FCST MAX WIND +12 HR:~~	~~22MPS~~
~~FCST PSN +18 HR~~	~~26/1000Z N2852 W07500~~
~~FCST MAX WIND +18 HR:~~	~~21MPS~~
~~FCST PSN +24 HR:~~	~~26/1600Z N2912 W07530~~
~~FCST MAX WIND +24 HR:~~	~~20MPS~~
~~RMK:~~	~~NIL~~
~~NXT MSG:~~	~~20040925/2000Z~~

Table A2-3. Template for advisory message for space weather information

Key: M = inclusion mandatory, part of every message
C = inclusion conditional, included whenever applicable

***Note 1**. The explanations for the abbreviations can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (PANS-ABC, Doc 8400).*

***Note 2**. The spatial resolutions are shown in Attachment E.*

***Note 3**. Inclusion of a «colon» after each element heading is mandatory.*

***Note 4**. The numbers 1 to 14 are included only for clarity and they are not part of the advisory message, as shown in the examples.*

Element		Detailed content	Template(s)			Examples	
1	Identification of the type of message (M)	Type of message	SWX ADVISORY	-	-	SWX ADVISORY	-
2	Status indicator (C)1	-	STATUS:	TEST or EXER	-	STATUS: STATUS:	TEST EXER
3	Time of origin (M)	-	DTG:	nnnnnnnn/nnnnZ	-	DTG:	20161108/0100Z
4	Name of SWXC (M)	-	SWXC:	Nnnnnnnnnnnn	-	SWXC:	DONLON
5	Advisory number (M)	-	ADVISORY NR:	nnnn/[n][n][n]n	-	ADVISORY NR:	2016/1
6	Number of advisory being replaced (C)	-	NR RPLC:	nnnn/[n][n][n]n	-	NR RPLC:	2016/1
7	Space weather effect and intensity (M)	Effect and intensity of the space weather phenomena	SWX EFFECT:	HF COM MOD or SEV [AND][3] or SATCOM MOD or SEV [AND][3] or GNSS MOD or SEV or [AND][3] or RADIATIONMOD or SEV	-	SWX EFFECT:	HF COM MOD GNSS SEV HF COM MOD AND SATCOM MOD AND GNSS MOD RADIATION MOD SATCOM SEV

8	Observed or expected extent of space weather phenomena (M)	Time: day, time in UTC; Observed (or forecast if phenomena have yet to occur); horizontal extent 2 (latitude bands and longitude in degrees) and/or altitude of space weather phenomena	OBS or FCST SWX:	DAYLIGHT SIDE or HNH and/or MNH and/or EQN and/or EQS and/or MSH and/or HSH and Wnnn(nn) or Ennn(nn) – Wnnn(nn) or Ennn(nn) and/or ABV FLnnn or FLnnn–nnn and/or 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 NO SWX EXP	OBS SWX:	08/0100Z DAYLIGHT SIDE 08/0100Z HNH HSH W18000 – W09000 ABV FL350 08/0100Z HNH HSH E18000 W18000 08/0100Z S2000 W17000 – S2000 W13000 – S1000 W13000 – S1000 W17000 – S2000 W17000 NO SWX EXP
9	Forecast of the phenomena for the next 6 hours (M)	Day, time (in UTC) (6 hours from time given in item 8, rounded to the next full hour);Forecast extent and/or altitude of the space weather phenomena for the fixed valid time	FCST SWX +6 HR:	nn/nnnn ZDAYLIGHT SIDEorHNH and/or MNH and/orEQNand/orEQSand/orMSH and/or HSHandWnnn(nn) or Ennn(nn) –Wnnn(nn) or Ennn(nn) and/or ABV FLnnnor FLnnn–nnnorNnn[nn] and/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]]orNO SWX EXPor NOT AVBL	FCST SWX +6 HR:	08/0700Z DAYLIGHT SIDE 08/0700Z HNH HSH W18000 – W09000 ABV FL350 08/0700Z HNH HSH E18000 W18000 NO SWX EXP NOT AVBL

~~10~~	~~Forecast of the phenomena for the next 12 hours (M)~~	~~Day, time (in UTC) (12 hours from time given in item 8, rounded to the next full hour); Forecast extent and/or altitude of the space weather phenomena for the fixed valid time~~	~~FCST SWX +12 HR:~~	~~nn/nnnnZ DAYLIGHT SIDE or HNH and/or MNH and/or EQN and/or EQS and/or MSH and/or HSH and Wnnn(nn) or Ennn(nn) – Wnnn(nn) or Ennn(nn) and/or ABV FLnnn or FLnnn–nnn and/or 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 NO SWX EXP or NOT AVBL~~	~~FCST SWX +12 HR:~~	~~08/1300Z DAYLIGHT SIDE~~ ~~08/1300Z HNH HSH W18000 – W09000 ABV FL350~~ ~~08/1300Z HNH HSH E18000 W18000~~ ~~NO SWX EXP NOT AVBL~~
~~11~~	~~Forecast of the phenomena for the next 18 hours (M)~~	~~Day, time (in UTC) (18 hours from time given in item 8, rounded to the next full hour);Forecast extent and/or altitude of the space weather phenomena for the fixed valid time~~	~~FCST SWX +18 HR:~~	~~nn/nnnnZDAYLIGHT SIDEorHNH and/or MNHand/or EQN and/orEQS and/or MSH and/or HSH and Wnnn(nn) or Ennn(nn) – Wnnn(nn) or Ennn(nn)and/orABV FLnnn or FLnnn–nnnorNnn[nn] and/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]]orNO SWX EXPor NOT AVBL~~	~~FCST SWX +18 HR:~~	~~08/1900Z DAYLIGHT SIDE~~ ~~08/1900Z HNH HSH W18000 – W09000 ABV FL350~~ ~~08/1900Z HNH HSH E18000 W18000~~ ~~NO SWX EXP NOT AVBL~~

~~12~~	~~Forecast of the phenomena for the next 24 hours (M)~~	~~Day, time (in UTC) (24 hours from time given in item 8, rounded to the next full hour); Forecast extent and/or altitude of the space weather phenomena for~~	~~FCST SWX +24 HR:~~	~~nn/nnnnZ DAYLIGHT SIDE or HNH and/or MNH and/or EQN and/or EQS and/or MSH and/or HSH and Wnnn(nn) or Ennn(nn) – Wnnn(nn) or Ennn(nn) and/or ABV FLnnn or FLnnn–nnn and/or 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 NO SWX EXP or NOT AVBL~~	~~FCST SWX +24 HR:~~	~~09/0100Z DAYLIGHT SIDE 09/0100Z HNH HSH W18000 – W09000 ABV FL350 09/0100Z HNH HSH E18000 W18000 NO SWX EXP NOT AVBL~~
~~13~~	~~Remarks (M)~~	~~Remarks, as necessary~~	~~RMK :~~	~~Free text up to 256 characters or NIL~~	~~RMK: RMK: RMK:~~	~~SWX EVENT HAS CEASED WWW.SPACEWEATHERPROVIDER.GOV NIL~~
~~14~~	~~Next advisory (M)~~	~~Year, month, day and time in UTC~~	~~NXT ADVISORY:~~	~~nnnnnnnn/nnnnZ or NO FURTHER ADVISORIES or WILL BE ISSUED BY~~	~~NXT ADVISORY: NXT ADVISORY: WILL BE ISSUED BY:~~	~~20161108/0700Z NO FURTHER ADVISORIES 20210726/1800Z~~

~~***Notes.***~~

1. ~~*Used only when the message issued to indicate that a test or an exercise is taking place. When the word "TEST" or the abbreviation "EXER" is included, the message may contain information that should not be used operationally or will otherwise end immediately after the word "TEST". [Applicable 7 November 2019].*~~
2. ~~*Ficticious location.*~~
3. ~~*3 One or more effects with the same intensity may be combined.*~~
4. ~~*One or more latitude ranges may be included in the space weather advisory information .*~~

Example A2-2. Advisory message for tropical cyclones

TC ADVISORY

DTG:	20040925/1900Z
TCAC:	YUFO
TC:	GLORIA
ADVISORY NR:	2004/13
OBS PSN:	25/1800z N2706 W07306
CB:	WI250NM OF TC CENTRE
MOV:	NW 20KMH
C:	965HPA
MAX WIND:	22MPS
FCST PSN +6 HR:	25/2200Z N2748 W07350
FCST MAX WIND +6 HR:	22MPS
FCST PSN +12 HR:	26/0400Z N2830 W07430
FCST MAX WIND +12 HR:	22MPS
FCST PSN +18 HR	26/1000Z N2852 W07500
FCST MAX WIND +18 HR:	21MPS
FCST PSN +24 HR:	26/1600Z N2912 W07530
FCST MAX WIND +24 HR:	20MPS
RMK:	NIL
NXT MSG:	20040925/2000Z

Table A2-3. Template for advisory message for space weather information

Key: M = inclusion mandatory, part of every message
C = inclusion conditional, included whenever applicable
Note 1.— The explanations for the abbreviations can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes *(PANS-ABC, Doc 8400).*
***Note 2.—** The spatial resolutions are shown in Attachment E.*
***Note 3.—** Inclusion of a «colon» after each element heading is mandatory.*
***Note 4.—** The numbers 1 to 14 are included only for clarity and they are not part of the advisory message, as shown in the examples*

	Element	Detailed content	Template(s)	Examples
1	Identification of the type of message (M)	Type of message	SWX ADVISORY	SWX ADVISORY
2	Status indicator (C)[1]	Indicator of test *or* exercise	STATUS: TEST *or* EXER	STATUS: TEST EXER
3	Time of origin (M)	Year, month, day and time in UTC	DTG: nnnnnnnn/nnnnZ	DTG: 20161108/0100Z
4	Name of SWXC (M)	Name of SWXC	SWXC: Nnnnnnnnnnnn	SWXC: DONLON[2]
5	Advisory number (M)	Year in full and unique message number	ADVISORY NR: nnnn/[n][n][n]n	ADVISORY NR: 2016/1
6	Number of advisory being replaced (C)	Number of the previously issued advisory being replaced	NR RPLC: nnnn/[n][n][n]n	NR RPLC: 2016/1
7	Space weather effect and intensity (M)	Effect and intensity of the space weather phenomena	SWX EFFECT: HF COM MOD *or* SEV *or* SATCOM MOD *or* SEV *or* GNSS MOD *or* SEV *or* HF COM MOD *or* SEV AND GNSS MOD *or* SEV *or* RADIATION[3] MOD *or* SEV	SWX EFFECT: HF COM MOD SATCOM SEV GNSS SEV HF COM MOD AND GNSS MOD RADIATION MOD
8	Observed *or* expected space weather phenomena (M)	Day and time (n UTC) of observed phenomena (*or* forecast if phenomena have yet to occur); Horizontal extent[3] (latitude bands and longitude in degrees) *and/or* altitude of space weather phenomena	OBS (*or* FCST) SWX: nn/nnnnZ DAYLIGHT SIDE *or* HNH *and/or* MNH *and/or* EQN *and/or* EQS *and/or* MSH *and/or* HSH Wnnn(nn) *or* Ennn(nn) – Wnnn(nn) *or* Ennn(nn) *and/or* ABV FLnnn *or* FLnnn – nnn *or* 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* NO SWX EXP	OBS SWX:: 08/0100Z DAYLIGHT SIDE 08/0100Z HNH HSH E18000 – W18000 08/0100Z HNH HSH W18000 – W09000 ABV FL350
9	Forecast of the phenomena (+6 HR) (M)	Day and time (in UTC) (6 hours from the time given in Item 8, rounded to the next full hour); Forecast extent *and/or* altitude of the space weather phenomena	FCST SWX +6 HR: nn/nnnnZ DAYLIGHT SIDE *or* HNH *and/or* MNH *and/or* EQN *and/or* EQS *and/or* MSH *and/or* HSH Wnnn(nn) *or* Ennn(nn) – Wnnn(nn) *or* Ennn(nn) *and/or* ABV FLnnn or FLnnn – nnn *or* 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 SWX +6 HR: 08/0700Z DAYLIGHT SIDE 08/0700Z HNH HSH W18000 – W09000 ABV FL350 08/0700Z HNH HSH E18000 – W18000

		for that fixed valid time	Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn]] *or* NO SWX EXP *or* NOT AVBL	
10	Forecast of the phenomena (+12 HR) (M)	Day and time (in UTC) (12 hours from the time given in Item 8, rounded to the next full hour). Forecast extent *and/or* altitude of the space weather phenomena for that fixed valid time	FCST SWX +12 HR: nn/nnnnZ DAYLIGHT SIDE *or* HNH *and/or* MNH *and/or* EQN *and/or* EQS *and/or* MSH *and/or* HSH Wnnn(nn) *or* Ennn(nn) – Wnnn(nn) *or* Ennn(nn) *and/or* ABV FLnnn or FLnnn – nnn *or* 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* NO SWX EXP *or* NOT AVBL	FCST SWX +12 HR: 08/1300Z DAYLIGHT SIDE 08/1300Z HNH HSH W18000 – W09000 ABV FL350 08/1300Z HNH HSH E18000 – W18000
11	Forecast of the phenomena (+18 HR) (M)	Day and time (in UTC) (18 hours from the time given in Item 8, rounded to the next full hour). Forecast extent and/or altitude of the space weather phenomena for that fixed valid time	FCST SWX +18 HR: nn/nnnnZ DAYLIGHT SIDE *or* HNH *and/or* MNH *and/or* EQN *and/or* EQS *and/or* MSH *and/or* HSH Wnnn(nn) *or* Ennn(nn) – Wnnn(nn) *or* Ennn(nn) *and/or* ABV FLnnn or FLnnn – nnn *or* 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* NO SWX EXP *or* NOT AVBL	FCST SWX +18 HR: 08/1900Z DAYLIGHT SIDE 08/1900Z HNH HSH W18000 – W09000 ABV FL350 08/1900Z HNH HSH E18000 – W18000
12	Forecast of the phenomena (+24 HR) (M)	Day and time (in UTC) (24 hours from the time given in Item 8, rounded to the next full hour). Forecast extent and/or altitude of the space weather phenomena for that fixed valid time	FCST SWX +24 HR: nn/nnnnZ DAYLIGHT SIDE *or* HNH *and/or* MNH *and/or* EQN *and/or* EQS *and/or* MSH *and/or* HSH Wnnn(nn) *or* Ennn(nn) – Wnnn(nn) *or* Ennn(nn) *and/or* ABV FLnnn or FLnnn – nnn *or* 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* NO SWX EXP *or* NOT AVBL	FCST SWX +24 HR: 09/0100Z DAYLIGHT SIDE 09/0100Z HNH HSH W18000 – W09000 ABV FL350 09/0100Z HNH HSH E18000 – W18000
13	Remarks (M)	Remarks, as necessary	RMK: *Free text up to 256 characters* *or* NIL	RMK: SWX EVENT HAS CEASED WWW.SPACEWEATHER PROVIDER.GOV NIL
14	Next advisory (M)	Year, month, day and time in UTC	NXT ADVISORY: nnnnnnnn/nnnnZ *or* NO FURTHER ADVISORIES *or* WILL BE ISSUED BY nnnnnnnn/nnnnZ	NXT ADVISORY: 20161108/0700Z NO FURTHER ADVISORIES

~~*Notes.*~~

~~1. Used only when the message issued to indicate that a test or an exercise is taking place. When the word "TEST" or the abbreviation "EXER" is included, the message may contain information that should not be used operationally or will otherwise end immediately after the word "TEST". *[Applicable 7 November 2019].*~~

~~2. One or more latitude ranges should be included in the space weather advisory information for "GNSS" and "RADIATION".~~

Example A2-3: Space weather advisory message (GNSS and HF COM effects)

SWX ADVISORY	
DTG:	20161108/0100Z
SWXC:	DONLON*
SWX EFFECT:	HF COM MOD AND GNSS MOD
ADVISORY NR:	2016/2
NR RPLC :	2016/1
OBS SWX:	20161108/0100Z HNH HSH E18000 W18000
FCST SWX +6 HR:	20121108/0700Z HNH HSH E18000 W18000
FCST SWX +12 HR:	20161108/1300Z HNH HSH E18000 W18000
FCST SWX +18 HR:	20161108/1900Z HNH HSH E18000 W18000
FCST SWX +24 HR:	20161109/0100Z NO SWX EXP
RMK:	LOW LVL GEOMAGNETIC STORMING CAUSING INCREASED AURORAL ACT AND SUBSEQUENT MOD DEGRADATION OF GNSS AND HF COM AVBL IN THE AURORAL ZONE. THIS STORMING EXP TO SUBSIDE IN THE FCST PERIOD. SEE WWW.SPACEWEATHERPROVIDER.WEB
NXT ADVISORY:	NO FURTHER ADVISORIES

* Fictitious location

Example A2-4: Space weather advisory message (RADIATION effects)

SWX ADVISORY	
DTG:	20161108/0000Z
SWXC:	DONLON*
SWX EFFECT:	RADIATION MOD
ADVISORY NR:	2016/2
NR RPLC :	2016/1
FCST SWX:	20161108/0100Z HNH HSH E18000 W18000 ABV FL350
FCST SWX +6 HR:	20121108/0700Z HNH HSH E18000 W18000 ABV FL350
FCST SWX +12 HR:	20161108/1300Z HNH HSH E18000 W18000 ABV FL350
FCST SWX +18 HR:	20161108/1900Z HNH HSH E18000 W18000 ABV FL350
FCST SWX +24 HR:	20161109/0100Z NO SWX EXP
RMK:	RADIATION LVL EXCEEDED 100 PCT OF BACKGROUND LVL AT FL350 AND ABV. THE CURRENT EVENT HAS PEAKED AND LVL SLW RTN TO BACKGROUND LVL. SEE WWW.SPACEWEATHERPROVIDER.WEB
NXT ADVISORY:	NO FURTHER ADVISORIES

* Fictitious location

Example A2-5: Space weather advisory message (HF COM effects)

SWX ADVISORY	
DTG:	20161108/0100Z
SWXC:	DONLON*
SWX EFFECT:	HF COM SEV
ADVISORY NR:	2016/1
OBS SWX:	20161108/0100Z DAYLIGHT SIDE
FCST SWX +6 HR:	20121108/0700Z DAYLIGHT SIDE
FCST SWX +12 HR:	20161108/1300Z DAYLIGHT SIDE
FCST SWX +18 HR:	20161108/1900Z DAYLIGHT SIDE
FCST SWX +24 HR:	20161109/0100Z DAYLIGHT SIDE
RMK:	PERIODIC HF COM ABSORPTION OBS AND LIKELY TO CONT IN THE NEAR TERM. CMPL AND PERIODIC LOSS OF HF ON THE SUNLIT SIDE OF THE EARTH EXP. CONT HF COM DEGRADATION LIKELY OVER THE NXT 7 DAYS. SEE WWW.SPACEWEATHERPROVIDER.WEB
NXT ADVISORY:	20161108/0700Z

* Fictitious location

APPENDIX 3. TECHNICAL SPECIFICATIONS RELATED TO METEOROLOGICAL OBSERVATIONS AND REPORTS

(See Chapter 4 of this Regulation)

1. GENERAL PROVISIONS RELATED TO METEOROLOGICAL OBSERVATIONS

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

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

1.2 Meteorological instruments at aeronautical meteorological stations should be exposed, operated and maintained in accordance with the practices, procedures and specifications promulgated by the World Meteorological Organization.

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

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

2. GENERAL CRITERIA RELATED TO METEOROLOGICAL REPORTS

2.1 Format of meteorological reports

2.1.1 Local routine and special reports shall be issued in abbreviated plain language, in accordance with the template shown in Table A3-1.

2.1.2 METAR and SPECI shall be issued in accordance with the template shown in Table A3-2 and disseminated in the METAR and SPECI code forms prescribed by the World Meteorological Organization.

Note. *The METAR and SPECI code forms are contained in WMO Publication No. 306,* Manual on Codes, *Volume I.1, Part A - Alphanumeric Codes.*

2.1.3 Until 4 November 2020, METAR and SPECI should be disseminated, in IWXXM GMLform, in addition to the dissemination of the METAR and SPECI in accordance with 2.1.2.

2.1.4 As of 5 November 2020, METAR and SPECI shall be disseminated in IWXXM GML form in addition to the dissemination of the METAR and SPECI in accordance with 2.1.2.

2.1.5 Note.— The technical specifications for IWXXM are contained in the Manual on Codes (WMO No. 306), Volume I.3, Part D — Representation Derived from Data Models. Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological

Information Exchange Model (IWXXM) (Doc 10003).

2.2 Use of CAVOK

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

a) visibility, 10 km or more, and the lowest visibility is not reported;

Note 1. *- In local routine and special reports, visibility refers to the value(s) to be reported in accordance with 4.2.4.2 and 4.2.4.3; in METAR and SPECI, visibility refers to the value(s) to be reported in accordance with 4.2.4.4.*

Note 2. *-The lowest visibility is reported in accordance with 4.2.4.4 a).*

b) no cloud of operational significance;

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:

a) those values which most closely correspond with the operating minima of the operators using the aerodrome;

b) those values which satisfy other local requirements of the air traffic services units and of the operators;

c) an increase in air temperature of 2°C or more from that given in the latest report, or an alternative threshold value as agreed between the meteorological authority, the appropriate ATS authority and the operators concerned;

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;

e) when noise abatement procedures are applied in accordance with 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

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:

a) when the mean surface wind direction has changed by 60° or more from that given in the

latest report, the mean speed before and/or after the change being 5 m/s (10 kt) or more;

b) when the mean surface wind speed has changed by 5 m/s (10 kt) or more from that given in the latest report;

c) when the variation from the mean surface wind speed (gusts) has 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;

d) when the onset, cessation or change in intensity of any of the following weather phenomena occurs:

— freezing precipitation

— moderate or heavy precipitation (including showers thereof)

— thunderstorm (with precipitation);

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

— freezing fog

— thunderstorm (without precipitation);

f) when the amount of a cloud layer below 450 m (1 500 ft) changes:

1) from SCT or less to BKN or OVC; or

2) from BKN or OVC to SCT or less.

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

a) when the wind changes through values of operational significance. The threshold values should be established by the meteorological authority in consultation with the appropriate ATS authority and operators concerned, taking into account changes in the wind which would:

1) require a change in runway(s) in use; and

2) indicate that the runway tailwind and crosswind components have changed through values representing the main operating limits for typical aircraft operating at the aerodrome;

b) when the visibility is improving and changes to or passes through one or more of the following values, or when the visibility is deteriorating and passes through one or more of the following values:

1) 800, 1500 or 3000 m; and

2) 5000 m, in cases where significant numbers of flights are operated in accordance with the visual flight rules;

Note 1. *- In local special reports, visibility refers to the value(s) to be reported in accordance with 4.2.4.2 and 4.2.4.3; in SPECI, visibility refers to the value(s) to be reported in accordance with 4.2.4.4.*

~~***Note 2.*** *~~Visibility refers to "prevailing visibility" except in the case where only the lowest visibility is reported in accordance with 4.2.4.4 b).~~*

~~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: 50, 175, 300, 550 or 800 m;~~

~~d) when the onset, cessation or change in intensity of any of the following weather phenomena occurs:~~

~~— duststorm~~

~~— sandstorm~~

~~— funnel cloud (tornado or waterspout);~~

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

~~— low drifting dust, sand or snow~~

~~— blowing dust, sand or snow~~

~~— squall;~~

~~f) when the height of base of the lowest cloud layer of BKN or OVC extent is lifting and changes to or passes through one or more of the following values, or when the height of base of the lowest cloud layer of BKN or OVC extent is lowering and passes through one or more of the following values:~~

~~1) 30, 60, 150 or 300 m (100, 200, 500 or 1000 ft); and~~

~~2) 450 m (1500 ft), in cases where significant numbers of flights are operated in accordance with the visual flight rules;~~

~~g) when the sky is obscured and the vertical visibility is improving and changes to or passes through one or more of the following values, or when the vertical visibility is deteriorating and passes through one or more of the following values: 30, 60, 150 or 300 m (100, 200, 500 or 1000 ft); and~~

~~h) any other criteria based on local aerodrome operating minima, as agreed between the meteorological authority and the operators concerned.~~

~~***Note.*** *~~Other criteria based on local aerodrome operating minima are to be considered in parallel with similar criteria for the inclusion of change groups and for the amendment of TAF developed in response to Appendix 5,~~*

~~2.3.4 When a deterioration of one weather element is accompanied by an improvement in another element, a single SPECI shall be issued; it shall then be treated as a deterioration report.~~

3. DISSEMINATION OF METEOROLOGICAL REPORTS

3.1 METAR and SPECI

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

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

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

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

3.2 Local routine and special reports

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

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

a) any element for which there is in the local air traffic services unit a display corresponding to the one in the meteorological station, and where arrangements are in force for the use of this display to update information included in local routine and special reports; and

b) runway visual range, when all changes of one or more steps on the reporting scale in use are being reported to the local air traffic services unit by an observer on the aerodrome.

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

4. OBSERVING AND REPORTING OF METEOROLOGICAL ELEMENTS

Introductory Note- Selected criteria applicable to meteorological information referred to under 4.1 to 4.8 for inclusion in aerodrome reports are given in tabular form at Attachment C.

4.1 Surface wind

4.1.1 Siting

4.1.1.1 Surface wind shall be observed at a height of 10 ± 1 m (30 ± 3 ft) above the ground.

4.1.1.2 Representative surface wind observations should be obtained by the use of sensors appropriately sited. Sensors for surface wind observations for local routine and special reports should be sited to give the best practicable indication of conditions along the runway and touchdown zones. At aerodromes where topography or prevalent weather conditions cause significant differences in surface wind at various sections of the runway, additional sensors should be provided.

Note. *Since, in practice, the surface wind cannot be measured directly on the runway, surface wind observations for take-off and landing are expected to be the best practicable indication of the winds which an aircraft will encounter during take-off and landing.*

4.1.2 Displays

4.1.2.1 Surface wind displays relating to each sensor shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units shall relate to the same sensors, and where separate sensors are required as specified in 4.1.1.2, the displays shall be clearly marked to identify the runway and section of runway monitored by each sensor.

4.1.2.2 The mean values of, and significant variations in, the surface wind direction and speed for each sensor should be derived and displayed by automated equipment.

4.1.3 Averaging

4.1.3.1 The averaging period for surface wind observations shall be:

a) 2 minutes for local routine and special reports and for wind displays in air traffic services units; and

b) 10 minutes for METAR and SPECI, except that when the 10-minute period includes a marked discontinuity in the wind direction and/or speed, only data occurring after the discontinuity shall be used for obtaining mean values; hence, the time interval in these circumstances shall be correspondingly reduced.

Note. *A marked discontinuity occurs when there is an abrupt and sustained change in wind direction of 30° or more, with a wind speed of 5 m/s (10 kt) before or after the change, or a change in wind speed of 5 m/s (10 kt) or more, lasting at least 2 minutes.*

4.1.3.2 The averaging period for measuring variations from the mean wind speed (gusts) reported in accordance with 4.1.5.2 c) should be 3 seconds for local routine reports local special reports, METAR, SPECI and for wind displays used for depicting variations from the mean wind speed (gusts) in air traffic services units.

~~4.1.4 Accuracy of measurement~~

~~The reported direction and speed of the mean surface wind, as well as variations from the mean surface wind, should meet the operationally desirable accuracy of measurement as given in Attachment A.~~

~~4.1.5 Reporting~~

~~4.1.5.1 In local routine reports local special reports, METAR and SPECI, the surface wind direction and speed shall be reported in steps of 10 degrees true and 1 metre per second (or 1 knot), respectively. Any observed value that does not fit the reporting scale in use shall be rounded to the nearest step in the scale.~~

~~4.1.5.2 In local routine reports, local special reports, METAR and SPECI:~~

~~a) the units of measurement used for the wind speed shall be indicated;~~

~~b) variations from the mean wind direction during the past 10 minutes shall be reported as follows, if the total variation is 60° or more:~~

~~1) when the total variation is 60° or more and less than 180 and the wind speed is 1.5 m/s (3 kt) or more, such directional variations shall be reported as the two extreme directions between which the surface wind has varied;~~

~~2) when the total variation is 60 or more and less than 180 and the wind speed is less than 1.5 m/s (3 kt), the wind direction shall be reported as variable with no mean wind direction; or~~

~~3) when the total variation is 180° or more, the wind direction shall be reported as variable with no mean wind direction;~~

~~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) 2.5 m/s (5 kt) or more in local routine and special reports when noise abatement procedures are applied in accordance with the PANS-ATM (Doc 4444); or~~

~~2) 5 m/s (10 kt) or more otherwise;~~

~~d) when a wind speed of less than 0.5 m/s (1 kt) is reported, it shall be indicated as calm;~~

~~e) when a wind speed of 50 m/s (100 kt) or more is reported, it shall be indicated to be more than 49 m/s (99 kt); and~~

~~f) when the 10-minute period includes a marked discontinuity in the wind direction and/or speed, only variations from the mean wind direction and mean wind speed occurring since the discontinuity shall be reported.~~

~~***Note.*** *See note under 4.1.3.1.*~~

4.1.5.3 In local routine and special reports:

a) if the surface wind is observed from more than one location along the runway, the locations for which these values are representative shall be indicated;

b) when there is more than one runway in use and the surface wind related to these runways is observed, the available wind values for each runway shall be given, and the runways to which the values refer shall be reported;

c) when variations from the mean wind direction are reported in accordance with 4.1.5.2 b) 2), the two extreme directions between which the surface wind has varied shall be reported; and

d) when variations from the mean wind speed (gusts) are reported in accordance with 4.1.5.2 c), they shall be reported as the maximum and minimum values of the wind speed attained.

4.1.5.4 In METAR and SPECI, when variations from the mean wind speed (gusts) are reported in accordance with c), the maximum value of the wind speed attained shall be reported.

4.2 Visibility

4.2.1 Siting

4.2.1.1 When instrumented systems are used for the measurement of visibility, the visibility shall be measured at a height of approximately 2.5 m (7.5 ft) above the runway.

4.2.1.2 When instrumented systems are used for the measurement of visibility, representative visibility observations shall be obtained by the use of sensors appropriately sited. Sensors for visibility observations for local routine and special reports should be sited to give the best practicable indications of visibility along the runway and touchdown zone.

4.2.2 Displays

When instrumented systems are used for the measurement of visibility, visibility displays relating to each sensor shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units should relate to the same sensors, and where separate sensors are required as specified in 4.2.1, the displays should be clearly marked to identify the area, e.g. runway and section of runway, monitored by each sensor.

4.2.3 Averaging

When instrumented systems are used for the measurement of visibility, their output shall be updated at least every 60 seconds to permit provision of current representative values.

The averaging period should be:

a) 1 minute for local routine and special reports and for visibility displays in air traffic services units; and

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

Note. *A marked discontinuity occurs when there is an abrupt and sustained change in visibility, lasting at least 2 minutes, which reaches or passes through criteria for the issuance of SPECI reports given in 2.3.*

4.2.4 Reporting

4.2.4.1 In local routine reports, local special reports, METAR and SPECI, the visibility shall be reported in steps of 50 m when the visibility is less than 800 m; in steps of 100 m, when it is 800 m or more but less than 5 km; in kilometre steps, when the visibility is 5 km or more but less than 10 km; and it shall be given as 10 km when the visibility is 10 km or more, except when the conditions for the use of CAVOK apply. Any observed value which does not fit the reporting scale in use shall be rounded down to the nearest lower step in the scale.

Note. *Specifications concerning the use of CAVOK are given in 2.2.*

4.2.4.2 In local routine and special reports, visibility along the runway(s) shall be reported together with the units of measurement used to indicate visibility.

4.2.4.3 In local routine and special reports, when instrumented systems are used for the measurement of visibility:

a) if the visibility is observed from more than one location along the runway as specified in Chapter 4, 4.6.2.2, the values representative of the touchdown zone should be reported first, followed, as necessary, by the values representative of the mid-point and stop-end of the runway, and the locations for which these values are representative should be indicated; and

b) when there is more than one runway in use and the visibility is observed related to these runways, the available visibility values for each runway should be reported, and the runways to which the values refer should be indicated.

4.2.4.4 In METAR and SPECI, visibility shall be reported as prevailing visibility, as defined in Chapter 1. When the visibility is not the same in different directions and

a) when the lowest visibility is different from the prevailing visibility, and 1) less than 1500 m or 2) less than 50 per cent of the prevailing visibility and less than 5000 m; the lowest visibility observed should also be reported and, when possible, its general direction in relation to the aerodrome reference point indicated by reference to one of the eight points of the compass. If the lowest visibility is observed in more than one direction,

then the most operationally significant direction should be reported; and

b) when the visibility is fluctuating rapidly, and the prevailing visibility cannot be determined, only the lowest visibility should be reported, with no indication of direction.

4.3 Runway visual range

4.3.1 Siting

4.3.1.1 Runway visual range shall 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.

4.3.1.2 Runway visual range should be assessed at a lateral distance from the runway centre line of not more than 120 m. The site for observations to be representative of the touchdown zone should be located about 300 m along the runway from the threshold. The sites for observations to be representative of the mid-point and stop-end of the runway should be located at a distance of 1000 to 1500 m along the runway from the threshold and at a distance of about 300 m from the other end of the runway. The exact position of these sites and, if necessary, additional sites should be decided after considering aeronautical, meteorological and climatological factors such as long runways, swamps and other fog-prone areas.

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 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 runway visual range systems is given in the* Manual of Runway Visual Range Observing and Reporting Practices *(Doc 9328).*

4.3.2.1 Instrumented systems based on transmissometers or forward-scatter meters shall be used to assess runway visual range on runways intended for Category II and III instrument approach and landing operations.

4.3.2.2 Instrumented systems based on transmissometers or forward-scatter meters shall be used to assess runway visual range on runways intended for Category I instrument approach and landing operations.

4.3.3 Display

4.3.3.1 Where runway visual range is determined by instrumented systems, one display or more, if required, shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units shall be related to the same sensors, and where separate sensors are required as specified in 4.3.1.2, the displays shall be clearly marked to identify the runway and section of runway monitored by each sensor.

4.3.3.2 Where runway visual range is determined by human observers, runway visual range should be reported to the appropriate local air traffic services units, whenever there is a change in the value to be reported in accordance with the reporting scale (except where the provisions of 3.2.2 a) or b) apply). The transmission of such reports should normally be completed within 15 seconds after the termination of the observation.

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:

a) 1 minute for local routine and special reports and for runway visual range displays in air traffic services units; and

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,*

4.3.5 Runway light intensity

When instrumented systems are used for the assessment of runway visual range, computations shall be made separately for each available runway. For local routine and special reports, the light intensity to be used for the computation should be:

a) for a runway with the lights switched on and the light intensity of more than 3 per cent of the maximum light intensity available, the light intensity actually in use on that runway;

b) for a runway with the lights switched on and the light intensity of 3 per cent or less of the maximum light intensity available, the optimum light intensity that would be appropriate for operational use in the prevailing conditions; and

c) for a runway with lights switched off (or at the lowest setting pending the resumption of operations), the optimum light intensity that would be appropriate for operational use in the prevailing conditions.

Note. *Guidance on the conversion of instrumented readings into runway visual range is given at Attachment D.*

4.3.6 Reporting

4.3.6.1 In local routine reports, local special reports, METAR and SPECI, the runway visual range shall be reported in steps of 25 m when the runway visual range is less than 400 m; in steps of 50 m when it is between 400 m and 800 m; and in steps of 100 m when

the runway visual range is more than 800 m. Any observed value which does not fit the reporting scale in use shall be rounded down to the nearest lower step in the scale.

4.3.6.2 Fifty metres should be considered the lower limit and 2000 metres the upper limit for runway visual range. Outside of these limits, local routine reports, local special reports, METAR and SPECI should merely indicate that the runway visual range is less than 50 m or more than 2000 m.

4.3.6.3 In local routine reports, local special reports, METAR and SPECI:

a) when runway visual range is above the maximum value that can be determined by the system in use, it shall be reported using the abbreviation "ABV" in local routine and special reports and the abbreviation "P" in METAR and SPECI, followed by the maximum value that can be determined by the system; and

b) when the runway visual range is below the minimum value that can be determined by the system in use, it shall be reported using the abbreviation "BLW" in local routine and special reports and the abbreviation "M" in METAR and SPECI, followed by the minimum value that can be determined by the system.

4.3.6.4 In local routine and special reports:

a) the units of measurement used shall be included;

b) if runway visual range is observed from only one location along the runway, i.e. the touchdown zone, it shall be included without any indication of location;

c) if the runway visual range is observed from more than one location along the runway, the value representative of the touchdown zone shall be reported first, followed by the values representative of the mid-point and stop-end and the locations for which these values are representative shall be indicated; and

d) when there is more than one runway in use, the available runway visual range values for each runway shall be reported and the runways to which the values refer shall be indicated.

4.3.6.5 In METAR and SPECI:

a) only the value representative of the touchdown zone should be reported and no indication of location on the runway should be included; and

b) where there is more than one runway available for landing, touchdown zone runway visual range values should be included for all such runways, up to a maximum of four, and the runways to which the values refer should be indicated.

4.3.6.6 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 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. 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.

4.4 Present weather

4.4.1 Siting

When instrumented systems are used for observing present weather phenomena listed under 4.4.2.3, and 4.4.2.4 representative information should be obtained by the use of sensors appropriately sited.

4.4.2 Reporting

4.4.2.1 In local routine and special reports, observed present weather phenomena shall be reported in terms of type and characteristics and qualified with respect to intensity, as appropriate.

4.4.2.2 In METAR and SPECI, observed present weather phenomena shall be reported in terms of type and character-istics and qualified with respect to intensity or proximity to the aerodrome, as appropriate.

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

Precipitation

Drizzle

Rain

Snow

Snow grains

Ice pellets

~~*Hail*~~

~~*- Reported when diameter of largest hailstones is 5 mm or more.*~~

~~*Small hail and/or snow pellets*~~

~~*- Reported when diameter of largest hailstones is less than 5 mm.*~~

~~*Obscurations (hydrometeors)*~~

~~*Fog*~~

~~*- Reported when visibility is less than 1 000 m, except when qualified by "MI", "BC", "PR" or "VC" (see 4.4.2.6 and 4.4.2.7).*~~

~~*Mist*~~

~~*- Reported when visibility is at least 1 000 m but not more than 5 000 m.*~~

~~*Obscurations (lithometeors)*~~

~~*- The following should be used only when the obscuration consists predominantly of lithometeors and the visibility is 5 000 m or less except "SA" when qualified by "DR" (see 4.4.2.6) and volcanic ash.*~~

~~*Sand*~~

~~*Dust (widespread)*~~

~~*Haze*~~

~~*Smoke*~~

~~*Volcanic ash*~~

~~*Other phenomena*~~

~~*Dust/sand whirls (dust devils)*~~

~~*Squall*~~

~~*Funnel cloud (tornado or waterspout)*~~

~~*Duststorm*~~

~~*Sandstorm*~~

~~4.4.2.4 In automated local routine reports, local special reports, METAR and SPECI, in addition to the precipitation types listed under 4.4.2.3 a), the abbreviation UP should be used for unidentified precipitation when the type of precipitation cannot be identified by the automatic observing system.~~

~~4.4.2.5 In local routine reports, local special reports, METAR and SPECI, the following characteristics of present weather phenomena, as necessary, shall be reported, using their respective abbreviations and relevant criteria, as appropriate:~~

~~*Thunderstorm TS*~~

~~— *Used to report a thunderstorm with precipitation in accordance with the templates shown in Tables A3-1 and A3-2. When thunder is heard or lightning is detected at the aerodrome during the 10-minute period preceding the time of observation but no precipitation is observed at the aerodrome, the abbreviation "TS" shall be used without qualification.*~~

~~*Freezing FZ*~~

~~— *Supercooled water droplets or precipitation, used with types of present weather phenomena in accordance with the templates shown in Tables A3-1 and A3-2.*~~

~~***Note.*** *At aerodromes with human observers, lightning detection equipment may supplement human observations. For aerodromes with automatic observing systems, guidance on the use of lightning detection equipment intended for thunderstorm reporting is given in the* Manual on Automatic Meteorological Observing Systems at Aerodromes *(Doc 9837).*~~

~~4.4.2.6 In local routine reports, local special reports, METAR and SPECI, the following characteristics of present weather phenomena, as necessary, should be reported, using their respective abbreviations and relevant criteria, as appropriate:~~

~~*Shower SH*~~

~~— *Used to report showers in accordance with the templates shown in Tables A3-1 and A 2. Showers observed in the vicinity of the aerodrome (see 4.4.2.7) should be reported as "VCSH" without qualification regarding type or intensity of precipitation.*~~

~~*Blowing BL*~~

~~— *Used in accordance with the templates shown in Tables A3-1 and A3-2 with types of present weather phenomena raised by the wind to a height of 2 m (6 ft) or more above the ground.*~~

~~*Low drifting DR*~~

~~— *Used in accordance with the templates shown in Tables A3-1 and A3-2 with types of present weather phenomena raised by the wind to less than 2 m (6 ft) above ground level.*~~

~~*Shallow MI*~~

~~— *Less than 2 m (6 ft) above ground level.*~~

~~*Patches BC*~~

~~— *Fog patches randomly covering the aerodrome.*~~

~~*Partial PR*~~

~~— *A substantial part of the aerodrome covered by fog while the remainder is clear.*~~

~~4.4.2.7 Recommendation.— In automated local routine reports, local special reports, METAR and SPECI when showers (SH) referred to in 4.4.2.6 cannot be determined based upon a method that takes account of the presence of convective cloud, the precipitation should not be characterized by SH.~~

~~4.4.2.8 In local routine reports, local special reports, 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:~~

	~~*(local routine and special reports)*~~	~~*(METAR and SPECI)*~~
~~*Light*~~	~~*FBL*~~	~~—~~

Moderate	*MOD*	*(no indication)*
Heavy	*HVY*	+

Used with types of present weather phenomena in accordance with the templates shown in Tables A3-1 and A3-2. Light intensity should be indicated only for precipitation.

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.*

4.4.2.9 In local routine reports, local special reports, 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 4.4.2.4 shall be used, as necessary, together with an indication, where appropriate, of the characteristics given in 4.4.2.5 and 4.4.2.6 and intensity or proximity to the aerodrome given in 4.4.2.8, so as to convey a complete description of the present weather of significance to flight operations;

b) the indication of intensity or proximity, as appropriate, shall be reported first followed respectively by the characteristics and the type of weather phenomena; and

c) where two different types of weather are observed, they shall be reported in two separate groups, where the intensity or proximity indicator refers to the weather phenomenon which follows the indicator. However, different types of precipitation occurring at the time of observation shall be reported as one single group with the dominant type of precipitation reported first and preceded by only one intensity qualifier which refers to the intensity of the total precipitation.

4.4.2.10 In automated local routine reports, local special reports, 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

4.5.1 Siting

When instrumented systems are used for the measurement of the cloud amount and the height of cloud base, representative observations should be obtained by the use of sensors appropriately sited. For local routine and special reports, in the case of aerodromes with precision approach runways, sensors for cloud amount and height of cloud base should be sited to give the best practicable indications of the cloud amount and height of cloud base at the threshold of the runway in use. For that purpose, a sensor should

be installed at a distance of less than 1200 m (4000 ft) before the landing threshold.

4.5.2 Display

When automated equipment is used for the measurement of the height of cloud base, height of cloud base display(s) should be located in the meteorological station with corresponding display(s) in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units should relate to the same sensor, and where separate sensors are required as specified in 4.5.1, the displays should clearly identify the area monitored by each sensor.

4.5.3 Reference level

The height of cloud base shall be reported above aerodrome elevation. When a precision approach runway is in use which has a threshold elevation 15 m (50 ft) or more below the aerodrome elevation, local arrangements shall be made in order that the height of cloud bases reported to arriving aircraft shall refer to the threshold elevation. In the case of reports from offshore structures, the height of cloud base shall be given above mean sea level.

4.5.4 Reporting

4.5.4.1 In local routine reports, local special reports, METAR and SPECI, the height of cloud base shall be reported in steps of 30 m (100 ft) up to 3000 m (10000 ft).

4.5.4.2 At aerodromes where low-visibility procedures are established for approach and landing, as agreed between the meteorological authority and the appropriate ATS authority concerned, in local routine and special reports the height of cloud base should be reported in steps of 15 m (50 ft) up to and including 90 m (300 ft) and in steps of 30 m (100 ft) between 90 m (300 ft) and 3000 m (10000 ft), and the vertical visibility in steps of 15 m (50 ft) up to and including 90 m (300 ft) and in steps of 30 m (100 ft) between 90 m (300 ft) and 600 m (2000 ft).

4.5.4.3 In local routine reports, local special reports, METAR and SPECI:

a) cloud amount should be reported using the abbreviations “FEW” (1 to 2 oktas), “SCT” (3 to 4 oktas), “BKN” (5 to 7 oktas) or “OVC” (8 oktas);

b) cumulonimbus clouds and towering cumulus clouds should be indicated as “CB” and “TCU”, respectively;

c) the vertical visibility should be reported in steps of 30 m (100 ft) up to 600 m (2000 ft);

d) if there are no clouds of operational significance and no restriction on vertical visibility and the abbreviation “CAVOK” is not appropriate, the abbreviation “NSC” should be used;

e) when several layers or masses of cloud of operational significance are observed, their amount and height of cloud base should be reported in increasing order of the height

of cloud base, and in accordance with the following criteria:

1) the lowest layer or mass, regardless of amount to be reported as FEW, SCT, BKN or OVC as appropriate;

2) the next layer or mass, covering more than 2/8 to be reported as SCT, BKN or OVC as appropriate;

3) the next higher layer or mass, covering more than 4/8 to be reported as BKN or OVC as appropriate; and 4) cumulonimbus and/or towering cumulus clouds, whenever observed and not reported in 1) to 3);

f) when the cloud base is diffuse or ragged or fluctuating rapidly, the minimum height of cloud base, or cloud fragments, should be reported; and

g) when an individual layer (mass) of cloud is composed of cumulonimbus and towering cumulus clouds with a common cloud base, the type of cloud should be reported as cumulonimbus only.

Note. *- Towering cumulus indicates cumulus congestus clouds of great vertical extent.*

4.5.4.4 Any observed value in 4.5.4.1, 4.5.4.2 and 4.5.4.3 c) which does not fit the reporting scale in use shall be rounded down to the nearest lower step in the scale.

4.5.4.5 In local routine and special reports:

a) the units of measurement used for the height of cloud base and vertical visibility shall be indicated; and

b) when there is more than one runway in use and the heights of cloud bases are observed by instruments for these runways, the available heights of cloud bases for each runway shall be reported and the runways to which the values refer shall be indicated.

4.5.4.6 In automated local routine reports, local special reports, METAR and SPECI:

a) when the cloud type cannot be observed by the automatic observing system, the cloud type in each cloud group should be replaced by "///";

b) when no clouds are detected by the automatic observing system, it should be indicated by using the abbreviation "NCD";

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 "///"; and

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.

4.6 Air temperature and dew-point temperature

4.6.1 Display

When automated equipment is used for the measurement of air temperature and dew-point temperature, air temperature and dew-point temperature displays should be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units should relate to the same sensors.

4.6.2 Reporting

4.6.2.1 In local routine reports, local special reports, METAR and SPECI, the air temperature and the dew-point temperature shall be reported in steps of whole degrees Celsius. Any observed value which does not fit the reporting scale in use shall be rounded to the nearest whole degree Celsius, with observed values involving 0.5° rounded up to the next higher whole degree Celsius.

4.6.2.2 In local routine reports, local special reports, METAR and SPECI, a temperature below 0°C shall be identified.

4.7 Atmospheric pressure

4.7.1 Display

When automated equipment is used for the measurement of atmospheric pressure, QNH and, if required in accordance with 4.7.3.2 b), QFE displays relating to the barometer shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. When QFE values are displayed for more than one runway, as specified in 4.7.3.2 d), the displays shall be clearly marked to identify the runway to which the QFE value displayed refers.

4.7.2 Reference level

The reference level for the computation of QFE should be the aerodrome elevation. For non-precision approach runways, the thresholds of which are 2 m (7 ft) or more below the aerodrome elevation, and for precision approach runways, the QFE, if required, should refer to the relevant threshold elevation.

4.7.3 Reporting

4.7.3.1 For local routine reports, local special reports, METAR and SPECI, QNH and QFE shall be computed in tenths of hectopascals and reported therein in steps of whole hectopascals, using four digits. Any observed value which does not fit the reporting scale in use shall be rounded down to the nearest lower whole hectopascal.

4.7.3.2 In local routine and special reports:

a) QNH shall be included;

b) QFE shall be included if required by users or, as agreed between the meteorological authority the ATS authorities and the operators concerned, on a regular basis;

c) the units of measurement used for QNH and QFE values shall be included; and

d) if QFE values are required for more than one runway, the required QFE values for each runway shall be reported and the runways to which the values refer shall be indicated.

4.7.3.3 In METAR and SPECI, only QNH values shall be included.

4.8 Supplementary information

4.8.1 Reporting

4.8.1.1 In local routine reports, local special reports, 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:

— freezing precipitation

— moderate or heavy precipitation (including showers thereof)

— blowing snow

— duststorm, sandstorm

— thunderstorm

— funnel cloud (tornado or water spout)

— volcanic ash

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

4.8.1.2 In local routine and special reports, the following significant meteorological conditions, or combinations thereof, should be reported in supplementary information:

— *cumulonimbus clouds*	*CB*
— *Thunderstorm*	*TS*
— *moderate or severe turbulence*	*MOD TURB, SEV TURB*
— *wind shear*	*WS*
— *Hail*	*GR*
— *severe squall line*	*SEV SQL*
— *moderate or severe icing*	*MOD ICE, SEV ICE*
— *freezing precipitation*	*FZDZ, FZRA*
— *severe mountain waves*	*SEV MTW*
— *duststorm, sandstorm*	*DS, SS*

— *blowing snow* BLSN

· *funnel cloud (tornado or water spout)* FC

The location of the condition should be indicated. Where necessary, additional information should be included using abbreviated plain language.

4.8.1.3 In automated local routine reports, local special reports, 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.*

4.8.1.4 In METAR and SPECI, where local circumstances so warrant, information on wind shear should be added.

Note. *The local circumstances referred to in 4.8.1.4 include, but are not necessarily limited to, wind shear of a non-transitory nature such as might be associated with low-level temperature inversions or local topography.*

4.8.1.5 Until 3 November 2021, 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

b) information on the state of Kuwait runways is provided by Kuwait DGCA.

Note 1. *The state of the sea is specified in the Manual on Codes (WMO-No. 306), Volume I.1, Part A — Alphanumeric Codes, Code Table 3700.*

Note 2*. The state of the runway is specified in the Manual on Codes (WMO-No. 306), Volume I.1, Part A — Alphanumeric Codes, Code Tables 0366, 0519, 0919 and 1079.*

4.8.1.6 as of 4 November 2021, METAR and SPECI, 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 should be included in the supplementary information, in accordance with regional air navigation agreement.

Note*. The state of the sea is specified in the Manual on Codes (WMO-No. 306), Volume I.1, Part A — Alphanumeric Codes, Code Table 3700.*

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 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*
Identification of the type of report (M)	Type of report	MET REPORT *or* SPECIAL			MET REPORT SPECIAL
Location indicator (M)	ICAO location indicator (M)	nnnn			YUDO[1]
Time of the observation (M)	Day and actual time of the observation in UTC	nnnnnnZ			221630Z
Identification of an automated report (C)	Automated report identifier (C)	AUTO			AUTO
Surface wind (M)	Name of the element (M)	WIND			WIND 240/4MPS (WIND 240/8KT) WIND RWY 18 TDZ 190/6MPS (WIND RWY 18 TDZ 190/12KT) WIND VRB1MPS WIND CALM (WIND VRB2KT) WIND VRB BTN 350/ AND 050/1MPS (WIND VRB BTN 350/ AND 050/2KT) WIND 270/ABV49MPS (WIND 270/ABV99KT) WIND 120/3MPS MAX9 MNM2 (WIND 120/6KT MAX18 MNM4) WIND 020/5MPS VRB BTN 350/ AND 070/ (WIND 020/10KT VRB BTN 350/ AND 070/) WIND RWY 14R MID 140/6MPS (WIND RWY 14R MID 140/12KT) WIND RWY 27 TDZ 240/8MPS MAX14 MNM5 END 250/7MPS (WIND RWY 27 TDZ 240/16KT
	Runway (O)[2]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			
	Runway section (O)[3]	TDZ			
	Wind direction (M)	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	C A L M	
	Wind speed (M)	[ABV]n[n][n]MPS (*or* [ABV]n[n]KT)			
	Significant speed variations (C)[4]	MAX[ABV]nn[n] MNMn[n]			
	Significant directional variations (C)[5]	VRB BTN nnn/ AND nnn/	—		
	Runway section (O)[3]	MID			
	Wind direction (O)[3]	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	C A L M	
	Wind speed (O)[3]	[ABV]n[n][n]MPS (*or* [ABV]n[n]KT)			
	Significant speed variations (C)[4]	MAX[ABV]nn[n] MNMn[n]			
	Significant directional variations (C)[5]	VRB BTN nnn/ AND nnn/	—		
	Runway section (O)[3]	END			

Element as specified in Chapter 4	*Detailed content*	*Template(s)*			*Examples*
	Wind direction (O)[3]	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	C A L M	MAX28 MNM10 END 250/14KT)
	Wind speed (O)[3]	[ABV]n[n][n]MPS (*or* [ABV]n[n]KT)			
	Significant speed variations (C)[4]	MAX[ABV]nn[n] MNMn[n]			
	Significant directional variations (C)[5]	VRB BTN nnn/ AND nnn/	—		

Visibility (M)	Name of the element (M)	VIS		C A V O K	VIS 350M CAVOK VIS 7KM VIS 10KM VIS RWY 09 TDZ 800M END 1200M VIS RWY 18C TDZ 6KM RWY 27 TDZ 4000M
	Runway (O)[2]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			
	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			
	Visibility (O)[3]	n[n][n][n]M *or* n[n]KM			
Runway visual range (C)[6]	Name of the element (M)	RVR			RVR RWY 32 400M RVR RWY 20 1600M RVR RWY 10L BLW 50M RVR RWY 14 ABV 2000M RVR RWY 10 BLW 150M RVR RWY 12 ABV 1200M RVR RWY 12 TDZ 1100M MID ABV 1400M RVR RWY 16 TDZ 600M MID 500M END 400M RVR RWY 26 500M RWY 20 800M
	Runway (C)[7]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			
	Runway section (C)[8]	TDZ			
	Runway visual range (M)	[ABV *or* BLW] nn[n][n]M			
	Runway section (C)[8]	MID			
	Runway visual range (C)[8]	[ABV *or* BLW] nn[n][n]M			
	Runway section (C)[8]	END			
	Runway visual range (C)[8]	[ABV *or* BLW] nn[n][n]M			
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]	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]		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				CLD NSC CLD SCT 300M OVC 600M (CLD SCT 1000FT OVC 2000FT) CLD OBSC VER VIS 150M (CLD OBSC VER VIS 500FT) CLD BKN TCU 270M (CLD BKN TCU 900FT) 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
	Runway (O)[2]	RWY nn[L] or RWY nn[C] or RWY nn[R]				
	Cloud amount (M) or vertical visibility (O)[9]	FEW or SCT or BKN or OVC or ///[12]	OBSC	NSC or NCD[12]		
	Cloud type (C)[9]	CB or TCU or ///[12]	—			
	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]			
Air temperature (M)	Name of the element (M)	T				T17 TMS08
	Air temperature (M)	[MS]nn				
Dew-point temperature (M)	Name of the element (M)	DP				DP15 DPMS18
	Dew-point temperature (M)	[MS]nn				
Pressure values (M)	Name of the element (M)	QNH				QNH 0995HPA QNH 1009HPA QNH 1022HPA QFE 1001HPA QNH 0987HPA QFE RWY 18 0956HPA RWY 24 0955HPA
	QNH (M)	nnnnHPA				
	Name of the element (O)	QFE				
	QFE (O)	[RWY nn[L] or RWY nn[C] or RWY nn[R]] nnnnHPA [RWY nn[L] or RWY nn[C] or RWY nn[R] nnnnHPA]				
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 360/13MPS WS RWY 12 REFZRA CB IN CLIMB-OUT RETSRA
	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[L] or RWY nn[C] or RWY nn[R]				

Element as specified in Chapter 4	Detailed content	Template(s)					Examples
	Recent weather (C)[9, 10]	REFZDZ *or* REFZRA *or* REDZ *or* RE[SH]RA *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* REFC *or* REPL or REUP[12] *or* REFZUP[12] *or* RETSUP[12] *or* RESHUP[12] *or* REVA *or* RETS					
Trend forecast (O)[16]	Name of the element (M)	TREND					TREND NOSIG TREND BECMG FEW 600M (TREND BECMG FEW 2000FT) TREND TEMPO 250/18 MPS MAX25 (TREND TEMPO 250/36KT MAX50) TREND BECMG AT1800 VIS 10KM NSW TREND BECMG TL1700 VIS 800M FG TREND BECMG FM1030 TL1130 CAVOK TREND TEMPO TL1200 VIS 600M BECMG AT1230 VIS 8KM NSW CLD NSC
	Change indicator (M)[17]	NOSIG	BECMG *or* TEMPO				
	Period of change (C)[9]		FMnnnn *and/or* TLnnnn *or* ATnnnn				
	Wind (C)[9]		nnn/[ABV]n[n][n]MPS [MAX[ABV]nn[n]] (*or* nnn/[ABV]n[n]KT [MAX[ABV]nn])				
	Visibility (C)[9]		VIS n[n][n][n]M *or* VIS n[n]KM			CAVOK	
	Weather phenomenon: intensity (C)[9]		FBL *or* MOD *or* HVY	—	NSW		
	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	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 FM0300 TL0430 MOD FZRA TREND BECMG FM1900 VIS 500M HVY SNRA TREND BECMG FM1100 MOD SN TEMPO FM1130 BLSN TREND BECMG AT1130 CLD OVC 300M (TREND BECMG AT1130 CLD OVC 1000FT) TREND TEMPO TL1530 HVY SHRA CLD BKN CB 360M (TREND TEMPO TL1530 HVY SHRA CLD BKN CB 1200FT)
	Name of the element (C)[9]		CLD				
	Cloud amount and vertical visibility (C)[9, 14]		FEW *or* SCT *or* BKN *or* OVC	OBSC	NSC		
	Cloud type (C)[9, 14]		CB *or* TCU	—			
	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.—***~~

~~1. Fictitious location.~~
~~2. Optional values for one or more runways.~~
~~3. Optional values for one or more sections of the runway.~~
~~4. To be included in accordance with 4.1.5.2 c).~~
~~5. To be included in accordance with 4.1.5.2 b) 1).~~
~~6. To be included if visibility or runway visual range < 1 500 m.~~
~~7. To be included in accordance with 4.3.6.4 d).~~
~~8. To be included in accordance with 4.3.6.4 c).~~
~~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.~~
~~17. Number of change indicators to be kept to a minimum in accordance with Appendix 5, 2.2.1, normally not exceeding three groups.~~

~~Table A3-2. Template for METAR and SPECI (applicable until 4 November 2021)~~

~~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
Identification of the type of report (M)	Type of report (M)	METAR, METAR COR, SPECI or SPECI COR	METAR METAR COR SPECI
Location indicator (M)	ICAO location indicator (M)	nnnn	YUDO[1]
Time of the observation (M)	Day and actual time of the observation in UTC (M)	nnnnnnZ	221630Z
Identification of an automated or missing report (C)[2]	Automated or missing report identifier (C)	AUTO or NIL	AUTO NIL
END OF METAR IF THE REPORT IS MISSING.			
Surface wind (M)	Wind direction (M)	Nnn VRB	24004MPS VRB01MPS
	Wind speed (M)	[P]nn[n]	(24008KT) 19006MPS (VRB02KT)240//KT (19012KT) 00000MPS (00000KT) 140P149MPS (140P99KT)
	Significant speed variations (C)[3]	G[P]nn[n]	12003G09MPS
	Units of measurement (M)	MPS (or KT)	(12006G18KT) 24008G14MPS (24016G28KT)
	Significant directional variations (C)[4]	nnnVnnn	02005MPS 350V070 (02010KT 350V070)
Visibility (M)	Prevailing or minimum visibility (M)[5]	nnnn o	0350 CAVOK 7000 9999 0800
	Minimum visibility and direction of the minimum visibility (C)[6]	nnnn[N] or nnnn[NE] or nnnn[E] or nnnn[SE] or nnnn[S] or nnnn[SW] or nnnn[W] or nnnn[NW]	2000 1200NW 6000 2800E 6000 2800
Runway visual range (C)[7]	Name of the element (M)	R	R32/0400 R12R/1700 R10/M0050 R14L/P2000
	Runway (M)	nn[L]/or nn[C]/or nn[R]/	

Element as specified in Chapter 4	Detailed content	Template(s)			Examples		
	Runway visual range (M)	[P or M]nnnn			R16L/0650 R16C/0500 R16R/0450 R17L/0450		
	Runway visual range past tendency (C)8	U, D or N			R12/1100U R26/0550N R20/0800D R12/0700		
Present weather (C)2, 9	Intensity or proximity of present weather (C)10	- or +	—	VC			
	Characteristics and type of present weather (M)11	DZ or RA or SN or SG or PL or DS or SS or FZDZ or FZRA or FZUP12 or FC13 or SHGR or SHGS or SHRA or SHSN or SHUP12 or TSGR or TSGS or TSRA or TSSN or TSUP12 or UP12	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 VA or SS or TS or SH or BLSN or BLSA or BLDU or VA	RA +TSRA +DZ -SN +TSRASN -SNRA DZ FG +SHSN BLSN UP FZUP TSUP FZUP //	HZ FG VA MIFG	VCFG VCSH VCTS VCBLSA
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 ///nnn12 or /////12	VVnnn or VV///12	NSC or NCD12	FEW015 SCT010 OVC020 BKN///	VV005 VV///	NSC ///015
	Cloud type (C)2	CB or	—		BKN009TCU		NCD

		TCU *or* ///[12]				SCT008 BKN025CB BKN025////////CB
Air and dew-point temperature (M) Pressure values (M)	Air and dew-point temperature (M) Name of the element (M)	[M]nn/[M]nn Q				02/M08 M01/M10 Q0995 Q1009 Q1022 Q0987
	QNH (M)	nnnn				
Supplementary information (C)	Recent weather (C)[2, 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[12] *or* REFZUP[12] *or* RETSUP[12] *or* RESHUP[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)[16]	Change indicator (M)[18]	NOSIG	BECMG *or* TEMPO			NOSIG / BECMG FEW020
	Period of change (C)[2]		FMnnnn *and/or* TLnnnn *or* ATnnnn			
	Wind (C)[2]		nnn[P]nn[n][G[P]nn[n]] MPS (*or* nnn[P]nn[G[P]nn] KT)			TEMPO 25018G25MPS (TEMPO 25036G50KT)
	Prevailing visibility (C)[2]		nnnn		C A V O K	BECMG FM1030 TL1130 CAVOK BECMG TL1700 0800 FG BECMG AT1800 9000 NSW BECMG FM1900 0500 +SNRA BECMG FM1100 SN TEMPO FM1130 BLSN TEMPO FM0330 TL0430 FZRA
	Weather phenomenon: intensity (C)[10]		- *or* +	—	N S W	
	Weather phenomenon: characteristics and type (C)[2, 9, 11]		DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or*	FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or*		

			FZDZ *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* TSGR *or* TSGS *or* TSRA *or* TSSN	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 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.
9. One or more, up to a maximum of three groups, in accordance with 4.4.2.9 a), 4.8.1.1 and Appendix 5, 2.2.4.1.
10. To be included whenever applicable; no qualifier for *moderate* intensity in accordance with 4.4.2.8.
11. Precipitation types listed under 4.4.2.3 a) may be combined in accordance with 4.4.2.9 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 (no qualifier) to indicate funnel cloud not reaching the ground.
14. Up to four cloud layers in accordance with 4.5.4.3 e).
15. To be included in accordance with 4.8.1.5 a).
16. To be included in accordance with 4.8.1.5 b) until 3 November 2021.
17. To be included in accordance with Chapter 6, 6.3.2.
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 A3-2. Template for METAR and SPECI (applicable as of 4 November 2021)

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*
Identification of the type of report (M)	Type of report (M)	METAR, METAR COR, SPECI *or* SPECI COR			METAR METAR COR SPECI
Location indicator (M)	ICAO location indicator (M)	nnnn			YUDO[1]
Time of the observation (M)	Day and actual time of the observation in UTC (M)	nnnnnnZ			221630Z
Identification of an automated or missing report (C)[2]	Automated *or* missing report identifier (C)	AUTO *or* NIL			AUTO NIL
END OF METAR IF THE REPORT IS MISSING.					
Surface wind (M)	Wind direction (M)	Nnn or ///[12]	VRB		24004MPS VRB01MPS
	Wind speed (M)	[P]nn[n] //[12]			///10MPS (24008KT) (VRB02KT)240//KT 19006MPS ////KT (19012KT) 00000MPS (00000KT) 140P149MPS (140P99KT)
	Significant speed variations (C)[3]	G[P]nn[n]			12003G09MPS
	Units of measurement (M)	MPS (*or* KT)			(12006G18KT) 24008G14MPS (24016G28KT)
	Significant directional variations (C)[4]	nnnVnnn	—		02005MPS 350V070 (02010KT 350V070)
Visibility (M)	Prevailing *or* minimum visibility (M)[5]	nnnn or ////[12]	C A V O K		0350 //// 7000 CAVOK 9999 0800
	Minimum visibility and direction of the minimum	nnnn[N] *or* nnnn[NE] *or* nnnn[E] *or* nnnn[SE] *or*			2000 1200NW 6000 2800E

	visibility (C)[6]	nnnn[S] *or* nnnn[SW] *or* nnnn[W] *or* nnnn[NW]			6000 2800		
Runway visual range (C)[7]	Name of the element (M)	R			R32/0400 R12R/1700		
	Runway (M)	nn[L]/*or* nn[C]/*or* nn[R]/			R10/M0050 R14L/P2000		
Element as specified in Chapter 4	*Detailed content*	*Template(s)*			*Examples*		
	Runway visual range (M)	[P *or* M]nnnn or ///[12]			R16L/0650 R16C/0500 R16L//// R10///// R16R/0450 R17L/0450		
	Runway visual range past tendency (C)8	U, D *or* N			R12/1100U R26/0550N R20/0800D R12/0700		
Present weather (C)2, 9	Intensity or proximity of present weather (C)10	– or +	—	VC			
	Characteristics and type of present weather (M)11	DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ or FZRA or FZUP[12] *or* FC[13] *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]	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 +TSRA +DZ –SN +TSRASN –SNRA DZ FG +SHSN BLSN UP FZUP TSUP FZUP //	HZ FG VA MIFG	VCFG VCSH VCTS VCBLSA
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*	VVnnn *or* VV///[12]	NSC *or* NCD[12]	FEW015 VV005 OVC030 VV/// SCT010 OVC020 BKN///		NSC ///015

		BKN///[1] [2] or OVC///[1] [2] or ///nnn[12] or /////[12]					
	Cloud type (C)[2]	CB or TCU or ///[12]	—			BKN009TCU SCT008 BKN025CB /////CB /////// BKN///TCU	NCD BKN025///
Air and dew-point temperature (M)	Air and dew-point temperature (M)	[M]nn/[M]nnor ///[M]nn12 or [M]nn///12 or ////12				17/10 ///10 17/// ///// 02/M08 M01/M10	
Pressure values (M)	Name of the element (M)	Q				Q0995 Q1009 Q1022 Q//// Q0987	
	QNH (M)	nnnn or ////[12]					
Supplementary information (C)	Recent weather (C)[2, 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[12] or REFZUP[12] or RETSUP[12] or RESHUP[12] or RE//[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] W[M]nn/Sn or W///Sn or W[M]nn/S/ or W[M]nn/Hn[n][n] or W///Hn[n][n] or W[M]nn/H///				W15/S2 W12/H75 W///S3 WM01/S/ W///H104 W17/H/// W///H/// W///S/	
Trend forecast (O)[16]	Change indicator (M)[17]	NOSIG	BECMG or TEMPO			NOSIG	BECMG FEW020
	Period of change (C)[2]		FMnnnn and/or TLnnnn or ATnnnn				
	Wind (C)[2]		nnn[P]nn[n][G[P]nn[n]] MPS (or nnn[P]nn[G[P]nn] KT)			TEMPO 25018G25MPS (TEMPO 25036G50KT)	
	Prevailing visibility (C)[2]		nnnn	C A		BECMG FM1030 TL1130 CAVOK BECMG TL1700 0800 FG BECMG AT1800 9000 NSW BECMG FM1900 0500 +SNRA	

						V O K	BECMG FM1100 SN TEMPO FM1130 BLSN TEMPO FM0330 TL0430 FZRA
	Weather phenomenon: intensity (C)[10]		*or* +	—	N S W		
	Weather phenomenon: characteristics and type (C)[2, 9, 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	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	N S W		
	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 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.
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.
10. To be included whenever applicable; no qualifier for *moderate* intensity in accordance with 4.4.2.7.
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. When a meteorological element is temporarily missing, or its value considered temporarily as incorrect, it is
13. replaced by "/" for each digit of the abbreviation of the text message and indicated as missing for its IWXXM version..
14. Heavy used to indicate tornado or waterspout; moderate (no qualifier) to indicate funnel cloud not reaching the ground.
15. Up to four cloud layers in accordance with 4.5.4.3 e).
16. To be included in accordance with Chapter 6, 6.3.2. (until 3 Nov 2021)

~~17. Number of change indicators to be kept to a minimum in accordance with Appendix 5, 2.2.1, normally not exceeding three groups.~~

Table A3-3. Use of change indicators in trend forecasts

Change indicator	*Time indicator and period*	*Meaning*	
NOSIG	—	no significant changes are forecast	
BECMG	FMn1n1n1n1 TLn2n2n2n2	the change is forecast to	commence at n1n1n1n1 UTC and be completed by n2n2n2n2 UTC
	TLnnnn		commence at the beginning of the trend forecast period and be completed by nnnn UTC
	FMnnnn		commence at nnnn UTC and be completed by the end of the trend forecast period
	ATnnnn		occur at nnnn UTC (specified time)
	—		commence at the beginning of the trend forecast period and be completed by the end of the trend forecast period; *or* the time is uncertain
TEMPO	FMn1n1n1n1 TLn2n2n2n2	temporary fluctuations are forecast to	commence at n1n1n1n1 UTC and cease by n2n2n2n2 UTC
	TLnnnn		commence at the beginning of the trend forecast period and cease by nnnn UTC
	FMnnnn		commence at nnnn UTC and cease by the end of the trend forecast period
	—		commence at the beginning of the trend forecast period and cease by the end of the trend forecast period

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

Element as specified in Chapter 4		*Range*	*Resolution*
Runway:		01 – 36	1
Wind direction:	°true	010 – 360	10
Wind speed:	MPS	1 – 99*	1
	KT	1 – 199*	1
Visibility:	M	0 – 750	50
	M	800 – 4 900	100
	KM	5 – 9	1
	KM	10 –	0 (fixed value: 10 KM)
Runway visual range:	M	0 – 375	25
	M	400 – 750	50
	M	800 – 2 000	100
Vertical visibility:	M	0 – 75**	15
	M	90 – 600	30
	FT	0 – 250**	50
	FT	300 – 2 000	100
Clouds: height of cloud base:	M	0 – 75**	15
	M	90 – 3 000	30
	FT	0 – 250**	50
	FT	300 – 10 000	100
Air temperature; Dew-point temperature:	°C	–80 – +60	1
QNH; QFE:	hPa	0500 – 1 100	1

* 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 4.5.4.2; 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
Runway:	(no units)	01–36	1
Wind direction:	°true	000–360	10
Wind speed:	MPS	00 – 99*	1
	KT	00 – 199*	1
Visibility:	M	0000 – 0750	50
	M	0800 – 4 900	100
	M	5 000–9 000	1 000
	M	10 000 –	0 (fixed value: 9 999)
Runway visual range:	M	0000 – 0375	25
	M	0400 – 0750	50
	M	0800 – 2 000	100
Vertical visibility:	30's M (100's FT)	000 – 020	1
Clouds: height of cloud base:	30's M (100's FT)	000 – 100	1
Air temperature; Dew-point temperature:	°C	–80 – +60	1
QNH:	hPa	0850 – 1 100	1
Sea-surface temperature:	°C	–10 – +40	1
State of the sea:	(no units)	0 – 9	1
Significant wave height:	M	0 – 999	0.1

* 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.

Example A3-1. Routine report

a) Local routine report (same location and weather conditions as METAR):

MET REPORT YUDO 221630Z WIND 240/4MPS VIS 600M RVR RWY 12 TDZ 1000M MOD DZ FG CLD SCT 300M OVC 600M T17 DP16 QNH 1018HPA TREND BECMG TL1700 VIS 800M FG BECMG AT1800 VIS 10KM NSW

b) METAR for YUDO (Donlon/International):*

METAR YUDO 221630Z 24004MPS 0600 R12/1000U DZ FG SCT010 OVC020 17/16 Q1018 BECMG TL1700 0800 FG BECMG AT1800 9999 NSW

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 1000 metres and the runway visual range values have shown an upward tendency during previous 10 minutes (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 1018 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

Note. *– In this example, the primary units "metre per second" and "metre" were used for wind speed and height of cloud base, respectively. However, in accordance with KCASR 5, the corresponding non-SI alternative units "knot" and "foot" may be used instead.*

Example A3-2. Special report

a) Local special report (same location and weather conditions as SPECI):

SPECIAL YUDO 151115Z WIND 050/25KT MAX37 MNM10 VIS 1200M RVR RWY 05 ABV 1800M HVY TSRA CLD BKN CB 500FT T25 DP22 QNH 1008HPA TREND TEMPO TL1200 VIS 600M BECMG AT1200 VIS 8KM NSW NSC

b) SPECI for YUDO (Donlon/International):*

SPECI YUDO 151115Z 05025G37KT 3000 1200NE+TSRA BKN005CB 25/22 Q1008 TEMPO TL1200 0600 BECMG AT1200 8000 NSW NSC

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 1200 metres (along the runway(s) in the local special report); prevailing visibility 3000 metres (in SPECI) with minimum visibility 1200 metres to north east (directional variations to be included in SPECI

only); runway visual range above 1800 metres on runway 05 (runway visual range not required in SPECI with prevailing visibility of 3000 metres); thunderstorm with heavy rain; broken cumulonimbus cloud at 500 feet; air temperature 25 degrees Celsius; dew-point temperature 22 degrees Celsius; QNH 1008 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

Note. *In this example, the non-SI alternative units "knot" and "foot" were used for wind speed and height of cloud base, respectively. However, in accordance with KCASR 5, the corresponding primary units "metres per second" and "metre" may be used instead.*

Example A3-3. Volcanic activity report

VOLCANIC ACTIVITY REPORT YUSB* 231500 MT TROJEEN* VOLCANO N5605 W12652 ERUPTED 231445 LARGE ASH CLOUD EXTENDING TO APPROX 30000 FEET MOVING SW

Meaning:

Volcanic activity report issued by Siby/Bistock meteorological station at 1500 UTC on the 23rd of the month. Mt. Trojeen volcano 56 degrees 5 minutes north 126 degrees 52 minutes west erupted at 1445 UTC on the 23rd; a large ash cloud was observed extending to approximately 30000 feet and moving in a south-westerly direction.

* Fictitious location

APPENDIX 4. TECHNICAL SPECIFICATIONS RELATED TO AIRCRAFT OBSERVATIONS AND REPORTS

(See Chapter 5 of this Regulation)

1. CONTENTS OF AIR-REPORTS

1.1 Routine air-reports by air-ground data link

1.1.1 When air-ground data link is used and automatic dependent surveillance- contract (ADS-C) or SSR Mode S is being applied, the elements contained in routine air-reports shall be:

Message type designator

Aircraft identification

Data block 1

- Latitude
- Longitude
- Level
- Time

Data block 2

- Wind direction
- Wind speed
- Wind quality flag
- Air temperature
- Turbulence (if available)
- Humidity (if available)

Note. *— When ADS-C or SSR Mode S is being applied, the requirements of routine air-reports may be met by the combination of the basic ADS-C/SSR Mode S data block (data block 1) and the meteorological information data block (data block 2), available from ADS-C or SSR Mode S reports. The ADS-C message format is specified in the PANS-ATM (Doc 4444), 4.11.4 and Chapter 13 and the SSR Mode S message format is specified in KCASR 10, Volume III, Part I —* Digital Data Communication Systems, *Chapter 5.*

1.1.2 When air-ground data link is used while ADS-C and SSR Mode S are not being applied, the elements contained in routine reports shall be:

Message type designator

Section 1 (Position information)

- Aircraft identification
- Position or latitude and longitude
- Time
- Flight level or altitude
- Next position and time over
- Ensuing significant point

Section 2 (Operational information)

- Estimated time of arrival
- Endurance

Section 3 (Meteorological information)

- Air temperature
- Wind direction
- Wind speed
- Turbulence
- Aircraft icing
- Humidity (if available)

Note.-*When air-ground data link is used while ADS-C and SSR Mode S are not being applied, the requirements of routine air reports may be met by the controller-pilot data link communication (CPDLC) application entitled "Position report". The details of this data link application are specified in the* Manual of Air Traffic Services Data Link Applications *(Doc 9694) and in KCASR 10, Volume III, Part I.*

1.2 Special air-reports by air-ground data link

When air-ground data link is used, the elements contained in special air-reports shall be:

Message type designator

Aircraft identification

Data block 1

- Latitude
- Longitude
- Level
- Time

Data block 2

- Wind direction
- Wind speed
- Wind quality flag
- Air temperature
- Turbulence (if available)
- Humidity (if available)

Data block 3

Condition prompting the issuance of a special air-report (one condition to be selected from the list presented in Table A4-1).

Note 1.—*The requirements of special air -reports may be met by the data link flight information service (D-FIS) application entitled "Special air-report service". The details of this data link application are specified in Doc 9694.*

Note 2.—*In the case of a special air-report of pre-eruption volcanic activity, volcanic eruption or volcanic ash cloud, additional requirements are indicated in 4.2.*

1.3 Special air-reports by voice communications

When voice communications are used, the elements contained in special air-reports shall be:

Message type designator

Section 1 (Position information)

- Aircraft identification
- Position or latitude and longitude
- Time
- Level or range of levels

Section 3 (Meteorological information)

Condition prompting the issuance of a special air-report, to be selected from the list presented in Table A4-1.

Note 1.- *Air-reports are considered routine by default. The message type designator for special air-reports is specified in the PANS-ATM (Doc 4444), Appendix 1.*

Note 2.- *In the case of a special air-report of pre-eruption volcanic activity, volcanic eruption or volcanic ash cloud, additional requirements are indicated in 4.2.*

2. CRITERIA FOR REPORTING

2.1 General

When air-ground data link is used, the wind direction, wind speed, wind quality flag, air temperature, turbulence and humidity included in air-reports shall be reported in accordance with the following criteria.

2.2 Wind direction

The wind direction shall be reported in terms of degrees true, rounded to the nearest whole degree.

2.3 Wind speed

The wind speed shall be reported in metres per second or knots, rounded to the nearest 1 m/s (1 knot). The units of measurement used for the wind speed shall be indicated.

2.4 Wind quality flag

The wind quality flag shall be reported as 0 when the roll angle is less than 5 degrees and as 1 when the roll angle is 5 degrees or more.

2.5 Air temperature

The air temperature shall be reported to the nearest tenth of a degree Celsius.

2.6 Turbulence

The turbulence shall be reported in terms of the cube root of the eddy dissipation rate (EDR).

Note. *The EDR is an aircraft-independent measure of turbulence. However, the relationship between the EDR value and the perception of turbulence is a function of aircraft type, and the mass, altitude, configuration and airspeed of the aircraft. The EDR values given below describe the severity levels for a medium-sized transport aircraft under typical en-route conditions (i.e. altitude, airspeed and weight).*

2.6.1 Routine air-reports

The turbulence shall be reported during the en-route phase of the flight and shall refer to the 15-minute period immediately preceding the observation. Both the average and peak value of turbulence, together with the time of occurrence of the peak value to the nearest minute, shall be observed. The average and peak values shall be reported in terms of EDR. The time of occurrence of the peak value shall be reported as indicated in Table A4-2. The turbulence shall be reported during the climb-out phase for the first 10 minutes of the flight and shall refer to the 30-second period immediately preceding the observation. The peak value of turbulence shall be observed.

2.6.2 Interpretation of the turbulence report

Turbulence shall be considered:

a) severe when the peak value EDR equals or exceeds 0.45;

b) moderate when the peak value EDR is equals or above 0.20 and below 0.45;

c) light when the peak value of EDR is equals or above 0.10 and below to 0.20; and

d) nil when the peak value of EDR is below or equal to 0.10.

2.6.3 Special air-reports

Special air-reports on turbulence shall be made during any phase of the flight whenever the peak value of the cube root of EDR equals or exceeds 0.20. The special air-report on turbulence shall be made with reference to the 1-minute period immediately preceding the observation. Both the average and peak value of turbulence shall be observed. The average and peak values shall be reported in terms of EDR. Special air-reports shall be issued every minute until such time as the peak values of EDR fall below 0.20.

2.7 Humidity

The humidity shall be reported as the relative humidity, rounded to the nearest whole per cent.

Note. *The ranges and resolutions for the meteorological elements included in air-reports are shown in Table A4-3.*

3. EXCHANGE OF AIR-REPORTS

3.1 Responsibilities of the meteorological watch offices

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

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

3.1.3 When a special air-report is received at the meteorological watch office but the forecaster considers that the phenomenon causing the report is not expected to persist and, therefore, does not warrant issuance of a SIGMET, the special air-report shall be disseminated in the same way that SIGMET messages are disseminated in accordance with Appendix 6, 1.2.1, i.e. to meteorological watch offices, WAFCs, and other meteorological offices in accordance with regional air navigation agreement.

Note. *The template used for special air-reports which are uplinked to aircraft in flight is in Appendix 6, Table A6-1B.*

3.2 Responsibilities of world area forecast centres

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

Note.—*The dissemination of basic meteorological data is normally carried out on the WMO global telecommunication system.*

3.3 Supplementary dissemination of air-reports

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

3.4 Format of air-reports

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

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

4.1 Reporting of wind shear

4.1.1 **Recommendation.-** *When reporting aircraft observations of wind shear encountered during the climb-out and approach phases of flight, the aircraft type should be included.*

4.1.2 **Recommendation.-** *Where wind shear conditions in the climb-out or approach phases of flight were reported or forecast but not encountered, the pilot-in-command should advise the appropriate air traffic services unit as soon as practicable unless the pilot-in-command is aware that the appropriate air traffic services unit has already been so advised by a preceding aircraft.*

4.2 Post-flight reporting of volcanic activity

Note.—*The detailed instructions for recording and reporting volcanic activity observations are given in the PANS-ATM (Doc 4444), Appendix 1.*

4.2.1 On arrival of a flight at an aerodrome, the completed report of volcanic activity shall be delivered by the operator or a flight crew member, without delay, to the aerodrome meteorological office, or if such office is not easily accessible to arriving flight crew members, the completed form shall be dealt with in accordance with local arrangements made by the meteorological authority and the operator.

4.2.2 The completed report of volcanic activity received by 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.

Table A4-1. Template for the special air-report (downlink)

Key: M = inclusion mandatory, part of every message;
C = inclusion conditional; included whenever available.

Note. *Message to be prompted by the pilot-in-command. Currently only the condition "SEV TURB" can be automated (see 2.6.3).*

Element as specified in Chapter 5	*Detailed content*	*Template(s)*	*Examples*
Message type designator (M)	Type of air-report (M)	ARS	ARS
Aircraft identification (M)	Aircraft radiotelephony call sign (M)	nnnnnn	VA812
DATA BLOCK 1			
Latitude (M)	Latitude in degrees and minutes (M)	Nnnnn *or* Snnnn	S4506
Longitude (M)	Longitude in degrees and minutes (M)	Wnnnnn *or* Ennnnn	E01056
Level (M)	Flight level (M)	FLnnn *or* FLnnn to FLnnn	FL330 FL280 to FL310
Time (M)	Time of occurrence in hours and minutes (M)	OBS AT nnnnZ	OBS AT 1216Z
DATA BLOCK 2			
Wind direction (M)	Wind direction in degrees true (M)	nnn/	262/
Wind speed (M)	Wind speed in metres per second (*or* knots) (M)	nnnMPS (*or* nnnKT)	40MPS (080KT)
Wind quality flag (M)	Wind quality flag (M)	n	1
Air temperature (M)	Air temperature in tenths of degrees C (M)	T[M]nnn	T127 TM455
Turbulence (C)	Turbulence in hundredths of $m^{2/3} s^{-1}$ and the time of occurrence of the peak value (C)[1]	EDRnnn/nn	EDR064/08
Humidity (C)	Relative humidity in per cent (C)	RHnnn	RH054
DATA BLOCK 3			

Element as specified in Chapter 5	*Detailed content*	*Template(s)*	*Examples*
Condition prompting the issuance of a special air-report (M)		SEV TURB [EDRnnn][2] *or* SEV ICE *or* SEV MTW *or* TS GR[3] *or* TS[3] *or* HVY DS[4] *or* HVY SS[4] *or* VA CLD [FL nnn/nnn] *or* VA[5] [MT nnnnnnnnnnnnnnnnnnnn] *or* MOD TURB [EDRnnn][2] *or* MOD ICE	SEV TURB EDR076 VA CLD FL050/100

Notes.—

1. The time of occurrence to be reported in accordance with Table A4-2.
2. The turbulence to be reported in accordance with 2.6.3.
3. Obscured, embedded or widespread thunderstorms or thunderstorms in squall lines.
4. Duststorm or sandstorm.
5. Pre-eruption volcanic activity or a volcanic eruption.

Table A4-2. Time of occurrence of the peak value to be reported

Peak value of turbulence occurring during the one-minute period ..... minutes prior to the observation	*Value to be reported*
0 – 1	0
1 – 2	1
2 – 3	2
. . .	. . .
13 – 14	13
14 – 15	14
No timing information available	15

Table A4-3 Ranges and resolutions for the meteorological elements included in air-reports

Element as specified in Chapter 5		*Range*	*Resolution*
Wind direction:	°true	000 – 360	1
Wind speed:	MPS	00 – 125	1
	KT	00 – 250	1
Wind quality flag:	(index)*	0 – 1	1
Air temperature:	°C	–80 – +60	0.1
Turbulence: routine air-report:	$m^{2/3} s^{-1}$	0 – 2	0.01
	(time of occurrence)*	0 – 15	1
Turbulence: special air-report:	$_m{}^{2/3}{}_s{}^{-1}$	0 – 2	0.01
Humidity:	%	0 – 100	1

* Non-dimensional

APPENDIX 5. TECHNICAL SPECIFICATIONS RELATED TO FORECASTS

(See Chapter 6 of this Regulation)

1. CRITERIA RELATED TO TAF

1.1 TAF format

1.1.1 TAF shall be issued in accordance with the template shown in Table A5-1 and disseminated in the TAF code form prescribed by the World Meteorological Organization.

Note. *The TAF code form is contained in WMO Publication No. 306,* Manual on Codes, *Volume I.1, Part A — Alphanumeric Codes.*

1.1.2 Until 4 November 2020, TAF should be disseminated in digital IWXXM GML form in addition to the dissemination of the TAF in accordance with 1.1.1.

1.1.3 1.1.2 As of 5 November 2020, TAF shall be disseminated in IWXXM GML form in addition to the dissemination of the TAF in accordance with 1.1.1.

Note.— The technical specifications for IWXXM are contained in the Manual on Codes (WMO-No. 306), Volume I.3, Part D — Representation Derived from Data Models. Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003).

1.2 Inclusion of meteorological elements in TAF

Note.— *Guidance on operationally desirable accuracy of forecasts is given in Attachment B.*

1.2.1 Surface wind

In forecasting surface wind, the expected prevailing direction shall be given. When it is not possible to forecast a prevailing surface wind direction due to its expected variability, for example, during light wind conditions (less than 1.5 m/s (3 kt)) or thunderstorms, the forecast wind direction shall be indicated as variable using "VRB". When the wind is forecast to be less than 0.5 m/s (1 kt), the forecast wind speed shall be indicated as calm. When the forecast maximum speed (gust) exceeds the forecast mean wind speed by 5 m/s (10 kt) or more, the forecast maximum wind speed shall be indicated. When a wind speed of 50 m/s (100 kt) or more is forecast, it shall be indicated to be more than 49 m/s (99 kt).

1.2.2 Visibility

When the visibility is forecast to be less than 800 m, it should be expressed in steps of 50 m; when it is forecast to be 800 m or more but less than 5 km, in steps of 100 m; 5 km or more but less than 10 km, in kilometre steps; and when it is forecast to be 10 km or more, it should be expressed as 10 km, except when conditions of CAVOK are forecast to apply. The prevailing visibility should be forecast. When visibility is forecast to vary in different directions and the prevailing visibility cannot be forecast, the lowest forecast visibility should be given.

1.2.3 Weather phenomena

One or more, up to a maximum of three, of the following weather phenomena or combinations thereof, together with their characteristics and, where appropriate, intensity, shall be forecast if they are expected to occur at the aerodrome:

— freezing precipitation
— freezing fog
— moderate or heavy precipitation (including showers thereof)
— low drifting dust, sand or snow

— blowing dust, sand or snow
— duststorm
— sandstorm
— thunderstorm (with or without precipitation)
— squall
— funnel cloud (tornado or waterspout)
— other weather phenomena given in Appendix 3, 4.4.2.3, as agreed between the meteorological authority the appropriate ATS authority and operators concerned.

The expected end of occurrence of those phenomena shall be indicated by the abbreviation "NSW".

1.2.4 Cloud

Cloud amount shall be forecast using the abbreviations "FEW", "SCT", "BKN" or "OVC" as necessary. When it is expected that the sky will remain or become obscured and clouds cannot be forecast and information on vertical visibility is available at the aerodrome, the vertical visibility should be forecast in the form "VV" followed by the forecast value of the vertical visibility. When several layers or masses of cloud are forecast, their amount and height of base should be included in the following order:

a) the lowest layer or mass regardless of amount, to be forecast as FEW, SCT, BKN or OVC as appropriate;

b) the next layer or mass covering more than 2/8, to be forecast as SCT, BKN or OVC as appropriate;

c) the next higher layer or mass covering more than 4/8, to be forecast as BKN or OVC as appropriate; and

d) cumulonimbus clouds and/or towering cumulus clouds, whenever forecast and not already included under a) to c).

Cloud information should be limited to cloud of operational significance; when no cloud of operational significance is forecast, and "CAVOK" is not appropriate, the abbreviation "NSC" should be used.

1.2.5 Temperature

When forecast temperatures are included in accordance with regional air navigation agreement, the maximum and minimum temperatures expected to occur during the period of validity of the TAF should be given, together with their corresponding times of occurrence.

1.3 Use of change groups

Note. *— Guidance on the use of change and time indicators in TAF is given in Table A5-2.*

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
— duststorm

— sandstorm.

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

a) when the mean surface wind direction is forecast to change by 60º or more, the mean speed before and/or after the change being 5 m/s (10 kt) or more;

b) when the mean surface wind speed is forecast to change by 5 m/s (10 kt) or more;

c) when the variation from the mean surface wind speed (gusts) is forecast to 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;

d) when the surface wind is forecast to change through values of operational significance. The threshold values should be established by the meteorological authority in consultation with the appropriate ATS authority and operators concerned, taking into account changes in the wind which would:

1) require a change in runway(s) in use; and

2) indicate that the runway tailwind and crosswind components will change through values representing the main operating limits for typical aircraft operating at the aerodrome;

e) when the visibility is forecast to improve and change to or pass through one or more of the following values, or when the visibility is forecast to deteriorate and pass through one or more of the following values:

1) 150, 350, 600, 800, 1500 or 3000 m; or

2) 5000 m in cases where significant numbers of flights are operated in accordance with the visual flight rules;

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

— low drifting dust, sand or snow

— blowing dust, sand or snow

— squall

— funnel cloud (tornado or waterspout);

g) when the height of base of the lowest layer or mass of cloud of BKN or OVC extent is forecast to lift and change to or pass through one or more of the following values, or when the height of the lowest layer or mass of cloud of BKN or OVC extent is forecast to lower and pass through one or more of the following values:

1) 30, 60, 150 or 300 m (100, 200, 500 or 1000 ft); or

2) 450 m (1500 ft) in cases where significant numbers of flights are operated in accordance with the visual flight rules;

h) when the amount of a layer or mass of cloud below 450 m (1500 ft) is forecast to change:

1) from NSC, FEW or SCT to BKN or OVC; or

2) from BKN or OVC to NSC, FEW or SCT;

i) when the vertical visibility is forecast to improve and change to or pass through one or more of the following values, or when the vertical visibility is forecast to deteriorate and pass through one or more of the following values: 30, 60, 150 or 300 m (100, 200, 500 or 1000 ft); and

j) any other criteria based on local aerodrome operating minima, as agreed between the meteorological authority and the operators concerned.

Note. *Other criteria based on local aerodrome operating minima are to be considered in parallel with similar criteria for the issuance of SPECI developed in response to Appendix 3, 2.3.3 h).*

1.3.3 When a change in any of the elements given in Chapter 6, 6.2.3 is required to be indicated in accordance with the criteria given in 1.3.2, the change indicators "BECMG" or "TEMPO" shall be used followed by the time period during which the change is expected to occur. The time period should be indicated as the beginning and end of the period in whole hours UTC. Only those elements for which a significant change is expected should be included following a change indicator. However, in the case of significant changes in respect of cloud, all cloud groups, including layers or masses not expected to change, should be indicated.

1.3.4 The change indicator "BECMG" and the associated time group should be used to describe changes where the meteorological conditions are expected to reach or pass through specified threshold values at a regular or irregular rate and at an unspecified time during the time period. The time period should normally not exceed 2 hours but in any case should not exceed 4 hours.

1.3.5 The change indicator "TEMPO" and the associated time group should be used to describe expected frequent or infrequent temporary fluctuations in the meteorological conditions which reach or pass specified threshold values and last for a period of less than one hour in each instance and, in the aggregate, cover less than one-half of the forecast period during which the fluctuations are expected to occur. If the temporary fluctuation is expected to last one hour or longer, the change group "BECMG" should be used in accordance with 1.3.4 or the validity period should be subdivided in accordance with 1.3.6.

1.3.6 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 six-figure time group in 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.

1.4 Use of probability groups

The probability of occurrence of an alternative value of a forecast element or elements should be indicated, as necessary, by use of the abbreviation "PROB" followed by the probability in tens of per cent and the time period during which the alternative value(s) is (are) expected to apply. The probability information should be placed after the element or elements forecast and be followed by the alternative value of the element or elements. The probability of a forecast of temporary fluctuations in meteorological conditions should be indicated, as necessary, by use of the abbreviation "PROB" followed by the probability in tens of per cent, placed before

the change indicator "TEMPO" and associated time group. A probability of an alternative value or change of less than 30 per cent should not be considered sufficiently significant to be indicated. A probability of an alternative value or change of 50 per cent or more, for aviation purposes, should not be considered a probability but instead should be indicated, as necessary, by use of the change indicators "BECMG" or "TEMPO" or by subdivision of the validity period using the abbreviation "FM". The probability group should not be used to qualify the change indicator "BECMG" nor the time indicator "FM".

1.5 Numbers of change and probability groups

The number of change and probability groups should be kept to a minimum and should not normally exceed five groups.

1.6 Dissemination of TAF

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

2. CRITERIA RELATED TO TREND FORECASTS

2.1 Format of trend forecasts

Trend forecasts shall be issued in accordance with the templates shown in Appendix 3, Tables A3-1 and A3-2. The units and scales used in the trend forecast shall be the same as those used in the report to which it is appended.

Note. *Examples of trend forecasts are given in Appendix 3.*

2.2 Inclusion of meteorological elements in trend forecasts

2.2.1 General provisions

The trend forecast shall indicate significant changes in respect of one or more of the elements: surface wind, visibility, weather and clouds. Only those elements shall be included for which a significant change is expected. However, in the case of significant changes in respect of cloud, all cloud groups, including layers or masses not expected to change, shall be indicated. In the case of a significant change in visibility, the phenomenon causing the reduction of visibility shall also be indicated. When no change is expected to occur, this shall be indicated by the term "NOSIG".

2.2.2 Surface wind

The trend forecast shall indicate changes in the surface wind which involve:

a) a change in the mean wind direction of 60° or more, the mean speed before and/or after the change being 5 m/s (10 kt) or more;

b) a change in mean wind speed of 5 m/s (10 kt) or more; and

c) changes in the wind through values of operational significance. The threshold values shall be established by the meteorological authority in consultation with the appropriate ATS authority and operators concerned, taking into account changes in the wind which would:

1) require a change in runway(s) in use; and

2) indicate that the runway tailwind and crosswind components will change through values representing the main operating limits for typical aircraft operating at the aerodrome.

2.2.3 Visibility

When the visibility is expected to improve and change to or pass through one or more of the following values, or when the visibility is expected to deteriorate and pass through one or more of the following values: 150, 350, 600, 800, 1500 or 3000 m, the trend forecast shall indicate the change. When significant numbers of flights are conducted in accordance with the visual flight rules, the forecast shall additionally indicate changes to or passing through 5000 m.

Note.*In trend forecasts appended to local routine and special reports, visibility refers to the forecast visibility along the runway(s); in trend forecasts appended to METAR and SPECI, visibility refers to the forecast prevailing visibility.*

2.2.4 Weather phenomena

2.2.4.1 The trend forecast shall indicate the expected onset, cessation or change in intensity of one or more of the following weather phenomena or combinations thereof:

— freezing precipitation

— moderate or heavy precipitation (including showers thereof)

— thunderstorm (with precipitation)

— duststorm

— sandstorm

— other weather phenomena given in Appendix 3, 4.4.2.3, as agreed by the meteorological authority with the ATS authority and operators concerned.

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:

— freezing fog

— low drifting dust, sand or snow

— blowing dust, sand or snow

— thunderstorm (without precipitation)

— squall

— funnel cloud (tornado or waterspout).

2.2.4.3 The total number of phenomena reported in 2.2.4.1 and 2.2.4.2 shall not exceed three.

2.2.4.4 The expected end of occurrence of the weather phenomena shall be indicated by the abbreviation “NSW”.

2.2.5 Clouds

When the height of the base of a cloud layer of BKN or OVC extent is expected to lift and change to or pass through one or more of the following values, or when the height of the base of a cloud layer of BKN or OVC extent is expected to lower and pass through one or more of the following values: 30, 60, 150, 300 and 450 m (100, 200, 500, 1000 and 1500 ft), the trend forecast shall indicate the change. When the height of the base of a cloud layer is below or is expected to fall below or rise above 450 m (1500 ft), the trend forecast shall also indicate

changes in cloud amount from FEW, or SCT increasing to BKN or OVC, or changes from BKN or OVC decreasing to FEW or SCT. When no clouds of operational significance are forecast and "CAVOK" is not appropriate, the abbreviation "NSC" shall be used.

2.2.6 Vertical visibility

When the sky is expected to remain or become obscured and vertical visibility observations are available at the aerodrome, and the vertical visibility is forecast to improve and change to or pass through one or more of the following values, or when the vertical visibility is forecast to deteriorate and pass through one or more of the following values: 30, 60, 150 or 300 m (100, 200, 500 or 1000 ft), the trend forecast shall indicate the change.

2.2.7 Additional criteria

Criteria for the indication of changes based on local aerodrome operating minima, additional to those specified in 2.2.2 to 2.2.6, shall be used as agreed between the meteorological authority and the operator concerned.

2.3 Use of change groups

Note. *Guidance on the use of change indicators in trend forecasts is given in Appendix 3, Table A3-3.*

2.3.1 When a change is expected to occur, the trend forecast shall begin with one of the change indicators "BECMG" or "TEMPO".

2.3.2 The change indicator "BECMG" shall be used to describe forecast changes where the meteorological conditions are expected to reach or pass through specified values at a regular or irregular rate. The period during which, or the time at which, the change is forecast to occur shall be indicated, using the abbreviations "FM", "TL" or "AT", as appropriate, each followed by a time group in hours and minutes. When the change is forecast to begin and end wholly within the trend forecast period, the beginning and end of the change shall be indicated by using the abbreviations "FM" and "TL", respectively, with their associated time groups. When the change is forecast to commence at the beginning of the trend forecast period but be completed before the end of that period, the abbreviation "FM" and its associated time group shall be omitted and only "TL" and its associated time group shall be used. When the change is forecast to begin during the trend forecast period and be completed at the end of that period, the abbreviation "TL" and its associated time group shall be omitted and only "FM" and its associated time group shall be used. When the change is forecast to occur at a specified time during the trend forecast period, the abbreviation "AT" followed by its associated time group shall be used. When the change is forecast to commence at the beginning of the trend forecast period and be completed by the end of that period or when the change is forecast to occur within the trend forecast period but the time is uncertain, the abbreviations "FM", "TL" or "AT" and their associated time groups shall be omitted and the change indicator "BECMG" shall be used alone.

2.3.3 The change indicator "TEMPO" shall be used to describe forecast temporary fluctuations in the meteorological conditions which reach or pass specified values and last for a period of less than one hour in each instance and, in the aggregate, cover less than one-half of the period during which the fluctuations are forecast to occur. The period during which the temporary fluctuations are forecast to occur shall be indicated, using the abbreviations "FM" and/or "TL", as appropriate, each followed by a time group in hours and minutes. When the

period of temporary fluctuations in the meteorological conditions is forecast to begin and end wholly within the trend forecast period, the beginning and end of the period of temporary fluctuations shall be indicated by using the abbreviations "FM" and "TL", respectively, with their associated time groups. When the period of temporary fluctuations is forecast to commence at the beginning of the trend forecast period but cease before the end of that period, the abbreviation "FM" and its associated time group shall be omitted and only "TL" and its associated time group shall be used. When the period of temporary fluctuations is forecast to begin during the trend forecast period and cease by the end of that period, the abbreviation "TL" and its associated time group shall be omitted and only "FM" and its associated time group shall be used. When the period of temporary fluctuations is forecast to commence at the beginning of the trend forecast period and cease by the end of that period, both abbreviations "FM" and "TL" and their associated time groups shall be omitted and the change indicator "TEMPO" shall be used alone.

2.4 Use of the probability indicator

The indicator "PROB" shall not be used in trend forecasts.

3. CRITERIA RELATED TO FORECASTS FOR TAKE-OFF

3.1 Format of forecasts for take-off

The format of the forecast shall be as agreed between the meteorological authority and the operator concerned. The order of the elements and the terminology, units and scales used in forecasts for take-off should be the same as those used in reports for the same aerodrome.

3.2 Amendments to forecasts for take-off

The criteria for the issuance of amendments to forecasts for take-off for surface wind direction and speed, temperature and pressure and any other elements agreed locally should be agreed between the meteorological authority and the operators concerned. The criteria should be consistent with the corresponding criteria for special reports established for the aerodrome in accordance with Appendix 3, 2.3.1.

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

4.1 Format and content of GAMET area forecasts

When prepared in GAMET format, area forecasts shall contain two sections: Section I related to information on en-route weather phenomena hazardous to low-level flights, prepared in support of the issuance of AIRMET information, and Section II related to additional information required by low- level flights. The content and order of elements in a GAMET area forecast, when prepared, shall be in accordance with the template shown in Table A5-3. Additional elements in Section II shall be included in accordance with regional air navigation agreement. Elements which are already covered by a SIGMET message shall be omitted from GAMET area forecasts.

4.2 Amendments to GAMET area forecasts

When a weather phenomenon hazardous to low-level flights has been included in the GAMET area forecast and the phenomenon forecast does not occur, or is no longer forecast, a GAMET AMD shall be issued, amending only the weather element concerned.

Note. *- Specifications regarding the issuance of AIRMET information amending the area forecast in respect of weather phenomena hazardous for low-level flights are given in Appendix 6.*

4.3 Content of area forecasts for low-level flights in chart form

4.3.1 When chart form is used for area forecasts for low-level flights, the forecast of upper wind and upper-air temperature shall be issued for points separated by no more than 500 km (300 NM) and for at least the following altitudes: 600, 1500 and 3000 m (2000, 5000 and 10000 ft), and 4500 m (15000 ft) in mountainous areas.

4.3.2 When chart form is used for area forecasts for low-level flights, the forecast of SIGWX phenomena shall be issued as low-level SIGWX forecast for flight levels up to 100 (or up to flight level 150 in mountainous areas, or higher, where necessary). Low-level SIGWX forecasts shall include the following items:

a) the phenomena warranting the issuance of a SIGMET as given in Appendix 6 and which are expected to affect low-level flights; and

b) the elements in area forecasts for low-level flights as given in Table A5-3 except elements concerning:

1) upper winds and temperatures; and

2) forecast QNH.

Note. *- Guidance on the use of terms "ISOL", "OCNL" and "FRQ" referring to cumulonimbus and towering cumulus clouds, and thunderstorms is given in Appendix 6.*

4.4 Exchange and dissemination of area forecasts for low-level flights

4.4.1 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.

4.4.2 Area forecasts for low-level flights, in support of international air navigation, prepared in accordance with regional air navigation agreement and in support of the issuance of AIRMET information should be disseminated to the aeronautical fixed service Internet-based services.

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*
Identification of the type of forecast (M)	Type of forecast (M)	TAF *or* TAF AMD *or* TAF COR	TAF TAF AMD
Location indicator (M)	ICAO location indicator (M)	Nnnn	YUDO[1]
Time of issue of forecast (M)	Day and time of issue of the forecast in UTC (M)	nnnnnnZ	160000Z
Identification of a missing forecast (C)	Missing forecast identifier (C)	NIL	NIL
END OF TAF IF THE FORECAST IS MISSING.			
Days and period of validity of forecast (M)	Days and period of the validity of the forecast in UTC (M)	nnnn/nnnn	0812/0918
Identification of a cancelled forecast (C)	Cancelled forecast identifier (C)	CNL	CNL
END OF TAF IF THE FORECAST IS CANCELLED.			
Surface wind (M)	Wind direction (M)	nnn *or* VRB[2]	24004MPS; VRB01MPS (24008KT); (VRB02KT)
	Wind speed (M)	[P]nn[n]	19005MPS (19010KT) 00000MPS (00000KT)
	Significant speed variations (C)[3]	G[P]nn[n]	140P49MPS (140P99KT) 12003G09MPS (12006G18KT)
	Units of measurement (M)	MPS (*or* KT)	24008G14MPS

			~~(24016G28KT)~~

Visibility (M)	Prevailing visibility (M)	nnnn		C A V O K	0350 7000 9000 9999	CAVOK
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*	FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* BCFG *or*		RA +TSRA -FZDZ PRFG +TSRASN SNRA FG	HZ FG
		SHGS *or* SHRA *or* SHSN *or* TSGR *or* TSGS *or* TSRA *or* TSSN	BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG			
Cloud (M)[8]	Cloud amount and height of base or vertical visibility (M)	FEWnnn *or* SCTnnn *or* BKNnnn *or* OVCnnn	VVnnn *or* VV///	NSC	FEW010 OVC020 SCT005 BKN012	VV005 VV/// NSC
	Cloud type (C)[4]	CB *or* TCU	—		SCT008 BKN025CB	
Temperature (O)[9]	Name of the element (M)	TX			TX25/1013Z TN09/1005Z TX05/2112Z TNM02/2103Z	
	Maximum temperature (M) Day and time of occurrence of the maximum temperature (M)	[M]nn/ nnnnZ				
	Name of the element (M)	TN				
	Minimum temperature (M)	[M]nn/				
	Day and time of occurrence of the minimum temperature (M)	nnnnZ				

Expected significant changes to one or more of the above elements during the period of validity (C)[4, 10]	Change or probability indicator (M)	PROB30 [TEMPO] *or* PROB40 [TEMPO] *or* BECMG *or* TEMPO *or* FM				
	Period of occurrence or change (M)	nnnn/nnnn *or* nnnnnn[11]				
	Wind (C)[4]	nnn[P]nn[n][G[P]nn[n]]MPS *or* VRBnnMPS *(or* nnn[P]nn[G[P]nn]KT *or* VRBnnKT)				TEMPO 0815/0818 25017G25MPS (TEMPO 0815/0818 25034G50KT) TEMPO 2212/2214 17006G13MPS 1000 TSRA SCT010CB BKN020 (TEMPO 2212/2214 17012G26KT 1000 TSRA SCT010CB BKN020)
	Prevailing visibility (C)[4]	nnnn			C A V O K	BECMG 3010/3011 00000MPS 2400 OVC010 (BECMG 3010/3011 00000KT 2400 OVC010) PROB30 1412/1414 0800 FG BECMG 1412/1414 RA TEMPO 2503/2504 FZRA TEMPO 0612/0615 BLSN PROB40 TEMPO 2923/3001 0500 FG
	Weather phenomenon: intensity (C)[6]	– *or* +	—	NSW		
	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*	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*			
		SHRA *or* SHSN *or* TSGR *or* TSGS *or* TSRA *or* TSSN	BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG			
	Cloud amount and height of base or vertical visibility (C)[4]	FEWnnn *or* SCTnnn *or* BKNnnn *or* OVCnnn	VVnnn *or* VV///	NSC		FM051230 15015KMH 9999 BKN020 (FM051230 15008KT 9999 BKN020) BECMG 1618/1620 8000 NSW NSC
	Cloud type (C)[4]	CB *or* TCU	—			BECMG 2306/2308 SCT015CB BKN020

Notes.—

1. Fictitious location.
2. To be used in accordance with 1.2.1.

3. To be included in accordance with 1.2.1.
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.
8. Up to four cloud layers in accordance with 1.2.4.
9. To be included in accordance with 1.2.5, consisting of up to a maximum of four temperatures (two maximum temperatures and two minimum temperatures).
10. To be included in accordance with 1.3, 1.4 and 1.5.
11. To be used with FM only.

Table A5-2. Use of change and time indicators in TAF

Change or time indicator		*Time period*	*Meaning*	
FM		ndndnhnhnmnm	used to indicate a significant change in most weather elements occurring at ndnd day, nhnh hours and nmnm minutes (UTC); all the elements given before "FM" are to be included following "FM" (i.e. they are all superseded by those following the abbreviation)	
BECMG		nd1nd1nh1nh1/nd2nd2nh2nh2	the change is forecast to commence at nd1nd1 day and nh1nh1 hours (UTC) and be completed by nd2nd2 day and nh2nh2 hours (UTC); only those elements for which a change is forecast are to be given following "BECMG"; the time period nd1nd1nh1nh1/nd2nd2nh2nh2 should normally be less than 2 hours and in any case should not exceed 4 hours	
TEMPO		nd1nd1nh1nh1/nd2nd2nh2nh2	temporary fluctuations are forecast to commence at nd1nd1 day and nh1nh1 hours (UTC) and cease by nd2nd2 day and nh2nh2 hours (UTC); only those elements for which fluctuations are forecast are to be given following "TEMPO"; temporary fluctuations should not last more than one hour in each instance, and in the aggregate, cover less than half of the period nd1nd1nh1nh1/nd2nd2nh2nh2	
PROBnn	—	nd1nd1nh1nh1/nd2nd2nh2nh2	probability of occurrence (in %) of an alternative value of a forecast element or elements; nn = 30 or nn = 40 only; to be placed after the element(s) concerned	—
	TEMPO	nd1nd1nh1nh1/nd2nd2nh2nh2		probability of occurrence of temporary fluctuations

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 FIR/CTA (M)	ICAO location indicator of the ATS unit serving the FIR or CTA to which the GAMET refers (M)	nnnn	YUCC[1]
Identification (M)	Message identification (M)	GAMET	GAMET
Validity period (M)	Day-time groups indicating the period of validity in UTC (M)	VALID nnnnnn/nnnnnn	VALID 220600/221200
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]
Name of the FIR/CTA *or* part thereof (M)	Location indicator and name of the FIR/CTA, *or* part thereof for which the GAMET is issued (M)	nnnn nnnnnnnnnn FIR[/n] [BLW FLnnn] *or* nnnn nnnnnnnnnn CTA[/n] [BLW FLnnn]	YUCC AMSWELL FIR/2 BLW FL120 YUCC AMSWELL FIR

Element	Detailed content	Template(s)			Examples
		Identifier and time	Content	Location	
Indicator for the beginning of Section I (M)	Indicator to identify the beginning of Section I (M)	SECN I			SECN I
Surface wind (C)	Widespread surface wind exceeding 15 m/s (30 kt)	SFC WIND: [nn/nn]	Nnn/[n]nn MPS (*or* nnn/[n]nn KT)	[N OF Nnn *or* Snn] *or* [S OF Nnn *or* Snn] *or* [W OF Wnnn *or* Ennn] *or* [E OF Wnnn *or* Ennn] *or* [nnnnnnnnnn][2]	SFC WIND: 10/12 310/16 MPS SFC WIND: E OF W110 050/40KT
Surface visibility (C)	Widespread surface visibility below 5 000 m including the	SFC VIS:	nnnnM FG *or* BR		SFC VIS: 06/08 N OF N51 3000M BR

	weather phenomena causingthe reduction in visibility	[nn/nn]	or SA or DU or HZ or FU or VA or PO or DS or SS or DZ or RA or SN or SG or FC or GR or GS or PL or SQ		

Element	Detailed content	Template(s)			Examples
		Identifier and time	Content	Location	
Significant weather (C)	Significant weather conditions encompassing thunderstorms and heavy sandstorm and dust storm, and volcanic ash	SIGWX: [nn/nn]	ISOL TS or OCNL TS or FRQ TS or OBSC TS or EMBD TS or HVY DS or HVY SS or SQL TS or ISOL TSGR or OCNL TSGR or FRQ TSGR or OBSC TSGR or EMBD TSGR or SQL TSGR or VA		SIGWX: 11/12 ISOL TS SIGWX: 12/14 S OF N35 HVY SS
Mountain obscuration (C)	Mountain obscuration	MT OBSC: [nn/nn]	nnnnnnnnnn[2]		MT OBSC: S OF N48 MT PASSES
Cloud (C)	Widespread areas of broken or overcast cloud with height of base less than 300 m (1 000 ft) above ground level (AGL) or above mean sea level (AMSL) and/or any occurrence of cumulonimbus (CB) or towering cumulus (TCU) clouds	SIG CLD: [nn/nn]	BKN or OVC [n]nnn/[n]nnnM (or [n]nnn/[n]nnnFT) AGL or AMSL ISOL or OCNL or FRQ or OBSC or EMBD CB[3] or TCU[3] [n]nnn/[n]nnnM (or [n]nnn/[n]nnnFT		SIG CLD: 06/09 N OF N51 OVC 800/1100FT AGL 10/12 ISOL TCU 1200/8000FT AGL

			) AGL or AMSL		
Icing (C)	Icing (except for that occurring in convective clouds and for severe icing for which a SIGMET message has already been issued)	ICE: [nn/nn]	MOD FLnnn/nnn or MOD ABV FLnnn or SEV FLnnn/nnn or SEV ABV FLnnn		ICE: MOD FL050/080
Turbulence (C)	Turbulence (except for that occurring in convective clouds and for severe turbulence for which a SIGMET message has already been issued)	TURB: [nn/nn]	MOD FLnnn/nnn or MOD ABV FLnnn or SEV FLnnn/nnn or SEV ABV FLnnn		TURB: MOD ABV FL090
Mountain wave (C)	Mountain wave (except for severe mountain wave for which a SIGMET message has already been issued)	MTW: [nn/nn]	MOD FLnnn/nnn or MOD ABV FLnnn or SEV FLnnn/nnn or SEV ABV FLnnn		MTW: N OF N63 MOD ABV FL080
Element	*Detailed content*	*Template(s)*			*Examples*
		Identifier and time	*Content*	*Location*	
SIGMET (C)	SIGMET messages applicable to the FIR/CTA concerned or a sub-area thereof, for which the area forecast is valid	SIGMET APPLICABLE:	[n][n]n4	-	SIGMET APPLICABLE: 3, A5, B06
or HAZARDOUS WX NIL (C)[45]		HAZARDOUS WX NIL			HAZARDOUS WX NIL
Indicator for the beginning of Section II (M)	Indicator to identify the beginning of Section II (M)	SECN II			SECN II
Pressure centres and fronts (M)	Pressure centres and fronts and their expected	PSYS: [nn]	L [n]nnn HPA *or* H [n]nnn HPA	Nnnnn *or* Snnnn Wnnnnn *or*	PSYS: 06 N5130 E01000 L 1004 HPA MOV NE 25KT WKN

	movements and developments		or FRONT or NIL	Ennnnn or Nnnnn or Snnnn Wnnnnn or Ennnnn TO Nnnnn or Snnnn Wnnnnn or Ennnnn	
			MOV N or MOV NE or MOV E or MOV SE or MOV S or MOV SW or MOV W or MOV NW nnKMH (or nnKT) WKN or NC or INTSF	–	
Upper winds and temperatures (M)	Upper winds and upper-air temperatures for at least the following altitudes: 600, 1500 and 3000 m (2 000, 5000 and 10000 ft)	WIND/T:	[n]nnn M (or [n]nnn FT) nnn/[n]nn MPS (or nnn/[n]nn KT) PSnn or MSnn	Nnnnn or Snnnn Wnnnnn or Ennnnn or [N OF Nnn or Snn] or [S OF Nnn or Snn] or [W OF Wnnn or Ennn] or [E OF Wnnn or Ennn] or [nnnnnnnnnn][2]	WIND/T: 2000FT N5500 W01000 270/18MPS PS03 5000FT N5500 W01000 250/20MPS MS02 10000FT N5500 W01000 240/22MPS MS11
Cloud (M)	Cloud information not included in Section I giving type, height of base and top above ground level (AGL) or above mean sea level (AMSL)	CLD: [nn/nn]	FEW or SCT or BKN or OVC ST or SC or CU or AS or AC or NS [n]nnn/[n]nnn M (or [n]nnn/[n]nnn FT) AGL or AMSL or NIL		CLD: BKN SC 2500/8000 FT AGL CLD: NIL
Freezing level (M)	Height indication of 0 C level(s) above ground level (AGL) or above mean sea level (AMSL), if lower than the top of the airspace for which the forecast is supplied	FZLVL:	[ABV] (n)nnn FT AGL or AMSL		FZLVL: 3000FT AGL

Forecast QNH (M)	Forecast lowest QNH during the period of validity	MNM QNH:	[n]nnn HPA		MNM QNH: 1004HPA
Sea-surface temperature and state of the sea (O)	Sea-surface temperature and state of the sea if required by regional air navigation Agreement	SEA:	Tnn HGT [n]nM		SEA: T15 HGT 5M
Volcanic eruptions (M)	Name of volcano	VA:	nnnnnnnnn *or* NIL		VA: ETNA VA: NIL

Notes.—

1. Fictitious location.
2. Free text describing well-known geographical locations should be kept to a minimum.
3. The location of the CB and/or TCU should be specified in addition to any widespread areas of broken or overcast cloud as given in the example.
4. Repeat as necessary, with comma separating.

4.5 When no elements are included in Section I.

Table A5-4. Ranges and resolutions for the numerical elements included in TAF

Element as specified in Chapter 6		*Range*	*Resolution*
Wind direction:	° true	000 – 360	10
Wind speed:	MPS	00 – 99*	1
	KT	00 – 199*	1
Visibility:	M	0000 – 0750	50
	M	0800 – 4 900	100
	M	5 000 – 9 000	1 000
	M	10 000 –	0 (fixed value: 9 999)
Vertical visibility:	30's M (100's FT)	000 – 020	1
Cloud: height of cloud base:	30's M (100's FT)	000 – 100	1
Air temperature (maximum and minimum):	°C	–80 – +60	1

* 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.

Example A5-1. TAF

TAF for YUDO (Donlon/International):*

TAF YUDO 151800Z 1600/1618 13005MPS 9000 BKN020 BECMG 1606/1608 SCT015CB BKN020 TEMPO 1608/1612 17006G12MPS 1000 TSRA SCT010CB BKN020 FM161230 15004MPS 9999 BKN020

Meaning of the forecast:

TAF for Donlon/International* issued on the 15th of the month at 1800 UTC valid from 0000 UTC to 1800 UTC on the 16th of the month; surface wind direction 130 degrees; wind speed 5 metres per second; visibility 9 kilometres, broken cloud at 600 metres; becoming between 0600 UTC and 0800 UTC on the 16th of the month, scattered cumulonimbus cloud at 450 metres and broken cloud at 600 metres; temporarily between 0800 UTC and 1200 UTC on the 16th of the month surface wind direction 170 degrees; wind speed 6 metres per second gusting to 12 metres per second; visibility 1000 metres in a thunderstorm with moderate rain, scattered cumulonimbus cloud at 300 metres and broken cloud at 600 metres; from 1230 UTC on the 16th of the month surface wind direction 150 degrees; wind speed 4 metres per second; visibility 10 kilometres or more; and broken cloud at 600 metres.

* Fictitious location

Note. *— In this example, the primary units "metre per second" and "metre" were used for wind speed and height of cloud base, respectively. However, in accordance with KCASR 5, the corresponding non-SI alternative units "knot" and "foot" may be used instead.*

~~Example A5-2. Cancellation of TAF~~

~~*Cancellation of TAF for YUDO (Donlon/International)*:*~~

~~TAF AMD YUDO 161500Z 1600/1618 CNL~~

~~*Meaning of the forecast:*~~

~~Amended TAF for Donlon/International* issued on the 16th of the month at 1500 UTC cancelling the previously issued TAF valid from 0000 UTC to 1800 UTC on the 16th of the month.~~

~~* Fictitious location~~

~~Example A5-3. GAMET area forecast~~

~~YUCC GAMET VALID 220600/221200 YUDO –~~
~~YUCC AMSWELL FIR/2 BLW FL120~~
~~SECN I~~

~~SFC WIND:~~	~~10/12 310/16MPS~~
~~SFC VIS:~~	~~06/08 06/08 N OF N51 3000M BR~~
~~SIGWX:~~	~~11/12 ISOL TS~~
~~SIG CLD:~~	~~06/09 N OF N51 OVC 800/1100FT AGL 10/12 ISOL TCU 1200/8000FT AGL~~
~~ICE:~~	~~MOD FL050/080~~
~~TURB:~~	~~MOD ABV FL090~~
~~SIGMETS APPLICABLE:~~	~~3,5~~

~~SECN II~~

~~PSYS:~~	~~06 N5130 E01000 L 1004HPA MOV NE 25 KT WKN~~
~~WIND/T:~~	~~2000FT N5500 W01000 270/18MPS PS03 5000FT N5500 W01000 250/20MPS MS0 10000FT N5500 W01000 240/22MPS MS11~~
~~CLD:~~	~~BKN SC 2500/8000FT AGL~~
~~FZLVL:~~	~~3000FT AGL~~
~~MNM QNH:~~	~~1004HPA~~
~~SEA:~~	~~T15 HGT 5M~~
~~VA:~~	~~NIL~~

~~*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.~~

~~Section I:~~

~~surface wind speed and direction:~~	~~between 1000 UTC and 1200 UTC surface wind direction 310 degrees; wind speed 16 metres per second;~~
~~surface visibility:~~	~~between 0600 UTC and 0800 UTC north of 51 degrees north 3000 metres (due to mist);~~
~~significant weather phenomena:~~	~~between 1100 UTC and 1200 UTC isolated thunderstorms without hail;~~
~~significant clouds:~~	~~between 0600 UTC and 0900 UTC north of 51 degrees north overcast base 800, top 1100 feet above ground level; between 1000 UTC and 1200 UTC isolated towering cumulus base1200, top 8000 feet above ground level;~~
~~icing:~~	~~moderate between flight level 050 and 080;~~
~~turbulence:~~	~~moderate above flight level 090 (at least up to flight level 120);~~
~~SIGMET messages:~~	~~3 and 5 applicable to the validity period and sub-area concerned.~~

~~Section II:~~	
~~pressure systems:~~	~~at 0600 UTC low pressure of 1004 hectopascals at 51.5 degrees north 10.0 degrees east, expected to move north-eastwards at 25 knots and to weaken;~~

~~winds and temperatures:~~	~~at 2000 feet above ground level at 55 degrees north 10 degrees west wind direction 270 degrees; wind speed 18 metres per second, temperature plus 3 degrees Celsius; at 5000 feet above ground level at 55 degrees north 10 degrees west wind direction 250 degrees; wind speed 20 metres per second, temperature minus 2 degrees Celsius; at 10000 feet above ground level at 55 degrees north 10 degrees west wind direction 240 degrees; wind speed 22 metres per second, temperature minus 11 degrees Celsius;~~
~~clouds:~~	~~broken stratocumulus, base 2500 feet, top 8000 feet above ground level;~~
~~freezing level:~~	~~3000 feet above ground level;~~
~~minimum QNH:~~	~~1004 hectopascals;~~
~~sea:~~	~~surface temperature 15 degrees Celsius; and state of the sea 5 metres;~~
~~volcanic ash:~~	~~nil.~~

~~* 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 Regulation)

Note. — *Data type designators to be used in abbreviated headings for SIGMET, AIRMET, tropical cyclone and volcanic ash advisory messages are given in WMO Publication No. 386,* Manual on the Global Telecommunication System.

1. SPECIFICATIONS RELATED TO SIGMET INFORMATION

1.1 Format of SIGMET messages

1.1.1 The content and order of elements in a SIGMET message shall be in accordance with the template shown in Table A6-1A.

1.1.2 Messages containing SIGMET information shall be identified as: "SIGMET".

1.1.3 The sequence number referred to in the template in Table A6-1A shall correspond with the number of SIGMET messages issued for the flight information region since 0001 UTC on the day concerned. The meteorological watch offices whose area of responsibility encompasses more than one FIR and/or CTA shall issue separate SIGMET messages for each FIR and/or CTA within their area of responsibility.

1.1.4 In accordance with the template in Table A6-1A, only one of the following phenomena shall be included in a SIGMET message, using the abbreviations as indicated below:

At cruising levels (irrespective of altitude):	
Thunderstorm	
— Obscured	OBSC TS
— embedded	EMBD TS
— frequent	FRQ TS
— squall line	SQL TS
— obscured with hail	OBSC TSGR
— embedded with hail	EMBD TSGR
— frequent, with hail	FRQ TSGR
— squall line with hail	SQL TSGR
tropical cyclone	
— tropical cyclone with 10-minute mean surface wind speed of 17 m/s (34 kt)or more	TC (+ cyclone name)
Turbulence	
— severe turbulence	SEV TURB
Icing	
— severe icing	SEV ICE
— severe icing due to freezing rain	SEV ICE (FZRA)
mountain wave	
— severe mountain wave	SEV MTW
Duststorm	
— heavy duststorm	HVY DS
Sandstorm	
— heavy sandstorm	HVY SS
volcanic ash	
— volcanic ash	VA (+ volcano name, if known)
radioactive cloud	RDOACT CLD

1.1.5 SIGMET information shall not contain unnecessary descriptive material. In describing the weather phenomena for which the SIGMET is issued, no descriptive material additional to that given in 1.1.4 shall be included. SIGMET information concerning thunderstorms or a tropical cyclone shall not include references to associated turbulence and icing.

1.1.6 SIGMET information should be disseminated in IWXXM GML form, in addition to the issuance of this SIGMET information in accordance with 1.1.1.

1.1.7 As of 5 November 2020, SIGMET information shall be disseminated in IWXXM GML form in addition to the dissemination of SIGMET information in accordance with 1.1.1.

***Note**. The technical specifications for IWXXM are contained in the Manual on Codes (WMO-No. 306), Volume I.3, Part D — Representation Derived from Data Models. Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003).*

1.2 Dissemination of SIGMET messages

1.2.1 SIGMET messages shall be disseminated to meteorological watch offices, WAFCs and to other meteorological offices in accordance with regional air navigation agreement. SIGMET messages for volcanic ash shall also be disseminated to VAACs.

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

2. SPECIFICATIONS RELATED TO AIRMET INFORMATION

2.1 Format of AIRMET messages

2.1.1 The content and order of elements in an AIRMET message shall be in accordance with the template shown in Table A6-1A.

2.1.2 The sequence number referred to in the template in Table A6-1A shall correspond with the number of AIRMET messages issued for the flight information region since 0001 UTC on the day concerned. The meteorological watch offices whose area of responsibility encompasses more than one FIR and/or CTA shall issue separate AIRMET messages for each FIR and/or CTA within its area of responsibility.

2.1.3 The flight information region shall be divided in sub-areas, as necessary.

2.1.4 In accordance with the template in Table A6-1A, only one of the following phenomena shall be included in an AIRMET message, using the abbreviations as indicated below:

At cruising levels below flight level 100 (or below flight level 150 in mountainous areas, or higher, where necessary):

— surface wind speed	
– widespread mean surface wind speed above 15 m/s (30 kt)	SFC WSPD (+ wind speed, direction and units)
— surface visibility	
– widespread areas affected by reduction of	SFC VIS

visibility to less than 5000 m, including the weather phenomenon causing the reduction of visibility	(+ visibility) (+ one of the following weather phenomena or combinations thereof: BR, DS, DU, DZ, FC, FG, FU, GR, GS, HZ, IC, PL, PO, RA, SA, SG, SN, SQ, SS or VA)
— thunderstorms	
— isolated thunderstorms without hail	ISOL TS
— occasional thunderstorms without hail	OCNL TS
— isolated thunderstorms with hail	ISOL TSGR
— occasional thunderstorms with hail	OCNL TSGR
— mountain obscuration	
— mountains obscured	MT OBSC
— cloud	
— widespread areas of broken or overcast cloud with height of base less than 300 m (1000 ft)	
— above ground level:	
— broken	BKN CLD (+ height of the base and top and units)
— overcast	OVC CLD (+ height of the base and top and units)
— cumulonimbus clouds which are:	
— isolated	ISOL CB
— occasional	OCNL CB
— frequent	FRQ CB
— towering cumulus clouds which are:	
— isolated	ISOL TCU
— occasional	OCNL TCU
— frequent	FRQ TCU
— icing	
— moderate icing (except for icing in convective clouds)	MOD ICE
— turbulence	
— moderate turbulence (except for turbulence in convective clouds)	MOD TURB
— mountain wave	
— moderate mountain wave	MOD MTW

2.1.5 AIRMET information shall not contain unnecessary descriptive material. In describing the weather phenomena for which the AIRMET is issued, no descriptive material additional to that

given in 2.1.4 shall be included. AIRMET information concerning thunderstorms or cumulonimbus clouds shall not include references to associated turbulence and icing.

Note. *The specifications for SIGMET information which is also applicable to low-level flights are given in 1.1.4.*

2.1.6 AIRMET information should be disseminated in IWXXM GML form, in addition to the issuance of AIRMET information in accordance with 2.1.1.

As of 5 November 2020, AIRMET information shall be disseminated in IWXXM GML form in addition to the dissemination of AIRMET information in accordance with 2.1.1.

2.2 ***Note****.The technical specifications for IWXXM are contained in the Manual on Codes (WMO-No. 306), Volume I.3, Part D — Representation Derived from Data Models. Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003).***Dissemination of AIRMET messages**

2.2.1 AIRMET messages shall 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.

2.2.2 AIRMET messages shall be transmitted to international operational meteorological databanks and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service Internet-based services, in accordance with regional air navigation agreement.

3. SPECIFICATIONS RELATED TO SPECIAL AIR-REPORTS

Note. *This appendix deals with the uplink of special air-reports. The general specifications related to special air-reports are in Appendix 4.*

3.1 Special air-reports shall be uplinked for 60 minutes after their issuance.

3.2 Information on wind and temperature included in automated special air-reports should not be uplinked to other aircraft in flight.

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

4.1 Identification of the flight information region

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

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

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

4.2.1 An area of thunderstorms and cumulonimbus clouds shall be considered:

a) obscured (OBSC) if it is obscured by haze or smoke or cannot be readily seen due to darkness;

b) embedded (EMBD) if it is embedded within cloud layers and cannot be readily

recognized;

c) isolated (ISOL) if it consists of individual features which affect, or are forecast to affect, an area with a maximum spatial coverage less than 50 per cent of the area concerned (at a fixed time or during the period of validity); and

d) occasional (OCNL) if it consists of well-separated features which affect, or are forecast to affect, an area with a maximum spatial coverage between 50 and 75 per cent of the area concerned (at a fixed time or during the period of validity).

4.2.2 An area of thunderstorms shall be considered frequent (FRQ) if within that area there is little or no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75 per cent of the area affected, or forecast to be affected, by the phenomenon (at a fixed time or during the period of validity).

4.2.3 Squall line (SQL) shall indicate a thunderstorm along a line with little or no space between individual clouds.

4.2.4 Hail (GR) shall be used as a further description of the thunderstorm, as necessary.

4.2.5 Severe and moderate turbulence (TURB) shall refer only to: low-level turbulence associated with strong surface winds; rotor streaming; or turbulence whether in cloud or not in cloud (CAT). Turbulence should not be used in connection with convective clouds.

4.2.6 Turbulence shall be considered:

a) severe when the peak value of EDR equals or exceeds 0.45; and

b) moderate whenever the peak value of EDR is equals or above 0.20 and below to 0.45.

4.2.7 Severe and moderate icing (ICE) shall refer to icing in other than convective clouds. Freezing rain (FZRA) should refer to severe icing conditions caused by freezing rain.

4.2.8 A mountain wave (MTW) shall be considered:

a) severe whenever an accompanying downdraft of 3.0 m/s (600 ft/min) or more and/or severe turbulence is observed or forecast; and

b) moderate whenever an accompanying downdraft of 1.75–3.0 m/s (350–600 ft/min) and/or moderate turbulence is observed or forecast.

4.2.9 Sandstorm/duststorm shall 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

5.1 Format and dissemination of aerodrome warnings

5.1.1 The aerodrome warnings shall be issued in accordance with the template in Table A6-2 where required by operators or aerodrome services, and shall be disseminated in accordance with

local arrangements to those concerned.

5.1.2 The sequence number referred to in the template in Table A6-2 shall correspond with the number of aerodrome warnings issued for the aerodrome since 0001 UTC on the day concerned.

5.1.3 In accordance with the template in Table A6-2, aerodrome warnings shall relate to the occurrence or expected occurrence of one or more of the following phenomena:

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

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

5.1.4 The use of text additional to the abbreviations listed in the template in Table A6-2 shall be kept to a minimum. The additional text should be prepared in abbreviated plain language using approved ICAO abbreviations and numerical values. If no ICAO approved abbreviations are available, English plain language text should be used.

5.2 Quantitative criteria for aerodrome warnings

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 used should be as agreed between the aerodrome meteorological office and the users concerned.

6. SPECIFICATIONS RELATED TO WIND SHEAR WARNINGS

6.1 Detection of wind shear

Evidence of the existence of wind shear shall be derived from:

a) ground-based, wind shear remote-sensing equipment, for example, Doppler radar;

b) ground-based, wind shear detection equipment, for example, a system of surface wind and/or pressure sensors located in an array monitoring a specific runway or runways and associated approach and departure paths;

c) aircraft observations during the climb-out or approach phases of flight to be made in accordance with Chapter 5; or

d) other meteorological information, for example, from appropriate sensors located on existing masts or towers in the vicinity of the aerodrome or nearby areas of high ground.

Note.—*Wind shear conditions are normally associated with the following phenomena:*

- *thunderstorms, microbursts, funnel cloud (tornado or waterspout), and gust fronts*
- *frontal surfaces*
- *strong surface winds coupled with local topography*
- *sea breeze fronts*
- *mountain waves (including low-level rotors in the terminal area)*
- *low-level temperature inversions.*

6.2 Format and dissemination of wind shear warnings and alerts

Note.- *Information on wind shear is also to be included as supplementary information in local routine reports, local special reports, METAR and SPECI in accordance with the templates in Appendix 3, Tables A3-1 and A3-2.*

6.2.1 The wind shear warnings shall be issued in accordance with the template in Table A6-3 and shall be disseminated in accordance with local arrangements to those concerned.

6.2.2 The sequence number referred to in the template in Table A6-3 shall correspond with the number of wind shear warnings issued for the aerodrome since 0001 UTC on the day concerned.

6.2.3 The use of text additional to the abbreviations listed in the template in Table A6-3 shall be kept to a minimum. The additional text should be prepared in abbreviated plain language using approved ICAO abbreviations and numerical values. If no ICAO approved abbreviations are available, English plain language text should be used.

6.2.4 When an aircraft report is used to prepare a wind shear warning, or to confirm a warning previously issued, the corresponding aircraft report, including the aircraft type, shall be disseminated unchanged in accordance with local arrangements to those concerned.

Note 1.- *Following reported encounters by both arriving and departing aircraft, two different wind shear warnings may exist: one for arriving aircraft and one for departing aircraft.*

Note 2. *Specifications for reporting the intensity of wind shear are still undergoing development. It is recognized, however, that pilots, when reporting wind shear, may use the qualifying terms "moderate", "strong" or "severe", based to a large extent on their subjective assessment of the intensity of the wind shear encountered.*

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

6.2.6 *Where microbursts are observed, reported by pilots or detected by ground-based, wind shear detection or remote-sensing equipment, the wind shear warning and wind shear alert shall include a specific reference to microburst.*

6.2.7 Where information from ground-based, wind shear detection or remote-sensing equipment is used to prepare a wind shear alert, the alert shall, if practicable, relate to specific sections of the runway and distances along the approach path or take-off path as agreed between the meteorological authority, the appropriate ATS authority and the operators concerned.

Table A6-1A. Template for SIGMET and AIRMET messages

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

Note 2.— *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.*

Element	Detailed content	SIGMET template	AIRMET template	SIGMET message examples	AIRMET message Examples
Location indicator of FIR/CTA (M)[21]	ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET/AIRMET refers.	nnnn		YUCC[32] YUDD[32]	
Identification (M)	Message identification and sequence number[43]	SIGMET [n][n]n	AIRMET [n][n]n	SIGMET 1 SIGMET 01 SIGMET A01	AIRMET 9 AIRMET 19 AIRMET B19
Validity period (M)	Day-time groups indicating the period of validity in UTC	VALID nnnnnn/nnnnnn		—[5]	VALID 010000/010400 VALID 221215/221600 VALID 101520/101800 VALID 251600/252200 VALID 152000/160000 VALID 192300/200300
Location indicator of MWO (M)	Location indicator of MWO originating the message with a separating hyphen	nnnn–			YUDO–[32] YUSO–[32]
Name of the FIR/CTA (M)	Location indicator and name of the FIR/CTA[64] for which the SIGMET/AIRMET is issued	nnnn nnnnnnnnnn FIR or UIR or FIR or FIR/UIR *or* nnnn nnnnnnn nnn CTA	nnnn nnnnnnnnnn FIR[/n]	YUCC AMSWELL FIR[2] YUDD SHANLON FIR/UIR[2] UIR FIR/UIR YUDD SHANLON CTA[2]	YUCC AMSWELL FIR/2[2] YUDD SHANLON FIR[2]
IF THE SIGMET IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.					
Phenomenon (M)[5]	Description of phenomenon causing the issuance of SIGMET/AIRMET	OBSC[7] TS[GR[8]] EMBD[9] TS[GR[7]] FRQ[10] TS[GR[8]] SQL[11] TS[GR[8]] TC nnnnnnnnnn PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] CB or TC NN[12] PSN Nnn[nn]	SFC WIND nnn/nn[n]MPS (*or* SFC WIND nnn/nn[n]KT) SFC VIS nnnnM (nn)[16] ISOL[17] TS[GR[7]] OCNL[18] TS[GR[7]] MT OBSC BKN CLD (n)nnn/[ABV]nnnnM (*or* BKN CLD (n)nnn/[ABV][n]nnnnFT) or BKN CLD SFC/[ABV]nnnnM (or BKN CLD	OBSC TS OBSC TSGR EMBD TS EMBD TSGR FRQ TS FRQ TSGR SQL TS SQL TSGR TC GLORIA PSN N10 W060 CB TC NN PSN S2030 E06030 CB SEV TURB SEV ICE SEV ICE (FZRA)	SFC WIND 040/40MPS SFC WIND 310/20KT SFC VIS 1500M (BR) ISOL TS ISOL TSGR OCNL TS OCNL TSGR MT OBSC BKN CLD 120/900M (BKN CLD 400/3000FT) BKN CLD

		or Snn[nn] Wnnn[nn] or Ennn[nn] CB SEV TURB[13] SEV ICE[14] SEV ICE (FZRA)[14] SEV MTW[14] HVY DS HVY SS [VA ERUPTION] [MT] [nnnnnnnnnn] [PSN Nnn[nn] or Snn[nn] Ennn[nn] or Wnnn[nn]] VA CLD RDOACT CLD	SFC/[ABV][n]nnnnFT) OVC CLD nnn/[ABV]nnnnM (or OVC CLD nnn/[ABV][n]nnnnFT) or OVC CLD SFC/[ABV]nnnnM (or OVC CLD SFC/[ABV][n]nnnnFT) ISOL[17] CB[19] OCNL[18] CB[19] FRQ[19] CB[19] ISOL[17] TCU[17] OCNL[18] TCU[19] FRQ[19] TCU[19] MOD TURB[13] MOD ICE[14] MOD MTW[15]	SEV MTW HVY DS HVY SS VA ERUPTION MT ASHVAL[2] PSN S15 E073 VA CLD RDOACT CLD	SFC/3000M BKN CLD SFC/ABV10000FT OVC CLD 270/ABV3000M (OVC CLD 900/ABV10000FT) OVC CLD SFC/3000M OVC CLD SFC/ABV10000FT ISOL CB OCNL CB FRQ CB ISOL TCU OCNL TCU FRQ TCU MOD TURB MOD ICE MOD MTW
Observed or forecast phenomenon (M)[20,21]	Indication whether the information is observed and expected to continue, *or* forecast	OBS [AT nnnnZ] or FCST [AT nnnnZ]		OBS OBS AT 1210Z FCST FCST AT 1815Z	

Location (C)[20,21,33]	Location (referring to latitude and longitude (in degrees and minutes))	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 Nnn[nn] or N OF Snn[nn] AND S OF Nnn[nn] or S OF Snn[nn] or W OF Wnnn[nn] or W OF Ennn[nn] AND E OF Wnnn[nn] or E OF Ennn[nn] or N OF LINE[22] or NE OF LINE[22] or E OF LINE[22] or SE OF LINE[22] or S OF LINE[22] or SW OF LINE[22] or W OF LINE[22] or NW OF LINE[22] 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 N OF LINE[22] or NE OF LINE[22] or E OF LINE[22] or SE OF LINE[22] or S OF LINE[22] or SW OF LINE[22] or W OF LINE[22] or NW OF LINE[22] 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 WI [22, 23] 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 APRX nnKM WID LINE[22] BTN (or nnNM WID LINE[22] 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]] or ENTIRE FIR[/UIR] or ENTIRE CTA[24] or[25] WI nnnKM (or nnnNM) OF TC CENTRE	N48 E010 N2020 W07005 S60 W160 S0530 E16530 N OF N50 S OF N5430 N OF S10 S OF S4530 W OF W155 W OF E15540 E OF W45 E OF E09015 N OF N1515 AND W OF E13530 S OF N45 AND N OF N40 N OF LINE S2520 W11510 – S2520 W12010 SW OF LINE N50 W005 – N60 W020 SW OF LINE N50 W020 – N45 E010 AND NE OF LINE N45 W020 – N40 E010 WI N6030 E02550 – N6055 E02500 – N6050 E02630 – N6030 E02550 APRX 50KM WID LINE BTN N64 W017 – N60 W010 – N57 E010 ENTIRE FIR ENTIRE UIR ENTIRE FIR/UIR ENTIRE CTA WI 400KM OF TC CENTRE WI 250NM OF TC CENTRE WI 30KM OF N6030 E02550†
Level (C)[20,21]	Flight level or altitude	[SFC/]FLnnn *or* [SFC/]nnnnM (*or*	FL180

		[SFC/][n]nnnnFT) *or* FLnnn/nnn *or* TOP FLnnn *or* [TOP] ABV FLnnn *or* [nnnn/]nnnnM (or [[n]nnnn/][n]nnnnFT) or [nnnnM/]FLnnn (or [[n]nnnnFT/]FLnnn) *or*[24] TOP [ABV or BLW] FLnnn	SFC/FL070 SFC/3000M SFC/10000FT FL050/080 TOP FL390 ABV FL250 TOP ABV FL100 ABV 7000FT TOP ABV 9000FT TOP ABV 10000FT 3000M 2000/3000M 8000FT 6000/12000FT 2000M/FL150 10000FT/FL250 TOP FL500 TOP ABV FL500 TOP BLW FL450
Movement *or* expected movement (C)[20, 26, 34]	Movement *or* expected movement (direction and speed) with reference to one of the sixteen points of compass, *or* stationary	MOV N [nnKMH] *or* MOV NNE [nnKMH] *or* MOV NE [nnKMH] *or* MOV ENE [nnKMH] *or* MOV E [nnKMH] *or* MOV ESE [nnKMH] *or* MOV SE [nnKMH] *or* MOV SSE [nnKMH] *or* MOV S [nnKMH] *or* MOV SSW [nnKMH] *or* MOV SW [nnKMH] *or* MOV WSW [nnKMH] *or* MOV W [nnKMH] *or* MOV WNW [nnKMH] *or* MOV NW [nnKMH] *or* MOV NNW [nnKMH] (*or* MOV N [nnKT] *or* MOV NNE [nnKT] *or* MOV NE [nnKT] *or* MOV ENE [nnKT] *or* MOV E [nnKT] *or* MOV ESE [nnKT] *or* MOV SE [nnKT] *or* MOV SSE [nnKT] *or* MOV S [nnKT] *or* MOV SSW [nnKT] *or* MOV SW [nnKT] *or* MOV WSW [nnKT] *or* MOV W [nnKT] *or* MOV WNW [nnKT] *or* MOV NW [nnKT] *or* MOV NNW [nnKT]) *or* STNR	MOV SE MOV NNW MOV E 40KMH (MOV E 20KT) MOV WSW 20KT STNR
Changes in intensity (C)[20]	Expected changes in intensity	INTSF *or* WKN *or* NC	INTSF WKN NC
Forecast time (C)[20, 21, 26]	Indication of the forecast time of phenomenon	FCST AT nnnnZ —	FCST AT 2200Z —
TC forecast position (C)[24]	Forecast position of TC centre	TC CENTRE PSN Nnn[nn] *or* Snn[nn] Wnnn[nn] *or* Ennn[nn] or[31] TC CENTRE PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] CB	TC CENTRE PSN N1030 E16515 TC CENTRE PSN N1015 E15030 CB
Forecast position (C)[20, 21, 26, 27, 33]	Forecast position of phenomenon at the end of the validity period of the SIGMET message[32]	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 —	N30 W170 N OF N30 S OF S50 AND W OF E170 S OF N46 AND N OF N39 NE OF LINE N35 W020 – N45 —

		W OF Ennn[nn] or E OF Ennn[nn] or N OF Nnn[nn] or N OF Snn[nn] AND S OF Nnn[nn] or S OF Snn[nn] or W OF Wnnn[nn] or W OF Ennn[nn] AND E OF Wnnn[nn] or E OF Ennn[nn] or N OF LINE[22] or NE OF LINE[22] or E OF LINE[22] or SE OF LINE[22] or S OF LINE[22] or SW OF LINE[22] or W OF LINE[22] or NW OF LINE[22] 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 N OF LINE[22] or NE OF LINE[22] or E OF LINE[22] or SE OF LINE[22] or S OF LINE[22] or SW OF LINE[22] or W OF LINE[22] or NW OF LINE[22] 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 WI [22, 23] 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	W040 SW OF LINE N48 W020 – N43 E010 AND NE OF LINE N43 W020 – N38 E010 WI N20 W090 – N05 W090 – N10 W100 – N20 W100 – N20 W090 APRX 50KM WID LINE BTN N64 W017 – N57 W005 – N55 E010 – N55 E030 ENTIRE FIR ENTIRE UIR ENTIRE FIR/UIR ENTIRE CTA TC CENTRE PSN N2740 W07345 NO VA EXP WI 30KM OF N6030 E02550 + WI 150NM OF TC CENTRE	

		Ennn[nn]] or APRX nnKM WID LINE[22] BTN (nnNM WID LINE[22] 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]] or ENTIRE FIR[/UIR] or ENTIRE CTA or TC CENTRE PSN Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] or[28] NO VA EXP *or*[25] WI nnKM (*or* nnNM) OF Nnn[nn] *or* Snn[nn] Wnnn[nn] or Ennn[nn] or[24] WI nnnKM (nnnNM) OF TC CENTRE			
Repetition of elements (C)[29]	Repetition of elements included in a SIGMET message for volcanic ash cloud or tropical cyclone	[AND][29]	—	AND	—

OR

Cancellation of SIGMET/ AIRMET (C)[30]	Cancellation of SIGMET/AIRMET referring to its identification	CNL SIGMET [n][n]n nnnnnn/nnnnnn or[28] CNL SIGMET [n][n]n nnnnnn/nnnnnn [VA MOV TO nnnn FIR][24]	CNL AIRMET [n][n]n nnnnnn/nnnnnn	CNL SIGMET 2 101200/101600 CNL SIGMET A13 251030/251430 VA MOV TO YUDO FIR[2]	CNL AIRMET 05 151520/151800

Notes:-

1. See 4.1.

2. Fictitious location.

3. In accordance with 1.1.3 and 2.1.2.

4. See 2.1.3.

5. Used only when the message issued to indicate that a test or an exercise is taking place. When the word "TEST" or the abbreviation "EXER" is included, the message may contain information that should not be used operationally or will otherwise end immediately after the word "TEST". [Applicable 7 November 2019]

6. In accordance with 1.1.4 and 2.1.4.

7. In accordance with 4.2.1 a).
8. In accordance with 4.2.4.
9. In accordance with 4.2.1 b).
10. In accordance with 4.2.2.
11. In accordance with 4.2.3.
12. Used for unnamed tropical cyclones.
13. In accordance with 4.2.5 and 4.2.6.
14. In accordance with 4.2.7.
15. In accordance with 4.2.8.
16. In accordance with 2.1.4.
17. In accordance with 4.2.1 c).
18. In accordance with 4.2.1 d).
19. The use of cumulonimbus (CB) and towering cumulus, (TCU) is restricted to AIRMETs in accordance with 2.1.4.
20. In the case of volcanic ash cloud covering more than one area within the FIR, these elements can be repeated, as necessary Each location and forecast position is to be preceded by an observed or forecast time.
21. In the case of cumulonimbus clouds associated with a tropical cyclone covering more than one area within the FIR, these elements can be repeated as necessary. Each location and forecast position must be preceded by an observed or forecast time.
22. A straight line is to be used between two points drawn on a map in the Mercator projection or between two points which crosses lines of longitude at a constant angle.
23. The number of coordinates are to be kept to a minimum and should not normally exceed seven.
24. Only for SIGMET messages for tropical cyclones.
25. Only for SIGMET messages for volcanic ash cloud , a radius of up to 30 kilometres (or 16 nautical miles) from the source; and a vertical extent from surface (SFC) to the upper limit of the flight information region/upper flight information region (FIR/UIR) or control area (CTA) is to be applied. [Applicable from 7 November 2019 until 4 November 2020].
26. The elements 'Forecast Time' and 'Forecast Position' are not to be used in conjunction with the element Movement or Expected Movement.
27. The levels of the phenomena remain fixed throughout the forecast period.
28. Only for SIGMET messages for volcanic ash.
29. To be used for more than one volcanic ash clouds or cumulonimbus clouds associated with a tropical cyclone simultaneously affecting the FIR concerned.
30. End of the message (as the SIGMET/AIRMET message is being cancelled).
31. The term CB is to be used when the forecast position for the cumulonimbus cloud is included.
32. The forecast position for cumulonimbus (CB) cloud occurring in connection with tropical cyclones relate to the forecast time of the tropical cyclone centre position, not to the end of the validity period of the SIGMET message.
33. For SIGMET messages for radioactive cloud, only within (WI) is to be used for the elements "location" and "forecast position".

For SIGMET messages for radioactive cloud, only stationary (STNR) is to be used for the element "movement or expected movement".

Table A6-1B. Template for 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 special air-reports are shown in Table A6-4 of this appendix.*

Element	*Detailed content*	*Template[1,2]*	*Examples*
Identification (M)	Message identification	ARS	ARS
Aircraft identification (M)	Aircraft radiotelephony call sign	nnnnnn	VA812[3]
Observed phenomenon (M)	Description of observed phenomenon causing the issuance of	TS TSGR SEV TURB SEV ICE	TS TSGR SEV TURB

	the special air report[4]	SEV MTW HVY DS HVY SS VA CLD VA [MT nnnnnnnnn] MOD TURB MOD ICE	SEV ICE SEV MTW HVY DS HVY SS VA CLD VA VA MT ASHVAL[5] MOD TURB MOD ICE
Observation time (M)	Time of observation of observed phenomenon	OBS AT nnnnZ	OBS AT 1210Z
Observation Location (C)	Location (referring to latitude and longitude (in degrees and minutes)) of observed phenomenon	NnnnnWnnnnn *or* NnnnnEnnnnn *or* SnnnnWnnnnn *or* SnnnnEnnnnn	N2020W07005 S4812E01036
Observation Level (C)	Flight level *or* altitude of observed phenomenon	FLnnn *or* FLnnn/nnn *or* nnnnM (*or* [n]nnnnFT)	FL390 FL180/210 3000M 12000FT

Notes.

1. No wind and temperature to be uplinked to other aircraft in flight in accordance with 3.2.
2. See 3.1.
3. Fictitious call sign.
4. In the case of special air report for volcanic ash cloud, the vertical extent (if observed) and name of the volcano (if known) can be used.
5. Fictitious location.

Table A6-2. Template for aerodrome warnings

Key: M = inclusion mandatory, part of every message;
C = inclusion conditional, included whenever applicable.

Note 1.—*The ranges and resolutions for the numerical elements included in aerodrome warnings are shown in Table A6-4 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	*Detailed content*	*Templates*	*Examples*
Location indicator of the aerodrome (M)	Location indicator of the aerodrome	nnnn	YUCC[1]
Identification of the type of message (M)	Type of message and sequence number	AD WRNG [n]n	AD WRNG 2
Validity period (M)	Day and time of validity period in UTC	VALID nnnnnn/nnnnnn	VALID 211230/211530
IF THE AERODROME WARNING IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.			
Phenomenon (M)[2]	Description of phenomenon causing the issuance of the aerodrome warning	TC[3] nnnnnnnnnn *or* [HVY] TS *or* GR *or* [HVY] SN [nnCM][3] *or* [HVY] FZRA *or* [HVY] FZDZ *or* RIME[4] *or* [HVY] SS *or* [HVY] DS *or* SA *or* DU *or* SFC WSPD nn[n]MPS	TC ANDREW HVY SN 25CM SFC WSPD 20MPS MAX 30 VA TSUNAMI

		MAX nn[n] (SFC WSPD nn[n]KT MAX nn[n]) *or* SFC WIND nnn/nn[n]MPS MAX nn[n] (SFC WIND nnn/nn[n]KT MAX nn[n]) *or* SQ *or* FROST *or* TSUNAMI *or* VA[DEPO] *or* TOX CHEM *or* *Free text up to 32 characters*[5]	
Observed or forecast phenomenon (M)	Indication whether the information is observed and expected to continue, *or* forecast	OBS [AT nnnnZ] *or* FCST	OBS AT 1200Z OBS
Changes in intensity (C)	Expected changes in intensity	INTSF *or* WKN *or* NC	WKN

OR

Cancellation of aerodrome warning[6]	Cancellation of aerodrome warning referring to its identification	CNL AD WRNG [n]n nnnnnn/nnnnnn	CNL AD WRNG 2 211230/211530[6]

Notes.—

1. Fictitious location.
2. One phenomenon or a combination thereof, in accordance with 5.1.3.
3. In accordance with 5.1.3.
4. Hoar frost or rime in accordance with 5.1.3.
5. In accordance with 5.1.4.
6. End of the message (as the aerodrome warning is being cancelled).

Table A6-3. Template for wind shear warnings

Key: M = inclusion mandatory, part of every message;

C = inclusion conditional, included whenever applicable.

Note 1.—*The ranges and resolutions for the numerical elements included in wind shear warnings are shown in Table A6-4 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	*Detailed content*	*Template(s)*	*Example*
Location indicator of the aerodrome (M)	Location indicator of the aerodrome	nnnn	YUCC[1]
Identification of the type of message (M)	Type of message and sequence Number	WS WRNG [n]n	WS WRNG 1
Time of origin and validity period (M)	Day and time of issue and, where applicable, validity period in UTC	nnnnnn [VALID TL nnnnnn] *or* [VALID nnnnnn/nnnnnn]	211230 VALID TL 211330 221200 VALID 221215/221315
IF THE WIND SHEAR WARNING IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.			
Phenomenon (M)	Identification of the phenomenon and its location	[MOD] *or* [SEV] WS IN APCH *or* [MOD] *or* [SEV] WS [APCH] RWYnnn *or* [MOD] *or* [SEV] WS IN CLIMB-OUT *or* [MOD] *or* [SEV] WS CLIMB-OUT RWYnnn *or* MBST IN APCH *or* MBST [APCH] RWYnnn *or* MBST IN CLIMB-OUT *or* MBST CLIMB-OUT RWYnnn	WS APCH RWY12 MOD WS RWY34 WS IN CLIMB-OUT MBST APCH RWY26 MBST IN CLIMB-OUT
Observed, reported or forecast phenomenon (M)	Identification whether the phenomenon is observed or reported and expected to continue or forecast	REP AT nnnn nnnnnnnn *or* OBS [AT nnnn] *or* FCST	REP AT 1510 B747 OBS AT 1205 FCST
Details of the phenomenon (C)[2]	Description of phenomenon causing the issuance of the wind shear warning	SFC WIND: nnn/nnMPS (*or* nnn/nnKT) nnnM (nnnFT)-WIND: nnn/nnMPS (*or* nnn/nnKT) *or* nnKMH (*or* nnKT) LOSS nnKM (*or* nnNM) FNA RWYnn *or* nnKMH (*or* nnKT) GAIN nnKM (*or* nnNM) FNA RWYnn	SFC WIND: 320/5MPS 60M-WIND: 360/13MPS (SFC WIND: 320/10KT 200FT-WIND: 360/26KT) 60KMH LOSS 4KM FNA RWY13 (30KT LOSS 2NM FNA RWY13)
OR			
Cancellation of wind shear warning[3]	Cancellation of wind shear warning referring to its identification	CNL WS WRNG [n]n nnnnnn/nnnnnn	CNL WS WRNG 1 211230/211330[3]

Notes:-

1. Fictitious location.

2. Additional provisions in 6.2.3.

3. End of the message (as the wind shear warning is being cancelled).

Table A6-4. Ranges and resolutions for the numerical elements included in volcanic ash and tropical cyclone advisory messages, SIGMET/AIRMET messages and

aerodrome and wind shear warnings

Element as specified in Appendices 2 and 6		*Range*	*Resolution*
Summit elevation:	M FT	000 – 8 100 000 – 27 000	1 1
Advisory number:	for VA (index)* for TC (index)*	000 – 2 000 00 – 99	1 1
Maximum surface wind:	MPS KT	00 – 99 00 – 199	1 1
Central pressure:	hPa	850 – 1 050	1
Surface wind speed:	MPS KT	15 – 49 30 – 99	1 1
Surface visibility:	M M	0000 – 0750 0800 – 5 000	50 100
Cloud: height of base:	M FT	000 – 300 000 – 1 000	30 100
Cloud: height of top:	M M FT FT	000 – 2 970 3 000 – 20 000 000 – 9 900 10 000 – 60 000	30 300 100 1 000
Latitudes:	° (degrees) ′ (minutes)	00 – 90 00 – 60	1 1
Longitudes:	° (degrees) ′ (minutes)	000 – 180 00 – 60	1 1
Flight levels:		000 – 650	10
Movement:	KMH KT	0 – 300 0 – 150	10 5
* Non-dimensional			

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

SIGMET	Cancellation of 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 20KT WKN	YUDD SIGMET 3 VALID 101345/101600 YUSO – YUDD SHANLON FIR/UIR CNL SIGMET 2 101200/101600
AIRMET	**Cancellation of AIRMET**
YUDD AIRMET 1 VALID 151520/151800 YUSO – YUDD SHANLON FIR ISOL TS OBS N OF S50 TOP ABV FL100 STNR WKN	YUDD AIRMET 2 VALID 151650/151800 YUSO – YUDD SHANLON FIR CNL AIRMET 1 151520/151800

Example A6-2. SIGMET message for tropical cyclone

YUCC SIGMET 3 VALID 251600/252200 YUDO –
YUCC AMSWELL FIR TC GLORIA PSN N2706 W07306 CB OBS AT 1600Z WI 250NM OF TC CENTRE TOP FL500 NC FCST AT 2200Z TC CENTRE PSN N2740 W07345

Meaning:

The third 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 1600 UTC to 2200 UTC on the 25th of the month; tropical cyclone Gloria at 27 degrees 6 minutes north and 73 degrees 6 minutes west; cumulonimbus was observed at 1600 UTC within 250 nautical miles of the centre of the tropical cyclone with top at flight level 500; no changes in intensity are expected; at 2200 UTC the centre of the tropical cyclone is forecast to be located at 27 degrees 40 minutes north and 73 degrees 45 minutes west.

* Fictitious location

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 APRX 50KM WID LINE BTN S1500 E07348 – S1530 E07642 FL310/450 INTSF FCST AT 1700Z APRX 50KM WID LINE BTN S1506 E07500 – S1518 E08112 – S1712 E08330

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 in an approximately 50km wide line 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, intensifying at 1700 UTC the volcanic ash cloud is forecast to be located in an approximately 50km wide line between 15 degrees 6 minutes south and 75 degrees east, 15 degrees 18 minutes south and 81 degrees 12 minutes east, and 17 degrees 12 minutes south and 83 degrees 30 minutes east.

* Fictitious location

Example A6-4. SIGMET message for radioactive cloud

YUCC SIGMET 2 VALID 201200/201600 YUDO –
YUCC AMSWELL FIR RDOACT CLD OBS AT 1155Z WI 0KM OF N6030 E02550 SFC/FL550 STNR
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 30 kilometres of 60 degrees 30 minutes north 25
degrees 50 minutes east between the surface and flight level 550. The radioactive cloud is stationary.
* Fictitious location

Example A6-5. SIGMET message for severe turbulence

YUCC SIGMET 5 VALID 221215/221600 YUDO –
YUCC AMSWELL FIR SEV TURB OBS AT 1210Z N2020 W07005 FL250 INTSF FCST AT 1600Z S OF N2020 AND 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 20 degrees 20 minutes north and 70 degrees 5 minutes west at flight level 250; the turbulence is expected to strengthen in intensity; at 1600 UTC the severe turbulence is forecast to be located south of 20 degrees 20 minutes north and east of 69 degrees 50 minutes west.
* Fictitious location

Example A6-6. AIRMET message for moderate mountain wave

YUCC AIRMET 2 VALID 221215/221600 YUDO –
YUCC AMSWELL FIR MOD MTW OBS AT 1205Z N48 E010 FL080 STNR NC
Meaning:
The second AIRMET 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; moderate mountain wave was observed at 1205 UTC at 48 degrees north and 10 degrees east at flight level 080; the mountain wave is expected to remain stationary and not to undergo any changes in intensity.
* Fictitious location

APPENDIX 7. TECHNICAL SPECIFICATIONS RELATED TO AERONAUTICAL CLIMATOLOGICAL INFORMATION

(See Chapter 8 of this Regulation)

1. PROCESSING OF AERONAUTICAL CLIMATOLOGICAL INFORMATION

Meteorological observations for regular and alternate aerodromes shall be collected, processed and stored in a form suitable for the preparation of aerodrome climatological information.

2. EXCHANGE OF AERONAUTICAL CLIMATOLOGICAL INFORMATION

Aeronautical climatological information shall be exchanged on request between meteorological authorities. Operators and other aeronautical users desiring such information should normally apply to the meteorological authority responsible for its preparation.

3. CONTENT OF AERONAUTICAL CLIMATOLOGICAL INFORMATION

3.1 Aerodrome climatological tables

3.1.1 An aerodrome climatological table shall give as applicable:

a) mean values and variations therefrom, including maximum and minimum values, of meteorological elements (for example, of air temperature); and/or

b) the frequency of occurrence of present weather phenomena affecting flight operations at the aerodrome (for example, of sandstorms); and/or

c) the frequency of occurrence of specified values of one, or of a combination of two or more, elements (for example, of a combination of low visibility and low cloud).

3.1.2 Aerodrome climatological tables shall include information required for the preparation of aerodrome climatological summaries in accordance with 3.2.

3.2 Aerodrome climatological summaries

Aerodrome climatological summaries shall cover:

a) frequencies of the occurrence of runway visual range/visibility and/or height of the base of the lowest cloud layer of BKN or OVC extent below specified values at specified times;

b) frequencies of visibility below specified values at specified times;

c) frequencies of the height of the base of the lowest cloud layer of BKN or OVC extent below specified values at specified times;

d) frequencies of occurrence of concurrent wind direction and speed within specified ranges;

e) frequencies of surface temperature in specified ranges of 5°C at specified times; and

f) mean values and variations therefrom, including maximum and minimum values of meteorological elements required for operational planning purposes, including take-off performance calculations.

Note. — *Models of climatological summaries related to a) to e) are given in WMO Publication No. 49,* Technical Regulations, *Volume II, C.3.2.*

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

(See Chapter 9 of this Regulation)

Note. *- Specifications related to flight documentation (including the model charts and forms) are given in Appendix 1.*

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 the operator concerned, and with the order shown below not implying priorities:

a) written or printed material, including specified charts and forms;

b) data in digital form;

c) briefing;

d) consultation;

e) display; or

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.

1.2 The meteorological authority, in consultation with the operator, shall determine:

1.3 a) the type and format of meteorological information to be supplied; and

b) methods and means of supplying that information.

1.4 On request by the operator, the meteorological information supplied for flight planning shall include data for the determination of the lowest usable flight level.

2 SPECIFICATIONS RELATED TO INFORMATION FOR PRE-FLIGHT PLANNING AND INFLIGHT REPLANNING

2.1 Format of upper-air gridded information

Upper-air gridded information supplied by WAFCs for pre-flight and in-flight replanning shall be in the GRIB code form.

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

2.2 Format of information on significant weather

2.2.1 Information on significant weather supplied by WAFCs for pre-flight planning and in-flight replanning shall be in the BUFR code form.

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

2.2.2 As of 4 November 2021, in addition to 2.2.1, information on significant weather supplied by WAFCs for pre-flight planning and in-flight replanning should be in IWXXM GML form.

Note 1. — Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological Information Exchange Model (IWXXM) *(Doc 10003).*

Note 2. — Geography markup language (GML) *is an encoding standard of the Open Geospatial Consortium (OGC).*

2.3 Specific needs of helicopter operations

Meteorological information for pre-flight planning and in-flight replanning by operators of helicopters flying to offshore structures shall include data covering the layers from sea level to flight level 100. Particular mention should be made of the expected surface visibility, the amount, type (where available), base and tops of cloud below flight level 100, sea state and sea-surface temperature, mean sea-level pressure, and the occurrence and expected occurrence of turbulence and icing, as determined by regional air navigation agreement.

3. SPECIFICATIONS RELATED TO BRIEFING AND CONSULTATION

3.1 Information required to be displayed

The material displayed shall be readily accessible to the flight crew members or other flight operations personnel concerned.

4. SPECIFICATIONS RELATED TO FLIGHT DOCUMENTATION

4.1 Presentation of information

4.1.1 The flight documentation related to forecasts of upper wind and upper-air temperature and SIGWX phenomena shall be presented in the form of charts. For low-level flights, alternatively, GAMET area forecasts shall be used.

Note. *Models of charts and forms for use in the preparation of flight documentation are given in Appendix 1. These models and methods for their completion are developed by the World Meteorological Organization on the basis of relevant operational requirements stated by the International Civil Aviation Organization.*

4.1.2 The flight documentation related to concatenated route-specific upper wind and upper-air temperature forecasts shall be provided as agreed between the meteorological authority and the operator concerned.

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

4.1.3 METAR and SPECI (including trend forecasts as issued in accordance with regional air navigation agreement), TAF, GAMET, SIGMET and AIRMET, volcanic ash, tropical cyclone and space weather advisory information shall be presented in accordance with the templates in Appendices 1, 2, 3, 5 and 6, respectively. Such meteorological information received from other meteorological offices shall be included in flight documentation without change.

Note.— Examples *of the form of presentation of METAR/SPECI and TAF are given in Appendix 1.*

4.1.4 The location indicators and the abbreviations used shall be explained in the flight documentation.

4.1.5 The forms and the legend of charts included in flight documentation shall be printed in English, French, Russian or Spanish. Where appropriate, approved abbreviations should be used. The units employed for each element should be indicated; they should be in accordance with KCASR 5.

4.2 Charts in flight documentation

4.2.1 Characteristics of charts

4.2.1.1 Charts included in flight documentation should have a high standard of clarity and legibility and shall have the following physical characteristics:

a) for convenience, the largest size of charts should be about 42 × 30 cm (standard size A3) and the smallest size should be about 21 × 30 cm (standard size A4). The choice between these sizes should depend on the route lengths and the amount of detail that needs to be given in the charts as agreed between the meteorological authorities and the users concerned;

b) major geographical features, such as coastlines, major rivers and lakes should be depicted in a way that makes them easily recognizable;

c) for charts prepared by computer, meteorological data should take preference over basic chart information, the former cancelling the latter wherever they overlap;

d) major aerodromes should be shown as a dot and identified by the first letter of the name of the city the aerodrome serves as given in Table AOP of the relevant regional air navigation plan;

e) a geographical grid should be shown with meridians and parallels represented by dotted lines at each 10° latitude and longitude; dots should be spaced one degree apart;

f) latitude and longitude values should be indicated at various points throughout the charts (i.e. not only at the edges); and

g) labels on the charts for flight documentation should be clear and simple and should present the name of the world area forecast centre or, for non-WAFS products, the originating centre, the type of chart, date and valid time and, if necessary, the types of units used in an unambiguous way.

Note. *When plotting shapes, particularly polygons, on maps, appropriate corrections are necessary if plotted on projections different to that used in the production of the original forecast area .*

4.2.1.2 Meteorological information included in flight documentation shall be represented as follows:

a) winds on charts shall be depicted by arrows with feathers and shaded pennants on a sufficiently

dense grid;

b) temperatures shall be depicted by figures on a sufficiently dense grid;

c) wind and temperature data selected from the data sets received from a world area forecast centre shall be depicted in a sufficiently dense latitude/longitude grid; and

d) wind arrows shall take precedence over temperatures and either shall take precedence over chart background.

4.2.1.3 For short-haul flights, charts shall be prepared covering limited areas at a scale of 1:15 × 10^6 as required.

4.2.2 Set of charts to be provided

4.2.2.1 The minimum number of charts for flights between flight level 250 and flight level 630 shall include a high-level SIGWX chart (flight level 250 to flight level 630) and a forecast 250 hPa wind and temperature chart. The actual charts provided for pre-flight and in-flight planning and for flight documentation shall be as agreed between meteorological authorities and users concerned.

4.2.2.2 Charts to be provided shall be generated from the digital forecasts provided by the WAFCs whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, unless otherwise agreed between the meteorological authority and the operator concerned.

4.2.3 Height indications

In flight documentation, height indications shall be given as follows:

a) all references to en-route meteorological conditions, such as height indications of upper winds, turbulence or bases and tops of clouds, shall preferably be expressed in flight levels; they may also be expressed in pressure, altitude or, for low-level flights, height above ground level; and

b) all references to aerodrome meteorological conditions, such as height indications of the bases of clouds, shall be expressed in height above the aerodrome elevation.

4.3 Specifications related to low-level flights

4.3.1 In chart form

Where the forecasts are supplied in chart form, flight documentation for low-level flights, including those in accordance with the visual flight rules, operating up to flight level 100 (or up to flight level 150 in mountainous areas or higher, where necessary), shall contain the following as appropriate to the flight:

a) information from relevant SIGMET and AIRMET messages;

b) upper wind and upper-air temperature charts as given in Appendix 5, 4.3.1; and

c) significant weather charts as given in Appendix 5, 4.3.2.

4.3.2 In abbreviated plain language

Where the forecasts are not supplied in chart form, flight documentation for low-level flights, including those in accordance with the visual flight rules, operating up to flight level 100 (up to flight level 150 in mountainous areas or higher, where necessary), shall contain the following information as appropriate to the flight:

a) SIGMET and AIRMET information; and

b) GAMET area forecasts.

Note. *An example of the GAMET area forecast is given in Appendix 5.*

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 an aerodrome

meteorological office by telephone or other suitable telecommunications means.

5.2 Detailed specifications of the systems

Automated pre-flight information systems for the supply of meteorological information for self-briefing, pre-flight planning and flight documentation shall:

a) provide for the continuous and timely updating of the system database and monitoring of the validity and integrity of the meteorological information stored;

b) permit access to the system by operators and flight crew members and also by other aeronautical users concerned through suitable telecommunications means;

c) use access and interrogation procedures based on abbreviated plain language and, as appropriate, ICAO location indicators, and aeronautical meteorological code data-type designators prescribed by the WMO, or based on a menu-driven user interface, or other appropriate mechanisms as agreed between the meteorological authority and the operators concerned; and

d) provide for rapid response to a user request for information.

Note. *- ICAO abbreviations and codes and location indicators are given respectively in the* Procedures for Air Navigation Services — ICAO Abbreviations and Codes *(PANS -ABC, Doc 8400) and* Location Indicators *(Doc 7910). Aeronautical meteorological code data-type designators are given in the WMO Publication No. 386,* Manual on the Global Telecommunication System.

6. SPECIFICATIONS RELATED TO INFORMATION FOR AIRCRAFT IN FLIGHT

6.1 Supply of information requested by an aircraft in flight

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.

6.2 Information for in-flight planning by the operator

Meteorological information for planning by the operator for aircraft in flight should be supplied during the period of the flight and shall normally consist of any or all of the following:

a) METAR and SPECI (including trend forecasts as issued in accordance with regional air navigation agreement);

b) TAF and amended TAF;

c) SIGMET and AIRMET information and special air-reports relevant to the flight, unless the latter have been the subject of a SIGMET message;

d) upper wind and upper-air temperature information;

e) volcanic ash and tropical cyclone advisory information relevant to the flight; and

f) other meteorological information in alphanumeric or graphical form as agreed between the meteorological authority and the operator concerned.

Note. *— Guidance on the display of graphical information in the cockpit is provided in the* Manual of Aeronautical Meteorological Practice *(Doc 8896).*

CHART	L ATITUDE	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 WA FS 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 WA FS 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 WA FS 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 Regulation)

1. INFORMATION TO BE PROVIDED FOR AIR TRAFFIC SERVICES UNITS

1.1 List of information for the aerodrome control tower

The following meteorological information shall be supplied, as necessary, to an aerodrome control tower by its associated aerodrome meteorological office:

a) local routine reports, local special reports, METAR, SPECI, TAF, trend forecasts and amendments thereto, for the aerodrome concerned;

b) SIGMET and AIRMET information, wind shear warnings and alerts and aerodrome warnings;

c) any additional meteorological information agreed upon locally, such as forecasts of surface wind for the determination of possible runway changes;

d) information received on volcanic ash cloud, for which a SIGMET has not already been issued, as agreed between the meteorological and ATS authorities concerned; and

e) information received on pre-eruption volcanic activity and/or a volcanic eruption as agreed between the meteorological and ATS authorities concerned.

1.2 List of information for the approach control unit

The following meteorological information shall be supplied, as necessary, to an approach control unit by its associated aerodrome meteorological office:

a) local routine reports, local special reports, METAR, SPECI, TAF, and trend forecasts and amendments thereto, for the aerodrome(s) with which the approach control unit is concerned;

b) SIGMET and AIRMET information, wind shear warnings and alerts and appropriate special air-reports for the airspace with which the approach control unit is concerned and aerodrome warnings;

c) any additional meteorological information agreed upon locally;

d) information received on volcanic ash cloud, for which a SIGMET has not already been issued, as agreed between the meteorological and ATS authorities concerned; and

e) information received on pre-eruption volcanic activity and/or a volcanic eruption as agreed between the meteorological and ATS authorities concerned.

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:

a) METAR and SPECI, including current pressure data for aerodromes and other locations, TAF and trend forecasts and amendments thereto, covering the flight information region

or the control area and, if required by the flight information centre or area control centre, covering aerodromes in neighboring flight information regions, as determined by regional air navigation agreement;

b) forecasts of upper winds, upper-air temperatures and significant en-route weather phenomena and amendments thereto, particularly those which are likely to make operation under visual flight rules impracticable, SIGMET and AIRMET information and appropriate special air-reports for the flight information region or control area and, if determined by regional air navigation agreement and required by the flight information centre or area control centre, for neighboring flight information regions;

c) any other meteorological information required by the flight information centre or area control centre to meet requests from aircraft in flight; if the information requested is not available in the associated meteorological watch office, that office shall request the assistance of another meteorological office in supplying it;

d) information received on volcanic ash cloud, for which a SIGMET has not already been issued, as agreed between the meteorological and ATS authorities concerned;

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

f) tropical cyclone advisory information issued by a TCAC in its area of responsibility;

g) volcanic ash advisory information issued by a VAAC in its area of responsibility; and

h) information received on pre-eruption volcanic activity and/or a volcanic eruption as agreed between the meteorological and ATS authorities concerned.

1.4 Supply of information to aeronautical telecommunications stations

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

1.5 Format of information

1.5.1 Local routine reports, local special reports, METAR, SPECI, TAF, trend forecasts, SIGMET and AIRMET information, upper wind and upper-air temperature forecasts and amendments thereto shall 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, or received from other aerodrome meteorological offices or meteorological watch offices, unless otherwise agreed locally.

1.5.2 When computer-processed upper-air data for grid points are made available to air traffic services units in digital form for use by air traffic services computers, the contents, format and transmission arrangements shall be as agreed between the meteorological authority and the appropriate ATS authority concerned. The data should normally be supplied as soon as is practicable after the processing of the forecasts has been completed.

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

2.1 List of information

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

a) significant en-route weather phenomena;

b) cloud amount and type, particularly cumulonimbus; height indications of bases and tops;

c) visibility and phenomena reducing visibility;

d) surface wind and upper wind;

e) state of ground, in particular, any snow cover or flooding;

f) sea-surface temperature, state of the sea, ice cover if any and ocean currents, if relevant to the search area; and

g) sea-level pressure data.

2.2 Information to be provided on request

2.2.1 On request from the rescue coordination centre, the designated aerodrome meteorological office or meteorological watch office shall 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 To facilitate search and rescue operations, the designated aerodrome meteorological office or meteorological watch office shall , on request, supply:

a) complete and detailed information on the current and forecast meteorological conditions in the search area; and

b) current and forecast conditions en route, covering flights by search aircraft from and returning to the aerodrome from which the search is being conducted.

2.2.3 On request from the rescue coordination centre, the designated aerodrome meteorological office or meteorological watch office shall 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:

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

Note. *Details of this information are given in PAN-AIM, Appendix 3, Part 1, GEN 3.5 and Part 3, AD 2.2, 2.11, 3.2 and 3.11.*

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

1) the establishment, withdrawal and significant changes in operation of aeronautical meteorological services. This information is required to be provided to the

aeronautical information services unit sufficiently in advance of the effective date to permit issuance of NOTAM in compliance with KCASR 15, 6.3.2.2 and 6.3.2.3;

2) the occurrence of volcanic activity; and

Note. *- The specific information required is given in Chapter 3, 3.3.2 and Chapter 4, 4.8.*

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

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

c) information necessary for the preparation of aeronautical information circulars including, in particular, information on:

4) expected important changes in aeronautical meteorological procedures, services and facilities provided; and

5) effect of certain weather phenomena on aircraft operations.

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

(See Chapter 11 of this Regulation)

1. SPECIFIC REQUIREMENTS FOR COMMUNICATIONS

1.1 Required transit times of operational meteorological information

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

1.2 Grid point data for ATS and operators

1.2.1 When upper-air data for grid points in digital form are made available for use by air traffic services computers, the transmission arrangements shall be as agreed between the meteorological authority and the appropriate ATS authority concerned.

1.2.2 When upper-air data for grid points in digital form are made available to operators for flight planning by computer, the transmission arrangements shall be as agreed between the WAFC concerned, the meteorological authority and the operators concerned.

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

2.1 Meteorological bulletins in alphanumeric format

2.1.1 Composition of bulletins

Whenever possible, exchanges of operational meteorological information shall be made in consolidated bulletins of the same types of meteorological information.

2.1.2 Filing times of bulletins

Meteorological bulletins required for scheduled transmissions shall 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 not earlier than one hour prior to the beginning of their validity period.

2.1.3 Heading of bulletins

Meteorological bulletins containing operational meteorological information to be transmitted via the aeronautical fixed service or the public Internet shall contain a heading consisting of:

a) an identifier of four letters and two figures;

b) the ICAO four-letter location indicator corresponding to the geographical location of the meteorological office originating or compiling the meteorological bulletin;

c) a day-time group; and

d) if required, a three-letter indicator.

Note 1. *Detailed specifications on format and contents of the heading are given in WMO Publication No. 386,* Manual on the Global Telecommunication System, *Volume I and are reproduced in the* Manual of Aeronautical Meteorological Practice *(Doc 8896).*

Note 2. *ICAO location indicators are listed in* Location Indicators *(Doc 7910).*

2.1.4 Transmission of bulletins containing operational meteorological information

Meteorological bulletins containing operational meteorological information shall be transmitted via the aeronautical fixed service (AFS).

2.2 World area forecast system products

2.2.1 Telecommunications for the supply of WAFS products

The telecommunications facilities used for the supply of world area forecast system products shall be the aeronautical fixed service or the public Internet.

2.2.2 Quality requirements for charts

Where world area forecast system products are disseminated in chart form, the quality of the charts received shall be such as to permit reproduction in a sufficiently legible form for flight planning and documentation. Charts received shall be legible over 95 per cent of their area.

2.2.3 Quality requirements for transmissions

Transmissions should be such as to ensure that their interruption shall not exceed 10 minutes during any period of 6 hours.

2.2.4 Heading of bulletins containing WAFS products

Meteorological bulletins containing WAFS products in digital form to be transmitted via aeronautical fixed service or the public Internet shall contain a heading as given in 2.1.3.

3. USE OF AERONAUTICAL MOBILE SERVICE COMMUNICATIONS

3.1 Content and format of meteorological messages

3.1.1 The content and format of reports, forecasts and SIGMET information transmitted to aircraft shall be consistent with the provisions of Chapters 4, 6 and 7 of this Regulation.

3.1.2 The content and format of air-reports transmitted by aircraft shall be consistent with the provisions of Chapter 5 of this Regulation and the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), Appendix 1.

3.2 Content and format of meteorological bulletins

The substance of a meteorological bulletin transmitted via the aeronautical mobile service shall remain unchanged from that contained in the bulletin as originated.

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

4.1 Detailed content of meteorological information available for D-VOLMET

4.1.1 The aerodromes for which METAR, SPECI and TAF are to be available for uplink to aircraft in flight shall be determined by regional air navigation agreement.

4.1.2 The flight information regions for which SIGMET and AIRMET messages are to be available for uplink to aircraft in flight shall be determined by regional air navigation agreement.

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

4.2.1 The latest available METAR, SPECI and TAF, and valid SIGMET and AIRMET shall be used for uplink to aircraft in flight.

4.2.2 TAF included in the D-VOLMET shall 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.

4.2.3 If no SIGMET message is valid for a flight information region, an indication of "NIL SIGMET" shall be included in the D-VOLMET.

4.3 Format of information to be available for D-VOLMET

The content and format of reports, forecasts and SIGMET and AIRMET information included in D-VOLMET shall be consistent with the provisions of Chapters 4, 6 and 7 of this Regulation.

5. USE OF AERONAUTICAL BROADCASTING SERVICE — VOLMET BROADCASTS

5.1 Detailed content of meteorological information to be included in VOLMET broadcasts

5.1.1 The aerodromes for which METAR, SPECI and TAF are to be included in VOLMET broadcasts,

~~the sequence in which they are to be transmitted and the broadcast time shall be determined by regional air navigation agreement.~~

~~5.1.2 The flight information regions for which SIGMET messages are to be included in scheduled VOLMET broadcasts shall be determined by regional air navigation agreement. Where this is done, the SIGMET message shall be transmitted at the beginning of the broadcast or of a five-minute time block.~~

~~5.2 Criteria related to information to be included in VOLMET broadcasts~~

~~5.2.1 When a report has not arrived from an aerodrome in time for a broadcast, the latest available report shall be included in the broadcast, together with the time of observation.~~

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

~~5.2.3 Where SIGMET messages are included in scheduled VOLMET broadcasts, an indication of "NIL SIGMET" shall be transmitted if no SIGMET message is valid for the flight information regions concerned.~~

~~5.3 Format of information to be included in VOLMET broadcasts~~

~~5.3.1 The content and format of reports, forecasts and SIGMET information included in VOLMET broadcasts shall be consistent with the provisions of Chapters 4, 6 and 7 of this Regulation.~~

~~5.3.2 VOLMET broadcasts shall use standard radiotelephony phraseologies.~~

~~***Note.*** *Guidance on the standard radiotelephony phraseologies to be used in VOLMET broadcasts is given in the Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services (Doc 9377), Appendix 1.*~~

ATTACHMENT A. OPERATIONALLY DESIRABLE ACCURACY OF MEASUREMENT OR OBSERVATION

Note. *The guidance contained in this table relates to Chapter 2 — Supply, use, quality management and interpretation of meteorological information, in particular to 2.2.7, and Chapter 4 — Meteorological observations and reports.*

Element to be observed	*Operationally desirable accuracy of measurement or observation**
Mean surface wind	Direction: ± 10° Speed: ± 0.5 m/s (1 kt) up to 5 m/s (10 kt) ± 10% above 5 m/s (10 kt)
Variations from the mean surface wind	± 1 m/s (2 kt), in terms of longitudinal and lateral components
Visibility	± 50 m up to 600 m ± 10% between 600 m and 1500 m ± 20% above 1500 m
Runway visual range	± 10 m up to 400 m ± 25 m between 400 m and 800 m ± 10% above 800 m
Cloud amount	± 1 okta
Cloud height	± 10 m (33 ft) up to 100 m (330 ft) ± 10% above 100 m (330 ft)
Air temperature and dew-point temperature	± 1°C
Pressure value (QNH, QFE)	± 0.5 hPa

* The operationally desirable accuracy is not intended as an operational requirement; it is to be understood as a goal that has been expressed by the operators.

Note. *— Guidance on the uncertainties of measurement or observation can be found in WMO Publication No. 8 — Guide to Meteorological Instruments and Methods of Observation.*

ATTACHMENT B. OPERATIONALLY DESIRABLE ACCURACY OF FORECASTS

Note 1.— The guidance contained in this table relates to Chapter 2 — Supply, use, quality management and interpretation of meteorological information, in particular to 2.2.8, and Chapter 6 — Forecasts.

Note 2.— If the accuracy of the forecasts remains within the operationally desirable range shown in the second column, for the percentage of cases indicated in the third column, the effect of forecast errors is not considered serious in comparison with the effects of navigational errors and of other operational uncertainties.

Element to be forecast	*Operationally desirable accuracy of forecasts*	*Minimum percentage of cases within range*
TAF		
Wind direction	± 20°	80% of cases
Wind speed	± 2.5 m/s (5 kt)	80% of cases
Visibility	± 200 m up to 800 m ± 30% between 800 m and 10 km	80% of cases
Precipitation	Occurrence or non-occurrence	80% of cases
Cloud amount	One category below 450 m (1500 ft) Occurrence or non-occurrence of BKN or OVC between 450 m (1500 ft) and 3000 m (10000 ft)	70% of cases
Cloud height	± 30 m (100 ft) up to 300 m (1000 ft) ± 30% between 300 m (1000 ft) and 3000 m (10000 ft)	70% of cases
Air temperature	± 1°C	70% of cases
	TREND FORECAST	
Wind direction	± 20°	90% of cases
Wind speed	± 2.5 m/s (5 kt)	90% of cases
Visibility	± 200 m up to 800 m ± 30% between 800 m and 10 km	90% of cases
Precipitation	Occurrence or non-occurrence	90% of cases
Cloud amount	One category below 450 m (1500 ft) Occurrence or non-occurrence of BKN or OVC between 450 m (1500 ft) and 3000 m (10000 ft)	90% of cases
Cloud height	± 30 m (100 ft) up to 300 m (1000 ft) ± 30% between 300 m (1000 ft) and 3000 m (10000 ft)	90% of cases
FORECAST FOR TAKE-OFF		
Wind direction	± 20°	90% of cases
Wind speed	± 2.5 m/s (5 kt) up to 12.5 m/s (25 kt)	90% of cases
Air temperature	± 1°C	90% of cases
Pressure value (QNH)	± 1 hPa	90% of cases
AREA, FLIGHT AND ROUTE FORECASTS		
Upper-air temperature	± 2°C (Mean for 900 km (500 NM)	90% of cases
Relative humidity	± 20%	90% of cases
Upper wind	± 5 m/s (10 kt) (Modulus of vector difference for 900 km (500 NM))	90% of cases

~~Significant en-route weather phenomena and cloud~~	~~Occurrence or non-occurrence~~	~~80% of cases~~
	~~Location: ± 100 km (60 NM)~~	~~70% of cases~~
	~~Vertical extent: ± 300 m (1000 ft)~~	~~70% of cases~~
	~~Flight level of tropopause: ± 300 m (1000 ft)~~	~~80% of cases~~
	~~Max wind level: ± 300 m (1000 ft)~~	~~80% of cases~~

~~ATTACHMENT C. SELECTED CRITERIA APPLICABLE TO AERODROME REPORTS~~

	Surface wind					Visibility (VIS)					Runway visual range[1]			Present weather	Cloud				Temperature	Pressure (QNH, QFE)		Supplementary information
											A: ~10 min (Time, MIN)	B: ~5 min (Time, MIN)	C: (OBS TIME)		Amount							
	Directional variations[2]			Speed variations[3]		Directional variations[4]				Past tendency[5]				Layers reported if coverage							
Specifications	≥ 60° and < 180°	Mean speed	≥ 180°	Exceeding the mean speed by ≥ 5 m/s (10 kt)		General rule	Minimum VIS < 1 500 m or < 0.5 × prevailing VIS	Special cases Minimum VIS ≠ prevailing VIS		< 100 m	≥ 100 m			Lowest layer	Next layer>	Next higher layer>	CB or TCU	Type[6] Identification		Parameters reported	Updated if changes > agreed magnitude	Parameter to be included
	< 1.5 m/s (3 kt)	≥ 1.5 m/s (3 kt)						VIS fluctuating and prevailing VIS cannot be determined														
Local routine and special report	2/10 ↑ VRB + 2 extreme directions	2/10 min mean + 2 extreme directions	2 min VRB (no extremes)[7]	10 min Minimum and maximum speed	1 min VIS along the runway(s)	NA	NA	NA	1 min	NA[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)		mean + 2 extreme directions	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 (NT)	Upward (U) or downward (D)			Always	2/8	4/8	Always	CB TCU	Rounded off to whole degrees: up for decimal 5	QNH	No	Recent WX of operational significance and wind shear[12]
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 Prevailing VIS: VIS < 800 m : 50 m; 800 m ≤ VIS < 5 000 m : 100 m; 5 000 m ≤ VIS < 10 km : 1 km; VIS ≥ 10 km : None, given as 10 km or covered under CAVOK				No tendency available, the tendency is to be omitted			NA	if Base ≤ 3 000 m (10 000 ft) (Reference level: Aerodrome elevation[14] or mean sea level for offshore structures)	Step applicable : 30 m (100 ft)				In whole hPa[15] rounding down for decimals 1 – 9	NA

Notes—

1. Considered for the past 10 minutes (exception: if the 10-minute period includes a marked discontinuity (i.e. runway visual range changes or passes 175, 300, 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 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 $R_{(AB)}$ = 5-minute mean runway visual range value during period AB and $R_{(BC)}$ = 5-minute mean 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, metering 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. NA = 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.

ATTACHMENT D - CONVERSION OF INSTRUMENTED READINGS INTO RUNWAY VISUAL RANGE AND VISIBILITY

(See Appendix 3, 4.3.5 of this Regulation)

1. The conversion of instrumented readings into runway visual range and visibility is based on Koschmieder's Law or Allard's Law, depending on whether the pilot can be expected to obtain main visual guidance from the runway and its markings or from the runway lights. In the interest of standardization in runway visual range assessments, this Attachment provides guidance on the use and application of the main conversion factors to be used in these computations.

2. In Koschmieder's Law one of the factors to be taken into account is the pilot contrast threshold. The agreed constant to be used for this is 0.05 (dimensionless).

3. In Allard's Law the corresponding factor is the illumination threshold. This is not a constant, but a continuous function dependent on the background luminance. The agreed relationship to be used in instrumented systems with continuous adjustment of the illumination threshold by a background luminance sensor is shown by the curve in Figure D-1. The use of a continuous function which approximates the step function such as displayed in Figure D-1 is preferred, due to its higher accuracy, to the stepped relationship described in paragraph 4.

4. In instrumented systems without continuous adjustment of the illumination threshold, the use of four equally spaced illumination threshold values with agreed corresponding background luminance ranges is convenient but will reduce accuracy. The four values are shown in Figure D-1 in the form of a step function; they are tabulated in Table D-1 for greater clarity.

Note 1. *Information and guidance material on the runway lights to be used for assessment of runway visual range are contained in the* Manual of Runway Visual Range Observing and Reporting Practices *(Doc 9328).*

Note 2. *In accordance with the definition of visibility for aeronautical purposes, the intensity of lights to be used for the assessment of visibility is in the vicinity of 1 000 cd.*

Table D-1. Illumination threshold steps

Condition	*Illumination threshold (lx)*	*Background luminance (cd/m^2)*	
Night	8×10^{-7}	≤ 50	
Intermediate	10^{-5}	51	– 999
Normal day	10^{-4}	1 000	– 12 000
Bright day (sunlit fog)	10^{-3}	> 12 000	

10 2

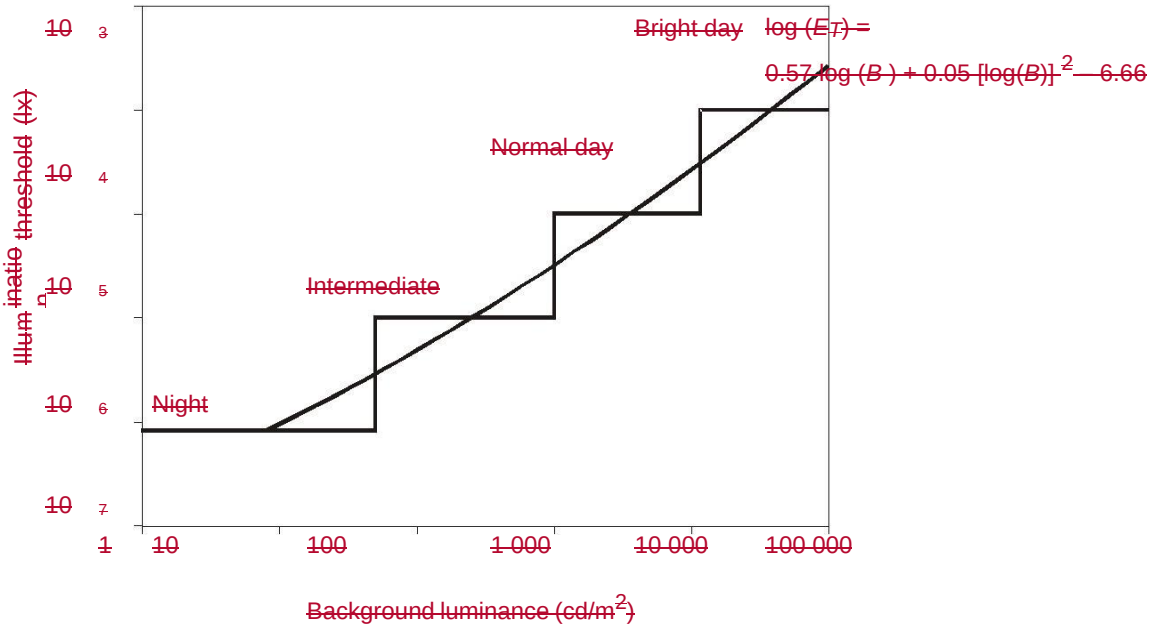


Figure D-1. Relationship between the illumination threshold E_T (lx) and background luminance B (cd/m^2)

~~ATTACHMENT E SPATIAL RANGES AND RESOLUTIONS FOR SPACE WEATHER ADVISORY INFORMATION~~

~~***Note**. The guidance contained in this table relates to Appendix 2, 6.1 Space weather advisory information*~~

~~Element~~	~~Range~~	~~Resolution~~	
~~Flight Level affected by radiation:~~	~~250-600~~	~~30~~	
~~Longitudes for advisories: (degrees)~~	~~000 – 180~~	~~15~~	
~~Latitudes for advisories: (degrees)~~	~~00-90~~	~~10~~	
~~Latitude bands for advisories:~~	~~High latitudes northern hemisphere (HNH)~~	~~N9000 - N6000~~	~~10~~
~~Middle latitudes northern hemisphere (MNH)~~		~~N6000 - N3000~~	
~~Equatorial latitudes northern hemisphere (EQN)~~		~~N3000 - N0000~~	
~~Equatorial latitudes southern hemisphere (EQS)~~		~~S0000 - S3000~~	
~~Middle latitudes southern hemisphere (MSH)~~		~~S3000 - S6000~~	
~~High latitudes southern hemisphere (HSH)~~		~~S6000 - S9000~~	

END