Air Navigation Order
For
Meteorological Service

ANO (MET)
First Edition 2014

CIVIL AVIATION AUTHORITY

BANGLADESH

Amendments

Amendments and Corrigenda to “Air Navigation Order (Meteorology)” is issued by the Chairman, Civil Aviation Authority, Bangladesh. The space below is provided to keep a record of such amendments.

Record of amendments and corrigenda

CORRIGENDA			
No.	DATE APPLICABLE	DATE ENTERED	ENTERED BY

AMENDMENT			
No.	DATE APPLICABLE	DATE ENTERED	ENTERED BY

1. Word meanings

1.1 "shall" means a procedure is mandatory.
1.2 "should" means a procedure is recommended
1.3 "may" means a procedure is optional
1.4 "will mean futurity, not a requirement for the application of a procedure.
1.5 "Bangladesh" means The People's Republic of Bangladesh.

FOREWORD

Article 28 (Air Navigation facilities and standard systems) of the Convention on International Civil Aviation requires each Contracting State to provide, in its territory, airports, radio services, meteorological services and other air navigation services to facilitate international air navigation, in accordance with the standards and recommended practices established from time to time, pursuant to this Convention. Under Article 37 (Adoption of international Standards and Procedures) of the Convention, each contracting State undertakes to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures, and organization in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve air navigation. To this end the International Civil Aviation Organization adopts and amends from time to time, as may be necessary, international standards and recommended practices and procedures dealing with air traffic service practices.

In above respect, ICAO Annex 3 provides the Standards pertaining to the Meteorological Services which are required to be adopted by the Contracting State.

This Air Navigation Order for Meteorological Services, "ANO (MET) has been enacted by the Civil Aviation Authority, Bangladesh under Rule 97, Rule 98 & Rule 99 of CAR-84 to give effect to the Standard and Recommended Practices of Annex-3 “Meteorological Services" to the Convention of International Civil Aviation for safety, regularity and efficiency of Civil Aviation Authority, Bangladesh.

(Air Vice Marshal M Sanaul Huq GUP, ndc, psc)
Chairman
Civil Aviation Authority, Bangladesh.

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INTRODUCTION

In pursuant to Article 28 of the Convention on International Civil Aviation each contracting State undertakes to provide Air navigation facilities and standard systems in accordance with standards which may be recommended or established from time to time, pursuant to this Convention. International Civil Aviation Organization adopts and amends from time to time, as may be necessary, international standards and recommended practices and procedures for Meteorological services for International Air Navigation in Annex 3. This Air Navigation Order (ANO) is issued under the provisions of Rule 97, 98 and Rule 99 of Civil Aviation Rules (CAR) ’84 with amendments 2009 for provision of Meteorological services for International Air Navigation to ensure the flow of information/data necessary for the safety, regularity and efficiency of international air navigation.

CHAPTER-1

1.1 Definitions

When the following terms are used in this "Air Navigation Order for Meteorological Services" 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.

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Aerodrome meteorological office: An office, located at an aerodrome, designated to provide meteorological service for 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 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 be also participate in this service on designated distress and emergency frequencies.

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

Aircraft: Any machines 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 precede to or to land at the aerodrome of intended landing. Alternate aerodromes include the following:

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

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

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

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

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

Altitude: The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (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 (ADS): A surveillance technique in which aircraft automatically provide, via a data link, data derived from on-board navigation and position-fixing systems, including aircraft identification, four-dimensional position and additional data as appropriate.

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

Cloud of operational significance: A cloud with the height of cloud base below 1500 m (5000 ft) or below the highest minimum sector altitude, whichever is greater or a cumulonimbus cloud or a towering cumulus cloud at any height.

Consultation: 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 aero plane 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, 1013.2 hectopascals (hpa), and is separated from other such surfaces by specific pressure intervals.

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

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; and

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 altimetry 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.

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 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.

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

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

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

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

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

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

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 an efficiency of the flight.

Operational flight plan: The operator's plan for the safe conduct of the flight based on considerations of aero plane 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

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

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

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

* ISO Standard 9000 — Quality Management Systems — Fundamentals and Vocabulary.

Quality system: The organizational structure, procedures, processes and resources needed to implement quality management (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 phenomena which may affect the safety of aircraft operations.

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

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

Touchdown zone: The portion of a runway, beyond the threshold, where it is intended landing aero planes 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 office ,world area forecast centers and international OPMET data banks regarding the position ,forecast direction and speed of movement ,central pressure and maximum surface wind of tropical cyclones.

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

Visibility: Visibility for aeronautical purposes is the greater of:

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

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

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

Volcanic Ash Advisory Center (VAAC): A meteorological center designated by regional air navigation agreement to provide advisory information to meteorological watch offices, area control centers, flight information centers, world area forecast centers and intentional OPMET data banks regarding the lateral and vertical extent and forecast movement of volcanic ash in the atmosphere following volcanic eruptions.

VOLMET: Meteorological information for aircraft in flight.

Data link-VOLMET (D-VOLMET): Provision of current aerodrome routine meteorological reports (METAR) and aerodrome special meteorological reports (SPECI), aerodrome forecasts (TAF), SIGMET, special air-reports not covered by a SIGMET and, where available, AIRMET via data link.

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

World area forecast 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 by appropriate means as part of the aeronautical fixed service.

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

1.2 Terms used with a limited meaning

For the purpose of this CAR, the following terms are used with a limited meaning as indicated below:
a) To avoid confusion in respect of the term “service” between the meteorological service considered as an administrative entity and the service which is provided, “meteorological authority” is used for the former and “service” for the latter;

b) “Provide” is used solely in connection with the provision of service;

c) “Issue” is used solely in connection with cases where the obligation specifically extends to sending out the information to a user;

d) “Make available” is used solely in connection with cases where the obligation ends with making the information accessible to a user; and

e) “Supply” is used solely in connection with cases where either c) or d) applies.

CHAPTER- 2

General Provisions

2.1 Objective, determination and provision of meteorological service

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

2.1.2 The 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 The meteorological services to be provided for international air navigation over Bangladesh Territory shall be in accordance with the provisions contained in this CAR. Meteorological service to be provided for international air navigation over international waters and other areas outside the territory of Bangladesh shall be in accordance with regional air navigation agreements.

2.1.4 Bangladesh Meteorological Department (BMD) shall provide Meteorological Services for safety, regularity, and efficiency of International air navigation in accordance with the provisions of this CAR and regional air navigation agreements in this regard.

Note: Director, Bangladesh Meteorological Department shall be the Designated Meteorological Authority for provision of Meteorological Services for international air navigation over Bangladesh Territory; including international waters and other areas outside the territory of Bangladesh in accordance with regional air navigation agreement.

2.1.5 BMD shall ensure compliance with the requirements of the World Meteorological Organization in respect of qualifications and training of meteorological personnel providing service for international air navigation.

Note. — Requirements concerning qualifications and training of meteorological personnel in aeronautical meteorology are given in WMO Publication No. 49,

Technical Regulations, *Volume I* — General Meteorological Standards and Recommended Practices, *Chapter B.4 — Education and Training*.

2.2 Supply, Use and Quality Management of meteorological information

2.2.1 Close liaison 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 BMD shall ensure establishment and implementation of 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 2.2.3 should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and should be certified by an approved organization.

Note. — Guidance on the establishment and implementation of a quality system is given in the Manual on the Quality Management System for the Provision of Meteorological Service to International Air Navigation *(Doc 9873).*

2.2.4 The quality system should provide the users with assurance that the meteorological information supplied complies with the stated requirements in terms of the geographical and spatial coverage, format and content, time and frequency of issuance and period of validity, as well as the accuracy of measurements, observations and forecasts. 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 should 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 Para 3, 4,6, 7, 8, 9 and 10 and Appendices 2, 3, 5, 6, 7, 8 and 9 of ICAO Annex 3 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 ICAO Annex 3.

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

Note. — Requirements concerning the exchange of operational meteorological information are given in Para 11 and Appendix 10 of ICAO Annex 3.

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

2.2.7 The meteorological information supplied to the users listed in 2.1.3 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 BMD or concerned the meteorological office(s), sufficiently in advance. The minimum amount of advance notice required shall be as agreed between the BMD and the operator.

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2.3.2 BMD 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 BMD.

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, or the meteorological office concerned, of individual flights should contain the following information except that, in the case of scheduled flights, the requirement for some or all of this information may be waived by agreement between the meteorological office and the operator:*

a) aerodrome of departure and estimated time of departure;
b) destination and estimated time of arrival;
c) route to be flown and estimated times of arrival at, and departure from, any intermediate aerodrome(s);
d) alternate aerodromes needed to complete the operational flight plan and taken from the relevant list contained in the regional air navigation plan;
e) cruising level;
f) type of flight, whether under 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

WORLD AREA FORECAST SYSTEM AND METEOROLOGICAL OFFICES

3.1 Objective of the World Area Forecast system

BMD (Bangladesh Meteorological Department) shall establish World Area Forecast Centre to supply meteorological authorities and other users with global aeronautical meteorological en-route forecast in digital form.

The purpose of the World Area Forecast (WAFS) is to provide the worldwide aviation community with operational meteorological forecasts and information about meteorological phenomena required for flight planning and safe, economic, and efficient air navigation. On behalf of the International Civil Aviation (ICAO) and World Meteorological Organization, the WAFS comprises two Provider States, these being the United Kingdom Meteorological Office (UKMO) and the United States National Weather Service (US NWS).

3. 2 World Area Forecast centers

U.K. and USA are the two WAFS Provider States. WAFC London and WAFC Washington are the two centers in the whole world that operates a World Area Forecast Centre (WAFC).

The WAFCs provide:

* global gridded forecasts of upper winds, upper-air temperature and humidity, flight level and temperature of tropopause, and direction, speed and flight level of maximum wind; and

* global High-level SIGWX (SWH) products and Medium-level SIGWX (SWM) products for limited geographical areas.

The official distribution mechanism for WAFS data is via UK's Satellite Data Distribution (SADIS) system and the USA's WAFS Internet File Service (WIFS), both of which from part of the ICAO Aeronautical Fixed Service (AFS). The UK also operates Internet based distribution systems known as Secure SADIS FTP.

In addition to the WAFS data, the above distribution mechanisms also forward OPMET data (TAF, METAR, SIGMET etc.) for purposes of flight planning.

3.2.2 Both WAFCs have back-up procedure so that in case of interruption of the operation of one, its functions can be carried out by the other.

(BMD uses Secure SADIS FTP and SADIS 2G reception system for flight briefing and documentation).

3.3 Meteorological offices

3.3.1 BMD (Bangladesh Meteorological Department) shall establish one or more aerodrome and/or other meteorological offices which shall be adequate for the provision of the meteorological service required to satisfy the needs of international air navigation.

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

a) prepare and/or obtain forecasts and other relevant information for flights with which it is concerned; the extent of its responsibilities to prepare forecasts 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 crewmembers and/or other flight operations personnel;
e) Supply other meteorological information to aeronautical users;
f) Display the available meteorological information;
g) Exchange meteorological information with other meteorological offices; and
h) Supply information received on pre-eruption volcanic activity, a volcanic eruption or volcanic ash cloud, to its associated air traffic services unit, aeronautical information service unit and meteorological watch office as agreed between the meteorological, aeronautical information service 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 aerodromes without meteorological offices:

a) The meteorological authority concerned shall designate one or more meteorological offices to supply meteorological information as required; and

b) The competent authorities shall establish means by which such information can be supplied to the aerodromes concerned.

3.4 Meteorological Watch Offices

3.4.1 BMD (Bangladesh Meteorological Department) shall establish one or more meteorological watch offices for provision of services enumerated under Para 3.4.2 to cover all the Flight Information Regions of Bangladesh.

3.4.2 A meteorological watch office shall:

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

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

c) Supply SIGMET information and, as required, other meteorological information to associated air traffic services units;
d) Disseminate SIGMET information;
e) When required by regional air navigation agreement,

i) Prepare AIRMET information related to its area of responsibility;
ii) Supply AIRMET information to associate air traffic services units; and
iii) Disseminate AIRMET information;

f) supply information received on pre-eruption volcanic activity, a volcanic eruption and volcanic ash cloud 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 accidental release of radioactive materials into the atmosphere, in the area for which it maintains watch or adjacent areas, to its associated ACC/FIC, as agreed between the meteorological and ATS authorities concerned, and to aeronautical information service units, as agreed between the meteorological and appropriate civil aviation authorities concerned .The information shall comprise location, date and time of the accident, and forecast trajectories of the radioactive materials.

Note – The information is provided, at the request of the delegated authority in a State by WMO regional specialized meteorological centers (RSMC) for the provision of transport model products for radiological environmental emergency response. The information is sent by the RSMC to a single contact point of the national meteorological service in each State. This contact point has the responsibility of redistributing the RSMC products within the State concerned.

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

3.5 **Tropical Cyclone Advisory Centers**

BMD (Bangladesh Meteorological Department) shall establish Tropical Cyclone Advisory Centers (TCAC) IN accordance with regional air navigation agreement.
Our TCAC is in New Delhi.

CHAPTER- 4.

METEOROLOGICAL OBSERVATIONS AND REPORTS

Note. — Please refer Appendix 3 of ICAO Annex 3 for technical specifications and detailed criteria.

4.1 Aeronautical meteorological stations and observations

4.1.1 BMD shall establish at aerodromes and other points of significance to international air navigation, such aeronautical meteorological stations as it determines to be necessary. An aeronautical meteorological station may be a separate station or may be combined with a synoptic station.

4.1.2 BMD should establish, or arrange for the establishment of, aeronautical meteorological stations on offshore structures or at other points of significance if requested by the operators of the concerned offshore structure in support of helicopter operations to offshore structures.

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

4.1.4 BMD shall establish a mechanism for its aeronautical meteorological stations to be inspected at sufficiently frequent intervals to ensure that a high standard of observations is maintained, that instruments and all their indicators are functioning correctly, and to check whether the exposure of the instruments has changed significantly

4.1.5 At aerodromes, with runways intended for Category II and III instrument approach and landing operations, automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure 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 1.
Note 2. — Guidance material on the application of Human Factors principles can be found in the ICAO Human Factors Training Manual (ICAO 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 should be installed to support approach and landing and take-off operations. These devices should 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 should observe Human Factors principles and include back-up procedures.

4.1.7 Where an integrated semiautomatic system is used for the dissemination/display of meteorological information, it should 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 for reports to be disseminated beyond the aerodrome of origin.

4.1.9 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 and currently attainable accuracy of measurement or observation is given in Attachment A.

4.2 Agreement between Air Traffic Services authorities and Meteorological authorities.

An agreement between the BMD (Bangladesh Meteorological Department) and CAAB (Civil Aviation Authority, Bangladesh) should be established to cover, amongst other things

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

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

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

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

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

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

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

4.3 Routine observations and reports

4.3.1 At aerodromes, routine observations shall be made throughout the 24 hours each day, except as otherwise agreed between BMD, the appropriate ATS authority, and the operator concerned. Such observations shall be made at intervals of one hour or, if so determined by regional air navigation agreement, at intervals of one half hour. At other aeronautical meteorological stations, such observations shall be made as determined by the BMD taking into account the requirements of air traffic services units and aircraft operations.

4.3.2 Reports of routine observations shall be issued as:

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

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

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

4.3.3 At aerodromes that are not operational throughout 24 hours in accordance with 4.3.1, METAR shall be issued prior to the aerodrome resuming operations in accordance with agreement between BMD and CAAB.

4.4 Special observations and reports

4.4.1 A list of criteria for special observations shall be established by the meteorological authority in consultation with the appropriate ATS authority, operators and others concerned.

4.4.2 Reports of special observations shall be issued as:

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

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

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

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

4.5 Contents of Reports

4.5.1 Local routine and special reports and 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 vertical visibility measured,;
j) Air temperature and dew-point temperature; and
k) QNH and, when applicable, QFE (QFE included only in local routine and special reports).

4.5.2 In addition to elements listed under 4.5.1 a) to k), local routine and special reports and METAR and SPECI should 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 meter per second (or knots), respectively.

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

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

4.6.2 Visibility

4.6.2.1 The visibility as defined in this CAR 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 of ICAO Annex 3.

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

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

4.6.3 Runway visual range

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

4.6.3.1 Runway visual range as defined in Chapter I 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 I should be assessed on all runways intended for use during periods of reduced visibility, including:

a) precision approach runways intended for Category I instrument approach and landing operations; and
b) runways used for take-off and having high-intensity edge lights and/or centre line Lights.

Note. — Precision approach runways are defined in Annex 14, Volume I, Chapter I, 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 meters throughout periods when either the visibility or the runway visual range is less than 1500 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 and/or its vicinity shall be observed and reported as necessary. The following present weather phenomena shall be identified, as a minimum: precipitation and freezing precipitation (including intensity thereof), fog, freezing fog and thunderstorms (including thunderstorms in the vicinity)

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 meters (or feet).

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

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 and special reports and METAR and SPECI should be representative of the whole runway complex.

4.6.7 Atmospheric pressure

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

4.6.8 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 Observations and reports of volcanic activity

No active / dormant volcano in Bangladesh.

CHAPTER-5

AIRCRAFT OBSERVATIONS AND REPORTS

Note. — Technical specifications and detailed criteria related to this chapter are given in Appendix 4 of ICAO Annex 3.

5.1 Obligations of States: Each Contracting State shall arrange, according to the provisions of this chapter, for observations to be made by aircraft of its registry operating on international air routes and for the recording and reporting of these observations.

5.2 Types of aircraft observations: 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 Routine aircraft observations

5.3.1 When air-ground data link is used and automatic dependent surveillance (ADS) or secondary surveillance radar (SSR) Mode S is being applied, automated routine observations should be made every 15 minutes during the en-route phase and every 30 seconds during the climb-out phase for the first10 minutes of the flight.

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

5.3.3 In the case of air routes with high-density air traffic (e.g. organized tracks), an aircraft from among the aircraft operating at each flight level shall be designated, at approximately hourly intervals, to make routine observations in accordance with 5.3.1. The designation procedures shall be subject to regional air navigation agreement.

5.3.4 In the case of the requirement to report during the climb-out phase, an aircraft shall be designated, at approximately hourly intervals, at each aerodrome to make routine observations in accordance with 5.3.1

5.4 Routine aircraft observations -- exemptions

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

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 dust storm or heavy sandstorm; or
g) Volcanic ash cloud;

5.6 Other non-routine aircraft observations

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.

5.7 Reporting of aircraft observations during flight

5.7.1 Aircraft observations shall be reported by air-ground data link. Where air ground data link is not available or appropriate, special and other non-routine aircraft observations during flight shall be reported by voice communications.

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

5.7.3 Aircraft observations shall be reported as air-reports

5.8 Relay of air- reports by ATS units

The meteorological authority concerned shall make arrangements with the appropriate ATS authority to ensure that, on receipt by the ATS units of:

a) Special air-reports by voice communications, the ATS units relay them without delay to their associated meteorological watch office; and

b) Routine and special air-reports by data link communications, the ATS units relay them without delay to their associated meteorological watch office and WAFCs.

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

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. A copy of the form shall be included with the flight documentation provided to flights operating on routes which, in the opinion of the meteorological authority concerned, could be affected by volcanic ash clouds.

CHAPTER-6

FORECASTS

6.1 Interpretation and use of forecasts

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

Note. — Guidance on the operationally desirable accuracy of forecasts is given in Attachment B of ICAO Annex 3.

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

6.2 Aerodrome forecasts

6.2.1 An aerodrome forecast shall be prepared, on the basis of regional air navigation agreement, by the meteorological office designated by the meteorological authority concerned.

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 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) 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.

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

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

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

6.2.6 The period of validity of a routine TAF should be not less than 9 hours nor more than 30 hours; the period of validity should be determined by regional air navigation agreement. Routine TAF valid for less than 12 hours should be issued every 3 hours and those valid for 12 to 30 hours should be issued every 6 hours.

6.2.7 When issuing TAF, meteorological offices 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 meteorological office designated by the meteorological authority concerned; as determined by regional air navigation agreement. such forecasts are intended to meet 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 or local special report, or a 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 prepared by the meteorological office designated by the meteorological authority concerned.

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

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

6.5 Area forecasts for low-level flights

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

Note. — Please refer Appendix 5 of ICAO Annex 3 for technical specifications and detailed criteria.

CHAPTER-7

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

Note. — Please refer Appendix 6 of ICAO Annex 3 for technical specifications and Detailed criteria

7.1 SIGMET information

7.1.1 SIGMET information shall be issued by a 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 phenomena, which 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 should 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 message of volcanic ash and tropical cyclones shall be updated at least every 6 hours.

7.2 Aerodrome warnings

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

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

7.3 Wind shear warnings and alerts

7.3.1 Wind shear warnings shall be prepared by the concerned meteorological office and shall give concise information of the observed wind shear which could adversely affect aircraft on the approach path or take-off path or during circling approach.

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

7.3.2 Wind shear warnings for arriving aircraft and/or departing aircraft should be cancelled when aircraft reports indicate that wind shear no longer exists, or alternatively, after two hours elapsed time. The criteria for the cancellation of a wind shear warning should warning should be defined locally for each aerodrome, as agreed between the meteorological authority the appropriate ATS authority and the operators concerned.

7.3.3 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.

7.3.4 Wind shear alerts issued in accordance with Para 7.3 should be updated at least every minute. The wind shear alert should be cancelled as soon as the headwind/tailwind change falls below 7.5 m/s (15 kt).

CHAPTER-8

AERONAUTICAL CLIMATOLOGICAL INFORMATION

8.1 General provisions

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 meteorological authority and those users.

Note. — Climatological data required for aerodrome planning purposes are set out in Annex -14 Volumes I, 3.1.4 and Attachment A.

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

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

8.2 Aerodrome climatological tables

BMD should make arrangements for collecting and retaining the necessary observational data and have the capability:

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

b) To make available such climatological tables to an aeronautical user within a time period as agreed with user.

8.3 Aerodrome climatological summaries

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

8.4 Copies of meteorological observational data

Each meteorological authority, on request and to the extent practicable, shall make available to any other 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.

Note1 — please refer Appendix 7 of ICAO Annex 3 for technical specifications and detailed criteria

CHAPTER-9

SERVICE FOR OPERATORS AND FLIGHT CREW MEMBERS

Note — please refer Appendix 8 of ICAO Annex 3 for technical specifications and detailed criteria

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 one alternate aerodrome 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,

a) forecasts of

1) upper wind and upper-air temperature;
2) upper-air humidity;
3) geo potential altitude of flight levels;
4) flight level and temperature of tropopause;
5) direction, speed and flight level of maximum wind; and
6) SIGWX phenomena;

Note. — Forecasts of upper-air humidity and geo potential altitude of flight levels are used only in automatic flight planning and need not be displayed.

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;

Note. — Appropriate special air-reports will be those not already used in the preparation of SIGMET.
Volcanic ash and tropical cyclone advisory information relevant to the whole route;

f) subject to regional air navigation agreement, GAMET area forecast and/or area forecasts for low-level flights in chart form prepared in support of the issuance of AIRMET information, and AIRMET information for low-level flights relevant to the whole route;
g) aerodrome warnings for the local aerodrome;
h) meteorological satellite images; and
i) ground-based weather radar information.

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 of ICAO Annex 3, 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 of ICAO Annex 3 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 of *ICAO Annex 3*, 1.3.2 and Appendix 5 *ICAO Annex 3*, 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 When necessary, BMD shall initiate coordinating action with the meteorological authorities of other States with a view to obtaining from them the reports and/or forecasts required.

9.1.10 Meteorological information shall be supplied to operators and flight crew members at the location to be determined by the BMD, after consultation with the operators and at the time to be agreed upon between the meteorological office and the operator concerned. The service for pre-flight planning shall be confined to flights originating within India. At an aerodrome without a meteorological office, arrangements for the supply of meteorological information shall be as agreed upon between BMD and the operator concerned.

9.2 Briefing, consultation and display

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, if so agreed between BMD and the operator, in lieu of flight documentation.

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

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

9.2.4 The required briefing, consultation, display and/or flight documentation shall normally be provided by the meteorological office associated with the aerodrome of departure. At an aerodrome where these services are not available, arrangements to meet the requirements of flight crew members shall be as agreed upon between the meteorological authority and the operator concerned. In exceptional circumstances, such as an undue delay, the meteorological office 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 The flight crew member or other flight operations personnel for whom briefing, consultation and/or flight documentation has been requested should visit the meteorological office at the time agreed upon between the meteorological office and the operator concerned. Where local circumstances at an aerodrome make personal briefing or consultation impracticable, the meteorological office should provide those services by telephone or other suitable telecommunications facilities.

9.3 Flight documentation

9.3.1 Flight documentation to be made available shall comprise information listed under 9.1.3 a) 1) and 6), b), c), e), f) and, if appropriate, g). However, when agreed between the meteorological authority and operator concerned, flight documentation for flights of two hours' duration or less, after a short stop or turnaround, shall be limited to the information operationally

needed, but in all cases the flight documentation shall at least comprise information on 9.1.3 b), c), e), f) and, if appropriate, g).

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 meteorological office 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 meteorological office should, as agreed locally, issue the necessary amendment or updated information to the operator or to the local air traffic services unit, for transmission to the aircraft.

9.3.4 The BMD 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 BMD 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 *Automated pre-flight information systems providing for a harmonized, common point of access to meteorological information and aeronautical information services information by operators, flight crew members and other aeronautical personnel concerned should be established by an agreement between the meteorological authority and the relevant civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with Annex 15, 3.1.1 c*

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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, BMD 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

Note. — The responsibilities relating to aeronautical information services information and the quality assurance of the information are given in Annex 15, Chapter 3.

9.5 Information for aircraft in flight

9.5.1 Meteorological information for use by aircraft in flight shall be supplied by a meteorological office to its associated air traffic services unit and through DVOLMET or VOLMET broadcasts. Meteorological information for planning by the operator for aircraft in flight shall be supplied on request, as agreed between 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 as determined by regional air navigation agreement, and in accordance with the specifications of Chapter 11.

CHAPTER-10

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

Note. — Please refer Appendix 9 of ICAO Annex 3 for Technical specifications and detailed criteria

10.1 Information for air traffic services units

10.1.1 BMD shall designate a meteorological office to be associated with each air traffic services unit. The associated meteorological office shall, after coordination with the air traffic services unit, supply, or arrange for the supply of up-to-date meteorological information to the unit as necessary for the conduct of its functions.

10.1.2 The associated meteorological office for an aerodrome control tower or approach control office shall be an aerodrome meteorological office. .

10.1.3 The associated meteorological office for a flight information centre or an area control centre shall be a meteorological watch office.

10.1.4 Where, owing to local circumstances, it is convenient for the duties of an associated meteorological office to be shared between two or more meteorological offices, the division of responsibility should be determined by the meteorological authority in consultation with the appropriate ATS authority.

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

Meteorological offices designated by the meteorological authority in accordance with regional air navigation agreement shall supply search and rescue services units with the meteorological information they require in a form established by mutual agreement. For that purpose, the designated meteorological office shall maintain liaison with the search and rescue services unit throughout a search and rescue operation.

10.3 Information for aeronautical information services units

The meteorological authority, in coordination with the appropriate civil aviation authority, shall arrange for the supply of 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 of ICAO Annex 3.

Note 2. — It is recognized that it is for each Contracting State to decide upon its own internal organization and responsibility for implementing the telecommunications facilities referred to in this Chapter.

11.1 Requirements for communications

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

11.1.2 Suitable telecommunications facilities shall be made available to permit meteorological watch offices to supply the required meteorological information to air traffic services 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 centers, area control centers and rescue coordination centers and the associated aeronautical telecommunications stations.

11.1.3 Suitable telecommunications facilities shall be made available to permit world area forecast centers to supply the required world area forecast system products to meteorological offices, meteorological authorities and other users.

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

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

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

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

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

11.1.6 The telecommunications facilities required in accordance with Para 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 As agreed between the meteorological authority and operators, provision should be made to enable operators to establish suitable telecommunications facilities for obtaining meteorological information from aerodrome meteorological offices or other appropriate sources.

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

11.1.9 The telecommunications facilities used for the exchange of operational meteorological information should be the aeronautical fixed service 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. — Three aeronautical fixed service satellite distribution systems providing for global coverage are used to support the global exchanges of operational meteorological information. Provisions relating to the satellite distribution systems are given in Annex 10, Volume III, Part 1, 10.1 and 10.2.

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

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

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

11.3 Use of aeronautical fixed service communications –

World area forecast system products in digital form should be transmitted using binary data communications techniques. The method and channels used for the dissemination of the products should be as determined by regional air navigation agreement.

11.4 Use of aeronautical mobile service communications

The content and format of meteorological information transmitted to aircraft and by aircraft shall be consistent with the provisions of this Annex.

11.5 Use of aeronautical broadcasting service — contents of VOLMET broadcasts

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

11.5.2 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.