KINGDOM OF CAMBODIA

STATE SECRETARIAT OF CIVIL AVIATION

CAMBODIAN CIVIL AVIATION REGULATIONS (CCAR)

PART 18:
Air Navigation Services
(Issue: 1, Revision: 0)

SECRETARY OF STATE

Approved by: _____ MAO HAVANNALL

Effective Date: 18 August 2016

The previous Regulation Part 15: Air Navigation Services (issue: 1, Revision: 0) dated 12 January 2015 is hereby repealed.

Part 18 – AIR NAVIGATION SERVICES

List of Approval Revisions

Rev. No.	*Rev. Date*	*Approval Signature*	*Date*

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Part 18 – Air Navigation Service

INTRODUCTION

The State Secretariat of Civil Aviation (SSCA) is under the Law on Civil Aviation of the Kingdom of Cambodia responsible for the promulgation of Cambodian Civil Aviation Regulations (CCAR). Air Navigation of Standards and Safety Department is under The State Secretariat of Civil Aviation. According to Article 17 of Law on Civil Aviation of The Kingdom of Cambodia, this CCAR Part 18 is promulgated to be the mechanism for State Secretariat of Civil Aviation (SSCA) to ensure safety and effectiveness of air navigation services and determines the capacity of personnel and standard of air navigation facilities be used in air traffic service in conformity with the recommendation for application set up under Chicago Convention.

Chapter 18.1 – General

Chapter 18.1 – General

18.1.1 Applicability

18.1.1.1 Part 18 prescribes the requirements applicable to all ANSPs, who are authorized by Cambodian government as a service provider for one or more of the following:

a. Air Traffic Services (ATS) as outlined in Chapter 18.2;
b. Instrument Flight Procedure Design (IFPD) Service/Aeronautical Chart as outlined in Chapter 18.3;
c. Provision of Aeronautical Information Services (AIS) as outlined in Chapter 18.4;
d. Provision of Aeronautical Meteorology Services (MET) as outlined in Chapter 18.5;
e. Provision of SAR Service (SAR) as outlined in Chapter 18.6;
f. Provision of CNS Services (CNS) as outlined in Chapter 18.7

18.1.1.2 SSCA shall approve on ANSP organization and conduct annual surveillance to ensure the continuous safety in air navigation service in Cambodia.

18.1.1.3 Any expenses for SSCA inspector to conduct inspection or surveillance will be borne by ANSP.

18.1.1.4 ANSP including ATS, AIS, SAR, MET, CNS, IFPD and CHART shall establish Operational Procedure Manual, which also describe job description, training program and training record for their technical staffs and maintain it up to date then submit one copy to SSCA for approval and documentation.

18.1.1.5 SSCA shall establish Technical Library which contain all document relate to department activities which address in Appendix 2 of this regulation and make it available to all technical and inspectorate staff.

18.1.1.6 SSCA and ANSP shall have close liaison with each other in developing Air Navigation Services Plan and contingency plan for air navigation services in Cambodia to in line with the international air navigation plan of ICAO and region. ANSP shall keep inform SSCA of all current services and system are being use.

18.1.2 Exemptions

18.1.2.1 Director General for Technical may in writing, exempt an ANSP from compliance with the specified provisions of this regulation.

18.1.2.2 Before deciding to exempt an ANSP from any requirements of this regulation, SSCA will take into account any relevant considerations relating to the safety of air navigation.

18.1.2.3 The validity of any exemption is dependent on the ANSP complying with any condition that Director General for Technical specifies in the exemption as being necessary in the interests of safety of air navigation.

18.1.2.4 The ANSP must comply with a condition specified in the exemption.

18.1.3 Definitions

18.1.3.1 All definition of technical words in this regulation are containing at the beginning of each chapter below.

18.1.3.2 Additional definitions or any definitions that differ from those contained in the ICAO Annexes are as follows:

a. ANSP – An organization that has been duly authorized by the government of Cambodia to provide one or more of the following services on behalf of the government of Cambodia in accordance with these regulations:
   i. ATS;
   ii. IFPD/Chart services;
   iii. Provision of AIS;
   iv. Provision of SAR
   v. Provision of MET;
   vi. Provision of CNS
b. Annex – Reference to any Annex in these regulations shall mean Annexes as established by the International Civil Aviation Organization (ICAO) in accordance with the Convention on International Civil Aviation.
c. Doc 4444 – means the ICAO document titled Procedures for Air Navigation Services —Rules of the Air and ATS.
d. Doc 7030 − means the ICAO document titled Regional Supplementary Procedures as applicable to the SEA ICAO region.

18.1.4 Units of measurement

18.1.4.1 International System of Units (SI Units)

18.1.4.1.1 The SI Units developed and maintained by the General Conference of Weights and Measures (CGPM) shall subject to the provisions of sub-regulation 18.1.4.2, be used as the standard system of units of measurement for all aspects of international civil aviation air and ground operations in Cambodia.

18.1.4.1.2 The prefixes and symbols listed in Table 3-1 of Annex 5 shall be use to form names and symbols of the decimal multiples and sub-multiples of SI Units.

18.1.4.2 Non-SI Units

18.1.4.2.1 The non-SI Units listed in Annex 5, Table 3-2 shall be use either in lieu of, or in addition to, the SI Units as the units of measurement but only as specified in Annex 5, Table 3-4.

18.1.4.2.2 The non-SI Units listed in Annex 5, Table 3-3 shall be permitted for temporary use as alternative units of measurement but only for those specific quantities listed in Annex 5, Table 3-4.

18.1.4.3 The application of units of measurements for certain quantities used in international civil aviation air and ground operations in SSCA shall be in accordance with Annex 5, Table 3-4.

18.1.4.4 Means and provisions for design, procedures and training should be established for operations in environments involving the use of standard and non-SI Units of measurement, or the transition between environments using different units, with due consideration to human performance.

18.1.5 Safety Management System (SMS)

18.1.5.1 The ANSPs, must establish an acceptable SMS that shall be:

a. We established in accordance with the framework elements contained in Appendix 1 of this regulations; and
b. commensurate with the size of the service provider and the complexity of its services.

18.1.5.2 The SMS of an ATS provider established in accordance with sub-regulation 18.1.5.1, shall be subject to the acceptance of Director General for Technical.

18.1.5.3 Need for Safety Assessments

18.1.5.4 A safety assessment shall be 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:

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

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

18.1.5.7 A reorganization of the ATS route structure;

a. re-sector of an airspace;
b. physical changes to the layout of runways and/or taxiways at an aerodrome; and
c. implementation of new communications, surveillance or other safety-significant systems and equipment, including those providing new functionality and/or capabilities.

Note 1. — A reduced separation minimum may refer to the reduction of a horizontal separation minimum, including a minimum based on required navigation performance (RNP), a reduced vertical separation minimum of 300 m (1 000 ft) between FL 290 and FL 410 inclusive (RVSM), the reduction of a separation minimum based on the use of an ATS surveillance system or a wake turbulence separation minimum or reduction of minima between landing and/or departing aircraft.

Note 2. — When, due to the nature of the change, the acceptable level of safety cannot be expressed in quantitative terms, the safety assessments may rely on operational judgement.

18.1.5.7.1 Proposals shall be implemented only when the assessment has shown that an acceptable level of safety will be met.

18.1.5.8 Runway Safety Teams

ANSP shall involve in runway safety activities and active participate with runway safety team that had established and approved by state.

Chapter 18.2 – Air Traffic Services (ATS)

Chapter18.2 – Air Traffic Service (ATS)

18.2.1 Definition

Note 1. — Throughout the text of this document the term "service" is used as an abstract noun to designate functions, or service rendered; the term "unit" is used to designate a collective body performing a service.

Note 2. — The designation (RR) in these definitions indicates a definition which has been extracted from the Radio Regulations of the International Telecommunication Union (ITU) (see Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including statement of approved ICAO policies (*Doc 9718)).*

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 aerodrome); or

c. the aircraft is missing or is completely inaccessible.

   Note 1. — For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified, by ICAO, as a

fatal injury.

Note 2. — An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.

Note 3. — The type of unmanned aircraft system to be investigated is addressed in Annex 13, 5.1.

Note 4. — Guidance for the determination of aircraft damage can be found in Annex 13, Attachment F.

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

Note. — For measured positional data the accuracy is normally expressed in terms of a distance from a stated position within which there is a defined confidence of the true position falling.

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).

Note. — The terms of the agreement will be exchanged between the ground system and the aircraft by means of a contract, or a series of contracts.

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 maneuvering area of an aerodrome and all aircraft flying in the vicinity of an aerodrome.

Note. — An aircraft is in the vicinity of an aerodrome when it is in, entering or leaving an aerodrome traffic circuit.

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 maneuvering 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.

Note 1. — For convenience, the term "air traffic control clearance" is frequently abbreviated to "clearance" when used in appropriate contexts.

Note 2. — The abbreviated term "clearance" may be prefixed by the words "taxi," "take-off," "departure," "en-route," "approach" or "landing" to indicate the particular portion of flight to which the air traffic control clearance relates.

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

a. preventing collisions:
    1. between aircraft, and
    2. on the maneuvering 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 center, 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.

Note. — ATS airspaces are classified as Class A to G as described in 2.6.

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

Note. — An air traffic services reporting office may be established as a separate unit or combined with an existing unit, such as another air traffic services unit, or a unit of the aeronautical information service.

Air traffic services unit. A generic term meaning variously, air traffic control unit, flight information center 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.

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

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

Approach control 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 center. 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.

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

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.

Note 1. — The term "ATS route" is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure route, etc.

Note 2. — An ATS route is defined by route specifications which include an ATS route designator, the track to or from significant points (waypoints), distance between significant points, reporting requirements and, as determined by the appropriate ATS authority, the lowest safe altitude.

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.

Note. — Base turns may be designated as being made either in level flight or while descending, according to the circumstances of each individual procedure.

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.

Note. — The term "controlled aerodrome" indicates that air traffic control service is provided to aerodrome traffic but does not necessarily imply that a control zone exists.

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

Note. — Controlled airspace is a generic term which covers ATS airspace Classes A, B, C, D and E as described in 2.6.

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

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.

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 center. A unit established to provide flight information service and alerting service.

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

Flight 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.

Note. — Specifications for flight plans are contained in Annex 2. When the expression "flight plan form" is used it denotes the model flight plan form at Appendix 2 to the PANS-ATM.

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.

Note.— The types of incidents which are of main interest to the International Civil Aviation Organization for accident prevention studies are listed in Annex 13, Attachment C.

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.

Note.— The specified minima for visual meteorological conditions are contained in Annex 2.

Integrity (aeronautical data). A degree of assurance that an aeronautical data and its value has not been lost nor altered since the data 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.

Maneuvering 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 maneuvering 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 navigate on specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

> *Note 1.— The* Performance-based Navigation (PBN) Manual *(Doc 9613), Volume II contains detailed guidance on navigation specifications.*
>
> *Note 2.— The term RNP, previously defined as "a statement of the navigation performance necessary for operation within a defined airspace," has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613.*

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 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.

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 radio communication primarily intended for the exchange of information in the form of speech.

RCP type. A label (e.g. RCP 240) that represents the values assigned to RCP parameters for communication transaction time, continuity, availability and integrity.

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

Required communication performance (RCP). A statement of the performance requirements for operational communication in support of specific ATM functions.

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

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 center line of a runway can see the runway surface markings or the lights delineating the runway or identifying its center 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 phenomena which 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 maneuvers 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.

Note.— The specified minima are contained in Annex 2.

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.

18.2.2 Establishment of authority

18.2.2.1 The ANSP shall arrange for ATS to be provided in accordance with the provisions of this regulation. These services shall be provided in accordance with the airspace classification established by SSCA and at the aerodromes designated as controlled aerodromes.

18.2.2.2 If applicable, the ANSP shall provide ATS over the high seas or the airspace of undetermined sovereignty in accordance with the provisions of this regulation.

18.2.2.3 The ANSP shall be designated by SSCA for providing such services.

18.2.3 Objectives of the ATS

18.2.3.1 The objectives of the ATS shall be to:

a. prevent collisions between aircraft;
b. prevent collisions between aircraft on the maneuvering area and obstructions on that area; expedite and maintain an orderly flow of air traffic;
c. expedite and maintain an orderly flow of air traffic;
d. provide advice and information useful for the safe and efficient conduct of flights; and
e. notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

18.2.4 ATS organization exposition manual

18.2.4.1 The ANSP shall provide, for compliance by its personnel, an ATS exposition manual or system of manuals for the ATS listed in its exposition manual.

18.2.4.2 The exposition manual shall contain:

a. a description of the provider's organizational structure and the names, qualifications, experience and positions of the key officers of the organization;
b. a statement of the duties and responsibilities of the supervisory positions within the organizational structure;
c. a statement showing how the provider determines the number of operational staff required, including the number of operational supervisory staff;
d. a statement setting out the ATS and related functions, that the provider will perform;
e. the hours of operation of each service;
f. the airspace within which each service is to be provided. This may be by reference to an aeronautical chart;
g. if the service is an ATS for a controlled aerodrome:
    i. a chart of the maneuvering area of the aerodrome showing all runways, taxiways, parking areas, etc.;

ii. extracts from the Airport Emergency Plan (AEP) relevant to the ATS functions;
iii. a copy of the procedures as set out in the aerodrome manual for preventing unauthorized entry of persons or things onto the movement area of the aerodrome; and
iv. a copy of the procedures set out in the aerodrome manual for the control of surface vehicles operating on or in the vicinity of the maneuvering area;

h. a duty statement including the functions, responsibilities and hours of operation, of each operating position.
i. a description of the arrangements made by the applicant to ensure that it has, and will continue to receive, the information necessary for providing each service:
   i. this requirement includes information that is both internally and externally sourced; and
   ii. the description should nominate the information requirement, its use in service provision, its source, and the means of its transfer, receipt and display;
   iii. a description of the arrangements made by the applicant to ensure that it can, and will continue to be able to, provide the information in relation to its ATS to other organizations whose functions reasonably require that information (e.g. other ATS units and center);
j. the requirement for a record keeping system that covers identification, collection, storage, security, maintenance, access and disposal of records necessary for the provision of ATS. The record systems shall provide an accurate chronicle of ATS activities for the purpose of reconstruction of events for air accident and incident investigation or for system safety analysis within the SMS;
k. a copy of any agreement entered into by the provider in relation to the provision of any of the ATS;
l. a copy of the document that sets out the provider's SMS;
m. a description of the procedures to be followed to ensure all operational staff are familiar with any operational changes that have been issued since they last performed operational duties;
n. a description of the provider's training and checking program and provide assurance that any individual performing any functions in ATS is competent to perform that function; and
o. the processes for the preparation, authorization and issue of amendments to its exposition manual.

18.2.4.3 The exposition manual shall be issued under the authority of the ANSP which shall control the distribution of the exposition manual and ensure that it is amended whenever necessary to maintain the accuracy of the information.

18.2.5 ATS procedures and standards

18.2.5.1 The ANSP shall provide ATS in accordance with these regulations, Doc 4444, supplemented by Doc 7030 as applicable.

18.2.5.2 Detailed procedures to be employed by the ATS unit concerned, with any applicable limitations, shall be set out in the unit's manual of ATS.

18.2.5.3 The ANSP shall provide, for compliance by its personnel, the manual of ATS for the services listed in its exposition manual.

18.2.5.4 The ANSP which provides ATS or services from more than one location shall ensure that the manual of ATS is supplemented by directives specific to each location.

18.2.5.5 The manual shall be kept up to date and be forwarded to the SSCA without delay.

18.2.5.6 The manual shall describe the operational procedures of ATS unit(s) which comply with Annex 11 and Doc 4444 and shall include:

a. the information required regarding hours of service, the establishment of an ATS and any transitional arrangements;
b. details of the procedures required regarding the control of documentation;
c. details of the systems and procedures regarding general information requirements that could have an operational impact on the ATS being provided;
d. details of the procedures required regarding the notification of facility status;
e. details of the systems and procedures regarding meteorological information and reporting by ATS personnel;
f. details of the procedures regarding the keeping of logbooks;
g. procedures regarding shift administration;
h. procedures to mitigate the effects of fatigue;
i. procedures required regarding responsibility for control;
j. systems and procedures regarding coordination requirements;
k. the contingency plans as required by these regulations;
l. procedures regarding incidents and accidents;
m. systems and procedures regarding the retention and management of records;
n. procedures regarding disruptions to service;
o. procedures for issuing ATC clearances and obtaining a correct read-back of clearances and safety-related information;
p. systems and procedures regarding the provision of approach control services, where applicable;
q. systems and procedures regarding the provision of aerodrome control service, where applicable;
r. procedures regarding the application of priorities;
s. procedures regarding flow control;
t. procedures regarding the provision of flight information service;
u. details of systems and procedures regarding the provision of aerodrome flight information service;
v. systems and procedures regarding the provision of alerting service;

w. procedures regarding the processing of flight plans;
x. procedures regarding time system and accuracy in the provision of ATS;
y. radiotelephony procedures;
z. procedures regarding the provision of radar services, where applicable;
aa. procedures regarding aircraft emergencies and irregular operation;
bb. procedures for aircraft in the event of in-flight contingencies;
cc. arrangements in place for provision of AIS to the unit;
dd. systems and procedures governing ATIS broadcasts.

18.2.6 Training and assessment

18.2.6.1 An ANSP shall establish training programs and procedures to assess and ensure the initial and continuing competence of operational personnel including continued competence in using new equipment, procedures and updated communications.

18.2.6.2 The programs and procedures in sub-regulation 18.2.6.1 shall ensure that operational personnel are trained, given regular recurrent training in normal and emergency procedures and are assessed on such.

18.2.7 Divisions of the ATS

The ATS shall comprise three services identified as follows:

18.2.7.1 The air traffic control service, to accomplish objectives a), b) and c) of sub-regulation 18.2.3.1. This service being divided in three parts as follows:

a. area control service: the provision of air traffic control service for controlled flights, except for those parts of such flights described in sub-regulation 18.2.7.1 and, in order to accomplish objectives a) and c) of sub-regulation 18.2.3.1;
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) of sub-regulation 18.2.3.1;
c. aerodrome control service: the provision of air traffic control service for aerodrome traffic, except for those parts of flights described in sub-regulation 18.2.7.1, in order to accomplish objectives a), b) and c) of sub-regulation 18.2.3.1.

18.2.7.2 The flight information service, to accomplish objective d) of sub-regulation 18.2.3.1.

18.2.7.3 The alerting service, to accomplish objective e) of sub-regulation 18.2.3.1

18.2.8 Determination of the need for ATS

18.2.8.1 The ANSP may propose changes to the State for the classification of airspace and provision of ATS by consideration of the following factors:

a. the types of air traffic involved;
b. the density of air traffic;

c. the meteorological conditions; and
d. such other factors as may be relevant.

18.2.8.2 The carriage of airborne collision avoidance systems (ACAS) by aircraft in a given area shall not be a factor in determining the need for ATS in that area.

18.2.9 Classification of airspaces

18.2.9.1 ATS airspaces shall be classified and designated in accordance with the following:

a. Class A. IFR flights only are permitted, all flights are provided with air traffic control service and are separated from each other.
b. Class B. IFR and VFR flights are permitted, all flights are provided with air traffic control service and are separated from each other.
c. Class C. IFR and VFR flights are permitted, all flights are provided with air traffic control service and IFR flights are separated from other IFR flights and from VFR flights. VFR flights are separated from IFR flights and receive traffic information in respect of other VFR flights.
d. Class D. IFR and VFR flights are permitted and all flights are provided with air traffic control service, IFR flights are separated from other IFR flights and receive traffic information in respect of VFR flights, VFR flights receive traffic information in respect of all other flights.
e. Class E. IFR and VFR flights are permitted; IFR flights are provided with air traffic control service and are separated from other IFR flights. All flights receive traffic information as far as is practical. Class E shall not be used for control zones.
f. Class F. IFR and VFR flights are permitted, all participating IFR flights receive an air traffic advisory service and all flights receive flight information service if requested.
g. Class G. IFR and VFR flights are permitted and receive flight information service if requested.

18.2.9.2 The Air Navigation Standards and Safety Department, SSCA shall select those airspace classes appropriate to the needs.

18.2.9.3 The requirements for flights within each class of airspace shall be as shown in the table in Annex 11, Appendix 4.

18.2.10 Performance-based navigation (PBN) operations

18.2.10.1 When applicable, the navigation specification(s) for designated areas, tracks or ATS routes shall be prescribed on the basis of regional air navigation agreements. In designating a navigation specification, limitations may apply as a result of navigation infrastructure constraints or specific navigation functionality requirements.

18.2.10.2 The prescribed navigation specification shall be appropriate to the level of communications, navigation and ATS provided in the airspace concerned as prescribed in the ICAO Doc 9613 —Performance Based Navigation Manual.

18.2.11 Required communication performance (RCP)

18.2.11.1 As required, the RCP type(s) shall be prescribed on the basis of regional air navigation agreements.

18.2.11.2 The prescribed RCP type shall be appropriate to the ATS provided in the airspace concerned.

18.2.12 Establishment and designation of the units providing ATS

The ATS shall be provided by units established and designated as follows:

18.2.12.1 Flight information center 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.

18.2.12.2 Air traffic control units shall be established to provide air traffic control service, flight information service and alerting service in accordance with the airspace classification and controlled aerodromes.

18.2.13 Specifications for flight information regions, control areas and control zones

18.2.13.1 Flight information regions shall be delineated to cover the whole of the air route structure to be served by such regions.

18.2.13.2 A flight information region shall include all airspace within its lateral limits, except as limited by an upper flight information region.

18.2.13.3 Where a flight information region is limited by an upper flight information region, the lower limit specified for the upper flight information region shall constitute the upper vertical limit of the flight information region and shall coincide with a VFR cruising level of the tables in Appendix 3 to Annex 2.

18.2.13.4 Control areas including airways and terminal control areas shall be delineated so as to encompass sufficient airspace to contain the flight paths of those IFR flights or portions thereof to which it is desired to provide the applicable parts of the air traffic control service, taking into account the capabilities of the navigation aids normally used in that area.

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

18.2.13.6 An upper limit of a control area shall be established when either:

a. air traffic control service will not be provided above such upper limit; or the control area is situated below an upper control area, in which case the upper limit
b. shall coincide with the lower limit of the upper control area. When established, such upper limit shall coincide with a VFR cruising level of the tables in Appendix 3 to Annex 2.

18.2.13.6.1 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 to be used under instrument

meteorological conditions.

18.2.13.7 The lateral limits of a control zone shall extend to at least 9.3 km (5 NM) from the center of the aerodrome or aerodromes concerned in the directions from which approaches may be made.

18.2.13.8 If 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.

18.2.14 Establishment and identification of ATS routes

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

18.2.14.2 ATS routes shall be identified by designators.

18.2.14.3 Designators for ATS routes other than standard departure and arrival routes shall be selected in accordance with the principles set forth in Annex 11, Appendix 1.

18.2.14.4 Standard departure and arrival routes and associated procedures shall be identified in accordance with the principles set forth in Annex 11, Appendix 3.

18.2.15 Establishment and identification of significant points

18.2.15.1 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 ATS for information regarding the progress of aircraft in flight.

18.2.15.2 Significant points shall be identified by designators.

18.2.15.3 Significant points shall be established and identified in accordance with the principles set forth in Appendix 2 of Annex 11.

18.2.16 Coordination between the operator and ATS

18.2.16.1 TS units, in carrying out their objectives, shall have due regard for the requirements of the operator's 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.

18.2.16.2 When requested by an operator, messages (including position reports) received by ATS 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.

18.2.17 Coordination between military authorities and ATS

18.2.17.1 ATS authorities shall establish and maintain close cooperation with military authorities responsible for activities that may affect flights of civil aircraft.

18.2.17.2 Coordination of activities potentially hazardous to civil aircraft shall be effected in accordance with regulation 18.2.18.

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

18.2.17.4 ATS 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, ATS authorities shall designate any areas or routes where the requirements of Annex 2 concerning flight plans, two-way communications and position reporting apply to all flights to ensure that all pertinent data is available in appropriate ATS units specifically for the purpose of facilitating identification of civil aircraft.

18.2.17.5 Special procedures shall be established in order to ensure that:

a. ATS 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; and
b. 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.

18.2.18 Coordination of activities potentially hazardous to civil aircraft

18.2.18.1 The arrangements for activities potentially hazardous to civil aircraft shall be coordinated with the SSCA. The coordination shall be effected early enough to permit timely promulgation of information regarding the activities in accordance with the provisions of Annex 18.

18.2.18.2 The objective of the coordination shall be to achieve the best arrangements which will avoid hazards to civil aircraft and minimize interference with the normal operations of such aircraft.

18.2.18.3 The appropriate ATS authorities shall be responsible for initiating the promulgation of information regarding the activities.

18.2.18.4 The ANSP shall develop procedures to implement steps taken by SSCA to prevent emission of laser beams from adversely affecting flight operations.

18.2.19 Aeronautical data

18.2.19.1 Determination and reporting of ATS related aeronautical data shall be in accordance with the accuracy and integrity requirements set forth in Tables 1 to 5 contained in Appendix 5 to Annex 11 while taking into account the established quality system procedures. Accuracy requirements for aeronautical data are based upon a 95 per cent confidence level, and in that respect, three types of positional data shall be identified: surveyed points, calculated points (mathematical calculations from the known surveyed points of points in space/fixes) and declared points.

18.2.19.2 The ANSP shall ensure that integrity of aeronautical data is maintained throughout the data process from survey/origin to the next intended user. Based on the applicable integrity classification, the validation and verification procedures shall:

a. for routine data: avoid corruption throughout the processing of the data;
b. for essential data: assure corruption does not occur at any stage of the entire process and may include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and
c. for critical data: assure corruption does not occur at any stage of the entire process and include additional integrity assurance procedures to fully mitigate the effects of faults identified by thorough analysis of the overall system architecture as potential data integrity risks.

18.2.19.3 Protection of electronic aeronautical data while stored or in transit shall be totally monitored by the cyclic redundancy check (CRC). To achieve protection of the integrity level of critical and essential aeronautical data as classified in sub-regulation 18.2.19.2, a 32- or 24-bit CRC algorithm shall apply respectively.

18.2.19.4 Geographical coordinates indicating latitude and longitude shall be determined and reported to the AIS authority in terms of the World Geodetic System — 1984 (WGS-84) geodetic reference datum, identifying those geographical coordinates which have been transformed into WGS-84 coordinates by mathematical means and whose accuracy of original field work does not meet the requirements in Appendix 5, Table 1 of Annex 11.

18.2.19.5 The order of accuracy of the field work and determinations and calculations derived therefrom shall be such that the resulting operational navigation data for the phases of flight will be within the maximum deviations, with respect to an appropriate reference frame, as indicated in the tables contained in Appendix 5 of Annex 11.

18.2.20 Coordination between meteorological and ATS authorities

18.2.20.1 To ensure that aircraft receive the most up-to-date meteorological information for aircraft operations, arrangements shall be made, where necessary, between meteorological and ATS authorities for ATS personnel:

a. in addition to using indicating instruments, to report, if observed by ATS 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 ATS 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 center and flight information center shall report the information to the associated meteorological watch office and volcanic ash advisory center (VAACs).

18.2.20.2 Close coordination shall be maintained between area control center, flight information center and associated meteorological watch offices to ensure that

information on volcanic ash included in NOTAM and SIGMET messages is consistent.

18.2.21 Coordination between AIS and ATS authorities

18.2.21.1 To ensure that AIS units obtain information to enable them to provide up-to-date preflight information and to meet the need for in-flight information, arrangements shall be made between AIS and ATS authorities responsible for ATS to report to the responsible AIS 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 ATS personnel or reported by aircraft; and
d. any other information considered to be of operational significance.

18.2.21.2 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.

18.2.21.3 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 ATS when submitting the raw information/data to AIS.

18.2.21.4 The ATS responsible for the provision of raw aeronautical information/data to the AIS shall do so while taking into account accuracy and integrity requirements for aeronautical data as specified in Appendix 5 to Annex 11.

18.2.22 Minimum flight altitudes

Minimum flight altitudes shall be determined and promulgated by the ANSP for each ATS route and control area over its territory. The minimum flight altitudes determined shall provide a minimum clearance above the controlling obstacle located within the areas concerned.

18.2.23 Service to aircraft in the event of an emergency

ANSPs shall establish and implement the procedures to provide service to aircraft in the event of emergency

18.2.23.1 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.

18.2.23.2 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.

18.2.23.3 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 SSCA and exchange necessary information with the operator or its designated representative.

18.2.24 In-flight contingencies

18.2.24.1 As soon as an ATS unit becomes aware of a strayed aircraft it shall take all necessary steps as outlined in sub-regulations 18.2.24.2 and 18.2.24.3 to assist the aircraft and to safeguard its flight.

18.2.24.2 If the aircraft's position is not known, the ATS 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 sub-regulation 18.2.24.2 c) and d) and from other aircraft in flight every assistance in establishing communication with the aircraft and determining its position.

18.2.24.3 When the aircraft's position is established, the ATS 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.

18.2.24.4 As soon as an ATS unit becomes aware of an unidentified aircraft in its area, it shall endeavor to establish the identity of the aircraft whenever this is necessary for the provision of ATS or required by the appropriate military authorities in accordance with locally agreed procedures. To this end, the ATS 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 ATS units within the flight information region about the flight and request their assistance in establishing two-way communication with the aircraft;
c. inquire of ATS 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.

18.2.24.5 The ATS unit shall, as necessary, inform the appropriate military unit as soon as the identity of the aircraft has been established.

18.2.24.6 Should the ATS unit consider that a strayed or unidentified aircraft may be the subject of unlawful interference, the SSCA shall immediately be informed, in accordance with locally agreed procedures.

18.2.25 Interception of civil aircraft

18.2.25.1 As soon as an ATS 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.

18.2.25.2 As soon as an ATS 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 sub-regulation 18.2.25.1;
b. relay messages between the intercepted aircraft and the appropriate ATS unit, the intercept control unit or the intercepting aircraft.

18.2.26 Time in ATS

18.2.26.1 ATS 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.

18.2.26.2 ATS units shall be equipped with clocks indicating the time in hours, minutes and seconds, clearly visible from each operating position in the unit concerned.

18.2.26.3 ATS 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 ATS unit, clocks and other time-recording devices shall be checked as necessary to ensure correct time to within 1 second of UTC.

18.2.26.4 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.

18.2.26.5 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. ATS units shall, in addition, provide aircraft with the correct time on request. Time checks shall be given to the nearest half minute.

18.2.26.6 Any significant safety-related change to the ATS system, including the implementation of a reduced separation minimum or a new procedure, shall only be effected after a safety assessment has demonstrated that an acceptable level of safety will be met and users have been consulted. When appropriate, the ANSP shall ensure that adequate provision is made for post-implementation monitoring to verify that the defined level of safety continues to be met.

18.2.27 Common reference systems

18.2.27.1 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.

18.2.27.2 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.

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

18.2.28 Language proficiency

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

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

18.2.29 Contingency arrangements

ATS authorities shall develop and promulgate contingency plans for implementation in the event of disruption, or potential disruption, of ATS and related supporting services in the airspace for which they are responsible for the provision of such services. Such contingency plans shall be developed in close coordination with the ATS authorities responsible for the provision of services in adjacent portions of airspace and with airspace users concerned.

18.2.30 *Provisions of Air Traffic Control Service*

18.2.30.1 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; and

d. to all aerodrome traffic at controlled aerodromes.

18.2.30.2 The parts of air traffic control service described in 18.2.7.1 shall be provided by the various units as follows:

a. area control service:
   i. by an area control center; or
   ii. 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 center is established;
b. approach control service:
   i. by an aerodrome control tower or area control center 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;
   ii. by an approach control unit when it is necessary or desirable to establish a separate unit; and
c. aerodrome control service: by an aerodrome control tower.

18.2.31 Operation of air traffic control service

18.2.31.1 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:
   i. whenever an aircraft might otherwise conflict with traffic operated under the
   ii. control of such other units; and before transferring control of an aircraft to such other units.

18.2.31.2 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.

18.2.31.3 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.

18.2.31.4 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:
   i. the appropriate table of cruising levels in Appendix 3 of Annex 2, or
   ii. a modified table of cruising levels, when so prescribed in accordance with Appendix 3 of Annex 2 for flight above FL 410, except that the correlation of levels to track as prescribed therein shall not apply whenever otherwise indicated in appropriate AIPs or air traffic control clearances;
b. horizontal separation, obtained by providing:
   I. longitudinal separation, by maintaining an interval between aircraft operating along the same, converging or reciprocal tracks, expressed in time or distance; or
   II. lateral separation, by maintaining aircraft on different routes or in different
c. geographical areas; and 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.

18.2.31.5 For all airspace where a reduced vertical separation minimum of 300 m (1000 ft.) is applied between FL 290 and FL 410 inclusive, a program 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 implementation and continued application of this vertical separation minimum meets the safety objectives. The coverage of the height-monitoring facilities provided under this program shall be adequate to permit monitoring of the relevant aircraft types of all operators that operate in RVSM airspace.

18.2.31.6 Arrangements shall be put in place, through interregional agreement, for the sharing between regions of data from monitoring programs.

18.2.32 Separation minima

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

a. the separation minima shall be selected from those prescribed by the provisions of the PANS-ATM 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:

i. following consultation with operators, for routes or portions of routes contained within the sovereign airspace of [State];
ii. regional air navigation agreements for routes or portions of routes contained within airspace over the high seas or over areas of undetermined sovereignty;

b. the selection of separation minima shall be made in consultation between the appropriate ATS authorities responsible for the provision of ATS in neighboring airspace when:

i. traffic will pass from one into the other of the neighboring airspaces;
ii. routes are closer to the common boundary of the neighboring airspaces than the separation minima applicable in the circumstances.

18.2.32.2 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 AIPs, where separation is based on the use by aircraft of specified navigation aids or specified navigation techniques.

18.2.33 ***Responsibility for control***

18.2.33.1 A controlled flight shall be under the control of only one air traffic control unit at any given time.

18.2.33.2 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.

18.2.34 Transfer of responsibility for control

The responsibility for the control of an aircraft shall be transferred from one air traffic control unit to another as follows:

18.2.34.1 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 center having control of the aircraft or at such other point or time as has been agreed between the two units.

18.2.34.2 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.

18.2.34.3 Between a unit providing approach control service and an aerodrome control tower:

18.2.34.3.1 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:
    i. it is considered that approach and landing will be completed in visual reference to the ground, or
    ii. 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.

18.2.34.3.1.1 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:
    i. prior to the time the aircraft leaves the vicinity of the aerodrome, or
    ii. prior to the aircraft entering instrument meteorological conditions, or
    iii. 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:
    i. immediately after the aircraft is airborne, or
    ii. at a prescribed point or level, as specified in letters of agreement or ATS unit instructions.

18.2.34.4 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.

18.2.34.5 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, which shall be obtained in accordance with sub-regulations 18.2.34.6, 18.2.34.7, 18.2.34.8 and 18.2.34.9.

18.2.34.6 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.

18.2.34.7 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.

18.2.34.8 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.

18.2.34.9 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 sub- sequent portion of the flight, which it requires the aircraft to have at the time of transfer.

18.2.34.10 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.

18.2.34.11 Applicable coordination procedures, including transfer of control points, shall be specified in letters of agreement and ATS unit instructions as appropriate.

18.2.35 Control of persons and vehicles at aerodromes

18.2.35.1 The movement of persons or vehicles including towed aircraft on the maneuvering 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.

18.2.35.2 In conditions where low visibility procedures are in operation:

a. persons and vehicles operating on the maneuvering 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 sub-regulation 18.2.44.3, the minimum separation between vehicles and taxiing aircraft shall be as prescribed by the appropriate ATS authority taking into account the aids available; and
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.

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

18.2.36 Flight information service – application

18.2.36.1 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 ATS units.

18.2.36.2 Where ATS 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.

18.2.37 Scope of flight information service

18.2.37.1 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
g. of any other information likely to affect safety.

18.2.37.2 Flight information service provided to flights shall include, in addition to that outlined in sub-regulation 18.2.37.1, 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.

18.2.37.3 Flight information service provided to VFR flights shall include, in addition to that outlined in sub-regulation 18.2.37.1, 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.

18.2.38 Operational flight information service broadcasts

18.2.38.1 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.

18.2.38.2 When requested by the pilot, the applicable Operational Flight Information Service message(s) shall be transmitted by the appropriate ATS unit.

18.2.39 Voice ATIS Broadcasts

18.2.39.1 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.

18.2.39.2 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.

18.2.39.3 Voice-ATIS broadcasts shall not be transmitted on the voice channel of an ILS.

18.2.39.4 Whenever Voice-ATIS is provided, the broadcast shall be continuous and repetitive.

18.2.39.5 The information contained in the current broad- cast 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).

18.2.39.6 Voice-ATIS broadcasts provided at designated aerodromes for use by international air services shall be available in the English language as a minimum.

18.2.39.7 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.

18.2.39.8 Where real-time meteorological information is included but the data remains within the parameters of the significant change criteria as specified in 2.3.2 of Appendix 3 to Annex 3, the content, for the purpose of maintaining the same designator, shall be considered identical.

18.2.39.9 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.

18.2.39.10 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 ATS;

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.

18.2.39.11 When rapidly changing meteorological conditions make it inadvisable to include a weather report in the ATIS, the ATIS messages shall indicate that the relevant weather information will be given on initial contact with the appropriate ATS unit.

18.2.39.12 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 sub-regulation 18.2.39.10, f).

18.2.39.13 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.

18.2.39.14 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 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; *
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 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.

***These elements are replaced by the term "CAVOK", whenever the conditions as specified in the PANS-ATM (Doc 4444), Chapter 11 prevail.**

As determined on the basis of regional air navigation agreements.

18.2.39.15 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 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; **
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 approach area including wind shear, and information on recent weather of operational significance;
t. trend forecast, when available; and

u. specific ATIS instructions.

***These elements are replaced by the term "CAVOK", whenever the conditions as specified in the PANS-ATM (Doc 4444), Chapter 11 prevail.**

As determined on the basis of regional air navigation agreements.

18.2.39.16 ATIS messages containing departure information only shall contain the following elements of information in the order listed:

a. name of aerodrome;
b. departure indicator;
c. contract type, if communication is via D-ATIS;
d. designator;
e. time of observation, if appropriate;
f. runway(s) to be used for take-off; status of arresting system constituting a potential hazard, if any;
g. significant surface conditions of runway(s) to be used for take-off and, if appropriate, braking action;
h. departure delay, if appropriate;
i. transition level, if applicable;
j. other essential operational information;
k. surface wind direction 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;
l. visibility and, when applicable, RVR; *
m. present weather; *
n. 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; *
o. air temperature;
p. dew point temperature; *
q. altimeter setting(s);
r. any available information on significant meteorological phenomena in the climb-out area including wind shear;
s. trend forecast, when available; and
t. specific ATIS instructions.

***These elements are replaced by the term "CAVOK", whenever the conditions as specified in the PANS-ATM (Doc 4444), Chapter 11 prevail.**

18.2.40 Alerting services

18.2.40.1 Alerting service shall be provided:

a. for all aircraft provided with air traffic control service;
b. in so far as practicable, to all other aircraft having filed a flight plan or otherwise known to the ATS; and

18.2.40.2 Flight information center or area control center 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 center.

18.2.40.3 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 center or area control center responsible which shall in turn notify the rescue coordination center, except that notification of the area control center, flight information center, or rescue coordination center shall not be required when the nature of the emergency is such that the notification would be superfluous.

18.2.40.4 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.

18.2.40.5 Without prejudice to any other circumstances that may render such notification advisable, ATS units shall, except as prescribed in 18.2.40.10, notify rescue coordination center immediately an aircraft is considered to be in a state of emergency in accordance with the following:

a. Uncertainty phase 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 when

    *As determined on the basis of regional air navigation agreements

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

b. Alert phase 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 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.

18.2.40.6 The notification 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.

18.2.40.7 Further to the notification in sub-regulation 18.2.40.5, the rescue coordination center 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.

18.2.40.8 ATS units shall, as necessary, use all available communication facilities to endeavor to establish and maintain communication with an aircraft in a state of emergency, and to request news of the aircraft.

18.2.40.9 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.

18.2.40.10 When an area control or a flight information center 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 center.

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

18.2.40.12 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 sub-regulation 18.2.40.13, be informed of the nature of the emergency as soon as practicable.

18.2.40.13 When an ATS 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.

18.2.41 ATS requirements for communications

18.2.41.1 Radiotelephony and/or data link shall be used in air-ground communications for ATS purposes.

18.2.41.2 ATS units shall, in addition to the requirements specified in 18.2.41.1 be provided with communication equipment which will enable them to provide ATS in accordance with the RCP type(s) prescribed by SSCA and promulgated in the ICAO Regional Air Navigation.

18.2.41.3 When direct pilot-controller two-way radio- telephony or data link communications are used for the provision of air traffic control service, recording facilities shall be provided on all such air-ground communication channels.

18.2.41.4 Recordings of communications channels as required in paragraph 18.2.41.3 shall be retained for a period of at least thirty days.

18.2.41.5 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.

18.2.41.6 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).

18.2.41.7 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.

18.2.41.8 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.

18.2.41.9 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.

18.2.41.10 Direct-speech and/or data link communications shall be used in ground-ground communications for ATS purposes.

18.2.41.11 ATS units shall, in addition to the requirements specified in 18.2.41.10, be provided with communication equipment which will enable them to provide ATS in accordance with the RCP type(s) prescribed by SSCA and promulgated in the ICAO Regional Air Navigation.

18.2.41.12 A flight information center shall have facilities for communications with the following units providing a service within its area of responsibility:

a. the area control center, unless collocated;
b. approach control units;
c. aerodrome control towers.

18.2.41.13 An area control center, in addition to being connected to the flight information center as prescribed in sub-regulation 18.2.41.12, 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; and
c. ATS reporting offices, when separately established.

18.2.41.14 An approach control unit, in addition to being connected to the flight information center and the area control center as prescribed in sub-regulations 18.2.41.12 and 18.2.41.13, shall have facilities for communications with the associated aerodrome control tower(s) and, when separately established, the associated ATS reporting office(s).

18.2.41.15 An aerodrome control tower, in addition to being connected to the flight information center, the area control center and the approach control unit as prescribed in sub-regulations 18.2.41.12, 18.2.41.13 and 18.2.41.14 shall have facilities for communications with the associated ATS reporting office, when separately established.

18.2.41.16 A flight information center and an area control center 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 center;
c. the ATE station serving the center;
d. appropriate operator's offices;
e. the rescue coordination center or, in the absence of such center, any other appropriate emergency service;
f. the international NOTAM office serving the center.

18.2.41.17 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 ATE station serving the unit concerned;
e. the unit providing apron management service, when separately established.

18.2.41.18 The communication facilities required under sub-regulations 18.2.41.16, a) and 18.2.41.17, a) shall include provisions for rapid and reliable communications between the ATS unit concerned and the military unit(s) responsible for control of interception operations within the area of responsibility of the ATS unit.

18.2.41.19 The communication facilities required under sub-regulations 18.2.41.12, 18.2.41.13, 18.2.41.15, 18.2.41.16 a) and 18.2.41.17 a), b) and c) shall include provisions for:

a. 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.

18.2.41.20 In all cases where automatic transfer of data to and/or from ATS computers is required, suitable facilities for automatic recording shall be provided.

18.2.41.21 The communication facilities required under 18.2.41.17 a), b) and c) shall include provisions for communications by direct speech arranged for conference communications.

18.2.41.22 All facilities for direct-speech or data link communications between ATS units and between ATS units and other units described under sub-regulations 18.2.41.16 and 18.2.41.17 shall be provided with automatic recording.

18.2.41.23 Recordings of data and communications as required in sub-regulations 18.2.41.20 and 18.2.41.22 shall be retained for a period of at least thirty days.

18.2.41.24 Flight information center and area control center shall have facilities for communications with all adjacent flight information center and area control center.

18.2.41.25 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.

18.2.41.26 Unless otherwise prescribed on the basis of regional air navigation agreements, facilities for communications between area control center 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.

18.2.41.27 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 center or area control center other than those mentioned in sub-regulation 18.2.41.26 shall include provisions for direct speech alone, or in combination with datalink communications. The communication facilities shall be provided with automatic recording.

18.2.41.28 In all cases where automatic exchange of data between ATS computers is required, suitable facilities for automatic recording shall be provided.

18.2.41.29 Recordings of data and communications as required in 18.2.41.28 shall be retained for a period of at least thirty days.

18.2.41.30 Two-way radiotelephony communication facilities shall be provided for aerodrome control service for the control of vehicles on the maneuvering area, except where communication by a system of visual signals is deemed to be adequate.

18.2.41.31 Where conditions warrant, separate communication channels shall be provided for the control of vehicles on the maneuvering area. Automatic recording facilities shall be provided on all such channels.

18.2.41.32 Recordings of communications as required in 18.2.41.31 shall be retained for a period of at least thirty days.

18.2.41.33 Surveillance data from primary and secondary radar equipment or other systems (e.g. ADS-B, ADS-C), used as an aid to ATS, shall be automatically recorded for use in accident and incident investigations, search and rescue, air traffic control and surveillance systems evaluation and training.

18.2.41.34 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.

18.2.42 ATS requirements for information

18.2.42.1 ATS 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 ATS personnel and with a frequency which satisfies the requirements of the ATS units concerned.

18.2.42.2 Flight information center and area control center shall be supplied with meteorological information as described in Annex 3, Appendix 9, 1.3, 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.

18.2.42.3 Flight information center and area control center shall be provided, at suitable intervals, with current pressure data for setting altimeters, for locations specified by the flight information center or area control center concerned.

18.2.42.4 Units providing approach control service shall be supplied with meteorological information as described in Annex 3, Appendix 9, 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.

18.2.42.5 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.

18.2.42.6 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.

18.2.42.7 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.

18.2.42.8 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.

18.2.42.9 Aerodrome control towers shall be supplied with meteorological information as described in Annex 3, Appendix 9, 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.

18.2.42.10 Aerodrome control towers shall be provided with current pressure data for setting altimeters for the aerodrome concerned.

18.2.42.11 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 sensor(s) 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.

18.2.42.12 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.

18.2.42.13 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.

18.2.42.14 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 center or the area control center.

18.2.42.15 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.

18.2.42.16 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.

18.2.42.17 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.

18.2.42.18 Area control center and flight information center shall be provided with volcanic ash advisory information issued by the associated volcanic ash advisory center (VAAC).

18.2.42.19 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.

Chapter 18.3 – Instrument Flight Procedure Design (IFPD) Service/ Aeronautical Chart

Chapter18.3 – Instrument Flight Procedure Design (IFPD) Service/Aeronautical Charts

18.3.1 Definition

When the following terms are used in the Standards and Recommended Practices for aeronautical charts, they have the following meanings:

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

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

Aerodrome operating minima. The limits of usability of an aerodrome for:

a. take-off, expressed in terms of runway visual range and/or visibility and, if necessary, cloud conditions;

b. landing in precision approach and landing operations, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appropriate to the category of the operation;

c. Landing in approach and landing operations with vertical guidance, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H); and

d. landing in non-precision approach and landing operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions.

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

Aeronautical chart. A representation of a portion of the Earth, its culture and relief, specifically designated to meet the requirements of air navigation.

Aircraft stand. A designated area on an apron intended to be used for parking an aircraft.

Air defense identification zone. Special designated airspace of defined dimensions within which aircraft are required to comply with special identification and/or reporting procedures additional to those related to the provision of air traffic services (ATS).

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 transit route. A defined route for the air transiting of helicopters.

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

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

Application. Manipulation and processing of data in support of user requirements (ISO 19104*).

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.

Area minimum altitude (AMA). The minimum altitude to be used under instrument meteorological conditions (IMC), that provides a minimum obstacle clearance within a specified area, normally formed by parallels and meridians.

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.

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

Arrival routes. Routes identified in an instrument approach procedure by which aircraft may proceed from the en-route phase of flight to an initial approach fix.

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

Note 1. — The term ATS route is used to mean variously, airway, advisory route, controlled or uncontrolled route, arrival or departure route, etc.

Note 2. — An ATS route is defined by route specifications that include an ATS route designator, the track to or from significant points (waypoints), distance between significant points, reporting requirements and, as determined by the appropriate ATS authority, the lowest safe altitude.

ATS surveillance system. A generic term meaning variously, ADS-B, PSR, SSR or any comparable ground-based system that enables the identification of aircraft.

Note. — A comparable ground-based system is one that has been demonstrated, by comparative assessment or other methodology, to have a level of safety and performance equal to or better than monopulse SSR.

Bare Earth. Surface of the Earth including bodies of water and permanent ice and snow, and excluding vegetation and man-made objects.

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

Canopy. Bare Earth supplemented by vegetation height.

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.

Clearway. A defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an aero plane may make a portion of its initial climb to a specified height.

Contour line. A line on a map or chart connecting points of equal elevation.

Culture. All man-made features constructed on the surface of the Earth, such as cities, railways and canals.

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

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

Data product specification. Detailed description of a data set or data set series together with additional information that will enable it to be created, supplied to and used by another party (ISO 19131*).

Note. — A data product specification provides a description of the universe of discourse and a specification for mapping the universe of discourse to a data set. It may be used for production, sales, end-use or other purpose.

Data quality. A degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution and integrity.

Data set. Identifiable collection of data (ISO 19101*).

Data set series. Collection of data sets sharing the same product specification (ISO 19115*).

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

Digital Elevation Model (DEM). The representation of terrain surface by continuous elevation values at all intersections of a defined grid, referenced to common datum.

Note. — Digital Terrain Model (DTM) is sometimes referred to as DEM.

Displaced threshold. A threshold not located at the extremity of a runway.

Electronic aeronautical chart display. An electronic device by which flight crews are enabled to execute, in a convenient and timely manner, route planning, route monitoring and navigation by displaying required information.

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

Ellipsoid height (Geodetic height). The height related to the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question.

Feature. Abstraction of real world phenomena (ISO 19101*).

Feature attribute. Characteristic of a feature (ISO 19101*).

Note. — A feature attribute has a name, a data type and a value domain associated with it.

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:

i. a landing can be made; or

ii. a missed approach procedure is initiated.

Final approach and take-off area (FATO). A defined area over which the final phase of the approach maneuver to hover or landing is completed and from which the take-off maneuver is commenced. Where the FATO is to be used by performance Class 1 helicopters, the defined area includes the rejected take-off area available.

Final approach fix or point. That fix or point of an instrument approach procedure where the final approach segment commences.

Final approach segment. That segment of an instrument approach procedure in which alignment and descent for landing are accomplished.

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

Flight level. A surface of constant atmospheric pressure which is related to a specific pressure datum, 1 013.2 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.

Geodesic distance. The shortest distance between any two points on a mathematically defined ellipsoidal surface.

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.

Geoid. The equipotential surface in the gravity field of the Earth which coincides with the undisturbed mean sea level (MSL) extended continuously through the continents.

Note. — The geoid is irregular in shape because of local gravitational disturbances (wind tides, salinity, current, etc.) and the direction of gravity is perpendicular to the geoid at every point.

Geoid undulation. The distance of the geoid above (positive) or below (negative) the mathematical reference ellipsoid.

Note. — In respect to the World Geodetic System — 1984 (WGS-84) defined ellipsoid, the difference between the WGS-84 ellipsoidal height and orthometric height represents WGS-84 geoid undulation.

Glide path. A descent profile determined for vertical guidance during a final approach.

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.

Helicopter stand. An aircraft stand which provides for parking a helicopter and where ground taxi operations are completed or where the helicopter touches down and lifts off for air taxi operations.

Heliport. An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

Heliport reference point (HRP). The designated location of a heliport or a landing location.

Holding procedure. A predetermined maneuver which keeps an aircraft within a specified airspace while awaiting further clearance.

Hot spot. A location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots/drivers is necessary.

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.

Hypsometric tints. A succession of shades or color gradations used to depict ranges of elevation.

Initial approach segment. That segment of an instrument approach procedure between the initial approach fix and the intermediate approach fix or, where applicable, the final approach fix or point.

Instrument approach procedure. A series of predetermined maneuvers by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing

is not completed, to a position at which holding or en-route obstacle clearance criteria apply.

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.

Intermediate approach segment. That segment of an instrument approach procedure between either the intermediate approach fix and the final approach fix or point, or between the end of a reversal, racetrack or dead reckoning track procedure and the final approach fix or point, as appropriate.

Intermediate holding position. A designated position intended for traffic control at which taxiing aircraft and vehicles shall stop and hold until further cleared to proceed, when so instructed by the aerodrome control tower.

Isogonal. A line on a map or chart on which all points have the same magnetic variation for a specified epoch.

Isogriv. A line on a map or chart which joins points of equal angular difference between the North of the navigation grid and Magnetic North.

Landing area. That part of a movement area intended for the landing or take-off of aircraft.

Landing direction indicator. A device to indicate visually the direction currently designated for landing and for take-off.

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

Logon address. A specified code used for data link logon to an ATS unit.

Magnetic variation. The angular difference between True North and Magnetic North.

Note. — The value given indicates whether the angular difference is East or West of True North.

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

Marking. A symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information.

Metadata. Data about data (ISO 19115*).

Note. — Data that describes and documents data.

Minimum en-route altitude (MEA). The altitude for an en-route segment that provides adequate reception of relevant navigation facilities and ATS communications, complies with the airspace structure and provides the required obstacle clearance.

Minimum obstacle clearance altitude (MOCA). The minimum altitude for a defined segment of flight that provides the required obstacle clearance.

Minimum sector altitude (MSA). The lowest altitude which may be used which will provide a minimum clearance of 300 m (1 000 ft) above all objects located in an area contained within a sector of a circle of 46 km (25 NM) radius centered on a significant point, the aerodrome reference point (ARP) or the heliport reference point (HRP).

Missed approach point (MAPt). That point in an instrument approach procedure at or before which the prescribed missed approach procedure must be initiated in order to ensure that the minimum obstacle clearance is not infringed.

Missed approach procedure. The procedure to be followed if the approach cannot be continued.

Movement area. That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the maneuvering 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.

> *Note 1. — The* Performance-based Navigation (PBN) Manual *(Doc 9613), Volume II, contains detailed guidance on navigation specifications.*
>
> *Note 2. — The term RNP, previously defined as "a statement of the navigation performance necessary for operation within a defined airspace", has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613.*

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.

Note. — The term obstacle is used in this Annex solely for the purpose of specifying the charting of objects that are considered a potential hazard to the safe passage of aircraft in the type of operation for which the individual chart series is designed.

Obstacle clearance altitude (OCA) or obstacle clearance height (OCH). The lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria.

Note 1. — Obstacle clearance altitude is referenced to mean sea level and obstacle clearance height is referenced to the threshold elevation or in the case of non-precision approaches to the aerodrome elevation or the threshold elevation if that is more than 2 m (7 ft) below the aerodrome elevation. An obstacle clearance height for a circling approach is referenced to the aerodrome elevation.

Note 2. — For convenience when both expressions are used they may be written in the form "obstacle clearance altitude/height" and abbreviated "OCA/H".

Note 3. — See Procedures for Air Navigation Services — Aircraft Operations *(Doc 8168), Volume I, Part I, Section 4, Chapter 1, 1.5, and Volume II, Part I, Section 4, Chapter 5, 5.4, for specific applications of this definition.*

Obstacle free zone (OFZ). The airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than a low-mass and frangible mounted one required for air navigation purposes.

Orthometric height. Height of a point related to the geoid, generally presented as an MSL elevation.

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.

Point light. A luminous signal appearing without perceptible length.

Portrayal. Presentation of information to humans (ISO 19117*).

Position (geographical). Set of coordinates (latitude and longitude) referenced to the mathematical reference ellipsoid which define the position of a point on the surface of the Earth.

Precision approach procedure. An instrument approach procedure utilizing azimuth and glide path information provided by ILS or PAR.

Procedure altitude/height. A specified altitude/height flown operationally at or above the minimum altitude/height and established to accommodate a stabilized descent at a prescribed descent gradient/angle in the intermediate/final approach segment.

Procedure turn. A maneuver in which a turn is made away from a designated track followed by a turn in the opposite direction to permit the aircraft to intercept and proceed along the reciprocal of the designated track.

Note 1. — Procedure turns are designated "left" or "right" according to the direction of the initial turn.

Note 2. — Procedure turns may be designated as being made either in level flight or while descending, according to the circumstances of each individual procedure.

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.

Relief. The inequalities in elevation of the surface of the Earth represented on aeronautical charts by contours, hypsometric tints, shading or spot elevations.

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

Note. — There are three categories of reporting 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. A reporting point can be indicated as "on request" or as "compulsory".

Resolution. A number of units or digits to which a measured or calculated value is expressed and used.

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.

Reversal procedure. A procedure designed to enable aircraft to reverse direction during the initial approach segment of an instrument approach procedure. The sequence may include procedure turns or base turns.

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

Runway-holding position. A designated position intended to protect a runway, an obstacle limitation surface, or an ILS/MLS critical/sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorized by the aerodrome control tower.

Note. — In radiotelephony phraseologies, the expression "holding point" is used to designate the runway-holding position.

Runway strip. A defined area including the runway and stop way, if provided, intended:

a. to reduce the risk of damage to aircraft running off a runway; and

b. to protect aircraft flying over it during take-off or landing operations.

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

Shoulder. An area adjacent to the edge of a pavement so prepared as to provide a transition between the pavement and the adjacent surface.

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.

Stop way. A defined rectangular area on the ground at the end of take-off run available prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take-off.

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

Taxi-route. A defined path established for the movement of helicopters from one part of a heliport to another. A taxi-route includes a helicopter air or ground taxiway which is centered on the taxi-route.

Taxiway. A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including:

a. *Aircraft stand taxi plane.* A portion of an apron designated as a taxiway and intended to provide access to aircraft stands only.
b. *Apron taxiway.* A portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron.
c. *Rapid exit taxiway.* A taxiway connected to a runway at an acute angle and designed to allow landing aero planes to turn off at higher speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times.

Terminal arrival altitude (TAA). The lowest altitude that will provide a

minimum clearance of 300 m (1 000 ft) above all objects located in an arc of a circle defined by a 46 km (25 NM) radius centered on the initial approach fix (IAF), or where there is no IAF on the intermediate approach fix (IF), delimited by straight lines joining the extremity of the arc to the IF. The combined TAAs associated with an approach procedure shall account for an area of 360 degrees around the IF.

Terrain. The surface of the Earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles.

Note. — In practical terms, depending on the method of data collection, terrain represents the continuous surface that exists at the bare Earth, the top of the canopy or something in-between, also known as "first reflective surface".

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

Touchdown and lift-off area (TLOF). A load bearing area on which a helicopter may touch down or lift off.

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

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).

Transition altitude. The altitude at or below which the vertical position of an aircraft is controlled by reference to altitudes.

Vectoring. Provision of navigational guidance to aircraft in the form of specific headings, based on the use of an ATS surveillance system.

Visual approach procedure. A series of predetermined maneuvers by visual reference, from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, a go-around procedure can be carried out.

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.

18.3.2 General

18.3.2.1 This Chapter prescribes the requirements for the design, continuous maintenance and periodic review of instrument flight procedures (IFP).

18.3.2.2 An ANSP shall be designated by SSCA for providing such services.

18.3.2.3 The designated ANSP shall follow an instrument flight procedure process that encompasses acquisition of data, design and promulgation of procedures.

18.3.2.4 The designated ANSP shall ensure that the quality and safety of the procedure design product are assured through review, verification, coordination and validation of the procedure at appropriate points in the process.

18.3.2.5 The designated ANSP shall ensure that the units of measurement, as specified in Part 18 of this document are used in the design of IFP.

18.3.3 Instrument Flight Procedure Design (IFPD) organization

18.3.3.1 The ANSP designated as the IFPD organization shall maintain an appropriate instrument design office to enable the IFP designer to carry on design work in IFP in accordance with the requirements set out in this regulation.

18.3.3.2 The designated ANSP shall ensure that the design of instrument flight procedures is in accordance with:

a. applicable standards set out or referred to in ICAO Doc 8168, and
b. applicable standards as set out in this regulation.

18.3.3.3 The designated ANSP shall make provisions for person(s) trained in IFP design to check and verify independently the plans of each instrument flight procedure designed.

18.3.3.4 The ANSP designated as the IFPD organization shall develop and maintain an operations manual which shall serve to demonstrate how the service provider will comply with the requirements set out in this regulation.

18.3.3.5 The contents of the operations manual shall include but not limited to the following:

a. the information required of the designated ANSP as mentioned in this regulation; and
b. a description of the IFPD office that shows the role, responsibilities and job functions of the IFP design office personnel who are responsible for ensuring the compliance of the organization with the requirements in sub-paragraph a.

18.3.3.6 The designated ANSP shall:

a. keep the operations manual in a readily accessible form;
b. ensure that the IFP designer has ready access to the operations manual; and
c. amend the operations manual whenever necessary to keep its content up to date.

18.3.3.7 The designated ANSP shall submit a copy of the most current operations manual to ANSSD, SSCA for approval.

18.3.3.8 The designated ANSP shall provide and maintain facilities for the design work on IFP as follows:

a. having available equipment appropriate for the design, design verification, flight validation, and maintenance of the types of IFP;
b. access to relevant and current data including, but not limited to, aeronautical data, land contour data, and obstacle data for the design, design verification, flight verification, and maintenance of the IFP; and
c. ready access to copies of relevant documentation comprising technical standards, practices, and instructions, and any other documentation that may be necessary for the design, design verification, flight

validation, and maintenance of the types of instrument flight procedure.

18.3.3.9 If an aeronautical database and aeronautical data is required for designing an instrument flight procedure, the IFP design organization shall ensure the integrity of the database and the data. The data used shall be current, traceable, and meets the required level of verifiable accuracy for the design.

18.3.3.10 The designated ANSP shall establish and put into effect, a system for controlling documents and records relating to the IFP on which the designer carries on design work, including the policies and procedures for making, amending, preserving and disposing of those documents and records.

18.3.3.11 The designated ANSP shall make available the documents and records, or copies of them or extracts from them for inspection.

18.3.4 *IFP designer qualifications and training*

18.3.4.1 The designated ANSP shall ensure that a person designing or amending a flight instrument procedure demonstrates required competency level for flight procedure design. IFP designers shall acquire and maintain this competency level through training and supervised on-the-job training (OJT). This is to ensure that the quality assurance in the procedure design process and its output, including the quality of aeronautical information/data, meets the requirements of ICAO Annex 4 – Aeronautical Charts and Annex 15 – Aeronautical Information Services.

18.3.4.2 The training for IFP designers shall include an initial training and recurrent training at periodic intervals.

18.3.4.3 The designated ANSP shall ensure that the IFP designer is able to demonstrate a basic level of competency through initial training that includes at least the following elements:

a. knowledge of information contained in ICAO Doc 8168 - PANS-OPS, Volumes I and II and other related ICAO provisions relevant to the procedure designs;
b. skills in the design of procedures; and
c. demonstration of competency as outlined in the competency framework for flight procedures designed as outlined in ICAO Doc 9906 — Quality Assurance Manual for Flight Procedure Design, Volume 2 — Flight Procedure Designer Training, Table 2-1.

18.3.4.4 The designated ANSP shall ensure that the IFP designer is able to demonstrate a basic level of competency through recurrent training that includes at least the following elements:

a. knowledge about updates in ICAO provisions and other provisions pertaining to procedure design; and
b. maintenance and enhancement of knowledge and skills in the design of procedures.

18.3.4.5 OJT is aimed at permitting the new IFP designer to integrate his basic knowledge with actual practice. The IFP design organization shall ensure that new IFP designers undergo an adequate, supervised OJT.

18.3.4.6 The competency of the IFP designer shall be subject to periodic verification by SSCA to ensure continued compliance with the requirements in this regulation.

18.3.4.7 The designated ANSP shall maintain training records for their IFP designers.

18.3.5 ***Procedure Design Information Acquisition***

18.3.5.1 The designated ANSP shall ensure that the survey and subsequent IFP design activities are controlled and monitored by a person(s) trained in procedure design.

18.3.5.2 In the obstacle survey for procedure design, the IFP designer shall consider that:

a. all obstacles be accounted for. Items, such as trees and heights of tall buildings shall be accounted for either by physical examination of the site or by addition of a suitable margin above terrain contours; and
b. the accuracy of the vertical and horizontal data obtained may be adjusted by adding an amount equal to the specified survey error to the height of all measured obstructions and by making a corresponding adjustment for specified horizontal error.

18.3.5.3 The procedure design information shall be coordinated with all relevant stakeholders. As input for the procedure design process the following aspects need to be assessed:

a. airport, navigation aid, obstacle, terrain coordinate and elevation data, based on verified surveys and complying with Annex 11, 14 and 15 requirements;
b. airspace requirements;
c. user requirements – the needs of Air Traffic Service provider and operators who will use this procedure;
d. airport infrastructure such as runway classification, lighting, communications, runway markings, and availability of local altimeter setting;
e. environmental considerations; and
f. any other potential issue associated with the procedure.

18.3.6 ***Instrument Flight Procedure Design (IFPD)***

18.3.6.1 The designated ANSP shall design in accordance with the instrument flight procedure process (see ICAO Doc 8168, Figure I-2-4-1) which encompasses the acquisition of data, design, and promulgation of procedure. It starts with compilation and verification of the many inputs and end with ground and/or flight validation of the finished product, and documentation for publication. Procedures shall be designed according to the ICAO DOC 8168 criteria. Coordination with all concerned parties shall continue throughout the procedure design and validation process to ensure that the procedure meets the needs of the user and the community.

18.3.6.2 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.

18.3.6.3 Published procedures shall be subject to periodic review to ensure that they continue to comply with changing criteria, and continue to meet user requirements. The maximum interval for this review is five years.

18.3.6.4 The documentation provided by the IFP designer is divided into three categories and includes:

a. documentation required for publication in the AIP in accordance with Annexes 4 and 15;
b. documentation required to maintain transparency concerning the details and assumptions used by the IFP designer, which should include supporting information/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. for modifications or amendments to existing procedures, the reasons for any changes;
    vi. for any deviation from existing standards, the reasons for such a deviation and details of the mitigations applied to assure continued safe operations; and
    vii. the results of the final verification for accuracy and completeness (quality assurance checks) prior to validation and then prior to publication.
c. additional documentation required to facilitate ground and flight validation of the procedure.

18.3.6.5 All calculations and results of calculations shall be presented in a manner that enables the reader to follow and trace the logic and resultant output. A record of all calculations shall be kept in order to prove compliance to or variation from the standard criteria.

18.3.6.6 Formulae used during calculation shall be the standard formulae as stated in the ICAO DOC 8168 and ICAO Publication related to IFP design. Units of measurement and conversion factors between such units shall be in accordance to Annexes 4 and 5.

18.3.6.7 Rounding of results shall follow the standard guidelines in the PANS-OPS. Rounding shall only be made at the publication stage to facilitate usable figures on maps and charts. Where rounding is required at earlier stages rounding shall be made to the pessimistic consideration.

18.3.6.8 All documentation shall undergo a final verification for accuracy and completeness prior to validation and publication.

18.3.6.9 All documentation shall be retained to assist in recreating the procedure in the future in the case of incidents and for periodic review and maintenance. The periodic retention shall not be less than the operational lifetime of the procedure.

18.3.6.10 Validation shall consist of ground validation and flight validation.

18.3.6.11 Ground validation shall always be undertaken.

18.3.6.12 When ground validation can verify the accuracy and completeness of all obstacle and navigation data considered in the procedure design, and any other factors normally considered in the flight validation, then the flight validation requirement may be dispensed with.

18.3.6.13 Ground validation shall review of the entire instrument flight procedure package by a person(s) trained in procedure design and with appropriate knowledge of flight validation issues.

18.3.6.14 The ground validation shall be conducted to determine if flight validation is needed for modifications and amendments to previously published procedures.

18.3.6.15 Flight validation of IFP when require shall be carried out as part of the initial record and shall be included as part of the periodic quality assurance program. It shall be accomplished by a qualified and experienced Flight Validation Pilot (FVP).

18.3.6.16 The flight validation of IFP shall:

a. provide assurance that adequate obstacle clearance has been provided;
b. verify that the navigation data to be published, as well as that used in the design of the procedure, is correct;
c. verify that all required infrastructure, such as runway markings, lighting, and communications and navigation sources, are in place and operative;
d. conduct an assessment of fly ability to determine that the procedure can be safely flown; and
e. evaluate the charting, required infrastructure, visibility and other operational factors.

18.3.6.17 The IFP design organization shall ensure that flight validation is conducted in accordance with the requirements of ICAO Doc 9906, Volume 5 — Validation of IFP.

18.3.6.18 The qualifications for FVP shall include:

a. At least a commercial pilot license with instrument rating. Alternatively, an equivalent authorization from the SSCA meeting the Annex 1 knowledge and skill requirements for issuing the commercial pilot license and instrument rating is acceptable;
b. the license held by the FVP shall be for the aircraft category (e.g. aero plane or helicopter) appropriate for the procedure to be validated; and
c. FVPs shall meet all the experience requirements for the airline transport pilot license in the relevant category of aircraft (e.g. aero plane or helicopter) as defined in Annex 1. The FVP does not have to be the pilot-in-command of the validation flight nor is he required to have the type rating on the aircraft used for the validation flight.

18.3.6.19 In order to adequately validate instrument procedures, FVPs training shall include the following:

a. Standards, procedures and guidance pertinent to AIS, including Annex 15;

b. Standards, procedures and guidance pertinent to flight inspection, including Annex 10 and ICAO Doc 8071 — Manual on Testing of Radio Navigation Aids;
c. Standards, procedures and guidance pertinent to aerodromes, including Annex 14, ICAO Doc 9157 — Airport Services Manual and ICAO Doc 9157 — Aerodrome Design Manual;
d. Standards, procedures and guidance pertinent to charting and aviation publications including Annex 4 and ICAO Doc 8697 — Aeronautical Chart Manual;
e. performance-based navigation (PBN) and conventional instrument procedure construction such as standard instrument departures/standard instrument arrivals (SIDs/STARs) and holding/reversal procedures, including the PANS-OPS;
f. the PBN concept including the ICAO Doc 9613 — Performance-based Navigation (PBN) Manual;
g. the basic concept of and differences between flight validation and flight inspection;
h. ARINC 424 coding;
i. Human Factors;
j. different types of aircraft operations and aircraft performance (i.e. limitations and equipment);
k. obstacle assessment methodology;
l. safety assessment process;
m. geodesy, including ICAO Doc 9906, Volume 2, paragraph 3.3.3.8; and
n. comprehensive understanding of ICAO Doc 9906, Volume 5.

18.3.6.20 The IFP designer shall be the originator of all data applicable to conduct a flight validation provided to the flight inspection operations activity.

18.3.7 *Design Publication*

18.3.7.1 The designated ANSP shall ensure that IFP designs/charts, are provided to the Aeronautical Information Service (AIS) provider for publication in the AIP.

18.3.7.2 The IFP shall be accompanied by a narrative, which describes the procedure in textual format.

18.3.7.3 The intended effective date for operational use of the IFP shall be included in the document narrative.

18.3.7.4 The designs/charts published in the AIP shall be produced in accordance with the provisions contained in the documents listed below:

a. ICAO Annex 4 — Aeronautical Charts
b. ICAO Doc 8168 — Procedures for Air Navigation Services — Aircraft Operations, Volumes I and II (PANS-OPS);
c. ICAO Doc 8697; and
d. Subpart 7.5 – AIS regulation.

18.3.7.5 The aeronautical charts included in the AIP shall be kept up-to-date by means of replacement sheets where necessary. Significant amendments or revisions in the IFP shall be clearly indicated in the revised charts.

18.3.8 ***Procedure design automation***

18.3.8.1 The designated ANSP shall ensure that the software packages used in the design of procedures have been validated. A description of the procedures to be used to ensure that all equipment, including software is operated in accordance with the manufacturer's operating instructions and manuals, shall be made readily available to the IFP designer.

18.3.8.2 Validation of the software shall be in accordance with the requirements of ICAO Doc 9906, Volume 3 — Flight Procedure Design Software Validation.

18.3.9 ***Safety Assessment***

18.3.9.1 The IFP design organization shall carry out a safety assessment in respect of proposals for new flight procedure designs or any significant changes in a revised procedure. Proposals shall be implemented only when the assessment has shown that an acceptable level of safety will be met.

18.3.9.2 The safety assessment shall consider relevant factors determined to be safety-significant, including but not limited to:

a. types of aircraft and their performance characteristics, including navigation capabilities and navigation performance;
b. traffic density and distribution;
c. airspace complexity; ATS route structure and classification of the airspace;
d. aerodrome layout
e. type and capabilities of ground navigation systems
f. any significant local or regional data (e.g. obstacles, infrastructures, operational factors, etc.).

18.3.9.3 Safety risk control/mitigation process shall include hazard/consequence identification and safety risk assessment. Once hazards and consequences have been identified and safety risks assessed, the effectiveness and efficiency of exiting aviation system defenses relative to the hazards and consequences should be evaluated. As a consequence of this evaluation, exiting defenses shall be reinforced, new ones introduced, or both.

18.3.9.4 As part of the safety assurance, the risk control/mitigation process shall include a system of feedback. This is to ensure integrity, efficiency and effectiveness of the defenses under the new operational conditions.

18.3.10 ***Aeronautical Charts***

18.3.10.1 The ANSP shall ensure that all aeronautical charts which are produced in Cambodia are in conformity with ICAO Annex 4.

18.3.10.2 The ANSP shall publish the following aeronautical charts which are applicable in Cambodia:

a. World Aeronautical Chart – ICAO
b. Aerodrome Chart – ICAO
c. Aerodrome Obstacle Chart – ICAO Type A

d. Aerodrome Obstacle Chart –ICAO Type B
e. Precision Approach Terrain Chart – ICAO
f. En-route Chart – ICAO
g. Area Chart – ICAO
h. Standard Departure Chart – Instrument (SID) – ICAO
i. Standard Arrival Chart – Instrument (STAR) – ICAO
j. Instrument Approach Chart – ICAO
k. Aircraft Parking Chart – ICAO

18.3.10.3 The ANSP shall ensure that all aeronautical charts listed in 18.3.10.2 are readily available to users, including from other ICAO Contracting States. The ANSP shall take all reasonable measures to ensure that the information it provides and the aeronautical charts made available are adequate and accurate and that they are maintained up-to-date by adequate revision service.

18.3.10.4 The ANSP shall ensure that each type of aeronautical chart provides information relevant to the function of the chart and its design shall observe human factors principles which facilitate its optimum use.

18.3.10.5 The ANSP shall ensure that the presentation of information in the aeronautical charts is accurate, free from distortion and clutter, unambiguous, and readable under all normal operating conditions.

18.3.10.6 The ANSP shall ensure that aeronautical data quality requirements related to the data integrity and charting resolution are in accordance with ICAO Annex 4 paragraph 2.17 and Table 1 to 5 in Appendix 6. The integrity of the data shall be maintained though out the data process from survey/origin to the next intended user. Aeronautical data integrity requirement shall be based upon the potential risk resulting from the corruption of data and the use to which the data item is put.

Chapter 18.4 – Aeronautical Information Service (AIS)

Chapter 18.4 – Aeronautical Information Service (AIS)

18.4.1 Definition

When the following terms are used in the Standards and Recommended Practices for aeronautical information services, they have the following meanings:

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

Note. — For measured positional data the accuracy is normally expressed in terms of a distance from a stated position within which there is a defined confidence of the true position falling.

***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 mapping data (AMD). Data collected for the purpose of compiling aerodrome mapping information.

Note. — Aerodrome mapping data are collected for purposes that include the improvement of the user's situational awareness, surface navigation operations, training, charting and planning.

Aerodrome mapping database (AMDB). A collection of aerodrome mapping data organized and arranged as a structured data set.

Aeronautical data. A representation of aeronautical facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing.

Aeronautical information. Information resulting from the assembly, analysis and formatting of aeronautical data.

Aeronautical Information Circular (AIC). A notice containing information that does not qualify for the origination of a NOTAM or for inclusion in the AIP, but which relates to flight safety, air navigation, technical, administrative or legislative matters.

Aeronautical information management (AIM). The dynamic, integrated management of aeronautical information through the provision and exchange of quality-assured digital aeronautical data in collaboration with all parties.

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 information service (AIS). A service established within the defined area of coverage responsible for the provision of aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation.

AIP Amendment. Permanent changes to the information contained in the AIP.

AIP Supplement. Temporary changes to the information contained in the AIP which are published by means of special pages.

AIRAC. An acronym (aeronautical information regulation and control) signifying a system aimed at advance notification, based on common effective dates, of circumstances that necessitate significant changes in operating practices.

Air defense identification zone (ADIZ). Special designated airspace of defined dimensions within which aircraft are required to comply with special identification and/or reporting procedures additional to those related to the provision of air traffic services (ATS).

Air traffic management (ATM). The dynamic, integrated management of air traffic and airspace (including air traffic services, airspace management and air traffic flow management) — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

AIS product. Aeronautical data and aeronautical information provided in the form of the elements of the Integrated Aeronautical Information Package (except NOTAM and PIB), including aeronautical charts, or in the form of suitable electronic media.

Application. Manipulation and processing of data in support of user requirements (ISO 19104*).

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.

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

ASHTAM. A special series NOTAM notifying by means of a specific format change in activity of a volcano, a volcanic eruption and/or volcanic ash cloud that is of significance to aircraft operations.

Assemble. A process of merging data from multiple sources into a database and establishing a baseline for subsequent processing.

Note. — The assemble phase includes checking the data and ensuring that detected errors and omissions are rectified.

ATS surveillance service. Term used to indicate a service provided directly by means of an ATS surveillance system.

ATS surveillance system. A generic term meaning variously, ADS-B, PSR, SSR or any comparable ground-based system that enables the identification of aircraft.

> *Note. — A comparable ground-based system is one that has been demonstrated, by comparative assessment or other methodology, to have a level of safety and performance equal to or better than monopulse SSR.*

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.

Bare Earth. Surface of the Earth including bodies of water and permanent ice and snow, and excluding vegetation and manmade objects.

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

Canopy. Bare Earth supplemented by vegetation height.

Confidence level. The probability that the true value of a parameter is within a certain interval around the estimate of its value.

Note. — The interval is usually referred to as the accuracy of the estimate.

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

Culture. All man-made features constructed on the surface of the Earth, such as cities, railways and canals.

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

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

Data product. Data set or data set series that conforms to a data product specification (ISO 19131*).

Data product specification. Detailed description of a data set or data set series together with additional information that will enable it to be created, supplied to and used by another party (ISO 19131*).

Note. — A data product specification provides a description of the universe of discourse and a specification for mapping

the universe of discourse to a data set. It may be used for production, sales, end-use or other purpose.

Data quality. A degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution and integrity.

Data set. Identifiable collection of data (ISO 19101*).

Data set series. Collection of data sets sharing the same product specification (ISO 19115*).

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

Digital Elevation Model (DEM). The representation of terrain surface by continuous elevation values at all intersections of a defined grid, referenced to common datum.

Note. — Digital Terrain Model (DTM) is sometimes referred to as DEM.

Direct transit arrangements. Special arrangements approved by the public authorities concerned by which traffic which is pausing briefly in its passage through the Contracting State may remain under their direct control.

Ellipsoid height (Geodetic height). The height related to the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question.

Feature. Abstraction of real world phenomena (ISO 19101*).

Feature attribute. Characteristic of a feature (ISO 19101*).

Note. — A feature attribute has a name, a data type and a value domain associated with it.

Feature operation. Operation that every instance of a feature type may perform (ISO 19110*).

Note. — An operation upon the feature type dam is to raise the dam. The result of this operation is to raise the level of water in the reservoir.

Feature relationship. Relationship that links instances of one feature type with instances of the same or a different feature type (ISO 19101*).

Feature type. Class of real world phenomena with common properties (ISO 19110*).

Note. — In a feature catalogue, the basic level of classification is the feature type.

Geodesic distance. The shortest distance between any two points on a mathematically defined ellipsoidal surface.

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.

Geoid. The equipotential surface in the gravity field of the Earth which coincides with the undisturbed mean sea level (MSL) extended continuously through the continents.

Note. — The geoid is irregular in shape because of local gravitational disturbances (wind tides, salinity, current, etc.) and the direction of gravity is perpendicular to the geoid at every point.

Geoid undulation. The distance of the geoid above (positive) or below (negative) the mathematical reference ellipsoid.

Note. — In respect to the World Geodetic System — 1984 (WGS-84) defined ellipsoid, the difference between the WGS-84 ellipsoidal height and orthometric height represents WGS-84 geoid undulation.

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, point or an object considered as a point, measured from a specific datum.

Heliport. An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

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.

Integrated Aeronautical Information Package. A package in paper, or electronic media which consists of the following elements:

- AIP, including amendment service;
- Supplements to the AIP;
- NOTAM and PIB;
- AIC; and
- checklists and lists of valid NOTAM.

Integrity (aeronautical data). A degree of assurance that an aeronautical data and its value has not been lost or altered since the data origination or authorized amendment.

Integrity classification (aeronautical data). Classification based upon the potential risk resulting from the use of corrupted data. Aeronautical data are 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 airport. Any airport designated by the Contracting State in whose territory it is situated as an airport of entry and departure for international air traffic, where the formalities incident to customs, immigration, public health, animal and plant quarantine and similar procedures are carried out.

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

Logon address. A specified code used for data link logon to an ATS unit.

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

Metadata. Data about data (ISO 19115*).

Note. — A structured description of the content, quality, condition or other characteristics of data.

Minimum en-route altitude (MEA). The altitude for an en-route segment that provides adequate reception of relevant navigation facilities and ATS communications, complies with the airspace structure and provides the required obstacle clearance.

Minimum obstacle clearance altitude (MOCA). The minimum altitude for a defined segment of flight that provides the required obstacle clearance.

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

Navigation specification. A set of aircraft and flight crew requirements needed to support performance-based navigation

operations within a defined airspace. There are two kinds of navigation specifications:

Required navigation performance (RNP) specification. A navigation specification based on area navigation that includes

the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.

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

Note 1. — The Performance-based Navigation (PBN) Manual *(Doc 9613), Volume II, contains detailed guidance on navigation specifications.*

Note 2. — The term RNP, previously defined as "a statement of the navigation performance necessary for operation within a defined airspace", has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the

context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613.

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.

Obstacle/terrain data collection surface. A defined surface intended for the purpose of collecting obstacle/terrain data.

Orthometric height. Height of a point related to the geoid, generally presented as an MSL elevation.

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.

Portrayal. Presentation of information to humans (ISO 19117*).

Position (geographical). Set of coordinates (latitude and longitude) referenced to the mathematical reference ellipsoid which define the position of a point on the surface of the Earth.

Post spacing. Angular or linear distance between two adjacent elevation points.

Precision. The smallest difference that can be reliably distinguished by a measurement process.

Note. — In reference to geodetic surveys, precision is a degree of refinement in performance of an operation or a degree of perfection in the instruments and methods used when taking measurements.

Pre-flight information bulletin (PIB). A presentation of current NOTAM information of operational significance, prepared prior to flight.

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.

Quality. Degree to which a set of inherent characteristics fulfils requirements (ISO 9000*).

Note 1. — The term "quality" can be used with adjectives such as poor, good or excellent.

Note 2. — "Inherent", as opposed to "assigned", means existing in something, especially as a permanent characteristic.

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

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

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

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.

Requirement. Need or expectation that is stated, generally implied or obligatory (ISO 9000*).

Note 1. — "Generally implied" means that it is custom or common practice for the organization, its customers and other interested parties, that the need or expectation under consideration is implied.

Note 2. — A qualifier can be used to denote a specific type of requirement, e.g. product requirement, quality management requirement, customer requirement.

Note 3. — A specified requirement is one which is stated, for example, in a document.

Note 4. — Requirements can be generated by different interested parties.

Resolution. A number of units or digits to which a measured or calculated value is expressed and used.

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.

Route stage. A route or portion of a route flown without an intermediate landing.

SNOWTAM. A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format.

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.

Terrain. The surface of the Earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles.

Note. — In practical terms, depending on the method of data collection used, terrain represents the continuous surface that exists at the bare Earth, the top of the canopy or something in-between, also known as "first reflective surface".

Traceability. Ability to trace the history, application or location of that which is under consideration (ISO 9000*).

Note. — When considering product, traceability can relate to:

- the origin of materials and parts;
- the processing history; and
- the distribution and location of the product after delivery.

Validation. Confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled (ISO 9000*).

Verification. Confirmation, through the provision of objective evidence, that specified requirements have been fulfilled (ISO 9000*).

Note 1. — The term "verified" is used to designate the corresponding status.

Note 2. — Confirmation can comprise activities such as:

- performing alternative calculations;
- comparing a new design specification with a similar proven design specification;
- undertaking tests and demonstrations; and
- reviewing documents prior to issue.

VOLMET. Meteorological information for aircraft in flight.

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

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

18.4.2 Responsibilities and Functions

18.4.2.1 The ANSP shall arrange for the provisions of AIS over the territory of [State] and if applicable those areas over the high seas for which [State] is responsible for the provision of AIS.

18.4.2.2 The ANSP shall be designated by SSCA as the AIS provider for providing such services in accordance with these regulations.

18.4.2.3 Aeronautical data and aeronautical information provided by the AIS provider on behalf of Cambodia shall clearly indicate that it is published under the authority of SSCA.

18.4.2.4 The AIS provider shall establish formal arrangements with originators of aeronautical data and aeronautical information in relation to the timely and complete provision of aeronautical data and aeronautical information.

18.4.2.5 An AIS provider shall ensure that aeronautical data and aeronautical information necessary for the safety, regularity or efficiency of air navigation is made available in a form suitable for the operational requirements of the ATM community, including:

a. those involved in flight operations, including flight crews, flight planning and flight simulators; and
b. the ATS units responsible for flight information service and the services responsible for pre-flight information.

18.4.2.6 An aeronautical information service shall receive, collate or assemble, edit, format, publish/store and distribute aeronautical data and aeronautical information/data concerning the entire territory of [State] as well as those areas over the high seas in which the [State] is responsible for the provision of ATS outside its territory. Aeronautical data and aeronautical information shall be provided as an Integrated Aeronautical Information Package.

18.4.2.7 Where 24 hours of service is not provided by the AIS provider, service shall be provided during the whole period an aircraft is in flight in the area of responsibility of the aeronautical information service, plus a period of at least two hours before and after such a period. The service shall also be available at such other time as may be requested by an appropriate ground organization.

18.4.2.8 An AIS provider shall, in addition, obtain aeronautical data and aeronautical information to enable it to provide pre-flight information service and to meet the need for inflight information.

a. from the AIS of other States;
b. from other sources that may be available.

18.4.2.9 Aeronautical data and aeronautical information obtained under sub-regulation 18.4.2.8 a) shall, when distributed, be clearly identified as having the authority of the State of Origin.

18.4.2.10 Aeronautical data and aeronautical information obtained under 18.4.2.8 b) shall, if possible, be verified before distribution and if not verified shall, when distributed, be clearly identified as such.

18.4.2.11 The AIS provider shall promptly make available to the AIS of other States any data and aeronautical information necessary for the safety, regularity or efficiency of air navigation required by them, to enable them to comply with sub-regulation 18.4.2.5.

18.4.3 Exchange of aeronautical data and aeronautical information/data

18.4.3.1 The AIS provider shall designate the office to which all elements of the Integrated Aeronautical Information Package originated by other States shall be addressed. Such an office shall be qualified to deal with requests for aeronautical data and aeronautical information originated by other States.

18.4.3.2 Where more than one international NOTAM office is designated within [State], the extent of responsibility and the territory covered by each office shall be defined.

18.4.3.3 The AIS provider shall arrange, as necessary, to satisfy operational requirements for the issuance and receipt of NOTAM distributed by telecommunication.

18.4.3.4 Wherever practicable, the AIS provider shall establish direct contact with other AIS in order to facilitate the international exchange of aeronautical data and aeronautical information.

18.4.3.5 One copy of each of the elements of the Integrated Aeronautical Information Package that have been requested by the aeronautical information service of an ICAO Contracting State shall be made available by the AIS provider in the mutually agreed form(s), without charge.

18.4.4 Copyright

Any product received by the AIS provider in accordance with sub-regulation 18.4.3 from of another State's AIS which has been granted copyright protection by that State shall only be made available to a third party on the condition that the third party is made aware that the product is copyright protected and provided that it is appropriately annotated that the product is subject to copyright by the originating State.

18.4.5 Information Management requirements

The information management resources and processes established by the AIS provider shall be adequate to ensure the timely collection, processing, storing, integration, exchange and delivery of quality-assured aeronautical data and aeronautical information within the ATM system.

18.4.6 Aeronautical data and aeronautical information validation and verification

18.4.6.1 The AIS provider shall ensure that material to be issued as part of the Integrated Aeronautical Information Package is thoroughly checked before it will be accepted AIS provider, in order to make certain that all necessary information has been included and that it is correct in detail prior to distribution. 1

18.4.6.2 The AIS provider shall establish verification and validation procedures which ensure that upon receipt of aeronautical data and aeronautical information, quality requirements (accuracy, resolution, integrity, and traceability) are met.

18.4.7 Data Quality Specification

18.4.7.1 The order of accuracy for aeronautical data, shall be as specified in Annex 11, Chapter 2, and Annex 14, Volumes I and II, Chapter 2. In that respect, three types of positional data shall be identified: surveyed points (runway thresholds, navigation aid positions, etc.), calculated points (mathematical calculations from the known surveyed points of points in space/fixes) and declared points (e.g. flight information region boundary points).

18.4.7.2 The order of publication resolution of aeronautical data shall be that as specified in Annex 15, Appendices 1 and 7.

18.4.7.3 The integrity classification and data integrity related to aeronautical data shall be as provided in Annex 15, Tables A7-1 to A7-5 of Appendix 7.

18.4.7.4 The integrity of aeronautical data shall be maintained by the AIS provider to the next intended user. Based on the applicable integrity classifications, the validation and verification procedures shall:

a. for routine data: avoid corruption throughout the processing of the data;
b. for essential data: assure corruption does not occur at any stage of the entire process and may include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and
c. for critical data: assure corruption does not occur at any stage of the entire process and include additional integrity assurance processes to fully mitigate the effects of faults identified by thorough analysis of the overall system architecture as potential data integrity risks.

18.4.8 Metadata

18.4.8.1 Metadata shall be collected for aeronautical data processes and exchange points. This metadata collection shall be applied throughout the aeronautical information data chain, from survey/origin to distribution to the next intended user.

18.4.8.2 The metadata to be collected shall include, as a minimum:

a. the name of the organizations or entities performing any action of originating, transmitting or manipulating the data;
b. the action performed; and
c. the date and time the action was performed.

18.4.9 Data protection

18.4.9.1 Aeronautical data and data sets shall be protected in accordance with data error detection, security, and authentication techniques.

18.4.9.2 Electronic aeronautical data sets shall be protected by the inclusion in the data sets of a 32-bit cyclic redundancy check (CRC) implemented by the application dealing with the data sets. This shall apply to the protection of the integrity classification of data sets as specified in sub-regulation 18.4.7.

18.4.10 Use of automation

18.4.10.1 Automation shall be introduced with the objective of improving the timeliness, quality, efficiency and cost-effectiveness of AIS.

18.4.10.2 Where aeronautical data and aeronautical information are provided in multiple formats, processes shall be implemented to ensure data and information consistency between formats.

18.4.10.3 In order to meet the data quality requirements, automation shall:

a. enable digital aeronautical data exchange between the parties involved in the data processing chain; and
b. use aeronautical information exchange models and data exchange models designed to be globally interoperable.

18.4.11 Quality Management System

18.4.11.1 Quality management systems shall be implemented and maintained by an AIS provider encompassing all functions of an aeronautical information service, as described in sub-regulation 18.4.2 The execution of such quality management systems shall be made demonstrable for each function stage.

18.4.11.2 Within the context of the established quality management system, competencies and the associated knowledge, skills and abilities required for each function shall be identified, and personnel assigned to perform those functions shall be appropriately trained. Processes shall be in place to ensure that personnel possess the skills and competencies required to perform specific assigned functions. Appropriate records shall be maintained so that the qualifications of personnel can be confirmed. Initial and periodic assessments shall be established that require personnel to demonstrate the required competencies. Periodic assessments of personnel shall be used as a means to detect and correct shortfalls.

18.4.11.3 The quality management system established by the AIS provider shall include the necessary policies, processes and procedures, including those for the use of metadata, to ensure and verify that aeronautical data is traceable throughout the aeronautical information data chain so as to allow any data anomalies or errors detected in use to be identified by root cause, corrected and communicated to affected users.

18.4.11.4 The quality management system established by the AIS provider shall provide users with the necessary assurance and confidence that the aeronautical data and aeronautical information satisfy the aeronautical data quality for accuracy, resolution and integrity as specified in sub-regulations 18.4.6 and 18.4.7 and that the data traceability requirements are met through the provision of appropriate metadata as specific in sub-regulation 18.4.8 The system shall also provide assurance of the applicability period of intended use of aeronautical information/data as well as that the agreed distribution dates will be met.

18.4.11.5 All necessary measures shall be taken to monitor compliance with the quality management system in place.

18.4.11.6 Demonstration of compliance of the quality management system applied shall be by audit. If nonconformity is identified, initiating action to correct its cause shall be determined and taken without undue delay. All audit observations and remedial actions shall be evidenced and properly documented.

18.4.12 Human factors considerations

18.4.12.1 The organization of the AIS as well as the design, contents, processing and distribution of aeronautical data and aeronautical information shall take into consideration Human Factors principles which facilitate their optimum utilization.

18.4.12.2 Due consideration shall be given to the integrity of information where human interaction is required and mitigating steps taken where risks are identified.

18.4.13 Common reference systems for air navigation

18.4.13.1 The World Geodetic System — 1984 (WGS-84) Manual (Doc 9674) shall be used as the horizontal (geodetic) reference system for international air navigation.

Published aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.

18.4.13.2 Geographical coordinates which have been transformed into WGS-84 coordinates but whose accuracy of original field work does not meet the requirements in Annex 11, Chapter 2 and Annex 14, Volumes I and II, Chapter 2, shall be identified by an asterisk.

18.4.13.3 The order of publication resolution of geographical coordinates shall be that specified in Annex 15, Appendix 1 and Table A7-1 of Appendix 7 while the order of chart resolution of geographical coordinates shall be that specified in Annex 4, Appendix 6, Table 1.

18.4.13.4 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 international air navigation.

18.4.13.5 The Earth Gravitational Model — 1996 (EGM-96), containing long wavelength gravity field data to degree and order 360, shall be used by international air navigation as the global gravity model.

18.4.13.6 At those geographical positions where the accuracy of EGM-96 does not meet the accuracy requirements for elevation and geoid undulation specified in Annex 14, Volumes I and II, on the basis of EGM-96 data, regional, national or local geoid models containing high resolution (short wavelength) gravity field data shall be developed and used. When a geoid model other than the EGM-96 model is used, a description of the model used, including the parameters required for height transformation between the model and EGM-96, shall be provided in the Aeronautical Information Publication (AIP).

18.4.13.7 In addition to elevation referenced to the MSL (geoid), for the specific surveyed ground positions, geoid undulation (referenced to the WGS-84 ellipsoid) for those positions specified in Annex 15, Appendix 1 shall also be published.

18.4.13.8 The order of publication resolution of elevation and geoid undulation shall be that specified in Annex 15, Appendix 1 and Table A7-2 of Appendix 7 while the order of chart resolution of elevation and geoid undulation shall be that specified in Annex 4, Appendix 6, Table 2.

18.4.13.9 For international civil aviation, the Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system.

18.4.13.10 When a different temporal reference system is used for some applications, the feature catalogue, or the metadata associated with an application schema or a data set, as appropriate, shall include either a description of that system or a citation for a document that describes that temporal reference system.

18.4.14 Miscellaneous specifications

18.4.14.1 Each element of the Integrated Aeronautical Information Package for international distribution shall include English text for those parts expressed in plain language.

18.4.14.2 Place names shall be spelt in conformity with local usage, transliterated, when necessary, into the Latin alphabet.

18.4.14.3 ICAO abbreviations shall be used in the AIS whenever they are appropriate and their use will facilitate distribution of aeronautical data and aeronautical information.

18.4.15 AIP Contents

18.4.15.1 The AIS provider shall publish an Aeronautical Information Publication (AIP) in 3 parts GEN, ENR, AD that containing current information, data and aeronautical charts relating to the airspace in which SSCA has responsibility for ATS. The contents of the AIP shall be in accordance with Appendix 2 of this regulation as applicable except that when the AIP, or volume of the AIP, is designed basically to facilitate operational use in flight, the precise format and arrangement is at the discretion of the AIS provider, providing that an adequate table of contents is included.

18.4.15.2 The AIS provider shall ensure that the AIP to be published shall include in Part 1 – General (GEN):

a. statement of the competent authority responsible for the air navigation facilities, services or procedures covered by the AIP;
b. the general condition under which the services or facilities are available for international use;
c. a list of significant differences between the national regulations and practices of Cambodia and the related ICAO Standards, Recommended Practices and Procedures, given in a form that would enable a user to differentiate readily between the requirements of the Cambodia and the related ICAO provisions; and
d. the choice made by Cambodia in each significant case where an alternative course of action is provided for in ICAO Standards, Recommended Practices and Procedures.

18.4.15.3 The aeronautical charts listed alphabetically below shall, when available for designated international aerodromes/heliports, form part of the AIP, or be distributed separately to recipients of the AIP:

a. Aerodrome/Heliport Chart — ICAO;
b. Aerodrome Ground Movement Chart — ICAO;
c. Aerodrome Obstacle Chart — ICAO Type A;
d. Aerodrome Terrain and Obstacle Chart — ICAO (Electronic);
e. Aircraft Parking/Docking Chart — ICAO;
f. Area Chart — ICAO;
g. ATC Surveillance Minimum Altitude Chart — ICAO;
h. Instrument Approach Chart — ICAO;
i. Precision Approach Terrain Chart — ICAO;
j. Standard Arrival Chart — Instrument (STAR) — ICAO;
k. Standard Departure Chart — Instrument (SID) — ICAO; and
l. Visual Approach Chart — ICAO.

18.4.15.4 Charts, maps or diagrams shall be used, when appropriate, to complement or as a substitute for the tabulations or text of AIPs.

18.4.16 AIP general specifications

18.4.16.1 Each AIP shall be self-contained and shall include a table of contents.

18.4.16.2 Each AIP shall not duplicate information within itself or from other sources.

18.4.16.3 When two or more States/AIS providers combine to issue a joint AIP, this shall be made clear both on the cover and in the table of contents.

18.4.16.4 Each AIP shall be dated. In the case of AIPs issued in loose-leaf form, each page shall be dated. The date, consisting of the day, month (by name) and year, shall be the publication date or the effective date of the information.

18.4.16.5 A checklist giving the current date of each page in the AIP series shall be reissued frequently to assist the user in maintaining a current publication. The page number/chart title and date of the checklist shall appear on the checklist itself.

18.4.16.6 Each AIP issued as a bound volume and each page of an AIP issued in loose-leaf form shall be so annotated as to indicate clearly:

a. the identity of the AIP;
b. the territory covered and subdivisions when necessary;
c. the identification of the issuing State and producing organization (authority);
d. page numbers/chart titles; and
e. the degree of reliability if the information is doubtful.

18.4.16.7 All changes to the AIP, or new information on a republished page, shall be identified by a distinctive symbol or annotation.

18.4.16.8 Operationally significant changes to the AIP shall be published in accordance with AIRAC procedures and shall be clearly identified by the acronym — AIRAC.

18.4.16.9 AIP shall be amended or reissued at such regular intervals as may be necessary to keep them up to date. Recourse to hand amendments or annotations shall be kept to the minimum. The normal method of amendment shall be by means of replacement sheets.

18.4.16.10 The regular interval referred to in 18.4.16.9 shall be specified in the AIP, Part 1 — General (GEN).

18.4.17 Specification for AIP Amendment

18.4.17.1 Permanent changes to the AIP shall be published as AIP Amendments.

18.4.17.2 Each AIP Amendment shall be allocated a serial number, which shall be consecutive.

18.4.17.3 Each AIP Amendment page, including the cover sheet, shall display a publication date.

18.4.17.4 Each AIRAC AIP Amendment page, including the cover sheet, shall display an effective date. When an effective time other than 0000 UTC is used, the effective time shall also be displayed on the cover sheet.

18.4.17.5 When an AIP Amendment is issued, it shall include references to the serial number of those elements, if any, of the Integrated Aeronautical Information Package which have been incorporated into the amendment.

18.4.17.6 A brief indication of the subjects affected by the amendment shall be given on the AIP Amendment cover sheet.

18.4.17.7 When an AIP Amendment will not be published at the established interval or publication date, a NIL notification shall be originated and distributed by the monthly plain-language list of valid NOTAM required by sub-regulation 18.4.22.15.

18.4.18 Specifications AIP Supplement

18.4.18.1 Temporary changes of long duration (three months or longer) and information of short duration which contains extensive text and/or graphics shall be published as AIP Supplement.

18.4.18.2 Each AIP Supplement shall be allocated a serial number which shall be consecutive and based on the calendar year. AIP Supplement pages shall be kept in the AIP as long as all or some of their contents remain valid.

18.4.18.3 When an error occurs in an AIP Supplement or when the period of validity of an AIP Supplement is changed, a new AIP Supplement shall be published as a replacement.

18.4.18.4 When an AIP Supplement is sent in replacement of a NOTAM, it shall include a reference to the serial number of the NOTAM.

18.4.18.5 A checklist of valid AIP Supplements shall be issued at intervals of not more than one month. This information shall be issued through the medium of the monthly plain-language list of valid NOTAM required by sub-regulation 18.4.22.15.

18.4.19 Distribution

AIP, AIP Amendments and AIP Supplements shall be made available by the most expeditious means.

18.4.20 Electronic AIP (eAIP)

18.4.20.1 The AIS provider may publish the AIP, AIP Amendment, AIP Supplement and AIC in a format that allows for displaying on a computer screen and printing on paper. This composite electronic document is named “Electronic AIP” (eAIP) and may be based on a format that allows for digital data exchange.

18.4.20.2 When provided, the information content of the eAIP and the structure of chapters, sections and sub-sections shall follow the content and structure of the paper AIP. The eAIP shall include files that allow for printing a paper AIP.

18.4.21 NOTAM Origination

18.4.21.1 The AIS provider shall promptly originate and issue a NOTAM whenever the information to be distributed is of a temporary nature and of short duration or when operationally significant permanent changes concerning circumstances as listed in Annex 15, Appendix 4, Part 1, or temporary changes of long duration are made at short notice, except for extensive text and/or graphics.

18.4.21.2 A NOTAM shall be originated and issued concerning the following information:

a. establishment, closure or significant changes in operation of aerodrome(s)/heliport(s) or runways;
b. establishment, withdrawal and significant changes in operation of aeronautical services (AGA, AIS, ATS, CNS, MET, SAR, etc.);
c. establishment, withdrawal and significant changes in operational capability of radio navigation and air-ground communication services. This includes: interruption or return to operation, change of frequencies, change in notified hours of service, change of identification, change of orientation (directional aids), change of location, power increase or decrease amounting to 50 per cent or more, change in broadcast schedules or contents, or irregularity or unreliability of operation of any radio navigation and air ground communication services;
d. establishment, withdrawal or significant changes made to visual aids;
e. interruption of or return to operation of major components of aerodrome lighting systems;
f. establishment, withdrawal or significant changes made to procedures for air navigation services;
g. occurrence or correction of major defects or impediments in the maneuvering area;
h. changes to and limitations on availability of fuel, oil and oxygen;
i. major changes to search and rescue facilities and services available;
j. establishment, withdrawal or return to operation of hazard beacons marking obstacles to air navigation;
k. changes in regulations requiring immediate action, e.g. prohibited areas for SAR action;
l. presence of hazards which affect air navigation (including obstacles, military exercises, displays, races and major parachuting events outside promulgated sites);
m. erecting or removal of, or changes to, obstacles to air navigation in the take-off/climb, missed approach, approach areas and runway strip;
n. establishment or discontinuance (including activation or deactivation) as applicable, or changes in the status of prohibited, restricted or danger areas;
o. establishment or discontinuance of areas or routes or portions thereof where the possibility of interception exists and where the maintenance of guard on the VHF emergency frequency 121.5 MHz is required;
p. allocation, cancellation or change of location indicators;
q. significant changes in the level of protection normally available at an aerodrome/heliport for rescue and firefighting purposes. NOTAM shall be originated only when a change of category is involved and such change of category shall be clearly stated;
r. presence or removal of, or significant changes in, hazardous conditions due to snow, slush, ice, radioactive material, toxic chemicals, volcanic ash deposition or water on the movement area;

s. outbreaks of epidemics necessitating changes in notified requirements for inoculations and quarantine measures;
t. forecasts of solar cosmic radiation, where provided;
u. an operationally significant change in volcanic activity, the location, date and time of volcanic eruptions and/or horizontal and vertical extent of volcanic ash cloud, including direction of movement, flight levels and routes or portions of routes which could be affected;
v. release into the atmosphere of radioactive materials or toxic chemicals following a nuclear or chemical incident, the location, date and time of the incident, the flight levels and routes or portions thereof which could be affected and the direction of movement;
w. establishment of operations of humanitarian relief missions, such as those undertaken under the auspices of the United Nations, together with procedures and/or limitations which affect air navigation;
x. implementation of short-term contingency measures in cases of disruption, or partial disruption, of ATS and related supporting services; and
y. the need for origination of a NOTAM shall be considered in any other circumstance which may affect the operations of aircraft.

18.4.21.3 The following information shall not be notified by NOTAM:

a. Routine maintenance work on aprons and taxiways which does not affect the safe movement of aircraft;
b. runway marking work, when aircraft operations can safely be conducted on other available runways, or the equipment used can be removed when necessary;
c. temporary obstructions in the vicinity of aerodromes/heliports that do not affect the safe operation of aircraft;
d. partial failure of aerodrome/heliport lighting facilities where such failure does not directly affect aircraft operations;
e. partial temporary failure of air-ground communications when suitable alternative frequencies are known to be available and are operative;
f. the lack of apron marshalling services and road traffic control;
g. the unserviceability of location, destination or other instruction signs on the aerodrome movement area;
h. parachuting when in uncontrolled airspace under VFR , when controlled, at promulgated sites or within danger or prohibited areas;
i. other information of a similar temporary nature

18.4.21.4 At least seven days' advance notice shall be given of the activation of established danger, restricted or prohibited areas and of activities requiring temporary airspace restrictions other than for emergency operations.

18.4.21.5 NOTAM notifying unserviceability of aids to air navigation, facilities or communication services shall give an estimate of the period of unserviceability or the time at which restoration of service is expected.

18.4.21.6 When an AIP Amendment or an AIP Supplement are published in accordance with AIRAC procedures, a NOTAM shall be originated giving a brief description of the contents, the effective date and time, and the reference number of the

amendment or supplement. This NOTAM shall come into force on the same effective date and time as the amendment or supplement and shall remain valid in the pre-flight information bulletin for a period of fourteen days.

18.4.22 General NOTAM specification

18.4.22.1 Except as otherwise provided in sub-regulations 18.4.22.4 and 18.4.22.5, each NOTAM shall contain the information in the order shown in the NOTAM Format in Annex 15, Appendix 6.

18.4.22.2 Text of NOTAM shall be composed of the significations/uniform abbreviated phraseology assigned to the ICAO NOTAM Code complemented by ICAO abbreviations, indicators, identifiers, designators, call signs, frequencies, figures and plain language.

18.4.22.3 When NOTAM is selected for international distribution, English text shall be included for those parts expressed in plain language.

18.4.22.4 Information concerning snow, slush, ice and standing water on aerodrome/heliport pavements shall, when reported by means of a SNOWTAM, contain the information in the order shown in the SNOWTAM Format in Annex 15, Appendix 2.

18.4.22.5 Information concerning an operationally significant change in volcanic activity, a volcanic eruption and/or volcanic ash cloud shall, when reported by means of an ASHTAM, contain the information in the order shown in Annex 15, the ASHTAM Format in Appendix 3.

18.4.22.6 The NOTAM originator shall allocate to each NOTAM a series identified by a letter and a four-digit number followed by a stroke and a two-digit number for the year. The four-digit number shall be consecutive and based on the calendar year.

18.4.22.7 When errors occur in a NOTAM, a NOTAM with a new number to replace the erroneous NOTAM shall be issued or the erroneous NOTAM shall be cancelled and a new NOTAM issued.

18.4.22.8 When a NOTAM is issued which cancels or replaces a previous NOTAM, the series and number of the previous NOTAM shall be indicated. The series, location indicator and subject of both NOTAM shall be the same. Only one NOTAM shall be cancelled or replaced by a NOTAM.

18.4.22.9 Each NOTAM shall deal with only one subject and one condition of the subject.

18.4.22.10 Each NOTAM shall be as brief as possible and so compiled that its meaning is clear without the need to refer to another document.

18.4.22.11 Each NOTAM shall be transmitted as a single telecommunication message.'

18.4.22.12 A NOTAM containing permanent or temporary information of long duration shall carry appropriate AIP or AIP Supplement references.

18.4.22.13 Location indicators included in the text of a NOTAM shall be those contained in ICAO Location Indicators (Doc 7910).

a. In no case shall a curtailed form of such indicators be used; and

b. where no ICAO location indicator is assigned to the location, its place name spelt in accordance with sub-regulation 18.4.14.2 shall be entered in plain language.

18.4.22.14 A checklist of valid NOTAM shall be issued as a NOTAM over the Aeronautical Fixed Service (AFS) at intervals of not more than one month using the NOTAM Format specified in Annex 15, Appendix 6. One NOTAM shall be issued for each series.

a. checklist of NOTAM shall refer to the latest AIP Amendments, AIP Supplements and at least the internationally distributed AIC; and
b. a checklist of NOTAM shall have the same distribution as the actual message series to which they refer and shall be clearly identified as checklist.

18.4.22.15 A monthly plain-language list of valid NOTAM, including indications of the latest AIP Amendments, AIC issued and a checklist of AIP Supplements, shall be prepared with a minimum of delay and forwarded by the most expeditious means to recipients of the Integrated Aeronautical Information Package.

18.4.23 NOTAM Distribution

18.4.23.1 NOTAM shall be distributed on the basis of a request.

18.4.23.2 NOTAM shall be prepared in conformity with the relevant provisions of the ICAO communication procedures.

a. The AFS shall, whenever practicable, be employed for NOTAM distribution; and
b. when a NOTAM exchanged as specified in 18.4.23.4 is sent by means other than the AFS, a six-digit date-time group indicating the date and time of NOTAM origination, and the identification of the originator shall be used, preceding the text.

18.4.23.3 The originating AIS provider shall select the NOTAM that are to be given international distribution.

18.4.23.4 International exchange of NOTAM shall take place only as mutually agreed between the international NOTAM offices concerned. The international exchange of ASHTAM and NOTAM where States continue to use NOTAM for distribution of information on volcanic activity, shall include volcanic ash advisory center and the center designated by regional air navigation agreement for the operation of AFS satellite distribution systems (satellite distribution system for information relating to air navigation (SADIS) and international satellite communications system (ISCS)), and shall take account of the requirements of long-range operations.

a. These exchanges of NOTAM between international NOTAM offices shall, as far as practicable, be limited to the requirements of the receiving States concerned by means of separate series providing for at least international and domestic flights; and
b. a predetermined distribution system for NOTAM transmitted on the AFS in accordance with Annex 15 Appendix 5 shall be used whenever possible.

18.4.24 AIRAC general specifications

18.4.24.1.1 Information concerning the circumstances listed in Annex 15, Appendix 4, Part 1, shall distributed under the regulated system (AIRAC), i.e. basing establishment, withdrawal or significant changes upon a series of common effective dates at intervals of 28 days, including 14 January 2010. The information notified therein shall not be changed further for at least another 28 days after the effective date, unless the circumstance notified is of a temporary nature and would not persist for the full period.

18.4.24.1.2 The ANSP shall use the regulate system (AIRAC) for the provision of information relating to the establishment and withdrawal of, and premeditated significant changes in, the circumstance listed in Appendix 4, part 2.

18.4.24.2 When information has not been submitted by the AIRAC date, a NIL notification shall be originated and distributed by NOTAM or other suitable means, not later than one cycle before the AIRAC effective date concerned.

18.4.24.3 Implementation dates other than AIRAC effective dates shall not be used for preplanned operationally significant changes requiring cartographic work and/or for updating of navigation databases.

18.4.25 Provisions of information in paper copy form

Information provided under the AIRAC system in paper copy form shall be distributed by the AIS unit at least 42 days in advance of the effective date with the objective of reaching recipients at least 28 days in advance of the effective date.

18.4.26 Provision of information as electronic media

18.4.26.1 If the AIS provider has established an aeronautical database, it shall, when updating its contents concerning the circumstances listed in Annex 15, Appendix 4, Part 1, ensure that the effective dates of data coincide with the established AIRAC effective dates.

18.4.26.2 Information provided as electronic media, concerning the circumstances listed in Annex 15, Appendix 4, Part 1, shall be distributed/made available by the AIS unit so as to reach recipients at least 28 days in advance of the AIRAC effective date.

18.4.27 AIC origination

18.4.27.1 The AIS provider shall originate an AIC whenever it is necessary to promulgate aeronautical information which does not qualify for inclusion in the AIP or NOTAM. An AIC shall be originated whenever it is desirable to promulgate:

a. a long-term forecast of any major change in legislation, regulations, procedures or facilities;
b. information of a purely explanatory or advisory nature liable to affect flight safety;
c. information or notification of an explanatory or advisory nature concerning technical, legislative or purely administrative matters.

This shall include:

i. forecasts of important changes in the air navigation procedures, services and facilities provided;
ii. forecasts of implementation of new navigational systems;
iii. significant information arising from aircraft accident/incident investigation which has a bearing on flight safety;
iv. information on regulations relating to the safeguarding of international civil aviation against acts of unlawful interference;
v. advice on medical matters of special interest to pilots;
vi. warnings to pilots concerning the avoidance of physical hazards;
vii. effect of certain weather phenomena on aircraft operations;
viii. information on new hazards affecting aircraft handling techniques;
ix. regulations relating to the carriage of restricted articles by air;
x. reference to the requirements of, and publication of changes in, national legislation;
xi. aircrew licensing arrangements;
xii. training of aviation personnel;
xiii. application of, or exemption from, requirements in national legislation;
xiv. advice on the use and maintenance of specific types of equipment;
xv. actual or planned availability of new or revised editions of aeronautical charts;
xvi. carriage of communication equipment;
xvii. explanatory information relating to noise abatement;
xviii. selected airworthiness directives;
xix. changes in NOTAM series or distribution, new editions of AIP or major changes in their contents, coverage or format;
xx. advance information on the snow plan; and
xxi. other information of a similar nature.

18.4.27.2 The snow plan published under Annex 15, of Appendix 1 shall be supplemented by seasonal information, to be issued well in advance of the beginning of each winter – not less than one month before the normal onset of winter conditions and shall contain information such as that listed below:

a. list of aerodromes/heliports where snow clearance is expected to be performed during the coming winter:
    i. An accordance with the runway and taxiway systems; * or
    ii. planned snow clearing, deviating from the runway system (length, width and number of runways, affected taxiways and aprons or portions thereof);

b. information concerning any center designated to coordinate information on the current state of progress of clearance and on the current state of runways, taxiways and aprons; *
c. an indication, as necessary, of minor changes to the standing snow plan; *
d. a descriptive list of clearance equipment; *
e. a listing of what will be considered as the minimum critical snow bank to be reported at each aerodrome/heliport at which reporting will commence. *

18.4.28 AIC general specifications

18.4.28.1 The AIS provider shall select the AIC originated by them that are to be given international distribution.

18.4.28.2 Each AIC shall be allocated a serial number which shall be consecutive and based on the calendar year.

18.4.28.3 When AIC are distributed in more than one series, each series shall be separately identified by a letter.

18.4.28.4 A checklist of AIC currently in force shall be issued at least once a year, with distribution as for the AIC.

18.4.29 Pre-Flight information

18.4.29.1 At any aerodrome/heliport normally used for international air operations, aeronautical information essential for the safety, regularity and efficiency of air navigation and relative to the route stages originating at the aerodrome/heliport shall be made available to flight operations personnel, including flight crews and services responsible for pre-flight information.

18.4.29.2 Aeronautical information provided for pre-flight planning purposes at the aerodromes/heliports referred to in sub-regulation 18.4.29.1 shall include relevant:

a. elements of the Integrated Aeronautical Information Package;
b. maps and charts.

This information, or any part of it, may be included in the AIP, if so desired.

c. additional current information relating to the aerodrome of departure shall be provided concerning the following:
    i. construction or maintenance work on or immediately adjacent to the maneuvering area;
    ii. rough portions of any part of the maneuvering area, whether marked or not, e.g. broken parts of the surface of runways and taxiways;
    iii. presence and depth of snow, ice or water on runways and taxiways, including their effect on surface friction;
    iv. snow drifted or piled on or adjacent to runways or taxiways;

v. parked aircraft or other objects on or immediately adjacent to taxiways;
vi. presence of other temporary hazards;
vii. presence of birds constituting a potential hazard to aircraft operations;
viii. failure or irregular operation of part or all of the aerodrome lighting system including approach, threshold, runway, taxiway, obstruction and maneuvering area unserviceability lights and aerodrome power supply;
ix. failure, irregular operation and changes in the operational status of SSR, ADS-B, ADS-C, CPDLC, D-ATIS, D-VOLMET, radio navigation services, VHF aero mobile channels, RVR observing system, and secondary power supply; and
x. presence and operation of humanitarian relief missions, such as those undertaken under the auspices of the United Nations, together with any associated procedures and/or limitations applied thereof.

18.4.29.3 A recapitulation of valid NOTAM of operational significance and other information of urgent character shall be made available to flight crews in the form of plain-language pre-flight information bulletins (PIB).

18.4.30 Pre-flight Information System

18.4.30.1 Automated pre-flight information systems shall be used to make an aeronautical data and aeronautical information available to operations personnel including flight crew. The aeronautical data and aeronautical information made available shall comply with the provisions of sub-regulations 18.4.29.2 and 18.4.29.3.

18.4.30.2 Self-briefing facilities of an automated pre-flight information system shall provide operations personnel, including flight crew members and other aeronautical personnel concerned, for consultation as necessary with the aeronautical information service by telephone or other suitable telecommunications means. The human/machine interface of such facilities shall ensure easy access in a guided manner to all relevant information/data.

18.4.30.3 Automated pre-flight information systems for the supply of aeronautical data and aeronautical information for self-briefing, flight planning and flight information service shall:

a. provide for continuous and timely updating of the system database and monitoring of the validity and quality of the aeronautical data stored;
b. permit access to the system by operations personnel including flight crew members, aeronautical personnel concerned and other aeronautical users through suitable telecommunications means;
c. ensure provision, in paper copy form, of the aeronautical data and aeronautical information accessed, as required;
d. use access and interrogation procedures based on abbreviated plain language and ICAO location indicators, as appropriate, or based on a

menu-driven user interface or other appropriate mechanism as agreed between the civil aviation authority and operator concerned; and

e. provide for rapid response to a user request for information.

18.4.30.4 Where automated pre-flight information systems are used to provide the harmonized, common point of access by operations personnel, including flight crew members and other aeronautical personnel concerned, to aeronautical data and aeronautical information and meteorological information, the AIS provider shall remain responsible for the quality and timeliness of the aeronautical data and aeronautical information provided by means of such a system.

18.4.31 Post-flight information

18.4.31.1 The AIS provider shall ensure that arrangements are made to receive at aerodromes/heliports information concerning the state and operation of air navigation facilities or services noted by aircrews and shall ensure that such information is distribution as the circumstances necessitate.

18.4.31.2 The AIS provider shall ensure that arrangements are made to receive at aerodromes/heliports information concerning the presence of birds observed by aircrews and shall ensure that such information is distribution as the circumstances necessitate.

18.4.32 Telecommunications requirements

18.4.32.1 International NOTAM offices shall be connected to the aeronautical fixed service (AFS) and the connections shall provide for printed communications.

18.4.32.2 Each international NOTAM office shall be connected, through the aeronautical fixed service (AFS), to the following points within the territory for which it provides service:

a. area control center and flight information center; and
b. aerodromes/heliports at which an information service is established in accordance with sub-regulation 18.4.29.1.

18.4.33 Electronic Terrain and Obstacle Data

18.4.33.1 The coverage areas for sets of electronic terrain and obstacle data shall be specified as:

a. Area 1- the entire territory of [State];
b. Area 2 - within the vicinity of an aerodrome, sub-divided as follows ;
    i. a runway that comprises the runway strip plus any clearway that exists.
    ii. Area 2b - an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side;
    iii. Area 2c - an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a; and

iv. Area 2d - an area outside the Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing TMA boundary, whichever is nearest;

c. Area 3 - the area bordering an aerodrome movement area that extends horizontally from the edge of a runway to 90 m from the runway center line and 50 m from the edge of all other parts of the aerodrome movement area.

d. Area 4 - The area extending 900 m prior to the runway threshold and 60 m each side of the extended runway center line in the direction of the approach on a precision approach runway, Category II or III.

18.4.33.2 Electronic terrain data shall be provided for Area 1. The obstacle data shall be provided for obstacles in Area 1 higher than 100 m above ground.

18.4.33.3 From 12 November 2015, at aerodromes regularly used by international civil aviation, electronic obstacle data shall be provided for all obstacles within Area 2 that are assessed as being a hazard to air navigation.

18.4.33.4 From 12 November 2015, at aerodromes regularly used by international civil aviation, electronic terrain data shall be provided for:

a. Area 2a;
b. the take-off flight path area; and
c. an area bounded by the lateral extents of the aerodrome obstacle limitation surfaces.

18.4.33.5 From 12 November 2015, at aerodromes regularly used by international civil aviation, electronic obstacle data shall be provided for:

a. Area 2a, for those obstacles that penetrate the relevant obstacle data collection surface specified in Annex 15, Appendix 8;
b. objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area; and
c. penetrations of the aerodrome obstacle limitation surfaces

18.4.33.6 At aerodromes regularly used by international civil aviation, electronic terrain and obstacle data shall be provided for Area 4 for terrain and obstacles that penetrate the relevant obstacle data collection surface specified in Annex 15, Appendix 8, for all runways where precision approach Category II or III operations have been established and where detailed terrain information is required by operators to enable them to assess the effect of terrain on decision height determination by use of radio altimeters.

18.4.34 Terrain data set — content, numerical specification and structure

18.4.34.1 A terrain data set shall contain digital sets of data representing terrain surface in the form of continuous elevation values at all intersections (points) of a defined grid, referenced to common datum. A terrain grid shall be angular or linear and shall be of regular or irregular shape.

18.4.34.2 Sets of electronic terrain data shall include spatial (position and elevation), thematic and temporal aspects for the surface of the Earth containing naturally

occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles. In practical terms, depending on the acquisition method used, this shall represent the continuous surface that exists at the bare earth, the top of the canopy or something in-between, also known as first reflective surface.

18.4.34.3 In terrain data sets, only one feature type, i.e. terrain, shall be provided. Feature attributes describing terrain shall be those listed in Annex 15, Table A8-3. The terrain feature attributes listed in Table A8-3 represent the minimum set of terrain attributes, and those annotated as mandatory shall be recorded in the terrain data set.

18.4.34.4 Electronic terrain data for each area shall conform to the applicable numerical requirements in Annex 15, Appendix 8, Table A8-1.

18.4.35 Obstacle data set — content, numerical specification and structure

18.4.35.1 Obstacle data shall comprise the digital representation of the vertical and horizontal extent of the obstacle. Obstacles shall not be included in terrain data sets. Obstacle data elements are features that shall be represented in the data sets by points, lines or polygons.

18.4.35.2 In an obstacle data set, all defined obstacle feature types shall be provided and each of them shall be described according to the list of mandatory attributes provided in Annex 15 Appendix 8, Table A8-4.

18.4.35.3 Electronic obstacle data for each area shall conform to the applicable numerical requirements in Annex 15 Appendix 8, Table A8-2.

18.4.36 Terrain and obstacle data product specifications

18.4.36.1 To allow and support the interchange and use of sets of electronic terrain and obstacle data among different data providers and data users, the ISO 19100 series of standards for geographic information shall be used as a general data modeling framework.

18.4.36.2 A comprehensive statement of available electronic terrain and obstacle data sets shall be provided in the form of terrain data product specifications as well as obstacle data product specifications on which basis air navigation users will be able to evaluate the products and determine whether they fulfill the requirements for their intended use (application).

18.4.36.3 Each terrain data product specification shall include an overview, a specification scope, data product identification, data content and structure, reference system, data quality, data capture, data maintenance, data portrayal, data product delivery, additional information, and metadata.

18.4.36.4 The overview of terrain data product specification or obstacle data product specification shall provide an informal description of the product and shall contain general information about the data product. Specification of terrain data may not be homogenous across the whole data product but may vary for different parts of the data sets. For each such subset of data, a specification scope shall be identified. Identification information concerning both terrain and obstacle data

products shall include the title of the product; a brief narrative summary of the content, purpose, and spatial resolution if appropriate (a general statement about the density of spatial data); the geographic area covered by the data product; and supplemental information.

18.4.36.5 Content information of feature-based terrain data sets or of feature-based obstacle data sets shall each be described in terms of an application schema and a feature catalogue. Application schema shall provide a formal description of the data structure and content of data sets while the feature catalogue shall provide the semantics of all feature types together with their attributes and attribute value domains, association types between feature types and feature operations, inheritance relations and constraints. Coverage is considered a subtype of a feature and can be derived from a collection of features that have common attributes. Both terrain and obstacle data product specifications shall identify clearly the coverage and/or imagery they include and shall provide a narrative description of each of them.

18.4.36.6 Both terrain data product specifications and obstacle data product specifications shall include information that identifies the reference system used in the data product. This shall include the spatial reference system and temporal reference system. Additionally, both data product specifications shall identify the data quality requirements for each data product. This shall include a statement on acceptable conformance quality levels and corresponding data quality measures. This statement shall cover all the data quality elements and data quality sub-elements, even if only to state that a specific data quality element or sub-element is not applicable.

18.4.36.7 Terrain data product specifications shall include a data capture statement which shall be a general description of the sources and of processes applied for the capture of terrain data. The principles and criteria applied in the maintenance of terrain data sets and obstacle data sets shall also be provided with the data specifications, including the frequency with which data products are updated. Of particular importance shall be the maintenance information of obstacle data sets and an indication of the principles, methods and criteria applied for obstacle data maintenance.

18.4.36.8 Terrain data product specifications shall contain information on how data held with data sets is presented, i.e. as a graphic output, as a plot or as an image. The product specifications for both terrain and obstacles shall also contain data product delivery information which shall include delivery formats and delivery medium information.

18.4.36.9 The core terrain and obstacle metadata elements shall be included in the data product specifications. Any additional metadata items required to be supplied shall be stated in each product specification together with the format and encoding of the metadata.

18.4.36.10 The obstacle data product specification, supported by geographical coordinates for each aerodrome included within the dataset, shall describe Areas 2a, 2b, 2c, 2d; the take-off flight path area; and the obstacle limitation surfaces.

18.4.37 Aerodrome mapping data product specification

18.4.37.1 The ISO 19100 series of standards for geographic information shall be used as a reference framework.

18.4.37.2 Aerodrome mapping data products shall be described following the ISO 19131 data product specification standard.

18.4.38 Aerodrome mapping database — data set content and structure

18.4.38.1 The content and structure of aerodrome

18.4.38.2 Aerodrome mapping data sets shall contain aerodrome mapping data consisting of aerodrome features.

18.4.38.3 Aerodrome mapping metadata shall comply with ISO 19118.

Chapter18.5 – Aeronautical Meteorology Services (MET)

Chapter 18.5 – Aeronautical Meteorology Services (MET)

18.5.1 Definition

When the following terms are used in the Standards and Recommended Practices for Meteorological Service for International Air Navigation, they have the following meanings:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Alternate aerodrome. An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing 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.

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

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

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

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

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

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

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

Automatic dependent surveillance (ADS). A surveillance technique in which aircraft automatically provide, via a data link, data derived from on-board navigation and position-fixing systems, including aircraft identification, four-dimensional position and additional data as appropriate.

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

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

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

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

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

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

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

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

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

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

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

Flight level. A surface of constant atmospheric pressure which is related to a specific pressure datum, 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, indicate altimetric rather than geometric heights and altitudes.

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

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

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

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

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

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

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

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

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

Meteorological authority. The authority providing or arranging for the provision of meteorological service for international air navigation on behalf of a Contracting State.

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

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

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

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

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

***Minimum sector altitude*.** The lowest altitude which may be used which will provide a minimum clearance of 300 m (1 000 ft) above all objects located in an

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

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

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

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

> *Note. — The* Performance-based Navigation (PBN) Manual *(Doc 9613), Volume II, contains detailed guidance on*

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

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

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

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

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

Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an

ATS route, on an instrument approach procedure or in a designated airspace.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Tropical cyclone advisory center (TCAC). A meteorological center designated by regional air navigation agreement to provide advisory information to meteorological watch offices, world area forecast center and international OPMET

databanks regarding the position, forecast direction and speed of movement, central pressure and maximum surface wind of tropical cyclones.

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

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

a. the greatest distance at which a black object of suitable dimensions, situated near the ground, can be seen and recognized when observed against a bright background;
b. the greatest distance at which lights in the vicinity of 1 000 candelas can be seen and identified against an unlit background.

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

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

VOLMET. Meteorological information for aircraft in flight.

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

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

World area forecast center (WAFC). A meteorological center designated to prepare and issue significant weather forecasts and upper-air forecasts in digital form on a global basis direct to States by appropriate means as part of the aeronautical fixed service.

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

Terms used with a limited meaning

For the purpose of this Annex, the following terms are used with a limited meaning as indicated below:

a. to avoid confusion in respect of the term “service” between the meteorological service considered as an administrative entity and the service which is provided, “meteorological authority” is used for the former and “service” for the latter;
b. “provide” is used solely in connection with the provision of service;
c. “issue” is used solely in connection with cases where the obligation specifically extends to sending out the information to a user;

d. "make available" is used solely in connection with cases where the obligation ends with making the information accessible to a user; and
e. "supply" is used solely in connection with cases where either c) or d) applies.

18.5.2 **Provision of meteorological service**

18.5.2.1 SSCA shall determine the meteorological service which it will provide to meet the needs of international air navigation. This determination shall be made in accordance with the provisions of this Annex and with due regard to regional air navigation agreements; it shall include the determination of the meteorological service to be provided for international air navigation over international waters and other areas which lie outside the territory of the State concerned.

18.5.2.2 The meteorological authority shall be designated by SSCA. The meteorological authority shall provide the meteorological service for air navigation for Cambodia in accordance with these regulations. The objective of meteorological service for international air navigation shall be to contribute towards the safety, regularity and efficiency of international air navigation. Details of the meteorological authority so designated shall be included in AIP of Cambodia in General part (GEN 1.1).

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

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

18.5.2.5 Designated meteorological authority shall establish and implements a properly organized quality system comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users listed in 18.5.2.3.

18.5.3 Agreement between air traffic services authorities and meteorological authorities

18.5.3.1 Meteorological authority shall establish agreement with the appropriate ATS authority to cover, amongst other things.

a. the provision in air traffic services units of displays related to integrated automatic systems;
b. the calibration and maintenance of these displays/instruments;
c. the use to be made of these displays/instruments by air traffic services personnel;
d. as and where necessary, supplementary visual observations (for example, of meteorological phenomena of operational significance in the climb-out and approach areas) if and when made by air traffic services personnel to update or supplement the information supplied by the meteorological station;

e. meteorological information obtained from aircraft taking off or landing (for example, on wind shear); and
f. if available, meteorological information obtained from ground weather radar.

18.5.4 Routine observations and reports

18.5.4.1 At aerodromes, routine observations shall be made throughout the 24 hours each day except as otherwise agreed between the meteorological authority, the appropriate ATS authority and the operator concerned. Such observations shall be made at intervals of one hour, or if determined by regional air navigation agreement, at intervals of one half-hour.

18.5.4.2 Reports of routine observations shall be issued as:

a. local routine reports, only for dissemination at the aerodrome of origin (intended for arriving and departing aircraft); and
b. METAR for dissemination beyond the aerodrome of origin (mainly intended for flight planning, VOLMET broadcasts and D-VOLMET).

18.5.4.3 At aerodromes that are not operational throughout 24 hours in accordance with sub-regulation 18.5.4.1, METAR shall be issued prior to the aerodrome resuming operations in accordance with regional air navigation agreement.

18.5.5 Special observations and reports

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

18.5.5.2 Reports of special observations shall be issued as:

a. local special reports, only for dissemination at the aerodrome of origin (intended for arriving and departing aircraft); and
b. SPECI for dissemination beyond the aerodrome of origin (mainly intended for flight planning, VOLMET broadcasts and D-VOLMET) unless METAR are issued at half- hourly intervals.

18.5.5.3 At aerodromes that are not operational throughout 24 hours in accordance with 18.5.4.1, following resumption of the issuance of METAR, SPECI shall be issued, as necessary.

18.5.6 Contents of reports

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

a. identification of the type of report;
b. location indicator;
c. time of the observation;
d. identification of an automated or missing report, when applicable;
e. surface wind direction and speed;
f. visibility;
g. runway visual range, when applicable;

h. present weather;
i. cloud amount, cloud type (only for cumulonimbus and towering cumulus clouds) and
j. height of cloud base or, where measured, vertical visibility;
k. air temperature and dew-point temperature; and
l. QNH and, when applicable, QFE (QFE included only in local routine and special reports

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

18.5.7 Observing and reporting meteorological elements

18.5.7.1 Surface wind - The mean direction and the mean speed of the surface wind shall be measured, as well as significant variations of the wind direction and speed, and reported in degrees true and meters per second (or knots), respectively. When local routine and special reports are used for departing aircraft, the surface wind observations for these reports shall be representative of conditions along the runway; when local routine and special reports are used for arriving aircraft, the surface wind observations for these reports shall be representative of the touchdown zone.

18.5.7.2 Visibility - The visibility as defined shall be measured or observed, and reported in meters or kilometers.

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

18.5.7.4 The runway visual range, assessed in accordance with 18.5.7.3 shall be reported in meters throughout periods when either the visibility or the runway visual range is less than 1500 m.

18.5.7.5 Runway visual range assessments shall be representative of:

a. the touchdown zone of the runway intended for non-precision or Category I instrument approach and landing operations;
b. the touchdown zone and the mid-point of the runway intended for Category II instrument approach and landing operations; and
c. the touchdown zone, the mid-point and stop-end of the runway intended for Category III instrument approach and landing operations.

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

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

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

in lieu of cloud amount, cloud type and height of cloud base. The height of cloud base and vertical visibility shall be reported in meters (or feet).

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

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

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

18.5.8 Routine aircraft observations – designations

18.5.8.1 The following aircraft observations shall be made:

a. tine aircraft observations during en-route and climb-out phases of the flight for aircraft equipped with air-ground data link; and
b. special and other non-routine aircraft observations during any phase of the flight.

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

18.5.8.3 In the case of air routes with high-density air traffic, an aircraft from among the aircraft operating at each flight level shall be designated, at approximately hourly intervals, to make routine observations in accordance with sub-regulation 18.5.18.2. The designation procedures shall be subject to regional air navigation agreement. ‘

18.5.8.4 In the case of the requirement to report during the climb-out phase, an aircraft shall be designated, at approximately hourly intervals, at each aerodrome to make routine observations in accordance with sub-regulation 18.5.8.2.

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

18.5.9 Special aircraft observations

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

a. moderate or severe turbulence; or
b. moderate or severe icing; or
c. severe mountain wave; or
d. thunderstorms, without hail, that are obscured, embedded, widespread or in squall lines; or
e. thunderstorms, with hail, that are obscured, embedded, widespread or in squall lines; or
f. heavy dust storm or heavy sandstorm; or
g. volcanic ash cloud; or
h. pre-eruption volcanic activity or a volcanic eruption.

18.5.9.2 When other meteorological conditions not listed under 18.5.19.1 are encountered and which, in the opinion of the pilot-in-command, may affect the safety or markedly affect the efficiency of other aircraft operations, the pilot-in-command shall advise the appropriate ATS unit as soon as practicable.

18.5.10 Reporting of aircraft observations during flight

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

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

18.5.10.3 Aircraft observations shall be reported as air-reports.

18.5.10.4 The meteorological authority shall make arrangements with the appropriate ATS authority to ensure that on receipt by the ATS units of special air-reports by voice communication of:

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

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

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

18.5.12 Aerodrome forecasts

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

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

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

a. identification of the type of forecast;
b. location indicator;
c. time of issue of forecast;
d. identification of a missing forecast, when applicable;
e. date and period of validity of forecast;
f. identification of a cancelled forecast, when applicable;
g. surface wind;

h. visibility;
i. weather;
j. cloud;
k. expected significant changes to one or more of these elements during the period of validity; and
l. optional elements shall be included in TAF in accordance with regional air navigation agreement.

18.5.12.4 Aerodrome meteorological offices preparing TAF shall keep the forecasts under continuous review and, when necessary, shall issue amendments promptly. The length of the forecast messages and the number of changes indicated in 18.5.23.4. Aerodrome meteorological offices preparing TAF shall keep the forecasts under continuous review and, when necessary, shall issue amendments promptly. The length of the forecast messages and the number of changes indicated in the forecast shall be kept to a minimum.

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

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

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

18.5.13 Landing forecasts

18.5.13.1 A landing forecast shall be prepared by the aerodrome meteorological office designated by the meteorological authority concerned as determined by regional air navigation agreement; such forecasts are intended to meet the requirements of local users and of aircraft within about one hour's flying time from the aerodrome.

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

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

18.5.14 Forecasts for take-off

A forecast for take-off shall be prepared by the aerodrome meteorological office designated by the meteorological authority concerned if required by agreement between the meteorological authority and operators.

18.5.15 Area forecasts for low-level flights

18.5.15.1 When the density of traffic operating below flight level 100 (or up to flight level 150 in mountainous areas, or higher, where necessary) warrants the routine issue and dissemination of area forecasts for such operations, the frequency of issue,

the form and the fixed time or period of validity of those forecasts and the criteria for amendments thereto shall be determined by the meteorological authority in consultation with the users.

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

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

18.5.16 SIGMET information

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

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

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

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

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

18.5.17 AIRMET information

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

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

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

18.5.18 Aerodrome warnings

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

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

18.5.19 Wind shear warnings and alerts

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

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

18.5.20 Reserve

ANSPs shall establish and implement internal procedures to ensure that information on the operational status of navigation aids is promptly forwarded to appropriate air traffic service (ATS)units as follow:

a. 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.

b. Information on the operational status, and any changes thereto, of radio navigation services and visual aids as referred to in (a.) 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.

18.5.21 Provision of aeronautical climatological information

Aeronautical climatological information required for the planning of flight operations shall be prepared in the form of aerodrome climatological tables and aerodrome climatological summaries. Such information shall be supplied to aeronautical users as agreed between the meteorological authority and those users.

18.5.22 Copies of meteorological observational data

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

18.5.23 Provision of service for operators and flight crew members

18.5.23.1 Meteorological information shall be supplied to operators and flight crew members for:

a. pre-flight planning by operators;
b. in-flight re-planning by operators using centralized operational control of flight operations;
c. use by flight crew members before departure; and
d. aircraft in flight.

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

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

a. forecasts of:
    i. upper wind and upper-air temperature;
    ii. upper-air humidity;
    iii. geopotential altitude of flight levels;
    iv. flight level and temperature of tropopause;

v. direction, speed and flight level of maximum wind; and
vi. SIGWX phenomena;

b. METAR or SPECI (including trend forecasts as issued in accordance with regional air navigation agreement) for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;
c. TAF or amended TAF for the aerodromes of departure and intended landing, and for take-off, en-route and destination alternate aerodromes;
d. forecasts for take-off;
e. SIGMET information and appropriate special air-reports relevant to the whole route;
f. volcanic ash and tropical cyclone advisory information relevant to the whole route;
g. subject to regional air navigation agreement, GAMET area forecast and/or area forecasts for low-level flights in chart form prepared in support of the issuance of AIRMET information, and AIRMET information for low-level flights relevant to the whole route;
h. aerodrome warnings for the local aerodrome;
i. meteorological satellite images; and
j. ground-based weather radar information.

18.5.23.4 Forecasts listed under 18.5.23.3 a) shall be generated from the digital forecasts provided by the WAFCs whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, unless otherwise agreed between the meteorological authority and the operator concerned.

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

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

18.5.23.7 When forecasts of upper wind and upper-air temperature listed under 18.5.23.3 a) i) are supplied in chart form, they shall be fixed time prognostic charts for flight levels as specified in Annex 3 Appendix 2, 1.2.2 a). When forecasts of SIGWX phenomena are supplied in chart form, they shall be fixed time prognostic charts for an atmospheric layer limited by flight levels as specified in Annex 3, Appendix 2, 1.3.2 and Appendix 5, 4.3.2.

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

18.5.23.9 Meteorological authority who is tasked to provide service for operators and flight crew members shall when necessary initiate coordinating action with the

meteorological authorities of other States with a view to obtaining from them the reports and/or forecasts required.

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

18.5.24 **Briefing, consultation and display**

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

18.5.24.2 Meteorological information used for briefing, consultation and display shall include any or all of the information listed in sub-regulation 18.5.23.3.

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

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

18.5.25 Flight documentation

18.5.25.1 Flight documentation to be made available shall comprise information listed under sub-regulation 18.5.23.3 a) (i) and (vi), b), c), e), f) and, if appropriate, g).

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

agreed between the operator and the aerodrome meteorological office concerned.

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

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

18.5.26.1 Where meteorological authority uses automated pre-flight information systems to supply and display meteorological information to operators and flight crew members for self-briefing, flight planning and flight documentation purposes, the information supplied and displayed shall comply with the relevant provisions in sub-regulations 18.5.23 to 18.5.25 inclusive.

18.5.26.2 Where automated pre-flight information systems are used to provide for a harmonized, common point of access to meteorological information and AIS information by operators, flight crew members and other aeronautical personnel concerned, the meteorological authority shall remain responsible for the quality control and quality management of meteorological information provided by means of such systems in accordance with sub-regulation 18.5.4

18.5.27 Information for aircraft in flight

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

18.5.27.2 Meteorological information for use by aircraft in flight shall be supplied to ATS units in accordance with the specifications of Annex 3, Chapter 10.

18.5.27.3 Meteorological information shall be supplied through D-VOLMET or VOLMET broadcasts in accordance with the specifications of Annex 3, Chapter 18.

18.5.28 Information for ATS units

18.5.28.1 The meteorological authority shall designate a meteorological office to be associated with each ATS units. The associated meteorological office shall, after coordination with the ATS units, supply, or arrange for the supply of, up-to-date meteorological information to the units as necessary for the conduct of their functions.

18.5.28.2 If applicable, the associated meteorological office for a flight information center or an area control center shall be a meteorological watch office.

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

18.5.29 Information for search and rescue services units

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

18.5.30 Information for AIS units

The meteorological authority, in coordination with the [CAA] shall arrange for the supply of up-to-date meteorological information to relevant AIS units, as necessary, for the conduct of their functions.

18.5.31 Requirements for communications

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

18.5.31.2 Suitable telecommunications facilities shall be made available to permit meteorological watch offices to supply the required meteorological information to ATS and search and rescue services units in respect of the flight information regions, control areas and search and rescue regions for which those offices are responsible, and in particular to flight information center, area control center and rescue coordination center and the associated ATE stations.

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

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

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

18.5.32 Use of aeronautical fixed service communications and the public internet — meteorological bulletins

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

18.5.33 Use of aeronautical mobile service communications

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

18.5.34 Use of aeronautical data link service —contents of D-VOLMET

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

18.5.35 Use of aeronautical broadcasting service —contents of VOLMET broadcasts

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

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

Chapter 18.6 – Aeronautical Search and Rescue Service (SAR)

Chapter 18.6 – Aeronautical Search and Rescue Service

18.6.1 Definition

When the following terms are used in the Standards and Recommended Practices for search and rescue, they have the following meanings:

Alerting post. Any facility intended to serve as an intermediary between a person reporting an emergency and a rescue coordination center or rescue sub center.

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

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

Ditching. The forced landing of an aircraft on water.

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

Joint rescue coordination center (JRCC). A rescue coordination center responsible for both aeronautical and maritime search and rescue operation.

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

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

Rescue. An operation to retrieve persons in distress, provide for their initial medical or other needs, and deliver them to a place of safety.

Rescue coordination center (RCC). 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.

Rescue sub center (RSC). A unit subordinate to a rescue coordination center, established to complement the latter according to particular provisions of the responsible authorities.

Search. An operation normally coordinated by a rescue coordination center or rescue sub center using available personnel and facilities to locate persons in distress.

Search and rescue aircraft. An aircraft provided with specialized equipment suitable for the efficient conduct of search and rescue missions.

***Search and rescue facility*.** Any mobile resource, including designated search and rescue units, used to conduct search and rescue operations.

Search and rescue service. The performance of distress monitoring, communication, coordination and search and rescue functions, initial medical assistance or medical evacuation, through the use of public and private resources, including cooperating aircraft, vessels and other craft and installations.

Search and rescue region (SRR). An area of defined dimensions, associated with a rescue coordination center, within which search and rescue services are provided.

Search and rescue unit. A mobile resource composed of trained personnel and provided with equipment suitable for the expeditious conduct of search and rescue operations.

State of Registry. The State on whose register the aircraft is entered.

Uncertainty phase. A situation wherein uncertainty exists as to the safety of an aircraft and its o c c u p a n t s .

18.6.2 Provision of Aeronautical Search and Rescue Services

18.6.2.1 This CANR Chapter 18-6 establishes general provisions governing the rights and obligations of SAR Service Providers and other parties planning for or participating in civil aviation search and rescue operations.

18.6.2.2 The SAR Service provider shall in coordination with the Authority:

a. determine the type and degree of search and rescue services to be provided within the search and rescue region and shall coordinate such services in accordance with these regulations;
b. establish a system for reporting occurrences and the conduct of Search and Rescue operations to the Authority; and
c. ensure the availability of sufficient resources and facilities to coordinate the search and rescue operations at any one time.

18.6.2.3 SAR Service provider shall, individually or in cooperation with other SAR Service provider, arrange for the establishment and prompt provision of search and rescue services within their territories to ensure that assistance is rendered to persons in distress. Such services shall be provided on a 24-hour basis.

18.6.2.4 The SAR Procedures shall be prepared taking into consideration available resources within the country of various organization for example, Defense Forces, Marine Authority, Fire Brigade, Hospitals, Police and other Organizations as may be applicable. The relevant Organizations shall render appropriate assistance and services as per the detailed role & procedures agreed upon and required for SAR Organization.

18.6.2.5 The Authority in coordination with the SAR Service provider shall ensure availability of resources, communication facilities and a skilled manpower to coordinate and provide the search and rescue functions.

18.6.2.6 The Authority shall also establish and provide SAR services in those portions of the high seas where Air Traffic Services are being provided on the basis of regional air navigation agreement.

18.6.2.7 The SCCA/SAR Service provider shall establish processes to improve service provision, including the aspects of planning domestic and international cooperative arrangements and training.

18.6.2.8 In providing assistance to aircraft in distress and to survivors of aircraft accidents, the SAR Service provider shall do so regardless of the nationality or status of such persons or the circumstances in which such persons are found.

18.6.2.9 ANSP involved with Search and rescue operation shall use search and rescue units and other available facilities to assist any aircraft or its occupants that are or appear to be in a state of emergency.

18.6.2.10 Where separate aeronautical and maritime rescue coordination center serve the same area, the SAR Service provider shall ensure the closest possible cooperation and coordination between the relevant aeronautical, maritime and military emergency response services.

18.6.2.11 The SAR Service provider shall facilitate consistency and cooperation between aeronautical and maritime search and rescue services.

18.6.2.12 Where separate aeronautical and maritime rescue coordination center serve the same area, States/ SAR Service provider shall ensure the closest practicable coordination between the center

18.6.2.13 The SAR Service provider may/shall cooperate in establishment of joint rescue coordination center to coordinate aeronautical and maritime search and rescue operations where practical.

18.6.2.14 The relevant between aeronautical and maritime authorities shall provide the closest practicable coordination for the most effective and efficient search and rescue service.

18.6.2.15 The SAR Service provider of the Cambodia shall determine the type and degree of search and rescue services to be provided within the Cambodia SRR in accordance with

a. Annex 12—Search and Rescue to the Convention on International Civil Aviation;
b. The International Aeronautical and Maritime Search and Rescue (IAMSAR) manual (ICAO Doc.973l -AN/9580; and
c. ICAO Basic Air Navigation Plan Asia and Pacific and Facilities and Services Implementation Document (Doc 9673).

18.6.2.16 The SAR Service provider may arrange for services to be provided on its behalf.

18.6.2.17 The identity of the SAR Service provider and the services to be provided shall be included in the Cambodia AIP.

18.6.2.18 No person shall provide civil aviation search and rescue services except under the authority of, and in accordance with the provisions of this regulation.

18.6.2.19 The SSCA/SAR service provider may, in order to ensure uniform application of Standard and Recommended Practices contained in this regulation, prescribe and issue complimentary procedures, specifications and requirements, through Directives or in the form of Standards Manuals, Organization and procedures for Search and Rescue as deemed Appropriate.

18.6.2.20 The SSCA/SAR Providers/Aerodrome Operators where applicable, shall ensure compliance with such procedures and directives.

18.6.3 General Obligations of SAR Service provider

18.6.3.1 The SAR Service provider shall:

a. Use established processes to plan, develop, conduct and improve civil aviation search and rescue operations in accordance with the provisions contained in Annex 12—Search and Rescue to the Convention on International Civil Aviation;
b. Have regard to relevant and appropriate guidance material contained in the International Aeronautical and Maritime Search and Rescue manual,
c. Prepare an annual report that contains:
    i. An assessment of prevailing risks to both civil aviation operations and SAR operations in the Cambodia.
    ii. An evaluation of the integrity and coverage of its services,
    iii. An identification of any shortcomings and deficiencies,
    iv. A formal notification to the Authority of proposed changes that effectively respond to its findings on such assessment, evaluation and identification,

18.6.3.2 The SAR Service provider shall produce, maintain and update master copies of all manuals required for the safe, effective and timely provision of civil aviation SAR services in the Cambodia and provide copies, on request, to the Authority.

18.6.4 Report System

18.6.4.1 The SAR service provider shall establish a reporting system covering documentation of incidents that occur during the conduct of SAR operations.

18.6.4.2 The SAR service provider shall notify any such incident to the Authority within seven days containing explanation of the event and specifying any proposed mitigation measures.

18.6.5 Competence and Training

18.6.5.1 The SAR Service provider shall ensure that initial and recurrent training of all RCC and, as appropriate, RSC operational and immediate supervisory staff which is conducted to a syllabus that:

a. Including the content of the international Aeronautical and Maritime search and rescue Manual (ICAO Document 9731-AN958)
b. Pays due regard to:
    i. Aviation law,
    ii. Rule of the air,
    iii. Air traffic control,
    iv. Aeronautical charts,
    v. Aeronautical Information
    vi. Aircraft accident and incident investigation,
    vii. Aircraft Performance,
    viii. Airspace management,
    ix. Aeronautical communication including proficiency in the

English language,
x. Aeronautical meteorology
xi. Aircraft security

c. Is acceptable to the Authority

18.6.5.2 The SAR Service provider shall ensure that RCC staff are given regular proficiency training and exercises to maintain skills, knowledge and attitudes as appropriate to the provision of civil aviation SAR services to domestic and international civil aviation operations and acceptable to the Authority.

18.6.6 Quality Assurance System (QAS) Requirements

18.6.6.1 A SAR Service Certificate Holder shall establish an internal quality assurance system (QAS) to ensure compliance with its procedures required by these Regulations and their adequacy.

18.6.6.2 The QAS shall, include –

a. A quality assurance policy and procedures that are relevant to the applicant's organizational goals and the expectations and needs of the aviation industry;
b. Procedures to ensure that aeronautical data is traceable to its origin to allow any detected data anomalies or errors to be corrected;
c. Procedures to ensure quality indicators relevant to the service being provided, are monitored to identify existing problems or potential causes of problems within the system;
d. A procedure for corrective action to ensure existing problems that have been identified within the system are corrected;
e. A procedure for preventive action to ensure that potential causes of problems that have been identified within the system are remedied;
f. An internal quality audit program to audit the applicant's organization for conformity with its quality assurance system; and
g. Management review procedures to ensure the continuing suitability and effectiveness of the internal quality assurance system in satisfying the requirements of this Subpart.

18.6.7 Establishment of Search and rescue region

The search and rescue region within which search and rescue services shall be provided will be coincident to the Asia/Pacific Flight Information Region published in the Cambodia Aeronautical Information Publication (AIP), and shall with respect to the high seas, cover the Cambodia maritime search and rescue region.

18.6.8 Establishment of Rescue coordination center and rescue sub center

18.6.8.1 The SAR Service provider shall establish and publish in the AIP, a rescue coordination center, equipped with appropriate facilities and personnel to:

a. facilitate efficient organization of search and rescue services; and
b. coordinate the conduct of search and rescue operations within the search and rescue region.

18.6.8.2 The SAR Service provider may establish and publish in the AIP search and rescue

sub center subordinate to the rescue coordination center where this is considered to improve the efficiency of search and rescue services within Cambodia.

18.6.8.3 The rescue coordination center and, as appropriate, rescue sub center, shall be staffed 24 hours a day by trained personnel proficient in the use of English language used for radiotelephony communications.

18.6.8.4 The rescue coordination center personnel involved in the conduct of radiotelephony communications shall be proficient in the use of the English language.

18.6.8.5 The SAR Service provider shall make formal arrangements for cooperative and appropriate use of public and private search and rescue units that are suitably located, equipped and crewed for search and rescue operations throughout the search and rescue region;

18.6.8.6 The SAR Service provider shall maintain an accurate and complete database of Search and Rescue Units and other Search and Rescue facilities and resources within the search and rescue region and make arrangements for the timely advice to the Rescue Coordination Center of any change in their readiness or capability;

18.6.8.7 In areas where telecommunications facilities would not permit persons observing an aircraft in emergency to notify the rescue coordination center concerned directly and promptly, suitable units of public or private services shall be designated and such units shall be published in the AIP as alerting posts

18.6.8.8 The SSCA shall establish the rescue coordination center to cooperate, collaborate, coordinate, contract and communicate with National Emergency Coordinating Center (NECC) have responded to changing demands with innovative and contemporarily relevant improvements to strengthen SAR services within Cambodia.

18.6.9 Search and rescue communications

18.6.9.1 The SAR Service provider shall ensure that the rescue coordination center shall have means of rapid and reliable two-way communication with:

a. associated air traffic services units;
b. associated rescue sub-center;
c. appropriate direction-finding and position-fixing stations;
d. where appropriate, coastal radio stations capable of alerting and communicating in the region;
e. the headquarters of search and rescue units in the region;
f. all maritime rescue coordination center in the region and aeronautical, maritime or joint rescue coordination center in adjacent regions;
g. a designated meteorological office or meteorological watch office; search and rescue units;
h. alerting posts; and
i. the COSPAS-SARSAT Mission Control Center servicing the search and rescue region.

18.6.9.2 The SAR Service provider shall ensure that each rescue sub center have means of rapid and reliable two-way communication with:

a. adjacent rescue sub-center;
b. a meteorological office or meteorological watch office;
c. search and rescue units; and
d. alerting posts

18.6.9.3 The SAR service provider designated pursuant to these regulations to operate an RCC shall ensure that the RCC shall be capable of rapid and reliable two-way communication with:

a. associated air traffic services,
b. associated rescue sub-center,
c. appropriate direction-finding and position-fixing stations in the SRR,
d. the appropriate operations center of SRUs in the SRR,
e. all MRCCs in the SRR and all ARCCs, MRCCs and JRCCs in adjacent SRRs,
f. designated meteorological offices and meteorological watch offices in the SRR,
g. all SRUs,
h. all alerting posts,
i. all police forces,
j. the Cospas-Sarsat Mission Control Center servicing the SRR or the relevant SPOC, as appropriate,
k. all aviation and maritime security and surveillance center in Cambodia SRR.

18.6.9.4 The SAR service provider designated pursuant to these regulations to operate an RSC within Cambodia SRR shall ensure that the RSC shall have means of rapid and reliable two-way communication with:

a. the RCC,
b. associated air traffic services,
c. associated police forces,
d. adjacent rescue sub-center,
e. Associated meteorological office or meteorological watch office,
f. Appropriate designated SAR Units,
g. Appropriate alerting posts,
h. Associated aviation and maritime security and surveillance center in Cambodia SRR.

18.6.10 Search and rescue units

18.6.10.1 The SAR Service provider shall publish in the AIP, as search and rescue units, elements of public or private services suitably located and equipped for search and rescue operations.

Note. — The minimum units and facilities necessary for provision of search and rescue operations within a search and rescue region are determined by regional air navigation agreements and are specified in the appropriate Air Navigation Plan, Facilities and Services Implementation Document publications.

18.6.10.2 The SAR Service provider shall publish in the AIP, as parts of the search and rescue plan of operation, elements of public or private services that do not qualify as search and rescue units but are able to participate in search and rescue operations.

18.6.10.3 The SAR Service provider shall ensure that each SRU:

a. Is cognizant of all parts of the plans of operations that are necessary for the effective conduct of its tasks,
b. Keeps the RCC informed of its preparedness

18.6.10.4 The SAR Service provider shall ensure that arrangements are made for:

a. The constant readiness of the required number of SAR facilities,

b. Adequate supplies of rations, medical provisions, signaling devices and other appropriate survival and rescue equipment.

18.6.11 Search and rescue resources and facilities

18.6.11.1 The SAR Service provider shall ensure the availability of sufficient accommodation, equipment, and resources to coordinate not less than two civil aviation search and rescue operations at any one time.

18.6.11.2 The SAR Service provider shall establish a contingency plan that includes completed arrangements to secure access to alternative accommodation and resources in order to ensure the ongoing provision of civil aviation search and rescue services in the event of primary accommodation or equipment becoming unavailable for any reason.

18.6.11.3 The SAR Service provider shall ensure the provision of an RCC which must be staffed on a 24-hour basis by a complement of personnel who are trained, qualified, proficient and certified to levels of competence relevant to the functions and responsibilities appropriate to a SAR service in the Cambodia and acceptable to the Authority.

18.6.11.4 The SAR Service provider shall ensure that:

a. Provision is made for a 406 MHz ELT register that is updated whenever necessary,
b. Registered ELT information is immediately available to RCC and other authorized SAR parties.

18.6.11.5 The RCC shall:

a. Designate and make formal arrangements for cooperative and appropriate use of public and private SAR Units that are suitably located, equipped and crewed for search and rescue operations throughout Cambodia SRR within the SRR.
b. Designate and make formal arrangements for cooperative and appropriate use of craft, vehicles and personnel that do not qualify as SAR Units, but which may be able to effective participate in SAR operations.
c. Maintain an accurate complete database of SAR Units and other SAR facilities and resources within the Cambodia SRR then arrange for the timely advice to the RCC of any change in their readiness or capability.

18.6.11.6 The SAR Service provider shall provide relevant information on the availability of SAR Units within Cambodia SRR to the Authority for publication in the AIP.

18.6.11.7 The SAR Service provider shall ensure the availability of appropriately packed, droppable life support equipment that is securely positioned and maintained at strategic locations throughout the Cambodia SRR and readily available for rapid loading onto SAR Units.

18.6.11.8 The SAR Service provider shall ensure the availability of trained personnel and necessary personal safety equipment at strategic locations within Cambodia SRR for the airborne delivery of life support equipment to accident survivors from SAR Units.

18.6.11.9 The SSCA shall provide relevant information on the availability of SAR Units within Cambodia SRR to the Authority for publication in the AIP for the civil aviation quality assurance and sustainability for search and rescue services.

18.6.12 Search and rescue equipment

18.6.12.1 The SAR Service provider shall ensure that –

a. search and rescue units are provided with equipment for locating promptly, and for providing adequate assistance at, the scene of an accident;
b. search and rescue units have means of rapid and reliable two-way communication with other search and rescue facilities engaged in the same operation;
c. search and rescue aircraft are equipped to be able to communicate on the aeronautical distress, on- scene frequencies and on such other frequencies as may be determined by the Authority;
d. search and rescue aircraft are equipped with a device for homing on distress frequencies;
e. search and rescue aircraft, when used for search and rescue over maritime areas, are equipped to be able to communicate with vessels;

18.6.12.2 Each search and rescue aircraft, when used for search and rescue over maritime areas carry a copy of the International Code of Signals to enable it to overcome language difficulties that may be experienced in communicating with ships.

18.6.12.3 Unless it is known that there is no need to provide supplies to survivors by air, at least one of the aircraft participating in a search and rescue operation shall carry droppable survival equipment.

18.6.12.4 The SAR Service provider shall ensure that appropriate survival equipment, suitably packed for dropping by aircraft are located at aerodromes.

18.6.12.5 The SSCA shall provide the equipment for strengthen SAR services and follow up SAR service provider.

18.6.13 Document Library

18.6.13.1 The SAR Service provider shall establish and maintain a document library that is readily accessible by its operational and management staff that contains up to date editions of relevant documentation that is immediately accessible by its operational and management staff at all times.

18.6.13.2 The library shall at all times have available for reference:

a. Current editions of Annex 12 to the Convention on International Civil Aviation –Search and Rescue;
b. International Aeronautical and Maritime Search and Rescue Manual;
c. Handbook on Distress Alert Messages for Rescue Coordination Center (RCCs);
d. Search and Rescue Points of Contact (SPOCs);
e. IMO Ship Security Competent Authorities (Cospas-Sarsat Document Reference G.007)
f. International Code of Signals (IMO Sales Numbers IA994E) and other technical documentation relevant to the effective delivery of SAR services in the Cambodia.
g. ICAO Basic Air Navigation Plan Asia and Pacific Facilities and Services Implementation Document (Doc 9673).

18.6.13.3 The SAR Service provider shall produce, maintain and update master copies of all manuals required for the safe, effective and timely provision of SAR services in the Cambodia and provide copies, on request, to the SSCA.

18.6.14 Search and Rescue Procedures manual

18.6.14.1 The SSCA/SAR service provider shall develop and maintain a search and rescue operations procedures manual. The operations procedures manual shall serve to demonstrate how the SAR service provider will comply with the requirements set out in this Regulation.

18.6.14.2 The contents of the operations procedures manual shall include but not limited to the following:

a. the information required of the SAR service provider as mentioned in this Regulation; and
b. a description of the SAR service provider that shows the role, responsibilities and job functions of the search and rescue personnel who are responsible for ensuring the compliance of the organization with the requirements in sub-paragraph (a).

18.6.14.3 The SSCA/SAR service provider shall:

a. keep the operations procedures manual in a readily accessible form;
b. ensure that SAR personnel have ready access to the operations procedures manual; and
c. amend the operations procedures manual whenever necessary to keep its content up to date.

18.6.14.4 The Authority/SAR service provider shall submit a copy of the most current operations procedures manual to Air Navigation Standard and Safety Department (ANSSD).

18.6.15 Collaboration and Cooperation with other Services

18.6.15.1 Cooperation and coordination with other States and Agencies

a. The SAR Service provider shall ensure that the search and rescue organization is coordinated with those of neighboring States.

i. The SAR Service provider shall, whenever necessary, coordinate its search and rescue operations with those of neighboring States especially when these operations are proximate to adjacent search and rescue regions.

ii. The SAR Service provider shall, in so far as practicable, develop common search and rescue plans and procedures to facilitate coordination of search and rescue operations with those of neighboring States.

iii. The Authority, through the rescue coordination center:

1. may request from other rescue coordination center such assistance, including aircraft, vessels, persons or equipment, as may be needed;
2. shall grant any necessary permission for the entry of such aircraft, vessels, persons or equipment into the territory; and
3. make the necessary arrangements with the appropriate customs, immigration or other authorities with a view to expediting such entry.

iv. The rescue coordination center shall have requested to provide assistance to other rescue coordination center, and shall coordinate any assistance required by those rescue coordination center in the form of aircraft, vessels, persons or equipment.

b. The SAR Service provider shall make arrangements for:

a. joint training exercises involving its search and rescue units, those of other States and operators, in order to promote search and rescue efficiency.

b. periodic liaison visits by personnel of its rescue coordination center and sub-center to the center of neighboring States.

18.6.15.1.1 Search and rescue letters of agreement

a. The SAR Service provider in coordination with the Authority and relevant government authorities shall establish letters of agreement with search and rescue service providers within the State and with all search and rescue agencies of contiguous States to strengthen search and rescue cooperation and coordination.

b. The SAR Service provider shall set forth in the agreements, the conditions for entry of each other's search and rescue units into respective territories and shall ensure that these agreements also provide for expediting entry of such units with the least possible formalities.

c. The SSCA shall establish letters of agreement with search and rescue service providers within the State and with all search and rescue agencies of contiguous States to strengthen search and rescue cooperation, contraction, communication, collaboration and

coordination within search and rescue service efficiency.

18.6.15.2 Entry into the territory of Cambodia by other States

a. The Director General for Technical shall in coordination with relevant government authorities and subject to such conditions as may be prescribed by authorities, permit immediate entry into the Cambodian territory, search and rescue units of other States for the purpose of searching for the site of aircraft accidents and rescuing survivors of such accidents.
b. Other States, which wish their search and rescue units to enter the territory of Cambodia for search and rescue purposes shall transmit a request, giving full details of the projected mission and the need for it, to the Director General for Technical.
c. The Director General shall:
    i. acknowledge the receipt of such a request, and
    ii. in coordination with relevant State agencies, as soon as possible, indicate the conditions, if any, under which the projected mission may be undertaken.

18.6.15.3 Cooperation with other services not forming part of the search and rescue organization

a. All aircraft, vessels, local services and facilities, which do not form part of the search and rescue organization shall cooperate fully with the search and rescue organization in search and rescue and shall extend any possible assistance to the survivors of aircraft accidents.
b. Close coordination between relevant aeronautical and maritime authorities shall be maintained to provide for the most effective and efficient search and rescue services.
c. The SAR Service provider shall ensure that search and rescue services cooperates with those agencies responsible for investigating accidents and with those responsible for the care of those who suffer from the accidents.
d. To facilitate accident investigation, rescue units shall, when practicable, be accompanied by persons qualified in the conduct of aircraft accident and incident investigations.

18.6.15.4 Establishment of aeronautical search and rescue committee

a. The SAR Service provider, shall in coordination with the relevant government departments, establish an aeronautical search and rescue committee to ensure a coordinated and effective search and rescue service within Cambodia.
b. The aeronautical search and rescue committee shall comprise representatives from:
    i. The ministry responsible for civil aviation
    ii. Civil aviation authority
    iii. Air traffic services
    iv. Aircraft operators
    v. Cambodia defense forces

vi. The maritime authority
vii. Police service
viii. The meteorological services
ix. Airports authority
x. Airline pilots' association
xi. Accident Investigation; and
xii. Such other person as may be deemed necessary by the Government.

c. The SAR Service provider shall appoint the chairperson of the committee from among the members, whose role will be to coordinate the functions of the committee with the assistance of SSCA appointed by the committee from among its members.

d. The committee shall in coordination with the SAR Service provider ensure the effective delivery of search and rescue services within the search and rescue region in accordance with these regulations.

e. Notwithstanding sub-decree, the committee and SAR Service provider in coordination shall be responsible for:

i. Developing and recommending the national strategic search and rescue policy;
ii. Coordination of administrative and operational matters regarding search and rescue of aircraft;
iii. Providing an interface between the national and other regional and international organizations involved in search and rescue operations;
iv. Overseeing the implementation of the search and rescue plan for Cambodia procedures contained in the aeronautical search and rescue Manual.
v. Coordinating arrangements for search and rescue training and exercises required by the search and rescue plan including follow-up of actions recommended following the conduct of search and rescue exercises;
vi. Promoting effective use of all available facilities for search and rescue;
vii. Serving as a co-operative forum to exchange information and develop positions and policies of interest to Parties involved in the Plan;
viii. Promoting close co-operation and co- ordination between civilian and military authorities and organizations for the provision of effective search and rescue services;
ix. Improving co-operation among aeronautical, maritime and land search and rescue communities for the provision of effective search and rescue services;
x. Coordinating search and rescue exercises as necessary;
xi. Ensuring the availability of appropriately packed, droppable life support equipment that is securely positioned and maintained at strategic locations throughout the search and rescue region and readily available for rapid loading onto Search and Rescue Units;

xii. Determining other ways to enhance the overall effectiveness and efficiency of search and rescue services within Cambodia and to standardize search and rescue procedures and equipment where practicable;

xiii. The SAR Committee shall/should be met at least twice a year to discuss matters related to its functions pursuant to sub-decree and to make any necessary recommendations to the SAR Service provider on matters affecting aeronautical search and rescue services in Cambodia; and

xiv. The chairperson of the committee may be at any time and in coordination with the SAR Service provider, call a special meeting of the committee when circumstances so require at a time and place to be determined and shall notify the members of the committee in writing.

18.6.15.5 Dissemination of information

a. The SAR Service provider shall:
   i. designate and publish in the Cambodia AIP, a search and rescue point of contact (SPOC) for the receipt of COSPAS-SARSAT distress data.
   ii. publish in the AIP, arrangements and information necessary for the entry into Cambodia of search and rescue units of other States for the purpose of search and rescue of aircraft.
   iii. make available, through the rescue coordination center or other agencies, information regarding search and rescue plans of operation.

b. The SSCA/SAR Service Provider shall, to the extent desirable and practicable, disseminate information to the general public and emergency response authorities regarding actions to be taken when there is reason to believe that an aircraft's emergency situation may become cause for public concern or require a general emergency response.

18.6.16 Preparatory Measures

18.6.16.1 Preparatory Information

18.6.16.1.1 The SAR Service provider shall make readily available, all times, up to-date information concerning the following in respect of its search and rescue region, search and rescue units, rescue sub-center and alerting posts, and air traffic services units:

a. means of communication that may be used in search and rescue operations,
b. addresses and telephone numbers of all operators, or their designated representatives, engaged in operations in the region; and
c. any other public and private resources including medical and transportation facilities that are likely to be useful in search and rescue.

18.6.16.1.2 The SAR Service provider shall ensure that the rescue coordination center have readily available all other information of interest to search and rescue, including information regarding:

a. the locations, call signs, hours of watch, and frequencies of all radio stations likely to be employed in support of search and rescue operations;
b. the locations and hours of watch of services keeping radio watch, and the frequencies guarded;
c. locations where supplies of droppable emergency and survival equipment are stored; and
d. objects which it is known might be mistaken for unallocated or unreported wreckage, particularly if viewed from the air.

18.6.16.1.3 The rescue coordination center shall coordinate with the marine search and rescue units to have ready access to information regarding the positions, course and speed of ships within areas that may be able to provide assistance to aircraft in distress and information on how to contact such ships.

18.6.16.1.4 The SAR Service provider shall in cooperation with other States, and cooperate with the maritime authority arrange communication links with Anvers or regional ship reporting systems to facilitate search and rescue operations at sea.

18.6.16.1.5 The SAR Service provider shall provide relevant information on the availability of Search and Rescue Units within the SRR for publication in the AIP;

18.6.16.2 Search and rescue plans of operation

18.6.16.2.1 The SAR Service provider shall prepare detailed plans of operation for the conduct of search and rescue operations within SRR.

18.6.16.2.2 Search and rescue plan of operations shall be developed jointly with representatives of the operators and other public or private services that may assist in providing search and rescue services or benefit from them, taking into account that the number of survivors could be large.

18.6.16.2.3 The plans of operation shall specify arrangements for the servicing and refueling, to the extent possible, of aircraft, vessels and vehicles employed in search and rescue operations, including those made available by other States.

18.6.16.2.4 The search and rescue plans of operation shall contain details regarding actions to be taken by those persons engaged in search and rescue, including:

a. the manner in which search and rescue operations are to be conducted in SRR;
b. the use of available communication systems and facilities;
c. the actions to be taken jointly with other rescue coordination center;
d. the methods of alerting en-route aircraft and ships at sea;
e. the duties and prerogatives of persons assigned to search and rescue;
f. the possible redeployment of equipment that may be necessitated by meteorological or other conditions;
g. the methods for obtaining essential information relevant to search and rescue operations, such as weather reports and forecasts, appropriate NOTAM, etc.;

h. the methods for obtaining, from other rescue coordination center, such assistance, including aircraft, vessels, persons or equipment, as may be needed;
i. the methods for assisting distressed aircraft being compelled to ditch to rendezvous with surface craft;
j. the methods for assisting search and rescue or other aircraft to proceed to aircraft in distress; and
k. cooperative actions to be taken in conjunction with air traffic services units and other authorities concerned to assist aircraft known or believed to be subject to unlawful interference.

18.6.16.2.5 Search and rescue plans of operation shall be integrated with airport emergency plans to provide for rescue services in the vicinity of aerodromes including, for coastal aerodromes, areas of water.

18.6.16.2.6 Search and rescue plans for operation shall be integrated with emergency response plans developed by the air operators in accordance with the provisions of the civil aviation (operation of aircraft) regulations.

18.6.16.2.7 To facilitate the implementation of the search and rescue plan, the SAR Service provider shall prepare and keep updated, a search and rescue manual containing the necessary procedures for search and rescue operations and matters connected therewith.

18.6.16.3 Training and exercises

18.6.16.3.1 To achieve and maintain maximum efficiency in search and rescue, the SAR Service provider shall provide for regular training of its search and rescue personnel and arrange appropriate search and rescue exercises.

18.6.16.3.2 The SSCA shall have invited by SAR service provider to join observation training as well as search and rescue exercises to maintain efficiency in search and rescue service.

18.6.16.4 Wreckage

The SSCA shall ensure that wreckage resulting from aircraft accidents within Cambodia or, in the case of accidents on the high seas, within the search and rescue regions, is removed, obliterated or charted following completion of the accident investigation, if its presence might constitute a hazard or confuse subsequent search and rescue operations.

18.6.17 Search and rescue Operating procedures

18.6.17.1 Information Concerning Emergencies

18.6.17.1.1 Any Authority or any element of search and rescue organization having reason to believe that an aircraft is an emergency shall give immediately all available information to the rescue coordination center.

18.6.17.1.2 The rescue coordination center shall, immediately upon receipt of information concerning aircraft in emergency, evaluate such information and assess the extent of the operation required.

18.6.17.1.3 When information concerning aircraft in emergency is received from other

sources than air traffic services units, the rescue coordination center shall determine to which emergency phase the situation corresponds and shall apply the procedures applicable to that phase.

18.6.17.2 Procedures for RCC during Emergency Phases

18.6.17.2.1 Uncertainty phase;

Upon the occurrence of an uncertainty phase, the rescue coordination center shall cooperate to the utmost with air traffic services units and other appropriate agencies and services in order that incoming reports may be speedily evaluated.

18.6.17.2.2 Alert phase;

Upon the occurrence of an alert phase the rescue coordination center shall immediately alert search and rescue units and initiate any necessary action

18.6.17.2.3 Distress phase;

Upon the occurrence of a distress phase, the rescue coordination center shall immediately initiate action by search and rescue units in accordance with the appropriate plan of operation;

a. ascertain the position of the aircraft, estimate the degree of uncertainty of this position, and, on the basis of this information and the circumstances, determine the extent of the area to be searched;
b. notify the operator, where possible, and keep the operator informed of developments;
c. notify other rescue coordination center, the help of which seems likely to be required, or which may be concerned in the operation;
d. notify the associated air traffic services unit, when the information on the emergency has been received from another source;
e. request at an early stage such aircraft, vessels, coastal stations and other services not specifically included in the appropriate plan of operation and able to assist to:
    i. maintain a listening watch for transmissions from the aircraft in distress, survival radio equipment or ELT 406Mhz.
    ii. assist the aircraft in distress as far as practicable; and inform the rescue coordination center of any developments;
    iii. from the information available, draw up a detailed plan of action for the conduct of the search and/or rescue operation required and communicate such plan for the guidance of the authorities immediately directing the conduct of such an operation;
    iv. amend as necessary, in the light of evolving circumstances, the detailed plan of action;
    v. notify the appropriate accident investigation authorities; and
    vi. notify the State of Registry of the aircraft.
f. the order in which these actions are described shall be followed unless circumstances dictate otherwise.

18.6.17.2.4 In the event that an emergency phase is declared in respect of an aircraft whose position is unknown and may be in one of two or more search and rescue regions, the following shall apply:

a. When a rescue coordination center is notified of the existence of an emergency phase and is unaware of other center taking appropriate action, it shall assume responsibility for initiating suitable action in accordance with these regulations and shall confer with neighboring rescue coordination center with the objective of designating one rescue coordination center to assume responsibility forthwith;

b. Unless otherwise decided by common agreement of the rescue coordination center concerned, the rescue coordination center to coordinate search and rescue action shall be the center responsible for:

i. the region in which the aircraft last reported its position; or

ii. the region to which the aircraft was proceeding when its last reported position was on the line separating two search and rescue regions; or

iii. the region to which the aircraft was destined the region to which the aircraft was destined when it was not equipped with suitable two-way radio communication or not under obligation to maintain radio communication; or

iv. the region in which the distress site is located as identified by the COSPAS-SARSAT system.

v. After declaration of the distress phase, the rescue coordination center with overall coordination responsibility shall inform all rescue coordination center that may become involved in the operation of all the circumstances of the emergency and subsequent developments.

vi. Likewise, all rescue coordination center becoming aware of any information pertaining to the emergency shall inform the rescue coordination center that has overall responsibility.

vii. Passing of information to aircraft in respect of which an emergency phase has been declared.

viii. Whenever applicable, the rescue coordination center responsible for search and rescue action shall forward to the air traffic services unit serving the flight information region in which the aircraft is operating, information of the search and rescue action initiated, in order that such information can be passed to the aircraft.

18.6.17.2.5 Initiation of Search and Rescue Operations in Respect of an Aircraft Whose Position Is Unknown

In the event that an emergency phase is declared in respect of an aircraft whose position is unknown and it is uncertain whether the aircraft is located in the

Cambodia SRR or another SRR, the following shall apply:

a. when the Cambodia RCC is notified of a civil aircraft emergency and is unaware of other RCCs taking responsive action, the Cambodia RCC shall take responsibility for initiating suitable procedures and shall confer with contiguous RCCs to agree upon a single RCC that will assume responsibility forthwith,
b. unless otherwise decided by common agreement of the RCCs concerned, the RCC to coordinate SAR action shall be the center responsible for:
    i. The SRR in which the aircraft last reported its position, or
    ii. The SRR to which the aircraft was proceeding when its last reported position was on the border separating two SRRs, or
    iii. The SRR to which the aircraft was destined when it was not equipped with suitable two-way radio communication or not under obligation to maintain radio communication, or
    iv. The SRR in which the distress site is located as identified by the Coaspas-Sarsat system.
c. After declaration of the distress phase, the RCC with overall coordination responsibility shall inform all RCCs that may become involved in the operation of all the circumstances of the emergency and subsequent developments. Likewise, all RCCs becoming aware of any information pertaining to the emergency shall inform the RCC that has overall responsibility.

18.6.17.3 Procedures where responsibility for operations extends to two or more Rescue Coordination Center (RCCs)

Where the conduct of operations over the entire search and rescue region is the responsibility of more than one rescue coordination center, each involved rescue coordination center shall take action in accordance with the relevant plan of operations when so requested by the rescue coordination center of the region.

18.6.17.4 Procedures for authorities in the field

The authorities immediately directing the conduct of search and rescue operations in the field or any part thereof shall:

a. give instructions to the units under their direction and inform the rescue coordination center of such instructions; and
b. keep the rescue coordination center informed of any developments.

18.6.17.5 Procedures for rescue coordination center—termination and suspension of operations

a. Search and rescue operations shall continue, when practicable, until all survivors are delivered to a place of safety or until all reasonable hope of rescuing survivors has passed.
b. The rescue coordination center shall be responsible for determining when to discontinue search and rescue operations.
c. When a search and rescue operation has been successful or when a rescue coordination center considers, or is informed, that an emergency no longer exists, the emergency phase shall be cancelled,

the search and rescue operation shall be terminated and any authorities, facilities or services that have been activated or notified shall be promptly informed.

d. If a search and rescue operation becomes impracticable and the rescue coordination center concludes that there might still be survivors, the center shall suspend on-scene activities pending further developments and shall promptly inform any agency, facility or service which has been activated or notified.

e. Relevant information subsequently received shall be evaluated and search and rescue operations resumed when justified and practicable.

18.6.17.6 Procedures at the scene of an accident

a. When multiple facilities are engaged in search and rescue operations on scene, the rescue coordination center or rescue sub-center shall designate one or more units on scene to coordinate all actions to help ensure the safety and effectiveness of air and surface operations, taking into account facility capabilities and operational requirements.

b. When a pilot-in-command observes that either another aircraft or a surface craft is in distress, the pilot shall, if possible and unless considered unreasonable or unnecessary:

   i. keep the craft in distress in sight until compelled to leave the scene or advised by the rescue coordination center that it is no longer necessary;

   ii. determine the position of the craft in distress;

   iii. as appropriate, report to the rescue coordination center or air traffic services unit as much of the following information as possible:

      1. type of craft in distress, its identification and condition;
      2. its position, expressed in geographical or grid coordinates or in distance and true bearing from a distinctive landmark or from a radio navigation aid;
      3. time of observation expressed in hours and minutes Coordinated Universal Time (UTC);
      4. number of persons observed;
      5. whether persons have been seen to abandon the craft in distress;
      6. on-scene weather conditions
      7. apparent physical condition of survivors;
      8. apparent best ground access route to the distress site; and

   iv. act as instructed by the rescue coordination center or the air traffic services unit.

c. If the first aircraft to reach the scene of an accident is not a search and rescue aircraft, it shall take charge of on-scene activities of all other aircraft. Subsequently arriving until the first search and rescue aircraft reaches the scene of the accident, and if, in the meantime, such aircraft

is unable to establish communication with the appropriate rescue coordination center or air traffic services unit, it shall, by mutual agreement hand over to an aircraft capable of establishing and maintaining such communications until the arrival of the first search and rescue aircraft.

d. When it is necessary for an aircraft to convey information to survivors or surface rescue units, and two- way communication is not available, it shall, if practicable, drop communication equipment that would enable direct contact to be established, or convey the information by dropping a hard copy message.

e. When a ground signal has been displayed, the aircraft shall indicate whether the signal has been understood or not by the means described or, if this is not practicable, by making the appropriate visual signal.

f. When it is necessary for an aircraft to direct a surface craft to the place where an aircraft or surface craft is in distress, the aircraft shall do so by transmitting precise instructions by any means at its disposal and if no radio communication can be established, the aircraft shall make the appropriate visual signal.

18.6.17.7 Passing of Information to Aircraft in Respect of Which an Emergency Phase has Been Declared

Where the RCC has responsibility for an SAR action within the Cambodia SRR, it shall forward to the Cambodia ACC information about the SAR action sufficient to enable communication of useful and relevant information to the subject aircraft and other aircraft operating in the Flight Information Region as deemed appropriate.

18.6.17.8 Procedures for Authorities in the Field

When cooperating authorities vested with functions and responsibilities under the national SAR plan engage in the field in SAR-related activity being coordinated by the RCC, they shall keep the RCC informed of instructions given to the units under their direction and inform the RCC of such instructions and other relevant developments.

18.6.17.9 Procedures for a pilot-in- command intercepting a distress transmission

Whenever a distress transmission is intercepted by a pilot-in-command of an aircraft, the pilot shall, if feasible:

a. acknowledge the distress transmission;
b. record the position of the craft in distress if given;
c. take a bearing on the transmission;
d. inform the appropriate rescue coordination center or air traffic services unit of the distress transmission, giving all available information; and at the pilot's discretion, while awaiting instructions, proceed to the position given in the transmission.

18.6.17.10 Recordkeeping

The SAR Service provider shall retain all data relating to every SAR action undertaken by the RCC in an orderly and easily accessed manner for a period of at last twelve calendar months.

18.6.17.11 Search and Rescue Signals

a. Upon observing any of the visual signals given in ICAO documents, aircraft shall take action as follows:
    i. When a ground signal has been displayed, a searching aircraft shall indicate whether the signal has been understood by any of:
        1. two-way radio communication on equipment that is to hand,
        2. communications equipment dropped from an aircraft, or, if these means are impracticable,
            i. during the hours of daylight, by rocking the aircraft's wings,
            ii. during the hours of darkness, by flashing the aircraft's lights on and off or, if not so equipped, by switching its navigation lights on and off.
    ii. Lack of the above signals would indicate that the ground signal is not understood.
b. When it is necessary for an aircraft to direct a surface craft to the place where an aircraft or surface craft is in distress, the aircraft shall do so by transmitting precise instructions by any means at its disposal. If no radio communication can be established, the aircraft shall:
    i. circle the surface craft at least once,
    ii. cross the projected course of the surface craft close ahead at low altitude, and
    iii. rock the wings, or
    iv. open and close the throttle, or
    v. change the propeller pitch, and
    vi. head in the direction in which the surface craft is to be directed. Repetition of this procedure has the same meaning.

18.6.17.12 Maintenance of records, appraisals and information sharing

a. The rescue coordination center shall keep a record of the operational efficiency of the search and rescue organization in the region.
b. The rescue coordination center shall prepare appraisals of actual search and rescue operations in the region and the reports shall include any pertinent remarks on the procedures used and on the emergency and survival equipment, and any suggestions for improvement of those procedures and equipment.
c. Appraisals which are likely to be of interest to other States shall be submitted to ICAO for information and dissemination as appropriate.

18.6.18 General Provisions of search and rescue services

18.6.18.1 Requisition of aircraft or vessel

a. The SSCA may for purposes of any aeronautical search and rescue operation-
    i. requisition any civil aircraft or vessel;
    ii. request the assistance of any military aircraft or vessel; or
    iii. request any holder of a Cambodia aircraft flight crew license or the master of a vessel to assist in the operation.
b. where the SSCA contemplates requisitioning a civilian aircraft or vessel or requesting a civilian holder of a Cambodian aircraft flight crew license or the master of a vessel, the SSCA may do so only if-
    i. human life is in immediate and grave danger; and there are no other means available to conduct the operation.

18.6.18.2 Recovery of certain expenses

a. If any search and rescue operation is undertaken in connection with any occurrence caused by the unlawful act or omission of any person, the SAR Service Provider may recover from that person the whole or any portion of the expenses incurred in connection with that operation.
b. The SSCA may/should, after having recovered the expenses contemplated in sub-decree, compensate any person who has incurred any loss or damage as a result of the operation.
c. The SSCA shall determine and notify in writing the expenses to be recovered depending on the nature of the unlawful act or omission.

18.6.18.3 Record keeping by the SAR Service Provider

SAR Service Provider shall retain all data relating to every search and rescue action undertaken by the rescue coordination center in an orderly and easily accessed manner for a period of at least twelve calendar months.

Chapter 18.7 – CNS Services

Chapter 18.7 – CNS Services

18.7.1 Definition

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

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.

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

Effective acceptance bandwidth. The range of frequencies with respect to the assigned frequency for which reception is assured when all receiver tolerances have been taken into account.

Effective adjacent channel rejection. The rejection that is obtained at the appropriate adjacent channel frequency when all relevant receiver tolerances have been taken into account.

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

Essential radio navigation service. A radio navigation service whose disruption has a significant impact on operations in the affected airspace or aerodrome.

Fan marker beacon. A type of radio beacon, the emissions of which radiate in a vertical fan-shaped pattern.

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

Mean power (of a radio transmitter). The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions.

Note. — A time of 1/10 second during which the mean power is greatest will be selected normally.

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:

a. 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.

b. 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.

c. Note.1— The Performance-based Navigation (PBN) Manual (Doc 9613), Volume II, contains detailed guidance on navigation specifications.

d. Note 2.— The term RNP, previously defined as "a statement of the navigation performance necessary for operation within a defined airspace", has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613.

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.

Pressure-altitude. An atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the Standard Atmosphere.

Protected service volume. A part of the facility coverage where the facility

provides a particular service in accordance with relevant SARPs and within which the facility is afforded frequency protection.

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.

Touchdown. The point where the nominal glide path intercepts the runway.

Note. — "Touchdown" as defined above is only a datum and is not necessarily the actual point at which the aircraft will touch the runway.

Z marker beacon. A type of radio beacon, the emissions of which radiate in a vertical cone-shaped pattern.

Aeronautical Administrative Communications (AAC). Communications necessary for the exchange of aeronautical administrative messages.

Aeronautical Operational Control (AOC). Communication required for the exercise of authority over the initiation, continuation, diversion or termination of flight for safety, regularity and efficiency reasons.

Aeronautical Telecommunication Network (ATN). A global internetwork architecture that allows ground, air-ground and avionic data subnetworks to

exchange digital data for the safety of air navigation and for the regular, efficient and economic operation of air traffic services.

Aircraft address. A unique combination of twenty-four bits available for assignment to an aircraft for the purpose of air-ground communications, navigation and surveillance.

Aircraft Earth Station (AES). A mobile earth station in the aeronautical mobile-satellite service located on board an aircraft (see also "GES").

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).

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.

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.

Bit error rate (BER). The number of bit errors in a sample divided by the total number of bits in the sample, generally averaged over many such samples.

Carrier-to-multipath ratio (C/M). The ratio of the carrier power received directly, i.e. without reflection, to the multipath power, i.e. carrier power received via reflection.

Carrier-to-noise density ratio (C/N_o). The ratio of the total carrier power to the average noise power in a 1 Hz bandwidth, usually expressed in dBHz.

Channel rate. The rate at which bits are transmitted over the RF channel. These bits include those bits used for framing and error correction, as well as the information bits. For burst transmission, the channel rate refers to the instantaneous burst rate over the period of the burst.

Channel rate accuracy. This is relative accuracy of the clock to which the transmitted channel bits are synchronized. For example, at a channel rate of 1.2 kbits/s, maximum error of one part in 10^6 implies the maximum allowed error in the clock is $\pm 1.2 \times 10^{-3}$Hz.

Circuit mode. A configuration of the communications network which gives the appearance to the application of a dedicated transmission path.

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

Data link flight information services (D-FIS). The provision of FIS via data link.

Doppler shift. The frequency shift observed at a receiver due to any relative motion between transmitter and receiver.

End-to-end. Pertaining or relating to an entire communication path, typically from (1) the interface between the information source and the communication system at the transmitting end to (2) the interface between the communication system and the information user or processor or application at the receiving end.

End-user. An ultimate source and/or consumer of information.

Energy per symbol to noise density ratio (E_s/N_o). The ratio of the average energy transmitted per channel symbol to the average noise power in a 1 Hz bandwidth, usually expressed in dB. For A-BPSK and A-QPSK, one channel symbol refers to one channel bit.

Equivalent isotropically radiated power (e.i.r.p.). The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).

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

Forward error correction (FEC). The process of adding redundant information to the transmitted signal in a manner which allows correction, at the receiver, of errors incurred in the transmission.

Gain-to-noise temperature ratio. The ratio, usually expressed in dB/K, of the antenna gain to the noise at the receiver output of the antenna subsystem. The noise is expressed as the temperature that a 1 ohm resistor must be raised to produce the same noise power density.

Ground earth station (GES). An earth station in the fixed satellite service, or, in some cases, in the aeronautical mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the aeronautical mobile-satellite service.

> *Note. — This definition is used in the ITU's Radio Regulations under the term "aeronautical earth station". The definition herein as "GES" for use in the SARPs is to clearly distinguish it from an aircraft earth station (AES), which is a mobile station on an aircraft.*

Mode S subnetwork. A means of performing an interchange of digital data through the use of secondary surveillance radar (SSR) Mode S interrogators and transponders in accordance with defined protocols.

Point-to-point. Pertaining or relating to the interconnection of two devices, particularly end-user instruments. A communication path of service intended to connect two discrete end-users; as distinguished from broadcast or multipoint service.

Slotted aloha. A random access strategy whereby multiple users access the same communications channel independently, but each communication must be confined to a fixed time slot. The same timing slot structure is known to all users, but there is no other coordination between the users.

Time division multiple access (TDMA). A multiple access scheme based on time-shared use of an RF channel employing: (1) discrete contiguous time slots as the fundamental shared resource; and (2) a set of operating protocols that allows users to interact with a master control station to mediate access to the channel.

Time division multiplex (TDM). A channel sharing strategy in which packets of information from the same source but with different destinations are sequenced in time on the same channel.

Transit delay. In packet data systems, the elapsed time between a request to transmit an assembled data packet and an indication at the receiving end that the corresponding packet has been received and is ready to be used or forwarded.

VHF digital link (VDL). A constituent mobile subnetwork of the aeronautical telecommunication network (ATN), operating in the aeronautical mobile VHF frequency band. In addition, the VDL may provide non-ATN functions such as, for instance, digitized voice.

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.

Note. — SSR transponders referred to above are those operating in Mode C or Mode S.

Aircraft address. A unique combination of twenty-four bits available for assignment to an aircraft for the purpose of air-ground communications, navigation and surveillance.

Note. — SSR Mode S transponders transmit extended squatters to support the broadcast of aircraft-derived position for

surveillance purposes. The broadcast of this type of information is a form of automatic dependent surveillance (ADS) known

as ADS-broadcast (ADS-B).

Automatic dependent surveillance-broadcast (ADS-B) OUT. A function on an aircraft or vehicle that periodically broadcasts its state vector (position and velocity) and other information derived from on-board systems in a format suitable for ADS-B IN capable receivers.

Automatic dependent surveillance-broadcast (ADS-B) IN. A function that receives surveillance data from ADS-B OUT data sources.

Collision avoidance logic. The sub-system or part of ACAS that analyses data relating to an intruder and own aircraft, decides whether or not advisories are appropriate and, if so, generates the advisories. It includes the following functions: range and altitude tracking, threat detection and RA generation. It excludes surveillance.

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

appropriate and, if so, generates the advisories. It includes the following functions: range and altitude tracking, threat detection and RA generation. It excludes surveillance.

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

Secondary surveillance radar (SSR). A surveillance radar system which uses transmitters/receivers (interrogators) and transponders.

Note. — The requirements for interrogators and transponders are specified in Chapter 3.

Surveillance radar. Radar equipment used to determine the position of an aircraft in range and azimuth.

Traffic information service – broadcast (TIS-B) IN. A surveillance function that receives and processes surveillance data from TIS-B OUT data sources.

Traffic information service – broadcast (TIS-B) OUT. A function on the ground that periodically broadcasts the surveillance information made available by ground sensors in a format suitable for TIS-B IN capable receivers.

Note. — This technique can be achieved through different data links. The requirements for Mode S extended squatters are specified in Annex 10, Volume IV, Chapter 5. The requirements for VHF digital link (VDL) Mode 4 and universal access transceiver (UAT) are specified in Annex 10, Volume III, Part I.

Alternative means of communication. A means of communication provided with equal status, and in addition to the primary means.

Double channel simplex. Simplex using two frequency channels, one in each direction.

Note. — This method was sometimes referred to as cross-band.

Duplex. A method in which telecommunication between two stations can take place in both directions simultaneously.

Frequency channel. A continuous portion of the frequency spectrum appropriate for a transmission utilizing a specified class of emission.

Note. — The classification of emissions and information relevant to the portion of the frequency spectrum appropriate for a given type of transmission (bandwidths) are specified in the Radio Regulations, Article 2 and Appendix 1.

Offset frequency simplex. A variation of single channel simplex wherein telecommunication between two stations is effected by using in each direction frequencies that are intentionally slightly different but contained within a portion of the spectrum allotted for the operation.

Operational control communications. Communications required for the exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of a flight.

Note. — Such communications are normally required for the exchange of messages between aircraft and aircraft operating agencies.

Primary means of communication. The means of communication to be adopted normally by aircraft and ground stations as a first choice where alternative means of communication exist.

Simplex. A method in which telecommunication between two stations takes place in one direction at a time.

Note. — In application to the aeronautical mobile service, this method may be subdivided as follows:

a. single channel simplex;
b. double channel simplex;
c. offset frequency simplex.

Single channel simplex. Simplex using the same frequency channel in each direction.

VHF digital link (VDL). A constituent mobile subnetwork of the aeronautical telecommunication network (ATN), operating in the aeronautical mobile VHF frequency band. In addition, the VDL may provide non-ATN functions such as, for instance, digitized voice.

Accuracy, in relation to a radio navigation service or facility, means the degree to which the value measured or displayed by the service or facility conforms to the true value.

Aeronautical Information Service. A service established within the defined area of coverage responsible for the provision of aeronautical information /data necessary for the safety, regularity, and efficiency of air navigation.

Air Navigation Facilities, the types of aeronautical telecommunication, radio navigation or surveillance (CNS) facilities including Airfield Lighting facility that either soloed, or by their interconnection, provide the electronic capability for the delivery of the defined services.

CNS System Specialist (CNSS) is a technical person authorized to perform the technical tasks concerning the design, installation, operation, maintenance and repair of aeronautical telecommunication and radio navigation services equipment and systems.

Airfield Lighting and Power Technician (ALPT) is technical personnel authorized to perform the technical tasks concerning the design, installation, commissioning, operation, maintenance and repair of airfield lightings and power facilities equipment and systems.

Availability, for a telecommunication service, radio navigation service or support service, means the percentage of its operating hours that the service is not interrupted.

CNS means Communication, Navigation, and Surveillance.

CNS Service refers to aeronautical telecommunication, radio navigation and surveillance service

Configuration, in relation to:

a. a CNS service – means the configuration of each facility and any interconnection between facilities that make up the service; and

b. A facility – means the configuration of equipment, hardware, software and data, and the interconnections between equipment.

Coverage, in relation to a CNS service, means the volume of airspace within which, or the locations between which, the service is nominally provided.

Functional Specification, for a CNS service or a support service, is a general description of the service, its operating principles and its functions.

Hazard means a source of potential harm to aviation safety.

Integrity, of a CNS service or a support service:

a. means the likelihood that the information supplied by the service at a particular moment is correct; and
b. Includes the ability of the service to warn users promptly when the service should not be used.

Manual of Standards means the document called "Manual of Standards (MOS). It comprises specifications (standards) prescribed by SSCA, for uniform application, determined to be necessary for the safety of air navigation. MOS are based on applicable provisions of ICAO SARPS.

Operating Hours, for a telecommunication or radio navigation service, means the times during which the service provider must, under its approval, operate the service.

Operation and Maintenance in the context of this regulation means:

- Placing a facility into operational service; or
- Removing a facility from operational service; or
- Undertaking any functions which affect the operability of a facility while the facility remains in operational service; or
- Undertaking periodic performance inspection, or any maintenance on a facility while the facility remains in operational service; or
- Undertaking any flight test on a facility for the purpose of compliance with this CANR.

Operations Manual means a manual that establishes the standards and procedures under which the services will be delivered.

Performance inspection means one or more test that show the accuracy or integrity of a facility.

Recovery time means the period during which a service is interrupted.

Reliability, of a telecommunication service, a radio navigation service or a support service, means the probability that the service will perform its function or functions without failure for a specified period.

Risk means risk to aviation industry.

Safety means aviation safety.

Service Provider means an organization authorized to operate and maintain a CNS service. In this case, ANSP is mandated by law to operate and maintain air navigation facilities.

Technical Specification, for a CNS service or facility, is a detailed description that may use technical terms and concepts, of:

a. The way in which the service or facility operates and performs its functions, and
b. The technical standards to which the service or facility has been designed and manufactured.

18.7.1.1 Services

Aeronautical broadcasting service. A broadcasting service intended for the transmission of information relating to air navigation.

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

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

Aeronautical 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 mobile (R)*service (RR S1.33). An aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes.

Aeronautical mobile-satellite service (RR S1.35). A mobile-satellite service in which mobile earth stations are located on board aircraft; survival craft stations and emergency position-indicating radio beacon stations may also participate in this service.

Aeronautical mobile-satellite (R)* service (RR S1.36). An aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes.

Aeronautical radio navigation service (RR S1.46). A radio navigation service intended for the benefit and for the safe operation of aircraft.

Note.— The following Radio Regulations are quoted for purposes of reference and/or clarity in understanding of the above definition of the aeronautical radio navigation service:

RR S1.10 Radio navigation: Radio determination used for the purpose of navigation, including obstruction warning.

RR S1.9 Radio determination: The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves.

Aeronautical telecommunication service. A telecommunication service provided for any aeronautical purpose.

International telecommunication service. A telecommunication service between offices or stations of different States, or between mobile stations which are not in the same State, or are subject to different States.

18.7.1.2 Station

Aerodrome control radio station. A station providing radio communication between an aerodrome control tower and aircraft or mobile aeronautical stations.

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

Aeronautical station (RR S1.81). A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea.

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

AFTN communication center. An AFTN station whose primary function is the relay or retransmission of AFTN traffic from (or to) a number of other AFTN stations connected to it.

AFTN destination station. An AFTN station to which messages and/or digital data are addressed for processing for delivery to the addressee.

AFTN origin station. An AFTN station where messages and/or digital data are accepted for transmission over the AFTN.

AFTN station. A station forming part of the aeronautical fixed telecommunication network (AFTN) and operating as such under the authority or control of a State.

Air-ground control radio station. An aeronautical telecommunication station having primary responsibility for handling communications pertaining to the operation and control of aircraft in a given area.

Aircraft station (RR S1.83). A mobile station in the aeronautical mobile service, other than a survival craft station, located on board an aircraft.

Communication center. An aeronautical fixed station which relays or retransmits telecommunication traffic from (or to) a number of other aeronautical fixed stations directly connected to it.

Mobile surface station. A station in the aeronautical telecommunication service, other than an aircraft station, intended to be used while in motion or during halts at unspecified points.

Network station. An aeronautical station forming part of a radiotelephony network.

Radio direction finding (RR S1.12). Radio determination using the reception of radio waves for the purpose of determining the direction of a station or object.

Radio direction-finding station (RR S1.91). A radio determination station using radio direction finding.

Note. — The aeronautical application of radio direction finding is in the aeronautical radio navigation service.

Regular station. A station selected from those forming an en-route air-ground radiotelephony network to communicate with or to intercept communications from aircraft in normal conditions.

Tributary station. An aeronautical fixed station that may receive or transmit messages and/or digital data but which does not relay except for the purpose of serving similar stations connected through it to a communication center.

18.7.1.3 Communication Methods

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

Air-to-ground communication. One-way communication from aircraft to stations or locations on the surface of the earth.

Blind transmission. A transmission from one station to another station in circumstances where two-way communication cannot be established but where it is believed that the called station is able to receive the transmission.

Broadcast. A transmission of information relating to air navigation that is not addressed to a specific station or stations.

Duplex. A method in which telecommunication between two stations can take place in both directions simultaneously.

Ground-to-air communication. One-way communication from stations or locations on the surface of the earth to aircraft.

Interpilot air-to-air communication. Two-way communication on the designated air-to-air channel to enable aircraft engaged in flights over remote and oceanic areas out of range of VHF ground stations to exchange necessary operational information and to facilitate the resolution of operational problems.

Non-network communications. Radiotelephony communications conducted by a station of the aeronautical mobile service, other than those conducted as part of a radiotelephony network.

Radiotelephony network. A group of radiotelephony aeronautical stations which operate on and guard frequencies from the same family and which support each other in a defined manner to ensure maximum dependability of air-ground communications and dissemination of air-ground traffic.

Readback. A procedure whereby the receiving station repeats a received message or an appropriate part thereof back to the transmitting station so as to obtain confirmation of correct reception.

Simplex. A method in which telecommunication between two stations takes place in one direction at a time.

Telecommunication (RR S1.3). Any transmission, emission, or reception of

signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems.

18.7.1.4 Direction Finding

Homing. The procedure of using the direction-finding equipment of one radio station with the emission of another radio station, where at least one of the stations is mobile, and whereby the mobile station proceeds continuously towards the other station.

Radio bearing. The angle between the apparent direction of a definite source of emission of electro-magnetic waves and a reference direction, as determined at a radio direction-finding station. A true radio bearing is one for which the reference direction is that of true North. A magnetic radio bearing is one for which the reference direction is that of magnetic North.

18.7.1.5 Teletypewriter Systems

Automatic relay installation. A teletypewriter installation where automatic equipment is used to transfer messages from incoming to outgoing circuits.

Note. — This term covers both fully automatic and semi-automatic installations.

Fully automatic relay installation. A teletypewriter installation where interpretation of the relaying responsibility in respect of an incoming message and the resultant setting-up of the connections required to effect the appropriate retransmissions is carried out automatically, as well as all other normal operations of relay, thus obviating the need for operator intervention, except for supervisory purposes.

Message field. An assigned area of a message containing specified elements of data.

Semi-automatic relay installation. A teletypewriter installation where interpretation of the relaying responsibility in respect of an incoming message and the resultant setting-up of the connections required to effect the appropriate retransmissions require the intervention of an operator but where all other normal operations of relay are carried out automatically.

Teletypewriter tape. A tape on which signals are recorded in the 5-unit Start-Stop code by completely severed perforations (Chad Type) or by partially severed perforations (Chadless Type) for transmission over teletypewriter circuits.

"Torn-tape" relay installation. A teletypewriter installation where messages are received and relayed in teletypewriter tape form and where all operations of relay are performed as the result of operator intervention.

18.7.1.6 Agencies

Aeronautical telecommunication agency. An agency responsible for operating a station or stations in the aeronautical telecommunication service.

Aircraft operating agency. The person, organization or enterprise engaged in, or offering to engage in, an aircraft operation.

18.7.1.7 Frequencies

Primary frequency. The radiotelephony frequency assigned to an aircraft as a first choice for air-ground communication in a radiotelephony network.

Secondary frequency. The radiotelephony frequency assigned to an aircraft as a second choice for air-ground communication in a radiotelephony network.

18.7.1.8 Data Link Communications

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

Current data authority. The designated ground system through which a CPDLC dialogue between a pilot and a controller currently responsible for the flight is permitted to take place.

Downstream data authority. A designated ground system, different from the current data authority, through which the pilot can contact an appropriate ATC unit for the purposes of receiving a downstream clearance.

Free text message element. A message element used to convey information not conforming to any standardized message element in the CPDLC message set.

Next data authority. The ground system so designated by the current data authority through which an onward transfer of communications and control can take place.

Pre-formatted free text message element. A free text message element that is stored within the aircraft system or ground system for selection. **Standardized free text message element.** A message element that uses a defined free text message format, using specific words in a specific order.

Note. — Standardized free text message elements may be manually entered by the user or pre-formatted.

18.7.1.9 Miscellaneous

Aeronautical fixed circuit. A circuit forming part of the aeronautical fixed service (AFS).

Aeronautical fixed telecommunication network circuit. A circuit forming part of the aeronautical fixed telecommunication network (AFTN).

Aeronautical telecommunication log. A record of the activities of an aeronautical telecommunication station.

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

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

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

ATS direct speech circuit. An aeronautical fixed service (AFS) telephone circuit, for direct exchange of information between air traffic services (ATS) units.

Automatic telecommunication log. A record of the activities of an aeronautical telecommunication station recorded by electrical or mechanical means.

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 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.

Frequency channel. A continuous portion of the frequency spectrum appropriate for a transmission utilizing a specified class of emission.

Note. — The classification of emissions and information relevant to the portion of the frequency spectrum appropriate for a given type of transmission (bandwidths) is specified in the ITU Radio Regulations, Article S2 and Appendix S1.

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

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

Location indicator. A four-letter code group formulated in accordance with rules prescribed by ICAO and assigned to the location of an aeronautical fixed station.

Meteorological operational channel. A channel of the aeronautical fixed service (AFS), for the exchange of aeronautical meteorological information.

Meteorological operational telecommunication network. An integrated system of meteorological operational channels, as part of the aeronautical fixed service (AFS), for the exchange of aeronautical meteorological information between the aeronautical fixed stations within the network.

Note. — "Integrated" is to be interpreted as a mode of operation necessary to ensure that the information can be transmitted and received by the stations within the network in accordance with pre-established schedules.

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.

Operational control communications. Communications required for the exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of a flight.

Note. — Such communications are normally required for the exchange of messages between aircraft and aircraft operating agencies.

Route segment. A route or portion of route usually flown without an intermediate stop.

Routing Directory. A list in a communication center indicating for each addressee the outgoing circuit to be used.

SNOWTAM. A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format.

18.7.2 General

18.7.2.1 Scope of CCAR Part 18

This CCAR Part18, Chapter 18.7 specifies the standards and basic regulatory framework for Air Navigation Service (Service Provider) on the following matters :

a. Established Standards and Practices on the establishment, operation, and maintenance of CNS Service/air navigation facilities
b. Organization
c. General obligations and responsibilities of CNS Service Provider (ANS)
d. Facility Operations Manual
e. Documentations
f. Safety Management System
g. Applicability

This Chapter sets out the requirements for the service provider or organization involved in the:

a. Establishment, operation and maintenance of one or more ground-based aeronautical telecommunication, radio navigation or surveillance services that supports air traffic service or IFR flight.
b. Establishment, operation and Maintenance of Airfield Lighting and Power facilities on airports and/or air navigation facilities.

18.7.2.2 Interpretation

This section contains the definitions of terminology that have specific meaning in relation to this CAR-ANS Chapter 18-7. The definitions are consistent with those definitions used in ICAO Annex 10.

18.7.2.3 Standards for CNS Services

a. Any reference in these regulations relative to CNS Services is a reference to the national and international standards and practices of these services set out in conformance to ICAO Annex 10 and related documents.

b. The service provider shall comply with the standards, practices and procedures stipulated in the Manual of Standards (MOS) for CNS Services, appropriate to the operation and maintenance of such services

18.7.2.3.1 An aircraft operated as a controlled flight shall maintain continuous air-ground voice communication watch on the appropriate communication channel of, and establish two-way communication as necessary with, the appropriate air traffic control unit, except as may be prescribed by the appropriate ATS authority in respect of aircraft forming part of aerodrome traffic at a controlled aerodrome.

18.7.2.3.2 Voice communications failure ANSPs shall establish procedure and implement for air-ground radio communications failure

18.7.2.3.2.1 Air-ground

a. When an aircraft station fails to establish contact with the appropriate aeronautical station on the designated channel, it shall attempt to establish contact on the previous channel used and, if not successful, on another channel appropriate to the route. If these attempts fail, the aircraft station shall attempt to establish communication with the appropriate aeronautical station, other aeronautical stations or other aircraft using all available means and advise the aeronautical station that contact on the assigned channel could not be established. In addition, an aircraft operating within a network shall monitor the appropriate VHF channel for calls from nearby aircraft.

b. If the attempts specified under (a) fail, the aircraft station shall transmit its message twice on the designated channel(s), preceded by the phrase “TRANSMITTING BLIND” and, if necessary, include the addressee(s) for which the message is intended.

c. PANS. — In network operation, a message which is transmitted blind should be transmitted twice on both primary and secondary channels. Before changing channel, the aircraft station should announce the channel to which it is changing.

d. Receiver failure

i. When an aircraft station is unable to establish communication due to receiver failure, it shall transmit reports at the scheduled times, or positions, on the channel in use, preceded by the phrase “TRANSMITTING BLIND DUE TO RECEIVER FAILURE”. The aircraft station shall transmit the intended message, following this by a complete repetition. During this procedure, the aircraft shall also advise the time of its next intended transmission.

ii. An aircraft which is provided with air traffic control or

advisory service shall, in addition to complying with (i), transmit information regarding the intention of the pilot-in-command with respect to the continuation of the flight of the aircraft.

iii. When an aircraft is unable to establish communication due to airborne equipment failure it shall, when so equipped, select the appropriate SSR code to indicate radio failure.

18.7.2.3.2.2 Ground-to-air

18.7.2.3.2.2.1 When an aeronautical station has been unable to establish contact with an aircraft station after calls on the frequencies on which the aircraft is believed to be listening, it shall:

a. request other aeronautical stations to render assistance by calling the aircraft and relaying traffic, if necessary;
b. request aircraft on the route to attempt to establish communication with the aircraft and relay traffic, if necessary.

18.7.2.3.2.2.2 The provisions of 18.7.2.3.2.2.1. shall also be applied:

a. on request of the air traffic services unit concerned;

b. when an expected communication from an aircraft has not been received within a time period such that the occurrence of a communication failure is suspected.

Note. — A specific time period may be prescribed by the appropriate ATS Authority.

18.7.2.3.2.3 Failure of CPDLC (Controller-Pilot Data Link Communications)

Failure of a single CPDLC message — When a controller or pilot is alerted that a single CPDLC message has failed, the controller or pilot shall take one of the following actions, as appropriate:

a. *via voice, confirm the actions that will be undertaken with respect to the related dialogue, prefacing the information with the phrase: CPDLC MESSAGE FAILURE;*
b. *via CPDLC, reissue the CPDLC message that failed.*

18.7.2.3.2.3.1 A CPDLC failure should be detected in a timely manner.

18.7.2.3.2.3.2 The controller and pilot shall be alerted to a failure of CPDLC as soon as a failure has been detected.

18.7.2.3.2.3.3 When a controller or pilot is alerted that CPDLC has failed, and the controller or pilot needs to communicate prior to CPDLC being restored, the controller or pilot should revert to voice, if possible, and preface the information with the phrase: CPDLC FAILURE.

18.7.2.3.2.3.4 Controllers having a requirement to transmit information concerning a complete CPDLC ground system failure to all stations likely to intercept should preface such a transmission by the general call ALL STATIONS CPDLC FAILURE, followed by the

identification of the calling station.

Note. — No reply is expected to such general calls unless individual stations are subsequently called to acknowledge receipt.

18.7.2.3.2.3.5 When CPDLC fails and communications revert to voice, all CPDLC messages outstanding should be considered not delivered and the entire dialogue involving the messages outstanding should be recommenced by voice.

18.7.2.3.2.3.6 When CPDLC fails but is restored prior to a need to revert to voice communications, all messages outstanding should be considered not delivered and the entire dialogue involving the messages outstanding should be recommenced via CPDLC.

18.7.2.3.3 Aerodrome control towers and units providing approach control service shall be provided with information on the operational status of radio navigation services essential for approach, landing and take-off at the aerodrome(s) with which they are concerned, on a timely basis consistent with the use of the service(s) involved.

18.7.2.3.4 Related Documents

a. Manual of Standards for Radio Navigational Aids
b. Manual of Standards for Aeronautical Telecommunications- Digital Data Communications Systems)
c. Manual of Standards for Aeronautical Telecommunications- Voice Communications Systems)
d. Manual of Standards for Surveillance
e. Flight inspection Manual
f. Manual of Standards for Aerodrome (refer to AO139)

18.7.2.3.5 Provision of Service without SSCA Approval

Any person or organization disallows the provision of any service defined as CNS service if it is not authorized by SSCA.

18.7.2.3.6 Flight Inspection

All visual and radio navigation aids facilities must be subjected to periodic flight inspection to verify the performance of the facility.

For navigational aids in particular, periodic flight inspections not only entail ground tests on site but also flight inspections at defined time intervals. The time intervals, procedures, standards and equipment used for flight inspections are to provide the final assurance that the signal in space accuracy, integrity, and coverage of the facilities are within tolerances defined in the operational specifications.

18.7.2.3.7 Safety Inspection/Audit

Air Navigation Facilities are subject to SSCA, Air Navigation Standards & Safety Department Audit.

Safety Oversight Auditors/Inspectors shall have full access to all facilities to verify the safety level of the facility. Other airport authorities must provide full access pass to SSCA/ANSSD Auditors for such purpose.

18.7.2.3.8 Resolution of Identified Deficiencies

Deficiencies/Findings affecting aviation safety identified by SSCA/ANSSD Auditor shall be resolved on a predetermined time acceptable to both the service provider and ANSSD. Should necessary corrective action not be accomplished within a reasonable time to be specified by the Auditor/Inspector, the matter must be reported to the SSCA for a decision regarding possible restriction on operation.

18.7.2.3.9 Licensing on Air navigation facility certification/rating

Pursuant to Law on Civil Aviation of the Kingdom of Cambodia, Article 2, as promulgated on 19 January 2008, the SSCA shall issue an Air Navigation Facility Certification/Rating to air navigation facilities operating within the Kingdom of Cambodia to determine the compliance of its operation based on prescribed standards and requirements to assure safety in air navigation.

18.7.3 Obligations and responsibilities of the service provider

18.7.3.1 Administration

Pursuant to BCT Agreement, the ANSP is required to establish the administration of Air Navigation Services.

18.7.3.2 Technical Personnel

Technical personnel authorized to operate and maintain CNS services/facilities are the following:

a. CNS System Specialists (CNSS)
b. Airfield Lighting and Power Technicians (ALPT)

The Service Provider must ensure that the technical personnel involved in the operation and maintenance of air navigation facility holds necessary qualification as required. In particular, the service provider must ensure that each CNSS/ALPT has been appropriately trained.

18.7.3.3 Qualification Standards and Job Description

ANSP is required to establish the Qualification Standards and Job Description of CNS technical personnel in accordance with Guidance/Materials provided by SSCA.

18.7.3.4 Technical Competence Certificate (TCC) program

The service provider must adopt a system for assessing the competency of technical personnel. The service provider must have an internal certification scheme for technical personnel that establish the technical authorization granted to each personnel.

The certification must be in the form of controlled document provided to each technical personnel that identifies the personnel and the types of aeronautical telecommunication and air navigation facilities for which the personnel has been granted authorization, the operation and maintenance functions authorized in relation to each facility, the date on which each authorization was granted and the date on which the authorization expires or the date on which revalidation or reassessment is due.

18.7.3.5 Facility-In-Charge

All CNS Services/Facilities shall have a designated Facility-In-Charge as the person responsible for the management and administration of the facility/ies and personnel.

18.7.3.6 Training Plans and Programs

The service provider must have a training plan and comprehensive program designed to develop skills and knowledge of technical personnel to attain competence and efficiency in the performance of the assigned task.

Technical personnel who carryout functions associated with the operation and maintenance of facilities must be given appropriate, specialized training on the facility type, followed by an on-the-job training and evaluation of their competence.

18.7.3.7 Distribution of Guidance Material/Information

The service provider must have a procedure for the formulation and distribution of guidance material especially safety critical information to technical personnel to enable them to perform their functions in accordance with the established requirements and in standardized manner.

18.7.3.8 Post-Accident Facility Performance Inspection

a. In this regulation:
    i. ANSSD has the meaning defined under Sub-decree 18, which mandate the authority to perform inspection.
    ii. Performance inspection means one or more test that show the accuracy or integrity of a facility.
b. This regulation applies if the SSCA advises the Service Provider that an air navigation facility may have contributed to an aviation accident or incident.
c. As soon as practicable time, and before any action is taken that could change the facility's performance, a performance inspection must be done.
d. The performance inspection must be:
    i. Done by qualified technical personnel in accordance with any instructions given by the SSCA; and
    ii. Witnessed by any representative assigned by the SSCA.
e. A report of the performance inspection must be prepared by the technical personnel and signed by him/her and the witness.
f. If the performance inspection shows that the facility contributes to a hazard, the facility must not be used until it is operating within its technical specifications.

18.7.3.9 Interruption to service

This regulation applies if a CNS service is interrupted or if the Service Provider knows that the service is to be interrupted.

a. If the service is published in an AIP, the Service Provider must advise AIS about the interruption. It requires the service provider to advise AIS (for purpose of issue of a NOTAM) and other users (e.g. ATS) of planned or unplanned interruptions to any service.
b. If it is practicable to do so, the Service Provider must tell the users of the service about the interruption.

18.7.3.10 Test Equipment

Air Navigation Facility/ies must be tested and maintained using test equipment that is maintained and calibrated in accordance with the accepted standards required.

Service providers must have available the necessary test and measuring equipment for the operation, performance inspection and maintenance of all its facilities. The operating and maintenance instructions for each facility should specify the test equipment requirements for all levels of operation and maintenance undertaken by the service provider.

Standards for the control, calibration and maintenance of test equipment are as follows:

- Service providers are to use documented procedures to control, calibrate and maintain test equipment.
- Calibrated test equipment is use in the maintenance of a service or facility.
- Calibration is carried out at prescribed intervals for each type of test equipment and the calibration is traceable to national measurement standards.
- Records of calibration status of each item of test equipment are retained.
- Each item of test equipment carries a visual identification of its calibration status, the date that the equipment was last calibrated and the prescribed calibration periodicity.
- The validity of previous results is assessed when any item of test equipment is found to be out of calibration.

The ANSP shall ensure that appropriate inspection, measuring and test equipment are available for staff to maintain the operation of each facility. The ANSP shall ensure the control, calibration and maintenance of such equipment so that they have the precision and accuracy necessary for the measurements and tests to be performed.

18.7.3.11 Allocation of Frequencies, Identification codes/call signs

Those services that radiate electromagnetic signals-in-space must operate on an assigned aeronautical frequency in the relevant aeronautical frequency band. It is the responsibility of the CNS service provider to arrange for their frequency and

identification codes/call signs of CNS service equipment before making any transmission, in close coordination with the Air Traffic Service.

18.7.3.12 Conformance to Flight Inspection Standard Procedures

ANSP shall ensure that Flight Inspection Company to be outsourced for Flight Inspection conforms to relevant ICAO Standards as certified by its Civil Aviation Authority, subject to the approval of SSCA.

18.7.3.13 Request for Flight Inspection

Request for flight inspection on visual and radio navigation aids shall be initiated by the service provider, in duly approved by the SSCA.

18.7.3.14 Changes/Amendments to Operational Procedures and Standards

The service provider must have an established procedure to assess and authorize any changes/amendments to operational procedures in accordance with the approved document on procedures for the amendments of enabling regulations and standards.

18.7.3.15 Agreements/Contracts with other Organizations Any support services agreement must be in writing and must include the terms about:

a. The functional specification of the support service; and
b. Each of the following that relates to the support service and is relevant to the service provided by the service provider:
    i. Reliability
    ii. Availability
    iii. Accuracy
    iv. Integrity
c. A way in which the service provider is to be notified of any interruption to the service.
d. A way in which the other organization will notify the service provider of any scheduled service interruptions.

18.7.4 Documentations

The ANSP shall maintain all documents and records which are necessary for the operation and maintenance of the service. Copies of these documents shall also be made available to personnel where needed. These documents shall include

18.7.4.1 Standard Documents to be maintained

Documents required are the following:

a. Approved Facility Operations Manual
b. ICAO Annex 10 Volumes I to V, (those volumes actually held will depend upon the services provided);
c. ICAO Annex 11 (if the services are in support of ATS)
d. ICAO Annex 14 (for Airfield Lighting and Power Plant Facilities in support of Aeronautical telecommunications and radio navigational aids services)

e. Doc 8071, Volume 1, Manual on Testing of Radio Navigation Aids (if the services are in support of radio navigation aids);
f. Doc 9684 (if the service is in support of Radar Surveillance)
g. CAR-ANS Part 18 Chapter 18.7 and relative Manual of Standards (MOS).
h. Administrative Order 139 and relative MOS (for ANF with Airports)
i. Manufacturer's equipment handbooks, in particular those volumes that contain the Operation and Maintenance Instructions, the logistics support and spare parts listings, as relevant to each facility, and for each associated item of test equipment used for maintenance.

18.7.4.2 Records

a. Records to keep are the following:
b. Records of as-built drawings, manufacturing, procurement, installation, testing, and commissioning, maintenance, routine operation, modification, and decommissioning;
c. Records of hazard analysis and risk management
d. Records of facility performance and facility maintenance history including performance parameters values, test facilities utilized, identity of authorized technical personnel conducting the operation and maintenance.
e. Records of facility failures and faults;
f. Records of defect reports and associated defect investigations;
g. Records of each technical personnel including details of Job description, personnel's qualification, experience, specialized trainings and Personnel Evaluation.
h. Flight Inspection Data/Commissioning Data
i. Record of internal audit report
j. Safety incident report

18.7.4.3 Personnel Evaluation System (PES)

The Service Provider shall adopt a Personnel Evaluation System enunciated under Cambodian Labor Law (Revised Policies on Performance Evaluation System).

18.7.4.4 The ANSP shall establish a process for the authorization and amendment of these documents to ensure that they are constantly updated. The process shall ensure that:

a. The currency of the documentation can be readily determined;
b. amendments to the documentation are controlled in accordance with established quality management principles; and
c. only current versions of documents are available.

18.7.4.5 The ANSP shall ensure that where documents are held as computer based records and where paper copies of computer based records are made, they are subjected to the same control as paper documents.

18.7.5 Facility operations manual

The ANSP shall develop an operations manual which shall serve to demonstrate how the ANSP will comply with the requirements of this regulation.

18.7.5.1 Contents of Operations Manual

An operations manual must contain the information in this administrative order that applies to each CNS service and the kind of facility of the service provider (ANS) installed.

18.7.5.2 Organization Structure of Service Provider

An operations manual must include an approved organization structure of the service provider that shows:

a. Different divisions/sections
b. Functions
c. Actual Duties and Responsibilities of personnel
d. Job Description and Qualification Standards

18.7.5.3 Facility Organizational Chart

The Operations Manual must include a chart of the facility's organizational structure that shows:

a. The names, relevant qualifications, relevant experience and positions of key personnel.
b. Number of technical personnel who will provide each service
c. Hours of Operation
d. Manpower Shifting schedule

18.7.5.4 Functional Specification and Performance Values of the Services

The operations manual must include the functional specification of each of the service provider's CNS Services. This is a general description of the service, its operating principles and its functions. The values for each of the following that apply to the service are:

a. availability
b. reliability
c. accuracy
d. integrity

The values mentioned must be derived or measured from either or both of the configuration of each service, and the known performance of each service.

For a radio navigation service, the integrity values must be given for each kind of navigational aid facility that forms part of the service.

18.7.5.5 Facility Technical Description

An operations manual must describe, for each CNS service, provided:

a. The type and location of each facility. The type of facility should be described and the location is the geographic name of the place at which the facility is installed.

b. The technical specification of each kind of facility. The technical specification of a facility should include, in technical terms, all inputs and outputs to the facility, and the specification and standards to which the facility has been designed. The technical specification must cover both the hardware and software of the facility. This information is normally provided by the equipment manufacturer. (If that is the case, reference to the relevant content in the manufacturer's documentation is all that is necessary in the Operation Manual).

c. The interconnection of each facility making up the service; or to any other service to be provided under the Operations Manual. This should be in the form of a block diagram, each facility representing one of the blocks should be identified and the major signal or data inputs and outputs between facilities or to or from other services shown.

d. The monitoring system relevant to each facility. The monitoring system for each facility, or group of facilities, should also be included in the block diagram form, conveying the method of monitoring, parameters monitored, monitoring outputs and the location at which the outputs are presented.

18.7.5.6 Compliance to Standards

An operations manual must contain a listing of each standard that relates to the design, installation, testing, operation or maintenance that are applicable to each service, and to each facility, which make up the service, and explain how each standard is met.

18.7.5.7 Safe Operation and Maintenance Procedures

Under this regulation, the service provider is required to document in its operations manual the in-house technical and operational procedures under which the organization shall carry out its service provision functions.

An operations manual must describe the following:

a. The procedures use for the conduct of daily and scheduled preventive maintenance including procedures for repair;

b. The method to be used to specify any changes to a service or facility, and to design, test and implement those changes;

c. The system to be used to maintain a record of the operational performance of a service;

d. The procedure to be used to monitor the performance of each service and facility, and to compare the results with the appropriate technical specification;

e. The procedure to be used if a service fails or a facility fault occurs, including the way in which the failure or fault is to be reported and rectified;
f. The procedure to be used to report deviations from standards any found during operation and maintenance of the facility;
g. The procedure to be used to:
    i. Detect and correct any latent defects in equipment;
    ii. Change software to adapt to any changes to the configuration of hardware; and
    iii. Change the design of equipment or facilities to adapt to any change to the functional or technical specification.

18.7.5.8 Safety Standard Procedures on Emergency Situations

The operations manual must contain the approved safety standard procedures on emergency situations in cases such as, natural calamities, terroristic attacks, fire, aircraft accidents, etc. which shall serve as safety preventive measures to protect the personnel and the CNS service facilities and equipment.

18.7.5.9 Human Factors Considerations

Human Factors principle must be observed in the operation and maintenance of air navigation facilities.

Note: guidance material on Human factors principles can be found in Human Factors training manual (Doc 9863) and Circular 249 (Human Factors Digest No. 11 – Human Factors in CNS/ATM Systems).

18.7.6 Repealing Provisions

CCAR Chapter 18.7 repeals:
Any previous Administrative Orders, Circulars, Rules and Regulations which are inconsistent with the provisions hereof.

18.7.7 Commissioning of New Facility

18.7.7.1 The ANSP shall establish procedures to ensure that each new facility:

a. is commissioned to meet the specifications for that facility; and
b. is in compliance with the SARPS prescribed in Annex 10, where applicable.

18.7.7.2 The ANSP shall ensure that the system performance of the new facility has been validated by the necessary tests, and that all parties involved with the operations and maintenance of the facility, including its maintenance contractors have accepted and are satisfied with the results of the tests.

18.7.7.3 The ANSP shall ensure that procedures include documentation of tests conducted on the facility prior to the commissioning, including those that test the compliance of the facility with the applicable Annex 10 SARPS and any flight check required in compliance with ICAO Doc 8071.

18.7.8 Operation and maintenance plan

18.7.8.1 In addition to the overall operation and maintenance plan, the ANSP shall establish an operation and maintenance plan for each facility. The plan shall include:

a. a procedure for the periodic inspection and testing of each facility to verify that it meets the operational and performance specifications of that facility;
b. details of flight test, if necessary, such as the standards and procedures to be used and flight test interval, which shall be in compliance with guidelines to ICAO Doc 8071 or any other appropriate ICAO document;
c. the interval between periodic inspection and flight test and the basis for that interval. Whenever the interval is changed, the reasons for such change should be documented;
d. the operation and maintenance instructions for each facility;
e. an analysis of the number of personnel required to operate and maintain each facility taking into account the workload required;
f. the corrective plan and procedures for each facility, including such as whether the repair of modules and component are undertaken in-house or by equipment manufacturers; and
g. the spare support plan for each facility.

18.7.9 Interface Arrangement for Support Services

18.7.9.1 The ANSP shall formalize interface arrangements where applicable with external organizations in the form of service level agreements, detailing the following:

a. interface and functional specifications of the support service;
b. service level of the support service such as availability, accuracy, integrity and recovery time of failure of service; and
c. monitoring and reporting of the operational status of the service to the service provider.

18.7.10 Facility malfunction incident and radio interference reporting

18.7.10.1 The ANSP shall establish procedures for the reporting, collection and notification of facility malfunction incidents and safety incidents.

18.7.10.2 Reports of such incidents shall be compiled and reviewed periodically by the ANSP with its maintenance contractors to:

a. determine the cause of the incidents and determine any adverse trends;
b. implement corrective and preventive actions where necessary to prevent recurrence of the incidents; and
c. implement any measures to improve the safety performance of the aeronautical telecommunication service.

18.7.10.3 Any serious service failure or safety incident shall be reported to [appropriate authority designated by the State] and be investigated by the ANSP. The purpose of the investigation shall be to understand how and why the incident happened, including possible organizational contributing factors and to recommend actions to prevent a recurrence.

18.7.10.4 A copy of the investigation report shall be forwarded to SSCA.

18.7.10.5 The ANSP shall establish a procedure for the management and protection of aeronautical radio spectrum. Any frequency allocation within the aeronautical radio spectrum shall be centrally controlled by a designated responsible person to ensure that there will be no conflict and interference to any radio stations or facility. Updated records shall be kept of all allocated frequencies.

18.7.10.6 The ANSP shall ensure that there is no willful transmission of unnecessary or anonymous radio signals, messages or data by any of its radio stations. Procedures shall also be established with the local telecommunication authority to address occurrence of radio frequency interference. Any frequency interference occurrence shall be reported, investigated and follow-up actions taken to prevent recurrence.

18.7.11 The ANSP shall, as soon as possible:

a. forward to the SSCA:
    i. information on the operational details of any new facility for publication in the Cambodian AIP; and
    ii. information concerning any change in the operational status of any existing facility, for the issue of a NOTAM; and
b. ensure that the information forwarded under sub-paragraph a) has been accurately published.

Appendix 1 FRAMEWORK FOR A SMS

This appendix specifies the framework for the implementation and maintenance of an SMS. The framework comprises four components and twelve elements as the minimum requirements for an implementation of SMS:

1. Safety policy and objectives
    - 1.1 Management commitment and responsibility;
    - 1.2 Safety accountabilities;
    - 1.3 Appointment of key safety personnel;
    - 1.4 Coordination of emergency response planning;
    - 1.5 SMS documentation.
2. Safety risk management
    - 2.1 Hazard identification;
    - 2.2 Safety risk assessment and mitigation.
3. Safety assurance
    - 3.1 Safety performance monitoring and measurement;
    - 3.2 The management of change;
    - 3.3 Continuous improvement of the SMS.
4. Safety promotion
    - 4.1 Training and education;
    - 4.2 Safety communication.

1. Safety policy and objectives

1.1 Management commitment and responsibility

1.1.1 The service provider shall define its safety policy in accordance with international and national requirements. The safety policy shall:

a. reflect organizational commitment regarding safety;

b. include a clear statement about the provision of the necessary resources for the implementation of the safety policy;

c. include safety reporting procedures;

d. clearly indicate which types of behaviors are unacceptable related to the service provider's aviation activities and include the circumstances under which disciplinary action would not apply;

e. be signed by the accountable executive of the organization;

f. be communicated, with visible endorsement, throughout the organization; and

g. be periodically reviewed to ensure it remains relevant and appropriate to the service provider.

1.2 Safety accountabilities

1.2.1 The service provider shall:

a. identify the accountable executive who, irrespective of other functions, has ultimate responsibility and accountability, on behalf of

the organization, for the implementation and maintenance of the SMS;

b. clearly define lines of safety accountability throughout the organization, including a direct accountability for safety on the part of senior management;

c. identify the accountabilities of all members of management, irrespective of other functions, as well as of employees, with respect to the safety performance of the SMS;

d. document and communicate safety responsibilities, accountabilities and authorities throughout the organization; and

e. define the levels of management with authority to make decisions regarding safety risk tolerability.

1.3 Appointment of key safety personnel

1.3.1 The service provider shall appoint a safety manager who is responsible for the implementation and maintenance of an effective SMS.

1.4 Coordination of emergency response planning

1.4.1 The service provider shall ensure that an emergency response plan is properly coordinated with the emergency response plans of those organizations it must interface with during the provision of its products and services.

1.5 SMS documentation

1.5.1 The service provider shall develop an SMS implementation plan, formally endorsed by the organization that defines the organization's approach to the management of safety in a manner that meets the organization's safety objectives.

1.5.2 The service provider shall develop and maintain SMS documentation that describes:

a. safety policy and objectives;

b. SMS requirements;

c. SMS processes and procedures;

d. accountabilities, responsibilities and authorities for SMS processes and procedures; and

e. SMS outputs.

1.5.3 The service provider shall develop and maintain an SMS manual as part of its SMS documentation.

Note. — An acceptable SMS Manual can be a stand-alone document or integrated within existing documents.

2. Safety risk managements

2.1 Hazard identification

2.1.1 The service provider shall develop and maintain a process that ensures that hazards associated with its aviation services are identified.

2.1.2 Hazard identification shall be based on a combination of reactive, proactive and predictive methods of safety data collection.

2.2 Safety risk assessment and mitigation

2.2.1 The service provider shall develop and maintain a process that ensures analysis, assessment, and control of the safety risks associated with identified hazards.

3. Safety assurance

3.1 Safety performance monitoring and measurement

3.1.1 The service provider shall develop and maintain the means to verify the safety performance of the organization and to validate the effectiveness of safety risk controls.

3.1.2 The service provider's safety performance shall be verified in reference to the safety performance indicators and safety performance targets of the SMS.

3.2 The management of change

3.2.1 The service provider shall develop and maintain a process to identify changes which may affect the level of safety risk associated with its aviation services and to identify and manage the safety risks that may arise from those changes.

3.3 Continuous improvement of the SMS

3.3.1 The Service provider shall monitor and assess the effectiveness of their SMS processes to enable continuous improvement of the overall performance of the SMS.

4. Safety promotion

4.1 Training and education

4.1.1 The service provider shall develop and maintain a safety training program that ensures that personnel are trained and competent to perform their SMS duties.

4.1.2 The scope of the safety training program shall be appropriate to each individual's involvement in the SMS.

4.2 Safety communication

4.2.1 The service provider shall develop and maintain a formal means for safety communication that:

a. ensures personnel are aware of the SMS to a degree commensurate with their positions;
b. conveys safety-critical information;
c. explains why particular safety actions are taken; and
d. explains why safety procedures are introduced or changed

Appendix 2 LIST OF ICAO DOCUMENT REQUIRED FOR ANSSD LIBRARY

Nº	Annexes and Documents to the Convention on International Civil Aviation	
1	Annex 1	Personnel Licensing
2	Annex 2	Rules of the Air
3	Annex 3	Meteorological Service for International Air Navigation
4	Annex 4	Aeronautical Charts
5	Annex 5	Units of Measurement to be Used in Air and Ground Operations
6	Annex 6	Operation of Aircraft Part I
7		Operation of Aircraft Part II
8		Operation of Aircraft Part III
9	Annex 7	Aircraft Nationality and Registration Marks
10	Annex 8	Airworthiness of Aircraft
11	Annex 9	Facilitation
12	Annex 10	Aeronautical Telecommunications, Vol.I
13		Aeronautical Telecommunications, Vol.II
14		Aeronautical Telecommunications, Vol.III
15		Aeronautical Telecommunications, Vol.IV
16		Aeronautical Telecommunications, Vol.V
17	Annex 11	Air Traffic Services
18	Annex 12	Search and Rescue
19	Annex 13	Aircraft Accident and Incident Investigation
20	Annex 14	Aerodromes. Vol.I
21		Heliports. Vol.II
22	Annex 15	Aeronautical Information Services
23	Annex 16	Environmental Protection.1
24		Aircraft Engine Emissions. Vol.II
25	Annex 17	Security
26	Annex 18	The Safe Transport of Dangerous Goods by Air
27	Annex 19	Safety Management
28	Doc.8400	ICAO Abbreviations and Codes
29	Doc.4444	Air Traffic Management
30	Doc.8168	Procedure for Air Navigation Service - Aircraft Operations. Vol. 1
31		Construction of Visual and Instrument Flight Procedures

32	Doc.9868	Training
33	Doc.8585	Designators for Aircraft Operating, Aeronautical Authorities and Services
34	Doc.7910	Location Indicators
35	Doc.8697	Aeronautical Chart Manual
36	Doc.8126	Aeronautical Information Services Manual
37	Doc.9674	World Geodetic System – 1984 (WGS-84) Manual
38	Doc.9426	Air Traffic Services Planning Manual
39	Doc.9750	Global Air Navigation Plan for CNS/ATM Systems
40	Doc.9854	Global Air Traffic Management Operational Concept
41	Doc.9731	International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual
42		Vol.I Organization and Management
43		Vol.II Mission Co-ordination
44		Vol.III Mobile Facilities
45	Doc.9433	Manual concerning Interception of Civil Aircraft
46	Doc.9554	Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations
47	Doc.9694	Manual of Air Traffic Services Data Link Applications
48	Doc.9432	Manual of Radiotelephony
49	Doc.9613	Performance –based navigation (PBN) manual
50	Doc.9882	Manual on Air Traffic Management System Requirements
51	Doc.9905	Required navigation performance authorization required (RNP AR)
52	Doc.9883	Manual on Global performance of the air navigation system
53	Doc.9863	Airborne Collision Avoidance System (ACAS) Manual
54	Doc.9739	Comprehensive Aeronautical Telecommunication Network (ATN) Manual
55	Doc.9849	Global Navigation Satellite System (GNSS) Manual
56	Doc.9855	Guidelines on the Use of the Public Internet for Aeronautical Applications
57	Doc.9718	Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including statement of approved ICAO policies
58	Doc.9804	Manual on Air Traffic Services (ATS) Ground – Ground Voice Switching and Signaling
59	Doc.9741	Manual on HF Data Link
60	Doc.9688	Manual on Mode S Specific Services
61	Doc.8071	Manual on Testing of Radio Navigation Aide

62		Vol.II Testing of Satellite – based Radio Navigation Systems
63		Vol.III Testing of Surveillance Radar System
64	Doc.8259	Manual on the Planning and Engineering of the Aeronautical Telecommunication Network
65	Doc.9684	Manual on the Secondary Surveillance Radar (SSR) Systems
66	Doc.9776	Manual on VHF Digital Link (VDL) Mode 2
67	Doc.9805	Manual on VHF Digital Link (VDL) Mode 3
68	Doc.9816	Manual on VHF Digital Link (VDL) Mode 4
69	Doc.9911	Recommended method for computing noise contours around airport
70	Doc.9861	Manual on the Universal Access Transceiver (UAT)
71	Doc.9896	Manual on the Aeronautical Telecommunication Network (ATN)
72	Doc.9824	Human Factors Guidelines for Aircraft Maintenance Manual. 2009-2010
73	Doc.9758	Human Factors Guidelines for Air Traffic Management (ATM) Systems
74	Doc.9806	Human Factors Guidelines for Safety Audits Manual
75	Doc.9808	Human Factors in Civil Aviation Security Operations
76	Doc.9683	Human Factors Training Manual
77	Doc.9835	Manual on the Implementation of ICAO Language Proficiency Requirements.
78	Doc.8973	Security Manual for safeguarding civil aviation against acts of unlawful interference
79		Vol.I – National Organization and Administration
80		Vol.II – Recruitment, Selection and Training
81		Vol.III – Airport Security Organization, program and design requirements
82		Vol.V – Crisis Management and Response to Acts of Unlawful Interference
83	Doc.7192	Training Manual
84		Volume 1 Course details
85		Volume 2 Instructor Briefing Sheets
86		Part D-1 – Aircraft Maintenance (Technician/Engineer/Mechanic)
87		Part D-3 – Flight Operations Officers/Flight Dispatchers
88		Part E-1 – Cabin Attendants' Safety Training
89		Part F-1 – Meteorology for Air Traffic Controllers and Pilots
90	Doc.9501	Environmental Technical Manual on the Use of Procedures in the Noise Certification of Aircraft
91	Doc.8335	Manual of Procedures for Operations Inspection, Certification and

		Continued Surveillance
92	Doc.9274	Manual on the Use of the Collision Risk Model (CRM) for ILS Operations
93	Doc.9376	Preparation of an Operations Manual
94	Doc.9906	Quality Assurance Manual for flight procedure design, Vol.1 flight procedures design quality assurance system
95	Doc.9906	Quality assurance manual for flight procedure design, Vol.2
96	Doc.9766	Handbook on the International Airways Volcano Watch (IAVW)
97	Doc.8896	Manual of Aeronautical Meteorological Practice
98	Doc.9328	Manual of Runway Visual Range Observing and Reporting Practices
99	Doc.7488	Manual of the ICAO Standard Atmosphere (extended to 80Kilometres (262500 feet)
100	Doc.9837	Manual on Automatic Meteorological Observing Systems at Aerodromes
101	Doc.9377	Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services
102	Doc.9817	Manual on Low-level Wind Shear
103	Doc.9661	Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds
104	Doc.9829	Guidance on the Balanced Approach to Aircraft Noise Management
105	Doc.9673	Air Navigation plan-Asia and Pacific Search and Rescue Region