MINISTRY OF TRANSPORTATION
CIVIL AVIATION AUTHORITY OF VIETNAM

SOCIALIST REPUBLIC OF VIETNAM
Independence - Freedom - Happiness

Số: 1960 /QĐ-CHK

Hanoi, September 15th, 2023

DECISION

Promulgating Manual on application of ICAO standards and recommended pcractices - Aeronautical meteorological service (Version 02)

DIRECTOR GENERAL
OF CIVIL AVATION AUTHORITY OF VIET NAM

Pursuant to the Law on Civil Aviation of Viet Nam dated 29th June 2006 and the Law amending and supplementing a number of articles of the Law on Civil Aviation of Viet Nam dated 21 November 2014;

Pursuant to Decree No. 66/2015/ND-CP dated 12th August 2015 of the Government on regulations on aviation authorities;

Pursuant to the Government's Decree 92/2016/ND-CP dated 01/7/2016 stipulating conditional business lines in the field of civil aviation; The Government's Decree No. 64/2022/ND-CP dated September 15, 2022 amending and supplementing a number of articles regulating conditional business lines in the field of civil aviation;

Pursuant to Circular No. 19/2017/TT-BGTVT dated 06th June 2017 of Ministry of Transportation on regulation on air navigation service management and assurance and Circular No. 32/2021/TT-BGTVT dated 14th December 2021 of Ministry of Transportation amending and supplementing Circular No. 19/2017/TT-BGTVT dated 06th June 2017;

Pursuant to Circular No. 10/2018/TT-BGVT dated March 14, 2018 regulating aviation personnel; training and testing of aviation personnel; Circular No. 35/2021/TT-BGTVT dated 17/12/2021 on amending and supplementing a number of articles of Circular No. 10/2018/TT-BGTVT dated 14/3/2018;

Pursuant to Decision No. 651/QĐ-BGTVT dated 29th May 2023 of Ministry of Transportation on defining the functions, tasks, powers and organizational structure of the Civil Aviation Authority of Vietnam (CAAV);

Pursuant to Decisions of the Director General of CAAV: No. 3209/QĐ-CHK dated December 31st, 2019 on promulgating Standards of Aeronautical Meteorology, and No. 1326/QĐ-CHK on promulgating Amendment 01 to the Standards of Aeronautical Meteorology;

Pursuant to the ICAO Annex 3 on Meteorological service for international air navigation;

At the proposal of Director of Air Navigation Department,

DECIDES:

Article 1. Issued together with this Decision the Manual on application of ICAO standards and recommended pcractices - Aeronautical meteorological service, Version 02, Vol. I and Vol. II;

Article 2. This Decision takes effect from the signing date.

Article 3. Director General of Viet Nam Air Traffice Management Corporation, Director of Air Navigation Department, Heads of relevant agencies and organizations are responsible to execute this Decision./.

Where to:
- As Article 3;
- Director General;
- Deputy DG;
- FSSD, Legal-IAD, STED;
- ACV;
- VNA, VJC, BAV, PIC, VAG, VSA;
- Vasco, HaiAu;
- VAA;
- NAA, MAA, SAA;
- Achieve: Clerical assistant, AND (Oh04c).

FOR DIRECTOR GENERAL
DEPUTY DIRECTOR GENERAL

BỘ GIAO THÔNG VẬN TẢI
CỤC HÀNG KHÔNG VIỆT NAM

Ho Minh Tan

CIVIL AVIATION AUTHORITY OF VIETNAM

MANUAL OF APPLICATION OF ICAO STANDARDS AND RECOMMENED PRACTICES - Meteorological Service for International Air Navigation (MOS – MET)

Version 02: 30th September 2023

Vol. II

Published by

Civil Aviation Authority of Vietnam

RECORD OF VERSION AND AMENDMENTS

Version/Amd	Subject	Source	Approved by (Date)	Effective Date
Ver.01		Annex 3 incorporating Amendment 78.	CAAV DG (31/12/2019)	31/12/2019
Ver.01 Amd.01		- Annex 3 incorporating Amendment 79; - WMO No. 49 and WMO No. 1209, Ed. 2019. - ANS Regulations by MOT, updated 2021. - Ongoing review of document	CAAV's Deputy DG (22/6/2022)	22/6/2022
Ver.02 Vol. I (vi) Amd.02	Amendment 02 of MOS-MET Version 01, published in Vietnamese	- Annex 3 incorporating Amendment 79, 80; - APAC SIGMET Guide Ed.10, 2022. - Amendment on requirement of Aeronautical Meteorological Personnel competency, based on ICAO and WMO Manual and Guidance. - Ongoing review of document and updates	CAAV DG (15/9/2023)	30/9/2023
Vol. II (en)	MOS-MET on MET service for international ANS, published in English	Manual of Standards on MET service for international air navigation (in English)	CAAV DG (15/9/2023)	30/9/2023

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Foreword

Standards of aeronautical meteorological service in Vietnam TCCS 25:2019/CHK had been compiled by Civil Aviation Authority of Vietnam, appraised by the Ministry of Transport, announced by the Civil Aviation Administration of Vietnam in Decision No. 3209 /QD-CHK dated December 31, 2019.

The 1st Amendment to the Document was released by Decision No. 1326/QD-CHK in June 22, 2022, including detailed standards and regulations on aeronautical meteorological (MET) services to ensure the service fully comply with regulations of Vietnam and regulations, standards and recommendations of practice (SARPs) of the International Civil Aviation Organization (ICAO), so that effectively contributes to ensure orderly flow of air traffic and safe and efficient conduct of flights operations.

Since then the Document has been under ongoing review and amended to reflect the changes of Vietnamese legislation as well as update of ICAO SARPs.

With the 3rd amendment, the MOS-MET with the name changed to "Manual on application of ICAO standards and recommended prcatices - aeronautical meteorological service" (MOS-MET) is composed of two volumes. The first volume in Vietnamese language, is a new updated version of the Document, contains general regulations and requirements, and the second volume, in English, focuses on MET service for international flight operation, contains the ICAO SARPs and regional specifications endorsed through Asia – Pacific Air Navigation Plan for the MET service provider to follow.

Readers should forward advice of errors, inconsistencies or suggestions for improvement to this Manual to the addressee stipulated below.

Air Navigation Department

Civil Aviation Authority of Vietnam

119 Nguyen Son St., Long Bien Dist. Hanoi.

Vietnam.

Abbreviations

ACC	Area Control Center
AD WRNG	Aerodrome Warning
AFTN	Aeronautical Fixed Telecommunication Network
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
AMC	Aviation Meteorological Centre
AMHS	Air Traffic Service Message Handling System
AMO	Aerodrome Meteorological Office
AMS	Aerodrome Meteorological Station
AMSL	Above Mean Sea Level
APP	Approach Control Unit
APAC	Asia – Pacific
ATM	Air Traffic Management
ATIS	Automatic Terminal Information Service
ATS	Air Traffic Service
AUTO	Automatic
AWOS	Automated Weather Observing System
BIP-M	Basic Instruction Package for Meteorologists
BIP-MT	Basic Instruction Package for Meteorological Technicians
CAAV	Civil Aviation Authority of Vietnam
CAT	CATegory
CB	Cumulonimbus
CNS	Communication, Navigation, Surveillance
D-ATIS	Data link-Automatic Terminal Information Service
D-VOLMET	Data link VOLMET
FASID	Facilities and Services Implementation Document
FIR	Flight Information Region
FL	Flight Level
hPa	Hectopascal
ICAO	International Civil Aviation Organization
KT, kt	Knot
LLWAS	Low Level Wind-shear Alert System

MET	METeorological
METAR	Aerodrome Routine METeorological report *(in meteorological code)*
MET REPORT	Local routine METeorological Report *(in abbreviated plain language)*
MOS-MET	Manual of Standards – Aeronautical Meteorological Service for International Air Navigation
MPS, m/s	Meter per second
MSL	Mean Sea Level
MWO	Meteorological Watch Office
NIL	Non or I have nothing to send to you
NOTAM	NoticeTo Airmen
OPMET	OPerational METeorological information
PBN	Performance Based Navigation
PIB	Pre-flight Information Bulletin
QMS	Quality Management System
SARPs	Standards and Recommended Practices
QFE	Atmospheric pressure at Aerodrome elevation or at runway threshold
QNH	Mean sea level pressure (MSLP) which is derived by reducing the measured pressure at ground level to MSL using the specifications of the ICAO standard atmosphere. *Also*, QNH is the altimeter showing aerodrome elevation when the aircraft is on the ground and QNH is set on the altimeter sub-scale.
RNAV	Area Navigation
RNP	Required Navigation Performance
RODB	Regional OPMET Databank
ROBEX	Regional Operational Meteorological Bulletin Exchange
RVR	Runway Visual Range
SPECI	Aerodrome SPECIal meteorological report (*in meteorological code*)
SPECIAL	Local SPECIAL meteorological report *(in abbreviated plain language)*
TAF	Aerodrome Forecast
TAF AMD	Amended Aerodrome Forecast
TCU	Towering Cumulus
TREND	Trend forecast

TWR	Tower
VATM	Vietnam Air Traffic Corporation
VIS	Visibility
VOLMET	VOLMET broadcast. Meteorological information for aircraft in flight.
WAFC	World Area Forecast Center
WAFS	World Area Forecast System
WMO	World Meteorological Organisation
WS WRNG	Wind Shear Warning

Definitions

When the following terms are used in this document, they have the following meanings:

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

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

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

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

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

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

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

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

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

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

Aeronautical MET personnel: refers to the Aeronautical MET Forecasters, Aeronautical MET Observers, and Aeronautical MET Technicians, whose duties and responsibilities support aeronautical MET services.

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

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

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

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

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

Air-report: A report from an aircraft in flight prepared in conformity with requirements for

position, and operational and/or meteorological reporting.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Note. – The abbreviated term "ADS contract" is commonly used to refer to ADS event contract, ADS demand contract, ADS periodic contract or an emergency mode.

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

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

Consultation: Discussion with a meteorologist or another qualified person of existing and/or

expected meteorological conditions relating to flight operations; a discussion includes answers to questions.

Control area: 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 aeroplane 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 centre: 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, 1 013.2 hPa, and is separated from other such surfaces by specific pressure intervals.

Note 1. – A pressure type altimeter calibrated in accordance with the ICAO Standard Atmosphere:

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

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

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

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 authority concerned and exchanged with meteorological offices in adjacent flight information regions, as agreed between the meteorological authorities concerned.

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

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

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

Human Factors principles: Principles which apply to aeronautical design, certification,

training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.

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

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

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

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

Meteorological authority: The authority providing or arranging for the provision of meteorological service for international air navigation on behalf of a Contracting State. It is the Civil Aviation Authority of Vietnam (CAAV) following the Law of Civil Aviation and Decree No. 66/2015/NĐ-CP on the Aviation Authority.

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

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

Meteorological watch office: An office designated to provide information concerning the occurrence or expected occurrence of specified en-route weather and other phenomena in the atmosphere that may affect the safety of aircraft operations within its specified area of responsibility.

Minimum sector altitude: The lowest altitude which may be used which will provide a minimum clearance of 300 m (1 000 ft) above all objects located in an area contained within a sector of a circle of 46 km (25 NM) radius centred on a radio aid to navigation.

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

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

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

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

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

Operational control: The exercise of authority over the initiation, continuation, diversion or

termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Search and rescue services unit: A generic term meaning, as the case may be, rescue

coordination centre, rescue sub-centre or alerting post.

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

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

Note. – A space weather centre is designated as global and/or regional.

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

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

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

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

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

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

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

Visibility: Visibility for aeronautical purposes is the greater of:

d) 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;

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

VOLMET: Meteorological information for aircraft in flight.

a) Data link-VOLMET (D-VOLMET): Provision of current aerodrome routine meteorological reports (METAR) and aerodrome special meteorological reports

(SPECI), aerodrome forecasts (TAF), SIGMET, special air-reports not covered by a SIGMET and, where available, AIRMET via data link.

b) VOLMET broadcast: Provision, as appropriate, of current METAR, SPECI, TAF and SIGMET by means of continuous and repetitive voice broadcasts.

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

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

Chapter 1. Introduction

1.1 Background

1.1.1 This Manual of Standards – Aeronautical Meteorological Service for International Air Navigation (MOS-MET) contains the standards, requirements and procedures pertaining to the planning and operation of generating meteorological products for air navigation. These include the maintenance of meteorological facilities.

1.1.2 This Manual is prepared with the primary objective of ensuring that the MET service provider maintains a high level of safety standards and is based on the SARPs as specified in the following Annexes to the Convention of International Civil Aviation in its provision of Aeronautical MET services and products. The Annexes concerned are primarily:

a) Annex 3: Meteorological Service for International Air Navigation,

b) Annex 11: Air Traffic Services (MET related issues only)

c) Annex 12: Search and Rescue (MET related issues only)

d) Annex 15: Aeronautical Information Services (MET related issues only)

e) Annex 19: Safety Management

References are also made to a set of ICAO documents including:

	Document Number	Document Title
a.	4444	Air Traffic Management
b.	8896	Manual of Aeronautical Meteorological Practice
c.	9328	Manual of Runway Visual Range Observing and Reporting Practices
d.	9377	Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services
e.	9673	Asia and Pacific Regions Air Navigation Plan (Volume I & II)
f.	9691	Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds
i.	9817	Manual on Low Level Wind-shear
j.	9837	Manual on Automatic Meteorological Observing Systems at Aerodromes
k.	9859	Safety Management Manual
l.	9873	Manual on the Quality Management System for the provision of Meteorological Service to International Air Navigation

1.2 Non-Compliance with Manual

1.2.1 When MET service provider is not able to comply with any standards specified or referenced in this Manual, the MET service provider shall apply to the Authority for exemption or deviation from the relevant standards. Applications shall be submitted in writing supported with the reasons for such exemption or deviation including any safety assessment or other studies undertaken, and an indication of when compliance with the current standards can be expected.

Chapter 2. General provisions

2.1 Objective, 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 This document prescribes the meteorological services to be provided by the designated MET service provider to meet the needs of international air navigation. The meteorological services are made in accordance with the provisions of Annex 3 and in accordance with Asia/Pacific regional air navigation agreements. It includes the meteorological services to be provided for international air navigation over Vietnam territory and the space over international waters in the scope of two FIRs that Vietnam is responsible for provide air navigation services (Hanoi and Ho_Chi_Minh FIRs).

2.1.4 CAAV acts as Civil Aviation Authority, including role of MET service for aviation in the country, shall arrange and manage the provision of meteorological services for international air navigation in the space of responsibility.

2.1.5 MET service provider(s) shall comply with the requirements of the World Meteorological Organization (WMO) in respect of qualifications, competencies, education and training of meteorological personnel providing services for international air navigation, as stipulated in the Technical Regulations (WMO Publication No. 49), Volume I — General Meteorological Standards and Recommended Practices, Part V – Qualifications and competencies of personnel involved in the provision of Meteorological (weather and climate) and hydrological services, Part VI – Education and Training of Meteorological Personnel and Appendix A – Basic Instruction Packages.

Note. – Specifications on assurance of aeronautical meteorological personnel competency are given in Attachment F to this Document.

2.2 Supply, use, quality management and interpretation of meteorological information

2.2.1 Close coordination and agreement shall be maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of meteorological service for international air navigation.

2.2.2 MET service provider(s) 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.

2.2.3 The quality system established in accordance with 2.2.2 shall be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and shall be certified by an approved organization.

Note. – The International Organization for Standardization (ISO) 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme. The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization. Guidance on the establishment and implementation of quality management systems is given in the Guide to the Implementation of

Quality Management Systems for National Meteorological and Hydrological Services and Other Relevant Service Providers (WMO-No. 1100).

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

Note. – Requirements concerning the geographical and spatial coverage, format and content, time and frequency of issuance and period of validity of meteorological information to be supplied to aeronautical users are given in Chapters 3, 4, 6, 7, 8, 9 and 10 and Appendices 2, 3, 5, 6, 7, 8 and 9 of this document and the relevant regional air navigation plans. Guidance concerning the accuracy of measurement and observation, and accuracy of forecasts is given in Attachments A and B, respectively, to this document.

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

Note. – Requirements concerning the exchange of operational meteorological information are given in Chapter 11 and Appendix 10.

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

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

Note. – Guidance on the operationally desirable accuracy of measurement or observation is given in Attachment A.

2.2.8 Owing to the variability of meteorological elements in space and time, to limitations of forecasting techniques and to limitations caused by the definitions of some of the elements, the specific value of any of the elements given in a forecast 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.

Note. – Guidance on the operationally desirable accuracy of forecasts is given in Attachment B.

2.2.9 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, as specified in the following chapters.

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

2.3 Notifications required from operators

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

2.3.2 MET service provider/AMO 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.

Such information shall contain all details necessary for the planning of appropriate arrangements by the MET service provider/AMO concerned.

2.3.3 The aerodrome meteorological office, or the meteorological office concerned, 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.

2.3.4 The notification to the aerodrome meteorological office 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 as agreed between the aerodrome meteorological office and the operator concerned:

a) aerodrome of departure and estimated time of departure;

b) destination and estimated time of arrival;

c) route to be flown and estimated times of arrival at, and departure from, any intermediate aerodrome(s);

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

e) cruising level;

f) type of flight, whether under visual or instrument flight rules;

g) type of meteorological information requested for a flight crew member, whether flight documentation and/or briefing or consultation; and

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

Chapter 3. Global system, supporting centre and meteorological office

Note. – Technical specifications and detailed criteria related to this chapter are given in Appendix 2.

3.1 Objective of the World area forecast system

3.1.1 The objective of the world area forecast system shall be to supply meteorological authorities and other users with global aeronautical meteorological en-route forecasts in digital form. This objective shall be achieved through a comprehensive, integrated, worldwide and as far as practicable, uniform system, and in a cost-effective manner, taking full advantage of evolving technologies.

3.2 World area forecast centre

3.2.1 ICAO stipulates in Chapter 3 of the Annex 3 the products and services required of the contracting states which have accepted responsibilities for providing a WAFC within the framework of the world area forecast system. The WAFS products as in 3.2.1 Chapter 3 Annex 3 ICAO.

3.2.2 MET service provider(s) shall have to be familiar with the roles/functions of WAFCs so as to be able to interact with them and use their products/services effectively.

3.3 Aerodrome meteorological office

3.3.1 Three AMOs (Noi Bai, Da Nang, Tan Son Nhat) have been establish for the provision of the meteorological service for international air navigation. In case of need to change the arrangement, MET service provider would, in consultation with CAAV, VATM, operators and others concerned, re-arrange the AMO system or establish new AMO to ensure best availability, quality and effectiveness of MET service for flight operations in Vietnam.

3.3.2 An AMO shall carry out all or some of the following functions as necessary to meet the needs of flight operations at the aerodromes of responsibility:

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

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

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

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

e) supply other meteorological information to aeronautical users;

f) display the available meteorological information;

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

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

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

3.3.4 For an aerodrome without an AMO located at the aerodrome:

a) Noi Bai AMO of AMC, VATM shall issue aerodrome forecast and TREND (-type landing) forecasts for international airports: Noi Bai (Ha Noi), Cat Bi (Hai Phong) and Van Don (Quang Ninh), and domestic airports: Dien Bien (Dien Bien), Tho Xuan (Thanh Hoa), Vinh (Nghe An), Dong Hoi (Quang Binh).

b) Da Nang AMO of AMC, VATM shall issue aerodrome forecast and TREND (-type landing) forecasts for international airports: Da Nang (Da Nang), Phu Bai (Hue) and Cam Ranh (Nha Trang), and domestic airports: Chu Lai (Quang Nam), Phu Cat (Quy Nhon), Pleiku (Gia Lai), Tuy Hoa (Phu Yen).

c) Tan Son Nhat AMO of AMC, VATM shall issue aerodrome forecast and TREND (-type landing) forecasts for international airports: Tan Son Nhat (Ho Chi Minh City), Can Tho (Can Tho), Phu Quoc (Kien Giang), and domestic airports: Buon Ma Thuot (Dak Lak), Lien Khuong (Da Lat), Rach Gia (Kien Giang), Ca Mau (Ca Mau), Con Dao (Ba Ria - Vung Tau).

3.3.5 AMOs shall maintain documents and records of operation and maintenance of the service for both safety oversight and quality management purposes. Details of requirement for MET documents and records are provided in the Attachment E.

3.4 Meteorological watch office

3.4.1 The Met Watch Office (MWO) of AMC, VATM is responsible for providing MET watch for the two Vietnam's FIRs (Hanoi FIR and Ho_Chi_Minh FIR).

3.4.2 The MWO shall:

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

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

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

d) disseminate SIGMET information;

e) (Reserved)

f) supply information received on pre-eruption volcanic activity, a volcanic eruption and volcanic ash cloud for which a SIGMET has not already been issued, to its associated ACC/FIC, as agreed between the meteorological and ATS authorities concerned, and to its associated VAAC as determined by regional air navigation agreement; and

g) supply information received concerning the release of radioactive materials into the atmosphere in Vietnam's FIRs or adjacent areas, to the ACC and AIS units. The information shall comprise location, date and time of the release, and forecast trajectories of the radioactive materials.

3.4.3 The boundaries of the area over which meteorological watch is to be maintained by MWO shall be Hanoi FIR and Ho_Chi_Minh FIR.

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

Note. – Guidance on the bilateral or multilateral coordination between MWOs of Contracting States for the provision of SIGMET can be found in the APAC Regional SIGMET Guide.

3.4.5 A MWO shall maintain documents and records of operation and maintenance of the service for both safety oversight and quality management purposes. Details of requirement for MET documents and records are provided in the Attachment E.

3.5 Volcanic ash advisory centre (VAAC)

3.5.1 ICAO stipulates in Chapter 3 of Annex 3 the products and services required of the contracting states which have accepted responsibilities for providing a VAAC within the framework of the world area forecast system.

3.5.2 Vietnam FIRs lay out in the regions that shares the responsibility of Darwin VAAC to the south and Tokyo VAAC to the north. MWO shall have to be familiar with the roles/functions of the two VAACs so as to be able to interact with them and use their products/services effectively.

Note. – For this content, follow 3.5 Chapter 3 Annex 3 ICAO.

3.6 State volcano observatory

3.6.1 ICAO stipulates in Chapter 3 of the Annex 3 the requirements for contracting states which maintain volcano observatories monitoring active volcanoes.

3.6.2 Vietnam is not in the list of States maintaining volcano observatories. MWO shall have to be familiar with the roles/functions of volcano observatories in the region so as to be able to interact with them and use their products/services effectively.

Note. – For this content, follow 3.6 Chapter 3 Annex 3 ICAO.

3.7 Tropical cyclone advisory centre (TCAC)

3.7.1 ICAO stipulates in Chapter 3 of the Annex 3 the products and services required of the contracting states which have accepted responsibilities for providing a TCAC within the framework of the world area forecast system.

3.7.2 Vietnam has not a TCAC. The two FIRs of Vietnam lays out in the region that TCAC Tokyo providing a tropical cyclone advisory for. MWO shall have to be familiar with the roles/functions of the TCAC so as to be able to interact with them and use their products/services effectively.

Note. – For this content, follow 3.7 Chapter 3 Annex 3 ICAO.

3.8 Space weather centre (SWXC)

3.8.1 ICAO stipulates in Chapter 3 of the Annex 3 the products and services required of the contracting states which have accepted responsibilities for providing a space weather centre (SWXC) within the framework of the world area forecast system.

3.8.2 Vietnam has not a SWXC. MWO shall have to be familiar with the roles/functions of the SWXCso as to be able to interact with them and use their products/services effectively.

Note. – For this content, follow 3.8 Chapter 3 Annex 3 ICAO.

Chapter 4. Meteorological observations and reports

Note. – Technical specifications and detailed criteria related to this chapter are given in Appendix 3.

4.1 Aeronautical meteorological stations and observations

4.1.1 MET service provider has (and shall) establish an aerodrome meteorological station (AMS) at each civil aerodrome in the territory. According to the Vietnam Legislation (Law on Hydro-Meteorology and Law on Civil Aviation), aerodrome meteorological stations are separate from the scheme of the national hydro-meteorological synoptic stations, and operate under the regulations of Ministry of Transpiration,

Note. – AMS may include sensors installed outside the aerodrome, where considered justified, by the MET service provider to ensure the compliance of meteorological service for international air navigation with the provisions of this document.

4.1.2 *(Recommendation; reserved)*

4.1.3 AMS at the international airports shall make routine observations every 30 minute, throughout the 24 hours each day. 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.

4.1.4 Both CAAV and Met service provider shall arrange for AMSs to be inspected at sufficiently frequent intervals to ensure that a high standard of observation is maintained, that instruments and all their indicators are functioning correctly, and that the exposure of the instruments has not changed significantly.

Note. – Guidance on the inspection of aeronautical meteorological stations including the frequency of inspections is given in the Manual on Automatic Meteorological Observing Systems at Aerodromes (Doc 9837).

4.1.5 At aerodromes which can be used for Category II instrument approach and landing operations, automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure 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 integrated automatic systems shall observe Human Factors principles and include back-up procedures.

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

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

4.1.6 At aerodromes with runways intended for Category I instrument approach and landing operations, automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure 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 integrated automatic systems shall observe Human Factors principles and include back-up procedures.

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

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

4.2 Agreement between air traffic services authorities and meteorological authorities

4.2.1 An agreement between the aeronautical MET service company/centre and the relevant ATS provider/ATS company should be established to cover, among other things:

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

b) the calibration and maintenance of these displays/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) meteorological information obtained from ground weather radar.

Note 1. – Guidance on the subject of coordination between ATS and aeronautical meteorological services is contained in the Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services (Doc 9377).

Note 2. – Specifications on operation and maintenance of aerodrome meteorological equipment are provided in Attachment G.

4.2.2 MET service provider(s) shall establish relevant procedures in using or providing the data (if any) as listed 4.2.1 d)-f).

4.3 Routine observations and reports

4.3.1 At international airports, routine observations shall be made throughout the 24 hours of each day at intervals of a half-hour.

4.3.2 Reports of routine observations shall be issued as:

a) local routine reports (MET REPORT), only for dissemination at the aerodrome of origin (intended for arriving and departing aircraft); and

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

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

4.4 Special observations and reports

4.4.1 The criteria for special observations are those specified in Appendix 3.

4.4.2 Reports of special observations shall be issued as:

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

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

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

4.4.3 (Reserved).

4.5 Contents of reports

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

a) identification of the type of report;

b) location indicator;

c) time of the observation;

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

e) surface wind direction and speed;

f) visibility;

g) runway visual range, when applicable;

h) present weather;

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

j) air temperature and dew-point temperature; and

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

Note.– The location indicators referred to under b) and their significations are published in Location Indicators (Doc 7910).

4.5.2 **Recommendation.** – *In addition to elements listed under 4.5.1 a) to k), local routine reports, local special reports, METAR and SPECI shall contain supplementary information to be placed after element k.*

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

4.6 Observing and reporting meteorological elements

4.6.1 Surface wind

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

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

4.6.1.3 For METAR and SPECI, the surface wind observations shall be representative of conditions above the whole runway where there is only one runway and the whole runway

complex where there is more than one runway.

4.6.2 Visibility

4.6.2.1 The visibility as defined in Chapter 1 shall be measured or observed, and reported in meters or kilometers.

Note. – Guidance on the conversion of instrument readings into visibility is given in Attachment D.

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

4.6.2.3 For METAR and SPECI, the visibility observations shall be representative of the aerodrome.

4.6.3 Runway visual range

Note. – Guidance on the subject of runway visual range is contained in the Manual of Runway Visual Range Observing and Reporting Practices (Doc 9328).

4.6.3.1 Runway visual range as defined in Chapter 1 shall be assessed on all runways intended for Category II and III instrument approach and landing operations.

4.6.3.2 Runway visual range as defined in Chapter 1 shall be assessed on all runways intended for use during periods of reduced visibility, including precision approach runways intended for Category I instrument approach and landing operations; and

Note. – Precision approach runways are defined in Annex 14, Volume I, Chapter 1, under "Instrument runway".

4.6.3.3 The runway visual range, assessed in accordance with 4.6.3.1 and 4.6.3.2, shall be reported in metres throughout periods when either the visibility or the runway visual range is less than 1 500 m.

4.6.3.4 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; and

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

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

4.6.4 Present weather

4.6.4.1 The present weather occurring at the aerodrome shall be observed and reported as necessary. The following present weather phenomena shall be identified, as a minimum: rain, drizzle, snow and freezing precipitation (including intensity thereof), haze, mist, fog, freezing fog and thunderstorms (including thunderstorms in the vicinity).

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

4.6.4.3 For METAR and SPECI, the present weather information shall be representative of

conditions at the aerodrome and, for certain specified present weather phenomena, in its vicinity.

4.6.5 Clouds

4.6.5.1 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 metres (or feet).

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

4.6.5.3 Cloud observations for METAR and SPECI shall be representative of the aerodrome and its vicinity.

4.6.6 Air temperature and dew-point temperature

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

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

4.6.7 Atmospheric pressure

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

4.6.8 Supplementary information

4.6.8.1 **Recommendation. –** *Observations made at aerodromes shall 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.*

4.7 Reporting meteorological information from automatic observing systems

4.7.1 Aerodrome meteorological observations in Vietnam mainly use data derived from automatic observing systems, especially local routine and special reports. However, it is not recommended to use METAR, SPECI, MET REPORT and SPCIAL reports generated fully from automatic observing systems to serve international flight operation. Specifications on usage of AUTO METAR, SPECI, MET REPORT, SPCIAL are provided in the Standards of aeronautical meteorological service in Vietnam Vol. I (TCCS 25:2019/CHK).

Note. – Guidance on the use of automatic meteorological observing systems is given in Doc 9837.

4.7.2 (Reserved)

4.7.3 Local routine reports, local special reports, METAR and SPECI from automatic observing systems shall be identified with the word “AUTO”.

4.8 Observations and reports of volcanic activity

4.8.1 (Reserved)

Chapter 5. Aircraft observations and reports

Note. – Technical specifications ad detailed criteria related to this chapter are given in Appendix 4.

5.1 Obligation of service provider

5.1.1 Aircraft departing or arriving to an airport in Vietnam and aircraft operating on international air routes are asked to make aircraft observations and report, following Annex 3 ICAO.

5.2 Types of aircraft observations

5.2.1 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.

5.3 (Reserved)

5.4 (Reserved)

5.5 Special aircraft observations

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

a) moderate or severe turbulence; or

b) moderate or severe icing; or

c) severe mountain wave; or

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

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

f) heavy duststorm or heavy sandstorm; or

g) volcanic ash cloud; or

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

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

5.6 Other non-routine aircraft observations

5.6.1 When other meteorological conditions not listed under 5.5, 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 air traffic services unit as soon as practicable.

Note. – Icing, turbulence and, to a large extent, wind shear are elements which, for the time being, cannot be satisfactorily observed from the ground and for which in most cases aircraft observations represent the only available evidence.

5.6.2 On receipt from ATS units the routine reports, Meteorological Watch Office shall disseminate the reports to WAFCs without delay.

5.6.3 On receipt from ATS units the special reports, Meteorological Watch Office shall

disseminate the reports to the WAFCs, VAACs and other bi-laterally arranged meteorological services without delay.

5.7 Reporting of aircraft observations during flight

5.7.1 (Reserved)

5.7.2 (Reserved)

5.7.3 Aircraft observations shall be reported as air-reports.

5.8 Relay of air-reports by ATS units

5.8.1 The relay of air-reports shall be arranged between the MET service provider/company/unit and relevant ATS service provider/company/unit. The MET service units shall be familiar with the arrangement and the associated codes so as to be able to disseminate and use the data effectively.

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

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

Chapter 6. Forecasts

Note. – Technical specifications and detailed criteria related to this chapter are given in Appendix 5.

6.1 Use of forecasts

6.1.1 The issue of a new forecast by the AMO, 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.

6.2 Aerodrome forecasts

6.2.1 Aerodrome forecast for an aerodrome shall be prepared, in accordance with regional air navigation agreement, by the responsible AMO as in 3.3.4 Chapter 3.

Note. – The aerodromes for which aerodrome forecasts are to be prepared and the period of validity of these forecasts are listed in the relevant facilities and services implementation document (FASID).

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

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

a) 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.

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.

6.2.4 AMO 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.

Note. – Guidance on methods to keep TAF under continuous review is given in Chapter 3 of the Manual of Aeronautical Meteorological Practice (Doc 8896).

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

6.2.6 Routine TAF valid for 24 or 30 hours and shall be issued every 6 hours.

6.2.7 When issuing TAF, AMO shall ensure that not more than one TAF is valid at an aerodrome at any given time.

6.3 Landing forecasts

6.3.1 A landing forecast shall be prepared by the associated AMO as determined in 3.3.4 Chapter 3; such forecasts are intended to meet the requirements of local users and of aircraft within about one hour's flying time from the aerodrome.

6.3.2 Landing forecasts shall be prepared in the form of a TREND forecast.

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

6.4 Forecasts for take-off

6.4.1 A forecast for take-off shall be provided as agreed between the operator and MET provider concerned.

6.4.2 **Recommendation.** – *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 direction and speed and any variations thereof, temperature, pressure (QNH), and any other elements as agreed locally*.

6.4.3 **Recommendation.** – *A forecast for take-off shall be supplied to operators and flight crew members on request within the 3 hours before the expected time of departure*.

6.4.4 **Recommendation.** – *AMO shall keep the forecasts under continuous review and, when necessary, should issue amendments promptly*.

6.5 Area forecasts for low-level flights

6.5.1 (Reserved).

Note. – According to the APAC ANP, CAA of Vietnam has not yet put into regulations the task of preparing and issuing routine area forecast.

Chapter 7. SIGMET and AIRMET information, aerodrome warnings and wind shear warnings and alerts

Note. – Technical specifications and detailed criteria related to this chapter are given in Appendix 6.

7.1 SIGMET information

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

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

7.1.3 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 and tropical cyclones, the period of validity shall be extended up to 6 hours.

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

7.1.5 Close coordination shall be maintained between the meteorological watch office and the associated area control centre/flight information centre to ensure that information on volcanic ash included in SIGMET and NOTAM messages is consistent.

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

7.2 AIRMET information

Note. – (In accordance to Air Navigation Plan Volume 1, Basic ANP, Part VI, there is currently no requirements for issuing AIRMET messages in the Asia/Pacific region.).

7.3 Aerodrome warnings

7.3.1 Aerodrome warnings shall be issued by the responsible AMO 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. Subject to agreement between the ATS and meteorological authority, additional meteorological conditions which could adversely affect aircraft on the approach path or take-off path may be included.

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

7.4 Wind shear warnings and alerts

Note. – Guidance on the subject is contained in the Manual on Low-level Wind Shear (Doc 9817). Wind shear alerts are expected to complement wind shear warnings and together are intended to enhance situational awareness of wind shear.

7.4.1 Wind shear warnings shall be prepared by the responsible AMO for aerodrome where wind shear is considered a factor, in accordance with local arrangements with the appropriate ATS unit and operators concerned. Wind shear warnings shall give concise information on the observed or expected existence of wind shear which could adversely affect aircraft on the

approach path or take-off path or during circling approach between runway level and 500 m (1 600 ft) above that level and aircraft on the runway during the landing roll or take-off run. Where local topography has been shown to produce significant wind shears at heights in excess of 500 m (1 600 ft) above runway level, then 500 m (1 600 ft) shall not be considered restrictive.

7.4.2 Wind shear warnings for arriving aircraft and/or departing aircraft shall be cancelled when aircraft reports and/or ground-based wind shear detection equipment indicate that wind shear no longer exists.

7.4.3 At aerodromes where wind shear is detected by automated, ground-based, wind shear remote-sensing or detection equipment, wind shear alerts generated by these systems shall be issued. Wind shear alerts shall give concise, up-to-date information related to the observed existence of wind shear involving a headwind/tailwind change of 7.5 m/s (15 kt) or more which could adversely affect aircraft on the final approach path or initial take-off path and aircraft on the runway during the landing roll or take-off run.

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

Chapter 8. Aeronautical climatological information

Note. – Technical specifications and detailed criteria related to this chapter are given in Appendix 7.

8.1 General provisions

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

8.1.1 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 as agreed between the MET service provider and the users concerned.

Note. – Climatological data required for aerodrome planning purposes are set out in Annex 14, Volume I, 3.1.4 and Appendix 7.

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

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

8.2 Aerodrome climatological tables

8.2.1 AMOs shall make arrangements for collecting and retaining the necessary observational data and have the capability:

a) to prepare aerodrome climatological tables for the international aerodrome within its area of responsibility; and

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

8.3 Aerodrome climatological summaries

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

8.4 Copies of meteorological observational data

8.4.1 MET service provider on request and to the extent practicable, shall make available to any meteorological authority, 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. Service for operators and flight crew members

Note. – Technical specifications and detailed criteria related to this chapter are given in Appendix 8.

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 alternate 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 agreed between the meteorological authority and the operators concerned:

a) forecasts of

1) upper wind and upper-air temperature;
2) upper-air humidity;
3) geopotential altitude of flight levels;
4) flight level and temperature of tropopause;
5) direction, speed and flight level of maximum wind; and
6) SIGWX phenomena; and
7) Cumulonimbus clouds, icing and turbulence.

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

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

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

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

d) forecasts for take-off;

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

f) volcanic ash and tropical cyclone advisory information relevant to the whole route;

g) (Reserved)

h) aerodrome warnings for the local aerodrome;

i) meteorological satellite images; and

j) ground-based weather radar information; and

k) space weather advisory information relevant to the whole route

9.1.4 Forecasts listed under 9.1.3 a) shall be generated from the digital forecasts provided by the WAFCs whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, unless otherwise agreed between the meteorological authority and the operator concerned.

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

9.1.6 Charts generated from the digital forecasts provided by the WAFCs shall be made available, as required by operators, for fixed areas of coverage as shown in Appendix 8, Figures A8-1, A8-2 and A8-3.

9.1.7 When forecasts of upper wind and upper-air temperature listed under 9.1.3 a) 1) are supplied in chart form, they shall be fixed time prognostic charts for flight levels as specified in Appendix 2, 1.2.2 a). When forecasts of SIGWX phenomena listed under

9.1.3 a) 6) are supplied in chart form, they shall be fixed time prognostic charts for an atmospheric layer limited by flight levels as specified in Appendix 2, 1.3.2 and Appendix 5, 4.3.2.

9.1.8 The forecasts of upper wind and upper-air temperature and of SIGWX phenomena above flight level 100 requested for pre-flight planning and in-flight re-planning by the operator shall be supplied as soon as they become available, but not later than 3 hours before departure. Other meteorological information requested for pre-flight planning and in-flight re-planning by the operator shall be supplied as soon as is practicable.

9.1.9 (Reserved)

9.1.10 Meteorological information shall be supplied to operators and flight crew members through secured internet or at the aerodrome of departure, as agreed between MET service provider and the operator concerned. The service for pre-flight planning shall be confined to flights originating within the territory of Vietnam.

9.2 Briefing, consultation and display

Note. – The requirements for the use of automated pre-flight information systems in providing briefing, consultation and display are given in 9.4.

9.2.1 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, as agreed between the meteorological authority and the operator concerned, in lieu of flight documentation.

9.2.2 Meteorological information used for briefing, consultation and display shall include any or all of the information listed in 9.1.3.

9.2.3 If the AMO 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.

9.2.4 The required briefing, consultation, display and/or flight documentation shall be provided by the AMO associated with the aerodrome of departure. In exceptional circumstances, such as an undue delay, the AMO associated with the aerodrome shall provide or, if that is not practicable, arrange for the provision of a new briefing, consultation and/or flight documentation as necessary.

9.2.5 Where local circumstances make personal briefing or consultation impracticable, the AMO shall provide those services by telephone or other suitable telecommunications facilities to flight crew members or other flight operation personnel.

9.3 Flight documentation

Note. – The requirements for the use of automated pre-flight information systems in providing flight documentation are given in 9.4

9.3.1 Flight documentation to be made available shall comprise information listed under 9.1.3 a) 1) and 6), b), c), e) and f). However, flight documentation for flights of two hours' duration or less, after a short stop or turnaround, shall be limited to the information operationally needed, as agreed between the meteorological provider and operator concerned, but in all cases the flight documentation shall at least comprise information on 9.1.3 b), c), e), f) and, if appropriate, k).

9.3.2 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 as agreed between the operator and the AMO concerned.

9.3.3 In cases where a need for amendment arises after the flight documentation has been supplied, and before take-off of the aircraft, the AMO shall issue the necessary amendment or updated information to the operator or to the local air traffic services unit, for transmission to the aircraft.

9.3.4 MET service provider(s) 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.

9.4 Automated pre-flight information systems for briefing, consultation, flight planning and flight documentation

9.4.1 Where the MET service provider uses automated pre-flight information systems to supply and display meteorological information to operators and flight crew members for self-briefing, flight planning and flight documentation purposes, the information supplied and displayed shall comply with the relevant provisions in 9.1 to 9.3 inclusive.

9.4.2 (Reserved)

9.4.3 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 MET service provider shall remain responsible for the quality control and quality management of meteorological information provided by means of such systems in accordance with Chapter 2, 2.2.2.

9.5 Information for aircraft in flight

9.5.1 Meteorological information for use by aircraft in flight shall be supplied by the AMO to its associated air traffic services unit and through D-VOLMET or VOLMET broadcasts as determined by regional air navigation agreement. Meteorological information for planning by the operator for aircraft in flight shall be supplied on request, as agreed between the meteorological authority or authorities and the operator concerned.

9.5.2 Meteorological information for use by aircraft in flight shall be supplied to air traffic services units in accordance with the specifications of Chapter 10.

9.5.3 Meteorological information shall be supplied through D-VOLMET or VOLMET

broadcasts in accordance with the specifications of Chapter 11.

Chapter 10. Information for air traffic services, search and rescue services and aeronautical information services

Note. – Technical specifications and detailed criteria related to this chapter are given in Appendix 9.

10.1 Information for air traffic services units

10.1.1 The AMO associated with the air traffic services units at the international airports in Northern, Middle, and Southern Regions of Vietnam is Noi Bai, Da Nang, and Tan Sơn Nhat AMO, respectively. There're also AMS at each airport to serve aerodrome observation and reports.

10.1.2 The AMOs shall, after coordination with the air traffic services units, supply, or arrange for the supply of, up-to-date meteorological information to the units as necessary for the conduct of their functions.

10.1.3 The MWO of AMC, VATM shall be associated with flight information centre(s) and area control centres for the provision of meteorological information.

10.1.4 (Reserved)

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

10.2 Information for search and rescue services units

10.2.1 AMOs and MWO shall supply search and rescue services units with the meteorological information they require in a form established by mutual agreement. For that purpose, the AMO/MWO shall maintain liaison with the search and rescue services unit throughout a search and rescue operation.

10.3 Information for aeronautical information services units

10.3.1 AMOs and MWO shall supply up-to-date meteorological information to relevant aeronautical information services units, as necessary, for the conduct of their functions.

Chapter 11. Requirements for and use of communications

Note 1. – Technical specifications and detailed criteria related to this chapter are given in Appendix 10.

11.1 Requirements for communications

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

11.1.2 Suitable telecommunications facilities shall be made available to permit MWO to supply the required meteorological information to air traffic services and search and rescue services units in respect of the flight information regions, control areas and search and rescue regions for which those offices are responsible, and in particular to flight information centres, area control centres and rescue coordination centres and the associated aeronautical telecommunications stations.

11.1.3 Suitable telecommunications facilities shall be made available to permit world area forecast centres to supply the required world area forecast system products to MET provider (AMOs, MWO) and other users.

11.1.4 Telecommunications facilities between AMO, AMS and associated aerodrome control towers and 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 AMOs or MWO and flight information centres, area control centres, rescue coordination centres and aeronautical telecommunications stations shall 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 shall 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 **Recommendation. –** *The telecommunications facilities required in accordance with 11.1.4 and 11.1.5 should be supplemented, as and where necessary, by other forms of visual or audio communications, for example, closed-circuit television or separate information processing systems.*

11.1.7 **Recommendation.** – *As agreed between the meteorological authority and the operators concerned, provision should be made to enable operators to establish suitable telecommunications facilities for obtaining meteorological information from AMO, MWO, AMS or other appropriate sources.*

11.1.8 Suitable telecommunications facilities shall be made available to permit MET units (AMO, MWO, AMS) to exchange operational meteorological information with other MET units.

11.1.9 The telecommunications facilities used for the exchange of operational meteorological information shall be the aeronautical fixed service or, for the exchange of non-time critical operational meteorological information, the public Internet, subject to availability, satisfactory

operation and bilateral/multilateral and/or regional air navigation agreements.

Note 1. – Aeronautical fixed service Internet-based services, operated by the WAFC, providing for global coverage are used to support the global exchanges of operational meteorological information.

Note 2. – Guidance material on non-time-critical operational meteorological information and relevant aspects of the public Internet is provided in the Guidelines on the Use of the Public Internet for Aeronautical Applications (Doc 9855).

11.2 Use of aeronautical fixed service communications and the public Internet – meteorological bulletins

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

Note. – Meteorological bulletins containing operational meteorological information authorized for transmission via the aeronautical fixed service are listed in Annex 10, Volume II, Chapter 4, together with the relevant priorities and priority indicators.

11.3 Use of aeronautical fixed service communications – world area forecast system products

11.3.1 (Reserved)**.**

11.4 Use of aeronautical mobile service communications

11.4.1 The content and format of meteorological information transmitted to aircraft and by aircraft shall be consistent with the provisions of this MOS-MET.

11.5 Use of aeronautical data link service – contents of D-VOLMET

11.5.1 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.

Note. – The requirement to provide METAR and SPECI may be met by the data link-flight information service (D-FIS) application entitled "Data link-aerodrome routine meteorological report (D-METAR) service"; the requirement to provide TAF may be met by the D-FIS application entitled "Data link-aerodrome forecast (D-TAF) service"; and the requirement to provide SIGMET and AIRMET messages may be met by the D-FIS application entitled "Data link-SIGMET (D-SIGMET) service". The details of these data link services are specified in the Manual of Air Traffic Services Data Link Applications (Doc 9694).

11.6 Use of aeronautical broadcasting service – contents of VOLMET broadcasts

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

11.6.2 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.

Appendix1. FLIGHT DOCUMENTATION – MODEL CHARTS AND FORMS

Model charts and forms for preparing Flight Documentation follow the model charts and forms given in Appendix 1, Annex 3 ICAO:

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

Appendix 2. TECHNICAL SPECIFICATIONS RELATED TO GLOBAL SYSTEMS, SUPPORTING CENTRES AND METEOROLOGICAL OFFICES

1. WORLD AREA FORECAST SYSTEM

1.1 ICAO stipulates in Appendix 2 of Annex 3 the technical specifications related to world area forecast system required of the contracting states which have accepted responsibilities for providing a WAFC within the framework of the world area forecast system.

1.2 Aeronautical MET service provider(s) shall have to be familiar with the technical specifications so as to be able to interact with them and use its products/services effectively.

1.3 Details about WAFC and technical specifications of WAFS products (Upper-air gridded forecasts, Significant weather (SIGWX) forecasts) including types of products, resolutions, times of dissemination are shown in Appendix 2, Annex 3 ICAO.

2. AERODROME METEOROLOGICAL OFFICES

2.1 Use of WAFS products

2.1.1 The AMO shall use forecasts issued by the WAFCs in the preparation of flight documentation, whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent.

2.1.2 In order to ensure uniformity and standardization of flight documentation, the WAFS GRIB and BUFR data shall be decoded into standard WAFS charts in accordance with relevant provisions in this Document, and the meteorological content and identification of the originator of the WAFS forecasts shall not be amended.

2.2 Notification of WAFC concerning significant discrepancies

2.2.1 The AMO using WAFS BUFR or IWXXM data shall notify the WAFC concerned immediately if significant discrepancies are detected or reported in respect of WAFS SIGWX forecasts concerning:

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

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

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

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

3. VOLCANIC ASH ADVISORY CENTRES (VAAC)

3.1 ICAO stipulates in Appendix 2 of Annex 3 the technical specifications required of the contracting states which have accepted responsibilities for providing a VAAC within the framework of the world area forecast system.

3.2 Vietnam FIRs lay out in the regions that shares the responsibility of Darwin VAAC to the south and Tokyo VAAC to the north. MWO shall have to be familiar with the

roles/functions of the two VAACs so as to be able to interact with them and use their products/services effectively.

3.3 Details in volcanic ash advisory information including template and example for advisory message for volcanic ash are described in Appendix 2 Annex 3 ICAO.

4. STATE VOLCANO OBSERVATORY

(Reserved)

5. TROPICAL CYCLONE ADVISORY CENTRES (TCAC)

5.1. ICAO stipulates in Appendix 2 of the Annex 3 the technical specifications of the products and services required of the contracting states which have accepted responsibilities for providing a TCAC within the framework of the world area forecast system.

5.2 Vietnam has not a TCAC. The two FIRs of Vietnam lays out in the region that TCAC Tokyo providing a tropical cyclone advisory for. MWO shall have to be familiar with the roles/functions of the TCAC so as to be able to interact with them and use their products/services effectively.

5.3 Details in cyclone advisory information including template and example for advisory message for tropical cyclone are described in Appendix 2 Annex 3 ICAO.

6. SPACE WEATHER CENTRES

6.1 ICAO stipulates in Chapter 3 of the Annex 3 the products and services required of the contracting states which have accepted responsibilities for providing a space weather centre (SWXC) within the framework of the world area forecast system.

6.2 Vietnam has not a SWXC. MWO shall have to be familiar with the roles/functions of the SWXC so as to be able to interact with them and use their products/services effectively.

6.3 Details in space weather advisory information including template and example for space weather advisory message are described in Appendix 2 Annex 3 ICAO. Specifications on spatial ranges and resolutions for space weather advisory information follow the Attachment E in Annex 3 ICAO.

Appendix3. TECHNICAL SPECIFICATIONS RELATED TO METEOROLOGICAL OBSERVATIONS AND REPORTS

1. GENERAL PROVISIONS RELATED TO METEOROLOGICAL OBSERVATIONS

1.1 Meteorological Observation

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

Note. – Specifications concerning the siting of equipment and installations on operational areas, aimed at reducing the hazard to aircraft to a minimum, are contained in Annex 14, Volume I, Chapter 9, and the Manual on Automatic Meteorological Observing Systems at Aerodromes (Doc 9837).

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

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

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

GENERAL CRITERIA RELATED TO METEOROLOGICAL REPORTS

2.1 Format of meteorological reports

2.1.1 Local routine and special reports shall be issued in abbreviated plain language, in accordance with the and Manual of Aeronautical Meteorological Messages of CAAV and template shown in Table A3-1 of Annex 3 ICAO.

2.1.2 METAR and SPECI shall be issued and disseminated in the METAR and SPECI code forms in accordance with the Manual of Aeronautical Meteorological Messages of CAAV and the WMO Publication No. 306, Manual on Codes, Volume I.1, Part A — Alphanumeric Codes.

2.1.3 METAR and SPECI shall be disseminated in IWXXM GML form, in addition to the dissemination of the METAR and SPECI in accordance with 2.1.2.

Note. – The technical specifications for IWXXM are contained in the Manual on Codes (WMO-No. 306), Volume I.3, Part D — Representation Derived from Data Models. Guidance on the implementation of IWXXM is provided in the Manual on the ICAO Meteorological Information Exchange Model (IWXXM) (Doc 10003).

2.2 Use of CAVOK

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

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

b. no cloud of operational significance;

c. no weather of significance to aviation.

Note. – Details for the conditions that can be used for report CAVOK are described in the Manual of Aeronautical Meteorological Messages of CAAV and in Annex 3 ICAO.

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

2.3 Criteria for issuance of local special reports and SPECI

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

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

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

c. an increase in air temperature of 2°C or more from that given in the latest report;

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

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

f. those values which constitute criteria for SPECI.

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

a) to wind:

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

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

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

iv) When gust happens or stops (wind speed increases higher than average speed by 10 kt or more) with mean wind speed before and/or after change being 15 kt or more.

v) when the wind changes through values of operational significance taking into account changes in the wind which would:

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

— indicate that the runway tailwind and crosswind components have changed through values representing the main operating limits for aircraft operating at the aerodrome that have been set by CAAV;

b) To visibility or RVR:

i) 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. 3 000 and 5 000 m; or

— operating minima for aircraft operating at the aerodrome.

ii) when the runway visual range is improving and changes to or passes through one or more of the following values, or when the runway visual range is deteriorating and passes through one or more of the following values: 50,175, 300, 550 or 800 m, or operating minima for aircraft operating at the aerodrome.

c) To weather:

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

— freezing precipitation

— moderate or heavy precipitation (including showers thereof)

— thunderstorm (with precipitation)

— duststorm

— sandstorm

— funnel cloud (tornado or waterspout);

ii) when the onset or cessation of any of the following weather phenomena occurs:

— freezing fog

— thunderstorm (without precipitation)

— low drifting dust, sand or snow

— blowing dust, sand or snow

— squall.

d) To cloud or vertical visibility:

i) 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), 450 m (1 500 ft; or

— operating minima for aircraft operating at the aerodrome.

ii) 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);

Note. – Details on criteria for issuance of local special reports and SPECI are described in the Manual of Aeronautical Meteorological Messages of CAAV.

2.3.3 When a deterioration of one weather element is accompanied by an improvement in another element, a single SPECI shall be issued; it shall then be treated as a deterioration report.

3. DISSEMINATION OF METEOROLOGICAL REPORTS

3.1 METAR and SPECI

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

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

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

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

3.2 Local routine and special reports

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

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

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

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

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

4. OBSERVING AND REPORTING OF METEOROLOGICAL ELEMENTS.

Note. – Details for observing and reporting of MET element, METAR, SPECI, MET REPORT, SPECIAL, includes templates and examples are given in the ICAO Manual of Aeronautical Meteorological Practice (Doc 8896); WMO Manual on Codes (WMO-No. 306), Volume I.1, Part A — Alphanumeric Codes; Standard of Aeronautical Meteorology Vol. I and the Manual of Aeronautical Meteorological Messages of CAAV.

APPENDIX 4. TECHNICAL SPECIFICATIONS RELATED TO AIRCRAFT OBSERVATIONS AND REPORTS

Details on the content, exchange of the aircraft observations and reports, including templates for the special air-report follow Appendix 4, Annex 3 ICAO.

APPENDIX 5. TECHNICAL SPECIFICATIONS RELATED TO FORECASTS

Details on the format, content, and other specifications related, including templates for TAF, TREND, forecast for take-off follow Appendix 5, Annex 3 ICAO, the Standard of Aeronautical Meteorology Vol. I and the Manual of Aeronautical Meteorological Messages of CAAV.

APPENDIX 6. TECHNICAL SPECIFICATIONS RELATED TO SIGMET AND AIRMET INFORMATION, AERODROME WARNINGS AND WIND SHEAR WARNINGS AND ALERTS

Details on the format, content, and other specifications related, including templates for TAF, TREND, forecast for take-off follow Appendix 6 Annex 3 ICAO, the Standard of Aeronautical Meteorology Vol. I and the Manual of Aeronautical Meteorological Messages of CAAV.

APPENDIX 7. TECHNICAL SPECIFICATIONS RELATED TO AERONAUTICAL CLIMATOLOGICAL INFORMATION

Details on the format, content, and other specifications related, including templates for TAF, TREND, forecast for take-off follow Appendix 7 Annex 3 ICAO and the Standard of Aeronautical Meteorology Vol. I.

APPENDIX 8. TECHNICAL SPECIFICATIONS RELATED TO SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

Details on MET service for flight operators and crew members follow the regulations and standards in Appendix 8 Annex 3 ICAO and the Standard of Aeronautical Meteorology Vol. I.

APPENDIX 9. TECHNICAL SPECIFICATIONS RELATED TO INFORMATION FOR AIR TRAFFIC SERVICES, SEARCH AND RESCUE SERVICES AND AERONAUTICAL INFORMATION SERVICES

Details on MET service for ATS, SAR services and AIS follow the regulations and standards in Appendix 9 Annex 3 ICAO and the Standard of Aeronautical Meteorology Vol. I.

APPENDIX 10. TECHNICAL SPECIFICATIONS RELATED TO REQUIREMENTS FOR AND USE OF COMMUNICATIONS

1. SPECIFIC REQUIREMENTS FOR COMMUNICATIONS

1.1 Required transit times of operational meteorological information

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

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

2.1 **Recommendation.** – *Whenever possible, exchanges of operational meteorological information should be made in consolidated bulletins of the same types of meteorological information.*

2.2 Filing times of bulletins

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 not earlier than one hour prior to the beginning of their validity period.

2.3 Heading of bulletins

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

a) an identifier of four letters and two figures;

b) the ICAO four-letter location indicator corresponding to the geographical location of the meteorological office originating or compiling the meteorological bulletin;

c) a day-time group; and

d) if required, a three-letter indicator.

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

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

3. USE OF AERONAUTICAL MOBILE SERVICE COMMUNICATIONS

3.1 For specifications on the use of aeronautical mobile service communications for international air navigation follow Appendix 10 Annex 3 ICAO.

ATTACHMENT A. OPERATIONALLY DESIRABLE ACCURACY OF MEASUREMENT OR OBSERVATION

Specifications on operational accuracy called for aerodrome observations follow ICAO SARPs in Attachment A of ICAO Annex 3, and the Attachment B (Phu Luc B) of Standard of Aeronautical Meteorology Vol. I.

ATTACHMENT B. OPERATIONALLY DESIRABLE ACCURACY OF FORECASTS

Specifications on operational accuracy called for aeronautical forecasts follow ICAO SARPs in Attachment B of ICAO Annex 3, and Attachment C (Phu Luc C) in the Standard of Aeronautical Meteorology Vol. I.

ATTACHMENT C. SELECTED CRITERIA APPLICABLE TO AERODROME REPORTS

Specifications on selected criteria applicable to aerodrome report follow the Attachment C in Annex 3 ICAO, and Attachment D (Phu Luc D) in the Standard of Aeronautical Meteorology Vol. I.

ATTACHMENT D. CONVERSION OF INSTRUMENTED READINGS INTO RUNWAY VISUAL RANGE AND VISIBILITY

Specifications on conversion of instrumented readings into RVR and visibility follow the Attachment D in Annex 3 ICAO.

ATTACHMENT E. METEOROLOGICAL DOCUMENTS AND RECORDS

1. Documents and Records

1.1 The MET Service Provider shall maintain documents and records of operation and maintenance of the service for both safety oversight and quality management purposes. These documents shall include:

a) ICAO documents on MET service for aviation;

b) Vietnam Legislation and Regulations; CAAV's Manuals, regulations and Guidance material related to aeronautical meteorological MET service;

c) The MET Service Provider's Quality Management System;

d) Different MET data in relevant length of time as specified in Article 130 of ANS Regulations;

e) Record of malfunction/fault of critical safety facilities;

f) Safety audit and inspection documentation;

g) MET personnel Documentation including training records, license and rating records.

2. Document Control

2.1 The MET Service Provider shall establish a process for the authorization and amendment of these documents to ensure that they are updated all the time. The process shall ensure that:

a) the currency of the documentation can be readily determined;

b) all amendments to the documentation are controlled in accordance with established quality management principles;

c) only current versions of documents are available.

2.2 Documents may be held as computer based records provided that where paper copies of computer-based records are made, they are subjected to the same control as paper documents

ATTACHMENT F. COMPETENCY STANDARDS FOR AERONAUTICAL METEOROLOGICAL PERSONNEL

1. Competency assessment system for aeronautical meteorological personnel

1.1 Specifications on the competency assessment system (CAS) for aeronautical meteorological personnel are given in the Competency Assessment Program for Aeronautical Meteorological Personnel (MET CAS), promulgated by the Decision No. 1991/QĐ-CHK dated 23/11/2021.

2. Conduct of Assessment

MET service provider shall:

a) assess the competency of its MET personnel.

b) ensure that the competency assessment is in accordance to the guidelines developed and endorsed by the WMO Commission for Aeronautical Meteorology (CAeM).

c) ensure that all MET personnel satisfy the competency standards.

3. Requirement for Assessors

MET service provider shall:

d) appoint Assessors to conduct the competency assessment for its MET personnel;

e) ensure that the Assessors are not the direct Supervisor of the MET personnel under assessment in order to prevent conflict of interest;

f) ensure that the Assessors are adequately trained to conduct the assessment;

g) ensure that the Assessors of the MET forecasters possess a meteorological qualification which satisfies the WMO's Basic Instruction Package for Meteorologists (BIP-

h) M) and have at least three years of operational experience as an aeronautical meteorological forecaster; and

i) ensure that the Assessors for the Aeronautical Meteorological Observer possess a meteorological qualification which satisfies the WMO's Basic Instruction Package for Meteorological Technician (BIP-MT) and have at least five years operational experience as an Aeronautical Meteorological observer.

4. Qualification and Training Requirements for Aeronautical Meteorological Observers

4.1 The Aeronautical Meteorological Observer (MET observer) shall be a person who holds a diploma (two-year education) in meteorology or equivalent so that they have successfully completed the Basic Instruction Package for Meteorological Technicians (BIP-MT) as described in the Technical Regulations (WMO-No. 49) Volume I, Part V. In addition, they have to acquired background knowledge and skills of aeronautical meteorological observers described in 2.2.2 of the Document WMO-No. 1209, in 5.2.8.1 of the Standard of Aeronautical Meteorology Vol. I, and in the Attachment 2 to the MET CAS Program.

4.2 The MET Observer shall also be trained in an initial course for aeronautical meteorological personnel conducted by a training institutions certified or recognized by CAAV.

4.3 The MET Observer shall undergo on-the-job training for a period of at least 6 months as an aeronautical meteorological forecaster. The on-the-job experience shall encompass

situations where the trainee will be exposed to both hazardous and non-hazardous weather conditions.

4.4 For an experienced meteorological forecaster from an alternative meteorological specialization, the on-the-job experience can be shortened to a period not more than 6 months. However, in any case it must ensure that he or she obtain knowledge and basic performance skill on basic Meteorology including phenomena that may impact on flight operations, operation of aerodrome weather observing instruments, ICAO SARPs for weather observations provided for international air navigation, specialized work procedures/standards/regulations, and any other local topics as decided by the MET service provider.

5. Qualifications and Training Requirements for Aeronautical Meteorological Forecaster (MET forecaster)

5.1 MET forecasters shall be a person who holds a university degree or equivalent majored in meteorology so that they have successfully completed the Basic Instruction Package for Meteorologists (BIP-M) as described in the Technical Regulations (WMO-No. 49) Volume I, Part V. In addition, they have to acquired background knowledge and skills of aeronautical meteorological forecasters described in 2.2.1 of the Document WMO-No. 1209, in 5.2.8.2 of the Standard of Aeronautical Meteorology Vol. I, and in the Attachment 2 to the MET CAS Program.

5.2 The MET forecaster shall also be trained in an initial course for aeronautical meteorological personnel conducted by a training institutions certified or recognized by CAAV.

5.3 The MET forecaster shall undergo on-the-job training for a period of at least 6 months as an aeronautical meteorological forecaster. The on-the-job experience shall encompass situations where the trainee will be exposed to both hazardous and non-hazardous weather conditions.

5.4 For an experienced meteorological forecaster from an alternative meteorological specialization, the on-the-job experience can be shortened to a period not more than 6 months. However, in any case it must ensure that he or she obtain knowledge and basic performance skill on significant weather phenomena to flight operations (thunderstorm rain, lightning, turbulence, volcanic ash, etc), ICAO SARPs for MET service provided for international air navigation, specialized work procedures/standards/regulations and any other local topics as decided by the MET service provider.

ATTACHMENT G. AERODROME METEOROLOGICAL EQUIPMENT – OPERATION AND MAINTENANCE

1. Safety Critical MET Facilities are those hardware or software applications that generate/disseminate meteorological data directly for use in managing air-traffic. These include AWOS or backup aerodrome observing equipment/instruments, low-level wind-shear detection systems (Meteorological Doppler Weather Radar, LLWAS). In order to maintain the required level of performance, the MET service provider shall establish an overall operation and maintenance plan, which shall meet the following safety requirements as stipulated in ICAO Doc 4444 (ATM/501), Chapter 2:

a) The MET facilities shall:

i. be tested for normal operations on a routine basis;

ii. meet the required level of accuracy, reliability and availability through a combination of routine calibrations, testing and/or regular parts replacement, and timely resolution of system failures;

iii. provide for the timely and appropriate detection and warning of system failures and degradations.

iv. include documentation on the consequences of system, sub-system and equipment failures and degradations; and

v. include measures to control the probability of failures and degradations.

b) Detailed records of systems and equipment serviceability shall be kept and periodically reviewed.

2. In addition to meeting the above safety requirements, the MET service provider shall also establish an operation and maintenance plan for each facility. The plan shall include:

c) A procedure for the periodic inspection of each facility to verify that it meets the operational and performance specification of that facility;

d) The operation and maintenance instructions for each facility;

e) An analysis of the number of personnel required to operate and maintain each facility taking into account the workload required;

f) The corrective plan and procedures for each facility, such as whether the repair of modules and component are undertaken in-house or by equipment manufacturers;

g) The spare support plan for each facility.
