



**AIR TRAFFIC INSPECTORATE DIVISION
DEPARTMENT OF CIVIL AVIATION
MALAYSIA**



**AIR TRAFFIC INSPECTORATE DIRECTIVE –
AIR TRAFFIC SERVICES**

ATID-ATS

EDITION 2: 15 April 2016

Published by

Department of Civil Aviation Malaysia

AMENDMENT DETAILS

| Amendment No | Edition No | Source(s) | Subject | Chapter Affected | Effective Date |
|--------------|------------|---|---------------|------------------|----------------|
| | 1 | ICAO Annex 2 – Rules of the Air incorporating Amendment 44; ICAO Annex 3 – Meteorological Service for International Air Navigation incorporating Amendment 1-76; ICAO Annex 11 – Air Traffic Services incorporating Amendment 49; ICAO Annex 10 – Aeronautical Telecommunications Volume II - Communication Procedures including those with PANS status incorporating Amendment 89; ICAO Annex 17 – Security incorporating Amendment 14; ICAO Annex 19 – Safety Management – 1 st Edition; ICAO Doc 4444 – PANS ATM incorporating Amendment 6 ICAO Doc 9426 – ATS Planning Manual incorporating Amendment 4 | First version | All | 15 Sep 2015 |

| | | | | | |
|---------|---|---|---|---------------------------------------|-------------|
| 01/2016 | 2 | Civil Aviation Regulations 2016; GM Doc 9734 Part A 3.7 | Requirements; Safety Management; Training records | 1, 2 and 9 | 15 Apr 2016 |
| 02/2016 | 2 | DGCA | Recommendations to standards | 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 | 06 May 2016 |
| 03/2016 | 2 | Civil Aviation Regulations 2016; ICAO Annex 11 – Air Traffic Services incorporating Amendment 50A | Definitions, Performance-based communication (PBC) operations, Performance-based surveillance (PBS) operations, Instrument flight procedure design service, requirement for reporting to MAAR, Aeronautical mobile service (air-ground communications), ATS operations manual | 1, 2, 3, 4, 6, 9, 10 | 15 Nov 2016 |

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FOREWORD

Background

In exercise of the powers conferred by regulation 76 of the Civil Aviation Regulations 2016, the Director General makes this *Air Traffic Inspectorate Directive – Air Traffic Services (ATID-ATS)*. This *ATID-ATS* is published by the Director General under *section 240 of Civil Aviation Act 1969 [Act 3]*. This *ATID-ATS* contains the standards, requirements and procedures pertaining to the provision of ATS meet the ATS standard and recommended practices (SARPs) of the Convention on International Civil Aviation. The standards and requirements in this Directive are based mainly on the SARPs stipulated in *International Civil Aviation Organization (ICAO) Annex 11 – Air Traffic Services* and including additional provisions contained in the following documents:

- *ICAO Annex 2 – Rules of the Air*
- *ICAO Annex 3 – Meteorological Service for International Air Navigation;*
- *ICAO Annex 10 – Aeronautical Telecommunications Volume II;*
- *ICAO Annex 17 – Security;*
- *ICAO Annex 19 – Safety Management;*
- *ICAO Doc 4444 – PANS-ATM; and*
- *ICAO Doc 9426 – Air Traffic Services Planning Manual.*



(Dato' Sri Azharuddin Abdul Rahman)
Director General of Civil Aviation
15th April 2016

EDITORIAL

Editorial practices

The following practice has been adhered to in order to indicate at a glance the status of each statement:

Standards have been printed in light face roman; and

Notes have been printed in light face italics, the status being indicated by the prefix Note.

Feedback

Readers should forward advice of errors, inconsistencies or suggestions for improvement to this Directive to the addressee below:

Director
Air Traffic Inspectorate Division
Department of Civil Aviation
No. 27 Persiaran Perdana
Level 3, Podium B, Precinct 4
62618 PUTRAJAYA
Tel: +60388714214
Fax: +60388714333

CHAPTER 1. REQUIREMENTS AND DEFINITIONS

1.1 Requirements

1.1.1 This *Air Traffic Inspectorate Directive – Air Traffic Services* (ATID-ATS) specifies the national standards and requirements to be met by the air traffic service (ATS) provider.

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

1.1.3 When the ATS provider is not able to comply with any recommended practices specified or referenced in this directive, the ATS provider shall notify the DGCA of the non-compliance or deviation with supporting reasons including any safety assessment or other studies undertaken, and where appropriate an indication of when compliance with the current recommended practices can be expected.

1.1.4 Any exemption or deviation granted to the ATS provider shall be recorded in the ATS provider operations manual. The ATS operations manual shall also contain the details of the exemption or deviation including the reason that the exemption or deviation was requested and the limitations or conditions imposed.

1.2 Definitions

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 (ATS), they have the following meanings:

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

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

- a) a person is fatally or seriously injured as a result of:
 - being in the aircraft, or
 - direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or

— direct exposure to jet blast,

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

b) the aircraft sustains damage or structural failure which:

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

— would normally require major repair or replacement of the affected component,

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

c) the aircraft is missing or is completely inaccessible.

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 ICAO Annex 13, 5.1.

Note 4.— Guidance for the determination of aircraft damage can be found in ICAO 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 manoeuvring 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 slingloads.

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

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

Air traffic control clearance. Authorisation 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 manoeuvring area between aircraft and obstructions; and
- b) expediting and maintaining an orderly flow of air traffic.

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

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

Air traffic service (ATS). 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 airspace. 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 centre or air traffic services reporting office.

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

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

Alerting service. A service provided to notify appropriate organisations regarding aircraft in need of search and rescue aid, and assist such organisations 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 centre. A unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction.

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

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

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 check (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*).

* All ISO Standards are listed at the end of this chapter.

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

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

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

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

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

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

- a) at the end of the last procedure turn, base turn or inbound turn of a racetrack procedure, if specified; or
- b) at the point of interception of the last track specified in the approach procedure; and ends at a point in the vicinity of an aerodrome from which:
 - 1) a landing can be made; or
 - 2) a missed approach procedure is initiated.

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

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

Flight information region (FIR). 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 ICAO 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 ICAO Annex 13, Attachment C.

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

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

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 authorised amendment.

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

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

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

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

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

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

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

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

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

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

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 ICAO Annex 11 as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this document 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, organisation or enterprise engaged in or offering to engage in an aircraft operation.

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

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

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

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

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

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

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

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

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

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

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

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

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

Rescue coordination centre (RCC). A unit responsible for promoting efficient organisation of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

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

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

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

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

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

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

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

Special VFR flight. A VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC.

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

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

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

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

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

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

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

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

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

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

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

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

Note.— The specified minima are contained in ICAO 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.

CHAPTER 2. GENERAL

2.1 Establishment of authority

2.1.1 The ATS provider shall arrange for ATS to be provided in accordance with the provisions of this document. These services shall be provided in accordance with the airspace classification established by the DGCA and at the aerodromes designated as controlled aerodromes.

2.1.2 The ATS provider shall provide ATS over the high seas or the airspace of undetermined sovereignty in accordance with the provisions of this document.

Note.— If one State delegates to another State the responsibility for the provision of ATS over its territory, it does so without derogation of its national sovereignty. Similarly, the providing State's responsibility is limited to technical and operational considerations and does not extend beyond those pertaining to the safety and expedition of aircraft using the concerned airspace. Furthermore, the providing State in providing ATS within the territory of the delegating State will do so in accordance with the requirements of the latter which is expected to establish such facilities and services for the use of the providing State as are jointly agreed to be necessary. It is further expected that the delegating State would not withdraw or modify such facilities and services without prior consultation with the providing State. Both the delegating and providing States may terminate the agreement between them at any time.

2.1.3 The ATS provider shall be designated by the DGCA for providing such services.

Note 1.— The Director of Air Traffic Management Sector of Department of Civil Aviation Malaysia acting under the authority of the DGCA, is the authority responsible for the overall administration of ATS in the provision of ATS within the Kuala Lumpur and Kota Kinabalu Flight Information Regions (FIRs).

Note 2.— ATS are provided for the entire territory of Malaysia, including its territorial waters as well as the airspace over the high seas within the Kuala Lumpur and Kota Kinabalu FIRs.

Note 3.— In some cases, in accordance with the regional air navigation agreement, ATS are provided, under the delegated authority, in the airspace within another bordering FIR. Details of such services are provided in Malaysia AIP Section ENR 2.

Note 4.— The airspace of the Kuala Lumpur FIR embraces Peninsular Malaysia and extensive international waters. The airspace of the Kota Kinabalu FIR embraces Sabah/Sarawak including Brunei and extensive international waters.

Note 5.— The boundaries of the Kuala Lumpur, Kota Kinabalu and Singapore FIRs are defined in Malaysia AIP Section ENR 2.1 - 9.

Note 6.— Area of Responsibility of Aerodrome and Approach Control units are listed in Malaysia AIP Section AD 2.17.

2.2 Objectives of ATS

The objectives of ATS shall be to:

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

2.3 Divisions of ATS

ATS shall comprise three services identified as follows:

2.3.1 The air traffic control service, to accomplish objectives a), b) and c) of 2.2, 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 2.3.1 b) and c), in order to accomplish objectives a) and c) of 2.2;
- 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 2.2; and
- c) Aerodrome control service: the provision of air traffic control service for aerodrome traffic, except for those parts of flights described in 2.3.1 b), in order to accomplish objectives a), b) and c) of 2.2.

2.3.2 The flight information service, to accomplish objective d) of 2.2.

2.3.3 The alerting service, to accomplish objective e) of 2.2.

2.4 Determination of the need for ATS

2.4.1 The need for the provision of ATS shall be determined by consideration of the following:

- 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.

Note.— Due to the number of elements involved, it has not been possible to develop specific data to determine the need for ATS in a given area or at a given location. For example:

- a) a mixture of different types of air traffic with aircraft of varying speeds (conventional jet, etc.) might necessitate the provision of ATS, whereas a relatively greater density of traffic where only one type of operation is involved would not;
- b) meteorological conditions might have considerable effect in areas where there is a constant flow of air traffic (e.g. scheduled traffic), whereas similar or worse meteorological conditions might be relatively unimportant in an area where air traffic would be discontinued in such conditions (e.g. local VFR flights); and
- c) open stretches of water, mountainous, uninhabited or desert areas might necessitate the provision of ATS even though the frequency of operations is extremely low.

2.4.2 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.

2.5 Designation of the portions of the airspace and controlled aerodromes where ATS will be provided

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

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

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

2.5.2.2 Control areas and control zones

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

Note.— The distinction between control areas and control zones is made in 2.10.

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

2.5.2.2.2 Where designated within a FIR, control areas and control zones shall form part of that FIR.

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

2.6 Classification of airspaces

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

Class A. IFR flights only are permitted, all flights are provided with air traffic control service and are separated from each other.

Class B. IFR and VFR flights are permitted; all flights are provided with air traffic control service and are separated from each other.

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.

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.

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.

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.

Note.— Where air traffic advisory service is implemented, this is considered normally as a temporary measure only until such time as it can be replaced by air traffic control. (See also PANS-ATM, Chapter 9.)

Class G. IFR and VFR flights are permitted and receive flight information service if requested.

2.6.2 The DGCA shall select those airspace classes appropriate to the operational needs.

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

Note.— Where the ATS airspaces adjoin vertically, i.e. one above the other, flights at a common level would comply with requirements of, and be given services applicable to, the less restrictive class of airspace. In applying these criteria, Class B airspace is therefore considered less restrictive than Class A airspace; Class C airspace less restrictive than Class B airspace, etc.

2.7 Performance-based navigation (PBN) operations

2.7.1 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

2.7.2 PBN operations shall be implemented as soon as practicable.

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

Note.— Applicable guidance on PBN and implementation is published in the Performance based Navigation (PBN) Manual (Doc 9613).

2.8 Performance-based communication (PBC) operations

2.8.1 In applying performance-based communication (PBC), RCP specifications shall be prescribed by States. When applicable, the RCP specification(s) shall be prescribed on the basis of regional air navigation agreements.

Note. — *In prescribing an RCP specification, limitations may apply as a result of communication infrastructure constraints or specific communication functionality requirements.*

2.8.2 The prescribed RCP specifications shall be appropriate to the ATS provided in the airspace concerned.

Note.— *Information on the performance-based communication and surveillance (PBCS) concept and guidance material on its implementation are contained in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).*

2.9 Performance-based surveillance (PBS) operations

2.9.1 In applying performance-based surveillance (PBS), RSP specifications shall be prescribed by States. When applicable, the RSP specification(s) shall be prescribed on the basis of regional air navigation agreements.

Note.— *In prescribing an RSP specification, limitations may apply as a result of surveillance infrastructure constraints or specific surveillance functionality requirements.*

2.9.2 The prescribed RSP specification shall be appropriate to the air traffic services provided.

2.9.3 Where an RSP specification has been prescribed by States for performance-based surveillance, ATS units shall be provided with equipment capable of performance consistent with the prescribed RSP specification(s).

Note.— *Information on the PBCS concept and guidance material on its implementation are contained in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).*

2.10 Establishment and designation of the units providing ATS

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

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

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

2.11 Specifications for FIRs, control areas and control zones

2.11.1 Where applicable, the delineation of airspace, wherein ATS are to be provided, shall be related to the nature of the route structure and the need for efficient service rather than to national boundaries.

Note 1.— Agreements to permit the delineation of airspace lying across national boundaries are advisable when such action will facilitate the provision of air traffic services (see 2.1.1). Agreements which permit delineation of airspace boundaries by straight lines will, for example, be most convenient where data processing techniques are used by air traffic services units.

Note 2.— Where delineation of airspace is made by reference to national boundaries there is a need for suitably sited transfer points to be mutually agreed upon.

2.11.2 FIRs

2.11.2.1 FIRs shall be delineated to cover the whole of the air route structure to be served by such regions.

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

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

Note.— In cases where an upper flight information region is established the procedures applicable therein need not be identical with those applicable in the underlying flight information region.

2.11.3 Control areas

2.11.3.1 Control areas including, inter alia, 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.

Note.— In a control area other than one formed by a system of airways, a system of routes may be established to facilitate the provision of air traffic control.

2.11.3.2 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).

Note.— This does not imply that the lower limit has to be established uniformly in a given control area (see Figure A-5 of the Air Traffic Services Planning Manual (Doc 9426), Part I, Section 2, Chapter 3).

2.11.3.2.1 The lower limit of a control area shall, when practicable and desirable in order to allow freedom of action for VFR flights below the control area, be established at a greater height than the minimum specified in 2.10.2.2.

2.11.3.2.2 When the lower limit of a control area is above 900 m (3 000 ft) MSL it shall coincide with a VFR cruising level of the tables in Appendix 3 to ICAO Annex 2.

Note.— This implies that the selected VFR cruising level be such that expected local atmospheric pressure variations do not result in a lowering of this limit to a height of less than 200 m (700 ft) above ground or water.

2.11.3.3 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
- b) the control area is situated below an upper control area, in which case the upper limit 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 ICAO Annex 2.

2.11.4 FIRs or control areas in the upper airspace

Where applicable, to limit the number of FIRs or control areas through which high flying aircraft would otherwise have to operate, a FIR or control area, as appropriate, shall be delineated to include the upper airspace within the lateral limits of a number of lower flight information regions or control areas.

2.11.5 Control zones

2.11.5.1 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.

Note.— Aircraft holding in the vicinity of aerodromes are considered as arriving aircraft.

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

Note.— A control zone may include two or more aerodromes situated close together.

2.11.5.3 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.

Note.— An upper limit higher than the lower limit of the overlying control area may be established when desired.

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

2.11.5.5 If it is desired to establish the upper limit of a control zone at a level higher than the lower limit of the control area established above it, or if the control zone is located outside of the lateral limits of a control area, its upper limit shall be established at a level which can easily be identified by pilots. When this limit is above 900 m (3 000 ft) MSL it shall coincide with a VFR cruising level of the tables in Appendix 3 to ICAO Annex 2.

Note.— This implies that, if used, the selected VFR cruising level be such that expected local atmospheric pressure variations do not result in a lowering of this limit to a height of less than 200 m (700 ft) above ground or water.

2.12 Identification of ATS units and airspaces

2.12.1 Where applicable, an area control centre or flight information centre shall be identified by the name of a nearby town or city or geographic feature.

2.12.2 Where applicable, an aerodrome control tower or approach control unit shall be identified by the name of the aerodrome at which it is located.

2.12.3 Where applicable, A control zone, control area or FIR shall be identified by the name of the unit having jurisdiction over such airspace.

2.13 Establishment and identification of ATS routes

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

2.13.2 Where applicable, when warranted by density, complexity or nature of the traffic, special routes shall be established for use by low-level traffic, including helicopters operating to and from helidecks on the high seas. When determining the lateral spacing between such routes, account shall be taken of the navigational means available and the navigation equipment carried on board helicopters.

2.13.3 ATS routes shall be identified by designators.

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

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

Note 1.— Guidance material relating to the establishment of ATS routes is contained in the Air Traffic Services Planning Manual (Doc 9426).

Note 2.— Guidance material relating to the establishment of ATS routes defined by VOR is contained in Attachment A of ICAO Annex 11.

Note 3.— The spacing between parallel tracks or between parallel ATS route centre lines based on performance-based navigation will be dependent upon the relevant navigation specification required.

2.14 Establishment of change-over point

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

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

Note.— Guidance on the establishment of change-over points is contained in ICAO Annex 11, Attachment A.

2.15 Establishment and identification of significant points

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 air traffic services for information regarding the progress of aircraft in flight.

2.15.2 Significant points shall be identified by designators.

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

2.16 Establishment and identification of standard routes for taxiing aircraft

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

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

2.17 Coordination between the operator and ATS

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

2.17.2 When so 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.

Note.— For aircraft subjected to unlawful interference, see 2.24.3.

2.18 Coordination between military authorities and ATS

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

2.18.2 Coordination of activities potentially hazardous to civil aircraft shall be effected in accordance with 2.19.

2.18.3 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.

2.18.3.1 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 ICAO 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 air traffic services units specifically for the purpose of facilitating identification of civil aircraft.

Note.— *For aircraft subjected to unlawful interference, see 2.23.3 and 2.24.1.3.*

2.18.3.2 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.

2.19 Coordination of activities potentially hazardous to civil aircraft

2.19.1 The arrangements for activities potentially hazardous to civil aircraft, whether over the territory of a State or over the high seas, shall be coordinated with the appropriate ATS authorities. The coordination shall be effected early enough to permit timely promulgation of information regarding the activities in accordance with the provisions of ATID-AIS Chart.

2.19.1.1 If the appropriate ATS authority is not that of the State where the organisation planning the activities is located, initial coordination shall be effected through the ATS authority responsible for the airspace over the State where the organisation is located.

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

2.19.2.1 In determining these arrangements the following shall be applied:

- a) the locations or areas, times and durations for the activities shall be selected to avoid closure or realignment of established ATS routes, blocking of the most economic flight levels, or delays of scheduled aircraft operations, unless no other options exist;
- b) the size of the airspace designated for the conduct of the activities shall be kept as small as possible; and
- c) direct communication between the appropriate ATS authority or ATS unit and the organisation or unit conducting the activities shall be provided for use in the event that civil aircraft emergencies or other unforeseen circumstances require discontinuation of the activities.

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

2.19.4 If activities potentially hazardous to civil aircraft take place on a regular or continuing basis, special committees shall be established as required to ensure that the requirements of all parties concerned are adequately coordinated.

2.19.5 Adequate steps shall be taken to prevent emission of laser beams from adversely affecting flight operations.

Note 1.— *Guidance material regarding the hazardous effects of laser emitters on flight operations is contained in the Manual on Laser Emitters and Flight Safety (Doc 9815).*

Note 2.— See also ICAO Annex 14 — Aerodromes, Volume I — Aerodrome Design and Operations, Chapter 5.

2.19.6 In order to provide added airspace capacity and to improve efficiency and flexibility of aircraft operations, ATS authority shall establish procedures providing for a flexible use of airspace reserved for military or other special activities. The procedures shall permit all airspace users to have safe access to such reserved airspace.

2.20 Aeronautical data

2.20.1 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 ICAO Annex 11 Appendix 5 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 (e.g. navigation aids positions), calculated points (mathematical calculations from the known surveyed points of points in space/fixes) and declared points (e.g. FIR boundary points).

Note.— Specifications governing the quality system are given in ATID-AIS Chart, Chapter 3.

2.20.2 The air navigation service (ANS) providers 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.

Note.— Guidance material in respect to the processing of aeronautical data and aeronautical information is contained in RTCA Document DO-200A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-76 — Standards for Processing Aeronautical Data.

2.20.3 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 all integrity levels of data sets as specified in 2.19.2.

Note 1.— The requirement in 2.20.3 does not apply to the communications systems used for the transfer of data sets.

Note 2.— Guidance material on the use of a 32-bit CRC algorithm to implement a protection of electronic aeronautical data sets is contained in the Aeronautical Information Services Manual (Doc 8126).

2.20.4 Geographical coordinates indicating latitude and longitude shall be determined and reported to the aeronautical information services 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 ICAO Annex 11 Appendix 5, Table 1.

2.20.5 The order of accuracy of the field work and determinations and calculations derived there from 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 ICAO Annex 11 Appendix 5.

Note 1.— An appropriate reference frame is that which enables WGS-84 to be realised on a given position and with respect to which all coordinate data are related.

Note 2.— Specifications governing the publication of aeronautical data are given in ATID-AIS Chart, Chapter 2 and Chapter 3.

Note 3.— For those fixes and points that are serving a dual purpose, e.g. holding point and missed approach point, the higher accuracy applies.

2.21 Coordination between meteorological and ATS authorities

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

Note 1.— VAACs are designated by regional air navigation agreements in accordance with ICAO Annex 3, Chapter 3, 3.5.1.

Note 2.— See 4.2.3 regarding transmission of special air-reports.

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

2.22 Coordination between aeronautical information services and ATS authorities

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

- a) information on aerodrome conditions;
- b) the operational status of associated facilities, services and navigation aids within their area of responsibility;
- c) the occurrence of volcanic activity observed by air traffic services personnel or reported by aircraft; and
- d) any other information considered to be of operational significance.

2.22.2 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.

2.22.3 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 ATID-AIS Chart, Chapter 6 and ICAO Annex 15 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 aeronautical information services.

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

Note 1.— Specifications for the issue of a Notice to Airmen (NOTAM) and ASHTAM are contained in ATID-AIS Chart, Chapter 5.

Note 2.— Reports of volcanic activity comprise the information detailed in ICAO Annex 3, Chapter 4.

Note 3.— AIRAC information is distributed by the aeronautical information service at least 42 days in advance of the AIRAC effective dates with the objective of reaching recipients at least 28 days in advance of the effective date.

Note 4.— The schedule of the predetermined, internationally agreed AIRAC common effective dates at intervals of 28 days and guidance for the AIRAC use are contained in the Aeronautical Information Services Manual (Doc 8126, Chapter 2, 2.6).

2.22.5 NOTAM issuance and register

Note. — NOTAMs are intended to supplement the AIP and serve as fast medium for disseminating information whenever it is necessary to give due warning of any change or occurrence at short notice. The NOTAM Office (NOF) at Kuala Lumpur International Airport is the designated unit to issue NOTAM.

2.22.5.1 All NOTAM issued shall be in compliance with ATID-AIS Chart, ICAO Annex 15, Doc 8400 and Doc 8126.

2.22.5.2 ATS provider that functions as a NOTAM originator shall promptly issue NOTAM in conformity with the provisions in Chapter 5 of ATID-AIS Chart.

2.22.5.3 While NOF is responsible for the control of national NOTAM registers involving all Domestic and International NOTAM, the ATS units shall maintain their own NOTAM register for issued NOTAM.

2.22.5.4 NOTAM originators shall keep and maintain a NOTAM register for all NOTAM issued from its unit.

2.23 Minimum flight altitudes

Minimum flight altitudes shall be determined and promulgated by the DGCA 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.

Note.— The requirements for publication by States of minimum flight altitudes and of the criteria used to determine them are contained in ICAO Annex 15, Appendix 1. Detailed obstacle clearance criteria are contained in PANS-OPS (Doc 8168), Volume II.

2.24 Service to aircraft in the event of an emergency

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

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

- a) on Mode A, Code 7700; or*
- b) on Mode A, Code 7500, to indicate specifically that it is being subjected to unlawful interference; and/or*
- c) activate the appropriate emergency and/or urgency capability of ADS-B or ADS-C; and/or*
- d) transmit the appropriate emergency message via CPDLC.*

2.24.1.1 In communications between ATS units and aircraft in the event of an emergency, Human Factors principles shall be observed where applicable.

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

2.24.2 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.

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

Note 1.— A strayed or unidentified aircraft may be suspected as being the subject of unlawful interference. See 2.24.1.3.

Note 2.— Procedures relating to the handling of strayed or unidentified aircraft are contained in 2.24.1.

Note 3.— PANS-ATM (Doc 4444), Chapter 15, 15.1.3 contains more specific procedures related to unlawful interference.

Note 4.— Chapter 11 of this document contains more detailed procedures related to emergencies and emergency response plan.

2.25 In-flight contingencies

2.25.1 Strayed or unidentified aircraft

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

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

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

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

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

2.25.1.1 As soon as an ATS unit becomes aware of a strayed aircraft it shall take all necessary steps as outlined in 2.25.1.1.1 and 2.25.1.1.2 to assist the aircraft and to safeguard its flight.

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

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

Note.— The requirements in d) and e) apply also to ATS units informed in accordance with c).

2.25.1.1.2 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.

2.25.1.2 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 FIR about the flight and request their assistance in establishing two-way communication with the aircraft;
- c) inquire of ATS units serving the adjacent FIRs about the flight and request their assistance in establishing two-way communication with the aircraft; and
- d) attempt to obtain information from other aircraft in the area.

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

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

2.25.2 Interception of civil aircraft

2.25.2.1 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; and
- f) inform ATS units serving adjacent FIRs if it appears that the aircraft has strayed from such adjacent FIRs.

2.25.2.2 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 2.24.2.1; and
- b) relay messages between the intercepted aircraft and the appropriate ATS unit, the intercept control unit or the intercepting aircraft.

2.26 Time in ATS

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.

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.

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 utilised 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.

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.

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.

2.27 Establishment of requirements for carriage and operation of pressure-altitude reporting transponders

2.27.1 All aircraft flying within controlled airspace in the Kuala Lumpur and Kota Kinabalu FIRs shall be equipped with SSR transponder complying with ICAO Standards and having both Mode 3/A4096 and Mode C automatic pressure altitude reporting capabilities. They shall operate their SSR transponder on Mode 3A and Mode C simultaneously.

2.27.2 Special dispensation may be granted to aircraft without a serviceable transponder. This will be treated on an individual basis and subject to any conditions that may be imposed. Approval for such dispensation shall be made through nearest ATCC unit. Such approval will depend on the traffic movements in the airspace concerned.

Note.1— This provision is intended to improve the effectiveness of ATS as well as airborne collision avoidance systems.

Note.2— This provision is published in Malaysia AIP ENR 3.1.

2.28 Safety management

Note.— ANS Regulatory Manual Chapter 8 includes the safety management provisions applicable to ATS providers. Further guidance is contained in the ICAO Annex 19, Safety

Management Manual (SMM) (Doc 9859) and associated procedures are contained in the PANS-ATM (Doc 4444).

2.28.1 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 responsible authority shall ensure that adequate provision is made for post-implementation monitoring to verify that the defined level of safety continues to be met.

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

2.28.2 ATS provider shall have in place a safety management system (SMS) acceptable to the Secretary General of the Ministry of Transport (Sec-Gen) and which addresses high-level safety objectives as follows:

- a. identify safety hazards;
- b. safety risks management;
- c. ensure the implementation of remedial action necessary to maintain agreed safety performance;
- d. provide for continuous monitoring and regular assessment of the safety performance; and;
- e. aim at continuous improvement of the overall performance of the SMS.

Note 1.— The provisions and requirements for the acceptance processes of ATS providers SMS and safety performance indicators are contained in the Chapter 8 of Air Navigation Services Regulatory Manual.

Note 2.— The provision of AIS, CNS, MET and/or SAR services, when under the authority of an ATS provider, are included in the scope of the ATS provider's SMS. When the provision of AIS, CNS, MET and/or SAR services are wholly or partially provided by an entity other than an ATS provider, the related services that come under the authority of the ATS provider, or those aspects of their services with direct operational implications, are included in the scope of the ATS provider's SMS.

2.28.3 Safety reviews

2.28.3.1 General requirements

Safety reviews of ATS units shall be conducted on a regular and systematic basis by personnel qualified through training, experience and expertise and having a full understanding of relevant Standards and Recommended Practices (SARPs), Procedures for Air Navigation Services (PANS), safe operating practices and Human Factors principles.

2.28.3.2 Scope

The scope of ATS unit safety reviews shall include at least the following issues:

2.28.3.2.1 Regulatory issues to ensure that:

- a) ATS operations manuals, ATS unit instructions and air traffic control coordination procedures are complete, concise and up-to-date;
- b) the ATS route structure, where applicable, provides for:
 - 1) adequate route spacing; and
 - 2) crossing points for ATS routes located so as to reduce the need for controller intervention and for inter- and intra-unit coordination;
- c) the separation minima used in the airspace or at the aerodrome are appropriate and all the provisions applicable to those minima are being complied with;
- d) where applicable, provision is made for adequate observation of the manoeuvring area, and procedures and measures aimed at minimising the potential for inadvertent runway incursions are in place. This observation may be performed visually or by means of an ATS surveillance system;
- e) appropriate procedures for low visibility aerodrome operations are in place;
- f) traffic volumes and associated controller workloads do not exceed defined, safe levels and that procedures are in place for regulating traffic volumes whenever necessary;
- g) procedures to be applied in the event of failures or degradations of ATS systems, including communications, navigation and surveillance systems, are practicable and will provide for an acceptable level of safety; and
- h) procedures for the reporting of incidents and other safety-related occurrences are implemented, that the reporting of incidents is encouraged and that such reports are reviewed to identify the need for any remedial action.

2.28.3.2.1 Operational and technical issues to ensure that:

- a) the environmental working conditions meet established levels for temperature, humidity, ventilation, noise and ambient lighting, and do not adversely affect controller performance;
- b) automation systems generate and display flight plan, control and coordination data in a timely, accurate and easily recognisable manner and in accordance with Human Factors principles;
- c) equipment, including input/output devices for automation systems, are designed and positioned in the working position in accordance with ergonomic principles;
- d) communications, navigation, surveillance and other safety significant systems and equipment:
 - 1) are tested for normal operations on a routine basis;
 - 2) meet the required level of reliability and availability as defined by the appropriate authority;
 - 3) provide for the timely and appropriate detection and warning of system failures and degradations;
 - 4) include documentation on the consequences of system, subsystem and equipment failures and degradations;
 - 5) include measures to control the probability of failures and degradations; and

- 6) include adequate backup facilities and/or procedures in the event of a system failure or degradation; and
- e) detailed records of systems and equipment serviceability are kept and periodically reviewed.

Note.— In the context above, the terms reliability and availability have the following meanings:

- 1) *Reliability. The probability that a device or system will function without failure over a specified time period or amount of usage; and*
- 2) *Availability. The ratio of percentage of the time that a system is operating correctly to the total time in that period.*

2.28.3.2.3 Licensing and training issues to ensure that:

- a) air traffic controllers are adequately trained and properly licensed with valid ratings;
- b) air traffic controller competency is maintained by adequate and appropriate refresher training, including the handling of aircraft emergencies and operations under conditions with failed and degraded facilities and systems;
- c) air traffic controllers, where the ATC unit/control sector is staffed by teams, are provided relevant and adequate training in order to ensure efficient teamwork;
- d) the implementation of new or amended procedures, and new or updated communications, surveillance and other safety significant systems and equipment is preceded by appropriate training and instruction;
- e) *air traffic controller competency in the English language is satisfactory in relation to providing ATS to air traffic; and*
- f) *standard phraseology is used.*

2.28.4 Safety assessments

2.28.4.1 A safety assessment shall be carried out in respect of proposals for significant airspace reorganisations, for significant changes in the provision of ATS procedures applicable to an airspace or an aerodrome, and for the introduction of new equipment, systems or facilities, such as:

- a) a reduced separation minimum to be applied within an airspace or at an aerodrome;
- b) a new operating procedure, including departure and arrival procedures, to be applied within an airspace or at an aerodrome;
- c) a reorganisation of the ATS route structure;
- d) a resectorisation of an airspace;
- e) physical changes to the layout of runways and/or taxiways at an aerodrome; and
- f) implementation of new communications, surveillance or other safety-significant systems and equipment, including those providing new functionality and/or capabilities.

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.

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

2.28.5 Runway safety programme

2.28.5.1 At aerodromes, ATS provider shall participate in the aerodrome runway safety programme with the aerodrome and aircraft operators to improve runway safety established under the *National Runway Safety Programme*.

2.29 Common reference systems

2.29.1 Horizontal reference system

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

Note.— Comprehensive guidance material concerning WGS-84 is contained in the World Geodetic System — 1984 (WGS-84) Manual (Doc 9674).

2.29.2 Vertical reference system

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

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

2.29.3 Temporal reference system

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

2.29.3.2 When a different temporal reference system is used, this shall be indicated in GEN 2.1.2 of the Malaysia AIP.

2.30 English language proficiency

2.30.1 An ATS authority shall ensure that air traffic controllers speak and understand the English language used for radiotelephony communications as specified in ICAO Annex 1.

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

Note.— The provisions for language proficiency requirement are contained in the ANS Regulatory Manual, Chapter 6.

2.31 Contingency arrangements

2.31.1 ATS authorities shall develop and publish 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 with the assistance of ICAO as necessary, in close coordination with the ATS authorities responsible for the provision of services in adjacent portions of airspace and with airspace users concerned.

Note 1.— Guidance material relating to the development, promulgation and implementation of contingency plans is contained in Attachment C of ICAO Annex 11.

Note 2.— Contingency plans may constitute a temporary deviation from the approved regional air navigation plans; such deviations are approved, as necessary, by the President of the ICAO Council on behalf of the Council.

2.30.2 Where appropriate, the details of contingency ATS routes and flight level allocation scheme as agreed under the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) shall be published in the Malaysia AIP.

2.32 Identification and delineation of prohibited, restricted and danger areas

2.32.1 Each prohibited area, restricted area, or danger area established by the DGCA shall, upon initial establishment, be given identification and full details shall be promulgated.

Note.— See ICAO Annex 15, Appendix 1, and Malaysia AIP ENR 5.1.

2.32.2 The identification so assigned shall be used to identify the area in all subsequent notifications pertaining to that area.

2.32.3 The identification shall be composed of a group of letters and figures as follows:

- a) nationality letters for location indicators assigned to Malaysia which has established the airspace;
- b) a letter P for prohibited area, R for restricted area and D for danger area as appropriate; and
- c) a number, unduplicated within Malaysia.

Note.— Nationality letters are those contained in Location Indicators (Doc 7910).

2.32.4 To avoid confusion, identification numbers shall not be reused for a period of at least one year after cancellation of the area to which they refer.

2.32.5 When a prohibited, restricted or danger area is established, the area shall be as small as practicable and be contained within simple geometrical limits, so as to permit ease of reference by all concerned.

2.33 Instrument flight procedure design service

2.33.1 The DGCA may authorise PANS-OPS service providers to provide instrument flight procedure design services within Malaysia airspace.

2.33.2 All instrument flight procedures for aerodromes or airspace in Malaysia shall be designed by an *Approved Flight Procedure Design Organisation* in accordance with the design criteria and processes as described in the *Air Traffic Inspectorate Directive – Approval for Flight Procedure Design* (ATID-FPD).

CHAPTER 3. AIR TRAFFIC CONTROL SERVICE

3.1 Application

Air traffic control service shall be provided:

- a) to all IFR flights in airspace Classes A, B, C, D and E;
- b) to all VFR flights in airspace Classes B, C and D;
- c) to all special VFR flights; and
- d) to all aerodrome traffic at controlled aerodromes.

3.2 Provision of air traffic control service

The parts of air traffic control service described in 2.3.1 shall be provided by the various units as follows:

- a) Area control service:
 - 1) by an area control centre; or
 - 2) by the unit providing approach control service in a control zone or in a control area of limited extent which is designated primarily for the provision of approach control service and where no area control centre is established.
- b) Approach control service:
 - 1) by an aerodrome control tower or area control centre when it is necessary or desirable to combine under the responsibility of one unit the functions of the approach control service with those of the aerodrome control service or the area control service;
 - 2) by an approach control unit when it is necessary or desirable to establish a separate unit.
- c) Aerodrome control service: by an aerodrome control tower.

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

3.3 Operation of air traffic control service

3.3.1 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
- 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: and

- 1) whenever an aircraft might otherwise conflict with traffic operated under the control of such other units; and
- 2) before transferring control of an aircraft to such other units.

3.3.2 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.

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

Note.— Provisions related to the non-disclosure of recordings and transcripts of recordings from air traffic control units are contained in ICAO Annex 13, 5.12.

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

- a) between all flights in airspace Classes A and B;
- b) between IFR flights in airspace Classes C, D and E;
- c) between IFR flights and VFR flights in airspace Class C;
- d) between IFR flights and special VFR flights; and
- 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.

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

- a) vertical separation, obtained by assigning different levels selected from:
 - 1) the appropriate table of cruising levels in Appendix 3 of ICAO Annex 2, or
 - 2) a modified table of cruising levels, when so prescribed in accordance with Appendix 3 of ICAO 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 aeronautical information publications or air traffic control clearances;
- b) horizontal separation, obtained by providing:
 - 1) longitudinal separation, by maintaining an interval between aircraft operating along the same, converging or reciprocal tracks, expressed in time or distance; or
 - 2) lateral separation, by maintaining aircraft on different routes or in different geographical areas;
- c) composite separation, consisting of a combination of vertical separation and one of the other forms of separation contained in b) above, using minima for each which may be lower than, but not less than half of, those used for each of the combined elements when applied individually. Composite separation shall only be applied on the basis of regional air navigation agreements.

Note.— Guidance material relating to the implementation of composite lateral/vertical separation is contained in the Air Traffic Service Planning Manual (Doc 9426).

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

Note. — Guidance material relating to vertical separation and monitoring of height-keeping performance is contained in the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum between FL 290 and FL 410 Inclusive (Doc 9574).

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

Note.— Guidance material relating to RCP and RSP specifications and monitoring of communication and surveillance performance is contained in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).

3.3.5.3 ATS providers for the Kuala Lumpur and Kota Kinabalu Flight Information Regions (FIRs) shall establish and implement monitoring mechanisms for RVSM airspace including the collection of Large Height Deviation (LHD) and coordination failures and subsequent reporting to the Monitoring Agency for Asia Region (MAAR). Consequently, a copy of such report to MAAR shall be sent to Air Traffic Inspectorate Division for the purpose of surveillance by the ATS regulator.

Note 1.— Monitoring Agency for Asia Region (MAAR) was established by Aeronautical Radio of Thailand, Ltd. (AEROTHAI) under the approval of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) to assume the duties and responsibilities of the Regional Monitoring Agency (RMA) for the Asia Region.

Note 2.— The principal role of the MAAR is to assist the International Civil Aviation Organization (ICAO) in the continuation of the safety assessment program for the implementation of Reduced Vertical Separation Minimum (RVSM) and other monitoring requirements as determined by the APANPIRG.

Note 3.— This is to ensure the compliance with the related APANPIRG Conclusions in relation to RVSM approval status that the information is continuously available to RMAs.

3.4 Separation minima

3.4.1 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:

- 1) the appropriate ATS authority, following consultation with operators, for routes or portions of routes contained within the sovereign airspace of Malaysia; and
- 2) regional air navigation agreements for routes or portions of routes contained within airspace over the high seas or over areas of undetermined sovereignty.

Note.— Details of current separation minima prescribed by ICAO are contained in the PANS-ATM (Doc 4444) and Part 1 of the Regional Supplementary Procedures (Doc 7030).

- b) the selection of separation minima shall be made in consultation between the appropriate ATS authorities responsible for the provision of ATS in neighbouring airspace when:
 - 1) traffic will pass from one into the other of the neighbouring airspaces; and
 - 2) routes are closer to the common boundary of the neighbouring airspaces than the separation minima applicable in the circumstances.

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

3.4.2 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.

3.5 Responsibility for control

3.5.1 Responsibility for control of individual flights

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

3.5.2 Responsibility for control within a given block of airspace

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

3.6 Transfer of responsibility for control

3.6.1 Place or time of transfer

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

3.6.1.1 *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 centre having control of the aircraft or at such other point or time as has been agreed between the two units.

3.6.1.2 *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.

3.6.1.3 *Between a unit providing approach control service and an aerodrome control tower*

3.6.1.3.1 Arriving aircraft. The responsibility for the control of an arriving aircraft shall be transferred from the unit providing approach control service to the aerodrome control tower, when the aircraft:

- a) is in the vicinity of the aerodrome, and:
 - 1) it is considered that approach and landing will be completed in visual reference to the ground, or
 - 2) it has reached uninterrupted visual meteorological conditions, or
- b) is at a prescribed point or level, as specified in letters of agreement or ATS unit instructions; or
- c) has landed.

Note.— Even though there is an approach control unit, control of certain flights may be transferred directly from an area control centre to an aerodrome control tower and vice versa, by prior arrangement between the units concerned for the relevant part of approach control service to be provided by the area control centre or the aerodrome control tower, as applicable.

3.6.1.3.2 Departing aircraft. The responsibility for control of a departing aircraft shall be transferred from the aerodrome control tower to the unit providing approach control service:

- a) when visual meteorological conditions prevail in the vicinity of the aerodrome:
 - 1) prior to the time the aircraft leaves the vicinity of the aerodrome, or
 - 2) prior to the aircraft entering instrument meteorological conditions, or
 - 3) at a prescribed point or level, as specified in letters of agreement or ATS unit instructions;
- b) when instrument meteorological conditions prevail at the aerodrome:
 - 1) immediately after the aircraft is airborne, or
 - 2) at a prescribed point or level, as specified in letters of agreement or ATS unit instructions.

Note.— See Note following 3.6.1.3.1.

3.6.1.4 *Between control sectors/positions within the same air traffic control unit*

The responsibility for control of an aircraft shall be transferred from one control sector/position to another control sector/position within the same air traffic control unit at a point, level or time, as specified in ATS unit instructions.

3.6.2 Coordination of transfer

3.6.2.1 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 3.6.2.2, 3.6.2.2.1, 3.6.2.2.2 and 3.6.2.3.

3.6.2.2 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.

3.6.2.2.1 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.

3.6.2.2.2 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.

3.6.2.3 The accepting control unit shall:

- a) indicate its ability to accept control of the aircraft on the terms specified by the transferring control unit, unless by prior agreement between the two units concerned, the absence of any such indication is understood to signify acceptance of the terms specified, or indicate any necessary changes thereto; and
- b) specify any other information or clearance for a subsequent portion of the flight, which it requires the aircraft to have at the time of transfer.

3.6.2.4 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.

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

3.7 Air traffic control clearances

Air traffic control clearances shall be based solely on the requirements for providing air traffic control service.

3.7.1 Contents of clearances

3.7.1.1 An air traffic control clearance shall indicate:

- a) aircraft identification as shown in the flight plan;

- b) clearance limit;
- c) route of flight;
- d) level(s) of flight for the entire route or part thereof and changes of levels if required; and

Note.— If the clearance for the levels covers only part of the route, it is important for the air traffic control unit to specify a point to which the part of the clearance regarding levels applies whenever necessary to ensure compliance with 3.6.5.2.2 a) of ICAO Annex 2.

- e) any necessary instructions or information on other matters such as approach or departure manoeuvres, communications and the time of expiry of the clearance.

Note.— The time of expiry of the clearance indicates the time after which the clearance will be automatically cancelled if the flight has not been commenced.

3.7.1.2 Standard departure and arrival routes and associated procedures shall be established when necessary to facilitate:

- a) the safe, orderly and expeditious flow of air traffic; and
- b) the description of the route and procedure in air traffic control clearances.

Note.— Material relating to the establishment of standard departure and arrival routes and associated procedures is contained in the Air Traffic Services Planning Manual (Doc 9426). The design criteria are contained in PANS-OPS, Volume II (Doc 8168).

3.7.2 Clearances for transonic flight

3.7.2.1 The air traffic control clearance relating to the transonic acceleration phase of a supersonic flight shall extend at least to the end of that phase.

3.7.2.2 The air traffic control clearance relating to the deceleration and descent of an aircraft from supersonic cruise to subsonic flight shall provide for uninterrupted descent, at least during the transonic phase.

3.7.3 Read-back of clearances and safety-related information

3.7.3.1 The flight crew shall read back to the air traffic controller safety-related parts of ATC clearances and instructions which are transmitted by voice. The following items shall always be read back:

- a) ATC route clearances;
- b) clearances and instructions to enter, land on, take off from, hold short of, cross and backtrack on any runway; and
- c) runway-in-use, altimeter settings, SSR codes, level instructions, heading and speed instructions and, whether issued by the controller or contained in ATIS broadcasts, transition levels.

3.7.3.1.1 Other clearances or instructions, including conditional clearances, shall be read back or acknowledged in a manner to clearly indicate that they have been understood and will be complied with.

3.7.3.1.2 The air traffic controller shall listen to the read-back to ascertain that the clearance or instruction has been correctly acknowledged by the flight crew and shall take immediate action to correct any discrepancies revealed by the read-back.

3.7.3.2 Unless specified by the appropriate ATS authority, voice read-back of CPDLC messages shall not be required.

Note.— The procedures and provisions relating to the exchange and acknowledgement of CPDLC messages are contained in ICAO Annex 10, Volume II, and PANS-ATM, Chapter 14.

3.7.4 Coordination of clearances

An air traffic control clearance shall be coordinated between air traffic control units to cover the entire route of an aircraft or a specified portion thereof as follows:

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

- a) when it has been possible, prior to departure, to coordinate the clearance between all the units under whose control the aircraft will come; or
- b) when there is reasonable assurance that prior coordination will be effected between those units under whose control the aircraft will subsequently come.

Note.— Where a clearance is issued covering the initial part of the flight solely as a means of expediting departing traffic, the succeeding en-route clearance will be as specified above even though the aerodrome of first intended landing is under the jurisdiction of an area control centre other than the one issuing the en-route clearance.

3.7.4.2 When coordination as in 3.7.4.1 has not been achieved or is not anticipated, the aircraft shall be cleared only to that point where coordination is reasonably assured; prior to reaching such point, or at such point, the aircraft shall receive further clearance, holding instructions being issued as appropriate.

3.7.4.2.1 When prescribed by the appropriate ATS authority, aircraft shall contact a downstream air traffic control unit, for the purpose of receiving a downstream clearance prior to the transfer of control point.

3.7.4.2.1.1 Aircraft shall maintain the necessary two-way communication with the current air traffic control unit whilst obtaining a downstream clearance.

3.7.4.2.1.2 A clearance issued as a downstream clearance shall be clearly identifiable as such to the pilot.

3.7.4.2.1.3 Unless coordinated, downstream clearances shall not affect the aircraft's original flight profile in any airspace, other than that of the air traffic control unit responsible for the delivery of the downstream clearance.

Note.— Requirements relating to the application of downstream clearance delivery service are specified in ICAO Annex 10, Volume II. Guidance material is contained in the Manual of Air Traffic Services Data Link Applications (Doc 9694).

3.7.4.2.1.4 Where practicable, and where data link communications are used to facilitate downstream clearance delivery, two-way voice communications between the pilot and the air traffic control unit providing the downstream clearance shall be available.

3.7.4.3 When an aircraft intends to depart from an aerodrome within a control area to enter another control area within a period of thirty minutes, or such other specific period of time as

has been agreed between the area control centers concerned, coordination with the subsequent area control centre shall be effected prior to issuance of the departure clearance.

3.7.4.4 When an aircraft intends to leave a control area for flight outside controlled airspace, and will subsequently reenter the same or another control area, a clearance from point of departure to the aerodrome of first intended landing may be issued. Such clearance or revisions thereto shall apply only to those portions of the flight conducted within controlled airspace.

3.7.5 Air traffic flow management

3.7.5.1 Air traffic flow management (ATFM) shall be implemented for airspace where air traffic demand at times exceeds, or is expected to exceed, the declared capacity of the air traffic control services concerned.

Note 1.— The capacity of the air traffic control services concerned will normally be declared by the appropriate ATS authority.

Note 2.— The provisions and guidelines for ATS system capacity are contained in Chapter 8 of this document.

3.7.5.2 ATFM shall be implemented on the basis of Asia/Pacific Air Navigation Planning and Implementation Regional Work Group (APANPIRG) or, if appropriate, through multilateral agreements. Such agreements shall make provision for common procedures and common methods of capacity determination.

3.7.5.3 When it becomes apparent to an ATC unit that traffic additional to that already accepted cannot be accommodated within a given period of time at a particular location or in a particular area, or can only be accommodated at a given rate, that unit shall so advise the ATFM unit, when such is established, as well as, when appropriate, ATS units concerned. Flight crews of aircraft destined to the location or area in question and operators concerned shall also be advised of the delays expected or the restrictions that will be applied.

Note 1.— Operators concerned will normally be advised, in advance where possible, of restrictions imposed by the ATFM unit when such is established.

Note 2.— Materials relating to the implementation of ATFM and associated procedures are contained in the PANS-ATM (Doc4444).

3.8 Control of persons and vehicles at aerodromes

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

3.8.2 In conditions where low visibility procedures are in operation:

- a) persons and vehicles operating on the manoeuvring area of an aerodrome shall be restricted to the essential minimum, and particular regard shall be given to the requirements to protect the ILS/MLS sensitive area(s) when Category II or Category III precision instrument operations are in progress;
- b) subject to the provisions in 3.8.3, the minimum separation between vehicles and taxiing aircraft shall be as prescribed by the appropriate ATS authority taking into account the aids available; 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.

Note.— The period of application of low visibility procedures is determined in accordance with ATS unit instructions. Guidance on low visibility operations on an aerodrome is contained in the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476).

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

3.8.4 Subject to the provisions in 3.8.3, vehicles on the manoeuvring area shall be required to comply with the following rules:

- a) vehicles and vehicles towing aircraft shall give way to aircraft which are landing, taking off or taxiing;
- b) vehicles shall give way to other vehicles towing aircraft;
- c) vehicles shall give way to other vehicles in accordance with ATS unit instructions; and
- d) notwithstanding the provisions of a), b) and c), vehicles and vehicles towing aircraft shall comply with instructions issued by the aerodrome control tower.

3.9 Provision of radar and ADS-B

Where applicable, radar and ADS-B ground systems shall provide for the display of safety-related alerts and warnings, including conflict alert, conflict prediction, minimum safe altitude warning and unintentionally duplicated SSR codes.

3.10 Use of surface movement radar (SMR)

In the absence of visual observation of all or part of the manoeuvring area or to supplement visual observation, SMR provided in accordance with the provisions of ICAO Annex 14, Volume I, or other suitable surveillance equipment, shall be utilised to:

- a) monitor the movement of aircraft and vehicles on the manoeuvring area;
- b) provide directional information to pilots and vehicle drivers as necessary; and
- c) provide advice and assistance for the safe and efficient movement of aircraft and vehicles on the manoeuvring area.

Note.— See the Manual of Surface Movement Guidance and Control Systems (SMGCS) (Doc 9476), the Advanced-Surface Movement Guidance and Control Systems (A-SMGCS) Manual (Doc 9830) and the Air Traffic Services Planning Manual (Doc9426) for guidance on the use of SMR.

3.11 Reciprocal runway operations

Where applicable, the aerodrome and/or approach control units shall ensure that the procedure is established before allowing an aircraft to land and take-off;

- a) from non-duty runway; or

- b) reciprocal runway; or
 - c) at airport with unidirectional operation where one direction is used for landings while the other direction for departures.
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CHAPTER 4. FLIGHT INFORMATION SERVICE

4.1 Application

4.1.1 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.

Note.— Flight information service does not relieve the pilot-in-command of an aircraft of any responsibilities and the pilot-in-command has to make the final decision regarding any suggested alteration of flight plan.

4.1.2 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.

Note.— It is recognised that in certain circumstances aircraft on final approach, landing, take-off and climb may require to receive without delay essential information other than that pertaining to the provision of air traffic control service.

4.2 Scope of flight information service

4.2.1 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.

4.2.2 Flight information service provided to flights shall include, in addition to that outlined in 4.2.1, the provision of information concerning:

- a) weather conditions reported or forecast at departure, destination and alternate aerodromes; or
- b) collision hazards, to aircraft operating in airspace Classes C, D, E, F and G; or
- c) for flight over water areas, in so far as practicable and when requested by a pilot, any available information such as radio call sign, position, true track, speed, etc., of surface vessels in the area.

Note 1.— The information in b), including only known aircraft the presence of which might constitute a collision hazard to the aircraft informed, will sometimes be incomplete and ATS cannot assume responsibility for its issuance at all times or for its accuracy.

Note 2.— When there is a need to supplement collision hazard information provided in compliance with b), or in case of temporary disruption of flight information service, traffic information broadcasts by aircraft may be applied in designated airspaces. Guidance on traffic information broadcasts by aircraft and related operating procedures is contained in ICAO Annex 11, Attachment B.

4.2.3 ATS units shall transmit, as soon as practicable, special air-reports to other aircraft concerned, to the associated meteorological office, and to other ATS units concerned. Transmissions to aircraft shall be continued for a period to be determined by agreement between the meteorological and ATS authorities concerned.

4.2.4 Flight information service provided to VFR flights shall include, in addition to that outlined in 4.2.1, the provision of available information concerning traffic and weather conditions along the route of flight that are likely to make operation under the visual flight rules impracticable.

4.3 Operational flight information service broadcasts

4.3.1 Application

4.3.1.1 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.

4.3.1.2 Where integrated operational flight information messages are to be transmitted to aircraft, they shall be transmitted with the content and, where specified, in the sequence indicated, for the various phases of flight.

4.3.1.3 Operational flight information service broadcasts, when provided, shall consist of messages containing integrated information regarding selected operational and meteorological elements appropriate to the various phases of flight. These broadcasts shall be of three major types, i.e. HF, VHF and ATI where applicable.

4.3.1.4 *Use of the OFIS messages in directed request/reply transmissions*

When requested by the pilot, the applicable OFIS message(s) shall be transmitted by the appropriate ATS unit.

4.3.2 HF operational flight information service (OFIS) broadcasts

4.3.2.1 HF operational flight information service (OFIS) broadcasts shall be provided when it has been determined by regional air navigation agreements that a requirement exists.

4.3.2.2 Whenever such broadcasts are provided:

- a) the information shall be in accordance with 4.3.2.5, as applicable, subject to regional air navigation agreements;

- b) the aerodromes for which reports and forecasts are to be included shall be as determined by regional air navigation agreements;
- c) the time-sequencing of stations participating in the broadcast shall be as determined by regional air navigation agreements;
- d) the HF OFIS broadcast message shall take into consideration human performance. The broadcast message shall not exceed the length of time allocated for it by regional air navigation agreements, care being taken that the readability is not impaired by the speed of the transmission;

Note.— *Guidance material on human performance can be found in the Human Factors Training Manual (Doc 9683).*

- e) each aerodrome message shall be identified by the name of the aerodrome to which the information applies;
- f) when information has not been received in time for a broadcast, the latest available information shall be included together with the time of that observation;
- g) the full broadcast message shall be repeated if this is feasible within the remainder of the time allotted to the broadcasting station;
- h) the broadcast information shall be updated immediately a significant change occurs; and
- i) the HF OFIS message shall be prepared and disseminated by the most appropriate unit(s) as designated by the DGCA.

4.3.2.3 Pending the development and adoption of a more suitable form of speech for universal use in aeronautical radiotelephony communications, HF OFIS broadcasts concerning aerodromes designated for use by international air services shall be available in the English language.

4.3.2.4 Where HF OFIS broadcasts are available in more than one language, a discrete channel shall be used for each language.

4.3.2.5 HF operational flight information service broadcast messages shall contain the following information in the sequence indicated or as determined by regional air navigation agreements:

- a) En-route weather information

Information on significant en-route weather phenomena shall be in the form of available SIGMET as prescribed in ATID-MET.

- b) Aerodrome information including:

- 1) name of aerodrome;
- 2) time of observation;
- 3) essential operational information;
- 4) surface wind direction and speed; if appropriate, maximum wind speed;
- *5) visibility and, when applicable, runway visual range (RVR);
- *6) present weather;

*7) 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; and

8) aerodrome forecast.

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

4.3.3 VHF operational flight information service (OFIS) broadcasts

4.3.3.1 VHF operational flight information service broadcasts shall be provided as determined by regional air navigation agreements.

4.3.3.2 Whenever such broadcasts are provided:

- a) the aerodromes for which reports and forecasts are to be included shall be as determined by regional air navigation agreements;
- b) each aerodrome message shall be identified by the name of the aerodrome to which the information applies;
- c) when information has not been received in time for a broadcast, the latest available information shall be included together with the time of that observation;
- d) the broadcasts shall be continuous and repetitive;
- e) The VHF OFIS broadcast message shall take into consideration human performance. The broadcast message shall, whenever practicable, not exceed five minutes, care being taken that the readability is not impaired by the speed of the transmission;

Note.— Guidance material on human performance can be found in the Human Factors Training Manual (Doc 9683).

- f) the broadcast message shall be updated on a scheduled basis as determined by regional air navigation agreements. In addition it shall be expeditiously updated immediately a significant change occurs; and
- g) the VHF OFIS message shall be prepared and disseminated by the most appropriate unit(s) as designated by each State.

4.3.3.3 Pending the development and adoption of a more suitable form of speech for universal use in aeronautical radiotelephony communications, VHF OFIS broadcasts concerning aerodromes designated for use by international air services shall be available in the English language.

4.3.3.4 Where VHF OFIS broadcasts are available in more than one language, a discrete channel shall be used for each language.

4.3.3.5 VHF operational flight information service broadcast messages shall contain the following information in the sequence indicated:

- a) name of aerodrome;
- b) time of observation;
- c) landing runway;
- d) significant runway surface conditions and, if appropriate, braking action;

- e) changes in the operational state of the radio navigation services, if appropriate;
- f) holding delay, if appropriate;
- g) surface wind direction and speed; if appropriate, maximum wind speed;
- *h) visibility and, when applicable, runway visual range (RVR);
- *i) present weather;
- *j) cloud below 1 500 m (5 000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility, when available;
- †k) air temperature;
- †l) dew point temperature;
- †m) QNH altimeter setting;
- n) supplementary information on recent weather of operational significance and, where necessary, wind shear;
- o) trend forecast, when available; and
- p) notice of current SIGMET messages.

*Note 1.— * These elements are replaced by the term “CAVOK” whenever the conditions as specified in the PANS-ATM (Doc 4444), Chapter 11 prevail.*

Note 2.— † As determined on the basis of regional air navigation agreements.

4.3.4 Voice-automatic terminal information service (Voice-ATIS) broadcasts

4.3.4.1 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.

4.3.4.2 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.

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

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

4.3.4.5 The information contained in the current broadcast shall immediately be made known to the ATS unit(s) concerned with the provision to aircraft of information relating to approach, landing and takeoff, whenever the message has not been prepared by that (those) unit(s).

Note.— The requirements for the provision of ATIS that applies to both Voice-ATIS and D-ATIS are contained in 4.3.5 below.

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

4.3.4.7 The Voice-ATIS broadcast message shall, whenever practicable, not exceed 30 seconds, care being taken that the readability of the ATIS message is not impaired by the speed of the transmission or by the identification signal of a navigation aid used for transmission of ATIS. The ATIS broadcast message shall take into consideration human performance.

Note.— Guidance material on human performance can be found in the Human Factors Training Manual (Doc 9683).

4.3.5 Data link-automatic terminal information service (D-ATIS)

4.3.5.1 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.

4.3.5.1.1 Where real-time meteorological information is included but the data remains within the parameters of the significant change criteria, the content, for the purpose of maintaining the same designator, shall be considered identical.

Note.— Significant change criteria are specified in 2.3.2 of Appendix 3 to ICAO Annex 3.

4.3.5.2 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.

Note.— Guidance material relating to D-ATIS is contained in the Manual of Air Traffic Services Data Link Applications (Doc 9694). The technical requirements for the D-ATIS application are contained in ICAO Annex 10, Volume III, Part I, Chapter 3.

4.3.6 Automatic terminal information service (voice and/or data link)

4.3.6.1 Whenever Voice-ATIS and/or D-ATIS is provided:

- a) the information communicated shall relate to a single aerodrome;
- b) the information communicated shall be updated immediately a significant change occurs;
- c) the preparation and dissemination of the ATIS message shall be the responsibility of the air traffic services;
- d) individual ATIS messages shall be identified by a designator in the form of a letter of the ICAO spelling alphabet. Designators assigned to consecutive ATIS messages shall be in alphabetical order;
- e) aircraft shall acknowledge receipt of the information upon establishing communication with the ATS unit providing approach control service or the aerodrome control tower, as appropriate;
- f) the appropriate ATS unit shall, when replying to the message in e) above or, in the case of arriving aircraft, at such other time as may be prescribed by the appropriate ATS authority, provide the aircraft with the current altimeter setting; and

g) the meteorological information shall be extracted from the local meteorological routine or special report.

Note 1.— In accordance with Sections 4.1 and 4.3 of Appendix 3 to ICAO Annex 3, the surface wind direction and speed and runway visual range (RVR) are to be averaged over 2 minutes and 1 minute, respectively; and the wind information is to refer to conditions along the runway for departing aircraft and to conditions at the touchdown zone for arriving aircraft. A template for the local meteorological report, including the corresponding ranges and resolutions of each element, are in Appendix 3 to ICAO Annex 3. Additional criteria for the local meteorological report are contained in ATID-MET Chapter 4, and in Attachment D to ICAO Annex 3.

Note 2.— MET Malaysia as the MET service provider has not implemented the local meteorological routine or special report as specified in Chapter 4 of ATID-MET and ICAO Annex 3. Where applicable, ATS providers shall use real-time weather conditions from the visual automated weather observation system (AWOS) and automated wind and runway visual range (WRVR) located along the runways.

4.3.6.2 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.

4.3.6.3 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 4.3.6.1 f).

4.3.6.4 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.

4.3.6.5 Contents of ATIS shall be kept as brief as possible. Information additional to that specified in 4.3.7 to 4.3.9, for example information already available in the AIPs and NOTAM, shall only be included when justified in exceptional circumstances.

4.3.6.6 Where applicable, the meteorological information shall be extracted from the local METAR when the local meteorological routine or special report as specified in 4.3.6.1 g) above is not available.

4.3.7 ATIS for arriving and departing aircraft

ATIS messages containing both arrival and departure information shall contain the following elements of information in the order listed:

- a) name of aerodrome;
- b) arrival and/or departure indicator;
- c) contract type, if communication is via D-ATIS;
- d) designator;
- e) time of observation, if appropriate;
- f) type of approach(es) to be expected;
- g) the runway(s) in use; status of arresting system constituting a potential hazard, if any;
- h) significant runway surface conditions and, if appropriate, braking action;

- i) holding delay, if appropriate;
- j) transition level, if applicable;
- k) other essential operational information;
- l) surface wind direction (in degrees magnetic) and speed, including significant variations and, if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;
- *m) visibility and, when applicable, RVR and, if visibility/RVR sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;
- *n) present weather;
- *o) cloud below 1 500 m (5 000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available;
- p) air temperature;
- †q) dew point temperature;
- r) altimeter setting(s);
- s) any available information on significant meteorological phenomena in the approach and climbout areas including wind shear, and information on recent weather of operational significance;
- t) trend forecast, when available; and
- u) specific ATIS instructions.

*Note 1.— * These elements are replaced by the term “CAVOK” whenever the conditions as specified in the PANS-ATM (Doc 4444), Chapter 11 prevail.*

Note 2.— † As determined on the basis of regional air navigation agreements.

4.3.8 ATIS for arriving aircraft

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

- a) name of aerodrome;
- b) arrival indicator;
- c) contract type, if communication is via D-ATIS;
- d) designator;
- e) time of observation, if appropriate;
- f) type of approach(es) to be expected;
- g) main landing runway(s); status of arresting system constituting a potential hazard, if any;
- h) significant runway surface conditions and, if appropriate, braking action;

- i) holding delay, if appropriate;
- j) transition level, if applicable;
- k) other essential operational information;
- l) surface wind direction (in degrees magnetic) and speed, including significant variations and, if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;
- *m) visibility and, when applicable, RVR and, if visibility/RVR sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;
- *n) present weather;
- *o) cloud below 1 500 m (5 000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available;
- p) air temperature;
- †q) dew point temperature;
- r) altimeter setting(s);
- s) any available information on significant meteorological phenomena in the approach area including wind shear, and information on recent weather of operational significance;
- t) trend forecast, when available; and
- u) specific ATIS instructions.

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

Note.— † As determined on the basis of regional air navigation agreements.

4.3.9 ATIS for departing aircraft

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 takeoff; status of arresting system constituting a potential hazard, if any;
- g) significant surface conditions of runway(s) to be used for takeoff and, if appropriate, braking action;

- h) departure delay, if appropriate;
- i) transition level, if applicable;
- j) other essential operational information;
- k) surface wind direction (in degrees magnetic) and speed, including significant variations and, if surface wind sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;
- *l) visibility and, when applicable, RVR and, if visibility/RVR sensors related specifically to the sections of runway(s) in use are available and the information is required by operators, the indication of the runway and the section of the runway to which the information refers;
- *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.

*Note 1.— * These elements are replaced by the term “CAVOK” whenever the conditions as specified in the PANS-ATM (Doc 4444), Chapter 11 prevail.*

Note 2.— † As determined on the basis of regional air navigation agreements. ATID-MET, 11.5 and 11.6 provide details of VOLMET broadcasts and DVOLMET service.

4.4 VOLMET broadcasts and D-VOLMET service

4.4.1 HF and/or VHF VOLMET broadcasts and/or D-VOLMET service shall be provided when it has been determined by regional air navigation agreements that a requirement exists.

4.4.2 VOLMET broadcasts shall use standard radiotelephony phraseologies.

Note.— Guidance on standard radiotelephony phraseologies to be used in VOLMET broadcasts is given in the Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services (Doc 9377), Appendix 1.

CHAPTER 5. ALERTING SERVICE

5.1 Application

5.1.1 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
- c) to any aircraft known or believed to be the subject of unlawful interference.

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

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

5.1.3.1 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 organisations which can give the immediate assistance required.

5.2 Notification of RCCs

5.2.1 Without prejudice to any other circumstances that may render such notification advisable, ATS units shall, except as prescribed in 5.5.1, notify the RCC immediately an aircraft is considered to be in a state of emergency in accordance with the following:

- a) Uncertainty phase when:
 - 1) 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
 - 2) 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:
 - 1) 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

- 2) 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
- 3) 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

- 4) an aircraft is known or believed to be the subject of unlawful interference.

c) Distress phase when:

- 1) 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
- 2) the fuel on board is considered to be exhausted, or to be insufficient to enable the aircraft to reach safety, or when
- 3) 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
- 4) 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.

5.2.2 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) colour and distinctive marks of aircraft;
- h) dangerous goods carried as cargo;
- i) any action taken by reporting office; and
- j) other pertinent remarks.

5.2.2.1 Such part of the information specified in 5.2.2, which is not available at the time notification is made to a RCC, shall be sought by an ATS unit prior to the declaration of a distress phase, if there is reasonable certainty that this phase will eventuate.

5.2.3 Further to the notification in 5.2.1, the RCC shall, without delay, be furnished with:

- a) any useful additional information, especially on the development of the state of emergency through subsequent phases; or
- b) information that the emergency situation no longer exists.

Note.— *The cancellation of action initiated by the RCC is the responsibility of that RCC.*

5.3 Use of communication facilities

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

5.4 Plotting aircraft in a state of emergency

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

5.5 Information to the operator

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

Note.— *If an aircraft is in the distress phase, the RCC has to be notified immediately in accordance with 5.2.1.*

5.5.2 All information notified to the RCC by an area control or flight information centre shall, whenever practicable, also be communicated, without delay, to the operator.

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

5.6.1 When it has been established by an ATS 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 5.6.2, be informed of the nature of the emergency as soon as practicable.

5.6.2 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.

CHAPTER 6. ATS REQUIREMENTS FOR COMMUNICATIONS

6.1 Aeronautical mobile service (air-ground communications)

6.1.1 General

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

Note.— Requirements for ATS units to be provided with and to maintain guard on the emergency channel 121.5 MHz are specified in ICAO Annex 10, Volumes II and V.

6.1.1.2 Where RCP types have been prescribed the DGCA for ATM functions, ATS units shall, in addition to the requirements specified in 6.1.1.1, be provided with communication equipment which will enable them to provide ATS in accordance with the prescribed RCP type(s).

Note.— Information on the performance-based communication and surveillance (PBCS) concept and guidance material on its implementation are contained in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).

6.1.1.3 When direct pilot-controller two-way radiotelephony 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.

Note.— Requirements for retention of all automatic recordings of communications in ATC are specified in ICAO Annex 10, Volume II, 3.5.1.5.

6.1.1.4 Recordings of communications channels as required in paragraph 6.1.1.3 shall be retained for a period of at least thirty days.

6.1.2 For flight information service

6.1.2.1 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.

6.1.2.2 Whenever practicable, air-ground communication facilities for flight information service shall permit direct, rapid, continuous and static-free two-way communications.

6.1.3 For area control service

6.1.3.1 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).

6.1.3.2 Whenever practicable, air-ground communication facilities for area control service shall permit direct, rapid, continuous and static-free two-way communications.

6.1.3.3 Where air-ground voice communication channels are used for area control service and are worked by air-ground communicators, suitable arrangements shall be made to permit direct pilot-controller voice communications, as and when required.

6.1.4 For approach control service

6.1.4.1 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.

6.1.4.2 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.

6.1.5 For aerodrome control service

6.1.5.1 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.

6.1.5.2 Where conditions warrant, separate communication channels shall be provided for the control of traffic operating on the manoeuvring area.

6.2 Aeronautical fixed service (ground-ground communications)

6.2.1 General

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

Note 1.— Indication by time of the speed with which the communication should be established is provided as a guide to communication services, particularly to determine the types of communication channels required, e.g. that “instantaneous” is intended to refer to communications which effectively provide for immediate access between controllers; “fifteen seconds” to accept switchboard operation and “five minutes” to mean methods involving retransmission.

Note 2.— Requirements for retention of all automatic recordings of communications in ATC are specified in ICAO Annex 10, Volume II, 3.5.1.5.

6.2.2 Communications within a flight information region

6.2.2.1 Communications between ATS units

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

- a) the area control centre, unless collocated;
- b) approach control units; and
- c) aerodrome control towers.

6.2.2.1.2 An area control centre, in addition to being connected to the flight information centre as prescribed in 6.2.2.1.1, 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.

6.2.2.1.3 An approach control unit, in addition to being connected to the flight information centre and the area control centre as prescribed in 6.2.2.1.1 and 6.2.2.1.2, shall have facilities for communications with the associated aerodrome control tower(s) and, when separately established, the associated ATS reporting office(s).

6.2.2.1.4 An aerodrome control tower, in addition to being connected to the flight information centre, the area control centre and the approach control unit as prescribed in 6.2.2.1.1, 6.2.2.1.2 and 6.2.2.1.3, shall have facilities for communications with the associated ATS reporting office, when separately established.

6.2.2.2 *Communications between ATS units and other units*

6.2.2.2.1 A flight information centre and an area control centre shall have facilities for communications with the following units providing a service within their respective area of responsibility:

- a) appropriate military units;
- b) the meteorological office serving the centre;
- c) the aeronautical telecommunications station serving the centre;
- d) appropriate operator's offices;
- e) the RCC or, in the absence of such centre, any other appropriate emergency service; and
- f) the international NOTAM office serving the centre.

6.2.2.2.2 An approach control unit and an aerodrome control tower shall have facilities for communications with the following units providing a service within their respective area of responsibility:

- a) appropriate military units;
- b) rescue and emergency services (including ambulance, fire, etc.);
- c) the meteorological office serving the unit concerned;
- d) the aeronautical telecommunications station serving the unit concerned; and
- e) the unit providing apron management service, when separately established.

6.2.2.2.3 The communication facilities required under 6.2.2.2.1 a) and 6.2.2.2.2 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.

6.2.2.3 *Description of communication facilities*

6.2.2.3.1 The communication facilities required under 6.2.2.1, 6.2.2.2.1 a) and 6.2.2.2.2 a), b) and c) shall include provisions for:

- a) communications by direct speech alone, or in combination with data link communications, whereby for the purpose of transfer of control using radar or ADS-B, the communications can be established instantaneously and for other purposes the communications can normally be established within fifteen seconds; and
- b) printed communications, when a written record is required; the message transit time for such communications being no longer than five minutes.

6.2.2.3.2 In all cases not covered by 6.2.2.3.1, the communication facilities shall include provisions for:

- a) communications by direct speech alone, or in combination with data link communications, whereby the communications can normally be established within fifteen seconds; and
- b) printed communications, when a written record is required; the message transit time for such communications being no longer than five minutes.

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

6.2.2.3.4 The communication facilities required in accordance with 6.2.2.1 and 6.2.2.2 shall be supplemented, as and where necessary, by facilities for other forms of visual or audio communications, for example, closed circuit television or separate information processing systems.

6.2.2.3.5 The communication facilities required under 6.2.2.2.2 a), b) and c) shall include provisions for communications by direct speech arranged for conference communications.

6.2.2.3.6 The communication facilities required under 6.2.2.2.2 d) shall include provisions for communications by direct speech arranged for conference communications, whereby the communications can normally be established within fifteen seconds.

6.2.2.3.7 All facilities for direct-speech or data link communications between ATS units and between ATS units and other units described under 6.2.2.2.1 and 6.2.2.2.2 shall be provided with automatic recording.

6.2.2.3.8 Recordings of data and communications as required in 6.2.2.3.3 and 6.2.2.3.7 shall be retained for a period of at least thirty days.

6.2.3 Communications between FIRs

6.2.3.1 Flight information centres and area control centres shall have facilities for communications with all adjacent flight information centres and area control centres.

6.2.3.1.1 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.

6.2.3.1.2 Unless otherwise prescribed on the basis of regional air navigation agreements, facilities for communications between area control centres serving contiguous control areas shall, in addition, include provisions for direct speech and, where applicable, data link communications, with automatic recording, whereby for the purpose of transfer of control using radar, ADS-B or ADS-C data, the communications can be established instantaneously

and for other purposes the communications can normally be established within fifteen seconds.

6.2.3.1.3 When so required by agreement between the States concerned in order to eliminate or reduce the need for interceptions in the event of deviations from assigned track, facilities for communications between adjacent flight information centres or area control centres other than those mentioned in 6.2.3.1.2 shall include provisions for direct speech alone, or in combination with data link communications. The communication facilities shall be provided with automatic recording.

6.2.3.1.4 The communication facilities in 6.2.3.1.3 shall permit communications to be established normally within fifteen seconds.

6.2.3.2 Adjacent ATS units shall be connected in all cases where special circumstances exist.

Note.— Special circumstances may be due to traffic density, types of aircraft operations and/or the manner in which the airspace is organised and may exist even if the control areas and/or control zones are not contiguous or have not (yet) been established.

6.2.3.3 Wherever local conditions are such that it is necessary to clear aircraft into an adjacent control area prior to departure, an approach control unit and/ or aerodrome control tower shall be connected with the area control centre serving the adjacent area.

6.2.3.4 The communication facilities in 6.2.3.2 and 6.2.3.3 shall include provisions for communications by direct speech alone, or in combination with 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.

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

6.2.3.6 Recordings of data and communications as required in 6.2.3.5 shall be retained for a period of at least thirty days.

6.2.4 Procedures for direct-speech Communications

Appropriate procedures for direct-speech communications shall be developed to permit immediate connections to be made for very urgent calls concerning the safety of aircraft, and the interruption, if necessary, of less urgent calls in progress at the time.

6.3 Surface movement control service

6.3.1 Communications for the control of vehicles other than aircraft on manoeuvring areas at controlled aerodromes

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

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

6.3.1.3 Recordings of communications as required in 6.3.1.2 shall be retained for a period of at least thirty days.

Note.— See also ICAO Annex 10, Volume II, 3.5.1.5.

6.4 Aeronautical radio navigation service

6.4.1 Automatic recording of surveillance data

6.4.1.1 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.

6.4.1.2 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.

6.5 Radio telephony procedures

6.5.1 In all communications the highest standard of discipline shall be observed at all times.

6.5.2 ICAO standardised phraseology shall be used in all situations for which it has been specified. Only when standardised phraseology cannot serve an intended transmission, plain language shall be used.

6.5.3 The communications procedures shall be in accordance with Volume II of ICAO Annex 10 — Aeronautical Telecommunications, and pilots, ATS personnel and other ground personnel shall be thoroughly familiar with the radiotelephony procedures contained therein.

Note 1.— The provisions for word spelling, transmissions of numbers, transmitting techniques, composition of messages, calling, test procedures, exchange of communication are contained in Chapter 5, Volume II of ICAO Annex 10 — Aeronautical Telecommunications.

Note 2.— The materials relating to phraseologies are contained in Chapter 12 PANS-ATM (Doc4444).

6.5.4 When a controller or pilot communicates via voice, the response shall be via voice. When a controller or pilot communicates via CPDLC, the response shall be via CPDLC except when a CPDLC emergency message is received, the controller shall acknowledge receipt of the message by the most efficient means available.

CHAPTER 7. ATS REQUIREMENTS FOR INFORMATION

7.1 Meteorological information

7.1.1 General

7.1.1.1 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.

7.1.1.2 ATS units shall be supplied with available detailed information on the location, vertical extent, direction and rate of movement of meteorological phenomena in the vicinity of the aerodrome, and particularly in the climb-out and approach areas, which could be hazardous to aircraft operations.

Note.— The meteorological phenomena are listed in ATID-MET, Chapter 4, 4.6.8.

7.1.1.3 When computer-processed upper air data are made available to ATS units in digital form for use by ATS computers, the contents, format and transmission arrangements shall be as agreed between the Meteorological Authority and the appropriate ATS Authority.

7.1.2 Flight information centres and area control centres

7.1.2.1 Flight information centres and area control centres shall be supplied with meteorological information as described in ICAO 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.

Note.— For the purpose of this provision, certain changes in meteorological conditions are construed as deterioration in a weather element, although they are not ordinarily considered as such. An increase in temperature may, for example, adversely affect the operation of certain types of aircraft.

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

7.1.3 Units providing approach control service

7.1.3.1 Units providing approach control service shall be supplied with meteorological information as described in ICAO 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.

Note.— For the purpose of this provision, certain changes in meteorological conditions are construed as deterioration in a weather element, although they are not ordinarily considered as such. An increase in temperature may, for example, adversely affect the operation of certain types of aircraft.

7.1.3.2 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.

7.1.3.3 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.

7.1.3.4 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.

7.1.3.5 Units providing approach control service for final approach, landing and take-off at aerodromes where the height of cloud base is assessed by instrumental means shall be equipped with display(s) permitting read-out of the current value(s) of the height of cloud base. The displays shall be related to the same location(s) of observations 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.

7.1.3.6 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.

Note.— Provisions concerning the issuance of wind shear warnings and alerts and ATS requirements for meteorological information are given in ATID-MET, Chapter 7 and ICAO Annex 3 Appendices 6 and 9.

7.1.4 Aerodrome control towers

7.1.4.1 Aerodrome control towers shall be supplied with meteorological information as described in ICAO 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.

Note.— For the purpose of this provision, certain changes in meteorological conditions are construed as deterioration in a weather element, although they are not ordinarily considered as such. An increase in temperature may, for example, adversely affect the operation of certain types of aircraft.

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

7.1.4.3 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.

7.1.4.4 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.

7.1.4.5 Aerodrome control towers at aerodromes where the height of cloud base is assessed by instrumental means shall be equipped with display(s) permitting read-out of the current value(s) of the height of cloud base. The displays shall be related to the same location(s) of observations and be fed from the same sensor(s) as the corresponding display(s) in the meteorological station, where such a station exists.

7.1.4.6 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.

7.1.4.7 Aerodrome control towers and/or other appropriate units shall be supplied with aerodrome warnings.

Note 1.— The meteorological conditions for which aerodrome warnings are issued are listed in ICAO Annex 3, Appendix 6, 5.1.3.

Note 2.— Where applicable, ATS service providers shall use real-time weather conditions from the visual automated weather observation system (AWOS) and automated wind and runway visual range (WRVR) located along the runways.

7.1.4.8 Where applicable, the surface wind information shall be extracted from the visual display of automated weather observation system (AWOS) and automated wind and runway visual range (WRVR) located along the runways for aircraft landing and take-off.

7.1.4.9 Where the AWOS or WRVR information are used for departing aircraft, the surface wind observations for these reports shall be representative of the conditions along the runway.

7.1.4.10 Where the AWOS or WRVR information are used for arriving aircraft, the surface wind observations for these reports shall be representative of the touchdown zone.

7.1.5 Communication stations

Where necessary for flight information purposes, current meteorological reports and forecasts shall be supplied to communication stations. A copy of such information shall be forwarded to the flight information centre or the area control centre.

7.2 Information on aerodrome conditions and the operational status of associated facilities

Aerodrome control towers and units providing approach control service shall be kept currently informed of the operationally significant conditions of the movement area, including the existence of temporary hazards, and the operational status of any associated facilities at the aerodrome(s) with which they are concerned.

7.3 Information on the operational status of navigation services

7.3.1 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.

7.3.2 Information on the operational status, and any changes thereto, of radio navigation services and visual aids as referred to in 7.3.1 shall be received by the appropriate ATS unit(s) on a timely basis consistent with the use of the service(s) and aid(s) involved.

Note.— Guidance material regarding the provision of information to ATS units in respect to visual and non-visual navigation aids is contained in the Air Traffic Services Planning Manual (Doc 9426). Specifications for monitoring visual aids are contained in ICAO Annex 14, Volume I, and related guidance material is in the Aerodrome Design Manual (Doc 9157), Part 5. Specifications for monitoring non-visual aids are contained in Annex 10, Volume I.

7.4 Information on unmanned free balloons

Operators of unmanned free balloons shall keep the appropriate ATS units informed of details of flights of unmanned free balloons in accordance with the provisions contained in ICAO Annex 2.

7.5 Information concerning volcanic activity

7.5.1 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.

7.5.2 Area control centres and flight information centres shall be provided with volcanic ash advisory information issued by the associated VAAC.

Note.— VAACs are designated by regional air navigation agreements in accordance with ICAO Annex 3, 3.5.1.

7.6 Information concerning radioactive materials and toxic chemical “clouds”

ATS units shall be informed, in accordance with local agreement, of the release into the atmosphere of radioactive materials or toxic chemicals which could affect airspace used by flights within their area of responsibility.

CHAPTER 8 ATS SYSTEM CAPACITY

8.1 Capacity Management

8.1.1 General

8.1.1.1 The capacity of an ATS system depends on many factors, including the ATS route structure, the navigation accuracy of the aircraft using the airspace, weather related factors, and air traffic controller workload. Every effort shall be made to provide sufficient capacity to cater to both normal and peak traffic levels; however, in implementing any measures to increase capacity, the ATS provider shall ensure that safety levels are not jeopardised.

8.1.1.2 The number of aircraft provided with an ATC service shall not exceed that which can be safely handled by the ATC unit concerned under the prevailing circumstances.

8.1.1.3 In order to define the maximum number of flights which can be safely accommodated, the ATS provider shall assess and declare the ATC capacity for control areas, for control sectors within a control area and for aerodromes.

8.1.1.4 ATC capacity shall be expressed as the maximum number of aircraft which can be accepted over a given period of time or at the aerodrome concerned.

Note.— The most appropriate measure of capacity is likely to be the sustainable hourly traffic flow. Such hourly capacities can, for example, be converted into daily monthly or annual values.

8.1.2 Capacity assessment

8.1.2.1 In assessing capacity values, factors to be taken into account shall include, inter alia:

- a) the level and type of ATS provided;
- b) the structural complexity of the control area, the control sector or the aerodrome concerned;
- c) air traffic controller workload, including control and coordination tasks to be performed;
- d) the types of communications, navigation and surveillance systems in use, their degree of technical reliability and availability as well as the availability of back-up systems and/or procedures;
- e) availability of ATC systems providing air traffic controller support and alert functions; and
- f) any other factor or element deemed relevant to air traffic controller workload.

Note:- Summaries of techniques which may be used to estimate control sector/position capacities are contained in the Air Traffic Services Planning Manual (Doc 9426).

8.2 Regulation of ATC capacity and traffic volumes

8.2.1 Where traffic demand varies significantly on a daily or periodic basis, facilities and procedures shall be implemented to vary the number of operational sectors or working positions to meet the prevailing and anticipated demand. Applicable procedures shall be contained in local instructions.

8.2.2 In case of particular events which have a negative impact on the declared capacity of an airspace or aerodrome, the capacity of the airspace or aerodrome concerned shall be reduced accordingly for the required time period.

8.2.3 Whenever possible, the capacity pertaining to such events in 8.2.2 above shall be pre-determined.

8.2.4 To ensure that safety is not compromised whenever the traffic demand in an airspace or at an aerodrome is forecast to exceed the available ATC capacity, measures shall be implemented to regulate traffic volumes accordingly.

8.3 Enhancement of ATC capacity

8.3.1 The ATS providers shall:

- a) periodically review ATS capacities in relation to traffic demand; and
- b) provide for flexible use of airspace in order to improve the efficiency of operations and increase capacity.

8.3.2 In the event that traffic demand regularly exceeds ATC capacity, resulting in continuing and frequent traffic delays, or it becomes apparent that forecast traffic demand will exceed capacity values, the provider shall, as far as practicable:

- a) implement steps aimed at maximising the use of the existing system capacity; and
- b) develop plans to increase capacity to meet the actual or forecast demand.

8.4 Flexible use of airspace

8.4.1 The ATS authorities shall, through the establishment of agreements and procedures, make provision for the flexible use of all airspace in order to increase airspace capacity and to improve the efficiency and flexibility of aircraft operations.

8.4.2 Agreements and procedures providing for a flexible use of airspace shall specify, inter alia:

- a) the horizontal and vertical limits of the airspace concerned;
- b) the classification of any airspace made available for use by civil air traffic;
- c) units or authorities responsible for transfer of the airspace;
- d) conditions for transfer of the airspace to the ATC unit concerned;
- e) conditions for transfer of the airspace from the ATC unit concerned;
- f) periods of availability of the airspace;
- g) any limitations on the use of the airspace concerned; and

h) any other relevant procedures or information.

CHAPTER 9. ATS ORGANISATION

9.1 ATS personnel

Note.— The objective of this section is to ensure that human resources are properly managed with a view to minimising their contribution to accident/incident in the provision of ATS.

9.1.1 Job Description

9.1.1.1 The ATS providers shall identify the key personnel responsible for the safe conduct of the ATM. Their positions, responsibilities, functions, accountabilities and authorities are to be clearly defined. ATS provider shall also develop job descriptions for other ATM staff & other technical staff. Organisation chart indicating the specific responsibilities shall be provided.

9.1.1.2 The ATS authority shall document and define the method of determining staffing levels to ensure safe and efficient ATM operations.

9.1.2 Recruitment and retention of ATS staff

The ATS authority shall establish and implement policies and procedures to enable recruitment and retention of adequate, appropriate qualified and experienced ATS staff.

9.1.3 Training programme, assessment and training records

9.1.3.1 The ATS provider shall establish and implement training programmes and procedures to ensure the initial and continuing competence of operational personnel including continued competence (refresher) in using new equipment, procedures and updated communications.

Note.— The provisions and requirements for the licensing including ratings, validation and proficiency for air traffic controllers are contained in the Civil Aviation Regulations 2016 and the ANS Regulatory Manual.

9.1.3.2 The programmes and procedures in paragraph 9.1.3.1 shall ensure that operational personnel are trained, given regular recurrent training in normal and emergency procedures and are assessed on such.

9.1.3.3 The training programme and procedures shall include initial, recurrent and specialised training.

9.1.3.4 ATS providers shall maintain individual training records for each staff, which shall include a training plan detailing the courses completed by each staff.

9.1.4 Guidance material

9.1.4.1 ATS providers shall ensure that relevant ICAO documents and other technical and regulatory publications are readily available to all ATM personnel.

9.1.4.2 A technical library shall be available, to include any method to ensure receipt, control and distribution of the necessary technical documentation. The library shall be kept and maintained to ensure the currency of the documentations.

9.2 ATS operations manual

9.2.1 The ATS provider shall provide ATS in accordance with the *Civil Aviation Act 1969*, *Civil Aviation Regulations 2016*, *ANS Regulatory Manual*, ATIDs, ICAO Annex 11, Doc 4444, supplemented by ICAO Doc 7030 as applicable.

9.2.2 The ATS authority shall publish the standard operating procedure as *Manual of Air Traffic Services Volume 1 (MATS Vol.1)* which contains the rules, and guidance material for air traffic controllers and other operational staff tasked with the provision of ATS in their designated airspace.

9.2.3 Detailed procedures to be employed by each ATS unit, with any applicable limitations, shall be set out in the unit's *Manual of Air Traffic Services Volume 2 (MATS Vol.2)*.

9.2.4 The MATS shall be supplemented by directives in the form of Unit Operations Instructions (UOIs), Regional Operations Instructions (ROIs), Supplementary Operations Instructions (SOIs) and Letter of Agreements (LOAs) specific to each location.

9.2.5 UOI which contains information on permanent or temporary nature shall be published under the authority of the Regional Directors / Directors as appropriate.

9.2.6 UOI which contains information on permanent nature shall be incorporated into MATS Vol.2 while information on temporary nature shall be issued as an operating instruction that is self-cancelling.

9.2.7 The Manuals shall describe the operational procedures of ATS unit(s) which comply with para 9.2.1, and shall include:

- a) the information required regarding hours of service, the establishment of an air traffic service 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 air traffic service 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 co-ordination requirements;
- k) the contingency plans as required in this document;
- 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, where applicable;
- 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;
- ab) procedures for aircraft in the event of in-flight contingencies;
- ac) arrangements in place for provision of AIS to the unit; and
- ad) systems and procedures governing ATIS broadcasts.

9.2.8 The Manuals shall be kept up to date and a copy shall be forwarded to the DGCA.

9.3 Records

The ATS provider shall maintain documents and records of operation and maintenance of the service for safety audit / inspection by the ATS regulator at any time. These documents shall include, inter alia:

- a) record of malfunction or fault of critical safety facilities and equipment;
- b) record of training programme and plan for each ATS staff;
- c) record and copy of certificates of all related trainings for each staff including where applicable, initial, OJT, recurrent and specialised training;
- d) safety risk management processes and the conduct of safety reviews;
- e) aircraft incidents investigations including abnormal occurrences and their related mitigation processes; and
- f) aircraft movement statistics, safety performance indicators including its related alerts and targets.

CHAPTER 10. EQUIPMENT AND FACILITIES

10.1 General

10.1.1 To function efficiently, an air traffic control system requires various equipment and facilities. Types and quantities of this equipment will vary with the complexity of the particular system. ATS authority shall meet the essential operational requirements apart from deciding which of the desirable features are reasonable.

10.1.2 ATS authority shall ensure that any automation systems generate and display flight plan, control and coordination data in a timely, accurate and easily recognisable manner, and in accordance with Human Factors principles.

10.1.3 ATS authority shall ensure that equipment, including input/output devices for automation systems, are designed and positioned in the control work position in accordance with ergonomic principles.

Note 1.— The Air traffic management (ATM) system should meet the requirements outlined in the ICAO vision for the integrated, harmonised, and globally interoperable ATM system.

Note 2.— The guidelines for the ground based navigation, surveillance and communications equipment generally be installed are contained in the Part III Section 1 of ATS Planning Manual (Doc 9426).

Note 3.— The guidelines for the facilities required by ATS are contained in the Part III Section 2 of ATS Planning Manual (Doc 9426).

10.2 Facilities and equipment maintenance

Note.— The definition of ATM is 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.

10.2.1 ATS providers shall ensure that:

- a) the facilities and equipment are maintained; and
- b) the environmental working conditions meet established levels for temperature, humidity, ventilation, noise and ambient lighting and do not adversely affect air traffic controller performance.

10.2.2 ATS providers shall ensure that the communications, navigation, surveillance and other safety significant systems, facilities, aids and equipment:

- a) are tested for normal operations on a routine basis;
- b) meet the required level of reliability and availability as defined by the appropriate authority;
- c) provide for the timely and appropriate detection and warning of system failures and degradations;
- d) include documentation on the consequences of system, subsystem and equipment failures and degradations;
- e) include measures to control the probability of failures and degradations; and

f) include adequate backup facilities and/or procedures in the event of a system failure or degradation.

Note.— In the context above, the terms reliability and availability have the following meanings:

- 1) Reliability. The probability that a device or system will function without failure over a specified time period or amount of usage; and*
- 2) Availability. The ratio of percentage of the time that a system is operating correctly to the total time in that period.*

10.3 Failure or irregularity of aids, systems and equipment

10.3.1 ATC units shall immediately report in accordance with local instructions any failure or irregularity of communication, navigation and surveillance systems or any other safety significant systems, facilities, aids or equipment which could adversely affect the safety or equipment which or efficiency of flight operations and/or the provision of air traffic control service.

10.3.2 Aerodrome control towers shall immediately report in accordance with local instructions any failure or irregularity of operation in any equipment, light or other device established at an aerodrome for the guidance of aerodrome traffic and flight crews or required for the provision of air traffic control service.

10.3.3 ATS providers shall have system for reporting of unserviceability and detailed records of aids, systems, facilities and equipment serviceability are kept and periodically reviewed.

10.4 Facilities and equipment failure contingency plan

10.4.1 In order to reduce the impact of complete ground radio equipment failure on the safety of air traffic, the appropriate ATS authority shall establish contingency procedures to be followed by control positions and ATC units in the event of such failures. Where feasible and practicable, such contingency procedures shall provide for the delegation of control to an adjacent control position or ATC unit in order to permit a minimum level of services to be provided as soon as possible, following the ground radio failure and until normal operations can be resumed.

10.4.2 ATS providers shall have contingency plan for aids, systems, facilities and equipment failure procedures appropriate to the size, nature and complexity of the organisation.

10.4.3 The contingency plan shall address all possible or likely failure / crisis scenarios relating to the organisation's aviation product or service deliveries.

10.4.4 The contingency plan shall include procedures for the continuing safe production, delivery or support of its aviation products or services during such failures / crisis.

10.4.5 There shall be a plan and record for drills or exercises with respect to the contingency plan.

10.4.6 The contingency plan shall address necessary coordination of its contingency procedures with the contingency procedures of other organisations where applicable.

10.4.7 The ATS provider shall have a process to distribute and communicate the contingency plan to all relevant personnel, including relevant external organisations.

10.4.8 There shall be a procedure for periodic review of the contingency plan to ensure its continuing relevance & effectiveness.

CHAPTER 11. PROCEDURES RELATED TO EMERGENCIES, COMMUNICATION FAILURE AND CONTINGENCIES

11.1 Emergency procedures

11.1.1 General

11.1.1.1 The various circumstances surrounding each emergency situation preclude the establishment of exact detailed procedures to be followed. The procedures outlined herein are intended as a general guide to ATS personnel. Air traffic control units shall maintain full and complete coordination, and personnel shall use their best judgement in handling emergency situations.

Note 1.— Additional procedures to be applied in relation to emergencies and contingencies while using an ATS surveillance system are contained in para 11.9 of this document.

Note 2.— If the pilot of an aircraft encountering a state of emergency has previously been directed by ATC to select a specific transponder code and/or a specific ADS-B emergency mode, that code and/or mode will normally be maintained unless, in special circumstances, the pilot has decided or has been advised otherwise. Where ATC has not requested a code or emergency mode to be set, the pilot will set the transponder to Mode A Code 7700 and/or the appropriate ADS-B emergency mode.

Note 3.— Some aircraft equipped with first generation ADS-B avionics have the capability to transmit a general emergency alert only, regardless of the code selected by the pilot.

Note 4.— Some aircraft equipped with first generation ADS-B avionics do not have the capability of squawking IDENT while the emergency and/or urgency mode is selected.

11.1.1.2 When an emergency is declared by an aircraft, the ATS unit shall take appropriate and relevant action as follows:

- a) unless clearly stated by the flight crew or otherwise known, take all necessary steps to ascertain aircraft identification and type, the type of emergency, the intentions of the flight crew as well as the position and level of the aircraft;
- b) decide upon the most appropriate type of assistance which can be rendered;
- c) enlist the aid of any other ATS unit or other services which may be able to provide assistance to the aircraft;
- d) provide the flight crew with any information requested as well as any additional relevant information, such as details on suitable aerodromes, minimum safe altitudes, weather information;
- e) obtain from the operator or the flight crew such of the following information as may be relevant: number of persons on board, amount of fuel remaining, possible presence of hazardous materials and the nature thereof; and
- f) notify the appropriate ATS units and authorities as specified in local instructions.

11.1.1.3 Changes of radio frequency and SSR code shall be avoided if possible and should normally be made only when or if an improved service can be provided to the aircraft concerned. Manoeuvring instructions to an aircraft experiencing engine failure shall be

limited to a minimum. When appropriate, other aircraft operating in the vicinity of the aircraft in emergency should be advised of the circumstances.

Note.— Requests to the flight crew for the information contained in 11.1.1.2 e) will be made only if the information is not available from the operator or from other sources and will be limited to essential information.

11.1.2 Priority

An aircraft known or believed to be in a state of emergency, including being subjected to unlawful interference shall be given priority over other aircraft.

11.1.3 Unlawful interference and aircraft bomb threat

11.1.3.1 ATS personnel shall be prepared to recognise any indication of the occurrence of unlawful interference with an aircraft.

11.1.3.2 Whenever unlawful interference with an aircraft is suspected, and where automatic distinct display of SSR Mode A Code 7500 and Code 7700 is not provided, the controller shall attempt to verify any suspicion by setting the SSR decoder to Mode A Code 7500 and thereafter to Code 7700.

Note.— An aircraft equipped with an SSR transponder is expected to operate the transponder on Mode A Code 7500 to indicate specifically that it is the subject of unlawful interference. The aircraft may operate the transponder on Mode A Code 7700, to indicate that it is threatened by grave and imminent danger and requires immediate assistance. An aircraft equipped with other surveillance system transmitters, including ADS-B and ADS-C, might send the emergency and/or urgency signal by all of the available means.

11.1.3.3 Whenever unlawful interference with an aircraft is known or suspected or a bomb threat warning has been received, ATS units shall promptly attend to requests by, or to anticipated needs of, the aircraft, including requests for relevant information relating to air navigation facilities, procedures and services along the route of flight and at any aerodrome of intended landing, and shall take such action as is necessary to expedite the conduct of all phases of the flight.

11.1.3.3.1 ATS units shall also:

- a) transmit, and continue to transmit, information pertinent to the safe conduct of the flight, without expecting a reply from the aircraft;
- b) monitor and plot the progress of the flight with the means available, and coordinate transfer of control with adjacent ATS units without requiring transmissions or other responses from the aircraft, unless communication with the aircraft remains normal;
- c) inform, and continue to keep informed, appropriate ATS units, including those in adjacent FIRs, which may be concerned with the progress of the flight;

Note.— In applying this provision, account must be taken of all the factors which may affect the progress of the flight, including fuel endurance and the possibility of sudden changes in route and destination. The objective is to provide, as far in advance as is practicable in the circumstances, each ATS unit with appropriate information as to the expected or possible penetration of the aircraft into its area of responsibility.

d) notify:

- 1) the operator or its designated representative;
- 2) the appropriate rescue coordination centre in accordance with appropriate alerting procedures;
- 3) the appropriate authority as designated by the DGCA.

Note.— It is assumed that the designated security authority and/or the operator will in turn notify other parties concerned in accordance with pre-established procedures.

e) relay appropriate messages, relating to the circumstances associated with the unlawful interference, between the aircraft and designated authorities.

Note.— These messages include, but are not limited to: initial messages declaring an incident; update messages on an existing incident; messages containing decisions made by appropriate decision makers; messages on transfer of responsibility; messages on acceptance of responsibility; messages indicating that an entity is no longer involved in an incident; and messages closing an incident.

11.1.3.4 The following additional procedures shall apply if a threat is received indicating that a bomb or other explosive device has been placed on board a known aircraft. The ATS unit receiving the threat information shall:

- a) if in direct communication with the aircraft, advise the flight crew without delay of the threat and the circumstances surrounding the threat; or
- b) if not in direct communication with the aircraft, advise the flight crew by the most expeditious means through other ATS units or other channels.

11.1.3.5 The ATS unit in communication with the aircraft shall ascertain the intentions of the flight crew and report those intentions to other ATS units which may be concerned with the flight.

11.1.3.6 The aircraft shall be handled in the most expeditious manner while ensuring, to the extent possible, the safety of other aircraft and that personnel and ground installations are not put at risk.

11.1.3.7 Aircraft in flight shall be given re-clearance to a requested new destination without delay. Any request by the flight crew to climb or descend for the purpose of equalising or reducing the differential between the outside air pressure and the cabin air pressure shall be approved as soon as possible.

11.1.3.8 An aircraft on the ground shall be advised to remain as far away from other aircraft and installations as possible and, if appropriate, to vacate the runway. The aircraft shall be instructed to taxi to a designated or isolated parking area in accordance with local instructions. Should the flight crew disembark passengers and crew immediately, other aircraft, vehicles and personnel shall be kept at a safe distance from the threatened aircraft.

11.1.3.9 ATS units shall not provide any advice or suggestions concerning action to be taken by the flight crew in relation to an explosive device.

11.1.3.10 An aircraft known or believed to be the subject of unlawful interference or which for other reasons needs isolation from normal aerodrome activities shall be cleared to the designated isolated parking position. Where such an isolated parking position has not been designated, or if the designated position is not available, the aircraft shall be cleared to a position within the area or areas selected by prior agreement with the aerodrome authority. The taxi clearance shall specify the taxi route to be followed to the parking position. This

route shall be selected with a view to minimising any security risks the public, other aircraft and installations at the aerodrome.

Note.— See ICAO Annex 14, Volume I, Chapter 3.

11.1.4 Emergency descent

11.1.4.1 *General*

Upon receipt of advice that an aircraft is making an emergency descent through other traffic, all possible action shall be taken immediately to safeguard all aircraft concerned. When deemed necessary, air traffic control units shall immediately broadcast by means of the appropriate radio aids, or if not possible, request the appropriate communications stations immediately to broadcast an emergency message.

11.1.4.2 *Action by the pilot-in-command*

It is expected that aircraft receiving such a broadcast will clear the specified areas and stand by on the appropriate radio frequency for further clearances from the air traffic control unit.

11.1.4.3 *Subsequent action by the air traffic control unit*

Immediately after such an emergency broadcast has been made the ACC, the approach control unit, or the aerodrome control tower concerned shall forward further clearances to all aircraft involved as to additional procedures to be followed during and subsequent to the emergency descent. The ATS unit concerned shall additionally inform any other ATS units and control sectors which may be affected.

11.2 Special procedures for in-flight contingencies in oceanic airspace

11.2.1 Introduction

11.2.1.1 Although all possible contingencies cannot be covered, the procedures in

11.2.2 and 11.2.3 provide for the more frequent cases such as:

- a) inability to comply with assigned clearance due to meteorological conditions, aircraft performance or pressurisation failure;
- b) en-route diversion across the prevailing traffic flow; and
- c) loss of, or significant reduction in, the required navigation capability when operating in an airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations.

11.2.1.2 With regard to 11.2.1.1 a) and b), the procedures are applicable primarily when descent and/or turnback or diversion is required. The pilot shall take action as necessary to ensure the safety of the aircraft, and the pilot's judgement shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air traffic control shall render all possible assistance.

11.2.2 General procedures

11.2.2.1 If an aircraft is unable to continue the flight in accordance with its ATC clearance, and/or an aircraft is unable to maintain the navigation performance accuracy specified for the airspace, a revised clearance shall be obtained, whenever possible, prior to initiating any action.

11.2.2.2 The radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) preferably spoken three times shall be used as appropriate. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and the overall air traffic situation.

11.2.2.3 If prior clearance cannot be obtained, until a revised clearance is received the following contingency procedures shall be employed and the pilot shall advise air traffic control as soon as practicable, reminding them of the type of aircraft involved and the nature of the problem. In general terms, the aircraft should be flown at a flight level and on an offset track where other aircraft are least likely to be encountered. Specifically, the pilot shall:

a) leave the assigned route or track by initially turning at least 45 degrees to the right or to the left, in order to acquire a same or opposite direction track offset 15 NM (28 km) from the assigned track centreline. When possible, the direction of the turn should be determined by the position of the aircraft relative to any organised route or track system. Other factors which may affect the direction of the turn are:

- 1) the direction to an alternate airport;
- 2) terrain clearance;
- 3) any strategic lateral offset being flown; and
- 4) the flight levels allocated on adjacent routes or tracks;

b) having initiated the turn:

1) if unable to maintain the assigned flight level, initially minimise the rate of descent to the extent that is operationally feasible (pilots should take into account the possibility that aircraft below on the same track may be flying a 1 or 2 NM strategic lateral offset procedure (SLOP)) and select a final altitude which differs from those normally used by 150 m (500 ft) if at or below FL 410, or by 300 m (1 000 ft) if above FL 410; or

2) if able to maintain the assigned flight level, once the aircraft has deviated 19 km (10 NM) from the assigned track centreline, climb or descend to select a flight level which differs from those normally used by 150 m (500 ft), if at or below FL 410, or by 300 m (1 000 ft) if above FL 410;

c) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.45 MHz) and where appropriate on the frequency in use: aircraft identification, flight level, position (including the ATS route designator or the track code, as appropriate) and intentions;

d) maintain a watch for conflicting traffic both visually and by reference to ACAS (if equipped);

e) turn on all aircraft exterior lights (commensurate with appropriate operating limitations); and

f) keep the SSR transponder on at all times.

11.2.2.3.1 When leaving the assigned track:

a) if the intention is to acquire a same direction offset track, the pilot should consider limiting the turn to a 45 degree heading change, in order not to overshoot the offset contingency track; or

b) if the intention is to acquire and maintain an opposite direction offset track, then:

1) operational limitations on bank angles at cruising altitudes will normally result in overshooting the track to be acquired. In such cases a continuous turn should be extended beyond 180 degrees heading change, in order to re-intercept the offset contingency track as soon as operationally feasible; and

2) furthermore, if executing such a turn back in a 56 km (30 NM) lateral separation route structure, extreme caution pertaining to opposite direction traffic on adjacent routes must be exercised and any climb or descent, as specified in 11.2.2.3 b) 2), should be completed preferably before approaching within 19 km (10 NM) of any adjacent ATS route.

11.2.2.4 *Extended range operations by aeroplanes with two-turbine power-units (ETOPS)*

If the contingency procedures are employed by a twin-engine aircraft as a result of an engine shutdown or failure of an ETOPS critical system, the pilot should advise ATC as soon as practicable of the situation, reminding ATC of the type of aircraft involved, and request expeditious handling.

11.2.3 Weather deviation procedures

11.2.3.1 *General*

Note.— The following procedures are intended for deviations around adverse meteorological conditions.

11.2.3.1.1 When the pilot initiates communications with ATC, a rapid response may be obtained by stating “WEATHER DEVIATION REQUIRED” to indicate that priority is desired on the frequency and for ATC response. When necessary, the pilot should initiate the communications using the urgency call “PAN PAN” (preferably spoken three times).

11.2.3.1.2 The pilot shall inform ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to its cleared route.

11.2.3.2 *Actions to be taken when controller-pilot communications are established*

11.2.3.2.1 The pilot should notify ATC and request clearance to deviate from track, advising, when possible, the extent of the deviation expected.

11.2.3.2.2 ATC should take one of the following actions:

- a) when appropriate separation can be applied, issue clearance to deviate from track; or
- b) if there is conflicting traffic and ATC is unable to establish appropriate separation, ATC shall:

- 1) advise the pilot of inability to issue clearance for the requested deviation;
- 2) advise the pilot of conflicting traffic; and
- 3) request the pilot's intentions.

11.2.3.2.3 The pilot should take the following actions:

- a) comply with the ATC clearance issued; or
- b) advise ATC of intentions and execute the procedures detailed in 11.2.3.3.

11.2.3.3 *Actions to be taken if a revised ATC clearance cannot be obtained*

Note.— The provisions of this section apply to situations where a pilot needs to exercise the authority of a pilot-in-command under the provisions of ICAO Annex 2, 2.3.1.

If the aircraft is required to deviate from track to avoid adverse meteorological conditions and prior clearance cannot be obtained, an ATC clearance shall be obtained at the earliest possible time. Until an ATC clearance is received, the pilot shall take the following actions:

- a) if possible, deviate away from an organised track or route system;
- b) establish communications with and alert nearby aircraft by broadcasting, at suitable intervals: aircraft identification, flight level, position (including ATS route designator or the track code) and intentions, on the frequency in use and on 121.5 MHz (or, as a backup, on the inter-pilot air-to-air frequency 123.45 MHz);
- c) watch for conflicting traffic both visually and by reference to ACAS (if equipped);

Note.— If, as a result of actions taken under the provisions of 11.2.3.3.1 b) and c), the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

- d) turn on all aircraft exterior lights (commensurate with appropriate operating limitations);
- e) for deviations of less than 19 km (10 NM) remain at a level assigned by ATC;
- f) for deviations greater than 19 km (10 NM), when the aircraft is approximately 19 km (10 NM) from track, initiate a level change in accordance with *Table 11-1* below;
- g) when returning to track, be at its assigned flight level when the aircraft is within approximately 19 km (10 NM) of the centre line; and
- h) if contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.

Table 11-1

| Route centre line track | Deviations > 19 km (10 NM) | Level change |
|------------------------------|-------------------------------|--|
| EAST 000° – 179° magnetic | LEFT RIGHT | DESCEND 90 m (300 ft) CLIMB 90 m (300 ft) |
| WEST 180° – 359° magnetic | LEFT RIGHT | CLIMB 90 m (300 ft) DESCEND 90 m (300 ft) |

11.3 Air-ground communications failure

Note 1.— Procedures to be applied in relation to an aircraft experiencing air-ground communication failure when providing ATS surveillance services are contained in Section 9 of this Chapter.

Note 2.— An aircraft equipped with an SSR transponder is expected to operate the transponder on Mode A Code 7600 to indicate that it has experienced air-ground communication failure. An aircraft equipped with other surveillance system transmitters, including ADS-B and ADS-C, might indicate the loss of air-ground communication by all of the available means.

Note 3.— Some aircraft equipped with first generation ADS-B avionics have the capability to transmit a general emergency alert only, regardless of the code selected by the pilot.

Note 4.— See also PANS-ATM (Doc 4444) Chapter 6, 6.3.2.5, concerning departure clearances containing no geographical or time limit for an initial level and procedures to be applied in relation to an aircraft experiencing air-ground communication failure under such circumstances.

Note 5.— See also PANS-ATM (Doc 4444) Chapter 5, 5.4.2.6.3.2, for additional requirements applying to communication failure during the application of the 50 NM longitudinal RNAV/RNP 10 separation minimum.

11.3.1 Action by air traffic control units when unable to maintain two-way communication with an aircraft operating in a control area or control zone shall be as outlined in the paragraphs which follow.

11.3.2 As soon as it is known that two-way communication has failed, action shall be taken to ascertain whether the aircraft is able to receive transmissions from the air traffic control unit by requesting it to execute a specified manoeuvre which can be observed by an ATS surveillance system or to transmit, if possible, a specified signal in order to indicate acknowledgement.

Note.— Some aircraft equipped with first generation ADS-B avionics do not have the capability of squawking IDENT while the emergency and/or urgency mode is selected.

11.3.3 If the aircraft fails to indicate that it is able to receive and acknowledge transmissions, separation shall be maintained between the aircraft having the communication failure and other aircraft, based on the assumption that the aircraft will:

- a) if in visual meteorological conditions:

- 1) continue to fly in visual meteorological conditions;
 - 2) land at the nearest suitable aerodrome; and
 - 3) report its arrival by the most expeditious means to the appropriate air traffic control unit; or
- b) if in instrument meteorological conditions or when conditions are such that it does not appear likely that the pilot will complete the flight in accordance with a):
- 1) unless otherwise prescribed on the basis of a regional air navigation agreement, in airspace where procedural separation is being applied, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 20 minutes following the aircraft's failure to report its position over a compulsory reporting point and thereafter adjust level and speed in accordance with the filed flight plan; or
 - 2) in airspace where an ATS surveillance system is used in the provision of air traffic control, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 7 minutes following:
 - i) the time the last assigned level or minimum flight altitude is reached; or
 - ii) the time the transponder is set to Code 7600 or the ADS-B transmitter is set to indicate the loss of air-ground communications; or
 - iii) the aircraft's failure to report its position over a compulsory reporting point;whichever is later and thereafter adjust level and speed in accordance with the filed flight plan;
 - 3) when being vectored or having been directed by ATC to proceed offset using RNAV without a specified limit, proceed in the most direct manner possible to rejoin the current flight plan route no later than the next significant point, taking into consideration the applicable minimum flight altitude;
 - 4) proceed according to the current flight plan route to the appropriate designated navigation aid or fix serving the destination aerodrome and, when required to ensure compliance with 5), hold over this aid or fix until commencement of descent;
 - 5) commence descent from the navigation aid or fix specified in 4) at, or as close as possible to, the expected approach time last received and acknowledged; or, if no expected approach time has been received and acknowledged, at, or as close as possible to, the estimated time of arrival resulting from the current flight plan;
 - 6) complete a normal instrument approach procedure as specified for the designated navigation aid or fix; and
 - 7) land, if possible, within 30 minutes after the estimated time of arrival specified in 5) or the last acknowledged expected approach time, whichever is later.

Note 1.— Provisions related to minimum levels are contained in ICAO Annex 2, 5.1.2.

Note 2.— As evidenced by the meteorological conditions prescribed therein, 11.3.3 a) relates to all controlled flights, whereas 11.3.3 b) relates only to IFR flights.

Note 3.— See also PANS-ATM (Doc 4444) Chapter 8, 8.6.5.1 b) concerning the requirement for the flight crew to be informed of what a vector is to accomplish and the limit of the vector.

11.3.4 Action taken to ensure suitable separation shall cease to be based on the assumption stated in 11.3.3 when:

- a) it is determined that the aircraft is following a procedure differing from that in 11.3.3; or
- b) through the use of electronic or other aids, air traffic control units determine that action differing from that required by 11.3.3 may be taken without impairing safety; or
- c) positive information is received that the aircraft has landed.

11.3.5 As soon as it is known that two-way communication has failed, appropriate information describing the action taken by the air traffic control unit, or instructions justified by any emergency situation, shall be transmitted blind for the attention of the aircraft concerned, on the frequencies available on which the aircraft is believed to be listening, including the voice frequencies of available radio navigation or approach aids. Information shall also be given concerning:

- a) meteorological conditions favourable to a cloud-breaking procedure in areas where congested traffic may be avoided; and
- b) meteorological conditions at suitable aerodromes.

11.3.6 Pertinent information shall be given to other aircraft in the vicinity of the presumed position of the aircraft experiencing the failure.

11.3.7 As soon as it is known that an aircraft which is operating in its area of responsibility is experiencing an apparent radio communication failure, an ATS unit shall forward information concerning the radio communication failure to all ATS units concerned along the route of flight. The ACC in whose area the destination aerodrome is located shall take steps to obtain information on the alternate aerodrome(s) and other relevant information specified in the filed flight plan, if such information is not available.

11.3.8 If circumstances indicate that a controlled flight experiencing a communication failure might proceed to (one of) the alternate aerodrome(s) specified in the filed flight plan, the air traffic control unit(s) serving the alternate aerodrome(s) and any other air traffic control units that might be affected by a possible diversion shall be informed of the circumstances of the failure and requested to attempt to establish communication with the aircraft at a time when the aircraft could possibly be within communication range. This shall apply particularly when, by agreement with the operator or a designated representative, a clearance has been transmitted blind to the aircraft concerned to proceed to an alternate aerodrome, or when meteorological conditions at the aerodrome of intended landing are such that a diversion to an alternate is considered likely.

11.3.9 When an air traffic control unit receives information that an aircraft, after experiencing a communication failure has re-established communication or has landed, that unit shall inform the ATS unit in whose area the aircraft was operating at the time the failure occurred, and other ATS units concerned along the route of flight, giving necessary information for the continuation of control if the aircraft is continuing in flight.

11.3.10 If the aircraft has not reported within thirty minutes after:

- a) the estimated time of arrival furnished by the pilot;
- b) the estimated time of arrival calculated by the ACC; or
- c) the last acknowledged expected approach time, whichever is latest, pertinent information concerning the aircraft shall be forwarded to aircraft operators, or their designated representatives, and pilots-in-command of any aircraft concerned and normal control resumed if they so desire. It is the responsibility of the aircraft operators, or their designated representatives, and pilots-in-command of aircraft to determine whether they will resume normal operations or take other action.

11.4 Assistance to VFR flights

11.4.1 Strayed VFR flights and VFR flights encountering adverse meteorological conditions

Note.— A strayed aircraft is an aircraft which has deviated significantly from its intended track or which reports that it is lost.

11.4.1.1 A VFR flight reporting that it is uncertain of its position or lost, or encountering adverse meteorological conditions, should be considered to be in a state of emergency and handled as such. The controller shall, under such circumstances, communicate in a clear, concise and calm manner and care shall be taken, at this stage, not to question any fault or negligence that the pilot may have committed in the preparation or conduct of the flight. Depending on the circumstances, the pilot should be requested to provide any of the following information considered pertinent so as to better provide assistance:

- a) aircraft flight conditions;
- b) position (if known) and level;
- c) airspeed and heading since last known position, if pertinent;
- d) pilot experience;
- e) navigation equipment carried and if any navigation aid signals are being received;
- f) SSR mode and code selected if relevant;
- g) ADS-B capability;
- h) departure and destination aerodromes;
- i) number of persons on board;
- j) endurance.

11.4.1.2 If communications with the aircraft are weak or distorted, it should be suggested that the aircraft climb to a higher level, provided meteorological conditions and other circumstances permit.

11.4.1.3 Navigation assistance to help the pilot determine the aircraft position may be provided by use of an ATS surveillance system, direction-finder, navigation aids or sighting by another aircraft. Care must be taken when providing navigation assistance to ensure that the aircraft does not enter cloud.

Note.— The possibility of a VFR flight becoming strayed as a result of encountering adverse meteorological conditions must be recognised.

11.4.1.4 The pilot should be provided with reports and information on suitable aerodromes in the vicinity where visual meteorological conditions exist.

11.4.1.5 If reporting difficulty in maintaining or unable to maintain VMC, the pilot should be informed of the minimum flight altitude of the area where the aircraft is, or is believed to be. If the aircraft is below that level, and the position of the aircraft has been established with a sufficient degree of probability, a track or heading, or a climb, may be suggested to bring the aircraft to a safe level.

11.4.1.6 Assistance to a VFR flight should only be provided using an ATS surveillance system upon the request or concurrence of the pilot. The type of service to be provided should be agreed with the pilot.

11.4.1.7 When providing such assistance in adverse meteorological conditions, the primary objective should be to bring the aircraft into VMC as soon as possible. Caution must be exercised to prevent the aircraft from entering cloud.

11.4.1.8 Should circumstances be such that IMC cannot be avoided by the pilot, the following guidelines may be followed:

- a) other traffic on the ATC frequency not able to provide any assistance may be instructed to change to another frequency to ensure uninterrupted communications with the aircraft; alternatively the aircraft being assisted may be instructed to change to another frequency;
- b) ensure, if possible, that any turns by the aircraft are carried out clear of cloud;
- c) instructions involving abrupt manoeuvres should be avoided; and
- d) instructions or suggestions to reduce speed of the aircraft or to lower the landing gear, should, if possible, be carried out clear of cloud.

11.5 Other in-flight contingencies

11.5.1 Fuel dumping

11.5.1.1 General

11.5.1.1.1 An aircraft in an emergency or other urgent situations may need to dump fuel so as to reduce to maximum landing mass in order to effect a safe landing.

11.5.1.1.2 When an aircraft operating within controlled airspace needs to dump fuel, the flight crew shall advise ATC. The ATC unit should then coordinate with the flight crew the following:

- a) the route to be flown, which, if possible, should be clear of cities and towns, preferably over water and away from areas where thunderstorms have been reported or are expected;
- b) the level to be used, which should be not less than 1 800 m (6 000 ft); and
- c) the duration of the fuel dumping.

11.5.1.2 Separation

Other known traffic should be separated from the aircraft dumping fuel by:

- a) at least 19 km (10 NM) horizontally, but not behind the aircraft dumping fuel;
- b) vertical separation if behind the aircraft dumping fuel within 11 minutes flying time or a distance of 93 km (50 NM) by:
 - 1) at least 300 m (1 000 ft) if above the aircraft dumping fuel; and
 - 2) at least 900 m (3 000 ft) if below the aircraft dumping fuel.

Note.— The horizontal boundaries of the area within which other traffic requires appropriate vertical separation extend for 19 km (10 NM) either side of the track flown by the aircraft which is dumping fuel, from 19 km (10 NM) ahead, to 93 km (50 NM) or 11 minutes along track behind it (including turns).

11.5.1.3 Communications

If the aircraft will maintain radio silence during the fuel dumping operation, the frequency to be monitored by the flight crew and the time when radio silence will terminate should be agreed.

11.5.1.4 Information to other ATS units and non-controlled traffic

11.5.1.4.1 A warning message shall be broadcast on appropriate frequencies for non-controlled traffic to remain clear of the area concerned. Adjacent ATC units and control sectors should be informed of the fuel dumping taking place and requested to broadcast on applicable frequencies an appropriate warning message for other traffic to remain clear of the area concerned.

11.5.1.4.2 Upon completion of the fuel dumping, adjacent ATC units and control sectors should be advised that normal operations can be resumed.

11.5.2 Fuel emergency and minimum fuel

Note 1.— General procedures to be applied when a pilot reports an emergency situation are contained in 11.1.1 and 11.1.2.

Note 2.— Coordination procedures to be applied between transferring and accepting ATS units for flights in fuel emergency or minimum fuel situations are contained in PANS-ATM (Doc 4444) Chapter 10, 10.2.5.

Note 3.— The words MAYDAY FUEL describe the nature of the distress condition as required in ICAO Annex 10, Volume II, 5.3.2.1.1 b) 3.

11.5.2.1 When a pilot reports a state of minimum fuel, the controller shall inform the pilot as soon as practicable of any anticipated delays or that no delays are expected.

Note.— The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing, and any change to the existing clearance may result in landing with less than planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

11.5.3 Descents by supersonic aircraft due to solar cosmic radiation

Air traffic control units should be prepared for the possibility that supersonic aircraft operating at levels above 11 000 m (49 000 ft) may, on rare occasions, experience a rise in solar cosmic radiation which requires them to descend to lower levels, possibly down to or below the levels being used by subsonic aircraft. When such a situation is known or suspected, air traffic control units should take all possible action to safeguard all aircraft concerned, including any subsonic aircraft affected by the descent.

Note.— All supersonic aircraft in a particular portion of airspace will be affected at the same time, and the event may be accompanied by a deterioration or loss of air-ground communications. It is expected that the aircraft will alert air traffic control units before the radiation reaches a critical level and will request a descent clearance when the critical level is reached. However, situations may occur in which the aircraft will need to descend without waiting for a clearance. In such cases, the aircraft are expected to advise air traffic control units, as soon as possible, of the emergency action taken.

11.6 ATC contingencies

The various circumstances surrounding each contingency situation preclude the establishment of exact detailed procedures to be followed. The procedures outlined below are intended as a general guide to ATS personnel.

11.6.1 Radio communications contingencies

11.6.1.1 General

ATC contingencies related to communications, i.e. circumstances preventing a controller from communicating with aircraft under control, may be caused by either a failure of ground radio equipment, a failure of airborne equipment, or by the control frequency being inadvertently blocked by an aircraft transmitter. The duration of such events may be for prolonged periods and appropriate action to ensure that the safety of aircraft is not affected should therefore be taken immediately.

11.6.1.2 Ground radio failure

11.6.1.2.1 In the event of complete failure of the ground radio equipment used for ATC, the controller shall:

- a) where aircraft are required to keep a listening watch on the emergency frequency 121.5 MHz, attempt to establish radio communications on that frequency;
- b) without delay inform all adjacent control positions or ATC units, as applicable, of the failure;
- c) appraise such positions or units of the current traffic situation;
- d) if practicable, request their assistance, in respect of aircraft which may establish communications with those positions or units, in establishing separation between and maintaining control of such aircraft; and

e) instruct adjacent control positions or ATC units to hold or re-route all controlled flights outside the area of responsibility of the position or ATC unit that has experienced the failure until such time that the provision of normal services can be resumed.

11.6.1.2.2 In order to reduce the impact of complete ground radio equipment failure on the safety of air traffic, the appropriate ATS authority should establish contingency procedures to be followed by control positions and ATC units in the event of such failures. Where feasible and practicable, such contingency procedures should provide for the delegation of control to an adjacent control position or ATC unit in order to permit a minimum level of services to be provided as soon as possible, following the ground radio failure and until normal operations can be resumed.

11.6.1.3 *Blocked frequency*

In the event that the control frequency is inadvertently blocked by an aircraft transmitter, the following additional steps should be taken:

- a) attempt to identify the aircraft concerned;
- b) if the aircraft blocking the frequency is identified, attempts should be made to establish communication with that aircraft, e.g. on the emergency frequency 121.5 MHz, by SELCAL, through the aircraft operator's company frequency if applicable, on any VHF frequency designated for air-to-air use by flight crews or any other communication means or, if the aircraft is on the ground, by direct contact;
- c) if communication is established with the aircraft concerned, the flight crew shall be instructed to take immediate action to stop inadvertent transmissions on the affected control frequency.

11.6.1.4 *Unauthorised use of ATC frequency*

11.6.1.4.1 Instances of false and deceptive transmissions on ATC frequencies which may impair the safety of aircraft can occasionally occur. In the event of such occurrences, the ATC unit concerned should:

- a) correct any false or deceptive instructions or clearances which have been transmitted;
- b) advise all aircraft on the affected frequency(ies) that false and deceptive instructions or clearances are being transmitted;
- c) instruct all aircraft on the affected frequency(ies) to verify instructions and clearances before taking action to comply;
- d) if practical, instruct aircraft to change to another frequency; and
- e) if possible, advise all aircraft affected when the false and deceptive instructions or clearances are no longer being transmitted.

11.6.1.4.2 Flight crews shall challenge or verify with the ATC unit concerned any instruction or clearance issued to them which they suspect may be false or deceptive.

11.6.1.4.3 When the transmission of false or deceptive instructions and clearances is detected, the appropriate authority shall take all necessary action to have the transmitter located and the transmission terminated.

11.7 Other ATC contingency procedures

11.7.1 Emergency separation

11.7.1.1 If, during an emergency situation, it is not possible to ensure that the applicable horizontal separation can be maintained, emergency separation of half the applicable vertical separation minimum may be used, i.e. 150 m (500 ft) between aircraft in airspace where a vertical separation minimum of 300 m (1 000 ft) is applied, and 300 m (1 000 ft) between aircraft in airspace where a 600 m (2 000 ft) vertical separation minimum is applied.

11.7.1.2 When emergency separation is applied the flight crews concerned shall be advised that emergency separation is being applied and informed of the actual minimum used. Additionally, all flight crews concerned shall be provided with essential traffic information.

11.7.2 Short-term conflict alert (STCA) procedures

Note 1.— The generation of short-term conflict alerts is a function based on surveillance data, integrated into an ATC system. The objective of the STCA function is to assist the controller in preventing collision between aircraft by generating, in a timely manner, an alert of a potential or actual infringement of separation minima.

Note 2. — In the STCA function the current and predicted three-dimensional positions of aircraft with pressure-altitude reporting capability are monitored for proximity. If the distance between the three-dimensional positions of two aircraft is predicted to be reduced to less than the defined applicable separation minima within a specified time period, an acoustic and/or visual alert will be generated to the controller within whose jurisdiction area the aircraft is operating.

11.7.2.1 Local instructions concerning use of the STCA function shall specify, inter alia:

- a) the types of flight which are eligible for generation of alerts;
- b) the sectors or areas of airspace within which the STCA function is implemented;
- c) the method of displaying the STCA to the controller;
- d) in general terms, the parameters for generation of alerts as well as alert warning time;
- e) the volumes of airspace within which STCA can be selectively inhibited and the conditions under which this will be permitted;
- f) conditions under which specific alerts may be inhibited for individual flights; and
- g) procedures applicable in respect of volume of airspace or flights for which STCA or specific alerts have been inhibited.

11.7.2.2 In the event an STCA is generated in respect of controlled flights, the controller shall without delay assess the situation and, if necessary, take action to ensure that the applicable separation minimum will not be infringed or will be restored.

11.7.2.3 Following the generation of an STCA, controllers should be required to complete an air traffic incident report only in the event that a separation minimum was infringed.

11.7.2.4 The appropriate ATS authority should retain electronic records of all alerts generated. The data and circumstances pertaining to each alert should be analysed to determine whether an alert was justified or not. Non-justified alerts, e.g. when visual separation was applied, should be ignored. A statistical analysis should be made of justified alerts in order to identify possible shortcomings in airspace design and ATC procedures as well as to monitor overall safety levels.

11.7.3 Procedures in regard to aircraft equipped with airborne collision avoidance systems (ACAS)

11.7.3.1 The procedures to be applied for the provision of ATS to aircraft equipped with ACAS shall be identical to those applicable to non-ACAS equipped aircraft. In particular, the prevention of collisions, the establishment of appropriate separation and the information which might be provided in relation to conflicting traffic and to possible avoiding action shall conform to the normal ATS procedures and shall exclude consideration of aircraft capabilities dependent on ACAS equipment.

11.7.3.2 When a pilot reports an ACAS resolution advisory (RA), the air traffic controller shall not attempt to modify the aircraft flight path until the pilot reports “Clear of Conflict”.

11.7.3.3 Once an aircraft departs from its ATC clearance or instruction in compliance with an RA, or a pilot reports an RA, the air traffic controller ceases to be responsible for providing separation between that aircraft and any other aircraft affected as a direct consequence of the manoeuvre induced by the RA. The air traffic controller shall resume responsibility for providing separation for all the affected aircraft when:

- a) the air traffic controller acknowledges a report from the flight crew that the aircraft has resumed the current clearance; or
- b) the air traffic controller acknowledges a report from the flight crew that the aircraft is resuming the current clearance and issues an alternative clearance which is acknowledged by the flight crew.

Note 1.— Pilots are required to report RAs which require a deviation from the current ATC clearance or instruction (see PANS-OPS (Doc 8168), Volume I, Part III, Section 3, Chapter 3, 3.2 c) 4)). This report informs the air traffic controller that a deviation from clearance or instruction is taking place in response to an ACAS RA.

Note 2.— Guidance on training of air traffic controllers in the application of ACAS events is contained in the Airborne Collision Avoidance System (ACAS) Manual (Doc 9863).

11.7.3.4 ACAS can have a significant effect on ATC. Therefore, the performance of ACAS in the ATC environment should be monitored.

11.7.3.5 Following a significant ACAS event, pilots and controllers should complete an air traffic incident report.

Note 1.— The ACAS capability of an aircraft may not be known to air traffic controllers.

Note 2.— Operating procedures for use of ACAS are contained in PANS-OPS (Doc 8168), Volume I, Part III, Section 3, Chapter 3.

Note 3.— The phraseology to be used by controllers and pilots is contained in PANS-ATM (Doc 4444) Chapter 12, 12.3.1.2.

11.7.4 Minimum safe altitude warning (MSAW) procedures

Note 1.— The generation of minimum safe altitude warnings is a function of an ATC radar data-processing system. The objective of the MSAW function is to assist in the prevention of controlled flight into terrain accidents by generating, in a timely manner, a warning of the possible infringement of a minimum safe altitude.

Note 2.— In the MSAW function, the reported levels from aircraft with pressure-altitude reporting capability are monitored against defined minimum safe altitudes. When the level of an aircraft is detected or predicted to be less than the applicable minimum safe altitude, an acoustic and visual warning will be generated to the controller within whose jurisdiction area the aircraft is operating.

11.7.4.1 Local instructions concerning use of the MSAW function shall specify, inter alia:

- a) the types of flight which are eligible for generation of MSAW;
- b) the sectors or areas of airspace for which MSAW minimum safe altitudes have been defined and within which the MSAW function is implemented;
- c) the values of the defined MSAW minimum safe altitudes;
- d) the method of displaying the MSAW to the controller;
- e) the parameters for generation of MSAW as well as warning time; and
- f) conditions under which the MSAW function may be inhibited for individual aircraft tracks as well as procedures applicable in respect of flights for which MSAW has been inhibited.

11.7.4.2 In the event an MSAW is generated in respect of a controlled flight, the following action shall be taken without delay:

- a) if the aircraft is being vectored, the aircraft shall be instructed to climb immediately to the applicable safe level and, if necessary to avoid terrain, be assigned a new heading;
- b) in other cases, the flight crew shall immediately be advised that a minimum safe altitude warning has been generated and be instructed to check the level of the aircraft.

11.7.4.3 Following an MSAW event, controllers should complete an air traffic incident report only in the event that a minimum safe altitude was unintentionally infringed with a potential for controlled flight into terrain by the aircraft concerned.

11.7.5 Change of radiotelephony call sign for aircraft

11.7.5.1 An ATC unit may instruct an aircraft to change its type of RTF call sign, in the interests of safety, when similarity between two or more aircraft RTF call signs are such that confusion is likely to occur.

11.7.5.1.1 Any such change to the type of call sign shall be temporary and shall be applicable only within the airspace(s) where the confusion is likely to occur.

11.7.5.2 To avoid confusion, the ATC unit should, if appropriate, identify the aircraft which will be instructed to change its call sign by referring to its position and/or level.

11.7.5.3 When an ATC unit changes the type of call sign of an aircraft, that unit shall ensure that the aircraft reverts to the call sign indicated by the flight plan when the aircraft is

transferred to another ATC unit, except when the call sign change has been coordinated between the two ATC units concerned.

11.7.5.4 The appropriate ATC unit shall advise the aircraft concerned when it is to revert to the call sign indicated by the flight plan.

11.8 Procedures for ATS units when a volcanic ash cloud is reported or forecast

11.8.1 If a volcanic ash cloud is reported or forecast in the airspace for which the ATS unit is responsible, the following actions should be taken:

- a) relay pertinent information immediately to flight crews whose aircraft could be affected to ensure that they are aware of the ash cloud's current and forecast position and the flight levels affected;
- b) accommodate requests for re-routing or level changes to the extent practicable;
- c) suggest re-routing to avoid or exit areas of reported or forecast ash clouds when requested by the pilot or deemed necessary by the controller; and
- d) when practicable, request a special air-report when the route of flight takes the aircraft into or near the forecast ash cloud and provide such special air-reports to the appropriate agencies.

Note 1.— Experience has shown that the recommended escape manoeuvre for an aircraft which has encountered an ash cloud is to reverse its course and begin a descent if terrain permits. The final responsibility for this decision, however, rests with the pilot-in-command as specified in the Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (Doc 9691), 5.2.4.1.

Note 2.— The final authority as to the disposition of the aircraft, whether to avoid or proceed through a reported or forecast ash cloud, rests with the pilot-in-command, as prescribed in ICAO Annex 2, 2.4.

11.8.2 When the flight crew advises the ATS unit that the aircraft has inadvertently entered a volcanic ash cloud, the ATS unit should:

- a) take such action applicable to an aircraft in an emergency situation; and
- b) initiate modifications of route or level assigned only when requested by the pilot or necessitated by airspace requirements or traffic conditions.

Note 1.— General procedures to be applied when a pilot reports an emergency situation are contained in the PANS-ATM (Doc 4444) Chapter 11, 11.1.1 and 11.1.2.

Note 2.— Guidance material concerning the effect of volcanic ash and the impact of volcanic ash on aviation operational and support services is provided in Chapters 4 and 5 of Doc 9691.

11.9 Emergencies, hazards and equipment failures in ATS surveillance

11.9.1 Emergencies

11.9.1.1 In the event of an aircraft in, or appearing to be in, any form of emergency, every assistance shall be provided by the controller, and the procedures prescribed herein may be varied according to the situation.

11.9.1.2 The progress of an aircraft in emergency shall be monitored and (whenever possible) plotted on the situation display until the aircraft passes out of coverage of the ATS surveillance system, and position information shall be provided to all ATS units which may be able to give assistance to the aircraft. Transfer to adjacent sectors shall also be affected when appropriate.

Note.— If the pilot of an aircraft encountering a state of emergency has previously been directed by ATC to select a specific transponder code and/or an ADS-B emergency mode, that code/mode will normally be maintained unless, in special circumstances, the pilot has decided or has been advised otherwise. Where ATC has not requested a code or emergency mode to be set, the pilot will set the transponder to Mode A Code 7700 and/or the appropriate ADS-B emergency mode.

11.9.1.3 Whenever a general ADS-B emergency alert is observed on the situation display and there is no other indication of the particular nature of the emergency, the controller shall take the following action:

- a) attempt to establish communication with the aircraft to verify the nature of the emergency; or
- b) if no response is received from the aircraft, the controller shall attempt to ascertain if the aircraft is able to receive transmissions from the air traffic control unit by requesting it to execute a specified manoeuvre which can be observed on the situation display.

Note 1.— Some aircraft equipped with first generation ADS-B avionics have the capability to transmit a general emergency alert only, regardless of the code selected by the pilot.

Note 2.— Some aircraft equipped with first generation ADS-B avionics do not have the capability of squawking IDENT while the emergency and/or urgency mode is selected.

11.9.2 Collision hazard information

11.9.2.1 When an identified controlled flight is observed to be on a conflicting path with an unknown aircraft deemed to constitute a collision hazard, the pilot of the controlled flight shall, whenever practicable:

- a) be informed of the unknown aircraft, and if so requested by the controlled flight or if, in the opinion of the controller, the situation warrants, a course of avoiding action should be suggested; and
- b) be notified when the conflict no longer exists.

11.9.2.2 When an identified IFR flight operating outside controlled airspace is observed to be on a conflicting path with another aircraft, the pilot should:

- a) be informed as to the need for collision avoidance action to be initiated, and if so requested by the pilot or if, in the opinion of the controller, the situation warrants, a course of avoiding action should be suggested; and
- b) be notified when the conflict no longer exists.

11.9.2.3 Information regarding traffic on a conflicting path should be given, whenever practicable, in the following form:

- a) relative bearing of the conflicting traffic in terms of the 12-hour clock;
- b) distance from the conflicting traffic in kilometres (nautical miles);
- c) direction in which the conflicting traffic appears to be proceeding;
- d) level and type of aircraft or, if unknown, relative speed of the conflicting traffic, e.g. slow or fast.

11.9.2.4 Pressure-altitude-derived level information, even when unverified, should be used in the provision of collision hazard information because such information, particularly if available from an otherwise unknown aircraft (e.g. a VFR flight) and given to the pilot of a known aircraft, could facilitate the location of a collision hazard.

11.9.2.4.1 When the pressure-altitude-derived level information has been verified, the information shall be passed to pilots in a clear and unambiguous manner. If the level information has not been verified, the accuracy of the information should be considered uncertain and the pilot shall be informed accordingly.

11.9.3 Failure of equipment

11.9.3.1 Aircraft radio transmitter failure

11.9.3.1.1 If two-way communication is lost with an aircraft, the controller should determine whether or not the aircraft's receiver is functioning by instructing the aircraft on the channel so far used to acknowledge by making a specified manoeuvre and by observing the aircraft's track, or by instructing the aircraft to operate IDENT or to make SSR code and/or ADS-B transmission changes.

Note 1.— Transponder-equipped aircraft experiencing radio communication failure will operate the transponder on Mode A Code 7600.

Note 2.— ADS-B-equipped aircraft experiencing radio communication failure may transmit the appropriate ADS-B emergency and/or urgency mode.

11.9.3.1.2 If the action prescribed in 11.9.3.1.1 is unsuccessful, it shall be repeated on any other available channel on which it is believed that the aircraft might be listening.

11.9.3.1.3 In both the cases covered by 11.9.3.1.1 and 11.9.3.1.2, any manoeuvring instructions shall be such that the aircraft would regain its current cleared track after having complied with the instructions received.

11.9.3.1.1 Where it has been established by the action in 11.9.3.1.1 that the aircraft's radio receiver is functioning, continued control can be affected using SSR code/ADS-B transmission changes or IDENT transmissions to obtain acknowledgement of clearances issued to the aircraft.

11.9.3.2 Complete aircraft communication failure

When a controlled aircraft experiencing complete communication failure is operating or expected to operate in an area and at flight levels where an ATS surveillance service is applied, separation specified in PANS-ATM (DOC 4444) para 8.7.3 may continue to be used. However, if the aircraft experiencing the communication failure is not identified, separation shall be applied between identified aircraft and all unidentified aircraft observed along the expected route of the aircraft with the communication failure, until such time as it is known, or can safely be assumed, that the aircraft with radio communication failure has passed through the airspace concerned, has landed, or has proceeded elsewhere.

11.9.3.3 Aircraft transponder failure in areas where the carriage of a functioning transponder is mandatory

11.9.3.3.1 When an aircraft experiencing transponder failure after departure is operating or expected to operate in an area where the carriage of a functioning transponder with specified capabilities is mandatory, the ATC units concerned should endeavour to provide for continuation of the flight to the aerodrome of first intended landing in accordance with the flight plan. However, in certain traffic situations, either in terminal areas or en-route, continuation of the flight may not be possible, particularly when failure is detected shortly after take-off. The aircraft may then be required to return to the departure aerodrome or to land at the nearest suitable aerodrome acceptable to the operator concerned and to ATC.

11.9.3.3.2 In case of a transponder failure which is detected before departure from an aerodrome where it is not practicable to effect a repair, the aircraft concerned should be permitted to proceed, as directly as possible, to the nearest suitable aerodrome where repair can be made. When granting clearance to such aircraft, ATC should take into consideration the existing or anticipated traffic situation and may have to modify the time of departure, flight level or route of the intended flight. Subsequent adjustments may become necessary during the course of the flight.

11.9.4 ATS surveillance system failure

11.9.4.1 In the event of complete failure of the ATS surveillance system where air-ground communications remain, the controller shall plot the positions of all aircraft already identified, take the necessary action to establish procedural separation between the aircraft and, if necessary, limit the number of aircraft permitted to enter the area.

11.9.4.2 As an emergency measure, use of flight levels spaced by half the applicable vertical separation minimum may be resorted to temporarily if standard procedural separation cannot be provided immediately.

11.9.5 Degradation of aircraft position source data

In order to reduce the impact of a degradation of aircraft position source data, for example, a receiver autonomous integrity monitoring (RAIM) outage for GNSS, the appropriate ATS authority shall establish contingency procedures to be followed by control positions and ATC units in the event of data degradation.

11.9.6 Ground radio failure

11.9.6.1 In the event of complete failure of the ground radio equipment used for control, the controller shall, unless able to continue to provide the ATS surveillance service by means of other available communication channels, proceed as follows:

- a) without delay inform all adjacent control positions or ATC units, as applicable, of the failure;
- b) apprise such positions or units of the current traffic situation;
- c) request their assistance, in respect of aircraft which may establish communications with those positions or units, in establishing and maintaining separation between such aircraft; and
- d) instruct adjacent control positions or ATC units to hold or re-route all controlled flights outside the area of responsibility of the position or ATC unit that has experienced the failure until such time that the provision of normal services can be resumed.

11.9.6.2 In order to reduce the impact of complete ground radio equipment failure on the safety of air traffic, the appropriate ATS authority should establish contingency procedures to be followed by control positions and ATC units in the event of such failures. Where feasible and practicable, such contingency procedures should provide for the delegation of control to an adjacent control position or ATC unit in order to permit a minimum level of services to be provided as soon as possible, following the ground radio failure and until normal operations can be resumed.

11.10 Emergency response plan

11.10.1 ATS providers shall have an emergency response plan (ERP) appropriate to the size, nature and complexity of the organisation.

11.10.2 The ERP shall address all possible or likely emergency/ crisis scenarios relating to the organisation's aviation product or service deliveries including natural disasters and public health emergencies.

11.10.3 The ERP shall include procedures for the continuing safe production, delivery or support of its services during such emergencies.

11.10.4 There shall be a plan and record for drills or exercises with respect to the ERP.

11.10.5 The ERP shall address necessary coordination of its emergency response procedures with the emergency response procedures of other organisations where applicable.

11.10.6 At all aerodrome, the ATS provider shall issue UOIs to define supplementary unit procedures to support the Aerodrome Emergency Plan. A copy of the Aerodrome Emergency Plan shall be kept by the ATS unit.

Note.— An Aerodrome Emergency Plan which defines the categories of aerodrome emergencies, the role and responsibilities of assisting authorities and agencies including ATS units and, committees specifically set up to handle an emergency, has been established at each airport.

11.10. The ATS provider shall have a process to distribute and communicate the ERP to all relevant personnel, including relevant external organisations.

11.10.8 There shall be a procedure for periodic review of the ERP to ensure its continuing relevance & effectiveness. _____

CHAPTER 12. ATM SECURITY

Note 1.— The definition of ATM security includes the protection of the ATM system against threats, and the support that the ATM system provides to organisations and authorities engaged in aviation security, national security, defence, and law enforcement.

Note 2.— ATM system infrastructure includes people, procedures, information, resources, facilities, and equipment. Facilities include control centres and airports. Equipment includes communications, navigation and surveillance (CNS), and information systems.

Note 3.— The guidelines for ATM security are contained in ICAO Doc 9985 – Air Traffic Management Security Manual. Part A of the manual addresses the protection of the ATM system infrastructure. Part B of the manual addresses the provision of ATM security services to support various organisational security requirements.

12.1 Definitions

Acts of unlawful interference. These are acts or attempted acts such as to jeopardise the safety of civil aviation, including but not limited to:

- unlawful seizure of aircraft,
- destruction of an aircraft in service,
- hostage-taking on board aircraft or on aerodromes,
- forcible intrusion on board an aircraft, at an airport or on the premises of an aeronautical facility,
- introduction on board an aircraft or at an airport of a weapon or hazardous device or material intended for criminal purposes,
- use of an aircraft in service for the purpose of causing death, serious bodily injury, or serious damage to property or the environment,
- communication of false information such as to jeopardise the safety of an aircraft in flight or on the ground, of passengers, crew, ground personnel or the general public, at an airport or on the premises of a civil aviation facility.

Aerial work. An aircraft operation in which an aircraft is used for specialised services such as agriculture, construction, photography, surveying, observation and patrol, search and rescue, aerial advertisement, etc.

Aircraft security check. An inspection of the interior of an aircraft to which passengers may have had access and an inspection of the hold for the purposes of discovering suspicious objects, weapons, explosives or other dangerous devices, articles and substances.

Aircraft security search. A thorough inspection of the interior and exterior of the aircraft for the purpose of discovering suspicious objects, weapons, explosives or other dangerous devices, articles or substances.

Airside. The movement area of an airport, adjacent terrain and buildings or portions thereof, access to which is controlled.

Background check. A check of a person's identity and previous experience, including where legally permissible, any criminal history, as part of the assessment of an individual's

suitability to implement a security control and/or for unescorted access to a security restricted area.

Cargo. Any property carried on an aircraft other than mail, stores and accompanied or mishandled baggage.

Certification. A formal evaluation and confirmation by or on behalf of the appropriate authority for aviation security that a person possesses the necessary competencies to perform assigned functions to an acceptable level as defined by the appropriate authority.

Commercial air transport operation. An aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire.

Corporate aviation. The non-commercial operation or use of aircraft by a company for the carriage of passengers or goods as an aid to the conduct of company business, flown by a professional pilot employed to fly the aircraft. (Note that corporate aviation is a subset of general aviation.)

Disruptive passenger. A passenger who fails to respect the rules of conduct at an airport or on board an aircraft or to follow the instructions of the airport staff or crew members and thereby disturbs the good order and discipline at an airport or on board the aircraft.

General aviation operation. An aircraft operation other than a commercial air transport operation or an aerial work operation.

High-risk cargo or mail. Cargo or mail presented by an unknown entity or showing signs of tampering shall be considered high risk if, in addition, it meets one of the following criteria:

- a) specific intelligence indicates that the cargo or mail poses a threat to civil aviation; or
- b) the cargo or mail shows anomalies that give rise to suspicion; or
- c) the nature of the cargo or mail is such that baseline security measures alone are unlikely to detect prohibited items that could endanger the aircraft.

Regardless of whether the cargo or mail comes from a known or unknown entity, a State's specific intelligence about a consignment may render it as high risk.

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.

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

In-flight security officer. A person who is authorised by the government of the State of the Operator and the government of the State of Registration to be deployed on an aircraft with the purpose of protecting that aircraft and its occupants against acts of unlawful interference. This excludes persons employed to provide exclusive personal protection for one or more specific people travelling on the aircraft, such as personal bodyguards.

Known consignor. A consignor who originates cargo or mail for its own account and whose procedures meet common security rules and standards sufficient to allow the carriage of cargo or mail on any aircraft.

Regulated agent. An agent, freight forwarder or any other entity who conducts business with an operator and provides security controls that are accepted or required by the appropriate authority in respect of cargo or mail.

Screening. The application of technical or other means which are intended to identify and/or detect weapons, explosives or other dangerous devices, articles or substances which may be used to commit an act of unlawful interference.

Note.— *Certain dangerous articles or substances are classified as dangerous goods by Annex 18 and the associated Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284) and must be transported in accordance with those instructions. In addition, the Aviation Security Manual (Doc 8973 — Restricted) provides a list of prohibited items that must never be carried in the cabin of an aircraft.*

Security. Safeguarding civil aviation against acts of unlawful interference. This objective is achieved by a combination of measures and human and material resources.

Security audit. An in-depth compliance examination of all aspects of the implementation of the national civil aviation security programme.

Security control. A means by which the introduction of weapons, explosives or other dangerous devices, articles or substances which may be used to commit an act of unlawful interference can be prevented.

Security inspection. An examination of the implementation of relevant national civil aviation security programme requirements by an airline, airport, or other entity involved in security.

Security restricted area. Those areas of the airside of an airport which are identified as priority risk areas where in addition to access control, other security controls are applied. Such areas will normally include, *inter alia*, all commercial aviation passenger departure areas between the screening checkpoint and the aircraft, the ramp, baggage make-up areas, including those where aircraft are being brought into service and screened baggage and cargo are present, cargo sheds, mail centres, airside catering and aircraft cleaning premises.

Security survey. An evaluation of security needs including the identification of vulnerabilities which could be exploited to carry out an act of unlawful interference, and the recommendation of corrective actions.

Security test. A covert or overt trial of an aviation security measure which simulates an attempt to commit an unlawful act.

Transfer cargo and mail. Cargo and mail departing on an aircraft other than that on which it arrived.

Unidentified baggage. Baggage at an airport, with or without a baggage tag, which is not picked up by or identified with a passenger.

Unpredictability. The implementation of security measures in order to increase their deterrent effect and their efficiency, by applying them at irregular frequencies, different locations and/or with varying means, in accordance with a defined framework.

12.2 Requirements for ATM security

12.2.1 ATS authority and/or ATS providers shall establish and implement appropriate security provisions to meet the requirements of the *National Civil Aviation Security Programme of Malaysia* (NCASP).

12.3 Scope of ATM security

Note 1.— The ATM system should meet national security requirements outlined in the ICAO vision for the integrated, harmonised, and globally interoperable ATM system. ATM security includes security services captured in aviation security SARPs and the broader expectation outlined in ICAO Doc 9854.

Note 2.— ATM protection refers to internal security services provided and consumed by the ATS providers. Some examples of internal security services by the ATS providers:

- a) cyber-security services to protect cyber systems; and*
- b) physical protection of facilities.*

Note 3.— ATM security operations for external security services provided by the ATS providers but required by the national agencies, partners, and stakeholders. Some examples of external security services are:

- a) support for air defence interdiction;*
- b) search and rescue efforts;*
- c) aiding law enforcement response (e.g., border protection);*
- d) air traffic control during unlawful interference to aircraft in flight;*
- e) VIP movements; and*
- f) support for emergency response to natural disasters.*

12.3.1 ATM security shall include:

- a) the safeguarding of the ATM system from security threats and vulnerabilities (ATM protection); and
- b) the provision of security services that contribute to civil aviation security, national security, defence, and law enforcement (ATM security operations).

12.3.2 An ATM security programme for infrastructure protection shall have the following components:

- a) physical security;
- b) personnel security;
- c) information and communication technology (ICT) security; and
- d) security contingency planning to address security issues for disaster recovery and continuity of operation.

12.3.3 ATS authority and/or ATS providers shall develop measures in order to protect information and communication technology systems used for civil aviation purposes from interference that may jeopardise the safety of civil aviation.