MOZAMBIQUE CIVIL AVIATION
TECHNICAL STANDARDS

MOZCATS PART 172

Certification of Air Traffic Management Services Organizations

Effective as from 07 of July 2018

APPROVAL PAGE

The Instituto de Aviação Civil de Moçambique (IACM) - the Civil Aviation Authority of the Republic of Mozambique. approves this Mozambique Civil Aviation Technical Standard (MOZ-CATS Part 172) for the use and guidance of the Airspace Users and Air *Navigation Service* Providers to comply with the requirements of MOZCAR Part 172, but also to IACM staff *in* the performance of their duties.

The detailed characteristics of the Air Traffic Management Services shall be published in the Aeronautical information Publication AIP Mozambique.

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Maputo, 07 July 2018

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Amendment Record

Amendment Record				
Page	**DATE RECEIVED**	**DATE INSERTED**	**INSERTED BY**	**SIGNATURE**

LIST OF EFFECTIVE PAGES

The list of effective pages below will be used to assist in keeping track of revisions and updates to the Mozambique Civil Aviation Technical Stardards (MOZ-CATS). The list shows the number of the last revision for each page of the last revision for each page of the Mozambique Civil Aviation Technical Standards a new list of effective pages will be published and distributed to all Mozambique Civil Aviation Technical standards holders.

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SUBPART I GENERAL

172.01.1 General

Decree 5 of 2016 empowers the CEO of the Civil Aviation Authority of the Republic of Mozambique IACM to issue technical standards for civil aviation on the matters prescribed by regulation. MOZCAR part 172 establishes the regulations applicable for the Certification of Air Traffic Management Service Providers.

172.01.2 References

- Lei de Aviação da República de Moçambique 05/2016
- ICAO Annex 11 Air traffic management services
- ICAO Annex 12 Search and Rescue
- ICAO Annex 19 Safety Management
- ICAO Doc 4444 PANS-RAC
- ICAO Doc 9859 Safety Management Manual
- ICAO DOC 8168 Aircraft Operations, Flight Procedures
- MOZCAR Parte 65 Licenciamento do pessoal de Serviços de Tráfego aéreo e Oficiais de Operações de Voo
- MOZCAR Parte 71 Organização e Gestão do Espaço aéreo
- MOZCAR Parte 172 Certificação e Operação dos serviços de Gestão do Tráfego Aéreo.

172.01.3 Definitions

When the following terms are used in the Standards and Recommended Practices for Air Traffic Services, they have the following meanings:

Accepting unit. Air traffic control unit next to take control of an aircraft.

Accident. An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

a) a person is fatally or seriously injured as a result of:

— being in the aircraft, or

— direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or

— direct exposure to jet blast, *except* when the injuries are from natural causes,

self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:

— adversely affects the structural strength, performance or flight characteristics of the aircraft, and

— would normally require major repair or replacement of the affected component, *except* for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or

c) the aircraft is missing or is completely inaccessible.

ADS-C agreement. A reporting plan which establishes the conditions of ADS-C data reporting (i.e. data required by the air traffic services unit and frequency of ADS-C reports which have to be agreed to prior to using ADS-C in the provision of air traffic services).

Advisory airspace. An airspace of defined dimensions, or designated route, within which air traffic advisory service is available.

Advisory route. A designated route along which air traffic advisory service is available.

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 control service. Air traffic control service for aerodrome traffic.

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

Aerodrome traffic. All traffic on the manoeuvring area of an aerodrome and all aircraft flying in the vicinity 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 Information Publication (AIP). A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

Aeronautical mobile service (RR S1.32). A mobile service between aeronautical

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

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

Airborne collision avoidance system (ACAS). An aircraft system based on secondary surveillance radar (SSR) transponder signals which operates independently of ground-based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponders.

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.

Air-ground communication. Two-way communication between aircraft and stations or locations on the surface of the earth.

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-taxiing. Movement of a helicopter/VTOL above the surface of an aerodrome, normally in ground effect and at a ground speed normally less than 37 km/h (20 kt).

Note.— The actual height may vary, and some helicopters may require air-taxiing above 8 m (25 ft) AGL to reduce ground effect turbulence or provide clearance for cargo sling loads.

Air traffic. All aircraft in flight or operating on the manoeuvring area of an aerodrome.

Air traffic advisory service. A service provided within advisory airspace to ensure separation, in so far as practical, between aircraft which are operating on IFR flight plans.

Air traffic control clearance. Authorization for an aircraft to proceed under conditions specified by an air traffic control unit.

Air traffic control service. A service provided for the purpose of:

a) Preventing collisions:

1) Between aircraft, and

2) On the manoeuvring area between aircraft and obstructions; and

b) Expediting and maintaining an orderly flow of air traffic.

Air traffic control unit. A generic term meaning variously, area control centre, approach control unit or aerodrome control tower.

Air traffic flow management (ATFM). A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

Air traffic service. A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).

Air traffic services airspaces. Airspaces of defined dimensions, alphabetically designated, within which specific types of flights may operate and for which air traffic services and rules of operation are specified.

Air traffic services reporting office. A unit established for the purpose of receiving reports concerning air traffic services and flight plans submitted before departure.

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

Airway. A control area or portion thereof established in the form of a corridor.

ALERFA. The code word used to designate an alert phase.

Alerting service. A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

Alert phase. A situation wherein apprehension exists as to the safety of an aircraft and its occupants.

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

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

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

Destination alternate. An alternate aerodrome at which an aircraft would be

able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing.

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

Approach control service. Air traffic control service for arriving or departing controlled flights.

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.

Apron. A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fueling, parking or maintenance.

Apron management service. A service provided to regulate the activities and the movement of aircraft and vehicles on an apron.

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

Area control service. Air traffic control service for controlled flights in control areas.

Area navigation (RNAV). A method of navigation which permits aircraft operation 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.

Area navigation route. An ATS route established for the use of aircraft capable of employing area navigation.

ATS route. A specified route designed for channeling the flow of traffic as necessary for the provision of air traffic services.

Automatic dependent surveillance — broadcast (ADS-B). A means by which aircraft, aerodrome vehicles and other objects can automatically transmit and/or receive data such as identification, position and additional data, as appropriate, in a broadcast mode via a data link.

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.

Automatic terminal information service (ATIS). The automatic provision of current, routine information to arriving and departing aircraft throughout 24 hours or a specified portion thereof:

Data link-automatic terminal information service (D-ATIS). The provision of ATIS via data link.

Voice-automatic terminal information service (Voice-ATIS). The provision of ATIS by means of continuous and repetitive voice broadcasts.

Base turn. A turn executed by the aircraft during the initial approach between the end of the outbound track and the beginning of the intermediate or final approach track. The tracks are not reciprocal.

Calendar. Discrete temporal reference system that provides the basis for defining temporal position to a resolution of one day (ISO 19108*).

Change-over point. The point at which an aircraft navigating on an ATS route segment defined by reference to very high frequency omnidirectional radio ranges is expected to transfer its primary navigational reference from the facility behind the aircraft to the next facility ahead of the aircraft.

Note.— Change-over points are established to provide the optimum balance in respect of signal strength and quality between facilities at all levels to be used and to ensure a common source of azimuth guidance for all aircraft operating along the same portion of a route segment.

Clearance limit. The point to which an aircraft is granted an air traffic control clearance.

Conference communications. Communication facilities whereby direct speech conversation may be conducted between three or more locations simultaneously.

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

Controlled aerodrome. An aerodrome at which air traffic control service is provided to aerodrome traffic.

Controlled airspace. An airspace of defined dimensions within which air traffic control service is provided in accordance with the airspace classification.

Controlled flight. Any flight which is subject to an air traffic control clearance.

Controller-pilot data link communications (CPDLC). A means of communication between controller and pilot, using data link for ATC communications.

Control zone. A controlled airspace extending upwards from the surface of the earth to a specified upper limit.

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

Cyclic redundancy check (CRC). A mathematical algorithm applied to the digital expression of data that provides a level of assurance against loss or alteration of data.

Data accuracy. A degree of conformance between the estimated or measured value and the true value.

Danger area. An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.

Data link communications. A form of communication intended for the exchange of messages via a data link

Data quality. A degree or level of confidence that the data provided meets the requirements of the data user in terms of accuracy, resolution and integrity (or equivalent assurance level), traceability, timelines, completeness and format.

Datum. Any quantity or set of quantities that may serve as a reference or basis for the calculation of other quantities
(ISO 19104*).

Declared capacity. A measure of the ability of the ATC system or any of its subsystems or operating positions to provide service to aircraft during normal activities. It is expressed as the number of aircraft entering a specified portion of airspace in a given period of time, taking due account of weather, ATC unit configuration, staff and equipment available, and any other factors that may affect the workload of the controller responsible for the airspace.

DETRESFA. The code word used to designate a distress phase.

Distress phase. A situation wherein there is reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger or require immediate assistance.

Downstream clearance. A clearance issued to an aircraft by an air traffic control unit that is not the current controlling authority of that aircraft.

Emergency phase. A generic term meaning, as the case may be, uncertainty phase, alert phase or distress phase.

Final approach. That part of an instrument approach procedure which commences at the specified final approach fix or point, or where such a fix or point is not specified,

a) at the end of the last procedure turn, base turn or inbound turn of a

racetrack procedure, if specified; or b) at the point of interception of the

last track specified in the approach procedure; and

ends at a point in the vicinity of an aerodrome from which:

1) a landing can be made; or

2) a missed approach procedure is initiated.

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

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 information service. A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

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

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

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

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

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

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

Flight plan. Specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft.

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

Geodetic datum. A minimum set of parameters required to define location and orientation of the local reference system with respect to the global reference

system/frame.

Gregorian calendar. Calendar in general use; first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar (ISO 19108*).

Note. — In the Gregorian calendar, common years have 365 days and leap years 366 days divided into twelve sequential months.

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.

Human performance. Human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.

IFR. The symbol used to designate the instrument flight rules.

IFR flight. A flight conducted in accordance with the instrument flight rules. ***IMC.*** The symbol used to designate instrument meteorological conditions. ***INCERFA.*** The code word used to designate an uncertainty phase.

Incident. An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

Instrument flight procedure design service. A service established for the design, documentation, validation, maintenance and periodic review of instrument flight procedures necessary for the safety, regularity and efficiency of air navigation.

Instrument meteorological conditions (IMC). Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.

Data integrity (assurance level). A degree of assurance that an aeronautical data and its value has not been lost nor altered since the origination or authorized amendment.

Integrity classification (aeronautical data). Classification based upon the potential risk resulting from the use of corrupted data. Aeronautical data is classified as:

a) routine data: there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;

b) essential data: there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and

c) critical data: there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

International NOTAM office. An office designated by a State for the exchange of NOTAM internationally.

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

Manoeuvring area. That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

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

Movement area. That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).

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.

NOTAM. A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Obstacle. All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that:

a) are located on an area intended for the surface movement of aircraft; or

b) extend above a defined surface intended to protect aircraft in flight; or

c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.

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

Performance-based communication (PBC). Communication based on performance specifications applied to the provision of air traffic services.

Note.— An RCP specification includes communication performance requirements that are allocated to system components in terms of the communication to be provided and associated transaction time, continuity, availability, integrity, safety and functionality needed for the proposed operation in the context of a particular airspace concept.

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 specifications (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.

Performance-based surveillance (PBS). Surveillance based on performance specifications applied to the provision of air traffic services.

Note.— An RSP specification includes surveillance performance requirements that are allocated to system components in terms of the surveillance to be provided and associated data delivery time, continuity, availability, integrity, accuracy of the surveillance data, safety 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.

Printed communications. Communications which automatically provide a permanent printed record at each terminal of a circuit of all messages which pass over such circuit.

Prohibited area. An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited.

Radio navigation service. A service providing guidance information or position data for the efficient and safe operation of aircraft supported by one or more radio navigation aids.

Radiotelephony. A form of radiocommunication primarily intended for the exchange of information in the form of speech.

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

Required communication performance (RCP) specification. A set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based communication.

Required surveillance performance (RSP) specification. A set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based surveillance.

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.

Restricted area. An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions.

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.

Safety management system (SMS). A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures.

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.

Significant point. A specified geographical location used in defining an ATS route or the flight path of an aircraft and for other navigation and ATS purposes.

Note. — There are three categories of significant points: ground-based navigation aid, intersection and waypoint. In the context of this definition, intersection is a significant point expressed as radials, bearings and/or distances from ground- based navigation aids.

Special VFR flight. A VFR flight cleared by air traffic control to operate within a control

zone in meteorological conditions below VMC.

Station declination. An alignment variation between the zero degree radial of a VOR and true north, determined at the time the VOR station is calibrated.

Taxiing. Movement of an aircraft on the surface of an aerodrome under its own power, excluding take-off and landing.

Terminal control area. A control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes.

Track. The projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (true, magnetic or grid).

Traffic avoidance advice. Advice provided by an air traffic services unit specifying manoeuvres to assist a pilot to avoid a collision.

Traffic information. Information issued by an air traffic services unit to alert a pilot to other known or observed air traffic which may be in proximity to the position or intended route of flight and to help the pilot avoid a collision.

Transfer of control point. A defined point located along the flight path of an aircraft, at which the responsibility for providing air traffic control service to the aircraft is transferred from one control unit or control position to the next.

Transferring unit. Air traffic control unit in the process of transferring the responsibility for providing air traffic control service to an aircraft to the next air traffic control unit along the route of flight.

Uncertainty phase. A situation wherein uncertainty exists as to the safety of an aircraft and its occupants.

VFR. The symbol used to designate the visual flight rules.

VFR flight. A flight conducted in accordance with the visual flight rules.

Visual meteorological conditions (VMC). Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.

VMC. The symbol used to designate visual meteorological conditions.

Waypoint. A specified geographical location used to define an area navigation route or the flight path of an aircraft employing area navigation. Waypoints are identified as either:

Fly-by waypoint. A waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure, or

Flyover waypoint. A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.

172.01.4 Abbreviations

The following abbreviations are used in part 172:

AIS - Aeronautical information Service

ATC - Air Traffic Control

AFIS - Aerodrome Flight Information Service

ARMA - AFI - Regional Monitoring Agency

APIRG - AFI - Regional Planning and Implementation

ATFM - Air Traffic Flow Management

ATM - Air Traffic Management

ARO - Air Traffic Reporting Office

ASM - Air Space Management

CNS - Communication, Navigation, Surveillance

COSPAS - Space System for Search o/Vessels in Distress

FIS - Flight Information Service

ICAO - International Civil Aviation Organization

IFR - Instrument Flight Rules

MOZCATS - Mozambique Civil Aviation Technical Standards

MSAW - Minimum Sale Altitude Warning

NOTAM - Notice to Air Mell

RCC - Rescue Coordination Centre

PBN - Performance Based Navigation

PANS - Procedures for Air Navigations Services

QBI - Compulsory IFR Flights

RVSM - Reduced Vertical Separation Minimum

RFF - Rescue and Fire Fighting

SAR - Search and Rescue

SMS - Safety Management System

SSP - State Safety Programme

SARSAT - Search and rescue satellite aided tracking -

STCA - Short-Term Conflict Alert

VFR - Visual Flight Rules

172.01.05 Purpose and Applicability

Document MOZCATS 172 contains the standards, rules, requirements, methods, specifications, characteristics and procedures, which are applicable in respect of certification and operation of Air Traffic Management Service providers.

SUPART II GENERAL PROVISIONS FOR AIR TRAFFIC SERVICES

172.02.1 Introduction

This Chapter contains the standards, rules and procedures for the provision of air traffic services that are additional to, or expand upon, or specify additional conditions for, the standards, rules and procedures contained in ICAO Annex 11, PANS-OPS Volume II, ICAO Doc 8168, ICAO Doc 7030 and ICAO PANS-ATM Doc 4444.

172.02.2 Objectives of the air traffic services

The objectives of the air traffic services shall be to:

a) Prevent collisions between aircraft;

b) Prevent collisions between aircraft on the maneuvering area and obstructions on that area;

c) Expedite and maintain an orderly flow of air traffic;

d) Provide advice and information useful for the safe and efficient conduct of flights;

e) Notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

172.02.3 Divisions of the air traffic services

The air traffic services shall comprise three services identified as follows.

1. The *air traffic control service*, to accomplish objectives a), b) and c) of 172.02.1, this service being divided in three parts as follows:

a) *Area control service:* the provision of air traffic control service for controlled flights, in order to accomplish objectives a) and c) of 172.02.1;

b) *Approach control service:* the provision of air traffic control service for those parts of controlled flights associated with arrival or departure, in order to accomplish objectives a) and c);

c) *Aerodrome control service:* the provision of air traffic control service for aerodrome traffic, in order to accomplish objectives a), b) and c) of 172.02.1.

2. The *flight information service*, to accomplish objective d) of 172.02.1.

3. The *alerting service,* to accomplish objective e) of 172.02.1.

172.02.4 Designation of the portions of the airspace and controlled aerodromes where air traffic services will be provided

1. When it has been determined that air traffic services will be provided in particular portions of the airspace or at particular aerodromes, then those portions of the airspace or those aerodromes shall be designated in relation to the air traffic services that are to be provided.

2. The designation of the particular portions of the airspace or the particular aerodromes shall be as follows:

2.1 *Flight information regions.* Those portions of the airspace where it is determined that flight information service and alerting service will be provided shall be designated as flight information regions.

2.2 *Control areas and control zones*

2.2.1 Those portions of the airspace where it is determined that air traffic control service will be provided to IFR flights shall be designated as control areas or control zones.

Note.— The distinction between control areas and control zones is made in 172.03.3.

2.2.1.1 Those portions of controlled airspace where in it is determined that air traffic control service will also be provided to VFR flights shall be designated as Classes B, C, or D airspace.

2.2.2 Where designated within a flight information region, control areas and control zones shall form part of that flight information region.

2.2.3 *Controlled aerodromes.* Those aerodromes where it is determined that air traffic control service will be provided to aerodrome traffic shall be designated as controlled aerodromes.

172.02.5 Establishment and designation of the units providing air traffic services

The air traffic services shall be provided by units established and designated as follows:

a) Flight information centres shall be established to provide flight information service and alerting service within flight information regions, unless the responsibility of providing such services within a flight information region is assigned to an air traffic control unit having adequate facilities for the discharge of such responsibility.

Note.— This does not preclude delegating to other units the function of providing certain elements of the flight information service.

b) Air traffic control units shall be established to provide air traffic control service, flight information service and alerting service within control areas, control zones and at controlled aerodromes.

172.02.6 Airspace Management

a) The classification of the Airspace for the sake of providing Air Traffic Management Services shall comply with MOZCAR 172.03.1.

b) Details about Airspace Organization and Management are described in MOZCAR part 71 and MOZCATS 71.

c) The required coordination of in the use of airspace are described under section MOZCAR 172.02.15 (e) and (f).

172.02.7 Establishment of Control Areas and Control Zones

1. Control Areas

   a) Those portions of controlled airspace where Air traffic Control Service shall also be provided to VFR flights shall be designated as classes C or D airspace.

   b) Control areas including airways and terminal control areas (TMAs) shall be delineated so as to encompass sufficient airspace to contain the flight paths of the IFR flights, taking into account the capabilities of the navigation aids used in that area.

   c) A lower limit of a control area shall be established at a height above the ground or water of not less than 700 ft (200 m).

   d) When the lower limit of a control area is above 3000 ft (900 m) MSL, it should coincide with a VFR cruising level as specified in the tables of Appendix 1 in this MOZCATs.

2. Control Zones

   e) The lateral limits of control zones shall encompass at least those portions of the airspace, which are not within control areas, containing the paths of IFR flights arriving at and departing from aerodromes and holding in the vicinity of aerodromes to be used under instrument meteorological conditions.

   f) The lateral limits of a control zone shall extend to at least 5NM (9.3 km) from the centre of the aerodromes concerned in the directions from which approaches shall be made. *Note: a control zone may include two or more aerodromes close together.*

   g) When a control zone is located within the lateral limits of a control area, it shall extend upwards from the surface of the earth to at least the lower limit of the control area. *Note: an upper limit higher than the lower limit of the overlying control area may be established when desired.*

   h) If a control zone is located outside of the lateral limits of a control area, an upper limit shall be established.

172.02.8 Identification of air traffic services units and airspaces

1. *An area control centre or flight information centre should be identified by the name of a nearby town or city or geographic feature.*

2. *An aerodrome control tower or approach control unit should be identified by the name of the aerodrome at which it is located.*

3. *A control zone, control area or flight information region should be identified by the name of the unit having jurisdiction over such airspace.*

172.02.9 Establishment and identification of ATS routes

a) When ATS routes are established, a protected airspace along each ATS route and a safe spacing between adjacent ATS routes shall be provided.

b) Special routes can be established for use by helicopters to and from helidecks on the high seas. When determining the lateral spacing between such routes, account should be taken of the navigational means available and the navigation equipment carried on board helicopters.

c) ATS routes shall be identified by designators, in accordance with the principles set forth in Appendix 2 in this MOZCATs.

d) Standard departure and arrival routes and associated procedures shall be identified in accordance with the principles set forth in Appendix 3 in this MOZCATs.

e) Guidance material relating to the establishment of ATS routes defined by VOR is contained in attachment A in this MOZCATs.

172.02.10 Area and Approach Control Services

1. The provider of air traffic management services in respect of an area or approach control service shall establish systems and procedures to-

   a) Determine, from information received, the positions of known aircraft relative to each other;

   b) Provide for the issue of ATC clearances, instructions, and information, according to the airspace classification and type of flight, for the purpose of preventing collisions between aircraft under the control of the unit, and expediting and maintaining a safe and efficient flow of traffic;

   c) Co-ordinate clearances, as necessary, with other ATC units;

   d) Display, in a manner that permits ready analysis, information on aircraft movements, together with a record of clearances issued.

2. The procedures required by paragraph (1) (b) shall ensure vertical or horizontal or composite separation is provided between-

   a) All flights in classes A and B airspace;

   b) IFR flights in classes D, and E airspace;

   c) IFR flights and VFR flights in class C airspace; and

   d) IFR flights and VFR flights, at night, in class D and E airspace.

4. The separation required by paragraph (2) shall be in accordance with criteria and minima prescribed by-

   a) Document 4444; or

   b) Document 7030.

172.02.11 Aerodrome Control Services

Aerodrome control

1. The provider of air traffic management services in respect of an aerodrome control service shall establish systems and procedures to-

   a) Determine, from information received and visual observation, the relative positions of known aircraft to each other;

   b) Provide for the issue of ATC clearances, instructions, and information, for the purpose of preventing collisions between-

      I. Aircraft flying in the vicinity of an aerodrome;

      II. Aircraft landing and taking off;

      III. Aircraft operating on the manoeuvring area;

      IV. Aircraft, vehicles, and persons, operating on the manoeuvring area;

      V. Aircraft on the maneuvering area and obstructions on that area;

   c) Provide for the issue of ATC clearances, instructions, and information, for the purpose of expediting and maintaining a safe and efficient flow of traffic;

   d) Provide runway and wake turbulence separation in accordance with criteria and minima prescribed by-

      I. Document 4444; or

II. Document 7030;

e) Ensure that emergency vehicles responding to an aircraft emergency are given priority over all other surface movement traffic;

f) Provide for the control of the movement of persons or vehicles, including towed aircraft, on the manoeuvring area, as necessary to avoid hazard to them or to aircraft landing, taxiing, or taking off;

g) Co-ordinate as necessary with other ATS units;

h) Display, at operating positions, continuously updated information on aircraft movements.

172.02.12 Radio-communication failure

The provider of air traffic management services shall establish a procedure to ensure that, when radio communication is not available, basic clearances, instructions, and information required by paragraph (1)(b) can be conveyed by the use of light signals.

172.02.13 Protection of ILS critical areas

The provider of air traffic management services shall establish procedures to ensure that when required by either the weather, or category of approach, or both-

a) Aircraft on an ILS approach are informed of ILS critical area incursions, or the imminent possibility of an incursion; or

b) The applicable ILS critical areas are protected from incursion when an aircraft is on an ILS approach, or has reached a point on the approach from which protection from incursion is necessary.

172.02.14 Responsibility for Control

a) The provider of air traffic management services shall establish a procedure to ensure that, when authority has been delegated by and accepted from the applicable area or approach control unit, aerodrome control units provide separation between controlled flights in accordance with the delegation.

b) The provider of air traffic management services shall establish procedures for the transfer of responsibility for the control of an aircraft to ensure that transfer arrangements are-

i. Agreed between ATC units responsible for adjacent airspaces and published in air traffic management services letters of procedures;

ii. In place for separate operating positions within an air traffic control unit and promulgated in the holder's manual of procedure;

c) The provider of air traffic management services shall establish procedures for the transfer of responsibility for the control of an aircraft to ensure responsibility for control of an aircraft is not transferred from one air traffic control unit to another without

I. Communication of appropriate parts of the current flight plan;

II. Any relevant control information; and

III. The consent of the accepting unit.

172.02.15 Aircraft Movement Priorities

1. The provider of air traffic management services shall establish procedures to ensure that providing safety is not jeopardized air traffic control units apply the following aircraft movement priorities-

   a) An aircraft known or believed to be in a state of emergency or impaired operation has priority over all other aircraft;

   b) An aircraft landing, or in the final stages of an approach to land has priority over a departing aircraft; and

   c) An aircraft landing or taking off has priority over taxiing aircraft.

2. The provider of air traffic management services shall establish procedures to ensure that, where practical, following a request from the pilot, an aircraft involved in or positioning for the following activities is granted priority-

   a) Ambulance or mercy missions;

   b) Search and rescue;

   c) Civil defense or police emergencies;

   d) Carriage of heads-of-state, heads-of-government, or equivalent dignitaries.

3. The provider of air traffic management services shall establish procedures to ensure that an aircraft at a cruising level shall normally have priority over other aircraft requesting that level.

4. A provider of air traffic management services in respect of an area control service may propose to the IACM procedures regarding priorities to be applied in airspace designated as ICAO RNP airspace.

5. Subject to the requirements of paragraphs (1) and (2), a provider of air traffic management services may put in place schemes for the determination of priorities for arriving and departing flights, provided that consultation with interested parties is undertaken prior to implementing the scheme.

6. The provider of air traffic management services shall establish procedures to ensure

that, where priorities are established under paragraphs (4) or (5), relevant information, including details regarding the handling of complaints, is published in the Mozambican Aeronautical Information Publication.

7. The provider of air traffic management services shall establish procedures to ensure that, providing safety is not jeopardized, due regard is given to those priorities determined in conjunction with the aerodrome operator for aircraft arriving and departing that aerodrome.

8. The provider of air traffic management services shall establish procedures to ensure that, except when applying priority in accordance with other provisions of this Part, priority for arriving and departing flights is allocated on a first-come first-served basis.

9. The provider of air traffic management services shall establish procedures to ensure that the provision of an air traffic control service takes precedence-

    a) Over the provision of a flight information service whenever the situation so requires; or

    b) Over the performance of any other non-air traffic management services tasks.

172.02.16 Air Traffic Control Clearances

1. Air traffic control clearances

Procedures for the provision of air traffic control clearances shall ensure that-

a) Clearances and instructions contain positive and concise data phrased according to standard ICAO radio-telephony procedures;

b) If a pilot advises that a clearance or instruction is unsuitable, an amended clearance or instruction is, if practicable, issued;

c) An air traffic control clearance for an en-route flight consists of-

I. The aircraft identification as shown in the flight plan or, where similarity with another flight might cause confusion, an alternative identification provided by air traffic control;

II. The clearance limit;

III. The route of flight;

IV. The level(s) of flight for the entire route, or part thereof, and changes of level if required; and

V. any necessary instructions or information on other matters, such as approach or departure maneuvers, communications, and the time of validity or expiry of the clearance;

2. procedures shall ensure that an air traffic control clearance for a local flight, a flight operating in defined areas, or a flight operating in a random manner, includes those

elements detailed in paragraph (c) that are appropriate;

172.02.17 Flight Levels

1. Cruising levels allocated are selected in accordance with the Annex 2 table of cruising levels for VFR or IFR flights,

2. Instructions instituted in clearances to levels shall consist of -

   a) Cruising level(s) or, for cruise climb, a range of levels, and, if necessary, the point to which the clearance is valid with regard to the level(s);

   b) Levels at which specified significant point are to be crossed, when necessary; (c) the place or time for starting climb or decent, when necessary;

   c) The rate of climb or decent, where necessary; and

   d) Detailed instructions concerning departure of approach levels, when necessary.

172.02.18 Deviation from an Air Traffic Control Clearance

a) Traffic Collision Avoidance System [TCAS] Resolution Advisory or Ground Proximity Warning System [GPWS] alerts have priority over ATC clearances and shall be immediately followed by aircrews;

b) The Pilot-in-Command of an aircraft may decide due to weather, or other emergency situations, to deviate from an air traffic control clearance with appropriate information to the ATC unit.

a) Procedures shall ensure that once the emergency situation has been resolved, if any separation has been lost, it is restored.

172.02.19 Flight Information Service

1. Procedures shall be established to ensure that a flight information service is provided to any aircraft that is likely to be affected by the information, if-

   a) The aircraft is being provided with an air traffic control service; or

   b) T he aircraft is being provided with an aerodrome flight information service; or

   c) T h e aircraft is operating IFR; or

   d) The aircraft is operating VFR and has filed a flight plan; or

   e) The pilot of an aircraft operating VFR without a flight plan makes a specific request for flight information.

2. The provider of air traffic management services shall establish procedures to ensure that

the flight information service includes the provision of available and relevant-

a) SIGMET information;

b) Information on weather conditions reported or forecast, at departure, destination, and alternate aerodromes;

c) Information concerning the release into the atmosphere of radioactive materials or toxic chemicals;

d) Information on changes in the serviceability of navigation aids;

e) Information on changes in the condition of aerodromes and associated facilities, including information on the state of the aerodrome movement areas when they are affected by snow, ice, or water;

f) Information on unmanned free balloons; and

g) Other information likely to affect safety.

3. The provider of air traffic management services shall establish procedures to ensure that flight information provided to aircraft operating on a VFR flight plan, and aircraft specifically requesting the information, includes available details concerning weather conditions along the route of flight that are likely to make operation under VFR impracticable.

4. The provider of air traffic management services shall establish procedures to ensure that, whenever water is present on a runway, a description of the runway surface conditions on the centre half of the width of the runway is made available using one of the following terms-

a) DAMP - the surface shows a change of color due to moisture;

b) WET - the surface is soaked but there is no standing water;

c) WATER PATCHES - Significant patches of standing water are visible;

d) FLOODED - extensive standing water is visible.

5. The provider of air traffic management services shall establish procedures to ensure that the airspace users as well as the IACM are advised of changes to published hours of service.

6. Traffic Information

a) The provider of air traffic management services shall establish procedures to ensure that essential traffic information is passed immediately to all affected traffic.

b) The provider of air traffic management services shall establish procedures to ensure that traffic information is provided to flights likely to be affected by the information-

I. In class C airspace, between VFR flights, together with traffic avoidance advice on request;

II. In class D airspace, between IFR and VFR flights by day, and between VFR flights, together with traffic avoidance advice on request;

III. In class E airspace, between IFR and VFR flights by day, and where practical between VFR flights on request; and

IV. In class G airspace, between all flights on request and where practical.

172.02.20 Aerodrome Flight Information Service (AFIS)

a) Providers of an aerodrome flight information service shall establish systems and procedures to issue all useful advice and information for the safe and efficient operation of-

I. Aircraft flying in the vicinity of an aerodrome;

II. Aircraft operating on the manoeuvring area;

III. Aircraft landing and taking off;

IV. Aircraft, vehicles, and persons, on the manoeuvring area; and

V. Aircraft on the manoeuvring area with respect to obstructions on that area.

172.02.21 Alerting Service

1. Application

a) Alerting service shall be provided:

I. for all aircraft provided with air traffic control service;

II. In so far as practicable, to all other aircraft having filed a flight plan or otherwise known to the air traffic management services; and

III. to any aircraft known or believed to be the subject of unlawful interference.

b) Flight information centres or area control centres shall serve as the central point for collecting all information relevant to a state of emergency of an aircraft operating within the flight information region or control area concerned and for forwarding such information to the appropriate rescue coordination Centre.

c) In the event of a state of emergency arising to an aircraft while it is under the control of an aerodrome control tower or approach control unit, such unit shall notify immediately the flight information centre or area control Centre responsible which shall in turn notify the rescue coordination centre, except that notification of the area control centre, flight information centre, or rescue coordination centre shall not be required when the nature of the emergency is such that the notification would be superfluous.

d) Nevertheless, whenever the urgency of the situation so requires, the aerodrome control tower or approach control unit responsible shall first alert and take other necessary steps to set in motion all appropriate local rescue and emergency organizations which can give the immediate assistance required.

2 . Notification of rescue coordination centre (RCC)

Without prejudice to any other circumstances that may render such notification advisable, air traffic services units shall notify the rescue coordination centre in Beira immediately when an aircraft is considered to be in a state of emergency in accordance with the following:

a) **Uncertainty phase (INCERFA)** when:

I. no communication has been received from an aircraft within a period of thirty minutes after the time a communication should have been received, or from the time an unsuccessful attempt to establish communication with such aircraft was first made, whichever is the earlier, or

II. When an aircraft fails to arrive within thirty minutes of the estimated time of arrival last notified to or estimated by air traffic management services units, whichever is the later, except when no doubt exists as to the safety of the aircraft and its occupants.

b) **Alert phase (ALERFA)** when:

I. following the uncertainty phase, subsequent attempts to establish communication with the aircraft or inquiries to other relevant sources have failed to reveal any news of the aircraft, or when

II. an aircraft has been cleared to land and fails to land within five minutes of the estimated time of landing and communication has not been re-established with the aircraft, or when

III. Information has been received which indicates that the operating efficiency of the aircraft has been impaired, but not to the extent that a forced landing is likely, except when evidence exists that would allay apprehension as to the safety of the aircraft and its occupants, or when

IV. An aircraft is known or believed to be the subject of unlawful interference.

c) **Distress phase (DETRESFA)** when:

I. Following the alert phase, further unsuccessful attempts to establish communication with the aircraft and more widespread unsuccessful inquiries point to the probability that the aircraft is in distress, or when

II. The fuel on board is considered to be exhausted, or to be insufficient to enable the

aircraft to reach safety, or when

III. Information is received which indicates that the operating efficiency of the aircraft has been impaired to the extent that a forced landing is likely, or when

IV. Information is received or it is reasonably certain that the aircraft is about to make or has made a forced landing, except when there is reasonable certainty that the aircraft and its occupants are not threatened by grave and imminent danger and do not require immediate assistance.

3. The notification message shall contain such of the following information as is available in the order listed:

a) **INCERFA, ALERFA** or **DETRESFA**, as appropriate to the phase of the emergency;

b) Agency and person calling;

c) Nature of the emergency;

d) Significant information from the flight plan;

e) Unit which made last contact, time and means used;

f) Last position report and how determined;

g) Color and distinctive marks of aircraft;

h) Dangerous goods carried as cargo;

i) Any action taken by reporting office; and

j) Other pertinent remarks.

Further to the notification, the rescue coordination centre shall, without delay, be furnished with:

a) Any useful additional information, especially on the development of the state of emergency through subsequent phases; or

b) Information that the emergency situation no longer exists.

Note: The cancellation of action initiated by the rescue coordination centre is the responsibility of that centre.

4. Use of communication facilities

Air traffic management services units shall, as necessary, use all available communication facilities to enddevour t o establish and maintain communication with an aircraft in a state of emergency, and to request news of the aircraft.

5. Plotting aircraft in a state of emergency

When a state of emergency is considered to exist, the flight of the aircraft involved shall be plotted on a chart in order to determine the probable future position of the aircraft and its maximum range of action from its last known position. The flights of other aircraft known to be operating in the vicinity of the aircraft involved shall also be plotted in order to determine their probable future positions and maximum endurance.

6. Information to the operator

a) When an area control or a flight information centre decides that an aircraft is in the uncertainty or the alert phase, it shall, when practicable, advise the operator prior to notifying the rescue coordination centre.

Note. If an aircraft is in the distress phase, the rescue coordination centre has to be notified immediately.

b) All information notified to the rescue coordination centre by an area control or flight information centre shall, whenever practicable, also be communicated, without delay, to the operator.

7. Information to aircraft operating in the vicinity of an aircraft in a state of emergency

a) When it has been established by an air traffic services unit that an aircraft is in a state of emergency, other aircraft known to be in the vicinity of the aircraft involved shall, except as provided in b), be informed of the nature of the emergency as soon as practicable.

b) When an air traffic management services unit knows or believes that an aircraft is being subjected to unlawful interference, no reference shall be made in ATS air- ground communications to the nature of the emergency unless it has first been referred to in communications from the aircraft involved and it is certain that such reference will not aggravate the situation.

172.02.22 Identification of Air Traffic Management services and airspaces

An area control centre of flight information centre should be identified by the name of a nearby town or city or geographic feature.

a) An aerodrome control tower or approach control unit should be identified by the name of the aerodrome at which it is located.

b) A control zone, control area or flight information region should be identified by the name of the unit having jurisdiction over such airspace.

172.02.23 ATM Operations Manual

a) An ATM Operations Manual shall be made be available at each ATM unit and accessible to the staff.

b) It shall contain in a clear and concise manner the provisions and information of the Manual of Procedures, as described under MOZCATS 172.02.1, alien 11 to 37 that are relevant for the unit.

c) Amendments to the ATM operations Manual shall be communicated to each staff member and acknowledged by individual signature.

172.02.24 Emergency check-lists

The contingency and emergency procedures described in the ATM OPS Manual shall be permanently displayed or available at the working positions in the form of checklists.

172.02.25 Compliance management

a) A Standards and Compliance Officer shall be designated for each ATM unit. b)

The Standards and Compliance Officer is responsible for:

i. The correct application of the rules, procedures and standards

ii. The communication of changes as described under 172.03.7 c) with appropriate explanations as required

iii. The initiation of training action as required

iv. The reporting of significant deviations from the established Standards and Regulations

v. The initiation of proposals for changes to the Regulations and Procedures as required.

172.02.26 Maintenance of the proficiency of the ATM personnel

a) A responsible Training Officer shall be designated for each ATM unit. Depending on the size of the unit, this function can be combined with Standards and Compliance.

b) The Unit Training Officer is responsible, in accordance with section 172.02.07, MOZCAR Part 65 and MOZCATS 65, for:

i. The design and organization of the unit training

ii. The assessment of the proficiency of each staff member

iii. The keeping of a training and proficiency record for each staff member of the unit

172.02.27 Air Traffic Control Clearances

Separations shall be provided by means of Air Traffic Control Clearances (ATC Clearances) in compliance with ICAO Doc 4444 PANS-ATM.

1. Contents of an ATC Clearance

   a) An ATC Clearance shall contain:

   b) Aircraft identification as shown in the flight plan

   c) Clearance limit

   d) Route of flight

   e) Level(s) of flight for the entire route or part thereof and changes of levels if required

   f) Any necessary instruction or information on other matters such as approach or departure maneuvers, communications, SSR code, ATFM slot, and the time of expiry of the clearance

2. Read-back of ATC clearances

   a) The flight crew shall read back (repeat) the safety-related parts of an ATC clearance:

   b) Route of flight

   c) Clearance and instructions to enter, land on, take off from, hold short of, cross and backtrack on any runway

   d) Runway in use, altimeter settings, SSR codes, level instructions, heading and speed instructions, transition level

   e) The controller shall listen carefully to the read-back to ascertain that the clearance or instruction has been correctly acknowledged and shall take immediate action to correct any discrepancies revealed by the read-back.

   b) Voice read-back of CPDLC clearances is not required

4. Co-ordination of ATC Clearances

   a) An aircraft shall be cleared for the entire route to the aerodrome of first intended landing:

   b) When it has been possible, before departure, to coordinate the ATC clearance between all ATC units concerned, or

   c) When there is reasonable assurance that prior coordination will be effected between the units concerned.

4. Denial of a clearance

   An ATC clearance cannot be denied to a crew for non-payment of the aerodrome or route charges, unless the aircraft is on the ground and has not entered the manoeuvring area.

172.02.28 Suspension of VFR Operations

An Aerodrome or Approach Control Unit shall establish procedures to suspend VFR operations when required for safety reasons in the Control Zone in accordance with ICAO Doc 4444 PANS.ATM.

172.02.29 Control of persons and vehicles at aerodromes

a) The movement of persons and vehicles including towed aircraft on the manoeuvring area of an aerodrome shall be controlled by the aerodrome control tower as necessary to avoid hazard to them or to aircraft landing, taxiing or taking off.

b) Vehicles on the manoeuvring area shall carry two-way communication equipment allowing direct speech communication with the aerodrome control tower

c) In conditions where low visibility procedures are in operation, persons and vehicles operating on the manoeuvring area of an aerodrome shall be restricted to the essential minimum, and particular regard shall be given to protect the ILS sensitive areas.

d) Emergency vehicles proceeding to the assistance of an aircraft in distress shall be afforded priority over all other surface movement traffic.

e) Subject to the provision in (d), vehicles on the manoeuvring area shall be required to comply with the following rules:

i. Vehicles and vehicles towing an aircraft shall give way to aircraft which are landing, taking off or taxiing

ii. Vehicles shall give way to other vehicles towing an aircraft,

iii. Vehicles shall give way to other vehicles in accordance with ATS instructions,

iv. In any case vehicles shall comply with ATC instructions.

172.02.30 Coordination between the operator and air traffic services

1. Air traffic services units, in carrying out their objectives, shall have due regard for the requirements of the operators consequent on their obligations as specified in Annex 6, and, if so required by the operators, shall make available to them or their designated representatives such information as may be available to enable them or their designated representatives to carry out their responsibilities.

2. When so requested by an operator, messages (including position reports) received by air traffic services units and relating to the operation of the aircraft for which operational control service is provided by that operator shall, so far as practicable, be made available

immediately to the operator or a designated representative in accordance with locally agreed procedures.

172.02.31 Coordination between military authorities and air traffic services

1. Air traffic services authorities shall establish and maintain close cooperation with military authorities responsible for activities that may affect flights of civil aircraft.

2. Coordination of activities potentially hazardous to civil aircraft shall be effected in accordance with 172.02.32.

3. Arrangements shall be made to permit information relevant to the safe and expeditious conduct of flights of civil aircraft to be promptly exchanged between air traffic services units and appropriate military units.

5. Air traffic services units shall, either routinely or on request, in accordance with locally agreed procedures, provide appropriate military units with pertinent flight plan and other data concerning flights of civil aircraft. In order to eliminate or reduce the need for interceptions, air traffic services authorities shall designate any areas or routes where the requirements of regulation concerning flight plans, two-way communications and position reporting apply to all flights to ensure that all pertinent data is available in appropriate air traffic services units specifically for the purpose of facilitating identification of civil aircraft.

6. Special procedures shall be established in order to ensure that:

a) Air traffic services units are notified if a military unit observes that an aircraft which is, or might be, a civil aircraft is approaching, or has entered, any area in which interception might become necessary;

c) All possible efforts are made to confirm the identity of the aircraft and to provide it with the navigational guidance necessary to avoid the need for interception.

172.02.32 Coordination of activities potentially hazardous to civil aircraft

1. The arrangements for activities potentially hazardous to civil aircraft, whether over the territory of a State or over the high seas, shall be coordinated with the appropriate air traffic services authorities. The coordination shall be effected early enough to permit timely promulgation of information regarding the activities in accordance with the provisions of Annex.

172.02.33 Aeronautical data

1. Determination and reporting of air traffic services-related aeronautical data shall be in accordance with the accuracy and classification required to meet the needs of the end-user of aeronautical data.

172.02.34 Coordination between meteorological and air traffic services authorities

1. To ensure that aircraft receive the most up-to-date meteorological information for aircraft operations, arrangements shall be made, where necessary, between meteorological and air traffic services authorities for air traffic services personnel:

a) In addition to using indicating instruments, to report, if observed by air traffic services personnel or communicated by aircraft, such other meteorological elements as may be agreed upon;

b) To report as soon as possible to the associated meteorological office meteorological phenomena of operational significance, if observed by air traffic services personnel or communicated by aircraft, which have not been included in the aerodrome meteorological report;

c) To report as soon as possible to the associated meteorological office pertinent information concerning pre-eruption volcanic activity, volcanic eruptions and information concerning volcanic ash cloud. In addition, area control centres and flight information centres shall report the information to the associated meteorological watch office and volcanic ash advisory centres (VAACs).

2. Close coordination shall be maintained between area control centres, flight information centres and associated meteorological watch offices to ensure that information on volcanic ash included in NOTAM and SIGMET messages is consistent.

172.02.35 Coordination between aeronautical information services and air traffic services authorities

1. To ensure that aeronautical information services units obtain information to enable them to provide up-to-date pre-flight information and to meet the need for in-flight information, arrangements shall be made between aeronautical information services and air traffic services authorities responsible for air traffic services to report to the responsible aeronautical information services unit, with a minimum of delay:

a) Information on aerodrome conditions;

b) The operational status of associated facilities, services and navigation aids within their area of responsibility;

c) The occurrence of volcanic activity observed by air traffic services personnel or reported by aircraft; and

d) Any other information considered to be of operational significance.

2. Before introducing changes to the air navigation system, due account shall be taken by the services responsible for such changes of the time needed by the aeronautical information service for the preparation, production and issuance of relevant material for promulgation. To ensure timely provision of the information to the aeronautical information service, close coordination between those services concerned is therefore required.

3. Of particular importance are changes to aeronautical information that affect charts and/or computer-based navigation systems which qualify to be notified by the Aeronautical

Information Regulation and Control (AIRAC) system, as specified in Annex 15, Chapter 6 and Appendix 4. The predetermined, internationally agreed AIRAC effective dates in addition to 14 days postage time shall be observed by the responsible air traffic services when submitting the raw information/data to aeronautical information services.

4. The air traffic services responsible for the provision of raw aeronautical information/data to the aeronautical information services shall do so while taking into account accuracy and integrity requirements for aeronautical data as specified in Appendix 5 to this Annex.

172.02.36 Service to aircraft in the event of an emergency

1. An aircraft known or believed to be in a state of emergency, including being subjected to unlawful interference, shall be given maximum consideration, assistance and priority over other aircraft as may be necessitated by the circumstances.

Note.— To indicate that it is in a state of emergency, an aircraft equipped with an appropriate data link capability and/or an SSR transponder might operate the equipment as follows:

a) On Mode A, Code 7700; or

b) On Mode A, Code 7500, to indicate specifically that it is being subjected to unlawful interference; and/or

c) Activate the appropriate emergency and/or urgency capability of ADS-B or ADS-C; and/or

d) Transmit the appropriate emergency message via CPDLC.

2. When an occurrence of unlawful interference with an aircraft takes place or is suspected, ATS units shall attend promptly to requests by the aircraft. Information pertinent to the safe conduct of the flight shall continue to be transmitted and necessary action shall be taken to expedite the conduct of all phases of the flight, especially the safe landing of the aircraft.

3. When an occurrence of unlawful interference with an aircraft takes place or is suspected, ATS units shall, in accordance with locally agreed procedures, immediately inform the appropriate authority designated by the State and exchange necessary information with the operator or its designated representative.

172.02.37 In-flight contingencies

1. **Strayed or unidentified aircraft**

Note 1.— The terms "strayed aircraft" and "unidentified aircraft" in this paragraph have the following meanings:

Strayed aircraft. *An aircraft which has deviated significantly from its intended track or which reports that it is lost.*

Unidentified aircraft. *An aircraft which has been observed or reported to be operating in a given area but whose identity has not been established.*

Note 2.— An aircraft may be considered, at the same time, as a "strayed aircraft" by one unit and as an "unidentified aircraft" by another unit.

Note 3.— A strayed or unidentified aircraft may be suspected as being the subject of unlawful interference.

1.1 As soon as an air traffic services unit becomes aware of a strayed aircraft it shall take all necessary steps as outlined in 1.1.1 and 1.1.2 to assist the aircraft and to safeguard its flight.

Note.— Navigational assistance by an air traffic services unit is particularly important if the unit becomes aware of an aircraft straying, or about to stray, into an area where there is a risk of interception or other hazard to its safety.

1.1.1 If the aircraft's position is not known, the air traffic services unit shall:

a) Attempt to establish two-way communication with the aircraft, unless such communication already exists;

b) Use all available means to determine its position;

c) Inform other ATS units into whose area the aircraft may have strayed or may stray, taking into account all the factors which may have affected the navigation of the aircraft in the circumstances;

d) Inform, in accordance with locally agreed procedures, appropriate military units and provide them with pertinent flight plan and other data concerning strayed aircraft;

e) Request from the units referred to in c) and d) and from other aircraft in flight every assistance in establishing communication with the aircraft and determining its position.

1.1.2 When the aircraft's position is established, the air traffic services unit shall:

a) Advise the aircraft of its position and corrective action to be taken; and

b) Provide, as necessary, other ATS units and appropriate military units with relevant information concerning the strayed aircraft and any advice given to that aircraft.

1.2. As soon as an air traffic services unit becomes aware of an unidentified aircraft in its area, it shall endeavour to establish the identity of the aircraft whenever this is necessary for the provision of air traffic services or required by the appropriate military authorities in accordance with locally agreed procedures. To this end, the air traffic services unit shall take such of the following steps as are appropriate in the circumstances:

a) Attempt to establish two-way communication with the aircraft;

b) Inquire of other air traffic services units within the flight information region about the flight and request their assistance in establishing two-way communication with the aircraft;

c) Inquire of air traffic services units serving the adjacent flight information regions about the flight and request their assistance in establishing two-way communication with the aircraft;

d) Attempt to obtain information from other aircraft in the area.

1.2.1 The air traffic services unit shall, as necessary, inform the appropriate military unit as soon as the identity of the aircraft has been established.

1.3 Should the ATS unit consider that a strayed or unidentified aircraft may be the subject of unlawful interference, the appropriate authority designated by the State shall immediately be informed, in accordance with locally agreed procedures.

2. **Interception of civil aircraft**

2.1. As soon as an air traffic services unit learns that an aircraft is being intercepted in its area of responsibility, it shall take such of the following steps as are appropriate in the circumstances:

a) Attempt to establish two-way communication with the intercepted aircraft via any means available, including the emergency radio frequency 121.5 MHz, unless such communication already exists;

b) Inform the pilot of the intercepted aircraft of the interception;

c) Establish contact with the intercept control unit maintaining two-way communication with the intercepting aircraft and provide it with available information concerning the aircraft;

d) relay messages between the intercepting aircraft or the intercept control unit and the intercepted aircraft, as necessary;

e) In close coordination with the intercept control unit take all necessary steps to ensure the safety of the intercepted aircraft;

f) Inform ATS units serving adjacent flight information regions if it appears that the aircraft has strayed from such adjacent flight information regions.

2.2. As soon as an air traffic services unit learns that an aircraft is being intercepted outside its area of responsibility, it shall take such of the following steps as are appropriate in the circumstances:

a) inform the ATS unit serving the airspace in which the interception is taking place, providing this unit with available information that will assist in identifying the aircraft and requesting it to take action in accordance with 2.25.2.1;

b) Relay messages between the intercepted aircraft and the appropriate ATS unit, the intercept control unit or the intercepting aircraft.

172.02.38 Time in air traffic services

1. Air traffic services units shall use Coordinated Universal Time (UTC) and shall express the time in hours and minutes and, when required, seconds of the 24-hour day beginning at midnight.
2. Air traffic services units shall be equipped with clocks indicating the time in hours, minutes and seconds, clearly visible from each operating position in the unit concerned.

3. Air traffic services unit clocks and other time-recording devices shall be checked as necessary to ensure correct time to within plus or minus 30 seconds of UTC. Wherever data link communications are utilized by an air traffic services unit, clocks and other time-recording devices shall be checked as necessary to ensure correct time to within 1 second of UTC.

4. The correct time shall be obtained from a standard time station or, if not possible, from another unit which has obtained the correct time from such station.

5. Aerodrome control towers shall, prior to an aircraft taxiing for take-off, provide the pilot with the correct time, unless arrangements have been made for the pilot to obtain it from other sources. Air traffic services units shall, in addition, provide aircraft with the correct time on request. Time checks shall be given to the nearest half minute.

172.02.39 Common reference systems

1. Horizontal reference system

World Geodetic System — 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system for air navigation. Reported aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.

2. Vertical reference system

Mean sea level (MSL) datum, which gives the relationship of gravity-related height (elevation) to a surface known as the geoid, shall be used as the vertical reference system for air navigation.

Note.— The geoid globally most closely approximates MSL. It is defined as the equipotential surface in the gravity field of the Earth which coincides with the undisturbed MSL extended continuously through the continents.

3. Temporal reference system

3.1 The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system for air navigation.

3.2 When a different temporal reference system is used, this shall be indicated in GEN 2.1.2 of the Aeronautical Information Publication (AIP).

172.02.40 Language proficiency

1. An air traffic services provider shall ensure that air traffic controllers speak and understand the language(s) used for radiotelephony communications as specified in regulation.

3. Except when communications between air traffic control units are conducted in a mutually agreed language, the English language shall be used for such communications.

172.02.41 Meteorological Information and Reporting

1. Meteorological information

a) The provider of air traffic management services shall establish systems and procedures to ensure that all meteorological information provided as part of any flight information service is-

i. supplied by the Instituto Nacional de Meteorologia; or

ii. Issued as a basic weather report.

b) The provider of air traffic management services shall establish systems and procedures to ensure that air traffic management services units are supplied with the meteorological information necessary for the performance of their respective functions, in a form that requires a minimum of interpretation by air traffic management services personnel.

c) The provider of air traffic management services shall establish procedures to ensure that equipment used in the compilation of basic weather reports-

d) Supplies data representative of the area for which the measurements are required; and

e) Where that equipment consists of multiple wind direction and speed indicators, identifies the runway, or section of the runway, monitored by each instrument.

f) The provider of air traffic management services shall establish a procedure to ensure that the information contained in a meteorological bulletin remains unchanged through onward transmission.

172.02.42 Flight Plans

1. The provider of an air traffic management service shall ensure that the flight plan acceptance procedures include, for the first air traffic management services unit receiving a filed flight plan-

a) A check for compliance with any prescribed flight plan format and data conventions;

b) A check for completeness, and to the extent practical, for accuracy; and

c) Provision for any action necessary to make the plan acceptable to air traffic management services.

2. The provider of an air traffic management service may nominate a single or more air traffic management services unit's within the applicant's organisation to accept filed flight plans on behalf of any or every unit.

3. The provider of an air traffic management service intending to operate a centralised flight planning office shall ensure the office is equipped with-

a) Adequate telephone, AFTN and facsimile services for the acceptance of flight plans from aircraft operators and any other air traffic management services unit; and

b) Facilities for the advance filing, retention, and activation of standard or repetitive elements of flight plan information.

172.02.43 Altimeter Setting Procedures

The air traffic management service provider shall establish a procedure to ensure that-

a) QNH altimeter settings are in hectopascals (Hpa) rounded down to the nearest whole hectopascal;

b) The appropriate aerodrome or area QNH setting is provided to all aircraft on initial radio contact, including aircraft that advise having already received the current applicable QNH; and

c) Air traffic management services units provide to an aircraft, on request, the current applicable aerodrome or area QNH altimeter setting.

172.02.44 Radiotelephony and Telephone Communication Procedures

1. The provider of air traffic management services shall establish systems and procedures to ensure that-

    a) The standard ICAO radiotelephony procedures and phraseology are used;

    b) In all radiotelephony communications discipline is observed, by transmitting only those messages that are necessary for the provision of an air traffic management service, or that otherwise contribute to safety;

    c) Communications procedures are in accordance with the applicable communication procedures prescribed in MOZCAR 171.

2. The provider of air traffic management services shall establish procedures to ensure that, for the purposes of paragraph (1), the standard phraseology, and the circumstances in which it is used, is that published in-

    a) MOZCAR 171; or

    b) Document 4444; or

    c) Document 9432.

3. For the purposes of paragraph (2), where differences occur between the stated documents, the particular phraseology shall be selected according to the order of precedence of the documents as listed.

172.02.45 Action after Serious Incident or Accident

1. Serious incident or accident involving air navigation facilities

The provider of air traffic management services shall establish procedures regarding a serious incident or accident to-

a) Determine if any air navigation facilities have contributed to the event;

b) Ensure immediate action is taken to-

   I. warn other aircraft that may be using or intending to use the facilities;

   II. Advise the operator of the facility of the occurrence that the facility may be implicated;

c) Assist the operator of the facility with the prompt promulgation of any decision to withdraw the equipment from service; and

d) Ensure that any facility identified in paragraph (a) is not used in the provision of separation to IFR aircraft until cleared for use by the relevant aeronautical telecommunications maintenance service organization in accordance with MOZ CAR Part 171.

172.02.46 Air Traffic Incidents investigation and reporting

In accordance with MOZCAR Part 172, the provider of air traffic management services shall establish procedures for:

a) Immediate notification to the IACM,

b) Investigation of the incident and establishment of a report including proposed corrective actions to the Director DINA, IACM

c) Implementation of corrective actions approved by the IACM where appropriate.

172.02.47 Records

Maintenance of records

1. The provider of air traffic management services shall establish systems and procedures to identify, collect, index, file, store, secure, maintain, access, and dispose of records necessary for-

   a) Improving the provision of air traffic management services;

   b) The purpose of supporting any accident or incident investigation with legal evidence;

   c) The collection of statistics and historical records.

2. The legal recording shall include-

   a) Telephone communications;

   b) Radio broadcasts, VHF and HF and communications;

   c) Filed flight plans including standard and repetitive plans;

   d) Flight progress strips;

   e) Staff duty rosters;

   f) Surveillance data;

   g) air-ground and ground-ground data communications used in the provision of ATS;

   h) Meteorological and aeronautical information;

   i) as far as practicable ambient voice recording,

   j) Including time recording correct to within 5 seconds of UTC, as determined by reference to a standard time station or GPS time standard

3. The legal recordings can be disposed after a period of 31 days, except

   a) When investigations are ongoing;

   b) When otherwise instructed by the IACM or by the Aircraft Accident and Incident Investigation Branch.

4. Administrative, operational and technical records for each ATS unit.

   a) a record of each internal quality assurance review carried out under the procedures required by MOZCAR 172.02.2. The record shall detail the activities reviewed and any necessary follow-up corrective and preventive actions;

   b) Movement and traffic flow statistics on the form prescribed at Annexure D;

   c) Enroute facility financial reports on the form prescribed at Annexure E;

   d) Training and assessment records;

   e) Staff duty rosters;

   f) ATS unit operational log-book;

   g) Technical occurrence and maintenance log-book;

The provider of air traffic management services shall establish systems and procedures to ensure that all records are of sufficient clarity to convey the required information, are dealt with as legal evidence and will be retained for 5 years.

172.02.48 Maintenance of logbooks

1. The provider of an air traffic management service shall establish procedures to ensure that a logbook, with sequentially numbered pages, is kept at each air traffic management services unit, and, where a unit has physically separate operations areas, at each such location within the unit.

2. The procedure shall ensure that-

   a) The senior person on duty, or a person designated maintains the logbook;

   b) The logbook is maintained throughout the hours of watch of the unit or operations room;

   c) All entries include the time of entry and the initials of the person performing the entry;

   d) The person responsible for maintaining a logbook signs On Watch, and effects transfer of responsibility by successive On Watch entries;

   e) Logbook entries are-

      I. in chronological sequence and in ink;

      II. without erasure, defacement, or obliteration;

      III. Corrected by drawing a single line through the erroneous information and initialing the correction;

   f) Actual times of opening and closing watch are recorded in the logbook, together with the reason for every variation from published hours of service;

   g) Logbooks are retained for a period of 5 years from the date of final entry.

   h) The senior person on duty, or a person designated maintains the logbook;

   i) The logbook is maintained throughout the hours of watch of the unit or operations room;

   j) All entries include the time of entry and the initials of the person performing the entry;

   k) The person responsible for maintaining a logbook signs On Watch, and effects transfer of responsibility by successive On Watch entries;

   l) Logbook entries are-

      I. in chronological sequence and in ink;

      II. without erasure, defacement, or obliteration;

      III. Corrected by drawing a single line through the erroneous information and initiating the correction;

   m) Actual times of opening and closing watch are recorded in the logbook, together with

the reason for every variation from published hours of service;

n) Logbooks are retained for a period of 5 years from the date of final entry.

172.02.49 Security requirements

1. A security programme shall specify for each air traffic management services unit the physical security requirements, practices, and procedures to be followed for the purposes of minimizing the risk of destruction of, damage to, or interference with the operation.

2. Without limiting the generality of paragraph (1), the security programme shall specify such physical security requirements, practices, and procedures as may be necessary to-

a) ensure that entrances to permanent ATS facilities operated by the air traffic management services provider are subject to positive access control at all times, so as to prevent unauthorized entry;

b) Protect personnel on duty;

c) To ensure that essential facilities and equipment is provided with alternative or secondary facilities or equipment that is in immediate readiness for operation in the event of main equipment failure;

d) Be followed in the event of a bomb threat or other threat of violence against an ATS unit; and

e) Monitor unattended ATS unit buildings to ensure that any intrusion or interference is detected.

172.02.50 Service Disruptions

1. The provider of an air traffic management service shall report to the IACM, within 48 hours of the occurrence, the circumstances surrounding any unplanned disruption to air traffic management services when the disruption affected, or could have affected, the safety of air traffic.

2. Disruptions reportable under paragraph (1) shall include, but are not limited to, any-

a) failure to open watch within 15 minutes of the promulgated opening time;

b) Interruption, greater than 10 minutes, to the normal provision of an air traffic management service; and curtailment of watch, by more than 30 minutes, from the promulgated off watch time.

172.02.51 Performance-based navigation (PBN) operation

a) In applying performance-based navigation, the navigation specifications shall be prescribed by the IACM on the basis of regional air navigation agreements.

b) The prescribed navigation specification shall be appropriate to the level of communications, navigation and air traffic services provided in the airspace concerned.

c) The spacing between parallel tracks or between parallel ATS route centre lines based on performance-based navigation will be dependent upon the relevant navigation specification required.

d) Performance-based navigation operations should be implemented as soon as practicable.

e) Applicable guidance on PBN implementation is published in ICAO Doc 9613 Performance-based Navigation Manual.

172.02.52 Establishment and identification of ATS routes

a) When ATS routes are established, a protected airspace along each ATS route and a safe spacing between adjacent ATS routes shall be provided.

b) Special routes can be established for use by helicopters to and from helidecks on the high seas. When determining the lateral spacing between such routes, account should be taken of the navigational means available and the navigation equipment carried on board helicopters.

c) ATS routes shall be identified by designators, in accordance with the principles set forth in Appendix 2 of this MOZCATs.

d) Standard departure and arrival routes and associated procedures shall be identified in accordance with the principles set forth in Appendix 3 of this MOZCATs.

e) Guidance material relating to the establishment of ATS routes defined by VOR is contained in attachment A of this MOZCATs

172.02.53 Establishment of change-over points

1. Change-over points should be established on ATS route segments defined by reference to very high frequency omnidirectional radio ranges where this will assist accurate navigation along the route segments. The establishment of change-over points should be limited to route segments of 110 km (60 NM) or more, except where the complexity of ATS routes, the density of navigation aids or other technical and operational reasons warrant the establishment of change-over points on shorter route segments.

2. Unless otherwise established in relation to the performance of the navigation aids or frequency protection criteria, the change-over point on a route segment should be the mid-point between the facilities in the case of a straight route segment or the intersection of radials in the case of a route segment which changes direction between the facilities.

172.02.54 Establishment and identification of significant points

a) Significant points shall be established for the purpose of defining an ATS route or instrument approach procedure and/or in relation to the requirements of air traffic services for information regarding the progress of aircraft in flight.

d) Significant points shall be identified by designators, in accordance with the principles set forth in Appendix 4 of this MOZCATs.

172.02.55 Establishment and identification of standard routes for taxiing aircraft

1. Where necessary, standard routes for taxiing aircraft should be established on an aerodrome between runways, aprons and maintenance areas. Such routes should be direct, simple and where practicable, designed to avoid traffic conflicts.

2. Standard routes for taxiing aircraft should be identified by designators distinctively different from those of the runways and ATS routes

SUBPART III REQUIREMENTS FOR THE CERTIFICATION OF ATM SERVICES

172.03.1 Application for a Certification

The application form for the issue, amendment or renewal of an air traffic management service unit certificate is contained in Annex A, which shall require the following information:

a) The applicant's name and address for service in Mozambique;

b) The key management positions in the organization;

c) The specific air traffic management service or services to be provided;

d) The aerodrome location or airspace designation at, or within which, the service will be provided;

e) The documents and information listed under MOZCAR 172.01.7

172.03.2 Issue of Certificate

An air traffic management services provider certificate is issued according to the sample in Annex B.

172.03.3 Duration of Certificate

An air traffic management service certificate may be granted or renewed for a period of up to 5 years.

172.03.4 Suspension and cancellation of certificate

1. Suspension

a) As stated in the regulation the IACM may suspend an air traffic management service organization certificate for a period not exceeding 30 days by letter signed by the CEO.

b) The inspector who has suspended a certificate shall, within one workday of such suspension, deliver a report in writing to the CEO of the IACM, stating the reasons why, in his or her opinion, the suspended certificate should be cancelled.

c) The inspector concerned shall submit a copy of the report referred to in paragraph (b) to the holder of the certificate that has been suspended, and shall furnish proof of such submission for the information of the CEO.

2. Cancellation

The CEO of the IACM may, subject to such conditions that he may determine, confirm, vary or set aside the suspension or cancel the certificate.

172.03.5 Appeal

a) The holder of an certificate who feels aggrieved by the suspension of the certificate may appeal against such suspension to the CEO of the IACM , within 14 days after such holder becomes aware of such suspension.

b) An appellant shall deliver an appeal in writing, stating the reasons why, in the opinion of the appellant, the suspension should be varied or set aside, and the appeal shall include, if applicable, full particulars of any remedial action which may have been taken by the appellant to rectify the circumstances which resulted in such suspension.

c) The CEO of the IACM shall acknowledge receipt of an appeal, which acknowledgement shall reflect the name of the recipient at the CEO's office and the date and time of receipt.

d) As soon as practicable, but within 14 days, after the receipt of an appeal, the CEO of the IACM shall adjudicate the appeal.

e) The CEO of the IACM may -

i. adjudicate the appeal on the basis of the documents submitted to him or her;

or

ii. Order the appellant and the inspector concerned to appear before him or her, either in person or through a representative selected by the appellant, at a time and place determined by the CEO of the IACM, to give evidence.

f) The CEO of the IACM shall, if an certificate is suspended and the holder thereof does not appeal against the suspension, adjudicate such suspension within 30 days from the date on which the certificate was suspended.

172.03.6 Transition

a) Approved providers of air traffic management services on the date Part 172 comes into force may continue to provide air traffic management services without an certificate for a period up to twelve months after the date on which Part 172 comes into force.

b) In order to provide any air traffic management service from the date twelve months after Part 172 comes into force, a certificate to provide each air traffic management service shall be obtained before twelve months after the date on which Part 172 comes into force.

172.03.7 Manual of Procedures

a) An applicant for the grant of an air traffic management service certificate shall provide the IACM with a manual of procedure containing:

1. A statement signed by the accountable manager and compliance officer on behalf of the applicant's organization, confirming that the manual of procedure and any included manuals -

   i. defines the organization and demonstrate its means and methods for ensuring ongoing compliance with this and any other applicable Part;

   ii. Will be complied with at all times;

2. The titles and names of the senior persons required by MOZCAR 172.01.7 e)

3. The duties and responsibilities of the compliance manager specified in MOZCAR 172.02.5, including matters for which he/she has responsibility to deal directly with the CEO of the IACM on behalf of the organization;

4. An organization chart showing lines of responsibility of the senior persons specified in MOZCAR 172.02.5 (1,2 e 3), and extending to each location at which the personnel referred to in MOZCAR 172.02.6 (d) are located;

5. In the case of an organization providing air traffic management services from more than one ATS unit, a table listing-

   a) Locations of ATS units;

   b) The aerodrome or airspace being serviced;

   c) The services provided;

6. Details of the applicant's staffing structure for each ATS unit;

7. Details of procedures required by MOZCAR 172.02.5.2, -3 and -4 regarding the competency, qualifications, maintenance of current operating practice, training and assessment of ATS personnel;

8. A description of the accommodation, facilities and equipment to be used in meeting the requirements of MOZ-CAR 172.02.7;

9. The information required by MOZ-CAR 172.02.9, 10 and 11 regarding hours of service shift administration and any transitional arrangements;

10. Details of the procedures required by MOZ-CAR 172.02.12 regarding the control of documentation;

11. The contingency plans required by MOZ-CAR 172.02.13;

12. Details of the systems and procedures required by MOZCAR 172.02.14 regarding communication requirements;

13. Details of the systems and procedures required by MOZCAR 172.02.15 regarding co – ordinations with adjacent units, military units and support services;

14. Details of procedures required by MOZCAR 172.02.16 regarding aeronautical information and the notification of facility status;

15. Details of the systems and procedures required by MOZCAR 172.02.18 regarding meteorological information and reporting;

16. Details of systems and procedures required by MOZCAR 172.02.19 regarding the provision of area control and approach control services;

17. Details of systems and procedures required by MOZCAR 172.02.20 regarding the provision of aerodrome control service;

18. Details of the procedures required by MOZCAR 172.02.21 regarding responsibility for control;

19. Details of the procedures required by MOZCAR 172.02.22 regarding the application of priorities;

20. Details of the procedures required by MOZCAR 172.02.23 regarding ATC clearances;

21. Details of the procedures required by MOZCAR 172.02.24 regarding the allocation of cruising levels;

22. Details of the procedures required by MOZCAR 172.02.25 regarding deviations from an ATC clearance;

23. Details of systems and procedures required by MOZCAR 172.02.26 regarding the provision of flight information service;

24. Details of systems and procedures required by MOZCAR 172.02.27 regarding the provision of alerting service;

25. Details of the procedures required by MOZCAR 172.02.28 regarding the management of Air Traffic Flows (ATFM) where applicable;

26. Details of the procedures required by MOZCAR 172.02.29 regarding the processing of flight plans;

27. Details of the procedures required by MOZCAR 172.02.30 regarding time;

28. Details of altimeter setting procedures required by MOZCAR 172.02.31;

29. Details of the radio-telephony procedures required by MOZCAR 172.02.32;

30. Details of the production and maintenance of flight procedures as required by 172.02.33;

31. Details of the procedures required by MOZCAR 172.02.34 regarding aircraft emergencies and abnormal situations;

32. Details required by MOZCAR 172.02.35 regarding procedures following a serious incident or accident;

33. Details of the procedures regarding the reporting and investigation of Air Traffic incidents required by MOZCAR 172.02.36;

34. Details of systems and procedures required by MOZCAR 172.02.37 regarding the legal recording;

35. Details of the procedures required by MOZCAR 172.02.38 regarding the keeping of logbooks;

36. Details required by MOZCAR 172.02.39 regarding security arrangements;

37. Details of the procedures required by MOZCAR 172.03.1A regarding Maintenance of the competency of classification of Airspace.

38. A Search and Rescue Manual as required by MOZCAR 172.04.3

39. Details of the maintenance programmer and specific agreements with approved maintenance organizations required by MOZCAR 172.02.7 (c)

39. Details of the procedures required by MOZCAR 172.02.40 regarding disruptions to service;

40. Details of the procedures established to control, amend and distribute the manual of procedures.

b) The Manual of Procedures must be acceptable to the Chairman of the IACM.

c) Amendments to the Manual of Procedures shall be approved by the Chairman of IACM.

d) Amendments to the Manual of Procedures shall be communicated to each staff member and acknowledged by individual signature.

172.03.08 Safety Management System

1. General safety requirements

A provider of air traffic management services shall, as an integral part of the management of its services, have in place a safety management system (SMS) as required by MOZCAR Part 172.02.2 (b) and (c) which:

a) Ensures that the level of air traffic Services (ATS) and communications, navigation and surveillance, as well as the ATS procedures applicable to the airspace or aerodrome concerned, are appropriate and adequate for maintaining an acceptable level of safety performance in the provision of ATS.

b) ensures a formalized, explicit and proactive approach to systematic safety management in meeting its safety responsibilities within the provision of its services; operates in respect of all its services and the supporting arrangements under its managerial control; and includes, as its foundation, a statement of safety policy defining the organization's fundamental approach to managing safety (safety management),

c) ensures that everyone involved in the safety aspects of the provision of air traffic management services has an individual safety responsibility for their own actions, that managers are responsible for the safety performance of their respective departments or divisions and that the top management of the provider carries an overall safety responsibility (safety responsibility),

d) ensures that the achievement of satisfactory safety in air traffic management services shall be afforded the highest priority (safety priority),

e) ensures that while providing air traffic management services, the principal safety objective is to minimize its contribution to the risk of an aircraft accident as far as reasonably practicable (safety objective).

2. Requirements for safety achievement

In the scope of the SMS, a provider of air traffic management services shall:

a) ensure that personnel are adequately trained and competent for the job they are required to do, in addition to being properly licensed if so required and satisfying applicable medical fitness requirements (competency),

b) Ensure that a safety management function is identified with organizational responsibility for development and maintenance of the safety management system; ensure that this point of responsibility is independent of line management, and accountable directly to the highest organizational level. However, in the case of small organizations where combination of responsibilities may prevent sufficient independence in this regard, the arrangements for safety assurance shall be supplemented by additional independent means; and ensure that the top management of the service provider organization is actively involved in ensuring safety management (safety

management responsibility),

c) Ensure that, data for use in safety monitoring programmes is collected from as wide a range of sources as possible, as the safety-related consequences of particular procedures or systems may not be realized until after an incident has occurred and wherever practicable, quantitative safety levels are derived and are maintained for all functional systems (quantitative safety levels),

d) Ensure that the SMS is systematically documented in a manner, which provides a clear linkage to the organization's safety policy (SMS documentation),

e) Ensure adequate justification of the safety of the externally provided services and supplies, having regard to their safety significance within the provision of its services (external services and supplies),

f) Ensure that risk assessment and mitigation is conducted to an appropriate level to ensure that due consideration is given to all aspects of the provision of ATM (risk assessment and mitigation). As far as changes to the ATM functional system are concerned, the provisions of paragraph 5 shall apply,

g) Ensure that ATM operational or technical occurrences which are considered to have significant safety implications are investigated immediately, and any necessary corrective action is taken (safety occurrences).

h) Transmit immediately the occurrence reports to the persons in charge of safety within the organization and to the IACM, and forward the investigation reports without delay to the Safety Manager and to the IACM (safety reporting).

3. Requirements for safety assurance

In the scope of the SMS, a provider of air traffic management services shall ensure that:

a) Safety surveys are carried out as a matter of routine, to recommend improvements where needed, to provide assurance to managers of the safety of activities within their areas and to confirm compliance with the relevant parts of the SMS (safety surveys),

b) Methods are in place to detect changes in functional systems or operations which may suggest any element is approaching a point at which acceptable standards of safety can no longer be met, and that corrective action is taken (safety monitoring),

c) Safety records are maintained throughout the SMS operation as a basis for providing safety assurance to all associated with, responsible for or dependent upon the services provided, and to the national supervisory authority (safety records).

4. Requirements for safety promotion

In scope of the SMS, a provider of air traffic management services shall ensure that:

a) All personnel are aware of the potential safety hazards connected with their duties (Safety awareness),

b) The lessons arising from safety occurrence investigations and other safety activities are disseminated within the organization at management and operational levels (lesson

dissemination),

c) All personnel are actively encouraged to propose solutions to identified hazards, and changes are made to improve safety where they appear needed (safety improvement).

5. Requirements for risk assessment and mitigation with regard to changes

In the scope of the SMS, a provider of air traffic management services shall ensure that hazard identification as well as risk assessment and mitigation are systematically conducted for any changes to those parts of the ATM functional system and supporting arrangements within his managerial control, in a manner which addresses:

a) The complete life cycle of the constituent part of the ATM functional system under consideration, from initial planning and definition to post-implementation operations, maintenance and de-commissioning;

b) The airborne, ground and, if appropriate, spatial components of the ATM functional system, through cooperation with responsible parties; and

c) The equipment, procedures and human resources of the ATM functional system, the interactions between these elements and the interactions between the constituent part under consideration and the remainder of the ATM functional System.

6 Requirements for safety reviews

A provider of air traffic management services shall ensure that safety reviews of ATS units are conducted on regular and systematic basis by personnel qualified through training, experience and expertise and having understanding of relevant Standards and Recommended Practices (SARPs), Procedures for Air Navigation Services (PANS), safe operating practices and Human Factors principles.

7 Requirement for Safety-Enhancing Measures

A provider of air traffic management services shall ensure that:

Any actual or potential hazard related to the provision of ATS within an airspace or at an aerodrome, whether identified through an ATS safety management activity or by any other means, shall be assessed and classified by the appropriate ATS authority for its risk acceptability.

Except when the risk can be classified as acceptable, the ATS authority concerned shall, as a matter of priority and as far as practicable, implement appropriate measures to eliminate the risk or reduce the risk to a level that is acceptable.

If it becomes apparent that the level of safety applicable to an airspace or an aerodrome is not, or may not be achieved, the appropriate ATS authority shall, as a matter of priority and as far as practicable, implement appropriate remedial measures.
Implementation of any remedial measure shall be followed by an evaluation of the effectiveness of the measure in eliminating or mitigating a risk.

172.03.09 Safety assessments

1. A provider of air traffic management services shall ensure that a safety assessment is carried out in respect of proposals for significant airspace reorganizations, for significant

changes in the provision of ATS procedures applicable to an airspace or an aerodrome, and for the introduction of new equipment, systems or facilities, such as:

a) A reduced separation minimum to be applied within an airspace or at an aerodrome;

b) A new operating procedure, including departure and arrival procedures, to be applied within an airspace or at an aerodrome;

c) A reorganization of the ATS route structure;

d) A resectorization of an airspace;

e) Physical changes to the layout of runways and/or taxiways at an aerodrome; and

f) Implementation of new communications, surveillance or other safety-significant systems and equipment, including those providing new functionality and/or capabilities.

Proposals shall be implemented only after submission to IACM and when the assessment has shown that an acceptable level of safety performance will be met.

2. Every significant modification in the ATM system shall be submitted to the IACM for approval with a safety assessment. The hazard identification, risk assessment and mitigation processes shall include:

a) A determination of the scope, boundaries and interfaces of the constituent part being considered, as well as the identification of the functions that the constituent part is to perform and the environment of operations in which it is intended to operate;

b) A determination of the safety objectives to be placed on the constituent part, incorporating:

c) An identification of ATM-related credible hazards and failure conditions, together with their combined effects,

d) An assessment of the effects they may have on the safety of aircraft, as well as an assessment of the severity of those effects, using the severity classification scheme provided in Section 4,

e) A determination of their tolerability, in terms of the hazard's maximum probability of occurrence, derived from the severity and the maximum probability of the hazard's effects, in a manner consistent with Section 4;

f) The derivation, as appropriate, of a risk mitigation strategy which:

i. Specifies the defenses to be implemented to protect against the risk-bearing hazards,

ii. Includes, as necessary, the development of safety requirements potentially bearing on the constituent part under consideration, or other

parts of the ATM functional system, or environment of operations, and

iii. Presents an assurance of its feasibility and effectiveness;

g) Verification that all identified safety objectives and safety requirements have been met:

i. Prior to its implementation of the change,

ii. During any transition phase into operational service,

iii. During its operational life, and

iv. during any transition phase until decommissioning.

h) The results, associated rationales and evidence of the risk assessment and mitigation processes, including hazard identification, shall be collated and documented in a manner which ensures that:

i. Complete arguments are established to demonstrate that the constituent part under consideration, as well as the overall ATM functional system are, and will remain tolerably safe by meeting. allocated safety objectives and requirements. This shall include, as appropriate, specifications of any predictive, monitoring or survey techniques being used,

ii. All safety requirements related to the implementation of a change are traceable to the intended operations/functions.

3. A systematic identification of the hazards shall be conducted. The severity of the effects of hazards in a given environment of operations shall be determined using the classification scheme shown in the following table, while the severity classification shall rely on a specific argument demonstrating the most probable effect of hazards, under the worst-case scenario.

Severity of occurrence	Meaning	Value
Catastrophic	— Equipment destroyed — Multiple deaths	A
Hazardous	— A large reduction in safety margins, physical distress or a workload such that the operators cannot be relied upon to perform their tasks accurately or completely — Serious injury — Major equipment damage	B
Major	— A significant reduction in safety margins, a reduction in the ability of the operators to cope with adverse operating conditions as a result of increase in workload, or as a result of conditions impairing their efficiency — Serious incident — Injury to persons	C
Minor	— Nuisance — Operating limitations — Use of emergency procedures — Minor incident	D
Negligible	— Little consequences	E

In order to deduce the effect of a hazard on operations and to determine its severity, the systematic approach/process shall include the effects of hazards on the various elements of the ATM functional system, such as the air crew, the air traffic controllers, the aircraft functional capabilities, the functional capabilities of the ground part of the ATM functional system, and the ability to provide safe air traffic management services.

4. Risk classification scheme

a) Safety objectives based on risk shall be established in terms of the hazards maximum probability of occurrence, derived both from the severity of its effect, and from the maximum probability of the hazard's effect.

b) As a necessary complement to the demonstration that established quantitative objectives are met, additional safety management considerations shall be applied so that more safety is added to the ATM system whenever reasonable.

5. Safety requirements for engineering and technical personnel undertaking

operational safety related tasks

a) A provider of air traffic management services shall ensure that technical and engineering personnel including personnel of subcontracted operating organisations who operate and maintain ATM equipment approved for its operational use have and maintain sufficient knowledge and understanding of the services they are supporting, of the actual and potential effects of their work on the safety of those services, and of the appropriate working limits to be applied.

b) With regard to the personnel involved in safety related tasks including personnel of subcontracted operating organisations, the provider of air traffic management services shall document the adequacy of the competence of the personnel; the rostering arrangements in place to ensure sufficient capacity and continuity of service; the personnel qualification schemes and policy, the personnel training policy, training plans and records as well as arrangements for the supervision of non-qualified personnel. It shall have procedures in place for cases where the physical or mental condition of the personnel is in doubt.

c) A provider of air traffic management services shall maintain a register of information on the numbers, status and deployment of the personnel involved in safety related tasks. The register shall:

i. identify the accountable managers for safety related functions;

ii. Record the relevant qualifications of technical and operational personnel, against required skills and competence requirements;

iii. Specify the locations and duties to which technical and operational personnel are assigned, including any rostering methodology.

172.03.10 Runway Safety Programme

Air navigation service providers shall establish a runway safety programme designed to improve and support runway safety by integrating the safety systems of the participating organization.

Interfacing service providers should document the interface between the SMS and the runway safety team (RST).

The implementation of a runway safety programme shall be based on “terms of Reference” developed in runway safety Team Handbook.

172.03.11 Quality Assurance System

1. An ISO 9001 certification or approved equivalent, covering the air navigation service provider and issued by an appropriately accredited organization, shall be considered as an approved means of compliance. At the request of the IACM, providers of air navigation services should give access to the documentation related to the Certification.

2. The provider of air traffic management services shall establish:

   a) A procedure to ensure quality indicators, including samples of radio and telephone records, defect and incident reports, and personnel and customer feedback, are monitored to identify existing problems or potential causes of problems within the system;

   b) A procedure for corrective action to ensure existing problems that have been identified within the system are corrected;

   c) An internal audit programme to audit the applicant's organisation for conformity with its safety policy; and

   d) Management will measure the effectiveness of any preventive action taken. (5) The internal quality audit programme shall-

   e) Specify the frequency and location of the audits taking into account the nature of the activity to be audited;

   f) Ensure audits are performed by trained auditing personnel who are independent of those having direct responsibility for the activity being audited;

   g) Ensure the results of audits are reported to the personnel responsible for the activity being audited and the manager responsible for internal audits;

   h) Require preventive or corrective action to be taken by the personnel responsible for the activity being audited if problems are found by the audit; and

   i) Ensure follow up audits to review the effectiveness of any preventive or corrective action taken.

3. The procedure for management review shall

   a) Specify the frequency of management reviews of the quality assurance system taking into account the need for the continuing effectiveness of the system;

   b) Identify the responsible manager who shall review the quality assurance system;

   c) Ensure the results of the review are evaluated and recorded.

4. The senior person who has the responsibility for internal quality assurance shall have direct access to the accountable manager and compliance officer on matters affecting the safe provision of any air traffic management service listed in the manual of procedure.

5. The quality assurance system shall be documented in the manual of procedure referred to

in MOZ-CAR 172.02.1.

6. Providers of air navigation services shall be provided no later than two years after the entry into force of this Regulation with a quality management system that covers all air navigation services provided by them in accordance with the following principles:

a) Definition of quality policy in order to satisfy as much as possible, the needs of different users;

b) Establishment of a quality assurance program that contains procedures designed to verify that all operations are carried out in accordance with the requirements, standards and procedures;

c) Provide evidence of the operation of the quality system through manuals and documents;

d) Appointment of representatives to the management to monitor the adequacy of the procedures to ensure safe and efficient operational practices and compliance with such procedures;

e) Perform reviews of the quality system in place and take corrective action as appropriate.

172.03.12 Financial strength

Air navigation service providers shall be able to meet their financial obligations, such as fixed and variable costs of operation or capital investment costs. They shall use an appropriate cost accounting system. They shall demonstrate their abilities through the annual plan as as well as through balance sheets and accounts as practicable under their legal statute.

172.03.13 Liability and insurance cover

a) Air navigation service providers shall have in place arrangements to cover their liabilities arising from applicable law.

b) The method employed to provide the cover shall be appropriate to the potential loss and damage in question, taking into account the legal status of the organization and the level of commercial insurance cover available.

c) An air navigation service provider which avails itself of the services of another air navigation service provider shall ensure that the agreements cover the allocation of liability between them.

172.03.14 PERSONNEL REQUIREMENTS

1. Operational training

The provider of air traffic management services shall establish procedures and programmes for operational training and assessment of the following personnel:

a) Air traffic controllers;

b) Aeronautical station operators;

c) Personnel directly involved in the provision of aeronautical information services;

d) Air traffic controllers assistants.

A yearly operational training and assessment program for each unit shall be submitted to the IACM for approval.

2. The provider of air traffic management services shall establish procedures to ensure that personnel giving instruction in an operational environment hold an appropriate current ATS instructor rating issued under Part 65.

3. ATM examinations

The provider of air traffic management services shall establish procedures to ensure that personnel carrying out assessment for the issue of licenses, or the issue of ratings, hold an appropriate current ATM examiner rating issued under Part 65.

4. Operational assessment

a) As part of the quality assurance system, the holder of an air traffic management service unit certificate shall regularly assess the operational competency of air traffic controllers, flight information service, aeronautical station operator, aeronautical information service and air traffic management services assistant personnel in its employ.

b) A formal proficiency assessment shall be carried out in accordance with Part 65 before a license or a rating validation can be issued to assess whether the applicant has achieved the required level of competence.

c) In addition, in accordance with Part 65 a formal assessment shall be carried out regularly to determine whether all operational personnel are maintaining the required level of competence in the positions for which a valid rating is held. In addition supervisory personnel should conduct routine assessments on an on-going basis during duty assignment.

d) Personnel shall be assessed in key elements of the performance areas detailed on an assessment form as specified in Part 65. The person conducting the assessment shall record the assessment on the form contained in Part 65, together with relevant remarks and any discrepancies noted. Assessments shall be retained on the unit training records.

e) An assessment shall be made of both the quality of work and the level of knowledge of the elements assessed.

f) A proficiency assessment record shall be maintained at each ATM unit for each person listed in paragraph (1) and each record shall indicate the objective and impartial judgement of an individual's ability, based on regular checks but may also be from observation made during normal duties.

g) The acceptance of proficiency checks as a process of personnel assessment and development is determined to a large degree by the objectivity, honesty and integrity with

which the checks are administered and the degree of participation and protection afforded the individual controller. Counselling is an important feature in the development of air traffic management services personnel and therefore personnel undergoing the assessment shall be made aware, by formal and informal counselling, of the assessments and remarks made by the assessing officer on the proficiency assessment record. Strengths as well as weaknesses must be discussed with the person being assessed.

h) If air traffic management services personnel perform duties in a manner which causes doubt as to the acceptable standard of performance, an assessment shall be made at any time irrespective of the period of time that has elapsed since the completion of the last preceding assessment. This assessment shall require the employee to demonstrate an acceptable standard of performance and knowledge in each of the key elements of performance being checked.

i) When corrective training is indicated, the air traffic management services employee shall not perform operational duties until the corrective training is successfully completed.

j) It is the responsibility of the unit manager to establish and maintain unit proficiency standards, and to ensure that proficiency check rosters are prepared and conducted in accordance with Part 65.

k) As a minimum the following points shall be evaluated when assessing the individual performance of air traffic controllers:

i. Awareness and analysis of traffic situations, detection of conflicts, definition of priorities

ii. Safety, correct application of procedures and separations;

iii. Emergency procedures

iv. Composition of clearances and use of correct phraseology procedures

v. Correct and efficient use of the equipment

vi. Anticipation and timely co-ordinations

vii. Attitude and teamwork

172.03.15 Accommodation, Facility and Equipment Requirements

1. The provider of air traffic management services shall establish accommodation that is appropriate to the air traffic management services listed in the applicant's manual of procedure required under MOZ-CATS 172.04.7 for any or all of the following services:

a) Aerodrome control towers

b) Approach control offices

c) Area control centers

d) Aerodrome flight information offices

e) Flight information Centre

2. The accommodation shall have:

a) Emergency power supply

b) Emergency lighting;

c) Emergency exits and escape procedures as required;

d) Entry control (security);

e) Desks, consoles and chairs;

f) Lighting protection;

g) Fire alarm;

h) Fire extinguishers;

i) A briefing room or briefing space with appropriate briefing support;

j) Equipment repair space

k) Technical equipment storage space;

l) Appropriate air conditioning, heating and cooling;

m) Toilet facilities;

n) Running water;

o) Lockers and a safe.

3. The provider of air traffic management services for an aerodrome control service, or an aerodrome flight information service, shall ensure that any aerodrome control tower or aerodrome flight information office, listed in the applicant's manual of procedure, is-

a) Constructed and situated to provide:

i. The maximum practicable visibility of aerodrome traffic;

ii. Protection from glare and reflection;

iii. Protection from noise; and

b) Safeguarded from any development that would affect the requirements of paragraph (3)(a).

4. Facilities

The working environment shall be conducive to providing the service consistent with

reasonable expectation and demand by making the necessary facilities readily available to personnel.

a) Solo watch locations shall be provided with-

i. Toilet facilities that ensure the minimum possible interruption to or degradation of the provision of air traffic services; and

ii. Storage and preparation facilities for food and drink.

b) At all locations facilities for maintaining records for the following-

i. Regular reports and returns to the Director;

ii. Air safety incident reports and remedial action taken;

iii. Personnel files; license and medical validity details;

iv. Training files;

v. Rosters and leave details;

vi. Aerodrome emergency plan;

vii. General information and staff notices.

c) At all locations facilities for the storage and ready display of the appropriate documents referred to in MOZCAR 172.02.9.

172.03.16 Minimum equipment list

Operational offices shall be equipped so as to permit records to be maintained and to ensure operational personnel have rapid and reliable communication with aircraft.

1. Aerodrome control towers shall be provided with:

a) Equipment for two-way voice communication with:

i. Aircraft in or approaching the airspace for which the applicant has responsibility;

ii. Aircraft, vehicles, and persons on the manoeuvring area and in the perimeter of the aerodrome.

iii. The possibility to monitor the emergency frequencies

b) The following minimum equipment:

i. A display system designed to show the status of current and pending aerodrome traffic together with flight plan information (stripboard or electronic display)

ii. A constant supply of electrical power;

iii. Telephone communications

iv. Appropriate and current maps and charts;

v. Binoculars;

vi. Clock;

vii. Logbook;

viii. QNH display, with at least an aneroid barometer or barometric altimeter, situated in the control room.

ix. Actual wind direction and speed information

x. Emergency maps and checklists

xi. Status monitors for approach and landing aids

xii. If applicable, airfield lighting controls panel;

xiii. Sketch or picture indicating visibility and cloud height checkpoints

xiv. Voice and, where applicable, data recording equipment:

xv. Audio emergency alarm system:

xvi. Signal lamp with green, red, and white functions; (ix) ;

xvii. AFTN terminal or an alternative means of reception and transmission of information conveyed by AFTN;

2. The provider of air traffic management services shall ensure that area control centres, flight information centres, and approach control offices are-

a) Provided with equipment enabling to the fullest extent practical, two-way voice communication to cover the area of responsibility.

b) Provided with the following minimum equipment:

i. A display system or systems designed to show the disposition of current and pending flights together with flight plan information for individual aircraft (stribboard and Air Situation Display where available);

ii. A constant supply of electrical power;

iii. Appropriate and current maps and charts;

iv. Clocks;

v. Telephone communications;

vi. Emergency checklists;

vii. Logbook;

viii. Appropriate status monitors for navigation, approach, and landing aids;

ix. Voice recording equipment and, where applicable, data recording equipment;

x. An AFTN terminal;

xi. For approach control operating positions, an ILS status monitor at the approach control operating position for the aerodrome concerned;

xii. For approach control operating positions responsible for aircraft on final approach, or aircraft landing or taking-off, a wind direction and speed display fed from the same source as the corresponding equipment in the aerodrome control tower.

172.03.17 Operation of equipment

a) The provider of air traffic management services shall establish procedures to ensure that the aeronautical telecommunications equipment required are operated in accordance with the requirements of MOZCAR Part 171.

b) The provider of air traffic management services shall establish procedures to ensure that visual display units used by air traffic management services are positioned with due regard to the relative importance of the information displayed and ease of use by the staff concerned.

c) The equipment required by paragraphs 5 shall have a level of reliability, availability, and redundancy that minimizes the possibility of failure, non-availability, or significant degradation of performance.

d) The provider of air traffic management services shall establish procedures to ensure monitors mentioned under paragraph 5 are fitted with-

i. An audio signal to indicate a change of status;

ii. A visual indication of the current status.

172.03.18 Shift Administration

The provider of air traffic management services shall ensure that:

a) Adequate time is provided at the beginning and end of each shift, for the performance of those duties required-

i. Before providing an air traffic management service;

ii. After ceasing to provide an air traffic management service; and,

b) A minimum of 10 minutes is provided for handover at an ATS operational position.

172.03.19 Documentation

1. The documentation provided at an air traffic management services unit shall include-

   a) M a n u a l of procedure (and any associated referenced material);

   b) Service orders;

   c) Appropriate air traffic management services Letters of Procedures;

   d) AIP and AIP Supplements;

   e) AIC and NOTAM;

   f) The relevant national legislation;

   g) All applicable Civil Aviation Regulations;

   h) All applicable Civil Aviation Technical Standards;

   i) Search and Rescue Manual;

   j) Unit Emergency Plan and checklists;

   k) Unit ATM contingency plan

   l) Air Safety Incident reports and remedial action;

   m) Operational log

   n) Maintenance log;

   o) Circulars and bulletins file;

   p) Equipment manuals;

   q) All applicable ICAO documents.

2. Control of documentation

   a) The provider of air traffic management services shall establish a procedure to control all the documentation required by their manual of procedure. The procedure shall ensure that-

   b) All incoming documentation is reviewed, and action taken as required, by authorized personnel;

   c) All documentation is reviewed and authorized before issue;

   d) Current issues of all relevant documentation are available to personnel at all locations where they need access to such documentation for the provision and operation of air traffic management services;

   e) All obsolete documentation is promptly removed from all points of issue or use;

f) Any obsolete documents retained as archives are suitably identified as obsolete;

g) changes to documentation are reviewed and approved by authorised personnel who shall have access to pertinent background information upon which to base their review and certificate;

h) The current version of each item of documentation can be identified to preclude the use of out-of-date editions.

172.03.20 Co-ordination Requirements

1. Organizations

The provider of air traffic management services shall establish systems and procedures to ensure, where applicable, co-ordination between each air traffic management services unit listed in the applicant's manual of procedure and the following organizations-

a) Maintenance organizations for all types of equipment;

b) Aviation meteorological service organization;

c) Aeronautical information service organization;

d) Aircraft operators, in order to provide them with all useful operational information they may require:

e) Military authorities and units: arrangements shall be made to permit information relevant to the safe and expeditious conduct of flights of civil aircraft to be promptly exchanged between air traffic management services units and appropriate military units. In particular:

i. ATM units shall, either routinely or on request, in accordance with locally agreed procedures, provide appropriate military units with pertinent flight plan and other data concerning flights of civil aircraft for the purpose of facilitating the identification of civil aircraft.

ii. Military units shall notify ATM units if they observe that an aircraft which is, or might be, a civil aircraft is approaching or has entered, any area in which interception might become necessary.

iii. Procedures shall be established to ensure that all possible efforts are made to confirm the identity of the aircraft and provide it with the navigational guidance necessary to avoid the need for interception.

f) Activities potentially hazardous to civil aircraft: arrangements shall be made to minimize the interference of such activities on the operations of civil aircraft

g) Search and rescue organizations;

h) The aerodrome operators.

2. Letters of Procedures

The provider of air traffic management services shall establish procedures to ensure each air traffic management services letter of procedures-

a) Is drawn up as prescribed in Annex C;

b) Details such matters as are necessary for effective co-ordination between the units party to the procedures)

c) Is kept current

d) Is signed by senior representatives of the participating units;

d) Is part of the applicant's manual of procedure

4. Air traffic services messages

The provider of air traffic management services shall establish procedures to ensure that air traffic management services messages are prepared and transmitted in accordance with procedures detailed and cross-referenced in Document 4444 (Part IX - Air traffic management services Messages).

172.03.21 Notification of Facility Status

1. In addition to procedures referred in MOZCAR Part 172 the provider of air traffic management services shall establish systems and clear operational procedures to ensure that each air traffic management services unit, as appropriate to the applicant's area of responsibility, is kept promptly informed of the operational status of visual and non-visual navigational aids including,

a) Visual aids essential for take-off, departure, approach, and landing procedures and en-route;

b) Visual and non-visual aids essential for surface movement.

4. The provider of air traffic management services for an aerodrome control unit; or approach control unit; or aerodrome flight information service unit shall establish procedures to ensure that the unit is kept promptly informed by the most appropriate expeditious means of all operationally significant conditions on the movement area. The information shall include the existence of temporary hazards and the operational status of any associated facility at the aerodrome.

172.03.22 Meteorological Information and Reporting

1. Meteorological i n f o r m a t i o n

a) The provider of air traffic management services shall establish systems and procedures to ensure that all meteorological information provided as part of any flight information service is-

i. supplied by the Instituto Nacional de Meteorologia; or ii. issued as a basic weather report.

b) The provider of air traffic management services shall establish systems and procedures to ensure that air traffic management services units are supplied with the meteorological information necessary for the performance of their respective functions, in a form that requires a minimum of interpretation by air traffic management services personnel.

c) The provider of air traffic management services shall establish procedures to ensure that equipment used in the compilation of basic weather reports-

d) supplies data representative of the area for which the measurements are required; and

e) where that equipment consists of multiple wind direction and speed indicators, identifies the runway, or section of the runway, monitored by each instrument.

f) The provider of air traffic management services shall establish a procedure to ensure that the information contained in a meteorological bulletin remains unchanged through onward transmission.

SUBPART IV. STANDARDS FOR THE PROVISION OF AIR TRAFFIC SERVICES

172.04.1 Application

Air traffic control service shall be provided:

a) to all IFR flights in airspace Classes A, B, C, D and E;

b) to all VFR flights in airspace Classes B, C and D;

c) to all special VFR flights;

d) to all aerodrome traffic at controlled aerodromes

172.04.2 The parts of air traffic control service described in 172.03.1 shall be provided by the various units as follows:

a) Area control service:

1. by an area control centre; or

2. by the unit providing approach control service in a control zone or in a control area of limited extent which is designated primarily for the provision of approach control service and where no area control centre is established.

b) Approach control service:

3. by an aerodrome control tower or area control centre when it is necessary or desirable to combine under the responsibility of one unit the functions of the approach control service with those of the aerodrome control service or the area control service;

4. by an approach control unit when it is necessary or desirable to establish a separate unit.

c) Aerodrome control service: by an aerodrome control tower

Note. — The task of providing specified services on the apron, e.g. apron management service, may be assigned to an aerodrome control tower or to a separate unit.

172.04.3 Operation of air traffic control service

In order to provide air traffic control service, an air traffic control unit shall:

a) Be provided with information on the intended movement of each aircraft, or variations therefrom, and with current information on the actual progress of each aircraft;

b) Determine from the information received, the relative positions of known aircraft to each other;

c) Issue clearances and information for the purpose of preventing collision between aircraft under its control and of expediting and maintaining an orderly flow of traffic;

d) Coordinate clearances as necessary with other units:

1) Whenever an aircraft might otherwise conflict with traffic operated under the control of such other units;

2) Before transferring control of an aircraft to such other units. Information on aircraft movements, together with a record of air traffic control clearances issued to such aircraft, shall be so displayed as to permit ready analysis in order to maintain an efficient flow of air traffic with adequate separation between aircraft.

3) Air traffic control units should be equipped with devices that record background communication and the aural environment at air traffic controller work stations, capable of retaining the information recorded during at least the last twenty-four hours of operation.

172.04.4 Clearances issued by air traffic control units shall provide separation:

a) between all flights in airspace Classes A and B;

b) between IFR flights in airspace Classes C, D and E;

c) between IFR flights and VFR flights in airspace Class C;

d) between IFR flights and special VFR flights;

e) between special VFR flights when so prescribed by the appropriate ATS authority, except that, when requested by an aircraft and if so prescribed by the appropriate ATS authority for the cases listed under b) above in airspace Classes D and E, a flight may be cleared without separation being so provided in respect of a specific portion of the flight conducted in visual meteorological conditions.

Separation by an air traffic control unit shall be obtained by at least one of the following:

a) vertical separation, obtained by assigning different levels selected from:

1. the appropriate table of cruising levels in Appendix 3 of this MOZCATs, or

2. a modified table of cruising levels, when so prescribed in accordance with Appendix 1 of this MOZCATs for flight above FL 410, except that the correlation of levels to track as

prescribed therein shall not apply whenever otherwise indicated in appropriate aeronautical information publications or air traffic control clearances;

b) horizontal separation, obtained by providing:

   1. longitudinal separation, by maintaining an interval between aircraft operating along the same, converging or reciprocal tracks, expressed in time or distance; or

   2. lateral separation, by maintaining aircraft on different routes or in different geographical areas;

c) composite separation, consisting of a combination of vertical separation and one of the other forms of separation contained in b) above, using minima for each which may be lower than, but not less than half of, those used for each of the combined elements when applied individually. Composite separation shall only be applied on the basis of regional air navigation agreements.

For all airspace where a reduced vertical separation minimum of 300 m (1 000 ft) is applied between FL 290 and FL 410 inclusive, a programme shall be instituted, on a regional basis, for monitoring the height-keeping performance of aircraft operating at these levels, in order to ensure that the continued application of this vertical separation minimum meets the safety objectives. The scope of regional monitoring programmes shall be adequate to conduct analyses of aircraft group performance and evaluate the stability of altimetry system error.

Where RCP/RSP specifications are applied, programmes shall be instituted for monitoring the performance of the infrastructure and the participating aircraft against the appropriate RCP and/or RSP specifications, to ensure that operations in the applicable airspace continue to meet safety objectives. The scope of monitoring programmes shall be adequate to evaluate communication and/or surveillance performance, as applicable.

172.04.5 Separation minima

The selection of separation minima for application within a given portion of airspace shall be as follows:

1. the separation minima shall be selected from those prescribed by the provisions of the PANS-ATM (Doc 4444) and the Regional Supplementary Procedures as applicable under the prevailing circumstances except that, where types of aids are used or circumstances prevail which are not covered by current ICAO provisions, other separation minima shall be established as necessary by:

a) the appropriate ATS authority, following consultation with operators, for routes or portions of routes contained within the sovereign airspace of a State;

b) Regional air navigation agreements for routes or portions of routes contained within airspace over the high seas or over areas of undetermined sovereignty.

2. the selection of separation minima shall be made in consultation between the appropriate ATS authorities responsible for the provision of air traffic services in neighbouring airspace when:

   a) traffic will pass from one into the other of the neighbouring airspaces;

   b) Routes are closer to the common boundary of the neighbouring airspaces than the separation minima applicable in the circumstances.

Note. — The purpose of this provision is to ensure, in the first case, compatibility on both sides of the line of transfer of traffic, and, in the other case, adequate separation between aircraft operating on both sides of the common boundary.

Details of the selected separation minima and of their areas of application shall be notified:

a) to the ATS units concerned; and

b) to pilots and operators through aeronautical information publications, where separation is based on the use by aircraft of specified navigation aids or specified navigation techniques.

172.04.6 Responsibility for control

Responsibility for control of individual flights A controlled flight shall be under the control of only one air traffic control unit at any given time.

Responsibility for control within a given block of airspace Responsibility for the control of all aircraft operating within a given block of airspace shall be vested in a single air traffic control unit. However, control of an aircraft or groups of aircraft may be delegated to other air traffic control units provided that coordination between all air traffic control units concerned is assured.

1. Transfer of responsibility for control

1.1. Place or time of transfer

The responsibility for the control of an aircraft shall be transferred from one air traffic control unit to another as follows:

1.1.2. Between two units providing area control service.

The responsibility for the control of an aircraft shall be transferred from a unit providing area control service in a control area to the unit providing area control service in an adjacent control area at the time of crossing the common control area boundary as estimated by the area control centre having control of the aircraft or at such other point or time as has been agreed between the two units. Between a unit providing area control service and a unit providing approach control service. The responsibility for the control of an aircraft shall be transferred from a unit providing area control service to a unit providing approach control service, and vice versa, at a point or time agreed between the two units.

1.1.3. Between a unit providing approach control service and an aerodrome control tower

1.1.3.1. Arriving aircraft

The responsibility for the control of an arriving aircraft shall be transferred from the unit providing approach control service to the aerodrome control tower, when the aircraft:

a) Is in the vicinity of the aerodrome, and:

1. It is considered that approach and landing will be completed in visual reference to the ground, or
2. It has reached uninterrupted visual meteorological conditions, or

b) Is at a prescribed point or level, as specified in letters of agreement or ATS unit instructions; or

c) Has landed.

Note.— Even though there is an approach control unit, control of certain flights may be transferred directly from an area control centre to an aerodrome control tower and vice versa, by prior arrangement between the units concerned for the relevant part of approach control service to be provided by the area control centre or the aerodrome control tower, as applicable.

1.1.3.2. Departing aircraft.

The responsibility for control of a departing aircraft shall be transferred from the aerodrome control tower to the unit providing approach control service:

a) when visual meteorological conditions prevail in the vicinity of the aerodrome:

1. prior to the time the aircraft leaves the vicinity of the aerodrome, or
2. prior to the aircraft entering instrument meteorological conditions, or

3. at a prescribed point or level,

As specified in letters of agreement or ATS unit instructions;

b) when instrument meteorological conditions prevail at the aerodrome:

4. immediately after the aircraft is airborne, or

5. at a prescribed point or level,

6. as specified in letters of agreement or ATS unit instructions.

1.1.4 Between control sectors/positions within the same air traffic control unit

The responsibility for control of an aircraft shall be transferred from one control sector/position to another control sector/ position within the same air traffic control unit at a point, level or time, as specified in ATS unit instructions.

172.04.7 Coordination of transfer

Responsibility for control of an aircraft shall not be transferred from one air traffic control unit to another without the consent of the accepting control unit,

The transferring control unit shall communicate to the accepting control unit the appropriate parts of the current flight plan and any control information pertinent to the transfer requested.

Where transfer of control is to be effected using radar or ADS-B data, the control information pertinent to the transfer shall include information regarding the position and, if required, the track and speed of the aircraft, as observed by radar or ADS-B immediately prior to the transfer.

Where transfer of control is to be effected using ADS-C data, the control information pertinent to the transfer shall include the four-dimensional position and other information as necessary.

The accepting control unit shall:

a) Indicate its ability to accept control of the aircraft on the terms specified by the transferring control unit, unless by prior agreement between the two units concerned, the absence of any such indication is understood to signify acceptance of the terms specified, or indicate any necessary changes thereto; and.

b) Specify any other information or clearance for a subsequent portion of the flight, which it requires the aircraft to have at the time of transfer.

The accepting control unit shall notify the transferring control unit when it has established two-way voice and/ or data link communications with and assumed control of the aircraft concerned, unless otherwise specified by agreement between the two control units concerned.

Applicable coordination procedures, including transfer of control points, shall be specified in letters of agreement and ATS unit instructions as appropriate.

172.04.8 Air traffic control clearances

Air traffic control clearances shall be based solely on the requirements for providing air traffic control service.

1. Contents of clearances

a) An air traffic control clearance shall indicate:

b) aircraft identification as shown in the flight plan;

c) clearance limit;

d) level(s) of flight for the entire route or part thereof and changes of levels if required;

e) Any necessary instructions or information on other matters such as approach or departure manoeuvres, communications and the time of expiry of the clearance.

Note.— The time of expiry of the clearance indicates the time after which the clearance will be automatically cancelled if the flight has not been commenced.

Recommendation.— Standard departure and arrival routes and associated procedures should be established when necessary to facilitate:

a) the safe, orderly and expeditious flow of air traffic;

b) the description of the route and procedure in air traffic control clearances.

2. Clearances for transonic flight

The air traffic control clearance relating to the transonic acceleration phase of a supersonic flight shall extend at least to the end of that phase.

3. Read-back of clearances and safety-related information

The flight crew shall read back to the air traffic controller safety-related parts of ATC clearances and instructions which are transmitted by voice. The following items shall always be read back:

a) ATC route clearances;

b) Clearances and instructions to enter, land on, take off from, hold short of, cross and backtrack on any runway; and

c) Runway-in-use, altimeter settings, SSR codes, level instructions, heading and speed instructions and, whether issued by the controller or contained in ATIS broadcasts, transition levels.

Other clearances or instructions, including conditional clearances, shall be read back or acknowledged in a manner to clearly indicate that they have been understood and will be complied with.

The controller shall listen to the read-back to ascertain that the clearance or instruction has been correctly acknowledged by the flight crew and shall take immediate action to correct any discrepancies revealed by the read- back.

Unless specified by the appropriate ATS authority, voice read-back of CPDLC messages shall not be required.

4. Coordination of clearances

An air traffic control clearance shall be coordinated between air traffic control units to cover the entire route of an aircraft or a specified portion thereof as follows.

An aircraft shall be cleared for the entire route to the aerodrome of first intended landing:

a) when it has been possible, prior to departure, to coordinate the clearance between all the units under whose control the aircraft will come; or

b) when there is reasonable assurance that prior coordination will be effected between those units under whose control the aircraft will subsequently come.

Note.— Where a clearance is issued covering the initial part of the flight solely as a means of expediting departing traffic, the succeeding en-route clearance will be as specified above even though the aerodrome of first intended landing is under the jurisdiction of an area control centre other than the one issuing the en-route clearance.

When coordination has not been achieved or is not anticipated, the aircraft shall be cleared only to that point where coordination is reasonably assured; prior to reaching such point, or at such point, the aircraft shall receive further clearance, holding instructions being issued as appropriate.

When prescribed by the appropriate ATS authority, aircraft shall contact a downstream air traffic control unit, for the purpose of receiving a downstream clearance prior to the transfer of control point.

Aircraft shall maintain the necessary two-way communication with the current air traffic control unit whilst obtaining a downstream clearance.

A clearance issued as a downstream clearance shall be clearly identifiable as such to the pilot.

Unless coordinated, downstream clearances shall not affect the aircraft's original flight profile in any airspace, other than that of the air traffic control unit responsible for the delivery of the downstream clearance.

Recommendation.— Where practicable, and where data link communications are used to facilitate downstream clearance delivery, two-way voice communications between the pilot and the air traffic control unit providing the downstream clearance should be available.

When an aircraft intends to depart from an aerodrome within a control area to enter another control area within a period of thirty minutes, or such other specific period of time as has been agreed between the area control centres concerned, coordination with the subsequent area control centre shall be effected prior to issuance of the departure clearance.

When an aircraft intends to leave a control area for flight outside controlled airspace, and will subsequently re-enter the same or another control area, a clearance from point of departure to the aerodrome of first intended landing may be issued. Such clearance or revisions thereto shall apply only to those portions of the flight conducted within controlled airspace.

172.04.9 Air traffic flow management

Air traffic flow management (ATFM) shall be implemented for airspace where air traffic demand at times exceeds, or is expected to exceed, the declared capacity of the air traffic control services concerned.

When it becomes apparent to an ATC unit that traffic additional to that already accepted cannot be accommodated within a given period of time at a particular location or in a particular area, or can only be accommodated at a given rate, that unit shall so advise the ATFM unit, when such is established, as well as, when appropriate, ATS units concerned. Flight crews of aircraft destined to the location or area in question and operators concerned shall also be advised of the delays expected or the restrictions that will be applied.

Note.— Operators concerned will normally be advised, in advance where possible, of restrictions imposed by the air traffic flow management unit when such is established.

172.04.10 Control of persons and vehicles at aerodromes

The movement of persons or vehicles including towed aircraft on the manoeuvring area of an aerodrome shall be controlled by the aerodrome control tower as necessary to avoid hazard to them or to aircraft landing, taxiing or taking off.

In conditions where low visibility procedures are in operation:

a) persons and vehicles operating on the manoeuvring area of an aerodrome shall be restricted to the essential minimum, and particular regard shall be given to the requirements to protect the ILS/MLS sensitive area(s) when Category II or Category III precision instrument operations are in progress;

b) subject to the provisions in 3.8.3, the minimum separation between vehicles and taxiing aircraft shall be as prescribed by the appropriate ATS authority taking into account the aids available;

c) when mixed ILS and MLS Category II or Category III precision instrument operations are taking place to the same runway continuously, the more restrictive ILS or MLS critical and sensitive areas shall be protected.

Emergency vehicles proceeding to the assistance of an aircraft in distress shall be afforded priority over all other surface movement traffic.

Subject to the provisions in 3.8.3, vehicles on the manoeuvring area shall be required to comply with the following rules:

a) vehicles and vehicles towing aircraft shall give way to aircraft which are landing, taking off or taxiing;

b) vehicles shall give way to other vehicles towing aircraft;

c) vehicles shall give way to other vehicles in accordance with ATS unit instructions;

d) notwithstanding the provisions of a), b) and c), vehicles and vehicles towing aircraft shall comply with instructions issued by the aerodrome control tower.Provision of radar and ADS-B

172.04.11 FLIGHT INFORMATION SERVICE

1. Application

Flight information service shall be provided to all aircraft which are likely to be affected by the information and which are:

a) provided with air traffic control service; or

b) Otherwise known to the relevant air traffic services units.

Note.— Flight information service does not relieve the pilot-in-command of an aircraft of any responsibilities and the pilot-in-command has to make the final decision regarding any suggested alteration off light plan.

Where air traffic services units provide both flight information service and air traffic control service, the provision of air traffic control service shall have precedence over the provision of flight information service whenever the provision of air traffic control service so requires.

Note.— It is recognized that in certain circumstances aircraft on final approach, landing, take-off and climb may require to receive without delay essential information other than that pertaining to the provision of air traffic control service.

2. Scope of flight information service

Flight information service shall include the provision of pertinent:

a) SIGMET and AIRMET information;

b) information concerning pre-eruption volcanic activity, volcanic eruptions and volcanic ash clouds;

c) information concerning the release into the atmosphere of radioactive materials or toxic chemicals;

d) information on changes in the availability of radio navigation services;

e) information on changes in condition of aerodromes and associated facilities, including information on the state of the aerodrome movement areas when they are affected by snow, ice or significant depth of water;

f) information on unmanned free balloons; and of any other information likely to affect safety.

Flight information service provided to flights shall include, in addition to that outlined in 4.2.1, the provision of information concerning:

a) weather conditions reported or forecast at departure, destination and alternate aerodromes;

b) collision hazards, to aircraft operating in airspace Classes C, D, E, F and G;

c) for flight over water areas, in so far as practicable and when requested by a pilot, any available information such as radio call sign, position, true track, speed, etc., of surface vessels in the area.

Note 1.— The information in b), including only known aircraft, the presence of which might constitute a collision hazard to the aircraft informed, will sometimes be incomplete and air traffic services cannot assume responsibility for its issuance at all times or for its accuracy.

Note 2. — When there is a need to supplement collision hazard information provided in compliance with b), or in case of temporary disruption of flight information service, traffic information broadcasts by aircraft may be applied in designated airspaces. Guidance on traffic information broadcasts by aircraft and related operating procedures is contained in Attachment B

Flight information service provided to VFR flights shall include, in addition to that outlined in 4.2.1, the provision of available information concerning traffic and weather conditions along the route of flight that are likely to make operation under the visual flight rules impracticable.

3. Operational flight information service broadcasts

3.1 Application

The meteorological information and operational information concerning radio navigation services and aerodromes included in the flight information service shall, whenever available, be provided in an operationally integrated form.

Use of the OFIS messages in directed request/reply transmissions When requested by the pilot, the applicable OFIS message(s) shall be transmitted by the appropriate ATS unit.

3.2 HF operational flight information service (OFIS) broadcasts

Recommendation.— HF operational flight information service (OFIS) broadcasts should be provided when it has been determined by regional air navigation agreements that a requirement exists.

Recommendation.— Whenever such broadcasts are provided:

a) the information should be in accordance with 4.3.2.5, as applicable, subject to regional air navigation agreements;

b) the aerodromes for which reports and forecasts are to be included should be as determined by regional air navigation agreements;

c) the time-sequencing of stations participating in the broadcast should be as determined by regional air navigation agreements;

d) the HF OFIS broadcast message should take into consideration human performance. The broadcast message should not exceed the length of time allocated for it by regional air navigation agreements, care being taken that the readability is not impaired by the speed of the transmission;

e) each aerodrome message should be identified by the name of the aerodrome to which the information applies;

f) when information has not been received in time for a broadcast, the latest available information should be included together with the time of that observation;

g) the full broadcast message should be repeated if this is feasible within the remainder of the time allotted to the broadcasting station;

h) the broadcast information should be updated immediately a significant change occurs; and

i) the HF OFIS message should be prepared and disseminated by the most appropriate unit(s) as designated by each State

3.3 VHF operational flight information service (OFIS) broadcasts

Recommendation. — VHF operational flight information service broadcasts should be provided as determined by regional air navigation agreements.

Recommendation. — Whenever such broadcasts are provided:

a) the aerodromes for which reports and forecasts are to be included should be as determined by regional air navigation agreements;

b) each aerodrome message should be identified by the name of the aerodrome to which the information applies;

c) when information has not been received in time for a broadcast, the latest available information should be included together with the time of that observation;

d) the broadcasts should be continuous and repetitive;

e) The VHF OFIS broadcast message should take into consideration human performance. The broadcast message should, whenever practicable, not exceed five minutes, care being taken that the readability is not impaired by the speed of the transmission;

f) The broadcast message should be updated on a scheduled basis as determined by regional air navigation agreements. In addition, it should be expeditiously updated immediately a significant change occurs; and

g) The VHF OFIS message should be prepared and disseminated by the most appropriate unit(s) as designated by each State.

1. Pending the development and adoption of a more suitable form of speech for universal use in aeronautical radiotelephony communications, VHF OFIS broadcasts concerning aerodromes designated for use by international air services should be available in the English language.

2. Where VHF OFIS broadcasts are available in more than one language, a discrete channel should be used for each language.

3. VHF operational flight information service broadcast messages should contain the following information in the sequence indicated:

a) Name of aerodrome;

b) Time of observation;

c) Landing runway;

d) Significant runway surface conditions and, if appropriate, braking action;

e) Changes in the operational state of the radio navigation services, if appropriate;

f) Holding delay, if appropriate;

g) Surface wind direction and speed; if appropriate, maximum wind speed;

h) *Visibility and, when applicable, runway visual range (RVR);

i) *Present weather;

j) *Cloud below 1 500 m (5 000ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility, when available;

k) Fair temperature;

l) Dew point temperature;

m) QNH altimeter setting;

n) Supplementary information on recent weather of operational significance and, where necessary, wind shear;

o) Trend forecast, when available; and

p) Notice of current SIGMET messages.

3.4 Voice-automatic terminal information service (Voice-ATS) broadcasts

Voice-automatic terminal information service (Voice-ATIS) broadcasts shall be provided at aerodromes where there is a requirement to reduce the communication load on the ATS VHF air-ground communication channels. When provided, they shall comprise:

a) one broadcast serving arriving aircraft; or

b) one broadcast serving departing aircraft; or

c) one broadcast serving both arriving and departing aircraft; or

d) two broadcasts serving arriving and departing aircraft respectively at those aerodromes where the length of a broadcast serving both arriving and departing aircraft would be excessively long.

A discrete VHF frequency shall, whenever practicable, be used for Voice-ATIS broadcasts. If a discrete frequency is not available, the transmission may be made on the voice channel(s) of the most appropriate terminal navigation aid(s), preferably a VOR, provided the range and readability are adequate and the identification of the navigation aid is sequenced with the broadcast so that the latter is not obliterated.

Voice-ATIS broadcasts shall not be transmitted on the voice channel of an ILS.

Whenever Voice-ATIS is provided, the broadcast shall be continuous and repetitive.

The information contained in the current broadcast shall immediately be made known to the ATS unit(s) concerned with the provision to aircraft of information relating to approach, landing and take-off, whenever the message has not been prepared by that (those) unit(s).

Voice-ATIS broadcasts provided at designated aerodromes for use by international air services shall be available in the English language as a minimum.

3.5 Data link-automatic terminal information service (DATIS)

Where a D-ATIS supplements the existing availability of Voice-ATIS, the information shall be identical in both content and format to the applicable Voice-ATIS broadcast. Where real-time meteorological information is included but the data remains within the parameters of the significant change criteria, the content, for the purpose of maintaining the same designator, shall be considered identical.

Where a D-ATIS supplements the existing availability of Voice-ATIS and the ATIS requires updating, Voice-ATIS and D-ATIS shall be updated simultaneously.

3.6 Automatic terminal information service (voice and/or data link)

Whenever Voice-ATIS and/or D-ATIS is provided:

a) the information communicated shall relate to a single aerodrome;

b) the information communicated shall be updated immediately a significant change occurs;

c) the preparation and dissemination of the ATIS message shall be the responsibility of the air traffic services;

d) Individual ATIS messages shall be identified by a designator in the form of a letter of the ICAO spelling alphabet. Designators assigned to consecutive ATIS messages shall be in alphabetical order;

e) aircraft shall acknowledge receipt of the information upon establishing communication with the ATS unit providing approach control service or the aerodrome control tower, as appropriate;

f) the appropriate ATS unit shall, when replying to the message in e) above or, in the case of arriving aircraft, at such other time as may be prescribed by the appropriate ATS authority, provide the aircraft with the current altimeter setting; and

g) the meteorological information shall be extracted from the local meteorological routine or special report.

Additional criteria for the local meteorological report are contained in MOZCATS 174. Information contained in a current ATIS, the receipt of which has been acknowledged by the aircraft concerned, need not be included in a directed transmission to the aircraft, with the exception of the altimeter setting, which shall be provided in accordance with 3.6. f).

If an aircraft acknowledges receipt of an ATIS that is no longer current, any element of information that needs updating shall be transmitted to the aircraft without delay.

ATIS for arriving and departing aircraft ATIS messages containing both arrival and departure information shall contain the following elements of information in the order listed:

a) name of aerodrome;

b) arrival and/or departure indicator;

c) contract type, if communication is via D-ATIS;

d) designator;

e) time of observation, if appropriate;

f) type of approach(es) to be expected;

g) the runway(s) in use; status of arresting system constituting a potential hazard, if any;

h) significant runway surface conditions and, if appropriate, braking action;

i) holding delay, if appropriate;

j) transition level, if applicable;

k) other essential operational information;

l) surface wind direction (in degrees magnetic) and speed, including significant variations and, if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;

m) visibility and, when applicable, RVR and, if visibility/RVR sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;

n) *present weather;

o) *cloud below 1 500 m (5 000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available;

p) air temperature;

q) fdew point temperature;

r) altimeter setting(s);

s) any available information on significant meteorological phenomena in the approach and climb-out areas including wind shear, and information on recent weather of operational significance;

t) trend forecast, when available; and

u) specific ATIS instructions.

3.7 ATS for arriving aircraft

ATIS messages containing arrival information only shall contain the following elements of information in the order listed:

a) name of aerodrome;

b) arrival indicator;

c) contract type, if communication is via D-ATIS;

d) designator;

e) time of observation, if appropriate;

f) type of approach(es) to be expected;

g) main landing runway(s); status of arresting system constituting a potential hazard, if any;

h) significant runway surface conditions and, if appropriate, braking action;

i) holding delay, if appropriate;

j) transition level, if applicable;

k) other essential operational information;

l) surface wind direction (in degrees magnetic) and speed, including significant variations and, if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication• of the runway and the section of the runway to which the information refers;

m) of the runway and the section of the runway to which the information refers;

n) *visibility and, when applicable, RVR and, if visibility/RVR sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;

o) *present weather;

p) *cloud below 1 500 m (5 000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available;

q) air temperature;

r) dew point temperature;

s) altimeter setting(s);

t) any available information on significant meteorological phenomena in the approach area including wind shear, and information on recent weather of operational significance;

u) trend forecast, when available; and

a) specific ATIS instructions.

b) name of aerodrome;

c) departure indicator;

d) contract type, if communication is via D-ATIS;

e) designator;

f) time of observation, if appropriate;

g) runway(s) to be used for take-off; status of arresting system constituting a potential hazard, if any;

h) significant surface conditions of runway(s) to be used for takeoff and, if appropriate, braking action;

i) departure delay, if appropriate;

j) transition level, if applicable;

k) other essential operational information;

l) surface wind direction (in degrees magnetic) and speed, including significant variations and, if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;

m) *visibility and, when applicable, RVR and, if visibility/RVR sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;

n) *present weather;

o) *cloud below 1 500 m (5 000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available;

p) air temperature;

q) dew point temperature;

r) altimeter setting(s);

s) any available information on significant meteorological phenomena in the climbout area including wind shear;

t) trend forecast, when available; and

u) specific ATIS instructions.

3.8 VOLMET broadcasts and D-VOLMET service

HF and/or VHF VOLMET broadcasts and/or D-VOLMET service should be provided when it has been determined by regional air navigation agreements that a requirement exists.

VOLMET broadcasts should use standard radiotelephony phraseologies.

172.04.14 AIR TRAFFIC SERVICES REQUIREMENTS FOR COMMUNICATIONS

1. Aeronautical mobile service (air-ground communications)

1.1. General

Radiotelephony and/or data link shall be used in air-ground communications for air traffic services purposes.

Where an RCP specification has been prescribed by States for performance-based communication, ATS units shall, in addition to the requirements specified in 6.1.1.1, be provided with communication equipment which will enable them to provide ATS in accordance with the prescribed RCP specifications(s).

1.2 For flight information service

Air-ground communication facilities shall enable two-way communications to take place between a unit providing flight information service and appropriately equipped aircraft flying anywhere within the flight information region.

1.3 For area control service

Air-ground communication facilities shall enable two-way communications to take place between a unit providing area control service and appropriately equipped aircraft flying anywhere within the control area(s).

1.4 For approach control service

Air-ground communication facilities shall enable direct, rapid, continuous and static-free two-way communications to take place between the unit providing approach control service and appropriately equipped aircraft under its control.

Where the unit providing approach control service functions as a separate unit, air-ground communications shall be conducted over communication channels provided for its exclusive use.

1.5 For aerodrome control service

Air-ground communication facilities shall enable direct, rapid, continuous and static-free two-way communications to take place between an aerodrome control tower and appropriately equipped aircraft operating at any distance within 45 km (25 NM) of the aerodrome concerned.

1.6 Aeronautical fixed service (ground-ground communications)

1.6.1 General

Direct-speech and/or data link communications shall be used in ground-ground communications for air traffic services purposes.

Note 1.— Indication by time of the speed with which the communication should be established is provided as a guide to communication services, particularly to determine the types of communication channels required, e.g. that “instantaneous" is intended to refer to communications which effectively provide for immediate access between controllers; “fifteen seconds” to accept switchboard operation and “five minutes” to mean methods involving retransmission.

1.6.2 Communications within a flight information region

1.6.3 Communications between air traffic services units

A flight information centre shall have facilities for communications with the following units providing a service within its area of responsibility:

a) the area control centre, unless collocated;

b) approach control units;

c) aerodrome control towers.

An area control centre, in addition to being connected to the flight information centre as prescribed in 1.6.4, shall have facilities for communications with the following units providing a service within its area of responsibility:

a) approach control units;

b) aerodrome control towers;

c) air traffic services reporting offices, when separately established.

An approach control unit, in addition to being connected to the flight information centre and the area control centre, shall have facilities for communications with the associated aerodrome control tower(s) and, when separately established, the associated air traffic services reporting office(s).

An aerodrome control tower, in addition to being connected to the flight information centre, the area control centre and the approach control unit, shall have facilities for communications with the associated air traffic services reporting office, when separately established.

1.6.4. Communications between air traffic services units and other units

A flight information centre and an area control centre shall have facilities for communications with the following units providing a service within their respective area of responsibility:

a) appropriate military units;

b) the meteorological office serving the centre;

c) the aeronautical telecommunications station serving the centre;

d) appropriate operator's offices;

e) the rescue coordination centre or, in the absence of such centre, any other appropriate emergency service;

f) the international NOTAM office serving the centre.

An approach control unit and an aerodrome control tower shall have facilities for communications with the following units providing a service within their respective area of responsibility:

a) appropriate military units;

b) rescue and emergency services (including ambulance, fire, etc.);

c) the meteorological office serving the unit concerned;

d) the aeronautical telecommunications station serving the unit concerned;

e) the unit providing apron management service, when separately established.

The communication facilities required under 1.6.3 a) and 1.6.4 shall include provisions for rapid and reliable communications between the air traffic services unit concerned and the military unit(s) responsible for control of interception operations within the area of responsibility of the air traffic services unit.

1.6.5. Description of communication facilities

The communication facilities required 1.6 shall include provisions for:

a) communications by direct speech alone, or in combination with data link communications, whereby for the purpose of transfer of control using radar or ADS-B, the communications can be established instantaneously and for other purposes the communications can normally be established within fifteen seconds; and

b) printed communications, when a written record is required; the message transit time for such communications being no longer than five minutes.

Recommendation.— the communication facilities should include provisions for:

a) communications by direct speech alone, or in combination with data link communications, whereby the communications can normally be established within fifteen seconds; and

b) printed communications, when a written record is required; the message transit time for such communications being no longer than five minutes

In all cases where automatic transfer of data to and/or from air traffic services computers is required, suitable facilities for automatic recording shall be provided.

Recommendation.— The communication facilities as and where necessary, by facilities for other forms of visual or audio communications, for example, closed circuit television or separate information processing systems.

The communication facilities required under 1.6.3 a), b) and c) shall include provisions for communications by direct speech arranged for conference communications.

All facilities for direct-speech or data link communications between air traffic services units and between air traffic services units and other units shall be provided with automatic recording.

Recordings of data and communications shall be retained for a period of at least thirty days.

1.6.6. Communications between flight information regions

Flight information centres and area control centres shall have facilities for communications with all adjacent flight information centres and area control centres.

These communication facilities shall in all cases include provisions for messages in a form suitable for retention as a permanent record, and delivery in accordance with transit times specified by regional air navigation agreements.

Unless otherwise prescribed on the basis of regional air navigation agreements, facilities for communications between area control centres serving contiguous control areas shall, in addition, include provisions for direct speech and, where applicable, data link communications, with automatic recording, whereby for the purpose of transfer of control using radar, ADS-B or ADS-C data, the communications can be established instantaneously and for other purposes the communications can normally be established within fifteen seconds.

When so required by agreement between the States concerned in order to eliminate or reduce the need for interceptions in the event of deviations from assigned track, facilities for communications between adjacent flight information centres or area control centres other than those mentioned in 6.2.3.1.2 shall include provisions for direct speech alone, or in combination with data link communications. The communication facilities shall be provided with automatic recording.

Note.— Special circumstances may be due to traffic density, types of aircraft operations and/or the manner in which the airspace is organized and may exist even if the control areas and/or control zones are not contiguous or have not (yet) been established.

In all cases where automatic exchange of data between air traffic services computers is required, suitable facilities for automatic recording shall be provided.

Recordings of data and communications shall be retained for a period of at least thirty days.

Procedures for direct-speech communications

Recommendation. —Appropriate procedures for direct- speech communications should be developed to permit immediate connections to be made for very urgent calls concerning the safety of aircraft, and the interruption, if necessary, of less urgent calls in progress at the time.

1.6.7 Surface movement control service

1.6.7.1 Communications for the control of vehicles other than aircraft on manoeuvring areas at controlled aerodromes

Two-way radiotelephony communication facilities shall be provided for aerodrome control service for the control of vehicles on the manoeuvring area, except where communication by a system of visual signals is deemed to be adequate.

Where conditions warrant, separate communication channels shall be provided for the control of vehicles on the manoeuvring area. Automatic recording facilities shall be provided on all such channels.

Recordings of communications shall be retained for a period of at least thirty days.

1.7 Aeronautical radio navigation service

1.7.1 Automatic recording of surveillance data

Surveillance data from primary and secondary radar equipment or other systems (e.g. ADS-B, ADS-C), used as an aid to air traffic services, shall be automatically recorded for use in accident and incident investigations, search and rescue, air traffic control and surveillance systems evaluation and training.

Automatic recordings shall be retained for a period of at least thirty days. When the recordings are pertinent to accident and incident investigations, they shall be retained for longer periods until it is evident that they will no longer be required.

172.04.15. AIR TRAFFIC SERVICES REQUIREMENTS FOR INFORMATION

1. Meteorological information

1.1 General

Air traffic services units shall be supplied with up-to-date information on existing and forecast meteorological conditions as necessary for the performance of their respective functions. The information shall be supplied in such a form as to require a minimum of interpretation on the part of air traffic services personnel and with a frequency which satisfies the requirements of the air traffic services units concerned.

1.2 Flight information centres and area control centres

Flight information centres and area control centres shall be supplied with meteorological information as described in Appendix 5, particular emphasis being given to the occurrence or

expected occurrence of weather deterioration as soon as this can be determined. These reports and forecasts shall cover the flight information region or control area and such other areas as may be determined on the basis of regional air navigation agreements.

Note.— For the purpose of this provision, certain changes in meteorological conditions are construed as deterioration in a weather element, although they are not ordinarily considered as such. An increase in temperature may, for example, adversely affect the operation of certain types of aircraft.

Flight information centres and area control centres shall be provided, at suitable intervals, with current pressure data for setting altimeters, for locations specified by the flight information centre or area control centre concerned.

1.3 Units providing approach control service

Units providing approach control service shall be supplied with meteorological information as described in Appendix 5, 1.2 for the airspace and the aerodromes with which they are concerned. Special reports and amendments to forecasts shall be communicated to the units providing approach control service as soon as they are necessary in accordance with established criteria, without waiting for the next routine report or forecast. Where multiple anemometers are used, the indicators to which they are related shall be clearly marked to identify the runway and section of the runway monitored by each anemometer.

Units providing approach control service shall be provided with current pressure data for setting altimeters, for locations specified by the unit providing approach control service.

Units providing approach control service for final approach, landing and take-off shall be equipped with surface wind display(s). The display(s) shall be related to the same location(s) of observation and be fed from the same sensor(s) as the corresponding display(s) in the aerodrome

Control tower and in the meteorological station, where such a station exists.

Units providing approach control service for final approach, landing and take-off at aerodromes where runway visual range values are assessed by instrumental means shall be equipped with display(s) permitting read-out of the current runway visual range value(s). The display(s) shall be related to the same location(s) of observation and be fed from the same sensor(s) as the corresponding displays in the aerodrome control tower and in the meteorological station, where such a station exists.

Units providing approach control service for final approach, landing and take-off shall be supplied with information on wind shear which could adversely affect aircraft on the approach or take-off paths or during circling approach.

1.4 Aerodrome control towers

Aerodrome control towers shall be supplied with meteorological information as described in Appendix 5, 1.1 for the aerodrome with which they are concerned. Special reports and amendments to forecasts shall be communicated to the aerodrome control towers as soon as they are necessary in accordance with established criteria, without waiting for the next routine report or forecast.

Aerodrome control towers shall be equipped with surface wind display(s). The display(s) shall be related to the same location(s) of observation and be fed from the same sensor(s) as the corresponding display(s) in the meteorological station, where such a station exists. Where multiple sensors are used, the displays to which they are related shall be clearly marked to identify the runway and section of the runway monitored by each sensor.

Aerodrome control towers at aerodromes where runway visual range values are measured by instrumental means shall be equipped with display(s) permitting read-out of the current runway visual range value(s). The display(s) shall be related to the same location(s) of observation and be fed from the same sensor(s) as the corresponding display(s) in the meteorological station, where such a station exists.

Aerodrome control towers shall be supplied with information on wind shear which could adversely affect aircraft on the approach or take-off paths or during circling approach and aircraft on the runway during the landing roll or take-off run.

Recommendation. — Aerodrome control towers and/or other appropriate units should be supplied with aerodrome warnings.

1.5. Communication stations

Where necessary for flight information purposes, current meteorological reports and forecasts shall be supplied to communication stations. A copy of such information shall be forwarded to the flight information centre or the area control centre. Information on aerodrome conditions and the operational status of associated facilities

Aerodrome control towers and units providing approach control service shall be kept currently informed of the operationally significant conditions of the movement area, including the existence

of temporary hazards, and the operational status of any associated facilities at the aerodrome(s) with which they are concerned.

1.6. Information on the operational status of navigation services.

ATS units shall be kept currently informed of the operational status of radio navigation services and visual aids essential for take-off, departure, approach and landing procedures within their area of responsibility and those radio navigation services and visual aids essential for surface movement.

Recommendation.— Information on the operational status, and any changes thereto, of radio navigation services and visual aids as referred to in 7.3.1 should be received by the appropriate ATS unit(s) on a timely basis consistent with the use of the service(s) and aid(s) involved.

Specifications for monitoring visual aids are contained in MOZCAR 139 Vol I and related guidance material is in the Aerodrome Design Manual (Doc 9157), Part 5. Specifications for monitoring non-visual aids are contained in MOZCAR 171.

Information on unmanned free balloons Operators of unmanned free balloons shall keep the appropriate air traffic services units informed of details of flights of unmanned free balloons.

2.7. Information concerning volcanic activity

ATS units shall be informed, in accordance with local agreement, of pre-eruption volcanic activity, volcanic eruptions and volcanic ash cloud which could affect airspace used by flights within their area of responsibility.

Area control centres and flight information centres shall be provided with volcanic ash advisory information issued by the associated VAAC.

Information concerning radioactive materials and toxic chemical “clouds”

ATS units shall be informed, in accordance with local agreement, of the release into the atmosphere of radioactive materials or toxic chemicals which could affect airspace used by flights within their area of responsibility.

SUBPART V MECHANISM FOR ELIMINATION OF DEFICIENCIES IN THE PROVISION OF AIR NAVIGATION SERVICES (ATS, CNS, AIS, MAP,PANS-OPS, SAR and MET)

172.05.1 Procedures for elimination of shortcomings and deficiencies

a) The ANSP shall develop corrective action plans to address all shortcomings and deficiencies identified within the framework of APIRG and ANS. The corrective actions shall be classified as short term or long term depending on the safety concern addressed and availability of resources.

b) Short-term corrective actions are intended to correct shortcomings and deficiencies of significant safety concern while planning for long-term action to prevent recurrence. Short-term corrective actions will be completed by the date and time specified by the Authority.

c) Long-term corrective action has two components. The first component will involve identifying the root cause of the problem and indicating the measures the ANSP will take to prevent recurrence. These measures may focus on a system change. The second component is a timetable for the implementation of the corrective action plan. Each corrective action plan will include milestones or progress review points leading up to the proposed completion date for each inspection/audit finding.

172.05.2 Submission and acceptance of corrective action plans

a) The ANSP is required to submit corrective action plans to the Authority for approval. Timelines for development and submission of the corrective action plans shall be specified by the Authority

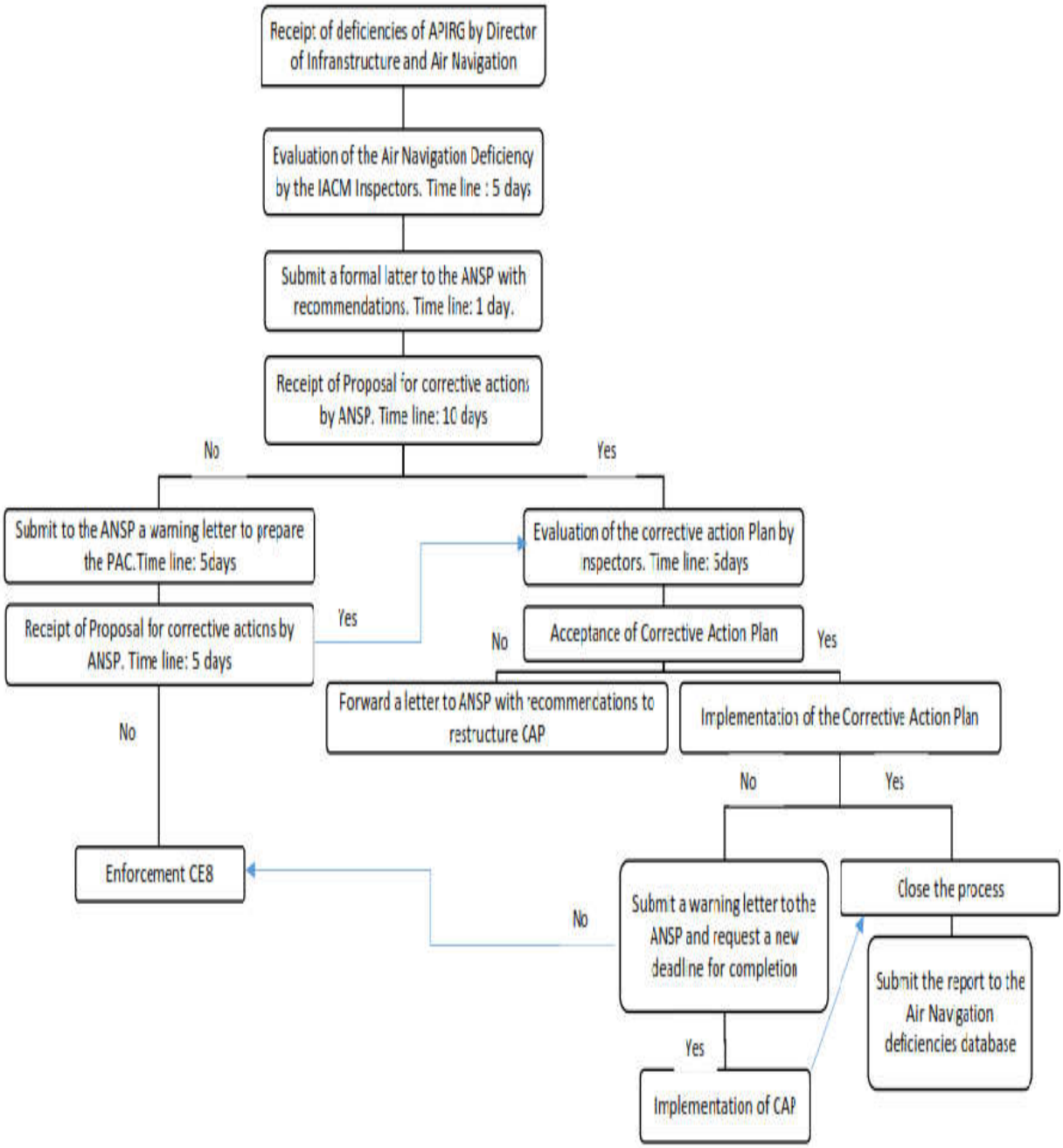
b) Where the corrective action plan is acceptable, the ANSP shall be so advised. It is important that the ANSP ensure the corrective action plan is submitted within the timeframe specified by the Authority.

172.05.3 Corrective action follow-up

a) Where the inspection/audit findings are of a minor nature and no threat to aviation safety exists an “administrative follow-up” may be acceptable. All other findings require “on-site follow-up” to ensure that non-conformances have been rectified and that corrective actions are effective.

b) Long-term corrective actions that have been accepted will be followed-up by the Authority until each item is complete or finding closed. This follow-up will be done through routine surveillance activities.

Note: See below the flowchart of procedures to be followed in the treatment of Air Navigation Deficiencies


Receipt of deficiencies of APIRG by Director of Infranstructure and Air Navigation
Evaluation of the Air Navigation Deficiency by the IACM Inspectors. Time line : 5 days
Submit a formal latter to the ANSP with recommendations. Time line: 1 day.
Receipt of Proposal for corrective actions by ANSP. Time line: 10 days
No
Yes
Submit to the ANSP a warning letter to prepare the PAC.Time line: 5days
Evaluation of the corrective action Plan by inspectors. Time line: 5days
Receipt of Proposal for corrective actions by ANSP. Time line: 5 days
Yes
No
Acceptance of Corrective Action Plan
Yes
No
Forward a letter to ANSP with recommendations to restructure CAP
Implementation of the Corrective Action Plan
No
Yes
Enforcement CE8
No
Submit a warning letter to the ANSP and request a new deadline for completion
Close the process
Submit the report to the Air Navigation deficiencies database
Yes
Implementation of CAP

SUBPART VI

172.06.1 ATS TRAINING PROGRAMMES

1. The Air navigation Service Provider shall establish a training Programme which includes:

a) Basic training;

b) On-Job-Training

c) Currency training

d) Refresher training

e) Advanced training;

f) Specialized training

2. Competency

In summary, an individual is competent if that individual is:

(a) licensed, where the function can only be performed by the holder of a licence;

(b) rated, where the function can only be performed by the holder of an appropriate rating;

(c) endorsed, where the function can only be performed by the holder of an appropriate endorsement;

(d) qualified, where the function can only be performed by the holder of an appropriate qualification;

(e) trained and proven to be proficient in the performance of functions that are not covered by sub-paragraphs (a) to (d) above; and

(f) recent in the performance of the function and knowledge and skills in emerging matters identified as essential to task performance.

Note: Competency standards for licensed functions are contained in CASR Part 65.

3. The training organizations in developing and implementing the ATS training programme shall structure and include the following, depending on the complexity of Air Traffic Services to be provided:

a) Induction Training

b) Basic Controller Training

c) Aerodrome Control Training

d) Approach Non-Radar Training

e) Approach Radar Control Training

f) Area Non-Radar Training

g) Area Radar Control Training

h) Computer Training

i) Management Training

j) Human Factors Principles

k) Safety Management Systems Training

l) RVSM, ADS-B and PBN Concepts

4. Training records

4.1 The ANSP shall ensure that training records, including OJT are properly kept for inspection.

4.2 The training records shall include certificates, OJT tasks performed and any other documents related to training and approval of jobs performed.
4.3 It is imperative that an accurate and permanent record be created to record training completed by each individual personnel.

5. Requirement for approved curriculum
5.1 The ANSP shall develop training programme and Plan for the ATS personnel as required by this document.

172.05.2 Determination of personnel requirements adequacy

1. As in every/any service provision, in the air traffic service the human resource requirements are usually determined by a study based on a comprehensive assessment of the duties to be performed.

2. A properly balanced workload scheme not only justifies the number of persons employed but it also protects against the overloading of any particular work position. In the latter capacity, it acts as a safeguard because employees who are frequently overloaded cannot be expected to be as efficient as those working under normal conditions.

3. To convert the abstract requirement for the provision of specific services into the number of days of operation from which the number of controllers required to provide that service

can be calculated, the following method may be used:

a) Determine the number of days of facility operation based on a general calculation of expected controller utilization or availability; This calculation should be based on a statistical mean and will give only an average figure

b) Determine the average number of days during which the average controller is away from the facility. Days away from the facility should include days off duty, leave, sick leave, absence for advanced training and any other cause;

c) The information on the number of days of facility operation and average number of days a controller is away from the facility should then be inserted into a formula in order to obtain the number of controllers required to provide the service in question in the course of a year. A typical example of such a formula is;

$$\text{Personnel need} = \frac{\text{Number of days a position is in operation per year}}{\text{Number of days of operation of the facility per year}} \times \frac{\text{Number of functional hours* per year}}{\text{Average number of hours worked per year by a controller**}}$$

* “Functional hours” means the hours when the position is occupied plus time for hand over.

** The “average number of hours” worked per year by a controller is obtained by subtracting from the days of the year the number of days the average controller is away from the facility. This figure is then multiplied by the average number of working hours per day of a controller.

3.1 As duty at some positions is more fatiguing than at others, supervisors should, at their discretion, rotate staff during their shifts between heavily loaded and more lightly loaded positions.

3.2 When making a workload study of any operating position, sector or unit, the study should be related to an hour-by-hour loading and normally not be confined to only one day’s operations. A more representative result will be obtained if the study covers a week or longer period. The arithmetic average of the workload values obtained for individual hours should then be plotted. However, any exceptionally busy day or other shorter period may be plotted separately if it

appears desirable to make this occurrence more outstanding.

3.3 Workload studies should be made in support of all proposals to change the staffing whenever such a proposal is based on work loading. Otherwise, studies should be made when it is believed that overloading is occurring with some regularity or that the functions of two or more positions may be combined without compromising safety or creating overloading of the so combined new positions.

3.4 An essential feature of any method used in conducting workload studies is that the assessment team should include a controller who is experienced in controlling traffic in the area under review but not personally involved in the control function.

4. Recruitment

4.1. The requirements for issuing ATS licenses and ratings are prescribed in the MOZCARs Part 65. The standards a candidate must meet to satisfy the medical and experience requirements determine to a large extent the conditions which govern the recruitment and selection process.

4.2. Selection methods normally follow established interviewing techniques requiring both written and oral examination with the latter emphasizing motivation. Psychological aptitude and manipulative tests are used and it is necessary to have candidates medically examined in accordance with the requirements in the MOZCARs as part of the selection process.

4.3 Because of the special nature of the ATS, persons selected for service in ATS require considerable training before they can qualify for a license. Such training is a costly process, making it necessary to have arrangements whereby a candidate, who is unable to reach a satisfactory standard of performance within set time limits, may have his employment terminated.

4.4 In addition to classroom instruction, candidates should be tested on the job by assigning them to units where they should perform supplementary duties assisting the controller, but under continuous supervision. In this way, the candidate will gain confidence and the employer can assess his potential and possibly take corrective action before a loss of confidence occurs. This on-the-job training is the most significant element of the training process and the ability to handle people firmly but compassionately should therefore be a major criterion in the selection of supervisory personnel.

5. Career progression

5.1 Service with the ATS is a career in itself, but in common with most other disciplines, as employees become more skilled, some of them are likely to aspire to increased responsibilities and the associated social advances. As the task of controlling air traffic does not develop management skills, personnel should therefore be given the opportunity to attend varying levels of administrative instructional courses to provide a career structure through to top management positions. Individual assessments of progress, together with the on-the-job assessments, will permit an employee the opportunity to demonstrate fitness for promotion, and also allow management to have a broader group from which to select possible candidates. ATS staff are required to pass promotion examinations. However, regardless of the method chosen, it appears unlikely that a good controller will automatically become a good supervisor unless he is given adequate training and opportunity.

5.2 Once a candidate has qualified for an ATS license, he will be required to obtain a rating, qualifying him to work at a specific ATS position. It is usual for a basic grade controller to return to the training school to be taught advanced ATS techniques so that he can compete for positions of higher responsibility and also to ensure that a pool of qualified staff is always available to meet normal staff attrition.

172.06.3 Determining continued competency of air traffic controllers on new equipment and procedures

1. The ANSP shall develop procedures for determining the continued competency of Air Traffic Controllers on new equipment and procedures.

2. In developing these procedures, the ANSP shall take into consideration the following provisions:

a) Controller competency is maintained by adequate and appropriate refresher training, including the handling of aircraft emergencies and operations under conditions with failed and degraded facilities and systems;

b) Controllers, where the ATC unit/control sector is staffed by teams, are provided with relevant and adequate training in order to ensure efficient teamwork;

c) The implementation of new or amended procedures, and new or updated communications, surveillance and other safety significant systems and equipment is preceded by appropriate training and instruction;

d) Controller competency in the English language is satisfactory in relation to providing ATS to air traffic; and

e) Standard phraseology is used.

3. The developed procedures shall be applicable when one or more of the following circumstances prevail:-

a) Changes in existing facilities and equipment at the operating positions;

b) New equipment that may necessitate complete renewal of operations and equipment rooms or even new ATS units or centres;

c) Re-organization of the airspace;

e) Introduction of new procedures or revision of existing procedures plan.

172.06.4 Read-Back Clearances

1. The flight crew shall read back to the air traffic controller safety-related parts of ATC clearances and instructions which are transmitted by voice.

1.1 The following items shall always be read back:

a) ATC route clearances;
b) Clearances and instructions to enter, land on, take off from, hold short of, cross, taxi and backtrack on any runway; and
c) Runway-in-use, altimeter settings, SSR codes, level instructions, heading and speed instructions and, whether issued by the controller or contained in automatic terminal information service (ATIS) broadcasts, transition levels.
Note. — If the level of an aircraft is reported in relation to standard pressure

1013.2 hPa, the words “FLIGHT LEVEL” precede the level figures. If the level of the aircraft is reported in relation to QNH/QFE, the figures are followed by the word “METRES” or “FEET”, as appropriate.

1.2. Other clearances or instructions, including conditional clearances, shall be read back or acknowledged in a manner to clearly indicate that they have been understood and will be complied with.

1.3. The controller shall listen to the read-back to ascertain that the clearance or instruction has been correctly acknowledged by the flight crew and shall take immediate action to correct any discrepancies revealed by the read-back.

1.4. Voice read-back of controller-pilot data link communications (CPDLC) messages shall not be required**.**

172.06.5 Flight Procedures Design and Validation

MOZCAR 172 contains basic provisions on the design and validation of flight procedures. Uniform and systematic application of this guidance material shall ensure safety of the aircraft executing the procedures. Flight Procedures considered in this MOZCAT include conventional

and RNAV departure, arrival and approach including non-precision and precision approaches.

1. **Standards, Criteria and Principles**

a) The PANS OPS Criteria contained in ICAO Doc 8168 shall be applied in developing instrument approach procedures.

b) The design and format for IAP charts shall be in accordance with MOZCAR 177 and ICAO Doc 8697.

c) In addition to the primary consideration of obstacle clearance, principles which should be applied to the design of flight procedures are that they should be safe, simple and economic in terms of time and airspace. Different procedures to the same runway should be harmonized as far as possible, e.g. platform altitudes and FAFs.

2. **Organizational Responsibilities for Flight Procedures**

a) The Procedure Design Service Provider is responsible for the recruitment and for the maintenance of competence of Flight Procedures designers and cartographers.

b) The Procedure Design Service Provider is responsible for the planning, construction, testing, validation and publication of flight procedures.

c) The Procedure Design Service Provider is responsible for the Quality Assurance in Flights Procedures design and publication.

d) IACM is responsible for establishing the standards and for the approval of flight procedures.

e) On receipt of a request for approval of a flight procedure for publication, IACM will evaluate the proposal including the supporting documentation and respond to the applicant.

3. Requirement for new or revised procedures

a) Where an operational requirement exists for a new flight procedure, the ANSP shall ensure that such procedure is designed in accordance with the prescribed standards and submitted to IACM for approval.

b) The Procedure Design Service Provider may consult with IACM in advance or during the design process to clarify on regulatory requirements.

c) Flight procedures published in the AIP should be revised:

I. When significant change to the obstacle environment occurs, requiring an amendment of procedural minimum altitudes;

II. When a published bearing, track or radial would fall into error by 1º, consequent on a change to magnetic variation or station declination;

III. To improve safety or operational efficiency, as identified by an interested party;

IV. To accommodate changes to aircraft category or characteristics;

V. To accommodate route connectivity on airspace organisation change;

VI. Due to changes to the supporting navigation facility;

VII. To comply with amendments to applicable ICAO provisions and other international and national standards and recommended practices; physical characteristics such as runways;

IX. When any other significant change occurs to aeronautical or topographical data.

d. Each procedure should be re-assessed at least yearly and a revision proposed if necessary.

4. **Proficiency and training of procedures designer**

4.1 Proficiency

In order to ensure that flight procedures submitted to IACM for approval and publication meet the required standards of quality assurance, the proficiency of the designers is specified as follows:

a) Successful completion of an ICAO PANS-OPS course for the relevant flight procedure type;

b) A minimum of five years aviation experience as a pilot, air traffic controller or equivalent experience;

c) Completion of a minimum of two flight procedures designs under the supervision of a competent procedure designer;

d) Flight procedures submitted for approval should be accompanied by details of competence of the designer(s).

5. Training

5.1 Categories of personnel to be trained

The following categories of personnel are covered by this MOZCATs:

a) Flight procedure designers

b) Cartographers

c) Flight Procedures inspectors

5.2 Approved training organizations

a) A number of organizations provide training in flight procedure design. An Procedure Design Service Provider shall request the IACM to approve training organizations intended for the provision of training.

b) The Procedure Design Service Provider shall bear the costs of approval.

5.3 Requirements for training

a. **Basic flight procedure design training**

Basic flight procedure design shall be provided to all personnel to be involved in the design, development, drawing and flight inspection. The training should provide participants with basic skills to develop non-precision approach and departure procedures using the ICAO PANS-OPS Doc 8168 criteria. The training will form a foundation for progression in the areas of specialization for each individual.

b. **Specialized training**

Flight procedure design is a wide discipline and it is not practicable for an individual to cover all aspects of the subject. The Procedure Design Service Provider needs to identify individual talents and provide specialized training as follows:

I. Precision approach procedures

II. RNAV and RNP procedures

III. Quality control in flight procedure design

IV. Flight procedures inspection

c. **On-the-Job Training**

I. The Procedure Design Service Provider shall ensure that performance based OJT programmes involving designing, developing, drawing and flight inspection of procedures are conducted before any individual can be authorized to carry out specified duties.

II. The Procedure Design Service Provider shall engage qualified OJT instructors to carry out specialized training in the field.

d. **Refresher training**

I. The technology employed in developing procedures as well as the airborne and space based system used in navigation are in a constant state of evolution. To cope with changing technology and operating procedures, it is necessary that the Procedure Design Service Provider, provide personnel with courses of instruction designed to bring knowledge and skills up to date.

II. Refresher courses may range from in-house to full-fledged training in specialized training organizations.

e**. Recurrent training**

I. Considering the level of activities in an organization, it might not be cost effective to establish a fully-fledged flight procedure design unit. The personnel will only be called when a need to develop new procedures or review existing ones is identified.

II. Recurrent training will be provided to ensure that the procedure designers remain current and that there is no need to retrain personnel following a long period of inactivity.

5.4 Training records

a. The Procedure Design Service Provider shall ensure that training records, including OJT are properly kept for inspection by the IACM as may be required.

b. The training records shall include certificates, OJT tasks performed and any other documents related to training and approval of jobs performed.

5.5 Requirement for approved curriculum

a) The ANSP shall develop training curricula for all types of training as required by this MOZCATs.

b) The curricula shall be approved by the IACM.

6. Standards and criteria

a) The PANS OPS Criteria contained in ICAO Doc 8168 shall be applied in developing instrument approach procedures and submitted to the IACM for approval.

b) The design and format for IAP charts shall be in accordance with MOZCAR 177 and ICAO Doc 8697.

7. Airspace organization

a) Instruments flight paths shall be contained within controlled airspace (class A, B, C, D or E), where established.

b) Where instrument flight paths are contained within controlled airspace which lies above uncontrolled airspace, the minimum procedural altitude should be at least 500 ft above the base of the controlled airspace.

c) Any proposal to establish a terminal instrument flight path in uncontrolled airspace will require a safety assessment including consideration of types and density of air traffic, risk analysis and acceptable mitigation.

8. Design Procedures

8.1. Data acquisition

The information and data required for procedure design shall consist of:

a) Airport, NAVAID, obstacle, terrain coordinates and elevation data based on verified surveys and compliant with regulation;

b) Airspace requirements;

c) Airport infrastructure: runway classification, lighting, communications, runway markings and local altimeter setting;

d) Environmental considerations;

e) Any other potential issue associated with the procedure.

8.2 Review of design and approval

Each new or revised procedure shall be verified by a qualified procedure designer other than the one who designed the procedure, to ensure compliance with applicable criteria, before submission to the IACM for approval. The credentials and the comments of the procedure designer reviewing the procedure must be attached to the documentation submitted for approval.

8.3 Documentation to be submitted. The procedure designer shall submit:

a) The documentation required for publication in the AIP in accordance with regulation MOZCAR 177 and MOZCAR 175.

b) The documentation required to maintain transparency concerning the details and assumptions used by the procedure designer, which should include supporting information and data used in the design, such as:

I. Controlling obstacle for each segment of the procedure

II. Effect of environmental considerations on the design of the procedure

III. Infrastructure assessment

IV. Airspace constraints

V. The results of the periodic reviews and, for modifications or amendments to existing procedures, the reasons for any change

VI. For any deviation from existing standards, the reasons for such a deviation, details of the safety assessment and of the mitigations applied to assure continued safe operation

VII. The results of the final verification for accuracy and completeness.

c) Additional documentation required to facilitate ground and flight validation of the procedure and the results of ground and flight validation.

8.4 Retention of documentation

The entity responsible for developing flight procedures shall retain during the entire lifetime of the procedure and 24 months after its withdrawal all procedure design and review documentation so as to allow any data irregularities or errors found during the production, maintenance or operational use of the procedure to be corrected, and to support any incident/accident investigation.

8.5 Obstacle clearance altitude / height OCA / OCH

The entity responsible for developing flight procedures shall publish obstacle clearance altitude OCA and obstacle clearance height OCH for an aerodrome as described in ICAO Doc 8168 vol II.

8.6 Minimum Descent Altitude MDA and Minimum Descent Height MDH

The entity responsible for developing flight procedures shall establish and publish minimum descent altitude MDA and Minimum descent height MDH for an aerodrome as described MOZCAR and MOZCATS 177 and Doc 8168 vol II. This applies also when the State has established operating minima for the aerodrome. (ICAO Doc 9365 chap 6).

8.7 Decision Altitude DA and Decision Height DH

The entity responsible for developing flight procedures shall establish and publish Decision Altitude DA and Decision Height DH for an aerodrome as described in MOZCAR 177 and Doc 8168 vol II. This applies also when the State has established operating minima for the aerodrome. (ICAO Doc 9365 chap 6).

8.8 Validation of flight procedures

Validation is the necessary final quality assurance step in the procedures design process prior to publication. The purpose of validation is the verification of all obstacles and navigation data, and assessment of applicability of the procedure. Ground validation shall always be undertaken. When the IACM can verify the accuracy and completeness of all obstacles and navigation data, then the IACM may decide to dispense with the flight validation requirement.

8.9 Ground validation

Ground validation is a review of the entire instrument flight procedure by a person trained in procedure design and with appropriate knowledge of flight validation issues. It is meant to catch errors in criteria and documentation, and evaluate on the ground, to the extent possible, those elements that will be evaluated in flight. Issues identified in the ground validation should be addressed prior to any flight validation. The ground validation will also determine if flight validation is needed for modifications and amendments to previously published procedures.

8.10 Flight validation

a) Flight validation of instrument flight procedures shall be carried out as part of the initial certification and shall be included as part of the periodic quality insurance programme. It shall be

performed by a flight crew approved by the IACM. The objectives of flight validation are:

I. Provide assurance that adequate obstacle clearance has been provided;

II. Verify that the navigation data used are correct;

III. Verify that all required infrastructures, such as runway marking, lighting, communication and navigational aids are in place and operative;

IV. Verify that the procedure can be safely flown;

V. Evaluate the charting, required infrastructures, visibility and other operational factors.

b) A briefing to the flight crew shall be performed before the flight test by the designer of the procedure or by a qualified procedure designer having reviewed the procedure.

c) To perform flight validation of procedures, pilots must carry a Commercial Pilot License and a valid Instrument Rating with appropriate experience and be approved by the IACM.

8.11 Flight inspection

Flight inspection of instrument flight procedures shall not be confused with flight validation, and is required to assure that the appropriate radio navigation aids adequately support the procedure. This is carried out as a part of a formal flight inspection programme and is performed by a qualified and certified flight inspector using an appropriately equipped and certified aircraft.

8.12 Periodical review of flight procedures

The entity responsible for flight procedures design shall establish, submit to IACM and conduct a programme of periodical review of the procedures to ensure that they continue to comply with changing criteria an meet the users requirements.

172.06.6 JOB DESCRIPTION OF ATS STAFF

1. Introduction

Air Traffic Services organizations are established in order to satisfactorily accomplish the objectives and functions of air traffic services. ATS providers have the responsibility for the overall policy, planning, personnel and management of air traffic services including defining job functions and assigning duties to ATS staff in accordance with the requirements of the Manual of ANS Standards.

2. Functions and Activities of ATS

ATS providers are responsible for promoting and supervising the development of civil aviation

within Mozambique while fostering safety, achieving efficient use of navigable airspaces and developing and operating satisfactory air traffic service systems. To ensure organized and efficient use of the airspace, ATS providers shall develop procedures for the employment of air traffic controllers and develop and implement training programmers. Besides determining the number of qualified personnel required to operate an ATS unit, ATS providers shall develop job descriptions for each air traffic control position in order to ensure that the functions and activities of ATS are aligned to the requirements of the regulations and the Manual of ANS Standards.

3. Job descriptions of ATS staff

As a general guide, the duties and responsibilities of air traffic services staff should include the following:

a) Development and administration of ATS policies, plans and procedures;

b) Management of ATS personnel and budgetary requirements;

c) Coordination of ATS operations within the flight information (FIR) and with neigh bouring FIRs as well as other agencies;

d) Administration and management of ATS operations within the Flight Information Region and at aerodromes to ensure that all ATS units operate in accordance with the applicable Civil Aviation Regulations, Manual of ANS standards, Civil Aviation Circulars and other relevant local procedures;

e) Supervising and conducting training to ensure achievement of required skills and competencies of ATS personnel;

f) Acting as focal point for the development, administration and maintenance of an effective safety management system to meet the requirements of the State Safety Programme;

g) Preparation and implementation of training programmes for ATS personnel including on-job-training;

h) Supervision and provision of air traffic control service at operational positions in order to prevent collision between aircraft and to expedite and maintain orderly flow of air traffic and in particular;

i. Provision of aerodrome control service

ii. Provision of approach control service

iii. Provision of area control service.

iv) Provision of flight information and alerting services; and

v) Monitoring of air traffic movement to minimize delays and maximize safety.

SUBPART VII CONTINGENCY PLANS

172.07.1 ANS CONTINGENCY PLANNING

1. The ANS contingency plan shall cover all aspects of ANS including Air Traffic Management (ATM), Communication, Navigation and Surveillance (CNS) and Aeronautical Information Services (AIS).

2. These guidelines have been developed in recognition of the fact that circumstances before and during events causing disruptions of services to international civil aviation vary widely and that contingency measures, including access to designated aerodromes for humanitarian reasons in response to specific events must be adapted to these circumstances. The guidelines also set forth the allocation of responsibility among States and ICAO for the conduct of contingency planning and the measures to be taken into consideration in developing, applying and terminating the application of such plans.

3. Experience has shown that the effects of disruption of services in particular portions of airspace are likely to affect significantly the services in adjacent airspace, thereby creating a requirement for international coordination, with the assistance of ICAO as appropriate. Hence, the role of ICAO in the field of contingency planning and coordination of such plans is described herein. It is necessary to note that, in order to preserve the availability of major world air routes within the air transportation system in the event of disruption of normal services, the role of ICAO in contingency planning is global and not limited to airspaces over the high seas and areas of undetermined sovereignty only.

3.1 Considering the nature of air traffic operations involved, international organizations concerned such as the International Air Transport Association (IATA) and the International Federation of Airline Pilots' Associations (IFALPA), are valuable advisers on the practicability of overall plans and elements of such plans.

3.2 Status of contingency plans

3.2.1 ANS contingency plans are intended to provide alternative facilities and services to those provided for in the regional air navigation plan when those facilities and services are temporarily not available.

3.2.2 The contingency arrangements are temporary in nature, remain in effect only until the services and facilities of the regional air navigation plan are reactivated and, accordingly, do not constitute amendments to the regional plan requiring processing in accordance with the "Procedure for the Amendment of Approved Regional Plans".

3.2.3 In cases where the proposed contingency plan would temporarily deviate from the approved regional air navigation plan, such deviations will need the approval of the President of the ICAO Council on behalf of the Council.

3.3 Responsibility for development, promulgating and implementing the contingency plan

3.3.1 The ANSPs providing air traffic services and related supporting services along major world air routes within the air transportation system of Mozambique are responsible for instituting measures to ensure the safety of international civil aviation operations and where possible for making provisions for alternative facilities and services in the event of disruption or potential disruption of these services. To that end the ANSPs shall develop, promulgate and implement appropriate contingency plans. Such plans shall be developed in consultation with other States and airspace users concerned and with
services in airspaces of adjacent States.

3.3.2 The responsibility for appropriate contingency action in respect of airspace over the high seas under the jurisdiction of Mozambique continues to rest with the ANSP until, and unless, that responsibility is temporarily reassigned by ICAO to another State.

3.3.3 Similarly, the responsibility for appropriate contingency action in respect of airspace where the responsibility for providing the services has been delegated by another State continues to rest with the State providing the services until, and unless, the delegating State terminates temporarily the delegation. Upon termination, the delegating State assumes responsibility for appropriate contingency action.

3.3.4 ICAO will initiate and coordinate appropriate contingency action in the event of disruption of air traffic services and related supporting services affecting international civil aviation operations provided by a State wherein, for some reason, the authorities cannot adequately discharge the responsibility referred to in 3.3.1. In such circumstances, ICAO will work in coordination with States responsible for airspaces adjacent to that affected by the disruption and in close consultation with international organizations concerned. ICAO will also initiate and

coordinate appropriate contingency action at the request of States.

4. Preparatory action

3.4.1 Time is essential in contingency planning if hazards to air navigation are to be reasonably prevented. Timely introduction of contingency arrangements requires decisive initiative and action, which again presupposes that contingency plans have, as far as practicable, been completed and agreed among the parties concerned before the occurrence of the event requiring contingency action, including the manner and timing of promulgating such arrangements.

3.4.2 Preparatory actions, as appropriate, for facilitating timely introduction of contingency arrangements shall include;

a) Preparation of general contingency plans for introduction in respect of generally foreseeable events such as industrial action or labour unrest affecting the provision of air traffic services and/or supporting services. In recognition of the fact that the world aviation community is not party to such disputes, the ANSPs shall ensure that adequate air traffic services will continue to be provided to international civil aviation operation in airspace over the high seas delegated to Mozambique. For the same reason, States providing air traffic services in their own airspaces or, by delegation, in the airspace of (an) other State(s) should take appropriate action to ensure that adequate air traffic services will continue to be provided to international civil aviation operations concerned, which do not involve landing or take-off in the State(s) affected by industrial action;

b) Assessment of risk to civil air traffic due to military conflict or acts of unlawful interference with civil aviation as well as a review of the likelihood and possible consequences of natural disasters. Preparatory action should include initial development of special contingency plans in respect of natural disasters, military conflicts or acts of unlawful interference with civil aviation that are likely to affect the availability of airspace for civil aircraft operations and/or the provision of air traffic services and supporting services. It should be recognized that avoidance of particular portions of airspace on short notice will require special efforts by States responsible for adjacent portions of airspaces and by international aircraft operators with regard to planning of alternative routings and services, and ANSPs should therefore, as far as practicable, endeavour to anticipate the need for such alternative actions;

c) Monitoring of any developments that might lead to events requiring contingency arrangements to be developed and applied. The ANSP shall consider designating persons/administrative units to undertake such monitoring and, when necessary, to initiate effective follow-up action; and

d) designation/establishment of a central agency which, in the event of disruption of air traffic services and introduction of contingency arrangements, would be able to provide, 24 hours a day, up-to-date information on the situation and associated contingency measures until the system has returned to normal. A coordinating team should be designated within, or in association with, such a central agency for the purpose of coordinating activities during the disruption.

3.4.3 ICAO will be available for monitoring developments that might lead to events requiring contingency arrangements to be developed and applied and will, as necessary, assist in the development and application of such arrangements. During the emergence of a potential crisis, a coordinating team will be established in the ESAF Regional Office and at ICAO Headquarters in Montreal, and arrangements will be made for competent staff to be available or reachable 24 hours a day. The tasks of these teams will be to monitor continuously information from all relevant sources, to arrange for the constant supply of relevant information received by the State aeronautical information service, to liaise with international organizations concerned and their regional organizations, as appropriate, and to exchange up-to-date information with States directly concerned and States which are potential participants in contingency arrangements. Upon analysis of all available data, authority for initiating the action considered necessary in the circumstances will be obtained from the State(s) concerned.

3.5 Coordination

3.6.1 A contingency plan should be acceptable to providers and users of contingency services alike, i.e. in terms of the ability of the providers to discharge the functions assigned to them and in terms of safety of operations and traffic handling capacity provided by the plan in the circumstances.

3.5.2 Accordingly, States which anticipate or experience disruption of air traffic services and/or related supporting services should advise, as early as practicable, the ICAO Regional Office, and other States whose services might be affected. Such advice should include information on associated contingency measures or a request for assistance in formulating contingency plans.

3.5.3 Detailed coordination requirements should be determined by States and/or ICAO, as appropriate, keeping the above in mind. In the case of contingency arrangements not appreciably affecting airspace users or service provided outside the airspace of the single State

involved, coordination requirements are naturally few or non-existent. Such cases are believed to be few.

3.5.4 In the case of multi-State ventures, detailed coordination leading to formal agreement of the emerging contingency plan should be undertaken with each State which is to participate. Such detailed coordination should also be undertaken with those States whose services will be significantly affected, for example by re-routing of traffic, and with international organizations concerned who provide invaluable operational insight and experience.

3.5.5 Whenever necessary to ensure orderly transition to contingency arrangements, the coordination referred to in this section should include agreement on a detailed, common NOTAM text to be promulgated at a commonly agreed effective date.

3.6 Development, promulgation and application of contingency plans

3.6.1Development of a sound contingency plan is dependent upon circumstances, including the availability, or not, of the airspace affected by the disruptive circumstances Mfor use by international civil aviation operations. Sovereign airspace can be used only on the initiative of, or with the agreement or consent of, the authorities of the State concerned regarding such use. Otherwise, the contingency arrangements must involve bypassing the airspace and should be developed by adjacent States or by ICAO in cooperation with such adjacent States. In the case of airspace over the high seas, development of the contingency plan might involve, depending upon circumstances, including the degree of erosion of the alternative services offered, temporary reassignment by ICAO of the responsibility for providing air traffic services in the airspace concerned.

3.6.2 Development of a contingency plan presupposes as much information as possible on current and alternative routes, navigational capability of aircraft and availability or partial availability of navigational guidance from ground-based aids, surveillance and communications capability of adjacent air traffic services units, volume and types of aircraft to be accommodated and the actual status of the air traffic services, communications, meteorological and aeronautical information services. Following are the main elements to be considered for contingency planning depending upon circumstances:

a) re-routing of traffic to avoid the whole or part of the airspace concerned, normally involving establishment of additional routes or route segments with associated conditions for their use;

b) Establishment of a simplified route network through the airspace concerned, if it is available,

together with a flight level allocation scheme to ensure lateral and vertical separation, and a procedure for adjacent area control centers to establish longitudinal separation at the entry point and to maintain such separation through the airspace;

c) Reassignment of responsibility for providing air traffic services in airspace over the high seas or in delegated airspace;

d) Provision and operation of adequate air-ground communications, AFTN and
ATS direct speech links, including reassignment, to adjacent States, of the responsibility for providing meteorological information and information on status of navigation aids;

e) Special arrangements for collecting and disseminating in-flight and post-flight reports from aircraft;

f) a requirement for aircraft to maintain continuous listening watch on a specified pilot-pilot VHF frequency in specified areas where air-ground communications are uncertain or non-existent and to broadcast on that frequency, position information and estimates, including start and completion of climb and descent;

g) A requirement for all aircraft in specified areas to display navigation and anti-collision lights at all times;

h) A requirement and procedures for aircraft to maintain an increased longitudinal separation that may be established between aircraft at the same cruising level;

i) A requirement for climbing and descending well to the right of the center line of specifically identified routes;

j) Establishment of arrangements for controlled access to the contingency area to prevent overloading of the contingency system; and
k) A requirement for all operations in the contingency area to be conducted in accordance with IFR, including allocation of IFR flight levels, from the relevant the ICAO Table of Cruising Levels to ATS routes in the area.

3.6.3 Notification, by NOTAM, of anticipated or actual disruption of air traffic services and/or related supporting services should be dispatched to users of air navigation services as early as practicable. The NOTAM should include the associated contingency arrangements. In the case of foreseeable disruption, the advance notice should in any case not be less than 48 hours.

3.6.4 Notification by NOTAM of discontinuance of contingency measures and reactivation of the services set forth in the regional air navigation plan should be dispatched as early as practicable to ensure an orderly transfer from contingency conditions to normal conditions.

3.7 Amendments to the contingency plan

Contingency plans shall be reviewed at frequent intervals and when any operational change is planned to ensure their currency and continued efficacy. Action shall be taken to ensure that amendments are made available to all holders of the contingency.

SUBPART VIII SEARCH AND RESCUE

172.08.1 Search and Rescue Manual

The ATM service provider shall establish and submit to the IACM for approval a search and rescue manual, which sets out procedures for each organization involved in a search and rescue operation. As a minimum it shall contain details of:

a) The area of responsibility of the rescue co-ordination centre;
b) The organizations involved in the search and rescue operation;
c) The method and procedures whereby the rescue co-ordination centre is activated;
d) A flow chart for assessment of the situation and alerting or information of the organizations concerned
e) The precise contact details both in office hours and outside normal office hours of the personnel responsible for activation of each element of the organization;
f) The responsibilities of organizations and personnel assigned to the search and rescue organization;
g) The resources available to the search and rescue organization;
h) Information recording and retrieval, including routine situation reports and their frequency of promulgation and addressees;
i) The methods of communication within the organization and any appropriate extremal organizations, including interactional organizations; and
j) The provisions for training and the frequency of exercises of sections of the organization or of the entire organization.

SUBPART IX AIR NAVIGATION CHARGES

172.09.1 General

a) The Air Navigation Service Provider shall propose a charging regime for approval by the State as described under 172.05.3.

b) This charging regime shall be complaint with Art 15 of the Chicago Convention and with ICAO Doc 9082 and 9161

c) The charging scheme shall be based on the account of costs for air navigation services incurred by the service provider for the benefit of airspace users. The scheme shall allocate these costs among categories of users.

172.09.2 Principles

The following principles shall be applied when establishing the cost-base for charges:

a) the cost to be shared among airspace users shall be the full cost of providing air navigation services, including appropriate amounts for interest on capital investment and depreciation of assets, as well as the costs of maintenance, operation, management and administration;

b) The costs to be taken into account in this context shall be those assessed in relation to the facilities and services provided for and implemented under the ICAO Regional Air Navigation Plan. They shall also include the costs of the provision of Aeronautical Information and MET services, as well as the costs Incurred by the Civil Aviation Authority IACM and other costs incurred by the State and service provider in relation to the provision of air navigation services;

c) The cost of different air navigation services shall be identified separately

d) cross-subsidy between different air navigation services shall be allowed only when justified for objective reasons, and subject to clear identification;

e) Transparency of the cost-base for charges shall be guaranteed

f) Charges shall be set for the availability of air navigation services under non-

discriminatory conditions. When imposing charges on different airspace users for the use of the same service, no distinction shall be made in relation to the nationality or category of the user;

g) Exemption of certain users, especially light aircraft and State aircraft, may be permitted, provided that the cost of such exemption is not passed on to other users;

h) Air navigation services may produce sufficient revenues to exceed all direct and indirect operating costs and to provide for a reasonable return on assets to contribute towards necessary capital improvements;

i) Charges shall reflect the cost of air navigation services and facilities made available to airspace users, taking into account the relative productive capacities of the different aircraft types concerned;

j) Charges shall encourage the safe, efficient and effective provision of air navigation services with a view to a high level of safety and to cost efficiency and shall stimulate integrated service provision. To that effect, such charges may be used to provide:

   i. Mechanisms, including incentives consisting of financial advantages and disadvantages, to encourage air navigation service providers and/or airspace users to support improvements in air traffic flow management such as increased capacity and reduction of delays, while maintaining an optimum safety level.

   ii. Revenues to benefit projects designed to assist specific categories of airspace users and/or air navigation service providers in order to improve collective air navigation infrastructures, the provision of air navigation services and the use of airspace.

172.09.3 Approval of Air Navigation Charges

a) Proposals for the establishment or amendment of Air Navigation Charges shall be submitted to the airspace users for consultation.

b) Proposals for the establishment or amendment of Air Navigation Charges shall be submitted to the IACM with appropriate explanations and a detailed report of the consultation with the users.

c) The proposed Air Navigation Charges shall be approved or modified by the Ministry of Transport and Communication and by the Ministry of Finance based on the recommendations of the IACM.

Annex A

Almeda do Aeroporto CP 225

Maputo, MZ

iacm@tvcabo.co.mz

Tel 258 (21) 465416 Fax 258 (21) 465415

APPLICATION FOR THE ISSUE [ ] AMENDMENT [ ] OR RENEWAL [ ] OF A CERTIFICATE TO PROVIDE AIR TRAFFIC MANAGEMENT SERVICES

1	**Company**	
1.1	Director General (CEO)	
1.2	Director Operations	
1.3	Head of Maintenance	
1.4	Compliance Manager	
1.5	Safety and Quality Manager	
1.6	Training Manager	
1.7	Incident Investigation Officer	
2	**Application for**	**Location(s)**
2.1.1	Area Control Service Surveillance	
2.1.2	Area Control Service Procedural	
2.2.1	Approach Control Service Surveillance	
2.2.1	Approach Control Service Procedural	
2.3	Aerodrome Control Service	
2.4	Flight Information service	
2.5	Air traffic Flow Management	
2.6	Rescue Coordination Center	

3	**Documents attached**		
3.1	Manual of Procedures		
3.2	Proof of financial capacity		
3.3	Proof of liability insurance		
3.4	Organisation of the company		
3.5	Proof of payment of the required fee		
4	Validity		
4.1	Certificate requested as from (date)		
4.2	Renewal requested as from (date)		
4.3	Amendment effective as from (date)		

Date:_____ The responsible Manager: _____

Decision by the IACM				
Service (Nr)	Granted /renewed amended	From (date)	To (date)	Refused (reason)
The responsible officer:				Date:

ANNEX B

Almeda do Aeroporto CP 225
Maputo, MZ
iacm@tvcabo.co.mz
Tel 258 (21) 465416 Fax 258 (21) 465415

CERTIFICATE of AIR TRAFFIC MANAGEMENT SERVICE PROVIDER

No_____

This is to certify that:

_____ *(Name of the company)*_____ _____
_____*(Address of the company)*_____ _____
_____

fulfills the requirements specified by the Civil Aviation Regulation Part 172 of the Republic of Mozambique (MOZCAR 172) in compliance with the ICAO Standards and Recommended Practices to provide the following Air Traffic Management Services:

(Type of service)	*(ICAO-Code of the Location(s))*
This certificate expires	*(date)*

Maputo, *(date)*

Instituto de Aviação Civil de Moçambique

Capt João Martins de Abreu

_____

Chairman of the Board and CEO

APPENDIX 1. TABLES OF CRUISING LEVELS

The cruising levels to be observed when so required by this MOZCATs are as follows:

RVSM — FEET

a) In areas where feet are used for altitude and where, in accordance with regional air navigation agreements, a vertical separation minimum of 1 000 ft is applied between FL 290 and FL 410 inclusive:*

TRACK**											
From 000 degrees to 179 degrees***						From 180 degrees to 359 degrees***					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Level			Level			Level			Level		
FL	Feet	Metres	FL	Feet	Metres	FL	Feet	Metres	FL	Feet	Metres
010	1 000	300	–	–	–	020	2 000	600	–	–	–
030	3 000	900	035	3 500	1 050	040	4 000	1 200	045	4 500	1 350
050	5 000	1 500	055	5 500	1 700	060	6 000	1 850	065	6 500	2 000
070	7 000	2 150	075	7 500	2 300	080	8 000	2 450	085	8 500	2 600
090	9 000	2 750	095	9 500	2 900	100	10 000	3 050	105	10 500	3 200
110	11 000	3 350	115	11 500	3 500	120	12 000	3 650	125	12 500	3 800
130	13 000	3 950	135	13 500	4 100	140	14 000	4 250	145	14 500	4 400
150	15 000	4 550	155	15 500	4 700	160	16 000	4 900	165	16 500	5 050
170	17 000	5 200	175	17 500	5 350	180	18 000	5 500	185	18 500	5 650
190	19 000	5 800	195	19 500	5 950	200	20 000	6 100	205	20 500	6 250
210	21 000	6 400	215	21 500	6 550	220	22 000	6 700	225	22 500	6 850
230	23 000	7 000	235	23 500	7 150	240	24 000	7 300	245	24 500	7 450
250	25 000	7 600	255	25 500	7 750	260	26 000	7 900	265	26 500	8 100
270	27 000	8 250	275	27 500	8 400	280	28 000	8 550	285	28 500	8 700
290	29 000	8 850				300	30 000	9 150			
310	31 000	9 450				320	32 000	9 750			
330	33 000	10 050				340	34 000	10 350			
350	35 000	10 650				360	36 000	10 950			
370	37 000	11 300				380	38 000	11 600			
390	39 000	11 900				400	40 000	12 200			
410	41 000	12 500				430	43 000	13 100			
450	45 000	13 700				470	47 000	14 350			
490	49 000	14 950				510	51 000	15 550			
etc.	etc.	etc.				etc.	etc.	etc.			

* Except when, on the basis of regional air navigation agreements, a modified table of cruising levels based on a nominal vertical separation minimum of 1 000 ft (300 m) is prescribed for use, under specified conditions, by aircraft operating above FL 410 within designated portions of the airspace.

** Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to the Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

*** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

Note.— Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive *(Doc 9574).*

RVSM — METRES

b) In areas where metres are used for altitude and where, in accordance with regional air navigation agreements, a vertical separation minimum of 300 m is applied between 8 900 m and 12 500 m inclusive:*

TRACK**											
From 000 degrees to 179 degrees***						From 180 degrees to 359 degrees***					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Level			Level			Level			Level		
Standard Metric	Metres	Feet	Standard Metric	Metres	Feet	Standard Metric	Metres	Feet	Standard Metric	Metres	Feet
0030	300	1 000	–	–	–	0060	600	2 000	–	–	–
0090	900	3 000	0105	1 050	3 500	0120	1 200	3 900	0135	1 350	4 400
0150	1 500	4 900	0165	1 650	5 400	0180	1 800	5 900	0195	1 950	6 400
0210	2 100	6 900	0225	2 250	7 400	0240	2 400	7 900	0255	2 550	8 400
0270	2 700	8 900	0285	2 850	9 400	0300	3 000	9 800	0315	3 150	10 300
0330	3 300	10 800	0345	3 450	11 300	0360	3 600	11 800	0375	3 750	12 300
0390	3 900	12 800	0405	4 050	13 300	0420	4 200	13 800	0435	4 350	14 300
0450	4 500	14 800	0465	4 650	15 300	0480	4 800	15 700	0495	4 950	16 200
0510	5 100	16 700	0525	5 250	17 200	0540	5 400	17 700	0555	5 550	18 200
0570	5 700	18 700	0585	5 850	19 200	0600	6 000	19 700	0615	6 150	20 200
0630	6 300	20 700	0645	6 450	21 200	0660	6 600	21 700	0675	6 750	22 100
0690	6 900	22 600	0705	7 050	23 100	0720	7 200	23 600	0735	7 350	24 100
0750	7 500	24 600	0765	7 650	25 100	0780	7 800	25 600	0795	7 950	26 100
0810	8 100	26 600	0825	8 250	27 100	0840	8 400	27 600	0855	8 550	28 100
0890	8 900	29 100				0920	9 200	30 100			
0950	9 500	31 100				0980	9 800	32 100			
1010	10 100	33 100				1040	10 400	34 100			
1070	10 700	35 100				1100	11 000	36 100			
1130	11 300	37 100				1160	11 600	38 100			
1190	11 900	39 100				1220	12 200	40 100			
1250	12 500	41 100				1310	13 100	43 000			
1370	13 700	44 900				1430	14 300	46 900			
1490	14 900	48 900				1550	15 500	50 900			
etc.	etc.	etc.				etc.	etc.	etc.			

* Except when, on the basis of regional air navigation agreements, a modified table of cruising levels based on a nominal vertical separation minimum of 1 000 ft (300 m) is prescribed for use, under specified conditions, by aircraft operating above FL 410 within designated portions of the airspace.

** Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to the Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

*** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

Note.— Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive *(Doc 9574)*.

Non-RVSM — FEET

c) in other areas where feet are the primary unit of measurement for altitude:

TRACK*											
From 000 degrees to 179 degrees**						From 180 degrees to 359 degrees**					
IFR Flights			VFR Flights			IFR Flights			VFR Flights		
Level			Level			Level			Level		
FL	Feet	Metres	FL	Feet	Metres	FL	Feet	Metres	FL	Feet	Metres
010	1 000	300	–	–	–	020	2 000	600	–	–	–
030	3 000	900	035	3 500	1 050	040	4 000	1 200	045	4 500	1 350
050	5 000	1 500	055	5 500	1 700	060	6 000	1 850	065	6 500	2 000
070	7 000	2 150	075	7 500	2 300	080	8 000	2 450	085	8 500	2 600
090	9 000	2 750	095	9 500	2 900	100	10 000	3 050	105	10 500	3 200
110	11 000	3 350	115	11 500	3500	120	12 000	3 650	125	12 500	3 800
130	13 000	3 950	135	13 500	4 100	140	14 000	4 250	145	14 500	4 400
150	15 000	4 550	155	15 500	4 700	160	16 000	4 900	165	16 500	5 050
170	17 000	5 200	175	17 500	5 350	180	18 000	5 500	185	18 500	5 650
190	19 000	5 800	195	19 500	5 950	200	20 000	6 100	205	20 500	6 250
210	21 000	6 400	215	21 500	6 550	220	22 000	6 700	225	22 500	6 850
230	23 000	7 000	235	23 500	7 150	240	24 000	7 300	245	24 500	7 450
250	25 000	7 600	255	25 500	7 750	260	26 000	7 900	265	26 500	8 100
270	27 000	8 250	275	27 500	8 400	280	28 000	8 550	285	28 500	8 700
290	29 000	8 850	300	30 000	9 150	310	31 000	9 450	320	32 000	9 750
330	33 000	10 050	340	34 000	10 350	350	35 000	10 650	360	36 000	10 950
370	37 000	11 300	380	38 000	11 600	390	39 000	11 900	400	40 000	12 200
410	41 000	12 500	420	42 000	12 800	430	43 000	13 100	440	44 000	13 400
450	45 000	13 700	460	46 000	14 000	470	47 000	14 350	480	48 000	14 650
490	49 000	14 950	500	50 000	15 250	510	51 000	15 550	520	52 000	15 850
etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.

* Magnetic track, or in polar areas at latitudes higher than 70 degrees and within such extensions to those areas as may be prescribed by the appropriate ATS authorities, grid tracks as determined by a network of lines parallel to the Greenwich Meridian superimposed on a polar stereographic chart in which the direction towards the North Pole is employed as the Grid North.

** Except where, on the basis of regional air navigation agreements, from 090 to 269 degrees and from 270 to 089 degrees is prescribed to accommodate predominant traffic directions and appropriate transition procedures to be associated therewith are specified.

Note.— Guidance material relating to vertical separation is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive *(Doc 9574).*

APPENDIX 2. PRINCIPLES GOVERNING THE IDENTIFICATION OF NAVIGATION SPECIFICATIONS AND THE IDENTIFICATION OF ATS ROUTES OTHER THAN STANDARD DEPARTURE AND ARRIVAL ROUTES

1. Designators for ATS routes and navigation specifications

1.1 The purpose of a system of route designators and navigation specification(s) applicable to specified ATS route segment(s), route(s) or area is to allow both pilots and ATS, taking into account automation requirements:

a) to make unambiguous reference to any ATS route without the need to resort to the use of geographical coordinates or other means in order to describe it;

b) to relate an ATS route to a specific vertical structure of the airspace, as applicable;

c) to indicate a required level of navigation performance accuracy, when operating along an ATS route or within a specified area; and

d) to indicate that a route is used primarily or exclusively by certain types of aircraft.

Note 1.— Specifications governing the publication of navigation specifications are given in Annex 4, Chapter 7, and Annex 15, Appendix 1.

Note 2.— In relation to this appendix and for flight planning purposes, a prescribed navigation specification is not considered an integral part of the ATS route designator.

1.2 In order to meet this purpose, the designation system shall:

a) permit the identification of any ATS route in a simple and unique manner;

b) avoid redundancy;

c) be usable by both ground and airborne automation systems;

d) permit utmost brevity in operational use; and

e) provide sufficient possibility of extension to cater for any future requirements without the need for fundamental changes.

1.3 Controlled, advisory and uncontrolled ATS routes, with the exception of standard arrival and departure routes, shall therefore be identified as specified hereafter.

2. Composition of designator

2.1 The ATS route designator shall consist of a basic designator supplemented, if necessary, by:

a) one prefix as prescribed in 2.3; and

b) one additional letter as prescribed in 2.4.

2.1.1 The number of characters required to compose the designator shall not exceed six characters.

2.1.2 The number of characters required to compose the designator should, whenever possible, be kept to a maximum of five characters.

2.2 The basic designator shall consist of one letter of the alphabet followed by a number from 1 to 999.

2.2.1 Selection of the letter shall be made from those listed hereunder:

a) A, B, G, R for routes which form part of the regional networks of ATS routes and are not area navigation routes;

b) L, M, N, P for area navigation routes which form part of the regional networks of ATS routes;

c) H, J, V, W for routes which do not form part of the regional networks of ATS routes and are not area navigation routes;

d) Q, T, Y, Z for area navigation routes which do not form part of the regional networks of ATS routes.

2.3 Where applicable, one supplementary letter shall be added as a prefix to the basic designator in accordance with the following:

a) K to indicate a low-level route established for use primarily by helicopters;

b) U to indicate that the route or portion thereof is established in the upper airspace;

c) S to indicate a route established exclusively for use by supersonic aircraft during acceleration, deceleration and while in supersonic flight.

2.4 When prescribed by the appropriate ATS authority or on the basis of regional air navigation agreements, a supplementary letter may be added after the basic designator of the ATS route in question in order to indicate the type of service provided in accordance with the following:

a) the letter F to indicate that on the route or portion thereof advisory service only is provided;

b) the letter G to indicate that on the route or portion thereof flight information service only is provided.

Note 1.— Due to limitations in the display equipment on board aircraft, the supplementary letters "F" or "G" may not be displayed to the pilot.

3. Assignment of basic designators

3.1 Basic ATS route designators shall be assigned in accordance with the following principles.

3.1.1 The same basic designator shall be assigned to a main trunk route throughout its entire length, irrespective of terminal control areas, States or regions traversed.

Note.— This is of particular importance where automated ATS data processing and computerized airborne navigation equipment is used.

3.1.2 Where two or more trunk routes have a common segment, the segment in question shall be assigned each of the designators of the routes concerned, except where this would present difficulties in the provision of air traffic service, in which case, by common agreement, one designator only shall be assigned.

3.1.3 A basic designator assigned to one route shall not be assigned to any other route.

3.1.4 States' requirements for designators shall be notified to the Regional Offices of ICAO for coordination.

4. Use of designators in communications

4.1 In printed communications, the designator shall be expressed at all times by not less than two and not more than six characters.

4.2 In voice communications, the basic letter of a designator shall be spoken in accordance with the ICAO spelling alphabet.

4.3 Where the prefixes K, U or S specified in 2.3 are used, they shall, in voice communications, be spoken

as follows: K — KOPTER
U — UPPER
S — SUPERSONIC

The word "kopter" shall be pronounced as in the word "helicopter" and the words "upper" and "supersonic" as in the English language.

4.4 Where the letters "F" or "G" specified in 2.4 are used, the flight crew should not be required to use them in voice communications.

APPENDIX 3. PRINCIPLES GOVERNING THE IDENTIFICATION OF STANDARD DEPARTURE AND ARRIVAL ROUTES AND ASSOCIATED PROCEDURES

1. Designators for standard departure and arrival routes and associated procedures

Note.— In the following text, the term "route" is used in the meaning of "route and associated procedures".

1.1 The system of designators shall:

a) permit the identification of each route in a simple and unambiguous manner;

b) make a clear distinction between:

— departure routes and arrival routes;

— departure or arrival routes and other ATS routes;

— routes requiring navigation by reference to ground-based radio aids or self-contained airborne aids, and routes requiring navigation by visual reference to the ground;

c) be compatible with ATS and aircraft data processing and display requirements;

d) be of utmost brevity in its operational application;

e) avoid redundancy;

f) provide sufficient possibility for extension to cater for any future requirements without the need for fundamental changes.

1.2 Each route shall be identified by a plain language designator and a corresponding coded designator.

1.3 The designators shall, in voice communications, be easily recognizable as relating to a standard departure or arrival route and shall not create any difficulties in pronunciation for pilots and ATS personnel.

2. Composition of designators

2.1 Plain language designator

2.1.1 The plain language designator of a standard departure or arrival route shall consist of:

a) a basic indicator; followed by

b) a validity indicator; followed by

c) a route indicator, where required; followed by

d) the word "departure" or "arrival"; followed by

e) the word "visual", if the route has been established for use by aircraft operating in accordance with the visual flight rules (VFR).

2.1.2 The basic indicator shall be the name or name-code of the significant point where a standard departure route terminates or a standard arrival route begins.

2.1.3 The validity indicator shall be a number from 1 to 9.

2.1.4 The route indicator shall be one letter of the alphabet. The letters "I" and "O" shall not be used.

2.2 Coded designator

The coded designator of a standard departure or arrival route, instrument or visual, shall consist of:

a) the coded designator or name-code of the significant point described in 2.1.1 a); followed by

b) the validity indicator in 2.1.1 b); followed by

c) the route indicator in 2.1.1 c), where required.

Note.— Limitations in the display equipment on board aircraft may require shortening of the basic indicator, if that indicator is a five-letter name-code, e.g. KODAP. The manner in which such an indicator is shortened is left to the discretion of operators.

3. Assignment of designators

3.1 Each route shall be assigned a separate designator.

3.2 To distinguish between two or more routes which relate to the same significant point (and therefore are assigned the same basic indicator), a separate route indicator as described in 2.1.4 shall be assigned to each route.

4. Assignment of validity indicators

4.1 A validity indicator shall be assigned to each route to identify the route which is currently in effect.

4.2 The first validity indicator to be assigned shall be the number "1".

4.3 Whenever a route is amended, a new validity indicator, consisting of the next higher number, shall be assigned. The number "9" shall be followed by the number "1".

5. Examples of plain language and coded designators

5.1 *Example 1*: Standard departure route — instrument:

a) Plain language designator: BRECON ONE DEPARTURE

b) Coded designator: BCN 1

5.1.1 *Meaning*: The designator identifies a standard instrument departure route which terminates at the significant point BRECON (basic indicator). BRECON is a radio navigation facility with the identification BCN (basic indicator of the coded designator). The validity indicator ONE (1 in the coded designator) signifies either that the original version of the route is still in effect or that a change has been made from the previous version NINE (9) to the now effective version ONE (1) (see 4.3). The absence of a route indicator (see 2.1.4 and 3.2) signifies that only one route, in this case a departure route, has been established with reference to BRECON.

5.2 *Example 2*: Standard arrival route — instrument:

a) Plain language designator: KODAP TWO ALPHA ARRIVAL

b) Coded designator: KODAP 2 A

5.2.1 *Meaning*: This designator identifies a standard instrument arrival route which begins at the significant point KODAP (basic indicator). KODAP is a significant point not marked by the site of a radio navigation facility and therefore assigned a five-letter name-code in accordance with Appendix 2. The validity indicator TWO (2) signifies that a change has been made from the previous version ONE (1) to the now effective version TWO (2). The route indicator ALPHA (A) identifies one of several routes established with reference to KODAP and is a specific character assigned to this route.

5.3 *Example 3*: Standard departure route — visual:

a) Plain language designator: ADOLA FIVE BRAVO DEPARTURE VISUAL

b) Coded designator: ADOLA 5 B

5.3.1 *Meaning*: This designator identifies a standard departure route for controlled VFR flights which terminates at ADOLA, a significant point not marked by the site of a radio navigation facility. The validity indicator FIVE (5) signifies that a change has been made from the previous version FOUR (4) to the now effective version FIVE (5). The route indicator BRAVO (B) identifies one of several routes established with reference to ADOLA

6. Composition of designators for MLS/RNAV approach procedures

6.1 Plain language designator

6.1.1 The plain language designator of an MLS/RNAV approach procedure shall consist of:

a) "MLS"; followed by

b) a basic indicator; followed by

c) a validity indicator; followed

by d) a route indicator; followed

by

e) the word "approach"; followed by

f) the designator of the runway for which the procedure is designed.

6.1.2 The basic indicator shall be the name or name-code of the significant point where the approach procedure begins.

6.1.3 The validity indicator shall be a number from 1 to 9.

6.1.4 The route indicator shall be one letter of the alphabet. The letters "I" and "O" shall not be used.

6.1.5 The designator of the runway shall be in accordance with Annex 14, Volume I, 5.2.2.

6.2 Coded designator

6.2.1 The coded designator of an MLS/RNAV approach procedure shall consist of:

a) "MLS"; followed by

b) the coded designator or name-code of the significant point described in 6.1.1 b); followed by

c) the validity indicator in 6.1.1 c); followed by

d) the route indicator in 6.1.1 d); followed by

e) the runway designator in 6.1.1 f).

6.3 Assignment of designators

6.3.1 The assignment of designators for MLS/RNAV approach procedures shall be in accordance with paragraph 3. Procedures having identical tracks but different flight profiles shall be assigned separate route indicators.

6.3.2 The route indicator letter for MLS/RNAV approach procedures shall be assigned uniquely to all approaches at an airport until all the letters have been used. Only then shall the route indicator letter be repeated. The use of the same route indicator for two routes using the same MLS ground facility shall not be permitted.

6.3.3 The assignment of validity indicator for approach procedures shall be in accordance with paragraph 4.

6.4 Example of plain language and coded designators

6.4.1 *Example:*

a) Plain language designator: MLS HAPPY ONE ALPHA APPROACH RUNWAY ONE EIGHT LEFT

b) Coded designator: MLS HAPPY 1 A 18L

6.4.2 *Meaning:* The designator identifies an MLS/RNAV approach procedure which begins at the significant point HAPPY (basic indicator). HAPPY is a significant point not marked by the site of a radio navigation facility and therefore assigned a five-letter name-code in accordance with Appendix 2. The validity indicator ONE (1) signifies that either the original version of the route is still in effect or a change has been made from the previous version NINE (9) to the now effective version ONE (1). The route indicator ALPHA (A) identifies one of several routes established with reference to HAPPY and is a specific character assigned to this route.

7. Use of designators in communications

7.1 In voice communications, only the plain language designator shall be used.

Note.— For the purpose of identification of routes, the words "departure", "arrival" and "visual" described in 2.1.1 d) and 2.1.1 e) are considered to be an integral element of the plain language designator.

7.2 In printed or coded communications, only the coded designator shall be used.

8. Display of routes and procedures to air traffic control

8.1 A detailed description of each currently effective standard departure and/or arrival route/approach procedure, including the plain language designator and the coded designator, shall be displayed at the working positions at which the routes/procedures are assigned to aircraft as part of an ATC clearance, or are otherwise of relevance in the provision of air traffic control services.

8.2 Whenever possible, a graphic portrayal of the routes/procedures shall also be displayed.

APPENDIX 4. PRINCIPLES GOVERNING THE ESTABLISHMENT AND IDENTIFICATION OF SIGNIFICANT POINTS

1. Establishment of significant points

1.1 Significant points should, whenever possible, be established with reference to ground-based or space-based radio navigation aids, preferably VHF or higher frequency aids.

1.2 Where such ground-based or space-based radio navigation aids do not exist, significant points shall be established at locations which can be determined by self-contained airborne navigation aids, or, where navigation by visual reference to the ground is to be effected, by visual observation. Specific points may be designated as ‘‘transfer of control’’ points by agreement between adjacent air traffic control units or control positions concerned.

2.Designators for significant points marked by the site of a radio navigation aid

2.1Plain language name for significant points marked by the site of a radio navigation aid

2.1.1 Whenever practicable, significant points shall be named with reference to an identifiable and preferably prominent geographical location.

2.1.2 In selecting a name for the significant point, care shall be taken to ensure that the following conditions are met:

a) the name shall not create difficulties in pronunciation for pilots or ATS personnel when speaking in the language used in ATS communications. Where the name of a geographical location in the national language selected for designating a significant point gives rise to difficulties in pronunciation, an abbreviated or contracted version of this name, which retains as much of its geographical significance as possible, shall be selected;

Example: FUERSTENFELDBRUCK = FURSTY

b) the name shall be easily recognizable in voice communications and shall be free of ambiguity with those of other significant points in the same general area. In addition, the name shall not create confusion with respect to other communications exchanged between air traffic services and pilots;

c) the name should, if possible, consist of at least six letters and form two syllables and preferably not more than three;

d) the selected name shall be the same for both the significant point and the radio navigation aid marking it.

2.2 Composition of coded designators for significant points marked by the site of a radio navigation aid

2.2.1 The coded designator shall be the same as the radio identification of the radio navigation aid. It shall be so composed, if possible, as to facilitate association with the name of the point in plain language.

2.2.2 Coded designators shall not be duplicated within 1 100 km (600 NM) of the location of the radio navigation aid concerned, except as noted hereunder.

Note.— When two radio navigation aids operating in different bands of the frequency spectrum are situated at the same

location, their radio identifications are normally the same.

2.3 States' requirements for coded designators shall be notified to the Regional Offices of ICAO for coordination.

3.Designators for significant points not marked by the site of a radio navigation aid

3.1 Where a significant point is required at a position not marked by the site of a radio navigation aid, and is used for ATC purposes, it shall be designated by a unique five-letter pronounceable "name-code". This name-code designator then serves as the name as well as the coded designator of the significant point.

Note.— The principles governing the use of alphanumeric name-codes in support of RNAV SIDs, STARs and instrument approach procedures are detailed in the PANS-OPS (Doc 8168).

3.2 The name-code designator shall be selected so as to avoid any difficulties in pronunciation by pilots or ATS personnel when speaking in the language used in ATS communications.

Examples: ADOLA, KODAP

3.3 The name-code designator shall be easily recognizable in voice communications and shall be free of ambiguity with those used for other significant points in the same general area.

3.4 The unique five-letter pronounceable name-code designator assigned to a significant point shall not be assigned to any other significant point. When there is a need to relocate a significant point, a new name-code designator shall be chosen. In cases when a State wishes to keep the allocation of specific name-codes for reuse at a different location, such name-codes shall not be used until after a period of at least six months.

3.5 States' requirements for unique five-letter pronounceable name-code designators shall be notified to the Regional Offices of ICAO for coordination.

3.6 In areas where no system of fixed routes is established or where the routes followed by aircraft vary depending on operational considerations, significant points shall be determined and reported in terms of World Geodetic System — 1984 (WGS-84) geographical coordinates, except that permanently established significant points serving as exit and/or entry points into such areas shall be designated in accordance with the applicable provisions in 2 or 3.

4. Use of designators in communications

4.1 Normally the name selected in accordance with 2 or 3 shall be used to refer to the significant point in voice communications. If the plain language name for a significant point marked by the site of a radio navigation aid selected in accordance with 2.1 is not used, it shall be replaced by the coded designator which, in voice communications, shall be spoken in accordance with the ICAO spelling alphabet.

4.2 In printed and coded communications, only the coded designator or the selected name-code shall be used to refer to a significant point.

5. Significant points used for reporting purposes

5.1 In order to permit ATS to obtain information regarding the progress of aircraft in flight, selected significant points may need to be designated as reporting points.

5.2 In establishing such points, consideration shall be given to the following factors:

a) the type of air traffic services provided;

b) the amount of traffic normally encountered;

c) the accuracy with which aircraft are capable of adhering to the current flight plan;

d) the speed of the aircraft;

e) the separation minima applied;

f) the complexity of the airspace structure;

g) the control method(s) employed;

h) the start or end of significant phases of a flight (climb, descent, change of direction, etc.);

i) transfer of control procedures;

j) safety and search and rescue aspects;

k) the cockpit and air-ground communication workload.

5.3 Reporting points shall be established either as "compulsory" or as "on-request".

5.4 In establishing "compulsory" reporting points, the following principles shall apply:

a) compulsory reporting points shall be limited to the minimum necessary for the routine provision of information to air traffic services units on the progress of aircraft in flight, bearing in mind the need to keep cockpit and controller workload and air-ground communications load to a minimum;

b) the availability of a radio navigation aid at a location should not necessarily determine its designation as a compulsory reporting point;

c) compulsory reporting points should not necessarily be established at flight information region or control area boundaries.

5.5 "On-request" reporting points may be established in relation to the requirements of air traffic services for additional position reports when traffic conditions so demand.

5.6 The designation of compulsory and on-request reporting points shall be reviewed regularly with a view to keeping the requirements for routine position reporting to the minimum necessary to ensure efficient air traffic services.

5.7 Routine reporting over compulsory reporting points should not systematically be made mandatory for all flights in all circumstances. In applying this principle, particular attention shall be given to the following:

a) high-speed, high-flying aircraft should not be required to make routine position reports over all reporting points established as compulsory for low-speed, low-flying aircraft;

b) aircraft transiting through a terminal control area should not be required to make routine position reports as frequently as arriving and departing aircraft.

5.8 In areas where the above principles regarding the establishment of reporting points would not be practicable, a reporting system with reference to meridians of longitude or parallels of latitude expressed in whole degrees may be established.

APPENDIX 5. TECHNICAL SPECIFICATIONS RELATED TO METEOROLOGICAL OBSERVATIONS AND REPORTS

1. GENERAL PROVISIONS RELATED TO METEOROLOGICAL OBSERVATIONS

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

1.2 **Recommendation.—** *Meteorological instruments at aeronautical meteorological stations should be exposed, operated and maintained in accordance with the practices, procedures and specifications promulgated by the World Meteorological Organization (WMO).*

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

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

2. GENERAL CRITERIA RELATED TO METEOROLOGICAL REPORTS

2.1 Format of meteorological reports

2.1.1 Local routine and special reports shall be issued in abbreviated plain language, in accordance with the template shown in Table A3-1.

2.1.2 METAR and SPECI shall be issued in accordance with the template shown in Table A3-2 and disseminated in the METAR and SPECI code forms prescribed by WMO.

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

2.1.3 **Recommendation**.— *METAR and SPECI should be disseminated in digital form in addition to the dissemination of the METAR and SPECI in accordance with 2.1.2.*

2.1.4 METAR and SPECI if disseminated in digital form shall be formatted in accordance with a globally interoperable information exchange model and shall use extensible markup language (XML)/geography markup language (GML).

2.1.5 METAR and SPECI if disseminated in digital form shall be accompanied by the appropriate metadata.

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

2.2 Use of CAVOK

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

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

Note 1.— In local routine and special reports, visibility refers to the value(s) to be reported in accordance with 4.2.4.2 and 4.2.4.3; in METAR and SPECI, visibility refers to the value(s) to be reported in accordance with 4.2.4.4.

Note 2.— The lowest visibility is reported in accordance with 4.2.4.4 a).

b) no cloud of operational significance;

c) no weather of significance to aviation as given in 4.4.2.3, 4.4.2.5 and 4.4.2.6;

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

2.3 Criteria for issuance of local special reports and SPECI

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

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

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

c) an increase in air temperature of 2°C or more from that given in the latest report, or an alternative threshold value as agreed between the meteorological authority, the appropriate ATS authority and the operators concerned;

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

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

f) those values which constitute criteria for SPECI.

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

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

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

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

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

— freezing precipitation
— moderate or heavy precipitation (including showers thereof)
— thunderstorm (with precipitation);

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

— freezing fog
— thunderstorm (without precipitation);

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

1) from SCT or less to BKN or OVC; or

2) from BKN or OVC to SCT or less.

2.3.3 **Recommendation.—** *Where required in accordance with Chapter 4, 4.4.2 b), SPECI should be issued whenever changes in accordance with the following criteria occur:*

a) when the wind changes through values of operational significance. The threshold values should be established by the meteorological authority in consultation with the appropriate ATS authority and the operators concerned, taking into account changes in the wind which would:

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

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

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

1) 800, 1 500 or 3 000 m; and

2) 5 000 m, in cases where significant numbers of flights are operated in accordance with the visual flight rules; Note 1.— In

local special reports, visibility refers to the value(s) to be reported in accordance with 4.2.4.2 and 4.2.4.3; in SPECI, visibility refers to the value(s) to be reported in accordance with 4.2.4.4.

Note 2.— Visibility refers to "prevailing visibility" except in the case where only the lowest visibility is reported in accordance with 4.2.4.4 b).

c) when the runway visual range is improving and changes to or passes through one or more of the following values, or when the runway visual range is deteriorating and passes through one or more of the following values: 50, 175, 300, 550 or 800 m;

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

— *duststorm*

— *sandstorm*
— *funnel cloud (tornado or waterspout);*

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

— *low drifting dust, sand or snow*
— *blowing dust, sand or snow*
— *squall;*

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

1) 30, 60, 150 or 300 m (100, 200, 500 or 1 000 ft); and

2) 450 m (1 500 ft), in cases where significant numbers of flights are operated in accordance with the visual flight rules;

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

h) any other criteria based on local aerodrome operating minima, as agreed between the meteorological authority and the operators concerned.

Note.— Other criteria based on local aerodrome operating minima are to be considered in parallel with similar criteria for the inclusion of change groups and for the amendment of TAF developed in response to Appendix 5, 1.3.2 j).

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

3. DISSEMINATION OF METEOROLOGICAL REPORTS

3.1 METAR and SPECI

3.1.1 METAR and SPECI shall be disseminated to international OPMET databanks and the centres designated by regional air navigation agreement 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 **Recommendation.—** *A SPECI representing an improvement in conditions should be disseminated only after the improvement has been maintained for 10 minutes; it should be amended before dissemination, if necessary, to indicate the conditions prevailing at the end of that 10-minute period.*

3.2 Local routine and special reports

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

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

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

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

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

4. OBSERVING AND REPORTING OF METEOROLOGICAL ELEMENTS

Introductory Note.— Selected criteria applicable to meteorological information referred to under 4.1 to 4.8 for inclusion in aerodrome reports are given in tabular form at Attachment C.

4.1 Surface wind

4.1.1 Siting

4.1.1.1 **Recommendation.—** *Surface wind should be observed at a height of 10 ± 1 m (30 ± 3 ft) above the ground.*

4.1.1.2 **Recommendation.—** *Representative surface wind observations should be obtained by the use of sensors appropriately sited. Sensors for surface wind observations for local routine and special reports should be sited to give the best practicable indication of conditions along the runway and touchdown zones. At aerodromes where topography or prevalent weather conditions cause significant differences in surface wind at various sections of the runway, additional sensors should be provided.*

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

4.1.2 Displays

4.1.2.1 Surface wind displays relating to each sensor shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units shall relate to the same sensors, and where separate sensors are required as specified in 4.1.1.2, the displays shall be clearly marked to identify the runway and section of runway monitored by each sensor.

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

4.1.3 Averaging

4.1.3.1 The averaging period for surface wind observations shall be:

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

b) 10 minutes for METAR and SPECI, except that when the 10-minute period includes a marked discontinuity in the wind direction and/or speed, only data occurring after the discontinuity shall be used for obtaining mean values; hence, the time interval in these circumstances shall be correspondingly reduced.
Note.— A marked discontinuity occurs when there is an abrupt and sustained change in wind direction of 30° or more, with a wind speed of 5 m/s (10 kt) before or after the change, or a change in wind speed of 5 m/s (10 kt) or more, lasting at least 2 minutes.

4.1.3.2 **Recommendation.—** *The averaging period for measuring variations from the mean wind speed (gusts) reported in accordance with 4.1.5.2 c) should be 3 seconds for local routine reports, local special reports, METAR, SPECI and wind displays used for depicting variations from the mean wind speed (gusts) in air traffic services units.*

4.1.4 Accuracy of measurement

Recommendation.— *The reported direction and speed of the mean surface wind, as well as variations from the mean surface wind, should meet the operationally desirable accuracy of measurement as given in Attachment A.*

4.1.5 Reporting

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

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

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

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

1) when the total variation is 60° or more and less than 180° and the wind speed is 1.5 m/s (3 kt) or more, such directional variations shall be reported as the two extreme directions between which the surface wind has varied;

2) when the total variation is 60° or more and less than 180° and the wind speed is less than 1.5 m/s (3 kt), the wind direction shall be reported as variable with no mean wind direction; or

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

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

1) 2.5 m/s (5 kt) or more in local routine and special reports when noise abatement procedures are applied in accordance with the PANS-ATM (Doc 4444); or

2) 5 m/s (10 kt) or more otherwise;

d) when a wind speed of less than 0.5 m/s (1 kt) is reported, it shall be indicated as calm;

e) when a wind speed of 50 m/s (100 kt) or more is reported, it shall be indicated to be more than 49 m/s (99 kt); and

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

Note.— See note under 4.1.3.1.

4.1.5.3 In local routine and special reports:

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

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

c) when variations from the mean wind direction are reported in accordance with 4.1.5.2 b) 2), the two extreme directions between which the surface wind has varied shall be reported; and

d) when variations from the mean wind speed (gusts) are reported in accordance with 4.1.5.2 c), they shall be reported as the maximum and minimum values of the wind speed attained.

4.1.5.4 In METAR and SPECI, when variations from the mean wind speed (gusts) are reported in accordance with 4.1.5.2 c), the maximum value of the wind speed attained shall be reported.

4.2 Visibility

4.2.1 Siting

4.2.1.1 **Recommendation.—** *When instrumented systems are used for the measurement of visibility, the visibility should be measured at a height of approximately 2.5 m (7.5 ft) above the runway.*

4.2.1.2 **Recommendation.—** *When instrumented systems are used for the measurement of visibility, representative visibility observations should be obtained by the use of sensors appropriately sited. Sensors for visibility observations for local routine and special reports should be sited to give the best practicable indications of visibility along the runway and touchdown zone.*

4.2.2 Displays

Recommendation.— *When instrumented systems are used for the measurement of visibility, visibility displays relating to each sensor should be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units should relate to the same sensors, and where separate sensors are required as specified in 4.2.1, the displays should be clearly marked to identify the area, e.g. runway and section of runway, monitored by each sensor.*

4.2.3 Averaging

Recommendation.— *When instrumented systems are used for the measurement of visibility, their output should be updated at least every 60 seconds to permit provision of current representative values. The averaging period should be:*

a) 1 minute for local routine and special reports and for visibility displays in air traffic services units; and

b) 10 minutes for METAR and SPECI, except that when the 10-minute period immediately preceding the observation includes a marked discontinuity in the visibility, only those values occurring after the discontinuity should be used for obtaining mean values.

Note.— A marked discontinuity occurs when there is an abrupt and sustained change in visibility, lasting at least

2 minutes, which reaches or passes through criteria for the issuance of SPECI reports given in 2.3.

4.2.4 Reporting

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

Note.— Specifications concerning the use of CAVOK are given in 2.2.

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

4.2.4.3 **Recommendation.—** *In local routine and special reports, when instrumented systems are used for the measurement of visibility:*

a) if the visibility is observed from more than one location along the runway as specified in Chapter 4, 4.6.2.2, the values representative of the touchdown zone should be reported first, followed, as necessary, by the values representative of the mid-point and stop-end of the runway, and the locations for which these values are representative should be indicated; and

b) when there is more than one runway in use and the visibility is observed related to these runways, the available visibility values for each runway should be reported, and the runways to which the values refer should be indicated.

4.2.4.4 **Recommendation.—** *In METAR and SPECI, visibility should be reported as prevailing visibility, as defined in Chapter 1. When the visibility is not the same in different directions and*

a) when the lowest visibility is different from the prevailing visibility, and 1) less than 1 500 m or 2) less than 50 per cent of the prevailing visibility and less than 5 000 m; the lowest visibility observed should also be reported and, when possible, its general direction in relation to the aerodrome reference point indicated by reference to one of the eight points of the compass. If the lowest visibility is observed in more than one direction, then the most operationally significant direction should be reported; and

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

4.3 Runway visual range

4.3.1 Siting

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

4.3.1.2 **Recommendation.—** *Runway visual range should be assessed at a lateral distance from the runway centre line of not more than 120 m. The site for observations to be representative of the touchdown zone should be located about 300 m along the runway from the threshold. The sites for observations to be representative of the mid-point and stop-end of the runway should be located at a distance of 1 000 to 1 500 m along the runway from the threshold and at a distance of about 300 m from the other end of the runway. The exact position of these sites and, if necessary, additional sites should be decided after considering aeronautical, meteorological and climatological factors such as long runways, swamps and other fog-prone areas.*

4.3.2 Instrumented systems

Note.— Since accuracy can vary from one instrument design to another, performance characteristics are to be checked before selecting an instrument for assessing runway visual range. The calibration of a forward-scatter meter has to be traceable and verifiable to a transmissometer standard, the accuracy of which has been verified over the intended operational range. Guidance on the use of transmissometers and forward-scatter meters in instrumented runway visual range systems is given in the Manual of Runway Visual Range Observing and Reporting Practices *(Doc 9328).*

4.3.2.1 Instrumented systems based on transmissometers or forward-scatter meters shall be used to assess runway visual range on runways intended for Category II and III instrument approach and landing operations.

4.3.2.2 **Recommendation.—** *Instrumented systems based on transmissometers or forward-scatter meters should be used to assess runway visual range on runways intended for Category I instrument approach and landing operations.*

4.3.3 Display

4.3.3.1 Where runway visual range is determined by instrumented systems, one display or more, if required, shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units shall be related to the same sensors, and where separate sensors are required as specified in 4.3.1.2, the displays shall be clearly marked to identify the runway and section of runway monitored by each sensor.

4.3.3.2 **Recommendation.—** *Where runway visual range is determined by human observers, runway visual range should be reported to the appropriate local air traffic services units, whenever there is a change in the value to be reported in accordance with the reporting scale (except where the provisions of 3.2.2 a) or b) apply). The transmission of such reports should normally be completed within 15 seconds after the termination of the observation.*

4.3.4 Averaging

Where instrumented systems are used for the assessment of runway visual range, their output shall be updated at least every 60 seconds to permit the provision of current, representative values. The averaging period for runway visual range values shall be:

a) 1 minute for local routine and special reports and for runway visual range displays in air traffic services units; and

b) 10 minutes for METAR and SPECI, except that when the 10-minute period immediately preceding the observation includes a marked discontinuity in runway visual range values, only those values occurring after the discontinuity shall be used for obtaining mean values.

Note.— A marked discontinuity occurs when there is an abrupt and sustained change in runway visual range, lasting at least 2 minutes, which reaches or passes through the values 800, 550, 300 and 175 m.

4.3.5 Runway light intensity

Recommendation.— *When instrumented systems are used for the assessment of runway visual range, computations should be made separately for each available runway. For local routine and special reports, the light intensity to be used for the computation should be:*

a) for a runway with the lights switched on and the light intensity of more than 3 per cent of the maximum light intensity available, the light intensity actually in use on that runway;

b) for a runway with the lights switched on and the light intensity of 3 per cent or less of the maximum light intensity available, the optimum light intensity that would be appropriate for operational use in the prevailing conditions; and

c) for a runway with lights switched off (or at the lowest setting pending the resumption of operations), the optimum light intensity that would be appropriate for operational use in the prevailing conditions.

In METAR and SPECI, the runway visual range should be based on the maximum light intensity available on the runway.

Note.— Guidance on the conversion of instrumented readings into runway visual range is given at Attachment D.

4.3.6 Reporting

4.3.6.1 In local routine reports, local special reports, METAR and SPECI, the runway visual range shall be reported in steps of 25 m when the runway visual range is less than 400 m; in steps of 50 m when it is between 400 m and 800 m; and in steps of 100 m when the runway visual range is more than 800 m. Any observed value which does not fit the reporting scale in use shall be rounded down to the nearest lower step in the scale.

4.3.6.2 **Recommendation.—** *Fifty metres should be considered the lower limit and 2 000 metres the upper limit for runway visual range. Outside of these limits, local routine reports, local special reports, METAR and SPECI should merely indicate that the runway visual range is less than 50 m or more than 2 000 m.*

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

a) when runway visual range is above the maximum value that can be determined by the system in use, it shall be reported using the abbreviation “ABV” in local routine and special reports and the abbreviation “P” in METAR and SPECI, followed by the maximum value that can be determined by the system; and

b) when the runway visual range is below the minimum value that can be determined by the system in use, it shall be reported using the abbreviation “BLW” in local routine and special reports and the abbreviation “M” in METAR and SPECI, followed by the minimum value that can be determined by the system.

4.3.6.4 In local routine and special reports:

a) the units of measurement used shall be included;

b) if runway visual range is observed from only one location along the runway, i.e. the touchdown zone, it shall be included without any indication of location;

c) if the runway visual range is observed from more than one location along the runway, the value representative of the touchdown zone shall be reported first, followed by the values representative of the mid-point and stop-end and the locations for which these values are representative shall be indicated; and

d) when there is more than one runway in use, the available runway visual range values for each runway shall be reported and the runways to which the values refer shall be indicated.

4.3.6.5 **Recommendation.—** *In METAR and SPECI:*

a) only the value representative of the touchdown zone should be reported and no indication of location on the runway should be included; and

b) where there is more than one runway available for landing, touchdown zone runway visual range values should be included for all such runways, up to a maximum of four, and the runways to which the values refer should be indicated.

4.3.6.6 **Recommendation.—** *In METAR and SPECI when instrumented systems are used for the assessment of runway visual range, the variations in runway visual range during the 10-minute period immediately preceding the observation should be included if the runway visual range values during the 10-minute period have shown a distinct tendency, such that the mean during the first 5 minutes varies by 100 m or more from the mean during the second 5 minutes of the period. When the variation of the runway visual range values shows an upward or downward tendency, this should be indicated by the abbreviation "U" or "D", respectively. In circumstances when actual fluctuations during the 10-minute period show no distinct tendency, this should be indicated using the abbreviation "N". When indications of tendency are not available, no abbreviations should be included.*

4.4 Present weather

4.4.1 Siting

Recommendation.— *When instrumented systems are used for observing present weather phenomena listed under 4.4.2.3 and 4.4.2.4, representative information should be obtained by the use of sensors appropriately sited.*

4.4.2 Reporting

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

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

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

a) Precipitation

Drizzle *DZ Rain*

RA Snow *SN Snow*

grains *SG*

Ice pellets *PL*

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

Small hail and/or snow pellets *GS*
— Reported when diameter of largest hailstones is less than 5 mm.

b) Obscurations (hydrometeors)

Fog *FG*
— Reported when visibility is less than 1 000 m, except when qualified by "MI", "BC", "PR" or "VC" (see 4.4.2.6 and 4.4.2.8).

Mist *BR*
— Reported when visibility is at least 1 000 m but not more than 5 000 m.

c) Obscurations (lithometeors)
— The following should be used only when the obscuration consists predominantly of lithometeors and the visibility is 5 000 m or less except "SA" when qualified by "DR" (see 4.4.2.6) and volcanic ash.

Sand *SA Dust*

(widespread) *DU Haze*

HZ Smoke *FU*

Volcanic ash *VA*

d) Other phenomena

Dust/sand whirls (dust devils) *PO Squall*

SQ Funnel cloud (tornado or waterspout) *FC*

Duststorm *DS Sandstorm*

SS

4.4.2.4 **Recommendation.—** *In automated local routine reports, local special reports, METAR and SPECI, in addition to the precipitation types listed under 4.4.2.3 a), the abbreviation UP should be used for unidentified precipitation when the type of precipitation cannot be identified by the automatic observing system*.

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

Thunderstorm *TS*
— Used to report a thunderstorm with precipitation in accordance with the templates shown in Tables A3-1 and A3-2. When thunder is heard or lightning is detected at the aerodrome during the 10-minute period preceding the time of observation but no precipitation is observed at the aerodrome, the abbreviation "TS" shall be used without qualification.

Freezing *FZ*
— Supercooled water droplets or precipitation, used with types of present weather phenomena in accordance with the templates shown in Tables A3-1 and A3-2.

Note.— At aerodromes with human observers, lightning detection equipment may supplement human observations. For aerodromes with automatic observing systems, guidance on the use of lightning detection equipment intended for thunderstorm reporting is given in the Manual on Automatic Meteorological Observing Systems at Aerodromes *(Doc 9837).*

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

Shower *SH*
— Used to report showers in accordance with the templates shown in Tables A3-1 and A3-2. Showers observed in the vicinity of the aerodrome (see 4.4.2.8) should be reported as "VCSH" without qualification regarding type or intensity of precipitation.

Blowing *BL*
— Used in accordance with the templates shown in Tables A3-1 and A3-2 with types of present weather phenomena raised by the wind to a height of 2 m (6 ft) or more above the ground.

Low drifting *DR*
— Used in accordance with the templates shown in Tables A3-1 and A3-2 with types of present weather phenomena raised by the wind to less than 2 m (6 ft) above ground level.

Shallow *MI*
— Less than 2 m (6 ft) above ground level.

Patches *BC*
— Fog patches randomly covering the aerodrome.

Partial *PR*
— A substantial part of the aerodrome covered by fog while the remainder is clear.

4.4.2.7 **Recommendation.—** *In automated local routine reports, local special reports, METAR and SPECI, when showers (SH) referred to in 4.4.2.6 cannot be determined based upon a method that takes account of the presence of convective cloud, the precipitation should not be characterized by SH.*

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

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

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

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

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

a) one or more, up to a maximum of three, of the present weather abbreviations given in 4.4.2.3 and 4.4.2.4 shall be used, as necessary, together with an indication, where appropriate, of the characteristics given in 4.4.2.5. and 4.4.2.6 and intensity or proximity to the aerodrome given in 4.4.2.8, so as to convey a complete description of the present weather of significance to flight operations;

b) the indication of intensity or proximity, as appropriate, shall be reported first followed respectively by the characteristics and the type of weather phenomena; and

c) where two different types of weather are observed, they shall be reported in two separate groups, where the intensity or proximity indicator refers to the weather phenomenon which follows the indicator. However, different types of precipitation occurring at the time of observation shall be reported as one single group with the dominant type of precipitation reported first and preceded by only one intensity qualifier which refers to the intensity of the total precipitation.

4.4.2.10 **Recommendation.—** *In automated local routine reports, local special reports, METAR and SPECI, the present weather should be replaced by "//" when the present weather cannot be observed by the automatic observing system due to a temporary failure of the system/sensor.*

4.5 Clouds

4.5.1 Siting

Recommendation.— *When instrumented systems are used for the measurement of the cloud amount and the height of cloud base, representative observations should be obtained by the use of sensors appropriately sited. For local routine and special reports, in the case of aerodromes with precision approach runways, sensors for cloud amount and height of cloud base should be sited to give the best practicable indications of the cloud amount and height of cloud base at the threshold of the runway in use. For that purpose, a sensor should be installed at a distance of less than 1 200 m (4 000 ft) before the landing threshold.*

4.5.2 Display

Recommendation.— *When automated equipment is used for the measurement of the height of cloud base, height of cloud base display(s) should be located in the meteorological station with corresponding display(s) in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units should relate to the same sensor, and where separate sensors are required as specified in 4.5.1, the displays should clearly identify the area monitored by each sensor.*

4.5.3 Reference level

The height of cloud base shall be reported above aerodrome elevation. When a precision approach runway is in use which has a threshold elevation 15 m (50 ft) or more below the aerodrome elevation, local arrangements shall be made in order that the height of cloud bases reported to arriving aircraft shall refer to the threshold elevation. In the case of reports from offshore structures, the height of cloud base shall be given above mean sea level.

4.5.4 Reporting

4.5.4.1 In local routine reports, local special reports, METAR and SPECI, the height of cloud base shall be reported in steps of 30 m (100 ft) up to 3 000 m (10 000 ft).

4.5.4.2 **Recommendation.—** *At aerodromes where low-visibility procedures are established for approach and landing, as agreed between the meteorological authority and the appropriate ATS authority, in local routine and special reports the height of cloud base should be reported in steps of 15 m (50 ft) up to and including 90 m (300 ft) and in steps of 30 m (100 ft) between 90 m (300 ft) and 3 000 m (10 000 ft), and the vertical visibility in steps of 15 m (50 ft) up to and including 90 m (300 ft) and in steps of 30 m (100 ft) between 90 m (300 ft) and 600 m (2 000 ft).*

4.5.4.3 **Recommendation.—** *In local routine reports, local special reports, METAR and SPECI:*

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

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

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

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

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

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

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

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

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

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

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

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

4.5.4.4 Any observed value in 4.5.4.1, 4.5.4.2 and 4.5.4.3 c) which does not fit the reporting scale in use shall be rounded down to the nearest lower step in the scale.

4.5.4.5 In local routine and special reports:

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

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

4.5.4.6 **Recommendation.—** *In automated local routine reports, local special reports, METAR and SPECI:*

a) when the cloud type cannot be observed by the automatic observing system, the cloud type in each cloud group should be replaced by "///";

b) when no clouds are detected by the automatic observing system, it should be indicated by using the abbreviation "NCD";

c) when cumulonimbus clouds or towering cumulus clouds are detected by the automatic observing system and the cloud amount and/or the height of cloud base cannot be observed, the cloud amount and/or the height of cloud base should be replaced by "///"; and

d) the vertical visibility should be replaced by "///" when the sky is obscured and the value of the vertical visibility cannot be determined by the automatic observing system due to a temporary failure of the system/sensor.

4.6 Air temperature and dew-point temperature

4.6.1 Display

Recommendation.— *When automated equipment is used for the measurement of air temperature and dew-point temperature, air temperature and dew-point temperature displays should be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units should relate to the same sensors.*

4.6.2 Reporting

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

4.6.2.2 In local routine reports, local special reports, METAR and SPECI, a temperature below 0°C shall be identified.

4.7 Atmospheric pressure

4.7.1 Display

When automated equipment is used for the measurement of atmospheric pressure, QNH and, if required in accordance with 4.7.3.2 b), QFE displays relating to the barometer shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. When QFE values are displayed for more than one runway, as specified in 4.7.3.2 d), the displays shall be clearly marked to identify the runway to which the QFE value displayed refers.

4.7.2 Reference level

Recommendation.— *The reference level for the computation of QFE should be the aerodrome elevation. For non-precision approach runways, the thresholds of which are 2 m (7 ft) or more below the aerodrome elevation, and for precision approach runways, the QFE, if required, should refer to the relevant threshold elevation.*

4.7.3 Reporting

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

4.7.3.2 In local routine and special reports:

a) QNH shall be included;

b) QFE shall be included if required by users or as agreed between the meteorological authority, the appropriate ATS authority and the operators concerned, on a regular basis;

c) the units of measurement used for QNH and QFE values shall be included; and

d) if QFE values are required for more than one runway, the required QFE values for each runway shall be reported and the runways to which the values refer shall be indicated.

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

4.8 Supplementary information

4.8.1 Reporting

4.8.1.1 **Recommendation.—** *In local routine reports, local special reports, METAR and SPECI, the following recent weather phenomena, i.e. weather phenomena observed at the aerodrome during the period since the last issued routine report or last hour, whichever is the shorter, but not at the time of observation, should be reported, up to a maximum of three groups, in accordance with the templates shown in Tables A3-1 and A3-2, in the supplementary information:*

— *freezing precipitation*
— *moderate or heavy precipitation (including showers thereof)*
— *blowing snow*
— *duststorm, sandstorm*

— *thunderstorm*
— *funnel cloud (tornado or waterspout)*
— *volcanic ash*

Note.— The meteorological authority, in consultation with users, may agree not to provide recent weather information where SPECI are issued.

4.8.1.2 **Recommendation.—** *In local routine and special reports, the following significant meteorological conditions, or combinations thereof, should be reported in supplementary information:*

— *cumulonimbus clouds*	*CB*
— *thunderstorm*	*TS*
— *moderate or severe turbulence*	*MOD TURB, SEV TURB*
— *wind shear*	*WS*
— *hail*	*GR*
— *severe squall line*	*SEV SQL*
— *moderate or severe icing*	*MOD ICE, SEV ICE*
— *freezing precipitation*	*FZDZ, FZRA*
— *severe mountain waves*	*SEV MTW*
— *duststorm, sandstorm*	*DS, SS*
— *blowing snow*	*BLSN*
— *funnel cloud (tornado or waterspout)*	*FC*

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

4.8.1.3 **Recommendation.—** *In automated local routine reports, local special reports, METAR and SPECI, in addition to the recent weather phenomena listed under 4.8.1.1, recent unknown precipitation should be reported in accordance with the template shown in Table A3-2 when the type of precipitation cannot be identified by the automatic observing system*.

Note.— The meteorological authority, in consultation with users, may agree not to provide recent weather information where SPECI are issued.

4.8.1.4 **Recommendation.—** *In METAR and SPECI, where local circumstances so warrant, information on wind shear should be added.*

Note.— The local circumstances referred to in 4.8.1.4 include, but are not necessarily limited to, wind shear of a non-transitory nature such as might be associated with low-level temperature inversions or local topography.

4.8.1.5 **Recommendation.—** *In METAR and SPECI, the following information should be included in the supplementary information, in accordance with regional air navigation agreement:*

a) information on sea-surface temperature, and the state of the sea or the significant wave height from aeronautical meteorological stations established on offshore structures in support of helicopter operations; and

b) information on the state of the runway provided by the appropriate airport authority.

Note 1.— The state of the sea is specified in the Manual on Codes *(WMO-No. 306), Volume I.1, Part A —* Alphanumeric Codes, *Code Table 3700.*

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

Table A3-1. Template for the local routine (MET REPORT) and local special (SPECIAL) reports

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

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

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

Element as specified in Chapter 4	*Detailed content*	*Template(s)*			*Examples*
Identification of the type of report (M)	Type of report	MET REPORT *or* SPECIAL			MET REPORT SPECIAL
Location indicator (M)	ICAO location indicator (M)	nnnn			YUDO[1]
Time of the observation (M)	Day and actual time of the observation in UTC	nnnnnnZ			221630Z
Identification of an automated report (C)	Automated report identifier (C)	AUTO			AUTO
Surface wind (M)	Name of the element (M)	WIND			WIND 240/4MPS (WIND 240/8KT) WIND RWY 18 TDZ 190/6MPS (WIND RWY 18 TDZ 190/12KT) WIND VRB1MPS WIND CALM (WIND VRB2KT) WIND VRB BTN 350/ AND 050/1MPS (WIND VRB BTN 350/ AND 050/2KT) WIND 270/ABV49MPS (WIND 270/ABV99KT) WIND 120/3MPS MAX9 MNM2 (WIND 120/6KT MAX18 MNM4) WIND 020/5MPS VRB BTN 350/ AND 070/ (WIND 020/10KT VRB BTN 350/ AND 070/) WIND RWY 14R MID 140/6MPS (WIND RWY 14R MID 140/12KT) WIND RWY 27 TDZ 240/8MPS MAX14 MNM5 END 250/7MPS (WIND RWY 27 TDZ 240/16KT MAX28 MNM10 END 250/14KT)
	Runway (O)[2]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]			
	Runway section (O)[3]	TDZ			
	Wind direction (M)	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	C A L M	
	Wind speed (M)	[ABV]n[n][n]MPS (*or* [ABV]n[n]KT)			
	Significant speed variations (C)[4]	MAX[ABV]nn[n] MNMn[n]			
	Significant directional variations (C)[5]	VRB BTN nnn/ AND nnn/	—		
	Runway section (O)[3]	MID			
	Wind direction (O)[3]	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	C A L M	
	Wind speed (O)[3]	[ABV]n[n][n]MPS (*or* [ABV]n[n]KT)			
	Significant speed variations (C)[4]	MAX[ABV]nn[n] MNMn[n]			
	Significant directional variations (C)[5]	VRB BTN nnn/ AND nnn/	—		
	Runway section (O)[3]	END			
	Wind direction (O)[3]	nnn/	VRB BTN nnn/ AND nnn/ *or* VRB	C A L M	
	Wind speed (O)[3]	[ABV]n[n][n]MPS (*or* [ABV]n[n]KT)			
	Significant speed variations (C)[4]	MAX[ABV]nn[n] MNMn[n]			
	Significant directional variations (C)[5]	VRB BTN nnn/ AND nnn/	—		

Element as specified in Chapter 4	*Detailed content*	*Template(s)*				*Examples*
Visibility (M)	Name of the element (M)	VIS			C A V O K	VIS 350M CAVOK VIS 7KM VIS 10KM VIS RWY 09 TDZ 800M END 1200M VIS RWY 18C TDZ 6KM RWY 27 TDZ 4000M
	Runway (O)[2]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]				
	Runway section (O)[3]	TDZ				
	Visibility (M)	n[n][n][n]M *or* n[n]KM				
	Runway section (O)[3]	MID				
	Visibility (O)[3]	n[n][n][n]M *or* n[n]KM				
	Runway section (O)[3]	END				
	Visibility (O)[3]	n[n][n][n]M *or* n[n]KM				
Runway visual range (C)[6]	Name of the element (M)	RVR				RVR RWY 32 400M RVR RWY 20 1600M RVR RWY 10L BLW 50M RVR RWY 14 ABV 2000M RVR RWY 10 BLW 150M RVR RWY 12 ABV 1200M RVR RWY 12 TDZ 1100M MID ABV 1400M RVR RWY 16 TDZ 600M MID 500M END 400M RVR RWY 26 500M RWY 20 800M
	Runway (C)[7]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]				
	Runway section (C)[8]	TDZ				
	Runway visual range (M)	[ABV *or* BLW] nn[n][n]M				
	Runway section (C)[8]	MID				
	Runway visual range (C)[8]	[ABV *or* BLW] nn[n][n]M				
	Runway section (C)[8]	END				
	Runway visual range (C)[8]	[ABV *or* BLW] nn[n][n]M				
Present weather (C)[9, 10]	Intensity of present weather (C)[9]	FBL *or* MOD *or* HVY		—		
	Characteristics and type of present weather (C)[9,11]	DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZUP[12] *or* FC[13] *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* SHUP[12] *or* TSGR *or* TSGS *or* TSRA *or* TSSN *or* TSUP[12] *or* UP[12]		FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG *or* //[12]		MOD RA HVY TSRA HVY DZ FBL SN HZ FG VA MIFG HVY TSRASN FBL SNRA FBL DZ FG HVY SHSN BLSN HVY TSUP //
Cloud (M)[14]	Name of the element (M)	CLD				CLD NSC CLD SCT 300M OVC 600M (CLD SCT 1000FT OVC 2000FT) CLD OBSC VER VIS 150M (CLD OBSC VER VIS 500FT) CLD BKN TCU 270M (CLD BKN TCU 900FT) CLD RWY 08R BKN 60M RWY 26 BKN 90M (CLD RWY 08R BKN 200FT RWY 26 BKN 300FT) CLD /// CB ///M (CLD /// CB ///FT)
	Runway (O)[2]	RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]				
	Cloud amount (M) *or* vertical visibility (O)[9]	FEW *or* SCT *or* BKN *or* OVC *or* ///[12]	OBSC	NSC *or* NCD[12]		
	Cloud type (C)[9]	CB *or* TCU *or* ///[12]	—			

Element as specified in Chapter 4	*Detailed content*	*Template(s)*				*Examples*
	Height of cloud base *or* the value of vertical visibility (C)[9]	n[n][n][n]M (*or* n[n][n][n]FT) *or* ///M (*or* ///FT)[12]	[VER VIS n[n][n]M(*or* VER VIS n[n][n][n]FT)] *or* VER VIS ///M (*or* VER VIS ///FT)[12]			CLD /// CB 400M (CLD /// CB 1200FT) CLD NCD
Air temperature (M)	Name of the element (M)	T				T17 TMS08
	Air temperature (M)	[MS]nn				
Dew-point temperature (M)	Name of the element (M)	DP				DP15 DPMS18
	Dew-point temperature (M)	[MS]nn				
Pressure values (M)	Name of the element (M)	QNH				QNH 0995HPA QNH 1009HPA QNH 1022HPA QFE 1001HPA QNH 0987HPA QFE RWY 18 0956HPA RWY 24 0955HPA
	QNH (M)	nnnnHPA				
	Name of the element (O)	QFE				
	QFE (O)	[RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]] nnnnHPA [RWY nn[L] *or* RWY nn[C] *or* RWY nn[R] nnnnHPA]				
Supplementary information (C)[9]	Significant meteorological phenomena (C)[9]	CB *or* TS *or* MOD TURB *or* SEV TURB *or* WS *or* GR *or* SEV SQL *or* MOD ICE *or* SEV ICE *or* FZDZ *or* FZRA *or* SEV MTW *or* SS *or* DS *or* BLSN *or* FC[15]				FC IN APCH WS IN APCH 60M-WIND 360/13MPS WS RWY 12 REFZRA CB IN CLIMB-OUT RETSRA
	Location of the phenomena (C)[9]	IN APCH [n[n][n][n]M-WIND nnn/n[n]MPS] *or* IN CLIMB-OUT [n[n][n][n]M-WIND nnn/n[n]MPS] (IN APCH [n[n][n][n]FT-WIND nnn/n[n]KT] *or* IN CLIMB-OUT [n[n][n][n]FT-WIND nnn/n[n]KT]) *or* RWY nn[L] *or* RWY nn[C] *or* RWY nn[R]				
	Recent weather (C)[9, 10]	REFZDZ *or* REFZRA *or* REDZ *or* RE[SH]RA *or* RE[SH]SN *or* RESG *or* RESHGR *or* RESHGS *or* REBLSN *or* RESS *or* REDS *or* RETSRA *or* RETSSN *or* RETSGR *or* RETSGS *or* REFC *or* REPL or REUP[12] *or* REFZUP[12] *or* RETSUP[12] *or* RESHUP[12] *or* REVA *or* RETS				
Trend forecast (O)[16]	Name of the element (M)	TREND				TREND NOSIG TREND BECMG FEW 600M (TREND BECMG FEW 2000FT) TREND TEMPO 250/18 MPS MAX25 (TREND TEMPO 250/36KT MAX50) TREND BECMG AT1800 VIS 10KM NSW TREND BECMG TL1700 VIS 800M FG TREND BECMG FM1030 TL1130 CAVOK TREND TEMPO TL1200 VIS 600M BECMG AT1230 VIS 8KM NSW CLD NSC
	Change indicator (M)[17]	NOSIG	BECMG *or* TEMPO			
	Period of change (C)[9]		FMnnnn *and/or* TLnnnn *or* ATnnnn			
	Wind (C)[9]		nnn/[ABV]n[n][n]MPS [MAX[ABV]nn[n]] (*or* nnn/[ABV]n[n]KT [MAX[ABV]nn])			
	Visibility (C)[9]		VIS n[n][n][n]M *or* VIS n[n]KM		C A V O K	
	Weather phenomenon: intensity (C)[9]		FBL *or* MOD *or* HVY	—	NSW	

Element as specified in Chapter 4	*Detailed content*	*Template(s)*					*Examples*
	Weather phenomenon: characteristics and type (C)[9, 10, 11]		DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* TSGR *or* TSGS *or* TSRA *or* TSSN	FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *Or* PO *or* FC *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG			TREND TEMPO FM0300 TL0430 MOD FZRA TREND BECMG FM1900 VIS 500M HVY SNRA TREND BECMG FM1100 MOD SN TEMPO FM1130 BLSN TREND BECMG AT1130 CLD OVC 300M (TREND BECMG AT1130 CLD OVC 1000FT) TREND TEMPO TL1530 HVY SHRA CLD BKN CB 360M (TREND TEMPO TL1530 HVY SHRA CLD BKN CB 1200FT)
	Name of the element (C)[9]		CLD				
	Cloud amount and vertical visibility (C)[9,14]		FEW *or* SCT *or* BKN *or* OVC	OBSC	NSC		
	Cloud type (C)[9,14]		CB *or* TCU	—			
	Height of cloud base *or* the value of vertical visibility (C)[9,14]		n[n][n][n] M (*or* n[n][n][n] FT)	[VER VIS n[n][n]M (*or* VER VIS n[n][n][n] FT)]			

Notes.—

1. Fictitious location.
2. Optional values for one or more runways.
3. Optional values for one or more sections of the runway.
4. To be included in accordance with 4.1.5.2 c).
5. To be included in accordance with 4.1.5.2 b) 1).
6. To be included if visibility or runway visual range < 1 500 m.
7. To be included in accordance with 4.3.6.4 d).
8. To be included in accordance with 4.3.6.4 c).
9. To be included whenever applicable.
10. One or more, up to a maximum of three groups, in accordance with 4.4.2.9 a), 4.8.1.1 and Appendix 5, 2.2.4.3.
11. Precipitation types listed under 4.4.2.3 a) may be combined in accordance with 4.4.2.9 c) and Appendix 5, 2.2.4.1. Only moderate or heavy precipitation to be indicated in trend forecasts in accordance with Appendix 5, 2.2.4.1.
12. For automated reports only.
13. Heavy used to indicate tornado or waterspout; moderate used to indicate funnel cloud not reaching the ground.
14. Up to four cloud layers in accordance with 4.5.4.3 e).
15. Abbreviated plain language may be used in accordance with 4.8.1.2.
16. To be included in accordance with Chapter 6, 6.3.2.
17. Number of change indicators to be kept to a minimum in accordance with Appendix 5, 2.2.1, normally not exceeding three groups.

Table A3-2. Template for METAR and SPECI

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

Note 1.— The ranges and resolutions for the numerical elements included in METAR and SPECI are shown in Table A3-5 of this appendix.

Note 2.— The explanations for the abbreviations can be found in the PANS-ABC (Doc 8400).

Element as specified in Chapter 4	*Detailed content*	*Template(s)*			*Examples*	
Identification of the type of report (M)	Type of report (M)	METAR, METAR COR, SPECI *or* SPECI COR			METAR METAR COR SPECI	
Location indicator (M)	ICAO location indicator (M)	nnnn			YUDO[1]	
Time of the observation (M)	Day and actual time of the observation in UTC (M)	nnnnnnZ			221630Z	
Identification of an automated or missing report (C)[2]	Automated *or* missing report identifier (C)	AUTO *or* NIL			AUTO NIL	
END OF METAR IF THE REPORT IS MISSING.						
Surface wind (M)	Wind direction (M)	nnn	VRB		24004MPS (24008KT) 19006MPS (19012KT) 00000MPS (00000KT) 140P49MPS (140P99KT)	VRB01MPS (VRB02KT)
	Wind speed (M)	[P]nn[n]				
	Significant speed variations (C)[3]	G[P]nn[n]			12003G09MPS (12006G18KT) 24008G14MPS (24016G28KT)	
	Units of measurement (M)	MPS (*or* KT)				
	Significant directional variations (C)[4]	nnnVnnn	—		02005MPS 350V070 (02010KT 350V070)	
Visibility (M)	Prevailing *or* minimum visibility (M)[5]	nnnn		C A V O K	0350 7000 9999 0800	CAVOK
	Minimum visibility and direction of the minimum visibility (C)[6]	nnnn[N] *or* nnnn[NE] *or* nnnn[E] *or* nnnn[SE] *or* nnnn[S] *or* nnnn[SW] *or* nnnn[W] *or* nnnn[NW]			2000 1200NW 6000 2800E 6000 2800	
Runway visual range (C)[7]	Name of the element (M)	R			R32/0400 R12R/1700 R10/M0050 R14L/P2000	
	Runway (M)	nn[L]/*or* nn[C]/*or* nn[R]/				
	Runway visual range (M)	[P *or* M]nnnn			R16L/0650 R16C/0500 R16R/0450 R17L/0450	
	Runway visual range past tendency (C)[8]	U, D *or* N			R12/1100U R26/0550N R20/0800D R12/0700	

Element as specified in Chapter 4	*Detailed content*	*Template(s)*				*Examples*		
Present weather (C)[2, 9]	Intensity *or* proximity of present weather (C)[10]	– *or* +	—	VC				
	Characteristics and type of present weather (M)[11]	DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZRA *or* FZUP[12] *or* FC[13] *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* SHUP[12] *or* TSGR *or* TSGS *or* TSRA *or* TSSN *or* TSUP[12] *or* UP[12]	FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG *or* //[12]	FG *or* PO *or* FC *or* DS *or* SS *or* TS *or* SH *or* BLSN *or* BLSA *or* BLDU *or* VA		RA +TSRA +DZ –SN +TSRASN –SNRA DZ FG +SHSN BLSN UP FZUP TSUP FZUP //	HZ FG VA MIFG	VCFG VCSH VCTS VCBLSA
Cloud (M)[14]	Cloud amount and height of cloud base *or* vertical visibility (M)	FEWnnn *or* SCTnnn *or* BKNnnn *or* OVCnnn *or* FEW///[12] *or* SCT///[12] *or* BKN///[12] *or* OVC///[12] *or* ///nnn[12] *or* /////[12]	VVnnn *or* VV///[12]	NSC *or* NCD[12]		FEW015 OVC030 SCT010 OVC020 BKN///	VV005 VV/// ///015	NSC
	Cloud type (C)[2]	CB *or* TCU *or* ///[12]	—			BKN009TCU SCT008 BKN025CB //////CB	NCD BKN025///	
Air and dew-point temperature (M)	Air and dew-point temperature (M)	[M]nn/[M]nn				17/10 02/M08 M01/M10		
Pressure values (M)	Name of the element (M)	Q				Q0995 Q1009 Q1022 Q0987		
	QNH (M)	nnnn						
Supplementary information (C)	Recent weather (C)[2, 9]	REFZDZ *or* REFZRA *or* REDZ *or* RE[SH]RA *or* RE[SH]SN *or* RESG *or* RESHGR *or* RESHGS *or* REBLSN *or* RESS *or* REDS *or* RETSRA *or* RETSSN *or* RETSGR *or* RETSGS *or* RETS *or* REFC *or* REVA *or* REPL *or* REUP[12] *or* REFZUP[12] *or* RETSUP[12] *or* RESHUP[12]				REFZRA RETSRA		
	Wind shear (C)[2]	WS Rnn[L] *or* WS Rnn[C] *or* WS Rnn[R] *or* WS ALL RWY				WS R03 WS ALL RWY WS R18C		
	Sea-surface temperature and state of the sea *or* significant wave height (C)[15]	W[M]nn/Sn *or* W[M]nn/Hn[n][n]				W15/S2 W12/H75		

Element as specified in Chapter 4	*Detailed content*		*Template(s)*					*Examples*
	State of the runway (C)[16]	Runway designator (M)	R nn[L]/ *or* Rnn[C]/ *or* Rnn[R]/			R/SNOCLO		R99/421594 R/SNOCLO R14L/CLRD//
		Runway deposits (M)	n *or* /		CLRD//			
		Extent of runway contamination (M)	n *or* /					
		Depth of deposit (M)	nn *or* //					
		Friction coefficient *or* braking action (M)	nn *or* //					
Trend forecast (O)[17]	Change indicator (M)[18]		NOSIG	BECMG *or* TEMPO				NOSIG BECMG FEW020
	Period of change (C)[2]			FMnnnn *and/or* TLnnnn *or* ATnnnn				TEMPO 25018G25MPS (TEMPO 25036G50KT)
	Wind (C)[2]			nnn[P]nn[n][G[P]nn[n]]MPS (*or* nnn[P]nn[G[P]nn]KT)				BECMG FM1030 TL1130 CAVOK BECMG TL1700 0800 FG
	Prevailing visibility (C)[2]			nnnn			C A V O K	BECMG AT1800 9000 NSW
	Weather phenomenon: intensity (C)[10]			– *or* +	—	N S W		BECMG FM1900 0500 +SNRA
	Weather phenomenon: characteristics and type (C)[2, 9, 11]			DZ *or* RA *or* SN *or* SG *or* PL *or* DS *or* SS *or* FZDZ *or* FZRA *or* SHGR *or* SHGS *or* SHRA *or* SHSN *or* TSGR *or* TSGS *or* TSRA *or* TSSN	FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* BCFG *or* BLDU *or* BLSA *or* BLSN *or* DRDU *or* DRSA *or* DRSN *or* FZFG *or* MIFG *or* PRFG			BECMG FM1100 SN TEMPO FM1130 BLSN TEMPO FM0330 TL0430 FZRA TEMPO TL1200 0600 BECMG AT1200 8000 NSW NSC BECMG AT1130 OVC010 TEMPO TL1530 +SHRA BKN012CB
	Cloud amount and height of cloud base *or* vertical visibility (C)[2, 14]			FEWnnn *or* SCTnnn *or* BKNnnn *or* OVCnnn	VVnnn *or* VV///	N S C		
	Cloud type (C)[2,14]			CB *or* TCU	—			

Notes.—

1. Fictitious location.
2. To be included whenever applicable.
3. To be included in accordance with 4.1.5.2 c).
4. To be included in accordance with 4.1.5.2 b) 1).
5. To be included in accordance with 4.2.4.4 b).
6. To be included in accordance with 4.2.4.4 a).
7. To be included if visibility or runway visual range < 1 500 m; for up to a maximum of four runways in accordance with 4.3.6.5 b).
8. To be included in accordance with 4.3.6.6.
9. One or more, up to a maximum of three groups, in accordance with 4.4.2.9 a), 4.8.1.1 and Appendix 5, 2.2.4.1.
10. To be included whenever applicable; no qualifier for *moderate* intensity in accordance with 4.4.2.8.
11. Precipitation types listed under 4.4.2.3 a) may be combined in accordance with 4.4.2.9 c) and Appendix 5, 2.2.4.1. Only moderate or heavy precipitation to be indicated in trend forecasts in accordance with Appendix 5, 2.2.4.1.
12. For automated reports only.

13. Heavy used to indicate tornado or waterspout; moderate (no qualifier) to indicate funnel cloud not reaching the ground.
14. Up to four cloud layers in accordance with 4.5.4.3 e).
15. To be included in accordance with 4.8.1.5 a).
16. To be included in accordance with 4.8.1.5 b).
17. To be included in accordance with Chapter 6, 6.3.2.
18. Number of change indicators to be kept to a minimum in accordance with Appendix 5, 2.2.1, normally not exceeding three groups.

Table A3-3. Use of change indicators in trend forecasts

Change indicator	*Time indicator and period*	*Meaning*	
NOSIG	—	no significant changes are forecast	
BECMG	FM$n_1n_1n_1n_1$ TL$n_2n_2n_2n_2$	the change is forecast to	commence at $n_1n_1n_1n_1$ UTC and be completed by $n_2n_2n_2n_2$ UTC
	TLnnnn		commence at the beginning of the trend forecast period and be completed by nnnn UTC
	FMnnnn		commence at nnnn UTC and be completed by the end of the trend forecast period
	ATnnnn		occur at nnnn UTC (specified time)
	—		a) commence at the beginning of the trend forecast period and be completed by the end of the trend forecast period; *or* b) the time is uncertain
TEMPO	FM$n_1n_1n_1n_1$ TL$n_2n_2n_2n_2$	temporary fluctuations are forecast to	commence at $n_1n_1n_1n_1$ UTC and cease by $n_2n_2n_2n_2$ UTC
	TLnnnn		commence at the beginning of the trend forecast period and cease by nnnn UTC
	FMnnnn		commence at nnnn UTC and cease by the end of the trend forecast period
	—		commence at the beginning of the trend forecast period and cease by the end of the trend forecast period

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

Element as specified in Chapter 4		*Range*	*Resolution*
Runway:	(no units)	01 – 36	1
Wind direction:	°true	010 – 360	10
Wind speed:	MPS KT	1 – 99* 1 – 199*	1 1
Visibility:	M M KM KM	0 – 750 800 – 4 900 5 – 9 10 –	50 100 1 0 (fixed value: 10 KM)
Runway visual range: M	M M	0 – 375 400 – 750 800 – 2 000	25 50 100
Vertical visibility:	M M FT FT	0 – 75** 90 – 600 0 – 250** 300 – 2 000	15 30 50 100
Clouds: height of cloud base:	M M FT FT	0 – 75** 90 – 3 000 0 – 250** 300 – 10 000	15 30 50 100
Air temperature; Dew-point temperature:	°C	–80 – +60	1
QNH; QFE:	hPa	0500 – 1 100	1

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

** Under circumstances as specified in 4.5.4.2; otherwise a resolution of 30 m (100 ft) is to be used.

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

Element as specified in Chapter 4			*Range*	*Resolution*
Runway:		(no units)	01 – 36	1
Wind direction:		°true	000 – 360	10
Wind speed:		MPS KT	00 – 99* 00 – 199*	1 1
Visibility: M M		M M	0000 – 0750 0800 – 4 900 5 000 – 9 000 10 000 –	50 100 1 000 0 (fixed value: 9 999)
Runway visual range: M		M M	0000 – 0375 0400 – 0750 0800 – 2 000	25 50 100
Vertical visibility:		30's M (100's FT)	000 – 020	1
Clouds: height of cloud base:		30's M (100's FT)	000 – 100	1
Air temperature; Dew-point temperature:		°C	–80 – +60	1
QNH:		hPa	0850 – 1 100	1
Sea-surface temperature:		°C	–10 – +40	1
State of the sea:		(no units)	0 – 9	1
Significant wave height:		M	0 – 999	0.1
State of the runway	Runway designator:	(no units)	01 – 36; 88; 99	1
	Runway deposits:	(no units)	0 – 9	1
	Extent of runway contamination:	(no units)	1; 2; 5; 9	—
	Depth of deposit:	(no units)	00 – 90; 92 – 99	1
	Friction coefficient/braking action:	(no units)	00 – 95; 99	1

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

Example A3-1. Routine report

a) Local routine report (same location and weather conditions as METAR):

MET REPORT YUDO 221630Z WIND 240/4MPS VIS 600M RVR RWY 12 TDZ 1000M MOD DZ FG CLD SCT 300M OVC 600M T17 DP16 QNH 1018HPA TREND BECMG TL1700 VIS 800M FG BECMG AT1800 VIS 10KM NSW

b) METAR for YUDO (Donlon/International):*

METAR YUDO 221630Z 24004MPS 0600 R12/1000U DZ FG SCT010 OVC020 17/16 Q1018 BECMG TL1700 0800 FG BECMG AT1800 9999 NSW

Meaning of both reports:

Routine report for Donlon/International* issued on the 22nd of the month at 1630 UTC; surface wind direction 240 degrees; wind speed 4 metres per second; visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) 600 metres; runway visual range representative of the touchdown zone for runway 12 is 1 000 metres and the runway visual range values have shown an upward tendency during previous 10 minutes (runway visual range tendency to be included in METAR only); and moderate drizzle and fog; scattered cloud at 300 metres; overcast at 600 metres; air temperature 17 degrees Celsius; dew-point temperature 16 degrees Celsius; QNH 1 018 hectopascals; trend during next 2 hours, visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) becoming 800 metres in fog by 1700 UTC; at 1800 UTC visibility (along the runway(s) in the local routine report; prevailing visibility in METAR) becoming 10 kilometres or more and nil significant weather.

* Fictitious location

Note.— In this example, the primary units "metre per second" and "metre" were used for wind speed and height of cloud base, respectively. However, in accordance with Annex 5, the corresponding non-SI alternative units "knot" and "foot" may be used instead.

Example A3-2. Special report

a) Local special report (same location and weather conditions as SPECI):

SPECIAL YUDO 151115Z WIND 050/25KT MAX37 MNM10 VIS 1200M RVR RWY 05 ABV 1800M HVY TSRA CLD BKN CB 500FT T25 DP22 QNH 1008HPA TREND TEMPO TL1200 VIS 600M BECMG AT1200
VIS 8KM NSW NSC

b) SPECI for YUDO (Donlon/International):*

SPECI YUDO 151115Z 05025G37KT 3000 1200NE+TSRA BKN005CB 25/22 Q1008 TEMPO TL1200 0600 BECMG AT1200 8000 NSW NSC

Meaning of both reports:

Special report for Donlon/International* issued on the 15th of the month at 1115 UTC; surface wind direction 050 degrees; wind speed 25 knots gusting between 10 and 37 knots (minimum wind speed not to be included in SPECI) visibility 1 200 metres (along the runway(s) in the local special report); prevailing visibility 3 000 metres (in SPECI) with minimum visibility 1 200 metres to north east (directional variations to be included in SPECI only); runway visual range above 1 800 metres on runway 05 (runway visual range not required in SPECI with prevailing visibility of 3 000 metres); thunderstorm with heavy rain; broken cumulonimbus cloud at 500 feet; air temperature 25 degrees Celsius; dew-point temperature 22 degrees Celsius; QNH 1 008 hectopascals; trend during next 2 hours, visibility (along the runway(s) in the local special report; prevailing visibility in SPECI) temporarily 600 metres from 1115 to 1200, becoming at 1200 UTC visibility (along the runway(s) in the local special report; prevailing visibility in SPECI) 8 kilometres, thunderstorm ceases and nil significant weather and nil significant cloud.

* Fictitious location

Note.— In this example, the non-SI alternative units "knot" and "foot" were used for wind speed and height of cloud base, respectively. However, in accordance with Annex 5, the corresponding primary units "metres per second" and "metre" may be used instead.

Example A3-3. Volcanic activity report

VOLCANIC ACTIVITY REPORT YUSB* 231500 MT TROJEEN* VOLCANO N5605 W12652 ERUPTED 231445 LARGE ASH CLOUD EXTENDING TO APPROX 30000 FEET MOVING SW

Meaning:

Volcanic activity report issued by Siby/Bistock meteorological station at 1500 UTC on the 23rd of the month. Mt. Trojeen volcano 56 degrees 5 minutes north 126 degrees 52 minutes west erupted at 1445 UTC on the 23rd; a large ash cloud was observed extending to approximately 30 000 feet and moving in a south-westerly direction.

* Fictitious location

ATTACHMENT A. MATERIAL RELATING TO A METHOD OF ESTABLISHING ATS ROUTES DEFINED BY VOR

1. Introduction

1.1 The guidance material in this Attachment results from comprehensive studies, carried out in Europe in 1972 and the United States in 1978, which were in general agreement.

Note.— Details of the European studies are contained in Circular 120 — Methodology for the Derivation of Separation
Minima Applied to the Spacing between Parallel Tracks in ATS Route Structures.

1.2 In applying the guidance material in 3 and 4, it should be recognized that the data on which it is based are generally representative of navigation using VOR meeting the full requirements of Doc 8071 — *Manual on Testing of Radio Navigation Aids*, Volume I. Any additional factors, such as those due to particular operational requirements, frequency of aircraft passings or information available regarding the actual track-keeping performance of aircraft within a given portion of airspace should be taken into account.

1.3 Attention is also invited to the basic assumptions in 4.2 and to the fact that the values given in 4.1 represent a conservative approach. Before applying these values, account should therefore be taken of any practical experience gained in the airspace under consideration, as well as the possibility of achieving improvements in the overall navigation performance of aircraft.

1.4 States are encouraged to keep ICAO fully informed of the results of the application of this guidance material.

2. Determination of VOR system performance values

The large variability of the values which are likely to be associated with each of the factors that make up the total VOR system, and the limitation of presently available methods to measure all these effects individually with the required precision, have led to the conclusion that an assessment of the total system error provides a more realistic method for determining the VOR system performance. The material contained in 3 and 4 should be applied only after study of Circular 120 especially with respect to the environmental conditions.

Note.— Guidance material on overall VOR system accuracy is also contained in Annex 10, Volume I, Attachment C.

3. Determination of protected airspace along VOR-defined routes

Note 1.— The material of this section has not been derived by means of the collision-risk/target level of safety

method. Note 2.— The word "containment" as used in this section is intended to indicate that the protected

airspace provided
will contain the traffic for 95 per cent of the total flying time (i.e. accumulated over all aircraft) for which the traffic operates along the route in question. Where, for example 95 per cent containment is provided, it is implicit that for 5 per cent of the
total flying time traffic will be outside *the protected airspace. It is not possible to quantify the maximum distance which such traffic is likely to deviate beyond the protected airspace.*

3.1 For VOR-defined routes where radar or ADS-B is not used to assist aircraft in remaining within the protected airspace, the following guidance is provided. However, when the lateral deviations of aircraft are being

controlled with the aid of radar or ADS-B monitoring, the size of the protected airspace required may be reduced, as indicated by practical experience gained in the airspace under consideration.

3.2 As a minimum, protection against activity in airspace adjacent to the routes should provide 95 per cent containment.

3.3 The work described in Circular 120 indicates that a VOR system performance based on the probability of
95 per cent containment would require the following protected airspace around the centre line of the route to allow for possible deviations:

— VOR routes with 93 km (50 NM) or less between VORs: ±7.4 km (4 NM);

— VOR routes with up to 278 km (150 NM) between VORs: ±7.4 km (4 NM) up to 46 km (25 NM) from the VOR then expanding protected airspace up to ±11.1 km (6 NM) at 139 km (75 NM) from the VOR.

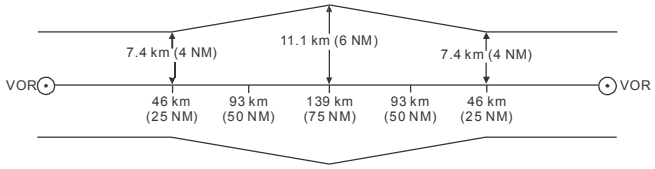


Figure A-1

3.4 If the appropriate ATS authority considers that a better protection is required, e.g. because of the proximity of prohibited, restricted or danger areas, climb or descent paths of military aircraft, etc., it may decide that a higher level of containment should be provided. For delineating the protected airspace the following values should then be used:

— for segments with 93 km (50 NM) or less between VORs, use the values in line A of the table below;

— for segments with more than 93 km (50 NM) and less than 278 km (150 NM) between the VORs use the values given in line A of the table up to 46 km (25 NM), then expand linearly to the value given in line B at 139 km (75 NM) from the VOR.

	Percentage containment					
	95	*96*	*97*	*98*	*99*	*99.5*
A (km)	±7.4	±7.4	±8.3	±9.3	±10.2	±11.1
(NM)	±4.0	±4.0	±4.5	±5.0	±5.5	±6.0
B (km)	±11.1	±11.1	±12.0	±12.0	±13.0	±15.7
(NM)	±6.0	±6.0	±6.5	±6.5	±7.0	±8.5

For example, the protected area for a route of 222 km (120 NM) between VORs and for which 99.5 per cent containment is required should have the following shape:

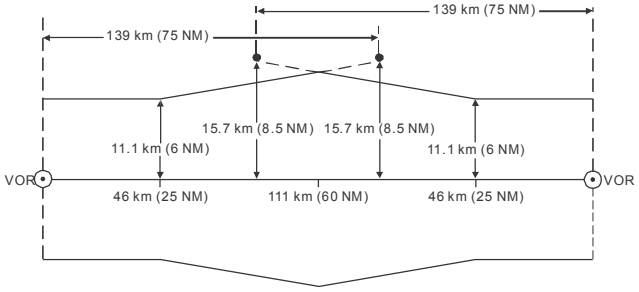


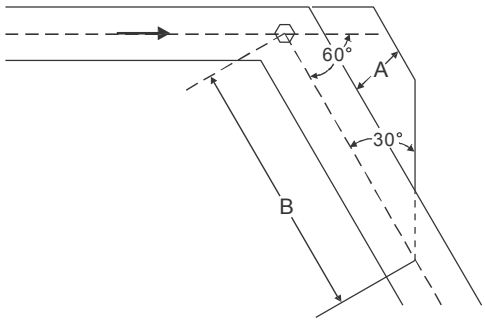
Figure A-2

3.5 If two segments of a VOR-defined ATS route intersect at an angle of more than 25 degrees, additional protected airspace should be provided on the outside of the turn and also on the inside of the turn as necessary. This additional space is to act as a buffer for increased lateral displacement of aircraft, observed in practice, during changes of direction exceeding 25 degrees. The amount of airspace added varies with the angle of intersection. The greater the angle, the greater the additional airspace to be used. Guidance is provided for protected airspace required at turns of no more than 90 degrees. For the exceptional circumstances which require an ATS route with a turn of more than 90 degrees, States should ensure that adequate protected airspace is provided on both the inside and outside of such turns.

3.6 The following examples have been synthesized from the practices of two States which use templates to facilitate the diagramming of airspace for planning purposes. Design of the turning area templates took into account factors such as aircraft speed, bank angle in turns, probable wind velocity, position errors, pilot delays and an intercept angle of at least 30 degrees to achieve the new track, and provides at least 95 per cent containment.

3.7 A template was used to establish the additional airspace required on the outside of turns to contain aircraft executing turns of 30, 45, 60, 75 and 90 degrees. The simplified figures below represent the outer limits of this airspace with the fairing curves removed to allow easy construction. In each case, the additional airspace is shown for aircraft flying in the direction of the large arrow. Where routes are used in both directions, the same additional airspace should be provided on the other outside boundary.

3.8 Figure A-3 illustrates the application of two segments intersecting at a VOR, at an angle of 60 degrees.



3.9 Figure A-4 illustrates the application for two segments meeting at a VOR intersection at an angle of 60 degrees beyond the point where boundary splay is required in order to comply with 3.3 and Figure A-1.

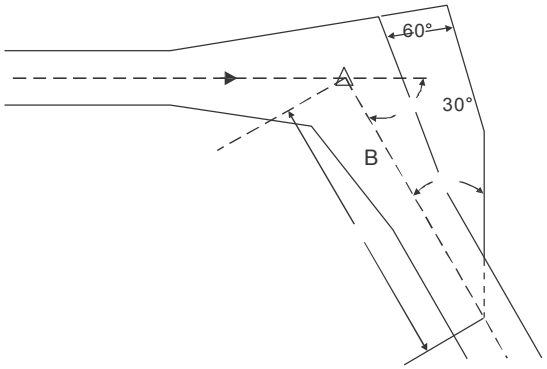


Figure A-4

3.10 The following table outlines the distances to be used in sample cases when providing additional protected airspace for route segments at and below FL 450, intersecting at a VOR or meeting at a VOR intersection not more than 139 km (75 NM) from each VOR.

Note.— Refer to Figures A-3 and A-4.

Angle of intersection	*30°*	*45°*	*60°*	*75°*	*90°*
VOR					
*Distance "A" (km)	5	9	13	17	21
(NM)	3	5	7	9	11
*Distance "B" (km)	46	62	73	86	92
(NM)	25	34	40	46	50
Intersection					
*Distance "A" (km)	7	11	17	23	29
(NM)	4	6	9	13	16
*Distance "B" (km)	66	76	88	103	111
(NM)	36	41	48	56	60

*Distances are rounded up to the next whole kilometre/nautical mile.

Note.— For behaviour of aircraft at turns, see Circular 120, 4.4.

3.11 Figure A-5 illustrates a method to construct the required additional protected airspace on the inside of turns for turns of 90 degrees or less:

Locate a point on the airway centre line, equal to the radius of turn plus the along-track tolerance prior to the

nominal turning point.

From this point, drop a perpendicular line to intersect the edge of the airway on the inside of the turn.

From this point on the inner edge of the airway, construct a line to intersect the airway centre line beyond the turn at an angle of half of the angle of turn.

The resulting triangle on the inside of the turn depicts the additional airspace which should be protected for the change of direction. For any turn of 90 degrees or less, the extra space on the inside will serve for aircraft approaching the turn from either direction.

Note 1.— Criteria for the calculation of the along-track tolerance are contained in PANS-OPS (Doc 8168), Volume II.

Note 2.— Guidance on the calculation of radius of turn is provided in Section 7.

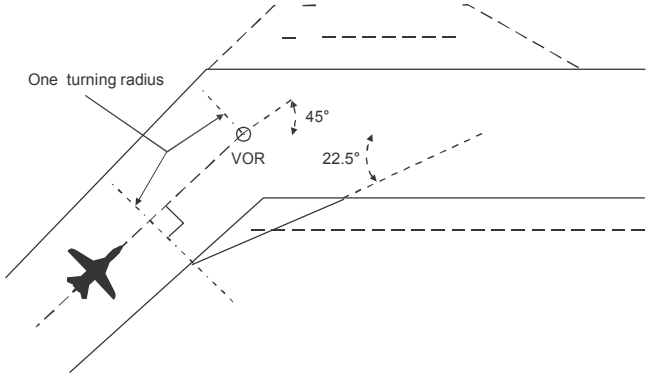
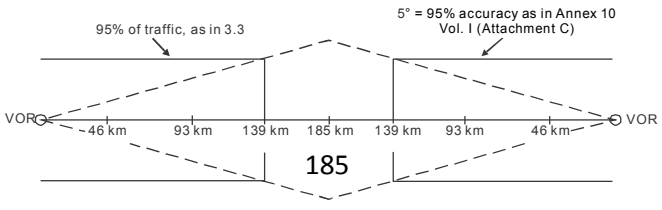


Figure A-5

3.12 For turns at VOR intersections, the principles of construction for extra airspace on the inside of a turn as described in 3.11 can be applied. Depending on the distance of the intersection from one or both VORs, one or both airways may have a splay at the intersection. Depending upon the situation, the extra airspace may be inside, partially inside, or outside of the 95 per cent containment. If the route is used in both directions, the construction should be completed separately for each direction.

3.13 Measured data for routes longer than 278 km (150 NM) between VORs are not yet available. To determine protected airspace beyond 139 km (75 NM) from the VOR, the use of an angular value of the order of 5 degrees as representing the probable system performance would appear satisfactory. The following figure illustrates this application.



(25 NM) (50 NM) (75 NM) (100 NM) (75 NM) (50 NM) (25 NM)

Figure A-6

4. Spacing of parallel routes defined by VORs

Note.— The material of this section has been derived from measured data using the collision-risk/target level of safety method.

4.1 The collision risk calculation, performed with the data of the European study mentioned in 1.1 indicates that, in the type of environment investigated, the distance between route centre lines (S in Figure A-7) for distances between VORs of 278 km (150 NM) or less should normally be a minimum of:

a) 33.3 km (18 NM) for parallel routes where the aircraft on the routes fly in opposite direction; and

b) 30.6 km (16.5 NM) for parallel routes where the aircraft on the two routes fly in the same direction.

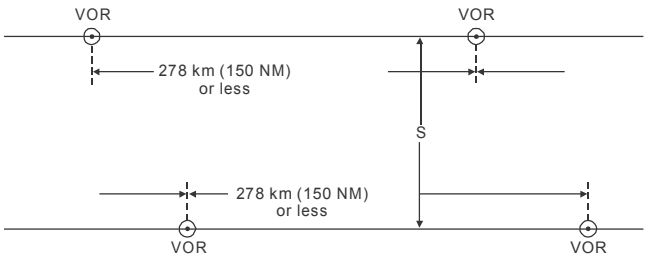


Figure A-7

Note.— Two route segments are considered parallel when:

— *they have about the same orientation, i.e. the angular difference does not exceed 10 degrees;*

— *they are not intersecting, i.e. another form of separation must exist at a defined distance from the intersection;*

— *traffic on each route is independent of traffic on the other route, i.e. it does not lead to restrictions on the other route.*

4.2 This spacing of parallel routes assumes:

a) aircraft may either during climb or descent or during level flight be at the same flight levels on the two routes;

b) traffic densities of 25 000 to 50 000 flights per busy two-month period;

c) VOR transmissions which are regularly flight checked in accordance with Doc 8071 — *Manual on Testing of Radio Navigation Aids,* Volume I, and have been found to be satisfactory in accordance with the procedures in that document for navigational purposes on the defined routes; and

d) no real-time radar or ADS-B monitoring or control of the lateral deviations is exercised.

4.3 Preliminary work indicates that, in the circumstances described in a) to c) below, it may be possible to reduce the

minimum distance between routes. However, the figures given have not been precisely calculated and in each case a detailed study of the particular circumstances is essential:

a) if the aircraft on adjacent routes are not assigned the same flight levels, the distance between the routes may be reduced; the magnitude of the reduction will depend on the vertical separation between aircraft on the adjacent tracks and on the percentage of climbing and descending traffic, but is not likely to be more than 5.6 km (3 NM);

b) if the traffic characteristics differ significantly from those contained in Circular 120, the minima contained in 4.1 may require adjustment. For example, for traffic densities of about 10 000 flights per busy two-month period, a reduction of 900 to 1 850 m (0.5 to 1.0 NM) may be possible;

c) the relative locations of the VORs defining the two tracks and the distance between the VORs will have an effect on the spacing, but this has not been quantified.

4.4 Application of radar or ADS-B monitoring and control of the lateral deviations of the aircraft may have a large effect on the minimum allowable distance between routes. Studies on the effect of radar monitoring indicate that:

— further work is necessary before a fully satisfactory mathematical model can be developed;

— any reduction of separation is closely related to:

  — traffic (volume, characteristics);
  — coverage and data processing, availability of an automatic alarm;
  — monitoring continuity;
  — sector workload; and
  — radiotelephony quality.

According to these studies and taking into account the experience some States have accumulated over many years with parallel route systems under continuous radar control, it can be expected that a reduction to the order of 15 to 18.5 km (8 to 10 NM), but most probably not less than 13 km (7 NM), may be possible as long as radar monitoring workload is not increased substantially by that reduction. Actual operations of such systems using reduced lateral spacing have shown that:

— it is very important to define and publish change-over points (see also 6);

— large turns should be avoided when possible; and

— where large turns cannot be avoided, required turn profiles should be defined for turns larger than 20 degrees.

Even where the probability of total radar or ADS-B failure is very small, procedures to cover that case should be considered

5. Spacing of adjacent VOR-defined routes that are not parallel

Note 1.— The material of this section is intended to provide guidance for situations where non-intersecting VOR-defined routes are adjacent and have an angular difference exceeding 10 degrees.

Note 2.— The material of this section has not been derived by means of the collision-risk/target level of safety method.

5.1 For adjacent non-intersecting VOR-defined routes that are not parallel, the collision-risk/target level of safety method is not, at its present state of development, fully appropriate. For this reason use should be made of the material in 3.

5.2 The protected airspace between such routes should not be less than that which will provide, without overlap, the 99.5 per cent containment values given in the table in 3.4 (see example in Figure A-8).

5.3 Where there is an angular difference of more than 25 degrees between route segments, additional protected

airspace, as indicated in 3.5 to 3.10, should be provided.

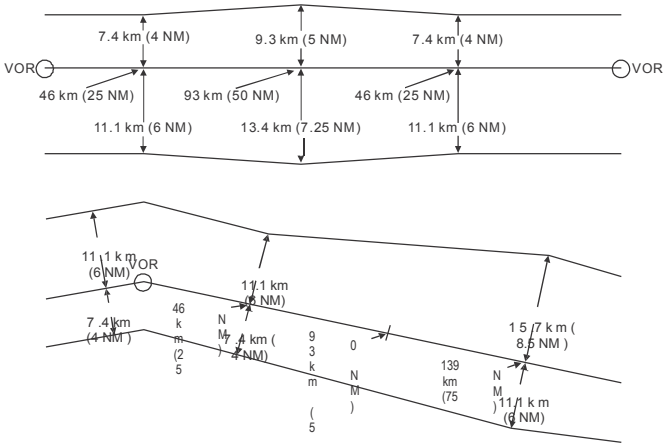


Figure A-8

6. Change-over points for VORs

6.1 When considering the establishment of points for changeover from one VOR to another for primary navigational guidance on VOR-defined ATS routes, States should bear in mind that:

a) the establishment of change-over points should be made on the basis of performance of the VOR stations concerned, including an evaluation of the interference protection criteria. The process should be verified by flight checking (see the *Manual on Testing of Radio Navigation Aids* (Doc 8071), Volume I);

b) where frequency protection is critical, flight inspection should be undertaken at the highest altitudes to which the facility is protected.

6.2 Nothing in 6.1 should be interpreted as placing a restriction on the service ranges of VOR installations meeting the specifications in Annex 10, Volume I, 3.3.

7. Calculation of radius of turn

7.1 The method used to calculate turn radii and the turn radii indicated below are applicable to aircraft performing a constant radius turn. The material has been derived from the turn performance criteria developed for RNP 1 ATS routes and can be used in the construction of the required additional protected airspace on the inside of turns also for ATS routes other than those defined by VOR.

7.2 Turn performance is dependent on two parameters — ground speed and bank angle. Due to the effect of the wind component changing with the change of heading, the ground speed and hence bank angle will change during a constant radius turn. However, for turns not greater than approximately 90 degrees and for the speed values considered below, the following formula can be used to calculate the achievable constant radius of turn, where the ground speed is the sum of the true airspeed and the wind speed:

$$\text{Radius of turn} = \frac{(\text{Ground speed})^2}{\text{Constant 'G'} * \text{TAN(bank angle)}}$$

7.3 The greater the ground speed, the greater will be the required bank angle. To ensure that the turn radius is

representative for all foreseeable conditions, it is necessary to consider extreme parameters. A true airspeed of 1 020 km/h (550 kt) is considered probably the greatest to be encountered in the upper levels. Combined with maximum anticipated wind speeds in the medium and upper flight levels of 370 km/h (200kt) [99.5 per cent values based on meteorological data], a maximum ground speed of 1 400 km/h (750 kt) should be considered. Maximum bank angle is very much a function of individual aircraft. Aircraft with high wing loadings flying at or near their maximum flight level are highly intolerant of extreme angles. Most transport aircraft are certified to fly no slower than 1.3 times their stall speed for any given configuration. Because the stall speed rises with TAN(bank angle), many operators try not to cruise below 1.4 times the stall speed to protect against gusts or turbulence. For the same reason, many transport aircraft fly at reduced maximum angles of bank in cruise conditions. Hence, it can be assumed that the highest bank angle which can be tolerated by all aircraft types is in the order of 20 degrees.

7.4 By calculation, the radius of turn of an aircraft flying at 1 400 km/h (750 kt) ground speed, with a bank angle of 20 degrees, is 22.51 NM (41.69 km). For purposes of expediency, this has been reduced to 22.5 NM (41.6 km). Following the same logic for the lower airspace, it is considered that up to FL 200 (6 100 m) the maximum figures to be encountered are a true airspeed of 740 km/h (400 kt), with a tailwind of 370 km/h (200 kt). Keeping the maximum bank angle of 20 degrees, and following the same formula, the turn would be defined along a radius of 14.45 NM (26.76 km). For expediency, this figure may be rounded up to 15 NM (27.8 km).

7.5 Given the above, the most logical break point between the two ground speed conditions is between FL 190 (5 800 m) and FL 200 (6 100 m). In order to encompass the range of turn anticipation algorithms used in current flight management systems (FMS) under all foreseeable conditions, the turn radius at FL 200 and above should be defined as 22.5 NM (41.6 km) and at FL 190 and below as 15 NM (27.8 km).