



THE UNITED REPUBLIC OF TANZANIA

CHAPTER 80

THE CIVIL AVIATION ACT

THE CIVIL AVIATION (METEOROLOGICAL SERVICE FOR AIR
NAVIGATION) REGULATIONS

[SUBSIDIARY]

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Dodoma,
31st July, 2026

HAMZA SAID JOHARI,
Attorney General

CHAPTER 80

THE CIVIL AVIATION ACT

THE CIVIL AVIATION (METEOROLOGICAL SERVICE FOR AIR NAVIGATION)
REGULATIONS

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CHAPTER 80

THE CIVIL AVIATION ACT

REGULATIONS

(Made under section 5)

THE CIVIL AVIATION (METEOROLOGICAL SERVICE FOR AIR NAVIGATION)
REGULATIONS

[24th February, 2017]
[DPG]

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PART I
PRELIMINARY PROVISIONS

Citation
GN. No.
352 of 2023
reg. 2

1. These Regulations may be cited as the Civil Aviation (Meteorological Service for Air Navigation) Regulations.

Interpretation
GN. No.
352 of 2023
reg. 3

2. In these Regulations unless the context requires otherwise -
“aerodrome” means 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” means concise summary of specified meteorological elements at an aerodrome, based on statistical data;
“aerodrome climatological table” means a table statistical data on the observed occurrence of one or more meteorological elements at an aerodrome;
“aerodrome control tower” means a unit established to provide air traffic control service to aerodrome traffic;
“aerodrome elevation” means the elevation of the highest point of a landing area;

- “aerodrome meteorological office” means an office designated to provide meteorological service for aerodromes serving international air navigation;
- “aerodrome reference point” means the designated geographical location of an aerodrome;
- “Aeronautical Fixed Service (AFS)” means 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)” means 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” means a station designated to make observations and meteorological reports for use in air navigation;
- “aeronautical mobile service” means 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” means a station in the aeronautical telecommunication service;
- “aircraft” means 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” means the evaluation of one or more meteorological elements made from an aircraft in flight;
- “AIRMET information” means the 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” means a report from an aircraft in flight

- prepared in conformity with requirements for position, and operational or meteorological reporting;
- “air traffic services unit” means a generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office;
- “altitude” means the vertical distance of a level, point or an object considered as a point, measured from mean sea level (MSL);
- “approach control unit” means a unit established to provide air traffic control services to controlled flights arriving at, or departing from, one or more aerodromes;
- “appropriate ATS authority” means the relevant authority designated by the State responsible for providing air traffic services in the airspace concerned;
- “area control centre” means a unit established for providing air traffic control services to controlled flights in control areas under its jurisdiction;
- “area navigation” means 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 as well as other operations that do not meet the definition of performance-based navigations;
- “alternate aerodrome” means 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
- “Authority” means the Tanzania Civil Aviation Authority;
- “Automatic Dependent Surveillance (ADS)” means a surveillance technique in which an aircraft automatically provides, via a data link, data derived from on-board navigation and position-fixing systems, including aircraft identification, four-dimensional position and additional data as appropriate;
- “briefing” means an oral commentary on existing or expected meteorological conditions;
- “cloud of operational significance” means 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” means the discussion with a meteorologist or another qualified person of existing or expected meteorological conditions relating to flight operations; a discussion includes answers to questions;

“control area” means a controlled airspace extending upwards from a specified limit above the earth;

“cruising level” means a level maintained during a significant portion of a flight;

“data link-VOLMET (D-VOLMET)” means 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;

“elevation” means 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” means 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;

“en-route alternate” means an alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route;

“destination alternation” means 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;

“flight crew member” means a licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period;

“flight documentation” means written or printed documents, including charts or forms, containing meteorological information for a flight;

“flight information centre” means a unit established to

- provide flight information service and alerting service;
- “flight information region” means an airspace of defined dimensions within which flight information service and alerting service are provided;
- “flight level” means a surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals;
- “forecast” means a statement of expected meteorological conditions for a specified time or period, and for a specified area or portion of airspace;
- “GAMET area forecast” means 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” means a 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;
- “height” means the vertical distance of a level, a point or an object considered as a point, measured from a specified datum;
- “human factor principles” means the 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;
- “International airways volcano watch (IAVW)” means International arrangements for monitoring and providing warnings to aircraft of volcanic ash in the atmosphere;
- “level” means a generic term relating to the vertical position of an aircraft in flight and meaning variously height, altitude or flight level;
- “meteorological authority” means the Tanzania Meteorological Agency designated and responsible for providing or arranging for the provision of

meteorological services for international air navigation on the behalf of the United Republic of Tanzania.

“meteorological bulletin” means a text comprising meteorological information preceded by an appropriate heading;

“meteorological information” means Meteorological report, analysis, forecast, and any other statement relating to existing or expected meteorological conditions;

“meteorological office” means an office designated to provide Meteorological Service for Air Navigation;

“meteorological report” means a statement of observed meteorological conditions related to a specified time and location;

“meteorological satellite” means an artificial earth satellite making meteorological observations and transmitting these observations to earth;

“Meteorological Watch Office (MWO)” means 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” means the lowest altitude which may be used which will provide a minimum clearance of 300 m(1 000 ft) above all objects located in the area contained within a sector of a circle of 46 km (25 NM) radius centred on a radio aid to navigation;

“navigation specification” means 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;

(a) Required Navigation Performance (RNP) specification means 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;

(b) Area Navigation (RNAV) specification means a navigation specification based on area navigation that does not include the

- requirement for performance monitoring and alerting, designated by the prefix RNAV, , RNAV 5 or RNAV 1;
- “observation (meteorological)” means the evaluation of one or more meteorological elements;
- “operational control” means 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” means 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” means the planning of flight operations by an operator;
- “operator” means a person, organization or enterprise engaged in or offering to engage in an aircraft operation;
- “Performance-Based Navigation (PBN)” means Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.
- “pilot-in-command” means 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;
- “pre-eruption volcanic activity” means unusual and increasing volcanic activity which may presage a volcanic eruption;
- “prevailing visibility” means 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;
- “prognostic chart” means a forecast of a specified meteorological element for a specified time or period and a specified surface or portion of airspace, depicted graphically on a chart;
- “QFE altimeter setting” means a pressure type altimeter calibrated in accordance with the standard atmosphere which when set indicates height above

- the QFE reference datum;
- “QNH altimeter setting” means a pressure type altimeter calibrated in accordance with the standard atmosphere which when set indicates altitude;
- “quality assurance” means part of quality management focused on providing confidence that quality requirements will be fulfilled (ISO 9000- Quality management system);
- “quality control” means part of quality management focused on fulfilling quality requirements (ISO 9000- Quality management system);
- “quality management” means Coordinated activities to direct and control an organization with regard to quality (ISO 9000- Quality management system);
- “regional air navigation agreement” means an Agreement approved by the Council of ICAO normally on the advice of a regional air navigation meeting;
- “reporting point” means a specified geographical location in relation to which the position of an aircraft can be reported;
- “rescue coordination centre” means 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” means a defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft;
- “Runway Visual Range (RVR)” means 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” means a generic term meaning, as the case may be, rescue coordination centre, rescue sub centre or alerting post.;
- “service provider” means the meteorological authority providing or arranging for the provision of meteorological service for air navigation;
- “SIGMET information” means information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified enroute weather phenomena which may affect the safety of aircraft operations;

- “Space Weather Centre (SWXC)” means a centre designated 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 or pose radiation risk to aircraft occupants;
- “standard isobaric surface” means an isobaric surface used on a worldwide basis for representing and analyzing the conditions in the atmosphere;
- “state volcano observatory” means a volcano observatory, designated by regional air navigation agreement to monitor active or potentially active volcanoes within a State and to provide information on volcanic activity to its associated area control centre or flight information centre, meteorological watch office and volcanic ash advisory centre;
- “take off alternate” means 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;
- “terminal aerodrome forecast (TAF)” means the aerodrome forecast issued at a specified time consisting of a concise statement of the expected meteorological conditions at an aerodrome;
- “threshold” means the beginning of that portion of the runway usable for landing;
- “touchdown zone” means the portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway;
- “tropical cyclone” means Generic term for a non-frontal synoptic-scale cyclone originating over tropical or subtropical waters with organized convection and definite cyclonic surface wind circulation;
- “Tropical Cyclone Advisory Centre (TCAC)” means 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” means a meteorological chart relating to a specified upper- air surface or layer of the atmosphere;

“visibility” means 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;

“Volcanic Ash Advisory Centre (VAAC)” means 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 atmosphere following volcanic eruptions;

“VOLMET” means Meteorological information for aircraft in flight;

“World Area Forecast Centre (WAFC)” means 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 by appropriate means as part of the aeronautical fixed service;

- (a) for the purpose of these regulations, the following terms shall be used with a limited meaning;
- (b) 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; and

“World Area Forecast System (WAFS)” means a worldwide system by which world forecast centres provide area aeronautical meteorological en-route forecasts in uniform standardized format;

Application

3. These Regulations shall-

- (a) apply to the provision of meteorological services for air navigation services within

- designated air spaces and at aerodromes; but
- (b) not apply to the provision of air navigation services for state aircraft.

PART II

PROVISION OF METEOROLOGY SERVICES FOR AIR NAVIGATION

Authority to provide meteorology services for air navigation

4. A person shall not provide meteorology services for air navigation unless-

- (a) he is mandated by the government of United Republic of Tanzania; and
- (b) the services are provided in accordance with the requirements prescribed in these regulations and any associated standards and procedures and includes having in place a manual of operations in terms of these Regulations.

Procedures for provision of services

5. A person mandated to provide meteorology services for air navigation under regulation 4 shall do so in accordance with the-

- (a) the manual of operations required under these regulations; and
- (b) the quality management system manual required under these regulations.

Obligations of services provider

6. The service provider of meteorology services for air navigation shall, before providing the services, be satisfied that-

- (a) the personnel are adequate in number and have the necessary competency to provide the service;
- (b) the manual of operations contains all the relevant information;
- (c) the facilities, services and equipment are established in accordance with these Regulations;
- (d) the operating procedures make satisfactory provision for the safety of aircraft;
- (e) an approved quality management system is in place;
- (f) the person has financial capability to provide the service; and
- (g) the applicant has insurance policy in force in

relation to the services provided.

Personnel
qualification and
training

7. The Authority shall ensure that the designated meteorological authority complies with the requirements of the World Meteorological Organization in respect of qualifications and training of meteorological personnel providing service for international air navigation.

PART III GENERAL PROVISIONS FOR METEOROLOGY SERVICES FOR AIR NAVIGATION

Objective,
determination and
provision of
meteorology service

8.-(1) The objective of meteorological service for air navigation shall be-

- (a) to contribute towards the safety, regularity and efficiency of air navigation;
- (b) achieved by supplying the following users with the meteorological information necessary for the performance of their respective functions;
- (c) operators, flight crew members;
- (d) air traffic services units;
- (e) search and rescue services units;
- (f) airport managements; and
- (g) others concerned with the conduct or development of international air navigation.

(2) The meteorological services provided shall be provided in accordance with these regulations and associated technical standards to meet the needs of international air navigation.

(3) Notwithstanding subregulation (3), the service provider shall determine the meteorological services to be provided in accordance with the provisions of these regulations and regional air navigation agreements and shall include the determination of the meteorological service to be provided for international air navigation over international waters and other areas which lie outside the territory of United Republic of Tanzania.

Supply, use and
quality
management of
meteorological
information
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9.-(1) Close liaison shall be maintained between supplies and users of meteorological information in matters which affect the provision of Meteorological Service for Air Navigation.

(2) The Authority shall ensure that a

reg. 2 and 4

meteorological service provider 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 users.

(3) The quality system established in accordance with sub-regulation (2) shall be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and shall be certified by an approved organization.

(4) The quality system shall 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.

(5) Subject to subregulation (4), the stated requirements for supplied meteorological information shall be as specified in the First Schedule.

(6) Where 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 shall not be supplied to the users unless it is validated with the originator

(7) With regard to the exchange of meteorological information for operational purposes, the quality system shall include verification and validation procedures and resources for monitoring adherence to the prescribed transmission schedules for individual messages or bulletins required to be exchanged, and the times of their filing for transmission.

(8) The quality system shall be capable of detecting excessive transit times of messages and bulletins received

(9) Demonstration of compliance of the quality system applied shall be by audit and where a non-conformity of the system is identified, action shall be initiated to determine and correct the cause.

(10) All audit observations shall be evidenced and properly documented.

(11) The meteorological information supplied to the users shall be consistent with Human Factors principles and shall be in forms which require a minimum

of interpretation by these users.

Notifications
required from
operators

10.-(1) An operator requiring meteorological service or changes in existing meteorological service shall notify, sufficiently in advance, the service provider or the aerodrome meteorological office concerned.

(2) The minimum amount of advance notice required shall be as agreed between the service provider or aerodrome meteorological office and the operator.

(3) The service provider shall be notified by the operator requiring service when-

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

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

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

(5) The information in subregulation (3) shall contain all details necessary for the planning of appropriate arrangements by the service provider.

(6) The operator or a flight crew member shall ensure that, where required by the service provider in consultation with users, the aerodrome meteorological office concerned is notified-

(a) of flight schedules;

(b) when non-scheduled flights are to be operated; and

(c) when flights are delayed, advanced or cancelled.

(7) The notification to the aerodrome meteorological office of individual flights shall contain the following information except that, in the case of scheduled flights, the requirement for some or all of this information may be waived by agreement between the aerodrome meteorological office and the operator-

(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 aerodromes;

(d) alternate aerodromes needed to complete the operational flight plan and taken from the relevant list contained in the regional air

- navigation plan;
- (e) cruising level;
- (f) type of flight, whether under visual or instrument flight rules;
- (g) type of meteorological information requested for a flight crew member, whether flight documentation or briefing or consultation; and
- (h) and the time at which briefing, consultation or flight documentation are required.

PART IV
WORLD AREA FORECAST SYSTEM AND METEOROLOGICAL
OFFICES

Objective of
world area
forecast system
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11.-(1) 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.

(2) 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) Subject to subregulation (2) the technical specification related to world area forecast system shall be as specified in Second Schedule.

World area
forecast centres

12.-(1) The meteorological service provider, having accepted the responsibility for providing a WAFC within the framework of the world area forecast system, shall arrange for that centre-

- (a) to prepare gridded global forecasts of-
 - (i) upper wind;
 - (ii) upper-air temperature and humidity;
 - (iii) geopotential altitude of flight levels;
 - (iv) flight level and temperature of tropopause;
 - (v) direction, speed and flight level of maximum wind;
 - (vi) cumulonimbus clouds;
 - (vii) icing; and
 - (viii) turbulence;
- (b) to prepare global forecasts of significant weather (SIGWX) phenomena;

- (c) to issue the forecasts referred to in paragraphs (a) and (b) in digital form to meteorological services and other users, on advice from the service provider
 - (d) to receive information concerning the accidental release of radioactive materials into the atmosphere from its associated WMO regional specialized meteorological centre (RSMC) for the provision of transport model products for radiological environmental emergency response, in order to include the information in SIGWX forecasts; and
 - (e) to establish and maintain contact with VAACs for the exchange of information on volcanic activity in order to coordinate the inclusion of information on volcanic eruptions in SIGWX forecasts.
- (2) In case of interruption of the operation of a WAFC the functions of the WAF shall, where there is an interruption in its operations, be carried out by the other WAFC.

Aerodrome
meteorological
offices

13.-(1) The Meteorological service provider shall establish one or more aerodrome or other meteorological offices which shall be adequate for the provision of the meteorological service required to satisfy the needs of air navigation.

(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) preparation or obtaining 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) maintain a continuous survey of meteorological conditions over the aerodromes for which it is designated to prepare forecasts;
- (c) preparation or obtaining of forecasts of local meteorological conditions;

- (d) provision briefing, consultation and flight documentation to flight crew members or other flight operations personnel;
 - (e) supply of other meteorological information to aeronautical users;
 - (f) display the available meteorological information;
 - (g) exchange of meteorological information with other aerodrome meteorological offices; and
 - (h) supply of 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 as agreed between the meteorological, aeronautical information service and ATS authorities concerned.
- (3) The aerodromes for which landing forecasts are required shall be determined by regional air navigation agreement.
- (4) For an aerodrome without an aerodrome meteorological office located at the aerodrome:
- (a) the Meteorological service provider shall designate one or more aerodrome meteorological offices to supply meteorological information as required; and
 - (b) shall establish means by which such information can be supplied to the aerodromes concerned.

Meteorological
watch offices

14.-(1) The meteorological services provider, having accepted the responsibility for providing meteorological services for air navigation in United Republic of Tanzania shall establish, on the basis of regional air navigation agreement, one or more meteorological watch offices.

(2) A meteorological watch office shall:

- (a) maintain continuous watch over meteorological conditions affecting flight operations within its area of responsibility;
- (b) prepare SIGMET information 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:
 - (i) prepare AIRMET information related to its area of responsibility;
 - (ii) supply AIRMET information to associated air traffic services units; and
 - (iii) 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 and ATS authorities 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 and ATS authorities concerned, and to aeronautical information service units, as agreed between the meteorological and appropriate civil aviation authorities concerned and such information shall comprise location, date and time of the release, and forecast trajectories of the radioactive materials.

Volcano
observatories

15. Where there is active or potentially active volcanoes the meteorological service provider shall arrange that selected State volcano observatories, as designated by regional air navigation agreement, monitor these volcanoes and when observing-

- (a) significant pre-eruption volcanic activity, or a cessation thereof;
- (b) a volcanic eruption, or a cessation thereof; or
- (c) volcanic ash in the atmosphere; shall send this information as quickly as practicable to their associated ACC, MWO and VAAC.

Space Weather
Centre
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reg. 6

15A.-(1) The Space Weather Centre shall monitor and provide advisory information on space weather phenomena in its area of responsibility by-

- (a) monitoring 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:
 - (i) high frequency radio communications;
 - (ii) communications via satellite;
 - (iii) Global Navigation Satellite Systems based navigation and surveillance; and
 - (iv) radiation exposure at flight levels;
- (b) issuing advisory information regarding the extent, severity and duration of the space weather phenomena that have an impact referred to in paragraph (a);
- (c) supplying in the advisory information referred to in paragraph (b) to:
 - (i) area control centres, flight information centres and aerodrome meteorological offices in its area of responsibility which may be affected;
 - (ii) other Space Weather Centres; and
 - (iii) international operation meteorology databanks, international notice to air men offices and aeronautical fixed service internet-based services.

(2) Space Weather Centres shall maintain a 24-hour watch and in the event of interruption of the operation of the Centre, its functions shall be carried out by another Space Weather Centre as designated by the Service Provider State concerned.

(3) The service provider shall arrange to receive advisory information regarding the extent, severity and duration of the space weather phenomena that have an impact referred to in subregulation (1).

PART V METEOROLOGICAL OBSERVATIONS AND REPORTS

Aeronautical
meteorological
stations and
observations
GN. No.
352 of 2023
reg. 7

16.-(1) The meteorological service provider shall establish, such aeronautical meteorological stations as it determines to be necessary.

(2) An aeronautical meteorological station may be a separate station or may be combined with a synoptic station.

(3) The meteorological service provider shall establish, or arrange for the establishment of, aeronautical 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) 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 or air temperature.

(5) The meteorological service provider 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.

(6) At aerodromes with runways intended for ILS 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.

(7) 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.

(8) The design of integrated automatic systems shall observe Human Factors principles and include back-up procedures.

(9) Where an integrated semi-automatic system is used for the dissemination or display of meteorological

information, it shall be capable of accepting the manual insertion of data covering those meteorological elements which cannot be observed by automatic means.

(10) 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.

(11) Subject to subregulation (10), meteorological technical specification for observations and reports shall be as specified in the Third Schedule.

(12) 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.

Agreement
between air traffic
services provider
and
meteorological
services provider

17. An agreement between the meteorological services provider and the appropriate ATS authority shall 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 or instruments;
- (c) the use to be made of these displays or 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, where 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; and
- (f) if available, meteorological information obtained from ground weather radar.

Routine
observations and
reports

18.-(1) At aerodromes, routine observations shall be made throughout the 24 hours each day, except as otherwise agreed between the service provider, the appropriate ATS authority and the operator concerned and 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.

(2) At other aeronautical meteorological stations, such observations shall be made as determined by the service provider taking into account the requirements of air traffic services units and aircraft operations.

(3) 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
- (b) METAR for dissemination beyond the aerodrome of origin, mainly intended for flight planning, VOLMET broadcasts and D-VOLMET.

(4) At aerodromes that are not operational throughout 24 hours, METAR shall be issued prior to the aerodrome resuming operations.

Special
observations and
reports

19.-(1) A list of criteria for special observations shall be established by the service provider, in consultation with the appropriate ATS authority, operators and others concerned.

(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
- (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.

(3) At aerodromes that are not operational throughout 24 hours, following the resumption of the issuance of METAR, SPECI shall be issued, as necessary.

Contents of
reports

20.-(1) Local routine and special reports and METAR and SPECI shall contain the following 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) surface wind direction and speed;
- (f) visibility;
- (g) runway visual range, when applicable;
- (h) present weather;
- (i) cloud amount, cloud type, only for cumulonimbus and towering cumulus clouds, and height of cloud base or, where measured, vertical visibility;
- (j) air temperature and dew-point temperature; and
- (k) QNH and, when applicable, QFE (QFE included only in local routine and special reports).

(2) In addition to elements listed under subregulation (1), local routine and special reports and METAR and SPECI shall contain supplementary information to be placed after paragraph (k).

Observing and
reporting
meteorological
elements

21.-(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.

(2) When local routine and special reports are used for departing aircraft, the surface wind observations for these reports shall 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 shall be representative of the touchdown zone.

(3) For METAR and SPECI, the surface wind observations shall 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) The visibility shall be measured or observed, and reported in metres or kilometres.

(5) When local routine and special reports are used for departing aircraft, the visibility observations for these reports shall be representative of conditions along the runway; when local routine and special reports are used for arriving aircraft, the visibility observations for these reports shall be representative of the touchdown zone of the runway.

(6) For METAR and SPECI, the visibility

observations shall be representative of the aerodrome.

(7) The runway visual range shall-

(a) be assessed on all runways intended for Category II and III instrument approach and landing operations;

(b) be assessed on all runways intended for use during periods of reduced visibility, including:

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

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

(c) be reported in metres throughout periods when either the visibility or the runway visual range is less than 1 500 m;

(d) be representative of-

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

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

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

(iv) 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.

(8) The present weather occurring at the aerodrome or its vicinity shall be observed and reported as necessary, including intensity thereof, and thunderstorms in the vicinity.

(9) Rain, drizzle, snow and freezing precipitation, haze, mist, fog, freezing fog and thunderstorms shall be as the minimum weather phenomena for-

- (a) local routine and special reports, the present weather information shall be representative of conditions at the aerodrome; and
 - (b) METAR and SPECI, the present weather information shall be representative of conditions at the aerodrome and, for certain specified present weather phenomena, in its vicinity.
- (10) The cloud amount, cloud type and height of cloud base shall be observed and reported as necessary to describe the clouds of operational significance.
- (11) Where 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 and the height of cloud base and vertical visibility shall be reported in metres or feet.
- (12) Cloud observations for-
- (a) local routine and special reports shall be representative of the runway thresholds in use; and
 - (b) METAR and SPECI, shall be representative of the aerodrome and its vicinity.
- (13) The air temperature and the dew-point temperature shall be measured and reported in degrees Celsius.
- (14) Observations of air temperature and dew-point temperature for local routine and special reports and METAR and SPECI shall be representative of the whole runway complex.
- (15) The atmospheric pressure shall be measured, and QNH and QFE values shall be computed and reported in hectopascal.
- (16) Observations made at aerodromes shall include the available supplementary information concerning significant meteorological conditions, particularly those in the approach and climb-out areas.
- (17) Where practicable, the information in subregulation (16) shall identify the location of the meteorological condition.

Reporting
meteorological
information from
automatic
observing systems

22.-(1) METAR and SPECI from automatic observing systems shall be used during non-operational hours of the aerodrome, and during operational hours of the aerodrome as determined by the service provider in consultation with users based on the availability and

efficient use of personnel.

(2) Local routine and special reports and METAR and SPECI from automatic observing systems shall be identified with the word “AUTO”.

Observations and reports of volcanic activity

23.-(1) The occurrence of pre-eruption volcanic activity, volcanic eruptions and volcanic ash cloud shall be reported without delay to the associated air traffic services unit, aeronautical information services unit and meteorological watch office.

(2) The report shall 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 or 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.

PART VI AIRCRAFT OBSERVATIONS AND REPORTS

Obligations of Authority

24. provisions of these regulations, for observations to be made by aircraft of its registry operating on national and international air routes and for the recording and reporting of these observations.

Aircraft observations
GN. No.
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reg. 8

25.-(1) The routine for aircraft observation shall be as follows:

- (a) routine aircraft observation during en-route and climb out phases of the flight; and
- (b) special and other non-routine aircraft observation during any phase of the flight.

(2) Subject to subregulation (1), the technical specification for aircraft observation and reports shall be as specified in the Fourth Schedule.

Routine aircraft
observations -
designation

26.-(1) When air-ground data link is used and automatic dependent surveillance (ADS) or Secondary surveillance radar (SSR) Mode S is being applied; automated routine observations shall 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.

(2) For helicopter operations to and from aerodromes on offshore structures, routine observations shall be made from helicopters at points and times as agreed between the meteorological authorities and the helicopter operators concerned.

(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 these regulations.

(4) The designation procedures shall be subject to regional air navigation agreement.

(5) 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 these regulations.

Routine aircraft
observations -
exemptions

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

Special aircraft
observations

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

- (a) moderate or severe turbulence;
- (b) moderate or severe icing;
- (c) severe mountain wave;
- (d) thunderstorms, without hail, that are obscured, embedded, widespread or in squall lines;
- (e) thunderstorms, with hail, that are obscured, embedded, widespread or in squall lines;
- (f) heavy dust storm or heavy sandstorm;
- (g) volcanic ash cloud; or
- (h) pre-eruption volcanic activity or a volcanic eruption.

Other non routine
aircraft observations

29. Where meteorological conditions other than the conditions listed under regulation (31), 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.

Reporting of aircraft
observations during
flight

30.-(1) Aircraft observations shall be reported-

- (a) by air-ground data link;
- (b) where air-ground data link is not available or appropriate, special and other non-routine aircraft observations during flight, by voice communications;
- (c) during flight at the time the observation is made or as soon thereafter as is practicable; and
- (d) as air-reports.

Relay of air reports
by air traffic services
units

31. The meteorological services 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 and WAFCs.

Recording and post-
flight reporting of
aircraft observations
of volcanic activity

32.-(1) 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.

(2) A copy of the activity form shall be included with the flight documentation provided to flights operating on routes which, in the opinion of the service provider concerned, are likely to be affected by volcanic ash clouds.

PART VII

FORECASTS

Interpretation and use
of forecasts
GN. No.
352 of 2023
reg. 9

33.-(1) 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 and 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.

(2) 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.

(3) The service provider shall issue meteorological forecast in accordance with the technical specification and detailed criteria specified in the Fifth Schedule.

Aerodrome forecasts

34.-(1) An aerodrome forecast shall be-

- (a) prepared, on the basis of regional air navigation agreement, by the aerodrome meteorological office designated by the service provider concerned; and
- (b) 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.

(2) Aerodrome forecasts and amendments shall be issued as TAF and include the following 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;
- (g) surface wind;
- (h) visibility;

- (i) weather;
 - (j) cloud; and
 - (k) expected significant changes to one or more of these elements during the period of validity.
- (3) Optional elements shall be included in TAF in accordance with regional air navigation agreement.
- (4) Aerodrome meteorological offices preparing TAF shall keep the forecasts under continuous review and, when necessary, shall issue amendments promptly.
- (5) The length of the forecast messages and the number of changes indicated in the forecast shall be kept to a minimum.
- (6) TAF that cannot be kept under continuous review shall be cancelled.
- (7) The period of validity of a routine TAF shall be not less than 6 hours nor more than 30 hours, the period of validity shall be determined by regional air navigation agreement.
- (8) TAF valid for less than 12 hours shall be issued every 3 hours and those valid for 12 to 30 hours shall be issued every 6 hours.
- (9) When issuing TAF, aerodrome meteorological offices shall ensure that not more than one TAF is valid at an aerodrome at any given time.

Landing forecasts

- 35.-(1) A landing forecast shall-
- (a) 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;
 - (b) be prepared in the form of a trend forecast; and
 - (c) consist of a concise statement of the expected significant changes in the meteorological conditions at that aerodrome to be appended to a local routine or local special report, or a METAR or SPECI.
- (2) 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.

Forecasts for take-off

36.-(1) A forecast for take-off shall-

- (a) be prepared by the aerodrome meteorological office designated by the service provider concerned, where required by agreement between the service provider and operators;
- (b) refer to a specified period of time and shall 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; and
- (c) be supplied to operators and flight crew members on request within the 3 hours before the expected time of departure.

(2) Aerodrome meteorological offices preparing forecasts for take-off shall keep the forecasts under continuous review and, when necessary, shall issue amendments promptly.

Area forecasts for low-level flights

37.-(1) Where 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 and the criteria for amendments thereto shall be determined by the service provider in consultation with the users.

(2) Where the density of traffic operating below flight level 100 warrants the issuance of AIRMET information, area forecasts for such operations shall be prepared in a format agreed upon between the meteorological authorities concerned.

(3) Where-

- (a) an abbreviated plain language is used, the forecast shall be prepared as a GAMET area forecast, employing approved ICAO abbreviations and numerical values; and
- (b) where a 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.

(4) 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.

(5) 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 or aerodrome meteorological offices concerned not later than one hour prior to the beginning of their validity period.

PART VIII SIGMET INFORMATION, AERODROME WARNINGS AND WIND SHEAR WARNINGS AND ALERT

SIGMET information
GN. No.
352 of 2023
reg. 10

- 38.-(1) The SIGMET information shall be-
- (a) issued by a meteorological watch office and shall give a concise description in abbreviated plain language concerning the occurrence or expected occurrence of specified en-route weather phenomena, which may affect the safety of aircraft operations, and of the development of those phenomena in time and space; and
 - (b) cancelled when the phenomena are no longer occurring or are no longer expected to occur in the area.
- (2) The period of validity of a SIGMET information shall-
- (a) be not more than 4 hours; and
 - (b) in the special case of SIGMET information for volcanic ash cloud and tropical cyclones, the period of validity shall be extended up to 6 hours.
- (3) The SIGMET information concerning volcanic ash cloud and tropical cyclones shall be based on advisory information provided by VAACs and TCACs, respectively, designated by regional air navigation agreement.
- (4) Close coordination shall be maintained between the meteorological watch office and the associated area control centre or flight information centre to ensure that information on volcanic ash included in

SIGMET and NOTAM messages is consistent.

(5) SIGMET information shall be issued not more than 4 hours before the commencement of the period of validity.

(6) The service provider shall issue SIGMET information in accordance with the technical specification and detailed criteria specified in the Sixth Schedule.

(7) In the special case of SIGMET information for volcanic ash cloud and tropical cyclones, these messages shall be issued as soon as practicable but not more than 12 hours before the commencement of the period of validity.

(8) SIGMET information for volcanic ash and tropical cyclones shall be updated at least every 6 hours.

Aerodrome warnings

39.-(1) Aerodrome warnings shall be issued by the aerodrome meteorological office designated by the service provider 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.

(2) Aerodrome warnings shall be cancelled when the conditions are no longer occurring or no longer expected to occur at the aerodrome.

Wind shear
warnings and
alerts

40.-(1) Wind shear warnings shall be prepared by the aerodrome meteorological office designated by the service provider 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.

(2) Wind shear warnings shall give concise information on the observed or expected existence of wind shear which could adversely affect aircraft on the approach path or take-off path or during circling approach between runway level and 500 m (1 600 ft) above that level and aircraft on the runway during the landing roll or take-off run.

(3) Where local topography has been shown to produce significant wind shears at heights in excess of 500 m (1 600 ft) above runway level, then 500 m (1 600 ft) shall not be considered restrictive.

(4) Wind shear warnings for arriving aircraft or departing aircraft shall be cancelled when aircraft reports indicate that wind shear no longer exists or, alternatively, after an agreed elapsed time.

(5) The criteria for the cancellation of a wind shear warning shall be defined locally for each aerodrome, as agreed between the service provider, the appropriate ATS authority and the operators concerned.

(6) 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.

(7) Wind shear alerts shall give concise, up-to-date information related to the observed existence of wind shear involving a headwind or 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.

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

PART IX AERONAUTICAL CLIMATOLOGICAL INFORMATION

General provisions
GN. No.
352 of 2023
reg. 11

41.-(1) The aeronautical climatological information required for the planning of flight operations shall be-

- (a) prepared in the form of aerodrome climatological tables and aerodrome climatological summaries;
- (b) be supplied to aeronautical users as agreed between the service provider and those users;
- (c) be based on observations made over a period of at least five years and the period shall be indicated in the information supplied; and
- (d) collected, processed, stored and issued in accordance with the technical specification and detailed criteria specified in the Seventh Schedule.

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

Aerodrome
climatological tables

42. The authority shall 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 service provider and that user.

Aerodrome climatological summaries

43.-(1) Aerodrome climatological summaries shall follow the procedures prescribed by the World Meteorological Organization.

(2) Where computer facilities are available to store, process and retrieve the information, the summaries shall be published or otherwise made available to aeronautical users on request.

(3) Where such computer facilities are not available, the summaries shall be prepared using the models specified by the World Meteorological Organization and shall be published and kept up to date as necessary.

Copies of meteorological observational data

44. The service provider, on request and to the extent practicable, shall make available to any other meteorological service provider, 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.

PART X SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

General provisions
GN. No.
352 of 2023
reg. 12

45.-(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.
- (2) Meteorological information supplied to

operators and flight crew members shall cover the flight in respect of time, altitude and geographical extent.

(3) Subject to subregulation (2), the meteorological information shall be supplied in accordance with the technical specification and detailed criteria specified in the Eighth Schedule.

(4) 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.

(5) Meteorological information supplied to operators and flight crew members shall be up to date and include the following information, as established by the service provider in consultation with operators concerned:

- (a) forecasts of-
 - (i) upper wind and upper-air temperature;
 - (ii) upper-air humidity;
 - (iii) geopotential altitude of flight levels;
 - (iv) flight level and temperature of tropopause;
 - (v) direction, speed and flight level of maximum wind; and
 - (vi) SIGWX phenomena;
- (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, enroute 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;
- (f) volcanic ash and tropical cyclone advisory information relevant to the whole route;
- (g) subject to regional air navigation agreement, GAMET area forecast 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; and
- (j) Ground-based weather radar information.

(6) Forecasts listed under subregulation (4)(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 service provider and the operator concerned.

(7) When forecasts are identified as being originated by the WAFCs, no modifications shall be made to their meteorological content.

(8) Charts generated from the digital forecasts provided by the WAFCs shall be made available, as required by operators, for fixed areas of coverage in accordance with technical guidance provided by the Authority.

(9) When forecasts of upper wind and upper-air temperature are supplied in chart form, they shall be fixed time prognostic charts for flight levels in accordance with guidance provided by the Authority, and when forecasts of SIGWX phenomena are supplied in chart form, they shall be fixed time prognostic charts for an atmospheric layer limited by flight levels as specified in technical standards developed by the Authority.

(10) 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 re-planning by the operator shall be supplied as soon as they become available, but not later than 3 hours before departure.

(11) Where additional meteorological information is required for pre-flight planning and in-flight re-planning by the operator it shall be supplied as soon as is practicable.

(12) When necessary, the service provider 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 or forecasts required.

(13) Meteorological information shall be supplied to operators and flight crew members at the location to be

determined by the service provider, after consultation with the operators and at the time to be agreed upon between the aerodrome meteorological office and the operator concerned.

(14) The service for preflight planning shall be confined to flights originating within United Republic of Tanzania.

(15) At an aerodrome without an aerodrome meteorological office at the aerodrome, arrangements for the supply of meteorological information shall be as agreed upon between the service provider and the operator concerned.

Briefing, consultation
and display

46.-(1) Briefing or consultation shall be provided, on request, to flight crew members or other flight operations personnel.

(2) 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, if so agreed between the service provider and the operator, in lieu of flight documentation.

(3) Meteorological information used for briefing, consultation and display shall include any or all of the information.

(4) Where 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.

(5) 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.

(6) The required briefing, consultation, display or flight documentation shall normally be provided by the aerodrome meteorological office associated with the aerodrome of departure

(7) At an aerodrome where these services are not available, arrangements to meet the requirements of flight crew members shall be as agreed upon between the service provider and the operator concerned.

(8) 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 or flight documentation as necessary.

(9) The flight crew member or other flight operations personnel for whom briefing, consultation or flight documentation has been requested shall visit the aerodrome meteorological office at the time agreed upon between the aerodrome meteorological office and the operator concerned.

(10) Where local circumstances at an aerodrome make personal briefing or consultation impracticable, the aerodrome meteorological office shall provide those services by telephone or other suitable telecommunications facilities.

Flight documentation

47.-(1) Flight documentation to be made available shall documentation comprise information on-

- (a) upper winds and upper-air temperature;
- (b) SIGWIX phenomena;
- (c) 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;
- (d) TAF or amended TAF for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;
- (e) SIGMET information and appropriate special airreports relevant to the whole route;
- (f) volcanic ash and tropical cyclone advisory information relevant to the whole route; and if appropriate; and
- (g) subject to regional air navigation agreement, GAMET area forecast or area forecasts for lowlevel 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.

(2) Where the service provider and operator concerned agree flight documentation for flights of two

hours' duration or less, after a short stop or turnaround, shall be limited to the information operationally needed, but in all cases the flight documentation shall at least comprise information in subregulation (1)(c), (d), (e), (f) and, where appropriate, paragraph (g).

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

(4) Where a need for amendment arises after the flight documentation has been supplied, and before take-off of the aircraft, the aerodrome meteorological office shall, 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.

(5) The service provider shall 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.

(6) This information in subregulation (5) shall be made available, on request, for inquiries or investigations and, for these purposes, shall be retained until the inquiry or investigation is completed.

Automated preflight
information systems
for briefing,
consultation, flight
planning and flight
documentation

48.-(1) Where the 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 regulation.

(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 shall be established by an agreement between the meteorological service provider and the Authority.

(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 service provider concerned shall remain responsible for the quality control.

Information for
aircraft in flight

49. Meteorological information-

- (a) 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;
- (b) for planning by the operator for aircraft in flight shall be supplied on request, as agreed between the service provider and the operator concerned;
- (c) for use by aircraft in flight shall be supplied to air traffic services units in accordance with the provision under Part XI; and
- (d) shall be supplied through D-VOLMET or VOLMET broadcasts in accordance with the requirements under Part XII.

PART XI

INFORMATION FOR AIR TRAFFIC SERVICES, SEARCH AND RESCUE SERVICES AND AERONAUTICAL INFORMATION SERVICES

Information for air
traffic services units

50.-(1) The meteorological authority shall designate an aerodrome meteorological office or meteorological watch office units to be associated with each air traffic services unit.

(2) 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.

(3) An aerodrome meteorological office shall be associated with an aerodrome control tower or approach control unit for the provision of meteorological information.

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

information.

(5) 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 shall be determined by the meteorological authority in consultation with the appropriate ATS authority.

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

Information for
search and rescue
services units

51.-(1) Aerodrome meteorological offices or meteorological watch offices designated by the meteorological authority in accordance with regional air navigation agreement shall supply search and rescue services units with the meteorological information they require in a form established by mutual agreement.

(2) The designated aerodrome meteorological office or meteorological watch office shall for that purpose maintain liaison with the search and rescue services unit throughout a search and rescue operation.

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

(2) Subject to subregulation (1), the service provider shall provide service to operators and flight crew members in accordance with the technical specification and detailed criteria specified in the Ninth Schedule.

PART XII REQUIREMENTS FOR AND USE OF COMMUNICATIONS

Requirements for
communication
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53.-(1) Suitable telecommunications facilities shall be made available to permit-

- (a) 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;
- (b) 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; and
 - (c) world area forecast centres to supply the required world area forecast system products to aerodrome meteorological offices, meteorological authorities and other users.
- (2). Telecommunications facilities between aerodrome meteorological offices-
- (a) 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; and
 - (b) or meteorological watch offices and flight information centres, area control centres, rescue coordination centres and aeronautical telecommunications stations shall permit-
 - (i) 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
 - (ii) printed communications, when a record is required by the recipients; the message transit time shall not exceed 5 minutes.
- (3) As agreed between the service provider and operators, provision shall be made to enable operators to establish suitable telecommunications facilities for

obtaining meteorological information from aerodrome meteorological offices or other appropriate sources.

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

(5) The telecommunications facilities used for the exchange of operational meteorological information shall 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 or regional air navigation agreements.

(6) The service provider shall provide and use communication services in accordance with the technical specification and detailed criteria specified in the Tenth Schedule.

Use of aeronautical fixed service communications and the public Internet - Meteorological bulletins

54. 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.

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

55.-(1) The world area forecast system products in digital form shall be transmitted using binary data communications techniques.

(2) The method and channels used for the dissemination of the products shall be as determined by regional air navigation agreement.

Use of aeronautical mobile service communications

56. The content and format of meteorological information transmitted to aircraft and by aircraft shall be consistent with the provisions of these regulations.

Use of aeronautical data link service contents of D-VOLMET

57. 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.

Use of aeronautical broadcasting service-contents of VOLMET

58.-(1) Continuous VOLMET broadcasts, normally on very high frequencies (VHF), shall contain current METAR and SPECI, together with trend forecasts

broadcasts

where available.

(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.

PART XIII EXEMPTIONS

Requirements for
application for
exemption

59.-(1) A person may apply to the Authority for an exemption from any provision of these Regulations.

(2) Unless in case of emergency, a person requiring exemption from any provision of these Regulations shall make an application to the Authority at least sixty days prior to the proposed effective date, giving the following information:

- (a) name and contact address including electronic mail and fax if any;
- (b) telephone number;
- (c) a citation of the specific requirement from which the applicant seeks exemption;
- (d) justification for the exemption;
- (e) a description of the type of operations to be conducted under the proposed exemption;
- (f) the proposed duration of the exemption;
- (g) an explanation of how the exemption would be in the public interest;
- (h) a detailed description of the alternative means by which the applicant will ensure a level of safety equivalent to that established by the regulation in question;
- (i) a safety risk assessment carried out in respect of the exemption applied for; and
- (j) if the applicant handles international operations and seeks to operate under the proposed exemption, an indication whether the exemption would contravene any provision of the Standards and Recommended Practices of ICAO; and any other information that the Authority may require.

(3) Where the applicant seeks emergency processing of an application for exemption, the application shall contain supporting facts and reasons for not filing the application within the time specified in

subregulation (2) and satisfactory reason for deeming the application an emergency.

(4) The Authority may in writing, refuse an application made under subregulation (3), where in the opinion of the Authority, the reasons given for emergency processing are not satisfactory.

(5) The application for exemption shall be accompanied by fee prescribed by the Authority.

Review and
publication

60.-(1) The Authority shall review the application for exemption made under regulation 52 for accuracy and compliance and if the application is satisfactory, the Authority shall publish a detailed summary of the application for comments, within a prescribed time, in either-

- (a) aeronautical information circular; or
- (b) a daily newspaper with national circulation.

(2) Where application requirements have not been fully complied with, the Authority shall request the applicant in writing, to comply prior to publication or making a decision under subregulation (3).

(3) Where the request is for emergency relief, the Authority shall publish the decision as soon as possible after processing the application.

Evaluation of request

61.-(1) Where the application requirements have been satisfied, the Authority shall conduct an evaluation of the request to include-

- (a) determination of whether an exemption would be in the public interest;
- (b) a determination, after a technical evaluation of whether the applicant's proposal would provide a level of safety equivalent to that established by the regulation, although where the Authority decides that a technical evaluation of the request would impose a significant burden on the Authority's technical resources, the Authority may deny the exemption on that basis;
- (c) a determination of whether a grant of the exemption would contravene these Regulations; and
- (d) a recommendation based on the preceding elements, of whether the request should be

granted or denied, and of any conditions or limitations that should be part of the exemption.

(2) The Authority shall notify the applicant in writing of, the decision to grant or deny the request and publish a detailed summary of its evaluation and decision.

(3) The summary referred to in subregulation (2) shall specify the duration of the exemption and any conditions or limitations of the exemption.

(4) Where the exemption affects a significant population of the aviation community of the United Republic of Tanzania the Authority shall publish the summary in aeronautical information circular.

PART XIV GENERAL PROVISIONS

Drug and alcohol
testing and reporting

62.-(1) A person who-

- (a) performs any function prescribed by these Regulations directly or by contract may be tested for drug or alcohol usage;
- (b) refuses to be tested for the percentage of present of alcohol in the blood; or
- (c) refuses to be tested for the presence of narcotic drugs, marijuana, or depressant or stimulant drugs or substances in the body, when so requested by a law enforcement officer or the Authority, or refuses to furnish or to authorise the release of the test results requested by the Authority,

shall-

- (i) be denied any licence, certificate, rating, qualification, or authorisation issued under these Regulations for a period of up to one year from the date of that refusal; or
- (ii) have their licence, certificate, rating, qualification, or authorisation issued under these Regulations suspended or revoked.

(2) A person who is convicted for the violation of any local or national statute relating to the use, growing, processing, manufacture, sale, disposition, possession, transportation, or importation of narcotic drugs, marijuana, or depressant or stimulant drugs or substances, shall-

- (a) be denied any license, certificate, rating,

- qualification, or authorisation issued under these Regulations for a period of up to one year after the date of conviction; or
- (b) have their licence, certificate, rating, qualification, or authorisation issued under these Regulations suspended or revoked.

Change of name

- 63.-(1) A holder of a certificate issued under these Regulations may apply to the Authority for-
- (a) a replacement of the certificate if lost or destroyed;
 - (b) a change of name on the certificate; or
 - (c) an endorsement on the certificate.
- (2) For the purposes of subregulation (1), the holder of a certificate shall submit to the Authority-
- (a) the original certificate or a copy thereof in case of loss; and
 - (b) a court order, or other legal document verifying the name change.
- (3) The Authority shall return to the holder of a certificate, with the appropriate changes applied for, if any, the documents in subregulation (2) and, where necessary, retain copies thereof.

Change of address

- 64.-(1) A holder of a certificate issued under these Regulations shall notify the Authority of any change in the physical and mailing address within fourteen days of such change.
- (2) A person who does not notify the Authority of the change in the physical and mailing address within the time frame specified in subregulation (1) shall not exercise the privileges of the certificate.

Replacement of documents.

65. A person may apply to the Authority, in the prescribed form for a replacement of the documents issued under these Regulations where the documents are lost or destroyed.

Use and retention of documents and records

- 66.-(1) A person shall not-
- (a) use any certificate or exemption issued or required by or under these Regulations which has been forged, altered, cancelled, or suspended, or to which he is not entitled;
 - (b) forge or alter any certificate or exemption

issued or required by or under these Regulations;

- (c) lend any certificate or exemption issued or required by or under these Regulations to any other person;
- (d) make any false representation for the purpose of procuring for himself or any other person the grant, issue, renewal or variation of any such certificate or exemption; or
- (e) mutilate, alter, render illegible or destroy any records, or any entry made therein, required by or under these Regulations to be maintained, or knowingly make, or procure or assist in the making of, any false entry in any such record, or wilfully omit to make a material entry in such record.

(2) All records required to be maintained by or under these Regulations shall be recorded in a permanent and indelible material.

(3) A person shall not issue any certificate:

- (a) or exemption under these Regulations unless he is authorised to do so by the Authority; or
- (b) referred to in subregulation (3) unless he has satisfied himself that all statements in the certificate are correct, and that the applicant is qualified to hold that certificate.

Reports of violation

67.-(1) A person who knows of a violation of the Act, or any Regulations, rules, or orders issued there under, shall report it to the Authority.

(2) The Authority may determine the nature and type of investigation or enforcement action that need to be taken.

Failure to comply with direction

68. A person who fails to comply with any direction given to him by the Authority or by any authorised person under any provision of these Regulations commits an offence.

Aeronautical fees

69.-(1) The Authority shall issue a written notification of the fees to be charged in connection with the issue, renewal or variation of any certificate, test, inspection or investigation required by, or for the purpose of these Regulations any orders, notices or proclamations made there under.

(2) An applicant for anything under these Regulations shall, before the application is accepted, be required to pay the fee so chargeable for the respective application.

(3) Where a payment has been made in terms of subregulation (2) and the applicant decides to withdraw the application, the Authority shall not refund the payment made.

Appeals

70. Where a person is aggrieved by any order made under these Regulations the person may, within twenty-one days of such order being made, appeal against the order to a court of law with competent jurisdiction.

PART XV OFFENCES AND PENALTIES

Penalties

71.-(1) A person who contravenes any provision of these Regulations, orders, notices or proclamations made there under shall, upon conviction, be liable to a fine not exceeding one million shillings or to imprisonment for a term not more than six months or both, and in the case of a continuing contravention, each day of the contravention shall constitute a separate offence.

(2) Where it is proved that an act or omission of any person, which would otherwise have been a contravention by that person of a provision of these Regulations, orders, notices or proclamations made there under was due to any cause not avoidable by the exercise of reasonable care by that person, the act or omission shall be deemed not to be a contravention by that person of that provision.

General penalty

72. A person who contravenes any provision of these Regulations for which no penalty has been provided, commits an offence and-

- (a) shall, on conviction be liable to a fine of the sum equivalent in Tanzanian shillings of five hundred United States dollars; and
- (b) may, on conviction have his certificate, approval, authorisation, exemption or such other document revoked or suspended.

 FIRST SCHEDULE

(Made under regulation 9(5))

GN. No.
352 of 2023
reg. 15

METEOROLOGICAL INFORMATION STATED REQUIREMENTS

PART A

 OPERATIONALLY DESIRABLE ACCURACY OF MEASUREMENT OR
OBSERVATION

*Element to be observed operationally desirable accuracy of measurement or observation**

Mean surface wind		Direction: $\pm 10^\circ$ Speed: ± 0.5 m/s (1 kt) up to 5 m/s (10 kt) $\pm 10\%$ 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 600m $\pm 10\%$ between 600m and 1 500 m $\pm 20\%$ above 1 500 m
Runway visual range		± 10 m up to 400m ± 25 m between 400 m and 800 m $\pm 10\%$ above 800 m
Cloud amount		± 1 okta

Cloud height		± 10 m (33 ft) up to 100 m (330ft) $\pm 10\%$ above 100 m (330 ft)
Air temperature and dew-point temperature $\pm 1^{\circ}\text{C}$		
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.		
<i>Note. — Guidance on the uncertainties of measurement or observation can be found in the Guide to Meteorological Instruments and Methods of Observation (WMO-No. 8).</i>		

PART B

OPERATIONALLY DESIRABLE ACCURACY OF FORECASTS

Note. — 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	$\pm 20^{\circ}$	80% of cases
Windspeed	± 2.5 m/s(5kt)	80% of cases
Visibility		± 200 m up to 800m $\pm 30\%$ between 800 m and 10 km 80% of cases
Precipitation		Occurrence or non-occurrence 80% of cases
Cloud amount		One category below 450 m (1 500ft) Occurrence or non-occurrence of BKN or OVC between 450 m (1 500 ft) and 3 000 m (10 000 ft) 70% of cases
Cloud height		± 30 m (100 ft) up to 300 m (1 000ft) $\pm 30\%$ between 300 m (1

		000 ft) and 3 000 m (10 000 ft) 70% of cases
Air temperature	$\pm 1^{\circ}\text{C}$	70% of cases

TREND FORECAST

Wind direction	$\pm 20^{\circ}$	90% of cases
Windspeed	$\pm 2.5 \text{ m/s (5 kt)}$	90% of cases
Visibility		$\pm 200 \text{ m up to } 800\text{m}$ $\pm 30\%$ between 800 m and 10 km 90% of cases
Precipitation		Occurrence or non-occurrence 90% of cases

*Element to be forecast**Operationally desirable accuracy of forecasts**Minimum percentage of cases within range*

Cloud amount		One category below 450 m (1 500ft) Occurrence or non-occurrence of BKN or OVC between 450 m (1 500 ft) and 3 000 m (10 000 ft) 90% of cases
Cloud height		$\pm 30 \text{ m (100 ft) up to } 300 \text{ m (1 000ft)}$ $\pm 30\%$ between 300 m (1 000 ft) and 3 000 m (10 000 ft) 90% of cases

FORECAST FOR TAKE-OFF

Wind direction	$\pm 20^{\circ}$	90% of cases
Wind speed	$\pm 2.5 \text{ m/s (5 kt) up to } 12.5 \text{ m/s (25 kt)}$	90% of cases
Air temperature	$\pm 1^{\circ}\text{C}$	90% of cases
Pressure value (QNH)	$\pm 1 \text{ hPa}$	90% of cases

AREA, FLIGHT AND ROUTE FORECASTS

Upper-air temperature	$\pm 2^{\circ}\text{C}$ (Mean for 900 km(500NM)) 90% of cases
Relative humidity	$\pm 20\%$ 90% of cases
Upper wind	$\pm 5 \text{ m/s (10kt)}$ (Modulus of vector difference for 900 km (500 NM))
Significant en-route weather phenomena and cloud	
Occurrence or non-occurrence	Location: $\pm 100 \text{ km (60 NM)}$ Vertical extent: $\pm 300 \text{ m (1 000 ft)}$
Flight level of tropopause:	$\pm 300 \text{ m (1 000 ft)}$ Max wind level: $\pm 300 \text{ m (1 000 ft)}$
80% of cases	
70% of cases	
70% of cases	
80% of cases	
80% of cases	
<i>Element to be observed operationally desirable accuracy of measurement or observation*</i>	

SECOND SCHEDULE

(Made under regulation 11(3))

GN. No.
352 of 2023
reg. 15

TECHNICAL SPECIFICATIONS RELATED TO GLOBAL SYSTEMS, SUPPORTING CENTRES AND METEOROLOGICAL OFFICES

1. WORLD AREA FORECAST SYSTEM

1.1 Formats and codes

World area forecast centres (WAFCs) shall adopt uniform formats and codes for the supply of forecasts.

1.2 Upper-air gridded forecasts

The forecasts of upper winds; upper-air temperature; and humidity; direction, speed and flight level of maximum wind; flight level and temperature of tropopause, areas of cumulonimbus clouds, icing, clear-air and in-cloud turbulence, 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. The dissemination of each forecast shall be in the above order and shall be completed as soon as technically feasible but not later than 6 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);
- (g) clear-air turbulence for layers centred at flight levels 240 (400 hPa), 270 (350 hPa), 300 (300 hPa), 340 (250 hPa), 390 (200 hPa) and 450 (150 hPa);
- (h) in-cloud turbulence for layers centred at flight levels 100 (700 hPa), 140 (600 hPa), 180 (500 hPa), 240 (400 hPa) and 300 (300 hPa); and

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

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

- (i) geopotential altitude data for flight levels 50 (850 hPa), 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).

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 the World Meteorological Organization (WMO).

Note.— The GRIB code form is contained in the Manual on Codes (WMO-No. 306), Volume I.2, Part B — Binary Codes.

1.2.4 The foregoing grid point forecasts shall be prepared by a WAFC in a regular grid with a horizontal resolution of 1.25° 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. The dissemination of each forecast shall be completed as soon as technically feasible but not later than 9 hours after standard time of observation.

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 the Manual on Codes (WMO-No. 306), Volume I.2, Part B — Binary Codes.

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 Types of 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 (34kt);
- (b) severe squall lines;
- (c) moderate or severe turbulence (in cloud or clear air);

- (d) moderate or severe icing;
- (e) widespread sandstorm/dust storm;
- (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; and

(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 RDOACTCLD.

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 Schedule 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 a narrow shall be used to link the location of the other item(s) to its associated symbol or textbox.

2. AERODROME METEOROLOGICAL OFFICES (PART I) –

2.1 Use of world area forecast system (WAFS) products.

2.1.1 Aerodrome meteorological offices shall use WAFS 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 shall be decoded into standard WAFS charts in accordance with relevant provisions in this Annex, and the meteorological content and identification of the originator of the WAFS forecasts shall not be amended.

2.2 Notification of WAFS concerning significant discrepancies

Aerodrome meteorological offices using WAFS BUFR data shall notify the WAFS 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/dust storms; and

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

The WAFS 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

Volcanic ash advisory information

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.

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

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

4. STATE VOLCANO OBSERVATORIES (PART II)

Information from State volcano observatories

The information required to be sent by State volcano observatories to their associated area control centres (ACCs)/flight information centres (FICs), meteorological watch office (MWO) and VAAC shall 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 website.

5. TROPICAL CYCLONE ADVISORY CENTRES

Tropical cyclone advisory information

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.

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.

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

The tropical cyclone advisory information listed in Table A2-2, when prepared in graphical format, shall be as specified in Schedule 1 and issued using the PNG format.

6. SPACE WEATHER CENTRES

Space weather advisory information

Advisory information on space weather shall be issued in abbreviated plain language, using approved ICAO abbreviations and numerical values of self-explanatory nature, and shall 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, shall be used.

Space weather advisory information shall be disseminated in IWXXM GML for, in addition to the dissemination of space weather advisory information in abbreviated plain language in accordance with 6.1.1.

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.

One or more of the following space weather effects shall 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

The following intensities shall be included in space weather advisory information, using their respective abbreviations as indicated below

moderate
severe

MOD
SEV

Updated advisory information on space weather phenomena shall 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 tatus indicator (C)1	Indicator of test or exercise	STATUS:TESTor EXER	STATUS:TEST STATUS: EXER
3 Time of origin (M)	Year, month, day, time in UTC	DTG: nnnnnnnn/nnnnZ	DTG: 20080 923/0130Z
4 Name of VAAC (M)	Name of VAAC	VAAC: nnnnnnnnnn n	VAAC: TOK YO

5	Name of volcano (M)	Name and IAVCEI number of volcano	VOLCANO: n nnnnnnnnnnnnnnnnnn nn nnn[nnnnnn] or UNKNOWN or UNNAMED	VOLCANO: KAR YMSKY1000-13 VOLCANO: UNN AMED
6	Location of volcano (M)	Location of volcano in degrees and minutes	PSN: N nnnnorSnnnn Wnnnnnor Ennnnn or UNKNOWN	PSN: N5403 E15927 PSN: UNK
7	State or region (M)	State, or region if ash is not reported over a State	AREA: n nnnnnnnnnnnnnnnnnn	AREA: RUSS IA
8	Summit elevation (M)	Summit elevation in m (or ft)	SUMMIT ELEV: n nnnM (or nnnnnFT)	SUMMIT ELEV: 1536M
9	Advisory number (M)	Advisory number: year in full and message number (separate sequence for each volcano)	ADVISORY NR: n nnn/nnnn	ADVISORY NR: 2008/4
10	Information source (M)	Information source using free text	INFOSOURCE: F ree text up to 32 characters	INFO SOURCE: MTSAT-1R KVERT KEMSD
11	Colour code (O)	Aviation colour code	AVIATION COLOUR R R ED or ORANGE or YELLOW CODE: or GREEN or UNKNOWN or NOT GIVEN or NIL	AVIATION RED COLOUR CODE:

Element	Detailed content	Template(s)	Examples
12	Eruption details (M)	ERUPTION DETAILS: Free text up to 64 character s or UNKNOWN	ERUPTION ON AT DETAIL 20080925 0300Z FL300

13	Time of	Day and time (in UTC)	OBS (or EST) VA DTG :	nn/nnnnZ	OBS VA DTG:	23/0100 Z
	observati on (or	of observatio n				
	estimati on) of ash	(est imatio n) of volcanic ash				
	(M)					
14	Observed or	Horizo ntal (in degrees and minutes) and	OBS VA CL D or EST VA CL D:	TOP FLnnn or SFC/FLn nn or FLnnn/nn n [nnKM WID LINE2 BTN (nnNM WID LINE BTN)] Nnn[nn] or Snn[nn] Wnnn[n n] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[n n]	OBS VA CLD:	FL250/3 00
	estimated ash	vertical extent at the time of the observed or				N5400 E15930 –
	cloud (M)	estimated ash if the base is the top of the or estimated ash				N5400 E16100
						N5300
						MOV SE 20KT
						SFC/FL2
						N5130
						N5130
						N5230
						N5230 E16130
		Movemen t of the observed or ash cloud		or Ennn[nn] [– Nnn[nn] or Snn[nn] Wnnn[nn] or		MOV SE 15KT
						TOP
						40KMH
						VA NOT
						FM
						WIND

			Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn]] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn]] <i>or</i> Ennn[nn]] MOV N nnKMH (<i>or</i> KT) <i>or</i> MOV NE nnKMH (<i>or</i> KT) <i>or</i> MOV E nnKMH (<i>or</i> KT) <i>or</i> MOV SE nnKMH (<i>or</i> KT) <i>or</i> MOV S nnKMH (<i>or</i> KT) <i>or</i> MOV SW nnKMH (<i>or</i> KT) <i>or</i>		180/12M PS
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1	Fore heig	Day time (in UTC)	FCST CLD +6 HR:	nn/nnnnZ SFC <i>or</i> FL [nnKM WID BTN (nnNM WID LINE BTN)] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Ennn[nn] – Nnn[nn] <i>or</i> Wnnn[nn] <i>or</i>	FCST VA CLD +6 HR:	23/0700Z FL250/35 0 N5130 N5130 E16230 – N5330 E16230 – N5330 SFC/FL18
	and posit ash	(6 hou of				
	(+6 HR) (M)	estim ation)				
		given 12);				
		Forecas t				

		position (in degrees and minutes) for each cloud mass for that fixed valid	Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]] ³ <i>or</i> NO VA EXP <i>or</i> NOT AVBL <i>or</i> NOT PROVIDED		N4830 E16330 – N4830 E16630 – N5130 E16630 – N5130 NO VA NOT NOT PROVIDED
Element			Detailed	Template(s)	Examples

16	Forecast height and position of the clouds (HR) (M)	Day and time (in UTC) (12 hours from the time of observation) (<i>or</i> estimation) or as given in item 12); forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	FCST VA CLD HR	nn/nnnn Z SFC <i>or</i> FLnnn/[FL]nn n [nnKM WID LINE2 BTN (nnNM WID LINE BTN)] Nnn[n n] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[n n] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[	FCST VA CLD +12 HR	23/1300Z SFC/FLZ/U N4830 E16130 – N4830 E16000 – N5300 E16000 – N5300 E16130 NO VA EXP NOT AVBL NOT PROVIDED
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				nn][– Nnn[n n] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[n n] <i>or</i> Snn[nn]		
17	Forecast height and position of the ash clouds (+18 HR) (M)	Day and time (in UTC) (18 hours from the “Time of observation (<i>or</i> estimation) of ash” given in Item12); Forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	FCST VA CLD +18 HR:	nn/nnnn Z SFC <i>or</i> FLnnn/[FL]nn n [nnKM WID LINE2 BTN (nnNM WID LINE BTN)] Nnn[n n] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[n n] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn][– Nnn[n n] <i>or</i> Snn[nn] Wnnn[n n] <i>or</i>	FCST VA CLD +18 HR:	23/1900Z NO VA EXP NOT AVBL NOT PROVIDED

18	Remarks (M)	Remarks, as necessary	RMK: <i>Free text up to 256 characters or NIL</i>	RMK:	LATEST REPFM KVERT (0120Z) INDICATES ERUPTION HAS CEASED. TWO DISPERSING VA CLD ARE EVIDENT
19	Next advisory (M)	Year, month, day and time in UTC	NXT <i>nnnnnnnn</i> /nnn ADVISOR nZ Y: <i>or</i> NO LATER THAN <i>nnnnnnnn</i> /nnn nZ <i>or</i> NO FURTHER ADVISO RIE S	NXT ADVISOR Y:	20080923/073 0Z NO LATER THAN <i>nnnnnnnn</i> /nnn nZ NO FURTHER ADVISO RIE S

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.

Example A2-1. Advisory message for volcanic ash

VA ADVISORY DTG: VAAC: VOLCANO: PSN: AREA: SUMMIT ELEV: ADVISORY NR: INFO SOURCE:	20080923/0130Z TOKYO KARYMSKY 1000-13 N5403 E15927 RUSSIA 1536M 2008/4 MTSAT-1R KVERT KEMSD
AVIATION COLOUR CODE:	RED ERUPTION AT 20080923/0000Z FL300 REPORTED

ERUPTION DETAILS:	23/0100Z
OBS VA DTG: OBS	FL250/300 N5400 E15930 – N5400 E16100 – N5300 E15945 MOV SE 20KT SFC/FL200 N5130 E16130 – N5130 E16230 – N5230 E16230 – N5230 E16130
VA CLD:	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;
==
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 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 indicat or (C)1	Indicator of test or exercise	ST TEST or AT EXER US:	STAT TEST EXER U S: STAT U S:
3	Time of origin(M)	Year, month, day and time in UTC of issue	DTG: nnnnnnnn/nnn nZ	DTG: 20040925/1600Z
4	Name of TCAC(M)	Name of TCA C (location indicator <i>or</i> full name)	TCA nnnn <i>or</i> C: nnnnnnnnnnn	TCAC: YUFO ¹ MIAMI TCAC:
5	Name of tropical cyclone (M)	Name of tropical cyclone <i>or</i> “NN” for unname d tropical cyclone	TC: nnnnnnnnnnn <i>or</i> NN	TC: GLORIA
6	Adviso ry number (M)	Advisory number. Year in full and message number(sep arat e	AD nnnn/[n][n]nn VIS OR YN R:	ADVIS 2004/13 ORY NR:

		sequence for each cyclone)			
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) and	O BS PS N:	nn/nnnnZ Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]	OBS 25/1800Z N2706 W07306 PSN
8	Observed CB cloud (C))	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]	CB: WI 250NM OF TC CENTRE TOP FL500

				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 TOP [ABV or BLW] FLnnn(<i>or</i> KT) <i>or</i> ESE nnKMH (<i>or</i> KT) <i>or</i> SE nnKMH (<i>or</i>	
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				KT) <i>or</i> SSE nnKMH (<i>or</i> KT) <i>or</i> S nnKMH (<i>or</i> KT) <i>or</i> SSW nnKMH (<i>or</i> KT) <i>or</i> SW nnKMH (<i>or</i> KT) <i>or</i> WSW nnKMH (<i>or</i> KT) <i>or</i> W nnKMH (<i>or</i> KT) <i>or</i> WNW nnKMH (<i>or</i> KT) <i>or</i> NW nnKMH (<i>or</i> KT) <i>or</i> NNW nnKMH (<i>or</i> KT) <i>or</i> SLW	
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				or STNR		
10	Central pressur e (M)	Central pressure (in hPa)	C:	nnnHPA	C:	965HPA
	<i>Element</i>	<i>Detailed content</i>	<i>Template(s)</i>		<i>Examples</i>	
1 1	Maxim um surface wind(M)	Maximu m surface wind near the centre (mean over 10 minutes, in m/s (or kt))	MA X WI ND:	nn[n]MPS (or nn[n]KT)	MAX WIND:	22MPS
1 2	Forecas t of centre positio n (+6 HR) (M) Forecast of	Day and time (in UTC) (6 hours from the “DTG” given in Item Forecast degrees and minutes) of the centre of the tropical	FCS T PSN +6 HR:	nn/nnnnZ	FCST PSN +6 HR:	25/2200 Z
				Nnn[nn] or Snn[nn] Wnnn[nn] or		N2748 W07350
				Ennn[nn]		

		cyclone				
1 3	Forecast of maximum surface wind (M) (+6 HR)	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
1 4	Forecast of centre position (+12 HR)(M)	Day and time (in UTC) (12 hours “DTG” given in Item 2); Forecast degrees and the centre of cyclone	FCS T PSN +12 HR:	nn/nnnnZ Nnn[nn] or Ennn[nn]	FCST PSN +12 HR:	26/0400 Z N2830
1 5	Forecast of maximum surface wind (+12 HR)(M)	Forecast of maximum surface wind (12 hours after the “DTG”	FCST MAX WIND +12 HR:	nn[n]MPS (or nn[n]KT)	FCST MAX WIND +12 HR:	22MPS

	)	given in Item 2)				
1 6	Forecas t of centre position	Day and time (in UTC) (18 hours from the	FCS T PSN +18 HR:	nn/nnnnZ	FCST PSN +18 HR:	26/1000 Z
				Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i>		N2852 W07500
	(+18 HR)(M)	“DTG” given in Item 2);		Ennn[nn]		
		Forecast position (in				
		degrees and the centre of the tropical				
		cyclone				
1 7	Forecast of maximu m surface wind (+18 HR)(M)	Forecast of maximum surface wind (18 hours after	FCST MAX WIND +18 HR:	nn[n]MPS (<i>or</i> nn[n]KT)	FCST MAX WIND +18 HR:	21MPS

		the “DTG” given in Item 2)			
1 8	Forecast of	Day and time	FCST nn/nnnnZ	FCST PSN	26/1600
	positio n (+24	(24 hours “DTG” given Forecast degrees and the centre of cyclone	Nnn[nn] or Ennn[nn]		N2912
1 9	Forecast of maximu m surface wind (+24 HR)(M)	Forecast of maximum surface wind (24 hours after the “DTG” given in Item 2)	FCST nn[n]MPS (or MAX nn[n]KT) WIND +24 HR:	FCST MAX WIND +24 HR:	20MPS
2 0	Remarks (M)	Remarks, as necessar y	RMK: <i>Free text up to 256 characters or NIL</i>	RMK:	NIL
2 1	Expect ed time of issuanc	Expected year, month, day and	N [BFR] X nnnnnnnn/nnnnZ T or M NO MSG EXP	NXT MSG:	2004092 5/2000Z

	e of next advisory y (M)	time (in UTC) of issuance of next advisory	SG :		
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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. 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: TCAC: TC: ADVISORY NR: OBS PSN: CB:	20040925/1900Z YUFO* GLORIA 2004/13 25/1800Z N2706 W07306 WI 250NM OF TC CENTRE TOP FL500
MOV: C: MAX WIND: FCST PSN +6 HR: FCST MAX WIND +6 HR: FCST PSN +12 HR: FCST MAX WIND +12 HR: FCST PSN +18 HR: FCST MAX WIND +18 HR: FCST PSN +24 HR: FCST MAX WIND +24 HR: RMK: NXT MSG: *Fictitious location	NW 20KMH 965HPA 22MPS 25/2200Z N2748 W07350 22MPS 26/0400Z N2830 W07430 22MPS 26/1000Z N2852 W07500 21MPS 26/1600Z N2912 W07530 20MPS NIL 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;

= = a double line indicates that the text following it should be placed on the subsequent line.

Note 1.— The explanations for the abbreviations can be found in the 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 are not part of the advisory message, as shown in the examples.

Element		Detailed	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	TEST EXER
3	Time of origin (M)	Year, month, day and time in UTC	DTG: nnnnnnnn/nnnn Z	20161108/0100Z
4	Name of SWXC (M)	Name of SWXC	SWXC:nnnnnn n nnnn	DONLON2
5	Advisory number (M)	Year in full and unique message number	ADVISORY NR: nnnn/[n]/[n]/[n]n	2016/1
6	Number of advisory being replaced	Number of the previously issued	NR RPLC:nnnn/[n] [n]/[n]n	2016/1

	(C)	advisory being			
7	Space weather effect and intensity (M)	Effect and intensity of the space weather phenomena	HF COM MOD SEV or SATCOM MOD SEV or GNSS MOD or HF COM MOD SEV AND GNSS MOD or RADIATION3 MOD or SEV		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 (UTC) of observed phenomena for forecast or phenomena have yet to occur); Horizontal extent; Quantitative values and longitude in degrees and/or	OBS (or DA FCST) HN SWX:	OBS SWX::	08/0100Z DAYLIGHT SIDE 08/0100Z HNH HSH E18000 – W18000 08/0100Z HNH HSH W18000 – W09000 ABV FL350

9	Forecast of the phenomenon (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 phenomenon for the fixed valid time	F C S T S W X + 6 H R :	nn /n n nn Z D A Y L I G H T S I D E or H N H an d/ o r M N H an d/ o r E Q N an d/ o r E Q S an d/ o r M S	OBS SWX.: 08/0100Z DAYLIGHT SIDE 08/0100Z HNH HSH E18000 – W18000 08/0100Z HNH HSH W18000 – W09000 ABV FL350

			H and/ o		
10	Forecast of the phenomena (M) HR ¹⁶	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	FCS T SW X +12 HR:	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 (M) HR ¹⁸	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	FCS T SW X +18 HR:	FCST SWX +18 HR:	08/1900Z DAYLIGHT SIDE 08/1900Z HNH HSH W18000 – W09000 ABV FL350 08/1900Z HNH HSH E18000 – W18000

		time			
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	FCS T SW X +24 HR:	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: 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: SORY:	NXT ADVI	20161108/0700Z NO FURTHER ADVISORIES
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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. Fictitious location.
3. 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 HFCOM effects)

SWX ADVISORY DTG: SWXC: ADVISORY NR: NR RPLC: SWX EFFECT: OBS SWX: FCST SWX +6 HR: FCST SWX +12 HR: FCST SWX +18 HR: FCST SWX +24 HR RMK: NXT ADVISORY: * Fictitious location	20161108/0100Z DONLON* 2016/2 2016/1 HF COM MOD AND GNSS MOD 08/0100Z HNH HSH E18000 – W18000 08/0700Z HNH HSH E18000 – W18000 08/1300Z HNH HSH E18000 – W18000 08/1900Z HNH HSH E18000 – W18000 09/0100Z NO SWX EXP 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 NO FURTHER ADVISORIES
SWX ADVISORY DTG: SWXC: ADVISORY NR: NR RPLC: SWX EFFECT: FCST SWX: FCST SWX +6 HR: FCST SWX +12 HR: FCST SWX +18 HR:	20161108/0000Z DONLON* 2016/2 2016/1 RADIATION MOD 08/0100Z HNH HSH E18000 – W18000 ABV FL 350 08/0700Z HNH HSH E18000 – W18000 ABV FL 350 08/1300Z HNH HSH E18000 – W18000 ABV FL 350 08/1900Z HNH HSH E18000 – W18000 ABV FL 350 09/0100Z NO SWX EXP 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

FCST SWX +24 HR: RMK: NXT ADVISORY: * Fictitious location	NO FURTHER ADVISORIES
SWX ADVISORY DTG: SWXC: ADVISORY NR: SWX EFFECT: OBS SWX: FCST SWX +6 HR: FCST SWX +12 HR: FCST SWX +18 HR: FCST SWX +24 HR RMK: NXT ADVISORY: * Fictitious location	20161108/0100Z DONLON* 2016/1 HF COM SEV 08/0100Z DAYLIGHT SIDE 08/0700Z DAYLIGHT SIDE 08/1900Z DAYLIGHT SIDE 09/0100Z NO SWX EXP PERIODIC HF COM ABSORPTION 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 20161108/0700Z

THIRD SCHEDULE

(Made under regulation 16(11))

TECHNICAL SPECIFICATIONS RELATED TO METEOROLOGICAL
OBSERVATIONS AND REPORTS

1. GENERAL PROVISIONS RELATED TO METEOROLOGICAL OBSERVATIONS

1.1 The meteorological instruments used at an aerodrome shall 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 Civil Aviation(Aerodrome) regulations.

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

1.3 The observers at an aerodrome shall 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 shall be a subset of and displayed parallel to those available in the local meteorological service unit. In those displays, each meteorological element shall 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 TableA3-1.

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 WMO.

Note.— The METAR and SPECI code forms are contained in the Manual on Codes (WMO-No. 306), Volume I.1, Part A — Alphanumeric Codes.

2.1.3 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.

2.2 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

(g) 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 5m/s(10kt) 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 7.5m/s (15kt) 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 regulation 21(2)(b), SPECI shall be issued whenever changes in accordance with the following criteria occur:

(a) when the wind changes through values of operational significance. The threshold values shall be established by the meteorological authority in consultation with the appropriate ATS authority and the 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, 1 500 or 3 000 m; and
- (2) 5 000 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 800m;

(d) when the onset, cessation or change in intensity of any of the following weather phenomena occurs:

- dust storm
- 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 1 000 ft); and
 - (2) 450 m (1 500 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 1 000 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 the Fifth Schedule.

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 shall be disseminated only after the improvement has been maintained for 10 minutes; it shall 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, 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 in Table A3-0.

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 shall be obtained by the use of sensors appropriately sited. Sensors for surface wind observations for local routine and special

reports shall 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 shall 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 shall be derived and displayed by automated equipment.

4.1.3 Averaging

4.1.3.1

T

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) shall be 3 seconds for local routine reports, local special reports, METAR, SPECI and 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, shall meet the operationally desirable accuracy of measurement as given in the First Schedule.

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 which 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 (ICAO 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 50m/s(100kt) or more is reported, it shall be indicated to be more than 49m/s (99kt); 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 winds peed (gusts) are reported in accordance with 4.1.5.2 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 shall 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 shall relate to the same sensors, and where separate sensors are required as specified in 4.2.1, the displays shall 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 shall 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 shall 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 regulation 28, the values representative of the touchdown zone shall 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 shall 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 shall be reported, and the runways to which the values refer shall be indicated.

4.2.4.4 In METAR and SPECI, visibility shall be reported as prevailing visibility, as defined in regulation 3. 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 1 500 m or 2) less than 50 per cent of the prevailing visibility and less than 5 000 m; the lowest visibility observed shall 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 shall be reported; and

(b) when the visibility is fluctuating rapidly, and the prevailing visibility cannot be determined, only the lowest visibility shall 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 shall be assessed at a lateral distance from the runway centre line of not more than 120m. The site for observations to be representative of the touchdown zone shall be located about 300m along the runway from the threshold. The sites for observations to be representative of the mid-point and stop-end of the runway shall be located at 1000 to 1500m along the runway from the threshold and at about 300m from the other end of the runway. The exact position of these sites and, if necessary, additional sites shall 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 (ICAO Doc9328).

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 shall 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 shall 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, 550, 300 and 175 m.

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 shall 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.

In METAR and SPECI, the runway visual range shall be based on the maximum light intensity available on the runway.

Note.— Guidance on the conversion of instrumented readings into runway visual range is given in table A3-0.

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 shall be considered the lower limit and 2 000 metres the upper limit for runway visual range. Outside of these limits, local routine reports, local special reports, METAR and SPECI shall merely indicate that the runway visual range is less than 50 m or more than 2 000m.

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 shall be reported and no indication of location on the runway shall be included; and
- (b) where there is more than one runway available for landing, touchdown zone runway visual range values shall be included for all such runways, up to a maximum of four, and the runways to which the values refer shall 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 shall 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 shall be indicated by the abbreviation “U” or “D”, respectively. In circumstances when actual fluctuations during the 10-minute period show no distinct tendency, this shall be indicated using the abbreviation “N”. When indications of tendency are not available, no abbreviations shall 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 shall 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 characteristics 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 shall be reported, using the irrespective abbreviations and relevant criteria, as appropriate:

(a) Precipitation

Drizzle	DZ
Rain	RA
Snow	SN
Snow grains	SG
Ice pellets	PL
Hail	GR

- Reported when diameter of largest hailstones is 5 mm or more.

Small hail and/or snow pellets GS

- Reported when diameter of largest hailstones is less than 5mm.

(b) Obscuration (hydrometeors)

Fog FG

- Reported when visibility is less than 1 000 m, except when qualified by “MI”, “BC”, “PR” or “VC” (see 4.4.2.6 and 4.4.2.8).

Mist BR

- Reported when visibility is at least 1 000 m but not more than 5 000m.

(c) Obscuration (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	SA
Dust(widespread)	DU
Haze	HZ
Smoke	FU
Volcanic ash	VA

(d) Other phenomena

Dust/sand whirls (dust devils) PO

Squall SQ

Funnel cloud (tornado or waterspout) FC

Dust storm DS

Sandstorm SS

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 shall 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 (ICAO 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, shall 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 A3-2. Showers observed in the vicinity of the aerodrome (see 4.4.2.8) 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 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 shall 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 shall be indicated as follows:

	<i>(local routine and special reports)</i>	<i>(METAR and SPECI)</i>
<i>Light</i>	<i>FBL</i>	—
<i>Moderate</i>	<i>MOD</i>	<i>(no indication)</i>
<i>Heavy</i>	<i>HVY</i>	+

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 shall 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 shall 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 shall 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 shall be installed at a distance of less than 1 200 m (4 000 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) shall 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 shall relate to the same sensor, and where separate sensors are required as specified in 4.5.1, the displays shall 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.

4.5.1 Reporting

4.5.1.1 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 3 000 m (10 000 ft).

4.5.1.2 At aerodromes where low-visibility procedures are established for approach and landing, as agreed between the meteorological authority and the appropriate ATS authority, in local routine and special reports the height of cloud base shall 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 3 000 m (10 000 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).

4.5.1.3 In local routine reports, local special reports, METAR and SPECI:

(a) cloud amount shall be reported using the abbreviations “FEW” (1 to 2 oktas), “SCT” (3 to 4 oktas), “BKN” (5 to 7 oktas) or “OVC” (8oktas);

(b) cumulonimbus clouds and towering cumulus clouds shall be indicated as “CB” and “TCU”, respectively;

- (c) the vertical visibility shall be reported in steps of 30m (100ft) up to 600m (2000ft);
- (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” shall be used;
- (e) when several layers or masses of cloud of operational significance are observed, their amount and height of cloud base shall 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, shall 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 shall be reported as cumulonimbus only.

Note. — Towering cumulus indicates cumulus congestus clouds of great vertical extent.

4.5.1.4 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.

4.5.1.5 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.

4.5.1.6 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 shall be replaced by “///”;
- (b) when no clouds are detected by the automatic observing system, it shall 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 shall be replaced by “///”; and
- (d) the vertical visibility shall 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 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.

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, 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 shall 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, shall 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 appropriate ATS authority 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, shall 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
- dust storm, sandstorm
- thunderstorm
- funnel cloud (tornado or waterspout)
- 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, shall be reported in supplementary information:

- cumulonimbus clouds	CB
- thunderstorm	TS
- moderate or severe turbulence	MOD TURB, SEVTURB
— wind shear	WS
— hail	GR
— severe squall line	SEVSQL
— moderate or severe icing	MOD ICE,
SEVICE	
— freezing precipitation	FZDZ,
FZRA	
— severe mountain waves	SEV MTW
— duststorm, sandstorm	DS, SS
— blowing snow	BLSN
— funnel cloud (tornado or waterspout)	FC

The location of the condition shall be indicated. Where necessary, additional information shall 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 shall be reported in accordance with the templates 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 shall 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 In METAR and SPECI, the following information shall 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 the runway provided by the appropriate airport authority.

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.

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 $\geq 30^\circ$ 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 5(AB) = 5-minute mean runway visual range value during period AB and R 5(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, referring period for extreme values, indicated in the upper left-hand corner.
8. According to the *Manual on Codes* (WMO-No. 306), Volume I.1, Part A — *Alphanumeric Codes*, paragraph 15.5.5, it is recommended that the wind measuring system should be such that peak gust should represent a three-second average”.
9. N/A = not applicable.
10. QFE is to be included if required. Reference elevation for QFE should be aerodrome elevation except for precision approach runways, and non-precision approach runways with threshold ≥ 2 m (7 ft) below or above aerodrome elevation, where the reference level should be therelevant 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 < 1500 m, limits for assessments 50 and 2000 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.

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

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

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

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).