CIVIL AVIATION AUTHORITY OF THE PHILIPPINES

Aerodrome and Air Navigation Safety Oversight Office

Air Traffic Management Inspectorate Division

MET Inspectorate

MANUAL OF STANDARDS

Aeronautical Meteorology

First Edition

NOVEMBER 2016

APPROVAL

This Manual of Standards is one in a set of manuals of ATMID-AANSOO forming the technical guidance provided for the conduct of aviation safety oversight by the Civil Aviation Authority of the Philippines (CAAP). These manuals are produced to provide the information, policy and procedures necessary to perform tasks in support of the Civil Aviation Regulations – Air Navigation Service (CAR-ANS).

All personnel assigned and designated by the CAAP to provide service that are addressed in this manual shall comply with these policies and procedures in the performance of their duties. All other relevant working documents relating to these specific tasks and responsibilities will also be considered. If there is any conflicting guidance, the service provider should advise management in writing. It is a goal of the CAAP to provide guidance that empowers service providers to conduct their tasks in a standardized manner.

This manual is subject to regular review and improvement as approved by the Director General. The CAAP has authority to replace, amend the manual, as necessary, to conform to the Philippine Safety Oversight Program.

This manual will be treated as a dynamic document. As a result of amendments to the Philippine Civil Aviation legislation and the progress of aviation safety practices, there will be the need for amendments. Contribution of meaningful ideas for the improvement of the content of this manual is therefore encouraged and requested from all concerned.

Approved by:

CAPT. JIM C. SYDIONGCO
Director General

Date: 28 NOV 2016

FOREWORD

The Civil Aviation Authority of the Philippines (CAAP) is responsible under the Civil Aviation Authority Act of 2008 (Republic Act No. 9497) of the Republic of the Philippines, as amended) for the regulation of civil aviation in the Philippines. The CAAP exercises regulatory oversight by, in part, developing and promulgating appropriate, clear and enforceable aviation safety standards.

This Manual of Standards (MOS) for Aeronautical Meteorological Services is one mechanism that CAAP uses to meet the responsibilities of the Republic Act No. 9497 to ensure safety regulation of air traffic service provision. This MOS, as a component of the state safety programme, prescribes the detailed technical requirements (ATS safety standards) that have been determined to be necessary for promoting and supporting aviation safety in general and civil air navigation safety in particular.

ICAO Annex 3 standards and recommended practices are contained in this MOS, including the requirement that all Air Navigation Service Providers shall have an acceptable safety management system in place.

The Manual of Standards – Aeronautical Meteorological Services (MOS-MET) contains the standards, requirements and procedures pertaining to the provision of air navigation services. The standards and requirements in this Manual are based mainly on standards and recommended practices stipulated in Annex 3 (entitled “Meteorological Service for International Air Navigation”) to the Chicago Convention on International Civil Aviation (as enforced and amended from time to time by the Council of the International Civil Aviation Organization) and in the Manual of Aeronautical Meteorological Practice, and with such modifications as may be determined by CAAP to be applicable in the Philippines. The MOS includes the requirement that all Aeronautical Meteorology Providers shall have an acceptable quality management system in place.

Amendments to this Manual of Standards – Aeronautical Meteorology are the responsibility of the Head of the Aerodrome and Air Navigation Safety Oversight Office, CAAP. Readers should forward advice of errors, inconsistencies or suggestions for improvement to this Manual to the Head of AANSOO at the address shown in this manual.

RECORD OF AMENDMENTS

No.	Effectivity Date	Date Entered	Entered By	Signature
1st Edition (Initial Issue)			CAPT. JIM C. SYDIONGCO	

TABLE OF CONTENTS

CHAPTER 1 – INTRODUCTION

1.1 General

1.1.1 The Manual of Standards (MOS) is the means CAAP uses to meet its responsibilities under the Philippine Civil Aviation Act of 2008 (R.A. 9497) for promulgating aviation safety standards. The MOS prescribes the detailed technical material (Aviation Safety Standard) that is determined to be necessary for air navigation.

1.1.2 References should be made to the applicable provision of Civil Aviation Act and Philippine Civil Aviation Regulations (CAR-ANS), together with this manual to ascertain the requirements of and the obligations imposed by or under the civil aviation legislation.

1.1.3 This MOS is made under Regulation in Part 3 of the CAR-ANS. Part 3 refers to the standards and methods to be used in regulating the requirement and standards for compliance including:

- Aeronautical Meteorology;
- The provider's organization, facilities and equipment, personnel, check and training system, interface arrangement, safety management system and records; and
- Discontinuance of service.

1.1.4 Readers should understand that in the circumstance of any perceived disparity of meaning between the MOS and Phil. CAR-ANS, primacy of intent rests with the regulations. Where there is any inconsistency between the Regulations and the MOS, the Regulations prevail.

1.1.5 Service providers must document internal actions (Rules) in their own manuals of Operations, to ensure the maintenance and compliance with standards.

1.1.6 The MOS is the means, but not necessarily the only means of complying with the Regulations. An Advisory Circular (AC) may explain certain regulatory requirements by providing interpretative and explanatory materials. It is expected that service providers will document internal actions in their own Manual of Operations, to put into effect those or similarly adequate practices.

1.2 Differences between ICAO Standards and those in the MOS

1.2.1 Notwithstanding the above, where there is a difference between a standard prescribed in ICAO documents and the MOS, the MOS standard shall prevail.

1.3 Differences Published in AIP

1.3.1 Differences from ICAO Standards and Recommended Practices (SARPs) are published in an Aeronautical Information Publication (AIP) Supplement.

1.4 MOS documentation change management

1.4.1 This MOS is issued, and may only be amended, under the authority of the Director General Civil Aviation Authority of the Philippines.

- Requests for any change to the content of this MOS may come from:
- technical areas within CAAP; or
- aviation industry service providers or operators; or
- individuals or approval holders.

1.4.2 The need to change standards in this MOS may arise for any of the following reasons:

- to ensure safety;
- to ensure standardization;
- to respond to changed Phil. CAR-ANS standards;
- to respond to ICAO prescription; or
- to accommodate proposed initiatives or new technologies.

1.4.3 CAAP may approve trials of new procedures or technologies in order to develop appropriate standards.

1.5 Relevant Documents

1.5.1 The standards and procedures under which any Aeronautical Meteorological service is to be provided shall be in accordance with the following:

- Civil Aviation Act 2008, R.A. 9497 Chapter V Sec 24 (j), CAAP's functions;
- Civil Aviation Regulation, CAR-ANS Part 3 in particular;
- ICAO Annex 3;
- ICAO Doc 8896 – Manual of Aeronautical Meteorological Practice;
- ICAO Doc 7030 -Regional Supplementary Procedures;
- Philippine AIP;
- Philippine AIP Supplement;
- Relevant CAAP circulars; and
- this Aeronautical Meteorology Manual of Standards.

Unless otherwise stated, words in this MOS have the meanings given in the Philippine CAR-ANS Part 3, AIP or relevant ICAO documents.

1.6 Interpretation of words

1.6.1 To avoid any misunderstanding within the MOS certain words are to be interpreted as having specific meanings when they are the operative words in an instruction.

'shall', 'is to', 'are to' and 'must'	mean that the instruction is mandatory.
'should'	means that it is strongly advisable that an instruction is carried out; it is recommended or discretionary. It is applied where the more positive 'shall' is unreasonable but nevertheless a service provider would have to have good reason for not doing so.
'may'	means that the instruction is permissive, optional or alternative, e.g. 'a service provider may seek assistance…but would not if he did not need it.
'will'	is used for informative or descriptive writing, e.g. 'pilots will file…', is not an instruction to the service provider.
Rule	refers to the Rules of the Air Regulations.
Regulation	refers to the Philippine Civil Aviation Regulations
'miles'	always refers to nautical miles.

1.7 Definitions and Abbreviations

1.7.1 When the following terms are used in this Manual of Standards, 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, located at an aerodrome, designated to provide meteorological service for international air navigation.

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

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

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

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

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

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

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

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

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

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

Air traffic services unit. A generic term meaning variously, air traffic control unit, flight information Center 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. Alternate aerodromes include the following:

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

En-route alternate**.** An aerodrome at which an aircraft would be able to land after experiencing an abnormal or emergency condition while en route.

ETOPS en-route alternate. A suitable and appropriate alternate aerodrome at which an Aircraft would be able to land after experiencing an engine shut-down or other abnormal or emergency condition while en route in an ETOPS operation.

Destination alternate. An alternate aerodrome to which an aircraft may proceed should it become impossible or inadvisable to land at the aerodrome of intended landing.

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

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

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

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

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

Area of coverage (world area forecast system). A geographical area for which a regional area forecast Center supplies forecasts for flights departing from aerodromes in its service area.

Area of responsibility (world area forecast system). A geographical area for which a regional area forecast Center prepares significant weather forecasts.

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.

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

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

Civil Aviation Authority. The Civil Aviation Authority of the Philippines

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

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

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

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

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

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

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

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

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

Flight level. A surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals.

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

- *when set to a QNH altimeter setting, will indicate altitude;*
- *when set to a QFE altimeter setting, will indicate height above the QFE reference datum; and*
- *when set to a pressure of 1013.2 hPa, may be used to indicate flight levels.*

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

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

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

Grid point data in alphanumeric form. Processed meteorological data for a set of regularly spaced points on a chart, in a code form suitable for manual use.

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

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

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

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

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

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.

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 the area contained within a sector of a circle of 46 km (25 NM) radius Centered on a radio aid to navigation.

Nephanalysis. The graphical depiction of analyzed cloud data on a geographical map.

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

Operational control. The exercise of provider 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 Aircraft 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.

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 or exceeded within at least half the horizon circle or within at least half of the surface of the aerodrome. These areas could comprise contiguous or non-contiguous sectors.

Prognostic chart. 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. All the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfil requirements for quality (ISO 9000:2000*).

Quality control. The operational techniques and activities that are used to fulfil requirements for quality (ISO 9000:2000*).

Quality management. All activities of the overall management function that determine the quality policy, objectives and responsibilities, and implementing them by means such as quality planning, quality control, quality assurance and quality improvement within the quality system (ISO 9000:2000).

Quality system. The organizational structure, procedures, processes and resources needed to implement quality management (ISO 9000:2000).

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

Regional Area Forecast Center (RAFC). A meteorological Center designated to prepare and supply significant weather forecasts and upper wind and temperature charts for flights departing from aerodromes within its service area and to supply grid point data in digital form for up to worldwide coverage.

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 takeoff 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 phenomena which may affect the safety of aircraft operations.

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

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 Aircrafts first contact the runway.

Tropical Cyclone. Generic term for a non-frontal synoptic-scale cyclone originating over tropical or sub-tropical waters with organized convention 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 data banks 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: 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; the greatest distance at which lights in the vicinity of 1 000 candelas can be seen and identified against an unlit background.

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

Volcanic Ash Advisory 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** data banks regarding the lateral and vertical extent and forecast movement of volcanic ash in the atmosphere following volcanic eruptions.

VOLMET broadcast. Routine broadcast containing, as appropriate, current aerodrome weather reports, aerodrome forecasts and SIGMET messages for aircraft in flight.

VOLMET data link service (D-VOLMET). Provision of current aerodrome weather reports, aerodrome forecasts and SIGMET messages through data link.

World Area Forecast Center (WAFC). A meteorological Center designated to prepare and supply significant weather forecasts and upper-air forecasts in digital and/or pictorial form on a global basis to regional area forecast Centers, and direct to States by appropriate means as part of the aeronautical fixed service.

World Area Forecast System (WAFS). A worldwide system by which world and regional area forecast Centers provide aeronautical meteorological en-route forecasts in uniform standardized formats.

1.8 Terms used with a limited meaning

1.8.1 For the purpose of this manual, 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 “service” 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.

1.8.2 Abbreviations

A

ACC	Area Control Center
AFS	Aeronautical Fixed Service
AFTN	Aeronautical Fixed Telecommunication Network
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
ATS	Air Traffic Service

B

BKN	Broken

C

CAAP	Civil Aviation Authority of the Philippines
CAT	Category
CB	Cumulonimbus

D

D-ATIS	Data ATIS

F

FIR	Flight Information Region
FIC	Flight Information Center
Ft	Foot (feet)

H

hPa	Hectopascal

I

ICAO	International Civil Aviation Organization

K

Km	Kilometer(s)
Kt	Knots

M

M	Meter
Met	Meteorology/Meteorological
METAR	Aviation routine weather report
MOS	Manual of Standards

N

NSC	No Significant Cloud
NSW	No Significant Weather

O

OPMET	Operational Meteorological
OVC	Overcast

P

PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration (Meteorological Service Provider)

Q

QFE	Atmospheric pressure at aerodrome level
QNH	Observed Atmospheric pressure at aerodrome elevation corrected for temperature and reduced to mean sea level using the ICAO formula

R

RVR	Runway Visual Range

S

SADIS	Satellite Distribution System
SARP	Standards and Recommended Practices
SKC	Sky Clear

T

TCU	Towering Cumulus
TURB	Turbulence

U

UTC	Universal Co-coordinated Time

W

WAFC	World Area Forecast Center
WAFS	World Area Forecast System
WMO	World Meteorological Organization

CHAPTER 2-GENERAL PROVISIONS

2.1 Determination and Provision of Meteorological Service

2.1.1 The objective of meteorological service for international air navigation shall be to contribute towards the safety, regularity and efficiency of international air navigation.

2.1.2 This objective shall be achieved by supplying the following users: operators, flight crew members, air traffic services units, search and rescue services units, airport managements and others concerned with the conduct or development of international air navigation, with the meteorological information necessary for the performance of their respective functions.

2.1.3 PAGASA and the Civil Aviation Authority of the Philippines shall determine the meteorological service which it will provide to meet the needs of international air navigation. This determination shall be made in accordance with the provisions of this Manual of Standards (MOS) and with due regard to regional air navigation agreements; it shall include the determination of the meteorological service to be provided for international air navigation over international waters and other areas as may be necessary.

2.1.4 The meteorological service provider shall provide aeronautical meteorological services in accordance with the manual of standards. Published and as may be amended by the Authority.

2.2 Designation and approval of Aeronautical Meteorological Services Provider

2.2.1 PAGASA shall be designated and approved as the Aeronautical Meteorological Services Provider in accordance with the Philippine Civil Aviation Regulations, Part 3 to provide services for air navigation. Details of the approved meteorological service provider shall be included in the Aeronautical Information Publication GEN 3.5-1 – 3.5-7, in accordance with Annex 15, Appendix 1 GEN 3.5.

2.2.2 A Letter of Agreement shall be developed between the Civil Aviation Authority of the Philippines and PAGASA to operate and provide sufficient information as may be required by the authority.

2.2.3 The Letter of Agreement shall be reviewed, updated and if needed, renewed to ensure aeronautical meteorological service as required is provided to the authority.

2.2.4 The Letter of Agreement shall include the technical assistance of PAGASA maintenance personnel in terms of calibration, equipment maintenance and integrity of data. (To be agreed upon in the LOA or local MOA).

2.3 Qualifications and Training of Aeronautical Meteorological Personnel

2.3.1 An approved meteorological service provider shall comply with the requirements of the World Meteorological Organization in respect of qualifications and training of meteorological personnel providing service for international air navigation.

2.3.2 An aeronautical meteorological service provider shall ensure that practical training carried out by him or her or on his or her behalf complies with:

a) The standards and requirements set out in the manual of standards; and
b) The service provider's operations manual.

Note:— Requirements concerning qualifications and training of meteorological personnel in aeronautical meteorology are given in WMO Publication No.49, Technical Guidance Materials, Volume I-General Meteorological Standards and Recommended Practices, Education and Training.

2.4 Standards

2.4.1 Requirements and standards for the provision of aeronautical meteorological services shall be determined in accordance with the standards and recommended practices (SARPs) of the International Civil Aviation Organization (ICAO) and the guidance issued by the World Meteorological Organization (WMO).

2.5 Supply, Quality Assurance and use of Meteorological Information

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

2.5.2 In order to meet the objective of meteorological service for international air navigation, the approved meteorological service provider referred to in section 2 shall 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 the users listed in 2.1.2.

2.5.3 The quality system established in accordance with 2.5.2 should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards, and certified by an approved organization.

Note: — International Organization for Standardization (ISO) 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme.

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

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

2.5.6 Demonstration of compliance of the quality system applied should be by audit. If nonconformity of the system is identified, action should be initiated to determine and correct the cause. All audit observations should be evidenced and properly documented.

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

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

2.6 Notifications required from Operators

2.6.1 An operator requiring meteorological service or changes in existing meteorological service shall notify, sufficiently in advance, the meteorological service provider or the meteorological office(s) concerned. The minimum period of advance notice required shall be as agreed between the meteorological service provider or meteorological office(s) and the operator.

2.6.2 The aeronautical meteorological service provider shall be notified by the operator requiring service when:

a) new routes or new types of operations are planned;
b) changes of a lasting character are to be made in scheduled operations; and
c) other changes, affecting the provision of meteorological service, are planned.

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

2.6.4 The aerodrome meteorological office shall be notified by the operator or a flight crew member:

a) of flight schedules;
b) when non-scheduled flights are to be operated; and
c) when flights are delayed, advanced or cancelled.

2.6.5 The notification to the aeronautical meteorological service provider, of individual flights should contain the following information except that, in the case of scheduled flights, the requirement for some or all of this information may be waived by agreement between the meteorological office and the operator:

a) aerodrome of departure and estimated time of departure;
b) destination and estimated time of arrival;
c) route to be flown and estimated times of arrival at, and departure from, any intermediate 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 the visual or the 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.

2.7 Arrangement for Provision of Meteorological Services

2.7.1 The aerodrome operator shall be responsible for arranging the provision of weather observations and meteorological information to users.

2.7.2 At aerodromes with an Air Traffic Control unit, meteorological information shall be provided and utilized in accordance with ICAO PANS ATM Doc 4444. At aerodromes that do not have an ATC unit, the procedures for ensuring that meteorological information are made available to pilots and other users should be described locally.

2.7.3 Aeronautical meteorological information shall be used for flight planning purposes and to facilitate safe operation of aircraft in the take-off, en-route and landing phases of flight.

CHAPTER 3 - FUNCTIONS OF THE METEOROLOGICAL SERVICE PROVIDER

3.1 Aerodrome Meteorological Services

3.1.1 At aerodromes, the Meteorological Service Provider shall carry out all or some of the following functions as necessary to meet the needs of flight operations at the aerodrome:

a) Make routine meteorological observations at aerodromes at fixed intervals as provided in this manual;

b) Make special weather observations whenever specified changes occur in respect of surface wind, visibility, runway visual range, present weather, clouds and/or air temperature;

c) Prepare and /or obtain forecasts and other relevant information for aerodromes, flight information regions, routes and flights with which it is concerned;

d) Prepare landing forecast at all international aerodromes and/or any other aerodromes for which such is required;

e) Maintain a continuous survey of meteorological conditions over the aerodromes, flight information regions, and routes for which it is designated to prepare forecasts;

f) Perform weather watch and monitoring, including the ability to detect and forecast hazards relevant to the aviation community, in accordance with ICAO and WMO requirements;

g) Derive forecast and warning products to the standards required by the user community.

h) Communicate effectively with aeronautical users, including oral briefings to pilots and dispatchers as necessary; and

i) Tailor meteorological products and services to aviation operations, in accordance with local aviation procedures and regulatory requirements.

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

k) Supply other meteorological information to aeronautical users;

l) Display the available meteorological information; and

m) Exchange meteorological information with other meteorological offices.

Note: -The responsibilities of a Meteorological Observing Service Provider shall include (i) and any other services required in accordance with local aviation procedures and regulatory requirements.

3.1.2 Aerodrome meteorological offices should use as far as practicable output products of the world area forecast system in the preparation of flight documentation.

3.1.3 For aerodromes without meteorological offices, the meteorological service provider, ATS provider and the civil aviation authority shall establish means by which such information can be supplied to the aerodromes concerned.

3.2 Meteorological Watch Services

3.2.1 The meteorological service provider shall establish a meteorological watch office within each flight information region.

3.2.2 A meteorological watch office shall:

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) on request and in accordance with Chapter 6:

1) prepare AIRMET information related to its area of responsibility;
2) supply AIRMET information to associated air traffic services units; and
3) disseminate AIRMET information;

f) supply information received 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 and to aeronautical information service units, as agreed between the meteorological service provider and the civil aviation authority. The information shall comprise location, date and time of the accident, and forecast trajectories of the radioactive materials.

Note: — The information is provided, at the request of the meteorological service provider, by WMO regional specialized meteorological Centers for the provision of transport model products for radiological environmental emergency response.

3.2.3 The extent to which a meteorological watch office makes use of products from WAFCs and other sources shall be determined by the meteorological service provider.

3.2.4 The boundaries of the area over which meteorological watch is to be maintained by a meteorological watch office should, in so far as is practicable, be coincident with the boundaries of a flight information region or a control area or a combination of flight information regions and/or control areas.

3.2.5 Meteorological watch should 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.

3.3 Agreement between Air Traffic Service providers and Meteorological Service Providers

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

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

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

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

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

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

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

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

CHAPTER 4-METEOROLOGICAL OBSERVATIONS AND REPORTS

4.1 General provisions related to Meteorological Observations

4.1.1 At certified aerodromes, the aerodrome operator shall arrange for the establishment of aeronautical meteorological stations and the provision of meteorological information to users.

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

4.1.3 At aerodromes with runways intended for precision approach and landing operations, automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, runway visual range and cloud height shall be installed to support approach and landing and take-off operations. These devices shall be integrated automatic systems for acquisition, processing, dissemination and display in real time of the meteorological parameters affecting landing and take-off operations. The design of these systems shall observe Human Factors principles. Provision shall be made for the manual insertion of meteorological parameters in case of failure of the integrated automatic systems.

Note 1: — Categories of precision approach and landing operations are defined in ICAO Annex 6, Part I.

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

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

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

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

4.2 General requirements for Meteorological observing equipment

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

Note.— Specifications concerning the siting and construction of equipment and installations on operational areas, aimed at reducing the hazard to aircraft to a minimum, are contained in ICAO Annex 14, Volume I, Chapter 8.

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

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

4.2.4 The aeronautical meteorological personnel carrying out observations at the aerodrome should be provided with a workplace from which a clear view over the whole aerodrome operating area is available either from a window or open area adjoining the technician's work position.

4.2.5 Meteorological observing equipment shall provide an accurate source of meteorological information to aid in the safe and expeditious flow of civil air traffic.

4.2.6 The Aeronautical Meteorological Service Provider should ensure that appropriate consideration and provision for service continuity of observing equipment has been made, including any necessary support facilities, such as backup power supply etc.

4.2.7 Instruments should be positioned in such a manner that allows them to measure meteorological elements free of other influences.

4.3 Routine observations and reports

4.3.1 At aerodromes, routine observations shall be made and reported at half-hourly or hourly intervals in accordance with 4.3.2 during the operational hours of the aerodromes.

Note: -Accurate, timely and complete aerodrome meteorological observations are necessary to support safe and efficient air navigation.

4.3.2 Two types of aerodrome meteorological observations shall be provided.

a) **Local routine reports**. These reports shall be prepared at half-hourly intervals and transmitted to local air traffic services (ATS) units and other users at the aerodrome.

b) **A meteorological aerodrome report (METAR).** These reports shall be prepared at hourly intervals and disseminated beyond the aerodrome of departure to pilots and other meteorological offices.

4.3.3 Where an aerodrome is closed for more than 24 hours, METAR shall be produced before the aerodrome resumes operations, unless otherwise agreed between the meteorological service provider and the civil aviation authority.

4.4 Special observations and reports

4.4.1 When required as a result of specified operationally significant changes in the meteorological conditions, special observations and reports shall be made whenever such changes occur between routine observations.

4.4.2 A list of criteria for special observations shall be established by the meteorological service provider, in consultation with the ATS provider, operators and others concerned (see 4.7 for the list of criteria).

4.4.3 Reports of special observations shall be issued as:

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

b) SPECI for dissemination to other aerodromes beyond the aerodrome of origin (mainly intended for flight planning, VOLMET broadcasts and DVOLMET) unless when METAR is issued at half-hourly intervals.

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

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

4.5 Contents of Meteorological reports

4.5.1 Local routine and special reports and METAR and SPECI shall contain the under listed items of information in the order indicated:

a) Identification of the type of report;
b) Location indicator;
c) Time of Observation, in UTC ;
d) Identification of an automated or missing report, when applicable;
e) Surface wind direction and speed (including variations in direction);
f) Visibility* -see note;
g) Runway visual range (where applicable and equipment/procedures have been approved)* -see note;
h) Present weather* -see note;

i) Cloud amount (and type, if applicable) and height of base* -see note;
j) Air temperature and dew point temperature;
k) QNH and, where applicable QFE;
l) Supplementary information (e.g. additional remarks/information from technician, controller or pilot report).

Note: -Asterisked elements are included as necessary. The term CAVOK may replace visibility, present weather and cloud information under certain conditions (see 5.3.6).

4.6 Format of Meteorological reports

4.6.1 Local routine and special reports shall be issued in abbreviated plain language, in accordance with the template shown in CAR-ANS Part 3, Appendix 3.3, Example A3.3-1.

4.6.2 METAR and SPECI shall be issued in accordance with the template shown in CAR-ANS Part 3, Appendix 3.3, Example A3.3-1 and disseminated in the METAR and SPECI code forms prescribed by the World Meteorological Organization.

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

4.7 Criteria for issuance of Local Special Reports and SPE

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

a) those values which most closely correspond with the operating minima of the operators using the aerodrome;
b) those values which satisfy other local requirements of the air traffic services units and of the operators;
c) an increase in air temperature of 2°C or more from that given in the latest report, or an alternative threshold value as agreed between the meteorological service provider, the ATS unit and operators concerned;
d) the available supplementary information concerning the occurrence of significant meteorological conditions in the approach and climb-out areas.;
e) those values which constitute criteria for SPECI.

4.7.2 Selected special reports-SPECI should be issued whenever changes in accordance with the following criteria occur:

a) Surface wind

1) when the mean surface wind direction has changed by 60° or more from that given in the latest report the mean speed before and/or after the change being 20 km/h (10 kt) or more;

2) when the mean surface wind speed has changed by 20 km/h (10 kt) or more from that given in the latest report;

3) when the variation from the mean surface wind speed (gusts) has increased by 20 km/h (10 kt) or more from that given in the latest report, the mean speed before and/or after the change being 30 km/h (15 kt) or more;

4) when the wind changes through values of operational significance as required by the operators.

b) Visibility

1) when the visibility is improving and changes to or passes through one or more of the following values, or when the visibility is deteriorating and passes through one or more of the following values:

- 800, 1 500 or 3 000m; and
- 5000m, in cases where significant numbers of flights are operated in accordance with the visual flight rules;

2) when the runway visual range is improving and changes to or passes through one or more of the following values, or when the runway visual range is deteriorating and passes through one or more of the following values:

- 150, 350, 600 or 800 m.

c) Present weather

1) when the onset, cessation or change in intensity of any of the following weather phenomena or combinations thereof occurs:

moderate or heavy precipitation (including showers thereof)

2) when the onset or cessation of any of the following weather phenomena or combinations thereof occurs:

fog
thunderstorm (with or without precipitation)
squall
funnel cloud (tornado or waterspout);

d) Cloud

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

30, 60, 150 or 300 m (100, 200, 500 or 1 000 ft); and
450m (1 500 ft), in cases where significant numbers of flights are operated in accordance with the visual flight rules;

2) when the amount of a cloud layer below 450m (1 500 ft) changes:

from SKC, FEW or SCT to BKN or OVC; or
from BKN or OVC to SKC, FEW or SCT; and

when the sky is obscured and the vertical visibility is improving and changes to or passes through one or more of the following values, or when the vertical visibility is deteriorating and passes through one or more of the following values: 30, 60, 150 or 300 m (100, 200, 500 or 1,000 ft).

CHAPTER 5 -TECHNICAL SPECIFICATIONS FOR METEOROLOGICAL REPORTS

5.1 METAR and SPECI

5.1.1 METAR and SPECI shall be disseminated to other aerodrome meteorological offices where necessary.

5.1.2 METAR and SPECI shall be disseminated to international OPMET data banks and the Centers designated by regional air navigation agreement for the operation of aeronautical fixed service satellite distribution systems, in accordance with regional air navigation agreement.

5.1.3 SPECI representing deterioration in conditions should be disseminated immediately after the observation. A SPECI representing an improvement in conditions should be disseminated only after the improvement has been maintained for 10 minutes; it should be amended before dissemination, if necessary, to indicate the conditions prevailing at the end of that 10-minute period. A SPECI representing a deterioration of one weather element and an improvement in another element should be disseminated immediately after the observation.

5.2 Local Routine and Special Reports

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

5.2.2 Local special reports shall be transmitted to local air traffic services (ATS) units as soon as the specified conditions occur.

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

5.3 Observing and reporting of Meteorological elements

5.3.1 Surface wind

5.3.1.1 Siting

5.3.1.1.1 Surface wind should be observed at a height of approximately 10 m (30 ft) above the runway(s).

5.3.1.1.2 Representative surface wind observations should be obtained by the use of sensors appropriately sited. Sensors for surface wind observations for local routine and special reports should be sited to give the best practicable indication of conditions

along the runway and touchdown zones. At aerodromes where topography or prevalent weather conditions cause significant differences in surface wind at various sections of the runway, additional sensors should be provided.

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

Note.— Since, in practice, the surface wind cannot be measured directly on the runway, surface wind observations for take-off and landing are expected to be the best practicable indication of the winds which an aircraft will encounter during takeoff and landing.

5.3.1.2 Displays

5.3.1.2.1 Surface wind displays relating to each sensor shall be located in the meteorological station with corresponding displays in the appropriate air traffic services (ATS) units. The displays in the meteorological station and in the air traffic services (ATS) units shall relate to the same sensors, and where separate sensors are required, the displays shall be clearly marked to identify the runway and section of runway monitored by each sensor.

5.3.1.2.2 The mean values of, and significant variations in, the surface wind direction and speed for each sensor should be derived and displayed by automated equipment.

5.3.1.3 Averaging

5.3.1.3.1 The averaging period for surface wind observations shall be:

a) 2 minutes for local routine and special reports and for wind displays in air traffic services units; and

b) 10 minutes for METAR and SPECI, except that when the 10-minute period includes a marked discontinuity in the wind direction and/or speed, only data occurring since the discontinuity shall be used for obtaining mean values, hence the time interval in these circumstances should be correspondingly reduced.

Note.— A marked discontinuity occurs when there is an abrupt and sustained change in wind direction of 30° or more, with a wind speed of 20 km/h (10 kt) before or after the change, or a change in wind speed of 20 km/h (10 kt) or more, lasting at least 2 minutes.

5.3.1.3.2 The averaging period for measuring variations from the mean wind speed (gusts) reported in accordance with 5.3.1.3.1 should be 3 seconds for local routine and special reports and for METAR and SPECI and for wind displays used for depicting variations from the mean wind speed (gusts) in air traffic services units.

5.3.1.4 Reporting

5.3.1.4.1 The mean direction and the mean speed of the surface wind should be measured, as well as significant variations of the wind direction and speed, and reported in degrees true north and knots respectively.

5.3.1.4.2 In local routine and special reports and in METAR and SPECI, the surface wind direction and speed shall be reported in steps of 10 degrees true north and 1 knot, respectively. Any observed value which does not fit the reporting scale in use shall be rounded to the nearest step in the scale.

5.3.1.4.3 In local routine and special reports and in METAR and SPECI:

a) the units of measurement used for the wind speed shall be indicated;

b) variations from the mean wind direction during the past 10 minutes shall be reported as follows, if the total variation is 60° or more:

1) when the total variation is between 60° and 180° and the wind speed is 3 kt or more such directional variations shall be reported as the two extreme directions between which the surface wind has varied;

2) when the total variation is between 60° and 180° and the wind speed is less than 3kt, the wind direction shall be reported as variable with no mean wind direction; or

3) when the total variation is 180° or more, the wind direction shall be reported as variable with no mean wind direction;

c) variations from the mean wind speed (gusts) during the past 10 minutes shall be reported when the maximum wind speed exceeds the mean speed by 10 kt or more;

d) when a wind speed of less than 1 kt is reported, it shall be indicated as calm;

e) when a wind speed of 100 kt or more is reported, it shall be indicated to be more than 99 kt; and

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

5.3.1.4.4 In local routine and special reports:

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

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

c) when variations from the mean wind direction are reported, the two extreme directions between which the surface wind has varied shall be reported; and

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

5.3.1.4.5 In METAR and SPECI, when variations from the mean wind speed (gusts) are reported, the maximum value of the wind speed attained shall be reported.

5.3.2 Visibility

5.3.2.1 Siting

5.3.2.1.1 The visibility should be measured at a height of approximately 2.5 m (7.5 ft) above the runway.

5.3.2.1.2 The Visibility observations for local routine and special reports should give the best practicable indications of visibility along the runway and touchdown zone.

5.3.2.1.3 Where observations are made using automatic observing equipment, provision should be made for manual insertion of the visibility value(s) in the corresponding displays.

5.3.2.1.4 For METAR/SPECI the visibility observations should be representative of the aerodrome.

5.3.2.2 Reporting

5.3.2.2.1 The visibility as defined shall be measured or observed and reported in meters or kilometers.

5.3.2.2.2 In local routine and special reports and METAR and SPECI, the visibility shall be reported in steps of 50m when the visibility is less than 800m; in steps of 100m, when it is 800m or more but less than 5km; in kilometer steps, when the visibility is 5km or more but less than 10km; and it shall be given as 10 km when the visibility is 10km or more, except when the conditions for the use of CAVOK apply. Any observed value which does not fit the reporting scale in use shall be rounded down to the nearest lower step in the scale.

Note: — Specifications concerning the use of CAVOK are given in 5.3.6.

5.3.2.2.3 In local routine and special reports, visibility along the runway(s) shall be reported together with the units of measurement.

5.3.2.2.4 In METAR and SPECI, visibility should be reported as prevailing visibility. When the visibility is not the same in different directions and

a) when the lowest visibility is different from the prevailing visibility, and less than 500 m or less than 50 per cent of the prevailing visibility, the lowest visibility observed should also be reported and its general direction in relation to the aerodrome indicated by reference to one of the eight points of the compass. If the lowest visibility is observed in more than one direction, then the most operationally significant direction should be reported; and

b) when the visibility is fluctuating rapidly, and the prevailing visibility cannot be determined, only the lowest visibility should be reported, with no indication of direction.

5.3.3 Runway visual range

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

5.3.3.2 Runway visual range as defined should be assessed on all runways intended for use during periods of reduced visibility.

5.3.3.3 The runway visual range shall be reported in meters throughout periods when either the visibility or the runway visual range is less than 1 500m.

5.3.3.4 Runway visual range assessments shall be representative of:

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

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

5.3.3.5 Where automated equipment is used for assessing RVR at an aerodrome, the units providing air traffic service and aeronautical information service for that aerodrome shall be kept informed without delay of changes in the serviceability status of the automated equipment.

5.3.4 Present weather

5.3.4.1 Siting

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

5.3.4.1.2 For METAR and SPECI, the present weather information should be representative of conditions at the aerodrome including thunderstorm in its vicinity.

5.3.4.2 Reporting

5.3.4.2.1 The present weather occurring at the aerodrome and/or its vicinity should be observed and reported as necessary.

5.3.4.2.2 The following present weather phenomena shall be identified, as a minimum: precipitation and freezing precipitation (including intensity thereof), fog, freezing fog and thunderstorms (including thunderstorms in the vicinity).

5.3.4.2.3 In local routine and special reports, observed present weather phenomena shall be reported in terms of type and characteristics and qualified with respect to intensity, as appropriate.

5.3.4.2.4 In METAR and SPECI, observed present weather phenomena shall be reported in terms of type and characteristics and qualified with respect to intensity or proximity to the aerodrome, as appropriate.

5.3.4.2.5 In local routine and special reports and in METAR and SPECI, the following types of present weather phenomena should be reported, using their respective abbreviations and relevant criteria, as appropriate:

Precipitation

Drizzle DZ
Rain RA Reported only when associated visibility is 5000 m or less.
Hail GR Reported when diameter of largest hailstones is 5 mm or more.

Obscurations (hydrometeors)

Fog FG Reported when visibility is less than 1000m, except when qualified by "MI" (Shallow),
"BC" (Patches),
"PR" (Partial) or "VC" (Vicinity).
Mist BR Reported when visibility is at least 1000m but not more than 5000m;

Obscurations (lithometeors)

The following should be used only when the obscuration consists predominantly of lithometeors and the visibility is 5000m or less.

Haze HZ
Smoke FU

Other phenomena

Squall
Funnel Cloud (tornado or water sprout) FC

5.3.4.2.6 In local routine and special reports and in METAR and SPECI, the following characteristics of present weather phenomena, as necessary, should be reported, using their respective abbreviations and relevant criteria, as appropriate:

Thunderstorm TS

- Used to report a thunderstorm with rain "TSRA", hail "TSGR". When thunder is heard or lightning is detected at the aerodrome during the 10-minute period preceding the time of observation but no precipitation is observed at the aerodrome, the abbreviation "TS" should be used without qualification.

Shower SH

- Used to report showers of rain "SHRA" and hail "SHGR". Showers observed in the vicinity of the aerodrome should be reported as "VCSH" without qualification regarding type or intensity of precipitation.

5.3.4.2.7 In local routine and special reports and in METAR and SPECI, the relevant intensity or, as appropriate, the proximity to the aerodrome of the reported present weather phenomena should be indicated as follows:

(Local routine and METAR and SPECI special reports)
Light FBL
Moderate MOD no indication
Heavy HVY +

Used only with DZ, GR, RA or in combinations involving these cases, intensity refers to precipitation. These present weather types; in DS and SS (in the cases of DS and SS, only moderate and heavy intensities to be indicated).

5.3.4.2.8 In local routine and special reports and in METAR and SPECI, one or more up to a maximum of three of the present weather abbreviations and should be used, as necessary, together with an indication, where appropriate, of the characteristics and intensity or proximity to the aerodrome, so as to convey a complete description of the present weather of significance to flight operations. In reporting this information, the indication of intensity or proximity as appropriate, should be reported first followed respectively by the characteristics and the type of weather phenomena. Where two different types of weather are observed, they should be reported in two separate groups, where the intensity or proximity indicator refers to the weather phenomenon which follows the indicator. However, different types of precipitation occurring at the time of observation should be reported as one single group with the dominant type of precipitation reported first and preceded by only one intensity qualifier which refers to the intensity of the total precipitation.

5.3.5 Clouds

5.3.5.1 Siting

5.3.5.1.1 Cloud observations for local routine and special reports should be representative of the approach area.

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

5.3.5.2 Reference level

5.3.5.2.1 The height of cloud base should normally be reported above aerodrome elevation. When a precision approach runway is in use which has a threshold elevation 15 m (50 ft) or more below the aerodrome elevation, local arrangements should be made in order that the height of cloud bases reported to arriving aircraft should refer to the threshold elevation.

5.3.5.3 Reporting

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

of cloud amount, cloud type and height of cloud base. The height of cloud base and vertical visibility shall be reported in meters.

5.3.5.3.2 In local routine and special reports and in METAR and SPECI:

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

b) cumulonimbus clouds and towering cumulus clouds should be indicated as "CB" and "TCU", respectively;

c) the height of cloud base should be reported in steps of 30 m (100 ft) up to 3 000m (10 000ft) and in steps of 300m (1 000ft) above 3 000m (10 000ft);

d) the vertical visibility should be reported in steps of 30m (100ft) up to 600m (2 000ft);

e) if there are no clouds and no restriction on vertical visibility and the abbreviation "CAVOK" is not appropriate, the abbreviation "SKC" should be used;

f) if there are no clouds of operational significance, no cumulonimbus and no restriction on vertical visibility and the abbreviations "CAVOK" and "SKC" are not appropriate, the abbreviation "NSC" should be used;

g) when several layers or masses of cloud of operational significance are observed, their amount and height of cloud base should be reported in increasing order of the height of cloud base, and in accordance with the following criteria:

1) the lowest layer or mass, regardless of amount to be reported as FEW, SCT, BKN or OVC as appropriate;

2) the next layer or mass, covering more than 2/8 to be reported as SCT, BKN or OVC as appropriate;

3) the next higher layer or mass, covering more than 4/8 to be reported as BKN or OVC as appropriate; and

4) cumulonimbus and/or towering cumulus clouds, whenever observed and not reported in 5.3.5.3.2, g) 1.) to 3.);

h) when the cloud base is diffused or ragged or fluctuating rapidly, the minimum height of cloud base, or cloud fragments, should be reported; and

i) when an individual layer (mass) of cloud is composed of cumulonimbus and towering cumulus clouds with a common cloud base, the type of cloud should be reported as cumulonimbus only.

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

5.3.5.4 In local routine and special reports:

a) the units of measurement used for the height of cloud base and vertical visibility shall be indicated; and

b) when there is more than one runway in use and the heights of cloud bases are observed by instruments for these runways, the available heights of cloud bases for each runway shall be reported and the runways to which the values refer shall be indicated.

5.3.6 Use of CAVOK:

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

a) visibility, 10km or more;
b) No cloud below 1500m (5000 feet) or below the Minimum Sector Altitude (whichever is the greater);
c) No cumulonimbus cloud (CB);
d) No significant weather at or in the vicinity of the aerodrome;

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

Note: -Example -CAVOK should be used when the meteorological visibility is 20 kilometers, there is no weather and there is broken cloud (5-7 oktas) at 1500m (5000 feet).

5.3.7 Air temperature and dew-point temperature

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

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

5.3.7.3 In local routine and special reports and in METAR and SPECI, the air temperature and the dew-point temperature shall be reported in steps of whole degrees Celsius. Any observed value which does not fit the reporting scale in use shall be rounded to the nearest whole degree Celsius, with observed values involving 0.5˚ rounded up to the next higher whole degree Celsius.

5.3.7.4 In local routine and special reports and in METAR and SPECI, a temperature below 0°C shall be identified by MS (minus).

5.3.8 Atmospheric pressure

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

5.3.8.1 Reference level

5.3.8.1.1 The reference level for the computation of QFE shall be the aerodrome elevation.

5.3.8.2 Reporting

5.3.8.2.1 For local routine and special reports and in METAR and SPECI, QNH and QFE shall be computed in tenths of hectopascals and reported therein in steps of whole hectopascals, using four digits. Any observed value which does not fit the reporting scale in use shall be rounded down to the nearest lower whole hectopascal.

5.3.8.2.2 In local routine and special reports:

a) QNH shall be included;
b) QFE shall be included on request;
c) the units of measurement used for QNH and QFE values shall be included; and
d) if QFE values are required for more than one runway, the required QFE values for each runway shall be reported and the runways to which the values refer shall be indicated.

5.3.8.2.3 In METAR and SPECI, only QNH values shall be included.

5.3.9 Supplementary information

5.3.9.1 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.

5.3.9.2 Reporting

5.3.9.2.1 In local routine and special reports and in METAR and SPECI, the following recent weather phenomena, i.e. weather phenomena observed at the aerodrome during the period since the last issued routine report or last hour, whichever is the shorter, but not at the time of observation, should be reported, up to a maximum of three groups, in te supplementary information:

moderate or heavy precipitation REDZ, RERA, RESHGS (including showers thereof) RESHRA,

thunderstorm RETS

5.3.9.2.2 In local routine and special reports, the following significant meteorological conditions, or combinations thereof, should be reported in supplementary information:

cumulonimbus clouds CB
thunderstorm TS
moderate or severe turbulence MOD TURB, SEV TURB
wind shear WS
hail GR
severe squall line SEV SQL
severe mountain waves SEV MTW

5.3.9.2.3 The location of the condition should be indicated. Where necessary, additional information should be included using abbreviated plain language.

5.3.9.2.4 In METAR and SPECI, where local circumstances so warrant, information on wind shear should be added.

5.4 Meteorological Information from Automatic Observing Systems

5.4.1 METAR and SPECI from automatic observing systems should be used by the meteorological service provider in a position to do so during non-operational hours of the aerodrome, and during operational hours of the aerodrome.

5.4.2 METAR and SPECI from automatic observing systems shall be identified with the word ‘’AUTO’’

5.5 Aircraft Observations

5.5.1 Where practicable, at aerodromes open to international flight operations, the meteorological service provider shall make arrangements with the ATS provider to ensure that, on receipt by the ATS units of routine and special air-reports by voice communications or data link communication from aircraft observations, the ATS units relay them without delay to their associated meteorological office and/or WAFCs.

Note-: Special reports of wind shear and turbulence during climb-out and approach are especially important, since no satisfactory method of observing these phenomena from the ground is available at this time. Measures should be taken to ensure that special air-reports messages are forwarded to other aircraft likely to be affected.

5.5.2 The following aircraft observations shall be made:

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

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

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

5.5.4 When voice communications are used, routine observations shall be made during the en-route phase in relation to those air traffic services reporting points or intervals:

a) at which the applicable air traffic services procedures require routine position reports; and

b) which are those separated by distances corresponding most closely to intervals of one hour of flying time.

5.5.5 In the case of the requirement to report during the climb out phase, an aircraft shall be designated at approximately hourly intervals, at each aerodrome to make routine observations in accordance with 5.5.3

5.5.6 When voice communications are used, an aircraft shall be exempted from making the routine observations specified in 5.5.4 when:

a) the aircraft is not equipped with RNAV equipment; or
b) the flight duration is 2 hours or less; or
c) the aircraft is at a distance equivalent to less than 1 hour of flying time from the next intended point of landing; or
d) the altitude of the flight path is below 1500m (5000ft).

5.5.7 When voice communications are used, additional exceptions may be prescribed by regional air navigation agreement for flights over routes and areas with high density air traffic and/or with adequate synoptic networks. Such procedures would take the form of exemption or designation procedures and would:

a) make it possible for the minimum requirements for aircraft observations of all meteorological offices concerned to be met; and

b) be as simple as possible to implement and preferably not involving consideration of individual cases.

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

a) severe turbulence; or
b) 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) volcanic ash cloud; or

g) pre-eruption volcanic activities or a volcanic eruption; or

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

h) smell of sulphur, without visible volcanic ash present, unless an alternate source of the smell is obvious.

Note: -The smell of sulphur with no associated sign of volcanic ash may still be an indication of volcanic ash.

5.5.9 When other meteorological conditions not listed under 5.5.8 e.g. wind shear, are encountered and which, in the opinion of the pilot in command may affect the safety or markedly affect the efficiency of other aircraft operations, the pilot in command shall advise the appropriate ATS unit as soon as practicable.

5.5.10 Aircraft observations shall be reported by air-ground data link. Where air-ground data link is not available or appropriate, aircraft observations during the flight shall be reported by voice communication.

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

5.5.12 Aircraft observations shall be reported as air-report.

5.5.13 The meteorological authority concerned shall make arrangement with the appropriate ATS authority to ensure that, on receipt by the ATS unit of:

a) routine and special air-report by voice communications, the ATS unit relay them without delay to their associated meteorological watch office;

b) routine air-report by data link communications, the ATS unit relay them without delay to WAFCs; and

c) special air-report by data link communications, the ATS unit relay them without delay to their associated meteorological watch office and WAFCs.

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

CHAPTER 6 -AERONAUTICAL METEOROLOGICAL FORECASTS

6.1 General

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

6.1.2 The issue of a new forecast by a meteorological office, such as a routine aerodrome forecast, shall be understood to cancel automatically any forecast of the same type previously issued for the same place and for the same period of validity or part thereof as soon as the validity period of the new forecast has commenced.

6.2 Aerodrome Forecasts

6.2.1 General

6.2.1.1 An aerodrome forecast shall be prepared by the meteorological office designated by the meteorological service provider.

6.2.1.2 An aerodrome forecast shall be issued at a specified time and consist of a concise statement of the expected meteorological conditions at an aerodrome for a specified period.

6.2.1.3 Aerodrome forecasts and amendments thereto shall be issued as TAF and include the following 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.

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

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

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

6.2.1.6 TAF that cannot be kept under continuous review shall be cancelled.

6.2.1.7 Routine TAF should be issued every 6 hours and the period of validity should be 24 hours.

6.2.2 TAF format

6.2.2.1 TAF shall be issued in accordance with the template shown in CAR-ANS Part 3, Appendix 3.5, Table A5-1 and disseminated in the TAF code form prescribed by the World Meteorological Organization.

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

6.2.2.2 Meteorological offices shall not issue more than one TAF covering the same period of validity.

6.2.3 Inclusion of meteorological elements in TAF

Note.-Guidance on operationally desirable accuracy of forecasts is given in CAR-ANS Part 3, Attachment B.

6.2.3.1 Surface wind

6.2.3.1.1 In forecasting surface wind, the expected prevailing direction should be given. When it is not possible to forecast a prevailing surface wind direction due to its expected variability, for example, during light wind conditions (less than 6 km/h (3kt)) or thunderstorms, the forecast wind direction should be indicated as variable using "VRB". When the wind is forecast to be less than 2 km/h (1kt) the forecast wind speed should be indicated as calm. When the forecast maximum speed (gust) exceeds the forecast mean wind speed by 20km/h (10kt) or more, the forecast maximum wind speed should be indicated. When a wind speed of 200km/h (100kt) or more is forecast, it should be indicated to be more than 199 km/h (99kt).

6.2.3.2 Visibility

6.2.3.2.1 When the visibility is forecast to be less than 800 m it should be expressed in steps of 50 m; when it is forecast to be 800 m or more but less than 5 km, in steps of 100 m; 5 km or more but less than 10 km in kilometre steps and when it is forecast to be 10 km, or more it should be expressed as 10 km, except when conditions of CAVOK are forecast to apply. The prevailing visibility should be forecast. When

visibility is forecast to vary in different directions and the prevailing visibility cannot be forecast, the lowest forecast visibility should be given.

6.2.3.3 Weather phenomena

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

- moderate or heavy precipitation (including showers thereof)
- thunderstorm (with or without precipitation)
- squall

other weather phenomena only if they are expected to cause a significant change in visibility.

6.2.3.4 The expected end of occurrence of those phenomena should be indicated by the abbreviation "NSW".

6.2.4 Cloud

6.2.4.1 Cloud amount should be forecast using the abbreviations "FEW", "SCT", "BKN" or "OVC" as necessary. If no clouds are forecast, and the abbreviation "CAVOK" is not appropriate, the abbreviation "SKC" should be used. When it is expected that the sky will remain or become obscured and clouds cannot be forecast and information on vertical visibility is available at the aerodrome, the vertical visibility should be forecast in the form "VV" followed by the forecast value of the vertical visibility. When several layers or masses of cloud are forecast, their amount and height of base should be included in the following order:

a) the lowest layer or mass regardless of amount, to be forecast as FEW, SCT, BKN or OVC as appropriate;

b) the next layer or mass covering more than 2/8, to be forecast as SCT, BKN or OVC as appropriate;

c) the next higher layer or mass covering more than 4/8, to be forecast as BKN or OVC as appropriate; and

d) cumulonimbus clouds, whenever forecast and not already included under a) to c).

6.2.4.1.1 Cloud information should be limited to cloud of operational significance, i.e. cloud below 1 500 m (5 000 ft) or the highest minimum sector altitude whichever is greater, and cumulonimbus whenever forecast. In applying this limitation, when no cumulonimbus and no cloud below 1 500 m (5 000 ft) or below the highest minimum sector altitude whichever is greater are forecast, and "CAVOK" or "SKC" are not appropriate, the abbreviation "NSC" should be used.

6.2.4.2 Temperature

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

6.2.4.3 Use of change groups

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

a) when the surface wind is forecast to change through values of operational significance the threshold values should be established by the meteorological service provider in consultation with the appropriate Air traffic services (ATS) unit and operators concerned, taking into account changes in the wind which would:

1) require a change in runway(s) in use; and

2) indicate that the runway tailwind and crosswind components will change through values representing the main operating limits for typical aircraft operating at the aerodrome;

b) when the visibility is forecast to improve and change to or pass through one or more of the following values, or when the visibility is forecast to deteriorate and pass through one or more of the following values:

1) 150, 350, 600, 800, 1 500 or 3 000m; or

2) 5 000m in cases where significant numbers of flights are operated in accordance with the visual flight rules;

c) when any of the following weather phenomena or combinations thereof are forecast to begin or end or change in intensity:

moderate or heavy precipitation (including showers thereof)

— other weather phenomena given in 5.3.4.2.5 only if they are expected to cause a significant change in visibility;

d) when the onset or cessation of any of the following weather phenomena or combinations thereof are forecast to begin or end:

thunderstorm (with or without precipitation)
squall

e) when the height of base of the lowest layer or mass of cloud of BKN or OVC extent is forecast to lift and change to or pass through one or more of the following values, or when the height of the lowest layer or mass of cloud of BKN or OVC extent is forecast to lower and pass through one or more of the following values:

1) 30, 60, 150 or 300 m (100, 200, 500 or 1 000 ft); or
2) 450 m (1 500 ft), in cases where significant numbers of flights are operated in accordance with the visual flight rules;

f) when the amount of a layer or mass of cloud below 450 m (1 500 ft) is forecast to change:

1) from SKC, FEW or SCT to BKN or OVC; or
2) from BKN or OVC to SKC, FEW or SCT;

g) when cumulonimbus clouds are forecast to develop or dissipate;

h) when the vertical visibility is forecast to improve and change to or pass through one or more of the following values, or when the vertical visibility is forecast to deteriorate and pass through one or more of the following values:

1) 30, 60, 150 or 300 m (100, 200, 500 or 1 000 ft); and
2) any other criteria based on local aerodrome operating minima, as agreed between the meteorological service provider and the operators.

6.2.4.3.2 When a change in any of the combinations thereof are forecast to begin or end or elements given in 6.2.1.3 (g to j) is required to be indicated in accordance with the criteria given in 6.2.4.3.1, the change indicators "BECMG" or "TEMPO" should be used followed by the time period during which the change is expected to occur. The time period should be indicated as the beginning and end of the period in whole hours UTC. Only those elements for which a significant change is expected should be included following a change indicator. However, in the case of significant changes in respect of cloud, all cloud groups, including layers or masses not expected to change should be indicated.

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

6.2.4.3.4 The change indicator "TEMPO" and the associated time group should be used to describe expected frequent or infrequent temporary fluctuations in the meteorological conditions which reach or pass specified threshold values and last for a period of less than one hour in each instance and, in the aggregate, cover less than one-half of the forecast period during which the fluctuations are expected to occur. If the temporary fluctuation is expected to last one hour or longer, the change group "BECMG" should be used in accordance with 6.2.4.3.1 or the validity period should be subdivided in accordance with 6.2.4.3.5.

6.2.4.3.5 Where one set of prevailing weather conditions is expected to change significantly and more or less completely to a different set of conditions, the period of validity should be subdivided into self-contained periods using the abbreviation "FM" followed immediately by a four-figure time group in whole hours and minutes UTC

indicating the time the change is expected to occur. The subdivided period following the abbreviation "FM" should be self-contained and all forecast conditions given before the abbreviation should be superseded by those following the abbreviation.

6.2.4.4 Use of probability groups

6.2.4.4.1 The probability of occurrence of an alternative value of a forecast element or elements should be indicated, as necessary, by use of the abbreviation "PROB" followed by the probability in tens of per cent and the time period during which the alternative value(s) is (are) expected to apply. The probability information should be placed after the element or elements forecast and be followed by the alternative value of the element or elements. The probability of a forecast of temporary fluctuations in meteorological conditions should be indicated, as necessary, by use of the abbreviation "PROB" followed by the probability in tens of per cent, placed before the change indicator "TEMPO" and associated time group. A probability of an alternative value or change of less than 30 per cent should not be considered sufficiently significant to be indicated. A probability of an alternative value or change of 50 per cent or more, for aviation purposes, should not be considered a probability but instead should be indicated, as necessary, by use of the change indicators "BECMG" or "TEMPO" or by subdivision of the validity period using the abbreviation "FM". The probability group should not be used to qualify the change indicator "BECMG" nor the time indicator "FM".

6.2.4.5 Numbers of change and probability groups

6.2.4.5.1 The numbers of change and probability groups should be kept to a minimum and should not normally exceed five groups.

6.2.4.6 Dissemination of TAF

6.2.4.6.1 TAF and amendments thereto shall be disseminated to international OPMET data banks and the Centers designated by regional air navigation agreement for the operation of aeronautical fixed service satellite distribution systems, in accordance with regional air navigation agreement.

6.3 Landing Forecast

6.3.1 Format of landing forecasts

6.3.1.1 A landing forecast shall be prepared by the meteorological office designated by the Civil Aviation Authority as determined by regional air navigation agreement; such forecasts are intended to meet requirements of local users and of aircraft within about 1 hr flying time from the aerodrome.

6.3.1.2 Landing forecasts shall be prepared in the form of a trend forecast.

6.3.1.3 A trend forecast shall consist of a concise statement of the expected significant changes in the meteorological conditions at the aerodrome to be appended to a local

routine or local special or a METAR or SPECI. The period of validity of a trend forecast shall be 2 hrs from the time of the report which forms part of the landing forecast.

Note:-Trend forecasts shall be issued in accordance with the templates shown in ICAO Annex 3, Appendix 3, Table A3-1. The units and scales used in the trend forecast shall be the same as those used in the report to which it is appended.

6.3.2 Inclusion of meteorological elements in trend forecasts

6.3.2.1 General provisions

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

6.3.2.2 Surface wind

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

a) a change in the mean wind direction of 60° or more, the mean speed before and/or after the change being 10 kt or more;

b) a change in mean wind speed of 10 kt or more; and

c) changes in the wind through values of operational significance. The threshold values should be established by the meteorological service provider in consultation with the air traffic services (ATS) unit and operators concerned, taking into account changes in the wind which would:

1) require a change in runway(s) in use; and

2) indicate that the runway tailwind and crosswind components will change through values representing the main operating limits for typical aircraft operating at the aerodrome.

6.3.2.3 Visibility

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

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

6.3.2.4 Weather phenomena

6.3.2.4.1 The trend forecast shall indicate the expected onset, cessation or change in intensity of one or more, up to a maximum of three, of the following weather phenomena or combinations thereof:

moderate or heavy precipitation (including showers thereof)

— other weather phenomena given only if they are expected to cause a significant change in visibility.

6.3.2.5 The trend forecast shall indicate the expected onset or cessation of one or more, up to a maximum of three, of the following weather phenomena or combinations thereof:

thunderstorm (with or without precipitation)
squall.

6.3.2.5.1 The expected end of occurrence of the weather phenomena shall be indicated by the abbreviation "NSW" (No Significant Weather).

6.3.2.6 Clouds

6.3.2.6.1 When the height of the base of a cloud layer of BKN or OVC extent is expected to lift and change to or pass through one or more of the following values, or when the height of the base of a cloud layer of BKN or OVC extent is expected to lower and pass through one or more of the following values: 30, 60, 150, 300 and 450m (100, 200, 500, 1 000 and 1 500 ft), the trend forecast shall indicate the change. When the height of the base of a cloud layer is below or is expected to fall below or rise above 450 m (1 500 ft), the trend forecast shall also indicate changes in cloud amount from SKC, FEW, or SCT increasing to BKN or OVC, or changes from BKN or OVC decreasing to SKC, FEW or SCT. When no cumulonimbus and no cloud below 1 500m (5 000ft) or below the highest minimum sector altitude, whichever is greater, are forecast and "CAVOK" and "SKC" are not appropriate, the abbreviation "NSC" shall be used.

6.3.2.7 Vertical visibility

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

6.3.2.8 Use of change indicators

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

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

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

6.3.2.9 Use of the probability indicator

6.3.2.9.1 The indicator "PROB" shall not be used in trend forecasts.

6.4 Forecasts for take-off

6.4.1 A forecast for take-off shall be prepared and supplied on request to operators or flight crew members within the three hours before the expected time of departure.

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

6.4.3 Meteorological services providers preparing forecasts for take-off shall keep the forecasts under continuous review and, when necessary, shall issue amendments promptly.

6.4.4 The order of the elements and the terminology, units and scales used in forecasts for take-off shall be the same as those used in reports for the same aerodrome.

6.5 Area and Route Forecasts

6.5.1 General

6.5.1.1 Forecasts of en-route conditions for low-level flights shall be prepared on request by the aerodrome meteorological offices.

Note:-1 Low-level flights include flights operating below flight level 100 (or up to 150 in mountainous areas or higher, where necessary).

Note:-2 Forecasts of en-route conditions for flights operating above flight level 100 are normally provided within the framework of the WAFS by the two world area forecast centers (WAFCs).

6.5.1.2 Area and route forecasts shall contain upper winds, upper-air temperatures, significant en-route weather phenomena and associated clouds. Other elements may be added as required. This information shall cover the flight operations for which they are intended in respect of time, altitude and geographical extent.

6.5.1.3 Meteorological offices preparing area and route forecasts shall keep the forecasts under continuous review and issue amendments as necessary.

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

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

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

CHAPTER 7 -SIGMET AND AIRMET INFORMATION, AERODROME WARNINGS AND WIND SHEAR WARNINGS

7.1 SIGMET Information

7.1.1 General

7.1.1.1 SIGMET information shall be issued by a meteorological service provider maintaining watch over a given flight information region or area control Center and shall give a concise description in abbreviated plain language concerning the occurrence and/or expected occurrence of specified en-route weather phenomena, which may affect the safety of aircraft operations, and of the development of those phenomena in time and space.

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

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

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

7.1.1.5 Close co-ordination shall be maintained between the meteorological watch office and the associated area control center/flight information center to ensure that information on volcanic ash included in SIGMET and NOTAM messages is consistent.

7.1.1.6 A SIGMET message relating to the expected occurrence of the weather phenomena listed in 7.1.2.3 should be issued not more than 6 hours, and preferably not more than 4 hours, before the expected time of occurrence of that phenomenon.

7.1.2 Format of SIGMET messages

7.1.2.1 The content and order of elements in a SIGMET message shall be in accordance with the template shown in CAR-ANS Part 3, Appendix 3.6, Table A6-1.

7.1.2.2 Messages containing SIGMET information shall be identified as “SIGMET”.

7.1.2.3 In accordance with the template in CAR-ANS Part 3, Appendix 3.6, Table A6-1, only one of the following phenomena shall be included in a SIGMET message, using the abbreviations as indicated below:

Thunderstorm

- Obscured — OBSC TS
- Embedded — EMBD TS
- Frequent — FRQ TS

- squall line SQL TS
- obscured with hail OBSC TSGR
- embedded with hail EMBD TSGR
- frequent with hail FRQ TSGR
- squall line with hail SQL TSGR

Turbulence
- severe turbulence SEV TURB

Mountain wave
- severe mountain wave SEV MTW

7.1.3 Dissemination of SIGMET messages

7.1.3.1 SIGMET messages shall be disseminated to meteorological watch offices, WAFCs and to other meteorological offices.

7.2 AIRMET Information

7.2.1 General

7.2.1.1 AIRMET information shall be issued by a meteorological watch office in accordance with regional air navigation agreement, taking into account the density of air traffic operating below flight level 100. AIRMET information shall give a concise description in abbreviated plain language concerning the occurrence and/or expected occurrence of specified en-route weather phenomena, which have not been included in the area forecast for low-level flights and which may affect the safety of low-level flights, and of the development of those phenomena in time and space.

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

7.2.1.3 The period of validity of an AIRMET message shall not be more than 4 hours.

7.2.2 Format of AIRMET messages

7.2.2.1 The content and order of elements in an AIRMET message shall be in accordance with the template shown in CAR-ANS Part 3, Appendix 3.6, Table A6-1.

7.3 Criteria related to phenomena included in SIGMET and AIRMET messages.

7.3.1 An area of thunderstorms and cumulonimbus clouds should be considered:

a) obscured (OBSC) if it is obscured by haze or smoke or cannot be readily seen due to darkness;
b) embedded (EMBD) if it is embedded within cloud layers and cannot be readily recognized;

c) isolated (ISOL) if it consists of individual features which affect, or are forecast to affect, an area with a maximum spatial coverage less than 50 per cent of the area concerned (at a fixed time or during the period of validity); and
d) occasional (OCNL) if it consists of well-separated features which affect, or are forecast to affect, an area with a maximum spatial coverage between 50 and 75 per cent of the area concerned (at a fixed time or during the period of validity).

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

7.3.3 Squall line (SQL) should indicate a thunderstorm along a line with little or no space between individual clouds.

7.3.4 Hail (GR) should be used as a further description of the thunderstorm, as necessary.

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

7.4 Aerodrome Warnings

7.4.1 General

7.4.1.1 Aerodrome warnings shall be issued by the aerodrome meteorological service provider and shall give concise information of meteorological conditions which could adversely affect aircraft on the ground, including parked aircraft, and the aerodrome facilities and services.

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

7.4.2 Format and dissemination of aerodrome warnings

7.4.2.1 The aerodrome warnings shall be issued in accordance with the template in CAR-ANS Part 3, Appendix 3.6, Table A6-2 where required by operators or aerodrome services, and shall be disseminated in accordance with local arrangements to those concerned.

7.4.2.2 In accordance with 7.4.2.1, aerodrome warnings should relate to the occurrence or expected occurrence of one or more of the following phenomena:

a) thunderstorm
b) hail
c) strong surface wind and gusts
d) squall — other phenomena as necessary.

7.5 Wind Shear Warnings

7.5.1 General Provisions

7.5.1.1 Wind shear warnings shall be prepared by the meteorological office designated by the meteorological service provider for aerodromes where wind shear is considered a factor in accordance with local arrangements with the appropriate ATS authority and operators concerned. Wind shear warnings shall give concise information of the observed or expected existence of wind shear which could adversely affect aircraft on the approach path or take-off path or during circling approach between runway level and 500m (1 600ft) above that level and aircraft on the runway during the landing roll or take-off run. Where local topography has been shown to produce significant wind shears at heights in excess of 500m (1600ft) above runway level, then 500m (1600ft) shall not be considered restrictive.

7.5.1.2 At aerodromes where wind shear is detected by automated ground-based wind shear remote-sensing or detection equipment, wind shear alert generated by these systems shall be issued. Wind shear alert shall give concise up to date information related to the observed existent of wind shear involving a head wind/tail wind change of 30 km/hr (15 kt) or more which could adversely affect aircraft on the final approach path or initial take-off path and aircraft on the runway during the landing roll or takeoff run.

7.5.1.3 Wind shear alerts should be updated at least every minutes and should be cancelled for arriving aircraft and/or departing aircraft when aircraft reports indicate that wind shear no longer exists, or alternatively as soon as the headwind/tailwind change falls below 30 km/h (15 kt).

7.5.2 Detection of wind shear

7.5.2.1 Evidence of the existence of wind shear should be derived from:

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

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

c) aircraft observations during the climb-out or approach phases of flight, or

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

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

thunderstorms, microbursts and gust fronts
frontal surfaces
strong surface winds coupled with local topography

sea breeze fronts
mountain waves (including low-level rotors in the terminal area)
low-level temperature inversions.

7.5.3 Format and dissemination of wind shear warnings

Note: — Information on wind shear is also to be included as supplementary information in local routine and special reports and METAR and SPECI in accordance with 5.3.9.

7.5.3.1 The wind shear warnings shall be prepared in abbreviated plain language in accordance with the template in ICAO Annex 3, Appendix 6, Table A6-3 and disseminated for aerodromes where wind shear is considered a factor in accordance with local arrangements with the ATS unit and operators concerned.

7.5.3.2 When an aircraft report is used to prepare a wind shear warning, or to confirm a warning previously issued, the corresponding aircraft report, including the aircraft type, should be given unchanged in the warning.

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

Note 2:— Specifications for reporting the intensity of wind shear are still undergoing development. It is recognized, however, that pilots, when reporting wind shear, may use the qualifying terms "moderate", "strong" or "severe", based to a large extent on their subjective assessment of the intensity of the wind shear encountered. Such reports are to be incorporated unchanged in wind shear warnings.

CHAPTER 8 -AERONAUTICAL CLIMATOLOGICAL INFORMATION

8.1 General Provisions

8.1.1 Meteorological observations for regular and alternate aerodromes should be collected, processed and stored in a form suitable for the preparation of aerodrome climatological information. Aeronautical climatological information should normally be based on observations made over a period of at least five years and the period should be indicated in the information supplied.

8.1.2 Aeronautical climatological information required for the planning of flight operations shall be prepared in the form of aerodrome climatological tables and aerodrome climatological summaries. Such information shall be supplied to aeronautical users on request.

Note: — Climatological data required for aerodrome planning purposes are set out in CAAP MOS-Aerodromes, 6.2.1.3.

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

8.2 Aerodrome Climatological Table

8.2.1 The meteorological service provider should collect and retain the necessary observational data and have the capability:

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

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

8.2.2 Aerodrome climatological tables should include information required for the preparation of aerodrome climatological summaries.

8.2.3 An aerodrome climatological table should give as applicable:

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

b) the frequency of occurrence of present weather phenomena affecting flight operations at the aerodrome; and/or

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

8.2.4 Aerodrome climatological tables should include information required for the preparation of aerodrome climatological summaries in accordance with Section 3.

8.3 Aerodrome Climatological Summaries

8.3.1 Aerodrome climatological summaries should follow the procedures prescribed by the World Meteorological Organization. Where computer facilities are available to store, process and retrieve the information, the summaries should be published, or otherwise made available to aeronautical users on request. Where such computer facilities are not available, the summaries should be prepared using the models specified by the World Meteorological Organization, and should be published and kept up to date as necessary.

8.3.2 Aerodrome climatological summaries should cover:

a) frequencies of the occurrence of runway visual range/visibility and/or height of the base of the lowest cloud layer of BKN or OVC extent below specified values at specified times;
b) frequencies of visibility below specified values at specified times;
c) frequencies of the height of the base of the lowest cloud layer of BKN or OVC extent below specified values at specified times;
d) frequencies of occurrence of concurrent wind direction and speed within specified ranges;
e) frequencies of surface temperature in specified ranges of 5°C at specified times; and
f) mean values and variations therefrom, including maximum and minimum values of meteorological elements required for operational planning purposes, including take-off performance calculations.

Note: — Models of climatological summaries related to a) to e) are given in WMO Publication No. 49, Technical Regulations, Volume II, C.3.2.

8.4 Copies of Meteorological Observational Data

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

CHAPTER 9 - METEOROLOGICAL SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

9.1 General Provisions

9.1.1 Meteorological information shall be supplied 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.

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

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

a) forecasts of upper wind and upper-air temperature; upper air humidity; altitude of flight levels; tropopause altitude and temperature; direction, speed and altitude of maximum wind; and significant weather phenomena;

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

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

d) forecast for take-off;

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

Note: Appropriate special air report will be those not already used in preparation of SIGMET.

f) Subject to regional air navigation agreement, GAMET area forecast and AIRMET information for low level flights relevant to the whole route.

9.1.4 Forecasts listed under 9.1.3 (a) above shall be derived, to the extent possible as determined by the meteorological service provider, from the digital forecasts

provided by the WAFCs. Where forecasts are identified as being originated by the WAFCs, no modifications shall be made to their meteorological content. Charts derived from the digital forecasts provided by the WAFCs shall be made available, as a minimum, for fixed areas of coverage as made available from the WAFCs.

9.1.5 When forecasts of upper wind and upper air temperature listed under 9.1.3 (a) are supplied in chart form, they shall be fixed time prognostic chart for standard flight levels. When forecasts of significant weather phenomena listed under 9.1.3 (a) as supplied in chart form, they shall be fixed time prognostic chart for an atmospheric layer limited by standard flight levels.

9.1.6 The forecasts of upper wind and upper air-temperature and of significant weather phenomena requested for pre-flight planning and in flight re-planning by the operator shall be supplied as soon as they become available but not later than 3 hours before departure. Other meteorological information requested for pre-flight planning and in flight re-planning shall be supplied as soon as is practicable.

9.1.7 Where necessary, the meteorological service provider shall initiate coordinating action with the meteorological service providers of other States with a view to obtaining from them the reports and/or forecasts required.

9.2 Supply and format of Meteorological Information

9.2.1 Meteorological information shall be supplied to operators and flight crew members at the office of the meteorological service provider. The service shall be confined to flights originating from the aerodrome served by the meteorological service provider. At an aerodrome without a meteorological office, arrangements for the supply of meteorological information shall be as agreed upon between the meteorological service provider and the operator concerned.

9.2.2 Meteorological information shall be supplied to operators and flight crew members by one or more of the following, and with the order shown below not implying priorities:

a) written or printed material, including specified charts and forms;
b) data in digital form;
c) briefing;
d) consultation; or
e) display.

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

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

9.3 Information for Operators for Pre-Flight Planning and for In-Flight Re-Planning under Centralized Operational Control

9.3.1 Meteorological information for pre-flight planning and in-flight re-planning by operators shall include any or all of the following information, as established by the meteorological service provider in consultation with operators concerned:

a) current and forecast: upper winds, upper-air temperatures and humidity;
b) tropopause height and temperature, and direction, speed and height of maximum wind;
c) existing and expected significant en-route weather phenomena and amendments thereto;
d) a forecast for take-off;
e) METAR and, where available, SPECI (including trend forecasts) for the aerodrome of departure, take-off and en-route alternate aerodromes, the aerodrome of intended landing and destination alternate aerodromes;
f) TAF and amendments thereto for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;
g) SIGMET information and appropriate special air-reports relevant to the whole of the routes concerned; and

Note: — Appropriate special air-reports will be those not already used in preparation of SIGMET messages.

h) AIRMET information for low-level flights.

9.3.1.1 The upper wind and upper-air temperature information and the significant en-route weather information requested for pre-flight planning and in-flight re-planning by the operator should be supplied as soon as it becomes available, but not later than 3 hours before departure. Other meteorological information requested for pre-flight planning and in-flight re-planning by the operator should be supplied as soon as is practicable.

9.3.1.2 When upper-air information is supplied in chart form, it shall consist of charts for standard flight levels.

Note: — Information on Upper-air information and significant weather supplied by WAFCs for pre-flight and in-flight re-planning shall be in the GRIB code form. The GRIB code form is contained in WMO Publication No. 306, Manual on Codes, Volume I.2, Part B — Binary Codes.

9.4 Briefing and Consultation

9.4.1 General provisions

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

9.4.1.2 Meteorological information used for briefing and consultation shall include any or all of the information listed in 9.3.1.

9.4.1.3 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 shall be drawn to the divergence. The portion of the briefing dealing with the divergence shall be recorded at the time of briefing and this record shall be made available to the operator.

9.4.1.4 The required briefing, consultation, display and/or flight documentation shall normally be provided within the aerodrome of departure, at a location that is easily accessible to flight crew members. Where there is an undue delay, the meteorological service provider associated with the aerodrome shall provide a new briefing, consultation and/ or flight documentation as necessary.

9.4.1.5 The flight crew member or other flight operations personnel for whom briefing, consultation and/or flight documentation has been requested should visit the meteorological service provider's office at the time agreed upon between the meteorological service provider and the operator concerned. Where local circumstances at an aerodrome make personal briefing or consultation impracticable, the meteorological service provider should provide those services by telephone or other suitable telecommunications facilities.

9.4.2 Information required to be displayed

9.4.2.1 To assist the flight crew members and others concerned with the preparation of the flight and for use in briefing and consultation, the meteorological service provider office shall display the latest available:

a) METAR and SPECI;
b) TAF and trend forecasts;
c) aerodrome warnings relating to the local aerodrome;
d) SIGMET and AIRMET information and special air reports not covered by a SIGMET;
e) current and prognostic charts;
f) images from meteorological satellites, ground-based weather radar etc.

9.5 Flight Documentation

9.5.1 General provisions

9.5.1.1 Flight documentation shall comprise information listed under 9.3.1 (a), (b), c) (e) and if appropriate (f). However, where agreed between the meteorological service provider and operator concerned, flight documentation for flights of two hours' duration or less, after a short stop or turnaround shall be limited to the information operationally needed, but in all cases the flight documentation shall at least comprise information on 9.3.1 (b), (c), (e) and if appropriate (f).

9.5.1.2 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 shall be advised immediately and, if practicable, be supplied with the revised information.

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

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

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

9.6.1 Where the meteorological service provider uses automated pre-flight information systems to supply and display meteorological information to operators and flight crew members for self-briefing, flight planning and flight documentation purposes, the information supplied and displayed shall comply with the relevant provisions in 9.4 to 9.5 inclusive.

9.6.2 Automated pre-flight information systems providing for a harmonized, common point of access to meteorological information and aeronautical information services information by operators, flight crew members and other aeronautical personnel concerned should be established by an agreement between the meteorological service provider and the civil aviation authority.

Note: — The meteorological and aeronautical information services information concerned is specified CAR-ANS Part 15, 15.8.1 and 15.8.2, respectively.

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

Note: — The responsibilities relating to aeronautical information services information and the quality assurance of the information are given in CAR-ANS Part 15, 15.3.

9.7 Information for Aircraft in Flight

9.7.1 Meteorological information for use by aircraft in flight shall be supplied by an aerodrome meteorological office to its associated air traffic services unit and

through D-VOLMET or VOLMET broadcast as determined by regional navigation agreement. Meteorological information for planning by the operator for aircraft in flight shall be supplied on request.

9.7.2 Meteorological information for use by aircraft in flight shall be supplied to air traffic services (ATS) units in accordance with the specifications of CHAPTER 10

9.7.3 Meteorological information shall be supplied through D-VOLMET or VOLMET broadcast in accordance with the specifications of CHAPTER 11.

9.8 Charts to be provided

9.8.1 The set of charts to be provided under the world area forecast system (WAFS) for pre-flight and in-flight planning and for flight documentation should be as agreed with users.

9.8.2 Where information on significant en-route weather phenomena is supplied in chart form to flight crew members before departure, the charts shall be significant weather charts valid for a specified fixed time. Such charts shall show, as appropriate to the flight:

a) thunderstorms;
b) severe squall lines;
c) moderate or severe turbulence (in cloud or clear air);
d) for flight level 100 to flight level 250, clouds associated with a) to e);
e) above flight level 250, cumulonimbus cloud associated with a) to e);
f) surface position of well-defined convergence zones;
g) surface positions, speed and direction of movement of frontal systems when associated with significant enroute weather phenomena;
h) tropopause heights;
i) jetstreams.

Note 1:— For aircraft operating above flight level 250, items a) to e) are only required if expected to be above that level, and in the case of item a), only those thunderstorms which warrant the issuance of a SIGMET as given in CHAPTER 7.

Note 2:.— The abbreviation "CB" should only be included where it refers to the occurrence or expected occurrence of an area of widespread cumulonimbus clouds or cumulonimbus along a line with little or no space between individual clouds, or to cumulonimbus embedded in cloud layers or concealed by haze. It does not refer to isolated or scattered cumulonimbus not embedded in cloud layers or concealed by haze.

9.9 Requirements for TAF

9.9.1 The flight documentation shall in all cases include the TAF for the aerodrome of departure, and for the aerodrome of intended landing. In addition, the flight documentation shall include TAF for one or more suitable alternate aerodromes, as needed to complete the operational flight plan and as selected by agreement

between the meteorological service provider and the operators, and taken from the list of aerodromes contained in the regional air navigation plan.

9.9.2 TAF received from other meteorological offices shall be included in flight documentation without change in substance.

9.9.3 Flight documentation should include TAF for alternate aerodromes, en-route and of aerodromes where intermediate stops are planned.

CHAPTER 10 -INFORMATION FOR AIR TRAFFIC SERVICES (ATS), SEARCH AND RESCUE SERVICES (SAR) AND AERONAUTICAL INFORMATION SERVICES (AIS)

10.1 Information to be provided for Air Traffic Services (ATS) Units

10.1.1 General provisions

10.1.1.1 The meteorological service provider shall, after coordination with the ATS providers, supply, or arrange for the supply of up-to-date meteorological information to the various air traffic services units as necessary for the conduct of their functions.

10.1.1.2 Any meteorological information requested by an ATS unit in connection with an aircraft emergency shall be supplied as rapidly as possible.

10.1.1.3 The associated meteorological office for an aerodrome control tower or approach control unit should be an aerodrome meteorological office.

10.1.2 List of information for the aerodrome control tower

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

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

b) SIGMET and AIRMET information, wind shear warnings and aerodrome warnings;

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

10.1.3 List of information for the flight information Center

10.1.3.1 The following meteorological information shall be supplied, as necessary, to a Flight Information Center (FIC) or an Area Control Center (ACC) by the meteorological office providing meteorological watch services for the FIR or ACC:

a) METAR and SPECI, TAF and trend forecasts and amendments thereto, covering the flight information region or the control area;

b) forecasts of upper winds, upper-air temperatures and significant en-route weather phenomena and amendments thereto, particularly those which are likely to make operation under visual flight rules impracticable, SIGMET and AIRMET information and appropriate special air-reports for the flight information region or control area.

c) any other meteorological information required by the flight information Center (FIC) or area control Center (ACC) to meet requests from aircraft in flight; if the information requested is not available in the associated meteorological watch office, that office shall request the assistance of another meteorological office in supplying it; and

d) information received concerning the accidental release of radioactive materials into the atmosphere, as agreed between the meteorological service provider and ATS services unit.

10.2 Information to be provided for Search and Rescue Services Units

10.2.1 General

10.2.1.1 The meteorological service provider shall supply search and rescue (SAR) services units with the meteorological information they require in a form established by mutual agreement. For that purpose, the meteorological service provider shall maintain liaison with the search and rescue services unit throughout a search and rescue operation.

10.2.2 List of information to be provided

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

a) significant en-route weather phenomena;
b) cloud amount and type, particularly cumulonimbus; height indications of bases and tops;
c) visibility and phenomena reducing visibility;
d) surface wind and upper wind;
e) state of ground, in particular, flooding;
f) sea-surface temperature, state of the sea, and ocean currents, if relevant to the search area; and
g) sea-level pressure data.

10.2.4 Information to be provided on request

10.2.4.1 On request from the rescue coordination Center, the meteorological service provider should arrange to obtain details of the flight documentation which was supplied to the missing aircraft, together with any amendments to the forecast which were transmitted to the aircraft in flight.

10.2.4.2 To facilitate search and rescue operations the designated meteorological office should, on request, supply:

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

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

10.2.4.3 On request from the rescue coordination Center, the designated meteorological office should supply or arrange for the supply of meteorological information required by ships undertaking search and rescue operations.

10.3 Information to be provided for Aeronautical Information Services (AIS) Units

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

10.3.2 List of information

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

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

Note: — Details of this information are given in CAR-ANS Part 15, Appendix 15A, Part 1, GEN 3.5 and Part 3, AD 2.2, AD 2.11, AD 3.2 and AD 3.11.

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

1) the establishment, withdrawal and significant changes in operation of aeronautical meteorological services. This information is required to be provided to the aeronautical information services unit sufficiently in advance of the effective date to permit issuance of NOTAM in compliance with CAR-ANS Part 15, 15.5.1.1 and 15.5.1.1.1;

2) accidental release of radioactive materials into the atmosphere, as agreed between the meteorological service provider and the civil aviation authority; and

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

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

2) effect of certain weather phenomena on aircraft operations.

CHAPTER 11 -REQUIREMENTS FOR AND USE OF COMMUNICATIONS

11.1 Requirements for Communications

11.1.1 Suitable telecommunications facilities shall be made available to permit aerodrome meteorological offices, and as necessary aeronautical meteorological stations to supply the required meteorological information to air traffic services (ATS) 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.

Note: — Circuits of the aeronautical fixed service are used for the collection and regional and inter-regional exchanges of operational meteorological information as well as for access to international operational meteorological data banks. Three aeronautical fixed service satellite distribution systems providing for global coverage are used to support the regional and inter-regional exchanges of operational meteorological information. Provisions relating to the satellite distribution systems are given in CAR-ANS Part 7, 7.10.

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

11.1.3 Suitable telecommunications facilities shall be made available to permit world area forecast Centers (WAFC) to supply the required world area forecast system products to meteorological offices and other users.

11.1.4 Telecommunications facilities between meteorological offices and, as necessary, aeronautical meteorological stations and aerodrome control towers or approach control units shall permit communications by direct speech, the speed with which the communications can be established being such that the required points may normally be contacted within approximately 15 seconds.

11.1.5 Telecommunications facilities between meteorological offices and flight information centers, area control centers, rescue coordination centers and aeronautical telecommunications stations should permit:

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

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

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

11.1.6 The telecommunications facilities required in accordance with 11.1.4 and 11.1.5 should be supplemented, as and where necessary, by any other form of visual or audio communications such as closed circuit television or separate information processing systems.

11.1.7 Provision should be made to enable operators to establish suitable telecommunications facilities for obtaining meteorological information from aerodrome meteorological offices or other appropriate sources.

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

11.1.9 The telecommunications facilities used for the exchange of operational meteorological information should be the aeronautical fixed service.

11.2 Specific Requirements for Transit Times

11.2.1 AFTN messages and bulletins containing operational meteorological information should achieve transit times of less than the following:

SIGMET and AIRMET messages and 5 minutes Special air-reports

Abbreviated plain-language 5 minutes amendments to significant weather and upper air forecasts

Amended TAF and corrections to 5 minutes TAF -METAR 0–900 km (500 NM) 5 minutes

Trend forecasts TAF 5 minutes

SPECI -more than 900 km (500 NM) 10 minutes

11.3 Use of Aeronautical Fixed Service Communications — Meteorological Bulletins in Alphanumeric Format

11.3.1 General provision

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

Note:—Meteorological bulletins containing operational meteorological information authorized for transmission via the aeronautical fixed service are listed in CAR-ANS Part 2, 2.7, together with the relevant priorities and priority indicators.

11.3.2 Meteorological bulletins in alphanumeric format

11.3.2.1 Composition of bulletins

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

11.3.2.2 Filing times of bulletins

11.3.2.2.1 Meteorological bulletins required for scheduled transmissions should be filed regularly and at the prescribed scheduled times. METAR should be filed for transmission not later than 5 minutes after the actual time of observation. TAF should be filed for transmission at least one hour before the commencement of their period of validity.

11.3.2.3 Heading of bulletins

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

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

Note 1:— Detailed specifications on format and contents of the heading are given in the WMO Manual on the Global Telecommunication System, Volume I and are reproduced in the Manual of Aeronautical Meteorological Practice.

Note 2:— ICAO location indicators are listed in Location Indicators (ICAO Doc 7910).

11.3.2.4 Structure of bulletins

11.3.2.4.1 Meteorological bulletins containing operational meteorological information to be transmitted via the AFTN shall be encapsulated in the text part of the AFTN message format.

11.4 Use of Aeronautical Mobile Service Communications

11.4.1 Content and format of meteorological messages

11.4.1.1 The contents and format of meteorological information transmitted to aircraft and by aircraft shall be consistent with the provisions of CAR-ANS Part 3, 3.4, 3.6 and 3.7.

11.4.2 Content and format of meteorological bulletins

11.4.2.1 The substance of a meteorological bulletin transmitted via the aeronautical mobile service shall remain unchanged from that contained in the bulletin as originated.

11.4.3 Use of Aeronautical Data Link Service — D-VOLMET

11.4.3.1 Use of Aeronautical Data link service — contents of D-VOLMET

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

11.4.3.1.2 The content and format of reports, forecasts and SIGMET information included in VOLMET broadcasts shall be consistent with the provisions of CAR-ANS Part 3, 3.4, 3.6 and 3.7.

11.4.3.1.3 VOLMET broadcasts should use standard radiotelephony phraseologies.

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

11.4.3.2 Use of aeronautical broadcasting service — contents of VOLMET broadcasts

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

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

CHAPTER 12 - APPLICATION TO PROVIDE AERONAUTICAL METEOROLOGY SERVICE

12.1 General

12.1.1 On application for, and renewal to operate as an Aviation Meteorological service provider, the applicant must provide sufficient information to the Civil Aviation Authority of the Philippines so that the Authority can assess the suitability of the applicant.

12.2 Manual of Operations

12.2.1 The CAAP has determined that the information required should be included in the applicant's Manual of Operations.

12.2.2 To assist applicants the following is a guideline to ensure that applicants include the information required.

12.2.3 An applicant for an approval shall provide the Authority with a Manual of Operation containing:

a) a statement signed by the accountable officer, on behalf of the applicant's Organization confirming that:

1) the Manual of Operation defines the Organization and demonstrates its means and methods for ensuring ongoing compliance with the Regulation; and

2) the Manual of Operation and Manual of Standards and appropriate operational documentation, shall be complied with by the Organization's personnel at all times;

b) the titles and names of the senior person or persons;

c) the duties and responsibilities of the senior person or persons in paragraph 12.2.3 (*b*) including matters for which they have responsibility to deal directly with the CAAP on behalf of the Organization;

d) an Organization chart showing lines of responsibility of the senior persons in paragraph 12.2.3 (*b*) and covering each location listed under paragraph 12.2.3 (*f*);

e) a summary of the Organization's staffing structure at each location listed under paragraph 12.2.3 (*f*);

f) a list of the type of Aeronautical Meteorological Service to be provided under the authority of the Aeronautical Meteorological Service provider approval;

g) a summary of the scope of activities at each location where the Organization's personnel are based for the purpose of providing or maintaining the types of services listed under paragraph 12.2.3 (*f*);

h) procedures and a plan to undertake checking and training of staff in the positions for which they will provide a service;

i) the detailed procedures required regarding internal quality assurance and safety management system;

j) a contingency plan for implementation in the event of a disruption to services provided ;

k) a security programme that details protection for facilities and services;

l) a summary of the communication capability of each facility associated with each location listed under paragraph 12.2.3 (*g*); and

m) procedures to control, amend, and distribute documentation and retain records.

12.2.4 The CAAP may not grant an approval unless the CAAP is satisfied that the applicant's Manual of Operation complies with Chapter 12, 12.2 of this Manual.

CHAPTER 13 – PROVISION OF AERONAUTICAL METEOROLOGY SERVICE

13.1 General

13.1.1 The Aeronautical Meteorology service provider must provide Aeronautical Meteorology services in accordance with the Manual of Standards, approved, authorised, published and amended by the CAAP.

13.1.2 An Aeronautical Meteorology services provider shall ensure that any aeronautical meteorological equipment or facilities that it provides shall be appropriately sited and maintained to perform in accordance with its Manual of Operations.

13.2 Application of Human Factors principles

13.2.1 The applicant must demonstrate that human factors principles are considered when assessing the appropriateness of equipment, systems, software, facilities, procedures, jobs, environments, training, staffing, and personnel management to produce safe, comfortable, and effective human performance.

13.3 Aeronautical Meteorology service provider's Manual of Operations

13.3.1 An applicant for the provision of Aeronautical Meteorological Service must provide in its Operations Manual;

a) current unit Organizational chart and written delegated responsibilities and position descriptions;

b) staffing-levels for operational positions; and

c) staffing numbers and qualifications of personnel at each office or station.

13.4 Personnel

13.4.1 An Aeronautical Meteorological service provider shall, at all times, maintain an appropriate Organization with a sound and effective management structure to enable it provide, in accordance with the standards set out in the Philippine CARs, the aviation meteorological services covered by its approval.

13.4.2 An Aeronautical Meteorological service provider shall have, at all times, sufficient suitably qualified and trained personnel to enable it provide, in accordance with the standards set out in the Regulations, the aviation meteorological service covered by its approval.

13.4.3 The Aeronautical Meteorological service provider shall ensure that its personnel are in sufficient numbers and experienced and have been given the appropriate authority to be able to discharge their allocated responsibilities.

13.4.4 The Aeronautical Meteorological service provider must ensure that the qualifications of personnel providing aviation meteorological services are in accordance with World Meteorological Organization requirements.

13.4.5 An Aeronautical Meteorological service provider shall arrange the work flow schedule of aviation meteorological personnel to provide sufficient rest time. A sample of the Aviation Meteorological service providers' roster is to be included in the Manual of Operations.

13.4.6 The Aeronautical Meteorological service provider shall engage, employ or contract:

a) At each meteorological office a senior person to whom authority has been granted to ensure that all activities undertaken by the unit are carried out in accordance with the applicable requirements prescribed in this section, and who shall in addition be vested with the following powers and duties in respect of the compliance with such requirements:

1) unrestricted access to work performed or activities undertaken by all other persons as employees of, and other persons rendering service within the unit;

2) full rights of consultation with any such person(s) in respect of such compliance by him or her;

3) powers to order cessation of any activity where such compliance is not effected;

4) a duty to establish liaison mechanisms with the CAAP with a view to ascertain correct manners of compliance with the said requirements, and interpretations of such requirements by the CAAP, and to facilitate liaison between the CAAP and the unit concerned;

5) powers to report directly to the management of his or her Organization, on his or her investigations and consultations generally, and in cases contemplated in 13.4.6, 3) and with regard to the results of the liaison contemplated in 13.4.6, 4); and

6) Upon receipt of proficiency reports received from synoptic and forecast units, the responsible officer at the headquarters of the service provider shall undertake thorough evaluation with a view to correcting any deficiency revealed by the assessment report;

b) At each meteorological office and station a person who is responsible for:

1) quality control, and who must have direct access to the person referred to in 13.4.6 a) on matters affecting Aeronautical Meteorology; and

2) preparation of proficiency reports on personnel within the stations for onward transmission to the management of the aviation meteorological service provider; and

c) enough personnel to plan, provide and supervise the services listed in its approval as a service provider, in a safe and efficient manner.

13.5 Training and Competency

13.5.1 It is the responsibility of the meteorological service provider to establish and maintain proficiency standards in service provision.

13.5.2 The Aeronautical Meteorological Service provider shall establish a procedure for initially assessing, and a procedure for maintaining, the competence of the personnel required to operate and maintain the unit concerned. This shall include copies of the relevant assessment forms.

13.5.3 The Aeronautical Meteorological Service provider shall establish a training program for its technical staff and maintain proper accounts of the training undertaken for each staff member.

13.5.4 Conduct of practical training

13.5.4.1 An Aeronautical Meteorological Service provider must ensure that practical training carried out by him or her or on his or her behalf complies with:

a) the standards and requirements set out in the Manual of Standards; and

b) the provider's operations manual.

13.6 Safety Management

13.6.1 An Aeronautical Meteorological service provider must have, and put into effect, a safety management system that includes the policies, procedures, and practices necessary to provide the aviation meteorological service covered by its approval safely.

13.6.2 The provider must keep under review its safety management system and take such corrective action as is necessary to ensure that it operates properly. Safety reviews must be conducted on a regular basis by qualified personnel.

13.6.3 A safety assessment must be undertaken for any safety related change.

13.7 Contingency Planning

13.7.1 An Aeronautical Meteorological service provider shall develop and maintain Contingency Plans for implementation in the event of disruption, or potential disruption, of aviation meteorological services. The disruption may be caused intentionally (sabotage) or unintentionally (equipment failure).

13.7.2 The plan shall include:

a) the actions to be taken by the members of the provider's personnel responsible for providing the service;
b) possible alternative arrangements for providing the service; and
c) the arrangements for resuming normal operations for the service.

13.7.3 These plans must be submitted as part of the Manual of Operation.

13.7.4 The applicant must provide a plan based on the Airport Security Programme that details what measures, both physical and procedural that they intend to protect their facility and the services provided from that facility. This should include a security assessment of the facilities used by the applicant.

13.8 Facilities

13.8.1 An Aeronautical Meteorological service provider must, at all times, make available for the use by its personnel, the equipment and facilities necessary for providing aviation meteorological service covered by its approval. Operations Manual a list of facilities from which Aviation Meteorological service will be provided.

13.8.2 The equipment must meet with the requirements for measuring and detecting the meteorological elements specified in CAR-ANS Part 3.

13.8.3 All persons involved with the provision of maintenance must be fully conversant with current ICAO standards and recommended practices, instructions, directives and relevant information.

13.8.4 An Aeronautical Meteorological service provider must ensure that equipment is calibrated to required operational standards. Calibration must be carried out at defined intervals of time and the results recorded.

13.8.5 The Aeronautical Meteorological service provider must at all times inform CAAP of its plan to upgrade or procure new equipment, facilities or technologies to enable the Authority ensure compliance with ICAO/WMO standards.

13.8.6 Existing Facilities

13.8.6.1 The Aeronautical Meteorological service provider must, for each location for which a service is provided, supply an indication from the list below, the existing facilities and equipment. An indication must be provided on the status of calibration of the equipment.

13.8.6.2 All equipment used in the provision of Aeronautical Meteorology services shall perform and be maintained in accordance with the standards and recommended practices as contained in CAR-ANS Part 3.

13.8.6.2.1 Aeronautical Meteorology service facility

Minimum Items

- Wall clocks displaying UTC and local time
- Wind speed and direction display
- Temperature and dew point measuring equipment
- Barometer
- Visibility targets
- Back-up power
- Receiver/Transmitter capable of receiving/ transmitting meteorological information from/to other agencies.

13.8.7 The applicant must maintain a system for tracking and rectifying faults within the Aeronautical Meteorological service system.

13.8.8 Procedures for the reporting and the resolution of faults and defects must be documented in the Manual of Operations.

13.9 Documentation

13.9.1 The applicant for service provider approval must provide the following operational documentation at locations of an Aeronautical Meteorology service office:

a) local operating procedures manual;
b) operational directives and instructions file;
c) accident and incident logs;
d) equipment/facilities maintenance logs;
e) equipment operation manuals;
f) CAAP Manual of Standards; and
g) all applicable ICAO and WMO documents.

13.9.2 The Aeronautical Meteorological Service provider shall ensure that:

a) the documentation is reviewed and authorised by appropriate personnel before issue;
b) current issues of relevant documentation are available to personnel;
c) obsolete documentation is removed from all points of issue or use;
d) changes to documentation are reviewed and approved by appropriate personnel; and
e) the current version of each document can be identified to preclude the use of obsolete editions.

13.9.3 The Aeronautical Meteorological Service provider must demonstrate that there is a system in place to record and retain operational data in accordance with CAR-ANS Part 3.

13.9.4 Records must be maintained on the following:

a) personnel files including supervisory reports;
b) training files;
c) leave records;
d) duty roster; and
e) list of equipment and facilities.

13.10 Search and Rescue

13.10.1 The Aeronautical Meteorological service provider must provide such assistance as requested from the agency responsible for conducting SAR activities.

13.11 Accident and Incident Investigation

13.11.1 The Aeronautical Meteorological service provider shall on request by AIP or CAAP provide data which are required for accident/incident investigation purposes.

13.12 Data

13.12.1 The Aeronautical Meteorological service provider must develop local operating procedures for the collection and dissemination of relevant data.

13.12.2 External Data sources

13.12.2.1 An Aeronautical Meteorology provider must consider the availability and reliability of external data sources required to provide an Aeronautical Meteorology service. The Aeronautical Meteorology service provider must include the provider, the data source and means of receipt, display and integrity of the following information:

a) Meteorological information;
b) Meteorological warning service; and
c) Voice coordination with ATS providers.

13.12.3 Output Data

13.12.3.1 The Aeronautical Meteorology service provider should include procedures to ensure that it can, and will continue to be able to provide the information in relation to its Aeronautical Meteorology services to other Organizations whose functions reasonably require that information (e.g. ATS units and flight crew members).

13.12.3.2 Data recipients may include:

a) AIS;
b) ATS provider (flight information Centers, area control Centers, approach control units and aerodrome control towers);
c) Aerodrome administration; and
d) ARFFS.