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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.

Citation.

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

Interpretation.

“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;

“cruising 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 millibar;

“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 Internet 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.

Application.

(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.

Designation and authorization to provide Meteorology services for air navigation.

(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.

Procedures for provision of meteorological services for air navigation.

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.

Obligations of the service provider.

### 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.

Requirements for the Manual of Operations.

(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—

Contents of the manual of operations.

- (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.

Amendment of Manual of Operations.

#### 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.

Objective, determination and provision of meteorology service.

(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—

Personnel, qualification and

- (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; training.
- (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.

Supply, use and quality management of meteorological information

(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 in 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.

Notifications  
required from  
operators.

(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.

Objective of the world area forecast system.

(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.

Aerodrome meteorological offices.

(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.

Meteorological  
watch offices.

- (2) A meteorological watch office shall—
  - (a) maintain continuous watch over meteorological conditions affecting flight operations within its area of responsibility;
  - (b) prepare SIGMET 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 —

Volcano observatories.

- (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 each aeronautical meteorological station may be a separate station or combined with a synoptic station.

Aeronautical meteorological stations and observations.

(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.

Agreement between air traffic services provider and meteorological services provider.

Routine observations reports.

(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.

Special observations and reports.

(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—

Contents of reports.

- (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.

Observing and reporting meteorological elements.

(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

Reporting  
meteorological  
information from

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.

automatic observing systems.

(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 activity ash cloud shall be reported without delay to the associated air traffic services unit, aeronautical information services unit and meteorological watch office.

Observation and reports.

(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.

Obligation of the Authority.

(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—

Types of aircraft observations.

- (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.

Routine aircraft observations.



(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 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.

Routine observations-exemptions.

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

Special observations.

- (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.

Other non-routine aircraft observations.

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.

Reporting of aircraft observations during flight.

(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—

Relay of airreports by air traffic services units.

- (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.

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

(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.

Interpretation and use of forecasts.

(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.

Aerodrome forecasts.

(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.

Landing forecasts.

(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—

Forecasts for take-off.

- (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.

Area forecasts.

(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.

Sigmat information.

(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.

Aerodrome warnings.

(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.

Wind shear warnings and alerts.

(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.

General provisions.

(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—

Aerodrome climatological tables.

- (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.

Aerodrome climatological summaries

(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.

Copies of meteorological observational data.

#### 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.

General Provisions.

(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.

Briefing,  
consultation and  
display.

(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—

Flight  
documentation

- (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.

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

(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.

Information for  
aircraft in flight.

(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.

Information for air  
traffic services units.

(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.

Information for search and rescue services units.

(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.

Information for aeronautical information services units.

### 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.

Requirements for use of communications.

(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 sub regulations (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.

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

(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

Use of aeronautical fixed service Communications —

data communications techniques and the method and channels used for the dissemination of the products shall be as determined by regional air navigation agreement.

world area forecast system products.

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.

Use of aeronautical mobile service communications.

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.

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

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.

Use of aeronautical broadcasting service—contents of VOLMET broadcasts.

(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.

Requirements for application for exemption.

(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—

Review and publication.

- (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—

Evaluation of the request.

- (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.

Drug and alcohol testing and reporting.

(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—

Change of name.

- (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.

Change of address.



(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.

Replacement of documents.

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.

Use and retention of documents and records.

(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.

Reports of violation.

(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.

Failure to comply with direction.

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.

Aeronautical fees.

(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.

Contravention of 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.

Appeals 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.

Offences.

(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.

Transitional.

(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.

FIRST SCHEDULE  
21 OPERATIONALLY DESIRABLE ACCURACY OF MEASUREMENT OR  
OBSERVATION  
(r 12(10) (a))

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

Mean surface wind	Direction: $\pm 10^\circ$ Speed: $\pm 0.5$ m/s (1 kt) up to 5 m/s (10 kt) $\pm 10\%$ above 5 m/s (10 kt)
Variations from the mean surface wind	$\pm 1$ m/s (2 kt), in terms of longitudinal and lateral components
Visibility	$\pm 50$ m up to 600 m $\pm 10\%$ between 600 m and 1 500 m $\pm 20\%$ above 1 500 m
Runway visual range	$\pm 10$ m up to 400 m $\pm 25$ m between 400 m and 800 m $\pm 10\%$ above 800 m
Cloud amount	$\pm 1$ okta
Cloud height	$\pm 10$ m (33 ft) up to 100 m (330 ft) $\pm 10\%$ above 100 m (330 ft)
Air temperature and dew-point temperature	$\pm 1^\circ\text{C}$
Pressure value (QNH, QFE)	$\pm 0.5$ hPa

\* The operationally desirable accuracy is not intended as an operational requirement; it is to be understood

as a goal that has been expressed by the operators.

*Note.— Guidance on the uncertainties of measurement or observation can be found in 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.*

<i>Operationally desirable Element to be forecast accuracy of forecasts</i>	<i>Minimum percentage of cases within range</i>
<b>TAF</b>	
Wind direction $\pm 20^\circ$	80% of cases
Wind speed $\pm 2.5$ m/s (5 kt)	80% of cases
Visibility $\pm 200$ m up to 800 m $\pm 30\%$ between 800 m and 10 km	80% of cases
Precipitation Occurrence or non-occurrence	80% of cases
Cloud amount One category below 450 m (1 500 ft) Occurrence or non-occurrence of BKN or OVC between 450 m (1 500 ft) and 3 000 m (10 000 ft)	70% of cases
Cloud height $\pm 30$ m (100 ft) up to 300 m (1 000 ft) $\pm 30\%$ between 300 m (1 000 ft) and 3 000 m (10 000 ft)	70% of cases
Air temperature $\pm 1^\circ\text{C}$	70% of cases
<b>TREND FORECAST</b>	
Wind direction $\pm 20^\circ$	90% of cases
Wind speed $\pm 2.5$ m/s (5 kt)	90% of cases

Visibility	± 200 m up to 800 m	90% of cases
± 30% between 800 m and 10 km		

Precipitation	Occurrence or non-occurrence	90% of cases
<i>Operationally desirable</i>		<i>Minimum percentage of</i>
<i>Element to be forecast</i>		<i>accuracy of forecasts cases within range</i>

Cloud amount	One category below 450 m (1 500 ft)	90% of cases
	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)	

#### 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 I.2, Part B — Binary Codes.*

1.2.4 The foregoing grid point forecasts shall be prepared by a WAFC in a regular grid with a horizontal resolution of

1.25° of latitude and longitude.

1.3 Significant weather (SIGWX) forecasts

1.3.1 General provisions

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

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

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

1.3.2 Types of SIGWX forecasts

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

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

1.3.3 Types of SIGWX forecasts

*SIGWX forecasts shall include the following items:*

- (a) tropical cyclone provided that the maximum of the 10-minute mean surface wind speed is expected to reach or exceed 17 m/s (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 WAFS concerning significant discrepancies

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

- (a) icing, turbulence, cumulonimbus clouds that are obscured, frequent, embedded or occurring at a squall line, and sandstorms/duststorms; and
- (b) volcanic eruptions or a release of radioactive materials into the atmosphere, of significance to aircraft operations.

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

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

## 3. 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

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

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

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

*Note 3.— Inclusion of a “colon” after each element heading is mandatory.*

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

<i>Element</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>
1	Identificati on of the type of message	Type of message	VA ADVISORY
2	Time of origin (M)	Year, month, day, time in	DTG: nnnnnnnn/nnnnZ 20080923/0130Z
3	Name of VAAC (M)	UTC Name of VAAC	VAAC: nnnnnnnnnnn VAAC: TOKYO
4	Name of volcano (M)	Name and IAVCEI1 number of volcano	VOLCANO: nnnnnnnnnnnnnnnnnnnnnnn [nnnnn] UNKNOWN <i>or</i> UNNAMED VOLCANO: KARYMSKY 1000-13 VOLCANO:
5	Location of volcano (M)	Location of volcano in degrees and minutes	PSN: Nnnnn <i>or</i> Snnnn Wnnnnn <i>or</i> Ennnnn <i>or</i> UNKNOWN PSN N5403 E15927 :
6	State <i>or</i> region (M)	State, <i>or</i> region if ash is not reported over a	AREA: nnnnnnnnnnnnnnnnn PSN UNKNOWN : RUSSIA AR EA:
7	Summit elevation (M)	State Summit elevation in m	SUMMIT ELEV: nnnnM ( <i>or</i> nnnnnFT) SUMMIT ELEV: 1536M
8	(M) Advisory number (M)	( <i>or</i> ft) Advisory number: year in full and message number (separate sequence for	ADVISORY NR: nnnn/nnnn ADVISORY NR: 2008/4
9	Informat ion source	each volcano) Information source using	INFO SOURCE: <i>Free text up to 32 characters</i> INFO SOURCE: MTSAT-1R KVERT
10	source Colour code (O)	free text Aviation colour code	AVIATION COLOUR RED <i>or</i> ORANGE <i>or</i> YELLOW CODE: <i>or</i> GREEN <i>or</i> UNKNOWN <i>or</i> D COLOUR KEMSD AVIATION RE

## NOT GIVEN CODE:

Element	Detailed content	Template(s)	Examples
11 Eruption details (M)	Eruption details (including date/time of	ERUPTION <i>Free text up to 64 characters or</i> DETAILS: UNKNOWN	ERUPTI ERUPTION AT ON 20080923/0000Z DETAIL FL300
12 Time of observation (estimation) of or ash(M)	eruption(s)) Day and time (in of observation (estimation) of or volcanicash	OBS (or EST) VA nn/nnnnZ	S: REPORTED OBS VA 23/0100Z
13 Observed estimated ashcloud (M)	Horizontal (in and minutes) and vertical extent at time of he observation ofthe observed or estimated ash cloud if the base is or, unknown,the top of the or bservedestimated ash cloud;  Movement of the observed or ash cloudtime	OBS VATOP FLnnn or CLD orSFC/FLnnn or EST VAFLnnn/nnn CLD: [nnKM WID LINE2 BTN (nnNM WID LINE BTN)] Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn][ – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] MOV N nnKMH (or KT) or MOV NE nnKMH (or KT) or MOV E nnKMH (or KT) or MOV SE nnKMH (or KT) or MOV S nnKMH (or KT) or MOV SW nnKMH (or KT) or MOV W nnKMH (or	OBS VA FL250/300 N5400 E15930 – N5400 E16100 – N5300 E15945 MOV SE 20KT SFC/FL200 N5130 E16130 – N5130 E16230 – N5230 E16230 – N5230 E16130 MOV SE 15KT  TOP FL240 MOV W40 KMH  VA NOT FM SATELLITE DATAWIND FL050/070 180/12MPS
14 Forecast and position of theash clouds (+6 HR) (M)	Day and time (in (6 hours from the of observation “Time (estimation) of or given in Item ash” (12) ;	FCST KT) or MOV NW VA CLDnn/nnnnZ +6 HR: SFC or FLnnn/[FL]nnn [nnKM WID LINE2 BTN (nnNM WID LINE BTN)] Nnn[nn] or Snn[nn] Wnnn[nn] or	FCST VA23/0700Z +6 HR: FL250/350 N5130 E16030 – N5130 E16230 – N5330 E16230 – N5330 E16030 SFC/FL180 N4830 E16330 –

<i>Element</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>	
	Forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn][ – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]3	N4830 E16630 – N5130 E16630 – N5130 E16330  NO VA EXP NOT AVBL NOT PROVIDED	
15	Forecast height and position of the ash clouds (+12 HR) (M)	Day and time (in UTC) (12 hours from the “Time of observation (or estimation) of ash” given in Item 12); Forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	FCST VA CLD nn/nnnnZ +12 HR: SFC or FLnnn/[FL]nnn [nnKM WID LINE2 BTN (nnNM WID LINE BTN)] Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn][ – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]3 or	FCST 23/1300Z VA CLD SFC/FL +12 HR: 270 N4830 E16130 – N4830 E16600 – N5300 E16600 – N5300 E16130  NO VA EXP NOT AVBL NOT PROVIDED
16	Forecast height and position of the ash clouds (+18 HR) (M)	Day and time (in UTC) (18 hours from the “Time of observation (or estimation)	FCST VA CLD +18 HR: NO VA EXP nn/nnnnZ SFC or FLnnn/[FL]nnn [nnKM WID LINE2 BTN (nnNM WID LINE BTN)] Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] –	FCST 23/1900Z VA CLD +18 HR: NO VA EXP NOT AVBL NOT PROVIDED

	of ash” given in Item 12);  Forecast height and position (in degrees and minutes) for each cloud mass for that fixed valid time	Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn] – Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]]3		
17	Remarks (M)	Remarks, as necessary	RMK: or Free text up to 256 characters or NIL	RMK: LATEST REP FM KVERT (0120Z) INDICATES ERUPTION HAS CEASED. TWO DISPERSING VA CLD ARE EVIDENT ON SATELLITE
18	Next advisory (M)	Year, month, day and time in UTC	NXT nnnnnnnn/nnnnZ ADVISORY: or NO LATER THAN nnnnnnnn/nnnnZ or NO FURTHER ADVISORIES or WILL BE ISSUED BY	NXT IMAGERY ADVISO20080923/0730 RY: Z NO LATER THAN nnnnnnnn/nnnn Z NO FURTHER ADVISORI ES

or nnnnnnnn/nnnnZ

Notes.—

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

WFF01 RITD

/A

20080927/0

DTG  
/OICAN  
/SN

TOKYO  
1001  
F15927

IMMEDIATE  
ADVISON NR  
NEO

153/

2008

Kenya Subsidiary Legislation, 2018

2791

VIATION COLOR  
DESCRIPTION

MTC-R KVERT KEMSD

RS VA  
RS VA

2/010 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.  
FI 250/300 N5400 N5400 -N5300 F15945 MOV SF  
SEC/FI 200 N5130 N5130 -N5230 F16130  
SF 3. Up to 4 selected layers.

OST VA CID

2/07007 F16030 (N5100E) but not identifiable from satellite data.  
F16030 SEC/FI 180 N18000 -N5130 -N51163

2/13007 SEC/FI 270 N18200 -N5300 -N5300  
F16111 Example A2-1. Advisory message for volcanic ash

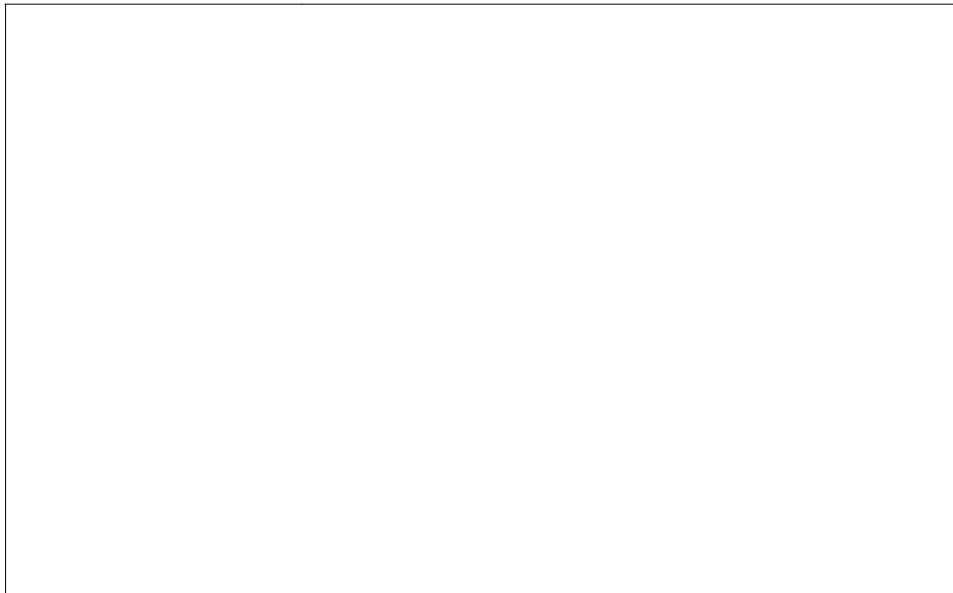


Table A2-2. Template for advisory message for tropical cyclones

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.

Element	Detailed content	Template(s)	Examples
1	Identification of the type of message	TC ADVISORY	TC ADVISORY
2	Time of origin	DTG: nnnnnnnn/nnnnZ	DTG: 20040925/1600Z
3	Name of TCAC	TCAC: nnnn or nnnnnnnnnn	TCAC: YUFO1 TCAC: MIAMI
4	Name of tropical cyclone or “NN” for unnamed	TC: nnnnnnnnnnnn or NN	TC: GLORIA
5	Advisory number	NR: nn	NR: 01
6	Position of the centre	PSN: Nnn[nn] or Snn[nn] Wnnn[nn] or Ennn[nn]	PSN: N2706 W07306



<i>Element</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>	
7	Direction and speed of movement	Direction and speed of movement given in sixteen compass points and km/h (or kt), respectively, or moving slowly (< 6 km/h (3 kt)) or stationary (< 2 km/h (1 kt))	MOV: N nnKMH (or KT) or NNE nnKMH (or KT) or NE nnKMH (or KT) or ENE nnKMH (or KT) or E nnKMH (or KT) or ESE nnKMH (or KT) or SE nnKMH (or KT) or SSE nnKMH (or KT) or S nnKMH (or KT) or SSW nnKMH (or KT) or SW nnKMH (or KT) or WSW nnKMH (or KT) or W nnKMH (or KT) or	MOV: NW 20KMH
8	Central pressure	Central pressure (in	C: nnnHPA	C: 965HPA
<i>Element</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>	
9	Maximum surface wind	Maximum surface wind near the centre	MAX WIND: nn[n]MPS (or nn[n]KT)	MAX WIND: 22MPS
10	Forecast of position (+6 HR)	(mean over 10 Day and time (in 6 hours from the given in Item 2); Forecast degrees and the centre of the cyclone	FCST PSN +6 nn/nnnnZ Nnn[nn] or Snn[nn] Wnnn[nn] Ennn[nn]	FCST PSN +6 25/2200Z N2748 W07350
11	Forecast of maximum surface wind (+6 HR)	Forecast of maximum surface wind (6 hours after the "DTG"	FCST nn[n]MPS MAX (or nn[n]KT) WIND +6	FCST 22MPS MAX WIND +6
		HR:	HR:	

<i>Element</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>
12 Forecast of position (+12 HR)	Day and time (in 12 hours from the "DTG" given in Item 2); Forecast degrees and the centre of the cyclone	FCST PSN +12 nn/nnnnZ Nnn[nn] Ennn[nn]	FCST PSN +12 26/0400Z N2830 W07430
13 Forecast of maximum surface wind (+12 HR)	Forecast of maximum surface wind (12 hours after the "DTG")	FCST MAX nn[n]MPS WIND (or nn[n]KT) +12 HR:	FCST MAX 22MPS WIND +12 HR:
14 Forecast of position (+18 HR)	Day and time (in 18 hours from "DTG" given in Item 2); Forecast degrees and the centre of the cyclone	FCST PSN +18 nn/nnnnZ Nnn[nn] Ennn[nn]	FCST PSN +18 26/1000Z N2852 W07500
15 Forecast of maximum surface wind (+18 HR)	Forecast of maximum surface wind (18 hours after the "DTG")	FCST MAX nn[n]MPS WIND (or nn[n]KT) +18 HR:	FCST MAX 21MPS WIND +18 HR:
16 Forecast of position (+24 HR)	Day and time (in 24 hours from "DTG" given in Item 2); Forecast degrees and the centre of the cyclone	FCST PSN +24 nn/nnnnZ Nnn[nn] or Snn[nn] Wnnn[nn] Ennn[nn]	FCST PSN +24 26/1600Z N2912 W07530
17 Forecast of maximum surface wind (+24 HR)	Forecast of maximum surface wind (24 hours after the "DTG")	FCST nn[n]MPS MAX (or nn[n]KT) WIND +24 HR:	FCST MAX 20MPS WIND +24 HR:
18 Remarks	Remarks, as necessary	RMK: <i>Free text up to 256 characters or</i>	RMK: NIL

2004092571

VII F  
G I O R I  
0

M 2706  
M W  
06HD

7 MD

75/27 M2712

7 MP

NIL

7-10-007-0712

7-11-18

Element	Detailed content	Template(s)	Examples
19	Expected time of year, month, day and time (in UTC) of issuance of	NXT MSG: [BFR] nt or NO MSG EXP	NXT MSG: 20040925/2000Z

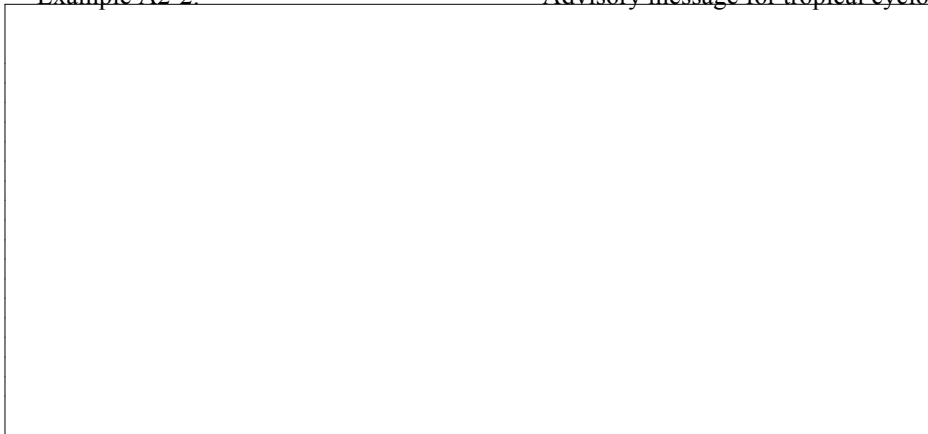
next issuance of next

Note.—

1. Fictitious location.

Example A2-2.

Advisory message for tropical cyclones



0  
T G  
0 2 A  
0  
R  
C N  
1 0

1 A Y W I N D  
C N + 6

0 2 T M A Y W I N D  
0 2 T D S N + 1 2

0 2 T M A Y W I N D  
0 2 T D S N + 1 2

## 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.

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

## 2.2 Use of CAVOK

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

- (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 in accordance with regional air navigation agreement.

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

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

3.1.4A SPECI representing an improvement in conditions shall be disseminated only after the improvement has been maintained for 10 minutes; it shall be amended before dissemination, if necessary, to indicate the conditions prevailing at the end of that 10-minute period.

#### 3.2 Local routine and special reports

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

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

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

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

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

#### 4. OBSERVING AND REPORTING OF METEOROLOGICAL ELEMENTS

*Introductory Note.— Selected criteria applicable to meteorological information referred to under 4.1 to 4.8 for inclusion in aerodrome reports are given in tabular form in Table A3-0.*

##### 4.1 Surface wind

###### 4.1.1 Siting

4.1.1.1 Surface wind shall be observed at a height of  $10 \pm 1$  m ( $30 \pm 3$  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  $30^\circ$  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 1 500 m or 2) less than 50 per cent of the prevailing visibility and less than 5 000 m; the lowest visibility observed shall also be reported and, when possible, its general direction in relation to the aerodrome reference point indicated by reference to one of the eight points of the compass. If the lowest visibility is observed in more than one direction, then the most operationally significant direction shall be reported; and*
- (b) *when the visibility is fluctuating rapidly, and the prevailing visibility cannot be determined, only the lowest visibility shall be reported, with no indication of direction.*

#### 4.3 Runway visual range

##### 4.3.1 Siting

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

4.3.1.2 Runway visual range shall be assessed at a lateral distance from the runway centre line of not more than 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 1 000 to 1 500 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

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

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

Small hail and/or snow pellets GS

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

##### (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                      BR

—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:

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

*Used with types of present weather phenomena in accordance with the templates shown in Tables A3-1 and A3-2. Light intensity should be indicated only for precipitation.*

*Vicinity VC*

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



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

- (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           | CB                 |
| —thunderstorm                  | TS                 |
| —moderate or severe turbulence | MOD TURB, SEV TURB |
| —wind shear                    | WS                 |
| —hail                          | GR                 |

—severe squall line	SEV SQL
—moderate or severe icing	MOD ICE, SEV ICE
—freezing precipitation	FZDZ, FZRA
—severe mountain waves	SEV MTW
—duststorm, sandstorm	DS, SS
—blowing snow	BLSN
—funnel cloud (tornado or 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 I.1, Part A — Alphanumeric Codes, Code Table 3700.*

*Note 2.*— *The state of the runway is specified in the Manual on Codes (WMO-No. 306), Volume I.1, Part A — Alphanumeric Codes, Code Tables 0366, 0519, 0919 and 1079.*

#### 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  $\geq 2$  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  $\geq 30^\circ$  with a speed  $\geq 5$  m/s or the speed changes  $\geq 5$  m/s lasting  $\geq 2$  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.

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

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

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

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>
Identification of the type of	Type of report	MET REPORT <i>or</i> SPECIAL	MET REPORT
Location	ICAO location	nnnn	YUDO1
Time of the observation	Day and actual time of the	nnnnnnZ	221630Z
Identification of an automated	Automated report identifier (C)	AUTO	AUTO
Surface wind (M)	Name of the element	WIND	WIND WIND
	Runway (O)2	RWY nn[L] <i>or</i> RWY nn[C] <i>or</i>	240/4MPS (WIND 240/8KT)
	Runway section	TDZ	
	Wind direction (M)	nnn/ VRB BTN nnn/ AND nnn/	WIND RWY 18 TDZ 190/6MPS (WIND RWY 18 TDZ 190/12KT)
	Wind speed (M)	[ABV]n[n][n]MPS ( <i>or</i>	
	Significant speed	MAX[ABV]nn[n] MNMn[n]	WIND VRB1MPS CALM (WIND VRB2KT)
	Significant directional	VRB BTN nnn/ AND	WIND VRB BTN 350/ AND 050/1MPS (WIND VRB BTN 350/ AND 050/2KT)
	Runway section	MID	
	Wind direction (O)3	nnn/ VRB BTN nnn/ AND nnn/	WIND 270/ABV49MPS (WIND 270/ABV99KT)
	Wind speed (O)3	[ABV]n[n][n]MPS ( <i>or</i>	
	Significant speed	MAX[ABV]nn[n] MNMn[n]	WIND 120/3MPS MAX9 MNM2 (WIND 120/6KT MAX18 MNM4)
	Significant directional	VRB BTN nnn/ AND	
	Runway section	END	
	Wind direction (O)3	nnn/ VRB BTN nnn/ AND nnn/	WIND 020/5MPS VRB E 350/ AND 070/ (WIND 020/10 VRB BTN 350/ AND 070/)
	Wind speed (O)3	[ABV]n[n][n]MPS ( <i>or</i>	
Significant speed	MAX[ABV]nn[n] MNMn[n]	WIND RWY 14R MID 140/6MPS (WIND RWY	
Significant directional	VRB BTN nnn/ AND		

variations (C)5

nnn/

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>
Visibility (M)	Name of the element	VIS	CVIS 350M CA VIS 7KM
	Runway (O)2	RWY nn[L] or RWY nn[C] or	AVIS 10KM
	Runway section	TDZ	VIS RWY 09 TDZ 800M END
	Visibility (M)	n[n][n][n]M or n[n]KM	V1200M VIS RWY 18C TDZ 6KM RWY
	Runway section	MID	O27 TDZ 4000M
	Visibility (O)3	n[n][n][n]M or n[n]KM	
	Runway section	END	K
	Visibility (O)3	n[n][n][n]M or n[n]KM	
Runway visual (C)6	Name of the element	RVR	RVR RWY 32 400M RVR RWY 20 1600M
	Runway (C)7	RWY nn[L] or RWY nn[C] or	RVR RWY 10L BLW 50M RVR RWY 14 ABV 2000M
	Runway section	TDZ	RVR RWY 10 BLW 150M RVR RWY 12 ABV 1200M
	Runway visual range	[ABV or BLW] nn[n][n]M	RVR RWY 12 TDZ 1100M MID ABV
	Runway section	MID	RVR RWY 16 TDZ 600M MID 500M
	Runway visual range	[ABV or BLW] nn[n][n]M	RVR RWY 26 500M RWY 20 800M
	Runway section	END	
	Runway visual range	[ABV or BLW] nn[n][n]M	
Present weather (C)9, 10	Intensity of present weather (C)9	FBL or MOD	
	Characteristics and present weather (C)9,11	DZ or RA or SN or SG or PL or DS or  SS or FZDZ or FZUP12 or FC13 or FZRA  or SHGR  SHGS or SHRA SHSN or SHUPTS GR <sup>12</sup> or or TSGS TSRA or	FG or BR or SA or DU or HZ or FU or  VA or SQ or PO or TS or BCFG or BLDU  S N  H Z  FG VA  MIFG  HV Y TS RA HV Y DZ F B L  S N  H Z  FG VA  MIFG  HVY



		TSSN TSUP12 or UP12	PRFG //12	TSRA SN FBL SNRA FBL DZ FG HVY SHSN BLSN HVY TSUP //
Cloud (M)14	Name of the element	CLD		CLD NSC CLD SCT 300M OVC 600M (CLD SCT 1000FT OVC 2000FT)  CLD OBSC VER VIS 150M (CLD OBSC VER VIS 500FT) CLD BKN TCU 270M
	Runway (O)2	RWY nn[L] or RWY nn[C] or		
	Cloud amount (M) or vertical visibility	FE OBS NSC or W C NCD12 or SCT or BK N or OV C or //12	or	
	Cloud type (C)9	CB	—	

//12 (CLD BKN TCU

Element as specified in	Detailed content	Template(s)	Examples
	Height of cloud base or the value of vertical visibility (C)9	n[n][n][ n]M[VER VIS (or n[n][n][nn[n][n] M(or]FT) or VER VIS n[n][n][n	CLD /// CB 400M (CLD /// CB 1200FT) CLD NCD
Air temperature (M)	Name of the element	///FT)T 12 ]FT)]	T17 TMS
	Air temperature (M)	[MS]nn	
Dew-point temperature	Name of the element	DP	DP15 DPMS
	Dew-point	[MS]nn	
Pressure values (M)	Name of the element	QNH	QNH 0995H PA QNH 1009HPA
	QNH (M)	nnnnHPA	
	Name of the element	QFE	
	QFE (O)	[RWY nn[L] or RWY nn[C] or RWY nn[R]] nnnnHPA [RWY nn[L] or	

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>			<i>Examples</i>
Supplementary information (C)9	Significant meteorological phenomena (C)9	CB or TS or MOD TURB or SEV TURB or WS or GR or SEV SQL or MOD ICE or SEV ICE or			QNH 1022HPA QFE FC IN APCH WS IN APCH 60M-WIND 360/13MPS WS RWY 12
	Location of the phenomena (C)9	FZDZ IN APCoH [n][n][nr] FZRA or [n]M-WIND nnn/n[n]MPS] or IN CLIMB-OUT [n][n][n]M-WIND nnn/n[n]MPS] (IN APCH [n][n][n]FT-WIND			REFZRA CB IN CLIMB-OUT RETSRA
	Recent weather (C)9, 10	REFZDZ or REFZRA or REDZ or RE[SH]RA or RE[SH]SN or RESG or RESHGR or RESHGS or REBLSN or RESS or REDS or RETSRA or RETSSN or			
Trend forecast (O)16	Name of the element	RETSGTRENDR or RETSGS or REFC or REPL			TREND NOSIG TREND BECMG FEW 600M (TREND BECMG FEW 2000FT)
	Change indicator	NOSIG BECMG or TEMPO			
	Period of change	FMnnnn and/or TLnnnn or			TREND TEMPO 250/18 MPS MAX25 (TREND
	Wind (C)9	nnn/[ABV]n[n][n]MPS [MAX[ABV]nn[n]]			TEMPO 250/36KT MAX50)
	Visibility (C)9	VIS n[n][n][n]M or VIS n[n]KM			CA TREND BECMG AT1800 VIS 10KM NSW TREND BECMG TL1700 VIS 800M FG TREND
	Weather phenomenon: intensity (C)9	FBL or MOD or HVY			NSK BECMG FM1030 TL1130 CAVOK

TREND TEMPO TL1200 VIS

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>			<i>Examples</i>
	Weather characteristics and type (C)9, 10, 11	DZ or RA or SN or SG or PL or	FG or BR or SA or DU or HZ or		TREND TEMPO FM0300 TL0430 TREND BECMG FM1900 VIS TREND BECMG FM1100 MOD SN FM1130

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>			<i>Examples</i>
		DS <i>or</i> SS <i>or</i> FZDZ <i>or</i> FZRA SHGR SHGS <i>or</i> SHRA SHSN TSGR <i>or</i> TSGS TSRA TSSN	FU <i>or</i> VA <i>or</i> SQ <i>Or</i> PO <i>or</i> FC <i>or</i> TS <i>or</i> BCFG BLDU BLSA BLSN DRDU DRSA DRSN FZFG MIFG <i>or</i> PRFG		TREND BECMG AT1130 CLD  (TREND BECMG AT1130 CLD  TREND TEMPO TL1530 HVY SHRA 360M  (TREND TEMPO TL1530 HVY SHRA CLD BKN CB1200FT)
	Name of the element	CLD			
	Cloud amount and visibility (C)9,14	FEW <i>or</i> SCT <i>or</i> BKN <i>or</i> OVC	OBSC	NSC	
	Cloud type (C)9,14	CB <i>or</i> TCU	—		
	Height of cloud base value of vertical visibility(C)9,14	n[n][n][ M ( <i>or</i> n[n][n][ n]	[VER n[n][n] ( <i>or</i> VER		
		FT)	VIS n[n][n][ FT)]		

Notes.—

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

4. To be included in accordance with 4.1.5.2 c).
5. To be included in accordance with 4.1.5.2 b) 1).
6. To be included if visibility or runway visual range < 1 500 m.
7. To be included in accordance with 4.3.6.4 d).
8. To be included in accordance with 4.3.6.4 c).
9. To be included whenever applicable.
10. One or more, up to a maximum of three groups, in accordance with 4.4.2.9 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

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).*

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

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>		<i>Examples</i>	
Identification of an automated or missing report (C)2	Automated or missing report identifier (C)	AUTO or NIL		AUTO NIL	
END OF METAR IF THE REPORT IS MISSING.					
Surface wind (M)	Wind direction (M)	nnn	VRB	24004MPS (24008KT)	VRB01MPS (VRB02KT)
	Wind speed (M)	[P]nn[n]		19006MPS (19012KT)	
	Significant speed variations (C)3	G[P]nn[n]		00000MPS (00000KT)	
	Units of measurement (M)	MPS (or KT)		140P49MPS (140P99KT)	
	Significant directional variations (C)4	nnnVnnn	—	12003G09MPS (12006G18KT)	
Visibility (M)	Prevailing or minimum visibility (M)5	nnnn	C A V O K	0350 7000 9999 0800	CAVOK
	Minimum visibility	nnnn[N] or nnnn[NE] or nnnn[E] or		2000 1200NW 6000 2800E	
	and direction of the minimum visibility (C)6	nnnn[SE] or nnnn[S] or nnnn[SW] or nnnn[W] or nnnn[NW]		6000 2800	
Runway	Name of the element	R		R32/0400 R12R/1700	

visual (rangeC)7	Runway (M) <sup>M)</sup>	nn[L]/or nn[C]/or nn[R]/	R10/M0050 R14L/P2000
	Runway visual range (M)	[P or M]nnnn	R16L/0650 R16C/0500 R16R/0450 R17L/0450
	Runway visual range past tendency (C)8	U, D or N	R12/1100U R26/0550N R20/0800D R12/0700

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>			<i>Examples</i>
Present weather (C)2, 9	Intensity proximity of present weather (C)10	or— or +	—	VC	
	Characteristics and present weather (M)11	DZ or RA or SN or SG or PL or DS or SS or FZDZ or FZRA or FZUP12 or FC13 or SHGR or SHGS or SHRA or SHSN or SHUP12 or TSGR or	FG or BR or SA or DU or HZ or FU or VA or SQ or PO or TS or BCFG or BLDU or BLSA or BLSN or DRDU or DRSA or DRSN or FZFG or MIFG or	FG or PO or FC or DS or SS or TS or SH or BLSN or BLSA or BLDU or VA	RA HZ VCFG +TSRA FG VCSH +DZ VA VCTS -SN MIFGVCBLSA +TSRASN -SNRA DZ FG +SHSN BLSN UP FZUP TSUP FZUP

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>			<i>Examples</i>
		TSGS or TSRA or TSSN or TSUP12 or UP12	PRFG or //12		//
Cloud (M)14	Cloud amount and height of cloud base or vertical visibility (M)	FEWnnn or SCTnnn or BKNnnn or OVCnnn or FEW///12	VVnnn or VV///12	NSC or NCD12	FEW015 VV005 OVC030 VV/// N SCT010 OVC020 BKN/// ///015
	Cloud type (C)2	CB or TCU or ///12	—		BKN009TCU NCD SCT008 BKN025/// BKN025CB
Air and dew-point temperature (M)	Air and dew-point (M)	[M]nn/[M]nn			17/10 02/M08 M01/M10
Pressure values (M)	Name of the element	Q			Q099 5
	QNH <sup>M</sup> (M)	nnnn			Q100 9
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 RETS or REFC or R RETSUP12 or RESHUP12			REFZRA RETSRA
	Wind shear (C)2	WS Rnn[L] or WS Rnn[C] or WS Rnn[R] or WS ALL RWY			WS R03 WS ALL RWY WS

Sea-surface temperature and state of the sea or significant wave height (C)15	W[M]nn/Sn or W[M]nn/Hn[n][n]	W15/S2 W12/H7 5
--	------------------------------	-----------------------

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>		<i>Examples</i>
(C)16	State of the runway	R nn[L]/ or Rnn[C]/ or Rnn[R]/	R/SNOCLO	R99/4215 9 4
	Runway deposits	n or / CLR D//		R/SNOCL O
	Extent of <sup>M)</sup> runway	n or /		R14L/CL
	Depth of deposit	nn or //		R D//
	Friction coefficient <sup>M)</sup> or	nn or //		
Trend forecast (O)17	Change indicator 18 Period of change (C)2 Wind (C)2 Prevailing visibility Weather <sup>2</sup> phenomenon:	NOSIG G FMnnnn and/or TLnnn n or ATnnn nnn[P]nn[n][G[P]nn[n]]MPS (or nnn[P]nn[G[P]nn]KT) nnnn - or — N S W A + — — V	TEMPO 25018G25 MPS (TEMPO 25036G50 KT)	NOSIG BECM FEW020 TEMPO 25018G25 MPS (TEMPO 25036G50 KT)



<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>				<i>Examples</i>
	Weather phenomenon: characteristics and type (C)2, 9, 11	DZ or RA or SN or SG or PL or DS or SS or FZD Z or FZR A or SHG R or SHG S or SHR A	FG or BR or SA or DU or HZ or FU or VA or SQ or PO or FC or TS or BCFG or BLD		O K	G  BECMG FM1030 TL1130  CAVOK BECMG TL1700  0800 FG BECMG AT1800  9000 NSW BECMG  FM1900 0500 +SNRA  BECMG FM1100 SN TEMPO FM1130 BLSN  TEMPO FM0330 TL0430 FZRA TEMPO TL1200 0600 BECMG AT1200 8000 NSW NSC
	Cloud amount and height of cloud base <i>or</i> vertical visibility (C)2, 14	FEW nnn or SCT nnn or	U or VVnn n or VV///	N S C		
	Cloud type (C)2,14	CB or	—			

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>					<i>Examples</i>
							BECMG AT1130 OVC010  TEMPO TL1530 +SHRA BKN012C B

## 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

<i>Change</i>	<i>Time indicator and</i>	<i>Meaning</i>	
<i>indicator</i> NOSIG	<i>period</i> —	no significant changes are forecast	
BECMG	FMn1n1n1n1	the change is forecast to	commence at n1n1n1n1 UTC and be completed by n2n2n2n2 UTC
	TLnTLnnnnn n n		commence at the beginning of the trend forecast period and be
	FMnnnn		completed by nnnn UTC commence at nnnn UTC and be completed by the end of the trend
	ATnnnn		forecast period occur at nnnn UTC (specified time)
	—		commence at the beginning of the trend forecast period and be completed by the end of the trend forecast period; <i>or</i> the time is uncertain
TEMPO	FMn1n1n1n1 TLn2n2n2n2	temporary fluctuations are forecast to	commence at n1n1n1n1 UTC and cease by n2n2n2n2 UTC
	TLnnnn		commence at the beginning of the trend forecast period and cease by
	FMnnnn		nnnn UTC commence at nnnn UTC and cease by the end of the trend forecast
	—		period commence at the beginning of the trend forecast period and cease by the end of the trend forecast period

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

<i>Element as specified in</i> <i>Chapter 4</i>		<i>Range</i>	<i>Resolution</i>
Runway:	(no units)	01 – 36	1
Wind direction:	°true	010 – 360	10
Wind speed:	MPS	1 – 99*	1
	KT	1 – 199*	1
Visibility:	M	0 – 750	50
	M	800 – 4 900	100
	KM	5 – 9	1
	KM	10 –	0 (fixed value: 10 KM)
Runway visual range:	M	0 – 375	25
	M	400 – 750	50
	M	800 – 2 000	100
Vertical visibility:	M	0 – 75**	15
	M	90 – 600	30

<i>Element as specified in Chapter 4</i>	<i>Range</i>	<i>Resolution</i>
	FT	0 – 250**
	FT	300 – 2 000
Clouds: height of cloud base:	M	0 – 75**
	M	90 – 3 000
	FT	0 – 250**
	FT	300 – 10 000
Air temperature;	°C	–80 – +60
Dew-point temperature:		
QNH; QFE:	hPa	0500 – 1 100
<p>* 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.</p> <p>** Under circumstances as specified in 4.5.4.2; otherwise a resolution of 30 m (100 ft) is to be used.</p>		

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

<i>Element as specified in Chapter 4</i>	<i>Range</i>	<i>Resolution</i>
Runway:	(no units)	01 – 36
Wind direction:	°true	000 – 360
Wind speed:	MPS KT	00 – 99*
		00 – 199*
Visibility:	M	0000 – 0750
	M	0800 – 4 900
	M	5 000 – 9 000
	M	10 000 –
Runway visual range:	M	0000 – 0375
	M	0400 – 0750
	M	0800 – 2 000
Vertical visibility:	30's M (100's	000 – 020
Clouds: height of cloud base:	30's M (100's <sup>FT</sup> )	000 – 100
Air temperature;		
Dew-point temperature:	°C	80 +60
		– –
QNH:	hPa	0850 – 1 100
Sea-surface temperature:	°C	–10 – +40
State of the sea:	(no units)	0 – 9

Significant wave height:		0 – 999	0.1
State of the runway	Runway designator: (no units)	01 – 36; 88; 99	1
	Runway deposits: (no units)	0 – 9	1
	Extent of runway (no units)	1; 2; 5; 9	—
	contamin ation: Depth of deposit:	(no units) 00 – 90; 92 – 99	1
	Friction coefficient/braking	(no units) 00 – 95; 99	1
* There is no aeronautical requirement to report surface wind speeds of 50 m/s (100 kt) or more; however, provision has <sup>action:</sup> 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/Internation)\*:*

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

(if available)

*Note.— When ADS-C or SSR Mode S is being applied, the requirements of routine air-reports may be met by the combination of the basic ADS-C/SSR Mode S data block (data block 1) and the meteorological information data block (data block 2), available from ADS-C or SSR Mode S reports. The ADS-C message format is specified in the PANS-ATM (Doc 4444), 4.11.4 and Chapter 13 and the SSR Mode S message format is specified in 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 while ADS-C and SSR Mode S are not being applied, the requirements of routine airreports 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 1.*

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

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

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

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

*Note. — Message to be prompted by the pilot-in-command. Currently only the condition “SEV TURB” can be automated (see 2.6.3).*

<i>Element as specified in Chapter 5</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>
Message type designator (M)	Type of air-report (M)	ARS	ARS
Aircraft identification (M)	Aircraft radiotelephony call sign (M)	nnnnnn	VA812
DATA BLOCK 1			
Latitude (M)	Latitude in degrees and minutes	Nnnnn or Snnnn	S4506
Longitude (M)	Longitude in degrees and minutes (M)	Wnnnnn or Ennnnn	E01056
Level (M)	Flight level (M) <sup>M)</sup>	FLnnn or FLnnn to FLnnn	FL330 FL280 to FL310
Time (M)	Time of occurrence in hours and minutes (M)	OBS AT nnnnZ	OBS AT 1216Z
DATA BLOCK 2			



<i>Peak value of turbulence occurring during the one-minute period</i>	<i>Value to be reported</i>
...	...
13 – 14	13
14 – 15	14
No timing information available	15

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

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

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

## 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

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

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

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>
Identification of the type of	Type of forecast (M)	TAF or TAF AMD or TAF COR	TAF TAF AMD
Location	ICAO location	nnnn	YUDO1
Time of issue of forecast (M)	Day and time of issue of the forecast	nnnnnnZ	160000Z
Identification of a missing	Missing forecast identifier (C)	NIL	NIL
END OF TAF IF THE FORECAST IS MISSING.			

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>
Days and period of validity of	Days and period of the validity of the forecast	nnnn/nnnn	0812/0918
Identification of a cancelled	Cancelled forecast identifier (C)	CNL	CNL
END OF TAF IF THE FORECAST IS CANCELLED.			
Surface wind (M)	Wind direction (M)	nnn or VRB2	24004MPS; VRB01MPS (24008KT); (VRB02KT) 19005MPS (19010KT) 00000MPS (00000KT) 140P49MP S
	Wind speed (M)	[P]nn[n]	
	Significant speed	G[P]nn[n]	
	Units of measurement (M)	MPS (or KT)	
Visibility (M)	Prevailing visibility (M)	nnnn	C0350 CAVOK A7000 V9000
Weather (C)4, 5	Intensity of weather	- or +	O9999 HZ KRA FG
	Characteristics and type of weather phenomena	DZ or RA or SN or SG or	FG or BR or SA or DU or +TSRA -FZDZ PRFG

<i>Element as specified in</i>	<i>Detailed content</i>	<i>Template(s)</i>			<i>Examples</i>
	(C)7	PL <i>or</i> DS <i>or</i> SS <i>or</i> FZDZ <i>or</i> FZRA <i>or</i> SHGR <i>or</i> SHGS <i>or</i> SHRA <i>or</i> SHSN <i>or</i> TSGR <i>or</i> TSGS <i>or</i>	HZ <i>or</i> FU <i>or</i> VA <i>or</i> SQ <i>or</i> PO <i>or</i> FC <i>or</i> TS <i>or</i> BCFG <i>or</i> BLDU <i>or</i> BLSA		+TSRA  SN  SNRA  FG
Cloud (M)8	Cloud amount and height of base <i>or</i> vertical Cloud type (C)4	FEWnnn <i>or</i> SCTnnn <i>or</i> CB <i>or</i> TCU	VVnnn <i>or</i> VV///	NSC	VV005 VV///  FEW0 10 OVC0 20 NSC
Temperature (O)9	Name of the element Maximum Day and time of occurrence of the Name of the element Minimum Day and time of occurrence of the	TX [M]nn/ nnnnZ TN [M]nn/ nnnnZ			TX25/1013Z TN09/1005Z TX05/2112Z TNM02/2103Z
Expected significant changes to one or more of the above elements during the period of validity (C)4, 10	Change <i>or</i> probability indicator (M) Period of occurrence <i>or</i> Wind (C)4 Prevailing visibility Weather phenomenon:	PROB30 [TEMPO] <i>or</i> PROB40 [TEMPO] <i>or</i> nnnn/nnnn <i>or</i> nnnnnn11 nnn[P]nn[n][G[P]nn[n]]MPS <i>or</i> VRBnnMPS ( <i>or</i> nnnn - <i>or</i> +			TEMPO 0815/0818 25017G25MPS (TEMPO 0815/0818 25034G50KT) TEMPO 2212/2214 17006G13MPS 1000 TSRA

Weather phenomenon: characteristics and type (C)4, 7	DZ or RA or SN or SG or PL or DS or SS or FZDZ or FZRA or SHGR or SHGS	FG or BR or SA or DU or HZ or FU or VA or SQ or PO or FC or TS or BCFG or BLDU or BLSA or	K	SCT010CB BKN020 (TEMPO 2212/2214 17012G26KT 1000 TSRA SCT010CB BKN020)  BECMG 3010/3011 00000MPS 2400 OVC010 (BECMG 3010/3011 00000KT 2400 OVC010)  PROB30 1412/1414 0800 FG BECMG 1412/1414 RA TEMPO 2503/2504 FZRA TEMPO
Cloud amount and height of base or vertical visibility 4	FEWnnn or SCTnnn	VVnnn or VV///	NSC	0612/0615 BLSN FM051230 15015KMH 9999 BKN020 (FM051230 15008KT 9999 BKN020)
(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

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

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.

<i>Element</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Examples</i>
Location indicator of FIR/CTA (M)	ICAO location indicator of the ATS unit serving the FIR	nnnn	YUCC1
Identification	or CTA to which	GAMET	GAMET

	the Message		
Validity period (M)	Day-time groups indicating the period of validity in UTC	VALID nnnnnn/nnnnnn	VALID 220600/221200
Location indicator of aerodrome meteorological office or meteorological	Location indicator of aerodrome meteorological office or meteorological	nnnn-	YUDO-1
watch office (M)	watch office		
Name of the FIR/CTA or part thereof (M)	Location indicator and name of the FIR/CTA, or part	nnnn nnnnnnnnnn FIR[/n] [BLW FLnnn] or nnnn nnnnnnnnnn CTA[/n] [BLW FLnnn]	YUCC AMSWELL FIR/2 BLW FL120 YUCC

thereof for which the

		Template(s)			
		Identifier and time	Location	Content	
Element	Detailed content	SECN I			Examples
Indicator for the beginning of Section	Indicator to identify the				SECN I
Surface wind (C)	Widespread surface wind exceeding 15 m/s	SFC WIND: [nn/nn]	[N OF Nnn or Snn] or [S OF Nnn or Snn]	nnn/[n]nnM PS (or nnn/[n]nnK	SFC WIND: 10/12 310/16MPS SFC WIND: E OF W110
Surface visibility (C)	Widespread surface visibility below 5 000 m including the weather phenomena	SFC VIS: [nn/nn]	or [W OF Wnnn] or [E OF Wnnn] or Wnnn or Ennn] or	nnnnM FG or BR or SA or DU or HZ or FU or VA or PO or DS	SFC VIS: 06/08 N OF N51 3000M BR

		Template(s)			
		Identifier and time	Location	Content	
	causing the reduction in visibility		[nnnnnnnn nn]2		
Significant weather (C)	Significant weather conditions encompassing thunderstorms, heavy sandstorm and duststorm, and volcanic ash	SIGWX: [nn/nn]	[ (	ISOL TS <i>or</i> OCNL TS <i>or</i> FRQ TS <i>or</i> OBSC TS <i>or</i> EMBD TS <i>or</i> HVY DS <i>or</i> HVY SS <i>or</i> SQL TS <i>or</i> ISOL TSGR <i>or</i> OCNL	SIGWX: 11/12 ISOL TS  SIGWX: 12/14 S OF N35 HVY SS
Mountain obscuration (C)	Mountain obscuration	MT OBSC: [nn/nn]		nnnnnnnn nn2	MT OBSC: S OF N48 MT PASSES
Cloud (C)	Widespread areas of broken <i>or</i> overcast cloud with height of base less than 300 m (1 000 ft) above ground level (AGL) <i>or</i> above mean sea level (AMSL) <i>and/or</i> any occurrence of	SIG CLD: [nn/nn]		BKN <i>or</i> OVC n]nnn/[n]nnnM <i>or</i> n]nnn/[n]nnnF T) AGL <i>or</i> AMSL ISOL <i>or</i> OCNL <i>or</i> FRQ <i>or</i>	SIG CLD: 06/09 N OF N51 OVC 800/1100FT AGL 10/12 ISOL TCU 1200/8000FT AGL

		<i>Template(s)</i>			
		<i>Identifier and time</i>	<i>Location</i>	<i>Content</i>	
Icing (C)	Icing (except for that occurring in convective clouds and for severe icing for	ICE: [nn/nn]		MOD FLnnn/nnn or MOD ABV FLnnn or SEV	ICE: MOD FL050/080
Turbulence (C)	which a SIGMET Turbulence (except for that occurring in convective clouds and for severe turbulence	TURB: [nn/nn]		FLnnn/nnn or MOD FLnnn/nnn or MOD ABV FLnnn or SEV	TURB: MOD ABV FL090
Mountain wave (C)	for which a SIGMET Mountain wave (except for severe mountain wave for	MTW: [nn/nn]		FLnnn/nnn or MOD FLnnn/nnn or MOD ABV	MTW: N OF N63 MOD ABV FL080

		<i>Template(s)</i>			
		<i>Identifier and time</i>	<i>Location</i>	<i>Content</i>	
<i>Element</i>	<i>Detailed content</i>	SIGMET	—	[n][n]n4	<i>Examples</i>
SIGMET (C)	SIGMET messages applicable to the FIR/CTA concerned or a subarea thereof, for	APPLIC	A BLE:		SIGMET APPLICABLE : 3, A5, B06
			HAZARDOUS WX NIL		HAZARDOU S WX NIL
Indicator for the beginning of Pressure centres and fronts (M)	Indicator to identify the beginning of Pressure centres and fronts and their expected movements and developments	SECN II PSYS: [nn]	Nnnnn or Snnnn Wnnnnn or Ennnnn or Nnnnn or Snnnn	L [n]nnnHP A or H [n]nnnHPA or FRONT or	SECN II PSYS: 06 N5130 E01000 L 1004HPA MOV NE 25KT

		<i>Template(s)</i>		
		<i>Identifier</i>		
		<i>and time</i>	<i>Location</i>	<i>Content</i>
		Wnnnnn	NIL	WKN
		or —	MOV N or MOV NE or MOV E or MOV SE or MOV S or MOV SW or MOV W	
Upper winds and temperatures (M)	Upper wind and upper-air temperatures for at least the following	WIND/T: Nnnnn or Snnnn Wnnnnn or Ennnnn	[n]nnnM (or [n]nnnFT) nnn/[n]nnM	WIND/T: 2000FT N5500 W01000 270/18MPS PS03 5000FT N5500 W01000 250/20MPS MS02
Cloud (M)	altitudes: 600, 1500 Cloud information not included in Section I giving type, height of base and top above ground level (AGL) or above mean sea	CLD: [nn/nn] Snn] or [W OF Wnnn or Ennn ] or	[S OF Nnn or FEW or SCT or BKN or OVC ST or SC or CU or AS or	10000FT N5500 W01000 CLD: BKN SC 2500/8000FT AGL CLD: NIL
Freezing level (M)	Height indication of 0°C level(s) above ground level (AGL) or above mean sea level (AMSL), if lower than	FZLVL: [E Wnnn or Ennn]	OF[ABV] [n]nnnFT AGL or AMSL	FZLVL: 3000FT AGL
Forecast QNH (M)	Forecast lowest QNH during the	MNM QNH:	[n]nnnHPA	MNM QNH: 1004HPA
Sea-surface temperature and state of the sea	Sea-surface temperature and state of the sea if	SEA:	Tnn HGT [n]nM	SEA: T15 HGT 5M

		<i>Template(s)</i>	
		<i>Identifier</i>	
		<i>and time</i>	<i>Location</i>
<i>(O)</i>	<i>required by regional</i>		
		<i>Content</i>	
	air		
Volcanic eruptions	Name of volcano	VA:	nnnnnnnnnn VA:
			<i>or</i>
which a SIGMET	FLnnn <i>or</i> 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 xbe 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

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

minimum):

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

## Example A5-1. TAF

*TAF for YUDO (Donlon/International)\*:*

TAF YUDO 151800Z 1600/1618 13005MPS 9000 BKN020 BECMG 1606/1608  
SCT015CB BKN020 TEMPO 1608/1612 17006G12MPS 1000 TSRA SCT010CB  
BKN020 FM161230 15004MPS 9999 BKN020

*Meaning of the forecast:*

TAF for Donlon/International\* issued on the 15th of the month at 1800 UTC valid from 0000 UTC to 1800 UTC on the 16th of the month; surface wind direction 130 degrees; wind speed 5 metres per second; visibility 9 kilometres, broken cloud at 600 metres; becoming between 0600 UTC and 0800 UTC on the 16th of the month, scattered cumulonimbus cloud at 450 metres and broken cloud at 600 metres; temporarily between 0800 UTC and 1200 UTC on the 16th of the month surface wind direction 170 degrees; wind speed 6 metres per second gusting to 12 metres per second; visibility 1 000 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.



CC GAMET VALID -

CC AMSWELL FIR/2 BLW

C 1/12

C 0/08 N OF N51

iW 1/12 ISOL

0/09 N OF N51 OVC 800/1100FT AGL 10/12 ISOL TCU

2857

APPLICABLE FL050/0

Example A5-3. GAMET area forecast

0 N5130 E01000 L 1004HPA MOV NE 25  
200FT N5500 W01000 270/20MPS N5500 W01000 0

1000FT N5500 W01000 240/22MPS  
BKN SC 2500/8000FT

300FT

A area forecast-level flights (GAMET) issued two of the  
flight ion region (identified by YUCC Amwell area control centre) for  
level 120 by the Donlon/International\* aerodrome meteorological office

between 1000 UTC and 1200 UTC surface wind direction 310 degrees; wind  
direction

between 0600 UTC and 0800 UTC north of 51 degrees north 3  
st); weather phenomenon between 1100 UTC and 1200 UTC isolated

between 0600 UTC and 0900 UTC north of 51 degrees north overcast  
over ground level; between 1000 UTC and 1200 UTC base 1 200, top 8 000 feet

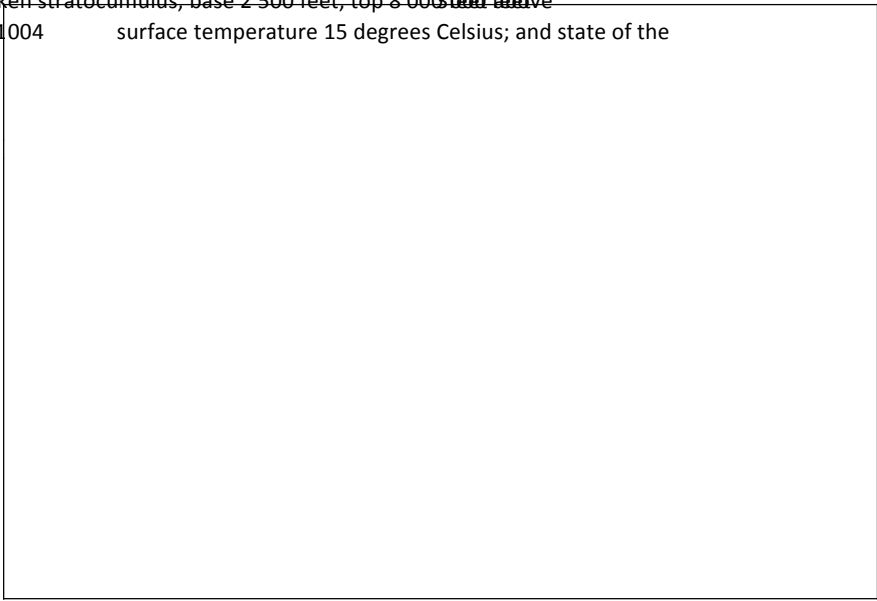
moderate between flight level

ction  
essystem at 0600 UTC low pressure of 1 004 hectopascals at 51.5 degrees north  
expected to move eastwards at 25 knots and to

Win an at 2 feet above ground degrees north degrees wind 27 degree  
temperatur

wind 1 metre per second, temperature 31 degrees at 5 feet above ground  
at degrees north degrees wind direction 25 degrees, speed metre per second  
temperature 2 degrees at 10 feet above ground degrees 1 degree  
west wind 24 degrees wind speed 2 metres per second temperature 1 degree  
Celsius broken stratocumulus, base 2 500 feet, top 8 000 feet  
ground 1004 surface temperature 15 degrees Celsius; and state of the  
nil

cloud  
Fictitious



## 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	OBSC TS
—embedded	EMBD TS
—frequent	FRQ TS
—squall line	SQL TS
—obscured with hail	OBSC TSGR
—embedded with hail	EMBD TSGR
—frequent, with hail	FRQ TSGR
—squall line with hail	SQL TSGR

## tropical cyclone

—tropical cyclone with 10-minute mean surface wind speed of 17 m/s (34 kt) or more	TC (+ cyclone name)
--	---------------------

## turbulence

—severe turbulence icing	SEV TURB
—severe icing	SEV ICE
—severe icing due to freezing rain mountain wave	SEV ICE (FZRA)
—severe mountain wave duststorm	SEV MTW

—heavy duststorm sandstorm	HVY DS
—heavy sandstorm volcanic ash	HVY SS
—volcanic ash	VA (+ volcano name, if known)
—radioactive cloud	RDOACT CLD

1.1.5 SIGMET information shall not contain unnecessary descriptive material. In describing the weather phenomena for which the SIGMET is issued, no descriptive material additional to that given in 1.1.4 shall be included. SIGMET information concerning thunderstorms or a tropical cyclone shall not include references to associated turbulence and icing.

1.1.6 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.

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

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
- tsunami
- volcanic ash deposition
- toxic chemicals
- other phenomena as agreed locally.

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

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

The additional text 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 remotesensing 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

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

*Note 1.—The ranges and resolutions for the numerical elements included in SIGMET messages are shown in Table A6-4 of this Schedule.*

*Note 2.—In accordance with 1.1.5 and 2.1.5, severe or moderate icing and severe or moderate turbulence (SEV ICE, MOD ICE, SEV TURB, MOD TURB) associated with thunderstorms, cumulonimbus clouds or tropical cyclones should not be included.*

Element	Detailed content	SIGMET template	AIRMET* template	SIGMET message	AIRMET* message
Location indicator of FIR/CTA (M)1	ICAO location indicator of the ATS unit serving	nnnn		YUC C2 YUD	
Identification (M)	the FIR or CTA to Message identification and 3	SIGMET [n][n]n	AIRMET [n][n]n	2 SIGMET 1 SIGMET 01	AIRMET * 9 AIRMET * 19
Validity period (M)	sequence number Day-time groups indicating the period of validity in UTC	VALID nnnnnn/nnnnnn		VALID 010000/010400 VALID 221215/221600 VALID	
Location indicator of MWO (M)	Location indicator of MWO originating the	nnnn —		YUD O-2 YUSO	





			SFC/[ABV][n]nn n  ISOL1617 CB CB1818 OCNL FRQ9 CB18  ISOL16 TCU18 OCNL17 TCU18 FRQ9 TCU18 MOD TURB12 MOD ICE1314 MOD MTW		ISOL TCU OCNL TCU FRQ TCU  MOD TURB  MOD ICE MOD MTW
Observed forecast phenomenon (M)	or Indication whether information is observed and expected to or forecast	OBS [AT nnnnZ] or FCST [AT nnnnZ]		OBS OBS AT 1210Z FCST  FCST AT 1815Z	
Location ©19	Location (referring latitude and degrees and minutes))	Nnn[nn] Wnnn[nn] or Nnn[nn] Ennn[nn] Snn[nn] Wnnn[nn] or Snn[nn] Ennn[nn]  or  N OF Nnn[nn] or S OF Nnn[nn] or N OF S OF Snn[nn] [AND] W OF Wnnn[nn] or E OF Wnnn[nn] or W E OF Ennn[nn]  or N OF Nnn[nn] or N OF Snn[nn] AND S S OF Snn[nn]  or W OF Wnnn[nn] or W OF Ennn[nn] ANDE OF Wnnn[nn] or E OF Ennn[nn]  or N OF LINE20 or NE OF LINE20 or E OF LINE or NW OF LINE20 or S OF LINE20 Nnn[nn] 20 or SW OF or Snn[nn] Wnnn[nn] Ennn[nn] -or Nnn[nn] or Snn[nn] [- Nnn[nn] or Snn[nn]		N2020 W07005 N48 E010 S60 W160 S0530 E16530  N OF N50 S OF N5430  N OF S10 S OF S4530  W OF W155 E OF W45  W OF E15540 E OF E09015  N OF N1515 AND W OF E13530 S OF N45 AND N OF N40  N OF LINE S2520 W11510 – S2520 SW OF LINE N50 W005 – N60 W020 SW OF LINE N50 W020 – N45 E010 N45 W020 – N40 E010  WI N6030 E02550 –	

		<p>Wnnn[nn] <i>or</i>  <i>or</i> Snn[nn] Wnnn[nn] <i>or</i>                  Ennn[nn]]                  [AND N OF LINE20 <i>or</i> NE OF                  LINE20                  SE OF LINE20 <i>or</i> NW OF                  LINE20 <i>or</i> S OF LINE20                  Nnn[nn] 20 <i>or</i> SW <i>or</i>                  LINE                  Snn[nn] Wnnn[nn] Ennn[nn] –                  Nnn[nn] <i>or or</i> Snn[nn]                  [– Nnn[nn] <i>or</i> Snn[nn]                  Wnnn[nn] <i>or or</i> Snn[nn]                  Wnnn[nn] <i>or</i> Ennn[nn]]]</p>		<p>N6055 E02500 –                  N6050 E02630 – N6030                  E02550                   APRX 50KM WID                  LINE BTN N64                  N57 E010</p>	
<i>Element</i>	<i>Detailed content</i>	<i>SIGMET template</i>	<i>AIRMET template</i>	<i>SIGMET message</i>	<i>AIRMET* message</i>
		<p><i>or</i>                  WI20, 21 Nnn[nn] <i>or</i> Snn[nn]                  Wnnn[nn] Nnn[nn] <i>or</i> Snn[nn]                  Wnnn[nn] <i>or</i>                  Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn]  <i>or</i>                  Ennn[nn] [Nnn[nn] <i>or</i> Snn[nn]                  Wnnn[nn] <i>or</i>                  Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn]  <i>or</i>  <i>or</i>                  APRX nnKM WID LINE20                  BTN (<i>or</i>                  BTN) Nnn[nn] nnNM WID                  LINE <i>or</i> Snn[nn] Wnnn[nn] 20                  Ennn[nn]– Nnn[nn] <i>or</i> Snn[nn]                  Wnnn[nn] <i>or</i>                  [– Nnn[nn] <i>or</i> Snn[nn]                  Wnnn[nn] <i>or</i>                  [– Nnn[nn] <i>or</i> Snn[nn]                  Wnnn[nn] <i>or</i>                  Ennn[nn]] <i>or</i>                  ENTIRE FIR[/UIR]  <i>or</i>                  ENTIRE CTA  <i>or</i>22                  WI nnnKM (<i>or</i> nnnNM) OF TC                  CENTRE</p>		<p>ENTIRE FIR                   ENTIRE FIR/UIR                   ENTIRE CTA                   WI 400KM OF TC                  CENTRE                  WI 250NM OF TC                  CENTRE</p>	
Level (C)19	Flight level <i>or</i> altitude23	<p>[SFC/]FLnnn <i>or</i>                  [SFC/]nnnnM (<i>or</i>                  [SFC/][n]nnnnFT) <i>or</i>                  FLnnn/nnn <i>or</i>                  TOP FLnnn <i>or</i></p>		<p>FL18                  0                  SFC/FL070                   SFC/3000M                  SFC/10000FT</p>	

		[TOP] ABV FLnnn <i>or</i> [nnnn/]nnnnM ( <i>or</i> [[n]nnnn/][n]nnnnFT) ( <i>or</i> [[n]nnnnFT/]FLnnn)  <i>or</i> 22 TOP [ABV <i>or</i> BLW] FLnnn	FL050/080 TOP FL390  ABV FL250 TOP ABV FL100 3000M 2000/3000M 8000FT 6000/12000FT 2000M/FL150 10000FT/FL250 TOP FL500 TOP ABV FL500 TOP BLW FL450
Movement <i>or</i> movement (C)19, 24	Movement <i>or</i> movement speed) with  one of the sixteen pointsof compass, <i>or</i>	MOV N [nnKMH] <i>or</i> MOV NNE MOV NE [nnKMH] <i>or</i> MOV ENE MOV E [nnKMH] <i>or</i> MOV ESE MOV SE [nnKMH] <i>or</i> MOV SSE [MOV S [nnKMH] nnKMH] <i>or</i> <i>or</i> MOV SSW MOV SW [nnKMH] <i>or</i> MOV WSW MOV W [nnKMH] <i>or</i> MOV WNW [MOV NW [nnKMH] nnKMH] <i>or</i> <i>or</i> MOV NNW ( <i>or</i> MOV N [nnKT] <i>or</i> MOV NNE MOV NE [nnKT] <i>or</i> MOV ENE [nnKT] <i>or</i> MOV E [nnKT] <i>or</i> MOV ESE [nnKT] <i>or</i> MOV SE [nnKT] <i>or</i> MOV SSE [nnKT] <i>or</i> MOV S [nnKT] <i>or</i> MOV SSW [nnKT] <i>or</i> MOV SW [nnKT] <i>or</i> MOV WSW [nnKT] MOV W [nnKT] <i>or</i> MOV WNW [nnKT] MOV NW [nnKT] <i>or</i> MOV NNW [ <i>or</i> nnKT]) STN	MOV SE  MOV NNW  MOV E 40KMH MOV E 20KT  MOV WSW 20KT  STN

OR

<i>Element</i>	<i>Detailed content</i>	<i>SIGMET template</i>	<i>AIRMET template</i>	<i>SIGMET message</i>	<i>AIRMET* message</i>
Changes in intensity (C)19	Expected changes in intensity	INTSF <i>or</i> WKN <i>or</i> NC		INTS F WK	
Forecast time (C)24	Indication of the forecast time of	FCST AT nnnnZ	—	FCST AT 2200Z	—
Forecast position (C)19, 24, 25	Forecast position of phenomenon at the end of the validity period of the SIGMET message	Nnn[nn] Wnnn[nn] <i>or</i> Nnn[nn] Ennn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Snn[nn] Ennn[nn]  <i>or</i> N OF Nnn[nn] <i>or</i> S OF Nnn[nn] <i>or</i> N OF Snn[nn] <i>or</i> S OF Snn[nn] [AND] W OF Wnnn[nn] <i>or</i> E OF Wnnn[nn] <i>or</i> W OF Ennn[nn] <i>or</i> E OF Ennn[nn]  <i>or</i> N OF Nnn[nn] <i>or</i> N OF Snn[nn] AND S OF Nnn[nn] <i>or</i> S OF Snn[nn]  <i>or</i> W OF Wnnn[nn] <i>or</i> W OF Ennn[nn] AND E OF Wnnn[nn] <i>or</i> E OF Ennn[nn]  <i>or</i>	—	N30 W170 N OF N30 S OF S50 AND W OF E170  S OF N46 AND N OF N39  NE OF LINE N35 W020 – N45 W040  SW OF LINE N48 W020 – N43 E010 AND NE OF LINE N43 W020 – N38 E010  WI N20 W090 – N05 W090 – N10 W100 – N20 W100 – N20 W090  APRX 50KM WID LINE BTN N64 W017 – N57 W005 – N55 E010 – N55 E030	—

<i>Element</i>	<i>Detailed content</i>	<i>SIGMET template</i>	<i>AIRMET template</i>	<i>SIGMET message</i>	<i>AIRMET* message</i>
		N OF LINE20 <i>or</i> NE OF LINE20 <i>or</i> E		ENTIRE FIR ENTIRE FIR/UIR ENTIRE CTA	
		<i>or</i> WI20, 21 Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]  <i>or</i> APRX        nnKN WID        LINE2 BTN (nnNM WID LINE20 BTN) Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn] – Nnn[nn] <i>or</i> Snn[nn] Wnnn[nn] <i>or</i> Ennn[nn]			
Repetition of elements (C)27	Repetition of elements included in a SIGMET	[AND]27	—	AND	—

message for OR

<i>Cancellation of</i>	<i>Cancellation of</i>	<i>CNL SIGMET</i>	<i>CNL AIRMET</i>	<i>CNL SIGMET 2</i>	<i>CNL AIRMET*</i>
AIRMET (C)28	SIGMET/AIRMET to its identification	nnnnnn/nnnnnn	nnnnnn/nnnnn nn	101200/1016 00	151520/1518 00
		<i>or</i> 26		CNL	

<i>Cancellation of</i>	<i>Cancellation of</i>	<i>CNL SIGMET</i>	<i>CNL AIRMET</i>	<i>CNL SIGMET 2</i>	<i>CNL AIRMET*</i>
				SIGMET	
		CNL SIGMET		251030/251430	
		[n][n]n nnnnnn/nnnnnn VA MOV TO		TO YUDO FIR2	

nnnn FIR

*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.
13. In accordance with 4.2.7. 14. In accordance with 4.2.8.
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)

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

*Note.* — The ranges and resolutions for the numerical elements included in special air-reports are shown in Table A6-4 of this Schedule.

<i>Element</i>	<i>Detailed content</i>	<i>Template 1,2</i>	<i>Examples</i>
Identification (M)	Message identification	ARS	ARS
Aircraft identification (M)	Aircraft radiotelephony call sign	nnnnnn	VA8123
Observed phenomenon (M)	Description of observed phenomenon causing the issuance of the special air-report <sup>4</sup>	TS TSG R  SEV TURB SEV ICE  SEV  MTW	TS TSGR  SEV TURB SEV ICE  SEV MTW  HVY SS  VA CLD VA VA MT ASHVAL5  MOD TURB
Observation time (M)	Time of observation of observed phenomenon	<sup>HVY</sup> OBS AT nnnnZ	OBS AT 1210Z
Location (C)	Location (referring to latitude and longitude (in degrees and minutes)) of observed phenomenon	NnnnnWnnn nn or NnnnnEnnnn n or SnnnnWnnn	N2020W07005 S4812E01036
Level (C)	Flight level or altitude of observed phenomenon	nn FLnnn or or FLnnn/nnn or nnnnM	FL390 FL180/210 3000M 12000FT



<i>Element</i>	<i>Detailed content</i>	<i>Template 1,2</i>	<i>Examples</i>
		(or [n]nnnnFT)	

*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

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

*Note 1. — The ranges and resolutions for the numerical elements included in aerodrome warnings are shown in Table A6-4 of this 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).*

<i>Element</i>	<i>Detailed content</i>	<i>Templates</i>	<i>Examples</i>
Location indicator of the aerodrome (M)	Location indicator of the aerodrome	nnnn	YUCC1
Identification of the type of message (M)	Type of message and sequence number	AD WRNG [n]n	AD WRNG 2
Validity period (M)	Day and time of validity period in UTC	VALID nnnnnn/nnnnnn	VALID 211230/211530
IF THE AERODROME WARNING IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.			

Phenomenon (M)2	Description of phenomenon causing the issuance of the aerodrome warning	TC3 nnnnnnnnnn <i>or</i> [HVY] TS <i>or</i> GR <i>or</i> [HVY] SN [nnCM]3 <i>or</i> [HVY] FZRA <i>or</i> [HVY] FZDZ <i>or</i> RIME4 <i>or</i> [HVY] SS <i>or</i> [HVY] DS <i>or</i> SA <i>or</i> DU <i>or</i> SFC WSPD nn[n]MPS MAX nn[n] (SFC WSPD nn[n]KT MAX nn[n]) <i>or</i> SFC WIND nnn/nn[n]M PS MAX nn[n] (SFC WIND nnn/nn[n]KT MAX nn[n]) <i>or</i> SQ <i>or</i> FROST <i>or</i> TSUNAMI <i>or</i> VA[DEPO] <i>or</i> TOX CHEM <i>or</i> Free text up to 32 characters5	TC ANDREW HVY SN 25CM SFC WSPD 20MPS MAX 30 VA TSUNAMI
Observed or forecast phenomenon (M)	Indication whether the information is observed and expected to continue, <i>or</i> forecast	OBS [AT nnnnZ] <i>or</i> FCST	OBS AT 1200 Z OBS
Changes in intensity (C)	Expected changes in intensity	INTSF <i>or</i> WKN <i>or</i> NC	WKN

OR

Cancellation of aerodrome warning <sup>6</sup>	Cancellation of aerodrome warning referring to its identification	CNL AD WRNG [n]n nnnnnn/nnnnnn	CNL AD WRNG 2 211230/2115306
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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).

<i>Element</i>	<i>Detailed content</i>	<i>Template(s)</i>	<i>Example</i>
Location indicator of the	Location indicator of the aerodrome	nnnn	YUCC1
Identification of the type of message	Type of message and sequence number	WS WRNG [n]n	WS WRNG 1
Time of origin and validity period (M)	Day and time of issue and, where applicable,	nnnnnn [VALID TL nnnnnn] <i>or</i> [VALID nnnnnn/nnnnnn]	211230 VALID TL 211330 221200 VALID
IF THE WIND SHEAR WARNING IS TO BE CANCELLED, SEE DETAILS AT THE END OF THE TEMPLATE.			

Phenomenon (M)	Identification of the phenomenon and its location	[MOD] <i>or</i> [SEV] WS IN APCH <i>or</i> [MOD] <i>or</i> [SEV] WS [APCH] RWYnnn <i>or</i> [MOD] <i>or</i> [SEV] WS IN CLIMB-OUT <i>or</i> [MOD] <i>or</i> [SEV] WS CLIMB-OUT RWYnnn <i>or</i> MBST IN APCH <i>or</i> MBST [APCH] RWYnnn <i>or</i> MBST IN CLIMB-OUT <i>or</i> MBST CLIMB-OUT RWYnnn	WS APCH RWY12 MOD WS RWY34  WS IN CLIMB-OUT MBST  APCH RWY26  MBST IN CLIMB-OUT
Observed, reported or forecast phenomenon (M)	Identification whether the phenomenon is observed <i>or</i> reported and expected to continue, <i>or</i> forecast	REP AT nnnn nnnnnnnn <i>or</i> OBS [AT nnnn] <i>or</i> FCST	REP AT 1510 B747 OBS AT 1205 FCST
Details of the phenomenon (C)2	Description of phenomenon causing the issuance of the wind shear warning	SFC WIND: nnn/nnMPS ( <i>or</i> nnn/nnKT) nnnM (nnnFT)WIND: nnn/nnMPS ( <i>or</i> nnn/nnKT) <i>or</i> nnKMH ( <i>or</i> nnKT) LOSS nnKM ( <i>or</i> nnNM) FNA RWYnn <i>or</i> nnKMH ( <i>or</i> nnKT) GAIN nnKM ( <i>or</i> nnNM) FNA RWYnn	SFC WIND: 320/5MPS 60MWIND: 360/13MPS (SFC WIND: 320/10KT 200FT-WIND: 360/26KT) 60KMH LOSS 4KM FNA RWY13 (30KT LOSS 2NM FNA

RWY13)

OR

Cancellation of wind shear warning <sup>3</sup>	Cancellation of wind shear warning referring to its identification	CNL WS WRNG [n]n nnnnnn/nnnnnn	CNL WS WRNG 1 211230/2113303
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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

<i>Element as specified in Appendices 2 and 6</i>		<i>Range</i>	<i>Resolution</i>
Summit elevation:	M	000 – 8 100	1
	FT	000 – 27 000	1
Advisory number:	for VA (index)*	000 – 2 000	1
	for TC (index)*	00 – 99	1
Maximum surface wind:	MPS	00 – 99	1
	KT	00 – 199	1
Central pressure:	hPa	850 – 1 050	1
Surface wind speed:	MPS	15 – 49	1
	KT	30 – 99	1
Surface visibility:	M	0000 – 0750	50
	M	0800 – 5 000	100
Cloud: height of base:	M	000 – 300	30
	FT	000 – 1 000	100
Cloud: height of top:	M	000 – 2 970	30
	M	3 000 – 20 000	300
	FT	000 – 9 900	100
	FT	10 000 – 60 000	1 000
Latitudes:	° (degrees)	00 – 90	1
	' (minutes)	00 – 60	1
Longitudes:	° (degrees)	000 – 180	1
	' (minutes)	00 – 60	1
Flight levels:		000 – 650	10
Movement:	KMH	0 – 300	10
	KT	0 – 150	5
* Non-dimensional			

Example A6-1. SIGMET message and the corresponding cancellations



Example A6-2. SIGMET message for tropical cyclone

YUCC SIGMET 3 VALID 251600/252200 YUDO -  
YUCC AMSWELL FIR TC GLORIA PSN N2706 W07306 CB OBS AT 1600Z WI  
250NM OF TC CENTRE TOP FL500 NC FCST AT 2200Z TC CENTRE PSN N2740  
W07345

*Meaning:*

The third SIGMET message issued for the AMSWELL\* flight information region (identified by YUCC Amswell area control centre) by the Donlon/International\* meteorological watch office (YUDO) since 0001 UTC; the message is valid from 1600 UTC to 2200 UTC on the 25th of the month; tropical cyclone Gloria at 27 degrees 6 minutes north and 73 degrees 6 minutes west; cumulonimbus was observed at 1600 UTC within 250 nautical miles of the centre of the tropical cyclone with top at flight level 500; no changes in intensity are expected; at 2200 UTC the centre of the tropical cyclone is forecast to be located at 27 degrees 40 minutes north and 73 degrees 45 minutes west.

\* Fictitious location

Example A6-3. SIGMET message for volcanic ash

YUDD SIGMET 2 VALID 211100/211700 YUSO -  
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL PSN S1500 E07348 VA  
CLD OBS AT 1100Z APRX 50KM WID LINE  
BTN S1500 E07348 - S1530 E07642 FL310/450 INTSF FCST AT 1700Z APRX 50KM  
WID LINE BTN S1506 E07500 - S1518

E08112 - S1712 E08330

*Meaning:*

The second SIGMET message issued for the SHANLON\* flight information region (identified by YUDD Shanlon area control centre/upper flight information region) by the Shanlon/International\* meteorological watch office (YUSO) since 0001 UTC; the message is valid from 1100 UTC to 1700 UTC on the 21st of the month; volcanic ash eruption of Mount Ashval\* located at 15 degrees south and 73 degrees 48 minutes east; volcanic ash cloud observed at 1100 UTC in an approximately 50 km wide line between 15 degrees south and 73 degrees 48 minutes east, and 15 degrees 30 minutes south and 76 degrees 42 minutes east; between flight levels 310 and 450, intensifying at 1700 UTC the volcanic ash cloud is forecast to be located in an approximate 50 km wide line between

15 degrees 6 minutes south and 75 degrees east, 15 degrees 18 minutes south and 81 degrees 12 minutes east, and 17 degrees 12 minutes south and 83 degrees 30 minutes east.

\*Fictitious location

Example A6-4. SIGMET message for radioactive cloud

YUCC SIGMET 2 VALID 201200/201600 YUDO –  
 YUCC AMSWELL FIR RDOACT CLD OBS AT 1155Z WI S5000 W14000 – S5000  
 W13800 – S5200 W13800 – S5200 W14000 – S5000 W14000 SFC/FL100 WKN  
 FCST AT 1600Z WI S5200 W14000 – S5200 W13800 – S5300 W13800 – S5300  
 W14000 – S5200 W14000

*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 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 52 degrees 0 minutes south 138 degrees 0 minutes west to 53 degrees 0 minutes south 138 degrees 0 minutes west to 53 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 × 10<sup>6</sup> 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*.

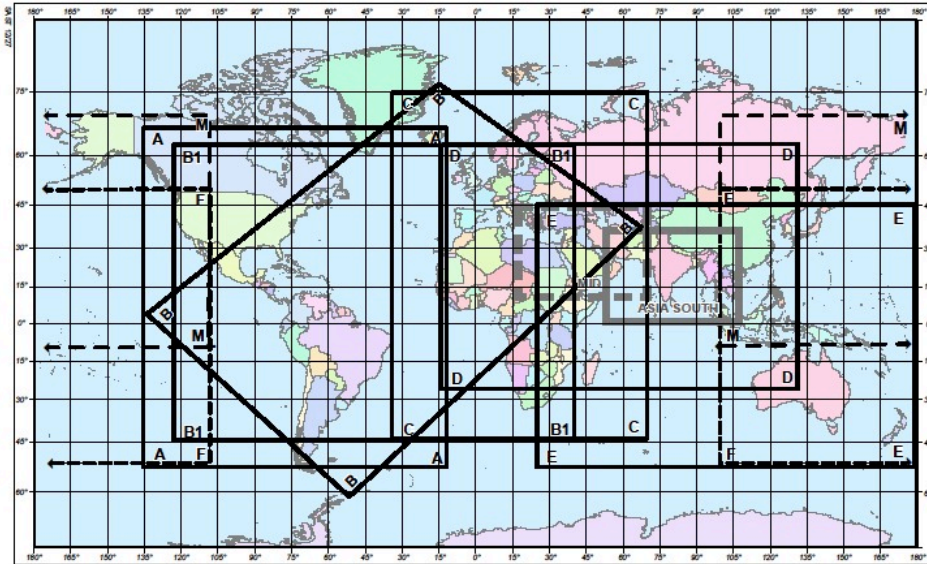


CHART	LATITUDE	LONGITUD	CHART	LATITUDE	LONGITUD
A	N6700	W13724	D	N6300	W01500
A	N6700	W01236	D	N6300	E13200
A	S5400	W01236	D	S2700	E13200
A	S5400	W13724	D	S2700	W01500
ASIA	N3600	E05300	E	N4455	E02446
ASIA	N3600	E10800	E	N4455	E18000
ASIA	0000	E10800	E	S5355	E18000
ASIA	0000	E05300	E	S5355	E02446
B	N0304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

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



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



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

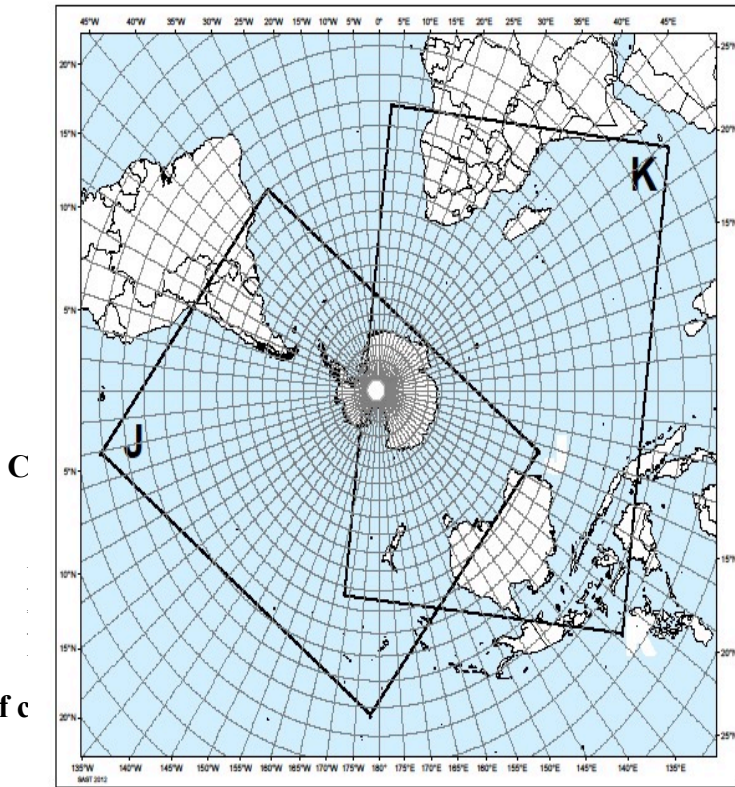


Figure Fixed areas of c  
projection (southern

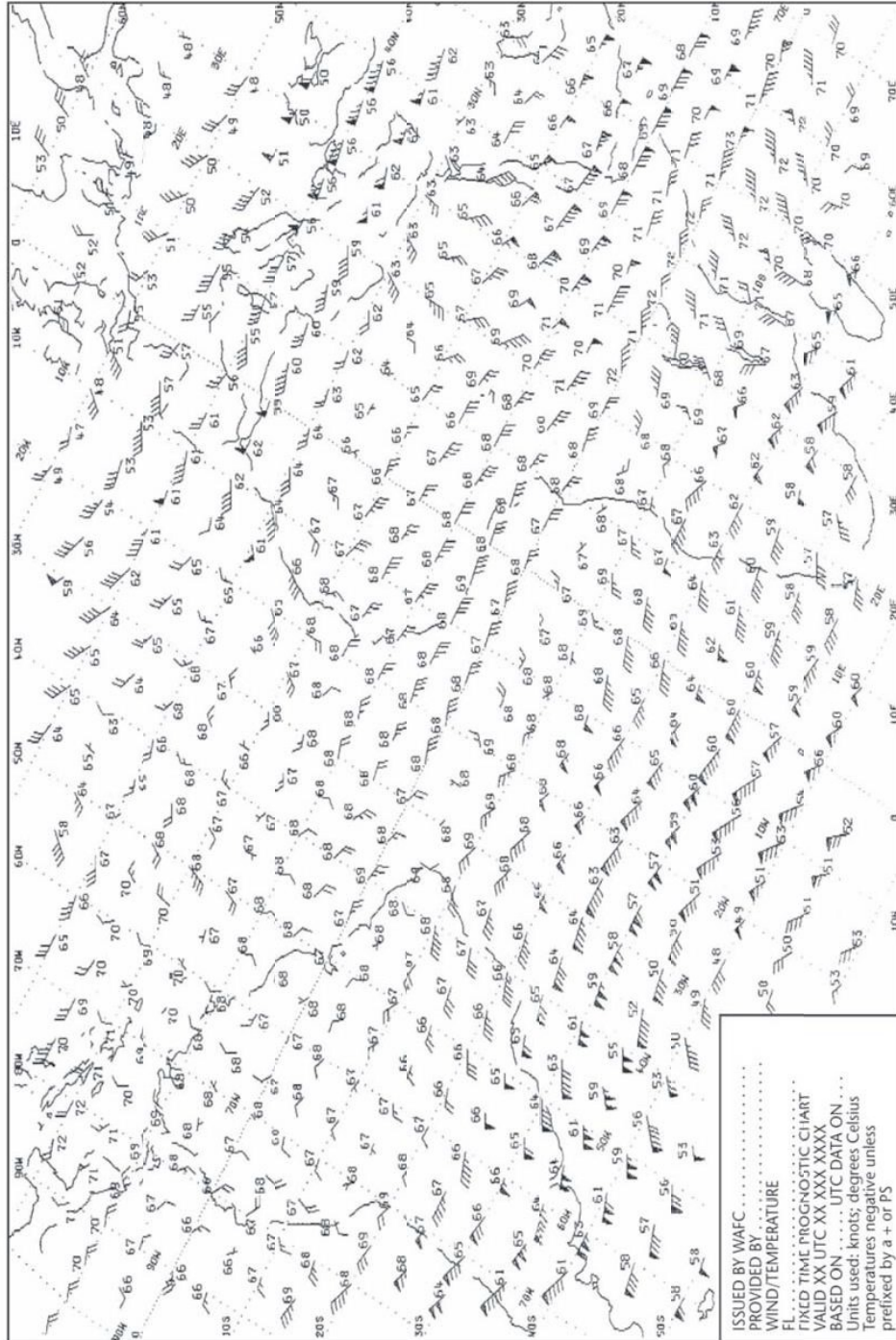
## 5.0 FLIGHT DOCUMENTATION — MODEL CHARTS AND FORMS

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

ISSUED BY ..... METEOROLOGICAL OFFICE (DATE, TIME UTC).....			
<b>INTENSITY</b>			
" - " (light); no indicator (moderate); " + " (heavy, or a tornado/waterspout in the case of funnel cloud(s)) are used to indicate the intensity of certain phenomena			
<b>DESCRIPTORS</b>			
MI - shallow	PR - partial	BL - blowing	TS - thunderstorm
BC - patches	DR - low drifting	SH - shower(s)	IZ - freezing (supercooled)
<b>PRESENT WEATHER ABBREVIATIONS</b>			
DZ - drizzle	BR - mist	PO - dust/sand whirls (dust devils)	
RA - rain	FG - fog	SQ - squall	
SN - snow	FU - smoke	FC - funnel cloud(s) (tornado or waterspout)	
SG - snow grains	VA - volcanic ash	SS - sandstorm	
PL - ice pellets	DU - widespread dust	DS - duststorm	
GR - hail	SA - sand		
GS - small hail and/or snow pellets	HZ - haze		
<b>EXAMPLES</b>			
+SHRA - heavy shower of rain	TSSN - thunderstorm with moderate snow		
FZDZ - moderate freezing drizzle	SNRA - moderate snow and rain		
+TSSNGR - thunderstorm with heavy snow and hail			
<b>SELECTED ICAO LOCATION INDICATORS</b>			
CYUL Montreal Pierre Elliot Trudeau/Intl	HECA Cairo/Intl	OBBI Bahrain Intl	
EDDF Frankfurt/Main	HKJK Nairobi/Jomo Kenyatta	RJTT Tokyo Intl	
EGLL London/Heathrow	KJFK New York/John F. Kennedy Intl	SBGL Rio de Janeiro/Galeão Intl	
GMMC Casablanca/Anfa	LFPG Paris/Charles de Gaulle	YSSY Sydney/Kingsford Smith Intl	
	NZAA Auckland Intl	ZBAA Beijing/Capital	
METAR CYUL 240700Z 27018C30KT 5000 SN FEW020 BKN045 M02/M07 Q0995=			
METAR EDDF 240950Z 05015KT 9999 FEW025 04/M05 Q1018 NOSIG=			
METAR LFPG 241000Z 07010KT 5000 SCT010 BKN040 02/M01 Q1014 NOSIG=			
SPECI GMMC 220530Z 24006KT 5000 -TSGR BKN016TCU FEW020CB SCT02608/07 Q1013=			
TAF AMD NZAA 240855Z 2409/2506 24010KT 9999 FEW030 BECMG 2411/2413 VRB02KT 2000 HZ FM 242200 24010KT CAVOK=			
TAF ZBAA 240440Z 2406/2506 13004MPS 6000 NSC BECMG 2415/2416 2000 SN OVC040 TEMPO 2418/2421 1000SN BECMG 2500/2501 32004MPS 3500 BR NSC BECMG 2503/2504 32010G20MPSCAVOK=			
TAF YSSY 240443Z 2406/2506 05015KT 3000 BR SCT030 BECMG 2414/2416 33008KT FM 2422 04020KT CAVOK=			
HECC SIGMET2 VALID 240900/241200 HECA-			
HECC CAIRO FR SEV TURB OBS N OF N27 FL :90/440 MOV E 25KMH NC.			

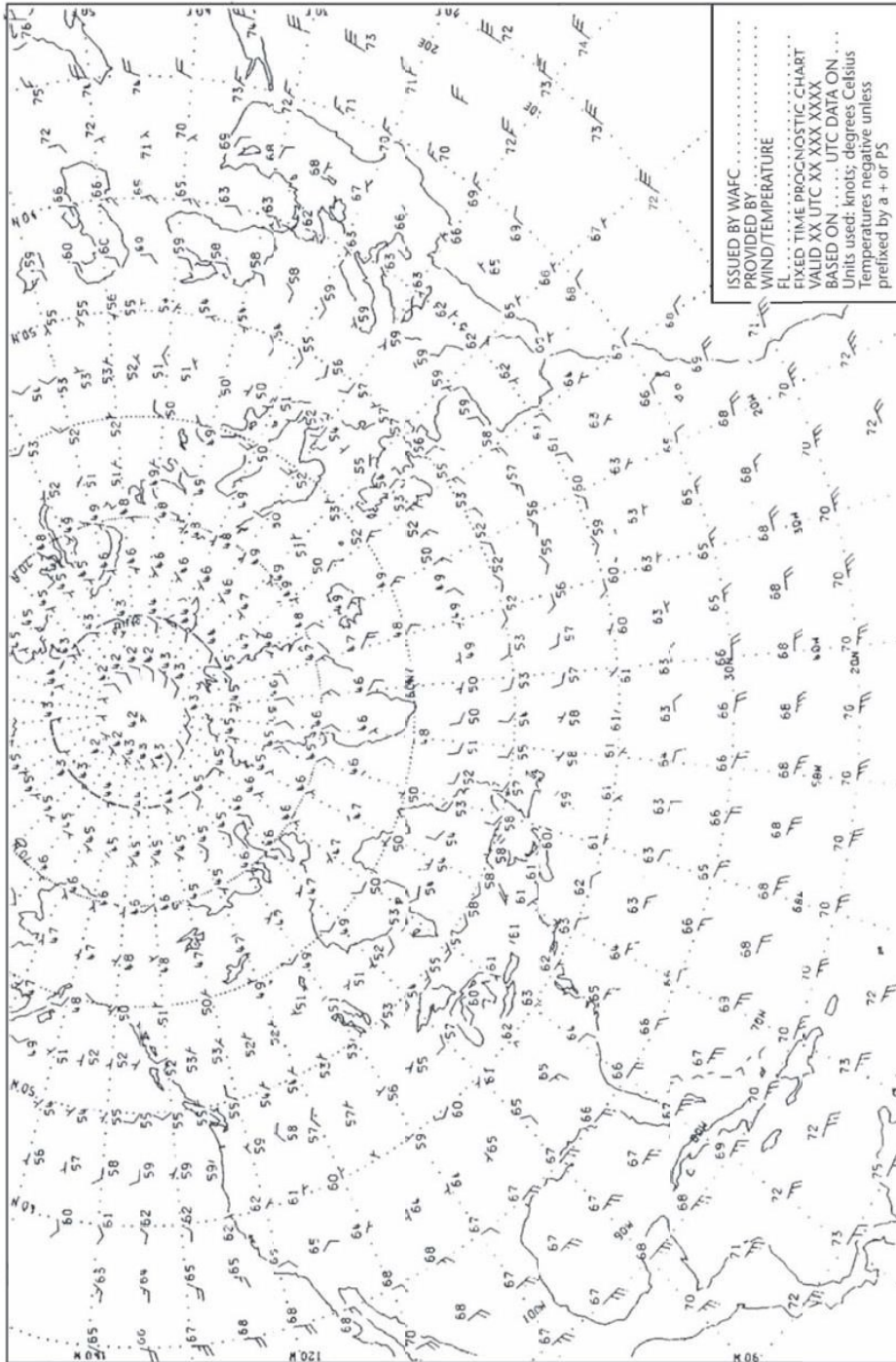
UPPER WIND AND UPPER-AIR TEMPERATURE CHART FOR STANDARD ISOBARIC SURFACE MODEL IS

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



UPPER WIND AND UPPER-AIR TEMPERATURE CHART FOR STANDARD ISOBARIC SURFACE- MODEL IS

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

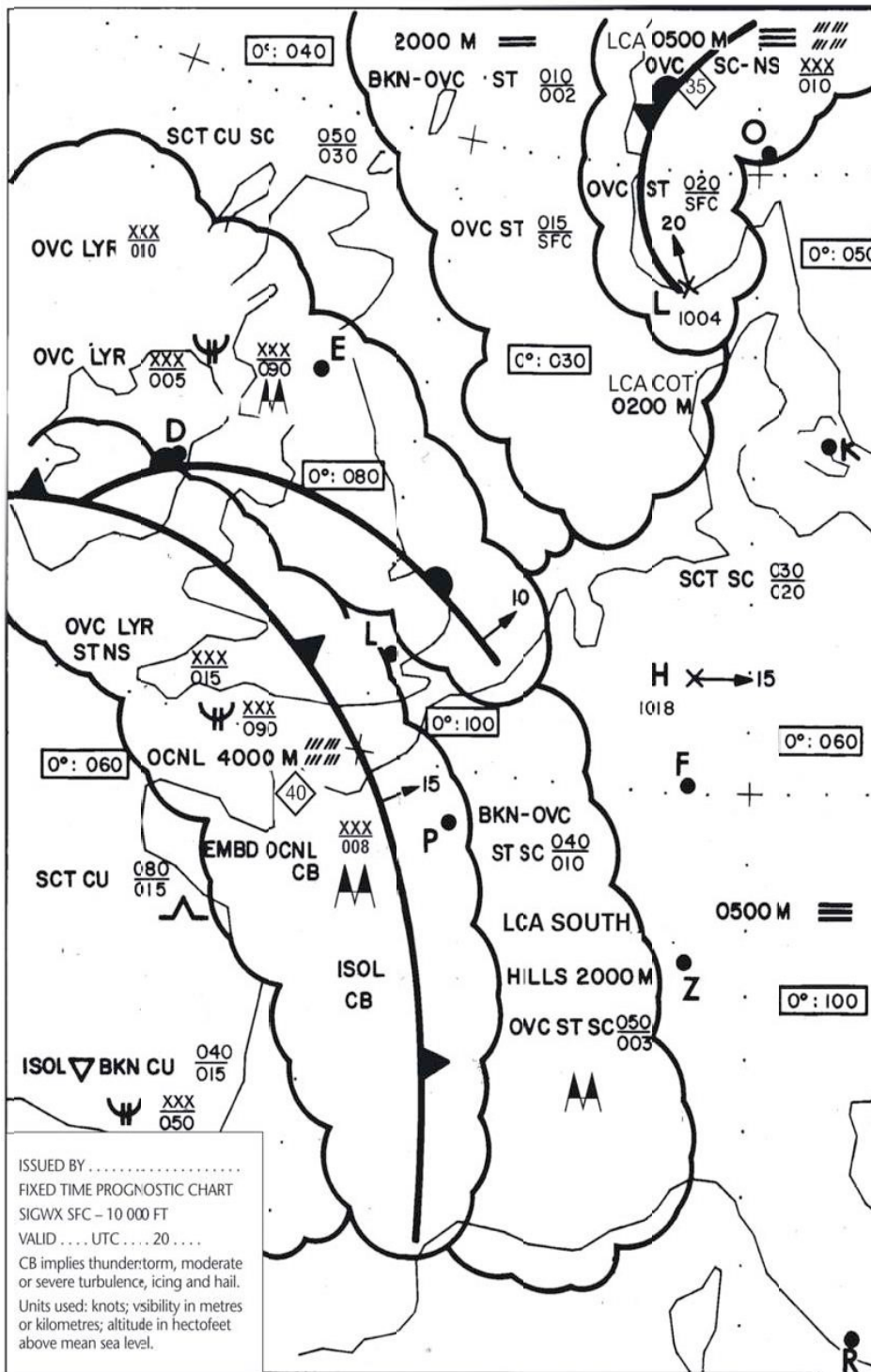








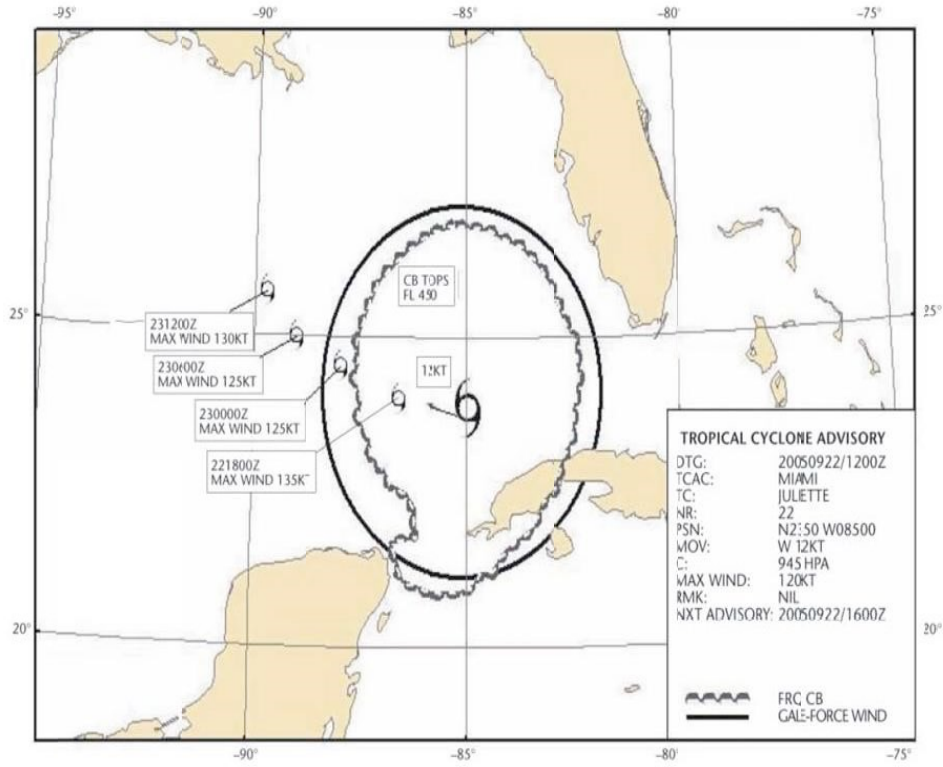




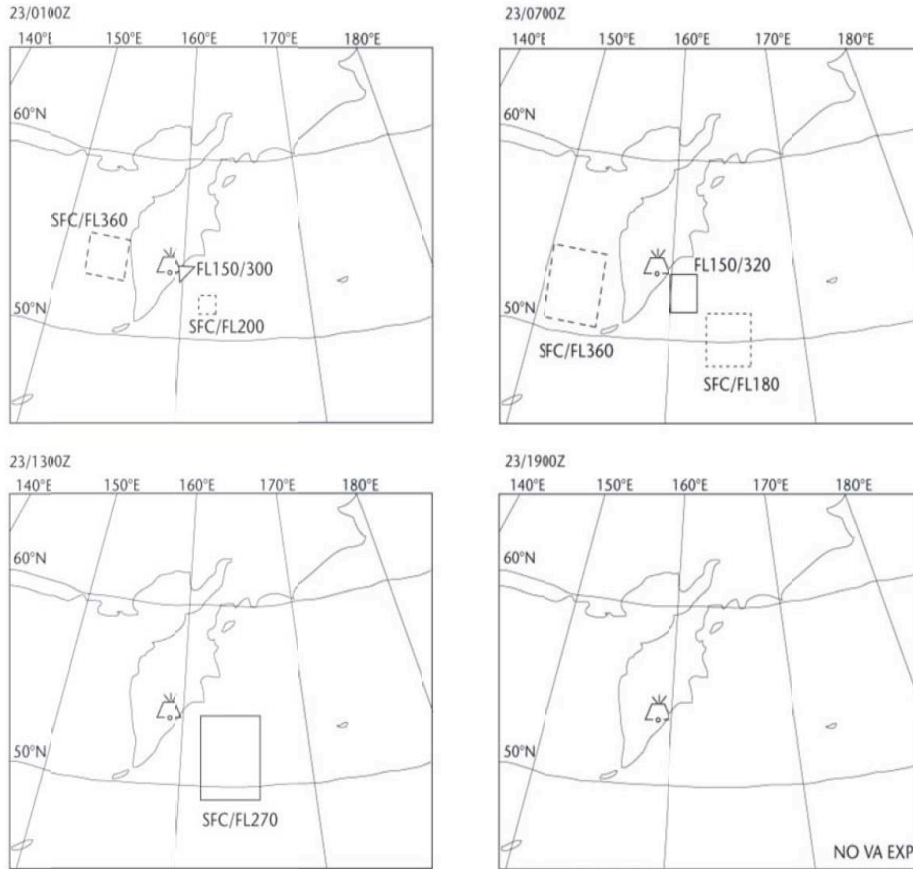
SIGNIFICANT WEATHER CHART (LOW LEVEL) -MODEL SWL Example 2

FIXED TIME PROGNOSTIC CHART		VALID .....	UTC .....	BASED ON .....	UTC DATA ON .....	0°C	
		VARIANT	VIS	SIGNIFICANT WEATHER	CLOUD, TURBULENCE, ICING	0°C	
		AREA A			— SCT CU 025/080		50
		ISOL			— BKN CU 015/XXX M 050/XXX		50
		AREA B			— OVC LVR ST NS 015/XXX M 050/XXX		50
		OCNL	4000	HEAVY RAIN	EMBD CB 008/XXX M		50
		ISOL	1000	THUNDERSTORM			100
		AREA C			BKN to OVC ST SC 010/040		100
		LCA SOUTH COT HILLS	2000	DRIZZLE	OVC ST SC 003/050 M		90
		AREA D			OVC LVR SC NS 010/XXX		90
		LCA NORTH	1500	RAIN	OVC LVR ST NS 005/XXX M 090/XXX M		40
AREA E			SCT SC 020/030		40		
LCA LAND	0500	FOG			30		
AREA F	2000	MIST	BKN to OVC ST 002/010		30		
LCA COT HILLS	0200	FOG	OVC ST SFC/015		30		
AREA G	4500	RAIN	— OVC CU SC NS 010/XXX M 030/XXX		30		
LCA NORTH	0500	FOG	OVC ST SFC/010		40		
AREA J			SCT CU SC 030/050		40		
LCA HILLS NORTH			— BLW 070		40		
SIGWX SFC – 10 000 FT ISSUED BY ..... AT ..... UTC Notes: 1. Pressure in hPa and speeds in knots. 2. Vis in m included if less than 5 000 m. M implies vis 200 m or less. 3. Altitude in the upper case: above MSL. XXX = above 10 000 ft. 4. CB implies MOD/SEV icing, turbulence and thunderstorm. 5. Only significant weather and/or weather phenomena causing visibility reduction below 5 000 m included.		REMARKS: EAST TO NE GALES SHETLAND TO HEBRIDES - SEVERE MOUNTAIN WAVES NW SCOTLAND – FOG PATCHES EAST ENGLIA – WDSPR 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**

DTG: 20080923/0130Z

VAAC: TOKYO

VOLCANO: KARYMSKY 1000-13

AREA: RUSSIAN FEDERATION

SUMMIT ELEV: 1536M

ADVISORY NR: 2008/4

INFO SOURCE: MTSAT-1R, KVERT KEMSD

AVIATION COLOUR CODE: RED

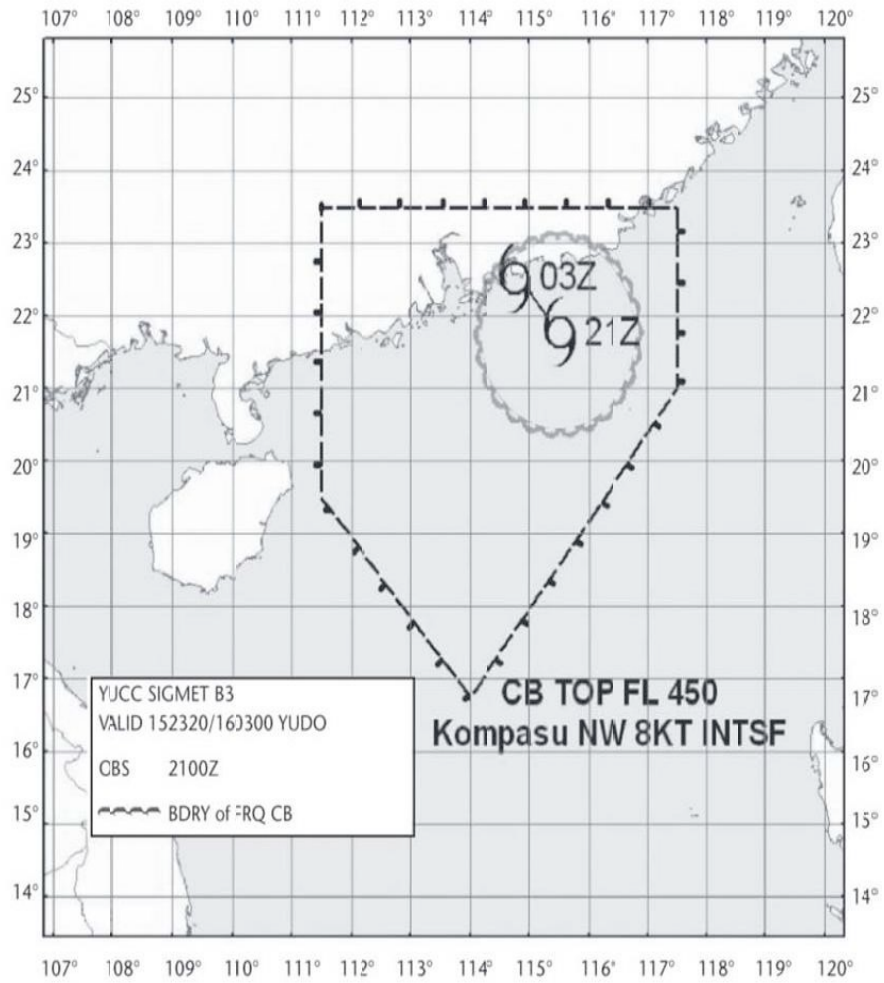
ERUPTION DETAILS: ERUPTED AT 20080523/0000Z FL300 REPORTED

RMK: LATEST REP FM K/ERT (0120Z) INDICATES ERUPTION HAS CEASED

TWO DISPERSING VA CLD ARE EVIDENT ON SATELLITE IMAGERY

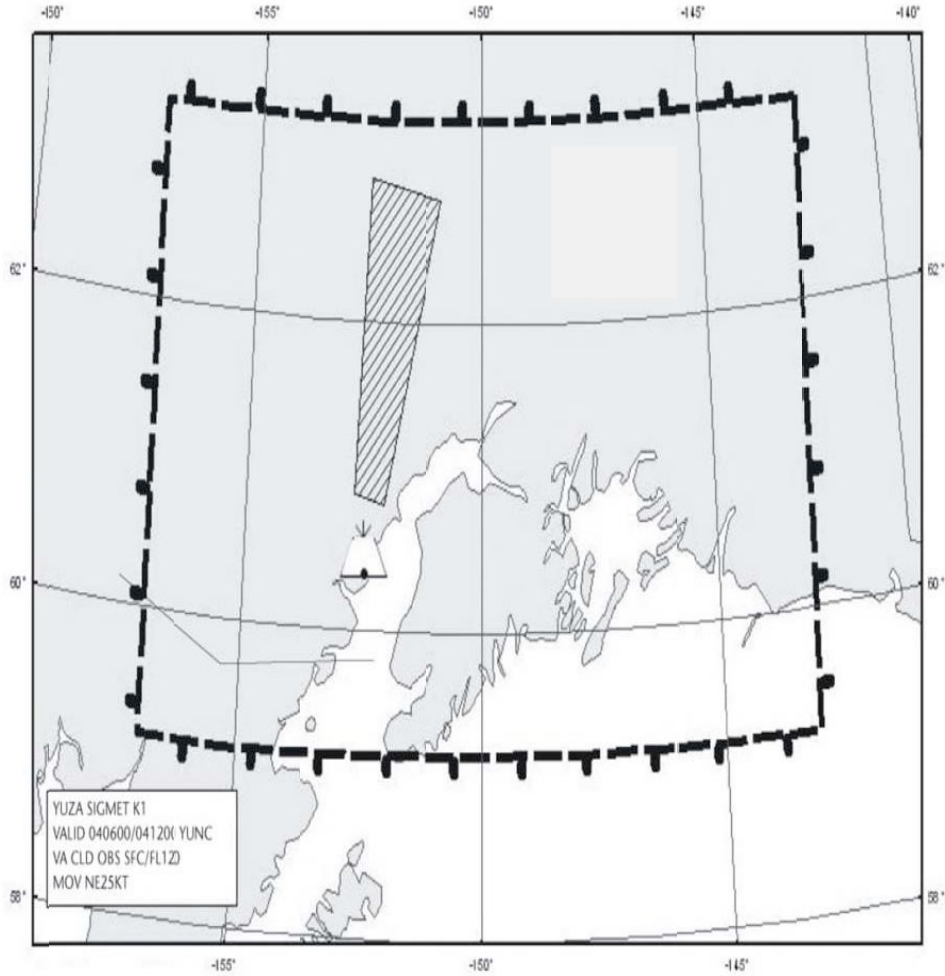
NXT ADVISORY: 20080923/0730Z

ICAL FORMAT-

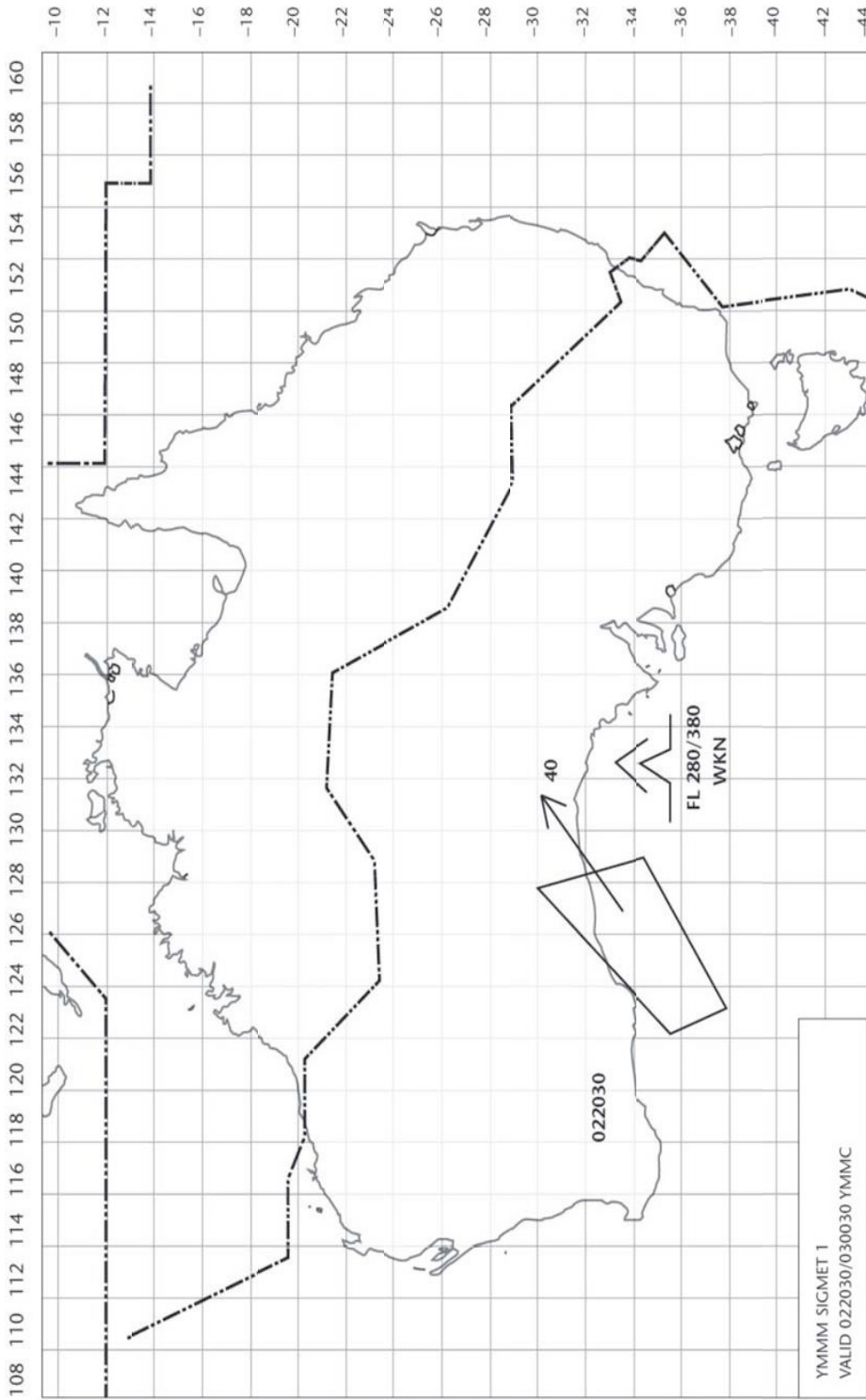


Note:  Fictitious FIR.

SIGMET FOR VOLCANIC ASH IN GRAPHICAL FORMAT - MODEL SVA



 Fictitious FIR.



1. Symbols for significant weather

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

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

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

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

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

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

2. Fronts and convergence zone: and other symbols used

	Cold front at the surface		Position, speed and level of maximum wind
	Warm front at the surface		Convergence line
	Occluded front at the surface		Freezing level
	Quasistationary front at the surface		Intertropical convergence zone
	Tropopause high		State of the sea
	Tropopause low		Sea surface temperature
	Tropopause level		Widespread strong surface wind*

Wind arrows indicate the maximum wind in jet and the flight level at which it occurs. If the maximum wind speed is 60 m/s (120 kt) or more, the flight levels between which winds are greater than 40 m/s (80 kt) is placed below the maximum wind level. In the example, winds are greater than 40 m/s (80 kt) between FL 20 and FL 400.

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

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

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

3. Abbreviations used to describe clouds

- 3.1 Type
- |                   |                    |                   |
|-------------------|--------------------|-------------------|
| CI = Cirrus       | AS = Altostratus   | ST = Stratus      |
| CC = Cirrocumulus | NS = Nimbostratus  | CU = Cumulus      |
| CS = Cirrostratus | SC = Stratocumulus | CB = Cumulonimbus |
| AC = Alcumulus    |                    |                   |

- 3.2 Amount
- Clouds except CB
- FEW = few (1/8 to 2/8)      BKN = broken (5/8 to 7/8)
- SCT = scattered (3/8 to 4/8)      OVC = overcast (8/8)
- CB only
- ISOL = individual CBs (isolated)
- OCNL = well-separated CBs (occasional)
- FRQ = CBs with little or no separation (frequent)
- EMBD = CBs embedded in layers of other clouds or concealed by haze (embedded)

- 3.3 Heights
- Heights are indicated on SWH and SWM charts in flight levels (FL), top over base. When XXX is used, tops or bases are outside the layer of the atmosphere to which the chart applies.
- In SWL charts:
- (a) Heights are indicated as altitudes above mean sea level;
- (b) The abbreviation SFC is used to indicate ground level.

4. Depicting of lines and systems on specific charts

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

- Scalloped line = demarcation of areas of significant weather
- Heavy broken line = delineation of area of CAT
- Heavy solid line = position of jet stream axis with indication of wind direction, speed in kt or m/s and height in flight levels. The vertical extent of the jet stream is indicated (in flight levels), e.g. FL 270 accompanied by 240/290 indicates that the jet extends from FL 240 to FL 290.
- Flight levels inside small rectangles = height in flight levels of tropopause at spot locations, e.g. 120. Low and high points of the tropopause topography are indicated by the letters L or H, respectively, inside a pentagon with the height in flight levels. Display explicit FL to jet depths and tropopause height even if outside forecast bounds.

4.2 Model SWL – Significant weather chart (low level)

- X = position of pressure centres given in hectopascals
- L = centre of low pressure
- H = centre of high pressure
- Scalloped lines = demarcation of area of significant weather
- Dashed lines = altitude of 0°C isotherm in feet (hecto)feet or metres
- Note: 0°C level may also be indicated by 5700, i.e. 0°C level is at an altitude of 6000ft.
- Figures on arrows = speed in kt or km/h of movement of frontal systems, depressions or anticyclones
- Figure inside the state of the sea symbol = total wave height in feet or metres
- Figure inside the sea-surface temperature symbol = sea-surface temperature in °C
- Figures inside the strong surface wind symbol = wind in kt or m/s

4.3 Arrows, feathers and pennants

- Arrows indicate direction. Number of pennants and/or feathers correspond to speed.
- Example: 270/115 kt (equivalent to 57.5 m/s)
- Pennants correspond to 50 kt or 25 m/s
- Feathers correspond to 10 kt or 5 m/s
- Half-feathers correspond to 5 kt or 2.5 m/s

\* A conversion factor of 1 to 2 is used.



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 telecommunication 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 Regulation).*

- (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-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-

VOLMET.

4.3 Format of information to be available for D-VOLMET

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

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