
# TECHNICAL STANDARDS – Issue version (2024)
# NAMCATS: Part 174 – A-MET

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**NAMIBIAN CIVIL AVIATION TECHNICAL STANDARDS**

**RELATING TO**

**AVIATION METEOROLOGICAL SERVICES**

## 1. GENERAL

1.1 Section 227 of the Civil Aviation Act, 2016 empowers the Executive Director of Civil Aviation to issue technical standard for civil aviation. Section 227 of the Civil Aviation Act, 2016 further empowers the Executive Director of Civil Aviation to incorporate into a technical standard any international aviation standard or any amendment without publishing the text of such standard or any amendment by mere reference to the title, number and year of issue of such standard or amendment or to any other particulars by which such standard or amendment is sufficiently identified.

1.2 The Executive Director of Civil Aviation has, pursuant to the empowerment mentioned above, has issued technical standards relating to Regulation Part 174 (Aviation Meteorological Services) to be known as Document NAMCATS-MET.

1.3 Document NAMCATS-MET comprises the standards, rules, requirements, methods, specifications, characteristics and procedures which are applicable in respect of aviation meteorology as incorporated in Annex 3 (Edition 12, July 2018, Amendment 80) which addresses the Air Navigation rules procedures and services applications as stated in Articles 13, 37, and 38 of the Convention on International Civil Aviation (Chicago) 1994.

1.4 To the extent possible, each reference to a technical standard in this document, is a reference to the corresponding regulation in the Namibian Civil Aviation Regulations.

***Example:*** *(1) Technical standard xx.02.12 refers to specific sub-regulation 12 of Subpart 02 of the applicable Regulation.*

*(2) Technical standard xx.03 refers to either the whole, or more than one specific sub-regulation, of Subpart 03 of the applicable Regulation.*

1.5 Where there is any perceived disparity of meaning or inconsistency between these technical standards and the regulations, the provisions of the regulations will take precedence.

1.6 Where there is a difference between a standard and procedure prescribed in ICAO documents and the Civil Aviation Technical Standards (CATS), the CATS standard will prevail.

## 2. GUIDANCE MATERIAL

2.1 Guidelines and recommendations in support of any particular technical standard are contained in schedules or appendices to, and/or compliance notes inserted throughout, the technical standards. These guidelines are intended to provide recommendations and guidance to illustrate a means, but not necessarily the only means of complying with the regulations and technical standards. They may explain certain regulatory requirements by providing interpretive and explanatory materials. It is expected that service providers will document internal actions in their own manuals, to put into effect those, or similarly adequate, practices.

## 3. AMENDMENTS TO THE TECHNICAL STANDARDS

3.1 The NCAA Safety Division ANS Safety Oversight Section (ANSSO) has responsibility for the technical content of this technical standard.

3.2 This technical standard is issued, and may only be amended, under the authority of the Executive Director of Civil Aviation.

3.3 Requests for changes to the content of this technical standard shall be forwarded to the Executive Director and may come from:

(a) technical areas within NCAA; or

(b) aviation industry service providers or operators; or

(c) pilots, AIS, meteorological and ATC staff.

3.4 The need to change the content of this technical standard may arise for any of the following reasons:

(a) to ensure safety.

(b) to ensure standardization.

(c) to respond to changed NAMCARs.

(d) to respond to changes initiated by ICAO or the WMO;

(e) to accommodate proposed initiatives or new technologies.

3.5 NCAA may approve trials of new procedures or technologies to develop appropriate standards.

## 4. INTERNATIONAL STANDARDS

4.1 Section 227 of the Aviation Act, 2016 empowers the Executive Director of Civil Aviation to incorporate into a technical standard any international aviation standard or any amendment without stating the text of such standard or amendment, by mere reference to the title, number and year of issue of such standard or amendment, or to any other particulars by which such standard or amendment is sufficiently identified.

4.2 The following international standards, recommended practices and procedures, as amended from time to time, are incorporated into the technical standards contained in this document:

(a) ICAO Annex 3 – Meteorological Service for International Air Navigation.
(b) ICAO Annex 5 – Units of Measurements to be used in Air and Ground Operations.
(c) ICAO Annex 10 – Aeronautical Telecommunications.
(d) ICAO Annex 11 – Air Traffic Services.
(e) ICAO Annex 12 – Search and Rescue.
(f) ICAO Annex 15 – Aeronautical Information Services.
(g) ICAO Annex 19 – Safety Management.
(h) ICAO Manual on Aeronautical Meteorological Practices (Doc 8896)
(i) ICAO Manual on Automatic Observing System (Doc 9837)
(j) WMO Guidelines for the education and training of personnel in meteorology and operational hydrology — Volume I: Meteorology (WMO-No. 258)
(k) WMO Technical Regulations – Volume II: Meteorological Services for International Air Navigation (WMO-No. 49)
(l) ICAO Procedures for Air Navigation Services – Aeronautical Information Management (ICAO Doc 10066)
(m) ICAO Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) (Doc 4444).
(n) ICAO Manual on the Quality Management System for the Provision of Meteorological Service for International Air Navigation (Doc 9873).
(o) CAO Regional Supplementary Procedures (Doc 7030).
(p) WMO
(q) ICAO

4.3 The Air Navigation Plan - Africa-Indian Ocean Region (Document 7474/26), approved and published by a decision of the Council of ICAO, as amended from time to time, is incorporated into the technical standards contained in this document.

4.4 Differences from ICAO Standards, Recommended Practices and Procedures are published in the AIP.

These Technical Standards apply with immediate effect.

Further access is available on NCAA website: www.ncaa.com.na
Enquiries: ANSSO@ncaa.na


MS. TOSKA SEM
EXECUTIVE DIRECTOR

**Civil Aviation Technical Standards**

**Relating to**

**PART 174 – AVIATION METEOROLOGICAL SERVICES**

**(NAM-CATS-A-MET)**

## 174.01 DEFINITIONS

### 174.01.1 Definitions

1. When the following terms are used, they have the following meanings:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

***En-route alternate***. An alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route.

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

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

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

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

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

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

**Area navigation (RNAV).** A method of navigation which permits aircraft operations on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

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

**Automatic dependent surveillance (ADS).** 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.

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

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

**Basic weather report**. A verbal comment, in support of aviation, describing any of the following current weather conditions observed at a particular place or airspace:

(a) wind direction and strength;

(b) mean sea level air pressure;

(c) air temperature; and/or

(d) weather conditions and cloud cover.

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

**Cloud of operational significance**. A cloud with the height of cloud base below 1 500 m (5 000 ft) or below the highest minimum sector altitude, whichever is greater, or a cumulonimbus cloud or a towering cumulus cloud at any height.

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

**Control area (CTA)**. A controlled airspace extending upwards from a specified limit above the earth.

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

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

**Erroneous meteorological information**. Any meteorological information that is or has the potential to be significantly outside the allowable accuracy or tolerance for that information.

**Executive Director.** The Chief Executive Officer of the Namibia Civil Aviation Authority under the Civil Aviation Act No.16 of 2016.

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

**Facility**. Any system or equipment which provides an automatic function that supports a meteorological office or provides aviation meteorological information, and includes any system or equipment for the following:

(a) electronic data analysis and forecast production;

(b) remote weather sensing; or

(c) electronic or automatic meteorological information delivery.

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

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

**Flight information centre (FIC)**. A unit established to provide flight information service and alerting service.

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

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

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

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

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

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

*Compliance Note 2: The terms "height" and "altitude", used in (a), (b) and (c) above, indicate altimetric rather than geometric heights and altitudes.*

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

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

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

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

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

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

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

**International airways volcano watch (IAVW)**. International arrangements for monitoring and providing warnings to aircraft of volcanic ash in the atmosphere.

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

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

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

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

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

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

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

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

**Meteorological service.** Any of the following services that provide meteorological information in support of aviation:

(a) ***Climatology service:*** a service for the development and supply of climatological information for a specific place or airspace:

(b) ***Forecast service:*** a service for the supply of forecast meteorological information for a specific area or portion of airspace:

(c) ***Information dissemination service:*** a service for the collection and dissemination of meteorological information:

(d) ***Meteorological briefing service:*** a service for the supply of written and oral meteorological information on existing and expected meteorological conditions:

(e) ***Meteorological reporting service:*** a service for the supply of routine meteorological reports:

(f) ***Meteorological watch service:*** a service for maintaining a watch over meteorological conditions affecting aircraft operations in a specific area.

**Meteorological service provider:** The relevant entity providing meteorological service for international air navigation on behalf of a Contracting State.

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

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

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

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

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

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

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

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

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

**Performance-based navigation (PBN).** Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

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

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

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

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

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

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

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

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

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

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

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

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

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

**Search and rescue services unit.** A generic term meaning, as the case may be, rescue coordination center, rescue sub-center or alerting post.

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

**Space weather center (SWXC).** A center designated to monitor and provide advisory information on space weather phenomena expected to affect high-frequency radio communications, communications via satellite, GNSS-based navigation and surveillance systems and/or pose a radiation risk to aircraft occupants.
*Compliance Note: A space weather center is designated as global and/or regional.*

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

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

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

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

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

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

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

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

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

(b) the greatest distance at which lights in the vicinity of 1 000 candelas can be seen and identified against an unlit background.

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

**Volcanic ash advisory center (VAAC**). A meteorological center designated by regional air navigation agreement to provide advisory information to meteorological watch offices, area control centers, flight information centers, world area forecast centers and international OPMET databanks regarding the lateral and vertical extent and forecast movement of volcanic ash in the atmosphere.

**VOLMET**. Meteorological information for aircraft in flight.

**Data link-VOLMET (D-VOLMET).** Provision of current aerodrome routine meteorological reports (METAR) and aerodrome special meteorological reports (SPECI), aerodrome forecasts (TAF), SIGMET, special air-reports not covered by a SIGMET and, where available, AIRMET via data link. **VOLMET broadcast**. Provision, as appropriate, of current METAR, SPECI, TAF and SIGMET by means of continuous and repetitive voice broadcasts.

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

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

For the purpose of NAM-CARs and NAM-CATS Part 174, the following terms are used with a limited meaning as indicated below:

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

(b) "provide" is used solely in connection with the provision of service.

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

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

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

**174.02.4 Application for A-MET services provider certificate or amendment thereof**

An application for an A-MET services provider certificate, or an amendment thereof, must be made in the appropriate form to the Executive Director.

**174.02.8 PRIVILEGES OF A MET SERVICE PROVIDER CERTIFICATE HOLDER**

(1) Subject to any limitations as may be specified by the Executive Director in the certificate, the A-MET service provider may provide the meteorological services listed on the certificate provided that each service, and the meteorological information supplied for each service, and the location and airspace covered by each service is listed in the manual of procedures.

## 174.03 REQUIREMENTS TO BE COMPLIED WITH BY A-MET SERVICES IN RELATION TO AVIATION METEOROLOGICAL SERVICES

### 174.03.1 Manual of procedure and station standing instructions

**1. General**

1.1 This section sets out the minimum requirements for the manual of procedure that must be developed and maintained by an aviation meteorological (MET) services provider.

1.2 The manual is a set of documents that shows how and where a MET services provider provides, or proposes to provide, aviation meteorology services in compliance with regulations and standards.

**2. Content of the Manual of Procedure**

2.1 The MET Manual of Procedure (manual) must contain:

(a) a table of contents based on the items in the manual, indicating the page number (and volume number where appropriate) on which each item begins;

(b) a statement signed by the Senior Executive on behalf of the service provider organization confirming that the manual (of procedure) and any included manuals:

(i) define the organization and demonstrate its means and methods for ensuring ongoing compliance with Part 174; and

(ii) will be complied with at all times;

(c) the titles and names of the senior person or persons required under this Part and the duties and responsibilities of the senior person or persons including

(i) matters for which they deal directly with the Executive Director on behalf of the MET service provider; and

(ii) responsibilities for safety management

(d) a description of the MET service provider's organizational structure and a statement setting out the functions that the provider performs, or proposes to perform under this Part 174;

(e) a description of the chain of command established, or proposed to be established, by the provider and a statement of the duties and responsibilities of any supervisory positions within the organizational structure.

(f) a summary of the providers staffing structure at each meteorological office listed in the provider's manual.

(g) information identifying the lines of safety responsibility within the MET provider organization;

(h) a statement showing how the provider determines the number of operational staff required including the number of operational supervisory staff.

(i) a list providing:

(i) the location of each meteorological office operated by the MET service provider.
(ii) the location of each facility operated by the applicant that provides meteorological information directly to the users.
(iii) the meteorological services provided by each of those meteorological offices and facilities; and
(iv) the locations and airspace covered by such meteorological services.

(j) a statement showing the proposed hours of operation of the service of any MET unit;

(k) a statement of the responsibilities and functions for each operating position;

(l) a description of the arrangements made or proposed to be made to ensure that the MET service provider has, and will continue to receive, on a daily basis, the information necessary for providing the service including information to be internally and externally sourced, information requirements and its use, means of transfer and data integrity levels.

(m) a description of the arrangements made or proposed to be made by the provider to ensure that the MET service provider has, and will continue to be able to provide, information in connection with its MET services to another person whose functions reasonably require that information;

(n) a description of the provider's document and record keeping system.

(o) in relation to the system for safety management.

(i) the documented processes required for the establishment and maintenance of the system for safety management under regulation 174.03.17; and

(ii) the safety management system implementation plan that describes how the system for safety management will be implemented:

(p) the documented processes required for managing the quality of meteorological information.

(q) a description of the processes and documentation used to present to staff the relevant standards, rules and procedures contained in this Document NAM-CATS-MET and associated documents, and any of the provider's site-specific instructions for the provision of MET services.

(r) a description of the processes and documentation used to provide operational instructions to staff.

(s) a description of the procedures to be followed to ensure all operational staff are familiar with any operational changes that have been issued since they last performed operational duties.

(t) a description of the provider's training and checking program and competence of personnel.

(u) a description of the facilities and equipment and procedures to be used in commissioning new facilities, equipment and services.

(v) the procedures to be followed for amending or reviewing of the manual.

(w) details of the provider's procedures and systems required under this Part regarding:

(i) site requirements as listed in regulation 174.03.5 of the NAM-CAR, Part 174.

(ii) the documented processes required for managing the quality of meteorological information.

(iii) communication requirements.

(iv) meteorological service input requirements.

(v) meteorological service output requirements;

(vi) facility requirements.

(vii) control of documentation.

(viii) verifications, inspections, tests and calibrations.

(ix) notification of meteorological office and facility status.

(x) meteorological information checks after notification of an accident or incident.

(xi) malfunctions and erroneous information.

(xii) identification, collection, indexing, storage, maintenance and disposal of records; and

(x) procedures to control, amend and distribute the manual.

**3. Station Standing Instructions**

3.1 A MET provider must prepare station standing instructions for each meteorological office listed in their manual of procedure. The operating instructions must set out the procedures for the operation and maintenance of the meteorological office and associated facilities and must include a list of—

(a) the meteorological information and meteorological services provided.

(b) the minimum acceptable operating parameters and standards for facilities;

(c) the minimum meteorological inputs required.

(d) the minimum performance and quality levels for output meteorological information and meteorological services provided;

(e) the test equipment and systems required for the measurement of the minimum performance and quality levels required in (d) above; and

(f) any mandatory check procedures for releasing meteorological information.

3.2 The SSI forms part of, and may be integrated with, the service provider's manual of procedure.

## 174.03.3 Personnel requirements

**1. Personnel requirements - General**

1.1 A MET service provider must employ, contract, or otherwise engage:

(a) a senior person identified as the accountable executive who:

(i) has the authority within the organization to ensure that all activities undertaken by the organization can be resourced and carried out to meet applicable operational requirements; and

(ii) is responsible for ensuring that the organization complies with the requirements of this Part 174.

(b) a senior person or persons responsible to the accountable executive for ensuring that the organization complies with the provisions of its manual of procedure;

(c) sufficient, competent and qualified technical personnel to inspect, supervise, and maintain the facilities listed in the manual; and

(d) sufficient competent and qualified operational staff to ensure the effective provision of MET services listed in the manual.

1.2 A MET service provider must develop and publish job descriptions for all technical staff involved in the provision of meteorological services for air navigation.

*Compliance Note. Guidance on the development of job descriptions is contained in Advisory. Pamphlet ANNSO-MET-AP174/04.*

**2. Personnel qualification requirements**

2.1 A MET service provider must ensure that all meteorological personnel are competent and hold appropriate qualifications to perform the duties which they are assigned.

2.2 A MET service provider must ensure that all meteorological personnel are:

(a) appropriately trained; and

(b) assessed as competent through a formal process by a person who is qualified.

2.3 A MET service provider must give each member of the meteorological personnel a certificate that:

(a) names the meteorological personnel.

(b) describes the functions that the meteorological personnel are authorized to perform; and

(c) states the period during which the certificate is effective and valid.

2.4 A MET service provider must develop a periodic and comprehensive recurrent training program to ensure that each member of the meteorological personnel maintains the appropriate level of qualification. The established period must not exceed 12 months.

**3. Staffing Levels and Supervision**

3.1 A MET service provider must:

(a) establish arrangements that define the person responsible and the process to be followed to ensure an adequate number of suitably trained and rated staff are available in respect of MET services.

(b) define the method by which staffing levels are determined in relation to the MET services to be provided.

(c) establish arrangements that define the management responsibilities and process for ensuring adequate staff supervision. Arrangements must include the mechanisms that ensure only trained and competent staff undertake the provision of MET services.

**4. Human Performance**

4.1 In developing training requirements, a MET service provider must ensure that human factors and human performance considerations are applied in the training for, and provision of, MET services.

**174.03.4 Training and Checking Program**

1.1 A MET service provider must:

(a) establish a procedure to assess the competence of those personnel who are authorized to:

(i) place facilities listed in the applicant's manual into operational service; and

(ii) supervise the production and release of meteorological information; and

(b) establish a procedure to maintain the competence of those authorized personnel; and

(c) provide those authorized personnel with written evidence of the scope of their authorization.

1.2 A MET service provider must implement a training and checking program to ensure individuals performing a function in connection with the provision of meteorological services for air navigation are competent to perform that function.

1.3 A MET service provider must develop staff training and checking programme which as a minimum cover:

(a) Formal training

(b) On-the-job-training

(c) Proficiency training

1.4 A MET service provider must have a unit training programme (UTP) for each aerodrome meteorological office at which they provide MET services, which details the processes by which the MET personnel are trained, and their competence maintained. The unit training programme must form part of the MET provider's manual of procedure.

1.5 A MET service provider must comply with the requirements of the World Meteorological Organization in respect of qualifications and training of meteorological personnel providing service for international air navigation.

1.6 The training and checking programme established by A MET provider must take into consideration the training and qualification requirements prescribed in WMO Publication No. 49, Technical Regulations, Volume I — General Meteorological Standards and Recommended Practices, Chapter B.4 — Education and Training.

### 174.03.6 Communication Requirements

1.1 Suitable telecommunications facilities must be provided to permit:

(a) meteorological offices and aeronautical meteorological stations to supply the necessary meteorological information to ATS units and to respond quickly to requests for non-routine information.

(b) the transmission of meteorological information and requests for information from ATS units to meteorological offices and stations.

(c) the rapid and reliable exchange of information between meteorological offices and search and rescue services units.

1.2 Telecommunications facilities between meteorological offices and/or aeronautical meteorological stations, and TWRs and/or APPs must permit communications by direct speech, the speed with which such communications can be established being approximately 15 seconds (this requirement can be met if switchboards are used)

1.3 Telecommunications facilities between MWOs and ACCs, FICs and/or RCCs must permit contacts between the respective offices and centers to be established within approximately 15 seconds. In addition, for printed communications, when a record is required, the transit time should not exceed 5 minutes. The telecommunications facilities may be supplemented by other forms of communications (e.g. data, visual and audio).

1.4 The use of computerized automated information systems, automatic meteorological observing stations, closed-circuit television or automatic data transfer using keyboard input and video display units (VDUs) for transmitting information from meteorological offices and stations to ATS units, may not remove the need for efficient speech circuits.

1.5 Where non-routine data (special reports, SIGMET and AIRMET information, warnings, etc.) are transmitted in addition to routine data via methods such as automated information systems, automatic meteorological observing stations, closed-circuit television, VDUs and audio communications, aural and visual arrangements must draw attention to this information (e.g. by means of a cueing feature). If such messages are supplied by direct-speech communications, a confirmatory hard copy of these messages may also be required.

1.6 Where, information is supplied to ATS units (particularly FICs/ACCs) by more than one meteorological office, using various sources of information and methods of communication, an agreement must be developed between the meteorological and ATS authorities concerned regarding the supply of necessary OPMET messages to ACCs and FICs direct from international sources of OPMET information (e.g. ICAO satellite broadcasts and ICAO regional schemes for OPMET data exchange, such as AMBEX and ROBEX). Similarly, ACCs and FICs may be offered access to the communications systems/networks of the meteorological services provider and to international OPMET data banks.

1.7 Suitable means of communication must be agreed for the transmission of tropical cyclone and volcanic ash advisories from TCACs and VAACs to the FICs and ACCs concerned.

### 174.03.7 Facility Requirements

**1. MET facility requirements**

1.1 MET facilities intended for provision of meteorological information for air navigation must comply with the standards prescribed in this Part and the related standards prescribed by the World Meteorological Organization.

1.2 Automatic meteorological sensors must be capable of operating continuously and unattended for extended periods of time. The instruments must be able to re-start automatically after a power failure and must not require any human intervention to return to normal operation.

1.3 Satisfactory documentation must be provided to cover installation, starting up, normal use, periodical maintenance, field calibration, troubleshooting and repair of the instruments and in this regard, the supplier of the instruments must provide training on the use and maintenance of the instruments it supplies.

1.4 The meteorological instruments must be capable of monitoring their own operation. Alternatively, the automatic meteorological observing system must be able to monitor the instruments. Incorrect information must not be transmitted in the case of instrument failure or external influences, e.g. snow blocking the lens of a sensor.

1.5 The meteorological instruments must maintain their specified accuracies within routine maintenance and calibration intervals.

1.6 Calibration of the meteorological instruments must be possible to carry out in the field, or the instruments must be easy to remove and transport to a calibration facility. The manufacturer must specify a recommended calibration interval or long-term stability of the equipment. The manufacturer must document calibration procedures for the instruments to be calibrated in the field and provide any special tools necessary.

1.7 The instruments must be safe to install, operate, calibrate and maintain.

1.8 Equipment installed outdoors must be capable of operating in the meteorological conditions normally expected to occur at the aerodrome.

1.9 Meteorological instruments must function reliably with the electrical power available at the aerodrome.

1.10 Meteorological instruments must have appropriate electromagnetic compatibility (EMC) characteristics for operation in an aerodrome environment. The instruments must not interfere with or be adversely affected by other electronic equipment present.

1.11 Meteorological instruments must comply with applicable local requirements for electrical safety.

1.12 The sensors must provide data interfaces suitable for the data collection system used. The interfaces must not cause any degradation of specified performance (resolution, accuracy, reporting interval).

1.13 Sensors operated unattended must provide diagnostic information via the data interface, or sufficient information for the system to evaluate the condition of the sensor. Instruments which will be maintained and repaired in the field must provide a suitable local user interface. The interfaces must be suitable for the communication infrastructure of the aerodrome, directly or with suitable converters. The actual requirements need to be determined locally. The sensor supplier must have a certified and regularly audited quality management system, e.g. according to ISO 9001.

## 2. MET requirements for ATS facilities

2.1 Air traffic control towers and approach units must be equipped, as a minimum, with surface wind displays and, where such values are measured by instrumented means, runway visual range (RVR) values and displays providing current pressure data for the altimeter setting for the aerodrome, corresponding to those of the meteorological station at the local aerodrome.

2.2 The displays in the control tower and approach control unit must provide the same information, and both must derive that information from the same sensors as the displays in the meteorological station at the aerodrome. Each display must be clearly labelled to show the location of the sensor to which it refers. This applies also to multiple anemometers used at the aerodromes.

2.3 Air traffic control towers and approach units must where possible, be equipped with remote displays providing:

(a) visibility.

(b) the height of the cloud base; and

(c) temperature and dew-point temperature.

2.4 Where provided, the remote displays which provide visibility and cloud base heights must be related to the same locations and fed from the same sensors as the corresponding displays in the meteorological office and/or station.

2.5 Integrated automatic systems for the acquisition, processing, dissemination and display, in real time, of the meteorological parameters affecting landing and take-off operations must be deployed at aerodromes with Category II, III A and III B instrument approach and landing operations. These systems are also desirable for Category I approach and landing operations. Information concerning meteorological elements and phenomena indicated on remote displays of such systems in ATS units must comply with the provisions in 2.2 and 2.4 above.

**3. Calibration of Meteorological Instruments**

3.1 In order to control effectively the standardization of meteorological instruments on a national and international scale, a system of national and regional standards has been adopted by WMO.

3.2 The standardization of meteorological and related environmental measurements and assurance of the traceability of individual Members' standards to the International System of Units (SI) can be supported by Regional Instrument Centres.

3.3 In general, regional standards are designated by the regional associations, and national standards by the individual Members.

3.4 Unless otherwise specified, instruments designated as regional and national standards should be compared by means of travelling standards at least once every five years.

3.5 Similarly, the instruments in operational use at a Service should be periodically compared directly or indirectly with the national standards.

3.6 Comparisons of instruments within a Service should, as far as possible, be made at the time when the instruments are issued to a station and subsequently during each regular inspection of the station.

3.7 Portable standard instruments used by inspectors should be checked against the standard instruments of the Service before and after each tour of inspection.

3.8 Sensors, in particular AWS sensors with electrical outputs, show accuracy drifts in time and, consequently, need regular inspection and calibration.

3.9 In principle, the calibration interval is determined by the drift specifications given by the manufacturer and the required accuracy.

3.10 All synoptic land stations and principal climatological stations should be inspected no less than once every two years.

*Compliance Note: Guidance on the calibration of meteorological instruments is contained in Advisory.*

*Pamphlet ANNSO-MET-AP174/05.*

**4. System Commission and Upgrade Process**

4.1 The MET Service Provider must establish procedures to ensure that each new facility is commissioned to meet the specifications for that facility.

4.2 The purposes of the procedures are to ensure that the system performance of the new facility has been validated by all the necessary tests and that the MET Service Provider, its maintenance contractors as well as the appropriate representatives of the User have accepted and are satisfied with the results of the tests.

4.3 The procedures must include the documentation of all the tests conducted on the facility prior to the commissioning. The documentation must also include the names and signatures of all persons who conducted or witness the tests, including representatives from the User of the facility as well as the maintenance contractor.

4.4 The purpose of this process is to ensure that the introduction of new meteorological system or changes to existing meteorological systems will not compromise the quality and reliability in the provision of information for ensuring safety performance.

4.5 Testing must be conducted for all meteorological systems (including critical systems as well as software that are used to generate products for aeronautical MET) according to regulations, manufacturer's recommendations and International SARPs.

4.6 Critical systems must undergo a minimum test period of 2 months, while other systems/software must undergo a minimum test period of at least 1 month.

4.7 The performance of the system must be closely monitored during the testing period and all faults reported and the corrective actions taken must be recorded.

4.8 Before the actual upgrade or commission of the system, the MET Service Provider must submit an implementation and failure mitigation plan to the Executive Director.

4.9 The report must include results of the testing and all records of faults and corrective actions during the test period.

4.10 In any special circumstances whereby the minimum test period cannot be adhered to, the MET Service Provider must submit a report to the Executive Director detailing the justification for not adhering to the minimum test period.

### 174.03.8 Document and record control system

**1. Document and record control procedures and processes**

1.1 A MET service provider must establish procedures for the control of documents and records.

1.1.1 The procedures must define the processes for authorization, standardization, publication, distribution and amendment of all documents and records issued by the service provider or required for the provision of Meteorological services for air navigation.

1.2.1 The procedures must describe the procedures and the processes for:

(a) control of input and output meteorological information; and

(b) documenting the performance of each meteorological office and facility and for ensuring traceability of documents and records pertaining to maintenance, service and product quality, periodic inspections, and the persons responsible for each of these activities; and

(c) documenting records of the equipment and systems used for verification, inspection, testing and calibration of meteorological equipment; and

(d) identifying and documenting occurrences relating to erroneous meteorological information reported and of malfunctions detected including procedures for documenting results of investigation and the follow-up corrective actions; and

(e) reviewing of the internal quality assurance system and for documenting the results of such reviews including procedures for follow-up of findings corrective actions; and

(f) recording persons authorized by the service provider to supervise the production and release of meteorological information and to place facilities into operational service including the recording of the details of their experience, qualifications, training and current authorizations; and

(g) ensuring that all records are legible, and of a permanent nature.

**2. Document retention procedures**

2.1 A MET service provider must establish procedures requiring the retention of information supplied to flight crew members, either as printed copies or in computer files, for a period of at least 60 days from the date of issue, or such other period as may be determined by the Executive Director.

2.2 A MET service provider must establish procedures to ensure retention of information that should be made available to the Executive Director and the Directorate of Aviation Accident and Incident Investigation, for inquiries or investigations until such inquiry or investigation is completed.

2.3 A MET service provider must establish procedures to ensure retention of qualification and training records for at least the last three years for all active meteorological personnel qualified and trained.

**174.03.16 Records**

1.1 A MET service provider must identify, collect, index, store, maintain and dispose of the records that are necessary for the supply of the meteorological services listed in their manual.

1.2 The MET service provider must ensure that:

(a) there is a record of the input meteorological information obtained as required under regulation 174.03.9.

(b) there is a record of all output meteorological information identified under regulation 174.03.10;

(c) the records specified in paragraphs (a) and (b) above are retained for a period of at least 60 days or for such longer period as may be required by the Executive Director.

(d) there is a record for each meteorological office and facility listed in the MET provider manual, in order to document the performance of each meteorological office and facility and to provide a traceable history of its maintenance, service and product quality, its periodic inspections, and the persons responsible for each of these activities.

(e) there is a record of the equipment and systems used for verification, inspection, testing and calibration under the procedures required under regulation 174.03.11. The record must provide a traceable history of the location, maintenance, and calibration checks for the equipment and systems.

(f) there is a record of each occurrence of erroneous meteorological information reported and of each malfunction detected under regulation 174.03.15. The record must detail the nature of the erroneous meteorological information or malfunction and the findings of the investigation and the follow-up corrective actions.

(g) there is a record for each person who is authorized by the MET provider to supervise the production and release of meteorological information and for each person who is authorized by the MET provider to place facilities into operational service. The record must include details of their experience, qualifications, training and current authorizations.

(h) all records are legible, and of a permanent nature; and

(i) all records other than those required by paragraphs (a) and (b) above are retained for at least one year, or for such longer period as may be required by the Executive Director, in order to establish a history of the performance of the meteorological services.

**174.03.17 Safety Management**

Meteorological observation and forecasting. The following aspects must be examined:

1.1 A MET service provider must establish, implement, and maintain a system for safety management in accordance with Part 140.

1.2 The key to a successful SMS is that all senior staff, from managers to meteorologists, weather observers and technical officers must be trained to understand the need for it, and this understanding must permeate to staff of all levels.

1.3 The MET Service Provider must work towards nurturing a safety culture within the organization and all of its maintenance contractors.

1.4 The MET Service Provider is responsible for responding to end-user's queries, carrying out risk assessments, providing the assessment reports to the Executive Director for review and comments, and up-keeping of safety-related data and records.

1.5 To foster a safety culture within the organization, the MET Service Provider must share the following information with the Executive Director:
a) Updates and changes in their aeronautical procedures and products, and its impact on safety (if any);
b) Changes in key staff providing aviation weather support such as the Senior Accountable Manager, Safety Manager, Senior MET Officers and Supervisors of Main MET Office and MET Stations.
c) Best practices of other meteorological offices which can enhance aviation safety; and
d) Any service lapses in the delivery of their products, as well as their analysis on what can be done to prevent it from occurring again, to show their commitment to continually improve their processes; and

1.6 The instruments and all their indicators are functioning correctly, and to check whether the exposure of the instruments has changed significantly.

**174.03.18 Standards for the provision of A-MET Services**

**1. Applicability of the Standards of the International Civil Aviation Organization and the World Meteorological Organization**

1.1 The provision of aviation meteorological services (MET) is governed by the applicable standards, rules and procedures of the International Civil Aviation Organization and of the World Meteorological Organization (WMO). A MET service provider must provide services in full compliance with the

applicable standards of ICAO as adopted in this Part and those of the World Meteorological Organization (WMO). These standards, rules and procedures are applicable to all MET services provided for air navigation.

1.2 Specifically, a MET service provider must comply with the standards prescribed in NAM-CARs Part 174 and this NAM-CATS and with the WMO Doc 258 - *Guidelines for the education and training of personnel in meteorology and operational hydrology — Volume I.*

**174.03.19 Contingency Plan**

1.1 The MET Service Provider must ensure that an emergency response plan and business continuity plan are in place to provide the essential weather services to support aviation.

1.2 The plan must be properly coordinated with the emergency response plans and business continuity plans of those organizations it must interface with during the provision of its products and services.

1.3 The Contingency arrangements must be in the case:

a) of disruption of service due to civil unrests.
b) industrial disputes.
c) natural disasters.
d) public health emergencies; and
e) military conflicts or acts of unlawful interference with civil aviation.

1.4 The Contingency plan must include:
(a) the actions, to be taken by the A-MET Provider's personnel responsible for providing the services.
(b) possible alternative arrangements for the provisioning of services; and
(c) the arrangements for resuming normal operations for the services.

1.5 These Plans must be submitted as part of the Manual of Procedures to the Executive Director.

**2. Limitations for the provision of meteorological services for air navigation**

2.1 A meteorological service provider may not provide meteorological information where:

(a) the meteorological input information required to provide that meteorological information is not available; or

(b) the operational performance of the meteorological office or facility producing that meteorological information does not meet the applicable requirements; or

(c) where any integrity monitoring system associated with that meteorological information is not fully functional; or

(d) any required verification, inspection, test or calibration relating to that meteorological information has not been completed; or

(e) there is any cause whatsoever to suspect the integrity of that meteorological information.

**174.04 GENERAL PROVISIONS**

*Compliance Note 1: The standards provided in this CATS with respect to meteorological information are subject to the understanding that the Republic of Namibia as a contracting State of ICAO, has an obligation to supply, under Article 28 of the Convention on International Civil Aviation, aviation meteorological information for the use in the airspace and at aerodromes in Namibia.*

*Compliance Note 2: Although the obligation for the supply of aviation meteorological information lies with the State, the Convention on International Civil Aviation allocates to the State of Registry certain functions which that State is entitled to discharge, or obligated to discharge, as the case may be. The ICAO Assembly recognized, in Resolution A23-13, that the State of Registry may be unable to fulfil its responsibilities adequately in instances where aircraft are leased, chartered or interchanged — in particular without crew — by an operator of another State. The Convention may not adequately specify the rights and obligations of the State of an operator in such instances until such time as Article 83 bis of the Convention enters into force. Accordingly, if, in the above-mentioned instances, the Republic of Namibia finds itself unable to discharge adequately the functions allocated to it by the Convention, it may delegate to the State of the Operator, subject to acceptance by the latter State, those functions of the Republic of Namibia that can more adequately be discharged by the State of the Operator. Pending entry into force of Article 83 bis of the Convention the foregoing action would only be a matter of convenience and will not affect the rights of the Republic of Namibia from discharging its duties as the State of Registry for aircraft registered in Namibia. However, since Article 83 bis of the Convention entered into force on 20 June 1997, agreements to transfer responsibility for the provision of aviation meteorology to a State of operator will apply only to other ICAO Contracting States which have ratified the related Protocol (Doc 9318) upon fulfilment of the conditions established in Article 83 bis.*

*Compliance Note 3: In the case of international operations effected jointly with aeroplanes not all of which are registered in the Republic of Namibia, nothing in this CATS prevents the Republic of Namibia entering into an agreement for the joint exercise of the functions placed upon it by the provisions of this CATS.*

### 174.04.1 Objectives, Determination and Provision of Meteorological Services

1.1 The objective of MET services is to contribute to the safety, regularity and efficiency of air navigation.

1.2 A MET service provider must achieve this objective by supplying operators, flight crew members, air traffic services units, search and rescue services units, aerodrome managements and others concerned with the conduct or development of air navigation, with the meteorological information necessary for the performance of their respective functions.

1.3 The designated MET authority must determine the meteorological service which it will provide to meet the needs of international air navigation. This determination must be made in accordance with the provisions of the standards contained in this Part and in accordance with regional air navigation agreements. This must include the determination of the meteorological services to be provided for international air navigation over international waters and other areas which lie outside the territory of the Republic of Namibia for which Namibia has been assigned or has accepted responsibility for the provision of services.

1.4 The Namibian Meteorological Services, as the designated meteorological service provider for Namibia, must provide meteorological service for air navigation in the territory of Namibia including the international waters as determined in accordance with 1.3 above. Details of the Namibian Meteorological Services must be published in the Aeronautical Information Publication.

1.5 The Namibian Meteorological Services in providing meteorological services must comply with the requirements of the World Meteorological Organization (WMO) in respect of qualifications ~~and~~, competencies, education and training of meteorological personnel providing service for air navigation.

1.6 Any person, having been certified by the Executive Director in accordance with this Part, to provide meteorological services over specified airspaces or aerodromes of Namibia, must in the provision of such services comply with the provisions of this Part and the requirements of the World Meteorological Organization including requirements in respect of qualifications and training of meteorological personnel providing services.

1.7 The requirements concerning qualifications and training of meteorological personnel in aeronautical meteorology must be as prescribed in WMO Publication No. 49, Technical Regulations, Volume I — General Meteorological Standards and Recommended Practices, Chapter B.4 — Education and Training.

### 174.04.2 Supply, Use and Quality Management of Meteorological Information

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

1.2 The MET service provider must establish and implement 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 operators, flight crew members, air traffic services units, search and rescue services units, aerodrome managements and others concerned with the conduct or development of air navigation.

1.3 The quality system established by the MET service provider must be certified by an approved organization and must be in conformity with International Organization for Standardization (ISO) 9000 series of quality assurance standards.

*Compliance Note: — The ISO 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme. The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization. Guidance on the establishment and implementation of a quality management systems is given in the Advisory Pamphlet ANSSO-MET-AP174/02.*

1.4 The quality system must provide the users with assurance that the meteorological information supplied complies with the stated requirements in terms of the geographical and spatial coverage, format and content, time and frequency of issuance and period of validity, as well as the accuracy of measurements, observations and forecasts. When the quality system indicates that meteorological information to be supplied to the users does not comply with the stated requirements, and automatic error correction

procedures are not appropriate, such information must not be supplied to the users unless it is validated with the originator.

*Compliance Note: Requirements regarding the geographical and special coverage, format and content, time and frequency of issuance and period of validity of meteorological information to be supplied to aeronautical users are given in Sub-Parts 4, 5, 7, 8, 9, 10 and the Appendices 2, 3, 5, 6, 7, 8, and 9 to this Document NAM-CATS-MET.*

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

*Compliance Note: Requirements concerning the exchange of operational meteorological information are given in Sub-Part 12 and Appendix 10 to this Document NAM-CATS-A-MET.*

1.6 Demonstration of compliance of the quality system applied must be by audit. If nonconformity of the system is identified, action must be initiated to determine and correct the cause. All audit observations must be evidence-based and properly documented.

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

*Compliance Note: Guidance on the operationally desirable accuracy of measurement or observation is contained in Attachment A to this Document NAM-CATS-A-MET.*

1.8 Owing to the variability of meteorological elements in space and time, to limitations of forecasting techniques and to limitations caused by the definitions of some of the elements, the specific value of any of the elements given in a forecast must be understood by the recipient to be the most probable

value which the element is likely to assume during the period of the forecast. Similarly, when the time of occurrence or change of an element is given in a forecast, this time must be understood to be the most probable time.

*Compliance Note: Guidance on the operationally desirable accuracy of forecasts is contained in Attachment B to this Document NAM-CATS-A-MET.*

1.9 The meteorological information supplied to the users must be consistent with Human Factors principles and must be in forms which require a minimum of interpretation by these users.

1.10 Within the context of the MET service provider's quality system, the skills and knowledge required for each function must be identified and personnel assigned to perform those functions must be appropriately trained.

1.11 Though not the only means, an ISO 9001 certificate, issued by an appropriately accredited organization, covering the aeronautical information services of the provider is considered as a sufficient means of compliance. The A-MET provider must accept the disclosure of the documentation related to the certification to the Executive Director upon request.

1.12 A MET service provider must ensure that personnel possess the skills and competencies required to perform specific assigned functions, and appropriate records must be maintained so that the qualifications of personnel can be confirmed.

1.13 Initial and periodic assessments must be established that require personnel to demonstrate the required skills and competencies. Periodic assessments of personnel must be used as a means to detect and correct shortfalls.

1.14 Within the quality assurance system, if nonconformity is identified, initiating action to correct its cause must be determined and taken as follows:

(a) The procedure required for corrective action must specify how:

(i) to correct an existing quality problem; and

(ii) to follow up a corrective action to ensure the action is effective; and

(iii) to amend any procedure required under this Part as a result of a corrective action; and

(iv) management will measure the effectiveness of any corrective action taken.

(b) The procedure required for preventive action must specify how:

(i) to correct a potential quality problem; and

(ii) to follow-up a preventive action to ensure the action is effective; and

(iii) to amend any procedure required under this Part as a result of a preventive action; and

(iv) management will measure the effectiveness of any preventive action taken.

1.15 The MET Service provider States must ensure that the meteorological information supplied to the users listed in 1.2 is provided through information services.

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

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

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

**174.04.3 Notification required from Operators.**

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

1.2 The meteorological service provider must 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, and.

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

1.3 The operator or a flight crew member must ensure that, where required by the meteorological 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.

1.4 The notification to the aerodrome meteorological office of individual flights must contain the following information except that, in the case of scheduled flights, the requirement for some or all of this

information may be waived as agreed between the aerodrome meteorological office and the operator concerned:

(a) aerodrome of departure and estimated time of departure;

(b) destination and estimated time of arrival.

(c) route to be flown and estimated times of arrival at, and departure from, any intermediate 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 a flight crew member, whether flight documentation and/or briefing or consultation; and

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

## 174.05 GLOBAL SYSTEMS, SUPPORTING CENTRES AND METEOROLOGICAL OFFICES

### 174.05.1 World Area Forecast System (WAFS)

1.1 The objective of the world area forecast system (WAFS) must be to supply meteorological authorities and other users with global aeronautical meteorological en-route forecasts in digital form.

1.2 This objective must 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.

### 174.05.2 World Area Forecast Centres (WAFC)

1.1 Where a MET service provider has been assigned, and/or has accepted the responsibility for providing a WAFC within the framework of the world area forecast system they must arrange to:

(a) prepare for grid points for all required levels global forecasts of:

(i) upper wind.

(ii) upper-air temperature and humidity;

(iii) geopotential altitude of flight levels.

(iv) flight level and temperature of tropopause.

(v) direction, speed and flight level of maximum wind;

(vi) cumulonimbus clouds.

(vii) icing; and

(viii) turbulence.

(b) prepare global forecasts of significant weather (SIGWX) phenomena.

(c) issue the forecasts referred to in a) and b) in digital form to meteorological authorities and other users.

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

(e) establish and maintain contact with VAACs for the exchange of information on volcanic activity in order to coordinate the inclusion of information on volcanic eruptions in SIGWX forecasts.

1.2 In case of interruption of the operations of a WAFC, its functions must be carried out by another WAFC.

*Compliance Note: Back-up procedures to be used in case of interruption of the operation of a WAFC are updated by the World Area Forecast System Operations Group (WAFSOPSG) as necessary.*

**174.05.3 Aerodrome Meteorological Offices**

1.1 The MET service provider must establish one or more aerodrome and/or other meteorological offices which must be adequate for the provision of the meteorological service required to satisfy the needs of air navigation.

1.2 An aerodrome meteorological office must carry out all or some of the following functions as necessary to meet the needs of flight operations at the aerodrome:

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

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

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

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

(e) supply other meteorological information to aeronautical users;

(f) display the available meteorological information;

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

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

1.3 The aerodrome meteorological offices at which flight documentation is required, as well as the areas to be covered, will be determined by regional air navigation agreement.

1.4 The aerodromes for which landing forecasts are required will be determined by regional air navigation agreement.

1.5 For aerodromes without meteorological offices:

(a) The MET service provider must designate one or more meteorological offices to supply meteorological information as required; and

(b) The MET service provider must establish means by which such information can be supplied to the aerodromes concerned.

**174.05.4 Meteorological Watch Offices**

1.1 A designated MET authority must establish one or more meteorological watch offices within the Namibia flight information region or control areas for which it has been assigned the responsibility for the provision of A-MET services.

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

1.2 Each meteorological watch office must:

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

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

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

(d) disseminate SIGMET information.

(e) when required by regional air navigation agreements:

(i) prepare AIRMET information related to its area of responsibility.

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

(iii) disseminate AIRMET information.

(f) Supply information received on pre-eruption volcanic activity, a volcanic eruption and volcanic ash cloud for which a SIGMET has not already been issued, to its associated ACC/FIC, as agreed

between the MET and the ATS service provider, and to its associated VAAC as determined by regional air navigation agreement; and

(g) Supply information received concerning the accidental release of radioactive materials into the atmosphere, in the area for which it maintains watch or adjacent areas, to its associated ACC/FIC, as agreed between the MET and the ATS service providers concerned, and to the AIS units, as agreed between the MET and the AIS service provider concerned. The information must comprise location, date and time of the release, and forecast trajectories of the radioactive materials.

*Compliance Note: The information is provided by WMO regional specialised meteorological centres (RSMC) for the provision of transport model products for radiological environmental emergency response, at the request of the delegated authority of the State in which the radioactive material was released into the atmosphere, or the International Audit Energy Agency (IAEA). The information is sent by the RSMC to a single contact point of the national meteorological service in each State. This contact point has the responsibility of redistributing the RSMC products within the State concerned. Furthermore, the information is provided by IAEA to RSMC co-located with VAAC London (designated as the focal point) which in turn notifies the ACC/FIC about the release.*

1.3 The boundaries of the area over which meteorological watch is to be maintained by a meteorological watch office must be coincident with the boundaries of the flight information region or a control area or a combination of the flight information region and/or control areas. Meteorological watch must be maintained continuously; however, in areas with a low density of traffic, the watch may be restricted to the period relevant to expected flight operations.

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

*Compliance Note: Guidance on the bilateral or multilateral coordination between MWOs of Contracting States for the provision of SIGMET can be found in the Manual of Aeronautical Meteorological Practice (Part 5).*

### 174.05.5 Volcanic Ash Advisory Centres (VAAC)

1.1 Where a A-MET provider has been assigned, and/or has accepted the responsibility for providing a VAAC within the framework of the international airway's volcano watch, the A-MET provider must arrange to respond to a notification that a volcano has erupted or is expected to erupt, or volcanic ash is reported in its area of responsibility. The A-MET provider must arrange to:

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

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

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

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

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

(i) Meteorological watch offices, area control centres and flight information centres serving flight information regions in its area of responsibility which may be affected.

(ii) Other VAACs whose areas of responsibility may be affected.

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

(iv) Airlines requiring the advisory information through the AFTN address provided specifically for this purpose.

*Compliance Note: The AFTN address to be used by VAACs is given in the Handbook on the International Airways Volcano Watch (IAVW) Doc 9766 which is available in the ICAO IAVWOPSG website.*

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

(i) the volcanic ash "cloud" is no longer identifiable from satellite data and where available, ground-based and airborne data.

(ii) no further reports of volcanic ash are received from the area; and

(iii) no further eruptions of the volcano are reported.

1.2 Volcanic ash advisory centres must maintain a 24-hour watch.

1.3 In case of interruption of the operation of a VAAC, an authorized A-MET service provider must ensure its functions are carried out by another VAAC or another meteorological centre.

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

**174.05.6 Volcano observatories**

1.1 The designated MET authority must, where active or potentially active volcano exists, make arrangements for the State volcano observatories, to monitor these volcanoes and must send this information as quickly as practicable to the associated ACC/FIC, MWO and VAAC when any of the following is observed:

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

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

(c) volcanic ash in the atmosphere.

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

### 174.05.7 Tropical Cyclone Advisory Centre (TCAC)

1.1 A MET provider having been assigned, and/or having accepted the responsibility for providing a TCAC, must arrange to:

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

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

(i) Meteorological watch offices in its area of responsibility.

(ii) Other TCACs whose areas of responsibility may be affected; and

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

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

### 174.05.8 Space Weather Centres (SWXC)

1.1 A-MET provider having been assigned, and/or having accepted the responsibility for providing a SWXC, must arrange for that centre to monitor and provide advisory information on space weather phenomena in its area of responsibility by arranging for that centre to:

a) monitor relevant ground-based, airborne and space-based observations to detect, and predict, when possible, the existence of space weather phenomena that have an impact in the following areas:
   1) high frequency (HF) radio communications.
   2) communications via satellite.
   3) GNSS-based navigation and surveillance; and
   4) radiation exposure at flight levels.

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

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

1) area control centres, flight information centres and aerodrome meteorological offices in its area of responsibility which may be affected.
2) other SWXCs; and
3) international OPMET databanks, international NOTAM offices and aeronautical fixed service Internet-based services.

1.2 SWXC must maintain a 24-hour watch.

1.3 In case of interruption of the operation of a SWXC, its functions must be carried out by another SWXC or another centre, as designated by the SWXC Provider State concerned.

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

## 174.06 METEOROLOGICAL OBSERVATIONS AND REPORTS

### 174.06.1 Aeronautical Meteorological Stations and Observations

1.1 The designated MET authority must establish, at aerodromes, such aeronautical meteorological stations as it determines to be necessary. An aeronautical meteorological station may be a separate station or may be combined with a synoptic station.

*Compliance Note: Aeronautical meteorological stations may include sensors installed outside the aerodrome, where considered justified, by the A-MET service provider to ensure the compliance of meteorological service for air navigation with the provisions of this part.*

1.2 The MET service provider must 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.

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

1.4 The MET service provider must 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.

1.5 At aerodromes with runways intended for Category II and III instrument approach and landing operations, automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure must be installed to support approach and landing and takeoff operations. These devices must be integrated automatic systems for acquisition, processing, dissemination and display in real time of the meteorological parameters affecting landing and takeoff

operations. The design of integrated automatic systems must observe Human Factors principles and include back-up procedures.

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

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

1.8 The aeronautical meteorological observations must 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.

### 174.06.2 Agreement between the Meteorological and Air Traffic Services Authorities

**1. Purpose**

1.1 An agreement between the MET service provider and the ATS authority must be prepared to: (a) provide a systematic listing of services and responsibilities which can assist in ensuring a complete and efficient meteorological service to air navigation.

(b) assist in bringing about a better understanding of the needs and capabilities of the parties involved where the meteorological service and air traffic services are provided by different organizations like in the case of the Republic of Namibia; and

(c) provide for clear and unambiguous allocation of responsibilities when legal aspects arise (e.g. during inquiries into incidents or accidents).

**2. Contents of agreements**

2.1 An agreement established between the MET service provider and the ATS service provider must cover:

(a) arrangements for meetings, at operational and administrative levels, between the heads of ATS units and meteorological offices and stations to discuss requirements for meteorological information, methods of meeting these requirements and changes in local procedures necessitated by changes in operations. The arrangements should also provide for who to convene the meetings and the involvement, as necessary, of AIS, communications, airport management and operator representatives for coordination purposes. Minutes of the meetings.

(b) requirements for meteorological information.

(c) means to be used for exchanging/supplying that information.

(d) responsibilities and functions of the ATS units and meteorological offices and stations involved;

(e) designation of the meteorological offices associated with individual ATS units and search and rescue services centers.

(f) arrangements for automatic air-reporting (via data link) and manual air-reporting (via voice communications) in the FIRs/control areas concerned, including and taking into consideration the relevant provisions of this Part and Appendix 4 of this Document NAM-CATS-A-MET regarding reports of aircraft observations:

(i) the selection of ATS/MET reporting points.

(ii) arrangements for automatic air-reporting, including the climb-out phase of flight (i.e. contracts for ADS/SSR Mode S reports containing meteorological information) and relevant automated dissemination procedures; and

(iii) if applicable, designation procedures for air-reporting on air routes with high-density traffic.

(g) arrangements regarding the dissemination of information received and/or obtained on pre-eruption volcanic activity, volcanic eruptions and volcanic ash cloud, with special emphasis given to information/notifications of these events from non-aeronautical sources and, in the case

of FIRs and control areas having active volcanoes, to the arrangements for information from the State vulcanological agency.

(h) arrangements between the ATS and meteorological authorities regarding the dissemination of information on the release into the atmosphere of radioactive materials and toxic chemicals.

(i) arrangements for the periodic familiarization of ATS, search and rescue, and meteorological personnel with each other's facilities, functions and procedures.

(j) where necessary, arrangements for meteorological training of ATS personnel; and

(k) arrangements for the provision of aeronautical climatological information to support ATS activities, e.g. development of ATS procedures.

(l) the provision of air traffic services units displays related to integrated automatic systems the calibration and maintenance of these displays/instruments and the use to be made of these displays/instruments by air traffic services personnel.

2.2 The following information must be included as Annexes to the agreement between A-MET services provider and ATS provider:

(a) the information to be supplied routinely by meteorological offices and stations to ATS units, including the format and frequency of the information.

(b) the information to be supplied non-routinely by meteorological offices and stations to ATS units (e.g. local special reports, SPECI, SIGMET and AIRMET information, aerodrome and wind shear warnings and alerts), including criteria and local arrangements for the preparation of local special reports and aerodrome, and wind shear warnings and alerts.

(c) the transmission of meteorological information in the form of digital data, including WAFS digital grid point data from MET to ATS computers (and vice versa) specifying the sources, formats and volumes of the data, transmission protocols, interfaces, etc.

(d) the provision in ATS units of displays related to integrated automatic systems and the circumstances under which certain meteorological information need not be supplied by the meteorological offices or stations to ATS units (i.e. when the information is independently available at ATS units);

(e) instruments/displays connected to the same sensors (e.g. of automatic meteorological observing stations, and RVR systems at ATS units), their use, calibration and maintenance;

(f) the making of supplementary (visual) observations (for example, of meteorological phenomena of operational significance in the climb-out and approach areas) if and when made by air traffic services personnel and their supply to the meteorological offices and station.

(g) meteorological information obtained in ATS units from aircraft taking off, landing and enroute, via voice communications (i.e. routine and special air-reports and non-routine aircraft observations), and relayed to meteorological offices, stations and MWOs.

(h) provision and use of meteorological information obtained from ground weather radar or from radar used by ATS (if applicable) and from meteorological satellites.

(i) dissemination of information obtained on pre-eruption volcanic activity, volcanic eruptions and volcanic ash cloud, including volcanic ash advisories;

(j) dissemination of tropical cyclone advisories.

(k) dissemination and use of information concerning the release into the atmosphere of radioactive materials and toxic chemicals.

(l) means to be used for the supply, exchange and dissemination of information under (a) and (b) and (f) to (k); and

(m) detailed allocation of responsibilities to designated associated meteorological offices and meteorological stations for the supply of information to the ATS units concerned.

2.3 A sample Letter of Agreement between an ATS provider and a meteorological services provider is given in the Advisory Pamphlet ANSSO-MET-AP174/01.

### 174.06.3 Routine Observations and Reports

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

1.2 Reports of routine observations must 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).

1.3 Meteorological information used in ATIS (voice-ATIS and D-ATIS) must be extracted from the local routine meteorological routine or special report.

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

### 174.06.4 Special Observations and Reports

1.1 A list of criteria for special observations must be established by the MET service provider, in consultation with the appropriate ATS authority, operators and others concerned.

1.2 Reports of special observations must be issued as:

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

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

*Compliance Note: Meteorological information used in ATIS (voice-ATIS and D-ATIS) is to be extracted from the local special report: the surface wind direction and speed and runway visual range (RVR) are to be averaged over 2 minutes and 1 minute, respectively; and the wind information is to refer to conditions along the runway for departing aircraft and to conditions at the touchdown zone for arriving aircraft. A template for the local meteorological report, including the corresponding ranges and resolutions of each element, is in Appendix 3 to this Document NAM-CATS-A-MET.*

1.3 At aerodromes that are not operational throughout 24 hours, SPECI must be issued, as necessary following the resumption of the issuance of METAR.

### 174.06.5 Contents of Reports

1.1 Local routine reports, local special reports, METAR and SPECI must contain the following elements in the order indicated:

(a) Identification of the type of report;

(b) Location indicator;

(c) Time of the observation.

(d) Identification of an automated or missing report, when applicable;

(e) Surface wind direction and speed.

(f) Visibility.

(g) Runway visual range, when applicable;

(h) Present weather.

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

(j) Air temperature and dew-point temperature; and

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

1.2 In addition to elements listed under paragraph 1.1 (a) to (k), local routine reports, local special reports, METAR and SPECI must contain supplementary information to be placed after element (k).

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

### 174.06.6 Observing and Reporting Meteorological Elements

1. The following standards and procedures apply in relation to observing and reporting meteorological elements:

1.1 **Surface wind**

1.1.1 The mean direction and the mean speed of the surface wind must be measured, as well as significant variations of the wind direction and speed, and reported in degrees true and kilometers per hour (or knots), respectively.

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

1.1.3 For METAR and SPECI, the surface wind observations must 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.

**1.2 Visibility**

1.2.1 The visibility must be measured or observed and reported in meters or kilometers.
*Compliance Note. Guidance on the conversion of instrument readings into visibility is given in Attachment D to this NAM-CATS-A-MET.*

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

1.2.3 For METAR and SPECI, the visibility observations must be representative of the aerodrome.

**1.3 Runway visual range**

1.3.1 Runway visual range must be assessed on all runways intended for Category II and III instrument approach and landing operations.

1.3.2 Runway visual range must 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 takeoff and having high-intensity edge lights and/or centre line lights.

1.3.3 The runway visual range, assessed in accordance with 1.3.1 and 1.3.2, must be reported in meters throughout periods when either the visibility or the runway visual range is less than 1 500 m.

1.3.4 Runway visual range assessments must 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.

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

**1.4 Present weather**

1.4.1 The present weather occurring at the aerodrome and/or its vicinity must be observed and reported as necessary. The following present weather phenomena must be identified, as a minimum: precipitation and freezing precipitation (including intensity thereof), fog, freezing fog and thunderstorms (including thunderstorms in the vicinity).

1.4.2 For local routine and special reports, the present weather information must be representative of conditions at the aerodrome.

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

**1.5 Clouds**

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

1.5.2 Cloud observations for local routine and special reports must be representative of the approach area.

1.5.3 Cloud observations for METAR and SPECI must be representative of the aerodrome and its vicinity.

**1.6 Air temperature and dew-point temperature**

1.6.1 The air temperature and the dew-point temperature must be measured and reported in degrees Celsius.

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

1.7 **Atmospheric pressure**

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

1.8 **Supplementary information**

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

### 174.06.7 Reporting Meteorological Information from Automatic Observing Systems

1.1 METAR and SPECI from automatic observing systems may be used, to the maximum extent practicable, during non-operational hours of the aerodrome, and during operational hours of the aerodrome as determined by the meteorological service provider in consultation with users based on the availability and efficient use of personnel.

1.2 A MET service provider must develop procedures on the use of automatic meteorological observing systems.

1.3 Local routine and special reports from automatic observing systems may be used during operational hours of the aerodrome as determined by the meteorological service provider in consultation with users based on the availability and efficient use of personnel.

1.4 Local routine and special reports and METAR and SPECI from automatic observing systems must be identified with the word "AUTO".

### 174.06.8 Observations and Reports of Volcanic Activity

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

(a) message type, VOLCANIC ACTIVITY REPORT.
(b) station identifier, location indicator or name of station;
(c) date/time of message.
(d) location of volcano and name if known; and
(e) concise description of event including, as appropriate, level of intensity of volcanic activity, occurrence of an eruption and its date and time, and the existence of a volcanic ash cloud in the area together with direction of ash cloud movement and height.

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

## 174.07 AIRCRAFT OBSERVATIONS AND REPORTS

### 174.07.3 Routine aircraft observations and designation

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

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

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

1.4 In the case of the requirement to report during the climb-out phase, an aircraft must be designated, at approximately hourly intervals, at each aerodrome to make routine observations.

### 174.07.5 Special aircraft observations

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

(a) moderate or severe turbulence; or

(b) moderate or severe icing; or

(c) severe mountain wave; or

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

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

(f) heavy dust storm or heavy sandstorm; or

(g) volcanic ash cloud; or

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

(i) runway braking action encountered is not as good as reported.

1.2 Pre-eruption volcanic activity when used in this Part means unusual and/or increasing volcanic activity which could presage a volcanic eruption.

### 174.07.6 Other non-routine aircraft observations

1.1 When other meteorological conditions not listed under 174.07.5 such as 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 must advise the appropriate air traffic services unit as soon as practicable.

*Compliance Note: Turbulence and wind shear are elements which may not be satisfactorily observed from the ground and therefore aircraft observations must be used to represent the only available evidence.*

### 174.07.7 Reporting of aircraft observations during flight

1.1 Aircraft observations must be reported by air-ground data link, except that where air-ground data link is not available or appropriate, special and other non-routine aircraft observations during flight must be reported by voice communications.

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

1.3 Aircraft observations must be reported as air-reports.

### 174.07.8 Relay of Air-Reports by ATS Units

1.1 The designated MET authority must make arrangements with ATS providers to ensure that, on receipt by the ATS units of special air-reports by voice communications, the ATS units relay them without delay to their associated meteorological watch office; and

1.2 The designated MET authority must make arrangements with ATS providers to ensure that, on receipt by the ATS units of routine and special air-reports by data link communications, the ATS units relay them without delay to their associated meteorological watch office and WAFCs.

### 174.07.9 Recording and Post-Flight Reporting of Aircraft Observations of Volcanic Activity

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

## 174.08 FORECASTS

### 174.08.1 Interpretation and use of forecasts

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

*Compliance Note: — Guidance on the operationally desirable accuracy of forecasts is given in Attachment B of this Documents NAM-CATS-A-MET.*

*Compliance Note: Technical specifications and detailed criteria related to this Sub-Part are given in Appendix 5 to this Document NAM-CATS-A-MET.*

1.2 The issue of a new forecast by an aerodrome meteorological office, such as a routine aerodrome forecast, must 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.

### 174.08.2 Aerodrome Forecasts

1.1 A MET service provider must prepare an aerodrome forecast for aerodromes for which they have the responsibility to provide MET services.

1.2 An aerodrome forecast must 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.

1.3 Aerodrome forecasts and amendments thereto must be issued as TAF and include the following information in the order indicated:

(a) Identification of the type of forecast;
(b) Location indicator;
(c) Time of issue of forecast.
(d) Identification of a missing forecast, when applicable;
(e) Date and period of validity of forecast;
(f) Identification of a cancelled forecast, when applicable;
(g) Surface wind;
(h) Visibility;
(i) Weather;
(j) Cloud; and
(k) Expected significant changes to one or more of these elements during the period of validity.
(l) Optional elements must be included in TAF in accordance with regional air navigation agreement.

*Compliance Note: The visibility included in TAF refers to the forecast prevailing visibility.*

1.4 A-MET service provider preparing TAF must keep the forecasts under continuous review and, when necessary, must issue amendments promptly. The length of the forecast messages and the number of changes indicated in the forecast must be kept to a minimum.

1.5 TAF that cannot be kept under continuous review must be cancelled.

1.6 The period of validity of a routine TAF must be not less than 6 hours or more than 30 hours; the period of validity must be determined by regional air navigation agreement. Routine TAF valid for less than 12 hours should be issued every 3 hours and those valid for 12 to 30 hours must be issued every 6 hours.

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

### 174.08.3 Landing Forecasts

1.1 A MET service provider must prepare a landing forecast for aerodromes for which they have MET service responsibility. Such forecasts are intended to meet the requirements of local users and of aircraft within about one hour's flying time from the aerodrome.

1.2 Landing forecasts must be prepared in the form of a trend forecast.

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

### 174.08.4 Forecasts for Takeoff

1.1 An aerodrome meteorological office must prepare a forecast for takeoff for those aerodromes for which they have the responsibility to provide aeronautical meteorological services as agreed between the MET service provider and the operators concerned.

1.2 The forecast for takeoff must refer to a specified period of time and should contain information on expected conditions over the runway complex in regard to surface wind direction and speed and any variations thereof, temperature, pressure (QNH), and any other elements as agreed locally.

1.3 A forecast for takeoff must be supplied to operators and flight crew members on request within the 3 hours before the expected time of departure.

1.4 Aerodrome Meteorological offices preparing forecasts for takeoff must keep the forecasts under continuous review and, when necessary, issue amendments promptly.

### 174.08.5 Area Forecasts for Low-Level Flights

1.1 When the density of traffic operating below 10,000 feet (or up to flight level 150 in mountainous areas, or higher, where necessary) warrants the routine issue and dissemination of area forecasts for such

operations, the frequency of issue, the form and the fixed time or period of validity of those forecasts and the criteria for amendments thereto must be determined by the MET service provider in consultation with the users.

1.2 When the density of traffic operating below 10,000 feet warrants the issuance of AIRMET information, area forecasts for such operations must be prepared in a format as agreed between the meteorological service provider and other Meteorological authorities concerned.

1.3 When abbreviated plain language is used, the forecast must be prepared as a GAMET area forecast, employing approved abbreviations and numerical values.

1.4 When chart form is used, the forecast must be prepared as a combination of forecasts of upper wind and upper-air temperature, and of SIGWX phenomena.

1.5 The area forecasts must be issued to cover the layer between the ground and 10,000 feet (or up to flight level 150 in mountainous areas, or higher, where necessary) and must contain information on en-route weather phenomena hazardous to low-level flights, in support of the issuance of AIRMET information, and additional information required by low-level flights.

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

## 174.09 SIGMET AND AIRMET INFORMATION, AERODROME AND WIND SHEAR WARNINGS AND ALERTS

*Compliance Note: Technical specifications and detailed criteria related to this Sub-Part are given in Appendix 6 of this in Document NAM-CATS-A-MET.*

### 174.09.1 SIGMET Information

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

1.2 SIGMET information must be cancelled when the phenomena are no longer occurring or are no longer expected to occur in the area.

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

1.4 SIGMET messages concerning volcanic ash cloud and tropical cyclones must be based on advisory information provided by VAACs and TCACs, respectively.

1.5 A MET service provider must ensure close coordination is maintained between meteorological watch office and the associated area control centre/flight information centre to ensure that information on volcanic ash included in SIGMET and NOTAM messages is consistent.

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

### 174.09.2 AIRMET Information

1.1 AIRMET information must be issued by meteorological watch office in accordance with regional air navigation agreement, taking into account the density of air traffic operating below 10,000 feet.

1.2 AIRMET information must give a concise description in abbreviated plain language concerning the occurrence and/or expected occurrence of specified en-route weather phenomena, which have not been included in Section I of the area forecast for low-level flights issued in accordance with Sub-Part 8 and which may affect the safety of low-level flights, and of the development of those phenomena in time and space.

1.3 AIRMET information must be cancelled when the phenomena are no longer occurring or are no longer expected to occur in the area.

1.4 The period of validity of an AIRMET message must be not more than 4 hours.

### 174.09.3 Aerodrome Warnings

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

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

### 174.09.4 Wind Shear Warnings and Alerts

*Compliance Note: Wind shear alerts are expected to complement wind shear warnings and together are intended to enhance situational awareness of wind shear.*

1.1 Wind shear warnings must be prepared by the meteorological office for aerodromes where wind shear is considered a factor, in accordance with local arrangements with the ATS unit and operators concerned.

1.2 Wind shear warnings must give concise information on the observed or expected existence of wind shear which could adversely affect aircraft on the approach path or takeoff path or during circling approach between runway level and 1600 ft above that level and aircraft on the runway during the landing roll or takeoff run. Where local topography has been shown to produce significant wind shears at heights in excess of 1600 ft above runway level, then 1600 ft must not be considered restrictive.

1.3 Wind shear warnings for arriving aircraft and/or departing aircraft must be cancelled when aircraft reports indicate that wind shear no longer exists or, alternatively, after an agreed elapsed time.

1.4 The criteria for the cancellation of a wind shear warning must be defined locally for each aerodrome, as agreed between the MET service provider, the ATS service provider and the operators concerned.

1.5 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 must be issued.

1.6 Wind shear alerts must give concise, up-to-date information related to the observed existence of wind shear involving a headwind/tailwind change of 15 kt or more which could adversely affect aircraft on the final approach path or initial takeoff path and aircraft on the runway during the landing roll or takeoff run.

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

## 174.10 AERONAUTICAL CLIMATOLOGICAL INFORMATION

*Compliance Note: Technical specifications and detailed criteria related to this Sub-Part are given in Appendix 7 of this Document NAM-CATS-A-MET.*

### 174.10.1 Aeronautical climatological information - General provisions

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

1.1 Aeronautical climatological information required for the planning of flight operations must be prepared in the form of aerodrome climatological tables and aerodrome climatological summaries. Such information must be supplied to aeronautical users as agreed between the A-MET provider and the users concerned.

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

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

### 174.10.2 Aerodrome Climatological Tables

1.1 A MET service provider must make arrangements for collecting and retaining the necessary observational data and have the capability to:

(a) prepare aerodrome climatological tables for each regular and alternate international aerodrome within Namibia; and

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

### 174.10.3 Aerodrome climatological summaries

1.1 A MET service provider must prepare aerodrome climatological summaries following the procedures prescribed by the World Meteorological Organization.

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

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

## 174.11 SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

*Compliance Note: Technical specifications and detailed criteria related to this Sub-Part are given in Appendix 8 of this Document NAM-CATS-A-MET.*

### 174.11.1 General provisions

1.1 Each MET service provider must supply meteorological information to operators and flight crew members for:

(a) Pre-flight planning by operators.

(b) In-flight re-planning by operators using centralized operational control of flight operations;

(c) Use by flight crew members before departure; and

(d) Aircraft in flight.

1.2 Meteorological information supplied to operators and flight crew members must cover the flight in respect of time, altitude and geographical extent. Accordingly, the information must relate to appropriate fixed times, or periods of time, and must 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.

1.3 Meteorological information supplied to operators and flight crew members must be up to date and include the following information, as agreed between the A-MET service provider and the 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; and

(vii) Cumulonimbus clouds, icing and turbulence.

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

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

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

(c) TAF or amended TAF for the aerodromes of departure and intended landing, and for takeoff, en-route and destination alternate aerodromes.

(d) Forecasts for takeoff.

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

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

(f) Volcanic ash and tropical cyclone advisory information relevant to the whole route.

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

(h) Aerodrome warnings for the local aerodrome;

(i) Meteorological satellite images.

(j) Ground-based weather radar information-; and

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

1.4 Forecasts listed under 1.3 (a) must 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 A-MET service provider and the operator concerned.

1.5 When forecasts are identified as being originated by the WAFCs, no modifications must be made to their meteorological content.

1.6 Charts generated from the digital forecasts provided by the WAFCs must be made available, as required by operators, for fixed areas of coverage as shown in Appendix 8 of this Document NAM-CATS-A-MET, Figures A8-1, A8-2 and A8-3.

1.7 When forecasts of upper wind and upper-air temperature listed under 174.11.1, paragraph 1.3 (a)(i) are supplied in chart form, they must be fixed time prognostic charts for flight levels as specified in Appendix 2, paragraph 1.2.2 a) of this Document NAM-CATS-A-MET.

1.8 When forecasts of SIGWX phenomena listed under 174.11.1, paragraph 1.3 (a) (vi) are supplied in chart form, they must be fixed time prognostic charts for an atmospheric layer limited by flight levels as specified in Appendix 2, paragraph 1.3.2 and Appendix 5, paragraph 4.3.2 of this Document NAM-CATS-A-MET.

1.9 The forecasts of upper wind and upper-air temperature and of SIGWX phenomena above 10,000 ft requested for pre-flight planning and in-flight re-planning by the operator must be supplied as soon as they become available, but not later than 3 hours before departure. Other meteorological information requested for preflight planning and in-flight re-planning by the operator must be supplied as soon as is practicable.

1.10 When necessary, each MET service provider providing service for operators and flight crew members must initiate coordinating action with the meteorological authorities of other States with a view to obtaining from them the reports and/or forecasts required.

1.11 Meteorological information must be supplied to operators and flight crew members at the location to be determined by the MET service provider after consultation with the operators concerned and at the time agreed between the meteorological office and the operator concerned.

1.12 The service for pre-flight planning must be confined to flights originating within the territory of Namibia. At an aerodrome without a meteorological office, arrangements for the supply of meteorological information must be as agreed between the A-MET service provider and the operator concerned.

### 174.11.2 Briefing, Consultation and Display

*Compliance Note: The requirements for the use of automated pre-flight information systems in providing briefing, consultation and display are given in 174.11.4.*

1.1 Briefing and/or consultation must be provided, on request, to flight crew members and/or other flight operations personnel. Its purpose must 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 A-MET service provider and the operator concerned, in lieu of flight documentation.

1.2 Meteorological information used for briefing, consultation and display must include any or all of the information listed in 174.11.1, paragraph 1.3.

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

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

1.5 The flight crew member or other flight operations personnel for whom briefing, consultation and/or flight documentation has been requested must visit the aerodrome meteorological office at the time agreed between the aerodrome meteorological office and the operator concerned. Where local

circumstances at an aerodrome make personal briefing or consultation impracticable, the aerodrome meteorological office must provide those services by telephone or other suitable telecommunications facilities.

### 174.11.3 Flight Documentation

*Compliance Note: The requirements for the use of automated pre-flight information systems in providing flight documentation are given in 174.11.4.*

1.1 Flight documentation to be made available must comprise information listed under 174.11.1 as appropriate. However, flight documentation for flights of two hours' duration or less, after a short stop or turnaround, must be limited to the information operationally needed, as agreed between the A-MET service provider and the operator concerned, but in all cases the flight documentation must at least comprise information in 174.11.1, 1.3 (b), (c), (e) (f) and, if appropriate (g) and k).

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

1.3 In cases where a need for amendment arises after the flight documentation has been supplied, and before takeoff of the aircraft, the meteorological office must issue the necessary amendment or updated information to the operator or to the local air traffic services unit, for transmission to the aircraft.

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

### 174.11.4 Automated Pre-Flight Information Systems for Briefing, Consultation, Flight Planning and Flight Documentation

1.1 Where the A-MET 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 must comply with the relevant provisions in 174.11.1 – 174.11.3 inclusive.

1.2 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 must be as agreed between the meteorological service provider and the Executive Director or aeronautical information services.

1.3 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 A-MET service provider must remain responsible for the quality control and quality management of meteorological information provided by means of such systems in accordance with 174.04.2.

*Compliance Note: The responsibilities relating to aeronautical information services information and the quality assurance of the information is addressed under NAMCARs Part 175.*

### 174.11.5 Information for Aircraft in Flight

1.1 Meteorological information for use by aircraft in flight must be supplied by a meteorological office to its associated air traffic services unit and through D-VOLMET or VOLMET broadcasts as determined by regional air navigation agreement. Meteorological information for planning by the operator for aircraft in flight must be supplied on request, as agreed between the A-MET service provider and the operator concerned.

1.3 Meteorological information for use by aircraft in flight must be supplied to air traffic services units in accordance with the specifications of Subpart 11.

1.4 Meteorological information must be supplied through D-VOLMET or VOLMET broadcasts in accordance with the specifications of Sub-Part 12.

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

*Compliance Note: Technical specifications and detailed criteria related to this subpart are contained in Appendix 9 of this Document NAM-CATS-A-MET.*

### 174.12.1 Information for air traffic services units

1.1 The MET service provider must designate an aerodrome meteorological office or meteorological watch office to be associated with each air traffic services unit. The associated aerodrome meteorological office or meteorological watch office must, 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.

1.2 An aerodrome meteorological office must be associated with an aerodrome control tower or approach control unit for the provision of meteorological information.

1.3 A meteorological watch office must be associated with a flight information centre or an area control centre for the provision of meteorological information.

1.4 Where, owing to local circumstances, it is convenient for the duties of an associated aerodrome meteorological office or meteorological watch office to be shared between two or more meteorological offices or meteorological watch offices, the division of responsibility must be determined by the designated MET authority in consultation with the ATS authority.

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

## 174.13 REQUIREMENTS FOR AND USE OF COMMUNICATIONS

*Compliance Note: Technical specifications and detailed criteria related to this subpart are contained in Appendix 10 of this Document NAM-CATS-A-MET. The designated MET authority must decide upon its own organization and responsibility for implementing the telecommunication facilities referred to in this Sub-Part.*

### 174.13.1 Requirements for Communications

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

1.2 A MET service provider must make available suitable telecommunications facilities to permit meteorological watch offices to supply the required meteorological information to air traffic services and search and rescue services units in respect of the flight information region, control areas and search and rescue region for which those offices are responsible, and in particular to flight information centre, area control centres and rescue coordination centre and the associated aeronautical telecommunications stations.

1.3 A MET service provider must make available suitable telecommunications facilities to permit world area forecast centres to supply the required world area forecast system products to the A-MET service provider and other users.

1.4 Telecommunications facilities between meteorological offices and, as necessary, aeronautical meteorological stations and aerodrome control towers or approach control units must 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.

1.5 Telecommunications facilities between aerodrome meteorological offices or meteorological watch offices and flight information centres, area control centres, rescue coordination centres and aeronautical telecommunications stations must permit:

(a) communications by direct speech, the speed with which the communications can be established being such that the required points may normally be contacted within approximately 15 seconds; and

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

*Compliance Note: In 1.4 and 1.5, "approximately 15 seconds" refers to telephony communications involving switchboard operation and "5 minutes" refers to printed communications involving retransmission.*

1.6 The telecommunications facilities required in accordance with 1.4 and 1.5 must be supplemented, as and where necessary, by other forms of visual or audio communications, for example, closed-circuit television or separate information processing systems.

1.7 As agreed between the meteorological service provider and the operators concerned, provision must be made to enable operators to establish suitable telecommunications facilities for obtaining meteorological information from aerodrome meteorological offices or other appropriate sources.

1.8 A-Met service provider must make available suitable telecommunications facilities to permit meteorological offices to exchange operational meteorological information with other meteorological offices.

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

1.10 Point-to-multipoint telecommunication service via satellite to support the dissemination of aeronautical meteorological information must be based on full-time, non-pre-emptible, protected services.

1.11 System characteristics for dissemination of WAFS products via satellite systems must be as follows:

(a) frequency — C-band, earth-to-satellite, 6 GHz band, satellite-to-earth, 4 GHz band.

(b) capacity with effective signaling rate of not less than 9 600 bits/s;

(c) bit error rates — better than 1 in 107.

d) forward error correction; and

e) availability - 99.95 per cent.

1.12 The MET service provider must publish guidance on use of non-time-critical operational meteorological information and relevant aspects of the public Internet.

### 174.13.2 Use of Aeronautical Fixed Service Communications - Meteorological Bulletins in Alphanumeric Format

1.1 Meteorological bulletins containing operational meteorological information to be transmitted via the aeronautical fixed service must be originated by the appropriate meteorological office or aeronautical meteorological station.

1.2 Meteorological operational channel procedures and meteorological operational communication network procedures must be compatible with aeronautical fixed telecommunications network (AFTN) procedures.

*Compliance Note: "Compatible" is to be interpreted as a mode of operation ensuring that the information exchanged over the meteorological operational channels also can be exchanged over the aeronautical fixed telecommunication network without harmful effect on the operation of the aeronautical fixed telecommunication network and vice versa.*

1.3 Meteorological messages with priority indicator GG, comprise:

(a) messages concerning forecasts, e.g. terminal aerodrome forecasts (TAFs), area and route forecasts.

(b) messages concerning observations and reports, e.g. METAR, SPECI.

### 174.13.3 Use of Aeronautical Fixed Service Communications: WAFS Products

1.1 World area forecast system products in digital form should be transmitted using binary data communications techniques.

1.2 The method and channels used for the dissemination of the products should be as determined by regional air navigation agreement.

### 174.13.4 Use of aeronautical mobile service communications

1.1 The content and format of meteorological information transmitted to aircraft and by aircraft must be consistent with the provisions of this technical standard.

### 174.13.5 Use of Aeronautical Data Link Service - Contents of D-VOLMET

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

1.2 The requirement to provide METAR and SPECI may be met by the data link-flight information service (D-FIS) application entitled “Data link-aerodrome routine meteorological report (D-METAR) service”.

1.3 The requirement to provide TAF may be met by the D-FIS application entitled “Data link-aerodrome forecast (D-TAF) service”.

1.4 The requirement to provide SIGMET and AIRMET messages may be met by the D-FIS application entitled “Data link-SIGMET (D-SIGMET) service”.

### 174.13.6 Use of aeronautical broadcasting service: contents of VOLMET broadcasts

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

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