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THE CIVIL AVIATION ACT
(No. 21 of 2013)

THE CIVIL AVIATION (METEOROLOGY SERVICES FOR AIR NAVIGATION) REGULATIONS, 2018

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THE CIVIL AVIATION ACT

(No. 21 of 2013)

IN EXERCISE of powers conferred by section 82 of the Civil Aviation Act, 2013 the Cabinet Secretary for Transport, Infrastructure, Housing and Urban Development makes the following Regulations—

THE CIVIL AVIATION (METEOROLOGY SERVICES FOR AIR NAVIGATION) REGULATIONS, 2018

PART I — PRELIMINARY

1. These Regulations may be cited as the Civil Aviation (Meteorology Services for Air Navigation) Regulations, 2018.

2. In these Regulations, unless the context otherwise requires—

“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 providing 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 the landing area;

“aerodrome meteorological office” means an office designated to provide meteorological service for aerodromes serving 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 (RR S1.32)” 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 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;

“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 expected time of use including the following—

(a) take-off alternate an alternate aerodrome at which an aircraft would be able to land shall this become necessary shortly after take-off and it is not possible to use the aerodrome of departure;

(b) en-route alternate an alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en-route destination alternate and an alternate aerodrome at which an aircraft would be able to land shall it become either impossible or inadvisable to land at the aerodrome of intended landing;

“altitude” means the vertical distance of a level, a 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 service to controlled flights arriving at, or departing from, one or more aerodromes;
“appropriate ATS provider” means the relevant ATS designated by Kenya responsible for providing air traffic services in the airspace concerned;

“Area Control Centre” means a unit established to provide air traffic control service to Controlled flights in control areas under its jurisdiction;

“Area navigation (RNAV)” 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;

“Authority” means Kenya Civil Aviation Authority;

“Automatic Dependent Surveillance (ADS)” means a surveillance technique in which aircraft automatically provide, 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;

“ADS-C” means automatic dependent surveillance-contract;

“briefing” means 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 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;

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

“direct speech” means a direct aeronautical fixed service (AFS) telephone circuit, for direct exchange of voice between air traffic services (ATS) units and other service providers;

“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 International Standards Aerodrome and still air conditions), from a point on the route to an adequate alternate aerodrome, is greater than the threshold time approved by the State of the Operator;

“flight crew member” 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 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;

(a) Note 1.—a pressure type altimeter calibrated in accordance with the standard atmosphere—

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

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

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

(b) Note 2. — The terms “height” and “altitude”, used in Note 1, indicate altimetric rather than geometric heights and altitudes;

“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 service provider 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 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;

“hectopascal (hPa)” means a metric (SI) measurement unit of pressure equivalent to millabar;

“height” means the vertical distance of a level, a point or an object considered as a point, measured from a specified datum;

“human factors principles” means 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 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 service provider” means a person designated under these regulations to provide or arrange for the provision of meteorological service for international air navigation on behalf of Kenya;

“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 an 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;

“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;

“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, e.g. RNAV 5, RNAV;

“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;

“person” includes an entity, company or association or body of persons, corporate or incorporate;

“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;

“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 of contiguous or noncontiguous sectors and the value may be assessed by human observation or instrumented systems which when installed, are used to obtain the best estimate of the prevailing visibility;

“prognostic chart” means a forecast of a specified meteorological element(s) for a specified time or period and a specified surface or portion of airspace, depicted graphically on a chart;

“quality assurance” means part of quality management focused on providing confidence that quality requirements will be fulfilled (ISO 9000*);

“quality control” means Part of quality management focused on fulfilling quality requirements (ISO 9000*);

“quality management” means Coordinated activities to direct and control an organization with regard to quality (ISO 9000*);

“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;

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

“standard isobaric surface” means an isobaric surface used on a worldwide basis for representing and analyzing the conditions in the atmosphere;

“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;

“Tribunal” means the National Civil Aviation Administrative Review Tribunal established under section 66 of the Civil Aviation Act, 2013;

“tropical cyclone” means generic term for a non-frontal synoptic-scale cyclone originating over tropical or sub-tropical waters with organized convection and definite cyclonic surface wind circulation;

“Tropical Cyclone Advisory Centre (TCAC)” 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 1 000 candelas can be seen and identified against an unlit
background, and the visibility shall be measured or observed, and reported in metres or kilometres;

“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;

“Kenya volcano observatory” means a volcano observatory, designated by regional air navigation agreement, to monitor active or potentially active volcanoes within Kenya 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;

“VOLMET” means Meteorological information for aircraft in 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;

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

“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 using the aeronautical fixed service Interne based services; and

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

3. (1) These Regulations shall apply to a person providing Meteorological services for air navigation services within Kenya air spaces and at aerodromes.

(2) These Regulations may not apply to a person providing air navigation services in the course of his duties for state aircraft.

PART II—PROVISION OF METEOROLOGY SERVICES FOR AIR NAVIGATION PROVIDER

4. (1) The Authority shall designate a person to provide or arrange for the provision of meteorological service for air navigation on its behalf.

(2) Details of the meteorological authority designated under sub regulation (1) shall be included in the Kenya Aeronautical Information Publication.
(3) A person shall not provide meteorology services for air navigation unless—
    (a) such person has been authorized by the Authority in accordance with Civil Aviation (Certification of ANSPs) Regulations; and
    (b) the services are provided in accordance with the requirements prescribed in these Regulations and any associated standards and procedures.

5. A person authorized to provide meteorology services for air navigation under regulation 4 shall do so in accordance with the procedures described in—
    (a) the Manual of Operations required under these regulations; and
    (b) the quality management system manual required under these Regulations.

6. (1) The 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.

**PART III — PREPARATION OF THE MANUAL OF OPERATIONS**

7. (1) The Manual of Operations required under these Regulations shall be—
    (a) type written;
    (b) signed by the service provider;
    (c) in a format that is easy to revise and includes a list of effective pages; and
    (d) organized in a manner that facilitates evaluation and approval processes.

    (2) A service provider shall submit two copies of the manual of operations to the Authority for approval.

    (3) A service provider shall keep at least one approved copy of the manual at the principal place of business.
8. A Manual of Operations, shall contain all information and instructions necessary to enable the service provider to perform their duties and in particular shall include—

(a) services to be provided;
(b) personnel requirements and their responsibilities;
(c) training and performance assessment of staff and how that information is tracked;
(d) Quality Management System;
(e) contingency plans developed for part or total system failure;
(f) Installation and maintenance of facilities and equipment;
(g) fault and defect reporting;
(h) maintenance of documents and records;
(i) search and rescue responsibilities and co-ordination, operations, plan and procedures;
(j) the proposed hours of service;
(k) systems and procedures in the provision of Meteorological Services for Air Navigation Service; and
(l) any other information required by the Authority.

9. For the purposes of maintaining the accuracy of the information in the Manual of the Manual of Operations, the service provider shall whenever necessary, amend the manual and keep the operations manual updated and shall submit the said amendments to the Authority for approval.

PART IV — GENERAL PROVISIONS FOR METEOROLOGY SERVICES FOR AIR NAVIGATION

10. (1) The objective of meteorological service shall be to contribute towards the safety, regularity and efficiency of air navigation.

   (2) This objective shall be achieved by supplying the following users with the meteorological information necessary for the performance of their respective functions;

   (a) air operators and flight crew members;
   (b) air traffic services units;
   (c) search and rescue services units;
   (d) airport management; and
   (e) any other person as identified by the Authority.

   (3) The Authority shall in accordance with these regulations and regional air navigation agreement determine the meteorological services provided to meet the needs of air navigation over international waters and other areas which lie outside the territory of the Kenya.

11. The designated meteorological services provider shall—
(a) comply with the requirements of the World Meteorological Organization in respect of qualifications and training of meteorological personnel providing service for air navigation and other requirements as may be provided by the Authority;

(b) establish a procedure to assess the competency of personnel authorised to install meteorological facility for operational use and to perform meteorological services; and

(c) maintain the competence of the personnel authorised to provide the services.

12. (1) The Authority shall ensure that close liaison is maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of meteorological service for international air navigation.

(2) The Authority shall ensure that the Meteorological services 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 recognized by Authority.

(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) When the quality system indicates that meteorological information to be supplied to the users does not comply with the stated requirements, and automatic error correction procedures are not appropriate, such information shall not be supplied to the users unless it is validated with the originator.

(6) In 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.

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

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

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

(10) The specific value of any of the elements given in—
(a) an observation report shall be the best approximation of the actual conditions at the time of observation as set out in the First Schedule;

(b) a forecast report shall be the most probable value which the element is likely to assume during the period of the forecast as set out in the Second Schedule.

11. The meteorological information supplied to the users listed under regulation 10(2) shall be consistent with Human Factors principles and shall be in forms which require a minimum of interpretation by the users.

13. (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 concerned.

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

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

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

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

(4) The information referred to under sub-regulation (3) shall contain all details necessary for the planning of appropriate arrangements by the service provider.

(5) 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.

(6) The notification to the aerodrome meteorological office of individual flights shall contain the following information—

(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 aerodrome(s);

(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 by a flight crew member, whether flight documentation or briefing or consultation; and

(h) time(s) at which briefing, consultation or flight documentation are required.

(7) Notwithstanding the provisions sub-regulation (6) of this regulation, in case of scheduled flights, the requirements of some of the information referred to under sub-regulation (6) may be waived by agreement between the aerodrome meteorological office and the operator concerned.

PART V — WORLD AREA FORECAST SYSTEM AND METEOROLOGICAL OFFICES

14. (1) Pursuant to the objective of the world area forecast system, the meteorological service provider shall arrange and receive global aeronautical meteorological en-route forecasts in digital form and subsequently supply to users.

(2) The objective in sub-regulation (1) above 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.

15. (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 as specified in Part I of the Third Schedule.

(2) An aerodrome meteorological office established under sub-regulation (1) above shall carry out all or some of the following functions as necessary to meet the needs of flight operations at the aerodrome—

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

(b) prepare or obtain forecasts of local meteorological conditions;

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

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

(e) supply other meteorological information to aeronautical users;

(f) display the available meteorological information;

(g) exchange meteorological information with other aerodrome meteorological offices; and
(h) supply information received on pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud, to its associated air traffic services (ATS) 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 the Authority through regional air navigation agreement.

(4) For an aerodrome without an aerodrome meteorological office located at the aerodrome the meteorological service provider shall—

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

(b) agree with the concerned aerodrome operator or ATS units to establish means by which such information can be supplied to the aerodromes concerned.

16. (1) A meteorological services provider authorized to provide meteorological services for air navigation, shall establish, on the basis of regional air navigation agreement, one or more meteorological watch offices as specified in Part I of the Third Schedule.

(2) A meteorological watch office shall—

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

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

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

(d) disseminate SIGMET information;

(e) 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;

(f) supply information received concerning the release of radioactive materials into the atmosphere, in Kenya 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; and
(g) prepare, supply and disseminate any other information as required by the regional air navigation agreements.

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

17. Where there is active or potentially active volcanoes the meteorological service provider shall arrange that the Kenya volcano observatories, as designated by Regional Air Navigation Agreement in accordance with Part II of the Third Schedule, monitor and observe these volcanoes and send the following information, as quickly as practicable to their associated ACC, MWO and VAAC —

(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.

PART VI—METEOROLOGICAL OBSERVATIONS AND REPORTS

18. (1) The Authority shall ensure that aeronautical meteorological stations are established at aerodromes as it may deem necessary and such aeronautical meteorological station may be a separate station or combined with a synoptic station.

(2) The meteorological service provider shall carry out meteorological observations and issue reports in accordance with the technical specification and detailed criteria set out in Fourth Schedule.

(3) The Aeronautical meteorological stations shall include sensors installed outside the aerodrome, where considered justified, by the meteorological service provider to ensure the compliance of meteorological service for air navigation with the provisions of this Regulation.

(4) 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.

(5) Aeronautical meteorological stations shall make routine observations at fixed time intervals and in case of 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.

(6) The Authority shall ensure that 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.
(7) Automated equipment shall be installed at aerodromes with runways intended for category II and III instrument approach and landing operations and such equipment shall be for measuring or assessing, monitoring and remote indicating of surface wind, visibility, runway, visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure.

(8) 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.

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

(10) 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.

(11) 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.

19. An agreement between the meteorological services provider and the appropriate traffic ATS provider 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/instruments by air traffic services personnel;

(d) as and where necessary, supplementary visual observations including meteorological phenomena of operational significance in the climb-out and approach areas 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 including on wind shear; and

(f) any meteorological information obtained from ground weather radar; and

(g) any meteorological information provided for use by aeronautical information service unit.

20. (1) Routine observations shall be made at aerodromes throughout the 24 hours each day, except as otherwise agreed between the meteorological service provider, the appropriate ATS provider 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) Routine observations at other aeronautical meteorological stations shall be made as determined by the meteorological 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) METAR shall be issued prior to the aerodrome resuming operations at aerodromes that are not operational throughout 24 hours in accordance with regional air navigation agreement.

21. (1) A list of criteria for special observations shall be established by the reports meteorological service provider, in consultation with the appropriate ATS provider, 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 intended for flight planning, VOLMET broadcasts and D-VOLMET unless METAR are issued at half-hourly intervals.

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

22. (1) Local routine, special reports, 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 sub-regulations (1) above, local routine and special reports and METAR and SPECI shall contain supplementary information to be placed after element referred to under sub-regulation (1) (k).

23. (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 and arriving aircraft, the surface wind observations for these reports shall be representative of conditions along the runway for departing aircraft and the touchdown zone for arriving aircraft.

(3) The surface wind observations for METAR and SPECI, 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 as defined in Part 1 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) The visibility observations for METAR and SPECI shall be representative of the aerodrome.

(7) Runway visual range as defined in regulation shall be assessed on all runways intended for Category II and III instrument approach and landing operations.

(8) Runway visual range shall be assessed on all runways intended for use during periods of reduced visibility, including—

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

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

(9) The runway visual range referred to under paragraphs (a) and (b), shall be reported in metres throughout periods when either the visibility or the runway visual range is less than 1 500 m.

(10) Runway visual range assessments shall be representative of—

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

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

(11) 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.

(12) The present weather occurring at the aerodrome shall be observed and reported as necessary for at least a minimum of rain, drizzle, (including intensity thereof), haze, mist, fog, and thunderstorms (including thunderstorms in the vicinity).

(13) The present weather information for local routine and special reports shall be representative of conditions at the aerodrome.

(14) The present weather information for METAR and SPECI shall be representative of conditions at the aerodrome and, for certain specified present weather phenomena, in its vicinity.

(15) Cloud amount, cloud type and height of cloud base shall be observed and reported as necessary to describe the clouds of operational significance.

(16) When the sky is obscured, vertical visibility shall be observed and reported, where measured, in lieu of cloud amount, cloud type and height of cloud base and the height of cloud base and vertical visibility shall be reported in metres (or feet).

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

(18) Cloud observations for METAR and SPECI shall be representative of the aerodrome and its vicinity.

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

(20) 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 or runway complex.

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

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

24. (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.”

25. (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 and time of message;
(d) location of volcano and name if known;
(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; and
(f) contingency plan on the volcanic activity.

PART VII — AIRCRAFT OBSERVATIONS AND REPORTS

26. (1) The Authority shall ensure that arrangements for observations to be made by aircraft of its registry operating on international air routes and for the recording and reporting of these observations are made in accordance with the provisions of these Regulations.

(2) The aircraft observations and reports referred to sub regulation (1) above shall be made by aircraft and reported in accordance with the technical specification and detailed criteria set out in the Fifth Schedule.

27. The following aircraft observations shall be made—

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

28. (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 designation during the climb-out phase for the first 10 minutes of the flight.
(2) Routine observations shall be made from helicopters at points and times as agreed between the meteorological service providers and the helicopter operators concerned for helicopter operations to and from aerodromes on offshore structures.

(3) Where there are air routes with high-density air traffic including organized tracks exist, 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 sub-regulation (1),

Provided that the designation procedures under this sub-regulation are subject to regional air navigation agreement.

(4) Where a report is required during the climb-out phase, an aircraft shall be designated, at approximately hourly intervals, at each aerodrome to make routine observations in accordance with sub-regulation (1).

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

30. 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 duststorm or heavy sandstorm;
(g) volcanic ash cloud; and
(h) Pre-eruption volcanic activity or a volcanic eruption.

31. When other meteorological conditions not listed under regulation 30, including wind shear, are encountered and which, in the opinion of the pilot-in-command, may affect the safety or markedly affect the efficiency of other aircraft operations, the pilot-in-command shall advise the appropriate air traffic services unit as soon as practicable.

32. (1) Aircraft observations shall be reported as air-reports during flight at the time the observation is made or as soon thereafter as is practicable.

(2) Aircraft observations referred to in sub-regulation (1) above shall be reported by air-ground data link but where not available or appropriate, special and other non-routine aircraft observations during flight shall be reported by voice communications.

33. The meteorological services provider shall make arrangements with the appropriate ATS provider 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, World Area Forecasting Centres (WAFCs) and the centres designated by regional air navigation agreement for the operation of aeronautical fixed service internet-based services.

34. (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 form shall be included with the flight documentation provided to flights operating on routes which, in the opinion of the service provider, could be affected by volcanic ash clouds.

PART VIII—FORECASTS

35. (1) The meteorological service provider shall issue meteorological forecast in accordance with the technical specification and detailed criteria set in Sixth Schedule.

(2) 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.

(3) 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.

36. (1) An aerodrome forecast shall be prepared, on the basis of regional air navigation agreement, by the aerodrome meteorological office designated by the meteorological service provider.

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

(3) Aerodrome forecasts and amendments thereto shall be issued as Terminal Aerodrome Forecast (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.

(4) Notwithstanding the provisions in sub-regulation (2) above, optional elements shall be included in TAF in accordance with regional air navigation agreement.

(5) Aerodrome meteorological offices preparing TAF shall continuously review the forecasts and, when necessary, issue amendments promptly and the length of the forecast messages and the number of changes indicated in the forecast shall be kept to a minimum.

(6) Where TAF cannot be kept under continuous review shall be cancelled. The period of validity of a routine TAF shall be not less than 6 hours nor more than 30 hours; and shall be determined by regional air navigation agreement.

(7) Routine 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.

(8) Aerodrome meteorological offices shall ensure that not more than one TAF is valid at an aerodrome at any given time, when issuing TAF.

37. (1) A landing forecast shall be prepared by the aerodrome meteorological office designated by the service provider as determined by regional air navigation agreement to meet the requirements of local users and of aircraft within about one hour’s flying time from the aerodrome.

(2) Landing forecasts referred to under sub-regulation (1) shall be prepared in the form of a trend forecast and shall consist of a concise statement of the expected significant changes in the meteorological conditions at that aerodrome to be appended to a local routine or local special report, or a METAR or SPECI.

(3) 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.

38. (1) A forecast for take-off shall—

(a) be prepared by the aerodrome meteorological office designated by the meteorological service provider if required by agreement between the service provider and operators;

(b) refer to a specified period of time and contain information on expected conditions over the runway complex in regard to
surface wind direction, wind speed and any variations thereof, temperature, pressure (QNH), and any other elements as agreed locally;

(c) be supplied to operators and flight crew members on request within the 3 hours before the expected time of departure; and

(d) be continuously reviewed and, when necessary, amendments issued promptly by the aerodrome meteorological office.

39. (1) When the density of traffic, operating below flight level 100 or up to flight level for low-level 150 in mountainous areas, or higher, where necessary warrants the routine issue and flights 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 meteorological service provider in consultation with the users.

(2) When abbreviated plain language is used, the forecast shall be prepared as a GAMET area forecast, employing approved ICAO abbreviations and numerical values; when chart form is used, the forecast shall be prepared as a combination of forecasts of upper wind and upper-air temperature, and of SIGWX phenomena.

PART IX — SIGMET INFORMATION, AERODROME WARNINGS AND WIND SHEAR WARNINGS AND ALERT

40. (1) The meteorological service provider shall issue SIGMET information, aerodrome warnings and wind shear warnings and alerts in accordance with the technical specification and detailed criteria set out in the Seventh Schedule.

(2) SIGMET information shall be—

(a) issued by a meteorological watch office and 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 referred to in sub-regulation (2)(a) above are no longer occurring or are no longer expected to occur in the area.

(3) The period of validity of a SIGMET message shall be not more than 4 hours and in the special case of SIGMET messages for volcanic ash cloud or tropical cyclones, the period of validity shall be extended up to 6 hours.

(4) SIGMET messages concerning volcanic ash cloud or tropical cyclones shall be based on advisory information provided by Volcanic Ash Advisory Centres (VAACs) and Tropical Cyclone Advisory Centres (TCACs), respectively, designated by regional air navigation agreement.

(5) 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.

(6) SIGMET messages shall be issued not more than 4 hours before the commencement of the period of validity and in the special case 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.

Provided that SIGMET messages for volcanic ash or tropical cyclones shall be updated at least every 6 hours.

41. (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 referred to in sub-regulation (1) above shall be cancelled when the conditions are no longer occurring and/or no longer expected to occur at the aerodrome.

42. (1) Wind shear warnings shall be prepared by the aerodrome meteorological office designated by the meteorological service provider 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 referred to in subregulation (4) above shall be defined locally for each aerodrome, as agreed between the meteorological service provider, the appropriate ATS provider 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 generated by automated ground based sensors shall be updated at least every minute and be cancelled as soon as the headwind or tailwind change falls below 7.5 m/s (15 kt).

PART X—AERONAUTICAL CLIMATOLOGICAL INFORMATION

43. (1) The meteorological service provider shall issue aeronautical climatological information in accordance with the technical specification and detailed criteria set out in the Eighth Schedule.

(2) Aeronautical climatological information required for the planning of flight operations shall be prepared in the form of aerodrome climatological tables and aerodrome climatological summaries and such information shall be supplied to aeronautical users as agreed between the service provider and those users.

(3) Where it is impracticable to meet the requirements for aeronautical climatological information on a national basis, the collection, processing and storage of observational data may be effected through computer facilities available for international use, and the responsibility for the preparation of the required aeronautical climatological information may be delegated as agreed between the meteorological service providers.

(4) Aeronautical climatological information shall be based on observations made over a period of at least five years and the period shall be indicated in the information supplied.

(5) 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.

44. The meteorological service provider 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 Flight Information Region (FIR); 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.

45. (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 computer facilities referred to in sub-regulation (2) 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.
46. The meteorological service provider, on request and to the extent practicable, shall make available to any other meteorological service provider, operators and others concerned with the application of meteorology to international air navigation, copies of meteorological observational data required for research, investigation or operational analysis.

PART XI—SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

47. (1) The meteorological service provider shall provide service to operators and flight provisions crew members in accordance with the technical specification and detailed criteria set out in the Ninth Schedule.

(2) Meteorological information required under these regulations 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.

(3) Meteorological information supplied to operators and flight crew members shall cover the flight in respect of time, altitude and geographical extent.

(4) The information referred to under sub-regulation (3) 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, en-route and destination alternate aerodromes;
(c) TAF or amended TAF for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;

(d) forecasts for take-off;

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

(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, 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 sub-regulation (5)(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) Modifications shall not be made to meteorological content of forecasts when they are identified as being originated by the WAFCs.

(8) Charts generated from the digital forecasts provided by the WAFCs shall be made available, as required by operators, for fixed areas of coverage as provided for in the Ninth Schedule.

(9) When forecasts of upper wind and upper-air temperature in regulation 47 (5) (a) are supplied in chart form, they shall be fixed time prognostic charts for flight levels in as provided for in the Fourth Schedule, 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 provided in the Fourth and Sixth Schedules.

(10) The forecasts of upper wind, 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. Other meteorological information requested for pre-flight planning and in-flight re-planning by the operator shall be supplied as soon as is practicable.

(11) The meteorological service provider for operators and flight crew members shall initiate coordinating action with the meteorological service provider of other States with a view to obtaining from them the reports or forecasts required, when necessary.

(12) Meteorological information shall be supplied to operators and flight crew members at the location to be determined by the
meteorological service provider, after consultation with the operators and at the time to be agreed upon between the aerodrome meteorological office and the operator concerned.

(13) The service for preflight planning shall be confined to flights originating within Kenya.

(14) The meteorological service provider and the operator concerned shall agree upon the supply of meteorological information at an aerodrome without an aerodrome meteorological office.

48. (1) The meteorological service provider shall provide, on request, briefing or consultation to flight crew members or other flight operations personnel.

(2) The briefing or consultation referred to in sub-regulation (1) 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 meteorological 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 listed in regulation 47 (5).

(4) If the aerodrome meteorological office expresses an opinion on the development of the meteorological conditions at an aerodrome which differs appreciably from the aerodrome forecast included in the flight documentation, the aerodrome meteorological office shall inform the flight crew members of the divergence: Provided 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.

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

(6) At an aerodrome where the services referred to in sub-regulation (6) are not available, arrangements to meet the requirements of flight crew members shall be as agreed upon between the meteorological service provider and the operator concerned.

(7) 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.

(8) 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.

(9) 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.

49. (1) The aerodrome meteorological office shall provide flight documentation which shall 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 air-reports 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 low-level flights in chart form prepared relevant to the whole route; (2) When agreed between the service provider and operator concerned, 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 regulation 47 (5) (b), (c), (d), (e), (f) and, if appropriate, (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 meteorological 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 and this information shall be made available, on request, for inquiries or investigations and, for these purposes, shall be retained until the inquiry or investigation is completed.

50. (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 regulations 47, 48 and 49.
(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 or AIS provider.

(3) Where automated pre-flight information systems are used to provide for a harmonized, common point of access to meteorological information and aeronautical information services information by operators, flight crew members and other aeronautical personnel concerned, the meteorological service provider and AIS provider shall remain responsible for the quality control and management.

51. (1) Meteorological information for use by aircraft in flight shall be supplied by an aerodrome meteorological office or meteorological watch office to its associated air traffic services unit and through D-VOLMET or VOLMET broadcasts as determined by regional air navigation agreement.

(2) Meteorological information referred to in sub-regulation (1) above for planning by the operator for aircraft in flight shall be supplied on request, as agreed between the service provider and the operator concerned.

(3) Meteorological information for use by aircraft in flight shall be supplied to air traffic services units in accordance with the Part XII of these Regulations.

(4) Meteorological information shall be supplied through D-VOLMET or VOLMET broadcasts in accordance with the requirements in Part XIII of these Regulations.

PART XII— INFORMATION FOR AIR TRAFFIC SERVICES, SEARCH AND RESCUE SERVICES AND AERONAUTICAL INFORMATION SERVICES

52. (1) The meteorological service provider shall provide information for air traffic services, search and rescue services and aeronautical information services in accordance with the technical specification and detailed criteria set out in the Tenth Schedule.

(2) The meteorological service provider shall designate an aerodrome meteorological office or meteorological watch office to be associated with each air traffic services unit.

(3) 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.

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

(5) A meteorological watch office shall be associated with a flight information centre or an area control centre for the provision of meteorological information.
(6) 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 service provider in consultation with the appropriate ATS provider.

(7) Any meteorological information requested by an air traffic services unit in connection with an aircraft emergency shall be provided immediately.

53. (1) Aerodrome meteorological offices or meteorological watch offices designated by the meteorological service provider in accordance with regional air navigation agreement shall supply search and rescue services units with the meteorological information required in a form established by mutual agreement.

(2) For the purpose of sub-regulation (1), the designated aerodrome meteorological office or meteorological watch office shall maintain liaison with the search and rescue services unit throughout a search and rescue operation.

54. The meteorological service provider, in coordination with the Authority, shall arrange for the supply of up-to-date meteorological information to aeronautical information services unit, as necessary, for the conduct of its functions.

PART XIII—REQUIREMENTS FOR AND USE OF COMMUNICATIONS

55. (1) The meteorological service provider shall provide and use communication services in accordance with the technical specification and detailed criteria set out in the Eleventh Schedule.

(2) The Authority shall ensure suitable telecommunications facilities are 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;

(c) world area forecast centres to supply the required world area forecast system products to aerodrome meteorological offices, meteorological service providers and other users;
(d) telecommunications facilities between aerodrome meteorological offices and, as necessary, aeronautical meteorological stations and aerodrome control towers or approach control units shall permit communications by direct speech, the speed with which the communications can be established being such that the required points may normally be contacted within approximately 15 seconds; and

(e) telecommunications facilities between aerodrome meteorological offices 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) The telecommunications facilities referred to in subregulations (3) shall be supplemented, as and when necessary, by other forms of visual or audio communications, for example, closed-circuit television or separate information processing systems.

(4) Where agreed between the meteorological 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.

(5) The meteorological service provider shall ensure that suitable telecommunications facilities shall be made available to permit meteorological offices to exchange operational meteorological information with other meteorological offices.

(6) 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, bilateral or multilateral or regional air navigation agreements.

56. (1) The Authority shall ensure that 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.

(2) The Authority shall ensure that the Meteorological and ATS service providers maintain coordination in regard to the installation, maintenance and use of the aeronautical fixed services.

57. The meteorological service provider shall ensure that world area forecast system products in digital form are received using binary
58. The meteorological and ATS service providers and aircraft operators shall ensure that the content and format of meteorological information transmitted to aircraft and by aircraft shall be consistent with the provisions of these Regulations.

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

60. (1) Where, continuous VOLMET broadcasts are required, normally on very high frequencies (VHF), they shall contain current METAR and SPECI, together with trend forecasts where available.

(2) Notwithstanding the provisions of sub-regulation (1) above, 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 XIV—EXEMPTIONS

61. (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 exemptions from any of these regulations shall make an application to the Authority at least sixty days prior to the proposed effective date of commencement of the exemption, 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;

(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 the International Civil Aviation Organization (ICAO); and

(k) 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 sub regulation (2) and satisfactory reason for deeming the application an emergency.

(4) The Authority may in writing, refuse an application made under sub regulation (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 a fee prescribed by the Authority.

62. (1) The Authority shall review the application for exemption 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) the Kenya Gazette; or
(b) aeronautical information circular; or
(c) a daily newspaper with a wide 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 sub regulation (3).

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

63. (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, the decision to grant or deny the request and publish a detailed summary of its evaluation and decision.

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

(4) If the exemption affects a significant population of the aviation community, the Authority shall publish the summary in aeronautical information circular.

PART XV—GENERAL PROVISIONS

64. (1) Any person who performs any function prescribed by these Regulations directly or by contract under the provisions of these Regulations may be tested for drug or alcohol usage.

(2) A person who—
   (a) refuses to submit to a test to indicate the percentage by weight of alcohol in the blood; or
   (b) refuses to submit to a test to indicate the presence of narcotic drugs, marijuana, or depressant or stimulant drugs or substances in the body, when 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.

65. (1) A holder of a certificate issued under these Regulations may apply to the Authority for—
   (a) replacement of the certificate if lost or destroyed;
   (b) change of name on the certificate; or
   (c) an endorsement on the certificate.

(2) when applying under paragraph (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 originals specified under paragraph (2) and, where necessary, retain copies thereof.

66. (1) A holder of a certificate issued under these Regulations shall notify the Authority of the 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 sub-regulation (1) shall not exercise the privileges of the certificate.

67. A person may apply to the Authority in the prescribed form for replacement of documents issued under these Regulations if such documents are lost or destroyed.

68. (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; or

(b) forge or alter any certificate or exemption issued or required by or under these Regulations; or

(c) lend any certificate or exemption issued or required by or under these Regulations to any other person; or

(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 willfully 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 or exemption under these Regulations unless he is authorised to do so by the Authority.

(4) A person shall not issue any certificate referred to in sub-regulation (3) unless he has satisfied himself that all statements in the certificate are correct, and that the applicant is qualified to hold that certificate.

69. (1) Any 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.

70. Any person who fails to comply with any direction given to him by the Authority or by any authorized person under any provision of these Regulations shall be deemed for the purposes of these Regulations to have contravened that provision.

71. (1) The Authority shall notify in writing 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) Upon an application being made in connection with which any fee is chargeable in accordance with the provisions of sub-regulation (1), the applicant shall be required, before the application is accepted, to pay the fee so chargeable.

(3) If, after that payment has been made, the application is withdrawn by the applicant or otherwise ceases to have effect or is refused, the Authority shall not refund the payment made.

PART XVI — MISCELLANEOUS PROVISIONS

72. The Authority may cancel or suspend the certificate of a person who contravenes any provision of these Regulations.

73. A person who is aggrieved with the decision of the Authority under these regulations may within twenty one days appeal to the tribunal.

74. (1) Any person who contravenes any provision of these Regulations shall upon conviction be liable to a fine not exceeding one million Kenya shillings or to imprisonment for a term not more than six months or to both.

(2) If 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.

75. (1) A licence, certificate, permit or authorization issued or granted by the Authority before the commencement of these Regulations shall remain operational until it expires or is revoked, annulled or replaced.

(2) Notwithstanding any other provision of these Regulations, a person who at the commencement of these Regulations, is carrying out any acts, duties or operations affected by these Regulations shall, within one (1) year from the date of commencement, or within such longer time that the Cabinet Secretary may, by notice in the Gazette prescribe, comply with the requirements of these Regulations or cease to carry out such acts, duties or operations.
Element to be observed operationally desirable accuracy of measurement or observation*  

<table>
<thead>
<tr>
<th>Element to be observed</th>
<th>Direction: ± 10°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean surface wind</td>
<td>Speed: ± 0.5 m/s (1 kt) up to 5 m/s (10 kt)</td>
</tr>
<tr>
<td></td>
<td>± 10% above 5 m/s (10 kt)</td>
</tr>
<tr>
<td>Variations from the mean surface wind</td>
<td>± 1 m/s (2 kt), in terms of longitudinal</td>
</tr>
<tr>
<td></td>
<td>and lateral components</td>
</tr>
<tr>
<td>Visibility</td>
<td>± 50 m up to 600 m</td>
</tr>
<tr>
<td></td>
<td>± 10% between 600 m and 1 500 m</td>
</tr>
<tr>
<td></td>
<td>± 20% above 1 500 m</td>
</tr>
<tr>
<td>Runway visual range</td>
<td>± 10 m up to 400 m</td>
</tr>
<tr>
<td></td>
<td>± 25 m between 400 m and 800 m</td>
</tr>
<tr>
<td></td>
<td>± 10% above 800 m</td>
</tr>
<tr>
<td>Cloud amount</td>
<td>± 1 okta</td>
</tr>
<tr>
<td>Cloud height</td>
<td>± 10 m (33 ft) up to 100 m (330 ft)</td>
</tr>
<tr>
<td></td>
<td>± 10% above 100 m (330 ft)</td>
</tr>
<tr>
<td>Air temperature and dew-point temperature</td>
<td>± 1°C</td>
</tr>
<tr>
<td>Pressure value (QNH, QFE)</td>
<td>± 0.5 hPa</td>
</tr>
</tbody>
</table>

* The operationally desirable accuracy is not intended as an operational requirement; it is to be understood as a goal that has been expressed by the operators.

Note.— Guidance on the uncertainties of measurement or observation can be found in the Guide to Meteorological Instruments and Methods of Observation (WMO-No. 8).
SECOND SCHEDULE:  
OPERATIONALLY DESIRABLE ACCURACY OF FORECASTS

Regulation 12(10) (b)

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.

<table>
<thead>
<tr>
<th>Operationally desirable Element to be forecast accuracy of forecasts</th>
<th>Minimum percentage of cases within range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind direction</td>
<td>± 20°</td>
</tr>
<tr>
<td>Wind speed</td>
<td>± 2.5 m/s (5 kt)</td>
</tr>
<tr>
<td>Visibility</td>
<td>± 200 m up to 800 m</td>
</tr>
<tr>
<td></td>
<td>± 30% between 800 m and 10 km</td>
</tr>
<tr>
<td>Precipitation</td>
<td>Occurrence or non-occurrence</td>
</tr>
<tr>
<td>Cloud amount</td>
<td>One category below 450 m (1 500 ft)</td>
</tr>
<tr>
<td></td>
<td>Occurrence or non-occurrence of BKN or OVC between 450 m (1 500 ft) and 3 000 m (10 000 ft)</td>
</tr>
<tr>
<td>Cloud height</td>
<td>± 30 m (100 ft) up to 300 m (1 000 ft)</td>
</tr>
<tr>
<td></td>
<td>± 30% between 300 m (1 000 ft) and 3 000 m (10 000 ft)</td>
</tr>
<tr>
<td>Air temperature</td>
<td>± 1°C</td>
</tr>
</tbody>
</table>

TREND FORECAST

| Wind direction            | ± 20°                                   | 90% of cases                             |
| Wind speed                | ± 2.5 m/s (5 kt)                        | 90% of cases                             |
Visibility
± 200 m up to 800 m
± 30% between 800 m and 10 km

Precipitation
Occurrence or non-occurrence
90% of cases

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

Cloud amount
One category below 450 m (1 500 ft)
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
± 30 m (100 ft) up to 300 m (1 000 ft)
± 30% between 300 m (1 000 ft) and 3 000 m (10 000 ft)
90% of cases

FORECAST FOR TAKE-OFF

Wind direction
± 20°
90% of cases

Wind speed
± 2.5 m/s (5 kt) up to 12.5 m/s (25 kt)
90% of cases

Air temperature
± 1°C
90% of cases

Pressure value (QNH)
± 1 hPa 90% of cases

AREA, FLIGHT AND ROUTE FORECASTS

Upper-air temperature
± 2°C (Mean for 900 km (500 NM)) 90% of cases

Relative humidity
± 20% 90% of cases

Upper wind
± 5 m/s (10 kt) 90% of cases
(Modulus of vector difference for 900 km (500 NM))

Significant en-route
Occurrence or non-occurrence
80% of cases weather phenomena and cloud
Location: ± 100 km (60 NM) 70% of cases
Vertical extent: ± 300 m (1 000 ft)
70% of cases

Flight level of tropopause: ± 300 m (1 000 ft)
80% of cases

Max wind level: ± 300 m (1 000 ft)
80% of cases
THIRD SCHEDULE

TECHNICAL SPECIFICATIONS RELATED TO WORLD AREA FORECAST SYSTEM AND METEOROLOGICAL OFFICES

Regulation 14(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

1.2.1 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 1.2, 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 1.2, 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 (34 kt);

(b) severe squall lines;

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

(d) moderate or severe icing;

(e) widespread sandstorm/duststorm;

(f) cumulonimbus clouds associated with thunderstorms and with a) to e);
Note. — Non-convective cloud areas associated with in-cloud moderate or severe turbulence and/or moderate or severe icing are to be included in the SIGWX forecasts.

(g) flight level of tropopause;

(h) jet streams;

(i) information on the location of volcanic eruptions that are producing ash clouds of significance to aircraft operations, comprising: volcanic eruption symbol at the location of the volcano and, in a separate text box on the chart, the volcanic eruption symbol, the name of the volcano (if known) and the latitude/longitude of the eruption. In addition, the legend of SIGWX charts should indicate “CHECK SIGMET, ADVISORIES FOR TC AND VA, AND ASHTAM AND NOTAM FOR VA”; 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 RDOACT CLD”.

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

Note 2.— Items to be included in low-level SIGWX forecasts (i.e. flight levels below 100) are included in 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 an arrow shall be used to link the location of the other item(s) to its associated symbol or text box.

2. AERODROME METEOROLOGICAL OFFICES (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 Regulations, and the meteorological content and identification of the originator of the WAFS forecasts shall not be amended.

2.2 Notification of WAFC concerning significant discrepancies

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

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

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

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

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

3. KENYA VOLCANO OBSERVATORIES (PART II)

4.1 Information from Kenya 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 should comprise:

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

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

(c) for volcanic eruption cessation: the date/time (UTC) of report and time of eruption cessation (UTC); name and, if known, number of the volcano; and location (latitude/longitude).
Note 1.— Pre-eruption volcanic activity in this context means unusual and/or increasing volcanic activity which could presage a volcanic eruption.

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

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

<table>
<thead>
<tr>
<th>Key:</th>
<th>M = inclusion mandatory, part of every message;</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>inclusion optional;</td>
</tr>
<tr>
<td></td>
<td>= = a double line indicates that the text following it should be placed on the subsequent line</td>
</tr>
</tbody>
</table>

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.
<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identification of the type of message</td>
<td>VA ADVISORY</td>
<td>VA ADVISORY</td>
</tr>
<tr>
<td>2</td>
<td>Time of origin (M)</td>
<td>DTG: mmmmmnn/mmmZ</td>
<td>DTG: 20080923/0130Z</td>
</tr>
<tr>
<td>3</td>
<td>Name of VAAC (M)</td>
<td>VAAC: mmmmmnnnn</td>
<td>VAAC: TOKYO</td>
</tr>
<tr>
<td>4</td>
<td>Name of volcano (M)</td>
<td>VOLCANO: [mmmmnnnnnnnnnnnnnnnnnnn]</td>
<td>VOLCANO: KARYMSKY 1000-13 VOLCANO:</td>
</tr>
<tr>
<td>5</td>
<td>Location of volcano (M)</td>
<td>PSN: Nnnn or Snnn Wnnn or Ennnn or UNKNOWN</td>
<td>PSN N5403 E15927</td>
</tr>
<tr>
<td>6</td>
<td>State or region (M)</td>
<td>AREA: mmmmmnnnnnnnnnnnnnn</td>
<td>PSN UNKNOWN AREA:</td>
</tr>
<tr>
<td>7</td>
<td>Summit elevation</td>
<td>SUMMIT ELEV: mmmM (or mmmFT)</td>
<td>SUMMIT ELEV: 1536M</td>
</tr>
<tr>
<td>8</td>
<td>Advisory number (M)</td>
<td>ADVISORY NR: mmmnbr</td>
<td>ADVISORY NR: 2008/4</td>
</tr>
<tr>
<td>9</td>
<td>Information source code (O)</td>
<td>INFO SOURCE: Free text up to 32 characters</td>
<td>INFO SOURCE: MTSAT-1R KVERT</td>
</tr>
<tr>
<td>10</td>
<td>Free text Aviation colour code</td>
<td>AVIATION COLOUR RED or ORANGE or YELLOW CODE: or GREEN or UNKNOWN or RED COLOUR</td>
<td>KEMSD AVIATION COLOUR</td>
</tr>
</tbody>
</table>
### NOT GIVEN CODE:

<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 Eruption details (M)</td>
<td>Eruption details (including date/time of eruption)</td>
<td>ERUPTION DETAILS: Free text up to 64 characters or UNKNOWN</td>
<td>ERUPTION AT 20080923/0000Z DETAIL FL300</td>
</tr>
<tr>
<td>12 Time of observation (estimation) of or ash (M)</td>
<td>Day and time (in minutes) of eruption</td>
<td>OBS (or EST) VA nn/nnnnZ</td>
<td>S: REPORTED OBS VA 23/0100Z</td>
</tr>
<tr>
<td>13 Observed estimated ash cloud (M)</td>
<td>Horizontal (in km and minutes) and vertical extent at time of observation of the observed or estimated ash cloud if the base is unknown, the top of the observed or estimated ash cloud; Movement of the observed or estimated ash cloud.</td>
<td>OBS VATOP FLnnn or EST VAFLnnn/nnn (or SFC/FLnnn or OBS VAFLnnn/nnn)</td>
<td>OBS VA FL250/300 N5400 E15930 – N5400 E16100 – N5300 E15945 – N5130 E16130 – N5130 E16230 – N5230 E16230 – N5230 E16130 – MOV SE 20KT SFC/FL200 MOV SE 15KT VA NOT FM SATELLITE DATAWIND FL050/070 180/12MPS</td>
</tr>
<tr>
<td>14 Forecast and position of the ash clouds (estimation) of or given in Item 12</td>
<td>Day and time (in 6 hours from the estimation of or given in Item 12)</td>
<td>FCST VA CLDnn/nnnnZ or MOV NW W40 KMH</td>
<td>FCST VA 23/0700Z N5130 E16030 – N5130 E16230 – N5330 E16230 – N5330 E16030 – MOV S SFC/FL180 MOV E N4830 E16330 –</td>
</tr>
<tr>
<td>Element</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>Remarks (M)</td>
<td>Remarks, as necessary</td>
<td>RMK:</td>
<td>RMK: LATEST REP</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------</td>
<td>------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
<td>FM KVERT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
<td>(0120Z) INDICATES</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
<td>ERUPTION HAS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
<td>CEASED.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
<td>TWO DISPERING</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
<td>VA CLD ARE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
<td>EVIDENT ON</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
<td>SATELLITE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Next advisory (M)</th>
<th>Year, month, day and time in UTC</th>
<th>NXT ADVISORY or</th>
<th>NXT ADVISORY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>or NO LATER</td>
<td>NO LATER</td>
</tr>
<tr>
<td></td>
<td></td>
<td>THAN</td>
<td>THAN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>nnnnnnnnnnnZ</td>
<td>nnnnnnnnnnnZ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
<td>or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NO FURTHER ADVISORIES</td>
<td>NO FURTHER ADVISORIES</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or</td>
<td>or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WILL BE ISSUED BY</td>
<td>WILL BE ISSUED BY</td>
</tr>
</tbody>
</table>

Notes.—

1. International Association of Volcanology and Chemistry of the Earth’s Interior (IAVCEI).
2. A straight line between two points drawn on a map in the Mercator projection or a straight line between two points which crosses lines of longitude at a constant angle.

3. Up to 4 selected layers.

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

Example A2-1.

Advisory message for volcanic ash
Table A2-2. Template for advisory message for tropical cyclones

Key: = = 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.— All the elements are mandatory.

Note 4.— Inclusion of a “colon” after each element heading is mandatory.

Note 5.— The numbers 1 to 19 are included only for clarity and they are not part of the advisory message, as shown in the example.

<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identification of the type of message</td>
<td>TC ADVISORY</td>
<td>TC ADVISORY</td>
</tr>
<tr>
<td>2</td>
<td>Time of origin</td>
<td>Year, month, day and time in DTG: nnnnnn/nnnnZ</td>
<td>DTG: 20040925/1600Z</td>
</tr>
<tr>
<td>3</td>
<td>Name of TCAC</td>
<td>Name of TCAC (location)</td>
<td>TCAC: nnnn or nnnnnnnn</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TCAC: MIAMI</td>
</tr>
<tr>
<td>4</td>
<td>Name of tropical cyclone</td>
<td>Name of tropical cyclone or “NN” for unnamed</td>
<td>TC: nnnnnnnnnn or NN</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TC: GLORIA</td>
</tr>
<tr>
<td>5</td>
<td>Advisory number</td>
<td>Advisory number (starting with NR: nn</td>
<td>NR: 01</td>
</tr>
<tr>
<td>Element</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>7</td>
<td>Direction and speed of movement</td>
<td>MOV: N nnKMH (or KT) or NNE nnKMH (or KT) or NE nnKMH (or KT) or ENE nnKMH (or KT) or E nnKMH (or KT) or ESE nnKMH (or KT) or SE nnKMH (or KT) or SSE nnKMH (or KT) or S nnKMH (or KT) or SSW nnKMH (or KT) or SW nnKMH (or KT) or W nnKMH (or KT) or</td>
<td>MOV: NW 20KMH</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Central pressure</td>
<td>C: nnnHPA</td>
<td>C: 965HPA</td>
</tr>
<tr>
<td>9</td>
<td>Maximum surface wind</td>
<td>MAX WIND: nn[n]MPS (or nn[n]KT)</td>
<td>MAX WIND: 22MPS</td>
</tr>
<tr>
<td>10</td>
<td>Forecast of position (+6 HR)</td>
<td>FCST PSN +6 nn/nnnZ or Nnn[n] or Snn[n] or Wnn[n] or Ennn[n]</td>
<td>FCST PSN +6 25/2200Z 25/2200Z</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N2748 or W07350</td>
</tr>
<tr>
<td>11</td>
<td>Forecast of maximum surface wind (6 hours +6 HR)</td>
<td>FCST nn[n]MPS (or nn[n]KT) MAX WIND +6</td>
<td>FCST 22MPS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HR: HR:</td>
</tr>
<tr>
<td>Element</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>12 Forecast of position (+12 HR)</td>
<td>Day and time (in 12 hours from the “DTG” given in Item 2); Forecast degrees and the centre of the cyclone</td>
<td>FCST PSN +12 nn/nmnnZ Nnn[nr] Ennn[nn]</td>
<td>FCST PSN +12 26/0400Z N2830 W07430</td>
</tr>
<tr>
<td>13 Forecast of maximum surface wind (+12 HR)</td>
<td>Forecast of maximum surface wind (12 hours after the “DTG”)</td>
<td>FCST MAX nn[n]MPS WIND (or +12 HR: nn[n]KT)</td>
<td>FCST MAX 22MPS</td>
</tr>
<tr>
<td>14 Forecast of position (+18 HR)</td>
<td>Day and time (in 18 hours from “DTG” given in Item 2); Forecast degrees and the centre of the cyclone</td>
<td>FCST PSN +18 nn/nmnnZ Nnn[nr] Ennn[nn]</td>
<td>FCST PSN +18 26/1000Z N2852 W07500</td>
</tr>
<tr>
<td>15 Forecast of maximum surface wind (+18 HR)</td>
<td>Forecast of maximum surface wind (18 hours after the “DTG”)</td>
<td>FCST MAX nn[n]MPS WIND (or +18 HR: nn[n]KT)</td>
<td>FCST MAX 21MPS</td>
</tr>
<tr>
<td>17 Forecast of maximum surface wind (+24 HR)</td>
<td>Forecast of maximum surface wind (24 hours after the “DTG”)</td>
<td>FCST nn[n]MPS MAX (or nn[n]KT) WIND +24 HR:</td>
<td>FCST MAX 20MPS</td>
</tr>
<tr>
<td>18 Remarks</td>
<td>Remarks, as necessary</td>
<td>RMK: Free text up to 256 characters or RMK: NIL</td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>19</td>
<td>Expected time of issuance of next</td>
<td>NXT MSG:</td>
<td>[BFR] nnnnnnnn/nnnnZ or NO MSG EXP</td>
</tr>
<tr>
<td></td>
<td>Expected year, month, day and time (in UTC) of issuance of next</td>
<td>NXT MSG:</td>
<td>20040925/2000Z</td>
</tr>
</tbody>
</table>

**Note.**—
1. Fictitious location.

Example A2-2. Advisory message for tropical cyclones
FOURTH SCHEDULE

TECHNICAL SPECIFICATIONS RELATED TO METEOROLOGICAL OBSERVATIONS AND REPORTS

Regulations 18(2) and 47(9)

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 Table A3-1.

2.1.2 METAR and SPECI shall be issued in accordance with the template shown in Table A3-2 and disseminated in the METAR and SPECI code forms prescribed by 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 digital form in addition to the dissemination of the METAR and SPECI in accordance with 2.1.2.

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

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

2.2 Use of CAVOK

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

(a) visibility, 10 km or more, and the lowest visibility is not reported;

Note 1.— In local routine and special reports, visibility refers to the value(s) to be reported in accordance with 4.2.4.2 and 4.2.4.3; in METAR and SPECI, visibility refers to the value(s) to be reported in accordance with 4.2.4.4.

Note 2.— The lowest visibility is reported in accordance with 4.2.4.4 a).

(b) no cloud of operational significance;

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

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

2.3 Criteria for issuance of local special reports and SPECI

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

(a) those values which most closely correspond with the operating minima of the operators using the aerodrome;

(b) those values which satisfy other local requirements of the air traffic services units and of the operators;

(c) an increase in air temperature of 2°C or more from that given in the latest report, or an alternative threshold value as agreed between the meteorological authority, the appropriate ATS authority and the operators concerned;

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

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

(f) those values which constitute criteria for SPECI.

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

(a) when the mean surface wind direction has changed by 60° or more from that given in the latest report, the mean speed before and/or after the change being 5 m/s (10 kt) or more;

(b) when the mean surface wind speed has changed by 5 m/s (10 kt) or more from that given in the latest report;

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

(d) when the onset, cessation or change in intensity of any of the following weather phenomena occurs:
—freezing precipitation
—moderate or heavy precipitation (including showers thereof)
—thunderstorm (with precipitation);
  (e) when the onset or cessation of any of the following weather phenomena occurs:
—freezing fog
—thunderstorm (without precipitation);
  (f) when the amount of a cloud layer below 450 m (1 500 ft) changes:
    (1) from SCT or less to BKN or OVC; or
    (2) from BKN or OVC to SCT or less.

2.3.3 Where required in accordance with 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 800 m;

(d) when the onset, cessation or change in intensity of any of the following weather phenomena occurs:
—duststorm
—sandstorm
—funnel cloud (tornado or waterspout);
  (e) when the onset or cessation of any of the following weather phenomena occurs:
—low drifting dust, sand or snow
—blowing dust, sand or snow
—squall;

(f) when the height of base of the lowest cloud layer of BKN or OVC extent is lifting and changes to or passes through one or more of the following values, or when the height of base of the lowest cloud layer of BKN or OVC extent is lowering and passes through one or more of the following values:

1. §30, 60, 150 or 300 m (100, 200, 500 or 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 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
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 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 50 m/s (100 kt) or more is reported, it shall be indicated to be more than 49 m/s (99 kt); and

(f) when the 10-minute period includes a marked discontinuity in the wind direction and/or speed, only variations from the mean wind direction and mean wind speed occurring since the discontinuity shall be reported.

Note.—See note under 4.1.3.1.
4.1.5.3 In local routine and special reports:

(a) if the surface wind is observed from more than one location along the runway, the locations for which these values are representative shall be indicated;

(b) when there is more than one runway in use and the surface wind related to these runways is observed, the available wind values for each runway shall be given, and the runways to which the values refer shall be reported;

(c) when variations from the mean wind direction are reported in accordance with 4.1.5.2 b) 2), the two extreme directions between which the surface wind has varied shall be reported; and

(d) when variations from the mean wind speed (gusts) are reported in accordance with 4.1.5.2 c), they shall be reported as the maximum and minimum values of the wind speed attained.

4.1.5.4 In METAR and SPECI, when variations from the mean wind speed (gusts) are reported in accordance with 4.1.5.2C, 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 214, 4.6.2.2, 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 1500 m or 2) less than 50 per cent of the prevailing visibility and less than 5000 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 120 m. The site for observations to be representative of the touchdown zone shall be located about 300 m along the runway from the threshold. The sites for observations to be representative of the mid-point and stop-end of the runway shall be located at a distance of 1000 to 1500 m along the runway from the threshold and at a distance of about 300 m from the other end of the runway. The exact position of these sites and, if necessary, additional sites 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 Doc 9328).

4.3.2.1 Instrumented systems based on transmissometers or forward-scatter meters shall be used to assess runway visual range on runways intended for Category II and III instrument approach and landing operations.

4.3.2.2 Instrumented systems based on transmissometers or forward-scatter meters shall be used to assess runway visual range on runways intended for Category I instrument approach and landing operations.

4.3.3 Display

4.3.3.1 Where runway visual range is determined by instrumented systems, one display or more, if required, shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units shall be related to the same sensors, and where separate sensors are required as specified in 4.3.1.2, the displays shall be clearly marked to identify the runway and section of runway monitored by each sensor.

4.3.3.2 Where runway visual range is determined by human observers, runway visual range 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;
(a) 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

(b) 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 at Attachment D.

4.3.6 Reporting

4.3.6.1 In local routine reports, local special reports, METAR and SPECI, the runway visual range shall be reported in steps of 25 m when the runway visual range is less than 400 m; in steps of 50 m when it is between 400 m and 800 m; and in steps of 100 m when the runway visual range is more than 800 m. Any observed value which does not fit the reporting scale in use shall be rounded down to the nearest lower step in the scale.

4.3.6.2 Fifty metres 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 2 000 m.

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

(a) when runway visual range is above the maximum value that can be determined by the system in use, it shall be reported using the abbreviation “ABV” in local routine and special reports and the abbreviation “P” in METAR and SPECI, followed by the maximum value that can be determined by the system; and

(b) when the runway visual range is below the minimum value that can be determined by the system in use, it shall be reported using the abbreviation “BLW” in local routine and special reports and the abbreviation “M” in METAR and SPECI, followed by the minimum value that can be determined by the system.

4.3.6.4 In local routine and special reports:

(a) the units of measurement used shall be included;

(b) if runway visual range is observed from only one location along the runway, i.e. the touchdown zone, it shall be included without any indication of location;

(c) if the runway visual range is observed from more than one location along the runway, the value representative of the touchdown zone shall be reported first, followed by the values representative of the mid-point and stop-end and the locations for which these values are representative shall be indicated; and

(d) when there is more than one runway in use, the available runway visual range values for each runway shall be reported and the runways to which the values refer shall be indicated.

4.3.6.5 In METAR and SPECI:

(a) only the value representative of the touchdown zone 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 their respective abbreviations and relevant criteria, as appropriate:

(a) Precipitation

**Drizzle** DZ

<table>
<thead>
<tr>
<th>Type</th>
<th>Abbreviation</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain</td>
<td>RA</td>
<td>Reported when diameter of largest hailstones is 5 mm or more.</td>
</tr>
<tr>
<td>Snow</td>
<td>SN</td>
<td></td>
</tr>
<tr>
<td>Snow grains</td>
<td>SG</td>
<td></td>
</tr>
<tr>
<td>Ice pellets</td>
<td>PL</td>
<td></td>
</tr>
<tr>
<td>Hail</td>
<td>GR</td>
<td></td>
</tr>
</tbody>
</table>

(b) Obscurations (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 — Reported when visibility is at least 1 000 m but not more than 5 000 m.

(c) Obscurations (lithometeors)

—The following should be used only when the obscuration consists predominantly of lithometeors and the visibility is 5 000 m or less except “SA” when qualified by “DR” (see 4.4.2.6) and volcanic ash.

Sand 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
Duststorm 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:

<table>
<thead>
<tr>
<th>(local routine and special reports)</th>
<th>(METAR and SPECI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light FBL</td>
<td>—</td>
</tr>
<tr>
<td>Moderate MOD</td>
<td>(no indication)</td>
</tr>
<tr>
<td>Heavy HVY</td>
<td>+</td>
</tr>
</tbody>
</table>

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:

(b) 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;

(c) the indication of intensity or proximity, as appropriate, shall be reported first followed respectively by the characteristics and the type of weather phenomena; and

(d) 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.
4.5.4 Reporting

4.5.4.1 In local routine reports, local special reports, METAR and SPECI, the height of cloud base shall be reported in steps of 30 m (100 ft) up to 3 000 m (10 000 ft).

4.5.4.2 At aerodromes where low-visibility procedures are established for approach and landing, as agreed between the meteorological authority and the appropriate ATS authority, 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 (2 000 ft).

4.5.4.3 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” (8 oktas);

(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 30 m (100 ft) up to 600 m (2 000 ft);

(d) if there are no clouds of operational significance and no restriction on vertical visibility and the abbreviation “CAVOK” is not appropriate, the abbreviation “NSC” 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."

4.5.4.4 Any observed value in 4.5.4.1, 4.5.4.2 and 4.5.4.3 c) which does not fit the reporting scale in use shall be rounded down to the nearest lower step in the scale.

4.5.4.5 In local routine and special reports:

(a) the units of measurement used for the height of cloud base and vertical visibility shall be indicated; and
(b) when there is more than one runway in use and the heights of cloud bases are observed by instruments for these runways, the available heights of cloud bases for each runway shall be reported and the runways to which the values refer shall be indicated.

4.5.4.6 In automated local routine reports, local special reports, METAR and SPECI:

(a) when the cloud type cannot be observed by the automatic observing system, the cloud type in each cloud group 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 dewpoint 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 are displayed for more than one runway, as specified in 4.7.3.2d), 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
—duststorm, 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
—thunderstorm
—moderate or severe turbulence
—wind shear
—hail

CB
TS
MOD TURB, SEV TURB
WS
GR
—severe squall line SEV SQL
—moderate or severe icing MOD ICE, SEV ICE
—freezing precipitation FZDZ, FZRA
—severe mountain waves SEV MTW
—duststorm, sandstorm DS, SS
—blowing snow BLSN
—funnel cloud (tornado or 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 template shown in Table A3-2 when the type of precipitation cannot be identified by the automatic observing system.

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

4.8.1.4 In METAR and SPECI, where local circumstances so warrant, information on wind shear 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

(b) helicopter operations; and

(c) 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 1.1, 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 1.1, Part A — Alphanumeric Codes, Code Tables 0366, 0519, 0919 and 1079.

SELECTED CRITERIA APPLICABLE TO AERODROME REPORTS

Notes.— 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.

1. Layer composed of CB and TCU with a common base should be reported as “CB”.

2. Considered for the past 10 minutes (exception: if the 10-minute period includes a marked discontinuity (i.e. the direction changes ≥ 30° with a speed ≥ 5 m/s or the speed changes ≥ 5 m/s lasting ≥ 2 minutes), only data after the discontinuity to be used).

3. If several directions, the most operationally significant direction used.
4. 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.

5. CB (cumulonimbus) and TCU (towering cumulus = cumulus congestus of great vertical extent) if not already indicated as one of the other layers.

6. Time averaging, for mean values and, if applicable, referring period for extreme values, indicated in the upper left-hand corner.

7. 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 systems should be such that peak gusts should represent a three-second average”. 9. N/A = not applicable.

8. 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 $\geq 2$ m (7 ft) below or above aerodrome elevation, where the reference level should be the relevant threshold elevation.

9. As listed in Appendix 3, 4.8.

10. Also sea-surface temperature, and state of the sea or the significant wave height from offshore structures in accordance with regional air navigation agreement.

11. Report if RVR and/or VIS < 1 500 m, limits for assessments 50 and 2 000 m.

12. For landing at aerodromes with precision approach runways and with the threshold elevation $\geq 15$ 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.

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>inclusion mandatory, part of every message;</td>
</tr>
<tr>
<td>C</td>
<td>inclusion conditional, dependent on meteorological conditions;</td>
</tr>
<tr>
<td>O</td>
<td>inclusion optional.</td>
</tr>
</tbody>
</table>

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).
<table>
<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of the type of report</td>
<td>Type of report</td>
<td>MET REPORT or SPECIAL</td>
<td>MET REPORT</td>
</tr>
<tr>
<td>Location</td>
<td>ICAO location</td>
<td>nnnn</td>
<td>YUDO1</td>
</tr>
<tr>
<td>Time of the observation</td>
<td>Day and actual time of the observation</td>
<td>nnnnnnZ</td>
<td>221630Z</td>
</tr>
<tr>
<td>Identification of an automated report identifier (C)</td>
<td>Automated report identifier (C)</td>
<td>AUTO</td>
<td>AUTO</td>
</tr>
<tr>
<td>Surface wind (M)</td>
<td>Name of the element</td>
<td>WIND</td>
<td>WIND</td>
</tr>
<tr>
<td>Runway (O)2</td>
<td>RWY nn[L] or RWY nn[C]</td>
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<td>WIND 240/4MPS (WIND WIND 240/4KTS)</td>
</tr>
<tr>
<td>Runway section</td>
<td>TDZ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind direction (M)</td>
<td>nnn/</td>
<td>VRB BTN nnn/ AND nnn/</td>
<td>WIND Rwy 18 TDZ 190/6MPS (WIND Rwy 18 TDZ 190/12KTS)</td>
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<tr>
<td>Wind speed (M)</td>
<td>[ABV]nn[n][n]MPS</td>
<td></td>
<td>WIND VRB[1]MPS CALM (WIND VRB2KT)</td>
</tr>
<tr>
<td>Significant speed</td>
<td>MAX[ABV]nn[n]</td>
<td></td>
<td>WIND VRB BTN 350/ AND 050/1MPS (WIND VRB BTN 350/ AND 050/2KTS)</td>
</tr>
<tr>
<td>Significant directional</td>
<td>VRB BTN nnn/ AND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runway section</td>
<td>MID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind direction (O)3</td>
<td>nnn/</td>
<td>VRB BTN nnn/ AND nnn/</td>
<td>WIND 270/ABV49MPS (WIND 270/ABV99KTS)</td>
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<tr>
<td>Wind speed (O)3</td>
<td>[ABV]nn[n][n]MPS</td>
<td></td>
<td>WIND 120/3MPS MAX9 MNM2 (WIND 120/6KTS MAX18 MNM4)</td>
</tr>
<tr>
<td>Significant speed</td>
<td>MAX[ABV]nn[n]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significant directional</td>
<td>VRB BTN nnn/ AND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runway section</td>
<td>END</td>
<td></td>
<td>WIND Rwy 14R MID 140/6MPS (WIND Rwy 110/3MPS)</td>
</tr>
<tr>
<td>Wind direction (O)3</td>
<td>nnn/</td>
<td>VRB BTN nnn/ AND nnn/</td>
<td>WIND 020/5MPS VRB 350/ AND 070/ (WIND 020/11 VRB BTN 350/ AND 070/)</td>
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<td>[ABV]nn[n][n]MPS</td>
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<tr>
<td>Significant directional</td>
<td>VRB BTN nnn/ AND</td>
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<tr>
<td>variations (C)5</td>
<td>nnn/</td>
<td></td>
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<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
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<td>Visibility (M)</td>
<td>Name of the element</td>
<td>VIS</td>
<td>VIS 350M CAVOK</td>
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<td>RWY nn[L] or RWY nn[C] or</td>
<td>VISM 10KM VIS RWY 09 TDZ 800M END</td>
</tr>
<tr>
<td></td>
<td>Runway section</td>
<td>TDZ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visibility (M)</td>
<td>n[n][n][n]M or n[n]KM</td>
<td>VIS RWY 18C TDZ 6KM RWY Q7 TDZ 4000M</td>
</tr>
<tr>
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<td>Runway section</td>
<td>MID</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visibility (O)3</td>
<td>n[n][n][n]M or n[n]KM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Runway section</td>
<td>END</td>
<td></td>
</tr>
<tr>
<td>Runway visual range (C)6</td>
<td>Name of the element</td>
<td>RVR</td>
<td>RVR RWY 32 400M</td>
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<tr>
<td></td>
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<td>RWY nn[L] or RWY nn[C]</td>
<td>RVR RWY 20 1600M</td>
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<td>Runway section</td>
<td>TDZ</td>
<td>RVR RWY 10L BLW 50M</td>
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<td>Runway visual range</td>
<td>ABV or BLW</td>
<td>RVR RWY 14 ABV 2000M</td>
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<tr>
<td></td>
<td>Runway visual range</td>
<td>n[n][n]M</td>
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<td>Runway visual range</td>
<td>ABV or BLW</td>
<td>RVR RWY 12 TDZ 1100M MID ABV</td>
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<td>Runway section</td>
<td>END</td>
<td>RVR RWY 16 TDZ 600M MID 500M</td>
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<td>Runway visual range</td>
<td>ABV or BLW</td>
<td>RVR RWY 26 500M RWY 20 800M</td>
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<tr>
<td>Present weather (C)9, 10</td>
<td>Intensity of present weather (C)9</td>
<td>MOD</td>
<td>MOD RA</td>
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<td></td>
<td>Characteristics and present weather (C)9,11</td>
<td>BL, or MOD</td>
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<td></td>
<td></td>
<td>DZ or RA</td>
<td>FG or BR or MOD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SN or PL or DS</td>
<td>S or Y or RA</td>
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<td>SG or PL or DS</td>
<td>S or Y</td>
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<td>FZDZ or FZUP12 or FZRA or SHGR</td>
<td>S or Y</td>
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<td>SHGS or SHRA or SHSN or SHUPTS</td>
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<td>H or Z</td>
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<td>F or B</td>
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<tr>
<td></td>
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<td>or MIFG</td>
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<tr>
<td></td>
<td></td>
<td>or VA or SQ or BLDU</td>
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<td>or MIFG</td>
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<td></td>
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<td>or DRSN or FZ</td>
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<tr>
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<td></td>
<td>or TSIG</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>or MIFG</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>or HVY</td>
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</tr>
</tbody>
</table>
### Cloud (M)14

- **Name of the element:** CLD
- **Runway (O)2:** RWY nn[L] or RWY nn[C] or
- **Cloud amount (M) or vertical visibility:** W or SCT or B or N or OVC or
- **Cloud type (C)9:** CB or TC or

<table>
<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Height of cloud base</strong> or the value of vertical visibility (C)9</td>
<td>n[n][n] M or n[n][n][n] M</td>
<td>VER VIS or [M][n][n][n] M</td>
<td>CLD // CB 400M (CLD // CB 1200FT)</td>
</tr>
<tr>
<td><strong>Air temperature (M)</strong></td>
<td>[FT]T 12 [FT]</td>
<td>T17</td>
<td>TMS</td>
</tr>
<tr>
<td><strong>Dew-point temperature</strong></td>
<td>[MS]nn</td>
<td>DP15</td>
<td>DPMS</td>
</tr>
<tr>
<td><strong>Pressure values (M)</strong></td>
<td>QNH</td>
<td>QNH 9995H</td>
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<tr>
<td><strong>QNH (M)</strong></td>
<td>nnnHPA</td>
<td>PA</td>
<td></td>
</tr>
<tr>
<td><strong>Name of the element</strong></td>
<td>QFE</td>
<td>QNH 1009HPA</td>
<td></td>
</tr>
<tr>
<td><strong>QFE (O)</strong></td>
<td>[RWY nn[L] or RWY nn[C] or RWY nn[R]] nnnHPA [RWY nn[L] or RWY nn[C] or RWY nn[R]]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Element as specified in</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>Significant meteorological phenomena (C)9</td>
<td>CB or TS or MOD TURB or SEV TURB or WS or GR or SEV SQL or MOD ICE or SEV ICE or</td>
<td>QCNH 1022HPA QFE FC IN APCH</td>
<td></td>
</tr>
<tr>
<td>Location of the phenomena (C)9</td>
<td>FZDZ IN APCoH [n][n][n] or FZRA or [n]M-WIND nn/n[n]MPS or IN CLIMB-OUT [n][n][n]M-WIND nn/n[n]MPS or IN APCH [n][n][n] FT-WIND</td>
<td>REFZRA CB IN CLIMB-OUT RETSRA</td>
<td></td>
</tr>
<tr>
<td>Recent weather (C)9, 10</td>
<td>PRFZDZ or REFZRA or REDZ or RE[SH]RA or RE[SH]SN or RESG or RE[SH] or RESHS or RE[SH]SN or REDS or RETSRA or RETSSN or</td>
<td>TREND NOSIG TREND BECMG FEW 600M (TREND BECMG FEW 2000FT)</td>
<td></td>
</tr>
<tr>
<td>Trend forecast (O)16</td>
<td>Name of the element: RETSGTRENDR or RETSGS or REFC or REPL</td>
<td>TREND TEMPO 250/18 MPS MAX25 (TREND TEMPO 250/36KT MAX50)</td>
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</tr>
<tr>
<td>Change indicator</td>
<td>NOSIG BECMG or TEMPO</td>
<td>TREND BECMG AT1800 VIS 10KM NSW TREND BECMG TL1700 VIS 800M FG TREND BECMG FM1030 TL1130 CAVOK</td>
<td></td>
</tr>
<tr>
<td>Period of change</td>
<td>FMnnnn and/or TLnnnn or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind (C)9</td>
<td>nn/[ABV][n][n][n]MPS or [MAX[ABV][n][n]]</td>
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</tr>
<tr>
<td>Visibility (C)9</td>
<td>VIS [n][n][n][n]M or VIS [n][n][n][n]KM</td>
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<td>Weather phenomenon: intensity (C)9</td>
<td>FBL or MOD or HVY or NS or W</td>
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</tbody>
</table>

**TREND TEMPO TL1200 VIS**

<table>
<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather characteristics and type (C)9, 10, 11</td>
<td>DZ or FG or RA or BR or SN or SA or SG or PL or DU or HZ</td>
<td>TREND TEMPO FM0300 TL0430 TREND BECMG FM1900 VIS TREND BECMG FM1100 MOD SN FM1130</td>
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</tr>
<tr>
<td>Element as specified in</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>DS or FU or SS or VA or FZDZ or FZRA</td>
<td>TRENDBECMG AT1130 CLD</td>
<td>TRENDBECMG AT1130 CLD</td>
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</tr>
<tr>
<td>SHGR FC or</td>
<td>TRENDEMSIPE TL1530 HVY</td>
<td>SHRA 360M</td>
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</tr>
<tr>
<td>SHGS TS or or SHRA BCFG</td>
<td>TRENDEMSIPE TL1530 HVY</td>
<td>SHRA CLD BKN CB1200FT</td>
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<td>SHSN BLDU</td>
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<td>TSGR or TSGS</td>
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<td></td>
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<tr>
<td>TSRA DRDU</td>
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<td></td>
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<tr>
<td>TSSN DRSA DRSN FZFG MIFG or PRFG</td>
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<table>
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<tbody>
<tr>
<td>Cloud amount and visibility (C)9,14</td>
<td>FEW or SCT or BKN or OVC</td>
</tr>
<tr>
<td>Cloud type (C)9,14</td>
<td>CB or TCU</td>
</tr>
<tr>
<td>Height of cloud base value of vertical visibility (C)9,14</td>
<td>n[n][n][n] or VER</td>
</tr>
</tbody>
</table>

Notes. —

1. Fictitious location.
2. Optional values for one or more runways.
3. Optional values for one or more sections of the runway.
4. To be included in accordance with 4.1.5.2 c).
5. To be included in accordance with 4.1.5.2 b) 1).
6. To be included if visibility or runway visual range < 1 500 m.
7. To be included in accordance with 4.3.6.4 d).
8. To be included in accordance with 4.3.6.4 c).
9. To be included whenever applicable.
10. One or more, up to a maximum of three groups, in accordance with 4.4.2.9 a), 4.8.1.1 and Appendix 5, 2.2.4.3.
11. Precipitation types listed under 4.4.2.3 a) may be combined in accordance with 4.4.2.9 c) and Appendix 5, 2.2.4.1. Only moderate or heavy precipitation to be indicated in trend forecasts in accordance with Appendix 5, 2.2.4.1.
12. For automated reports only.
13. Heavy used to indicate tornado or waterspout; moderate used to indicate funnel cloud not reaching the ground.
14. Up to four cloud layers in accordance with 4.5.4.3 e).
15. Abbreviated plain language may be used in accordance with 4.8.1.2.
16. To be included in accordance with Chapter 6, 6.3.2.
17. Number of change indicators to be kept to a minimum in accordance with Appendix 5, 2.2.1, normally not exceeding three groups.

Table A3-2. Template for METAR and SPECI

<table>
<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of the type of report (M)</td>
<td>Type of report (M)</td>
<td>METAR, METAR COR, SPECI or SPECI COR</td>
<td>METAR, METAR COR, SPECI</td>
</tr>
<tr>
<td>Location indicator (M)</td>
<td>ICAO location indicator (M)</td>
<td>nnnn</td>
<td>YUDO1</td>
</tr>
<tr>
<td>Time of the observation (M)</td>
<td>Day and actual time of the observation in UTC (M)</td>
<td>nnnnnnZ</td>
<td>221630Z</td>
</tr>
</tbody>
</table>

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

Note 1.— The ranges and resolutions for the numerical elements included in METAR and SPECI are shown in Table A35 of this appendix.

Note 2.— The explanations for the abbreviations can be found in the PANS-ABC (Doc 8400).
<table>
<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of an automated or missing report identifier (C)2</td>
<td>Automated or missing report</td>
<td>AUTO or NIL</td>
<td>AUTO NIL</td>
</tr>
<tr>
<td>END OF METAR IF THE REPORT IS MISSING.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surface wind (M)</td>
<td>Wind direction (M)</td>
<td>nnn</td>
<td>VRB</td>
</tr>
<tr>
<td></td>
<td>Wind speed (M)</td>
<td>[P]nn[n]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Units of measurement (M)</td>
<td>MPS (or KT)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Significant speed variations (C)3</td>
<td>G[P]nn[n]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Significant directional variations (C)4</td>
<td>nnnVnnn</td>
<td>—</td>
</tr>
<tr>
<td>Visibility (M)</td>
<td>Prevailing or minimum visibility (M)5</td>
<td>nnnn</td>
<td>CA V O K</td>
</tr>
<tr>
<td></td>
<td>Minimum visibility</td>
<td>nnnn[N] or nnnn[NE] or nnnn[E] or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and direction of the minimum visibility (C)6</td>
<td>nnnn[SE] or nnnn[S] or nnnn[SW] or nnnn[W] or nnnn[NW]</td>
<td></td>
</tr>
<tr>
<td>Runway</td>
<td>Name of the element</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>R32/0400</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>R12R/1700</td>
</tr>
<tr>
<td>Visual (range)</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>Runway (M)</td>
<td>mn[L]/or mn[C]/or mn[R]/</td>
<td>R10/M0050</td>
<td></td>
</tr>
<tr>
<td>Runway visual range (M)</td>
<td>[P or M]nnnn</td>
<td>R16L/0650 R16C/0500</td>
<td></td>
</tr>
<tr>
<td>Runway visual range past tendency (C)</td>
<td>U, D or N</td>
<td>R12/1100U</td>
<td>R26/0550N</td>
</tr>
<tr>
<td>Runway visual range past tendency (C)</td>
<td>U, D or N</td>
<td>R20/0800D R12/0700</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present weather (C)</td>
<td>Intensity or – or + or – or +</td>
<td>VC</td>
<td></td>
</tr>
<tr>
<td>Characteristics and present weather (M)</td>
<td>DZ or FG or FG or RA or BR or PO or SN or SA or FC or or PL or DU or DS or HZ or SS or or or or or</td>
<td>R10/M0050</td>
<td>R14L/P2000</td>
</tr>
<tr>
<td></td>
<td>FZDZ or PO or TS or or FZRA or BCFG or BLSN or</td>
<td>+TSRA FG VCSH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FZUP12 or or</td>
<td>+DZ VA VCTS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FC13 or BLSN or</td>
<td>SN MIFG VCBLSA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHGR or BLSN or</td>
<td>-SNRA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHGS or DRDU or</td>
<td>+SHSN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHRA or DRSA or</td>
<td>BLSN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHSN or DRSN or</td>
<td>UP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SHUP12 or FZFG or</td>
<td>FZUP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TSGR or MIFG or</td>
<td>TSUP FZUP</td>
<td></td>
</tr>
<tr>
<td>Element as specified in</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TSGS or TSRA or TSSN or TSUP12 or UP12</td>
<td>PRFG or //12 //12</td>
</tr>
</tbody>
</table>
| Cloud (M)14             | Cloud amount and height of cloud base or vertical visibility (M) | FEWnnn or SCTnnn or BKNnnn or OVCnnn or FEW///12 | NSC or NCD12 FEW015 VV005 OVC030 VV/// N |}
<p>| | | | |
|                         |                  |             |          |
| Cloud type (C)2         | Cloud type (C)2 | CB or TCU or ///12 | BKN009TCU NCD |
|                         |                  |             |          |
| Air and dew-point temperature (M) | Air and dew-point (M) | [M]nn/[M]mn | 17/10 |
| Pressure values (M)     | Name of the element | Q | Q099  |
|                         | QNH (M)          | nnnn | Q100  |
| Supplementary information (C) | Recent weather (C)2, 9 | REFZDZ or REFZRA or REDZ or RE[SH]RA or RE[SH]SN or RESG or RESHGR or RESHGS or REBLSN or REDS or RETSRA or RETSSN or RETSGR or RETSGS or RETS or REFC or or REFZRA |
|                         | Wind shear (C)2  | WS Rnn[L] or WS Rnn[C] or WS Rnn[R] or WS ALL RWY WS ALL RWY WS | WS R03 |</p>
<table>
<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea-surface temperature and state of the sea or significant wave height</td>
<td>W[M]nn/Sn or W[M]nn/Hn[n][n]</td>
<td>W15/S2</td>
<td>W12/H7 5</td>
</tr>
<tr>
<td>Element(s) as specified in</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>State of the runway</td>
<td>Runway designator (M) or Rnn[R]/ Rnn[L] or Rnn[C]/ or Rnn[R]/</td>
<td>R/SNOCLO/R</td>
<td>R99/4215 9 4 R/SNOCLO O R14L/CL R D/</td>
</tr>
<tr>
<td></td>
<td>Runway deposits</td>
<td>or / CLR D//</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Extent of (m) runway</td>
<td>or /</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depth of deposit</td>
<td>or /</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Friction coefficient (m)</td>
<td>or /</td>
<td></td>
</tr>
<tr>
<td>Trend forecast</td>
<td>Change indicator</td>
<td>NOSI NOSI BECMG or TEMPO</td>
<td>BECMG or TEMPO NOSI FEW020</td>
</tr>
<tr>
<td></td>
<td>Period of change (C)2</td>
<td>FMnnnn and/or TLnnn n or ATnnn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prevailing visibility</td>
<td>nnn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weather phenomenon:</td>
<td>+ or NA N W</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C or S W A N</td>
<td></td>
</tr>
<tr>
<td>Element as specified in</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>Weather phenomenon: characteristics and type (C)2, 9, 11</td>
<td>DZ or RA or SN or SG or PL or DS or SS or FZD or Z or FZR or SHG or SHG S or SHR or U or FEW or SCT or CB</td>
<td>D or K or 0800 FG or 9000</td>
<td>BECMG or TL1130 or AT1800 or NSW or BECMG</td>
</tr>
<tr>
<td>Cloud amount and height of cloud base or vertical visibility (C)2, 14</td>
<td>U or VVnnn or VV///</td>
<td>NS C</td>
<td>TEMPO or BECMG or BLSN</td>
</tr>
<tr>
<td>Cloud type (C)2, 14</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Element as specified in</td>
<td>Detailed content</td>
<td>Template(s)</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BECMG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AT1130</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>OVC010</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TEMPO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>TL1530</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>+SHRA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>BKN012C</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

**TCU**

**Notes.—**

1. Fictitious location.
2. To be included whenever applicable.
3. To be included in accordance with 4.1.5.2 c).
4. To be included in accordance with 4.1.5.2 b) 1).
5. To be included in accordance with 4.2.4.4 b).
6. To be included in accordance with 4.2.4.4 a).
7. To be included if visibility or runway visual range < 1 500 m; for up to a maximum of four runways in accordance with 4.3.6.5 b).
8. To be included in accordance with 4.3.6.6.
9. One or more, up to a maximum of three groups, in accordance with 4.4.2.9 a), 4.8.1.1 and Appendix 5, 2.2.4.1.
10. To be included whenever applicable; no qualifier for moderate intensity in accordance with 4.4.2.8.
11. Precipitation types listed under 4.4.2.3 a) may be combined in accordance with 4.4.2.9 c) and Appendix 5, 2.2.4.1. Only moderate or heavy precipitation to be indicated in trend forecasts in accordance with Appendix 5, 2.2.4.1.
12. For automated reports only.
13. Heavy used to indicate tornado or waterspout; moderate (no qualifier) to indicate funnel cloud not reaching the ground.
14. Up to four cloud layers in accordance with 4.5.4.3 e).
15. To be included in accordance with 4.8.1.5 a).
16. To be included in accordance with 4.8.1.5 b).
17. To be included in accordance with Chapter 6, 6.3.2.
18. Number of change indicators to be kept to a minimum in accordance with Appendix 5, 2.2.1, normally not exceeding three groups.
Table A3-3. Use of change indicators in trend forecasts

<table>
<thead>
<tr>
<th>Change indicator and time period</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOSIG</td>
<td>no significant changes are forecast</td>
</tr>
<tr>
<td>BECMG</td>
<td>the change is forecast to commence at n1n1n1 UTC and be completed by n2n2n2 UTC</td>
</tr>
<tr>
<td>TLnTLnnnnnnn n n n</td>
<td>commence at the beginning of the trend forecast period and be completed by mnnn UTC</td>
</tr>
<tr>
<td>FMnnnn</td>
<td>commence at mnnn UTC and be completed by the end of the trend forecast period</td>
</tr>
<tr>
<td>ATnnnn</td>
<td>forecast period occur at mnnn UTC (specified time)</td>
</tr>
<tr>
<td></td>
<td>commence at the beginning of the trend forecast period and be completed by the end of the trend forecast period; or the time is uncertain</td>
</tr>
<tr>
<td>TEMPO</td>
<td>temporary fluctuations are forecast to</td>
</tr>
<tr>
<td>FMn1n1n1n1</td>
<td>commence at n1n1n1n1 UTC and cease by n2n2n2n2 UTC</td>
</tr>
<tr>
<td>TLn2n2n2n2n2n2</td>
<td>commence at the beginning of the trend forecast period and cease by mnnn UTC</td>
</tr>
<tr>
<td>FMnnnn</td>
<td>mnnn UTC commence at mnnn UTC and cease by the end of the trend forecast period</td>
</tr>
<tr>
<td></td>
<td>period commence at the beginning of the trend forecast period and cease by the end of the trend forecast period</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Element as specified in Chapter 4</th>
<th>Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway: (no units)</td>
<td>01 – 36</td>
<td>1</td>
</tr>
<tr>
<td>Wind direction: °true</td>
<td>010 – 360</td>
<td>10</td>
</tr>
<tr>
<td>Wind speed:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPS</td>
<td>1 – 99*</td>
<td>1</td>
</tr>
<tr>
<td>KT</td>
<td>1 – 199*</td>
<td>1</td>
</tr>
<tr>
<td>Visibility:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>0 – 750</td>
<td>50</td>
</tr>
<tr>
<td>M</td>
<td>800 – 4 900</td>
<td>100</td>
</tr>
<tr>
<td>KM</td>
<td>5 – 9</td>
<td>1</td>
</tr>
<tr>
<td>KM</td>
<td>10 –</td>
<td>0 (fixed value: 10 KM)</td>
</tr>
<tr>
<td>Runway visual range:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>0 – 375</td>
<td>25</td>
</tr>
<tr>
<td>M</td>
<td>400 – 750</td>
<td>50</td>
</tr>
<tr>
<td>M</td>
<td>800 – 2 000</td>
<td>100</td>
</tr>
<tr>
<td>Vertical visibility:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>0 – 75**</td>
<td>15</td>
</tr>
<tr>
<td>M</td>
<td>90 – 600</td>
<td>30</td>
</tr>
</tbody>
</table>
Table A3-5. Ranges and resolutions for the numerical elements included in METAR and SPECI

<table>
<thead>
<tr>
<th>Element as specified in Chapter 4</th>
<th>Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway: (no units)</td>
<td>01 – 36</td>
<td>1</td>
</tr>
<tr>
<td>Wind direction: °true</td>
<td>000 – 360</td>
<td>10</td>
</tr>
<tr>
<td>Wind speed: MPS KT</td>
<td>00 – 99*</td>
<td>1</td>
</tr>
<tr>
<td>Visiblity: M</td>
<td>0000 – 0750</td>
<td>50</td>
</tr>
<tr>
<td>M</td>
<td>0800 – 4900</td>
<td>100</td>
</tr>
<tr>
<td>M</td>
<td>5000 – 9000</td>
<td>1000</td>
</tr>
<tr>
<td>M</td>
<td>10000 – 0 (fixed value: 9)</td>
<td></td>
</tr>
<tr>
<td>Runway visual range: M</td>
<td>0000 – 0375</td>
<td>999) 25</td>
</tr>
<tr>
<td>M</td>
<td>0400 – 0750</td>
<td>50</td>
</tr>
<tr>
<td>M</td>
<td>0800 – 2000</td>
<td>100</td>
</tr>
<tr>
<td>Vertical visibility: 30’s M (100’s)</td>
<td>000 – 020</td>
<td>1</td>
</tr>
<tr>
<td>Clouds: height of cloud 30’s M (100’s °F)</td>
<td>000 – 100</td>
<td>1</td>
</tr>
<tr>
<td>Air temperature; °C</td>
<td>80 – 60</td>
<td>1</td>
</tr>
<tr>
<td>Dew-point temperature: °C</td>
<td>80 – 60</td>
<td>1</td>
</tr>
<tr>
<td>QNH: hPa</td>
<td>0850 – 1100</td>
<td>1</td>
</tr>
<tr>
<td>Sea-surface temperature: °C</td>
<td>-10 – 40</td>
<td>1</td>
</tr>
<tr>
<td>State of the sea: (no units)</td>
<td>0 – 9</td>
<td>1</td>
</tr>
</tbody>
</table>
Significant wave height:  

<table>
<thead>
<tr>
<th>State of the runway</th>
<th>Runway designator: (no units)</th>
<th>01 – 36; 88; 99</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway deposits: (no units)</td>
<td>0 – 9</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Extent of runway contamination: (no units)</td>
<td>1; 2; 5; 9</td>
<td>_</td>
<td></td>
</tr>
<tr>
<td>Depth of deposit: (no units)</td>
<td>00 – 90; 92 – 99</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Friction coefficient/braking (no units)</td>
<td>00 – 95; 99</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

* There is no aeronautical requirement to report surface wind speeds of 50 m/s (100 kt) or more; however, provision has been made for reporting wind speeds up to 99 m/s (199 kt) for non-aeronautical purposes, as necessary.

Example A3-1. Routine report

Local routine report (same location and weather conditions as METAR):

MET REPORT YUDO 221630Z WIND 240/4MPS VIS 600M RVR RWY 12 TDZ 1000M MOD DZ FG CLD SCT 300M OVC 600M T17 DP16 QNH 1018HPA TREND BECMG TL1700 VIS 800M FG BECMG AT1800 VIS 10KM NSW

METAR for YUDO (Donlon/International)*:

METAR YUDO 221630Z 24004MPS 0600 R12/1000U DZ FG SCT010 OVC020 17/16 Q1018 BECMG TL1700 0800 FG BECMG AT1800 9999 NSW

Meaning of both reports:

Routine report for Donlon/International* issued on the 22nd of the month at 1630 UTC; surface wind direction 240 degrees; wind speed 4 metres per second; visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) 600 metres; runway visual range representative of the touchdown zone for runway 12 is 1000 metres and the runway visual range values have shown an upward tendency during previous 10 minutes (runway visual range tendency to be included in METAR only); and moderate drizzle and fog; scattered cloud at 300 metres; overcast at 600 metres; air temperature 17 degrees Celsius; dew-point temperature 16 degrees Celsius; QNH 1 018 hectopascals; trend during next 2 hours, visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) becoming 800 metres in fog by 1700 UTC; at 1800 UTC visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) becoming 10 kilometres or more and nil significant weather.

Fictitious location

Note.— In this example, the primary units “metre per second” and “metre” were used for wind speed and height of cloud base, respectively. However, in accordance with Annex 5, the corresponding non-SI alternative units “knot” and “foot” may be used instead.
Example A3-2. Special report

a) Local special report (same location and weather conditions as SPECI):

SPECIAL YUDO 151115Z WIND 050/25KT MAX37 MNM10 VIS 1200M RVR RWY 05 ABV 1800M HVY TSRA CLD BKN CB 500FT T25 DP22 QNH 1008HPA TREND TEMPO TL1200 VIS 600M BECMG AT1200 VIS 8KM NSW NSC

b) SPECI for YUDO (Donlon/International)*:

SPECI YUDO 151115Z 05025G37KT 3000 1200NE+TSRA BKN005CB 25/22 Q1008 TEMPO TL1200 0600 BECMG AT1200 8000 NSW NSC

Meaning of both reports:

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

*Fictitious location

Note.— In this example, the non-SI alternative units “knot” and “foot” were used for wind speed and height of cloud base, respectively. However, in accordance with Annex 5, the corresponding primary units “metres per second” and “metre” may be used instead.

Example A3-3. Volcanic activity report

VOLCANIC ACTIVITY REPORT YUSB* 231500 MT TROJEEN* VOLCANO N5605 W12652 ERUPTED 231445 LARGE ASH CLOUD EXTENDING TO APPROX 30000 FEET MOVING SW

Meaning:

Volcanic activity report issued by Siby/Bistock meteorological station at 1500 UTC on the 23rd of the month. Mt. Trojeen volcano 56 degrees 5 minutes north 126 degrees 52 minutes west erupted at 1445 UTC on the 23rd; a large ash cloud was observed extending to approximately 30 000 feet and moving in a south-westerly direction.

* Fictitious location
FIFTH SCHEDULE

TECHNICAL SPECIFICATIONS RELATED TO AIRCRAFT OBSERVATIONS AND REPORTS

Regulation 26(2)

1. CONTENTS OF AIR-REPORTS

1.1 Routine air-reports by air-ground data link

1.1.1 When air-ground data link is used and automatic dependent surveillance — (ADS-C) or SSR Mode S is being applied, the elements contained in routine air-reports shall be:

Message type designator

Aircraft identification

Data block 1

Latitude Longitude

Level Time

Data block 2

Wind direction

Wind speed

Wind quality flag

Air temperature

Turbulence (if available) Humidity

Note. — When ADS-C or SSR Mode S is being applied, the requirements of routine air-reports may be met by the combination of the basic ADS-C/SSR Mode S data block (data block 1) and the meteorological information data block (data block 2), available from ADS-C or SSR Mode S reports. The ADS-C message format is specified in the PANS-ATM (Doc 4444), 4.11.4 and Chapter 13 and the SSR Mode S message format is specified in the Civil Aviation (Communications Systems) Regulations 2017.

1.1.2 When air-ground data link is used while ADS-C and SSR Mode S are not being applied, the elements contained in routine reports shall be:

Message type designator Section 1

(Position information)

Aircraft identification

Position or latitude and longitude Time

Flight level or altitude

Next position and time over Ensuing significant point

Section 2 (Operational information)

Estimated time of arrival Endurance

Section 3 (Meteorological information)

Air temperature

Wind direction

Wind speed

Turbulence

Aircraft icing

Humidity (if available)
Note.— When air-ground data link is used whileADS-Cand SSR Mode S are not being applied, the requirements of routine air reports may be met by the controller-pilot data link communication (CPDLC) application entitled “Position report”. The details of this data link application are specified in the Manual of Air Traffic Services Data Link Applications (Doc 9694) and in the Civil Aviation (Communications Systems) Regulations 2017.

1.2 Special air-reports by air-ground data link

When air-ground data link is used, the elements contained in special air-reports shall be:

Message type designator
Aircraft identification
Data block 1
Latitude Longitude
Level Time
Data block 2
Wind direction
Wind speed
Wind quality flag
Air temperature
Turbulence (if available)
Humidity (if available)
Data block 3
Condition prompting the issuance of a special air-report (one condition to be selected from the list presented in Table A4-1).

Note 1.— The requirements of special air-reports may be met by the data link flight information service (D-FIS) application entitled “Special air-report service”. The details of this data link application are specified in ICAO Doc 9694.

Note 2.— In the case of a special air-report of pre-eruption volcanic activity, volcanic eruption or volcanic ash cloud, additional requirements are indicated in 4.2.

1.3 Special air-reports by voice communications

When voice communications are used, the elements contained in special air-reports shall be:

Message type designator
Section 1 (Position information)
Aircraft identification
Position or latitude and longitude
Time
Level or range of levels
Section 3 (Meteorological information)
Condition prompting the issuance of a special air-report, to be selected from the list presented in Table A4-1.

Note 1.— Air-reports are considered routine by default. The message type designator for special air-reports is specified in the PANS-ATM (ICAO Doc 4444), Appendix 1.

Note 2.— In the case of a special air-report of pre-eruption volcanic activity, volcanic eruption or volcanic ash cloud, additional requirements are indicated in 4.2.
2. CRITERIA FOR REPORTING

2.1 General
When air-ground data link is used, the wind direction, wind speed, wind quality flag, air temperature, turbulence and humidity included in air-reports shall be reported in accordance with the following criteria.

2.2 Wind direction
The wind direction shall be reported in terms of degrees true, rounded to the nearest whole degree.

2.3 Wind speed
The wind speed shall be reported in metres per second or knots, rounded to the nearest 1 m/s (1 knot). The units of measurement used for the wind speed shall be indicated.

2.4 Wind quality flag
The wind quality flag shall be reported as 0 when the roll angle is less than 5 degrees and as 1 when the roll angle is 5 degrees or more.

2.5 Air temperature
The air temperature shall be reported to the nearest tenth of a degree Celsius.

2.6 Turbulence
The turbulence shall be reported in terms of the cube root of the eddy dissipation rate (EDR).

2.6.1 Routine air-reports
The turbulence shall be reported during the en-route phase of the flight and shall refer to the 15-minute period immediately preceding the observation. Both the average and peak value of turbulence, together with the time of occurrence of the peak value to the nearest minute, shall be observed. The average and peak values shall be reported in terms of the cube root of EDR. The time of occurrence of the peak value shall be reported as indicated in Table A4-2. The turbulence shall be reported during the climb-out phase for the first 10 minutes of the flight and shall refer to the 30-second period immediately preceding the observation. The peak value of turbulence shall be observed.

2.6.2 Interpretation of the turbulence report
Turbulence shall be considered:

(a) severe when the peak value of the cube root of EDR exceeds 0.7;
(b) moderate when the peak value of the cube root of EDR is above 0.4 and below or equal to 0.7;
(c) light when the peak value of the cube root of EDR is above 0.1 and below or equal to 0.4; and
(d) nil when the peak value of the cube root of EDR is below or equal to 0.1.

Note — The EDR is an aircraft-independent measure of turbulence. However, the relationship between the EDR value and the perception of turbulence is a function of aircraft type, and the mass, altitude, configuration and airspeed of the aircraft. The EDR values given above describe the severity levels for a medium-sized transport aircraft under typical en-route conditions (i.e. altitude, airspeed and weight).
2.6.3 Special air-reports

Special air-reports on turbulence shall be made during any phase of the flight whenever the peak value of the cube root of EDR exceeds 0.4. The special air-report on turbulence shall be made with reference to the 1-minute period immediately preceding the observation. Both the average and peak value of turbulence shall be observed. The average and peak values shall be reported in terms of the cube root of EDR. Special air-reports shall be issued every minute until such time as the peak values of the cube root of EDR fall below 0.4.

2.7 Humidity

The humidity shall be reported as the relative humidity, rounded to the nearest whole per cent.

*Note.*—*The ranges and resolutions for the meteorological elements included in air-reports are shown in Table A4-3.*

3. EXCHANGE OF AIR-REPORTS

3.1 Responsibilities of the meteorological watch offices

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

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

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

*Note.*—*The template used for special air-reports which are uplinked to aircraft in flight is in Seventh Schedule, Table A6-1B.*

3.2 Responsibilities of world area forecast centres

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

*Note.*—*The dissemination of basic meteorological data is normally carried out on the World Meteorological Organization (WMO) global telecommunication system.*

3.3 Supplementary dissemination of air-reports

Where supplementary dissemination of air-reports is required to satisfy special aeronautical or meteorological requirements, such dissemination shall be arranged and agreed between the meteorological authorities concerned.

3.4 Format of air-reports

Air-reports shall be exchanged in the format in which they are received.
4. SPECIFIC PROVISIONS RELATED TO REPORTING WIND SHEAR AND VOLCANIC ASH

4.1 Reporting of wind shear

4.1.1 When reporting aircraft observations of wind shear encountered during the climb-out and approach phases of flight, the aircraft type shall be included.

4.1.2 Where wind shear conditions in the climb-out or approach phases of flight were reported or forecast but not encountered, the pilot-in-command shall advise the appropriate air traffic services unit as soon as practicable unless the pilot-in-command is aware that the appropriate air traffic services unit has already been so advised by a preceding aircraft.

4.2 Post-flight reporting of volcanic activity

Note—The detailed instructions for recording and reporting volcanic activity observations are given in the PANS-ATM (Doc 4444), Appendix I.

4.2.1 On arrival of a flight at an aerodrome, the completed report of volcanic activity shall be delivered by the operator or a flight crew member, without delay, to the aerodrome meteorological office, or if such office is not easily accessible to arriving flight crew members, the completed form shall be dealt with in accordance with local arrangements made by the meteorological authority and the operator.

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

Table A4-1. Template for the special air-report (downlink)

<table>
<thead>
<tr>
<th>Element as specified in Chapter 5</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Message type designator (M)</td>
<td>Type of air-report (M)</td>
<td>ARS</td>
<td>ARS</td>
</tr>
<tr>
<td>Aircraft identification (M)</td>
<td>Aircraft radiotelephony call sign</td>
<td>nnnnn</td>
<td>VA812</td>
</tr>
</tbody>
</table>

DATA BLOCK 1

<table>
<thead>
<tr>
<th>Latitude (M)</th>
<th>Latitude in degrees and minutes</th>
<th>Nnnnn or Snnnn</th>
<th>S4506</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitude (M)</td>
<td>Longitude in degrees and minutes (M)</td>
<td>Wnnnnn or Ennnnn</td>
<td>E01056</td>
</tr>
<tr>
<td>Level (M)</td>
<td>Flight level (M)</td>
<td>FLnnn or FLnnn to FLnnn</td>
<td>FL330</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FL280 to FL310</td>
</tr>
<tr>
<td>Time (M)</td>
<td>Time of occurrence in hours and</td>
<td>OBS AT nnnnZ</td>
<td>OBS AT 1216Z</td>
</tr>
<tr>
<td></td>
<td>minutes (M)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. — Message to be prompted by the pilot-in-command. Currently only the condition “SEV TURB” can be automated (see 2.6.3).
<table>
<thead>
<tr>
<th>Element as specified in Chapter 5</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind direction (M)</td>
<td>Wind direction in degrees true (M)</td>
<td>mn/</td>
<td>262/</td>
</tr>
<tr>
<td>Wind speed (M)</td>
<td>Wind speed in metres per second (or knots) (M)</td>
<td>mnMPS (or mnKT)</td>
<td>040MPS</td>
</tr>
<tr>
<td>Wind quality flag (M)</td>
<td>Wind quality flag (M)</td>
<td>n</td>
<td>080K</td>
</tr>
<tr>
<td>Air temperature (M)</td>
<td>Air temperature in tenths of degrees C (M)</td>
<td>TMnnn</td>
<td>T127T</td>
</tr>
<tr>
<td>Turbulence (C)</td>
<td>Turbulence in hundredths of m2/s-1 and the time of</td>
<td>EDRnnn/nn</td>
<td>55EDR064/08</td>
</tr>
<tr>
<td>Humidity (C)</td>
<td>occurrence of the peak value Relative humidity in per cent (C)</td>
<td>RHnnn</td>
<td>RH054</td>
</tr>
</tbody>
</table>

**DATA BLOCK 3**

<table>
<thead>
<tr>
<th>Element as specified in Chapter 5</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition prompting the issuance air-report (M)</td>
<td>SEV TURB [EDRnnn]2 or SEV ICE or SEV MTW or TS GR3 or TS3 or HVY SS4 or VA CLD [FL nnn/nnn] or VA5 [MT nnnnnnnnnnnnnnnnnn] MOD TURB [EDRnnn]2 or MOD ICE</td>
<td>SEV TURB VA CLD FL050/100</td>
<td></td>
</tr>
</tbody>
</table>

Notes.—

1. The time of occurrence to be reported in accordance with Table A4-2.
2. The turbulence to be reported in accordance with 2.6.3.
3. Obscured, embedded or widespread thunderstorms or thunderstorms in squall lines.
4. Duststorm or sandstorm.
5. Pre-eruption volcanic activity or a volcanic eruption.

Table A4-2. Time of occurrence of the peak value to be reported

<table>
<thead>
<tr>
<th>Peak value of turbulence occurring during the one-minute period</th>
<th>Value to be reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 1</td>
<td>0</td>
</tr>
<tr>
<td>1 – 2</td>
<td>1</td>
</tr>
<tr>
<td>2 – 3</td>
<td>2</td>
</tr>
<tr>
<td>Peak value of turbulence occurring during the one-minute period</td>
<td>Value to be reported</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>. . .</td>
<td>. . .</td>
</tr>
<tr>
<td>13 – 14</td>
<td>13</td>
</tr>
<tr>
<td>14 – 15</td>
<td>14</td>
</tr>
<tr>
<td>No timing information available</td>
<td>15</td>
</tr>
</tbody>
</table>

Table A4.3. Ranges and resolutions for the meteorological elements included in air-reports

<table>
<thead>
<tr>
<th>Element as specified in Chapter 5</th>
<th>Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind direction: °true</td>
<td>000 – 360</td>
<td>1</td>
</tr>
<tr>
<td>Wind speed:</td>
<td>MPS</td>
<td>00 – 125</td>
</tr>
<tr>
<td></td>
<td>KT</td>
<td>00 – 250</td>
</tr>
<tr>
<td>Wind quality flag:</td>
<td>(index)*</td>
<td>0 – 1</td>
</tr>
<tr>
<td>Air temperature: °C</td>
<td>-80 – +60</td>
<td>0.1</td>
</tr>
<tr>
<td>Turbulence: routine air-report:</td>
<td>0 – 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 – 15</td>
<td></td>
</tr>
<tr>
<td>Turbulence: special air-report:</td>
<td>m2/3 s-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 – 2</td>
<td></td>
</tr>
<tr>
<td>Humidity:</td>
<td>%</td>
<td>0 – 100</td>
</tr>
</tbody>
</table>

* Non-dimensional

SIXTH SCHEDULE
TECHNICAL SPECIFICATIONS RELATED TO FORECASTS

Regulations 35(1) and 47(9)

1. CRITERIA RELATED TO TAF

1.1 TAF format

1.1.1 TAF shall be issued in accordance with the template shown in Table A5-1 and disseminated in the TAF code form prescribed by the World Meteorological Organization (WMO).

Note.— The TAF code form is contained in the Manual on Codes (WMO-No. 306), Volume I.1, Part A — Alphanumeric Codes.

1.1.2 TAF shall be disseminated in digital form in addition to the dissemination of the TAF in accordance with 1.1.1.

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

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

1.2 Inclusion of meteorological elements in TAF

Note.— Guidance on operationally desirable accuracy of forecasts is given in the Second Schedule.

1.2.1 Surface wind

In forecasting surface wind, the expected prevailing direction shall be given. When it is not possible to forecast a prevailing surface wind direction due to its expected variability, for example, during light wind conditions (less than 1.5 m/s (3 kt)) or thunderstorms, the forecast wind direction shall be indicated as variable using “VRB”. When the wind is forecast to be less than 0.5 m/s (1 kt), the forecast wind speed shall be indicated as calm. When the forecast maximum speed (gust) exceeds the forecast mean wind speed by 5 m/s (10 kt) or more, the forecast maximum wind speed shall be indicated. When a wind speed of 50 m/s (100 kt) or more is forecast, it shall be indicated to be more than 49 m/s (99 kt).

1.2.2 Visibility

When the visibility is forecast to be less than 800 m, it shall be expressed in steps of 50 m; when it is forecast to be 800 m or more but less than 5 km, in steps of 100 m; 5 km or more but less than 10 km, in kilometre steps; and when it is forecast to be 10 km or more, it shall be expressed as 10 km, except when conditions of CAVOK are forecast to apply. The prevailing visibility shall be forecast. When visibility is forecast to vary in different directions and the prevailing visibility cannot be forecast, the lowest forecast visibility shall be given.

1.2.3 Weather phenomena

One or more, up to a maximum of three, of the following weather phenomena or combinations thereof, together with their characteristics and, where appropriate, intensity, shall be forecast if they are expected to occur at the aerodrome:

— freezing precipitation
— freezing fog
— moderate or heavy precipitation (including showers thereof)
— low drifting dust, sand or snow
— blowing dust, sand or snow
— duststorm
— sandstorm
— thunderstorm (with or without precipitation)
— squall
— funnel cloud (tornado or waterspout)
— other weather phenomena given in Appendix 3, 4.4.2.3, as agreed between the meteorological authority, the appropriate ATS authority and the operators concerned.

The expected end of occurrence of those phenomena shall be indicated by the abbreviation “NSW”.

1.2.4 Cloud

Cloud amount shall be forecast using the abbreviations “FEW”, “SCT”, “BKN” or “OVC” as necessary. When it is expected that the sky will remain or become obscured and clouds cannot be forecast and information on vertical visibility is available at the aerodrome, the vertical visibility shall be forecast in the form “VV” followed by the
forecast value of the vertical visibility. When several layers or masses of cloud are forecast, their amount and height of base shall be included in the following order:

(a) the lowest layer or mass regardless of amount, to be forecast as FEW, SCT, BKN or OVC as appropriate;
(b) the next layer or mass covering more than 2/8, to be forecast as SCT, BKN or OVC as appropriate;
(c) the next higher layer or mass covering more than 4/8, to be forecast as BKN or OVC as appropriate; and
(d) cumulonimbus clouds and/or towering cumulus clouds, whenever forecast and not already included under a) to c).

Cloud information shall be limited to cloud of operational significance; when no cloud of operational significance is forecast, and “CAVOK” is not appropriate, the abbreviation “NSC” shall be used.

1.2.5 Temperature

When forecast temperatures are included in accordance with regional air navigation agreement, the maximum and minimum temperatures expected to occur during the period of validity of the TAF shall be given, together with their corresponding times of occurrence.

1.3 Use of change groups

Note. — Guidance on the use of change and time indicators in TAF is given in Table A5-2.

1.3.1 The criteria used for the inclusion of change groups in TAF or for the amendment of TAF shall be based on any of the following weather phenomena or combinations thereof being forecast to begin or end or change in intensity:
— freezing fog
— freezing precipitation
— moderate or heavy precipitation (including showers)
— thunderstorm — duststorm — sandstorm.

1.3.2 The criteria used for the inclusion of change groups in TAF or for the amendment of TAF shall be based on the following:

(a) when the mean surface wind direction is forecast to change by 60° or more, the mean speed before and/or after the change being 5 m/s (10 kt) or more;
(b) when the mean surface wind speed is forecast to change by 5 m/s (10 kt) or more;
(c) when the variation from the mean surface wind speed (gusts) is forecast to change by 5 m/s (10 kt) or more, the mean speed before and/or after the change being 7.5 m/s (15 kt) or more;
(d) when the surface wind is forecast to change through values of operational significance. The threshold values should be established by the meteorological authority in consultation with the appropriate ATS authority and 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 will change through values representing the main operating limits for typical aircraft operating at the aerodrome;
(e) when the visibility is forecast to improve and change to or pass through one or more of the following values, or when the visibility is forecast to deteriorate and pass through one or more of the following values:
   (1) 150, 350, 600, 800, 1,500 or 3,000 m; or
   (2) 5,000 m in cases where significant numbers of flights are operated in accordance with the visual flight rules;

(f) when any of the following weather phenomena or combinations thereof are forecast to begin or end:
   — low drifting dust, sand or snow
   — blowing dust, sand or snow
   — squall
   — funnel cloud (tornado or waterspout);

(g) when the height of base of the lowest layer or mass of cloud of BKN or OVC extent is forecast to lift and change to or pass through one or more of the following values, or when the height of the lowest layer or mass of cloud of BKN or OVC extent is forecast to lower and pass through one or more of the following values:
   (1) 30, 60, 150 or 300 m (100, 200, 500 or 1,000 ft); or
   (2) 450 m (1,500 ft) in cases where significant numbers of flights are operated in accordance with the visual flight rules;

(h) when the amount of a layer or mass of cloud below 450 m (1,500 ft) is forecast to change:
   (1) from NSC, FEW or SCT to BKN or OVC; or
   (2) from BKN or OVC to NSC, FEW or SCT;

(i) when the vertical visibility is forecast to improve and change to or pass through one or more of the following values, or when the vertical visibility is forecast to deteriorate and pass through one or more of the following values: 30, 60, 150 or 300 m (100, 200, 500 or 1,000 ft); and

(j) any other criteria based on local aerodrome operating minima, as agreed between the meteorological authority and the operators concerned.

Note.—Other criteria based on local aerodrome operating minima are to be considered in parallel with similar criteria for the issuance of SPECI developed in response to Fourth Schedule).

1.3.3 When a change in any of the elements given in regulation 36 (3) is required to be indicated in accordance with the criteria given in 1.3.2, the change indicators “BECMG” or “TEMPO” shall be used followed by the time period during which the change is expected to occur. The time period shall be indicated as the beginning and end of the period in whole hours UTC. Only those elements for which a significant change is expected shall be included following a change indicator. However, in the case of significant changes in respect of cloud, all cloud groups, including layers or masses not expected to change, shall be indicated.

1.3.4 The change indicator “BECMG” and the associated time group shall be used to describe changes where the meteorological conditions are expected to reach or pass through specified threshold values at a regular or irregular rate and at an unspecified time
during the time period. The time period shall normally not exceed 2 hours but in any case shall not exceed 4 hours.

1.3.5 The change indicator “TEMPO” and the associated time group shall be used to describe expected frequent or infrequent temporary fluctuations in the meteorological conditions which reach or pass specified threshold values and last for a period of less than one hour in each instance and, in the aggregate, cover less than one-half of the forecast period during which the fluctuations are expected to occur. If the temporary fluctuation is expected to last one hour or longer, the change group “BECMG” shall be used in accordance with 1.3.4 or the validity period shall be subdivided in accordance with 1.3.6.

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

1.4 Use of probability groups

The probability of occurrence of an alternative value of a forecast element or elements shall be indicated, as necessary, by use of the abbreviation “PROB” followed by the probability in tens of per cent and the time period during which the alternative value(s) is (are) expected to apply. The probability information shall be placed after the element or elements forecast and be followed by the alternative value of the element or elements. The probability of a forecast of temporary fluctuations in meteorological conditions shall be indicated, as necessary, by use of the abbreviation “PROB” followed by the probability in tens of per cent, placed before the change indicator “TEMPO” and associated time group. A probability of an alternative value or change of less than 30 per cent shall not be considered sufficiently significant to be indicated. A probability of an alternative value or change of 50 per cent or more, for aviation purposes, shall not be considered a probability but instead shall be indicated, as necessary, by use of the change indicators “BECMG” or “TEMPO” or by subdivision of the validity period using the abbreviation “FM”.

The probability group shall not be used to qualify the change indicator “BECMG” nor the time indicator “FM”.

1.5 Numbers of change and probability groups

The number of change and probability groups shall be kept to a minimum and shall not normally exceed five groups.

1.6 Dissemination of TAF

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

2. CRITERIA RELATED TO TREND FORECASTS

2.1 Format of trend forecasts

Trend forecasts shall be issued in accordance with the templates shown in Fourth Schedule, Tables A3-1 and A3-2. The units and scales used in the trend forecast shall be the same as those used in the report to which it is appended.
Note.— Examples of trend forecasts are given in Fourth Schedule.

2.2 Inclusion of meteorological elements in trend forecasts

2.2.1 General provisions

The trend forecast shall indicate significant changes in respect of one or more of the elements: surface wind, visibility, weather and clouds. Only those elements shall be included for which a significant change is expected. However, in the case of significant changes in respect of cloud, all cloud groups, including layers or masses not expected to change, shall be indicated. In the case of a significant change in visibility, the phenomenon causing the reduction of visibility shall also be indicated. When no change is expected to occur, this shall be indicated by the term “NOSIG”.

2.2.2 Surface wind

The trend forecast shall indicate changes in the surface wind which involve:

(a) a change in the mean wind direction of 60° or more, the mean speed before and/or after the change being 5 m/s (10 kt) or more;
(b) a change in mean wind speed of 5 m/s (10 kt) or more; and
(c) changes in the wind through values of operational significance. The threshold values shall be established by the meteorological authority in consultation with the appropriate ATS authority and 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 will change through values representing the main operating limits of typical aircraft operating at the aerodrome.

2.2.3 Visibility

When the visibility is expected to improve and change to or pass through one or more of the following values, or when the visibility is expected to deteriorate and pass through one or more of the following values: 150, 350, 600, 800, 1 500 or 3 000 m, the trend forecast shall indicate the change. When significant numbers of flights are conducted in accordance with the visual flight rules, the forecast shall additionally indicate changes to or passing through 5 000 m.

Note.— In trend forecasts appended to local routine and special reports, visibility refers to the forecast visibility along the runway(s); in trend forecasts appended to METAR and SPECI, visibility refers to the forecast prevailing visibility.

2.2.4 Weather phenomena

2.2.4.1 The trend forecast shall indicate the expected onset, cessation or change in intensity of one or more of the following weather phenomena or combinations thereof:
   —freezing precipitation
   —moderate or heavy precipitation (including showers)
   —thunderstorm (with precipitation)
   —duststorm
   —sandstorm
   —other weather phenomena given in Fourth Schedule, as agreed between the meteorological authority, the appropriate ATS authority and the operators concerned.

2.2.4.2 The trend forecast shall indicate the expected onset or cessation of one or more of the following weather phenomena or combinations thereof:
—freezing fog
—low drifting dust, sand or snow
—blowing dust, sand or snow
—thunderstorm (without precipitation)
—squall
—funnel cloud (tornado or waterspout).

2.2.4.3 The total number of phenomena reported in 2.2.4.1 and 2.2.4.2 shall not exceed three.

2.2.4.4 The expected end of occurrence of the weather phenomena shall be indicated by the abbreviation “NSW”.

2.2.5 Clouds

When the height of the base of a cloud layer of BKN or OVC extent is expected to lift and change to or pass through one or more of the following values, or when the height of the base of a cloud layer of BKN or OVC extent is expected to lower and pass through one or more of the following values: 30, 60, 150, 300 and 450 m (100, 200, 500, 1 000 and 1 500 ft), the trend forecast shall indicate the change. When the height of the base of a cloud layer is below or is expected to fall below or rise above 450 m (1 500 ft), the trend forecast shall also indicate changes in cloud amount from FEW, or SCT increasing to BKN or OVC, or changes from BKN or OVC decreasing to FEW or SCT. When no clouds of operational significance are forecast and “CAVOK” is not appropriate, the abbreviation “NSC” shall be used.

2.2.6 Vertical visibility

When the sky is expected to remain or become obscured and vertical visibility observations are available at the aerodrome, and the vertical visibility is forecast to improve and change to or pass through one or more of the following values, or when the vertical visibility is forecast to deteriorate and pass through one or more of the following values: 30, 60, 150 or 300 m (100, 200, 500 or 1 000 ft), the trend forecast shall indicate the change.

2.2.7 Additional criteria

Criteria for the indication of changes based on local aerodrome operating minima, additional to those specified in 2.2.2 to 2.2.6, shall be used as agreed between the meteorological authority and the operator concerned.

2.3 Use of change groups

Note. — Guidance on the use of change indicators in trend forecasts is given in Fourth Schedule, Table A3-3.

2.3.1 When a change is expected to occur, the trend forecast shall begin with one of the change indicators “BECMG”
or “TEMPO”.

2.3.2 The change indicator “BECMG” shall be used to describe forecast changes where the meteorological conditions are expected to reach or pass through specified values at a regular or irregular rate. The period during which, or the time at which, the change is forecast to occur shall be indicated, using the abbreviations “FM”, “TL” or “AT”, as appropriate, each followed by a time group in hours and minutes. When the change is forecast to begin and end wholly within the trend forecast period, the beginning and end
of the change shall be indicated by using the abbreviations “FM” and “TL”, respectively, with their associated time groups. When the change is forecast to commence at the beginning of the trend forecast period but be completed before the end of that period, the abbreviation “FM” and its associated time group shall be omitted and only “TL” and its associated time group shall be used. When the change is forecast to begin during the trend forecast period and be completed at the end of that period, the abbreviation “TL” and its associated time group shall be omitted and only “FM” and its associated time group shall be used. When the change is forecast to occur at a specified time during the trend forecast period, the abbreviation “AT” followed by its associated time group shall be used. When the change is forecast to commence at the beginning of the trend forecast period and be completed by the end of that period or when the change is forecast to occur within the trend forecast period but the time is uncertain, the abbreviations “FM”, “TL” or “AT” and their associated time groups shall be omitted and the change indicator “BECMG” shall be used alone.

2.3.3 The change indicator “TEMPO” shall be used to describe forecast temporary fluctuations in the meteorological conditions which reach or pass specified values and last for a period of less than one hour in each instance and, in the aggregate, cover less than one-half of the period during which the fluctuations are forecast to occur. The period during which the temporary fluctuations are forecast to occur shall be indicated, using the abbreviations “FM” and/or “TL”, as appropriate, each followed by a time group in hours and minutes. When the period of temporary fluctuations in the meteorological conditions is forecast to begin and end wholly within the trend forecast period, the beginning and end of the period of temporary fluctuations shall be indicated by using the abbreviations “FM” and “TL”, respectively, with their associated time groups. When the period of temporary fluctuations is forecast to commence at the beginning of the trend forecast period but cease before the end of that period, the abbreviation “FM” and its associated time group shall be omitted and only “TL” and its associated time group shall be used. When the period of temporary fluctuations is forecast to begin during the trend forecast period and cease by the end of that period, the abbreviation “TL” and its associated time group shall be omitted and only “FM” and its associated time group shall be used. When the period of temporary fluctuations is forecast to commence at the beginning of the trend forecast period and cease by the end of that period, both abbreviations “FM” and “TL” and their associated time groups shall be omitted and the change indicator “TEMPO” shall be used alone.

2.4 Use of the probability indicator

The indicator “PROB” shall not be used in trend forecasts.

3. CRITERIA RELATED TO FORECASTS FOR TAKE-OFF

3.1 Format of forecasts for take-off

The format of the forecast shall be as agreed between the meteorological authority and the operator concerned. The order of the elements and the terminology, units and scales used in forecasts for take-off shall be the same as those used in reports for the same aerodrome.

3.2 Amendments to forecasts for take-off

The criteria for the issuance of amendments to forecasts for take-off for surface wind direction and speed, temperature and pressure and any other elements agreed locally shall be agreed between the meteorological authority and the operators concerned. The criteria shall be consistent with the corresponding criteria for special reports established for the aerodrome in accordance with Fourth Schedule.
4. CRITERIA RELATED TO AREA FORECASTS FOR LOW-LEVEL FLIGHTS

4.1 Format and content of GAMET area forecasts

When prepared in GAMET format, area forecasts shall contain two sections: Section I related to information on en-route weather phenomena hazardous to low-level flights, prepared in support of the issuance of AIRMET information, and Section II related to additional information required by low-level flights. The content and order of elements in a GAMET area forecast, when prepared, shall be in accordance with the template shown in Table A5-3. Additional elements in Section II shall be included in accordance with regional air navigation agreement. Elements which are already covered by a SIGMET message shall be omitted from GAMET area forecasts.

4.2 Amendments to GAMET area forecasts

When a weather phenomenon hazardous to low-level flights has been included in the GAMET area forecast and the phenomenon forecast does not occur, or is no longer forecast, a GAMET AMD shall be issued, amending only the weather element concerned.

4.3 Content of area forecasts for low-level flights in chart form

4.3.1 When chart form is used for area forecasts for low-level flights, the forecast of upper wind and upper-air temperature shall be issued for points separated by no more than 500 km (300 NM) and for at least the following altitudes: 600, 1 500 and 3 000 m (2 000, 5 000 and 10 000 ft), and 4 500 m (15 000 ft) in mountainous areas.

4.3.2 When chart form is used for area forecasts for low-level flights, the forecast of SIGWX phenomena shall be issued as low-level SIGWX forecast for flight levels up to 100 (or up to flight level 150 in mountainous areas, or higher, where necessary). Low-level SIGWX forecasts shall include the following items:

(a) the phenomena warranting the issuance of a SIGMET as given in sixth schedule and which are expected to affect low-level flights; and
(b) the elements in area forecasts for low-level flights as given in Table A5-3 except elements concerning:
   (1) upper wind and upper-air temperature; and
   (2) Forecast QNH.

Note.— Guidance on the use of terms “ISOL”, “OCNL” and “FRQ” referring to cumulonimbus and towering cumulus clouds, and thunderstorms is given in sixth schedule.

4.4 Exchange of area forecasts for low-level flights

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

Table A5-1. Template for TAF

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>inclusion mandatory, part of every message;</td>
</tr>
<tr>
<td>C</td>
<td>inclusion conditional, dependent on meteorological conditions or method of observation;</td>
</tr>
<tr>
<td>O</td>
<td>inclusion optional.</td>
</tr>
</tbody>
</table>

Note 1.— The ranges and resolutions for the numerical elements included in TAF are shown in Table A5-4 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, ICAO Doc 8400).

<table>
<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of the type of</td>
<td>Type of forecast (M)</td>
<td>TAF or TAF AMD or TAF COR</td>
<td>TAF, TAF AMD</td>
</tr>
<tr>
<td>Location</td>
<td>ICAO location</td>
<td>mnn</td>
<td>YUDO1</td>
</tr>
<tr>
<td>Time of issue of forecast (M)</td>
<td>Day and time of issue of the forecast</td>
<td>mnnnnnZ</td>
<td>160000Z</td>
</tr>
<tr>
<td>Identification of a missing</td>
<td>Missing forecast identifier (C)</td>
<td>NIL</td>
<td>NIL</td>
</tr>
</tbody>
</table>

END OF TAF IF THE FORECAST IS MISSING.

<table>
<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days and period of validity of</td>
<td>Days and period of the validity of the forecast</td>
<td>mnn/mnn</td>
<td>0812/0918</td>
</tr>
<tr>
<td>Identification of a cancelled</td>
<td>Cancelled forecast identifier (C)</td>
<td>CNL</td>
<td>CNL</td>
</tr>
</tbody>
</table>

END OF TAF IF THE FORECAST IS CANCELLED.

<p>| Surface wind (M)                  | Wind direction (M) | mnn or VRB2           | 24004MPS; VRB01MPS |
| Wind speed (M)                    | [P]nn[n]           | (24008KT); VRB02KT)   | 19005MPS          |
| Significant speed                 | G[P]nn[n]          | 19010KT              |                  |
| Units of measurement (M)          | MPS (or KT)        | (00000MPS)           | 140P49MP          |
| Visibility (M)                    | Prevailing visibility (M) | mnn                 | C0350 CAVOK       |
| Weather (C)4, 5                   | Intensity of weather | – or +               | D09999 HZ         |
| Characteristics and type of       | DZ or RA or SN or SG | FG or BR or SA or DU |                  |
| weather phenomena                 |                   |                      |                  |
|                                   |                   |                      |                  |
|                                   |                   |                      |                  |
|                                   |                   |                      |                  |
|                                   |                   |                      |                  |
|                                   |                   |                      |                  |
|                                   |                   |                      |                  |</p>
<table>
<thead>
<tr>
<th>Element as specified in</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>(C)7</td>
<td>PL or DS or SS or FZDZ or FZRA or SHGR or SHGS or SHRA or SHSN or TSGR or TSGS or HZ or FU or VA or SQ or PO or FC or TS or BCFG or BLDU or BLSA</td>
<td>HZ or FU or VA or SQ or SN or SNRA or FG or TSRA or +TSRA</td>
<td>+TSRA</td>
</tr>
<tr>
<td>Cloud (M)8</td>
<td>Cloud amount and height of base or vertical</td>
<td>FEWnnn or SCTnnn or VVnnn or VV///</td>
<td>FEW0 VV005 VV///</td>
</tr>
<tr>
<td>Temperature (O)9</td>
<td>Name of the element</td>
<td>TX</td>
<td>TX25/1013Z TX09/1005Z</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>M]nn/</td>
<td>TX05/2112Z TNM02/2103Z</td>
</tr>
<tr>
<td></td>
<td>Day and time of occurrence of the element</td>
<td>nnnZ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Name of the element</td>
<td>TN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimum</td>
<td>M]nn/</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Day and time of occurrence of the element</td>
<td>nnnZ</td>
<td></td>
</tr>
<tr>
<td>Expected significant changes to one or more of the above elements during the period of validity (C)4, 10</td>
<td>Change or probability indicator (M)</td>
<td>PROB30 [TEMPO] or PROB40 [TEMPO] or TEMPO 0815/0818 25017G25MPS</td>
<td>TEMPO 0815/0818 25017G25MPS</td>
</tr>
<tr>
<td></td>
<td>Period of occurrence or</td>
<td>nnn/nnn or nnnnn11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wind (C)4</td>
<td>nnn[P]nn[n][G[P]nn[n]]MPS or VRBonMPS (or TEMPO 0815/0818 25034G50KT)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prevailing visibility</td>
<td>nnn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weather phenomenon:</td>
<td>— or +</td>
<td>NSW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1000 TSRA</td>
</tr>
</tbody>
</table>
Weather phenomenon: characteristics and type (C)4, 7

| Weather phenomenon | DZ or | RA or | BR or | SN or | SA or | SG or | DU or | PL or | HZ or | DS or | FU or | SS or | VA or | FZDZ | SQ or | or | PO or FC | FZRA or | TS or | or | BECMG | or | BCFG or | SHGR or | BLDU or | or | BLSA or | SHGS |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|     |       |       |        |       |        |       |        |       |        |       |       |
| FeWnnn             | VVnnn |       |       |       |       |       |       |       |       |       |       |       |       |       |       |     |       |       |       |       |       |       |       |       |       |
| Cloud amount and   |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |     |       |       |       |       |       |       |       |       |       |
| height of base     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |     |       |       |       |       |       |       |       |       |       |
| or vertical        |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |     |       |       |       |       |       |       |       |       |       |
| visibility 4       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |     |       |       |       |       |       |       |       |       |       |
| (C) Cloud type (C)4|       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |     |       |       |       |       |       |       |       |       |       |
| or CB or TCU       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |     |       |       |       |       |       |       |       |       |       |

BECMG 1618/1620 8000

Notes.—

1. Fictitious location.
2. To be used in accordance with 1.2.1.
3. To be included in accordance with 1.2.1.
4. To be included whenever applicable.
5. One or more, up to a maximum of three, groups in accordance with 1.2.3.
6. To be included whenever applicable in accordance with 1.2.3. No qualifier for moderate intensity.
7. Weather phenomena to be included in accordance with 1.2.3.
8. Up to four cloud layers in accordance with 1.2.4.
9. To be included in accordance with 1.2.5, consisting of up to a maximum of four temperatures (two maximum temperatures and two minimum temperatures).
10. To be included in accordance with 1.3, 1.4 and 1.5.
11. To be used with FM only.
Table A5-2. Use of change and time indicators in TAF

<table>
<thead>
<tr>
<th>Change or time indicator</th>
<th>Time period</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM</td>
<td>ndndnhnhnmnm</td>
<td>used to indicate a significant change in most weather elements occurring at ndnd day, nhnh hours and nmnm minutes (UTC); all the elements given before “FM” are to be included following “FM”</td>
</tr>
<tr>
<td>BECMG</td>
<td>nd1nd1nh1nh1/nd2</td>
<td>(i.e. they are all superseded by those following the abbreviation) the change is forecast to commence at nd1nd1 day and nh1nh1 hours (UTC) and be completed by nd2nd2 day and nh2nh2 hours (UTC); only those elements for which a change is forecast are to be given following “BECMG”; the time period nd1nd1nh1nh1/nd2nd2nh2nh2 should normally be</td>
</tr>
<tr>
<td>TEMPO</td>
<td>nd1nd1nh1nh1/nd2</td>
<td>temporary fluctuations are forecast to commence at nd1nd1 day and nh1nh1 hours (UTC) and cease by nd2nd2 day and nh2nh2 hours (UTC); only those elements for which fluctuations are forecast are to be given</td>
</tr>
<tr>
<td>PROBnn</td>
<td>nd1nd1nh1nh1/nd2</td>
<td>probability of occurrence (in %) of an alternative value of a forecast element or elements; probability of occurrence of temporary fluctuations</td>
</tr>
</tbody>
</table>

nn = 30 or nn = 40 only;

Table A5-3. Template for GAMET

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

<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location indicator of FIR/CTA (M)</td>
<td>ICAO location indicator of the ATS unit serving the FIR</td>
<td>nnm</td>
<td>YUCC1</td>
</tr>
<tr>
<td>Identification</td>
<td>or CTA to which</td>
<td>GAMET</td>
<td>GAMET</td>
</tr>
<tr>
<td>Element</td>
<td>Detailed content</td>
<td>Identifier and time</td>
<td>Location</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>---------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Success</td>
<td>✅ Validity period (M)</td>
<td>✅ Day-time groups indicating the period of validity in UTC</td>
<td>✅ VALID nnnnn/nmnmnm</td>
</tr>
<tr>
<td>Location indicator of aerodrome meteorological office or meteorological watch office (M)</td>
<td>✅ Location indicator of aerodrome meteorological office or meteorological watch office</td>
<td>✅ nnn–</td>
<td>✅ YUCAMSWELL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>Identifier and time</th>
<th>Location</th>
<th>Content</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface wind (C)</td>
<td>✅ Widespread surface wind exceeding 15 m/s</td>
<td>✅ SFC WIND: [nn/n]</td>
<td>✅ [N OF Nnn or Snn]</td>
<td>✅ 10/12 310/16MPS</td>
<td>✅ SFC WIND: E OF W110</td>
</tr>
<tr>
<td>Surface visibility (C)</td>
<td>✅ Widespread surface visibility below 5 000 m including the weather phenomena</td>
<td>✅ SFC VIS: [nn/n]</td>
<td>✅ [W OF Wnnn or E of Emnn]</td>
<td>✅ 06/08 N OF N51 3000M BR</td>
<td>✅ SFC VIS: 06/08 N OF N51 3000M BR</td>
</tr>
<tr>
<td>Template(s)</td>
<td>Identifier and time</td>
<td>Location</td>
<td>Content</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>---------------------</td>
<td>----------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>causing the reduction in visibility</td>
<td>[nnnnnnn nn]2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Significant weather (C)</strong></td>
<td>Significant weather conditions encompassing thunderstorms, heavy sandstorm and duststorm, and volcanic ash</td>
<td>SIGWX: [nn/mn]</td>
<td>SIGWX: ISOL TS or OCNL TS or FRQ TS or OBSC TS or EMBD TS or HVY DS or HVY SS or SQL TS or ISOL TSGR or OCNL</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mountain obscuration (C)</strong></td>
<td>Mountain obscuration</td>
<td>MT OBSC: [nn/mn]02</td>
<td>MT OBSC: S OF N48 MT</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cloud (C)</strong></td>
<td>Widespread areas of broken or overcast cloud with height of base less than 300 m (1 000 ft) above ground level (AGL) or above mean sea level (AMSL) and/or any occurrence of</td>
<td>SIG CLD: [nn/mn]</td>
<td>SIG CLD: BKN or OVC or N51 OVC or 800/1100FT AGL or AMSL or ISOL TCU or ISOL or 1200/8000FT AGL or FRQ or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Icing (C)</td>
<td>Icing (except for that occurring in convective clouds and for severe icing for)</td>
<td>ICE: [nn/nn]</td>
<td>MOD FLnnn/nnn or MOD ABV FLnn or SEV ICE: MOD FL050/080</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>--------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbulence (C)</td>
<td>Turbulence (except for that occurring in convective clouds and for severe turbulence)</td>
<td>[nn/nn]</td>
<td>MOD FLnnn/nnn or MOD ABV FLnn or SEV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mountain wave (C)</td>
<td>Mountain wave (except for severe mountain wave for)</td>
<td>MTW: [nn/nn]</td>
<td>MOD FLnnn/nnn or MOD ABV FL050/080</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Template(s)

<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>Location</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIGMET (C)</td>
<td>SIGMET messages applicable to the FIR/CTA concerned or a subarea thereof, for HAZARDOUS WX NIL</td>
<td>SIGMET — [n][n][n4]</td>
<td>Examples</td>
</tr>
<tr>
<td>Indicator for the beginning of Pressure centres and fronts (M)</td>
<td>Indicator to identify the beginning of expected movements and developments</td>
<td>PSYS: Nnnn or L, Snnn [n][n]nnHP, Wnnnn or A or H, E01000 L, Ennnnn or [n][n]nnHPA, Nnnn or or MOV NE, Snnn FRONT or 25KT</td>
<td>PSYS: 06 N5130 1004HPA</td>
</tr>
<tr>
<td>Template(s)</td>
<td>Identifier and time</td>
<td>Location</td>
<td>Content</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------------</td>
<td>----------</td>
<td>---------</td>
</tr>
<tr>
<td>Wnnnn</td>
<td>NIL</td>
<td>WKN</td>
<td></td>
</tr>
<tr>
<td>or —</td>
<td>MOV N or MOV NE or MOV E or MOV SE or MOV S or MOV SW or MOV W</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Upper winds and upper-air temperatures** for at least the following:

- **WIND/T**: Nnnnn or Snnnn
- **Snnnn** or **Wnnnnn** or **Ennnnn**
- **N OF Nnn** or **Snn** or **Snn** or **W OF Wnnn** or **Ennn**
- **[n]nnnM** or **[n]nnnFT**
- **2000FT** or **270/18MPS** or **WIND/T: 2000FT** or **WIND/T: 270/18MPS**
- **5000FT** or **5500** or **W01000** or **W01000 CLD: BKN SC 2500/8000FT AGL**
- **PS03** or **N5500** or **W01000** or **W01000 CLD: BKN SC 2500/8000FT AGL**

**Cloud (M)**

- **CLD**: [n]nnn
- **[S OF Nnn or Snn]** or **Sct or BKN or OVC**
- **ST or SC or CU or AS or AGL**
- **FZLVL: 3000FT AGL**

**Freezing level (M)**

- **[E OF[ABV]** or **FZLVL: 3000FT AGL**

**Forecast QNH (M)**

- **MNM QNH**: [n]nnnHPA or **MNM QNH: 1004HPA**

**Sea-surface temperature and state of the sea**

- **SEA**: Tnn HGT or **SEA: T15**
- **[n]nM** or **HGT 5M**
Kenya Subsidiary Legislation, 2018

Template(s)
Identifier
and time   Location  Content

(O) required by regional
air

Volcanic eruptions
Name of volcano VA: nnnnnnnnn VA:
or

which a SIGMET FLnnn or SEV (M) NIL ETNA

Notes.—

1. Fictitious location.
2. Free text describing well-known geographical locations should be kept to a minimum.
3. The location of the CB and/or TCU should be specified in addition to any widespread areas of broken or overcast cloud as given in the example.
4. List as necessary, with comma separating.
5. When no elements are included in Section I.

Table A5-4. Ranges and resolutions for the numerical elements included in TAF

<table>
<thead>
<tr>
<th>Element as specified in Chapter 6</th>
<th>Range</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind direction: ° true</td>
<td>000 – 360</td>
<td>10</td>
</tr>
<tr>
<td>Wind speed:</td>
<td>00 – 99*</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>90 – 199*</td>
<td>1</td>
</tr>
<tr>
<td>Visibility:</td>
<td>0000 – 0750</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>0800 – 4 900</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>5 000 – 9 000</td>
<td>1 000</td>
</tr>
<tr>
<td></td>
<td>10 000</td>
<td>0 (fixed value: 9)</td>
</tr>
<tr>
<td>Vertical visibility:</td>
<td>000 – 020</td>
<td>1</td>
</tr>
<tr>
<td>Cloud: height of cloud base:</td>
<td>30’s M (100’s FT)</td>
<td></td>
</tr>
<tr>
<td>Air temperature (maximum and</td>
<td>°C</td>
<td>1</td>
</tr>
<tr>
<td>minimum):</td>
<td>-80 – +60</td>
<td></td>
</tr>
</tbody>
</table>

* There is no aeronautical requirement to report surface wind speeds of 50 m/s (100 kt) or more; however, provision has been made for reporting wind speeds up to 99 m/s (199 kt) for non-aeronautical purposes, as necessary.
Example A5-1. TAF

**TAF for YUDO (Donlon/International)*:**
TAF YUDO 151800Z 1600/1618 13005MPS 9000 BKN020 BECMG 1606/1608 SCT010CB BKN020 TEMPO 1608/1612 17006G12MPS 1000 TSRA SCT015CB BKN020 FM161230 15004MPS 9999 BKN020

*Meaning of the forecast:*
TAF for Donlon/International* issued on the 15th of the month at 1800 UTC valid from 0000 UTC to 1800 UTC on the 16th of the month; surface wind direction 130 degrees; wind speed 5 metres per second; visibility 9 kilometres, broken cloud at 600 metres; becoming between 0600 UTC and 0800 UTC on the 16th of the month, scattered cumulonimbus cloud at 450 metres and broken cloud at 600 metres; temporarily between 0800 UTC and 1200 UTC on the 16th of the month surface wind direction 170 degrees; wind speed 6 metres per second gusting to 12 metres per second; visibility 1000 metres in a thunderstorm with moderate rain, scattered cumulonimbus cloud at 300 metres and broken cloud at 600 metres; from 1230 UTC on the 16th of the month surface wind direction 150 degrees; wind speed 4 metres per second; visibility 10 kilometres or more; and broken cloud at 600 metres.

* Fictitious location

*Note.— In this example, the primary units “metre per second” and “metre” were used for wind speed and height of cloud base, respectively. However, in accordance with Annex 5, the corresponding non-SI alternative units “knot” and “foot” may be used instead.*

Example A5-2. Cancellation of TAF

**Cancellation of TAF for YUDO (Donlon/International)*:**
TAF AMD YUDO 161500Z 1600/1618 CNL

*Meaning of the forecast:*
Amended TAF for Donlon/International* issued on the 16th of the month at 1500 UTC cancelling the previously issued TAF valid from 0000 UTC to 1800 UTC on the 16th of the month.
Example A5-3. GAMET area forecast

<table>
<thead>
<tr>
<th>CC GAMET VALID</th>
<th>-</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC AMSWELL FIR/2 BLW</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>1/12</td>
</tr>
<tr>
<td>C</td>
<td>0/08 N OF NS1</td>
</tr>
<tr>
<td>SW</td>
<td>1/12 ISOL</td>
</tr>
<tr>
<td>:</td>
<td>0/09 N OF NS1 OVC 800/1100FT AGL FL120 ISOL</td>
</tr>
</tbody>
</table>

Example A5-3. GAMET area forecast

- **Meaning:** An area forecast for low-level flights (GAMET) is issued for two sub-area two of the flight information region (identified by YUCC Amwell area control centre) for below flight level 120 by the Donlon/International* aerodrome meteorological office.

- **Surface wind** between 1000 UTC and 1200 UTC surface wind direction 310 degrees; wind speed 16 metres per second.
- **Surface visibility** between 0600 UTC and 0800 UTC north of 51 degrees north 3000 metres (due to mist).
- **Significant weather phenomena** between 1100 UTC and 1200 UTC isolated thunderstorms without hail.
- **Significant clouds** between 0600 UTC and 0900 UTC north of 51 degrees north overcast base 800 feet, top 1200 feet, isolated towering cumulus base 1200, top 8000 feet.
- **Icing:** Moderate between flight level 050 and 0800.
at 0600 UTC low pressure of 1 004 hectopascals at 51.5 degrees north
expected to move eastwards at 25 knots and to

at 2 feet above ground 27 degrees
wind 1 metre second, temperature 5 degrees
at 10 feet above ground 25 degrees, speed 18 metres per second,
temperature 1 degree Celsius;
at 10 000 feet above ground 24 degrees east,
wind 22 metres per second, temperature minus 1 degree Celsius;
at 15 000 feet above ground 22 degrees north,
wind 22 metres per second, temperature minus 2 degrees Celsius;

broken stratocumulus, base 2 500 feet, top 8 000 feet
SEVENTH SCHEDULE

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

Regulation 40 (1)

Note. — Data type designators to be used in abbreviated headings for SIGMET, AIRMET, tropical cyclone and volcanic ash advisory messages are given in the Manual on the Global Telecommunication System (WMO-No. 386).

1. SPECIFICATIONS RELATED TO SIGMET INFORMATION

1.1 Format of SIGMET messages

1.1.1 The content and order of elements in a SIGMET message shall be in accordance with the template shown in Table A6-1A.

1.1.2 Messages containing SIGMET information shall be identified as: “SIGMET”.

1.1.3 The sequence number referred to in the template in Table A6-1A shall correspond with the number of SIGMET messages issued for the flight information region (FIR) since 0001 UTC on the day concerned. The meteorological watch offices whose area of responsibility encompasses more than one FIR and/or control area (CTA) shall issue separate SIGMET messages for each FIR and/or CTA within their area of responsibility.

1.1.4 In accordance with the template in Table A6-1A, only one of the following phenomena shall be included in a SIGMET message, using the abbreviations as indicated below:

At cruising levels (irrespective of altitude):

- thunderstorm
  - obscured
  - embedded
  - frequent
  - squall line
  - obscured with hail
  - embedded with hail
  - frequent, with hail
  - squall line with hail
- tropical cyclone
  - tropical cyclone with 10-minute mean surface wind speed of 17 m/s (34 kt) or more
  - TC (+ cyclone name)

- turbulence
  - severe turbulence icing
  - severe icing
  - severe icing due to freezing rain mountain wave
  - severe mountain wave duststorm
  - SEV TURB
  - SEV ICE
  - SEV ICE (FZRA)
  - SEV MTW
1.1.5 SIGMET information shall not contain unnecessary descriptive material. In describing the weather phenomena for which the SIGMET is issued, no descriptive material additional to that given in 1.1.4 shall be included. SIGMET information concerning thunderstorms or a tropical cyclone shall not include references to associated turbulence and icing.

1.1.6 Meteorological watch offices shall issue SIGMET information in digital form, in addition to the issuance of this SIGMET information in abbreviated plain language in accordance with 1.1.1.

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

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


1.1.9 — SIGMET, when issued in graphical format, shall be as specified in Ninth Schedule including the use of applicable symbols and/or abbreviations.

1.2 Dissemination of SIGMET messages

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

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

2. SPECIFICATIONS RELATED TO SPECIAL AIR-REPORTS

Note. — This appendix deals with the uplink of special air-reports. The general specifications related to special air-reports are in Fifth Schedule.

3.1 Special air-reports shall be uplinked for 60 minutes after their issuance.

3.2 Information on wind and temperature included in automated special air-reports shall not be uplinked to other aircraft in flight.

3. DETAILED CRITERIA RELATED TO SIGMET AND SPECIAL AIR-REPORTS (UPLINK)

3.1 Identification of the flight information region

— In cases where the airspace is divided into an FIR and an upper flight information region (UIR), the SIGMET shall be identified by the location indicator of the air traffic services unit serving the FIR.
Note.—The SIGMET message applies to the whole airspace within the lateral limits of the FIR, i.e. to the FIR and to the UIR. The particular areas and/or flight levels affected by the meteorological phenomena causing the issuance of the SIGMET are given in the text of the message.

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

4.2.1 An area of thunderstorms and cumulonimbus clouds shall be considered:
   (a) obscured (OBSC) if it is obscured by haze or smoke or cannot be readily seen due to darkness;
   (b) embedded (EMBD) if it is embedded within cloud layers and cannot be readily recognized;
   (c) isolated (ISOL) if it consists of individual features which affect, or are forecast to affect, an area with a maximum spatial coverage less than 50 per cent of the area concerned (at a fixed time or during the period of validity); and
   (d) occasional (OCNL) if it consists of well-separated features which affect, or are forecast to affect, an area with a maximum spatial coverage between 50 and 75 per cent of the area concerned (at a fixed time or during the period of validity).

4.2.2 An area of thunderstorms shall be considered frequent (FRQ) if within that area there is little or no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75 per cent of the area affected, or forecast to be affected, by the phenomenon (at a fixed time or during the period of validity).

4.2.3—Squall line (SQL) shall indicate a thunderstorm along a line with little or no space between individual clouds.

4.2.4—Hail (GR) shall be used as a further description of the thunderstorm, as necessary.

4.2.5 Severe and moderate turbulence (TURB) shall refer only to: low-level turbulence associated with strong surface winds; rotor streaming; or turbulence whether in cloud or not in cloud (CAT). Turbulence shall not be used in connection with convective clouds.

4.2.6 Turbulence shall be considered:
   a) severe whenever the peak value of the cube root of EDR exceeds 0.7; and
   b) moderate whenever the peak value of the cube root of EDR is above 0.4 and below or equal to 0.7.

4.2.7 Severe and moderate icing (ICE) shall refer to icing in other than convective clouds. Freezing rain (FZRA) shall refer to severe icing conditions caused by freezing rain.

4.2.8 A mountain wave (MTW) shall be considered:
   (a) severe whenever an accompanying downdraft of 3.0 m/s (600 ft/min) or more and/or severe turbulence is observed or forecast; and
   (b) moderate whenever an accompanying downdraft of 1.75–3.0 m/s (350–600 ft/min) and/or moderate turbulence is observed or forecast.

4.2.9 Sandstorm/duststorm shall be considered:
   (a) heavy whenever the visibility is below 200 m and the sky is obscured; and
   (b) moderate whenever the visibility is:
       (1) below 200 m and the sky is not obscured; or
       (2) between 200 m and 600 m.
4. SPECIFICATIONS RELATED TO AERODROME WARNINGS

4.1 Format and dissemination of aerodrome warnings

5.1.1 The aerodrome warnings shall be issued in accordance with the template in Table A6-2 where required by operators or aerodrome services, and shall be disseminated in accordance with local arrangements to those concerned.

5.1.2 The sequence number referred to in the template in Table A6-2 shall correspond with the number of aerodrome warnings issued for the aerodrome since 0001 UTC on the day concerned.

5.1.3 In accordance with the template in Table A6-2, aerodrome warnings shall relate to the occurrence or expected occurrence of one or more of the following phenomena:

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

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

5.1.4 The use of text additional to the abbreviations listed in the template in Table A6-2 shall be kept to a minimum.

The additional text shall be prepared in abbreviated plain language using approved ICAO abbreviations and numerical values. If no ICAO approved abbreviations are available, English plain language text shall be used.

5.2 Quantitative criteria for aerodrome warnings

When quantitative criteria are necessary for the issue of aerodrome warnings covering, for example, the expected maximum wind speed or the expected total snowfall, the criteria used shall be as agreed between the aerodrome meteorological office and the users concerned.

5. SPECIFICATIONS RELATED TO WIND SHEAR WARNINGS
5.1 Detection of wind shear

Evidence of the existence of wind shear shall be derived from:

a) ground-based, wind shear remote-sensing equipment, for example, Doppler radar;

b) ground-based, wind shear detection equipment, for example, a system of surface wind and/or pressure sensors located in an array monitoring a specific runway or runways and associated approach and departure paths;

c) aircraft observations during the climb-out or approach phases of flight to be made in accordance with Part VII to these Regulations; or

d) other meteorological information, for example, from appropriate sensors located on existing masts or towers in the vicinity of the aerodrome or nearby areas of high ground.

Note.—Wind shear conditions are normally associated with the following phenomena:

— thunderstorms, microbursts, funnel cloud (tornado or waterspout), and gust fronts

— frontal surfaces

— strong surface winds coupled with local topography

— sea breeze fronts

— low-level temperature inversions.

5.2 Format and dissemination of wind shear warnings and alerts

Note.—Information on wind shear is also to be included as supplementary information in local routine reports, local special reports, METAR and SPECI in accordance with the templates in Fourth Schedule, Tables A3-1 and A3-2.

6.2.1 The wind shear warnings shall be issued in accordance with the template in Table A6-3 and shall be disseminated in accordance with local arrangements to those concerned.

6.2.2 The sequence number referred to in the template in Table A6-3 shall correspond with the number of wind shear warnings issued for the aerodrome since 0001 UTC on the day concerned.

6.2.3 The use of text additional to the abbreviations listed in the template in Table A6-3 shall be kept to a minimum.

The additional text shall be prepared in abbreviated plain language using approved ICAO abbreviations and numerical values. If no ICAO approved abbreviations are available, English plain language text shall be used.

6.2.4 When an aircraft report is used to prepare a wind shear warning, or to confirm a warning previously issued, the corresponding aircraft report, including the aircraft type, shall be disseminated unchanged in accordance with local arrangements to those concerned.

Note 1.—Following reported encounters by both arriving and departing aircraft, two different wind shear warnings may exist: one for arriving aircraft and one for departing aircraft.

Note 2.—Specifications for reporting the intensity of wind shear are still undergoing development. It is recognized, however, that pilots, when reporting wind shear, may use the qualifying terms “moderate”, “strong” or “severe”, based to a large extent on their subjective assessment of the intensity of the wind shear encountered.
6.2.5 The wind shear alerts shall be disseminated from automated, ground-based, wind shear remote-sensing or detection equipment in accordance with local arrangements to those concerned.

6.2.6 Where microbursts are observed, reported by pilots or detected by ground-based, wind shear detection or remote-sensing equipment, the wind shear warning and wind shear alert shall include a specific reference to microburst.

6.2.7 Where information from ground-based, wind shear detection or remote-sensing equipment is used to prepare a wind shear alert, the alert shall, if practicable, relate to specific sections of the runway and distances along the approach path or take-off path as agreed between the meteorological service provider, the appropriate ATS authority and the operators concerned.

Table A6-1A. Template for SIGMET messages

<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>SIGMET template</th>
<th>AIRMET* template</th>
<th>SIGMET message</th>
<th>AIRMET* message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location indicator of FIR/CTA (M)1</td>
<td>ICAO location indicator of the ATS unit serving nnnn</td>
<td></td>
<td>YUC C2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification (M)</td>
<td>the FIR or CTA to Message identification and 3</td>
<td>SIGMET [n][n][n]</td>
<td>AIRMET 2</td>
<td>SIGMET 01</td>
<td>AIRMET * 9</td>
</tr>
<tr>
<td>Validity period (M)</td>
<td>sequence number Day-time groups indicating the period of validity in UTC</td>
<td>VALID nnnnn/nnnn</td>
<td></td>
<td>VALID 010000/010400</td>
<td></td>
</tr>
<tr>
<td>Location indicator of MWO (M)</td>
<td>Location indicator of MWO originating the</td>
<td>nnnn</td>
<td>YUD</td>
<td></td>
<td>YUSO</td>
</tr>
<tr>
<td>Element</td>
<td>Detailed content</td>
<td>SIGMET template</td>
<td>AIRMET template</td>
<td>SIGMET message</td>
<td>AIRMET message</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------------------------------------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Name of the FIR/CTA (M)</td>
<td>Location indicator and name of the FIR/CTA for</td>
<td>nnnn</td>
<td>nnnn</td>
<td>YUCC Amswell</td>
<td>YUCC Amswell</td>
</tr>
<tr>
<td></td>
<td>nn FIR[/UIR]</td>
<td></td>
<td></td>
<td>FIR/2 Yudd</td>
<td>FIR/22 Yudd</td>
</tr>
<tr>
<td>or</td>
<td>IF THE SIGMET OR AIRMET MESSAGE IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenomenon (M)5</td>
<td>Description of phenomenon causing the issuance of SIGMET/AIRMET</td>
<td>OBSC6</td>
<td>SFC WIND</td>
<td>OBSC TS</td>
<td>SFC WIND</td>
</tr>
<tr>
<td></td>
<td>TC [GR7]</td>
<td>MPS (or)</td>
<td>TSGR</td>
<td>TSGR</td>
<td>TSGR</td>
</tr>
<tr>
<td></td>
<td>EMBD8</td>
<td>SFC</td>
<td>EMBD</td>
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<td>TS [GR7]</td>
<td>TS</td>
<td>TS</td>
<td>TS</td>
<td>TS</td>
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<tr>
<td></td>
<td>FRQ9</td>
<td>nnn/n[n]</td>
<td>FRQ TS</td>
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<tr>
<td></td>
<td>SQL10</td>
<td>TSGR</td>
<td>SFC VIS</td>
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</tr>
<tr>
<td></td>
<td>TS[GR7]</td>
<td>FRQ</td>
<td>SQL TS</td>
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</tr>
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<td>EMBD</td>
<td>SQL TSGR</td>
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<td>nnnnnnnnnnnnnn</td>
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<td>ISOL16</td>
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<td>MT</td>
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<tr>
<td></td>
<td>PSN Nnn[n] or Snn[n]</td>
<td>ISOL</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Wnnn[n] or Ennn[n] CB or</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>or</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>TC NN11 PSN OBSC PSN N10 W060 BKN CLD</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>SIGMET template</th>
<th>AIRMET template</th>
<th>SIGMET message</th>
<th>AIRMET message</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVY SS</td>
<td>[VA Eruption]</td>
<td>SFC/[ABV][n]</td>
<td>OVC CLD</td>
<td>HVY DS</td>
<td>OVC CLD</td>
</tr>
<tr>
<td></td>
<td>[MT][nnnnnnnnnnn]</td>
<td>[ABV][n]</td>
<td></td>
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<tr>
<td></td>
<td>PSN Nnn[n] or Snn[n]</td>
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<td></td>
<td>VA CLD</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>[or OVC CLD]</td>
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<td></td>
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<tr>
<td></td>
<td>RDOACT CLD</td>
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<td></td>
</tr>
</tbody>
</table>

or
<table>
<thead>
<tr>
<th>Observed or forecast phenomenon (M)</th>
<th>Indication whether information is observed and expected to or forecast</th>
<th>OBS [AT nnnnZ] or FCST [AT nnnnZ]</th>
<th>OBS</th>
<th>FCST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>or N OF LINE20 or NE OF LINE20 or E OF LINE20</td>
<td>N OF LINE S2520 W11510 – S2520</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Element</td>
<td>Detailed content</td>
<td>SIGMET template</td>
<td>AIRMET template</td>
<td>SIGMET message</td>
</tr>
<tr>
<td>---------</td>
<td>------------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>----------------</td>
</tr>
<tr>
<td>or</td>
<td>FL18 0 SFC/FLnnn or SFC/nnnnM (or SFC/[n]nnnnFT) or FLnnn/nnn or TOP FLnnn</td>
<td>FL18 0</td>
<td>SFC/FL070</td>
<td>SFC/3000M</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Movement or movement (C) 19, 24</th>
<th>Movement or movement speed) with one of the sixteen points of compass, or</th>
</tr>
</thead>
<tbody>
<tr>
<td>[TOP] ABV FLnnn or FL050/080</td>
<td>[TOP] ABV FLnnn or FL050/080</td>
</tr>
<tr>
<td>or [nnnn/nnnnM (or FLnnn)</td>
<td>or [nnnn/nnnnM (or FLnnn)</td>
</tr>
<tr>
<td>or [nnnnFFLnnn]</td>
<td>or [nnnnFFLnnn]</td>
</tr>
<tr>
<td>or 22</td>
<td>or 22</td>
</tr>
<tr>
<td>TOP [ABV or BLW] FLnnn</td>
<td>TOP [ABV or BLW] FLnnn</td>
</tr>
</tbody>
</table>

| FL050/080                      | FL050/080 |
| TOP ABV FL100                  | TOP ABV FL100 |
| 2000M                           | 2000M |
| 3000M                           | 3000M |
| 8000FT                          | 8000FT |
| 6000/12000FT                    | 6000/12000FT |
| 2000M/FL150                     | 2000M/FL150 |
| TOP FL500                       | TOP FL500 |
| TOP ABV FL500                   | TOP ABV FL500 |
| TOP BLW FL450                   | TOP BLW FL450 |

| MOV N [nnKMH] or MOV NNE        | MOV N [nnKMH] or MOV NNE |
| MOV NE [nnKMH] or MOV ENE       | MOV NE [nnKMH] or MOV ENE |
| MOV E [nnKMH] or MOV ESE        | MOV E [nnKMH] or MOV ESE |
| MOV SE [nnKMH] or MOV SSE       | MOV SE [nnKMH] or MOV SSE |
| MOV S [nnKMH] or MOV SSE        | MOV S [nnKMH] or MOV SSE |
| MOV SW [nnKMH] or MOV WSW       | MOV SW [nnKMH] or MOV WSW |
| MOV W [nnKMH] or MOV WNW        | MOV W [nnKMH] or MOV WNW |
| MOV NW [nnKMH] or MOV NWN        | MOV NW [nnKMH] or MOV NWN |
| MOV NE [nnK] or MOV N [nnK] or MOV NNE | MOV NE [nnK] or MOV N [nnK] or MOV NNE |
| MOV E [nnK] or MOV ESE [nnK] | MOV E [nnK] or MOV ESE [nnK] |
| MOV S [nnK] or MOV SSE [nnK] | MOV S [nnK] or MOV SSE [nnK] |
| MOV SW [nnK] or MOV WSW [nnK] | MOV SW [nnK] or MOV WSW [nnK] |
| MOV NW [nnK] or MOV NNW [nnK] | MOV NW [nnK] or MOV NNW [nnK] |
| MOV NE [nnK] or MOV N [nnKT] or MOV NNE | MOV NE [nnK] or MOV N [nnKT] or MOV NNE |
| MOV E [nnKT] or MOV ESE [nnKT] | MOV E [nnKT] or MOV ESE [nnKT] |
| MOV S [nnKT] or MOV SSE [nnKT] | MOV S [nnKT] or MOV SSE [nnKT] |
| MOV SW [nnKT] or MOV WSW [nnKT] | MOV SW [nnKT] or MOV WSW [nnKT] |
| MOV W [nnKT] or MOV WNW [nnKT] | MOV W [nnKT] or MOV WNW [nnKT] |
| MOV NW [nnKT] or MOV NNW [nnKT] | MOV NW [nnKT] or MOV NNW [nnKT] |
| MOV NE [nnKT] or MOV N [nnKMH] | MOV NE [nnKT] or MOV N [nnKMH] |

<p>| MOV SE                        | MOV SE |
| MOV NNW                       | MOV NNW |
| MOV E 40KMH MOV E 20KT        | MOV E 40KMH MOV E 20KT |
| MOV WSW 20KT                  | MOV WSW 20KT |
| STN                           | STN |</p>
<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>SIGMET template</th>
<th>AIRMET template</th>
<th>SIGMET message</th>
<th>AIRMET* message</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in intensity (C)19</td>
<td>Expected changes in intensity</td>
<td>INTSF or WKN or NC</td>
<td>—</td>
<td>INTS F</td>
<td>—</td>
</tr>
<tr>
<td>Forecast time (C)24</td>
<td>Indication of the forecast time of</td>
<td>FCST AT nnnnZ</td>
<td>—</td>
<td>FCST AT 2200Z</td>
<td>—</td>
</tr>
<tr>
<td>Forecast position (C)19, 24, 25</td>
<td>Forecast position of phenomenon at the end of the validity period of the SIGMET message</td>
<td>Nnn[nn]</td>
<td>N30 W170 N OF N30 S OF S50 AND W170 S50</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

<p>| | | OF Wnn[nn] or OF Wnn[nn] or OF Enn[nn] or OF Enn[nn] | E010 | — | — |
| | | N090 W050 – N050 | APRX 50KM | — | — |
| | | W090 – N050 W090 – N100 | WID LINE BTN | — | — |
| | | W090 – N20 W100 – N20 | N64 W017 – N57 W005 – N55 | — | — |
| | | W090 | E010 – N55 E030 | — | — |</p>
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<th>SIGMET template</th>
<th>AIRMET template</th>
<th>SIGMET message</th>
<th>AIRMET* message</th>
</tr>
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<td>ENTIRE FIR</td>
<td>ENTIRE FIR/UIR</td>
<td>ENTIRE CTA</td>
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<tr>
<td>or</td>
<td>NE OF LINE20</td>
<td>or E</td>
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<td>or</td>
<td>WI20, 21</td>
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<tr>
<td>or</td>
<td>Nnn[nn] or</td>
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<td>or</td>
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<td>Ennn[nn] –</td>
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<td>CNL AIRMET</td>
<td>CNL SIGMET 2</td>
<td>CNL AIRMET*</td>
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<tr>
<td>of</td>
<td>of</td>
<td>nnnnn/nmmmnn</td>
<td>nnnnn/nmmmnn</td>
<td>101200/101600</td>
<td>151520/151800</td>
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<td>SIGMET/AIRMET</td>
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<tr>
<td>(C)28</td>
<td>to its</td>
<td>nnnnn/nmmmnn</td>
<td>nnnnn/nmmmnn</td>
<td>101200/101600</td>
<td>151520/151800</td>
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<tr>
<td>Cancellation of</td>
<td>Cancellation of</td>
<td>CNL SIGMET</td>
<td>CNL AIRMET</td>
<td>CNL SIGMET 2</td>
<td>CNL AIRMET*</td>
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<td>251030/251430</td>
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<td>nnnnn nnnnnn/nnnnnn</td>
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<td>VA MOV TO</td>
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</tr>
</tbody>
</table>

**Notes.**—

1. See 4.1.
2. Fictitious location.
3. In accordance with 1.1.3 and 2.1.2.
4. See 2.1.3.
5. In accordance with 1.1.4 and 2.1.4.
6. In accordance with 4.2.1 a).
7. In accordance with 4.2.4.
8. In accordance with 4.2.1 b).
9. In accordance with 4.2.2.
10. In accordance with 4.2.3.
11. Used for unnamed tropical cyclones.
12. In accordance with 4.2.5 and 4.2.6.
15. In accordance with 2.1.4.
16. In accordance with 4.2.1 c).
17. In accordance with 4.2.1 d).
18. The use of cumulonimbus (CB) and towering cumulus (TCU) is restricted to AIRMET*s in accordance with 2.1.4.
19. In the case of volcanic ash cloud or tropical cyclone covering more than one area within the FIR, these elements can be repeated, as necessary.
20. A straight line is to be used between two points drawn on a map in the Mercator projection or between two points which crosses lines of longitude at a constant angle.
21. The number of coordinates should be kept to a minimum and should not normally exceed seven.
22. Only for SIGMET messages for tropical cyclones.
23. Only for SIGMET messages for volcanic ash cloud and tropical cyclones.
24. The elements “forecast time” and “forecast position” are not to be used in conjunction with the element “movement or expected movement”.
25. The levels of the phenomena remain fixed throughout the forecast period.
26. Only for SIGMET messages for volcanic ash.

27. To be used for two volcanic ash clouds or two centres of tropical cyclones simultaneously affecting the FIR concerned.

28. End of the message (as the SIGMET/AIRMET* message is being cancelled).

AIRMET* - Not applicable

Table A6-1B. Template for special air-reports (uplink)

<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>Template1,2</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification (M)</td>
<td>Message identification</td>
<td>ARS</td>
<td>ARS</td>
</tr>
<tr>
<td>Aircraft identification (M)</td>
<td>Aircraft radiotelephony call sign</td>
<td>nnnnn</td>
<td>VA8123</td>
</tr>
<tr>
<td>Observed phenomenon (M)</td>
<td>Description of observed phenomenon causing the issuance of the special air-report</td>
<td>TS, TSGR</td>
<td>TS TSGR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SEV TURB</td>
<td>SEV TURB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SEV ICE</td>
<td>SEV ICE</td>
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<td>SEV MTW</td>
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<td>HVY SS</td>
<td>HVY SS</td>
</tr>
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<td></td>
<td>VA CLD VA</td>
<td>VA CLD VA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VA MT ASHVAL</td>
<td>VA MT ASHVAL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MOD TURB</td>
<td>MOD TURB</td>
</tr>
<tr>
<td>Observation time (M)</td>
<td>Time of observation of observed phenomenon</td>
<td>OBS AT nnnnZ</td>
<td>OBS AT 1210Z</td>
</tr>
<tr>
<td>Location (C)</td>
<td>Location (referring to latitude and longitude (in degrees and minutes)) of observed phenomenon</td>
<td>NnnnnWnnn nnnn or NnnnnEnnnn nnnn or SnnnnWnnn</td>
<td>N2020W07005 S4812E01036</td>
</tr>
<tr>
<td>Level (C)</td>
<td>Flight level or altitude of observed phenomenon</td>
<td>nn FLnnn or or FLnnn/nnn or nnnnM</td>
<td>FL390 FL180/210 3000M 12000FT</td>
</tr>
</tbody>
</table>
**Notes.**—

(c) No wind and temperature to be uplinked to other aircraft in light in accordance with 3.2. 2.
(d) See 3.1.
(e) Fictitious call sign.
(f) In the case of special air-report for volcanic ash cloud, the vertical extent (if observed) and name of the volcano (if known) can be used.
(g) Fictitious location.

Table A6-2. Template for aerodrome warnings

<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>Template</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location indicator of the aerodrome (M)</td>
<td>Location indicator of the aerodrome</td>
<td>mnn</td>
<td>YUCC1</td>
</tr>
<tr>
<td>Identification of the type of message (M)</td>
<td>Type of message and sequence number</td>
<td>AD WRNG [n]n</td>
<td>AD WRNG 2</td>
</tr>
<tr>
<td>Validity period (M)</td>
<td>Day and time of validity period in UTC</td>
<td>VALID nnnnn/mnnnn</td>
<td>VALID 211230/211530</td>
</tr>
</tbody>
</table>

IF THE AERODROME WARNING IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.
| Phenomenon (M)2 | Description of phenomenon causing the issuance of the aerodrome warning | TC3 nnmnnnnnnn or [HVY] or TS or GR or [HVY] or [HVY] SN or [nnCM] or [HVY] or [HVY] SS or [HVY] DS or SA or DU or SFC WSPD nn[n]MPS MAX nn[n] (SFC WSPD nn[n]KT MAX nn[n]) or SFC WIND nnn/nn[n]M PS MAX nn[n] (SFC WIND nnn/nn[n]KT MAX nn[n]) or SQ or FROST or TSUNAMI or VA[DEPO] or TOX CHEM or Free text up to 32 characters | TC or ANDREW or HVY SN or 25CM or SFC WSPD or 20MPS MAX 30 or VA or TSUNAMI |
| Observed or forecast phenomenon (M) | Indication whether the information is observed and expected to continue, or forecast | OBS [AT nnnnZ] or FCST | OBS or AT or 1200 or Z or OBS |
| Changes in intensity (C) | Expected changes in intensity | NTSF or WKN or NC | WKN |
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OR

| Cancellation of aerodrome warning6 | Cancellation of aerodrome warning referring to its identification | CNL AD WRNG [n]n | CNL AD WRNG 2 211230/2115306 |

Notes.—
1. Fictitious location.
2. One phenomenon or a combination thereof, in accordance with 5.1.3.
3. In accordance with 5.1.3.
4. Hoar frost or rime in accordance with 5.1.3.
5. In accordance with 5.1.4.
6. End of the message (as the aerodrome warning is being cancelled).

Table A6-3. Template for wind shear warnings

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

Note 1. — The ranges and resolutions for the numerical elements included in wind shear warnings are shown in Table A6-4 of this Schedule.

Note 2. — The explanations for the abbreviations can be found in the PANS-ABC (Doc 8400).

<table>
<thead>
<tr>
<th>Element</th>
<th>Detailed content</th>
<th>Template(s)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location indicator of the aerodrome</td>
<td>Location indicator of the aerodrome</td>
<td>nnnn</td>
<td>YUCC1</td>
</tr>
<tr>
<td>Identification of the type of message</td>
<td>Type of message and sequence number</td>
<td>WS WRNG [n]n</td>
<td>WS WRNG 1</td>
</tr>
<tr>
<td>Time of origin and validity period (M)</td>
<td>Day and time of issue and, where applicable,</td>
<td>nnnnn [VALID TL nnnnn] or [VALID nnnnn/nnnnn]</td>
<td>211230 211330 VALID TL 221200 VALID</td>
</tr>
</tbody>
</table>

IF THE WIND SHEAR WARNING IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.
<table>
<thead>
<tr>
<th>Phenomenon (M)</th>
<th>Identification of the phenomenon and its location</th>
<th>Observed, reported or forecast phenomenon (M)</th>
<th>Details of the phenomenon (C)2</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOD] or [SEV] WS IN APCH or [MOD] or [SEV] WS [APCH] RWYYnn or [MOD] or [SEV] WS IN CLIMB-OUT or [MOD] or [SEV] WS CLIMB-OUT RWYYnn or MBST IN APCH or MBST [APCH] RWYYnn or MBST IN CLIMB-OUT or MBST CLIMB-OUT RWYnn</td>
<td>MOD] or [SEV] WS IN APCH or [MOD] or [SEV] WS IN CLIMB-OUT or [MOD] or [SEV] WS CLIMB-OUT RWYYnn or MBST IN APCH or MBST [APCH] RWYYnn or MBST IN CLIMB-OUT or MBST CLIMB-OUT RWYnn</td>
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OR
Cancellation of wind shear warning

Cancellation of wind shear warning referring to its identification

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Notes.—
1. Fictitious location.
2. Additional provisions in 6.2.3.
3. End of the message (as the wind shear warning is being cancelled).

Table A6-4. Ranges and resolutions for the numerical elements included in volcanic ash and tropical cyclone advisory messages, SIGMET messages and aerodrome and wind shear warnings

<table>
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<th>Element as specified in Appendices 2 and 6</th>
<th>Range</th>
<th>Resolution</th>
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<td>Summit elevation:</td>
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<td></td>
<td>FT 000 – 27 000</td>
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</tr>
<tr>
<td>Advisory number:</td>
<td>for VA (index)* 000 – 2 000</td>
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<tr>
<td></td>
<td>for TC (index)* 00 – 99</td>
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<td>Maximum surface wind:</td>
<td>MPS 00 – 99</td>
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<tr>
<td></td>
<td>KT 00 – 199</td>
<td>1</td>
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<tr>
<td>Central pressure:</td>
<td>hPa 850 – 1 050</td>
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</tr>
<tr>
<td>Surface wind speed:</td>
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<td></td>
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<td>Surface visibility:</td>
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<td></td>
<td>M 0800 – 5 000</td>
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<td>Cloud: height of base:</td>
<td>M 000 – 300</td>
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<td></td>
<td>FT 000 – 1 000</td>
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<td>Cloud: height of top:</td>
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<td></td>
<td>M 3 000 – 20 000</td>
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<td>FT 000 – 9 900</td>
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<td>Latitudes:</td>
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<td></td>
<td>° (degrees) 00 – 60</td>
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<td>Longitudes:</td>
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<td>° (degrees) 00 – 60</td>
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<td>Flight levels:</td>
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<td></td>
<td>KT 0 – 150</td>
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* Non-dimensional
Example A6-1. SIGMET message and the corresponding cancellations

Example A6-2. SIGMET message for tropical cyclone

Example A6-3. SIGMET message for volcanic ash
15 degrees 6 minutes south and 75 degrees east, 15 degrees 18 minutes south and 81 degrees 12 minutes east, and 17 degrees 12 minutes south and 83 degrees 30 minutes east.

*Fictitious location

Example A6-4. SIGMET message for radioactive cloud


Meaning:
The second SIGMET message issued for the AMSWELL* flight information region (identified by YUCC Amswell area control centre) by the Donlon/International* meteorological watch office (YUDO) since 0001 UTC; the message is valid from 1200 UTC to 1600 UTC on the 20th of the month; radioactive cloud was observed at 1155 UTC within an area bounded by 50 degrees 0 minutes south 140 degrees 0 minutes west to 50 degrees 0 minutes south 138 degrees 0 minutes west to 52 degrees 0 minutes south 138 degrees 0 minutes west to 52 degrees 0 minutes south 140 degrees 0 minutes west to 52 degrees 0 minutes south 140 degrees 0 minutes west and between the surface and flight level 100; the radioactive cloud is expected to weaken in intensity; at 1600 UTC the radioactive cloud is forecast to be located within an area bounded by 52 degrees 0 minutes south 140 degrees 0 minutes west to 53 degrees 0 minutes south 138 degrees 0 minutes west to 52 degrees 0 minutes south 140 degrees 0 minutes west to 52 degrees 0 minutes south 140 degrees 0 minutes west.  

*Fictitious location

Example A6-5. SIGMET message for severe turbulence

YUCC SIGMET 5 VALID 221215/221600 YUDO – YUCC AMSWELL FIR SEV TURB OBS AT 1210Z N2020 W07005 FL250 INTSF FCST AT 1600Z S OF N2020 AND E OF W06950

Meaning:
The fifth SIGMET message issued for the AMSWELL* flight information region (identified by YUCC Amswell area control centre) by the Donlon/International* meteorological watch office (YUDO) since 0001 UTC; the message is valid from 1215 UTC to 1600 UTC on the 22nd of the month; severe turbulence was observed at 1210 UTC 20 degrees 20 minutes north and 70 degrees 5 minutes west at flight level 250; the turbulence is expected to strengthen in intensity; at 1600 UTC the severe turbulence is...
| forecast to be located south of 20 degrees 20 minutes north and east of 69 degrees 50 minutes west. |
| * Fictitious location |
EIGHTH SCHEDULE

TECHNICAL SPECIFICATIONS RELATED TO AERONAUTICAL CLIMATOLOGICAL INFORMATION (R. 43(1))

1. PROCESSING OF AERONAUTICAL CLIMATOLOGICAL INFORMATION

Meteorological observations for regular and alternate aerodromes shall be collected, processed and stored in a form suitable for the preparation of aerodrome climatological information.

2. EXCHANGE OF AERONAUTICAL CLIMATOLOGICAL INFORMATION

Aeronautical climatological information shall be exchanged on request between meteorological authorities. Operators and other aeronautical users desiring such information should normally apply to the meteorological authority responsible for its preparation.

3. CONTENT OF AERONAUTICAL CLIMATOLOGICAL INFORMATION

3.1 Aerodrome climatological tables

3.1.1 An aerodrome climatological table shall give as applicable:

(a) mean values and variations therefrom, including maximum and minimum values, of meteorological elements (for example, of air temperature); and/or

(b) the frequency of occurrence of present weather phenomena affecting flight operations at the aerodrome (for example, of sandstorms); and/or

(c) the frequency of occurrence of specified values of one, or of a combination of two or more, elements (for example, of a combination of low visibility and low cloud).

3.1.2 Aerodrome climatological tables shall include information required for the preparation of aerodrome climatological summaries in accordance with 3.2.

3.2 Aerodrome climatological summaries

Aerodrome climatological summaries shall cover:

(a) frequencies of the occurrence of runway visual range/visibility and/or height of the base of the lowest cloud layer of BKN or OVC extent below specified values at specified times;

(b) frequencies of visibility below specified values at specified times;

(c) frequencies of the height of the base of the lowest cloud layer of BKN or OVC extent below specified values at specified times;

(d) frequencies of occurrence of concurrent wind direction and speed within specified ranges;

(e) frequencies of surface temperature in specified ranges of 5°C at specified times; and

(f) mean values and variations therefrom, including maximum and minimum values of meteorological elements required for operational planning purposes, including take-off performance calculations.

Note.—Models of climatological summaries related to a) to e) are given in the Technical Regulations (WMO-No. 49), Volume II — Meteorological Service for International Air Navigation, Part III.
NINTH SCHEDULE
TECHNICAL SPECIFICATIONS RELATED TO SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

Regulation 47(1) and (8)

Note.—Specifications related to flight documentation (including the model charts and forms) are given in Part 5 of this Schedule.

1. MEANS OF SUPPLY AND FORMAT OF METEOROLOGICAL INFORMATION

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

(a) written or printed material, including specified charts and forms;
(b) data in digital form;
(c) briefing;
(d) consultation;
(e) display; or
(f) in lieu of (a) to (e), by means of an automated pre-flight information system providing self-briefing and flight documentation facilities while retaining access by operators and aircrew members to consultation, as necessary, with the aerodrome meteorological office, in accordance with 5.1.

1.2 The meteorological authority, in consultation with the operator, shall determine:

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

1.3 On request by the operator, the meteorological information supplied for flight planning shall include data for the determination of the lowest usable flight level.

2. SPECIFICATIONS RELATED TO INFORMATION FOR PRE-FLIGHT PLANNING AND IN-FLIGHT REPLANNING

2.1 Format of upper-air gridded information

Upper-air gridded information supplied by the world area forecast centres (WAFCs) for pre-flight and in-flight replanning shall be in the GRIB code form.

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

2.2 Format of information on significant weather

Information on significant weather supplied by WAFCs for pre-flight and in-flight replanning shall be in the BUFR code form.

Note.—The BUFR code form is contained in the Manual on Codes (WMO-No. 306), Volume I.2, Part B — Binary Codes.
2.3 Specific needs of helicopter operations

Meteorological information for pre-flight planning and in-flight replanning by operators of helicopters flying to offshore structures shall include data covering the layers from sea level to flight level 100. Particular mention shall be made of the expected surface visibility, the amount, type (where available), base and tops of cloud below flight level 100, sea state and sea-surface temperature, mean sea-level pressure, and the occurrence and expected occurrence of turbulence and icing, as determined by regional air navigation agreement.

3. SPECIFICATIONS RELATED TO BRIEFING AND CONSULTATION

3.1 Information required to be displayed

The material displayed shall be readily accessible to the flight crew members or other flight operations personnel concerned.

4. SPECIFICATIONS RELATED TO FLIGHT DOCUMENTATION

4.1 Presentation of information

The material displayed shall be readily accessible to the flight crew members or other flight operations personnel concerned.

4.1.1 The flight documentation related to forecasts of upper wind and upper-air temperature and SIGWX phenomena shall be presented in the form of charts. For low-level flights, alternatively, GAMET area forecasts shall be used.

*Note.* — Models of charts and forms for use in the preparation of flight documentation are given in First Schedule. These models and methods for their completion are developed by the World Meteorological Organization (WMO) on the basis of relevant operational requirements stated by ICAO.

4.1.2 The flight documentation related to concatenated route-specific upper wind and upper-air temperature forecasts shall be provided as agreed between the meteorological authority and the operator concerned.

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

4.1.3 METAR and SPECI (including trend forecasts as issued in accordance with regional air navigation agreement), TAF, GAMET, SIGMET and volcanic ash and tropical cyclone advisory information shall be presented in accordance with the templates in this Schedule and Schedules 4, 6 and 7. Such meteorological information received from other meteorological offices shall be included in flight documentation without change.

*Note.* — Examples of the form of presentation of METAR/SPECI and TAF are given in this Schedule.

4.1.4 The location indicators and the abbreviations used shall be explained in the flight documentation.

4.1.5 The forms and the legend of charts included in flight documentation shall be printed in English/ French. Where appropriate, approved abbreviations shall be used. The units employed for each element shall be indicated; they should be in accordance with the Civil Aviation (Units of Measurement to be used in Air Ground operations), Regulations …..

4.2 Charts in flight documentation

4.2.1 Characteristics of charts
4.2.1.1 Charts included in flight documentation shall have a high standard of clarity and legibility and shall have the following physical characteristics:

(a) for convenience, the largest size of charts should be about 42 × 30 cm (standard size A3) and the smallest size should be about 21 × 30 cm (standard size A4). The choice between these sizes should depend on the route lengths and the amount of detail that needs to be given in the charts as agreed between the meteorological authorities and the users concerned;

(b) major geographical features, such as coastlines, major rivers and lakes should be depicted in a way that makes them easily recognizable;

(c) for charts prepared by computer, meteorological data should take preference over basic chart information, the former cancelling the latter wherever they overlap;

(d) major aerodromes should be shown as a dot and identified by the first letter of the name of the city the aerodrome serves as given in Table AOP of the relevant regional air navigation plan;

(e) a geographical grid should be shown with meridians and parallels represented by dotted lines at each 10° latitude and longitude; dots should be spaced one degree apart;

(f) latitude and longitude values should be indicated at various points throughout the charts (i.e. not only at the edges); and

(g) labels on the charts for flight documentation should be clear and simple and should present the name of the world area forecast centre or, for non-world area forecast system (WAFS) products, the originating centre, the type of chart, date and valid time and, if necessary, the types of units used in an unambiguous way.

4.2.1.2 Meteorological information included in flight documentation shall be represented as follows:

(a) winds on charts shall be depicted by arrows with feathers and shaded pennants on a sufficiently dense grid;

(b) temperatures shall be depicted by figures on a sufficiently dense grid;

(c) wind and temperature data selected from the data sets received from a world area forecast centre shall be depicted in a sufficiently dense latitude/longitude grid; and

(d) wind arrows shall take precedence over temperatures and either shall take precedence over chart background.

4.2.1.3 For short-haul flights, charts shall be prepared covering limited areas at a scale of 1:15 × 10⁶ as required.

4.2.2 Set of charts to be provided

4.2.2.1 The minimum number of charts for flights between flight level 250 and flight level 630 shall include a highlevel SIGWX chart (flight level 250 to flight level 630) and a forecast 250 hPa wind and temperature chart. The actual charts provided for pre-flight and in-flight planning and for flight documentation shall be as agreed between meteorological authorities and users concerned.
4.2.2.2 Charts to be provided shall be generated from the digital forecasts provided by the WAFCs whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, unless otherwise agreed between the meteorological authority and the operator concerned.

4.2.3 Height indications

In flight documentation, height indications shall be given as follows:

a) all references to en-route meteorological conditions, such as height indications of upper winds, turbulence or bases and tops of clouds, shall preferably be expressed in flight levels; they may also be expressed in pressure, altitude or, for low-level flights, height above ground level; and

b) all references to aerodrome meteorological conditions, such as height indications of the bases of clouds, shall be expressed in height above the aerodrome elevation.

4.3 Specifications related to low-level flights

4.3.2 In chart form

Where the forecasts are supplied in chart form, flight documentation for low-level flights, including those in accordance with the visual flight rules, operating up to flight level 100 (or up to flight level 150 in mountainous areas or higher, where necessary), shall contain the following as appropriate to the flight:

(a) information from relevant SIGMET messages;
(b) upper wind and upper-air temperature charts as given in Sixth Schedule; and
(c) significant weather charts as given in Sixth Schedule.

4.3.3 In abbreviated plain language

Where the forecasts are not supplied in chart form, flight documentation for low-level flights, including those in accordance with the visual flight rules, operating up to flight level 100 (up to flight level 150 in mountainous areas or higher, where necessary), shall contain the following information as appropriate to the flight:

(a) SIGMET information; and
(b) GAMET area forecasts.

Note. — An example of the GAMET area forecast is given in Sixth Schedule.

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

5.1 Access to the systems

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

5.2 Detailed specifications of the systems

Automated pre-flight information systems for the supply of meteorological information for self-briefing, pre-flight planning and flight documentation shall:
(a) provide for the continuous and timely updating of the system database and monitoring of the validity and integrity of the meteorological information stored;

(b) permit access to the system by operators and flight crew members and also by other aeronautical users concerned through suitable telecommunications means;

(c) use access and interrogation procedures based on abbreviated plain language and, as appropriate, ICAO location indicators, and aeronautical meteorological code data-type designators prescribed by WMO, or based on a menu-driven user interface, or other appropriate mechanisms as agreed between the meteorological authority and the operators concerned; and

(d) provide for rapid response to a user request for information.

Note.—ICAO abbreviations and codes and location indicators are given respectively in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (PANS-ABC, Doc 8400) and Location Indicators (Doc 7910). Aeronautical meteorological code data-type designators are given in the Manual on the Global Telecommunication System (WMO-No. 386).

6.0 SPECIFICATIONS RELATED TO INFORMATION FOR AIRCRAFT IN FLIGHT

6.1 Supply of information requested by an aircraft in flight

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

6.2 Information for in-flight planning by the operator

Meteorological information for planning by the operator for aircraft in flight shall be supplied during the period of the flight and shall normally consist of any or all of the following:

(a) METAR and SPECI (including trend forecasts as issued in accordance with regional air navigation agreement);

(b) TAF and amended TAF;

(c) SIGMET information and special air-reports relevant to the flight, unless the latter have been the subject of a SIGMET message;

(d) upper wind and upper-air temperature information;

(e) volcanic ash and tropical cyclone advisory information relevant to the flight; and

(f) other meteorological information in alphanumeric or graphical form as agreed between the meteorological authority and the operator concerned.

Note.—Guidance on the display of graphical information in the cockpit is provided in Doc 8896.
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Figure A8-1. Fixed areas of coverage of WAFS forecasts in chart form — Mercator projection

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<td>NAT</td>
<td>N1711</td>
<td>W05406</td>
</tr>
</tbody>
</table>
Figure A8-2. Fixed areas of coverage of WAFS forecasts in chart form — Polar stereographic projection (northern hemisphere)

Figure A8-3. Fixed areas of coverage of WAFS forecasts in chart form — Polar stereographic projection (southern hemisphere)
5.0 FLIGHT DOCUMENTATION — MODEL CHARTS AND FORMS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MODEL A</td>
<td>OPMET information</td>
</tr>
<tr>
<td>MODEL IS</td>
<td>Upper wind and upper-air temperature chart for standard isobaric surface</td>
</tr>
<tr>
<td></td>
<td>Example 1. Arrows, feathers and pennants (Mercator projection)</td>
</tr>
<tr>
<td></td>
<td>Example 2. Arrows, feathers and pennants (Polar stereographic projection)</td>
</tr>
<tr>
<td>MODEL SWH</td>
<td>Significant weather chart (high level)</td>
</tr>
<tr>
<td></td>
<td>Example. Polar stereographic projection (showing the jet stream vertical extent)</td>
</tr>
<tr>
<td>MODEL SWM</td>
<td>Significant weather chart (medium level)</td>
</tr>
<tr>
<td>MODEL SWL</td>
<td>Significant weather chart (low level)</td>
</tr>
<tr>
<td></td>
<td>Example 1</td>
</tr>
<tr>
<td></td>
<td>Example 2</td>
</tr>
<tr>
<td>MODEL TCG</td>
<td>Tropical cyclone advisory information in graphical format</td>
</tr>
<tr>
<td>MODEL VAG</td>
<td>Volcanic ash advisory information in graphical format</td>
</tr>
<tr>
<td>MODEL STC</td>
<td>SIGMET for tropical cyclone in graphical format</td>
</tr>
<tr>
<td>MODEL SVA</td>
<td>SIGMET for volcanic ash in graphical format</td>
</tr>
<tr>
<td>MODEL SGE</td>
<td>SIGMET for phenomena other than tropical cyclone and volcanic ash in</td>
</tr>
<tr>
<td></td>
<td>graphical format</td>
</tr>
<tr>
<td>MODEL SN</td>
<td>Sheet of notations used in flight documentation</td>
</tr>
</tbody>
</table>
**Kenya Subsidiary Legislation, 2018**

**ISSUED BY: OPMNFORMA MODE**

<table>
<thead>
<tr>
<th>INTENSITY</th>
</tr>
</thead>
</table>
| "" - (light); "" + (moderate); + "" (heavy), or a tornado or waterspout in the case of funnel cloud(s) are used to indicate the intensity of certain phenomena.

<table>
<thead>
<tr>
<th>DESCRIPTOR:</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI - shallow</td>
</tr>
<tr>
<td>PR - partial</td>
</tr>
<tr>
<td>RL - blowing</td>
</tr>
<tr>
<td>KS - thunderstorms</td>
</tr>
<tr>
<td>BC - patches</td>
</tr>
<tr>
<td>DR - low drizzling</td>
</tr>
<tr>
<td>SH - shower(s)</td>
</tr>
<tr>
<td>ZF - freezing (supercooled)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRESENT WEATHER ABBREVIATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DZ - drizzle</td>
</tr>
<tr>
<td>BR - mist</td>
</tr>
<tr>
<td>FG - fog</td>
</tr>
<tr>
<td>PO - dust/sand whirls (dust devils)</td>
</tr>
<tr>
<td>RA - rain</td>
</tr>
<tr>
<td>SQ - sleet</td>
</tr>
<tr>
<td>SG - snow grains</td>
</tr>
<tr>
<td>IC - funnel cloud(s) (bomato or waterspout)</td>
</tr>
<tr>
<td>PL - ice pellets</td>
</tr>
<tr>
<td>DU - widespread dust</td>
</tr>
<tr>
<td>SS - sandstorm</td>
</tr>
<tr>
<td>GR - hail</td>
</tr>
<tr>
<td>VA - volcanic ash</td>
</tr>
<tr>
<td>SA - sand</td>
</tr>
<tr>
<td>DS - duststorm</td>
</tr>
<tr>
<td>GS - small hail and/or snow pellets</td>
</tr>
<tr>
<td>HZ - haze</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>+SHRA - heavy shower of rain</td>
</tr>
<tr>
<td>+FZDZ - moderate freezing drizzle</td>
</tr>
<tr>
<td>+VSSNGR - thunderstorm with heavy snow and hail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SELECTED IGL LOCATION INDICATORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CYUL Montreal/Montreal Intnl</td>
</tr>
<tr>
<td>VIE LHR London/Heathrow</td>
</tr>
<tr>
<td>ZGGA Cairo/CAI</td>
</tr>
<tr>
<td>ZVAA Zvartnot/CAI</td>
</tr>
<tr>
<td>89 MAI Manchester/Manchester</td>
</tr>
<tr>
<td>IEE Bahrain/SYR</td>
</tr>
<tr>
<td>EPM Paris/Le Bourget</td>
</tr>
<tr>
<td>KMG Casablanca/Casablanca</td>
</tr>
<tr>
<td>NAXZ Zvartnot/CAI</td>
</tr>
<tr>
<td>CDSM Beijing Capital</td>
</tr>
</tbody>
</table>

**METAR CYUL 24/0002Z 27/0118CST 3000 8N 0.0/0.0 80050 M03/1/02 Q0925=**

**METAR EDFC 24/0500Z 020001G 3000 SCT010 20000 M03/1/02 Q0925=**

**SPECI CYUL 24/0900Z 24006G 3000 TGRK 0021240005 2400005 000000 M03/1/02 Q1013=**

**TAF AMDN 24/0900Z 24006G 3000 TGRK 0021240005 2400005 000000 M03/1/02 Q1013=**

**TAF AMDN 24/0900Z 24006G 3000 TGRK 0021240005 2400005 000000 M03/1/02 Q1013=**

**TAF AMDN 24/0900Z 24006G 3000 TGRK 0021240005 2400005 000000 M03/1/02 Q1013=**

**TAF AMDN 24/0900Z 24006G 3000 TGRK 0021240005 2400005 000000 M03/1/02 Q1013=**

**TAF AMDN 24/0900Z 24006G 3000 TGRK 0021240005 2400005 000000 M03/1/02 Q1013=**

**HECC SICMET2 VALID 24/0000Z 24/1200Z HECA=**

**HECC CAIRO FR SEY TUBE OBS N OF N2F FL 90/444 MCV EJRAH NC.**
Example 1. Arrows, feathers and pennants (Mercator projection)
UPPER WIND AND UPPAIR TEMPERATURE CHART FOR STANDARD
ISOBARIC SURFACE - MODEL IS

Example 2. Arrows, feathers and pennants (Polar stereographic projection)
SIGNIFICANT WEATHER CHART (HIGH LEVEL)-MODEL SWH

Example. Polar stereographic projection showing the jet stream vertical extent.)
SIGNIFICANT WEATHER CHART (MEDIUM LEVEL)-MODEL SWM
SIGNIFICANT WEATHER CHART (LOW LEVEL) - MODEL SWL Example 2

VARIANT | VIS | SIGNIFICANT WEATHER | CLOUD, TURBULENCE, ICING | 0°C
---|---|---|---|---
AREA A | ISOL | BKN CU 015/XXX 050/XXX | SCT CU 028/029 | 50
AREA B | OCCNL 4000 | OVC LYR ST NS 015/XXX 050/XXX | 50
AREA C | ISOL 1000 | THUNDERSTORM | 100
LCA SOUTH COT HILLS | 2000 | DRIZZLE | OVC ST SC 003/050 | 90
AREA D | LCA NORTH 4500 | RAIN | OVC LYR ST NS 005/050 050/090 | 30
AREA E | LCA LAND 0500 | FOG | SCT SC 020/030 | 40
AREA F | LCA COT HILLS 0200 | MIST | BKN to OVC ST 002/010 | 30
AREA G | LCA NORTH 0500 | RAIN | OVC ST SC 003/050 | 30
AREA I | LCA HILLS NORTH | FOG | SCTX 030/050 | 40

SIGWX SFC – 10 000 FT
ISSUED BY .......... AT .......... UTC

NOTES:
1. Pressure in hpa and speeds in knots.
2. VIS in m includes if less than 5 000 m. M implies vis 200 m or less.
3. VIS 0500 M PLACES BELOW RAPAON.
4. CB implies MOD/SEV Icing, turbulence and thunderstorm.
5. Only significant weather and/or weather phenomena causing visibility reduction below 3 000 m included.

REMARKS:
EAST TO NE GALES SHETLAND TO HEBRIDES - SEVERE MOUNTAIN WAVES NW SCOTLAND - FOG PATCHES EAST ANGLIA - WINDS FOG OVER NORTH FRANCE, BELGIUM AND THE NETHERLANDS
TROPICAL CYCLONE ADVISORY INFORMATION IN GRAPHICAL FORMAT - MODEL TCG
VOLCANIC ASH ADVISORY INFORMATION IN GRAPHICAL FORMAT - MODEL VAG

VOLCANIC ASH ADVISORY
DTC: 20080923/0130Z
VAAC TOKYO
VOLCANO: KARYMSKY1000-13
AREA RUSSIAN FEDERATION
SUMMIT ELEV: 1336M
ADVISORY NR: 2008/14
INFO SOURCE: MTSAT-IR KVERT KEMIS
AVIATION COLOUR CODE: RED
ERUPTION DETAILS: ERUPTED AT 20080923/0000Z FL300 REPORTED
REMOTE LATEST REP FROM KVERT (0120Z) INDICATES ERUPTION HAS CEASED
TWO DISPERSED VA CLOUD ARE EVIDENT ON SATELLITE IMAGERY
NXT ADVISORY: 20080923/0730Z
Note: ———— Fictitious FLR.
SIGMET FOR VOLCANIC ASH IN GRAPHICAL FORMAT - MODEL SVA
TENTH SCHEDULE

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

Regulation 52(1)

1. INFORMATION TO BE PROVIDED FOR AIR TRAFFIC SERVICES UNITS

1.1 List of information for the aerodrome control tower

---

2. FRONTS AND CONVERGENCE ZONE:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold front at the surface</td>
<td>...</td>
</tr>
<tr>
<td>Warm front at the surface</td>
<td>...</td>
</tr>
<tr>
<td>Occluded front at the surface</td>
<td>...</td>
</tr>
<tr>
<td>Stationary front at the surface</td>
<td>...</td>
</tr>
<tr>
<td>Tropopause high</td>
<td>...</td>
</tr>
<tr>
<td>Tropopause low</td>
<td>...</td>
</tr>
</tbody>
</table>

---

3. ABBREVIATIONS USED TO DESCRIBE CLOUDS

3.1 Types

- CI = Cirrus
- CC = Cumulus
- NC = Nimbostratus
- CS = Cumulonimbus
- AL = Altocumulus
- ST = Stratus
- AC = Altocumulus
- ST = Stratuscumulus
- CB = Cumulonimbus

3.2 Armour

Clouds except CB

- P = Precipitation
- N = Night
- S = Snow
- F = Freezing rain
- I = Ice
- T = Turbulent
- H = Heavy

3.3 Heights

Indicates altitudes above mean sea level

4. DEPICTION OF LINES AND PATTERNS ON SPECIFIC CHARTS

4.1 Model SWL and SIM - Significant weather chart (high and low pressure)

---

4.2 Model SWL - Significant weather chart (low level)

---

4.3 AIRS, FEATHERS AND PARROTS

Air inlays direction. Number of eyewarms and/or feathers correspond to speed.

Example:

- 300 knots (550 km/h)
- 20 knots (37 km/h)
- 10 knots (18.5 km/h)

---

* A conventional factor of 1 to 2 is used.
The following meteorological information shall be supplied, as necessary, to an aerodrome control tower by its associated aerodrome meteorological office:

(a) local routine reports, local special reports, METAR, SPECI, TAF, trend forecasts and amendments thereto, for the aerodrome concerned;

(b) SIGMET information, wind shear warnings and alerts and aerodrome warnings;

(c) any additional meteorological information agreed upon locally, such as forecasts of surface wind for the determination of possible runway changes;

(d) information received on volcanic ash cloud, for which a SIGMET has not already been issued, as agreed between the meteorological and ATS authorities concerned; and

(e) information received on pre-eruption volcanic activity and/or a volcanic eruption as agreed between the Meteorological and ATS authorities concerned.

1.2 List of information for the approach control unit.

The following meteorological information shall be supplied, as necessary, to an approach control unit by its associated aerodrome meteorological office:

(a) local routine reports, local special reports, METAR, SPECI, TAF, trend forecasts and amendments thereto, for the aerodrome(s) with which the approach control unit is concerned;

(b) SIGMET information, wind shear warnings and alerts and appropriate special air-reports for the airspace with which the approach control unit is concerned and aerodrome warnings;

(c) any additional meteorological information agreed upon locally;

(d) information received on volcanic ash cloud, for which a SIGMET has not already been issued, as agreed between the meteorological and ATS authorities concerned; and

(e) information received on pre-eruption volcanic activity and/or a volcanic eruption as agreed between the meteorological and ATS authorities concerned.

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

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

(a) METAR and SPECI, including current pressure data for aerodromes and other locations, TAF and trend forecasts and amendments thereto, covering the flight information region (FIR) or the control area (CTA) and, if required by the flight information centre (FIC) or area control centre (ACC), covering aerodromes in neighbouring FIRs, as determined by regional air navigation agreement;

(b) forecasts of upper winds, upper-air temperatures and significant en-route weather phenomena and amendments thereto, particularly those which are likely to make operation under visual flight rules impracticable, SIGMET information and appropriate special air-reports for the FIR or CTA and, if determined by regional air navigation agreement and required by the FIC or ACC, for neighbouring FIRs;

(c) any other meteorological information required by the FIC or ACC to meet requests from aircraft in flight; if the information requested is not available in
the associated meteorological watch office (MWO), that office shall request
the assistance of another meteorological office in supplying it;
(d) information received on volcanic ash cloud, for which a SIGMET has not
already been issued, as agreed between the meteorological and ATS
authorities concerned;
(e) information received concerning the release of radioactive material into the
atmosphere, as agreed between the meteorological and ATS authorities
concerned;
(f) tropical cyclone advisory information issued by a tropical cyclone advisory
centre in its area of responsibility;
(g) volcanic ash advisory information issued by a volcanic ash advisory centre in
its area of responsibility; and
(h) information received on pre-eruption volcanic activity and/or a volcanic
eruption as agreed between the meteorological and ATS authorities
concerned.

1.4 Supply of information to aeronautical telecommunications stations

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

1.5 Format of information

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

1.5.2 When computer-processed upper-air data for grid points are made available to air
traffic services units in digital form for use by air traffic services computers, the contents,
format and transmission arrangements shall be as agreed between the meteorological
authority and the appropriate ATS authority. The data shall normally be supplied as soon
as is practicable after the processing of the forecasts has been completed.

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

2.1 List of information

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

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

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

2.2.2 To facilitate search and rescue operations, the designated aerodrome meteorological office or MWO shall, on request, supply:

(a) complete and detailed information on the current and forecast meteorological conditions in the search area; and

(b) current and forecast conditions en route, covering flights by search aircraft from and returning to the aerodrome from which the search is being conducted.

2.2.3 On request from the rescue coordination centre, the designated aerodrome meteorological office or MWO shall supply or arrange for the supply of meteorological information required by ships undertaking search and rescue operations.

3. INFORMATION TO BE PROVIDED FOR AERONAUTICAL INFORMATION SERVICES UNITS

3.1 List of information

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

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

Note.—Details of this information are given in Civil Aviation (Units of Measurement to be used in Air Ground operations) Regulations… and in the Ninth Schedule of these regulations.

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

(1) the establishment, withdrawal and significant changes in operation of aeronautical meteorological services. This information is required to be provided to the aeronautical information services unit sufficiently in advance of the effective date to permit issuance of NOTAM in compliance with Civil Aviation (Aeronautical Information) Regulations;

(2) the occurrence of volcanic activity; and

Note.—The specific information required is given in Part V and Part VI of these Regulations.

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

Note.—The specific information required is given in Part V of these Regulations.

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

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

(2) effect of certain weather phenomena on aircraft operations.
ELEVENTH SCHEDULE

TECHNICAL SPECIFICATIONS RELATED TO REQUIREMENTS FOR AND USE OF COMMUNICATIONS

Regulation 55(1)

1. SPECIFIC REQUIREMENTS FOR COMMUNICATIONS

1.1 Required transit times of meteorological information

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

1.2 Grid point data for ATS and operators

1.2.1 When upper-air data for grid points in digital form are made available for use by air traffic services computers, the transmission arrangements shall be as agreed between the meteorological authority and the appropriate ATS authority.

1.2.2 When upper-air data for grid points in digital form are made available to operators for flight planning by computer, the transmission arrangements shall be as agreed between the world area forecast centre concerned, the meteorological authority and the operators concerned.

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

2.1 Meteorological bulletins in alphanumeric format

2.1.1 Composition of bulletins

Whenever possible, exchanges of operational meteorological information shall be made in consolidated bulletins of the same types of meteorological information.

2.1.2 Filing times of bulletins

Meteorological bulletins required for scheduled transmissions shall be filed regularly and at the prescribed scheduled times. METAR shall be filed for transmission not later than 5 minutes after the actual time of observation. TAF shall be filed for transmission not earlier than one hour prior to the beginning of their validity period.

2.1.3 Heading of bulletins

Meteorological bulletins containing operational meteorological information to be transmitted via the aeronautical fixed service or the public Internet shall contain a heading consisting of:

(a) an identifier of four letters and two figures;
(b) the ICAO four-letter location indicator corresponding to the geographical location of the meteorological office originating or compiling the meteorological bulletin;
(c) a day-time group; and
(d) if required, a three-letter indicator.

Note 1.—Detailed specifications on format and contents of the heading are given in the Manual on the Global Telecommunication System (WMO-No. 386) and are reproduced in the Manual of Aeronautical Meteorological Practice (Doc 8896).

Note 2.—ICAO location indicators are listed in Location Indicators (Doc 7910).
2.1.4 Structure of bulletins
Meteorological bulletins containing operational meteorological information to be transmitted via the AFTN shall be encapsulated in the text part of the AFTN message format.

2.2 World area forecast system (WAFS) products
2.2.1 Telecommunications for the supply of WAFS products
The telecommunications facilities used for the supply of WAFS products shall be the aeronautical fixed service or the public Internet.

2.2.2 Quality requirements for charts
Where WAFS products are disseminated in chart form, the quality of the charts received shall be such as to permit reproduction in a sufficiently legible form for flight planning and documentation. Charts received shall be legible over 95 per cent of their area.

2.2.3 Quality requirements for transmissions
Transmissions shall be such as to ensure that their interruption should not exceed 10 minutes during any period of 6 hours.

2.2.4 Heading of bulletins containing WAFS products
Meteorological bulletins containing WAFS products in digital form to be transmitted via aeronautical fixed service or the public Internet shall contain a heading as given in 2.1.3.

3. USE OF AERONAUTICAL MOBILE SERVICE COMMUNICATIONS
3.1 Content and format of meteorological messages
3.1.1 The content and format of reports, forecasts and SIGMET information transmitted to aircraft shall be consistent with the provisions of Chapters 4, 6 and 7 of this Annex.

3.1.2 The content and format of air-traffic reports transmitted by aircraft shall be consistent with the provisions of Chapter 5 of this Annex and the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444), Appendix 1.

3.2 Content and format of meteorological bulletins
The substance of a meteorological bulletin transmitted via the aeronautical mobile service shall remain unchanged from that contained in the bulletin as originated.

4. USE OF AERONAUTICAL DATA LINK SERVICE — D-VOLMET
4.1 Detailed content of meteorological information available for D-VOLMET
4.1.1 The aerodromes for which METAR, SPECI and TAF are to be available for uplink to aircraft in flight shall be determined by regional air navigation agreement.

4.1.2 The flight information regions (FIRs) for which SIGMET and AIRMET messages are to be available for uplink to aircraft in flight shall be determined by regional air navigation agreement.

4.2 Criteria related to information to be available for D-VOLMET
4.2.1 The latest available METAR, SPECI and TAF, and valid SIGMET and AIRMET shall be used for uplink to aircraft in flight.

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

4.2.3 If no SIGMET message is valid for an FIR, an indication of “NIL SIGMET” shall be included in the D-
4.3 Format of information to be available for D-VOLMET

The content and format of reports, forecasts and SIGMET and AIRMET information included in D-VOLMET shall be consistent with the provisions of Chapters 4, 6 and 7 of this Annex.

5. USE OF AERONAUTICAL BROADCASTING SERVICE — VOLMET BROADCASTS

5.1 Detailed content of meteorological information to be included in VOLMET broadcasts

5.1.1 The aerodromes for which METAR, SPECI and TAF are to be included in VOLMET broadcasts, the sequence in which they are to be transmitted and the broadcast time shall be determined by regional air navigation agreement.

5.1.2 The FIRs for which SIGMET messages are to be included in scheduled VOLMET broadcasts shall be determined by regional air navigation agreement. Where this is done, the SIGMET message shall be transmitted at the beginning of the broadcast or of a five-minute time block.

5.2 Criteria related to information to be included in VOLMET broadcasts

5.2.1 When a report has not arrived from an aerodrome in time for a broadcast, the latest available report shall be included in the broadcast, together with the time of observation.

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

5.2.3 Where SIGMET messages are included in scheduled VOLMET broadcasts, an indication of “NIL SIGMET” shall be transmitted if no SIGMET message is valid for the FIRs concerned.

5.3 Format of information to be included in VOLMET broadcasts

5.3.1 The content and format of reports, forecasts and SIGMET information included in VOLMET broadcasts shall be consistent with the provisions of Parts VI, VII and VIII of these regulations.

5.3.2 VOLMET broadcasts shall use standard radiotelephony phraseologies.

Note.— Guidance on the standard radiotelephony phraseologies to be used in VOLMET broadcasts is given in the Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services (Doc 9377), Appendix 1.

Made on the 12th June, 2018.

JAMES W. MACHARIA,
Cabinet Secretary for Transport, Infrastructure, Housing and Urban Development.