



# **MANUAL OF STANDARDS AIR TRAFFIC SERVICES NEPAL (MATS Nepal)**

**FIRST EDITION 2013 (2069 B.S.)**

**This MATS Nepal incorporates latest amendments of relevant Civil Aviation Requirements, ICAO Annexes and DOCs.**

**Civil Aviation Authority of Nepal  
Babarmahal, Kathmandu  
April 2013**



## **FOREWORD**

Pursuant to Rule-82, Schedule-3 of Civil Aviation Regulation, 2058 (2002), this "Manual of Standards Air Traffic Services, Nepal" referred here-in-after "MATS Nepal" has been developed and approved by Civil Aviation Authority of Nepal to comply with the provisions of the relevant Civil Aviation Requirements, ICAO Annexes and Documents for safety, regularity or efficiency of International Civil Aviation in Nepal.

The MATS Nepal is the national standards that prescribe the detail processes and procedures for Air Traffic Services in Nepal for the safety of air navigation. ATS personnel are required to be familiar with the provision of this manual to perform their operational responsibilities.

This MATS Nepal is issued and amended under the authority of Director General of CAAN and comes into force from 30 April 2013.

This MATS Nepal incorporates latest amendments of relevant Civil Aviation Requirements, ICAO Annexes and DOCs.

All earlier national legislations and requirements still stand valid as a part of Civil Aviation requirements for practical purposes.

.....  
(Director General)  
Civil Aviation Authority of Nepal



# Anemdment Record

Amendments and Corrigenda to this "**Manual of Standards Air Traffic Services Nepal**" are regularly issued by Director General of CAAN, Nepal. The space below is provided to keep a record of such amendments.

## RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENT				CORRIGENDA			
No.	DATE APPLICABLE	DATE ENTERED	ENTERED BY	No.	DATE APPLICABLE	DATE ENTERED	ENTERED BY



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## **CHAPTER 1**

### **DOCUMENT IDENTIFICATION AND CONTROL**

#### **1.1 BACKGROUND**

1.1.1 This Manual of Standards Air Traffic Services, Nepal (MATS Nepal), made under Article 82, Schedule 3 of CAAN Civil Aviation Regulations 2058 (2002), refers to the standards and methods to be used in:

- (a) providing Air Traffic Services within Nepalese airspace.
- (b) the requirements and standards mentioned hereunder are applicable for the service provider's organization, facilities and equipment, personnel, and check and training system, interface arrangements, safety management system and records.

#### **1.2 DOCUMENTS**

1.2.1 The document hierarchy consists of:

- (a) Civil Aviation Authority of Nepal Act 2053 (1996);
- (b) Civil Aviation Regulations, 2058 (2002); and
- (c) Civil Aviation Requirements (CAR-11) – Air Traffic Services
- (d) Civil Aviation Requirements (CAR-2) – Rules of the Air
- (e) PANS-ATM Doc. 4444

1.2.2 The **MATS Nepal** comprises Standards of uniform application, determined to be necessary for the safety of air navigation.

1.2.3 In those parts of MATS Nepal where there is any inconsistency between the regulations and the MATS Nepal, the regulations prevail.

1.2.4 ATS Operational manual shall be developed and implemented by the respective ATS provider of concerned aerodrome. Until such period if there are differences between requirements prescribed in MATS Nepal and ATC Manual 2001, the MATS Nepal shall prevail.

#### **1.3 DIFFERENCES BETWEEN ICAO REQUIREMENTS AND THOSE IN MATS NEPAL**

1.3.1 Notwithstanding the above, where there is a difference between requirements prescribed in ICAO documents and the Manual of Standards Air Traffic Services (MATS Nepal), the MATS, Nepal shall prevail.

#### **1.4 DIFFERENCES PUBLISHED IN AIP**

1.4.1 Differences from ICAO Standards, Recommended Practices and Procedures are published in AIP Nepal.

## **1.5 MATS NEPAL DOCUMENTATION OWNERSHIP AND AMENDMENT PROCEDURES.**

- 1.5.1 The Air Traffic Management Department in CAAN Head Office has responsibility for the technical content of this **MATS Nepal**
- 1.5.2 This MATS Nepal is issued, and can only be amended, under the authority of the Director General CAAN.
- 1.5.3 Suggested changes to this MATS Nepal shall be forwarded to the Director, ATM Department.
- 1.5.4 Requests for any change to the content of this MATS Nepal may come from:
- (a) technical areas within CAAN; or
  - (b) aviation industry service provider(s) or operators; or
  - (c) individual's or authorization holders.
- 1.5.5 The need to change standards in this MATS Nepal may arise for any of the following reasons:
- (a) to ensure safety;
  - (b) to ensure standardization;
  - (c) to respond to changed CAAN safety standards;
  - (d) to respond to ICAO prescription;
  - (e) to accommodate proposed initiatives or new technologies.
- 1.5.6 CAAN may approve trials of new procedures or technologies in order to develop appropriate standards.

## **1.6 RELATED DOCUMENTS**

- 1.6.1 These standards shall be read in conjunction with:
- (a) CAAN Civil Aviation Regulations, 2058 (2002);
  - (b) Civil Aviation Requirements (CAR-11) –Air traffic Services
  - (c) Civil Aviation Requirements (CAR-2) –Rules of the Air.
  - (d) ICAO Air Traffic Services Planning Manual (Doc 9426);
  - (e) ICAO Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) (Doc 4444);
  - (f) ICAO Regional Supplementary Procedures (Doc 7030);
  - (g) Related ICAO Annexs, Documents and Circulars.
  - (h) AIP Nepal, AICs, Supplement and DGCA Directives.

## CHAPTER 2

### DEFINITIONS AND ABBREVIATIONS

#### 2.1 DEFINITIONS

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

**Accepting unit/controller.** Air traffic control unit/air traffic controller next to take control of an aircraft.

*Note- See definition of “transferring unit/controller”.*

**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.

*Note.— Air traffic control service provides a much more complete service than air traffic advisory service; advisory areas and routes are therefore not established within controlled airspace, but air traffic advisory service may be provided below and above control areas.*

**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.

*Note.— The term “aerodrome” where used in the provisions relating to flight plans and ATS messages is intended to cover also sites other than aerodromes which may be used by certain types of aircraft, e.g. helicopters or balloons.*

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

**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.*

**Aerodrome traffic circuit.** The specified path to be flown by aircraft operating in the vicinity of an aerodrome.

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

**Aeronautical fixed station.** A station in the aeronautical fixed service.

**Aeronautical ground light.** Any light specially provided as an aid to air navigation, other than a light displayed on an aircraft.

**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.** 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 station.** A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea.

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

**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.

**Aircraft address.** A unique combination of 24 bits available for assignment to an aircraft for the purpose of air-ground communications, navigation and surveillance.

**Aircraft identification.** A group of letters, figures or a combination thereof which is either identical to, or the coded equivalent of, the aircraft call sign to be used in air-ground communications, and which is used to identify the aircraft in ground-ground air traffic services communications.

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

**Aircraft proximity.** A situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as their relative positions and speed have been

such that the safety of the aircraft involved may have been compromised. An aircraft proximity is classified as follows:

**Risk of collision:** The risk classification of an aircraft proximity in which serious risk of collision has existed.

**Safety not assured:** The risk classification of an aircraft proximity in which the safety of the aircraft may have been compromised.

**No risk of collision:** The risk classification of an aircraft proximity in which no risk of collision has existed.

**Risk not determined:** The risk classification of an aircraft proximity in which insufficient information was available to determine the risk involved, or inconclusive or conflicting evidence precluded such determination.

**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.

**AIRPROX.** The code word used in an air traffic incident report to designate aircraft proximity.

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

**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-to-ground communication.** One-way communication from aircraft to stations or locations on the surface of the earth.

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

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

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



*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 instruction.** Directives issued by air traffic control for the purpose of requiring a pilot to take a specific action.

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

- a) preventing collisions:
  - 1) between aircraft, and
  - 2) on the manoeuvring area between aircraft and obstructions; and
- b) expediting and maintaining an orderly flow of air traffic.

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

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

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

**Air traffic management system.** A system that provides ATM through the collaborative integration of humans, information, technology, facilities and services, supported by air and ground- and/or space-based communications, navigation and surveillance.

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

*Note.— ATS airspaces are classified as Class A to G as shown in Annex 11, Appendix 4.*

**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 organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

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

**Allocation, allocate.** Distribution of frequencies, SSR codes, etc. to a State, unit or service. Distribution of 24-bit aircraft addresses to a State or common mark registering authority.

**Alphanumeric characters (alphanumerics).** A collective term for letters and figures (digits).

**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. Alternate aerodromes include the following:

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

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

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

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

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

**Approach control 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.

**Approach sequence.** The order in which two or more aircraft are cleared to approach to land at the aerodrome.

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

**Appropriate authority.**

- a) Regarding flight over the high seas: The relevant authority of the State of Registry.
- b) Regarding flight other than over the high seas: The relevant authority of the State having sovereignty over the territory being overflown.

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

**Area control centre (ACC).** 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.

**Assignment, assign.** Distribution of frequencies to stations. Distribution of SSR codes or 24-bit aircraft addresses to aircraft.

**ATIS.** The symbol used to designate automatic terminal information service.

**ATS route.** A specified route designed for channelling 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.*

**ATS surveillance service.** A term used to indicate a service provided directly by means of an ATS surveillance system.

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

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

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

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

*Note.— The abbreviated term “ADS contract” is commonly used to refer to ADS event contract, ADS demand contract, ADS periodic contract or an emergency mode.*

**Automatic terminal information service (ATIS).** The automatic provision of current, routine information to arriving and departing aircraft throughout 24 hours or a specified portion thereof: Data link-automatic terminal information service (D-ATIS). The provision of ATIS via data link. Voice-automatic terminal information service (Voice-ATIS). The provision of ATIS by means of continuous and repetitive voice broadcasts.

**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.*

**Blind transmission.** A transmission from one station to another station in circumstances where two-way communication cannot be established but where it is believed that the called station is able to receive the transmission.

**Broadcast.** A transmission of information relating to air navigation that is not addressed to a specific station or stations.

**Ceiling.** The height above the ground or water of the base of the lowest layer of cloud below 6000 m (20 000 ft) covering more than half the sky.

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

**Code (SSR).** The number assigned to a particular multiple pulse reply signal transmitted by a transponder in Mode A or Mode C.

**Common point.** A point on the surface of the earth common to the paths of two aircraft, used as a basis for describing longitudinal separation minima (e.g. significant point, waypoint, navigation aid, fix).

*Note.— Common point is not used for operational purposes or in pilot-controller communications.*

**Computer.** A device which performs sequences of arithmetical and logical steps upon data without human intervention.

*Note.— When the word “computer” is used in this document it may denote a computer complex, which includes one or more computers and peripheral equipment.*

**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 Annex 11, 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.

**Cruise climb.** An aeroplane cruising technique resulting in a net increase in altitude as the aeroplane mass decreases.

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

**Current data authority.** The designated ground system through which a CPDLC dialogue between a pilot and a controller currently responsible for the flight is permitted to take place.

**Current flight plan (CPL).** The flight plan, including changes, if any, brought about by subsequent clearances.

*Note.— When the word “message” is used as a suffix to this term, it denotes the content and format of the current flight plan data sent from one unit to another.*

**Data convention.** An agreed set of rules governing the manner or sequence in which a set of data may be combined into a meaningful communication.

**Data link initiation capability (DLIC).** A data link application that provides the ability to exchange addresses, names and version numbers necessary to initiate data link applications.

**Data processing.** A systematic sequence of operations performed on data.

*Note.— Examples of operations are the merging, sorting, computing or any other transformation or rearrangement with the object of extracting or revising information, or of altering the representation of information.*

**Decision altitude (DA) or decision height (DH).** A specified altitude or height in the precision approach or approach with vertical guidance at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.

*Note 1.— Decision altitude (DA) is referenced to mean sea level and decision height (DH) is referenced to the threshold elevation.*

*Note 2.— The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In Category III operations with a decision height the required visual reference is that specified for the particular procedure and operation.*

*Note 3.— For convenience where both expressions are used they may be written in the form “decision altitude/ height” and abbreviated “DA/H”.*

**Dependent parallel approaches.** Simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are prescribed.

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

**Discrete code.** A four-digit SSR code with the last two digits not being “00”.

**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 data authority.** A designated ground system, different from the current data authority through which the pilot can contact an appropriate ATC unit for the purposes of receiving a downstream clearance.

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

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

**Estimated elapsed time.** The estimated time required to proceed from one significant point to another.

**Estimated off-block time.** The estimated time at which the aircraft will commence movement associated with departure.

**Estimated time of arrival.** For IFR flights, the time at which it is estimated that the aircraft will arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the aerodrome, the time at which the aircraft will arrive over the aerodrome. For VFR flights, the time at which it is estimated that the aircraft will arrive over the aerodrome.

**Expected approach time.** The time at which ATC expects that an arriving aircraft, following a delay, will leave the holding fix to complete its approach for a landing.

*Note.— The actual time of leaving the holding fix will depend upon the approach clearance.*

**Filed flight plan (FPL).** The flight plan as filed with an ATS unit by the pilot or a designated representative, without any subsequent changes.

*Note.— When the word “message” is used as a suffix to this term, it denotes the content and format of the filed flight plan data as transmitted.*

**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 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 path monitoring.** The use of ATS surveillance systems for the purpose of providing aircraft with information and advice relative to significant deviations from nominal flight path, including deviations from the terms of their air traffic control clearances.

*Note.— Some applications may require a specific technology, e.g. radar, to support the function of flight path monitoring.*

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

*Note.— Specifications for flight plans are contained in Annex 2. A Model Flight Plan Form is contained in Appendix 2 to this document.*

**Flight visibility.** The visibility forward from the cockpit of an aircraft in flight.

**Flow control.** Measures designed to adjust the flow of traffic into a given airspace, along a given route, or bound for a given aerodrome, so as to ensure the most effective utilization of the airspace.

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

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

**Ground effect.** A condition of improved performance (lift) due to the interference of the surface with the airflow pattern of the rotor system when a helicopter or other VTOL aircraft is operating near the ground.

*Note.— Rotor efficiency is increased by ground effect to a height of about one rotor diameter for most helicopters.*



**Ground visibility.** The visibility at an aerodrome, as reported by an accredited observer or by automatic systems.

**Heading.** The direction in which the longitudinal axis of an aircraft is pointed, usually expressed in degrees from North (true, magnetic, compass or grid).

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

**Holding fix.** A geographical location that serves as a reference for a holding procedure.

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

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

**Human Factors principles.** Principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.

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

**Identification.** The situation which exists when the position indication of a particular aircraft is seen on a situation display and positively identified.

**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 type of incidents which are of main interest to the International Civil Aviation Organization for accident prevention studies can be found at <http://www.icao.int/anb/aig>.*

**Independent parallel approaches.** Simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are not prescribed.

**Independent parallel departures.** Simultaneous departures from parallel or near-parallel instrument runways.

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

**Instrument approach procedure (IAP).** A series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply. Instrument approach procedures are classified as follows:

**Non-precision approach (NPA) procedure:** An instrument approach procedure which utilizes lateral guidance but does not utilize vertical guidance.

**Approach procedure with vertical guidance (APV):** An instrument procedure which utilizes lateral and vertical guidance but does not meet the requirements established for precision approach and landing operations.

**Precision approach (PA) procedure:** An instrument approach procedure using precision lateral and vertical guidance with minima as determined by the category of operation.

*Note.— Lateral and vertical guidance refers to the guidance provided either by:*

- a) a ground-based navigation aid; or*
- b) computer-generated navigation data.*

**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 1. — The specified minima for visual meteorological conditions are contained in Chapter 3 of Annex 2.*

*Note 2.— In a control zone, a VFR flight may proceed under instrument meteorological conditions if and as authorized by air traffic control.*

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

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

**Location indicator.** A four-letter code group formulated in accordance with rules prescribed by ICAO and assigned to the location of an aeronautical fixed station.

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

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

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

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

**Minimum fuel.** The term used to describe a situation in which an aircraft's fuel supply has reached a state where little or no delay can be accepted.

*Note.— This is not an emergency situation but merely indicates that an emergency situation is possible, should any undue delay occur.*

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

**Mode (SSR).** The conventional identifier related to specific functions of the interrogation signals transmitted by an SSR interrogator. There are four modes specified in Annex 10: A, C, S and intermode.

**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).

**Near-parallel runways.** Non-intersecting runways whose extended centre lines have an angle of convergence/divergence of 15 degrees or less.

**Next data authority.** The ground system so designated by the current data authority through which an onward transfer of communications and control can take place.

**Normal operating zone (NOZ).** Airspace of defined dimensions extending to either side of an ILS localizer course and/or MLS final approach track. Only the inner half of the normal operating zone is taken into account in independent parallel approaches.

**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.

**No transgression zone (NTZ).** In the context of independent parallel approaches, a corridor of airspace of defined dimensions located centrally between the two extended runway centre lines, where a penetration by an aircraft requires a controller intervention to manoeuvre any threatened aircraft on the adjacent approach.

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

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

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

**Operational control.** The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight.

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

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

**Position indication.** The visual indication, in non-symbolic and/or symbolic form, on a situation display, of the position of an aircraft, aerodrome vehicle or other object.

**Position symbol.** The visual indication in symbolic form, on a situation display, of the position of an aircraft, aerodrome vehicle or other object, obtained after automatic processing of positional data derived from any source.

**Positive radio fix. (a)** An NDB or locator site (when propagation is normal); or  
(a) A VOR, TACAN site or marker beacon.

**Precision approach radar (PAR).** Primary radar equipment used to determine the position of an aircraft during final approach, in terms of lateral and vertical deviations relative to a nominal approach path, and in range relative to touchdown.

*Note.— Precision approach radars are designated to enable pilots of aircraft to be given guidance by radio communication during the final stages of the approach to land.*

**Pressure-altitude.** An atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the Standard Atmosphere.\* \* As defined in Annex 8.

**Primary radar.** A radar system which uses reflected radio signals.

**Primary surveillance radar (PSR).** A surveillance radar system which uses reflected radio signals.

**Procedural control.** Term used to indicate that information derived from an ATS surveillance system is not required for the provision of air traffic control service.

**Procedural separation.** The separation used when providing procedural control.

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

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

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

**Profile.** The orthogonal projection of a flight path or portion thereof on the vertical surface containing the nominal track.

**PSR blip.** The visual indication, in non-symbolic form, on a situation display of the position of an aircraft obtained by primary radar.

**Radar.** A radio detection device which provides information on range, azimuth and/or elevation of objects.

**Radar approach.** An approach in which the final approach phase is executed under the direction of a controller using radar.

**Radar clutter.** The visual indication on a situation display of unwanted signals.

**Radar contact.** The situation which exists when the radar position of a particular aircraft is seen and identified on a situation display.

**Radar separation.** The separation used when aircraft position information is derived from radar sources.

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

**Receiving unit/controller.** Air traffic services unit/air traffic controller to which a message is sent.

*Note.— See definition of “sending unit/controller”.*

**Repetitive flight plan (RPL).** A flight plan related to a series of frequently recurring, regularly operated individual flights with identical basic features, submitted by an operator for retention and repetitive use by ATS units.

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

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

**Required navigation performance (RNP).** A statement of the navigation performance necessary for operation within a defined airspace.

*Note.— Navigation performance and requirements are defined for a particular RNP type and/or application.*

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

**Rescue unit.** A unit composed of trained personnel and provided with equipment suitable for the expeditious conduct of search and rescue.

**RNP type.** A containment value expressed as a distance in nautical miles from the intended position within which flights would be for at least 95 per cent of the total flying time.

**Example.—** RNP 4 represents a navigation accuracy of plus or minus 7.4 km (4 NM) on a 95 per cent containment basis.

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

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

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

**Runway incursion.** Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated 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 case.** A safety case provides documented evidence and argument that a service or facility, or a proposed change to the design of a service or facility, meets safety objectives or levels for the service or facility.

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

**Secondary radar.** A radar system wherein a radio signal transmitted from the radar station initiates the transmission of a radio signal from another station.

**Secondary surveillance radar (SSR).** A surveillance radar system which uses transmitters/receivers (interrogators) and transponders.

**Sending unit/controller.** Air traffic services unit/air traffic controller transmitting a message.

*Note.— See definition of “receiving unit/controller”.*

**Shoreline.** A line following the general contour of the shore, except that in cases of inlets or bays less than 30 nautical miles in width, the line shall pass directly across the inlet or bay to intersect the general contour on the opposite side.

**SIGMET information.** Information issued by a meteorological watch office concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations.

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

**Situation display.** An electronic display depicting the position and movement of aircraft and other information as required.

**Slush.** Water-saturated snow which with a heel-and-toe slap-down motion against the ground will be displaced with a splatter; specific gravity: 0.5 up to 0.8.

*Note.— Combinations of ice, snow and/or standing water may, especially when rain, rain and snow, or snow is falling, produce substances with specific gravities in excess of 0.8. These substances, due to their high water/ice content, will have a transparent rather than a cloudy appearance and, at the higher specific gravities, will be readily distinguishable from slush.*

**Snow (on the ground).**

- a) Dry snow. Snow which can be blown if loose or, if compacted by hand, will fall apart upon release; specific gravity: up to but not including 0.35.
- b) Wet snow. Snow which, if compacted by hand, will stick together and tend to or form a snowball; specific gravity: 0.35 up to but not including 0.5.
- c) Compacted snow. Snow which has been compressed into a solid mass that resists further compression and will hold together or break up into lumps if picked up; specific gravity: 0.5 and over.

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

**SSR response.** The visual indication, in non-symbolic form, on a situation display, of a response from an SSR transponder in reply to an interrogation.

**Standard instrument arrival (STAR).** A designated instrument flight rule (IFR) arrival route linking a significant point, normally on an ATS route, with a point from which a published instrument approach procedure can be commenced.

**Standard instrument departure (SID).** A designated instrument flight rule (IFR) departure route linking the aerodrome or a specified runway of the aerodrome with a specified significant point, normally on a designated ATS route, at which the en-route phase of a flight commences.

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

**Surveillance radar.** Radar equipment used to determine the position of an aircraft in range and azimuth.

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

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

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

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

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

**Total estimated elapsed time.** For IFR flights, the estimated time required from take-off to arrive over that designated point, defined by reference to navigation aids, from which it is intended that an instrument approach procedure will be commenced, or, if no navigation aid is associated with the destination aerodrome, to arrive over the destination aerodrome. For VFR flights, the estimated time required from take-off to arrive over the destination aerodrome.

**Touchdown.** The point where the nominal glide path intercepts the runway.

*Note.— “Touchdown” as defined above is only a datum and is not necessarily the actual point at which the aircraft will touch the runway.*



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

*Note.— See definition of “accepting unit/controller”.*

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

**Transition layer.** The airspace between the transition altitude and the transition level.

**Transition level.** The lowest flight level available for use above the transition altitude.

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

**Unmanned free balloon.** A non-power-driven, unmanned, lighter-than-air aircraft in free flight.

*Note.— Unmanned free balloons are classified as heavy, medium or light in accordance with specifications contained in Annex 2, Appendix 4.*

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

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

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

**Visibility.** Visibility for aeronautical purposes is the greater of:

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

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

*Note 1.— The two distances have different values in air of a given extinction coefficient, and the latter b) varies with the background illumination. The former a) is represented by the meteorological optical range (MOR).*

*Note 2.— The definition applies to the observations of visibility in local routine and special reports, to the observations of prevailing and minimum visibility reported in METAR and SPECI and to the observations of ground visibility.*

**Visual approach.** An approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain.

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

*Note.— The specified minima are contained in Annex 2, Chapter 4.*

**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.

## 2.2 ABBREVIATIONS

Unless otherwise stated, abbreviations in this MATS Nepal have the meanings as follows:

### A

AA	All after .....
A/A	Air-to-air
AAL	Above Aerodrome Level
AB	All before.....
ABM	Abeam
ABT	About
AC	Altocumulus
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ACCID	Initial Notification of Aircraft accident
ACFT	Aircraft
ACK	Acknowledge
ACP	Acceptance (message type designator)
ACPT	Accept or Accepted
ACT	Active or activated or activity
AD	Aerodrome
ADA	Advisory area
ADDN	Addition or additional
ADF	Automatic direction-finding equipment
ADIZ	Air Defence Identification Zone
ADJ	Adjacent
ADR	Advisory route
ADS	Automatic Dependent Surveillance
ADS-B	ADS- Broadcast
ADS-C	ADS- Contract
ADZ	Advise
AFIL	Flight Plan Filed in the Air
AFIS	Aerodrome Flight Information Service
AFM	Yes, Affirm
AFS	Aeronautical Fixed Service
AFT	After ..... (time or place)
AFTN	Aeronautical Fixed Telecommunication Network
A/G	Air-to-ground aids
AGA	Aerodrome, air routes & ground aids
AGL	Above ground level
AGN	Again
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation and Control
AIREP	Air-report
AIS	Aeronautical Information Service
ALA	Alighting Area

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ALERFA	Alert Phase
ALM	Aircraft Landing Minima
ALR	Alerting (Message type designator)
ALS	Approach Lighting System
ALT	Altitude
ALTN	Alternate (aerodrome)
AMD	Amend or amended
AMS	Aeronautical Mobile Service
AMSL	Above Mean Sea Level
AP	Airport
APCH	Approach
APP	Approach Control Office or Approach control or Approach Control Service or Approach Control Center
APR	April
APRX	Approximate or approximately
APV	Approved, approve
ARFOR	Area forecast (in aeronautical meteorological code)
ARMET	Forecast upper wind and temperature at specified points (in aeronautical meteorological code)
ARO	Air Traffic Services Reporting Office
ARP	Aerodrome Reference Point
ARQ	Automatic Error Correction
ARR	Arrival (message type designator)
ARR	Arrive or arrival
AS	Altostratus
ASC	Ascent to or ascending to
ASDA	Accelerate-stop distance available
ASPH	Asphalt
ATA	Actual time of arrival
ATC	Air Traffic Control (in general)
ATD	Actual Time of Departure
ATFM	Air Traffic Flow Management
ATIS	Automatic Terminal Information Service
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
ATP	At ..... (time or place)
ATS	Air Traffic Service(s)
ATTN	Attention
ATZ	Aerodrome Traffic Zone
AUG	August
AUX	Auxiliary
AVASIS	Abbreviated visual approach slope indicator system
AVBL	Available or availability
AVG	Average
AVGAS	Aviation gasoline
AWK	Aerial work
AWY	Airway

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AZM	Azimuth
<b>B</b>	
BA	Braking Action
BASE	Cloud base
BCFG	Fog Patches
BCN	Beacon (aeronautical ground light)
BCST	Broadcast
BDRY	Boundary
BECMG	Becoming
BKN	Broken
BLDG	Building
BLSN	Blowing snow
BOMB	Bombing
BR	Mist
BRG	Bearing
BRKG	Braking
BS	Commercial broadcasting station
BTL	Between layers
BTN	Between
<b>C</b>	
C	Degree Celsius (Centigrade)
CAT	Clear Air Turbulence
CAVOK	Visibility, cloud and present weather better than prescribed values or conditions
CB	Cumulonimbus
CC	Cirrocumulus
CD	Candela
CDN	Co-ordination (message type designator)
CFM	Confirm or I confirm
CHG	Modification (message type designator)
CI	Cirrus
CIT	Near or over large towns/city
CIV	Civil
CK	Check
CL	I am closing my station
CLA	Clear type of ice formation
CLBR	Calibration
CLD	Cloud
CLR	Clear or cleared to .. or clearance
CLSD	Closed
CM	Centimeter
CMB	Climb to, or Climbing to
CMPL	Completion or completed or complete
CNL	Flight plan cancellation (message type designator)
CNL	Cancel or cancelled

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CNS	Communications, Navigation and Surveillance
COM	Communications
CON	Console
CONC	Concrete
CONST	Construction or constructed
CONT	Continue or continued
COP	Change Over Point
COR	Correct or corrected or correction
COV	Cover or covered or covering
CPL	Current flight plan (message type designator)
CS	Call sign (used to request a call sign)
CS	Cirrostratus
CTA	Control area
CTAM	Climb to and maintain
CTL	Control
CTN	Caution
CTR	Control zone
CU	Cumulus
CUF	Cumuliform
CW	Continuous wave
CWY	Clearway
<b>D</b>	
D	Danger area (followed by identification)
DA	Decision altitude
DATIS	Data Link Automatic Terminal Information Service
DCKG	Docking
DCT	Direct (in relation to flight plan clearances and type of approach)
DEC	December
DEG	Degree
DEP	Depart or departure
DEP	Departure (message type designator)
DES	Descend to or descending to
DEST	Destination
DETRESFA	Distress phase
DFTI	Distance from touchdown indicator
DH	Decision height
DIF	Diffuse
DIST	Distance
DLA	Delay (message type designator)
DLA	Delay or delayed
DME	Distance measuring equipment
DNG	Danger or dangerous
DOC	Document
DOM	Domestic
DPT	Dew Point temperature

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DR	Dead reckoning
DSB	Double side band
DTAM	Descend to and maintain
DTG	Date-time-group
DTRT	Deteriorate or deteriorating
DTW	Dual tandem wheels
DU	Dust
DUC	Dense upper cloud
DUPE	This is duplicate message
DUR	Duration
DVOR	Doppler VOR
DW	Dual wheels
DZ	Drizzle
<b>E</b>	
E	East or eastern longitude
EAT	Estimated approach time
EET	Estimated elapse time
EFC	Expected Further Clearance
EHF	Extremely high frequency 300000 KHZ to 300000MHZ
ELBA	Emergency location beacon aircraft
ELEV	Elevation
ELR	Extra long range
ELT	Emergency locator transmitter
EM	Emission
EMBD	Embedded in a layer (to indicate cumulonimbus embedded in layers of other clouds)
EMERG	Emergency
ENE	East north east
ENRT	En-route
EOBT	Estimated off-block time
EQPT	Equipment
ESE	East south east
EST	Estimate or estimated or estimate (as message type designator)
ETA	Estimated time of arrival or estimating arrival
ETD	Estimated time departure or estimating departure
ETO	Estimated time over significant point
EV	Every
EXC	Except
EXER	Exercises or exercising or to exercise
EXP	Expect or expected or expecting
EXTD	Extend or extending
<b>F</b>	
F	Fixed
F	Degree Fahrenheit
FAC	Facilities
FAF	Final approach fix

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FAL	Facilitation
FAP	Final approach point
FAS	Final Approach Segment
FATO	Final approach and take-off area
FAX	Facsimile transmission
FBL	Light (used to qualify icing, turbulence, interference or static reports)
FC	Funnel cloud
FCST	Forecast
FEB	February
FG	Fog
FIC	Flight information center
FIR	Flight information region
FIS	Flight information service
FISA	Automatic flight information service
FL	Flight level
FLG	Flashing
FLR	Flare
FLT	Flight
FLTCK	Flight check
FLW	Follow(s) or Following
FLY	Fly or flying
FM	From
FMS	Flight Management System
FNA	Final approach
FPL	Filed flight plan (message type designator)
FPM	Feet per minute
FREQ	Frequency
FRI	Friday
FRNG	Firing
FRONT	Front (relating to weather)
FRQ	Frequent
FSL	Full stop landing
FSS	Flight service station
FST	First
FT	Feet (dimensional unit)
FU	Smoke
FZ	Freezing
FZDZ	Freezing drizzle
FZFG	Freezing fog
FZL	Freezing level
FZRA	Freezing rain
<b>G</b>	
G/A	Ground-to-air
G/A/G	Ground-to-air and air-to-ground
GBAS	Ground Based Augmentation System



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GCA	Ground control approach or ground controlled approach
GEN	General
GEO	Geographic or true
GLD	Glider
GMT	Greenwich mean time
GND	Ground
GNDCK	Ground check
GNSS	Global Navigation Satellite System
GP	Glide path
GPWS	Ground Proximity Warning System
GR	Hail
GRADU	Gradual or gradually
GRAS	Ground Based Regional Augmentation system
GRASS	Grass landing area
GRID	Processed meteorological data in the form of grid point values (in aeronautical meteorological office)
GRVL	Gravel
GS	Ground seed
<b>H</b>	
H24	Continuous day and night service
HBN	Hazard beacon
HDG	Heading
HEL	Helicopter
HF	High frequency (3000 to 30000 kHz)
HGT	Height or height above
HJ	Sunrise to sunset
HLS	Helicopter landing site
HLDG	Holding
HN	Sunset to sunrise
HO	Service available to meet operational requirement
HOL	Holiday
HOSP	Hospital aircraft
HPA	Hectopascal
HR	Hours
HS	Service available during hours of scheduled operations
HURCN	Hurricane(s)
HX	No specific working hours
HZ	Hertz (cycles per second)
HZS	Horizontal surface
<b>I</b>	
IAF	Initial approach <b>fix</b>

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IAL	Instrument approach and landing
IAO	In and out of clouds
IAP	Instrument Approach Procedure
IAR	Intersection of air routes
IAS	Indicated air speed
IBN	Identification beacon
ICAO	International Civil Aviation Organisation
ICE	Icing
IDENT	Identification
IAF	Intermediate approach fix
IFF	Identification friend/foe
IFR	Instrument flight rules
IGA	International general aviation
ILS	Instrument landing system
IM	Inner marker
IMC	Instrument meteorological condition
IMPR	Improve or improving
IMT	Immediate or immediately
INA	Initial approach
INBD	Inbound
INC	In cloud
INCERFA	Uncertainty phase
INFO	Information
INOP	Inoperative
INP	If not possible
INPR	In progress
INS	Inches (dimensional unit)
INS	Inertial navigation system
INSTL	Install or installed or installation
INSTR	Instrument
INT	Intersection
INTER	Intermittent
INTL	International
INTRG	Interrogator
INTRP	Interrupt, interrupted or interruption
INTSF	Intensify or intensifying
INTST	Intensity
IR	Ice on runway
IRS	Inertial Reference System
ISA	International standard atmosphere
ISOL	Isolated
<b>J</b>	
JAN	January
JTST	Jet stream
JUL	July
JUN	June

**K**

KG	kilogram(s)
KHZ	Kilohertz
KM	Kilometer(s)
KMH	Kilometer per hour
KPA	Kilopascal
KT	Knots
KW	Kilowatt

**L**

L	Left (runway identification)
L	Locator (see LM, LO)
LAN	Inland
LAT	Latitude
LB	Pounds (weight)
LCN	Load classification number
LDA	Landing distance available
LDG	Landing
LDI	Landing direction indicator
LEN	Length
LF	Low frequency (30 to 300 khz )
LGT	Light or lighting
LGTD	Lighted
LLZ	Localizer
LM	Locator, middle
LMT	Local mean time
LO	Locator, outer
LOC	Locally, location or located
LONG	Longitude
LORAN	LORAN (long range air navigation system)
LR	The last message received by me was.
LRG	Long range
LS	The last message sent by me was....
LSQ	Line squall
LTD	Limited
LTH	Light-intensity high
LTL	Light-intensity low
LTM	Light-intensity medium
LV	Light and variable (relating to wind)
LYR	Layer or layered

**M**

M	Meter
M	Mach Number (Followed by figures)
MAG	Magnetic
MAINT	Maintenance
MAP	Aeronautical maps and charts
MATS	Manual of Standards Air Traffic Services

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MAPT	Missed approach point
MAR	March
MAR	At sea
MAX	Maximum
MAY	May
MB	Millibar
MDA	Minimum descent altitude
MDH	Minimum descent height
MEA	Minimum en-route altitude
METAR	Aviation routine weather report (in aeronautical meteorological code)
MF	Medium frequency 300 to 3000 khz
MHZ	Megahertz
MIFG	Shallow fog
MIL	Military
MIN	Minutes
MISC	Miscellaneous
MKR	Marker radio beacon
MNM	Minimum
MLS	Microwave landing system
MM	Middle marker
MNPS	Minimum Navigation Performance Specifications
MNPSA	Minimum Navigation Performance Specifications
MNT	Monitor or monitoring or monitored
MNTN	Maintain
MOC	Minimum obstacle clearance (required)
MOCA	Minimum obstacle clearance altitude
MOD	Moderate (used to qualify icing, turbulence, interference, or static reports)
MON	Above mountains
MON	Monday
MOV	Move or moving or movement
MPH	Statute miles per hour
MPS	Metres per second
MRG	Medium range
MRP	ATS/MET reporting points
MS	Minus
MSA	Minimum safe altitude
MSG	Message
MSL	Mean sea level
MT	Mountain
MTOF	Maximum Take-Off Weight
MTU	Metric units
MTW	Mountain waves
MWO	Meteorological watch office
N	
N	North or northern latitude
NAV	Navigation

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NB	North bound
NC	No change
NDB	Non-directional radio beacon
NE	North-east
NEG	Negative
NGT	Night
NIL	None or I have nothing to send
NM	Nautical miles
NML	Normal
NNNN	Connect to (.....) stations (used in multiple transmission, followed by call sign of stations)
NNE	North north east
NNW	North north west
NOF	International NOTAM Office
NOSIG	No significant change (used in trend type landing forecast)
NOTAM	A notice 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
NOV	November
NPA	Non Precision Approach
NR	Number
NS	Nimbostratus
NSC	Nil Significant Cloud
NW	North west
NXT	Next
<b>O</b>	
OAS	Obstacle assessment surface
OBS	Observe or observed or observation
OBSC	Obscure or obscured or obscuring
OBST	Obstacle
OBSTR	Obstruction
OCA	Obstacle Clearance Altitude
OCC	Occulting (light)
OCH	Obstacle Clearance Height
OCNL	Occasional or occasionally
OCS	Obstacle clearance surface
OCT	October
OK	We agree or it is correct
OM	Outer marker
OPA	Opaque, white type of ice formation
OPC	The control indicated is operational control
OPMA	Onboard Performance Monitoring and Alerting
OPMET	Operational meteorological (information)
OPN	Open or opened or opening

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OPS	Operations
O/R	On request
ORD	Indication of an order
OTP	On top
OVC	Overcast
<b>P</b>	
P	Prohibited area (followed by identification)
PANS	Procedures for air navigation services
PAPI	Precision approach Path indicator
PAR	Precision approach radar
PARL	Parallel
PAX	Passenger(s)
PCN	Pavement classification number
PER	Performance
PERM	Permanent
PJE	Parachute jumping exercise
PLA	Practice low approach
PN	Prior notice required
PNR	Point of no return
PO	Dust devils
POB	Person on board
PPI	Plan position indicator
PPR	Prior permission required
PRKG	Parking
PROB	Probability
PROC	Procedure
PROV	Provisional
PS	Plus
PSG	Passing
PSN	Position
PVT	Private
PWR	Power
<b>Q</b>	
QDM	Magnetic heading (zero wind)
QDR	Magnetic Bearing
QFE	Atmospheric pressure at aerodrome elevation (or runway threshold)
QFU	Magnetic orientation of runway
QNH	Altimeter sub-scale setting to obtain elevation when on the ground
QTE	True bearing
QUAD	Quadrant
<b>R</b>	
R	Restricted area (followed by identification)
R	Right (followed by runway identification)
RA	Rain
RA	Resolution Advisory

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RAC	Rules of the air and Air Traffic Services
RAD	Radius
RAG	Ragged
RAI	Runway alignment indicator
RAPID	Rapid or rapidity
RASH	Rain and showers
RB	Read back
RB	Rescue boat
RCC	Rescue co-ordination center
RCF	Radio communication failure (message type designator)
RCL	Runway center line
RDO	Radio
RDL	Radial
RE	Recent (used to qualify weather phenomena such as rain),e.g. recent rain = RERA
REC	Receive or receiver
REF	Reference to .. or refer to ....
REG	Registration
REILS	Runway end illumination light system
REP	Report or reporting or reporting point
REQ	Request or requested
RG	Range (lights)
RIF	Reclearance in flight
RITE	Right (direction or turn)
RLCE	Request level change en-route)
RMK	Remark
RNAV	Area navigation
RNG	Radio range
ROBEX	Regional OPMET bulletin exchange (exchange)
ROC	Rate of climb
ROFOR	Route forecast (in aeronautical meteorological code)
RON	Received only
RPL	Repetitive flight plan
RPLC	Replace or replaced
RPS	Radar Position Symbol
RPT	Repeat or I repeat Indication of a request
RQMNTS	Requirements
RQP	Request flight plan (message type designator)
RR	Report reaching
RSC	Rescue Sub-Centre
RSP	Responder Beacon
RSR	En-route Surveillance Radar
RTE	Route
RTF	Radiotelephony
RTG	Radiotelegraph
RTN	Return OR Returned OR Returning
RV	Rescue vessel

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RVR	Runway visual range
RWY	Runway
S	
S	South or Southern Latitude
SA	Dust storm, sand storm, rising dust or rising sand
SALS	Simple Approach Lighting System
SAP	As soon as possible
SARPS	Standard and Recommended Practices (ICAO)
SAT	Saturday
SC	Stratocumulus
SCT	Scattered
STDBY	Stand by
SE	South East
SEC	Seconds
SELCAL	Selective calling system
SEP	September
SER	Service or Servicing or Serviced
SEV	Severe (use to qualify icing and turbulence reports)
SFC	Surface
SG	Snow Grains
SGL	Signal
SH	Showers
SHF	Super High Frequency (3000 to 30000 MHz)
SID	Standard Instrument Departure
SIF	Selective Identification Feature
SIGMET	Information concerning en-route weather phenomena which may affect the safety of aircraft operations
SIGWX	Significant weather
SIMUL	Simultaneous or Simultaneously
SIWL	Single Isolated Wheel Load
SKC	Sky Clear
SLW	Slow
SMC	Surface Movement Control
SMR	Surface Movement Radar
SN	Snow
SNOWTAM	A special series NOTAM notifying the presence or removal or hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format
SNSH	Snow Showers
SOC	Start of Climb
SPECI	Aviation selected special weather report (in aeronautical meteorological code)
SPECIAL	Special meteorological report (in abbreviated plain language)
SPL	Supplementary flight plan (message type designator)
SPOT	Spot wind
SQ	Squall
SR	Sunrise

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SRA	Surveillance Radar Approach
SRE	Surveillance Radar Element of precision approach radar system
SRG	Short range
SRR	Search and rescue region
SS	Sunset
SSB	Single side band
SSE	South South East
SSR	Secondary Surveillance Radar
SST	Supersonic transport
SSW	South South West
ST	Stratus
STA	Straight in approach
STAR	Standard (Instrument) Arrival
STN	Station
STNR	Stationary
STOL	Short Take-Off and Landing
STS	Status
SUBJ	Subject to
SUN	Sunday
SUP	Supplement (AIP Supplement)
SUPPS	Regional supplementary procedures
SVC	Service message
SVCBL	Serviceable
SVFR	Special Visual Flight Rules
SW	South West
SWY	Stop way
<b>T</b>	
T	Temperature
TA	Transmission altitude
TACAN	UHF Tactical Air Navigation Aid
TAF	Aerodrome forecast
TAR	Terminal Area Surveillance Radar
TAS	True Airspeed
TAX	Taxi or taxiing
TC	Tropical Cyclone
TCAS	Traffic Alert and Collision Avoidance System
TCU	Towering Cumulus
TDO	Tornado
TDZ	Touch Down Zone
TECR	Technical Reason
TEMPO	Temporary or Temporarily
TFC	Traffic
TGL	Touch-and-Go Landing
TGS	Taxiing Guidance System
THR	Threshold
THRU	Through

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THU	Thursday
TIL	Until
TKOF	Take-off
TMA	Terminal control area
TO	To .... (place)
TOC	Top of climb
TODA	Take-Off Distance Available
TOP	Top of Cloud
TORA	Take-Off Runway Available
TP	Turning Point
TR	Track
TRA	Temporary Reserved Airspace
TRANS	Transmit or Transmitter
TS	Thunderstorm
TSGR	Thunderstorm with hail
TSSA	Thunderstorm with dust storm or sandstorm
TT	Teletypewriter
TUE	Tuesday
TURB	Turbulence
TVOR	Terminal VOR
TWR	Aerodrome control tower
TWY	Taxiway
TWYL	Taxiway Link
TXT	Text
TYP	Type of aircraft
TYPH	Typhoon
<b>U</b>	
UAB	Until Advised By .....
UAC	Upper Area Control Center
UAR	Upper Air Route
UDF	Ultra High Frequency Direction Finding System
UFN	Until Further Notice
UHF	Ultra High Frequency
ULR	Ultra Long Range
UNA	Unable
UNL	Unlimited
UNREL	Unreliable
U/S	Unserviceable
UTA	Upper Control Area
UTC	Co-ordinated Universal Time
<b>V</b>	
V	Cleared over a reporting point
VAL	In valleys
VAR	Magnetic variation
VASIS	Visual Approach Slope Indicator System
VDF	Very High Frequency Direction Finding Station

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VER	Vertical
VFR	Visual Flight Rules
VHF	Very High Frequency (30 to 300 MHz)
VIP	Very Important Persons
VIS	Visibility
VLF	Very Low Frequency
VLR	Very Long Range
VMC	Visual Meteorological Conditions
VOLMET	Meteorological information for aircraft in flight
VOR	Very High Frequency Omnidirectional Radio Range
VORTAC	VOR and TACAN combination
VOT	VOR airborne equipment test facility
VRB	Variable
VSA	By visual reference to the ground
VSP	Vertical speed
VTOL	Vertical Take-Off and Landing
<b>W</b>	
W	West or Western longitude
WAC	World Aeronautical Chart ICAO 1:1000 000
WDI	Wind Direction Indicator
WDSPR	Widespread
WED	Wednesday
WEF	With Effect From or Effective From
WI	Within
WID	Width or Wide
WIE	With Immediate Effect or Effective Immediately
WIP	Work In Progress
WKN	Weaken or Weakening
WNW	West North West
WPT	Way-point
WRNG	Warning
WS	Wind Shear
WSW	West South West
WX	Weather
<b>X</b>	
X	Cross
XBAR	Crossbar (of approach landing system)
XS	Atmospheric
XX	Heavy (used to qualify weather phenomena such as rain, e.g. heavy rain – XXRA)
<b>Y</b>	
YD	Yards
YES	Yes (affirmative)
YR	Your
<b>Z</b>	
Z	Co-ordinated Universal Time (in meteorological messages)

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## **CHAPTER 3**

### **ATS OPERATIONS MANUAL**

#### **3.1 INTRODUCTION**

3.1.1 An Air Traffic Service Operations Manual shows how and where Air Traffic Services are provided by different ATS Units.

#### **3.2 CONTENT OF THE ATS OPERATIONS MANUAL**

3.2.1 An ATS operations manual must contain:

- a. a table of contents based on the items in the manual, indicating the page number on which each item begins;
- b. a description of the provider's organizational structure and a statement setting out the functions that the provider performs, or proposes to perform;
- c. a description of the chain of command established, or proposed to be established, by the provider and a statement of the duties and responsibilities of any supervisory positions within the organizational structure;
- d. a statement showing how the provider determines the number of operational staff required including the number of operational supervisory staff;
- e. a list of the air traffic services that the provider provides, or proposes to provide;
- f. a statement for each air traffic service, showing the hours of operation of the service;
- g. a statement, for each air traffic service, that identifies the particular airspace within which the service is provided, or proposed to be provided;
- h. a statement, for each air traffic service, that identifies the location from where the service is provided, or proposed to be provided;
- i. if the provider provides, or proposes to provide, an air traffic service for a controlled aerodrome:
  - i. a description of the manoeuvring area of the aerodrome; and
  - ii. copy of the parts of the aerodrome emergency plan, set out in the aerodrome manual that are relevant to the provision of the service; and
  - iii. a copy of the procedures set out in the aerodrome manual for preventing the unauthorised entry of persons or things onto the manoeuvring area of the aerodrome; and

- iv. a copy of the procedures set out in the aerodrome manual for the control of surface vehicles operating on or in the vicinity of the manoeuvring area;
- j. a statement of the responsibilities and functions for each operating position;
- k. a description of the arrangements made or proposed to be made by the provider to ensure that it has, and will continue to receive, on a daily basis, the information necessary for providing the service;
- l. a description of the arrangements made or proposed to be made by the provider to ensure that it has, and will continue to be able to provide, information in connection with its air traffic services to another person whose functions reasonably require that information (includes SAR alerting);
- m. a description of the provider's document and record keeping system;
- n. a copy of any agreement entered into by the provider in relation to the provision of any of the air traffic services;
- o. a copy of the document that sets out the provider's safety management system;
- p. a copy of the provider's contingency plan;
- q. a copy of the provider's security program;
- r. a description of the processes and documentation used to present to staff the relevant standards, rules and procedures contained in CAR 10, CAR 11, ICAO PANS-ATM, ICAO Regional Supplementary Procedures, Chapter 10 of this Manual of ATS Nepal, and any of the provider's site-specific instructions for the provision of air traffic services;
- s. a description of the processes and documentation used to provide operational instructions to staff;
- t. a description of the procedures to be followed to ensure all operational staff are familiar with any operational changes that have been issued since they last performed operational duties;
- u. a description of the provider's training and checking program;
- v. a description of the procedures to be used in commissioning new facilities, equipment and services;
- w. the procedures to be followed for revising the operations manual.
- x. Operational Letter of agreement between different ATS units required for the provision of air traffic services within its jurisdiction.

## CHAPTER 4

### ATS FACILITIES AND EQUIPMENT

#### 4.1 INTRODUCTION

4.1.1 This standard sets out the standards for the design, siting, construction, equipping and maintenance of ATC facilities where applicable. Further information is contained in an Advisory Circular.

#### 4.2 CONTROL TOWERS

4.2.1 A control tower first commissioned after 1 January 2013, must enable the controller to have:

- a. adequate vision to all the manoeuvring area and airspace which are under the controllers' area of responsibility;
- b. a view of all runway ends and taxiways,
- c. maximum vision of airborne traffic patterns with primary consideration given to the view from the aerodrome control position(s);
- d. unobstructed line of sight from the control tower eye level to the manoeuvring area of the aerodrome;
- e. sufficient visual resolution of all aerodrome movement areas for which he/she has a responsibility;

4.2.2 In addition, procedures or facilities are required to ensure:

- (a) protection from glare, reflection and noise;
- (b) unobstructed view from an existing control tower cab.

4.2.3 **Communication.** Each control tower must contain:

- (a) an appropriate power supply to service the facilities identified in this Section;
- (b) facilities capable of two-way communications with aircraft, vehicles and persons within its area of responsibility;
- (c) facilities capable of providing two-way communications:
  - (i) between operational positions within the control tower;
  - (ii) with adjacent ATS units;
  - (iii) with aerodrome rescue and fire fighting services;
- (d) a means of alerting emergency services;

- (e) a means of recording air/ground/air and ground/ground communications;
- (f) AFTN terminal or other means to provide information normally conveyed by AFTN;
- (g) binoculars;
- (h) signal lamp, with white, red and green functions.

4.2.4 **Displays.** A control tower must have the following displays:

- (a) flight data displays (e.g. flight progress boards);
- (b) meteorological displays which meet the accuracy criteria specified in Annex 3 and

which provide at least the following information:

- (i) wind velocity;
- (ii) barometric pressure;
- (iii) temperature.

*Note: The meteorological displays must show mean speed and mean direction of the surface wind. Surface wind observations are to be representative of the conditions along the runway and near the touchdown zones. If more than one sensor is used, the displays must identify the sensor being utilized for the observation.*

(c) operational data displays for:

- (i) other significant weather information;
- (ii) NOTAMS;
- (iii) handover/takeover;
- (iv) essential aerodrome information;
- (v) relevant maps and charts;

(d) a time display at each operational position.

(e) a means to readily recognize the failure of any terrestrial navigation aid concerned.

4.2.5 **Switching, monitors and controls for aerodrome equipment.** A control tower must have appropriate switching, monitors, and controls for aerodrome lighting equipment for which the control tower has responsibility, including:

- (a) runway lighting;
- (b) approach lighting;

- (c) high intensity approach and runway lighting;
- (d) taxiway lighting;
- (e) VASIS;
- (f) obstruction lighting;
- (g) illuminated wind indicator; and
- (h) aerodrome beacon.

4.2.6 A control tower must have a means to readily recognize the failure of any terrestrial navigation aid being used for ATS purposes.

### **4.3 AREA CONTROL CENTRE AND APPROACH CONTROL UNIT**

4.3.1 Area Control Centre and Approach Control Unit must incorporate the following facilities:

- (a) air/ground RTF and/or data link communications equipment on assigned frequencies, in accordance with CAR-11 Air Traffic Services, Chapter 6;
- (b) ground/ground voice and/or data link equipment to enable communication between adjacent air traffic service units including control towers and the area control centre or approach control unit, in accordance with CAR-11 Air Traffic Services, Chapter 6;
- (c) time display at each operational position;
- (d) flight data display;
- (e) operational data display;
- (f) appropriate maps and charts;
- (g) external communications;
- (h) a means to readily recognize the failure of any terrestrial navigation aid used in providing separation to aircraft;
- (i) voice and, where applicable, data recording equipment;
- (j) AFTN terminal or other means to provide information normally conveyed by AFTN.

4.3.2 Area control centres and approach control units must have a means to readily recognise the failure of any terrestrial navigation aid being used for the control of aircraft.



#### **4.4 COMMISSIONING OF NEW FACILITIES AND EQUIPMENT**

4.4.1 Any new facilities must be commissioned in accordance with procedures stated in the concerned ATS Operations Manual.

4.4.2 The procedures must describe the way to determine:

- (a) the functional and performance requirements for the facility to be met; and
- (b) all ATS operating procedures to be validated; and
- (c) sufficient trained ATS personnel are available to operate the facility; and
- (d) all supportive arrangements for the facilities, including any necessary agreements, are in place.

## **CHAPTER 5**

### **TRAINING AND RATING PROGRAM**

#### **5.1 INTRODUCTION**

5.1.1 This Chapter sets out the standards for a Training and Rating program.

#### **5.2 PROGRAM**

5.2.1 A Training and Rating program must ensure that an individual performing a function in conjunction with any air traffic services is competent to perform that function.

5.2.2 Processes which address the integrity of staff training must be defined, documented and maintained.

#### **5.3 COMPETENCY**

5.3.1 In summary, an individual is competent if that individual is:

- (a) licensed, where the function can only be performed by the holder of a license;
- (b) rated, where the function can only be performed by the holder of an appropriate rating;
- (c) endorsed, where the function can only be performed by the holder of an appropriate endorsement;
- (d) qualified, where the function can only be performed by the holder of an appropriate qualification;
- (e) trained and proven to be proficient in the performance of functions that are not covered by sub-paragraphs (a) to (d) above; and
- (f) recent in the performance of the function and knowledge and skills in emerging matters identified as essential to task performance.

*Note: Competency standards for licensed functions are contained in concerned ATS Operation Manual.*

#### **5.4 TRAINING COURSES**

5.4.1 The term 'training course' has wide application and includes all training for a particular competency required for the provision of an air traffic service and includes training on new equipments and procedures.

5.4.2 Training courses must be provided on the basis of requirement, or training needs analysis or similar method.

5.4.3 The training programs for each course must be comprehensive and facilitate achievement of training goals through a syllabus, which reflects required competencies. The syllabus must ensure compliance with relevant national and international requirements and CAAN competency-based training standards.

5.4.4 Training courses must use a method of delivery consistent with requirements for an ATO, using facilities and instructors, or training officers, with current expertise and identified qualifications appropriate to achieving the goals of the course.

5.4.5 The method of assessment, both theoretical and practical, must utilise qualified assessors and appropriate processes and facilities and must be consistent.

## **5.5 EMERGENCY TRAINING**

5.5.1 Emergency training to specifically prepare a candidate for unforeseen circumstances must form part of all training courses.

## **5.6 REFRESHER TRAINING**

5.6.1 Refresher training is part of the Training and Rating program. It involves periodic training and assessment of individuals performing functions in air traffic services in those competencies (knowledge and skills) which are essential, but infrequently or rarely used (e.g. abnormal and emergency operations, degraded equipment modes, contingency plan implementation). The content and periodicity of refresher training must be sufficient to ensure competency and has to be mentioned in concerned ATS Operation Manual.

## **5.7 ON-GOING TRAINING**

5.7.1 The training and checking program must provide for on-going training, as necessary, to ensure that staff are competent in the use of new or emerging standards, procedures, techniques, facilities and equipment identified as essential to task performance.

## **5.8 REMEDIAL TRAINING**

5.8.1 The training and checking program must have a process which identifies deficiencies in knowledge or application, and must have a process to ensure these deficiencies are rectified.

## **5.9 CHECKING**

5.9.1 The purpose of checking is to ensure that the individual subject to the check meets the competency standards, and the concerned ATS unit's own standards where these are additional. Checks must be carried out as required.

## **5.10 RATING**

Categories for the ratings for the Air Traffic Controller shall be:

- (a) Aerodrome Control Rating
- (b) Approach Control Rating (Non radar)
- (c) Area Control Rating
- (d) Approach Radar Control Rating

## **5.11 QUALIFICATIONS OF TRAINERS AND CHECKERS**

5.11.1 Persons carrying out training and /or checking functions must be appropriately qualified for the functions as required by CAAN.

## **CHAPTER 6**

### **ATS SAFETY MANAGEMENT**

#### **6.1 GENERAL**

- 6.1.1 Civil Aviation Authority of Nepal will ensure that the level of air traffic services (ATS) and communications, navigation and surveillance, as well as the ATS procedures applicable to the airspace or aerodrome concerned within Kathmandu FIR, are appropriate and adequate for maintaining an acceptable level of safety in the provision of ATS.
- 6.1.2 CAAN will implement Safety Management System for the air traffic services under its jurisdiction to ensure that safety in the provision of ATS is maintained.

#### **6.2 OBJECTIVES**

The objectives of ATS safety management are to ensure that:

- a) the established level of safety applicable to the provision of ATS within an airspace or at an aerodrome is met; and
- b) safety-related enhancements are implemented whenever necessary.

#### **6.3 ATS SAFETY MANAGEMENT ACTIVITIES**

- 6.3.1 An ATS SMS will include the following with respect to the provision of air traffic services:
- a) monitoring of overall safety levels and detection of any adverse trend;
  - b) safety reviews of ATS units;
  - c) safety assessments in respect of the planned implementation of airspace reorganizations, the introduction of new equipment systems or facilities, and new or changed ATS procedures; and
  - d) a mechanism for identifying the need for safety enhancing measures.
- 6.3.2 All activities undertaken in an ATS SMS shall be fully documented. All documentation shall be retained for such period of time as is specified by the appropriate authority.

#### **6.4 MONITORING OF SAFETY LEVELS**

- 6.4.1 Collection and evaluation of safety-related data
- 6.4.1.1 Data for use in safety monitoring programmes will be collected from as wide range of sources as possible
  - 6.4.1.2 The Civil Aviation Authority of Nepal establish a formal incident reporting system for ATS personnel to facilitate the collection of information on actual

or potential safety hazards or deficiencies related to the provision of ATS, including route structures, procedures, communications, navigation and surveillance systems and other safety significant systems and equipment as well as controller workloads.

6.4.2 Review of incident and other safety-related reports

- 6.4.2.1 Safety-related reports concerning the operation of air traffic services, the serviceability of ATS facilities and systems, including air traffic incident reports, will be systematically reviewed in order to detect any trend in the operation of such systems which may have an adverse effect on safety.

## 6.5 SAFETY REVIEWS

### 6.5.1 General requirements

Safety reviews of ATS units will be conducted on a regular and systematic basis by personnel qualified through training, experience and expertise and having a full understanding of relevant civil aviation requirements (CAR), safe operating practices and Human Factors principles.

### 6.5.2 Scope

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

#### **Regulatory issues to ensure that:**

- a) ATS operations manuals, ATS unit instructions and air traffic control (ATC) 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 minimizing the potential for inadvertent runway incursions are in place. This observation may be performed visually or by means of an ATS surveillance system; Runway safety programme shall be developed and implemented by Aerodrome operators for minimizing the potential for inadvertent runway incursion.
- 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.

**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 recognizable 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;
  - 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:*

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

**Licensing and Training issues to ensure that:**

- a) controllers are adequately trained and properly licensed with valid ratings;

- b) 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) 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) controller competency in the English language is satisfactory in relation to providing ATS to international air traffic as well as domestic traffic; and
- f) standard phraseology is used.

## 6.6 SAFETY ASSESSMENTS

### 6.6.1 Need for safety assessments:

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

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

*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.*

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

### **6.6.2 Safety-significant factors**

The safety assessment shall consider relevant all factors determined to be safety-significant, including:

- a) types of aircraft and their performance characteristics, including aircraft navigation capabilities and navigation performance;
- b) traffic density and distribution;
- c) airspace complexity, ATS route structure and classification of the airspace;
- d) aerodrome layout, including runway configurations, runway lengths and taxiway configurations;
- e) type of air-ground communications and time parameters for communication dialogues, including controller intervention capability;
- f) type and capabilities of surveillance system, and the availability of systems providing controller support and alert functions.
- g) any significant local or regional weather phenomena.

*Note 1.— Guidance material on methods of expressing and assessing a safety level and on safety monitoring programmes is contained in CAR-11, Attachment B, the Air Traffic Services Planning Manual (Doc 9426), the Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574), the Performance-based Navigation Manual (Doc 9613) and the Manual on Airspace Planning Methodology for the Determination of Separation Minima (Doc 9689).*

## **6.7 SAFETY-ENHANCING MEASURES**

- 6.7.1 Any actual or potential hazard related to the provision of ATS within an airspace or at an aerodrome, whether identified through an ATS safety management activity or by any other means, shall be assessed and classified for its risk acceptability.
- 6.7.2 Except when the risk can be classified as acceptable, CAAN, as a matter of priority and as far as practicable, implement appropriate measures to eliminate the risk or reduce the risk to a level that is acceptable.
- 6.7.3 If it becomes apparent that the level of safety applicable to an airspace or an aerodrome is not, or may not be achieved, the CAAN shall, as a matter of priority and as far as practicable, implement appropriate remedial measures.
- 6.7.4 Implementation of any remedial measure shall be followed by an evaluation of the effectiveness of the measure in eliminating or mitigating a risk.



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## **CHAPTER 7**

### **CONTINGENCY PLAN**

#### **7.1 INTRODUCTION**

- 7.1.1 This Chapter sets out the standards for contingency plans in the provision of air traffic services.
- 7.1.2 A contingency plan must describe in detail the actions that operational staff is to follow to maintain safety in the event of the failure or non-availability of staff, facilities or equipment which affects the provision of air traffic services. The plan must also cover procedures for the safe and orderly transition back to full service provision.

#### **7.2 MINIMUM CONTENTS**

- 7.2.1 A contingency plan must include to the extent of the particular services authorised to the service provider, but is not limited to, arrangements for the following:
- (a) airspace management:
    - (i) transfer of responsibility;
    - (ii) redesignation;
    - (iii) emergency traffic;
  - (b) air traffic flow management;
  - (c) air traffic separation;
  - (d) alternatives for the continuing provision of the services (e.g. alternative operating positions or ATS units);
  - (e) alternative services (e.g. traffic information);
  - (f) SAR alerting;
  - (g) information transfer/coordination;
  - (h) notifications to affected parties;
  - (i) letters of agreement with other providers on any of the above matters;
  - (j) restoration of staff, facility or equipment to normal levels;
  - (k) measures to test the suitability of the plan;
  - (l) staff training requirements to ensure the plan can be safely implemented.

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## **CHAPTER 8**

### **ALTIMETER SETTING PROCEDURES**

#### **8.1 GENERAL**

8.1.1 An altimeter setting is pressure datum which, when set on the sub-scale of a sensitive altimeter, causes the altimeter to indicate vertical distance from that pressure datum. A pressure type altimeter calibrated in accordance with the international standard atmosphere (ISA) may be used to indicate altitude, flight level or height as follows:

- a. When set to QNH it will indicate altitude. An altimeter set to QNH reads, within close limits, the vertical distance above mean sea level of the aircraft is on the ground at the aerodrome, the altimeter will register the elevation of the aerodrome above mean sea level.
- b. When set to standard pressure (1013.2 hpa) it may be used to indicated flight levels. An aircraft maintains a flight level with the altimeter set to standard pressure flying along a surface of constant atmosphere pressure. The aircraft's vertical distance from mean sea level may vary while the aircraft maintains the flight level due to change in atmospheric pressure en route in the horizontal, for example, an aircraft flying toward a low pressure area will fly progressively lower while maintaining a flight level.
- c. When set to QFE, it will indicate height above the QFE reference datum. Maximum variation on QNH values within Kathmandu FIR does not exceed 15 hpa either side of the standard of setting 1013.2 hpa representing the change of 450 ft. on the altimeter from QNH to 1013.2 hpa. To simplify ATC procedures, therefore, a transition level of FL 150 has been established, thus provides a transition layer of 1500ft. and ensures at all times the 1000ft. vertical separation between aircraft.

8.1.2 The system of altimetry used in Kathmandu FIR (VNSM) makes use of a transition layer to separate aircraft using QNH from those using 1013.2 hpa (hectopascal)

8.1.3 A common transition altitude of 13500ft. has been established for the entire Kathmandu Flight Information Region.

8.1.4 A transition level of FL 150 has been established for the entire Kathmandu Flight Information Region.

#### **8.2 ALIMETER SEETING PROCEDURE**

8.2.1 All aircraft at or below the transition altitude will use Kathmandu, QNH supplied by ATS units. At controlled aerodromes other than Kathmandu, inbound aircraft

will set local QNH at the control zone boundary and outbound aircraft will change from local QNH to Kathmandu QNH on leaving the control zone boundary

- 8.2.2 For the flight at or above the transition level, the standard altimeter setting of 1013.2 hpa will be used.
- 8.2.3 Change from QNH to 1013.2 hpa will be made on climbing through the transition altitude.
- 8.2.4 Change from 1013.2 hpa. To QNH will be made on descent through the transition level.
- 8.2.5 Cruising within the transition layer is not permitted.
- 8.2.6 Vertical displacement of aircraft when at or below the transition altitude is expressed in terms of altitudes whereas such displacement at or above transition level is expressed in terms of flight level. While passing through the transition layer, vertical displacement is expressed in terms of altitude when descending and in terms of flight level when ascending.
- 8.2.7 Flight level zero is located at the atmospheric pressure level of 1013.2 hpa. Consecutive flight levels are separated by a pressure level corresponding to 500ft. in the standard atmosphere, for example FL 150, FL 155, FL 160 etc.

*Note: Example of the relationship between flight levels and altimeter indications are given in the following table*

FLIGHT LEVEL	ALTIMETER INDICATION
150	15,000
200	20,000
250	25,000
300	30,000
350	35,000
400	40,000
450	45,000

### 8.3 TAKE-OFF AND CLIMB

- 8.3.1 A QNH altimeter setting shall be made available to aircraft by approach/aerodrome control in the routine take off and climb instruction.
- 8.3.2 Vertical displacement of aircraft during climb shall be effected by reference to altitude until reaching the transition altitude above which vertical displacement shall be effected by reference to flight level.
- 8.3.3 A QFE altimeter setting will be provided on request if available but reports to ATC are to be made in altitude.

## **8.4 LEVEL INFORMATION BASED ON THE USE OF PRESSURE ALTITUDE INFORMATION:**

### **8.4.1 Verification of accuracy of level information:**

8.4.1.1 The tolerance value used to determine that pressure altitude-derived level information displayed to the controller is accurate shall be  $\pm 200$  ft in RVSM airspace. In other airspace, it shall be  $\pm 300$  ft. Geometric height information shall not be used for separation.

8.4.1.2 Verification of pressure altitude derived level information displayed to the controller shall be effected at least once by each suitably equipped ATC unit on initial contact with the aircraft concerned or, if this is not feasible, as soon as possible thereafter. The verification shall be effected by simultaneous comparison with altimeter derived level information received from the same aircraft by radiotelephony. The pilot of the aircraft whose pressure altitude derived level information is within the approved tolerance value need not be advised of such verification. Geometric height information shall not be used to determine if altitude differences exist.

8.4.1.3 If the displayed level information is not within the approved tolerance value or when a discrepancy in excess of the approved tolerance value is detected subsequent to verification, the pilot shall be advised accordingly and requested to check the pressure setting and confirm the aircraft's level.

8.4.1.4 If, following confirmation of the correct pressure setting the discrepancy continues to exist, the following action shall be taken according to circumstances:

- a) request the pilot to stop Mode C altitude data transmission, provided this does not cause the loss of position and identity information, and notify the next control positions or ATC unit concerned with the aircraft of the action taken;
- b) inform the pilot of the discrepancy and request that the relevant operation continue in order to prevent loss of position and identity information of the aircraft, and, when authorized by the appropriate ATS authority, override the label-displayed level information with the reported level. Notify the next control position or ATC unit concerned with the aircraft of the action taken.

### **8.4.2 Determination of level occupancy:**

8.4.2.1 The criterion which shall be used to determine that a specific level is occupied by an aircraft shall be  $\pm 200$  ft in RVSM airspace. In other airspace, it shall be  $\pm 300$  ft.

8.4.2.2 Aircraft maintaining a level. An aircraft is considered to be maintaining its assigned level as long as the pressure altitude-derived level information indicates that it is within the appropriate tolerances of the assigned level, as specified in 8.4.5.2.1.

8.4.2.3 Aircraft vacating a level. An aircraft cleared to leave a level is considered to have commenced its manoeuvre and vacated the previously occupied level when the

pressure altitude-derived level information indicates a change of more than  $\pm 300$  ft in the anticipated direction from its previously assigned level.

- 8.4.2.4 Aircraft passing a level in climb or descent. An aircraft in climb or descent is considered to have crossed a level when the pressure altitude-derived level information indicates that it has passed this level in the required direction by more than  $\pm 300$  ft.
- 8.4.2.5 Aircraft reaching a level. An aircraft is considered to have reached the level to which it has been cleared when the elapsed time of three display updates, three sensor updates or 15 seconds, whichever is the greater, has passed since the pressure altitude-derived level information has indicated that it is within + 300 ft of its assigned level.

## CHAPTER 9

### DOCUMENTS AND RECORDS

#### 9.1 DOCUMENTS

- 9.1.1 A document control system covers the authorization, standardization, publication, distribution and amendment of all documentation issued by the organisation, or required by the organisation for the provision of air traffic services.
- 9.1.2 These processes must ensure:
- (a) authorization is by a designated authority appropriate to the management and safety accountability structures;
  - (b) currency can be readily determined;
  - (c) availability at locations where needed by ATS personnel;
  - (d) only current versions are available;
  - (e) a master copy is securely held;
  - (f) archival where superseded.
- 9.1.3 **Reference Materials.** For the purposes of sub-regulations, the manuals and documents to be maintained are the following:
- (a) manuals for equipment used by staff in the provision of air traffic services;
  - (b) the relevant sections of the Aerodrome Emergency Plan (aerodrome services only).

#### 9.2 RECORDS

- 9.2.1 A system for records covers identification, collection, indexing, storage, security, maintenance, access and disposal of records necessary for the provision of air traffic services.
- 9.2.2 Records systems must provide an accurate chronicle of ATS activities for the purpose of reconstruction of events for air safety investigation, and for system safety analysis.

#### 9.3 RECORDS TO BE KEPT

- 9.3.1 **Automatic recordings.** The following items used for the provision of air traffic services must be recorded automatically and retained for the period shown:
- (a) direct pilot-controller two-way radiotelephony or datalink communications—30 days;
  - (b) direct-speech or data link between air traffic services units—30 days;
  - (c) surveillance data from primary and secondary radar equipment -30 days;



- (d) automated flight data processing including on-screen display of aircraft tracks and label blocks—30 days.
- 9.3.2 **Time injection.** Automatic recordings must have a means of establishing accurately the time, in hours/minutes/seconds, at which any recorded event occurred.
- 9.3.3 **Document records.** The following items must be kept for a minimum of 90 days:
  - (a) ATS messages, including flight plans;
  - (b) flight progress strips or documents of a similar nature used for the recording of flight data and the issue of clearances, instructions and directions;
  - (c) log books;
- 9.3.4 **Personnel Licensing Records.** Records of ATS personnel licensing and competency certification and rating under ATS Operation Manual must be kept for a minimum of 5 years, including after an employee ceases to be employed by the ATS provider. This includes details of:
  - (a) training;
  - (b) renewal and currency of ratings, endorsements and qualifications; and
  - (c) other proficiencies required by the ATS provider to be demonstrated.
- 9.3.5 **Record retention for investigation.** Where requisitioned, by an appropriate authority, for the purposes of investigation, records must be isolated and kept in a secure place until their release by that authority.

## 9.4 MAINTAINING OPERATIONAL LOG BOOKS

- 9.4.1 The Log Book must be used to record all significant occurrences and actions relating to operations, facilities, equipment and staff at an ATS unit.

*[Note: Except when forms such as fault reports or Air Safety Incident Reports must also be completed, duplication of information should be avoided.]*

- 9.4.2 A working record or Log Book entry must not be inserted between earlier entries. In the event of an out of sequence entry being necessary, it must be entered as soon as possible, and annotated that it is out of sequence with an explanatory note as to why it is out of sequence.
- 9.4.3 All Log Book entries must be recorded against the times of the occurrence, or time of the Log Book entry.
- 9.4.4 Minimum information to be recorded. The minimum information to be recorded is shown in the following table.

<b>Occasion</b>	<b>Information</b>
At the commencement of each day's operation	<ul style="list-style-type: none"> <li>• UTC date and time;</li> <li>• Where required, identification of the unit and/or the operating position.</li> </ul>
On assuming responsibility for a position	<ul style="list-style-type: none"> <li>• The UTC date and time of assuming responsibility for a position and the signature of the officer commencing duty (see also voice recordings);</li> <li>• Results of equipment checks;</li> <li>• Result of time check.</li> </ul>
During operation of the unit	<ul style="list-style-type: none"> <li>• Air Safety Incidents, including accidents and breaches of the Regulations such as noncompliance with ATC instructions; [Note: This is in addition to the completion of incident reporting actions.]</li> <li>• Actions taken in relation to any SAR activity including distress communications;</li> <li>• General notes concerning essential aerodrome information, such as the results of aerodrome inspections, closure of sections of the manoeuvring area caused by works or natural phenomena, etc.;</li> <li>• Times of aerodrome closure and reopening, with reasons for the closure;</li> <li>• Change in status of facilities, service or procedure including communication difficulties and tests;</li> <li>• Short term changes in staffing or hours of coverage, including variations to required staffing levels;</li> <li>• Any dispensation given against the Regulations</li> <li>• Status of navigation aids.</li> </ul>
Handover/takeover (where a separate form is not provided and kept as a record)	<ul style="list-style-type: none"> <li>• A resume of outstanding action and unusual operations which are current or anticipated, relating to the traffic display and/or SAR activity;</li> <li>• The status of communications and equipment;</li> <li>• The time of handover/takeover, against the signatures of the officers involved</li> </ul>
Closure of unit and/or position	<ul style="list-style-type: none"> <li>• Time of closure and conditions and actions relating to the closure, followed by changes to equipment status, and any outstanding action;</li> <li>• The time of intended reopening, and the signature of the officer closing the unit/position.</li> </ul>

## **9.5 VOICE AND DATA RECORDING**

- 9.5.1 Where appropriate voice recording facilities are available, details of opening and closing watch, or the identification of staff assuming responsibility for a position shall be recorded in the logbook entry. The procedures used must be sufficient to readily establish, for the purposes of investigation, the status of the position (active/inactive) and the person responsible for any active position, at any given time.
- 9.5.2 When an automatic voice recording facility fails, a manual record of communications must be maintained, to the possible extent.

## **CHAPTER 10**

### **STANDARDS FOR THE PROVISION OF AIR TRAFFIC SERVICES**

#### **10.1 INTRODUCTION**

- (a) This Chapter contains the standards, rules and procedures for the provision of air traffic services made remaining within the provision of the standards, recommendations, rules and procedures contained in CAAN CAR 2, CAR 11-Air Traffic Services, ICAO Annex 2, ICAO Annex 11, ICAO Doc 8168, ICAO Doc 7030 and ICAO PANS-ATM Doc 4444.
- (b) Unless otherwise authorised by CAAN, air traffic services must be provided commensurate with the airspace classifications as notified in the AIP.
- (c) Aircraft in a state of emergency must be given priority over all other traffic.

#### **10.2 OBJECTIVES OF THE AIR TRAFFIC SERVICES**

The objectives of the air traffic services shall be to:

- a) prevent collisions between aircraft;
- b) prevent collisions between aircraft on the 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;
- e) notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

#### **10.3 DIVISIONS OF THE AIR TRAFFIC CONTROL SERVICES**

##### **10.3.1 Air traffic control service**

10.3.1.1 The air traffic control service, to accomplish following objectives:

- 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.

10.3.1.2 Air traffic control services have been divided in three parts as follows:

- a. Aerodrome Control Service
- b. Approach Control Service
- c. Area Control Service

## **10.4 AERODROME CONTROL SERVICE**

### **10.4.1 Function Of Aerodrome Control Tower**

#### **10.4.1.1 General**

10.4.1.1.1 Aerodrome control towers shall issue information and clearances to aircraft under their control to achieve a safe, orderly and expeditious flow of air traffic on and in the vicinity of an aerodrome with the object of preventing collision(s) between:

- a) aircraft flying within the designated area of responsibility of the control tower, including the aerodrome traffic circuits;
- b) aircraft operating on the manoeuvring area;
- c) aircraft landing and taking off;
- d) aircraft and vehicles operating on the manoeuvring area;
- e) aircraft on the manoeuvring area and obstructions on that area.

10.4.1.1.2 Aerodrome controllers shall maintain a continuous watch on all flight operations on and in the vicinity of an aerodrome as well as vehicles and personnel on the manoeuvring area. Watch shall be maintained by visual observation, augmented in low visibility conditions by radar when available. Traffic shall be controlled in accordance with the procedures set forth herein and all applicable traffic rules specified by the civil aviation authority of Nepal.

10.4.1.1.3 Controllers shall maintain a continuous watch on all appropriate radio frequencies and conduct all air-ground communications in accordance with these instructions and those contained in the AIP.

10.4.1.1.4 At aerodromes where a separate surface movement control frequency is available, it shall be used for the control of all the traffic on the maneuvering area, other than on the runway(s) in use.

10.4.1.1.5 Company messages concerned with the safety of the aircraft shall be accepted for transmission. The transmission of other company messages shall be at the discretion of the controller. Messages unless concerned with the immediate safety of the aircraft shall not be passed to the aircraft which has been cleared for take-off and has entered the runway. Transmission of these messages shall be delayed until the aircraft is airborne.

10.4.1.1.6 An aircraft operating locally may be required to report at specified time or position at nominated reporting points.

10.4.1.1.7 Aerodrome controller shall use visual signals as and when required. The meanings of the light or ground signals for use in aerodrome control are as per the TABLE-ATC LIGHT SIGNALS.

10.4.1.1.8 Aerodrome controllers shall be familiar with the spread of the light signal lamp in use and shall choose a time for the direction of a signal so that it is not received by aircraft other than the one for which it is intended.

10.4.1.1.9 Aerodrome controllers shall use light signal from the table to control aircraft and movement of vehicles, equipments and personnel on the maneuvering area when radio communications cannot be employed.

**TABLE-ATC LIGHT SIGNALS**

COLOUR AND TYPE OF SIGNALS	AIRCRAFT ON		MOVEMENT OF VEHICLES. EQUIPMENT AND PERSONEL
	GROUND	FLIGHT	
Steady green...	Cleared for take off	Cleared to land	(Not applicable)
Flashing green....	Cleared to taxi	Return for Landing (to be followed by Steady green at the Proper time)	Cleared to cross or proceed.
Steady red....	Stop	Give way to other aircraft and continue circling	Stop
Flashing red...	Taxi clear of landing area	Airport unsafe, do not land	Clear the taxiway/runway.
Flashing white	Return to starting point on airport	Land at this Aerodrome & Proceed to apron	Return to starting point of airport.

**TABLE- GROUND SIGNALS TO AIRCRAFT**

GROUND SIGNAL	WHERE DISPLAYS	MEANINGS
To white cross	i. Adjacent to windsock  ii. On maneuvering area	i. Aerodrome completely unserviceable  ii. An area marked by a cross or crosses with the limits delineated by markers, is unfit for use by aircraft

#### 10.4.2 Alerting service provided by Aerodrome control towers

##### 10.4.2.1 Aerodrome control towers are responsible for alerting the rescue and fire fighting services whenever:

- a) an aircraft accident has occurred on or in the vicinity of the aerodrome; or,
- b) information is received that the safety of an aircraft which is or will come under the jurisdiction of the aerodrome control tower may have or has been impaired; or
- c) requested by the flight crew; or
- d) when otherwise deemed necessary or desirable.

##### 10.4.2.2 Procedures concerning the alerting of the rescue and fire fighting services shall be contained in local instructions. Such instructions shall specify the type of information to be provided to the rescue and fire fighting services, including type of aircraft and type of emergency and, when available, number of persons on board, and any dangerous goods carried on the aircraft

##### 10.4.2.3 Aircraft which fail to report after having been transferred to an aerodrome control tower, or, having once reported, cease radio contact and in either case fail to land five minutes after the expected landing time, shall be reported to the approach control unit, ACC or flight information centre, or to the rescue coordination centre.

#### 10.4.3 **Failure or irregularity of aids and equipment**

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.

#### 10.4.4 **SELECTION OF RUNWAY-IN-USE**

##### 10.4.4.1 The term “runway-in-use” shall be used to indicate the runway or runways that, at a particular time, are considered by the aerodrome control tower to be the most suitable for use by the types of aircraft expected to land or take-off at the aerodrome.

##### 10.4.4.2 Normally, an aircraft will land and take off into the wind unless safety, the runway configuration, meteorological conditions and available instrument approach procedures or air traffic conditions determine that a different direction is preferable. In selecting the runway-in-use, however, the unit providing aerodrome control service shall take into consideration, besides surface wind speed and direction, other relevant factors such as the aerodrome traffic circuits, the length of runways, and the approach and landing aids available.

- 10.4.4.3 If the runway-in-use is not considered suitable for the operation involved, the flight crew may request permission to use another runway and, if circumstances permit, should be cleared accordingly.
- 10.4.4.4 The supervisor on duty /Unit in charge shall nominate for use, the runway which appears to be most suitable, taking into consideration;
- a. type of aircraft
  - b. effective length of the runway
  - c. wind velocity / downwind component
  - d. weather phenomena including such things as wind gradients turbulence effects and position of sun
  - e. disposition of the traffic
  - f. if work load and traffic conditions permit, local instructions on “preferred runways” in particular wind conditions to avoid noise nuisance and runway deterioration.
- 10.4.4.5 A controller may authorize a departure from a runway intersection when requested by the pilot or may offer an intersection departure to assist traffic flow. The pilot must be advised of the remaining runway length if such information is not readily available to the pilot.
- 10.4.5 **SELECTION OF CIRCUIT DIRECTION**
- 10.4.5.1 The turn and circuit direction shall be specified by the aerodrome controller for particular traffic needs.
- 10.4.5.2 The pilot in command is responsible for advising the controller when a particular turn is essential to the safety of the aircraft for terrain or aircraft performance reasons. This does not necessarily preclude the issue of instructions in anticipation of a pilot’s advice.
- 10.4.6 **ENTRY OF TRAFFIC CIRCUIT**
- 10.4.6.1 The clearance to enter the traffic circuit should be issued to an aircraft whenever it is desired that the aircraft approaching the landing area in accordance with current traffic circuits but traffic conditions do not yet allow a landing clearance to be issued. Depending on the circumstances and traffic conditions, an aircraft may be cleared to join at any position in the traffic circuit.
- 10.4.6.2 An arriving aircraft executing an instrument approach shall normally be cleared to land straight-in unless visual maneuvering to the landing runway is required.



#### 10.4.7 **INFORMATION TO AIRCRAFT BY AERODROME CONTROL TOWERS**

##### 10.4.7.1 **Flight Information Services**

10.4.7.1.1 Fight information service shall be provided to all aircraft which are likely to be affected by the information and which are:

- a) provided with air traffic control service; or
- b) otherwise known to the relevant air traffic services units

10.4.7.1.2 Flight information service shall include the provision of pertinent:

- a) SIGMET and AIRMET information;
- b) information on changes in the serviceability of navigation aids;
- c) 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;
- d) weather conditions reported or forecast at departure, destination and alternate aerodromes;
- e) any other information likely to affect safety.

##### 10.4.7.2 **Aerodrome Meteorological Information**

10.4.7.2.1 Prior to taxiing for take-off, aircraft shall be advised of the following elements of information, in the order listed, with the exception of such elements which it is known the aircraft has already received:

- a) the runway to be used;
- b) the surface wind direction and speed, including significant variations;
- c) the QNH altimeter setting and, either on a regular basis in accordance with local arrangements or if so requested by the aircraft, the QFE altimeter setting;
- d) the air temperature for the runway to be used, in the case of turbine-engine aircraft;
- e) the visibility representative of the direction of take-off and initial climb, if less than 10 km, or, when applicable, the RVR value(s) for the runway to be used;
- f) the correct time.

10.4.7.2.2 Prior to take-off aircraft shall be advised of:

- a) any significant changes in the surface wind direction and speed, the air temperature, and the visibility or RVR value(s) given ;

- b) significant meteorological conditions in the take-off and climb-out area, except when it is known that the information has already been received by the aircraft.

*Note.— Significant meteorological conditions in this context include the occurrence or expected occurrence of cumulonimbus or thunderstorm, moderate or severe turbulence, wind shear, hail, moderate or severe icing, severe squall line, freezing precipitation, severe mountain waves, sand storm, dust storm, blowing snow, tornado or waterspout in the take-off and climb-out area.*

- 10.4.7.2.3 Prior to entering the traffic circuit or commencing its approach to land, an aircraft shall be provided with the following elements of information, in the order listed, with the exception of such elements which it is known the aircraft has already received:

- a) the runway to be used;
- b) the surface wind direction and speed, including significant variations there from;
- c) the QNH altimeter setting and, either on a regular basis in accordance with local arrangements or, if so requested by the aircraft, the QFE altimeter setting.

#### 10.4.8 **AERODROME WEATHER OBSERVATIONS**

- 10.4.8.1 The Aerodrome Controller shall be the sole authority responsible for opening or closing an aerodrome to arrivals and departures. Pilots shall be advised of observed weather conditions necessary for the purpose of landing and take-off and of significant weather, i.e. any weather phenomenon which might affect flight visibility or present a hazard to an aircraft.
- 10.4.8.2 Aerodrome controller shall use his own observations for determining whether the prevailing conditions are above or below the minima prescribed for aircraft operations. The aerodrome METAR shall not be used for the purpose of opening or closing an aerodrome to aircraft operations.
- 10.4.8.3 When observing weather conditions, the aerodrome controller may either make his observations over the whole of the visual horizon (general observations) or restrict the area considerations to that enclosing the probable flight path of the aircraft (sector observations). Sector observations may be made in any direction in order to accommodate both fixed and rotary wing operations.
- 10.4.8.4 In the specific cases covered by the following subparagraphs the aerodrome controller shall make either sector or general observations as specified.
- 10.4.8.5 Observations for the purpose of closing the aerodrome and for authorizing a flight shall be sector observations.
- 10.4.8.6 Observations made in response to a request by another unit shall be general observations.

- 10.4.8.7 Weather observation for departure and landing shall include such of the following. Items as are significant to the circumstance:
- a) Wind Velocity.
  - b) Altimeter setting.
  - c) Temperature.
  - d) Dew point subject to its availability.
  - e) Low cloud.
  - f) Visibility in meters.
  - g) Intensity of rain, reported or known wind shear, turbulence, etc.

*Note: Final decision on weather analysis, closure and open of aerodrome rests on Supervisor controller on duty.*

10.4.9 **ESSENTIAL LOCAL TRAFFIC INFORMATION**

- 10.4.9.1 Information on essential local traffic shall be issued in a timely manner, either directly or through the unit providing approach control service when, in the judgment of the aerodrome controller, such information is necessary in the interests of safety, or when requested by aircraft.
- 10.4.9.2 Essential local traffic shall be considered to consist of any aircraft, vehicle or personnel on or near the maneuvering area or traffic operating in the vicinity of the aerodrome, which may constitute a hazard to the aircraft concerned.
- 10.4.9.3 Essential local traffic shall be described so as to be easily identified.

10.4.10 **RUNWAY INCURSION OR OBSTRUCTED RUNWAY**

- 10.4.10.1 In the event the aerodrome controller, after a take-off clearance or a landing clearance has been issued, becomes aware of a runway incursion or the imminent occurrence thereof, or the existence of any obstruction on or in close proximity to the runway likely to impair the safety of an aircraft taking off or landing, appropriate action shall be taken as follows:
- a) cancel the take-off clearance for a departing aircraft;
  - b) instruct a landing aircraft to execute a go-around or missed approach;
  - c) in all cases inform the aircraft of the runway incursion or obstruction and its location in relation to the runway.

*Note. — Animals and flocks of birds may constitute an obstruction with regard to runway operations. In addition, an aborted take-off or a go-around executed after touchdown may expose the aircraft to the risk of overrunning the runway. Moreover, a low altitude missed approach may expose the aircraft to the risk of a tail strike. Pilots may, therefore, have to exercise their judgment in accordance with CAR-2, Para 2.4 concerning the authority of the pilot-in-command of an aircraft.*

- 10.4.10.2 Following any occurrence involving an obstruction on the runway or a runway incursion, pilots and controllers shall complete an air traffic incident report in accordance with the ICAO model air traffic incident report form.

10.4.11 **WAKE TURBULENCE AND JET BLAST HAZARDS**

10.4.11.1 **Wake Turbulence in General**

Aerodrome controllers shall, when applicable, apply the wake turbulence separation minima specified below. Whenever the responsibility for wake turbulence avoidance rests with the pilot-in-command, aerodrome controllers shall, to the extent practicable, advise aircraft of the expected occurrence of hazards caused by turbulent wake.

*Note. — Occurrence of turbulent wake hazards cannot be accurately predicted and aerodrome controllers cannot assume responsibility for the issuance of advice on such hazards at all times, nor for its accuracy.*

10.4.11.2 **Aircraft Category**

Wake turbulence separation minima shall be based on a group of aircraft types into three categories according to maximum certificated take-off mass as follows:

- a) HEAVY (H)-all aircraft types of 136000 kg or more;
- b) MEDIUM (M)-aircraft types less than 136000 kg but more than 7000 kg; and
- c) LIGHT(L)-aircraft types of 7000 kg or less.

10.4.11.3 **Non-radar wake turbulence longitudinal separation minima**

10.4.11.3.1 **Applicability**

- 10.4.11.3.1.1 The ATC unit concerned shall not be required to apply wake turbulence separation:

- a) for arriving VFR flights landing on the same runway as a preceding landing HEAVY or MEDIUM aircraft; and
- b) between arriving IFR flights executing visual approach when the aircraft has reported the preceding aircraft in sight and has been instructed to follow and maintain own separation from that aircraft.

- 10.4.11.3.1.2 The ATC unit shall, in respect of the flights specify in 10.4.11.3.1.1 a) and b), as well as when otherwise deemed necessary, issue a caution of possible wake turbulence. The pilot-in-command of the aircraft concerned shall be responsible for ensuring that the spacing from a preceding aircraft of a heavier wake turbulence category is acceptable. If it is determined that additional spacing is required, the flight crew shall inform the ATC unit accordingly, stating their requirements.

**10.4.11.3.2 Arriving aircraft**

10.4.11.3.2.1 Except as provided for in

10.4.11.3.1.1 a) and b), the following non-radar separation minima shall be applied:

10.4.11.3.2.2 Following non radar separation minima shall be applied to aircraft landing behind a HEAVY or a MEDIUM aircraft:

a) MEDIUM aircraft behind HEAVY aircraft---2 minutes

b) LIGHT aircraft behind a HEAVY or MEDIUM aircraft---3 minutes

**10.4.11.3.3 Departing aircraft**

10.4.11.3.3.1 A minimum separation of 2 minutes shall be applied between a LIGHT or MEDIUM aircraft taking off behind a HEAVY aircraft or a LIGHT aircraft taking off behind a MEDIUM aircraft when the aircraft are using:

a) the same runway;

b) parallel runways separated by less than 760 m (2500 ft);

c) crossing runways if the projected flight path of the second aircraft will cross the projected flight path of the first aircraft at the same altitude or less than 300 m (1 000 ft) below;

d) parallel runways separated by 760 m (2 500 ft) or more, if the projected flight path of the second aircraft will cross the projected flight path of the first aircraft at the same altitude or less than 300 m (1 000 ft) below.

*Note- See figures 2.1 and 2.2*

10.4.11.3.3.2 A separation minima of 3 minutes shall be applied between a LIGHT or MEDIUM aircraft when taking off behind a HEAVY aircraft or a LIGHT aircraft when taking off behind a MEDIUM aircraft from:

a) an intermediate part of the same runway; or

b) an intermediate part of a parallel runway separated by less than 760 m (2 500 ft).

*Note- See figures 2.3*

**10.4.11.3.4 Displaced landing threshold**

A separate minimum of 2 minute shall be applied between a LIGHT or MEDIUM aircraft and a HEAVY aircraft and between a LIGHT aircraft and a MEDIUM aircraft when operating on a runway with a displaced landing threshold when :

a) A departing LIGHT or MEDIUM aircraft follows a HEAVY aircraft arrival and a departing LIGHT aircraft follows a MEDIUM aircraft arrival; or

- b) An arriving LIGHT or MEDUM aircraft follows a HEAVY aircraft departure and an arriving LIGHT aircraft follows a MEDIUM aircraft departure if the projected paths are expected to cross.

#### 10.4.11.3.5 Opposite direction

A separation minimum of 2 minutes shall be applied between a LIGHT or MEDIUM aircraft and a HEAVY aircraft and between a LIGHT aircraft and a medium aircraft when the heavier aircraft is making a low or missed approach and the lighter aircraft is:

- a) Utilizing an opposite –direction runway for take –off; or

*Note- See figures 2.4*

- b) Landing on the same runway in the opposite direction.

*Note- See figures 2.5*

#### 10.4.11.3.6 Helicopters in Wake Turbulence

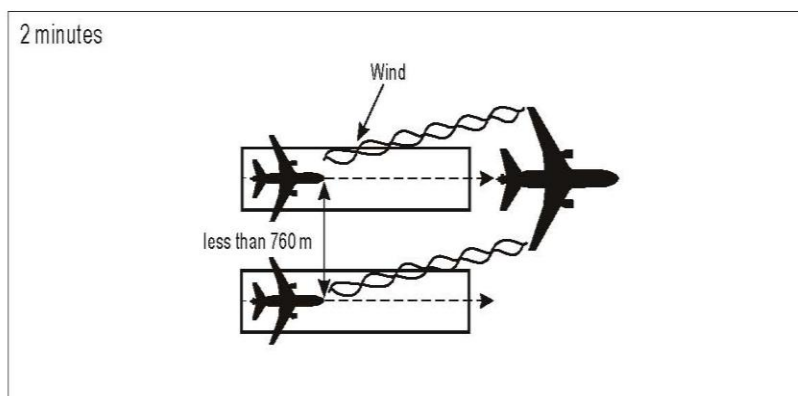
Helicopters should be kept well clear of light aircraft when hovering or while air taxiing.

*Note: Helicopters produce vortices when in flight and there is some evidence that per kilogram of gross mass, their vortices are more intense than those of fixed-wing aircraft.*

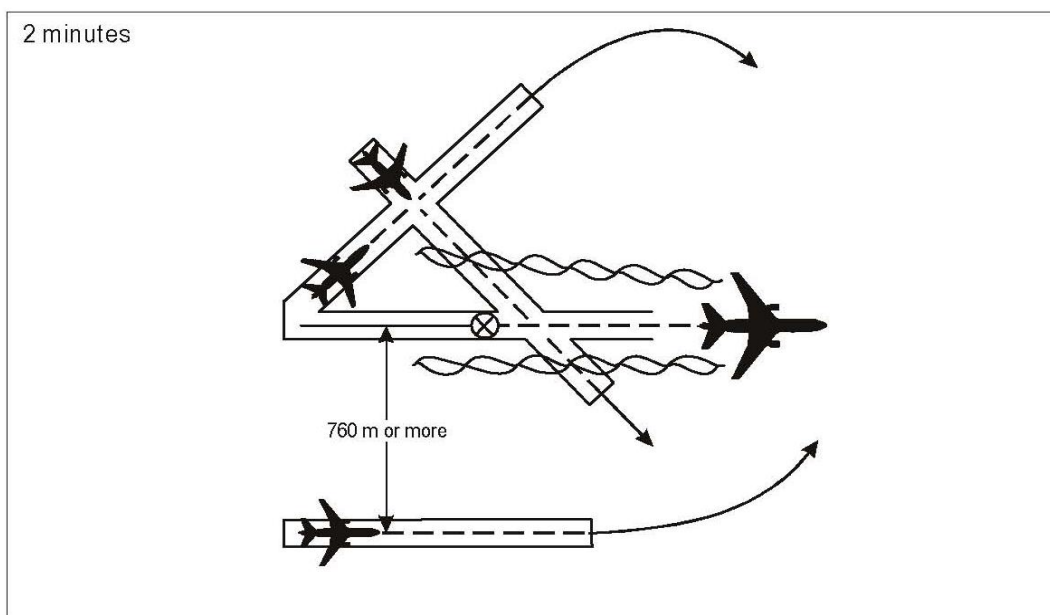
#### 10.4.11.3.7 General Caution

In issuing clearances or instructions, air traffic controllers should take into account the hazards caused by jet blast and propeller slipstream to taxiing aircraft, to aircraft taking off or landing, particularly when intersecting runways are being used, and to vehicles and personnel operating on the aerodrome.

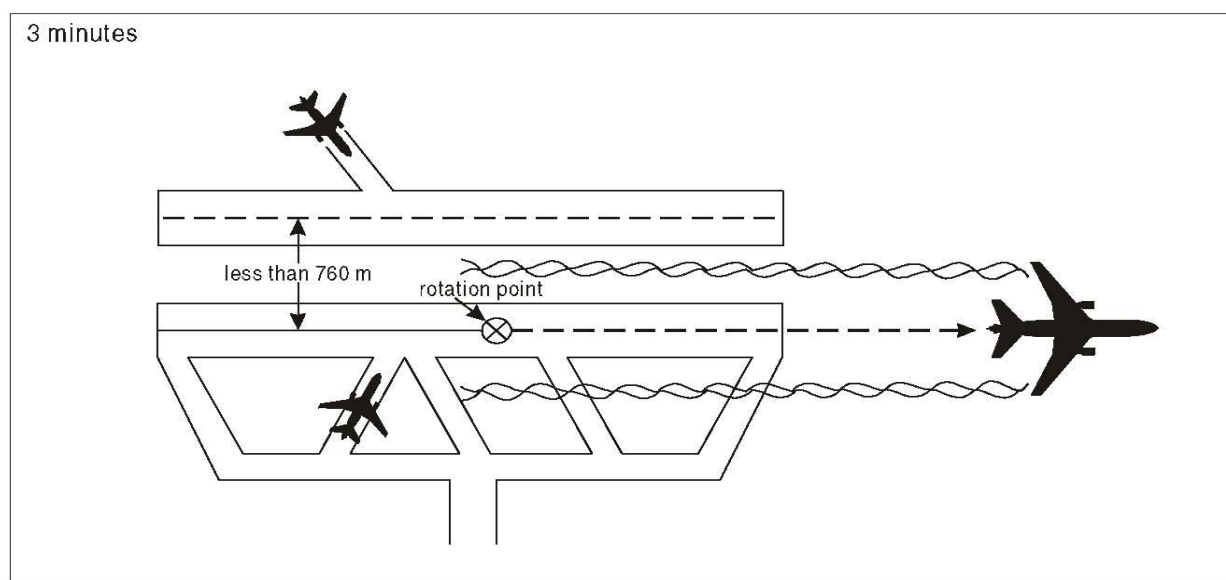
*Note. — Jet blast and propeller slipstream can produce localized wind velocities of sufficient strength to cause damage to other aircraft, vehicles and personnel operating within the affected area.*



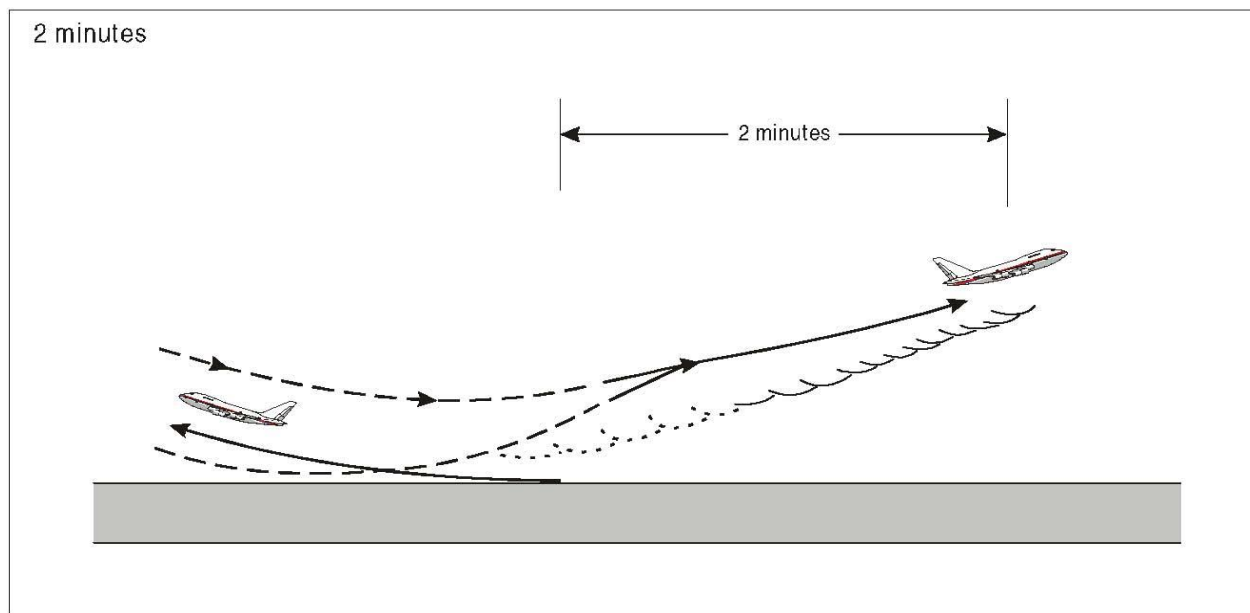
**Figure 2.1 Two-minute separations for following aircraft (see 10.4.11.3.3.1 a) and b)**



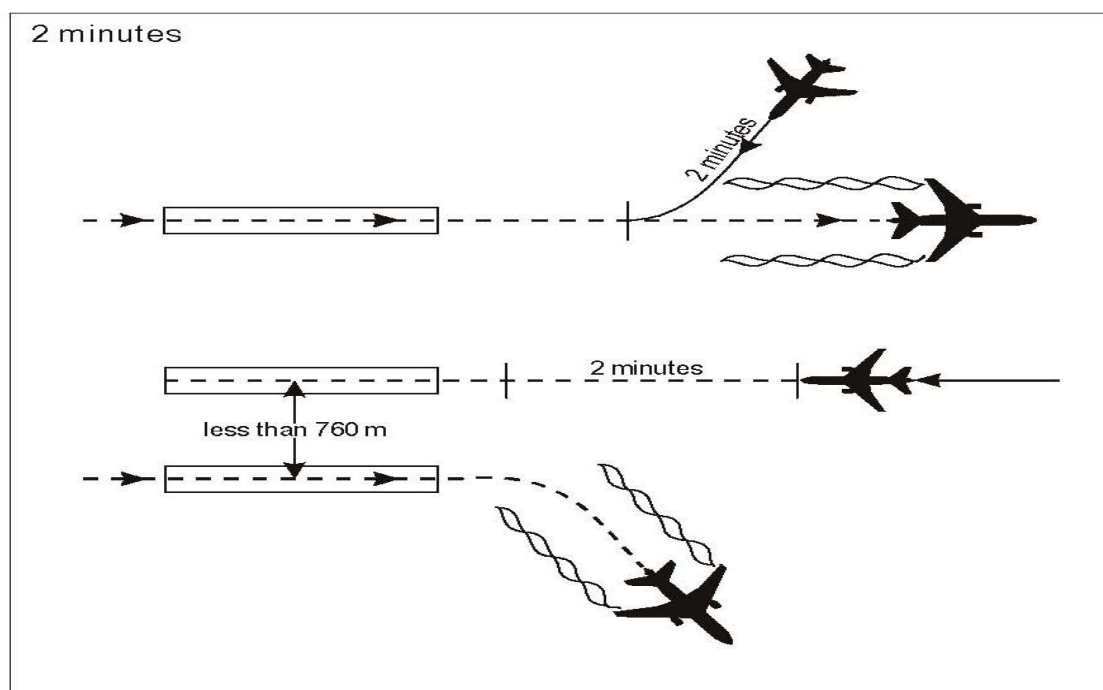
**Figure 2.2 Two-minute wake turbulence separations for crossing aircraft**  
(see 10.4.11.3.3.1 c) and d)



**Figure 2.3 Three-minute wake turbulence separations for following aircraft**  
(See 10.4.11.3.3.2)



**Figure 2.4 Two-minute wake turbulence separation for opposite direction take-off (see 10.4.11.3.5 a)**



**Figure 2.5 Two-minute wake turbulence separations for opposite direction landing (see 10.4.11.3.5 b)**



**10.4.12 ABNORMAL AIRCRAFT CONFIGURATION AND CONDITION**

10.4.12.1 Whenever an abnormal configuration or condition of an aircraft, including conditions such as landing gear not extended or only partly extended, or unusual smoke emissions from any part of the aircraft, is observed by or reported to the aerodrome controller, the aircraft concerned shall be advised without delay.

10.4.12.2 When requested by the flight crew of a departing aircraft suspecting damage to the aircraft, the departure runway used shall be inspected without delay and the flight crew advised in the most expeditious manner as to whether any aircraft debris or bird or animal remains have been found or not.

**10.4.13 ESSENTIAL INFORMATION ON AERODROME CONDITIONS**

10.4.13.1 Essential information on aerodrome conditions is information necessary to safety in the operation of aircraft, which pertains to the movement area or any facilities usually associated therewith. For example, construction work on a taxi strip not connected to the runway-in-use would not be essential information to any aircraft except one that might be taxied in the vicinity of the construction work. As another example, if all traffic must be confined to runways, that fact should be considered as essential aerodrome information to any aircraft not familiar with the aerodrome.

10.4.13.2 Essential information on aerodrome conditions shall include information relating to the following:

- a) construction or maintenance work on, or immediately adjacent to the movement area;
- b) rough or broken surfaces on a runway, a taxiway or an apron, whether marked or not;
- c) snow, slush or ice on a runway, a taxiway or an apron;
- d) water on a runway, a taxiway or an apron;
- e) snow banks or drifts adjacent to a runway, a taxiway or an apron;
- f) other temporary hazards, including parked aircraft and birds on the ground or in the air;
- g) failure or irregular operation of part or all of the aerodrome lighting system;
- h) any other pertinent information.

*Note. — Up-to-date information on the conditions on aprons may not always be available to the aerodrome control tower. The responsibility of the aerodrome control tower in relation to aprons is, with respect to the provisions of 10.4.13.1 and 10.4.13.2, limited to the transmission to aircraft of the information which is provided to it by the authority responsible for the aprons.*

- 10.4.13.3 Essential information on aerodrome conditions shall be given to every aircraft, except when it is known that the aircraft already has received all or part of the information from other sources. The information shall be given in sufficient time for the aircraft to make proper use of it, and the hazards shall be identified as distinctly as possible.

*Note.* — “Other sources” include NOTAM, ATIS broadcasts, and the display of suitable signals.

- 10.4.13.4 When a not previously notified condition pertaining to the safe use by aircraft of the maneuvering area is reported to or observed by the controller, the appropriate aerodrome authority shall be informed and operations on that part of the maneuvering area terminated until otherwise advised by the appropriate aerodrome authority.

10.4.14 **MESSAGES CONTAINING INFORMATION ON AERODROME CONDITIONS**

- 10.4.14.1 Whenever information is provided on aerodrome conditions, this shall be done in a clear and concise manner so as to facilitate appreciation by the pilot of the situation described. It shall be issued whenever deemed necessary by the controller on duty in the interest of safety, or when requested by an aircraft. If the information is provided on the initiative of the controller, it shall be transmitted to each aircraft concerned in sufficient time to enable the pilot to make proper use of the information.

- 10.4.14.2 Information that water is present on a runway shall be transmitted to each aircraft concerned, on the initiative of the controller, using the following terms:

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

WET - the surface is soaked but there is no standing water.

WATER PATCHES - patches of standing water are visible.

FLOODED - extensive standing water is visible.

10.4.15 **AUTOMATIC TERMINAL INFORMATION SERVICE**

- 10.4.15.1 Automatic Terminal Information Service (ATIS) automatically broadcasts prerecorded operational information required by aircraft before departure and landing. (At Tribhuvan International Airport these automatic broadcast are transmitted on 127.0MHz)

- 10.4.15.2 The ATIS provides essential operational information and shall be broadcast continuously. The aerodrome controller shall only advise aircraft of information which is additional to or amends that on the current ATIS broadcast.

- 10.4.15.3 Each ATIS recording shall be assigned a separate code letter pronounced phonetically. The first recording of the operational day is being assigned “ALPHA”.

10.4.15.4 The information to be recorded shall always be recorded as follows:

<b>a. Kathmandu terminal information</b>	( code letter e.g. ALPHA)
<b>b. TIME of observation</b>	(runway number) for arrivals,
<b>c. Expect runway</b>	(runway number) for departures.
<b>d. Runway wet</b>	(If applicable)
<b>e. Wind</b>	(number of degrees or directions)
<b>f. Visibility</b>	(number of knots)
<b>g. Present Weather</b>	(in meter up to and including 5000 m, this value in Kms)  (e.g. Visibility reduced to 6 km to the west in smoke haze or CAVOK or Rain showers to the south of aerodrome etc.)
<b>h. Cloud</b>	(Below 5000 ft.) if the sky is obscured, vertical visibility when available
<b>i. Temperature</b>	(degrees Celsius)
<b>j. QNH</b>	(hectopascals)
<b>k. Expect type of instrument approach.</b>	(e.g. <b>VOR/DME approach</b> )
<b>l. Operational remarks.....</b>	(e.g. Threshold runway 20 displaced by 250 meter, or, wind shear reported at 200 feet on final runway 20, or, taxiway three closed due work , or aerodrome closed to VFR operations).
<b>m. On initial contact notify receipt</b>	(code letter e.g. <b>ALPHA</b> ) <b>information</b>

10.4.15.5 Prior to making the ATIS recording, the aerodrome controller shall first complete an ATIS form. This form shall show the information broadcast including the code letter and the date time group of the recording. The form shall be retained with the day's operational records. The controller making the broadcast shall display the ATIS form at the console in front of coordinator position.

10.4.15.6 ATIS information shall be revised and a new code letter assigned whenever any of the following occurs and is expected to remain that way for at least 15 minutes. The current values of metrological information vary by the following amounts:

- |                    |               |
|--------------------|---------------|
| a. Wind direction: | 10 degrees    |
| Wind speed:        | 5 knots       |
| b. QNH:            | 1 hectopascal |
| c. Temperature     | 1 degree      |

## d. Visibility:

- i. Between 5 Km and 10 Km ----- 1 Km.
- ii. Between 2000 meters and 5 Km ----- 500 meters.
- iii. Between 800 meters and 2000 meters---- 100 meters.

e. The nominated instrument approach is changed

f. The nominated runway for landing or takeoff is changed.

g. Changes in the operational status of the aerodrome or its facilities.

- 10.4.15.7 All ATIS broadcast shall include data derived from weather and other observations made by the aerodrome controller.

*Note: Data to be included on ATIS broadcasts shall not be taken directly from the METAR without visual conformation by the aerodrome controller.*

## 10.4.16 CONTROL OF AERODROME TRAFFIC

### 10.4.16.1 General

As the view from the flight deck of an aircraft is normally restricted, the controller shall ensure that instructions and information which require the flight crew to employ visual detection, recognition and observation are phrased in a clear, concise and complete manner.

### 10.4.16.2 Designated positions of aircraft in the aerodrome traffic and taxi circuits

The following positions of aircraft in the traffic and taxi circuits are the positions where the aircraft normally receive aerodrome control tower clearances. The aircraft should be watched closely as they approach these positions so that proper clearances may be issued without delay. Where practicable, all clearances should be issued without waiting for the aircraft to initiate the call.

Position1. Aircraft initiates call to taxi for departing flight. Runway-in-use information and taxi clearances are given.

Position2. If there is conflicting traffic, the departing aircraft will be held at this position. Engine run-up will, when required, normally be performed here.

Position3. Take-off clearance is issued here, if not practicable at position 2.

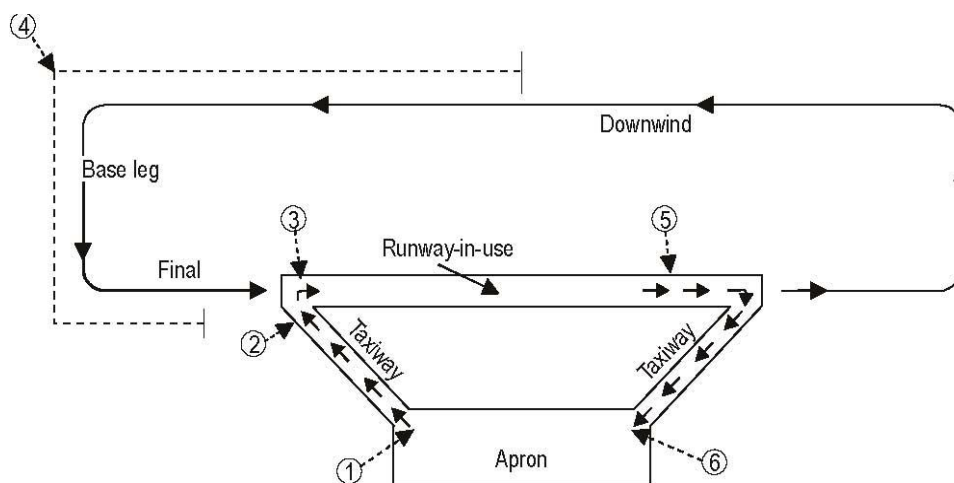
Position4. Clearance to land is issued here as practicable.

Position5. Clearance to taxi to apron is issued here.

Position6. Parking information issued here, if necessary.

*Note1. — Arriving aircraft executing an instrument approach procedure will normally enter the traffic circuit on final except when visual manoeuvring to the landing runway is required.*

*Note2. — See Figure 2-6.*



**Figure 2-6. Designated positions of aircraft from an aerodrome control tower viewpoint (see 10.4.16.2).**

#### 10.4.16.3 Traffic on the Manoeuvring Area

##### 10.4.16.3.1 Control of Taxiing Aircraft

###### 10.4.16.3.1.1 Taxi Clearance

10.4.16.3.1.1.1 Prior to issuing a taxi clearance, the controller shall determine where the aircraft concerned is parked. Taxi clearances shall contain concise instructions and adequate information so as to assist the flight crew to follow the correct taxi routes, to avoid collision with other aircraft or objects and to minimize the potential for the aircraft inadvertently entering an active runway.

10.4.16.3.1.1.2 When a taxi clearance contains a taxi limit beyond a runway, it shall contain an explicit clearance to cross or an instruction to hold short of that runway.

10.4.16.3.1.1.3 Standard taxi routes should be identified by appropriate designators and should be used in taxi clearances.

10.4.16.3.1.1.4 Where standard taxi routes have not been published, a taxi route should, whenever possible, be described by use of taxiway and runway designators. Other relevant information, such as an aircraft to follow or give way to, shall also be provided to a taxiing aircraft.

###### 10.4.16.3.1.2 Taxing on a Runway-in-use

10.4.16.3.1.2.1 For the purpose of expediting air traffic, aircraft may be permitted to taxi on the runway-in-use, provided no delay or risk to other aircraft will result. Where control of taxiing aircraft is provided by a ground controller and the control of runway operations by an aerodrome controller, the use of a runway by taxiing aircraft shall be coordinated with and approved by the aerodrome controller. Communication with the aircraft concerned should be transferred from the ground controller to the aerodrome controller prior to the aircraft entering the runway.

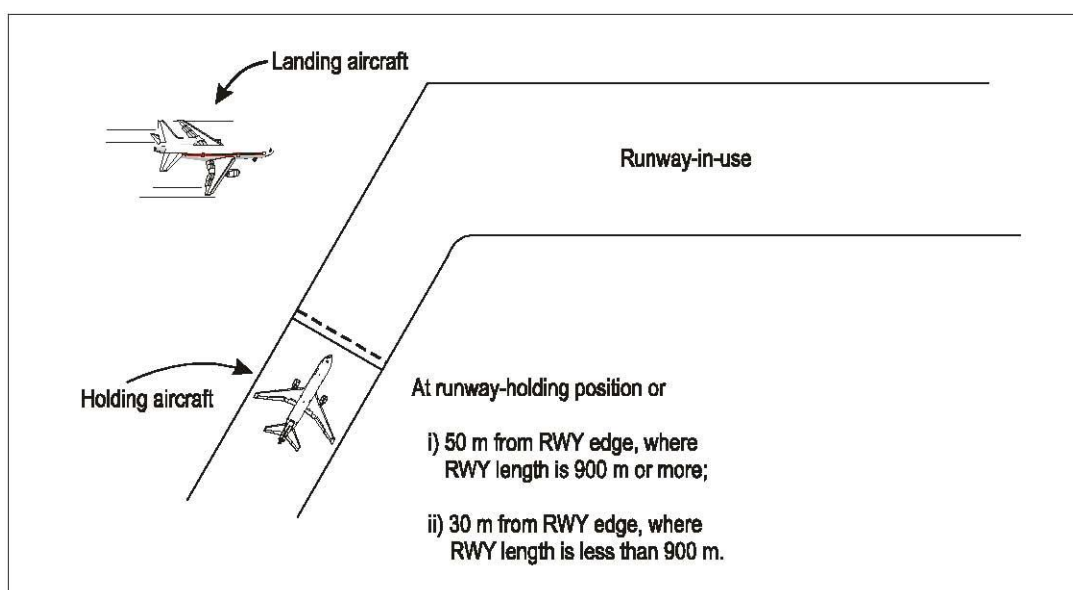
10.4.16.3.1.2.2 If the control tower is unable to determine, either visually or by radar, that a vacating or crossing aircraft has cleared the runway, the aircraft shall be requested to report when it has vacated the runway. The report shall be made when the entire aircraft is beyond the relevant runway-holding position.

#### 10.4.16.3.1.3 Use of Runway-Holding Positions

10.4.16.3.1.3.1 Except as prescribed in 10.4.16.3.1.3.2 or by the appropriate ATS authority, aircraft shall not be held closer to a runway-in-use than at a runway-holding position.

10.4.16.3.1.3.2 Aircraft shall not be permitted to line up and hold on the approach end of a runway-in-use whenever another aircraft is affecting a landing, until the landing aircraft has passed the point of intended holding.

*Note.* — See Figure 2-7.



**Figure 2-7 Method of holding aircraft (see 10.4.16.3.1.3.2)**

#### 10.4.16.3.1.4 Helicopter Taxing Operations

10.4.16.3.1.4.1 When necessary for a wheeled helicopter or vertical take-off and landing (VTOL) aircraft to taxi on the surface, the following provisions are applicable.

*Note.* — Ground taxiing uses less fuel than air-taxiing and minimizes air turbulence. However, under certain conditions, such as rough, soft or uneven terrain, it may become necessary to air-taxi for safety considerations. Helicopters with articulating rotors (usually designs with three or more main rotor blades) are subject to “ground resonance” and may, on rare occasions, suddenly lift off the ground to avoid severe damage or destruction.

- 10.4.16.3.1.4.2 When it is requested or necessary for a helicopter to proceed at a slow speed above the surface, normally below 37 km/h (20 kts) and in ground effect, air taxiing may be authorized.

*Note. — Air-taxiing consumes fuel at a high burn rate, and helicopter downwash turbulence (produced in ground effect) increases significantly with larger and heavier helicopters.*

- 10.4.16.3.1.4.3 Instructions which require small aircraft or helicopters to taxi in close proximity to taxiing helicopters should be avoided and consideration should be given to the effect of turbulence from taxiing helicopters on arriving and departing light aircraft.

- 10.4.16.3.1.4.4 A frequency change should not be issued to single-pilot helicopters hovering or air-taxiing. Whenever possible, control instructions from the next ATS unit should be relayed as necessary until the pilot is able to change frequency.

*Note. — Most light helicopters are flown by one pilot and require the constant use of both hands and feet to maintain control during low-altitude/low-level flight. Although flight control friction devices assist the pilot, changing frequency near the ground could result in inadvertent ground contact and consequent loss of control.*

#### **10.4.16.3.1.5 Control of Other than Aircraft Traffic**

##### **10.4.16.3.1.5.1 Entry to the Manoeuvring Area**

The movement of pedestrians or vehicles on the maneuvering area shall be subject to authorization by the aerodrome control tower. Persons, including drivers of all vehicles, shall be required to obtain authorization from the aerodrome control tower before entry to the maneuvering area. Notwithstanding such an authorization, entry to a runway or runway strip or change in the operation authorized shall be subject to a further specific authorization by the aerodrome control tower.

##### **10.4.16.3.1.6 Priority on the Manoeuvring Area**

- 10.4.16.3.1.6.1 All vehicles and pedestrians shall give way to aircraft which are landing, taxiing or taking off, except that emergency vehicles proceeding to the assistance of an aircraft in distress shall be afforded priority over all other surface movement traffic. In the latter case, all movement of surface traffic should, to the extent practicable, be halted until it is determined that the progress of the emergency vehicles will not be impeded.

- 10.4.16.3.1.6.2 When an aircraft is landing or taking off, vehicles shall not be permitted to hold closer to the runway-in-use than:

- a) at a taxiway/runway intersection — at a runway holding position; and
- b) at a location other than a taxiway/runway intersection — at a distance equal to the separation distance of the runway-holding position.

**10.4.16.3.1.6.3 Communication Requirements and Visual Signals**

10.4.16.3.1.6.3.1 At controlled aerodromes all vehicles employed on the maneuvering area shall be capable of maintaining two-way radio communication with the aerodrome control tower, except when the vehicle is only occasionally used on the maneuvering area and is:

- a) accompanied by a vehicle with the required communications capability, or
- b) employed in accordance with a pre-arranged plan established with the aerodrome control tower.

10.4.16.3.1.6.3.2 When communications by a system of visual signals is deemed to be adequate, or in the case of radio communication failure, the signals given hereunder shall have the meaning indicated therein:

<i>Light signal from</i>	
<i>aerodrome control</i>	<i>Meaning</i>
Green flashes	Permission to cross landing area or to move onto taxiway
Steady red	Stop
Red flashes	Move off the landing area or taxiway and watch out for aircraft
White flashes	Vacate maneuvering area in accordance with local instructions

10.4.16.3.1.6.3.3 In emergency conditions or if the signals in 10.4.16.3.1.6.3.2 are not observed, the signal given here under shall be used for runways or taxiways equipped with a lighting system and shall have the meaning indicated therein.

<i>Light signal</i>	<i>Meaning</i>
Flashing runway or taxiway lights	Vacate the runway and observe the tower for light signal

10.4.16.3.1.6.3.4 When employed in accordance with a plan pre-arranged with the aerodrome control tower, constructional and maintenance personnel should not normally be required to be capable of maintaining two-way radio communication with the aerodrome control tower.

**10.4.17 PRIORITY FOR LANDING**

10.4.17.1 If an aircraft enters an aerodrome traffic circuit without proper authorization, it shall be permitted to land if its actions indicate that it so desires. If circumstances warrant, aircraft which are in contact with



the controller may be instructed to give way so as to remove the hazard introduced by such unauthorized operation as soon as possible. In no case shall permission to land be withheld indefinitely.

10.4.17.2 In cases of emergency it may be necessary, in the interests of safety, for an aircraft to enter a traffic circuit and affect a landing without proper authorization. Controllers should recognize the possibilities of emergency action and render all assistance possible.

10.4.17.3 Priority shall be given to:

- a) an aircraft which anticipates being compelled to land because of factors affecting the safe operation of the aircraft (engine failure, shortage of fuel, etc.);
- b) hospital aircraft or aircraft carrying any sick or seriously injured persons requiring urgent medical attention;
- c) aircraft engaged in search and rescue operations; and
- d) other aircraft as may be determined by the appropriate authority.

10.4.18 **ORDER OF PRIORITY FOR ARRIVING AND DEPARTING AIRCRAFT**

An aircraft landing or in the final stages of an approach to land shall normally have priority over an aircraft intending to depart from the same or an intersecting runway.

10.4.19 **CONTROL OF DEPARTING AIRCRAFT**

10.4.19.1 **Departure sequence**

10.4.19.1.1 Departures shall normally be cleared in the order in which they are ready for take-off, except that deviations may be made from this order of priority to facilitate the maximum number of departures with the least average delay. Factors which should be considered in relation to the departure sequence include, inter alia:

- a) types of aircraft and their relative performance;
- b) routes to be followed after take-off;
- c) any specified minimum departure interval between take-offs;
- d) need to apply wake turbulence separation minima;
- e) aircraft which should be afforded priority; and
- f) aircraft subject to slot requirements.

10.4.19.1.2 Departing aircraft may be expedited by suggesting a take-off direction which is not into the wind. It is the responsibility of the pilot-in-command of an aircraft to make a take-off or wait for take-off in a preferred direction.

**10.4.19.2 General Procedures For Departing Aircraft**

10.4.19.2.1 Clearances for departing aircraft shall specify, when necessary for the separation of aircraft, direction of takeoff and turn after take-off; heading or track to be made good

before taking up the cleared departure track; level to maintain before continuing climb to assigned level; time, point and/or rate at which a level change shall be made; and any other necessary manoeuvre consistent with safe operation of the aircraft.

10.4.19.2.2 At aerodromes where standard instrument departures (SIDs) have been established, departing aircraft should normally be cleared to follow the appropriate SID.

**10.4.19.3 Standard clearances for Departing Aircraft****10.4.19.3.1 Clearance**

Issuance of the standard clearances and the transfer of control of departing aircraft between the ATC units shall be according to the standardized procedures as established in this manual and AIP.

**10.4.19.3.2 Coordination**

10.4.19.3.2.1 Where standard clearances for departing aircraft have been agreed to between the units concerned, the aerodrome control tower will normally issue the appropriate standard clearance without prior coordination with or approval from the approach control unit or ACC.

10.4.19.3.2.2 Prior coordination of clearances should be required only in the event that a variation to the standard

clearance or the standardized transfer of control procedures is necessary or desirable for operational reasons.

10.4.19.3.2.3 Provision shall be made to ensure that the approach control unit at all times is kept informed of the

sequence in which aircraft will depart as well as the runway to be used.

10.4.19.3.2.4 Provision shall be made to display the designators of assigned SIDs to the aerodrome control tower, the approach control unit and/or the ACC as applicable.

**10.4.19.3.3 Contents of standard clearances**

Standard clearances for departing aircraft shall contain the following items:

- a) aircraft identification;
- b) clearance limit, normally destination aerodrome;
- c) designator of the assigned SID, if applicable;

- d) initial level, except when this element is included in the SID description;
- e) allocated SSR code;
- f) any other necessary instructions or information not contained in the SID description, e.g. instructions relating to change of frequency and the time of expiry of the clearance.

10.4.19.3.4 **Read-back of clearances and safety-related information**

10.4.19.3.4.1 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.

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

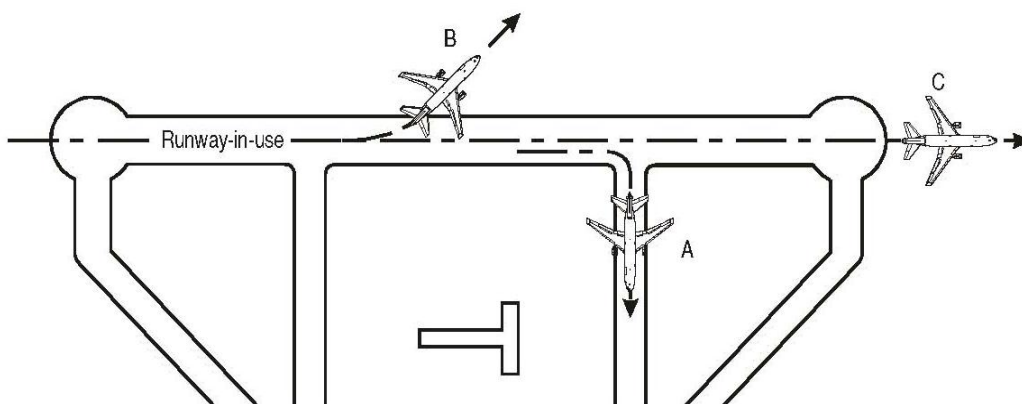
10.4.19.3.4.3 The controller shall listen to the read-back to ascertain that the clearance or instruction has been correctly acknowledged by the flight crew and shall take immediate action to correct any discrepancies revealed by the read back.

10.4.19.4 **Separation of Departing Aircraft**

A departing aircraft will not normally be permitted to commence take-off until the preceding departing aircraft has crossed the end of the runway-in-use or has started a turn or until all preceding landing aircraft are clear of the runway-in-use.

*Note 1. — See Figure 2-8.*

**Position limits to be reached by a landed aircraft (A) or a departing aircraft (B or C) before an arriving aircraft may be cleared to cross the threshold of the runway-in-use or a departing aircraft may be cleared to take off, unless otherwise prescribed by the appropriate ATS authority.**



*Figure 2-8 Separation between departing and arriving aircraft (See 10.4.19.4 & 10.4.20.3.2.4.b)*

#### 10.4.19.5 **Engine starting procedures**

##### 10.4.19.5.1 **Clearance delivery**

ADC shall deliver standard ATC clearance to all departing aircraft prior to issue taxi clearance.

10.4.19.5.2 In order to maintain an orderly flow of traffic, it is necessary that pilots of departing aircraft request a startup clearance. When requesting a startup clearance, a pilot will indicate the runway he/she requires to use if limited to a particular runway and name of destination airport.

10.4.19.5.3 If it is anticipated that traffic conditions may cause a delay before issuance of a taxi clearances of more than 10 minutes, pilots should be issued with a recommended startup time.

#### 10.4.19.6 **Taxi Clearance and Provision of Information**

##### 10.4.19.6.1 **Clearance**

Taxi clearance shall be issued for the purpose of

- providing the pilot with guidance to the appropriate runway.
- providing routes which will involve the minimum of conflict with other traffic.
- protecting other aircraft from the jet blast of heavy jets, helicopter downwash.

**10.4.19.6.2 Taxi information**

10.4.19.6.2.1 Prior to taxi for takeoff aircraft shall be advised of the elements in the order listed in Para 10.4.19.6.1, with the exception of such elements which it is known that the aircraft has already received.

10.4.19.6.2.2 At the discretion of the aerodrome controller, pilots in command of aircraft requesting permission to run up on the runway in use may be permitted. However when a suitable alternate is available, aircraft shall normally be required to use this area, and shall only be permitted to run up on the runway if it is certain that this will not delay arriving or other departing aircraft.

10.4.19.6.2.3 An aircraft operating on the ground shall be warned of jet blast of heavy jets.

**10.4.19.6.3 Take off information**

10.4.19.6.3.1 The aerodrome controller shall in addition to Para 10.4.19.6.1 provide to each aircraft under his/her control, the following information for take-off purposes as required:

- a. The mean and maximum crosswind components;
  - i. when the mean component equals or exceeds 8 knots for single-engine aircraft and 12 knots for multi-engine aircraft; or
  - ii. when requested by the pilot.
- b. The cross wind component may be interpolated by use of the following table:

10.4.19.6.3.2 Cross wind components should be calculated as shown in below:

<b>Divergence from Take-off/Landing Direction</b>	<b>Fraction of Wind Speed</b>
15 degrees	3/10
30 degrees	5/10
45 degrees	7/10
60 degrees	9/10
75 degrees	1

**10.4.19.6.4 Taxiing Aircraft**

10.4.19.6.4.1 Controllers shall not issue conditional taxi instructions that are dependent upon the movement of an arriving aircraft on or approaching the runway or a departing aircraft established on a take-off roll, e.g., do not say “cleared to line up and hold behind the landing traffic or line up and hold after departing traffic

**10.4.19.6.5 Intersection Departure**

10.4.19.6.5.1 An intersection departure is a departure from a point of intersection of a runway or taxiway with the active runway.

10.4.19.6.5.2 A pilot wishing to use less than the available full length of the runway shall nominate his/her intentions whilst taxiing. Intersection departure may be initiated by the controller to expedite traffic keeping in mind the type of aircraft, runway length available and wind condition etc. Intersection departure may be authorized for all type of aircraft upon request by the pilot in command. In any intersection departure, the controller shall advise the pilot of the remaining length available before issuing take-off clearance except the regular flight or crew operating at that aerodrome. The responsibility for accepting an intersection departure remains with the pilot in command.

10.4.19.6.5.3 Phraseology shall be as follows:

(Aircraft identification) RUNWAY (runway number) INTERSECTION DEPARTURE FROM TAXIWAY INTERSECTION (taxiway number) AVAILABLE or APPROVED, REMAINING LENGTH (feet) AVAILABLE.

10.4.19.6.5.4 As an aircraft is not authorized to make backtrack on the runway without the clearance from an Air Traffic Controller, whenever an aircraft need to backtrack on the runway for lineup, that shall be clearly spelled out by the controller in the lineup clearance to avoid the confusion about the position for lineup.

10.4.19.6.5.5 Phraseology shall be as follows:

(Aircraft identification) ENTER THE RUNWAY, BACKTRACK, LINEUP RUNWAY (runway number) REPORT WHEN READY.

**10.4.19.6.6 Take-off clearance**

10.4.19.6.6.1 An aircraft shall be cleared to enter the runway and take-off in accordance with the priorities and maintaining the separation specified in this manual.

10.4.19.6.6.2 The take-off clearance shall be issued when the aircraft is ready for take-off and at or approaching the departure runway and the traffic situation permits. To reduce the potential for misunderstanding, the take-off clearance shall include the designator of the departure runway.

10.4.19.6.6.3 In the interest of expediting traffic, a clearance for immediate take-off may be issued to an aircraft before it enters the runway. On acceptance of such clearance the aircraft shall taxi out to the runway and take off in one continuous movement.

10.4.19.6.6.4 Except when cleared via a standard instrument departure, any requirement after departure shall be communicated to the pilot before takeoff.

- 10.4.19.6.6.5 When a taxiing heavy jet is followed by an aircraft of lesser weight the aerodrome controller will not issue a line up immediate departure clearance that will require the heavy jet to use more than normal taxiing power to enter the runway.
- 10.4.19.6.6.6 Before clearing an aircraft for take-off, and immediately before it commences to take-off the aerodrome controller shall make a visual check from the control tower to determine, as far as practicable, whether obstructions exist on the take-off area (runway/strip). If there is any obstruction in respect of which continued operation has not been authorized or is not possible the controller shall withhold or cancel the clearance until the obstruction is removed.
- 10.4.19.6.6.7 When departure separation is based on the position of a preceding landing aircraft and conditions preclude the aerodrome controller from clearly observing that the landing aircraft vacated and is taxiing away from the runway, confirmation of this manoeuvre shall be obtained from the pilot in command prior to issuance of the take-off clearance.
- 10.4.19.6.6.8 Operation shall normally be confined to the runway most suitable for the majority of the current traffic.
- 10.4.19.6.6.9 The word "TAKE-OFF" shall be used in clearing an aircraft for take-off or canceling a take-off clearance; they shall be used as the last word of the take-off clearance except that an instruction specifying a turn or circuit direction to be made after departure shall be placed after the words "TAKE-OFF".
- 10.4.19.6.6.10 Before Authorizing a Take-off, the aerodrome controller shall, by his/her own visual observations, be reasonably satisfied that the weather conditions in the sector of airspace enclosing the normal path of a civil aircraft's take-off and initial climb are not below the minima applicable to the particular flight. Assessment of weather conditions for the purpose of authorizing take-off shall be the responsibility of the aerodrome controller and should be made immediately prior to the aircraft departure.
- 10.4.19.6.6.11 An aircraft shall not be cleared for take-off when weather conditions do not meet the requirement or when in the opinion of the aerodrome controller, the cumulative effects of small amounts of cloud at various levels below the minimum ceiling constitute a hazard in regard to obstructions in the take-off and initial climb area.
- 10.4.19.6.6.12 An aircraft shall also not be cleared for take-off when hazardous weather conditions are expected to exist. Such conditions might be a violent wind change, a heavy rain storm, or known severe convective turbulence moving over the runway during take-off or affecting the flight path after airborne.

**10.4.20 CONTROL OF ARRIVING AIRCRAFT****10.4.20.1 Determining of Aircraft Position**

10.4.20.1.1 As necessary, aircraft shall be requested to report their positions by reference to navigation aids, by a distance and direction (e.g. 5 miles NE) from the aerodrome, or by reference to one of the legs of a traffic circuit. Locally known place names shall not be used unless they are readily discernible on the appropriate aeronautical chart. Where established, VFR fix points may be used for position reporting purposes.

10.4.20.1.2 In addition to a radio watch, the aerodrome controller shall maintain, as far as practicable, a continuous watch with the unaided eye and, if necessary with binoculars, for the purpose of determining the position and ensuring the safety of aircraft. In particular, attention shall be paid to an aircraft suffering radio failure.

10.4.20.1.3 A controller's visual determination of the relative distance of aircraft close to each other can be seriously in error, even to the extent of reversing the position of the two aircraft. This is particularly so when two aircraft of different sizes are being considered, and at night.

10.4.20.1.4 In providing visual separation, controllers shall rely primarily on separation in azimuth, and not by distance or height. Visual separation by judgment of relative distance or height shall be used only when the margins are so wide that there is no possibility of the aircraft being close to each other. Corroborative evidence from the pilot of one aircraft of the relative position of another aircraft shall be obtained whenever possible before the application of visual separation.

10.4.20.1.5 Visual determination of position is not complete until aircraft identity has been established to the extent required for the adequate provision of traffic information or visual separation. Positive identifying action shall be taken by the controller before providing visual separation between arriving aircraft. The action is as follows:

10.4.20.1.5.1 By Day:

- a. Identification by type, or distinguished markings if the same type; or
- b. Change the heading of one the aircraft concerned.

10.4.20.1.5.2 By Night:

- a. Require one aircraft momentarily to extinguish navigation light or select them on "Steady" alternatively, momentarily to extinguish its hazard. beacon (if fitted) or turn on landing light, or
- b. Change the heading of one of the aircraft concerned.

10.4.20.1.6 The controller may instruct a following aircraft to sight and follow a preceding aircraft. In exercising such control, it is essential that the



pilot of the following aircraft correctly identifies the aircraft he/she is to follow. To assist pilot in proper identification the controller shall;

- a. Specify the type if the aircraft to be followed and if an unfamiliar type a brief description of the aircraft;
- b. Provide accurate position information on the preceding aircraft using direction and distance or position in the circuit; geographical features should only be used if depicted on relevant charts or the feature is regularly used in the control of locally operating aircraft; and
- c. Advise the pilot of the following aircraft of his number in the landing sequence.

10.4.20.1.7 In the case of formation flights, the controller shall advise only the leader of the formation, and he individual aircraft will be responsible for landing.

10.4.20.1.8 Before issuing any control clearance requiring that the pilot of one aircraft keep another in sight, the aerodrome controller shall bear in mind the following limitations to the pilot's ability to do this:

- a. the field view from the cockpit;
- b. the contrast formed by an aircraft with its background;
- c. glare from the sun;
- d. restriction on visibility which may not be currently apparent to the pilot e.g. loss of forward visibility following descent into a haze layer.

10.4.20.1.9 The aerodrome controller shall issue an alternative clearance if there is any doubt about the ability of the pilot to see the position of the other aircraft for the duration of the originally proposed clearance.

#### 10.4.20.2 **Regulation of Circuit Traffic**

10.4.20.2.1 Arriving aircraft will enter the traffic circuit in a landing sequence established by aerodrome controller.

10.4.20.2.2 For each type of aircraft engaged in airline operation, there is a normal circuit pattern which is largely dictated by the operating characteristics of the particular type. Thus, in spacing arriving aircraft during a landing sequence, controllers should pay due regard to these different circuit patterns. Nevertheless, to prevent cumulative delays to following aircraft, a pilot may be requested to make a short approach.

10.4.20.2.3 If an aircraft suffering radio failure enters the traffic circuits in such a manner that the aerodrome controller is doubtful whether sufficient spacing from another aircraft can be maintained, he/she shall request the radio equipped aircraft to give way.

**10.4.20.3 Landing Information and Landing Clearances****10.4.20.3.1 Landing information**

10.4.20.3.1.1 Aerodrome controller shall provide each aircraft under his/her control, the following information as applicable for landing purposes with the exception of such elements, which it is known, the aircraft have already received:

- a. runway;
- b. wind velocity, QNH and temperature;
- c. known significant weather information;
- d. aerodrome surface conditions and the presence of birds;
- e. the mean and maximum crosswind components:
  - i. when the mean component equals or exceeds 8 knots for single-engine aircraft or 12 knots for multi-engine aircraft; or
  - ii. when requested by the pilot;
- f. any discernible downwind component;
- g. possibility of wake turbulence.

10.4.20.3.1.2 Calculation of cross-wind component.

*See table (10.4.19.6.3.2)*

10.4.20.3.1.3 Aircraft flying at low speed, especially near the point of take-off and landing, create turbulence in their wake. The severity of the turbulence created is proportional to the weight of the aircraft, and the degree to which a following aircraft will be affected is proportional to the difference in weights involved. This turbulence may have very serious effects upon succeeding aircraft, particularly those of significantly lesser weight. Whenever practicable, the aerodrome controller shall advise aircraft of the expected occurrence of hazards caused by turbulence wake, by use of the phrase "CAUTION- WAKE TURBULANCE" however, as the occurrence and persistence of turbulent wake hazards cannot be predicated accurately it may not be possible to issue advice on such hazards at all times. Nevertheless, the prescribed separation standards for wake turbulence avoidance must always be applied as per this manual..

**10.4.20.3.2 Landing Clearance**

10.4.20.3.2.1 Except as provided in para 10.4.20.3.2.4 clearance to land shall be issued to a pilot when the separation required has been established but not before either of the following conditions:

- a. The aircraft has commenced final approach of straight- in instrument approach, or

- b. The aircraft has been sighted by the aerodrome controller, either approaching the end of the downwind leg, on base leg, or on the final leg of the circuit pattern, alternatively; if a circling approach has been made, in an approximately equivalent position to the foregoing.
- 10.4.20.3.2.2 Before clearing an aircraft to land, and before the aircraft is committed to a landing, the aerodrome controller shall make a visual check from the control tower to determine, as far as practicable whether obstructions exist on the landing area (runway/strip). If there is any obstruction in respect of which continued operation has not been authorized the controller shall withhold or cancel the clearance until the obstructions is removed.
- 10.4.20.3.2.3 Because of sink rate problems, turbo-jet aircraft should be in receipt of a clearance to land prior to reaching a distance of one half mile from beginning of runway-in-use as a minimum.
- 10.4.20.3.2.3.1 An aircraft shall also not be cleared to land when hazardous weather conditions are expected to exist.
- 10.4.20.3.2.3.2 Aerodrome controller shall advice aircraft of any discernible downwind. This shall be done at a time, which permits the pilot in command to nominate and land on another runway.
- 10.4.20.3.2.3.3 An aircraft cleared for an instrument approach circle to a runway, if unable to land due weather or some other reasons, and intends to divert elsewhere, shall be instructed to join missed approach path of the instrument approach at any point depending upon the traffic situation, position and performance of the aircraft.
- 10.4.20.3.2.4 When the landing area is occupied by another aircraft, or is obstructed, the pilot of the approaching aircraft shall be instructed as follows:
- a. if it is assessed that the landing area will become available but a landing clearance cannot be issued immediately -CONTINUE APPROACH (follow later with the appropriate clearance) ; or
  - b. a landing aircraft will not be permitted to cross the beginning of the RWY on its final approach until the preceding departing aircraft crosses the end of the runway-in-use or has started a turn or until a preceding landing aircraft is clear of the runway in use; or
  - c. an aircraft may be cleared to land when there is reasonable assurance that the separation in 10.4.20.3.2.4.b will exist. To reduce the potential for misunderstanding, the landing clearance shall include the designator of landing runway.
  - d. if it is apparent that the landing area will not be available GO ROUND or, if in a position to do so, -ORBIT. (Instructions to commence a second approach or hold should follow).

- 10.4.20.3.2.5 When separation is based on the position of a preceding landing aircraft and conditions preclude the Aerodrome controller from clearly observing that the landing aircraft has vacated and is taxiing away from the runway, conformation of this manoeuvre shall be obtained from the pilot in command prior to issuance of the clearance to land.
- 10.4.20.3.2.6 Any special clearance or information relating to vacating off the runway after landing should, if practicable, be given with the landing clearance. The phraseology should be followed by “if feasible”.
- 10.4.20.4 **Taxing After Landing**
- 10.4.20.4.1 Taxi clearance and provision of information
- 10.4.20.4.1.1 Taxi clearance shall be issued governing entry to and movement on the taxiway for the purpose of:
- applying priorities as laid down in this manual;
  - providing the pilot with guidance to the apron area;
  - providing routes which would involve the minimum of conflict with other traffic;
  - protecting other aircraft from the jet blast of heavy jets and downwash of helicopters;
- 10.4.20.4.1.2 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 designated isolated parking position. Where such an isolated parking position has not been assigned, the aircraft shall be cleared to a position in an area or areas advised by the Airport General Manager or in his absence by Terminal Duty Officer. The taxi clearance shall specify the taxi route to be followed to the parking position. This route shall be selected with a view to minimizing any security risks to the public, other aircraft and installations at the aerodrome.
- 10.4.20.4.1.3 A pilot-in-command who is unfamiliar with the aerodrome may request “GUIDANCE TO TERMINAL”. In providing this guidance, the controllers shall issue specific instructions relating to taxiing of the aircraft. The taxi route to be followed shall be progressively described, each section being specified in sufficient time for the pilot to recognize turning points, etc, and to take action. Taxiway letters, numbers or local designator, e.g. “Southern taxiway” should not be used.
- 10.4.20.4.1.4 Taxi clearances shall not relate to movement on the apron areas, nevertheless, available essential information referring to her aircraft entering or leaving the same apron area shall be given to an aircraft approaching the apron area.

- 10.4.20.4.1.5 An aircraft operating on the ground shall be warned of jet blast and helicopter downwash as appropriate.
- 10.4.20.4.1.6 Clearance that require the use of greater than normal taxing power by a jet, when other aircraft may be affected by the jet aircraft blast, shall be avoided. Every endeavor shall be made to avoid stopping a jet while it is taxing.
- 10.4.20.5 **Landing and roll-out manoeuvres**
- 10.4.20.5.1 When necessary or desirable in order to expedite traffic, a landing aircraft may be requested to:
- a) hold short of an intersecting runway after landing;
  - b) land beyond the touchdown zone of the runway;
  - c) vacate the runway at a specified exit taxiway;
  - d) expedite vacating the runway.
- 10.4.20.5.2 In requesting a landing aircraft to perform a specific landing and/or roll-out manoeuvre, the type of aircraft, runway length, location of exit taxiways, reported braking action on runway and taxiway, and prevailing meteorological conditions shall be considered. A HEAVY aircraft shall not be requested to land beyond the touchdown zone of a runway.
- 10.4.20.5.3 If the pilot-in-command considers that he or she is unable to comply with the requested operation, the controller shall be advised without delay.
- 10.4.20.5.4 When necessary or desirable, e.g. due to low visibility conditions, a landing or a taxiing aircraft may be instructed to report when a runway has been vacated. The report shall be made when the entire aircraft is beyond the relevant runway-holding position.
- 10.4.20.6 **Reduction in Separation Minima in the Vicinity of Aerodromes**
- 10.4.20.6.1 The separation minima detailed in this manual may be reduced in the vicinity of the aerodrome if:
- a) adequate separation can be provided by the aerodrome controller when each aircraft is continuously visible to the controller; or
  - b) each aircraft is continuously visible to flight crews of the other aircraft concerned and the pilots thereof report that they can maintain their own separation; or
  - c) in the case of one aircraft following another, the flight crew of the succeeding aircraft reports that the other aircraft is in sight and separation can be maintained.

- 10.4.20.6.2 The controller may instruct a following aircraft to sight and follow a preceding aircraft. In exercising such control, it is essential that the pilot of the following aircraft correctly identifies the aircraft he/she is to follow. To assist in proper identification the controller shall:
- 1) Specify the type of aircraft to be followed and if an unfamiliar type; a brief description of the aircraft,
  - 2) Provide accurate position information on the preceding aircraft using direction and distance or position in the circuit; geographical features should only be used if depicted on relevant charts or the feature is regularly used in control of locally operating aircraft, and
  - 3) Advise the pilot of the following aircraft of his number in landing sequence.
- 10.4.20.6.3 The controller shall issue an alternative clearance if there is any doubt about the ability of the pilot to see the position of the other aircraft for the duration of the originally proposed clearance.
- 10.4.20.7 **Aerodrome Closure**
- 10.4.20.7.1 If the effect of any conditions (e.g. weather, navigation aids availability, airspace restrictions, etc.) creates the situation where no instrument approach system can be used, then the aerodrome shall be closed to landing requiring an instrument approach.
- 10.4.20.7.2 Similarly, when special circumstance exist which in the opinion of the aerodrome controller on duty, would make a landing or take-off hazardous, he/she shall close the aerodrome to landing, take-off or all operations as appropriate.
- 10.4.20.7.3 Except as specified in the Para 10.4.20.7.4, the decisions to make a landing or take-off in cross wind or down wind conditions, from a water or slush affected runway or when the presence of birds has been notified, rest solely with the pilot-in-command.
- 10.4.20.7.4 When the aerodrome is closed to aircraft for landing, take-off or all operations, the aerodrome controller shall notify all aircraft which are affected and which are listening on the appropriate tower frequency.
- 10.4.21 **USE OF CLOSED AERODROME IN EMERGENCY**
- 10.4.21.1 At a closed aerodrome, if a pilot declares an emergency or after advice from the aerodrome controller of any known alternatives courses of action, states that it will be safer to land than to adopt alternative action, all assistance to land at the aerodrome shall be afforded to him and the incident shall be reported as an Incident Report.
- 10.4.21.2 The initial clearance indicating permission to continue to the closed aerodrome shall be prefaced by **“ON EMERGENCY BASIS”**.....(Clearance).

**10.4.22 SECTOR VISIBILITY PROCEDURES**

Sector visibility procedures can be established by the concerned airports if required by incorporating in the ATS Operational Manual.

**10.4.23 SUSPENSION OF VISUAL FLIGHT RULES OPERATIONS**

10.4.23.1 Any or all VFR operations on and in the vicinity of an aerodrome may be suspended by any of the following units, persons or authorities whenever safety requires such action:

- a) the approach control unit or the appropriate ACC;
- b) the aerodrome control tower;
- c) the appropriate ATS authority.

10.4.23.2 All such suspensions of VFR operations shall be accomplished through or notified to the aerodrome control tower.

10.4.23.3 The following procedures shall be observed by the aerodrome control tower whenever VFR operations are suspended:

- a) hold all VFR departures;
- b) recall all local flights operating under VFR or obtain approval for special VFR operations;
- c) notify the approach control unit or ACC as appropriate of the action taken;
- d) notify all operators, or their designated representatives, of the reason for taking such action, if necessary or requested.

**10.4.24 SPECIAL VFR FLIGHT****10.4.24.1 Approval of Special VFR Flights**

10.4.24.1.1 The request for Special VFR flights may be approved subject to approval of the unit providing approach control service. Request for such authorization shall be handled individually.

10.4.24.1.2 Separation shall be effected between all IFR flights and special VFR flights and between the special VFR flights in accordance with prescribed separation minima.

**10.4.24.2 Special VFR Flight Procedure**

10.4.24.2.1 By day, when VMC doesn't exist, at pilot request, a controller may issue a special VFR clearance to a VFR aircraft to operate in a control zone provided:

- a. traffic conditions permit.
- b. the special VFR flight will not conflict with or unduly delay any IFR flight.

- c. the visibility is not less than:
    - 1000 meters for rotary wing aircraft 2500 meters for fixed-wing aircraft in T.I.A. and 1500 meters for fixed wing aircraft in other controlled aerodromes or as specified by the appropriate ATS authority.
  - d. the aircraft shall be flown clear of cloud and in-sight of ground or water.
- 10.4.24.2.2 Special VFR flight shall not be authorized if there is any doubt to the ATC that an aircraft may not be able to fly clear of clouds and in sight of ground or water.
- 10.4.24.2.3 Positive separation shall be applied between special VFR flights.
- 10.4.24.2.4 Pilots shall not enter into cloud while operating special VFR flight.
- 10.4.24.2.5 Weather observations made for the purpose of authorizing a flight to be conducted under special VFR shall be general observations.

*Note: The topographical feature of the kingdom of Nepal is mainly mountainous. During the monsoon season clouds are developed mostly in those hills & mountains. Controllers, during the monsoon season, shall consider the monsoon factor before clearing the flight in special VFR conditions.*

#### 10.4.25 **BLOCKED FREQUENCY**

In the event that the control frequency is inadvertently blocked by an aircraft transmitter, the following additional steps will 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, 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.

#### 10.4.26 **UNAUTHORIZED USE OF ATC FREQUENCY**

- 10.4.26.1 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 (will):
- 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.
- 10.4.26.2 Flights 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.
- 10.4.26.3 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.

#### 10.4.27 **AERONAUTICAL GROUND LIGHTS**

##### 10.4.27.1 **Operation**

*Note: The procedures in this Section apply to all aerodromes, whether or not aerodrome control service is provided. In addition, the procedures in 10.4.27.2.1 apply to all aeronautical ground lights, whether or not they are on or in the vicinity of an aerodrome.*

##### 10.4.27.2 **General**

- 10.4.27.2.1 All aeronautical ground lights shall be operated, except as provided in 10.4.27.2.2 and 10.4.27.2.3
- a) continuously during the hours of darkness or during the time the centre of the sun's disc is more than 6 degrees below the horizon, whichever requires the longer period of operation, unless otherwise provided hereafter or otherwise required for the control of air traffic;
  - b) at any other time when their use, based on meteorological conditions, is considered desirable for the safety of air traffic.
- 10.4.27.2.2 Lights on and in the vicinity of aerodromes that are not intended for en-route navigation purposes may be turned off, subject to further provisions hereafter, if no likelihood of either regular or emergency operation exists, provided that they can be again brought into operation at least one hour before the expected arrival of an aircraft.
- 10.4.27.2.3 At aerodromes equipped with lights of variable intensity a table of intensity settings, based on conditions of visibility and ambient light, should be provided for the guidance of air traffic controllers in effecting adjustment of these lights to suit the prevailing conditions. When so requested by an aircraft, further adjustment of the intensity shall be made whenever possible.

##### 10.4.27.3 **Approach lighting**

*Note: Approach lighting includes such lights as simple approach lighting systems, precision*

*approach lighting systems, visual approach slope indicator systems, circling guidance lights, approach light beacons and runway alignment indicators.*

10.4.27.3.1 In addition to 10.4.27.2.1 approach lighting shall also be operated:

- a) by day when requested by an approaching aircraft;
- b) when the associated runway lighting is operated.

10.4.27.3.2 The lights of a visual approach slope indicator system shall be operated during the hours of daylight as well as of darkness and irrespective of the visibility conditions when the associated runway is being used.

#### 10.4.27.4 **Runway lighting**

*Note: Runway lighting includes such lights as edge, threshold, centre line, end, touchdown zone and wing bar lights.*

10.4.27.4.1 Runway lighting shall not be operated if that runway is not in use for landing, take-off or taxiing purposes, unless required for runway inspections or maintenance.

10.4.27.4.2 If runway lighting is not operated continuously, lighting following a take-off shall be provided as specified below:

- a) at aerodromes where air traffic control service is provided and where lights are centrally controlled, the lights of one runway shall remain lighted after take-off as long as is considered necessary for the return of the aircraft due to an emergency occurring during or immediately after take-off;
- b) at aerodromes without air traffic control service or without centrally controlled lights, the lights of one runway shall remain lighted until such time as would normally be required to reactivate the lights in the likelihood of the departing aircraft returning for an emergency landing, and in any case not less than fifteen minutes after take-off.

*Note: Where obstacle lighting is operated simultaneously with runway lighting, particular care should be taken to ensure that it is not turned off until no longer required by the aircraft.*

#### 10.4.27.5 **Stop way lighting**

Stop way lights shall be operated whenever the associated runway lights are operated.

#### 10.4.27.6 **Taxiway lighting**

*Note: Taxiway lighting includes such lights as edge lights, centre line lights, stop bars and clearance bars.*

Where required to provide taxi guidance, taxiway lighting shall be turned on in such order that a continuous indication of the taxi path is presented to taxiing aircraft. Taxiway lighting or any portion thereof may be turned off

when no longer needed.

**10.4.27.7 Monitoring of visual aids**

10.4.27.7.1 Aerodrome controllers shall make use of automatic monitoring facilities, when provided, to ascertain whether the lighting is in good order and functioning according to selection.

10.4.27.7.2 In the absence of an automatic monitoring system or to supplement such a system, the aerodrome controller shall visually observe such lighting as can be seen from the aerodrome control tower and use information from other sources such as visual inspections or reports from aircraft to maintain awareness of the operational status of the visual aids.

10.4.27.7.3 On receipt of information indicating a lighting fault, the aerodrome controller shall take such action as is warranted to safeguard any affected aircraft or vehicles, and initiate action to have the fault rectified.

**10.4.27.8 Strip Marking**

Strip marking should be accomplished in accordance with the Strip Marking Procedure. Refer Appendix J.

## **10.5 APPROACH CONTROL SERVICE**

**10.5.1 RESPONSIBILITY**

Approach control unit is responsible to provide air traffic control service to controlled flights arriving at, or departing from one or more aerodromes. Area of jurisdiction shall be determined and published by the responsible ATS providers in their respective SOPs.

**10.5.2 RADIO COMMUNICATION**

Controllers shall maintain a continuous watch on all appropriate radio frequencies and conduct all necessary air ground communications. An aircraft operating locally may be required to report at scheduled times or at nominated reporting points. An aircraft holding at a holding point serving a destination airport which is closed to landing shall be required to report at intervals not exceeding 15 minutes.

**10.5.3 REDUCTIONS IN SEPERATION MINIMA**

The separation minima may be reduced in the vicinity of the aerodrome as specified in Para 10.4.20.1.6

**10.5.4 PROCEDURES FOR ARRIVING AIRCRAFT**

**10.5.4.1 General**

10.5.4.1.1 Before authorizing an instrument approach, the approach controller on duty shall be reasonably satisfied that prevailing weather condition is not less than the specified weather minima for the instrument approach.

- 10.5.4.1.2 An aircraft shall not be cleared to descend below the lowest holding altitude when the weather condition does not meet the requirements of Para 10.5.4.1.1 or when frequent occurrence of heavy rain squall, in the opinion of approach controller, warrant the closure of the aerodrome.
- 10.5.4.1.3 When weather conditions are marginal or fluctuating about the relevant minimum and the approach controller is in doubt that the provisions of Para. 10.5.4.1.1 can be met, he/she shall advise each aircraft of the prevailing conditions and permit operation to continue.
- 10.5.4.1.4 An aircraft shall also not be cleared to continue an instrument descent below the lowest holding altitude when hazardous weather conditions are expected to exist.
- 10.5.4.1.5 When it becomes evident that delays will be encountered by arriving aircraft, operators or designated representatives shall, to the extent practicable, be notified and kept currently informed of any changes in such expected delays.
- 10.5.4.1.6 Arriving aircraft may be required to report when leaving or passing a significant point or navigation aid, or when starting procedure turn or base turn, or to provide other information required by the controller, to expedite departing and arriving aircraft.
- 10.5.4.1.7 An IFR flight shall not be cleared for an initial approach below the appropriate minimum altitude as specified in this manual and AIP nor to descend below that altitude unless:
- a) the pilot has reported passing an appropriate point defined by a navigation aid or as a waypoint; or
  - b) the pilot reports that the aerodrome is and can be maintained in sight; or
  - c) the aircraft is conducting a visual approach; or
  - d) the aircraft's position has been determined by the use of radar, and a lower minimum altitude has been specified for use when providing radar services.
- 10.5.4.1.8 At aerodromes where standard instrument arrivals (STARs) have been established, arriving aircraft should normally be cleared to follow the appropriate STAR. The aircraft shall be informed of the type of approach to expect and runway-in-use as early as possible.
- 10.5.4.1.9 After coordination with the approach control unit, the ACC may clear the first arriving aircraft for approach rather than to a holding fix.
- 10.5.4.1.10 **Speed Adjustment and Speed Limitations**
- Pilot shall advise ATC when the speed adjustment advised by ATC is considered to be contrary to the aircraft's safe operation. Pilot should

maintain the speed within plus or minus 10 knots of specified speed (indicated air speed).

Approach clearance issued supersedes any prior speed adjustment assignment, unless

ATC has restarted or requested a new speed adjustment.

If necessary to land as soon as possible due to imminent situation such as sick person on board or unlawful interference, the arriving aircraft should request ATC to fly faster than the assigned speed specified by ATC. ATC may approve the request, specifying the requested speed as the limited speed.

Phraseology: MAINTAIN [number] **KNOTS OR LESS**.

#### 10.5.4.2 **Visual Approach**

10.5.4.2.1 Subject to the conditions in 10.5.4.2.3, clearance for an IFR flight to execute a visual approach may be requested by a flight crew or initiated by the controller. In the latter case, the concurrence of the flight crew shall be required.

10.5.4.2.2 Controllers shall exercise caution in initiating a visual approach when there is reason to believe that the flight crew concerned is not familiar with the aerodrome and its surrounding terrain. Controllers should also take into consideration the prevailing traffic and meteorological conditions when initiating visual approaches.

10.5.4.2.3 An IFR flight may be cleared to execute a visual approach provided the pilot can maintain visual reference to the terrain and:

- a) the reported ceiling is at or above the approved initial approach level for the aircraft so cleared; or
- b) the pilot reports at the initial approach level or at any time during the instrument approach procedure that the meteorological conditions are such that with reasonable assurance a visual approach and landing can be completed.

10.5.4.2.4 Separation shall be provided between an aircraft cleared to execute a visual approach and other arriving and departing aircraft.

10.5.4.2.5 For successive visual approaches, radar or non-radar separation shall be maintained until the pilot of a succeeding aircraft reports having the preceding aircraft in sight. The aircraft shall then be instructed to follow and maintain own separation from the preceding aircraft. When both aircraft are of a heavy wake turbulence category, or the preceding aircraft is of a heavier wake turbulence category than the following, and the distance between the aircraft is less than the appropriate wake turbulence minimum, the controller shall issue a caution of possible wake turbulence. The pilot-in-command of the aircraft concerned shall be responsible for ensuring that the spacing from a preceding aircraft of a heavier wake

turbulence category is acceptable. If it is determined that additional spacing is required, the flight crew shall inform the ATC unit accordingly, stating their requirements.

- 10.5.4.2.6 Transfer of communications to the aerodrome controller should be effected at such a point or time that information on essential local traffic, if applicable, and clearance to land or alternative instructions can be issued to the aircraft in a timely manner.

10.5.4.3 **Instrument Approach**

- 10.5.4.3.1 The approach control unit shall specify the instrument approach procedure to be used by arriving aircraft. A flight crew may request an alternative procedure and, if circumstances permit, should be cleared accordingly.

- 10.5.4.3.2 If a pilot reports or it is clearly apparent to the ATC unit that the pilot is not familiar with an instrument approach procedure, the initial approach level, the point (in minutes from the appropriate reporting point) at which base turn or procedure turn will be started, the level at which the procedure turn shall be carried out and the final approach track shall be specified, except that only the last-mentioned need be specified if the aircraft is to be cleared for a straight-in approach. The frequency (ies) of the navigation aid(s) to be used as well as the missed approach procedure shall also be specified when deemed necessary.

- 10.5.4.3.3 If visual reference to terrain is established before completion of the approach procedure, the entire procedure must nevertheless be executed unless the aircraft requests and is cleared for a visual approach.

10.5.4.4 **Holding**

- 10.5.4.4.1 In the event of extended delays, aircraft should be advised of the anticipated delay as early as possible and, when practicable, be instructed or given the option to reduce speed enroute in order to absorb delay.

- 10.5.4.4.2 When delay is expected, the ACC shall normally be responsible for clearing aircraft to the holding fix, and for including holding instructions, and expected approach time or onward clearance time, as applicable, in such clearances.

- 10.5.4.4.3 After coordination with the approach control unit, the ACC may clear an arriving aircraft to a visual holding location to hold until further advised by the approach control unit.

- 10.5.4.4.4 After coordination with the aerodrome control tower, the approach control unit may clear an arriving aircraft to a visual holding location to hold until further advised by the aerodrome control tower.

- 10.5.4.4.5 Holding and holding pattern entry shall be accomplished in accordance with established procedures and as published in AIP. If entry and holding procedures have not been published or if the procedures are not known to a flight crew, the appropriate air traffic control unit shall specify the

designator of the location or aid to be used, the inbound track, radial or bearing, direction of turn in the holding pattern as well as the time of the outbound leg or the distances between which to hold.

10.5.4.4.6 Aircraft should normally be held at a designated holding fix. The required minimum vertical, lateral or longitudinal separation from other aircraft shall be provided. Procedures for the simultaneous use of adjacent holding patterns shall be executed as published in AIP.

10.5.4.4.7 Levels at a holding fix or visual holding location shall as far as practicable be assigned in a manner that will facilitate clearing each aircraft to approach in its proper priority. Normally, the first aircraft to arrive over a holding fix or visual holding location should be at the lowest level, with following aircraft at successively higher levels.

10.5.4.4.8 When extended holding is anticipated, turbojet aircraft should, when practicable be

permitted to hold at higher levels in order to conserve fuel, whilst retaining their order in the approach sequence.

10.5.4.4.9 If an aircraft is unable to comply with the published or cleared holding procedure, alternative instructions shall be issued.

10.5.4.4.10 For the purpose of maintaining a safe and orderly flow of traffic, an aircraft may be instructed to orbit at its present or at any other position, provided the required obstacle clearance is ensured.

#### 10.5.4.5 **Approach sequence**

##### 10.5.4.5.1 **General**

The following procedures shall be applied whenever approaches are in progress.

10.5.4.5.1.1 The approach sequence shall be established in a manner which will facilitate arrival of the maximum number of aircraft with the least average delay. Priority shall be given to:

- a) an aircraft which anticipates being compelled to land because of factors affecting the safe operation of the aircraft (engine failure, shortage of fuel, etc.);
- b) hospital aircraft or aircraft carrying any sick or seriously injured person requiring urgent medical attention;
- c) aircraft engaged in search and rescue operations; and
- d) other aircraft as may be determined by the appropriate authority.

10.5.4.5.1.2 Succeeding aircraft shall be cleared for approach:

- a) when the preceding aircraft has reported that it is able to complete its approach without encountering instrument meteorological

conditions; or

- b) when the preceding aircraft is in communication with and sighted by the aerodrome control tower and reasonable assurance exists that a normal landing can be accomplished, or
- c) when timed approaches are used, the preceding aircraft has passed the defined point inbound and reasonable assurance exists that a normal landing can be accomplished;
- d) when the required longitudinal spacing between succeeding aircraft, as observed by radar, has been established.

10.5.4.5.1.3 In establishing the approach sequence, the need for increased longitudinal spacing between arriving aircraft due to wake turbulence shall be taken into account.

10.5.4.5.1.4 If the pilot of an aircraft in an approach sequence has indicated an intention to hold for weather improvement, or for other reasons, such action shall be approved. However, when other holding aircraft indicate intention to continue their approach-to-land, the pilot desiring to hold will be cleared to an adjacent fix for holding awaiting weather change or re-routing. Alternatively, the aircraft should be given a clearance to place it at the top of the approach sequence so that other holding aircraft may be permitted to land. Coordination shall be effected with any adjacent ATC unit or control sector, when required, to avoid conflict with the traffic under the jurisdiction of that unit or sector.

10.5.4.5.1.5 When establishing the approach sequence, an aircraft which has been authorized to absorb a specified period of notified terminal delay by cruising at a reduced speed en route, should, in so far as practicable, be credited with the time absorbed en route.

10.5.4.5.2 **Interval between Successive Approaches**

In determining the time interval or longitudinal distance to be applied between successive approaching aircraft, the relative speeds between succeeding aircraft, the distance from the specified point to the runway, the need to apply wake turbulence separation, runway occupancy times, the prevailing meteorological conditions as well as any condition which may affect runway occupancy times shall be considered.

10.5.4.5.3 **Information on Approach Sequence**

Approach control shall keep aerodrome control informed of the sequence in which aircraft will be established on final approach for landing.

10.5.4.6 **Expected Approach Times**

10.5.4.6.1 An expected approach time shall be determined for an arriving aircraft that will be subject to a delay of 5 minutes or more. The expected approach time shall be transmitted to the aircraft as soon as practicable as and preferably not later than at the commencement of its initial descent from



cruising level. A revised expected approach time shall be transmitted to the aircraft without delay whenever it differs from that previously transmitted by 3 minutes or more.

10.5.4.6.2 An expected approach time shall be transmitted to the aircraft by the most expeditious means whenever it is anticipated that the aircraft will be required to hold for 30 minutes or more.

10.5.4.6.3 The holding fix to which an expected approach time relates shall be identified together with the expected approach time whenever circumstances are such that this would not otherwise be evident to the pilot.

10.5.4.7 **Onward clearance time**

In the event an aircraft is held en route or at a location or aid other than the initial approach fix, the aircraft concerned shall, as soon as practicable, be given an expected onward clearance time from the holding fix. The aircraft shall also be advised if further holding at a subsequent holding fix is expected.

*Note: "Onward clearance time" is the time at which an aircraft can expect to leave the fix at which it is being held.*

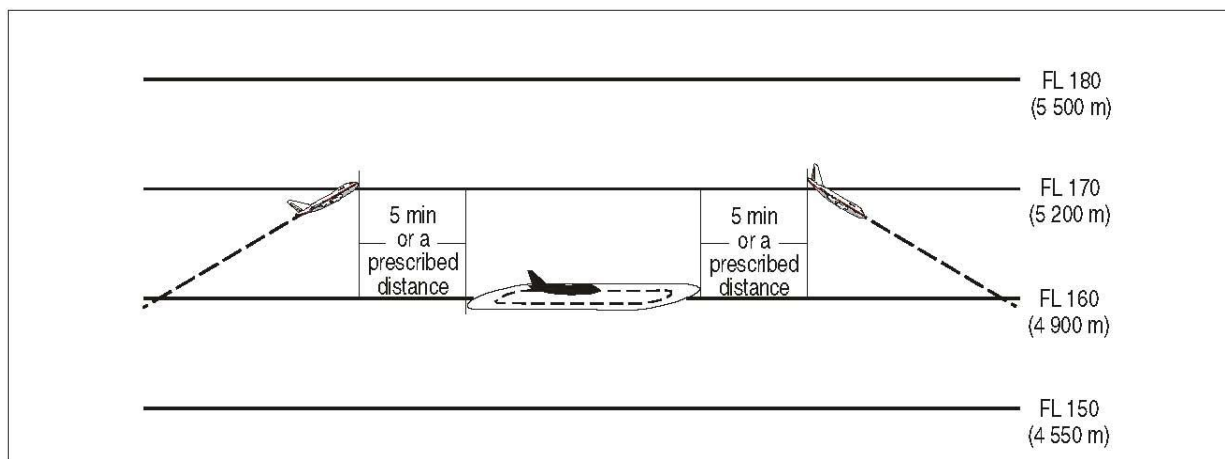
10.5.5 **INFORMATION FOR ARRIVING AIRCRAFT**

10.5.5.1 As early as practicable after an aircraft has established communication with the unit providing approach control service, the following elements of information, in the order listed, shall be transmitted to the aircraft, with the exception of such elements which it is known the aircraft has already received:

- a) type of approach and runway-in-use;
- b) meteorological information, as follows:
  - 1) surface wind direction and speed, including significant variations;
  - 2) visibility and, when applicable, runway visual range (RVR);
  - 3) present weather;
  - 4) cloud below 1500 m (5000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available;
  - 5) air temperature;
  - 6) dew point temperature(if available or requested);
  - 7) altimeter setting(s);
  - 8) any available information on significant meteorological phenomena in the approach area; and

- 9) trend-type landing forecast, when available.
  - c) current runway surface conditions, in case of precipitants or other temporary hazards;
  - d) changes in the operational status of visual and non visual aids essential for approach and landing.
- 10.5.5.2 If it becomes necessary or operationally desirable that an arriving aircraft follow an instrument approach procedure or use a runway other than that initially stated, the flight crew shall be advised without delay.
- 10.5.5.3 At the commencement of final approach, the following information shall be transmitted to aircraft:
- a) significant changes in the mean surface wind direction and speed;  
Mean head-wind component: 19 km/h (10 kt)  
Mean tail-wind component: 4 km/h (2 kt)  
Mean cross-wind component: 9 km/h (5 kt)
  - b) the latest information, if any, on wind shear and/or turbulence in the final approach area;
  - c) the current visibility representative of the direction of approach and landing or, when provided, the current runway visual range value(s) and the trend.
- 10.5.5.4 During final approach, the following information shall be transmitted without delay:
- a) the sudden occurrence of hazards (e.g. unauthorized traffic on the runway);
  - b) significant variations in the current surface wind, expressed in terms of minimum and maximum values;
  - c) significant changes in runway surface conditions;
  - d) changes in the operational status of required visual or non-visual aids;
  - e) changes in observed RVR value(s), in accordance with the reported scale in use, or changes in the visibility representative of the direction of approach and landing.
- 10.5.6 **CONTROL OF AIRCRAFT AFTER MISSED APPROACH**
- 10.5.6.1 A consecutive approach, following a missed approach, may be permitted at the discretion of the approach controller. It shall be authorized when the particular missed approach procedure is not laterally separated from the holding pattern and instrument approach course, or in circumstances justifying priority for the aircraft missing the approach e.g. low fuel state.

- 10.5.6.2 When a consecutive approach is likely to be required, appropriate lower levels in the holding pattern shall be kept vacant until the approaching aircraft is assumed of a landing or is appropriately separated en-route to its alternate.
- 10.5.6.3 When an aircraft will be authorized to make a second but not a consecutive approach, an altitude in the holding pattern shall be reserved to accept the aircraft returning after missed approach. This altitude should be high enough in the holding aircraft sequence to allow the processing of the holding stack to continue without being interrupted by the return of the aircraft.
- 10.5.6.4 Such a reserved altitude shall be released for other use as soon as the approaching aircraft is assured of a landing or is appropriately separated en-route to its alternate.
- 10.5.6.5 A following aircraft which has not commenced approach at the time a preceding aircraft initiates missed approach, shall be held in the holding pattern until the controller is satisfied that he/she can readily separate the aircraft should it also miss its approach.
- 10.5.6.6 Appropriate clearance shall be given to an aircraft which has initiated a missed approach to maintain separation and to direct it along the prescribed track and subsequently to a departure track to alternate or to return to the holding point and a new EAT shall be advised as soon as practicable.
- 10.5.6.7 Should separation so require, an aircraft may be required to climb on track different from that prescribed in the instrument approach procedure, provided such tracks meet adequate terrain clearance.
- 10.5.7 **ROUTING & CLEARANCE FOR ARRIVING AIRCRAFT**
- 10.5.7.1 Aircraft approaching the approach control area or which will enter the control zone will establish communication with the approach control unit while entering its area of responsibilities or at such other points as has been specified by ATC.
- 10.5.7.2 The approach controller shall issue a clearance including appropriate items.
- 10.5.8 **SEPARATION OF AIRCRAFT HOLDING IN FLIGHT**
- 10.5.8.1 Aircraft established in adjacent holding patterns shall, except when lateral separation between the holding areas exists as specified in this manual or AIP be separated by the applicable vertical separation minimum.
- 10.5.8.2 Except when lateral separation exists, vertical separation shall be applied between aircraft holding in flight and other aircraft, whether arriving, departing or en route, whenever the other aircraft concerned are within five minutes flying time of the holding area or within a distance prescribed in this manual or AIP. (See Figure 3-1)



**Figure 3-1 Separation between holding aircraft and enroute aircraft**

**10.5.9 SEPERATION OF DEPARTING AIRCRAFT FROM ARRIVING AIRCRAFT**

**10.5.9.1** The following separation shall be applied when take-off clearance is based on the position of an arriving aircraft:

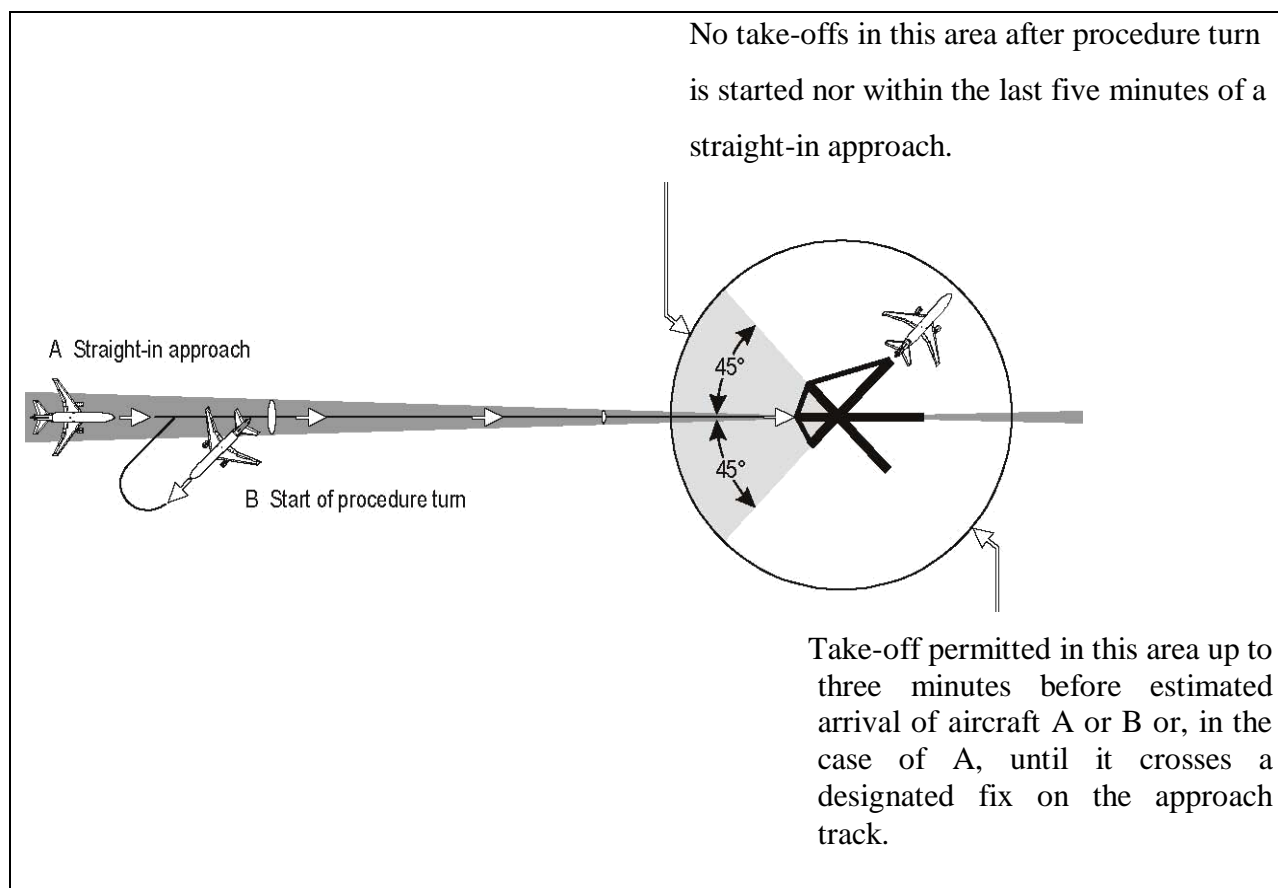
**10.5.9.1.1** If an arriving aircraft is making a complete instrument approach, a departing aircraft may take off:

- a) in any direction until an arriving aircraft has started its procedure turn or base turn leading to final approach;
- b) in a direction which is different by at least 45 degrees from the reciprocal of the direction of approach after the arriving aircraft has started procedure turn or base turn leading to final approach, provided that the takeoff will be made at least 3 minutes before the arriving aircraft is estimated to be over the beginning of the runway (see Figure 3-2).

**10.5.9.1.2** If an arriving aircraft is making a straight-in approach, a departing aircraft may take off:

- a) in any direction until 5 minutes before the arriving aircraft is estimated to be over the instrument runway;
- b) in a direction which is different by at least 45 degrees from the reciprocal of the direction of approach of the arriving aircraft:
  - 1) until 3 minutes before the arriving aircraft is estimated to be over the beginning of the instrument runway (see Figure 3-2), or
  - 2) before the arriving aircraft crosses a point determined by a DME report from the aircraft of 5 miles, adjusted as necessary for the variation in final approach distance between the landing threshold in use and DME site. In the application of this standard, the controller is required to estimate that the required separation will exist at the time

the take-off is commenced, and the DME report must be used to confirm that separation is not infringed.



**Figure 3-2. Separation of departing aircraft from arriving aircraft**

## 10.5.10 FUEL DUMPING IN FLIGHT

### 10.5.10.1 General

10.5.10.1.1 An aircraft in emergency or other urgent situations may need to dump fuel so as to reduce its weight to maximum landing mass in order to affect a safe landing.

10.5.10.1.2 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 1800 m (6000 ft); and
- c) the duration of the fuel dumping.

**10.5.10.1.3 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 15 minutes flying time or a distance of 93 km (50 NM) by;
  - i. at least 300 m (1000 ft) if above the aircraft dumping fuel; and
  - ii. at least 900 m (3000 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 15 minutes along track behind it (including turns).*

**10.5.10.1.4 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.

**10.5.10.1.5 Informaton to other ATS units and Non-controlled Traffic**

10.5.10.1.5.1 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.

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

**10.5.11 TRAFFIC INFORAMTION IN CONTROLLED AIRSPACE**

10.5.11.1 Significant traffic information shall be issued by a controller to the pilots of aircraft Concerned in the following situations:

- When planned tracks of VFR flight with less than 1000 ft vertical separation will cross
- When opposite and same direction VFR flight are climbing and descending through the level of other VFR flight.

10.5.11.2 Traffic information shall also be issued to pilots of aircraft concerned when:

- 1) the aircraft are operating with less than prescribed separation minima due to emergency or other cases.
- 2) any significant traffic advised by the appropriate ATS unit in respect of aircraft leaving controlled airspace.

- 10.5.11.3 Significant traffic information may contain any or all of the following items:
1. call sign of aircraft;
  2. aircraft type;
  3. levels;
  4. direction of flight;
  5. estimated or actual time at a position, a reporting point of flight path, or a point of passing or overtaking.
- 10.5.11.4 In restricted or danger areas, traffic information shall not be provided to or in respect of aircraft using the area for the purpose for which it is established.
- 10.5.12 **PROCEDURES FOR DEPARTING AIRCRAFT**
- 10.5.12.1 The approach controller shall undertake separation between arriving and departing aircraft within the area of his/her responsibility. For this purpose, the approach controller shall issue the release clearance, SID and additional restriction(s) within his/her area of responsibility to towers.
- 10.5.12.2 A clearance expiry time shall be specified by the area control center if a delayed departure would conflict with traffic not released to the unit providing approach control service. If for traffic reason of its own, a unit providing approach control service has to specify in addition its own clearance expiry time, this shall be in no case be later than that specified by ACC.
- 10.5.12.3 Control of departing aircraft may be transferred to the area control unit sooner than its arrival at control boundary if further control of it can be exercised without reference to the position of arriving aircraft.
- 10.5.12.4 Before applying lateral separation the approach controller shall obtain a report from a departing aircraft that it has established flight on the assigned departure track.
- 10.5.12.5 Clearance issued by approach controller shall specify the following as applicable.
1. direction of turn after take-off if other than normal.
  2. track to be made good before proceeding on desired heading.
  3. SID to be made.
  4. altitude to maintain before continuing climb to assigned cruising level.
  5. time or point at which altitude change shall be made.
  6. any other necessary manoeuvres consistent with the safe operation of the aircraft.

- 10.5.12.6 To be commensurate with the orderly flow of air traffic, every effort should be made to permit aircraft departing on long distance flights to proceed on a heading with a few turn or other manoeuvres as possible, and climb to cruising level without restriction. Heavy take-off loads render the early portion of flight very critical and this factor should be considered in the control of departing aircraft.
- 10.5.12.7 Departing aircraft may be expedited by suggesting a take-off direction which is not into the wind. It is the responsibility of the pilot-in-command of an aircraft to decide between making such a take-off and waiting for normal take-off in preferred direction.
- 10.5.12.8 If departures are delayed to avoid excessive holding at destination, delayed flights shall normally be cleared in an order based on their estimate time of departure, except that deviation from this order may be made to facilitate the maximum number of departures with least average delay.
- 10.5.12.9 ATC units should advise aircraft operators or their designated representatives when anticipated delays due traffic conditions are likely to be substantial and in any event when they are expected to exceed 30 minutes.
- 10.5.13 **COORDINATION WITH AERODROME CONTROL SERVICE**
- 10.5.13.1 **Division of control**
- 10.5.13.1.1 A unit providing approach control service shall retain control of arriving aircraft until such aircraft have been transferred to the aerodrome control tower and are in communication with the aerodrome control tower. Not more than one arrival shall be transferred to a unit providing aerodrome control service during IMC.
- 10.5.13.1.2 A unit providing approach control service may authorize an aerodrome control tower to release an aircraft for take-off subject to the discretion of the aerodrome control tower with respect to arriving aircraft.
- 10.5.13.1.3 Aerodrome control towers shall obtain approval from the unit providing approach control service prior to authorizing operation of special VFR flights.
- 10.5.13.2 **Exchange of movement and control data**
- 10.5.13.2.1 An aerodrome control tower shall keep the unit providing approach control service promptly advised of pertinent data on relevant controlled traffic such as:
- a) arrival and departure times;
  - b) when required, statement that the first aircraft in an approach sequence is in communication with and is sighted by the aerodrome control tower, and that reasonable assurance exists that a landing can



be accomplished;

- c) all available information relating to overdue or unreported aircraft;
- d) information concerning missed approaches;
- e) information concerning aircraft that constitute essential local traffic to aircraft under the control of the unit providing approach control service.

10.5.13.2.2 The unit providing approach control service shall keep the aerodrome control tower promptly advised of pertinent data on controlled traffic such as:

- a) estimated time of arriving aircraft over the aerodrome, as early as possible;
- b) when required, a statement that an aircraft has been instructed to contact the aerodrome control tower and that control shall be assumed by that unit;
- c) anticipated delay to departing traffic due to congestion.

#### 10.5.14 **COORDINATION BETWEEN CONTROL POSITIONS WITHIN THE SAME UNIT**

10.5.14.1 Appropriate flight plan and control information shall be exchanged between control positions within the same air traffic control unit, in respect of:

- a) all aircraft for which responsibility for control will be transferred from one control position to another;
- b) aircraft operating in such close proximity to the boundary between control sectors that control of traffic within an adjacent sector may be affected;
- c) all aircraft for which responsibility for control has been delegated by a procedural controller to a radar controller, as well as other aircraft affected.

10.5.14.2 Procedures for coordination and transfer of control between control sectors within the same ATC unit shall conform to the procedures applicable to ATC units.

#### 10.5.15 **COORDINATION WITH AREA CONTROL CENTRE**

##### 10.5.15.1 **Division of control**

10.5.15.1.1 A unit providing approach control service may issue clearances to any aircraft released to it by an ACC. However, when an approach has been missed the ACC shall, if affected by the missed approach, be advised immediately and subsequent action coordinated between the ACC and the unit providing approach control service as necessary.

- 10.5.15.1.2 An ACC may, after coordination with the unit providing approach control service, release aircraft directly to aerodrome control towers if the entire approach will be made under visual meteorological conditions.
- 10.5.15.1.3 **Take-off clearance expiry times.**
- 10.5.15.1.4 Time of take-off shall be specified by the ACC when it is necessary to:
- a) coordinate the departure with traffic not released to the unit providing approach control service; and
  - b) provide en-route separation between departing aircraft following the same route.
- 10.5.15.1.5 If time of take-off is not specified, the unit providing approach control service shall determine the take-off time when necessary to coordinate the departure with traffic released to it.
- 10.5.15.1.6 A clearance expiry time shall be specified by the ACC if a delayed departure would conflict with traffic not released to the unit providing approach control service. If, for traffic reasons of its own, a unit providing approach control service has to specify in addition its own clearance expiry time, this shall not be later than that specified by the ACC.
- 10.5.15.2 **Exchange of movement and control data**
- 10.5.15.2.1 The unit providing approach control service shall keep the ACC promptly advised of pertinent data on controlled traffic such as:
- a) runway-in-use and expected type of instrument approach procedure;
  - b) lowest vacant level at the holding fix available for use by the ACC;
  - c) average time interval or distance between successive arrivals as determined by the unit providing approach control service;
  - d) revision of the expected approach time issued by the ACC when the calculation of the expected approach time by the unit providing approach control service indicates a variation of three minutes or such other time as has been agreed between the two ATC units concerned;
  - e) arrival times over the holding fix when these vary by three minutes, or such other time as has been agreed between the two ATC units concerned, from those previously estimated;
  - f) cancellations by aircraft of IFR flight, if these will affect levels at the holding fix or expected approach times of other aircraft;
  - g) aircraft departure times if not received earlier;
  - h) all available information relating to overdue or unreported aircraft;
  - i) missed approaches which may affect the ACC.

- 10.5.15.2.2 The ACC shall keep the unit providing approach control service promptly advised of pertinent data on controlled traffic such as:
- a) identification, type and point of departure of arriving aircraft;
  - b) estimated time and proposed level of arriving aircraft over holding fix or actual time if aircraft is released to the unit providing approach control service after arrival over the holding fix;
  - c) requested type of IFR approach procedure if different to that specified by the approach control unit;
  - d) expected approach time issued;
  - e) when required, statement that aircraft has been instructed to contact the unit providing approach control service;
  - f) when required, statement that an aircraft has been released to the unit providing approach control service including, if necessary, the time and conditions of release;
  - g) anticipated delay to departing traffic due to congestion.
- 10.5.15.2.3 Information on arriving aircraft shall be forwarded as early as possible and such information shall be revised as necessary.

10.5.16 **STRIP MARKING**

Strip marking should be accomplished in accordance with the Strip Marking Procedure. Refer Appendix J.

## **10.6 ATS SURVEILLANCE SYSTEM IN AIR TRAFFIC CONTROL**

### **10.6.1 SURVEILLANCE RADAR APPROACH**

- 10.6.1.1 A final approach using solely surveillance radar should not be carried out if precision approach radar is available, unless meteorological conditions are such as to indicate with reasonable certainty that a surveillance radar approach can be completed successfully.
- 10.6.1.2 A surveillance radar approach shall only be performed with equipment suitably sited and a situation display specifically marked to provide information on position relative to the extended centre line of the runway to be used and distance from touchdown, and which is specifically approved for the purpose by the appropriate ATS authority.
- 10.6.1.3 When conducting a surveillance radar approach, the controller shall comply with the following:
- a) at or before the commencement of the final approach, the aircraft shall be informed of the point at which the surveillance radar approach will be terminated;
  - b) the aircraft shall be informed when it is approaching the point at which it is computed that descent should begin, and just before reaching that

point it shall be informed of the obstacle clearance altitude/height and instructed to descend and check the applicable minima;

- c) azimuth instructions shall be given in accordance with the precision approach technique
- d) except as provided in 10.6.1.4, distance from touchdown shall normally be passed at every 2 km (each NM);
- e) pre-computed levels through which the aircraft should be passing to maintain the glide path shall also be transmitted at every 2 km (each NM) at the same time as the distance;
- f) the surveillance radar approach shall be terminated:
  - i) at a distance of 4 km (2 NM) from touchdown, except as provided in 10.6.1.4; or
  - ii) before the aircraft enters an area of continuous radar clutter; or
  - iii) when the pilot reports that a visual approach can be effected; whichever is the earliest.

10.6.1.4 When, as determined by the appropriate ATS authority, the accuracy of the radar equipment permits, surveillance radar approaches may be continued to the threshold of the runway, or to a prescribed point less than 4 km (2 NM) from touchdown, in which case:

- a) distance and level information shall be given at each km (each half NM);
- b) transmission should not be interrupted for intervals of more than five seconds while the aircraft is within a distance of 8 km (4 NM) from touchdown;
- c) the controller should not be responsible for any duties other than those directly connected with a particular approach.

10.6.1.5 Levels through which the aircraft should pass to maintain the required glide path, and the associated distances from touchdown, shall be pre-computed and displayed in such a manner as to be readily available to the controller concerned.

## 10.6.2 DESCRIPTION OF SERVICES

### 10.6.2.1 General

Approach Radar control Services is provided only for transponder equipped aircraft in radar covered airspace within Kathmandu FIR and the responsible ATS provider shall prepare the detail approach control procedure.

*Note: ATC advises the pilot of his/her radar position when radar identification is established except when identification is established by position correlation with reference to VOR/DME or*

*when a departing aircraft is identified within one nautical mile of the take-off runway end. Aircraft radar position or “IDENTIFIED” may not be advised when ATC instructs to change transponder code or squawk ident for the confirmation.*

10.6.2.1.1 Radar service starts with identification and is continued until termination or loss of identification is notified. In the following cases radar termination will not be notified to the pilot:

1. when the loss of identification of an a/c is notified.
2. when an aircraft approaching to an aerodrome is advised to contact the aerodrome control tower.

10.6.2.2 **Radar Navigational Guidance**

- (a) Radar navigational guidance is provided for IFR traffic at or above MVA. The MVA for the radar approach jurisdiction and any restrictive provision if necessary for the radar navigation guidance service shall be determined and published by responsible ATS providers in their respective SOPs.
- (b) When radar navigational guidance is commenced, the purpose of the vector and where the aircraft will be vectored to, or either of them as appropriate, will be informed.

*Note: When instructed only magnetic heading with the phraseology “FLY HEADING [degrees]”, the pilot should turn in the shorter direction to the instructed heading.*

- (c) Radar navigational guidance will be terminated after an aircraft reaches/intercepts, or is going to reach/intercept the airway/radial/bearing, which has been notified as the purpose of the vector. In this case, the pilot, will be instructed to “RESUME OWN NAVIGATION” or “PROCEED DIRECT”

10.6.2.3 **Lost communication procedure.**

If radio communication with the Radar Unit is lost for one minute, squawk Mode 3/A Code 7600 and:

- (1) contact adjacent control unit, or any appropriate control unit.
- (2) if unable, proceed to the point/route, which is informed when the vector is initiated as the vectoring target on the last assigned heading.
- (3) if unable, proceed to the nearest point on the cleared route in VMC.

10.6.2.4 **Navigation assistance**

10.6.2.4.1 An identified aircraft observed to deviate significantly from its intended route or designated holding pattern shall be advised accordingly. Appropriate action shall also be taken if, in the opinion of the controller, such deviation is likely to affect the service being provided.

10.6.2.4.2 The pilot of an aircraft requesting navigation assistance from an air traffic control unit providing radar services shall state the reason (e.g. to avoid areas of adverse weather or unreliable navigational instruments) and shall give as much information as possible in the circumstances.

10.6.3 **RADAR TRAFFIC INFORMATION**

10.6.3.1 **Issuance**

When the traffic is observed on the radarscope which might be in such proximity to the position of the controlled aircraft or his/her intended route of flight that it warrants pilot's attention, the radar traffic information will be issued.

10.6.3.1.1 Radar traffic information will normally include the following information concerning the target.

- (1) To the radar identified aircraft:
  - (a) azimuth from the aircraft in terms of the 12-hour clock.
  - (b) distance from the aircraft in terms of nautical miles.
  - (c) direction in which the target is proceeding.
  - (d) type of aircraft and altitude, if known.

**Example:**

- Traffic one o'clock five miles northwest-bound DHC-6 8,500
- Traffic numerous.

*Note: For altitude information which has not been verified by ATC, the word "altitude readout" will be added.*

**Example:**

- Traffic eleven o'clock 10 miles eastbound type unknown altitude readout 4,500.
- (2) To the non-radar identified aircraft:
    - a) Distance and direction with respect to a fix or an airport
    - b) Direction in which the target is proceeding
    - c) Type of aircraft and altitude, if known:

**Example:**

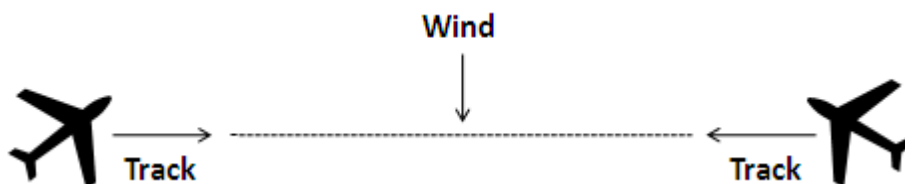
- Traffic eight miles east of the airport northeast-bound.
- Traffic numerous targets vicinity Simra.

*Note1: Traffic information is issued to the extent possible the workload of ATC permits. The issuance of the traffic information is, in the job priority, next to the provision of the required separation.*

Therefore the radar traffic information will not be issued always on all the relevant targets.

**Note2:** Target's azimuth is expressed to the pilot with his/her proceeding direction on the radarscope as 12 o'clock. While an aircraft is flying applying drift correction to maintain his/her track, or is making a turn, informed azimuth of the target may be different from the real azimuth as seen from the cockpit. Traffic information will be "TRAFFIC 12 O'CLOCK" respectively to both aircraft, although the actual position of the traffic, as seen by (A), would be "ONE O'CLOCK" or by (B), "ELEVEN O'CLOCK" respectively.

Example:



#### 10.6.3.1.2 Reply to the Traffic Information

- (1) The pilot should notify to ATC when he/she had the advised traffic in sight, or not in sight, or looking out.

"TRAFFIC IN SIGHT" or

"NEGATIVE CONTACT" or

"LOOKING OUT"

*Note: when the pilot notifies "LOOKING OUT" to ATC, he/she should report "TRAFFIC IN SIGHT" or "NEGATIVE CONTACT" as soon as possible.*

- (2) When the pilot could not have the advised traffic in sight, and the traffic moved to a new position where the target was not a factor any more, he may be informed by ATC with phraseology of "CLEAR OF TRAFFIC" or "CLEAR OF [number] O'CLOCK TRAFFIC".

#### 10.6.4 OPERATION OF TRANSPONDER

10.6.4.1 In case of operating in air spaces within Kathmandu FIR, the pilot shall operate transponder and select Modes and Codes as instructed by ATC.

10.6.4.2 Pilots should adjust the transponder to "on" of normal position as late as practicable prior to takeoff, and "off" or "standby" position as soon as practicable after landing, unless otherwise instructed by ATC.

10.6.4.3 Indent feature and low sensibility feature should be activated only when instructed by ATC.

10.6.4.4 When no instruction on Mode is given by ATC, the transponder should be adjusted to Mode A/C or Mode 3/C.

- 10.6.4.5 When instructed by ATC to “RESET [code number]”, the pilot should confirm and re-select the switch, Mode and Code number on the transponder control panel on board.

#### 10.6.5 **SELECTION OF SSR CODE**

- 10.6.5.1 The selection of SSR Code should be made as instructed by ATC except in the following cases.

##### 10.6.5.2 While flying under VFR

- 1) Below 13,500 feet ..... Code 1200
- 2) At or above 13,500 feet ..... Code 1400

VFR aircraft equipped with 4096 code transponder and squawking Code 1200 or 1400 may be instructed to change the Code to discrete beacon code for operational benefit.

- 10.6.5.3 IFR aircraft entering radar controlled airspace out of non-radar controlled airspace without Code instruction by ATC ..... Code 2000.

*Note: It is preferable that Code 2000 be selected before the aircraft enters radar-controlled airspace or before the aircraft establishes radio communication with the radar control facility.*

- 10.6.5.4 IFR aircraft going out of radar controlled airspace to non-radar controlled airspace ..... Code 2000

- 10.6.5.5 When a pilot feels it necessary to show any of the following in flight conditions;

- 1) Unlawful interference ..... Code 7500
- 2) Communication failure ..... Code 7600
- 3) Emergency ..... Code 7700

*Note: If the aircraft is in direct communication with ATC and under radar control, selection of Code 7700 is not necessarily required.*

#### 10.6.6 **ASSIGNMENT OF SSR CODE**

One of discrete codes from within Code blocks allocated to Nepal in accordance with Table ATS-3 of ICAO MID/ASIA Air Navigation Plan (Doc 8700) will be assigned.

- |                         |           |
|-------------------------|-----------|
| a) International flight | 2501~2577 |
| b) Domestic flight      | 0101~0177 |

*Note: Code 2500 and 0100 are reserved for aircraft, which does not have discrete code capability.*

#### 10.6.7 **TYPE OF TRANSPONDER**

When asked by the ATC the type of transponder, pilots should reply by stating the exact type of transponder on board as below.



Type of transponder	Capacity of transponder
November	None
Alpha (A)	Transponder Mode A/3 (4 digits 4096 codes)
Charlie (C)	Transponder Mode A/3 (4 digits 4096 codes) and Mode C
X- ray (X)	Transponder Mode S without both aircraft identification and pressure altitude transmission
Papa (P)	Transponder Mode S, including pressure altitude transmission, but no aircraft identification transmission.
India (I)	Transponder Mode S, including aircraft identification transmission, but no pressure altitude transmission.
Sierra (S)	Transponder Mode S, including both pressure-altitude and aircraft identification transmission.

#### 10.6.8 **ALTITUDE REPORTING**

10.6.8.1 Altitude reporting capability of Mode C equipped transponder should be activated in flight together with mode 3/A. if instructed by ATC to “Stop squawk Charlie” due to the excessive difference between read out altitude and assigned /reported altitude or other reasons, the altitude reporting switch should be turned off. If no altitude reporting switch is equipped, Mode C reply should be discontinued.

10.6.8.2 When ATC requests, pilot should accurately report his/her altitude because if there is a difference of 300 feet or more between the readout altitude on the radar scope and the assigned/reported altitude, Mode C altitude information is not usable for separation purpose.

10.6.8.3 When selecting or changing SSR Code, pilots should set transponder to standby mode to avoid inadvertent selection of Code assigned to other aircraft and code 7500, 7600 or 7700, then squawk normal again.

#### 10.6.9 **GENERAL RADAR PROVISIONS AND PROCEDURES**

##### 10.6.9.1 **Limitation in the use of Radar**

10.6.9.1.1 Where suitable radar systems and communication systems are available, radar-derived information, including safety-related alerts and warnings such as conflict alert and minimum safe altitude warning, should be used

to the extent possible in the provision of air traffic control service in order to improve capacity and efficiency as well as to enhance safety.

10.6.9.1.2 The number of aircraft simultaneously provided with radar services shall not exceed that which can safely be handled under the prevailing circumstances, taking into account:

- a) the structural complexity of the control area or sector concerned;
- b) the radar functions to be performed within the control area or sector concerned;
- c) assessments of controller workloads and sector capacity;
- d) the degree of technical reliability and availability of the main radar and communication systems;
- e) the possibility of a radar equipment failure or other emergency that would eventually require reverting to back-up facilities and/or non-radar separation; and
- f) the degree of technical reliability and availability of the back-up radar and communication systems.

#### 10.6.9.2 **Performance Checks**

10.6.9.2.1 The radar controller shall adjust the radar display(s) and carry out adequate checks on the accuracy thereof. For this, responsible ATS providers shall develop a daily checklist and publish it in their respective SOPs.

10.6.9.2.2 The radar controller shall be satisfied that the available functional capabilities of the radar system as well as the information presented on the radar display(s) is adequate for the functions to be performed.

10.6.9.2.3 The radar controller shall report, in accordance with local procedures, any fault in the equipment, or any incident requiring investigation, or any circumstances which make it difficult or impractical to provide radar services.

#### 10.6.10 **AIRCRAFT COMMUNICATION FAILURE**

##### 10.6.10.1 **Aircraft radio transmitter failure**

If two-way communication is lost with an aircraft, or the code 7600 is observed, the radar controller should take the following steps;

- 1) First, determine whether or not the aircraft's receiver is functioning by instructing the aircraft on the frequency so far used to acknowledge by making a specified maneuvering and by observing the aircraft's track, or by instructing the aircraft to operate IDENT transmission or to make code changes.
  - **REPLY NOT RECEIVED. IF YOU READ ME** (appropriate instructions)

- 2) If the first action is unsuccessful, it shall be repeated on any other available frequency on which it is believed that the aircraft might be listening.
- 3) When after performing (1), it is confirmed that the radio receiver of the aircraft is functioning, continue to provide the radar service by one-way transmission.
  - (action) OBSERVED. WILL CONTINUE RADAR CONTROL.
- 4) If necessary, instruct the aircraft to answer using Code 7600.
- 5) When necessary to obtain acknowledgement of clearance issued to aircraft, instruct the aircraft to use IDENT transmission or code changes.

#### 10.6.10.2 **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 radar separation is applied, such separation may continue to be used. However, if the aircraft experiencing the communication failure is not identified, radar separation shall be applied between aircraft under radar control 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 failure has passed through the airspace concerned, has landed, or has proceeded elsewhere.

#### 10.6.11 **RADAR EQUIPMENT FAILURE**

10.6.11.1 In the event of complete failure of the radar equipment except for air-ground communications, the radar controller shall;

- (1) Take the necessary action immediately to establish non-radar separation between the aircraft by taking into account the position of the aircraft already identified and inform the aircraft concerned in one way transmission that the radar equipment has failed.
- (2) As an emergency measure, use of flight levels spaced by half the applicable vertical separation minimum may be resorted temporarily if standard non-radar separation cannot be provided immediately.
- (3) Except when there is assurance that the complete radar equipment failure will be of a very limited duration, steps should be taken to limit the number of aircraft permitted to enter the area to that which can be safely handled without the use of radar.
- (4) Inform other ATC facilities/sector concerned of the radar equipment failure immediately.

10.6.11.2 In the event of RDPS failure, only radar monitoring shall be provided.

**10.6.12 RADAR ASSISTANCE TO VFR AIRCRAFT IN WEATHER DIFFICULTY.**

10.6.12.1 If a VFR aircraft requests radar assistance when it encounters or is to encounter IFR weather conditions, advise the aircraft in the following order.

- (1) Ask the pilot if he/she is qualified for and capable of conducting IFR flight.
- (2) If the pilot states he/she is qualified for and capable of IFR flight, request him/her to file an IFR flight plan and then issue clearance to destination airport, as appropriate.
- (3) If the pilot states he/she is not qualified for or not capable of conducting IFR flight, or if he/she refuses to file an IFR flight plan, take whichever of the following actions is appropriate.
  - a. Ask pilot if he will elect to conduct VFR flight to another airport where VMC exist. If required, inform the pilot of aircraft where VMC are reported.
  - b. If the aircraft is equipped with a transponder, identify the aircraft and:
    1. If the pilot declines to conduct VFR flight to another airport, provide radar monitoring and radar separation.
    2. If the aircraft has already encountered IMC, inform the pilot of the appropriate minimum altitude such as MEA, MVA, MSA, etc., and if available, terrain/obstacle clearance minimum altitude.
    3. If the pilot desires radar vectoring, advise him/her to climb to MVA for initiation of radar vectoring to destination airport. In case of RDPS outage, provide only radar monitoring service.

*Note: Avoidance with terrain/obstruction shall be pilot's responsibility.*

10.6.12.2 Use the following techniques to the extent possible when you provide clear communication channel.

- (1) Avoid radio frequency changes except when necessary to provide radar assistance to a pilot not qualified to operate in IFR conditions.
- (2) Make turn while the aircraft is in VFR conditions so that it will be in a position to fly a straight course while in IFR condition.
- (3) Have a pilot lower gear and slow aircraft to approach speed while in VFR conditions.
- (4) Avoid requiring a climb or descend while in a turn if in IFR conditions.
- (5) Avoid abrupt manoeuvres.
- (6) Vector aircraft to VMC.

**10.6.13 SHARING OF CONTROL IN CASE OF HEAVY TRAFFIC**

10.6.13.1 When the traffic volume exceeds or is about to exceed the controllable level, the approach jurisdiction can be splitted into two or more sectors. The procedure of control within those sectors is to be developed by responsible ATS provider and to be mentioned in the respective SOP.

**10.6.14 RESTRICTED PROVISION OF RADAR SERVICE**

10.6.14.1 Due to ground topography and other considerations which affect radar performance and operation, provide limited radar service as per the following chart. However, in case of RDPS outage, do not provide any type of radar service except radar monitoring to only transponder equipped-aircraft.

application type	Ident	type of radar service		
		monitoring	separation	vectoring
VFR without transponder		×	×	×
VFR with transponder	√	√	√	×
IFR without transponder	×	×	×	×
IFR with transponder	√	√	√	√

*Note: “√” depicts ‘applicable’ and “×” depicts ‘inapplicable’.*

**10.6.15 BEACON SYSTEM****10.6.15.1 Application**

10.6.15.1.1 Make beacon code assignment to only Mode 3/A transponder-equipped aircraft.

**10.6.15.2 Assignment of Beacon Code**

10.6.15.2.1 Issue a computer-assigned discrete beacon code to an International flight from 2501~2577 code block. (ICAO allots block codes of 2500~2577 for International flight)

10.6.15.2.2 Issue a computer-assigned discrete beacon code to a domestic flight from 0101~0177 code block. (ICAO allots block codes 0100~0177 for Domestic flight)

10.6.15.2.3 Assigned non-discrete beacon code 0100 and 2500, a special non-discrete code allotted for Kathmandu airport, to an aircraft which does not have discrete beacon code capability.

10.6.15.2.4 Assign departing IFR aircraft a beacon code 2000 on completion of radar service.

10.6.15.2.5 Make radar beacon code assignments with the following phraseologies.

\* SQUAWK ALFA (code)

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\* SQUAWK (code)

10.6.15.3 **Emergency Code**

10.6.15.3.1 Assigned codes to emergency aircraft as follows:

- (1) Code 7700 when the pilot declares an emergency and the aircraft is not radar identified.

\* SQUAWK MAYDAY

- (2) After radio contact and radar identification have been established, you may request

other than single-piloted helicopters to change from 7700 to another appropriate code.

- \* (Aircraft identification) IDENTIFIED, IF FEASIBLE, SQUAWK (code)

*Note: Pilot of single-piloted helicopter may not be able to reposition transponder control during the emergency.*

10.6.15.4 **Unlawful Interference Code**

10.6.15.4.1 When you observe a Mode 3/A Code 7500, do the following.

- (1) Acknowledge and confirm receipt of Code 7500 by asking the pilot to verify it. If the aircraft is not being subjected to unlawful interference, the pilot should respond to query by broadcasting clearly that he is not being subject to unlawful interference. If the reply is in the affirmative or if no reply is received, do not question the pilot further but be responsive to the aircraft requests.
- (2) Initiate actions as per Airport Emergency Procedures.
- (3) Follow the flight of aircraft and use normal transfer/hand-off procedures without requiring transmission or response by aircraft unless communications have been established by the aircraft.

10.6.15.5 **Beacon Termination**

10.6.15.5.1 Inform the aircraft when you want to turn off its transponder.

- \* STOP SQUAWK

10.6.15.6 **Inoperative or Malfunctioning of Transponder/Interrogator**

10.6.15.6.1 Inform an aircraft concerned when the ground interrogator appears to be inoperative or malfunctioning.

10.6.15.6.2 Ensure that the subsequent control position in the facility or the next facility, as applicable, is notified when an aircraft transponder is malfunctioning/ inoperative.

**10.6.15.7 Failure to Display Assigned Beacon Code**

10.6.15.7.1 Inform an aircraft with an operable transponder that the assigned beacon code is not being displayed.

\*RESET SQUAWK (Code)

\* RESET (Code)

10.6.15.7.2 Confirm a pilot that he is squawking the assigned beacon code, when the beacon code displayed on the scope differs from the assigned code and the display on the scope does not change even after instructing to reset.

\*CONFIRM SQUAWK (code)

**10.6.16 RADAR IDENTIFICATION****10.6.16.1 Application**

10.6.16.1.1 Before you provide radar service, establish and maintain radar identification of the aircraft involved.

10.6.16.1.2 If identification is questionable for any reason, such as proximity of targets, duplication of observed action, merging targets, radar interference etc., take immediate action to re-identify the aircraft or terminate radar service. In such a case, inform the aircraft of the reason.

\* FOR CONFIRMATION, SQUAWK IDENT.

**10.6.16.2 Radar Identification Methods**

10.6.16.2.1 Identify a primary or radar beacon target by using one of the following methods:

- (1) Observe a departing aircraft target within one nautical mile of the take-off runway end.
- (2) Observe a target whose position with respect to VOR/DME corresponds with the direct position report received from an aircraft, and the observed track is consistent with the reported heading or route of flight.

*Note: Use a primary target as means of radar identification only when it is displaced together with a beacon target of the same aircraft.*

10.6.16.2.2 When using only Mode Alfa radar beacon to identify a target, use one of the following methods.

- (1) Request the aircraft to activate the "IDENT" feature of the transponder and then observe the identification display.

\* SQUAWK IDENT

\* SQUAWK (code) AND IDENT

\* SQUAWK ALFA (code) AND IDENT

- (2) Request the aircraft to change transponder to a specific discrete or non-discrete code, as appropriate, and then observe the target or code display change.
- 10.6.16.2.3 Do not use the RDPS data block as a radar identification method.
- 10.6.16.2.4 Use the RDPS data block to maintain target identify unless it is in a COAST status.
- 10.6.17 **POSITION INFORMATION**
- 10.6.17.1 Inform an aircraft of its position whenever radar identification is established except when identification is established by position correlation or when a departing aircraft is identified within one nautical mile of the take-off runway end.
  - \* ( aircraft identification) IDENTIFIED, POSITION (position)
- 10.6.17.2 Pass the position information to an aircraft in the following form.
  - (1) Direction (eight cardinal compass point ) and distance from a known position; or
  - (2) Magnetic track and distance to a significant point, an en-route navigation aid, or an approach aid.
- 10.6.18 **QUESTIONABLE IDENTIFICATION**
- 10.6.18.1 Use more than one method of identification when proximity of targets, duplication of observed action, or any circumstances causes doubt as to target identification.
- 10.6.18.2 If identification is questionable for any reason, take immediate action to re-identify the aircraft or terminate radar service.
- 10.6.19 **IDENTIFICATION STATUS**
- 10.6.19.1 Inform an aircraft of radar identification when:
  - (1) Initial radar identification is established.
  - (2) Subsequent to loss of radar identification, terminating radar service or radar identification is reestablished.
- 10.6.19.2 Inform an aircraft when radar identification is lost.
  - \* IDENTIFICATION LOST [alternative instructions, if necessary]
- 10.6.19.3 When unable to identify the aircraft but deemed necessary, inform the aircraft of this and instruct alternative procedures, if necessary.
  - \* NOT YET IDENTIFIED [alternative procedures, if necessary]
- 10.6.20 **RADAR SERVICE TERMINATION**
- 10.6.20.1 Inform the aircraft when radar service is terminated.



\* RADAR SERVICE TERMINATED [non-radar routing, if necessary]

- 10.6.20.2 Radar service is automatically terminated and the aircraft need not be advised of termination when the arriving aircraft is instructed to contact tower.

10.6.21 **POSITION REPORTING**

- 10.6.21.1 If necessary, you may request an aircraft to provide an estimate or report over a specific fix.

*Note: After an aircraft receives the statement “identified” from ATC, it discontinues reporting over compulsory reporting points. It resumes normal position reporting when ATC informs it “identification lost” or “radar service terminated”.*

10.6.22 **RADAR VECTORING**

10.6.22.1 **Application**

- 10.6.22.1.1 Vector aircraft:

- (1) In controlled airspace for separation, safety and operational advantage.
- (2) At or above MVA
- (3) In airspace wherein you have control jurisdiction

- 10.6.22.1.2 Vector only transponder-equipped IFR aircraft. Regardless of flight rules, do not provide any radar service for an aircraft not equipped with a transponder. For a VFR aircraft equipped with a transponder, provide only radar monitoring and radar separation except radar assistance to VFR aircraft in weather difficulty and equipment outage.

- 10.6.22.1.3 When vectoring, ensure aircraft to establish on a non-radar route to be flown within the radar coverage.

10.6.22.2 **Minimum Vectoring Altitude**

- 10.6.22.2.1 Responsible ATS provider shall develop the MVA chart for radar control airspace. Vector the aircraft in compliance with MVA chart.

- 10.6.22.2.2 Design MVA segments with consideration to aircraft manoeuvring ability, obstacle clearance requirements, air traffic flow requirements and radar performance.

- 10.6.22.2.3 Provide 2000 feet above the highest obstacle in the minimum vectoring altitude in each segment of MVA Chart.

- 10.6.22.2.4 Separate each segment boundary at least 3 nautical miles from the obstruction which determines the MVA. ( 5 nautical miles if segments are more than 40 nautical miles away from radar antenna)

**10.6.22.3 Position Information**

10.6.22.3.1 If necessary, information on aircraft of its position with respect to a fix or airway.

- \* OVER/PASSING (fix)
- \* (Number) MILES FROM (fix)
- \* (Number) MILES (direction) OF (fix, airway, or location)
- \* CROSSING/JONING/LEAVING (airway or route)
- \* CROSING/INTRCEPTING (name of VOR) (specified) RADIAL

**10.6.22.4 Methods**

10.6.22.4.1 Vector aircraft by one of the following methods:

(1) Specify direction of turn and magnetic heading to be flown

\*TURN RIGHT/LEFT HEADING (number)

*NOTE: ASK the heading by the following phraseology.*

\* REPORT HEADING

(2) When the heading is unsure and you need imminent heading change,

\* TURN (number) DEGREES RIGHT/LEFT

Ex. TURN THIRTY DEGREES RIGHT

(3) Specify heading

\* FLY HEADING (number)

(4) Instruct to maintain present heading.

\* FLY PRESENT HEADING

(5) Specify departing heading from NAVAID/fix

\* LEAVE (name of fix) HEADING (number)

**10.6.22.5 Items to be issued when Initiating Vector**

10.6.22.5.1 When initiating a vector, issue the following items to the pilots;

1. Vector purpose or vector target.

\* VECTORING FOR (NAVAID/fix/airway)

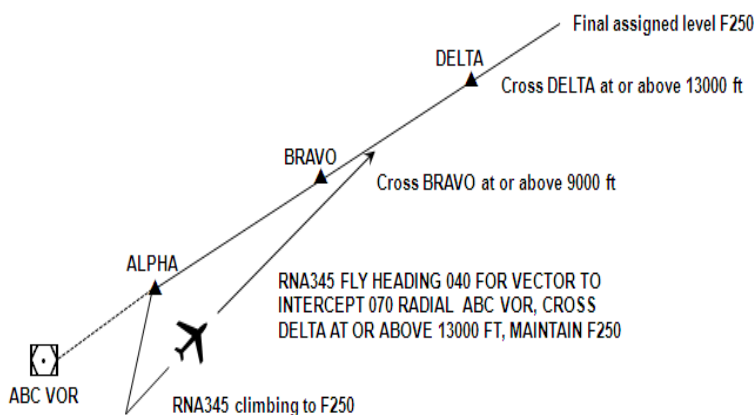
\* VECTORING FOR INTERCEPT (name of VOR) (specified) RADIAL, AIRWAY

\* VECTORING FOR INTERCEPT (specified) BEARING FROM/COURSE TO (name of NDB)

- \* VECTORING FOR FINAL APPROACH COURSE
- \* VECTORING FOR (approach name) FINAL APPROACH COURSE
- \* FOR TRAFFIC
- \* FOR SPACING
- \* FOR SEQUENCING
- \* FOR DELAYING ACTION

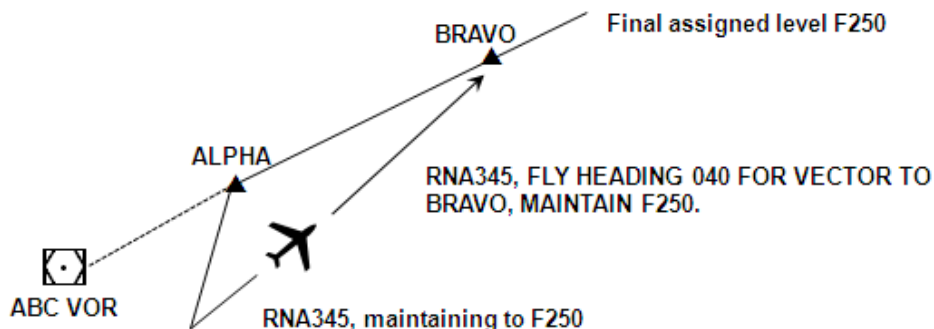
*Note: Except when vectoring for the final approach course, the vector target should be on an approved non-radar route.*

- (2) An altitude to maintain and all appropriate altitude restrictions when;
  - (i) The vector will take the aircraft off an assigned procedure which contains altitude restrictions, i.e., instrument approach, non-radar SID, etc.



- (ii) The previously issued clearance includes crossing restrictions.

*Note: When an aircraft is maintaining the final assigned altitude or is descending/ climbing without restrictions to the final assigned altitude, this may be omitted.*



- (iii) Advance information when a vector will take the aircraft across a previously assigned non-radar route.

- \* EXPECT VECTOR ACROSS (NAVAID radial/ course, airway, route )

**10.6.22.6 Termination of Vector**

10.6.22.6.1 Provide radar navigational guidance until the aircraft is:

- (1) Established within the airspace to be protected for the non-radar route to be flown and will intercept the non-radar route within a reasonable distance.
- (2) Able to proceed to NAVAID on its own navigation.

10.6.22.6.2 When terminating vector, ensure that;

- (1) The pilot is able to intercept non-radar route achieving the MEA, an altitude restriction over fix, MCA, MRA, etc.
- (2) The aircraft satisfies MVA until intercepting the previously assigned non-radar route.

10.6.22.6.3 When terminating vector, inform the aircraft of its position and instruct the aircraft to resume its own navigation. When 10.6.22.1.1 applies, instruct the aircraft to proceed direct to NAVAID. Omit position information if the aircraft is DME equipped and proceeds to VORDME.

- RESUME OWN NAVIGATION (position with respect to route or fix along route)
- RESUME OWN NAVIGATION, DIRECT (name of VORDME)
- RESUME OWN NAVIGATION, DIRECT (name of NAVAID), TRACK (three digits) DISTANCE (number)
- FLY/TURN LEFT (or RIGHT) HEADING (number) TO INTERCEPT (specified) BEARING FROM/COURSE TO (name of NDB), THEN RESUME OWN NAVIGATION, (position with respect to route or fix along route)

10.6.22.6.4 Aircraft instructed to resume a procedure which contains restrictions shall be advised to comply with those restrictions.

- COMPLY WITH RESTRICTIONS

**10.6.23 RADAR HANDOFF****10.6.23.1 Application**

10.6.23.1.1 To provide continuous service to an aircraft and facilitate a safe, orderly, and expeditious flow of traffic, it is often necessary to conduct radar handoff. Radar handoff procedure will be applied when one controller carries heavy traffic load and intends to alleviate them by transferring part of traffic to another controller.

10.6.23.1.2 Handoff an aircraft by either of the following methods.

- (1) Physically point to the target on the receiving controller's display.
- (2) Use RDPS automation capabilities.

- (3) Use voice communication

*Note: RDPS has the extra facility radar handoff capability. The radar handoff is executed by pressing a keyboard attached to a DEDS (Data Entry and Display Subsystem) and slew.*

#### 10.6.23.2 **Transferring Handoff**

##### 10.6.23.2.1 The transferring controller shall:

- (1) Ensure the potential conflicts are solved prior to transferring communications.
- (2) Ensure that restrictions issued to the aircraft are passed to the receiving controller.
- (3) Advise the receiving controller of pertinent information not contained in the data block. Pertinent information includes:
  - i. Assigned heading
  - ii. Altitude information issued
  - iii. Observed track or deviation from the last route clearance.
  - iv. Any other pertinent information.
- (4) Ensure that the data block is associated with the appropriate target.
- (5) When “CST” is displaced in the data block, hand off the aircraft by physically pointing to the target on the receiving controller’s display or wait to initiate handoff until “CST” disappears in the data block.

#### 10.6.23.3 **Receiving Handoff**

##### 10.6.23.3.1 The receiving controller shall:

- (1) ensure that there is a correlation between an automated data block and the target being transferred before accepting a handoff.
- (2) issue restrictions to be complied by the aircraft before accepting the handoff.
- (3) comply with restrictions issued by the transferring controller.

#### 10.6.24 **RADAR SEPERATION**

##### 10.6.24.1 **Application**

##### 10.6.24.1.1 Radar separation may be applied between:

- (1) Radar identified aircraft
- (2) An aircraft taking off and another radar-identified aircraft when the aircraft taking off will be radar-identified within 1 nautical mile of the runway end.

*Note: Radar separation shall not be applied between aircraft holding over the same navigation aid.*

**10.6.24.2 Target Separation****10.6.24.2.1 Apply radar separation:**

- (1) Between the centers of primary targets
- (2) Between the closest ends of beacon control slashes.
- (3) Between the closest end of a beacon control slash and the center of a primary target.

*Note: Apply radar separation to a primarily target only when it is displaced together with a beacon target of the same aircraft.*

**10.6.24.3 Beacon Target Displacement****10.6.24.3.1 Radar separation by beacon target shall be applied only when beacon range accuracy is verified by one of the following methods. If it cannot be verified, use beacon target only for traffic information purpose.**

- (1) Correlate beacon and primary targets of the same aircraft (not necessarily the one being provided separation) to assure that they coincide.
- (2) When beacon and primary targets of the same aircraft do not coincide, correlate them to assure that any beacon displacement agrees with the maximum of ½ nautical mile.

**10.6.24.4 Separation Minima****10.6.24.4.1 Separate aircraft by the following minima. In no circumstances shall primary targets and control slashes be allowed to touch with each other unless vertical separation is provided between aircraft concerned.**

- (1) When less than 40 nautical miles from the antenna: ..... 3 nautical miles
- (2) When 40 nautical miles or more from the antenna: ..... 5 nautical miles

**10.6.24.4.2 When applying radar separation by using displaced beacon target, add a 1-nautical mile correction factor to the applicable minima.****10.6.24.5 Edge of Scope****10.6.24.5.1 Separate radar-controlled aircraft climbing and descending through the altitude of an aircraft that has been tracked to the edge of scope/ display by the following minima until non-radar separation has been established.**

- (1) When less than 40 nautical miles from the antenna: ..... 3 nautical miles from edge of scope.
- (2) When 40 nautical miles or more from the antenna ..... 5 nautical miles from edge of scope.

**10.6.24.6 Validation of Mode C Read Out**

- 10.6.24.6.1 On initial contract with aircraft, verify the accuracy of Mode C derived level information. The tolerance value used to determine that Mode- C derived information displayed to the controller is accurate shall be  $\pm 90$  m ( $\pm 300$  ft)

**To request level check:**

\*CONFIRM (level)

- 10.6.24.6.2 Whenever you observe an invalid Mode C readout:

- (1) Issue the correct altimeter setting and confirm the pilot has accurately reported the altitude.
- (2) If the altitude readout continuous to be invalid, instruct the pilot to turn off the altitude-reporting part of his transponder.

\* SQUAWK CHARLIE

\* CHECK ALTIMETER SETTING AND CONFIRM (level)

\* STOP SQUAWK CHARLIE. WRONG INDICATION

**10.6.25 RADAR DEPARTURE AND ARRIVAL PROCEDURES**

The proceures for providing radar services to the departure and arrival traffic shall be developed by responsible ATS provider under the guidelines of this manual and publish in its SOP.

**10.6.26 VISUAL APPROACH****10.6.26.1 Provision of Radar Seperation**

- 10.6.26.1.1 Provide radar separation between the aircraft executing visual approach and the other arriving/departing aircraft until the tower establishes visual separation.

*Note: A visual approach is an ATC authorization for an IFR aircraft to proceed to the airport in visual reference to the terrain. Since an aircraft executing visual approach is regarded as an IFR aircraft, ATC has yet the responsibility for securing separation with other IFR aircraft and VFR aircraft.*

- 10.6.26.1.2 Provide radar monitoring and traffic information for the above aircraft until communication with them is transferred to the tower.

**10.6.27 SPEED ADJUSTMENT****10.6.27.1 Application**

Keep speed adjustments to the minimum necessary to achieve or maintain required or desired spacing. Permit pilots to resume normal speed when previously specified adjustments are no longer needed.

\* RESUME NORMAL SPPED

*Note: It is pilot's responsibility and prerogative to refuse speed adjustment that he/she considers contrary to the aircraft's operating specifications.*

10.6.27.1.1 Do not assign speed adjustment to aircraft:

- (1) in a holding pattern
- (2) after approach clearance is issued

*Note: At the time approach clearance is issued, previously issued speed adjustments shall be restated if required.*

10.6.27.1.2 Express speed adjustments in terms of knots based on IAS in 10 knots increments.

An arriving aircraft may be instructed to maintain its "maximum speed", "minimum clean speed", "minimum speed", or a specified speed.

*Note: "Minimum clean speed" signifies the minimum speed at which an aircraft can be flown in a clean configuration, i.e. without deployment of lift-augmentation devices, speed brakes or landing gear.*

10.6.27.2 **Methods**

10.6.27.2.1 Instruct aircraft to:

- (1) Maintain present/specific speed
  - \* REPORT SPEED
  - \* MAINTAIN (specific speed) KNOTS
  - \* MAINTAIN PRESENT SPEED
- (2) Increase/ reduce to a specific speed.
  - \* INCREASE/ REDUCE TO (specified speed) KNOTS
  - \* INCREASE/ REDUCE SPEED BY (specified speed) KNOTS

10.6.27.3 **Minima**

Unless a pilot concurs in the use of a lower speed, use the following speed minima:

Aircraft type	Flying miles from the Runway threshold	Altitude	IAS (knots)
All types		13,500 ft~FL280	250
Turbojet	Greater than 20 nautical miles	Below 13,500 ft	210
	20 nautical miles or less	Below 13,500 ft	170
Propeller- driven	20 nautical miles or less	Below 13,500 ft	150



**10.6.28 WEATHER INFORMATION**

Issue pertinent information about weather areas in sufficient time to permit pilot to decide on an appropriate course of action. Provide radar navigational guidance and/or approve deviations around weather areas when requested by the pilot. Do not use word “turbulence” in describing radar- derived weather.

**\* DEVIATION APPROVED ADVISE WHEN ABLE TO RESUME NORMAL NAVIGATION**

Issue weather information by defining the area of coverage in terms of azimuth (by referring to the 12-hour clock) and distance from the aircraft or by indicating the general width of the area and the area of coverage in terms of fixes or distance and direction from fixes.

**\* WEATHER AREA BETWEEN (number) O’CLOCK AND (number) O’CLOCK (number) MILES**

**\* (Nautical mile) MILE BAND OF WEATHER FROM (fix or number of nautical miles and direction from fix) TO (fix or number of nautical miles and direction from fix)**

**10.7 AREA CONTROL SERVICE****10.7.1 RESPONSIBILITY**

Area control service is provided by responsible Area Control Center. Under this service, Area Control Center shall provide air traffic control service to controlled flights in control areas under its jurisdiction in designated frequencies. In addition, flight information service shall be provided in all air space outside control airspace under its jurisdiction.

**10.7.2 RADIO COMMUNICATION**

- (a) Controllers shall maintain a continuous watch on all appropriate radio frequencies and conduct all necessary air ground communications
- (b) Aircraft shall be required to report at designated reporting points.
- (c) An aircraft holding at a holding point shall be required to report at an interval not exceeding 15 minutes.

**10.7.3 ATC CLEARANCES****10.7.3.1 Ref also chapter 10.4.19.3****10.7.3.2 Standard departure clearance**

(Airways clearances)

Clearances shall contain the following in the order listed:

- a) aircraft identification;
- 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;

*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.*

- d) any necessary instructions or information on other matters such as SSR transponder operation, approach or departure maneuvers, 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 started.*

- 10.7.3.3 Pilots should request the clearance in time to receive it before entering the control airspace. If the clearance is not requested, the controller shall pass it without fail before
- 10.7.3.4 When an airways clearance has been requested and is not available at the moment, the controller shall advise the pilot of its subsequent availability using the phrase \*CLEARANCE AVAILABLE\*.  
  
Following the issuance of the initial clearance, additional instructions and information shall be given to the aircraft in flight, or about to enter a control area, as may be necessary to ensure the provision of separation standards, or to approve or refuse a request by a pilot for a change of route, level or speed.
- 10.7.3.5 When it is necessary to issue the instructions contrary to the course of action requested by a pilot, a brief statement of the reason shall be included unless it is believed that the reason will be evident to the pilot in command.
- 10.7.3.6 When it is necessary to increase the longitudinal separation between aircraft not more than 3 minutes, maximum use shall be made of the procedure whereby the succeeding aircraft is to lose time to arrive over the next reporting points at the required time. If such a procedure can be used without involving any significant decrease in the airspeed of the aircraft, it will obviate the need to use the more complicated holding procedures.
- 10.7.3.7 The controller shall undertake separation between arriving and departing aircraft within the area of his/her responsibility but shall coordinate any restrictions to the clearances of a departing aircraft with the approach control unit.
- 10.7.3.8 Traffic information shall be provided to en-route aircraft as and when required.
- 10.7.3.9 **Clearance Limit**
  - 10.7.3.9.1 Every clearance issued shall be specified by a clearance limit.
  - 10.7.3.9.2 A description of the holding path to be flown at the clearance limit may be omitted when:

- a) holding path is published in AIP, or
  - b) a clearance limit has been imposed temporarily, and is expected that the requirement to hold will have lapsed before the aircraft arrives at the designated holding point.
- 10.7.3.9.3 At the discretion of the controller, a request by the pilot in command for deviation from a standard holding path may be approved, if such deviation does not infringe terrain clearance and /or separation.
- 10.7.4 **HOLDING**
- 10.7.4.1 Ref chapter 10.5.4.4
- 10.7.5 **SEPARATION**
- 10.7.5.1 Ref chapter 11
- 10.7.6 **HORIZONTAL SPEED CONTROL INSTRUCTIONS**
- 10.7.6.1 **General**
- 10.7.6.1.1 In order to facilitate a safe and orderly flow of traffic, aircraft may, subject to conditions specified by the appropriate authority, be instructed to adjust speed in a specified manner. Flight crews should be given adequate notice of planned speed control.

*Note1. — Application of speed control over a long period of time may affect aircraft fuel reserves*

- 10.7.6.1.2 Speed control shall not be applied to aircraft entering or established in a holding pattern.
- 10.7.6.1.3 Speed adjustments should be limited to those necessary to establish and/or maintain a desired separation minimum or spacing. Instructions involving frequent changes of speed, including alternate speed increases and decreases, should be avoided.
- 10.7.6.1.4 The flight crew shall inform the ATC unit concerned if at any time they are unable to comply with a speed instruction. In such cases, the controller shall apply an alternative method to achieve the desired spacing between the aircraft concerned.

*Note1. — When an aircraft is heavily loaded and at a high level, its ability to change speed may, in cases, be very limited.*

- 10.7.6.1.5 Aircraft shall be advised when a speed control restriction is no longer required.
- 10.7.6.2 **Methods of application**
- 10.7.6.2.1 In order to establish a desired spacing between two or more successive aircraft, the controller should first reduce the speed of the last aircraft, or increase the speed of the lead aircraft, then adjust the speed(s) of the other aircraft in order.

- 10.7.6.2.2 In order to maintain a desired spacing using speed control techniques, specific speeds need to be assigned to all the aircraft concerned.

*Note1: The true airspeed (TAS) of an aircraft will decrease during descent when maintaining a constant IAS. When two descending aircraft maintain the same IAS, and the leading aircraft is at the lower level, the TAS of the leading aircraft will be lower than that of the following aircraft. The distance between the two aircraft will thus be reduced, unless a sufficient speed differential is applied.*

*Note2: - Time and distance required to achieve a desired spacing will increase with higher levels, higher speeds, and when the aircraft is in a clean configuration.*

#### 10.7.6.3 Descending and arriving aircraft

- 10.7.6.3.1 An aircraft should, when practicable, be authorized to absorb a period of notified terminal delay by cruising at a reduced speed for the latter portion of its flight.
- 10.7.6.3.2 An arriving aircraft may be instructed to maintain its “maximum speed”, “minimum clean speed”, “minimum speed”, or a specified speed.

*Note. — “Minimum clean speed” signifies the minimum speed at which an aircraft can be flown in a clean configuration, i.e. without deployment of lift-augmentation devices, speed brakes or landing gear.*

- 10.7.6.3.3 Speed reductions to less than 460 km/h (250 knots) IAS for turbojet aircraft during initial descent from cruising level should be applied only with the concurrence of the flight crew.
- 10.7.6.3.4 Instructions for an aircraft to simultaneously maintain a high rate of descent and reduce its speed should be avoided as such maneuvers are normally not compatible. Any significant speed reduction during descent may require the aircraft to temporarily level off to reduce speed before continuing descent.
- 10.7.6.3.5 Arriving aircraft should be permitted to operate in a clean configuration for as long as possible. Below 4 550 m (FL 150), speed reductions for turbojet aircraft to not less than 410 km/h (220 knots) IAS, which will normally be very close to the minimum speed of turbojet aircraft in a clean configuration, may be used.
- 10.7.6.3.6 Only minor speed reductions not exceeding plus/minus 40 km/h (20 knots) IAS should be used for aircraft on intermediate and final approach.
- 10.7.6.3.7 Speed control should not be applied to aircraft after passing a point 7 km (4 NM) from the threshold on final approach.

#### 10.7.7 VERTICAL SPEED CONTROL INSTRUCTIONS

##### 10.7.7.1 General

- 10.7.7.1.1 In order to facilitate a safe and orderly flow of traffic, aircraft may be instructed to adjust rate of climb or rate of descent. Vertical speed control

may be applied between two climbing aircraft or two descending aircraft in order to establish or maintain a specific vertical separation minimum.

10.7.7.1.2 Vertical speed adjustments should be limited to those necessary to establish and/or maintain a desired separation minimum. Instructions involving frequent changes of climb/descent rates should be avoided.

10.7.7.1.3 The flight crew shall inform the ATC unit concerned if unable, at any time, to comply with a specified rate of climb or descent. In such cases, the controller shall apply an alternative method to achieve an appropriate separation minimum between aircraft, without delay.

10.7.7.1.4 Aircraft shall be advised when a rate of climb/descent restriction is no longer required.

10.7.7.2 **Methods of application**

10.7.7.2.1 An aircraft may be instructed to expedite climb or descent as appropriate to or through a specified level, or may be instructed to reduce its rate of climb or rate of descent.

10.7.7.2.2 Climbing aircraft may be instructed to maintain a specified rate of climb, a rate of climb equal to or greater than a specified value or a rate of climb equal to or less than a specified value.

10.7.7.2.3 Descending aircraft may be instructed to maintain a specified rate of descent, a rate of descent equal to or greater than a specified value or a rate of descent equal to or less than a specified value.

10.7.7.2.4 In applying vertical speed control, the controller should ascertain to which level(s) climbing aircraft can sustain a specified rate of climb or, in the case of descending aircraft, the specified rate of descent which can be sustained, and shall ensure that alternative methods of maintaining separation can be applied in a timely manner, if required.

*Note. — Controllers need to be aware of aircraft performance characteristics and limitations in relation to a simultaneous application of horizontal and vertical speed limitations.*

10.7.8 **CHANGE FROM IFR TO VFR FLIGHT**

10.7.8.1 Change from instrument flight rules (IFR) flight to visual flight rules (VFR) flight is only acceptable when a message initiated by the pilot-in-command containing the specific expression “CANCELLING MY IFR FLIGHT”, together with the changes, if any, to be made to the current flight plan, is received by an air traffic services unit. No invitation to change from IFR flight to VFR flight is to be made either directly or by inference.

10.7.8.2 No reply, other than the acknowledgment “IFR FLIGHT CANCELLED AT ... (time)”, should normally be made by an air traffic services unit.

10.7.8.3 When an ATS unit is in possession of information that instrument meteorological conditions are likely to be encountered along the route of

flight, a pilot changing from IFR flight to VFR flight should, if practicable, be so advised.

- 10.7.8.4 An ATC unit receiving notification of an aircraft's intention to change from IFR to VFR flight shall, as soon as practicable thereafter, so inform all other ATS units to whom the IFR flight plan was addressed, except those units through whose regions or areas the flight has already passed.

10.7.9 **POSITION REPORTING**

10.7.9.1 **Transmission of position reports**

- 10.7.9.1.1 On routes defined by designated significant points, position reports shall be made by the aircraft when over, or as soon as possible after passing, each designated compulsory reporting point except as provided in 10.7.9.1.3 and 10.7.9.2. Additional reports over other points may be requested by the appropriate ATS unit.

- 10.7.9.1.2 On routes not defined by designated significant points, position reports shall be made by the aircraft as soon as possible after the first half hour of flight and at hourly intervals thereafter, except as provided in 10.7.9.1.3. Additional reports at shorter intervals of time may be requested

- 10.7.9.1.3 Under conditions specified by the appropriate ATS authority, flights may be exempted from the requirement to make position reports at each designated compulsory reporting point or interval. In applying this, account should be taken of the meteorological requirement for the making and reporting of routine aircraft observations.

- 10.7.9.1.4 The position reports required by 10.7.9.1.1 and 10.7.9.1.2 shall be made to the ATS unit serving the airspace in which the aircraft is operated. In addition, when so prescribed by the appropriate ATS authority in aeronautical information publications or requested by the appropriate ATS unit, the last position report before passing from one FIR or control area to an adjacent FIR or control area shall be made to the ATS unit serving the airspace about to be entered.

- 10.7.9.1.5 If a position report is not received at the expected time, subsequent control shall not be based on the assumption that the estimated time is accurate. Immediate action shall be taken to obtain the report if it is likely to have any bearing on the control of other aircraft.

- 10.7.9.1.6 The controller responsible for obtaining the position report shall also be responsible for checking its details and in particular the pilots estimate for the next position report.

- 10.7.9.1.7 The estimate shall be checked for two purposes:

- a) To make sure that it is consistent with the time of receipt of the report as a whole, and
- b) To compare the time interval used by the pilot, with a time interval based on the ground speed made good between the reporting point just passed and the previous reporting point.

- 10.7.9.1.8 If the second interval of(b) above varies by not more than 3 minutes from that estimated by the pilot, then the pilot's estimate may be accepted for control purpose but if the variation is greater than 3 minutes, then the pilot shall be requested to check and advise his/her ground speed. An estimate based on his/her subsequently advised ground speed shall then be used for control purpose.
- 10.7.9.1.9 Estimates for all subsequent reporting points within the jurisdiction of the unit concerned shall be amended in accordance with the pilot's revised estimated ground speed.
- 10.7.9.1.10 If the controller is aware of any facts likely to be useful to the pilot in estimating ground speeds over any route segment e.g. head or tail wind components found by other aircraft, he/she shall inform the pilot accordingly. If practicable, this should be done before the pilot makes his/her estimates for the route segment concerned.
- 10.7.9.1.11 The level in the position report shall be in accordance with that authorized and if different, shall be checked at once with the aircraft itself. If there is any doubt about the actual level occupied by the reporting aircraft, action shall be taken immediately to safeguard other aircraft. If it is found that the aircraft is occupying a level different from that authorized, appropriate instructions shall be issued to maintain separation standards.
- 10.7.9.1.12 A pilot is required to report his/her level with all frequency changes. These shall be checked if omitted by the pilot.
- 10.7.9.2 **Contents of voice communication report**
- 10.7.9.2.1 Contents of voice position reports
- 10.7.9.2.1.1 The position reports required by 10.7.9.1.1 and 10.7.9.1.2 shall contain the following elements of information, except that elements (4), (5) and (6) may be omitted from position reports transmitted by radiotelephony, when so prescribed on the basis of regional air navigation agreements:
- 1) aircraft identification
  - 2) position
  - 3) time
  - 4) flight level or altitude, including passing level and cleared level if not maintaining the cleared level
  - 5) next position and time over
  - 6) ensuring significant point.
- 10.7.9.2.1.2 Element (4), flight level or altitude, shall, however, be included in the initial call after changing to a new radio frequency.
- 10.7.9.2.1.3 When assigned a speed to maintain, the flight crew shall include this speed in their position reports. The assigned speed shall also be advised on first

contact with an ATC unit after a frequency change, whether or not a full position report is required.

*Note. — Omission of element (4) may be possible when flight level or altitude, as appropriate, derived from SSR Mode C information can be made continuously available to controllers in labels associated with the radar position indication of aircraft and when adequate procedures have been developed to guarantee the safe and efficient use of SSR Mode C information.*

#### 10.7.9.3 **Level Assignment**

##### 10.7.9.3.1 Assignment of cruising levels for controlled flights

10.7.9.3.1.1 An ATC unit shall normally authorize only one level for an aircraft beyond its control area, i.e. that level at which the aircraft will enter the next control area whether contiguous or not. It is the responsibility of the accepting ATC unit to issue clearance for further climb as appropriate. When relevant, aircraft will be advised to request en route any cruising level changes desired.

10.7.9.3.1.2 Aircraft authorized to employ cruise climb techniques shall be cleared to operate between two levels or above a level.

10.7.9.3.1.3 If it is necessary to change the cruising level of an aircraft operating along an established ATS route extending partly within and partly outside controlled airspace and where the respective series of cruising levels are not identical, the change shall, whenever possible, be effected within controlled airspace.

10.7.9.3.1.4 When an aircraft has been cleared into a control area at a cruising level which is below the established minimum cruising level for a subsequent portion of the route, the ATC unit responsible for the area should issue a revised clearance to the aircraft even though the pilot has not requested the necessary cruising level change.

10.7.9.3.1.5 An aircraft may be cleared to change cruising level at a specified time, place or rate.

10.7.9.3.1.6 In so far as practicable, cruising levels of aircraft flying to the same destination shall be assigned in a manner that will be correct for an approach sequence at destination.

10.7.9.3.1.7 An aircraft at a cruising level shall normally have priority over other aircraft requesting that cruising level. When two or more aircraft are at the same cruising level, the preceding aircraft shall normally have priority.

10.7.9.3.1.8 Throughout Kathmandu FIR, the semi-circular system of cruising levels shall be used at and above FL 150. The quadrantal systems of cruising levels shall be applicable at and below 13500 feet.

10.7.9.3.1.9 The cruising levels to be assigned to controlled flights shall be selected from those allocated in the tables of cruising levels in Appendix I of this manual and as published in AIP.



10.7.9.3.1.10 Subject to the provision of separation, the aircraft with the first priority shall be given the lowest assignable level and higher levels shall then be allocated in order to subsequent priority

10.7.9.4 Assignment of level during climb or descent

10.7.9.4.1 An aircraft may be cleared to a level previously occupied by another aircraft after the latter has reported at or passing another level separated by the required minimum except when:

- a) severe turbulence is known to exist;
- b) the higher aircraft is effecting a cruise climb; or
- c) there is difference in aircraft performance.

10.7.9.4.2 An aircraft may be given the next lower assignable level after the aircraft which had vacated the level has reported a level at least 1000 feet below the vacated level.

10.7.9.4.3 In assigning altitudes whenever, weather conditions make successful approaches doubtful, allowances shall be made for the possibility of an aircraft having to climb to the altitude specified for missed approach.

10.7.9.4.4 In assigning of the levels in approach sequence, the following Para regarding the preservation of separation should be noted:

10.7.9.4.4.1 When aircraft which are descending on routes having decreasing lateral separation are cleared into the same area, and vertical separation has to be applied, the normal process should be to establish vertical separation and a step-down sequence well before lateral separation is lost. Clearance requiring an aircraft to reach a level by DME distance must therefore be carefully considered for practicability.

10.7.9.4.4.2 Pilots in direct communication with each other may, with their concurrence, be cleared to maintain a specified vertical separation between their aircraft during ascent or descent.

#### 10.7.10 **STRIP MARKING**

Strip marking should be accomplished in accordance with the Strip Marking Procedure. Refer Annex J.

## CHAPTER 11

### SEPARATION METHODS AND MINIMA

#### 11.1 INTRODUCTION

*Note 1. — With the exceptions stated below, this chapter contains procedures and procedural separation minima for use in the separation of aircraft in the en-route phase as well as aircraft in the arrival and departure phases of flight.*

*Note 2. — Procedures and separation minima applicable in the provision of aerodrome control service are contained in Chapter 10.4 and procedures and separation minima applicable to the use of ATS surveillance systems are contained in Chapter 10.6.*

#### 11.2 PROVISION FOR THE SEPARATION OF CONTROLLED TRAFFIC

##### 11.2.1 General

11.2.1.1 Vertical or horizontal separation shall be provided:

- a. between IFR flights and VFR flights in Class C airspace;
- b. between IFR flights and special VFR flights; and
- c. between special VFR flights, when so prescribed by the appropriate ATS authority.

11.2.1.2 No clearance shall be given to execute any manoeuvre that would reduce the spacing between two aircraft to less than the separation minimum applicable in the circumstances.

11.2.1.3 Larger separations than the specified minima should be applied whenever exceptional circumstances such as unlawful interference or navigational difficulties call for extra precautions. This should be done with due regard to all relevant factors so as to avoid impeding the flow of air traffic by the application of excessive separations.

*Note. — Unlawful interference with an aircraft constitutes a case of exceptional circumstances which might require the application of separations larger than the specified minima, between the aircraft being subjected to unlawful interference and other aircraft.*

11.2.1.4 Where the type of separation or minimum used to separate two aircraft cannot be maintained, another type of separation or another minimum shall be established prior to the time when the current separation minimum would be infringed.

##### 11.2.2 Degraded aircraft performance

Whenever, as a result of failure or degradation of navigation, communications, altimetry, flight control or other systems, aircraft performance is degraded below the level required for the airspace in which it is operating, the flight

crew shall advise the ATC unit concerned without delay. Where the failure or degradation affects the separation minimum currently being employed, the controller shall take action to establish another appropriate type of separation or separation minimum.

## **11.3 VERTICAL SEPARATION**

### **11.3.1 Vertical separation application**

Vertical separation is obtained by requiring aircraft using prescribed altimeter setting procedures to operate at different levels expressed in terms of flight levels or altitudes in accordance with the provisions in Chapter 8.

### **11.3.2 Vertical separation minimum**

The vertical separation minimum (VSM) shall be:

- a) a nominal 300 m (1 000 ft) below FL 290 and a nominal 600 m (2 000 ft) at or above this level, except as provided for in b) below; and
- b) within RVSM airspace (from FL 290 to FL 410): a nominal 300 m (1 000 ft) and a nominal 600 m (2 000 ft) at or above this level.

### **11.3.3 Vertical separation during climb or descent**

11.3.3.1 An aircraft may be cleared to a level previously occupied by another aircraft after the latter has reported vacating it, except when:

- a) severe turbulence is known to exist;
- b) the difference in aircraft performance is such that less than the applicable separation minimum may result; in which case such clearance shall be withheld until the aircraft vacating the level has reported at or passing another level separated by the required minimum.

11.3.3.2 When the aircraft concerned are entering or established in the same holding pattern, consideration shall be given to aircraft descending at markedly different rates and, if necessary, additional measures such as specifying a maximum descent rate for the higher aircraft and a minimum descent rate for the lower aircraft should be applied to ensure that the required separation is maintained.

11.3.3.3 Pilots in direct communication with each other may, with their concurrence, be cleared to maintain a specified vertical separation between their aircraft during ascent or descent.

## **11.4 HORIZONTAL SEPARATION**

### **11.4.1 Lateral separation**

#### **11.4.1.1 Lateral Separation Application**

11.4.1.1.1 Lateral separation shall be applied so that the distance between those portions of the intended routes for which the aircraft are to be laterally

separated is never less than an established distance to account for navigational inaccuracies plus a specified buffer. This buffer shall be determined by the appropriate authority and included in the lateral separation minima as an integral part thereof.

*Note.— In the minima specified in 11.4.1.2 an appropriate buffer has already been included.*

11.4.1.1.2 Lateral separation of aircraft is obtained by requiring operation on different routes or in different geographical locations as determined by visual observation, by the use of navigation aids or by the use of area navigation (RNAV) equipment.

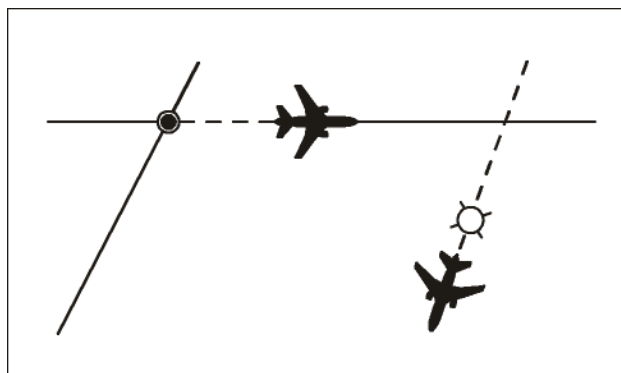
11.4.1.1.3 When information is received indicating navigation equipment failure or deterioration below the navigation performance requirements, ATC shall then, as required, apply alternative separation methods or minima.

#### 11.4.1.2 Lateral Separation Criteria and Minima

11.4.1.2.1 Means by which lateral separation may be applied include the following:

11.4.1.2.1.1 By reference to the same or different geographic locations.

By position reports which positively indicate the aircraft are over different geographic locations as determined visually or by reference to a navigation aid (see Figure 11-1).

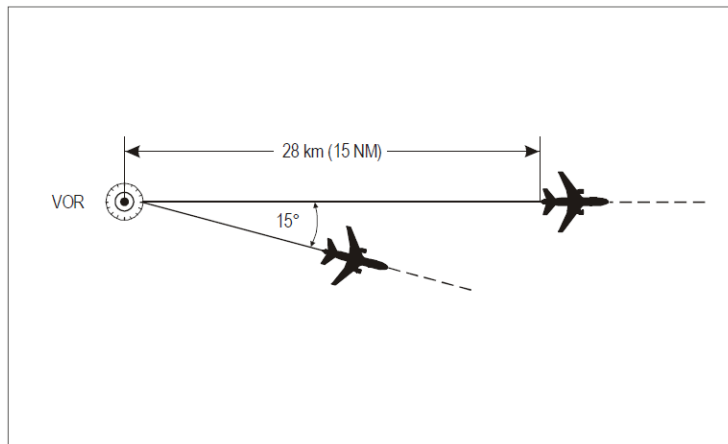


**Figure 11-1. Using same or different geographic locations**

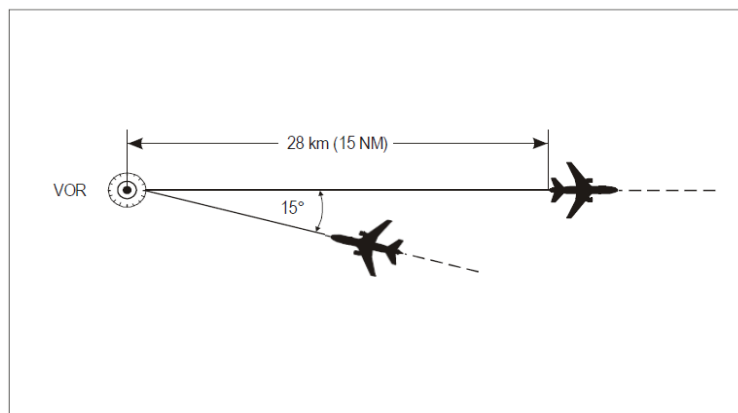
#### 11.4.1.2.1.2 By use of the same navigation aid or method.

By requiring aircraft to fly on specified tracks which are separated by a minimum amount appropriate to the navigation aid or method employed. Lateral separation between two aircraft exists when:

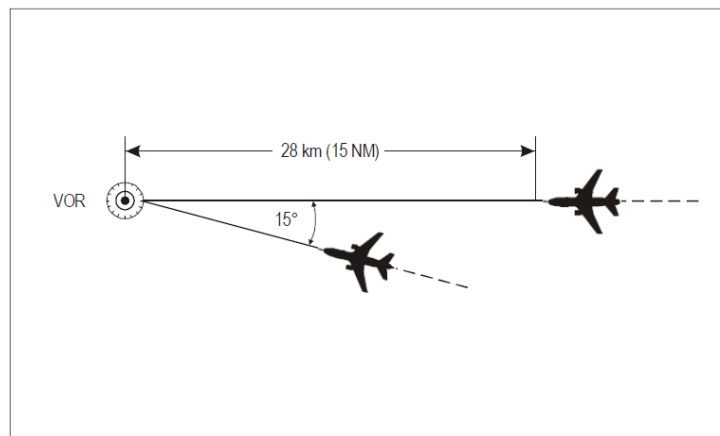
- a) VOR: both aircraft are established on radials diverging by at least 15 degrees and at least one aircraft is at a distance of 28 km (15 NM) or more from the facility (see Figure 11-2, 11-3 and 11-4);



**Figure 11-2. Separation using the same VOR**

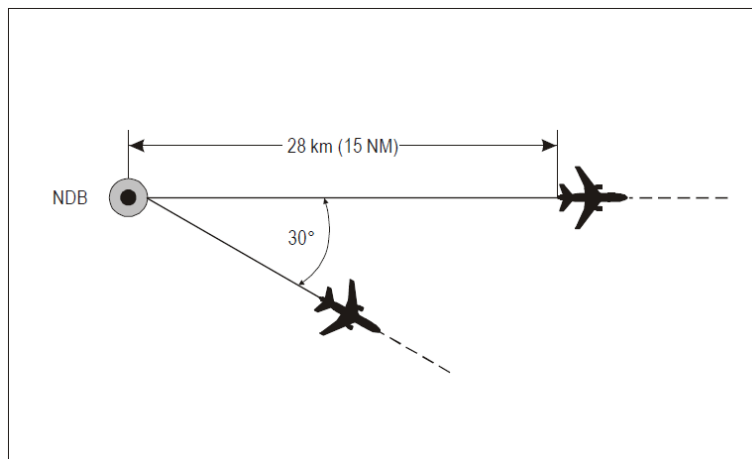


**Figure 11-3. Separation using the same VOR**

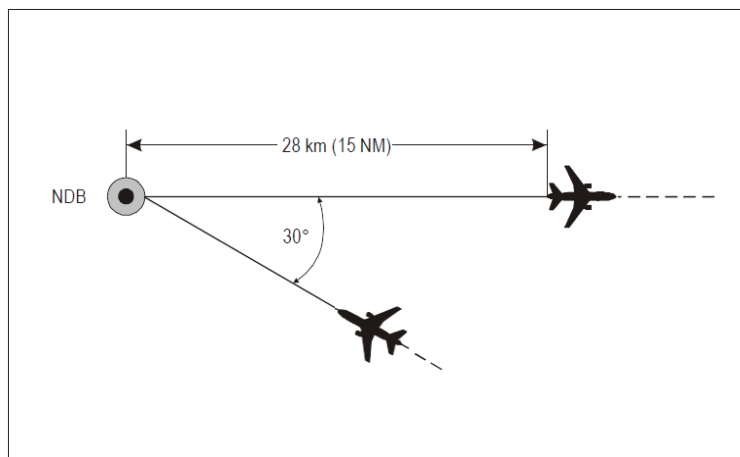


**Figure 11-4. Separation using the same VOR**

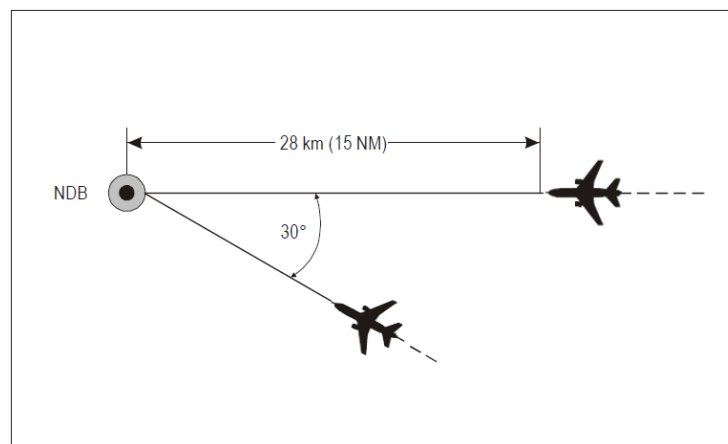
- a) NDB: both aircraft are established on tracks to or from the NDB which are diverging by at least 30 degrees and at least one aircraft at a time distance equivalent to 15 NM or more from the facility (see Figure 11-5, 11-6 and 11-7);



**Figure 11-5. Separation using the same NDB**



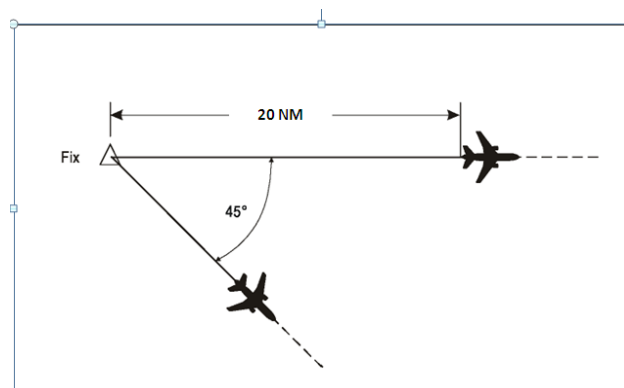
**Figure 11-6. Separation using the same NDB**



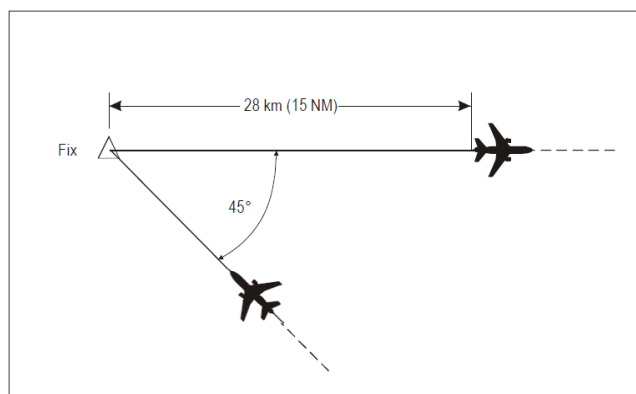
**Figure 11-7. Separation using the same NDB**

- b) Dead Reckoning (DR): both aircraft are established on tracks diverging by at least 45 degrees and at least one aircraft is at a distance of 28 km (15 NM) or more from the point of intersection of the tracks, this point being determined either visually or by reference to a navigation aid and

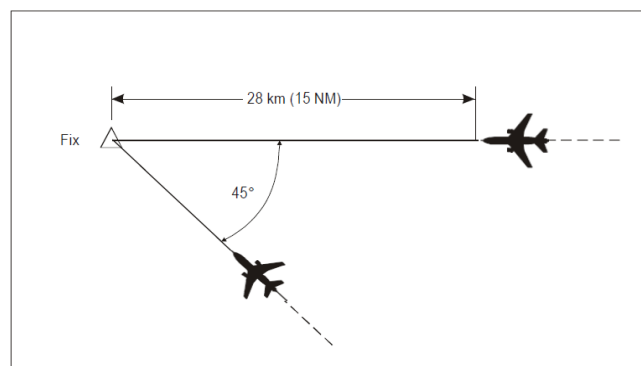
both aircraft are established outbound from the intersection (see Figure 11-8, 11-9 and 11-10); or



**Figure 11-8. Separation using dead reckoning**



**Figure 11-9. Separation using dead reckoning**

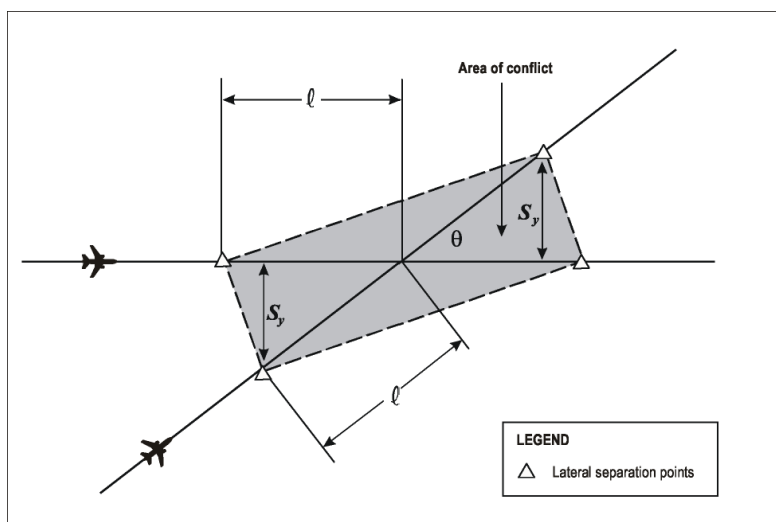


**Figure 11-10. Separation using dead reckoning**

- c) RNAV operations: both aircraft are established on tracks which diverge by at least 15 degrees and the protected airspace associated with the track of one aircraft does not overlap with the protected airspace associated with the track of the other aircraft. This is determined by applying the angular difference between two tracks and the appropriate

protected airspace value. The derived value is expressed as a distance from the intersection of the two tracks at which lateral separation exists.

- 11.4.1.2.1.2.1 When aircraft are operating on tracks which are separated by considerably more than the foregoing minimum figures, the distance at which lateral separation is achieved can be reduced.
- 11.4.1.2.1.3 **By use of different navigation aids or methods.** Lateral separation between aircraft using different navigation aids, or when one aircraft is using RNAV equipment, shall be established by ensuring that the derived protected airspaces for the navigation aid(s) or RNP do not overlap.
- 11.4.1.2.1.4 **RNAV operations where RNP is specified on ATS routes.** Within designated airspace or on designated routes, where RNP is specified, lateral separation between RNAV-equipped aircraft can be obtained by requiring aircraft to be established on the centre lines of ATS routes spaced at a distance which ensures that the protected airspace of the ATS routes does not overlap.
- 11.4.1.2.1.5 **RNAV operations (where RNP is specified) on intersecting tracks or ATS routes.** The use of this separation is limited to intersecting tracks that converge to or diverge from a common point at angles between 15 and 135 degrees.
- 11.4.1.2.1.5.1 For intersecting tracks, the entry points to and the exit points from the area in which lateral distance between the tracks is less than the required minimum are termed lateral separation points. The area bound by the lateral separation points is termed the area of conflict (see Figure 11-11).
- 11.4.1.2.1.5.2 Lateral separation exists between two aircraft when at least one of the aircraft is outside the area of conflict.



**Figure 11-11. Lateral separation points and the area of conflict (see 11.4.1.2.1.5.1)**

*Note.*— The lateral separation points are calculated by the formula:  $\ell = S_y / \sin \theta$  where:



$S_y$  = the lateral distance between the tracks equal to the lateral separation minimum;

$\ell$  = the distance of the lateral separation point from the intersection; and  $\theta$  = the angle between tracks.

11.4.1.2.1.6 **Transitioning into airspace where a greater lateral separation minimum applies.** Lateral separation will exist when aircraft are established on specified tracks which:

- a) are separated by an appropriate minimum; and
- b) diverge by at least 15 degrees until the applicable lateral separation minimum is established; providing that it is possible to ensure, by means approved by the appropriate ATS authority, that aircraft have the navigation capability necessary to ensure accurate track guidance.

## 11.4.2 Longitudinal separation

### 11.4.2.1 Longitudinal Separation Application

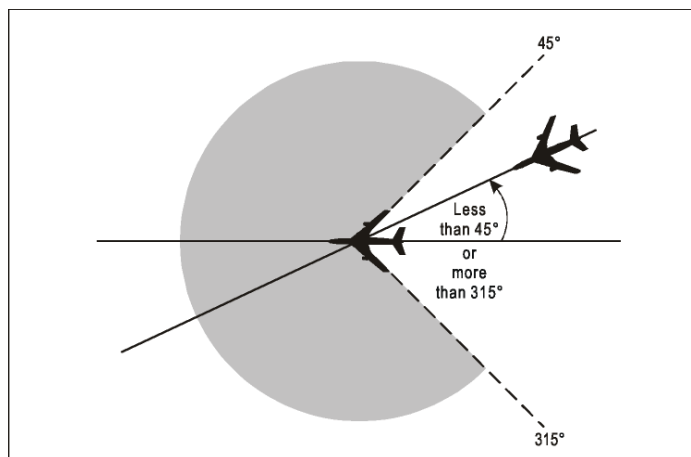
11.4.2.1.1 Longitudinal separation shall be applied so that the spacing between the estimated positions of the aircraft being separated is never less than a prescribed minimum. Longitudinal separation between aircraft following the same or diverging tracks can be maintained by application of speed control.

11.4.2.1.2 In applying a time- or distance-based longitudinal separation minimum between aircraft following the same track, care shall be exercised to ensure that the separation minimum will not be infringed whenever the following aircraft is maintaining a higher airspeed than the preceding aircraft. When aircraft are expected to reach minimum separation, speed control shall be applied to ensure that the required separation minimum is maintained.

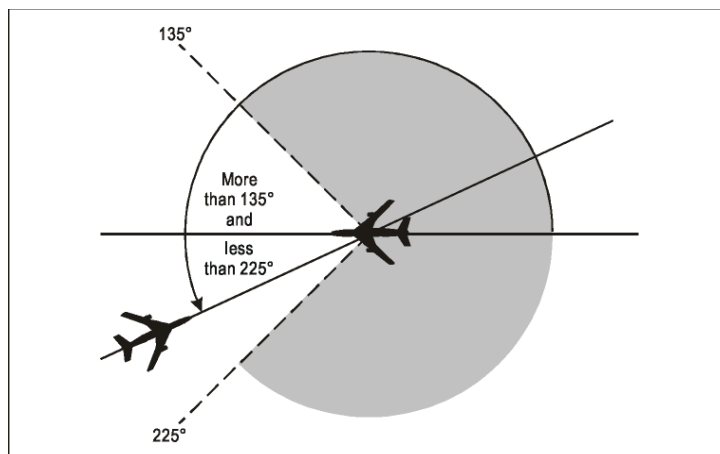
11.4.2.1.3 Longitudinal separation can be established by requiring aircraft to depart at a specified time, to arrive over a geographical location at a specified time, or to hold over a geographical location until a specified time.

11.4.2.1.4 For the purpose of application of longitudinal separation, the terms *same track*, reciprocal tracks and crossing tracks shall have the following meanings:

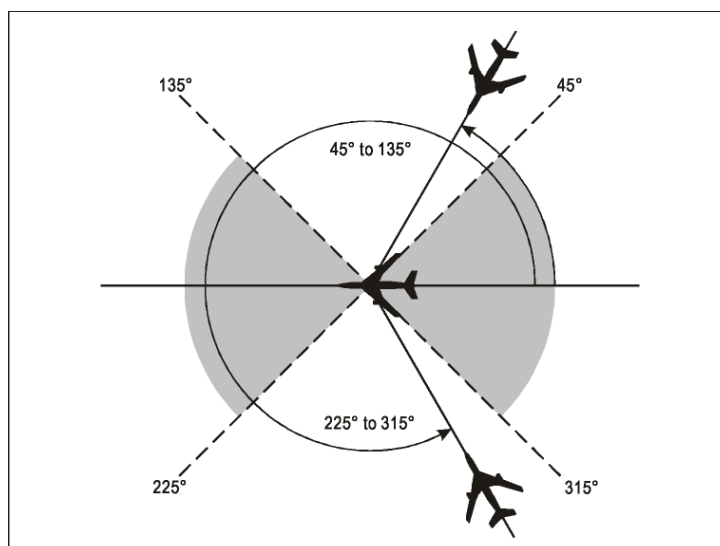
- a) Same track (see Figure 11-12):  
same direction tracks and intersecting tracks or portions thereof, the angular difference of which is less than 45 degrees or more than 315 degrees, and whose protected airspaces overlap.
- b) Reciprocal tracks (see Figure 11-13):  
opposite tracks and intersecting tracks or portions thereof, the angular difference of which is more than 135 degrees but less than 225 degrees, and whose protected airspaces overlap.
- c) Crossing tracks (see Figure 11-14): intersecting tracks or portions thereof other than those specified in a) and b) above.



**Figure 11-12. Aircraft on same track (see 11.4.2.1.4 a))**



**Figure 11-13. Aircraft on reciprocal tracks (see 11.4.2.1.4 b))**



**Figure 11-14. Aircraft on crossing tracks (see 11.4.2.1.4 c))**

**11.4.2.2 Longitudinal Separation Minima based on Time****11.4.2.2.1 Aircraft Maintaining the same Level****11.4.2.2.1.1 Aircraft flying on the same track:**

- (a) 15 minutes (see Figure 11-15); or
- (b) 10 minutes, if navigation aids permit frequent determination of position and speed (see Figure 11-16); or
- (c) 5 minutes in the following cases, provided that in each case the preceding aircraft is maintaining a true airspeed of 37 km/h (20 kt) or more faster than the succeeding aircraft (see Figure 11-17):
  - (1) between aircraft that have departed from the same aerodrome;
  - (2) between en-route aircraft that have reported over the same exact significant point;
  - (3) between departing and en-route aircraft after the en-route aircraft has reported over a fix that is so located in relation to the departure point as to ensure that five-minute separation can be established at the point the departing aircraft will join the air route; or
- (d) 3 minutes in the cases listed under c) provided that in each case the preceding aircraft is maintaining a true airspeed of 74 km/h (40 kt) or more faster than the succeeding aircraft (see Figure 11-18)

**11.4.2.2.1.2 Aircraft flying on crossing tracks:**

- (a) 15 minutes at the point of intersection of the tracks (see Figure 11-19); or
- (b) 10 minutes if navigation aids permit frequent determination of position and speed (see Figure 11-20).

**11.4.2.2.2 Aircraft Climbing or Descending****11.4.2.2.2.1 Aircraft on the same track.** When an aircraft will pass through the level of another aircraft on the same track, the following minimum longitudinal separation shall be provided:

- a) 15 minutes while vertical separation does not exist (see Figures 11-21A and 11-21B); or
- b) 10 minutes while vertical separation does not exist, provided that such separation is authorized only where navigation aids permit frequent determination of position and speed (see Figures 11-22A and 11-22B); or
- c) 5 minutes while vertical separation does not exist, provided that the level change is commenced within 10 minutes of the time the second aircraft has reported over an exact reporting point (see Figures 11-23A and 11-23B).

*Note.— To facilitate application of the procedure where a considerable change of level is involved, a descending aircraft may be cleared to some convenient level above the lower aircraft, or a climbing aircraft to some convenient level below the higher aircraft, to permit a further check on the separation that will be obtained while vertical separation does not exist.*

**11.4.2.2.2 Aircraft on crossing tracks:**

- a) 15 minutes while vertical separation does not exist (see Figures 11-24A and 11-24B); or
- b) 10 minutes while vertical separation does not exist if navigation aids permit frequent determination of position and speed (see Figures 11-25A and 11-25B).

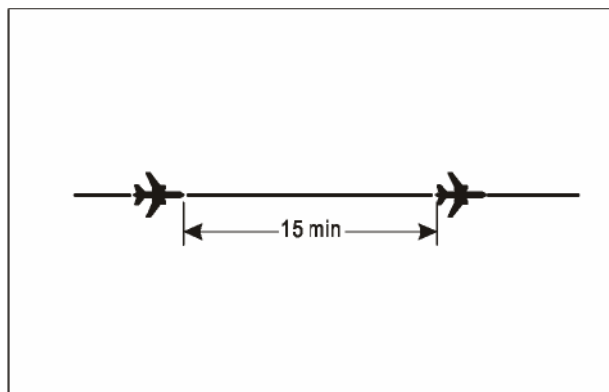
**11.4.2.2.3 Aircraft on reciprocal tracks.** Where lateral separation is not provided, vertical separation shall be provided for at least ten minutes prior to and after the time the aircraft are estimated to pass, or are estimated to have passed (see Figure 11-26). Provided it has been determined that the aircraft have passed each other, this minimum need not apply.

**11.4.2.3 Longitudinal Separation Minima based on Distance using Distance Measuring Equipment (DME) and/or GNSS**

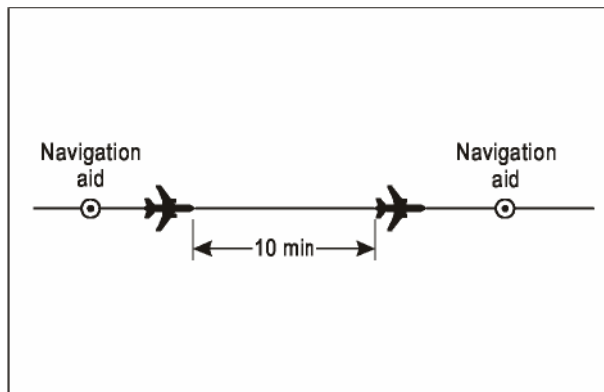
*Note.— Where the term “on track” is used in the provisions relating to the application of longitudinal separation minima using DME and/or GNSS, it means that the aircraft is flying either directly inbound to or directly outbound from the station/waypoint.*

**11.4.2.3.1** Separation shall be established by maintaining not less than specified distance(s) between aircraft positions as reported by reference to DME in conjunction with other appropriate navigation aids and/or GNSS. This type of separation shall be applied between two aircraft using DME, or two aircraft using GNSS, or one aircraft using DME and one aircraft using GNSS. Direct controller-pilot VHF voice communication shall be maintained while such separation is used.

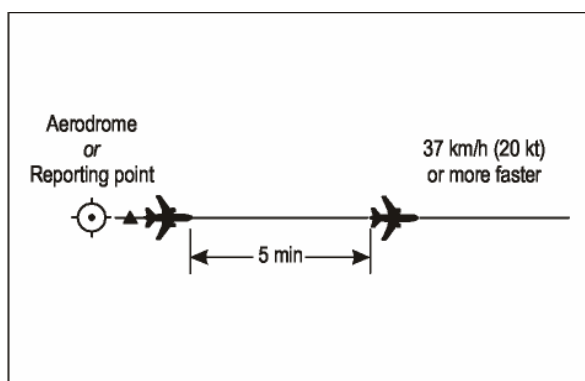
*Note.— For the purpose of applying GNSS-based separation minimum, a distance derived from an integrated navigation system incorporating GNSS input is regarded as equivalent to GNSS distance.*



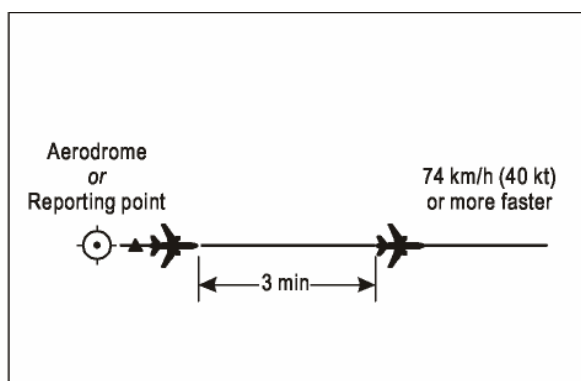
**Figure 11-15. Fifteen-minute separation between aircraft on same track and same level (see 11.4.2.2.1.1 a))**



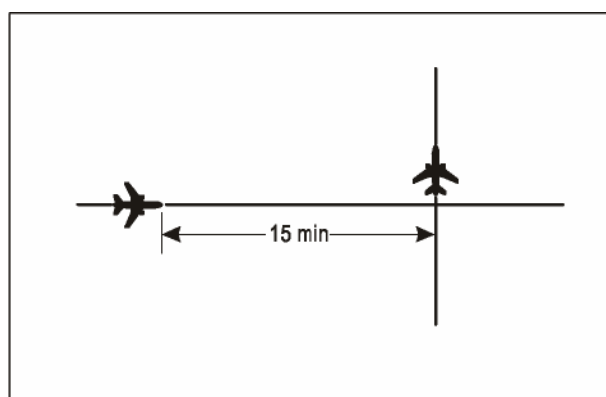
**Figure 11-16. Ten-minute separation between aircraft on same track and same level (see 11.4.2.2.1.1 b))**



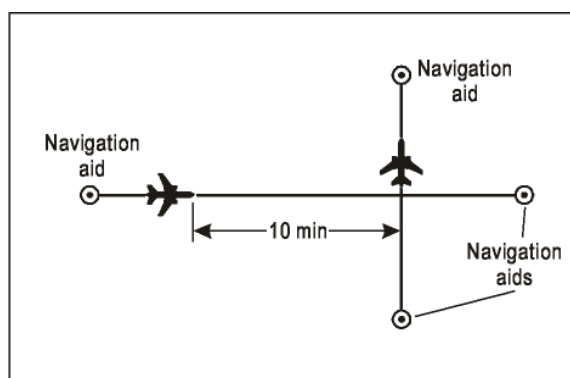
**Figure 11-17. Five-minute separation between aircraft on same track and same level (see 11.4.2.2.1.1 c))**



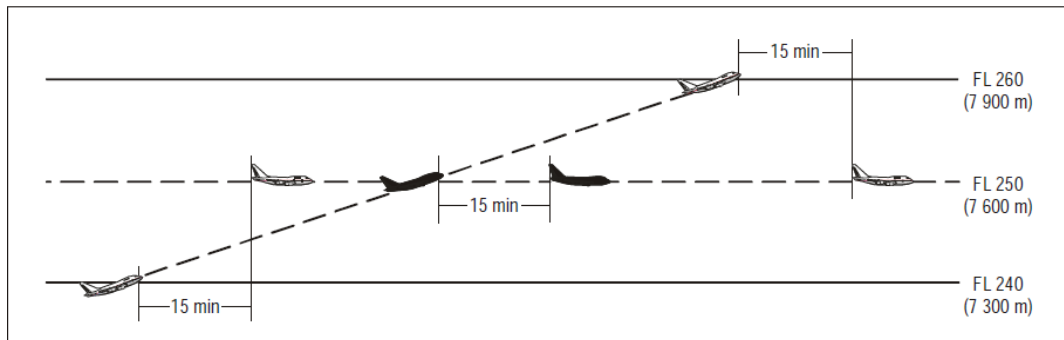
**Figure 11-18. Three-minute separation between aircraft on same track and same level (see 11.4.2.2.1.1 d))**



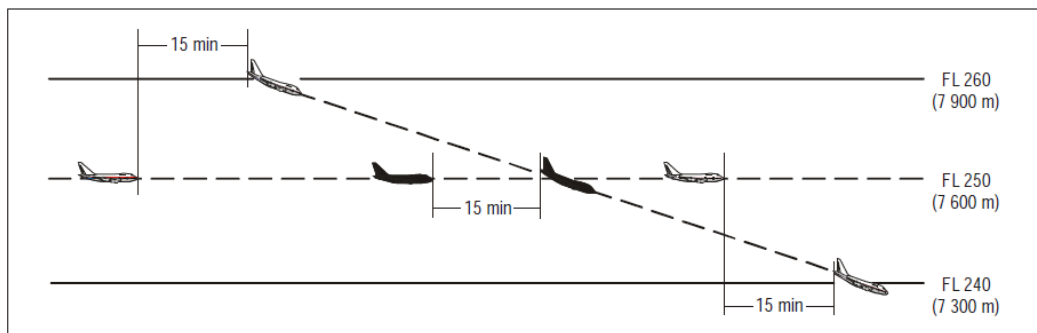
**Figure 11-19. Fifteen-minute separation between aircraft on crossing tracks and same level (see 11.4.2.2.1.2 a))**



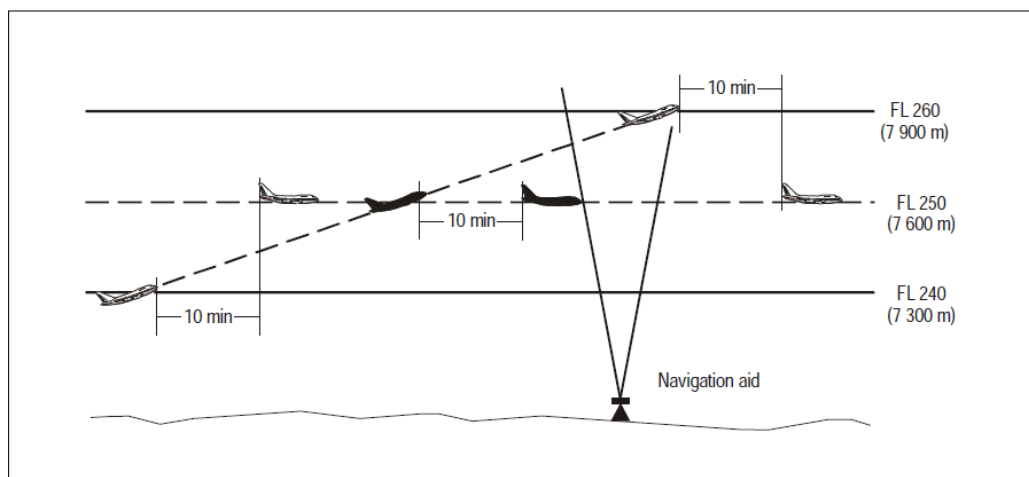
**Figure 11-20. Ten-minute separation between aircraft on crossing tracks and same level (see 11.4.2.2.1.2 b))**



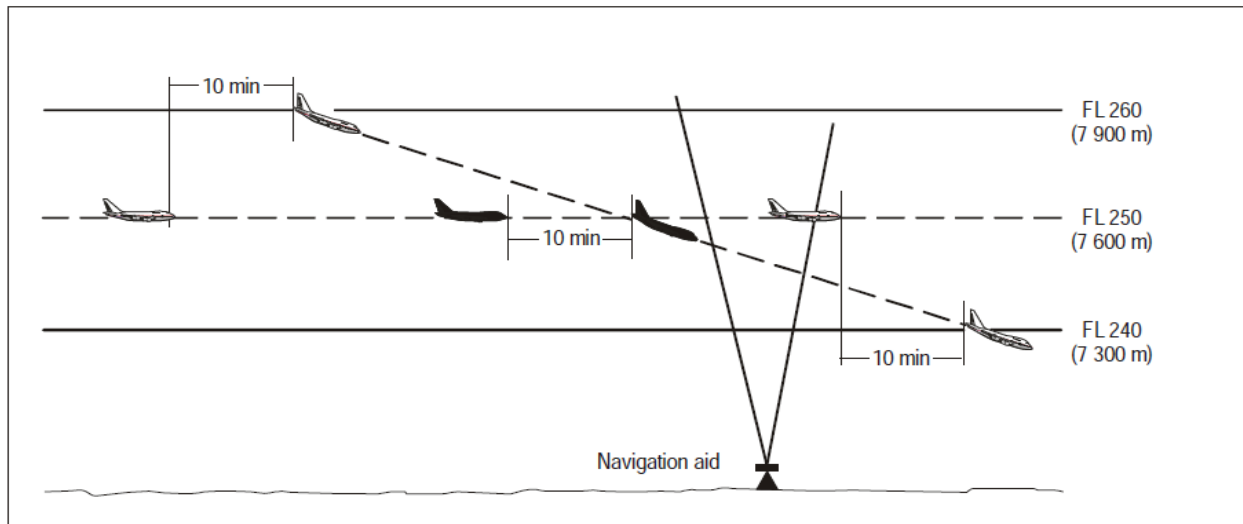
**Figure 11-21A. Fifteen-minute separation between aircraft climbing and on same track (see 11.4.2.2.2.1 a)**



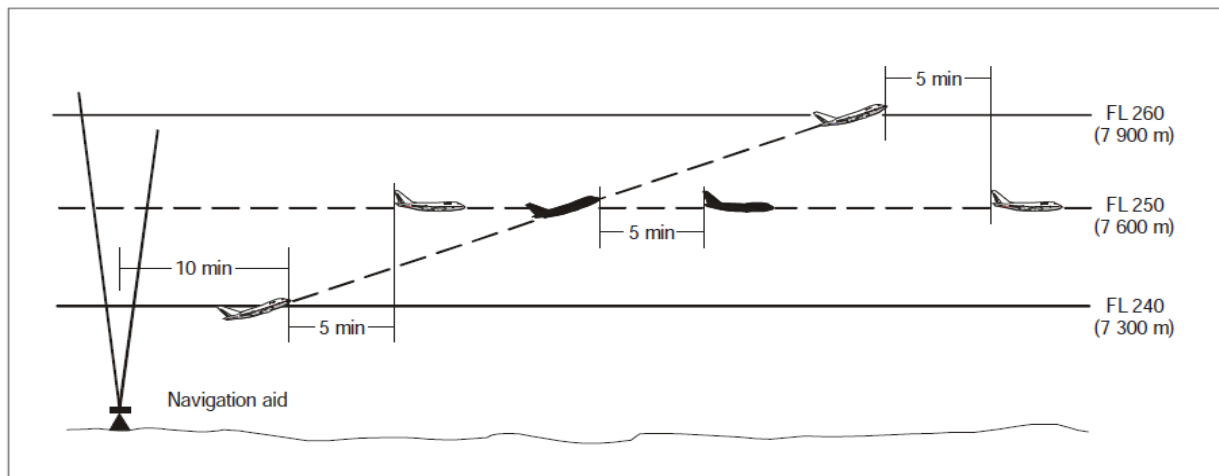
**Figure 11-21B. Fifteen-minute separation between aircraft descending and on same track (see 11.4.2.2.2.1 a)**



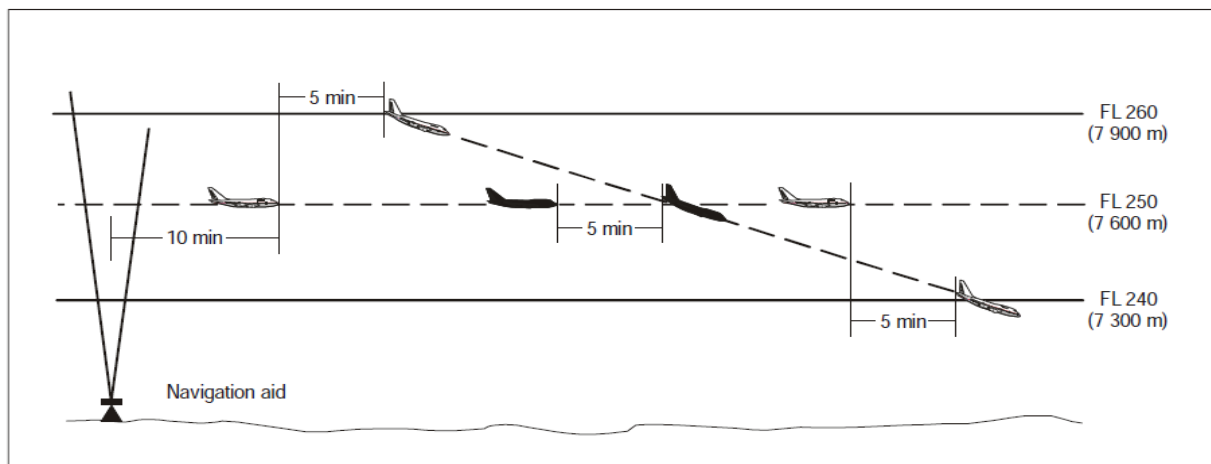
**Figure 11-22A. Ten-minute separation between aircraft climbing and on same track (see 11.4.2.2.2.1 b)**



**Figure 11-22B. Ten-minute separation between aircraft descending and on same track (see 11.4.2.2.2.1 b))**



**Figure 11-23A. Five-minute separation between aircraft climbing and on same track (see 11.4.2.2.2.1 c))**



**Figure 11-23B. Five-minute separation between aircraft descending and on same track (see 11.4.2.2.2.1 c))**

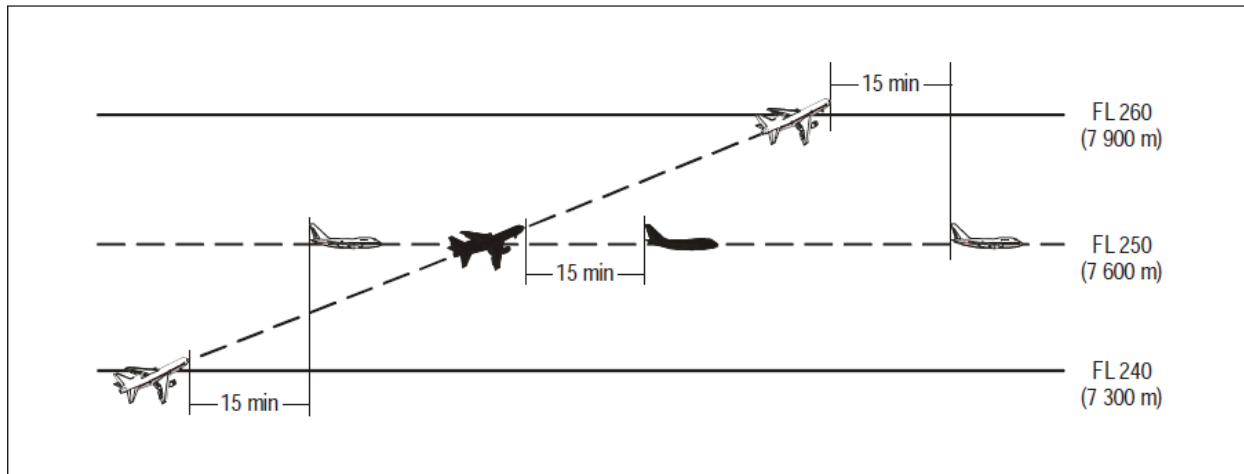


Figure 11-24A. Fifteen-minute separation between aircraft climbing and on crossing tracks(see 11.4.2.2.2.2a))

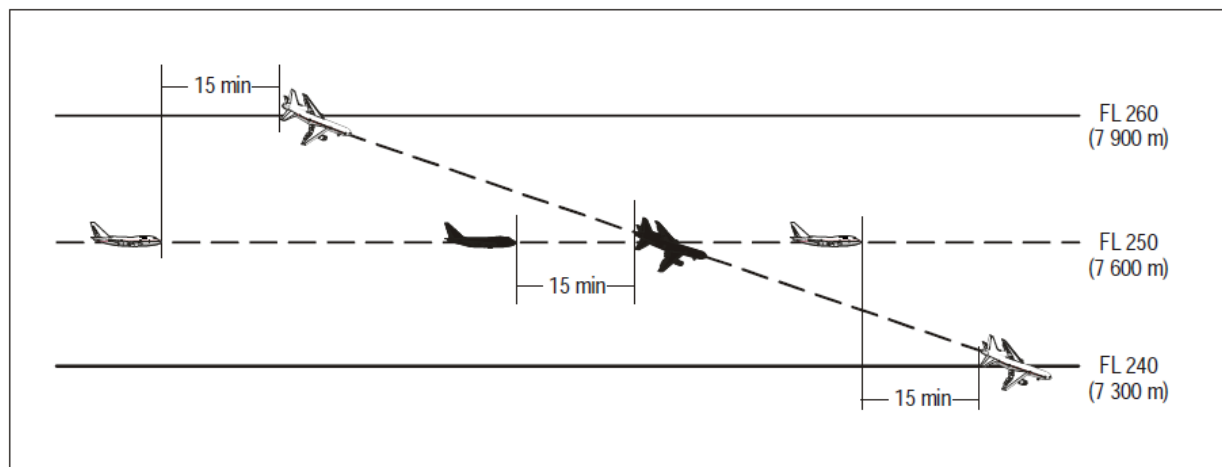


Figure 11-24B. Fifteen-minute separation between aircraft descending and on crossing tracks(see 11.4.2.2.2.2a))

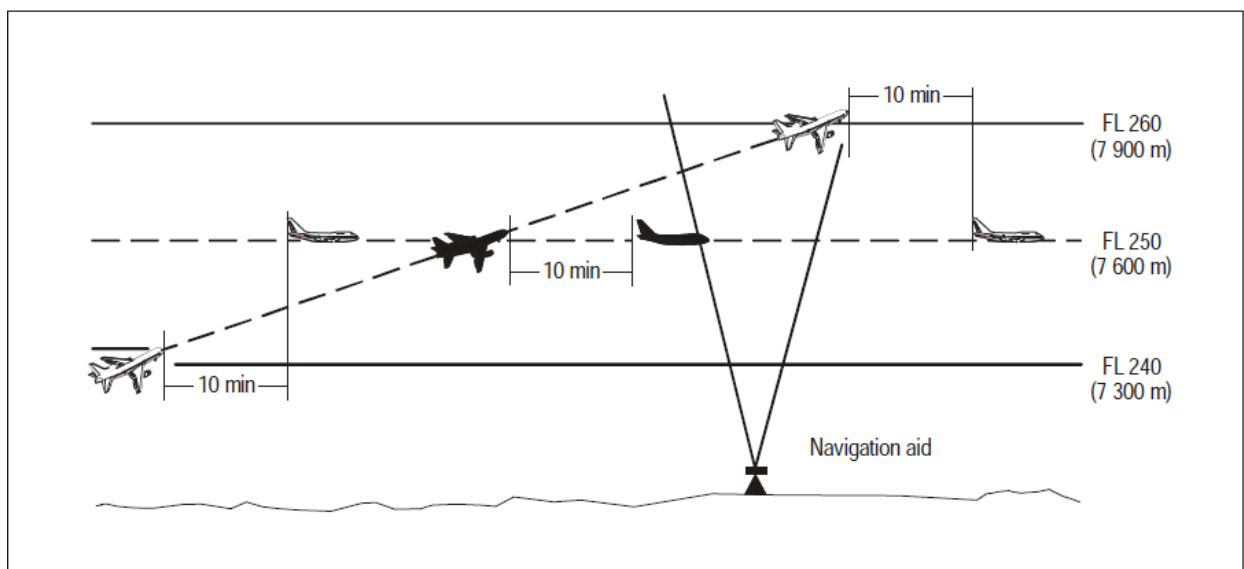
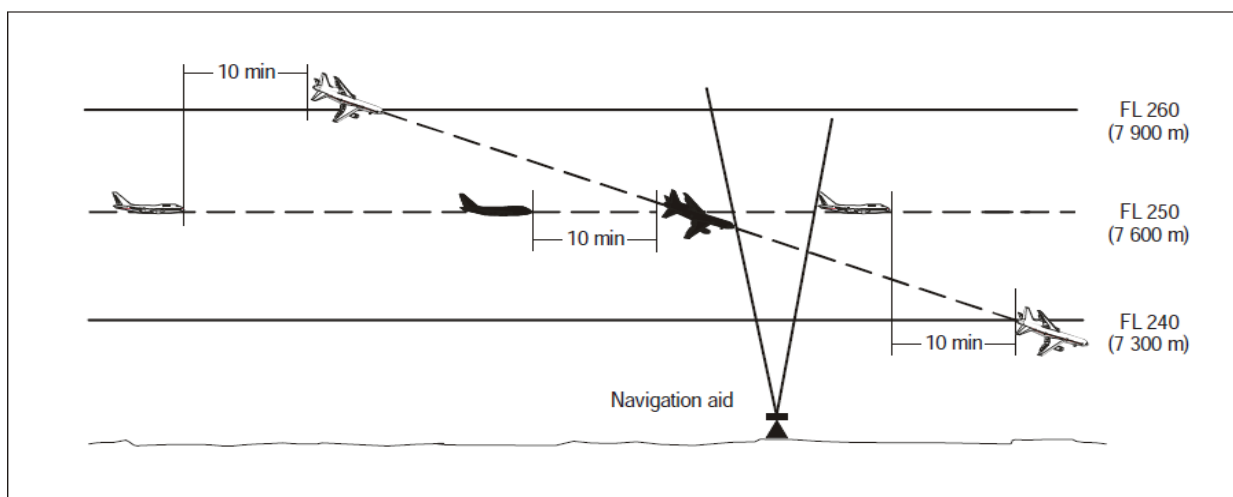
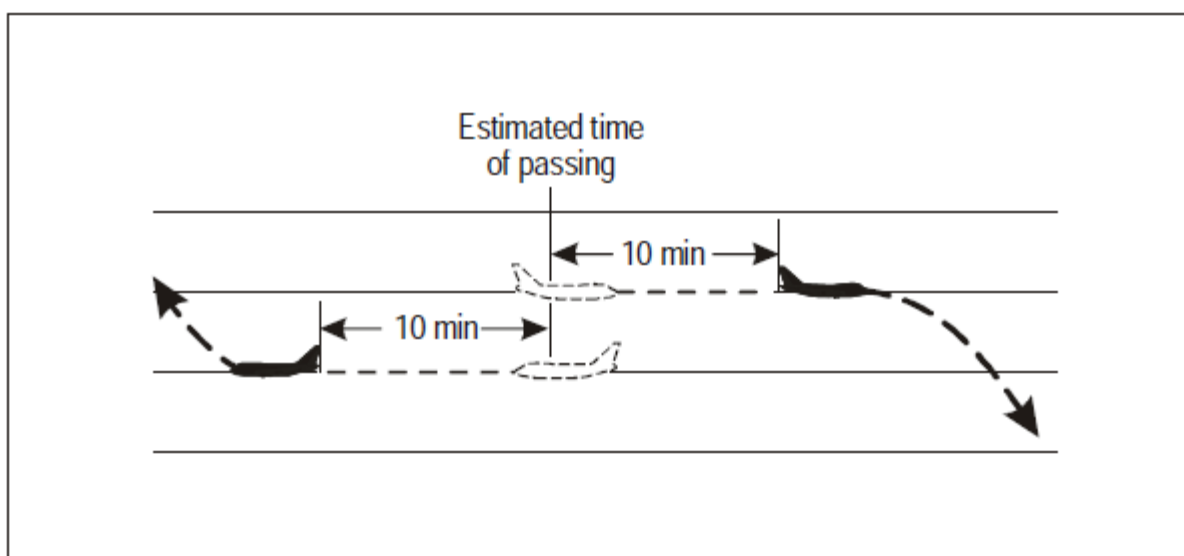


Figure 11-25A. Ten-minute separation between aircraft climbing and on crossing tracks (see 11.4.2.2.2.2 b))





**Figure 11-25B. Ten-minute separation between aircraft descending and on crossing tracks (see 11.4.2.2.2.2 b))**



**Figure 11-26. Ten-minute separation between aircraft on reciprocal tracks (see 11.4.2.2.2.3)**

11.4.2.3.2 When applying these separation minima between any aircraft with area navigation capability, controllers shall specifically request GNSS-derived distance.

#### 11.4.2.3.3 Aircraft at the same Cruising Level

11.4.2.3.3.1 Aircraft on the same track:

- a) 37 km (20 NM), provided:
  - 1) each aircraft utilizes:
    - i) the same “on-track” DME station when both aircraft are utilizing DME; or

- ii) an “on-track” DME station and a collocated waypoint when one aircraft is utilizing DME and the other is utilizing GNSS; or
- iii) the same waypoint when both aircraft are utilizing GNSS; and
- 2) separation is checked by obtaining simultaneous DME and/or GNSS readings from the aircraft at frequent intervals to ensure that the minimum will not be infringed (see Figure 11-27);
- b) 19 km (10 NM), provided:
  - 1) the leading aircraft maintains a true airspeed of 37 km/h (20 kt) or more faster than the succeeding aircraft;
  - 2) each aircraft utilizes:
    - i) the same “on-track” DME station when both aircraft are utilizing DME; or
    - ii) an “on-track” DME station and a collocated waypoint when one aircraft is utilizing DME and the other is utilizing GNSS; or
    - iii) the same waypoint when both aircraft are utilizing GNSS; and
    - 1) separation is checked by obtaining simultaneous DME and/or GNSS readings from the aircraft at such intervals as are necessary to ensure that the minimum is established and will not be infringed (see Figure 11-28).

11.4.2.3.3.2 Aircraft on crossing tracks. The longitudinal separation prescribed in 11.4.2.3.3.1 shall also apply provided each aircraft reports distance from the DME station and/or collocated waypoint or same waypoint located at the crossing point of the tracks and that the relative angle between the tracks is less than 90 degrees (see Figures 11-29A and 11-29B).

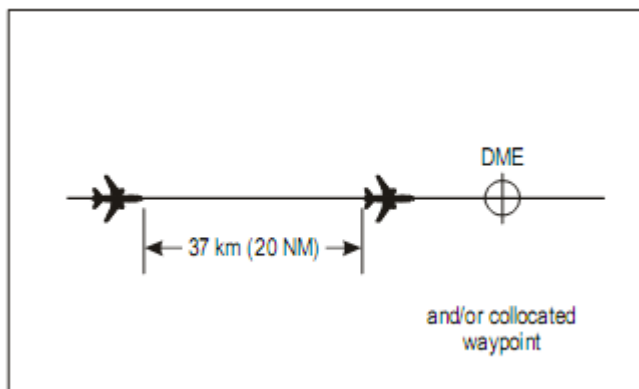


Figure 11-27. 37 km (20 NM) DME or GNSS-based separation between aircraft on same track and same level (see 11.4.2.3.3.1 a))

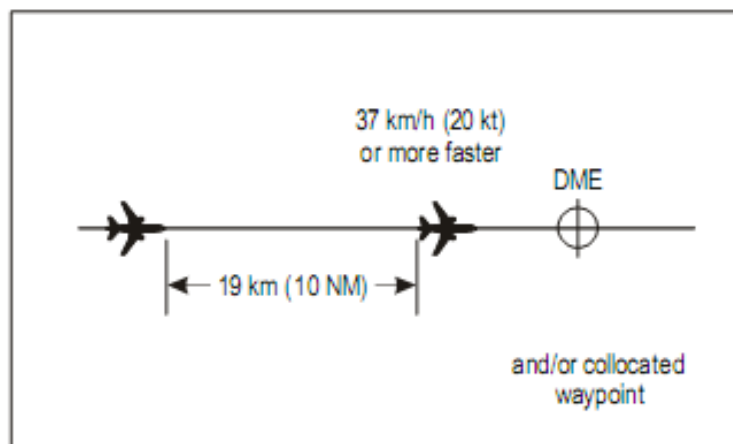


Figure 11-28. 19 km (10 NM) DME or GNSS-based separation between aircraft on same track and same level (see 11.4.2.3.3.1 b))

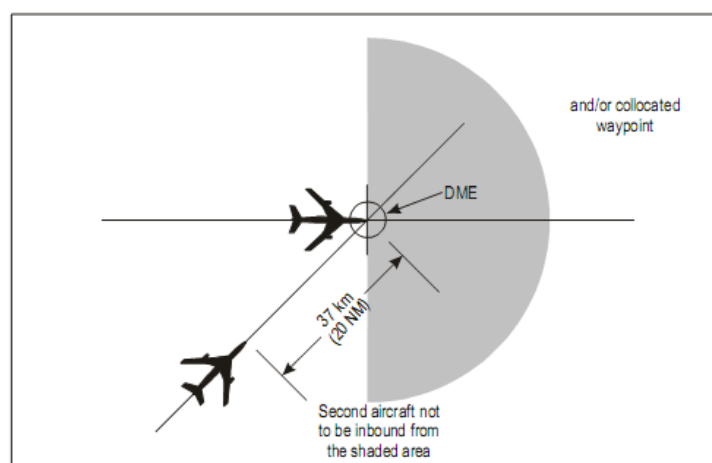


Figure 11-29A. 37 km (20 NM) DME or GNSS-based separation between aircraft on crossing tracks and same level (see 11.4.2.3.3.2)

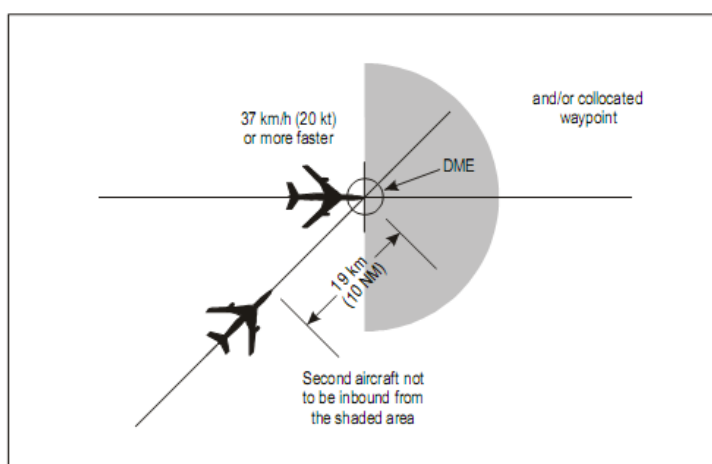


Figure 11-29B. 19 km (10 NM) DME or GNSS-based separation between aircraft on crossing tracks and same level (see 11.4.2.3.3.2)

#### 11.4.2.3.4 Aircraft Climbing and Descending

11.4.2.3.4.1 Aircraft on the same track: 19 km (10 NM) while vertical separation does not exist, provided:

- a) each aircraft utilizes:
  - i) the same “on-track” DME station when both aircraft are utilizing DME; or
  - ii) an “on-track” DME station and a collocated waypoint when one aircraft is utilizing DME and the other is utilizing GNSS; or
  - iii) the same waypoint when both aircraft are utilizing GNSS; and
- b) one aircraft maintains a level while vertical separation does not exist; and
- c) separation is established by obtaining simultaneous DME and/or GNSS readings from the aircraft (see Figures 11-30A and 11-30B).

*Note.— To facilitate application of the procedure where a considerable change of level is involved, a descending aircraft may be cleared to some convenient level above the lower aircraft, or a climbing aircraft to some convenient level below the higher aircraft, to permit a further check on the separation that will be obtained while vertical separation does not exist.*

11.4.2.3.4.2 Aircraft on reciprocal tracks. Aircraft utilizing on-track DME and/or collocated waypoint or same waypoint may be cleared to climb or descend through the levels occupied by other aircraft utilizing on-track DME and/or collocated waypoint or same waypoint, provided that it has been positively established that the aircraft have passed each other and are at least 10 NM apart, or such other value as prescribed by the appropriate ATS authority.

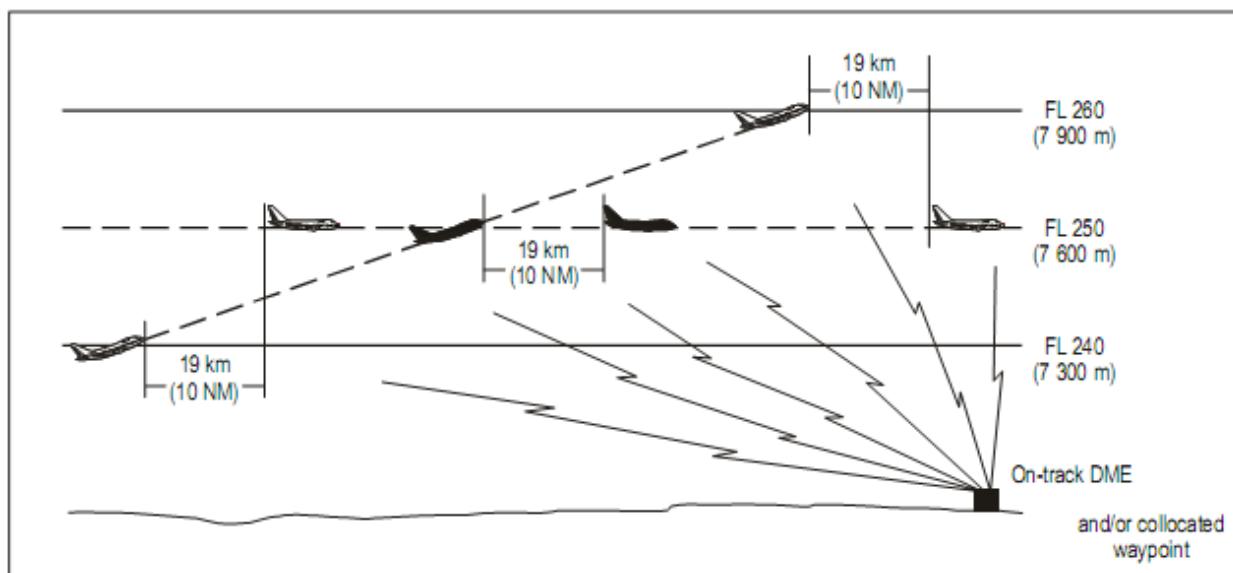


Figure 11-30A. 19 km (10 NM) DME or GNSS-based separation between aircraft climbing and on same track (see 11.4.2.3.4.1 c))

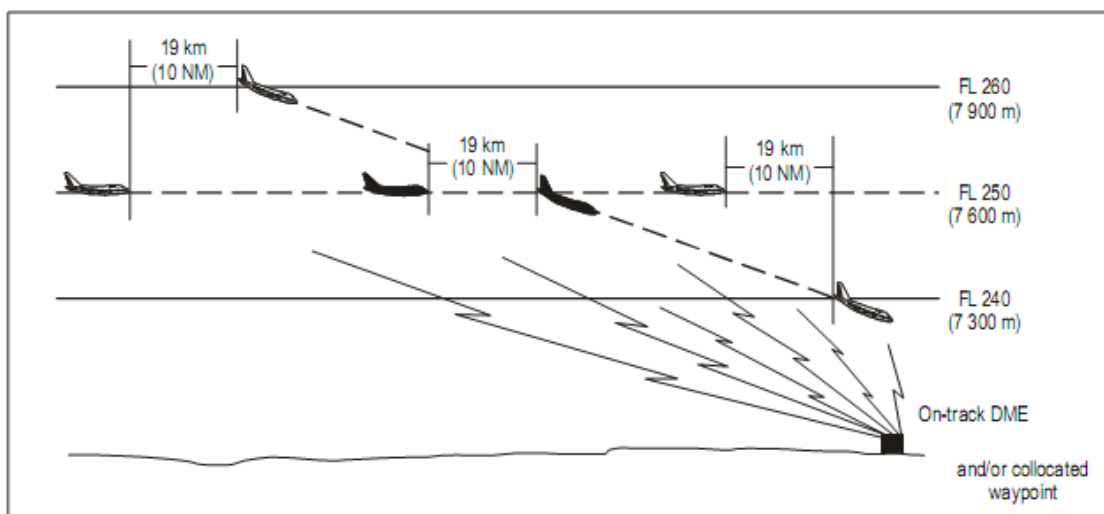


Figure 11-30B. 19 km (10 NM) DME or GNSS-based separation between aircraft descending and on same track (see 11.4.2.3.4.1 c))

#### 11.4.2.4 Longitudinal Separation Minima based on Distance using RNAV where RNP is Specified

- 11.4.2.4.1 Within designated airspace, or on designated routes, separation minima in accordance with the provisions of this section can be used, subject to regional air navigation agreements.
- 11.4.2.4.2 Separation shall be established by maintaining not less than the specified distance between aircraft positions as reported by reference to the same “on-track” common point, whenever possible ahead of both aircraft, or by means of an automated position reporting system.

*Note.— The term “on track” means that the aircraft is flying either directly inbound to or directly outbound from the station or waypoint.*

- 11.4.2.4.2.1 When information is received indicating navigation equipment failure or deterioration below the navigation performance requirements, ATC shall then, as required, apply alternative separation minima.

### 11.5 MINIMUM SEPARATION BETWEEN DEPARTING AIRCRAFT

*Note.— The following provisions are complementary to the longitudinal separation minima specified in Section 11.4.2.*

- 11.5.1 One-minute separation is required if aircraft are to fly on tracks diverging by at least 45 degrees immediately after take-off so that lateral separation is provided (see Figure 11-31)

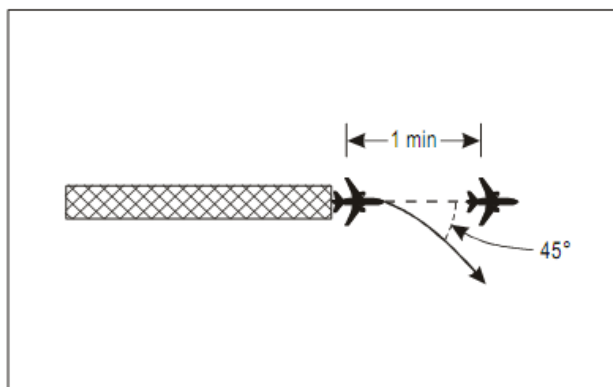


Figure 11-31. One-minute separation between departing aircraft following tracks diverging by at least 45 degrees

- 11.5.2 Two minutes are required between take-offs when the preceding aircraft is 74 km/h (40 kt) or more faster than the following aircraft and both aircraft will follow the same track (see Figure 11-32).

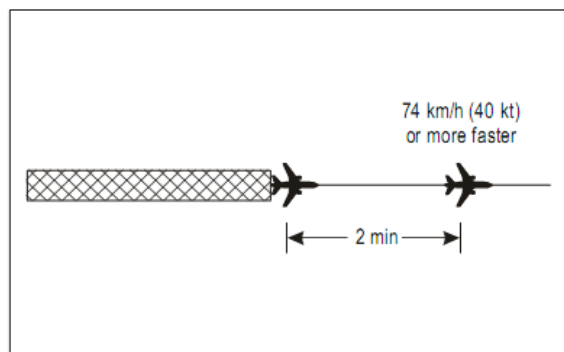


Figure 11-32. Two-minute separation between aircraft following same track

- 11.5.3 Five-minute separation is required while vertical separation does not exist if a departing aircraft will be flown through the level of a preceding departing aircraft and both aircraft propose to follow the same track (see Figure 11-33). Action must be taken to ensure that the five-minute separation will be maintained or increased while vertical separation does not exist.

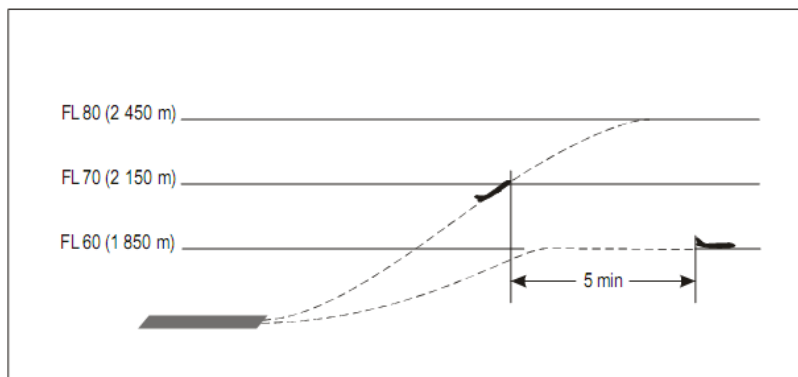


Figure 11-33. Five-minute separation of departing aircraft following same track

## 11.6 PROVISION OF ESSENTIAL TRAFFIC INFORMATION WITHIN KATHMANDU FIR

### 11.6.1 General

- 11.6.1.1 Essential traffic is that controlled traffic to which the provision of separation by ATC is applicable, but which, in relation to a particular controlled flight is not, or will not be, separated from other controlled traffic by the appropriate separation minimum.

*Note.— ATC is required to provide separation between IFR flights and between IFR and VFR flights in airspace Class C. In this airspace class, IFR or VFR flights may constitute essential traffic to IFR traffic, and IFR flights may constitute essential traffic to VFR traffic. However, a VFR flight would not constitute essential traffic to other VFR flights.*

- 11.6.1.2 Essential traffic information shall be given to controlled flights concerned whenever they constitute essential traffic to each other.

*Note.— This information will inevitably relate to controlled flights cleared subject to maintaining own separation and remaining in visual meteorological conditions and also whenever the intended separation minimum has been infringed.*

### 11.6.1.3 Information to be provided

Essential traffic information shall include:

- a) direction of flight of aircraft concerned;
- b) type and wake turbulence category (if relevant) of aircraft concerned;
- c) cruising level of aircraft concerned; and
  - 1) estimated time over the reporting point nearest to where the level will be crossed; or
  - 2) relative bearing of the aircraft concerned in terms of the 12-hour clock as well as distance from the conflicting traffic; or
  - 3) actual or estimated position of the aircraft concerned.

*Note 1.— Wake turbulence category will only be essential traffic information if the aircraft concerned is of a heavier wake turbulence category than the aircraft to which the traffic information is directed.*

## **CHAPTER 12**

### **PROCEDURES RELATED TO EMERGENCIES, COMMUNICATION FAILURE AND CONTINGENCIES**

#### **12.1 AIRCRAFT EMERGENCIES**

##### **12.1.1 INTRODUCTION**

12.1.1.1 The circumstances of each aircraft emergency can vary to such an extent that detailed instructions cannot be given for every situation. The procedures outlined in this section are intended as a general guide and controllers must use their own judgment when handling a particular emergency.

12.1.1.2 The procedures described in the preceding sections and the appropriate standard phraseology may also be varied to meet an emergency situation but any reduction in separation, necessary to cope with the emergency, should be restored as soon as possible. Special arrangements, made locally for handling aircraft emergencies, are detailed in AEP of concerned airport.

##### **12.1.2 CONTROLLER'S RESPONSIBILITY**

12.1.2.1 Controllers must always be alert to the possibility of an aircraft emergency. Speed may be necessary in certain circumstances but calm co-ordinated actions are essential in all situations.

12.1.2.2 Controllers shall offer as much assistance as possible to any aircraft that is considered to be in an emergency situation. Assistance to the aircraft can include the provision of information on the availability of aerodromes and their associated approach aids, **vectoring**, weather information and details of terrain clearance. An emergency may require alerting action to be taken immediately or it may develop to that point later.

12.1.2.3 The supervisor, if available, should be informed as soon as practicable and where more than one ATSU is involved complete co-ordination must be maintained between units.

12.1.2.4 ACC is involved; ACC supervisor should take charge of the operation. Controllers must be ready to give all possible assistance to the ACC and other units. If more than one ACC is involved then the supervisors should agree between them which one is to take charge.

##### **12.1.3 RECOGNIZING AN EMERGENCY SITUATION**

12.1.3.1 A controller may suspect that an aircraft is in an emergency situation or has suffered unlawful interference when:

- a) radio contact is not established at the time it is expected to be established;
- b) radio contact is lost;



- c) a pilot makes a report about the malfunctioning of his aircraft or the unusual behaviour of persons on-board;
- d) the erratic behaviour of an aircraft or position symbol is observed;
- e) it is overdue at an aerodrome; or
- f) the pilot reports that the aircraft is short of fuel.

12.1.3.2 If the controller is in radio contact with the aircraft he should ask the pilot if he wishes to declare an emergency and, if not specified by the pilot, the class of emergency being declared.

12.1.3.3 More positive indications that an aircraft is in an emergency are described in the following paragraphs.

#### **12.1.4 DISTRESS AND URGENCY MESSAGES**

12.1.4.1 Pilots have been advised that, in the event of an emergency situation, an ATSU can only provide the necessary priority and handling if the controller is made aware of the emergency by the crew's formal declaration on the RTF. Pilots have also been advised that the extent to which an ATSU will be able to offer assistance will depend on the amount of information provided and on its being transmitted at the earliest opportunity. Furthermore, it is preferable that if pilots believe that they are facing an emergency situation, to declare it as early as possible and cancel it later if they decide that the situation allows.

12.1.4.2 There are two classes of emergency message:

Distress: A condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.

Urgency: A condition concerning the safety of an aircraft or other vehicle, or of some person on board or within sight, but which does not require immediate assistance.

12.1.4.3 The message will contain as many as possible of the following items:

MAYDAY, MAYDAY, MAYDAY (for distress messages)

or

PAN PAN, PAN PAN, PAN PAN (for urgency messages)

and

Name of the station addressed (time and circumstances permitting)

Identification of the aircraft

Nature of the emergency

Intention of the pilot in command

Present position, level and heading

Qualification of the pilot (e.g. student, full instrument rated, etc)

As much other information as time permits.

12.1.4.4 When a pilot has given certain items of information normally associated with an emergency message but has not prefixed the transmission with 'MAYDAY' or 'PAN', the controller is to ask the pilot if he wishes to declare an emergency. If the pilot declines to do so, the controller may, if he thinks it appropriate, carry out the necessary actions as if the pilot had declared an emergency.

12.1.4.5 If a controller considers that another ATSU may be able to give more assistance and, in the circumstances, it is reasonable to do so, the pilot should be asked to change frequency.

### **12.1.5 ACTION ON RECEIVING URGENCY CALLS**

The controller shall take the following action at an aerodrome on receiving an urgency call:

- a. If the pilot elects to land at the aerodrome receiving the call. Rearrange traffic as necessary to enable him to make an uninterrupted approach;
- b. alert local safety services, and initiate local emergency action as necessary and appropriate;
- c. Inform the concerned ACC giving full details;
- d. If any doubt exists that the aircraft can reach an aerodrome, request concerned ACC to alert RCC stating that the Alert phase exists;
- e. Inform the aircraft's owners or representatives if possible.

### **12.1.6 ACTION ON RECEIVING DISTRESS CALLS**

The controllers shall take the following action at an aerodrome on receiving a Distress Call;

- a. Plot aircraft's position on map;
- b. Assist pilot in every way possible to make a safe landing;
- c. Advise pilot of nearest aerodrome if aircraft position is known;
- d. Inform the concerned ACC full details (ACC will alert RCC) and give all possible assistance in warning airfields adjacent to the aircraft track and in warning the local rescue services in the area in which the aircraft may crash-land.
- e. Alert aerodrome and local safety services;
- f. Inform aircraft's owner or representative if possible.

## **12.1.7 EMERGENCY AIRCRAFT – SELECTION OF CONTROLLING AGENCY**

### **12.1.7.1 Transfer of Control**

On receipt of information that indicates that an aircraft is in an emergency, the controller must decide whether or not to transfer the aircraft to another agency. The choice of agency will depend upon the circumstances and no hard and fast rules apply. The following guidance material will help controllers to make this decision.

12.1.7.2 If a controller considers that another unit may be able to give more assistance than he can himself and in the circumstances it is reasonable to ask the pilot to change frequency, he shall either:

- a) consult the ACC supervisor and transfer the aircraft according to his instructions; or
- b) alert the nearest suitable unit and transfer the aircraft to a common frequency, giving assistance to that unit as required.

12.1.7.3 Before transferring aircraft, controllers should obtain sufficient information from the pilot to be convinced that the aircraft will receive more assistance from another unit. If a change of frequency is desirable the pilot must be instructed to revert immediately if there is no reply on the new frequency. Controllers should then listen out on the original frequency until the aircraft is known to be in two-way communication with the other unit.

### **12.1.7.4 Retaining Control**

12.1.7.4.1 If the controller can offer immediate assistance the aircraft should normally be retained on the frequency. If necessary, impose a radio silence on other aircraft or transfer them to another frequency.

12.1.7.4.2 Alternatively it may be more expedient to transfer the emergency aircraft to a discrete frequency, particularly if a radio silence would endanger other traffic.

12.1.7.4.3 The aircraft should be retained on the original frequency if it is unreasonable to ask the pilot, or if he is not prepared, to change frequency. The controller may be able to relay instructions and information from other units to the pilot.

## **12.2 OVERDUE AIRCRAFT**

### **12.2.1 INTRODUCTION**

12.2.1.1 Overdue action should not be considered in isolation and the emergency actions described in other chapters, in particular radio failure procedures should be applied if they are appropriate. For example, if a radio equipped aircraft fails to make an expected report, continued attempts should be made to re-establish communication while at the same time commencing overdue action.

- 12.2.1.2 Overdue action is not related solely to the filing of a flight plan. If, at any stage of a flight the pilot has made his intentions clear and subsequently does not arrive or report when expected, controllers should seriously consider taking overdue action.

**12.2.2 RADIO EQUIPPED AIRCRAFT – PRELIMINARY ACTION**

If an aircraft fails to make a position report when expected, the following preliminary action shall be commenced not later than the estimated time for the reporting point plus 30 minutes:

- Advise the ACC supervisor that the aircraft is overdue;
- Confirm ATD from departure aerodrome by quickest possible means;
- Ensure that an RQS message is sent.

**12.2.3 RADIO EQUIPPED AIRCRAFT – FULL OVERDUE ACTION**

If, after the action above, no news is received or 1 hour has elapsed since a scheduled position report should have been received, or the fuel carried by the aircraft is considered to be exhausted, whichever is the sooner, the controller at the destination aerodrome shall inform the ACC supervisor that the aircraft is fully overdue.

**12.2.4 NON-APPEARANCE OF AIRCRAFT**

- 12.2.4.1 If an aircraft, which has been cleared to commence approach, after completing any necessary holding fails to land within 5 minutes of the estimated time of landing and communication cannot be established, the following action shall be taken:

- Alert Approach Radar Control where available;
- Request other aircraft flying in the vicinity of the aircraft's last known position to be on the lookout;
- Exercise caution when authorizing the movement of aerodrome traffic;
- Alert the emergency services in accordance with AEP;
- Check with other aerodromes in vicinity;
- Advise the ACC supervisor.

- 12.2.4.2 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 air traffic services; and
- c) to any aircraft known or believed to be the subject of unlawful interference.

- 12.2.4.3 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.
- 12.2.4.4 In the event of a state of emergency arising to an aircraft while it is under the control of an aerodrome control tower or approach control unit, such unit shall notify immediately the flight information centre or area control centre responsible which shall in turn notify the rescue coordination centre, except that notification of the area control centre, flight information centre, or rescue coordination centre shall not be required when the nature of the emergency is such that the notification would be superfluous.
- 12.2.4.5 Nevertheless, whenever the urgency of the situation so requires, the aerodrome control tower or approach control unit responsible shall first alert and take other necessary steps to set in motion all appropriate local rescue and emergency organizations which can give the immediate assistance required.

## **12.2.5 NOTIFICATION OF RESCUE COORDINATION CENTRE**

- 12.2.5.1 Without prejudice to any other circumstances that may render such notification advisable, air traffic services units shall, except as prescribed in 12.2.8.1, notify rescue coordination centres immediately an aircraft is considered to be in a state of emergency in accordance with the following:

### **12.2.5.1.1 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 air traffic services units, whichever is the later, except when no doubt exists as to the safety of the aircraft and its occupants.

### **12.2.5.1.2 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.

#### 12.2.5.1.3 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.

#### 12.2.5.2 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.

#### 12.2.5.2.1 **Recommendation.** — Such part of the information specified in 12.2.5.2, which is not available at the time notification is made to a rescue coordination centre, should be sought by an air traffic services unit prior to the declaration of a distress phase, if there is reasonable certainty that this phase will eventuate.

- 12.2.5.3 Further to the notification in 12.2.5.1, the rescue coordination centre shall, without delay, be furnished with:
- a) any useful additional information, especially on the development of the state of emergency through subsequent phases; or
  - b) information that the emergency situation no longer exists.

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

## **12.2.6 USE OF COMMUNICATION FACILITIES**

Air traffic services 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.

## **12.2.7 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.

## **12.2.8 INFORMATION TO THE OPERATOR**

- 12.2.8.1 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 rescue coordination centre.

*Note.— If an aircraft is in the distress phase, the rescue coordination centre has to be notified immediately in accordance with 12.2.5.1.*

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

## **12.2.9 INFORMATION TO AIRCRAFT OPERATING IN THE VICINITY OF AN AIRCRAFT IN A STATE OF EMERGENCY**

- 12.2.9.1 When it has been established by an air traffic services unit that an aircraft is in a state of emergency, other aircraft known to be in the vicinity of the aircraft involved shall, except as provided in 12.2.9.2, be informed of the nature of the emergency as soon as practicable.
- 12.2.9.2 When an air traffic services unit knows or believes that an aircraft is being subjected to unlawful interference, no reference shall be made in ATS air-ground communications to the nature of the emergency unless it has first been referred to in communications from the aircraft involved and it is certain that such reference will not aggravate the situation.

## **12.3 CLASSIFICATION OF AIRCRAFT EMERGENCIES**

Aircraft emergencies are classified into ten categories as follows:

### **12.3.1 "ALERT 1" - AIRCRAFT ACCIDENT (on-airport)**

When an aircraft accident has occurred on the airport or in the immediate vicinity of the airport (within 4 kilometers of the airport boundary).

### **12.3.2 "ALERT 2" - AIRCRAFT ACCIDENT (off-airport)**

When an aircraft accident has occurred - but not in the immediate vicinity of the Airport (more than 4 kilometers from the airport boundary).

### **12.3.3 "ALERT 3 " - FULL EMERGENCY (Airborne Aircraft)**

When an aircraft approaching the airport has declared an emergency if it is known to have problem or defect which will cause or is likely to cause an aircraft accident.

### **12.3.4 "ALERT 4" - UNLAWFUL INTERFERENCE**

When it is known or suspected that an aircraft has been subjected to a threat of sabotage or unlawful seizure (hi-jacking) - or any act has been committed which would affect the normal operation of that aircraft or safety of its occupants.

### **12.3.5 "ALERT 5" - BOMB THREAT - TO AIRCRAFT**

When information is received that an explosive device has been located (or suspected) on an aircraft either in the air or on the ground.

### **12.3.6 "ALERT 6" - BOMB THREAT - TO BUILDING**

When information is received that an explosive device has been located (or suspected) in, or around, airport building, facilities or equipment.

### **12.3.7 "ALERT 7" -AIRCRAFT GROUND INCIDENT**

When an incident occurs involving an aircraft on the ground which will affect the safety of that aircraft.

### **12.3.8 "ALERT 8"- STRUCTURAL FIRE**

When a fire occurs on the airport buildings, facilities, equipment or vehicles, and which does not directly involve an aircraft. Fires in Navigational or other auxiliary service station or complex or facilities located off-airport are also included in this category.

### **12.3.9 "ALERT 9" - LOCAL STANDBY**

When an aircraft approaching the airport has developed - or suspected to have developed – some defect, but this defect should not create any difficulty in effecting a safe landing. Crash vehicles may standby in the station, or at position on the movement area, as the situation warrants.



### 12.3.10 "ALERT 10" - WEATHER STANDBY

When severe storms or other expected adverse weather conditions can affect the safety of aircraft, or adversely affect the safety of persons, buildings, facilities, or equipment at the Airport.

*NOTE: The above classification - by ALERT number - shall be used for initial notification of emergency situations. If the emergency condition changes, complete additional notifications must be made for the new condition - Example: an Alert 9 (Local Standby) may escalate to an alert 3 (Full Emergency) condition.*

## 12.4 SOME MAJOR AIRCRAFT EMERGENCIES/CONTINGENCIES:

- (1) Pressurization Failure and Emergency Descent
- (2) Unlawful Interference – aircraft hijack
- (3) Brake Problem
- (4) Communication Failure
- (1) Hydraulic Failure
- (2) Engine Failure
- (3) Bird Strike
- (4) Fuel Dumping
- (5) Landing Gear Problem
- (6) Urgency Message

Always remember the following points during the aircraft emergency:

### (A S S I S T)

<b>A</b> cknowledge	Make sure you understood the nature of emergency and acknowledge accordingly.
<b>S</b> eparate	Don't forget to establish/maintain separation of the emergency aircraft from other aircraft.
<b>S</b> ilence	Impose silence on your control frequency if necessary. Don't disturb urgent cockpit actions by unnecessary transmissions.
<b>I</b> nform	Inform supervisor/shift-in charge, other sectors or units concerned as necessary
<b>S</b> upport	Give maximum possible support to the pilots. Start thinking alternatives.
<b>T</b> ime	Give the pilots sufficient time to concentrate on their problem. Don't trouble them for information. Time is precious during the emergencies and can produce good decisions.

**12.4.1 PRESSURIZATION FAILURE AND EMERGENCY DESCENT****(a) General**

- (i) Pressurization problem may arise due to the result of one or more of the following:
  - (1) malfunction of pressurization system
  - (2) damage to a door or window
- (3) physical leak in the system**
- (ii) Depressurization may cause severe medical problems for crews as well as passengers with heart or respiratory disease.
- (iii) The time of useful consciousness is very short and can vary depending on:
  - the altitude
  - the size of the leak
  - the size of the fuselage
- (iv) Rate of descent could be very high.

**(b) Effects/Consequences will be as follows:**

- (i) Loss of oxygen, losing consciousness, ultimately hypoxia
- (ii) Increased gas pressure in the human body
- (iii) Temperature drop
- (iv) Reduced visibility in the cabin
- (v) Wind sucks items towards the hole
- (vi) Aircraft will stop climb
- (vii) Request for immediate descent
- (viii) Emergency descent without warning
- (ix) Turn off track
- (x) Poor R/T quality (as pilot using cabin oxygen mask)
- (xi) Chances of separation infringement

**(c) ATC responsibilities****(A S S I S T)**

- (i) Acknowledge the emergency in RTF. Broadcast of emergency descent.
- (ii) Clear the airspace directly beneath the aircraft. Take all necessary action to safeguard all aircraft concerned.
- (iii) Inform supervisor/shift-in charge
- (iv) Suggest pilot about MEA or MSA if needed.
- (v) After emergency descent completed, request intentions.

**(d) Phraseology****(i) When pilot has sufficient time**

RNA228      CONTROL, RNA228 MAINTAINING FL250 REQ EMERGENCY DESCENT TO 12500' DUE PRESSURIZATION FAILURE

ACC            ROGER, RNA228 DESCEND TO 12500' [QNH -----] REPORT REACHING

**(ii) When pilot doesn't have sufficient time**

RNA228      CONTROL, RNA228 POSITION SMR EMERGENCY DESCENT TO 11500' DUE DECOMPRESSION NOW PASSING FL150 TURNING TO THE RIGHT [or LEFT] OF TRACK

ACC            ROGER, RNA228 [QNH -----] REPORT REACHING 11500'

**(iii) ATC phraseology with other aircraft**

ACC            ATTENTION ALL AIRCRAFT IN THE VICINITY OF [or AT] ----- (significant point or location) EMERGENCY DESCENT IN PROGRESS FROM ----- (level) TO 11500' ALL AIRCRAFT BELOW ----- (level) AND ABOVE 11500' LEAVE THE FLIGHT PATH [or AIRSPACE] IMMEDIATELY AND ACKNOWLEDGE.

**12.4.2 UNLAWFUL INTERFERENCE – AIRCRAFT HIJACK**

(a) Air Traffic Controllers should remember the following during an aircraft hijack:

- (i) Countermeasures against hijacking in the aircraft are limited.
- (ii) Concentrated calmness of crew and ATC is necessary to avoid additional risk and provocation to hijackers.
- (iii) Planning for all eventualities by ATC is an important task.
- (iv) Acquire permission from central security committee through command post to allow the aircraft to enter into Kathmandu FIR or land at Nepalese aerodrome.

**(b) Effects and consequences of a hijack could be as follows:**

- (i) Crew under high stress
- (ii) Every possible dangerous situation apparent to aircraft and its occupants
- (iii) R/T problem, crew may communicate in code
- (iv) May squawk 7500 in radar environment
- (v) Non-compliance with ATC instructions

**(c) ATC responsibilities:****(A S S I S T)**

- (i) Do not initiate any further RTF unless confirmed by pilot.

- (ii) If 7500 code observed in radar, check transponder setting with phraseology "CONFIRM SQUAWKING 7500"-- no reply here shall also be considered as aircraft is hijacked.
- (iii) Immediately after it is confirmed that aircraft is hijacked, inform it to supervisor/shift-in charge/chief ATC and proceed as per local procedure.
- (iv) Convey the message of designated authority to hijacker, and vice-versa.
- (v) Comply with pilot's request as far as possible.
- (vi) Transmit pertinent information without expecting a reply.
- (vii) Monitor and plot all flight manoeuvres and coordinate transfer of control without requiring the response from the aircraft.
- (viii) Collect any necessary information e.g. Destination aerodrome, WX situation at destination, routing, etc.
- (ix) If aircraft lands, direct it to the specified isolated parking position or to the location as designated by command post.

**(d) Phraseology**

(In radar environment, if getting HJ feature blinking or Code 7500 observed)

ATCRNA516 VERIFY SQUAWKING 7500

(No reply here shall also be considered as aircraft is hijacked.)

### **12.4.3 BRAKES PROBLEM**

Following factors should be kept in mind during brakes problem in aircraft.

**(a) Air Traffic controllers should remember that:**

- (i) Hydraulic failure may cause problems with brakes.
- (ii) Aircraft with brakes problem doesn't get priority unless it commences approach.

**(b) Some possible effects and consequences are as follows:**

- (i) Overrunning RWY threshold. Landing distance may increase Increase the probability of tyre-brust.
- (ii) Aircraft may swerve off RWY.
- (iii) Chances of RWY blockage.
- (iv) Following traffic may not land and chances of diversion.
- (v) Priority could be given to following traffic.

**(c) ATC responsibilities:**

**(A S S I S T)**

- (i) Inform supervisor/shift-in charge.

- (ii) Keep airport fire on alert position.
- (iii) Inform pilot about the RWY length/condition.
- (iv) Keep runway strip and associated area clear.
- (v) Check for towing vehicle stand-by.
- (vi) Check if technical personnel required.

**(d) Phraseology**

RNA227 APP, RNA227 DIVERTING TO KATHMANDU DUE BRAKE PROBLEM  
WILL HOLD INITIALLY OVER GURAS FOR THE INSTRUMENT CHECK

APP RNA227 CLEARED TO GURAS VIA 20DME ARC DESCEND TO -----  
(level) REPORT WHEN READY TO COMMENCE APPROACH.

(Initially clear the other succeeding aircraft below it for the approach then ask its  
intention; and decide the further priority.)

(If aircraft is ready to commence approach)

APP RNA227 DO YOU NEED ANY GROUND ASSISTANCE ?

#### **12.4.4 COMMUNICATION FAILURE**

**(a) Introduction**

- (i) Communication failure may be due to the result of either electrical/electronic  
and hardware problems.
- (ii) Causes of communication failure may be simple (i.e. earphone and  
microphone problems) or complex (i.e. broken wire, power failure and  
malfunctioning radio).
- (iii) Communication problems may originate with Pilots or ATCs.
- (iv) Communication failure in one of the following cases:
  - receiver failure
  - transmitter failure
  - total failure
- (v) An aircraft is considered to have a radio communication failure if a message is  
missing for a period of 5 minutes or more.
- (vi) Recognize that this is considered to be an emergency, and with urgency, try to  
find out the cause of the emergency.

**(b) Effects and consequences of communication failure**

- May display code 7600 in radar environment.
- Pilots' action (VMC):
  - Continue fly in VMC.

- Land at the nearest suitable aerodrome, and
- Report its arrival by the most expeditious means to appropriate ATC unit.
- Pilots' action (IMC):
  - Continue proceed according to FPL route to designated navigation aid/fix serving the destination aerodrome and hold until commencement of descend.
  - Commence descent from the navigation aid at, or as close as possible to, the EAT last received and acknowledged,  

or,

If no EAT received and acknowledged, at, or as close as possible to, the ETA resulting from FPL.
  - Complete a normal instrument approach procedure as specified for the designated navigation aid.
  - Land, if possible, within 30 minutes after the ETA specified above, or the last acknowledged EAT whichever is later.

**(c) ATC responsibilities:**

**(A S S I S T)**

- (i) Inform supervisor/shift-in-charge.
- (ii) Serial ATC actions:
  - Separate RCF aircraft with other aircraft.
  - Transmit blind the pertinent information on the available frequencies.
  - Other aircraft in the vicinity are to be informed about the RCF aircraft, and requested to establish two way communications with the aircraft.
  - Inform all ATS units concerned along the route of the flight and are requested to attempt to establish communication with the aircraft.
  - Inform all alternate aerodromes about possible diversion of the RCF aircraft.
  - By agreement with operator, when weather at intended aerodrome is bad, transmit blind clearing the aircraft to suitable alternate aerodrome.
  - If communication re-established or aircraft has landed, inform all previously notified regarding termination of RCF situation.
  - If aircraft unable to land within 30 minutes of ETA or EAT whichever is later, after prior consultation with airline operators or their designated representative and PIC of other aircraft, normal control can be resumed if they desire.

**(d) Phraseology**

ATC                RNA203 DO YOU READ ME

RNA203        (no response)

---

ATC	RNA203 IF YOU READ ME (any suitable instruction or information considering that aircraft receiver operating normal.)  (In radar environment, if RF feature or Code 7500 observed)
ATC	RNA416 VERIFY SQUAKING 7500
RNA416	(no response)
ATC	RNA416, IF YOU READ ME SQUAWK ..... (code) AND IDENT  (If ID feature observed)
ATC	RNA416 IDENT OBSERVED. WILL CONTINUE RADAR CONTROL. ACKNOWLEDGE BY IDENT.

#### **12.4.5 HYDRAULIC FAILURE**

##### **(a) General**

- (i) Hydraulic system is usually distributed throughout the aircraft body and affects multiple systems.
- (ii) Hydraulic system may be affected by technical problems or outside damage.
- (iii) Problems with hydraulics may affect various parts of the aircraft resulting in complete or partial failure of flaps, ailerons, elevators, rudder, lift and roll spoilers, brakes and nose wheel steering.
- (iv) Any or all of these may lead to control difficulties.
- (v) Hydraulic problems may lead to:
  - Fuel Dumping
  - Gear Problems
  - Brake Problems
  - Relatively High-speed Approach and Landing
- (vi) The crew needs time to check alternate systems and all other related functions.
- (vii) The crew may also need more time for actions such as manual gear extension.

##### **(b) Effects and Consequences of hydraulic failure are as follows:**

- (i) Problems with aircraft control and limited maneuverability (bank angle/turns).
- (ii) Limited or no flap setting
- (iii) Limited bank angle
- (iv) Manual gear extension (no retraction possible)
- (v) Holding pattern for necessary checks (may need extended hold due to lack of manoeuvrability)
- (vi) Extended final

(vii) Higher approach speed on final}

(viii) Limited braking capability

(ix) Possible overrun

(x) RWY blocked after landing

**(c) ATC responsibilities:**

**(A S S I S T)**

(i) Inform supervisor/ shift incharge.

(ii) Keep airport fire on alert position.

(iii) Increase vertical and lateral separation.

(iv) Ask if dangerous goods on board.

(v) Ask for POB and Fuel if feasible.

(vi) Avoid ATC-caused GO AROUND.

(vii) Clear RWY according to local instructions Keep runway strip and associated area clear.

(viii) Towing equipment and other emergency vehicles on stand-by as appropriate.

(ix) If needed, inform pilot about:

- Next suitable aerodrome
- Aerodrome details as soon as possible
- WX information of landing aerodrome
- Fire or smoke from brakes

**(d) Phraseology**

GFA844 APP GFA844 WE HAVE GOT HYDRAULIC PROBLEM REQUEST PRIORITY LANDING

APP GFA844 ROGER, YOU ARE NUMBER ONE IN APPROACH SEQUENCE. DO YOU NEED ANY GROUND ASSISTANCE?

**12.4.6 ENGINE FAILURE**

**(a) General**

(i) Engine failure may be caused by:

- (1) hydraulic or electric problems
- (2) bird-strike
- (3) engine on fire
- (4) fuel problems



- 
- (5) low oil pressure
  - (6) icing
  - (7) intake of debris, or
  - (8) pilot error
  - (ii) Loss of engine reduces its power and ability of normal flying.
  - (iii) May result in:
    - (1) abandoned take-off
    - (2) pressurization problems
    - (3) fuel dumping
    - (4) precautionary approach
  - (b) Effects and consequences of engine failure are as follows:**
    - (i) Heavy workload in the cockpit
    - (ii) Deviation from SID
    - (iii) Descent
    - (iv) Prefer flying straight and level and in a larger turning radius (especially in multiple engine aircraft)
    - (v) Course deviation
    - (vi) Take-off abort
    - (vii) Pressurization problems
    - (viii) Fuel dumping
    - (ix) Diversionary or forced landing
    - (x) Blocked RWY after landing
  - (c) ATC responsibilities:**  
**(A S S I S T)**
    - (i) Inform supervisor/shift-in charge.
    - (ii) Keep airport fire on alert position.
    - (iii) Request for POB and FOB if feasible.
    - (iv) Inform landing aerodrome.
    - (v) Clear RWY according to local procedures (prior to the aircraft reaches at least 25 nm from landing threshold).
    - (vi) Keep safety strip clear.
    - (vii) Offer pilot extended final.

- (viii) Towing equipment and other emergency vehicles on stand-by as appropriate.
- (ix) Monitor and mark the aircraft position in radar environment.
- (x) In case of forced landing, record last known position and time for SAR purposes.
- (xi) If needed, inform pilot about:
  - next suitable aerodrome
  - alternate aerodrome details ASAP
  - WX information of landing aerodrome

**(a) Phraseology**

**(i) Standard Phraseology**

RNA418 APP, RNA418 RIGHT ENGINE ON FIRE DECLARING FULL EMERGENCY REQUEST PRIORITY LANDING

APP RNA418 ROGER. REQ FUEL REMAINING AND PERSON ON BOARD

RNA418 ----- HOURS OF FUEL REMAINING AND ----- (no. of persons) PERSONS ON BOARD

APP RNA418 ROGER. EMERGENCY SERVICES ALERTED ----- (other pertinent instructions)

RNA418 MAYDAY, MAYDAY, MAYDAY. APP RNA418, BOTH ENGINES FAILURE. 7 MILES ON APPROACH PASSING 8000'FT

APP RNA418 APP, ROGER MAYDAY. WIND 022 DEGREES 10 KNOTS QNH ---- - YOU ARE NUMBER ONE CONTACT TOWER 118.1

APP EMERGENCY TO ALL CONCERNED. EMERGENCY EXIST AT KATHMANDU AIRPORT. DELAY NOT DETERMINED DUE AIRCRAFT IN DISTRESS.

**(ii) Imposition of radio silence during emergency**

APP ALL STATIONS KATHMANDU APP. STOP TRANSMITTING, MAYDAY.

APP 9NAGQ KATHMANDU APP. STOP TRANSMITTING, MAYDAY.

**(iii) Instruction to other aircraft**

APP BHA201, APP. CLEAR TO DHARKE [or IGRIS] VIA 20DME ARC. DELAY NOT DETERMINED DUE AIRCRAFT IN DISTRESS. REPORT PASSING ---- --- RADIAL KTM [or other suitable instruction].

**(iv) Termination of radio silence**

APP ALL STATIONS KATHMANDU APP, DISTRESS TRAFFIC ENDED

### **12.4.7 BIRD STRIKE**

#### **(a) General**

- (i) Bird strike may result in:
  - (1) Broken Windshield / Canopy
  - (2) Engine Failure (Multi-engine)
  - (3) Engine Failure (Single-engine)
  - (4) Hydraulic Problems
  - (5) Precautionary Approach
  - (6) Handling Difficulties
  - (7) Electrical Problems
  - (8) Gear Problems
- (ii) The seriousness of this emergency depends on:
  - the size of the bird
  - the speed of the aircraft at impact
  - where it hits the aircraft
- (iii) Its effects may be very severe.
- (iv) The most dangerous strikes are to the windshield and engine.
  - (1) A strike of this nature may lead to the ultimate loss of the aircraft.
- (v) Strikes especially on the windshield or on the engine may impair the flying characteristics of the aircraft, making levels and headings difficult to maintain and safe landings difficult. They may ultimately lead to loss of control, or even structural failure.
- (vi) The likelihood of bird-strike varies depending on the level, the location and the time of year.
- (vii) The greatest risk of bird-strike at lower level with decreasing risk with increasing altitude.
- (viii) The risk is also higher in spring and autumn.
- (ix) Highest risk over:
  - (1) garbage dumps
  - (2) rivers
  - (3) breeding grounds
  - (4) wintering places

**(b) Effects and consequences of bird strike**

- (i) Shutdown of engine
- (ii) Aborted take-off
- (iii) Immediate return to aerodrome
- (iv) Reduced/loss of visibility if windscreen broken
- (v) IFR operation (instrument flight rules)
- (vi) The pilot may have to land at the nearest suitable aerodrome
- (vii) Landing next suitable aerodrome
- (viii) Hydraulic problems

**(c) ATC responsibilities:****(A S S I S T)**

- (i) Inform supervisor/shift-incharge.
- (ii) Keep airport fire on alert position when required.
- (iii) Find out if the pilot can still control the aircraft. If control problem, allow increased separation.
- (iv) Arrange technical assistance as necessary by appropriate specialists.
- (v) If aircraft intends to land at nearest suitable aerodrome, recommend it one or more landing options with all the aerodrome details with weather details ASAP.
- (vi) Allow a LONG FINAL if requested.
- (vii) Avoid chances of possible miss approach.
- (viii) Check RWY, if bird-strike is during or after take-off.

**(d) Phraseology**

GMG129 APP GMG129 DIVERTING TO KATHMANDU DUE BIRD HIT AT RIGHT WING

ATC GMG129 ROGER, DO YOU NEED ANY GROUND ASSISTANCE

GMG029 .....

ATC (successive instructions as per the aircraft request)

**12.4.8 FUEL DUMPING****(a) General**

- (i) In emergency, aircraft may need to dump fuel to reduce landing mass so as to effect a safe landing.

(ii) Avoid the crowded or congested area and the area where TS is reported or expected.

(iii) Dumping level should not be less than 1800 m (6000 ft).

**(b) Effects and consequences of fuel dumping could be as follows:**

(i) Dumping at lower altitudes may create the chances of developing flammable mist near the ground which may produce toxic effects to all human being, animals and plants.

(ii) Aircraft may dump fuel in emergency without adequate warning.

(iii) Need of greater separation.

**(c) ATC responsibilities:**

**(A S S I S T)**

(i) Inform supervisor/ shift-incharge.

(ii) Recommend minimum altitude from which the fuel should be dumped.

(iii) Advise most suitable airspace for fuel dumping.

(iv) Make every effort to keep other aircraft clear of the vapor zone.

(v) Separate other aircraft from it:

(1) Horizontally by keeping them:

- at least 10 nm beyond either sides.
- at least 15 mins flying time or 50 nm beyond at back side.

(2) Vertically by keeping them:

- at least 1000 ft above.
- at least 3000 ft below.

(vi) In case of emergency fuel dumping, broadcast this warning information so that other aircraft flying in the vicinity may avoid the affected airspace.

(vii) Inform adjacent ATC units about fuel dump operation.

(viii) Inform all previously notified if fuel dumping is complete.

**(d) Phraseology for**

**(i) Non-emergency fuel dumping**

DRK215 APP DRK215, REQ FUEL DUMP ALONG G348 BETWEEN MECHI AND KIMTI AT FL ----- (level).

APP DRK215 OPERATE IN BETWEEN MECHI AND KIMTI (or any suitable area, not crowded city or town area and preferably over water) AT ----- (level, not below 6000' from GND).

**(ii) Emergency fuel dumping**

DRK215 APP DRK215, DUMPING FUEL IN EMERGENCY OVER TTR  
MAINTAINING ----- (level)

**(iii) Instruction to other aircraft**

APP ALL STATION THIS IS KATHMANDU APP, BA46 DUMPING FUEL -----  
----- (description of fuel dumping area) AT ----- (level) AVIOD FLIGHT  
BETWEEN ----- (level) and ----- (level) WITHIN 50 MILES BEHIND, 10  
MILES AHEAD OF AIRCRAFT AND WITHIN 10 MILES TO THE SIDES OF  
FUEL DUMPING TRACK.

**(iv) Fuel dumping outside controlled airspace**

ATC ALL STATIONS THIS IS KATHMANDU ----- (name of unit), FUEL  
DUMPING IN PROGRESS OVER ----- (description of dumping area)  
RECOMMEND REMAIN CLEAR THIS AREA UNTIL ADVISED

**(v) Completion of fuel dumping**

APP ALL STATIONS THIS IS KATHMANDU APP, FUEL DUMPING  
COMPLETED.

**12.4.9 LANDING GEAR PROBLEM****(a) General**

- (i) Gear extension problem, either partially or fully, is to be considered as an emergency.
- (ii) The landing gear is held up by a hook system and when the hook is released the gear falls down. A hydraulic or an electrical system supports this movement.
- (iii) Mechanical or electrical malfunction may cause gear extension problem.
- (iv) When gear extension problem occurs, the pilot may ask for a low pass in order to inspect the position of the landing gear visually by ATCs and concerned technicians.
- (v) Foam carpeting over the runway is required to reduce the runway friction.

**(b) Expectations and Consequences of landing gear problem**

- (i) GO AROUND
- (ii) Low pass for gear check by ATCs and concerned technical experts.
- (iii) Request for foam carpet
- (iv) Possible fuel dumping to reduce aircraft weight
- (v) Manual gear extension
- (vi) RWY blocked after landing

- (vii) Skidding off RWY
- (viii) Taxiway may be blocked after clearing runway

**(c) ATC responsibilities:**

**(A S S I S T)**

- (i) Inform supervisor/ shift-incharge.
- (ii) Keep airport fire on alert position.
- (iii) Inform pilot about landing gears position by carefully observing low pass manoeuvre, and seek specialists' advice in this regard.
- (iv) Clear the runway strip and associated area.
- (v) Keep towing vehicle on stand-by position.

**(d) Phraseology**

BHA416 TWR BHA416, GOING AROUND DUE GEAR EXTENSION PROBLEM TWR BHA406 CARRY OUT STANDARD MISAPPROACH CONTACT APP ON 120.6 [or ----- (any suitable instruction)]

BHA416 APP BHA416 CARRYING OUT STANDARD MISAPPROACH DUE GEAR EXTENSION PROBLEM PASSING ----- (level) FOR ----- (level) WILL CHECK THE PROBLEM OVER DHARKE

BHA416 APP BHA416, INBOUND TO DHARKE MAINTAINING 12500' UNABLE TO RECTIFY THE PROBLEM. WE ARE VMC CANCELING IFR REQUEST LOW PASS FOR VISUAL INSPECTION FROM TWR

(For low pass visibility should be preferably at least VMC.)

APP BHA416 ROGER, CANCELLED IFR AT----- (time). DESCEND TO ----- (level) CLEARED LOW PASS FOR VISUAL INSPECTION REPORT 10 MILES

(Advise TWR about the intention of aircraft and get the required clearance. TWR vacates the traffic circuits in order to separate aircraft with landing gear extension problem.)

BHA416 TWR BHA416, PASSING LOW FROM YOUR ----- (side/direction) CONFIRM LANDING GEARS DOWN

TWR BHA416, LANDING GEAR APPEARS DOWN

or

BHA416, RIGHT [or LEFT or NOSE] WHEEL APPEARS DOWN [or UP]

or

BHA416, RIGHT [or LEFT or NOSE] WHEEL DOES NOT APPEAR DOWN [or UP]

(If landing gears not extended or partially extended)

BHA416 APP BHA416, REQUIRE FUEL DUMP REQ INSTRUCTION

BHA416 APP BHA416, WILL MAKE BELLY LANDING REQ RWY FOAMING FROM RWY TH --- TO TXY INTERSECTION -----.

APP BHA416, RWY FOAMING COMPLETE FROM RWY TH --- TO TXY INTERSECTION -----.

#### **12.4.10 URGENCY MESSAGE**

##### **(a) General**

(i) An urgency message should contain as many of the following elements as for as possible:

- Name of the station addressed
- Identification of the aircraft
- Nature of urgency
- Intention of PIC
- Position, level and heading of the aircraft in urgency, and
- Any other useful information.

(ii) Urgency call should be made on the frequency in use at the time.

(iii) Urgency message should be addressed to the station in those area of responsibility the urgency aircraft is operating.

##### **(b) Phraseology**

GFA409 PAN PAN, PAN PAN, PAN PAN CONTROL GFA499, PASSENGER WITH SUSPECTED HEART ATTACK REQUIRING IMMEDIATE MEDICAL ASSISTANCE, REQUEST PRIORITY LANDING.

ACC GHA499 ROGER YOU ARE NUMBER ONE IN APPROACH SEQUENCE AMBULANCE ALERTED

BHA401 PAN PAN, PAN PAN, PAN PAN APP BHA491 INTERCEPTED URGENCY CALL FROM 9NAMW HAVING GEAR PROBLEM REQUESTING PRIORITY LANDING. HER POSITION 13 MILES WEST AT 6500’.

APP BHA491 ROGER.

APP 9NAMW KATHMANDU APP WIND 250 DEGREES 5 KNOTS QNH ----- NO TRAFFIC. REPORT -----.

## **12.5 SOME OTHER 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 air traffic services personnel.



**12.5.1 EMERGENCY SEPARATION**

- 12.5.1.1 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.
- 12.5.1.2 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.

**12.5.2 PROCEDURES IN REGARD TO AIRCRAFT EQUIPPED WITH AIRBORNE COLLISION AVOIDANCE SYSTEMS (ACAS)**

- 12.5.2.1 The procedures to be applied for the provision of air traffic services 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 with the normal ATS procedures and shall exclude consideration of aircraft capabilities dependent on ACAS equipment.
- 12.5.2.2 When a pilot reports an ACAS resolution advisory (RA), the controller shall not attempt to modify the aircraft flight path until the pilot reports "Clear of Conflict".
- 12.5.2.3 Once an aircraft departs from its ATC clearance or instruction in compliance with an RA, or a pilot reports an RA, the 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 controller shall resume responsibility for providing separation for all the affected aircraft when:
- a) the controller acknowledges a report from the flight crew that the aircraft has resumed the current clearance; or
  - b) the 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.
- 12.5.2.4 ACAS can have a significant effect on ATC. Therefore, the performance of ACAS in the ATC environment should be monitored.
- 12.5.2.5 Following a significant ACAS event, pilots and controllers shall complete an air traffic incident report.

**12.5.3 CHANGE OF RADIOTELEPHONY CALL SIGN FOR AIRCRAFT**

- 12.5.3.1 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.
- 12.5.3.2 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.
- 12.5.3.3 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.
- 12.5.3.4 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.
- 12.5.3.5 The appropriate ATC unit shall advise the aircraft concerned when it is to revert to the call sign indicated by the flight plan.

**12.5.4 STRAYED OR UNIDENTIFIED AIRCRAFT**

*Note 1: 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.*

- 12.5.4.1 As soon as an air traffic services unit becomes aware of a strayed aircraft, it shall take all necessary steps as outlined in 12.5.4.1.1 and 12.5.4.1.2 to assist the aircraft and to safeguard its flight.

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

- 12.5.4.1.1 If the aircraft's position is not known, the air traffic services unit shall:
- a) attempt to establish two-way communication with the aircraft, unless such communication already exists;
  - b) use all available means to determine its position;
  - c) inform other ATS units into whose area the aircraft may have strayed or may stray, taking into account all the factors which may have affected the navigation of the aircraft in the circumstances;

- d) inform, in accordance with locally agreed procedures, appropriate military units and provide them with pertinent flight plan and other data concerning the strayed aircraft;
- e) request from the units referred to in c) and d) and from other aircraft in flight every assistance in establishing communication with the aircraft and determining its position.

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

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

- a) advise the aircraft of its position and corrective action to be taken; and
- b) provide, as necessary, other ATS units and appropriate military units with relevant information concerning the strayed aircraft and any advice given to that aircraft.

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

- a) attempt to establish two-way communication with the aircraft, unless such communication already exists;
- b) use all available means to determine its position;
- c) inform other ATS units into whose area the aircraft may have strayed or may stray, taking into account all the factors which may have affected the navigation of the aircraft in the circumstances;
- d) inform, in accordance with locally agreed procedures, appropriate military units and provide them with pertinent flight plan and other data concerning the strayed aircraft;
- e) request from the units referred to in c) and d) and from other aircraft in flight every assistance in establishing communication with the aircraft and determining its position.

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

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

- a) advise the aircraft of its position and corrective action to be taken; and
- b) provide, as necessary, other ATS units and appropriate military units with relevant information concerning the strayed aircraft and any advice given to that aircraft.

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

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

- b) inquire of other air traffic services units within the FIR about the flight and request their assistance in establishing two-way communication with the aircraft;
  - c) inquire of air traffic services units serving the adjacent FIRs about the flight and request their assistance in establishing two-way communication with the aircraft;
  - d) attempt to obtain information from other aircraft in the area.
- 12.5.4.3.1 The air traffic services unit shall, as necessary, inform the appropriate military unit as soon as the identity of the aircraft has been established.
- 12.5.4.4 Should the ATS unit consider that a strayed or unidentified aircraft may be the subject of unlawful interference, the appropriate authority designated by the State shall immediately be informed, in accordance with locally agreed procedures.

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## **CHAPTER 13**

### **COORDINATION PROCEDURES**

#### **13.1 COORDINATION IN GENERAL**

13.1.1 Coordination shall be accomplished by all air traffic control units in accordance with procedures detailed in the appropriate letter of agreement attached as an appendix. This part of the instructions sets out the basic guidelines in establishing required co-ordination between units providing air traffic control service to aircraft.

13.1.2 Through and concise coordination between ATC units is as important as giving information or instructions to pilot. The best way of ensuring this complete coordination is to

- UNDERSTAND The other man's job
- BE ALERT for changes to a situation which another officer must know about.
- DEVELOP SOUND HABITS for scanning your information records to ensure that all relevant information is given.

13.1.3 The above is essential in all positions, but absolutely vital in situations where two aircraft operating under different controllers could come into conflict, for example

- Tower/App positions.

13.1.4 The transfer of responsibility for providing necessary services to aircraft normally occurs at the crossing of the vertical or lateral boundary between the two areas, exceptions to this are;

- a. For ACC/APP or APP/TWR and TWR/APP or APP/ACC, transfer of the responsibility might take place at any point as agreed upon after prior coordination;
- b. Where there is a position report on or within 10 miles of the boundary, the transfer will normally be effected at that position.

13.1.5 When communication conditions, particular traffic conditions or hours of duty so require, the officer normally responsible in one area may request an officer responsible in an adjoining area to take over defined functions for him for a specified period. This transfer of functions adequately under the proposed arrangements. The transfer shall be recorded.

#### **13.2 CHANGES OF FREQUENCY**

13.2.1 In coordination with the adjacent unit the normal frequency change point may be varied to permit the use of a preferred frequency for a particular service. However

the transferring unit shall ensure that the change of frequency will take place not later than the aircraft reaching the specified transfer of control point.

- 13.2.2 Irrespective of whether a frequency change is involved, the relinquishing unit shall inform the accepting unit of any difficulties with communications or equipment.

### 13.3 INTERCOMMUNICATION COORDINATION

- 13.3.1 Calls over the intercommunication systems should be answered promptly. Both from the point of view of efficiency and human relations, the aim should be either to deal with the call at once or to give an interim reply such as STAND BY or CALL YOU BACK.

- 13.3.2 Coordination should normally be effected on intercom or liaison channels. When these are not available, public telephone channels should be used in preference to the AFTN.

### 13.4 COORDINATION ACTION BEFORE TRANSFERRING RESPONSIBILITY

FROM	TO	COORDINATION BEFORE TRANSFERRING RESPONSIBILITY
1 ACC	2 TWR	3 PROVIDE <ul style="list-style-type: none"> <li>a) Route clearance with beacon code.</li> <li>b) Departure restriction if any</li> <li>c) Operational status information such as NAV aids and communication circuit</li> <li>d) Any significant weather</li> </ul>
ACC	APP	PROVIDE <ul style="list-style-type: none"> <li>a) In bound traffic call sign, type name of departure point</li> <li>b) ETA and assigned/actual altitude/level over transfer point and revised ETA if different by four minutes or more</li> <li>c) EAT issued</li> <li>d) Operational status information such as NAV aids and communication circuit</li> <li>e) Any significant weather</li> <li>f) Information of over flight with altitude, route and estimates</li> </ul>

TWR	ACC	<p>PROVIDE</p> <ul style="list-style-type: none"> <li>a) Request for route clearance</li> <li>b) Departure time</li> <li>c) Cruising level if other than flight planned</li> <li>d) Operational status information such as NAV aids and communication circuit</li> <li>e) Any significant weather</li> <li>f) Runway in use</li> </ul>
TWR	APP	<p>PROVIDE</p> <ul style="list-style-type: none"> <li>a) Operational status information such as NAV aids and communication circuit</li> <li>b) Any significant weather</li> <li>c) Runway in use</li> </ul> <p>Additionally PROVIDE</p> <p><b>For departure</b></p> <ul style="list-style-type: none"> <li>a) Call sign, type of aircraft, level, destination, restriction put by ACC such as altitude restriction, release time, clearance void time</li> <li>b) Departure time</li> <li>c) Cancel IFR</li> </ul> <p><b>For Arrivals</b></p> <ul style="list-style-type: none"> <li>a) Visual contact and landing information</li> <li>b) Missed approach</li> </ul>
APP	ACC	<p>PROVIDE</p> <ul style="list-style-type: none"> <li>a) Operational status information such as radar systems, NAV aids and communication circuit</li> <li>b) Any significant weather</li> <li>c) APP shall coordinate ACC about arrivals and departures to/from the airports that will enter ACC jurisdiction</li> </ul> <p><b>COORDINATE</b></p> <p><b><u>For Departures</u></b></p> <ul style="list-style-type: none"> <li>a) When control of aircraft is being transferred</li> <li>b) Intention, if the transfer point is other than Normal.</li> </ul>



**For Arrivals**

- a) Missed approach
- b) EAT if holding expected before the aircraft is transferred to APP
- c) Lowest vacant level at the holding point
- d) Revision of EAT if any
- e) Cancel IFR
- f) Clearance to enter TMA for VFR and for IFR from other than controlled airspace, if required to enter TMA at a level/track which is other than cruising level or designated track

APP

TWR

PROVIDE

- a) Operational status information such as radar systems, NAV aids and communication circuit
- b) Any significant weather

**ISSUE**

- a) SID for IFR and departure instruction for VFR
- b) If necessary, the climb restriction to provide an appropriate separation for departing aircraft from other traffics
- c) Release clearance
- d) Movement and control data of arriving aircraft without delay and same shall be kept revised. The revised ETA shall be forwarded if different by four minutes or more. Movement and control data shall include call sign, type of aircraft, name of departure airport, type of instrument approach procedure, and ETA.

Note: See Appendix B for Model Coordination phraseology among ADC, APP and ACC.

## CHAPTER 14

### PHARASEOLOGIES

It is essential that standard phrases be used for radio telephony communication between aircraft and ground stations, to avoid misunderstanding of the content and meaning of messages and to reduce the time required for communication. Therefore, the standard phrase and procedures included in this section shall be used by Air Traffic Controllers and aircrew in all air-ground-air communications.

#### 14.1 SUPPLEMENTARY PHRASES

- 14.1.1 The phrases given in this section may not cover every situation that may arise. Additional phraseologies may be required in other situations. These should be as concise as possible and consistent with clarity. Conversational type speech should be avoided wherever possible.

#### 14.2 TRANSMISSION TECHNIQUE

- 14.2.1 The following transmitting techniques will assist in ensuring that transmitted speech is clearly and satisfactorily received.
- a. Always depress the transmit switch fully before speaking.
  - b. Always precede the transmission with a call sign, even on the second or subsequent transmissions to the same station.
  - c. A slight pause before and after numbers will assist in making them easier to understand.
  - d. Avoid conversational speech.
  - e. Speak all words plainly and end each word clearly, so as to prevent the running together of consecutive words.
  - f. Maintain a formal business like manner and avoid informal phrases.

#### 14.3 LETTERS, FIGURES AND TIME

- 14.3.1 When it is necessary to identify any letter of the alphabet, the following standard phonetic alphabet shall be used.

Letter	Spoken as	Pronunciation	Letter	Spoken as	Pronunciation
A	ALFA	AL-FAH	N	NOVEMBER	NO-VEM-BER
B	BRAVO	BRAH-VOH	O	OSCAR	OSS-CAH
C	CHALIE	CHAR-LEE	P	PAPA	PAH-PAH
D	DELTA	DELL-TAH	Q	QUEBEC	KEH-BECK

E	ECHO	ECK-OH	R	ROMEO	ROW- ME-OH
F	FOXTROT	FOXS-TROT	S	SIERRA	SEE-AIR-AH
G	GOLF	GOLF	T	TANGO	TANG- GO
H	HOTEL	HOH-TEL	U	UNIFORM	YOU-NI-FOM
I	INDIA	IN-DEE-AH	V	VICTOR	VICK-TAH
J	JULIET	JEW-LEE-ETT	W	WHISKEY	WISS-KEY
K	KILO	KEY-LOH	X	X-RAY	ECKS-RAY
L	LIMA	LEE-MAH	Y	YANKEE	YANG-KEY
M	MIKE	MIKE	Z	ZULU	ZOO-LOO

14.3.2 Number in whole hundreds or whole thousands shall be pronounced by transmitting each digit in the number of hundreds or thousands followed by the word hundred or thousand as appropriate. Combinations of whole thousands and whole hundreds shall be transmitted by transmitting each digit in the number of thousands followed by the word thousand, followed by the number of hundreds followed by the word hundred.

EXAMPLES:	Number transmitted as
10	ONE ZERO
75	SEVEN FIVE
583	FIVE EIGHT THREE
600	SIX HUNDRED
5000	FIVE THOUSAND
7600	SEVEN THOUSAND SIX HUNDRED
11000	ONE ONE THOUSAND
18500	ONE EIGHT THOUSAND FIVE HUNDRED
38143	THREE EIGHT ONE FOUR THREE

Number containing a decimal point shall be transmitted with the decimal point, in appropriate sequence, indicated by the word DECIMAL e.g., Number 118.1 –ONE ONE EIGHT DECIMAL ONE.

Number should be transmitted using the following pronunciations.			
Number	Pronunciation	Number	Pronunciation
0	ZE-RO	7	SEV-EN

1	WUN	8	AIT
2	TOO	9	NIN-ER
3	TREE	Decimal	DAY-SEE-MAL
4	FOW-ER	Hundred	HUN-DRED
5	FIFE	Thousand	THOU-SAND
6	SIX		

14.3.3 When transmitting time, the twenty four clock system shall be used, each digit being transmitted separately. When it is certain that no misunderstanding will exist, minutes only may be used. When there is possibility of confusion with other items being transmitted, the prefix TIME shall be used. When giving a time check, the time shall be given to the nearest half minute, e.g. Time 0715 and a half.

14.3.4 Readability of signals. The readability of signal shall be referred to as a number taken from the following list as appropriate:

1. Unreadable
2. Readable now and then
3. Readable but with difficulty
4. Readable
5. Perfectly readable

## **14.4 SOME GENERAL RADIOTELEPHONY PHRASES FOR USE BY ATC AND AIRCREW**

### **14.4.1 RADIOTELEPHONY PHRASES WITHIN CONTROLLED AIRSPACE**

The following radiotelephony phrases are not intended to be exhaustive and when circumstances dictate, pilots and ATC personnel shall be expected to use appropriate phraseologies which shall be as clear and concise as possible and designed to avoid confusion.

It is to be understood that all transmissions shall be prefixed with the callsign of the caller.

ATS Phraseologies  
**ATS Phraseologies**

**GENERAL**

DESCRIPTION OF LEVELS (Subsequently Referred to as "Level")	a) <b>FLIGHT LEVEL</b> (number); or b) (number) <b>FEET</b> .
LEVEL CHANGES, REPORTS AND RATES  ...instruction that a climb (or descent) to a level within the vertical range defined is to commence           ...to require action at a specific time or place   ...to require action when convenient  ...to require an aircraft to climb or descend maintaining own separation and VMC   ...when there is doubt that an aircraft can comply with a clearance or instruction ...when pilot is unable to comply with a clearance or instruction	a) <b>CLIMB</b> (or <b>DESCEND</b> ); followed as necessary by; i) <b>TO</b> (level) ii) <b>TO AND MAINTAIN BLOCK</b> (level) <b>TO</b> (level)  iii) <b>TO REACH</b> (level) <b>AT</b> (or <b>BY</b> ) (time or significant point); iv) <b>REPORT LEAVING</b> (or <b>REACHING</b> , or <b>PASSING</b> ) (level) v) <b>AT</b> (number) <b>FEET PER MINUTE [OR GREATER (OR LESS)]</b> ;  b) <b>MAINTAIN AT LEAST</b> (number) <b>FEET ABOVE</b> (or <b>BELOW</b> ) (aircraft call sign)  c) <b>REQUEST LEVEL</b> (or <b>FLIGHT LEVEL</b> or <b>ALTITUDE CHANGE FROM</b> (name of unit) [ <b>AT</b> (time or significant point)]).  d) <b>STOP CLIMB</b> (or <b>DESCENT</b> ) <b>AT</b> (level);  e) <b>CONTINUE CLIMB</b> (OR <b>DESCENT</b> ) <b>TO</b> (level)  f) <b>EXPEDITE CLIMB</b> (or <b>DESCENT</b> )[ <b>UNTIL PASSING</b> (level)]  g) <b>WHEN READY CLIMB</b> (or <b>DESCEND</b> ) <b>TO</b> (level)  h) <b>EXPECT CLIMB</b> (or <b>DESCENT</b> ) <b>AT</b> (time or Significant point)  *i) <b>REQUEST DESCENT AT</b> (time)  j) <b>IMMEDIATELY</b> ;  k) <b>AFTER PASSING</b> (significant point)  l) <b>AT</b> (time or significant point)  m) <b>WHEN READY</b> (instruction);  n) <b>MAINTAIN OWN SEPARATION AND VMC [FROM</b> (level)] <b>[TO</b> (level)] o) <b>MAINTAIN OWN SEPARATION AND VMC ABOVE</b> (or <b>BELOW</b> , or <b>TO</b> ) (level)  p) <b>IF UNABLE</b> (alternative instructions) <b>AND ADVISE</b> ;  *q) <b>UNABLE</b> ;

<p>...after a flight crew starts to deviate from any ATC clearance or an instruction to comply with an ACAS resolution advisory (RA) (Pilot and controller interchange)</p> <p>...after the response to an ACAS RA is completed and the assigned ATC clearance or instruction has been resumed (Pilot and controller interchange)</p> <p>...after the response to an ACAS RA and the assigned ATC clearance or instruction has been resumed (Pilot and controller interchange)</p> <p>...after an ATC clearance or instruction contradictory to the ACAS RA is received, the flight crew will follow the RA and inform ATC directly (Pilot and controller interchange)</p> <p>...clearance to cancel level restriction(s) of the vertical profile of a SID during climb</p> <p>...clearance to cancel level restriction(s) of the vertical profile of a STAR during descent</p>	<p>*r) <b>TCAS RA;</b></p> <p>s) <b>ROGER</b></p> <p>*t) <b>CLEAR OF CONFLICT RETURNING TO</b> (assigned clearance);</p> <p>u) <b>ROGER</b> (or alternative instructions)</p> <p>*v) <b>CLEAR OF CONFLICT</b> (assigned clearance) <b>RESUMED;</b></p> <p>w) <b>ROGER</b> (or alternative instructions);</p> <p>*x) <b>UNABLE, TCAS RA;</b></p> <p>y) <b>ROGER</b></p> <p>z) <b>CLIMB TO</b> (level) [<b>LEVEL RESTRICTION(S)</b> (SID designator) <b>CANCELLED</b> (or) <b>LEVEL RESTRICTION(S)</b> (SID designator) <b>AT</b> (point) <b>CANCELLED.</b>]</p> <p>aa) <b>DESCEND TO</b> (level) [<b>LEVEL RESTRICTION(S)</b> (STAR designator) <b>CANCELLED</b> (or) <b>LEVEL RESTRICTION(S)</b> (STAR designator) <b>AT</b> (point) <b>CANCELLED.</b>]</p>
<p>TRANSFER OF CONTROL AND/OR FREQUENCY CHANGE</p> <p><i>Note : - An aircraft may be requested To “<b>STAND BY</b>” on a frequency when it is intended that the ATS unit will initiate communications soon and to “<b>MONITOR</b>” a frequency when information is being broadcast thereon.</i></p>	<p>a) <b>CONTACT</b> (unit call sign) (frequency) [<b>NOW</b>];</p> <p>b) <b>AT</b> (or <b>OVER</b>) (time or place) [or <b>WHEN PASSING/LEAVING/REACHING</b>] (level) <b>CONTACT</b> (unit call sign) (frequency);</p> <p>c) <b>IF NO CONTACT</b> (instructions);</p> <p>d) <b>STAND BY FOR</b> (unit call sign) (frequency) ;</p> <p>*e) <b>REQUEST CHANGE TO</b> (frequency);</p> <p>f) <b>FREQUENCY CHANGE APPROVED;</b></p> <p>g) <b>MONITOR</b> (unit call sign) (frequency);</p> <p>*h) <b>MONITORING</b> (frequency);</p> <p>i) <b>WHEN READY CONTACT</b> (unit call sign) (frequency);</p> <p>j) <b>REMAIN THIS FREQUENCY.</b></p>
<p>CHANGE OF CALL SIGN</p> <p>... to instruct an aircraft to change its type of call sign</p> <p>...to advise an aircraft to revert to the call sign indicated in the flight plan</p>	<p>a) <b>CHANGE YOUR CALL SIGN TO</b> (new call sign) [<b>UNTIL FURTHER ADVISED</b>];</p> <p>b) <b>REVERT TO FLIGHT PLAN CALL SIGN</b> (call sign) [<b>AT</b> (significant point)].</p>

<p>TRAFFIC INFORMATION</p> <p>... to pass traffic information</p> <p>... to acknowledge traffic information</p>	<p>a) <b>TRAFFIC</b> (information);</p> <p>b) <b>NO REPORTED TRAFFIC</b></p> <p>*c) <b>LOOKING OUT</b>;</p> <p>*d) <b>TRAFFIC IN SIGHT</b>;</p> <p>*e) <b>NEGATIVE CONTACT</b> [reasons];</p> <p>f) <b>[ADDITIONAL] TRAFFIC</b> (direction) <b>BOUND</b> (type of aircraft) (level) <b>ESTIMATED</b> (or <b>OVER</b>) (significant point) <b>AT</b> (time)</p>
<p>METEOROLOGICAL CONDITIONS</p>	<p>a) <b>[SURFACE] WIND</b> (number) <b>DEGREES</b> (speed) (units);</p> <p>b) <b>WIND AT</b> (level) (number) <b>DEGREES</b> (number) <b>KNOTS</b>; Note :- Wind is always expressed by giving the mean direction and speed and any significant variations thereof.</p> <p>c) <b>VISIBILITY</b> (distance) (units) [direction];</p> <p>d) <b>RUNWAY VISUAL RANGE</b> (or <b>RVR</b>) <b>[RUNWAY (number)]</b> (distance) (units);</p> <p>e) <b>RUNWAY VISUAL RANGE</b> (or <b>RVR</b>) <b>RUNWAY (number)</b> <b>NOT AVAILABLE</b> (or <b>NOT REPORTED</b>);</p> <p>f) <b>PRESENT WEATHER</b> (details);</p> <p>g) <b>CLOUD</b> (amount,[type]) and height of base) (unit) (or <b>SKY CLEAR</b>)</p> <p>h) <b>CAVOK</b>; [Note :- CAVOK pronounced CAV-O-KAY.]</p> <p>i) <b>TEMPERATURE [MINUS]</b> (number) (and/or <b>DEW-POINT [MINUS]</b> (number);</p> <p>j) <b>QNH</b> (number) [(units)];</p> <p>k) (aircraft type) <b>REPORTED</b> (description) <b>ICING</b> (or <b>TURBULENCE</b>) <b>[IN CLOUD]</b> (area) (time)</p> <p>l) <b>REPORT FLIGHT CONDITIONS.</b></p>
<p>POSITION REPORTING</p> <p>... to omit position reports until a specific position</p>	<p>a) <b>NEXT REPORT AT</b> (significant point)</p> <p>b) <b>OMIT POSITION REPORTS [UNTIL (specify)]</b>;</p> <p>c) <b>RESUME POSITION REPORTING</b></p>

<p>ADDITIONAL REPORTS</p> <p>... to request a report at a specified place or distance</p> <p>....to report at a specified place or distance</p> <p>...to request a report of present position</p> <p>... to report present position</p>	<p>a) <b>REPORT PASSING</b> (significant point)</p> <p>b) <b>REPORT</b> (distance) <b>MILES (GNSS or DME) FROM</b> (name of DME station) (or significant point);</p> <p>* c) (distance) <b>MILES (GNSS or DME) FROM</b> (name of DME station) (or significant point)</p> <p>d) <b>REPORT PASSING</b> (three digits) <b>RADIAL</b> (name of VOR) <b>VOR</b>;</p> <p>e) <b>REPORT (GNSS or DME) DISTANCE FROM</b> (significant point) or (name of DME station);</p> <p>* f) (distance) <b>MILES (GNSS or DME) FROM</b> (name of DME station) (or significant point)</p>
<p>AERODROME INFORMATION</p>	<p>a) [(location)] <b>RUNWAY SURFACE CONDITION RUNWAY</b> (number) (condition);</p> <p>b) [(location)] <b>RUNWAY SURFACE CONDITION RUNWAY</b> (number) <b>NOT CURRENT</b>;</p> <p>c) <b>LANDING SURFACE</b> (condition);</p> <p>d) <b>CAUTION CONSTRUCTION WORK</b> (location);</p> <p>e) <b>CAUTION (specify reasons) RIGHT</b> (or <b>LEFT</b>), (or <b>BOTH SIDES</b>) <b>OF RUNWAY</b> [number];</p> <p>f) <b>CAUTION WORK IN PROGRESS</b> (or <b>OBSTRUCTION</b>) (position and any necessary advice);</p> <p>g) <b>RUNWAY REPORT AT</b> (observation time) <b>RUNWAY</b> (number) (type of precipitant) <b>UP TO</b> (depth of deposit) <b>MILLIMETRES. BRAKING ACTION GOOD</b> (or <b>MEDIUM TO GOOD</b>, or <b>MEDIUM</b>, or <b>MEDIUM TO POOR</b>, or <b>POOR</b> or <b>UNRELIABLE</b>) [and/or <b>BRAKING COEFFICIENT</b> (equipment and number)];</p> <p>h) <b>BRAKING ACTION REPORTED BY</b> (aircraft type) <b>AT</b> (time) <b>GOOD</b> (or <b>MEDIUM</b> or <b>POOR</b>);</p> <p>i) <b>BRAKING ACTION</b> [(location)] (measuring equipment used), <b>RUNWAY</b> (number), <b>TEMPERATURE [MINUS]</b> (number), <b>WAS</b> (reading ) <b>AT</b> (time);</p> <p>j) <b>RUNWAY</b> (or <b>TAXIWAY</b>) (number) <b>WET</b> [or <b>DAMP</b>, <b>WATER PATCHES</b>, <b>FLOODED</b> (depth), or <b>SNOW REMOVED</b> (length and width as applicable), or <b>TREATED</b>, or <b>COVERED WITH PATCHES OF DRY SNOW</b> (or <b>WET SNOW</b>, or</p>



	<p><b>COMPACTED SNOW, or SLUSH, or FROZEN SLUSH, or ICE, or ICE UNDERNEATH, or ICE AND SNOW, or SNOWDRIFTS, or FROZEN RUTS AND RIDGES];</b></p> <p>k) <b>TOWER OBSERVES</b> (weather information);</p> <p>l) <b>PILOT REPORTS</b> (weather information).</p>
OPERATIONAL STATUS OF VISUAL AND NON- VISUAL AIDS	<p>a) (specify visual or non-visual aid) <b>RUNWAY</b> (number) (description of deficiency);</p> <p>b) (type) <b>LIGHTING</b> (unserviceability);</p> <p>c) <b>TAXIWAY LIGHTING</b> (description of deficiency);</p> <p>d) (type of visual approach slope indicator or other Approach aids) <b>RUNWAY</b> (number) (description of deficiency);</p>
<p>REDUCED VERTICAL SEPARATION MINIMUM (RVSM) OPERATIONS</p> <p>.... to ascertain RVSM approval status of an aircraft</p> <p>.....to report RVSM approved status</p> <p>.....to report RVSM non-approved status followed by supplementary information</p> <p>.....to deny ATC clearance in to RVSM airspace</p> <p>.....to report when severe turbulence affects the capability of an aircraft to maintain height-keeping requirements for RVSM</p> <p>.....to report that the equipment of an aircraft has degraded below minimum aviation system performance standards</p> <p>....to request an aircraft to provide information as soon as RVSM-approved status has been regained or the pilot is ready to resume RVSM operations.</p> <p>.....to request confirmation that an aircraft has regained RVSM approved status or a pilot is ready to resume RVSM operations.</p> <p>..... to report ability to resume RVSM-operations after an equipment or weather related contingency</p>	<p>a) <b>CONFIRM RVSM APPROVED ;</b></p> <p>* b) <b>AFFIRM RVSM ;</b></p> <p>*c) <b>NEGATIVE RVSM</b> [(supplementary information, e.g. State Aircraft)];</p> <p>d) <b>UNABLE ISSUE CLEARANCE INTO RVSM AIRSPACE, MAINTAIN [or DESCEND TO , or CLIMB TO] (level);</b></p> <p>*e) <b>UNABLE RVSM DUE TURBULENCE;</b></p> <p>*f) <b>UNABLE RVSM DUE EQUIPMENT;</b></p> <p>g) <b>REPORT WHEN ABLE TO RESUME RVSM;</b></p> <p>h) <b>CONFIRM ABLE TO RESUME RVSM</b></p> <p>*i) <b>READY TO RESUME RVSM</b></p>
DEGRADATION OF AIRCRAFT NAVIGATION PERFORMANCE	<p>* a) <b>UNABLE RNP</b> ( specify type ) ( or <b>RNAV</b> ) [<b>DUE TO</b> (reason, e.g. <b>LOSS OF RAIM</b> or <b>RAIM ALERT</b>) ] ;</p>

GNSS UNAVAILABLE	*b) <b>BASIC GNSS UNAVAILABLE</b> [DUE TO (reason, e.g. <b>LOSS OF RAIM</b> or <b>RAIM ALERT</b> ) ]
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**AREA CONTROL SERVICES**

Issuance of a clearance	<p>a) (name of unit) <b>CLEARs</b> (aircraft call sign);</p> <p>b) (aircraft call sign) <b>CLEARED TO</b>;</p> <p>c) <b>RECLEARED</b> (amended clearance details)[<b>REST OF CLEARANCE UNCHANGED</b>];</p> <p>d) <b>RECLEARED</b> (amended route portion) <b>TO</b> (significant point of original route) [<b>REST OF CLEARANCE UNCHANGED</b>];</p> <p>e) <b>ENTER CONTROLLED AIRSPACE</b> (or <b>CONTROL ZONE</b>) [<b>VIA</b> (significant point or route)] <b>AT</b> (level) [<b>AT</b> (time)];</p> <p>f) <b>LEAVE CONTROLLED AIRSPACE</b> (or <b>CONTROL ZONE</b>)[<b>VIA</b> (significant point or route)] <b>AT</b> (level) (or <b>CLIMBING</b>, or <b>DESCENDING</b>);</p> <p>g) <b>JOIN</b> (specify) <b>AT</b> (significant point) <b>AT</b> (level) [<b>AT</b> (time)].</p>
INDICATION OF ROUTE AND CLEARANCE LIMIT	<p>a) <b>FROM</b> (location) <b>TO</b> (location)</p> <p>b) <b>TO</b> (location) Followed as necessary by:  <b>I) DIRECT</b>  <b>II) VIA</b> (route and/or significant points);  <b>III) VIA FLIGHT PLANNED ROUTE</b>;  <b>IV) VIA</b> (distance <b>DME ARC</b> (direction) <b>OF</b> (name of DME station)</p> <p>c) (route) <b>NOT AVAILABLE DUE</b> (reason) <b>ALTERNATIVE(S) IS/ ARE</b> (route) <b>ADVISE</b>.</p>
MAINTENANCE OF SPECIFIED LEVELS	<p>a) <b>MAINTAIN</b> (level) [<b>TO</b> (significant point)];</p> <p>b) <b>MAINTAIN</b> (level) <b>UNTIL PASSING</b> (significant point);</p> <p>c) <b>MAINTAIN</b> (level) <b>UNTIL</b> (minutes) <b>AFTER PASSING</b> (significant point);</p> <p>d) <b>MAINTAIN</b> (level) <b>UNTIL</b> (time);</p> <p>e) <b>MAINTAIN</b> (level) <b>UNTIL ADVISED BY</b> (name of unit);</p> <p>f) <b>MAINTAIN</b> (level) <b>UNTIL FURTHER ADVISED</b>;</p> <p>g) <b>MAINTAIN</b> (level) <b>WHILE IN CONTROLLED AIRSPACE</b>;</p> <p>h) <b>MAINTAIN BLOCK</b> (level) <b>TO</b> (level) Note :- The term “<b>MAINTAIN</b>” is not to be used in lieu of “<b>DESCEND</b>” or “<b>CLIMB</b>” when instructing an aircraft to change level.</p>

SPECIFICATION OF CRUISING LEVELS	<p>a) <b>CROSS</b> (significant point) <b>AT</b> (or <b>ABOVE</b>, or <b>BELOW</b>) (level);</p> <p>b) <b>CROSS</b> (significant point) <b>AT</b> (time) <b>OR LATER</b> (or <b>BEFORE</b>) <b>AT</b> (level);</p> <p>c) <b>CRUISE CLIMB BETWEEN</b> (levels) (or <b>ABOVE</b> (levels);</p> <p>d) <b>CROSS</b> (distance) <b>MILES</b>, (GNSS or DME) [(direction)] <b>OF</b> (name of DME station) (or distance) [(direction)] <b>OF</b> (significant point) <b>AT</b> (or <b>ABOVE</b>, or <b>BELOW</b>) (level).</p>
EMERGENCY DESCENT	<p>*a) <b>EMERGENCY DESCENT</b> (intentions);</p> <p>b) <b>ATTENTION ALL AIRCRAFT IN THE VICINITY OF</b> (or <b>AT</b>) (significant point or location) <b>EMERGENCY DESCENT IN PROGRESS FROM</b> (level) (followed as necessary by specific instructions, clearance, traffic information etc.</p>
IF CLEARANCE CANNOT BE ISSUED IMMEDIATELY UPON REQUEST	<b>EXPECT CLEARANCE</b> (or type of clearance) <b>AT</b> (time).
WHEN CLEARANCE FOR DEVIATION CANNOT BE ISSUED	<p><b>UNABLE, TRAFFIC</b> (direction) <b>BOUND</b> (type of aircraft) (level)</p> <p><b>ESTIMATED</b> (or <b>OVER</b>) (significant point) <b>AT</b> (time) <b>CALL SIGN</b> (call sign) <b>ADVISE INTENTIONS</b></p>
SEPARATION INSTRUCTIONS	<p>a) <b>CROSS</b> (significant point) <b>AT</b> (time)[<b>OR LATER</b> (or <b>OR BEFORE</b>)]</p> <p>b) <b>ADVISE IF ABLE TO CROSS</b> (significant point) <b>AT</b> (time or level);</p> <p>c) <b>MAINTAIN</b> (number) <b>KNOTS</b> [<b>OR GREATER</b> (or <b>OR LESS</b>)] [UNTIL (significant point)]</p> <p>d) <b>DO NOT EXCEED</b> (number) <b>KNOTS</b></p>

**APPROACH CONTROL SERVICES**

DEPARTURE INSTRUCTIONS	<p>a) [<b>AFTER DEPARTURE</b>] <b>TURN RIGHT</b> (or <b>LEFT</b>) <b>HEADING</b> (three digits) (or <b>CONTINUE RUNWAY HEADING</b>) (or <b>TRACK EXTENDED CENTRE LINE</b>) <b>TO</b>(level or significant point) (other instructions as required)</p> <p>b) <b>AFTER REACHING</b> (or <b>PASSING</b>) (level or significant point) (instruction)</p> <p>c) <b>TURN RIGHT</b> (or <b>LEFT</b>) <b>HEADING</b> (three digits) <b>TO</b> (level) [<b>TO INTERCEPT</b> (track, route, airway etc)]</p>
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	<p>d) (standard departure name and number) <b>DEPARTURE</b></p> <p>e) <b>TRACK</b> (three digits) <b>DEGREES [MAGNETIC (or TRUE)]</b> <b>TO (or FROM)</b> (significant point) <b>UNTIL</b> (time, or <b>REACHING</b> (fix or significant point or level)) <b>[BEFORE PROCEEDING ON COURSE];</b></p> <p>f) <b>CLEARED VIA</b> (designation).</p>
<p>APPROACH INSTRUCTIONS</p> <p>...when cleared to initial holding fix before clearing approach</p> <p>... when a pilot requests a visual approach</p> <p>... to request if a pilot is able to accept visual approach</p> <p>...in case of successive visual approaches when the pilot of a succeeding aircraft has reported</p>	<p>a) <b>CLEARED (or PROCEED) VIA</b> (designation)</p> <p>b) <b>CLEARED TO</b> (clearance limit) <b>VIA</b> (designation);</p> <p>c) <b>CLEARED VIA (or PROCEED VIA)</b>(details of route to be followed);</p> <p>d) <b>CLEARED TO</b> (name of initial holding fix) <b>VIA</b> (name of the STAR) <b>DESCEND TO</b> (altitude) <b>FEET, QNH</b> (number) [units] <b>EXPECTED APPROACH TIME</b> (time)</p> <p>*e) <b>REQUEST</b> (type of approach) <b>APPROACH [RUNWAY (number)];</b></p> <p>f) <b>CLEARED</b> (type of approach) <b>APPROACH [RUNWAY (number)];</b></p> <p>g) <b>CLEARED</b> (type of app) <b>RUNWAY (number) FOLLOWED BY CIRCLING TO RUNWAY (number);</b></p> <p>h) <b>CLEARED APPROACH RUNWAY (NUMBER);</b></p> <p>i) <b>COMMENCE APPROACH AT</b> (time);</p> <p>*j) <b>REQUEST STRAIGHT-IN</b> ((type of approach) <b>APPROCH [RUNWAY (number)] ;</b></p> <p>k) <b>CLEARED STRAIGHT-IN</b> [(type of approach)] <b>APPROCH [RUNWAY (number)];</b></p> <p>l) <b>REPORT VISUAL;</b></p> <p>m) <b>REPORT RUNWAY [LIGHTS] IN SIGHT;</b></p> <p>*n) <b>REQUEST VISUAL APPROCH;</b></p> <p>o) <b>CLEARED VISUAL APPROACH RUNWAY (number);</b></p> <p>p) <b>ADVISE ABLE TO ACCEPT VISUAL APPROACH RUNWAY (number);</b></p> <p>q) <b>CLEARED VISUAL APPROACH RUNWAY (number), MAINTAIN OWN SEPARATION FROM PRECEDING</b> (aircraft</p>

<p>having the preceding aircraft in sight</p>	<p>type and wake turbulence category as appropriate) <b>[CAUTION WAKE TURBULANCE]</b></p> <p>r) <b>REPORT</b> (significant point); <b>[OUTBOUND, or INBOUND];</b></p> <p>s) <b>REPORT COMMENCING PROCEDURE TURN</b></p> <p>*t) <b>REQUEST VMC DESCENT;</b></p> <p>u) <b>MAINTAIN OWN SEPARATION;</b></p> <p>v) <b>MAINTAIN VMC;</b></p> <p>w) <b>ARE YOU FAMILIAR WITH</b> (name) <b>APPROACH PROCEDURE;</b></p> <p>*x) <b>REQUEST RNAV RUNWAY</b> (number) <b>APPROACH;</b></p> <p>y) <b>CLEARED RNAV RUNWAY</b> (number) <b>APPROACH.</b></p>
<p><b>HOLDING CLEARANCE</b></p> <p>... visual</p> <p>... published holding procedure over a facility or fix</p> <p>... when detailed holding clearance is required</p>	<p>a) <b>HOLD VISUAL [OVER]</b> (position), (or <b>BETWEEN</b> two prominent landmarks));</p> <p>b) <b>CLEARED (or PROCEED) TO</b> (significant point, name of facility or fix) <b>[MAINTAIN (or CLIMB or DESCEND TO) (level)] HOLD [direction] AS PUBLISHED EXPECT APPROACH CLEARANCE (or FURTHER CLEARANCE) AT (time)</b> (additional instructions if necessary);</p> <p>*c) <b>REQUEST HOLDING INSTRUCTIONS;</b></p> <p>d) <b>CLEARED (or PROCEED) TO</b> (significant point, name of facility or fix) <b>[MAINTAIN (or CLIMB or DESCEND TO) (level)] HOLD [direction] INBOUND TRACK (three digits) DEGREES RIGHT (or LEFT) HAND PATTERN OUTBOUND TIME (number) MINUTE(or MINUTES ) EXPECT APPROACH CLEARANCE (or FURTHER CLEARANCE) AT (time)</b> (additional instructions if necessary);</p> <p>e) <b>CLEARED TO THE</b> (three digits) <b>RADIAL OF THE</b> (name) <b>VOR AT (distance) DME FIX [MAINTAIN(or CLIMB or DESCEND TO) (level)] HOLD [directions] INBOUND TRACK (three digits) DEGREES RIGHT (or LEFT) HAND PATTERN OUTBOUND TIME(number) MINUTES (Or MINUTES) EXPECT APPROACH CLEARANCE (or FURTHER CLEARANCE) AT (time)</b> (additional instructions if necessary)</p> <p>f) <b>CLEARED TO THE</b> (three digits) <b>RADIAL OF THE</b> (name) <b>VOR AT (distance) DME FIX [MAINTAIN (or CLIMB or DESCEND TO) (level)]HOLD BETWEEN (distance) AND (distance) DME INBOUND TRACK (three digits) DEGREES RIGHT (or LEFT) HAND PATTERN EXPECT APPROACH</b></p>

	<b>CLEARANCE</b> (or <b>FURTHER CLEARANCE</b> )) <b>AT</b> (time) ( additional instructions if necessary)
EXPECTED APPROACH TIME	a) <b>NO DELAY EXPECTED</b> ; b) <b>EXPECTED APPROACH TIME</b> (time); c) <b>REVISED EXPECTED APPROACH TIME</b> (time); d) <b>DELAY NOT DETERMINED</b> (reasons).

#### PHRASEOLOGIES FOR USE ON AND IN THE VICINITY OF THE AERODROME

IDENTIFICATION OF AIRCRAFT	<b>SHOW LANDING LIGHTS</b>
ACKNOWLEDGEMENT BY VISUAL MEANS	a) <b>ACKNOWLEDGE BY MOVING AILERONS</b> (or <b>RUDDER</b> ); b) <b>ACKNOWLEDGE BY ROCKING WINGS</b> ; c) <b>ACKNOWLEDGE BY FLASHING LANDING LIGHTS</b> .
STARTING PROCEDURES ... to request permission to start engines  ... ATC replies	*a) [aircraft location] <b>REQUEST START UP</b> ; *b) [aircraft location] <b>REQUEST START UP, INFORMATION</b> (ATIS identification); c) <b>START UP APPROVED</b> ; d) <b>START UP AT</b> (time); e) <b>EXPECT START UP AT (TIME)</b> f) <b>START UP AT OWN DISCRETION</b> ; g) <b>EXPECT DEPARTURE</b> (time) <b>START UP AT OWN DISCRETION</b> .
PUSH-BACK PROCEDURES	*a) [aircraft location] <b>REQUEST PUSHBACK</b> ; b) <b>PUSHBACK APPROVED</b> ; c) <b>STAND BY</b> ; d) <b>PUSHBACK AT OWN DISCRETION</b> ; e) <b>EXPECT</b> (number) <b>MINUTES DELAY DUE</b> (reason);
TOWING PROCEDURE  ... ATC responses	*a) <b>REQUEST TOW</b> [company name] (aircraft type) <b>FROM</b> (location) <b>TO</b> (location); b) <b>TOW APPROVED VIA</b> (specified routing to be followed); c) <b>HOLD POSITION</b> ; d) <b>STAND BY</b>

<p>TO REQUEST TIME CHECK AND/OR AERODROME DATA FOR DEPARTURE</p> <p>... when no ATIS broadcast is available</p>	<p>*a) <b>REQUEST TIME CHECK;</b></p> <p>b) <b>TIME</b> (time);</p> <p>*c) <b>REQUEST DEPARTURE INFORMATION;</b></p> <p>d) <b>RUNWAY (NUMBER), WIND</b> (direction and speed), (units) <b>QNH</b> (number) [(units)] <b>TEMPERATURE (MINUS)</b> (number), <b>[VISIBILITY</b> (distance) (units) (OR <b>RUNWAY VISUAL RANGE</b> (or <b>RVR</b>) distance)(units)] <b>[TIME</b> (time)];</p>
<p>TAXI PROCEDURES</p> <p>... for departure</p> <p>...where detailed taxi instructions are required</p> <p>...where aerodrome information is not available from an alternative source such as ATIS</p> <p>...for helicopter operations</p>	<p>*a) (aircraft type)[wake turbulence category if “heavy”] [aircraft location] <b>REQUEST TAXI</b> (intentions);</p> <p>*b) [aircraft type][wake turbulence category if “heavy”] [aircraft location](flight rules) <b>TO</b> (aerodrome of destination) <b>REQUEST TAXI</b> (intentions);</p> <p>c) <b>TAXI TO HOLDING POINT</b> [number] [<b>RUNWAY</b> (number)] <b>HOLD SHORT OF RUNWAY</b>(number)(or <b>CROSS RUNWAY</b>(number) <b>[TIME</b> (time)];</p> <p>*d) (aircraft type)[wake turbulence category if “heavy”] <b>REQUEST DETAILED TAXI INSTRUCTIONS;</b></p> <p>e) <b>TAXI TO HOLDING POINT</b> [number] (<b>RUNWAY</b> (number)) <b>VIA</b> (specific route to be followed) <b>TIME</b> (time)] [<b>HOLD SHORT OF RUNWAY</b> (number) (or <b>CROSS RUNWAY</b> (number))];</p> <p>f) <b>TAXI TO HOLDING POINT</b> [number] (followed by aerodrome information as applicable) <b>[TIME</b> (time)];</p> <p>g) <b>TAKE</b> (or <b>TURN</b>) <b>FIRST</b> (or <b>SECOND</b>) <b>LEFT</b> (or <b>RIGHT</b>);</p> <p>h) <b>TAXI VIA</b> (identification of taxiway);</p> <p>i) <b>TAXI VIA RUNWAY</b> (number);</p> <p>j) <b>TAXI TO TERMINAL</b> (or other location, e.g. <b>GENERAL AVIATION AREA</b>) <b>[STAND</b> (number)];</p> <p>*k) <b>REQUEST AIR-TAXIING FROM</b> (or <b>VIA</b>) <b>TO</b> (location or routing as appropriate);</p> <p>l) <b>AIR-TAXI TO (or VIA)</b> (location or routing as appropriate) <b>CAUTION</b> (dust, blowing snow, loose debris, taxiing light aircraft, personnel, etc.);</p>

<p>...after landing</p> <p>... general</p>	<p><b>m) AIR TAXI VIA</b> (director, as requested, or specified route) <b>TO</b> (location, heliport, operating or movement area, active or inactive runway). <b>AVOID</b> (aircraft or vehicles or personnel);</p> <p><b>*n) REQUEST BACKTRACK;</b></p> <p><b>o) BACKTRACK APPROVED;</b></p> <p><b>p) BACKTRACK RUNWAY</b> (number);</p> <p><b>*q) [aircraft location] REQUEST TAXI TO</b> (destination on aerodrome);</p> <p><b>r) TAXI STRAIGHT AHEAD;</b></p> <p><b>s) TAXI WITH CAUTION;</b></p> <p><b>t) GIVE WAY TO</b> (description and position of other aircraft);</p> <p><b>*u) GIVING WAY TO</b> (traffic);</p> <p><b>*v) TRAFFIC</b> (or type of aircraft) <b>IN SIGHT;</b></p> <p><b>w) TAXI INTO HOLDING BAY;</b></p> <p><b>x) FOLLOW</b> (description of other aircraft or vehicle);</p> <p><b>y) VACATE RUNWAY</b></p> <p><b>*z) RUNWAY VACATED;</b></p> <p><b>aa) EXPEDITE TAXI</b> (reason);</p> <p><b>*bb) EXPEDITING;</b></p> <p><b>cc) [CAUTION] TAXI SLOWER</b> (reason);</p> <p><b>*dd) SLOWING DOWN.</b></p>
HOLDING	<p><b>a) ✧HOLD</b> (direction) <b>OF</b> (position, runway number, etc.);</p> <p><b>b) ✧HOLD POSITION;</b></p> <p><b>c) ✧HOLD</b> (distance) <b>FROM</b> (position);</p> <p><b>d) ✧HOLD SHORT OF</b> (position);</p>





...acknowledgement of a conditional clearance	*k) (condition) <b>LINING UP</b> (brief reiteration of the condition);
...confirmation or otherwise of the read-back of conditional clearance	l) <b>[THAT IS] CORRECT</b> (or <b>I SAY AGAIN...</b> (as appropriate).
TAKE-OFF CLEARANCE	a) <b>RUNWAY</b> (number) <b>CLEARED FOR TAKE-OFF [REPORT AIRBORNE]</b> ;
....when reduced runway separation is used	b) (traffic information) <b>RUNWAY</b> (number) <b>CLEARED FOR TAKE-OFF</b> ;
...when take-off clearance has not been complied with	c) <b>TAKE OFF IMMEDIATELY OR VACATE RUNWAY</b> [(instructions)];
...to cancel a take-off clearance	d) <b>TAKE OFF IMMEDIATELY OR HOLD SHORT OF RUNWAY</b> ;
... to stop a take-off after an aircraft has commenced take-off roll	e) <b>HOLD POSITION, CANCEL TAKE OFF I SAY AGAIN CANCEL TAKE-OFF</b> (reasons);
... for helicopter operations	*f) <b>HOLDING</b> ;
	g) <b>STOP IMMEDIATELY</b> [(repeat aircraft call sign) <b>STOP IMMEDIATELY</b> ];
	*h) <b>STOPPING</b> ;
	i) <b>CLEARED FOR TAKE-OFF [FROM LOCATION]</b> (present position, taxiway, final approach and take-off area, runway and number);
	*j) <b>REQUEST DEPARTURE INSTRUCTIONS</b> ;
	k) <b>AFTER DEPARTURE TURN RIGHT</b> (or <b>LEFT</b> or <b>CLIMB</b> ) (instructions as appropriate).
TURN OR CLIMB INSTRUCTIONS AFTER TAKE-OFF	*a) <b>REQUEST RIGHT</b> (or <b>LEFT</b> ) <b>TURN</b> ;
... to request airborne time	b) <b>RIGHT</b> (or <b>LEFT TURN APPROVED</b> ;
... heading to be followed	c) <b>WILL ADVISE LATER FOR RIGHT</b> (or <b>LEFT TURN</b> ;
... when a specific track is to be followed	d) <b>REPORT AIRBORNE</b> ;
	e) <b>AIRBORNE</b> (time)
	f) <b>AFTER PASSING</b> (level) (instructions);
	g) <b>CONTINUE RUNWAY HEADING</b> (instructions);
	h) <b>TRACK EXTENDED CENTRELINE</b> (instructions)

<p>ENTERING AN AERODROME TRAFFIC CIRCUIT</p> <p>... when ATIS information is available</p>	<p>i) <b>CLIMB STRAIGHT AHEAD</b> (instructions).</p> <p>*a) [aircraft type](position) (level) <b>FOR LANDING</b>;</p> <p>b) <b>JOIN</b> (direction of circuit) (direction of circuit) (runway number)[<b>SURFACE</b>] <b>WIND</b> (direction and speed) (units) [<b>TEMPERATURE [MINUS]</b> (number)] <b>QNH</b> (number) [(units)] [<b>TRAFFIC</b>(detail)];</p> <p>c) <b>MAKE STRAIGHT-IN APPROCH, RUNWAY</b> (number) [<b>SURFACE</b>] <b>WIND</b> (direction and speed) (units)[<b>TEMPERATURE[MINUS]</b> (number) <b>QNH</b> (number) (units)][<b>TRAFFIC</b> (detail)];</p> <p>*d) (aircraft type), (position) (level) <b>INFORMATION</b> (ATIS identification) <b>FOR LANDING</b>;</p> <p>e) <b>JOIN</b> (position in circuit) [<b>RUNWAY</b> (number)] <b>QNH</b> (number) (units)] [<b>TRAFFIC</b> (detail)].</p>
<p>IN THE CIRCUIT</p>	<p>*a) (position in circuit, e.g. <b>DOWNWIND / FINAL</b>);</p> <p>b) <b>NUMBER ... FOLLOW</b> (aircraft type and position) [additional instructions if required].</p>
<p>APPROACH INSTRUCTIONS</p>	<p>a) <b>MAKE SHORT APPROACH</b>.</p> <p>b) <b>MAKE LONG APPROCH</b> (or <b>EXTEND DOWNWIND</b>);</p> <p>c) <b>REPORT BASE</b> (or <b>FINAL</b>, or <b>LONG FINAL</b>);</p> <p>d) <b>CONTINUE APPROCH</b> [<b>PREPARE FOR POSSIBLE GO AROUND</b>].</p>
<p>LANDING CLEARANCE</p> <p>....when reduced runway separation is used</p> <p>... special operations</p> <p>...to make an approach along or parallel to a runway, descending to an agreed minimum level</p> <p>... to fly past the control tower or other observation point for the purpose of visual inspection by persons on the ground.</p>	<p>a) <b>RUNWAY</b> (number) <b>CLEARED TO LAND</b>;</p> <p>b) (traffic information) <b>RUNWAY</b> (number) <b>CLEARED TO LAND</b>;</p> <p>c) <b>CLEARED TOUCH AND GO</b>;</p> <p>d) <b>MAKE FULL STOP</b>;</p> <p>*e) <b>REQUEST LOW APPROACH</b> (reasons);</p> <p>f) <b>CLEARED LOW APPROACH</b> [<b>RUNWAY</b> (number)][(altitude restriction if required) (go around instructions)];</p> <p>*g) <b>REQUEST LOW PASS</b> (reasons);</p>

... for helicopter operations	<p>h) <b>CLEARED LOW PASS</b> [RUNWAY (number)][(altitude restriction if required) (go around instructions)];</p> <p>*i) <b>REQUEST STRAIGHT-IN</b> (or <b>CIRCLING APPROACH, LEFT</b> (or <b>RIGHT</b>) <b>TURN TO</b> (location));</p> <p>j) <b>MAKE STRAIGHT-IN</b> (or <b>CIRCLING APPROACH, LEFT</b> (or <b>RIGHT</b>) <b>TURN TO</b> (location, runway, taxiway, final approach and take-off area) [ARRIVAL (or <b>ARRIVAL ROUTE</b>) (number, name, or code)]. [HOLD SHORT OF (active runway, extended runway centre line, other)]. [REMAIN (direction or distance) FROM (runway, runway center line, other helicopter or aircraft)]. [CAUTION (power lines, unlighted obstructions, wake turbulence, etc.)]. <b>CLEARED TO LAND.</b></p>
DELAYING AIRCRAFT	<p>a) <b>CIRCLE THE AERODROME;</b></p> <p>b) <b>ORBIT (RIGHT, or LEFT)[FROM PRESENT POSITION];</b></p> <p>c) <b>MAKE ANOTHER CIRCUIT.</b></p>
MISSED APPROACH	<p>a) <b>GO AROUND;</b></p> <p>*b) <b>GOING AROUND.</b></p>
<p>INFORMATION TO AIRCRAFT</p> <p>...when pilot requested visual inspection of landing gear</p> <p>... wake turbulence</p> <p>... jet blast on apron or taxiway</p> <p>... propeller-driven aircraft slipstream</p>	<p>a) <b>LANDING GEAR APPEARS DOWN;</b></p> <p>b) <b>RIGHT</b> (or <b>LEFT</b>, or <b>NOSE</b>) <b>WHEEL APPEARS UP</b> (or <b>DOWN</b>);</p> <p>c) <b>WHEELS APPEAR UP;</b></p> <p>d) <b>RIGHT</b> (or <b>LEFT</b>, or <b>NOSE</b>) <b>WHEEL DOES NOT APPEAR UP</b> (or <b>DOWN</b>);</p> <p>e) <b>CAUTION WAKE TURBULENCE [FROM ARRIVING (or DEPARTING) (type of aircraft) [additional information as required];</b></p> <p>f) <b>CAUTION JET BLAST;</b></p> <p>g) <b>CAUTION SLIPSTREAM.</b></p>
RUNWAY VACATING AND COMMUNICATIONS AFTER LANDING	<p>a) <b>CONTACT GROUND</b> (frequency);</p> <p>b) <b>WHEN VACATED CONTACT GROUND</b> (frequency);</p> <p>c) <b>EXPEDITE VACATING;</b></p> <p>d) <b>YOUR STAND (OR GATE)(designation);</b></p> <p>e) <b>TAKE</b> (or <b>TURN</b>) <b>FIRST</b> (or <b>SECOND</b>, or <b>CONVENIENT</b>) <b>LEFT</b> (or <b>RIGHT</b>) <b>AND CONTACT GROUND</b> (frequency);</p>

... for helicopter operations	<p>f) <b>AIR-TAXI TO HELICOPTER STAND</b> (or) <b>HELICOPTER PARKING POSITION</b> (area);</p> <p>g) <b>AIR-TAXI TO</b> (or <b>VIA</b>) (location or routing as appropriate) <b>[CAUTION</b> (dust, blowing snow, loose debris, taxiing light aircraft, personnel, etc.));</p> <p>h) <b>AIR TAXI VIA</b> (direct, as requested, or specified route) <b>TO</b> (location heliport, operating or movement area, active or inactive runway). <b>AVOID</b> (aircraft or vehicles or personnel).</p>
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**COORDINATION BETWEEN ATS UNITS**

<p>Estimates and revisions</p> <p>... sending unit</p> <p>...receiving unit reply (if flight plan details are not available)</p> <p>....receiving unit reply (if flight plan details are available)</p> <p>..sending unit reply</p>	<p>a) <b>ESTIAMTE</b> (direction of flight) (aircraft call sign) <b>[SQUAWKING</b> (SSR Code)] (type) <b>ESTIMATED</b> (significant point)(time) (level) (or <b>DESCENDING FROM</b> (level) <b>TO</b> (level))[<b>SPEED</b>(filed <b>TAS</b>)] (route) [ (point of departure) <b>TO</b> (point of destination)] [RVSM status]<b>[REMARKS]</b>;</p> <p>b) <b>ESTIMATE</b> (significant point) <b>ON</b> (aircraft call sign)</p> <p>c) <b>NO DETAILS</b>;</p> <p>(aircraft type) (destination);</p> <p><b>[SQUAWKING</b> (SSR Code) <b>[ESTIMATED]</b> (significant point) (time) <b>AT</b> (level);</p> <p>Note :- In the event that flight plan details are not available the receiving station shall reply to b) NO DETAILS and transmitting station shall pass full estimate as in a).</p> <p>d) <b>ESTIMATE UNMANNED FREE BALLOONS(S)</b> (identification and classification) <b>ESTIMATED OVER</b> (place) <b>AT</b> (time) <b>REPORTED FLIGHT LEVEL(S)</b> (figure or figures) [or <b>FLIGHT LEVEL UNKNOWN</b>] <b>MOVING</b> (direction)<b>ESTIMATED GROUND SPEED</b> (figure) (other pertinent information, if any);</p> <p>e) <b>REVISION</b> (aircraft call sign) (details as necessary).</p>
TRANSFER OF CONTROL	<p>a) <b>REQUEST RELEASE OF</b> (aircraft call sign);</p> <p>b) (aircraft call sign) <b>RELEASED [AT</b> (time)] [conditions/restrictions];</p> <p>c) <b>IS</b> (aircraft call sign) <b>RELEASED [FOR CLIMB</b> (or <b>DESCENT</b>)]?;</p> <p>d) (aircraft call sign) <b>NOT RELEASED [UNTIL</b> (time or significant point)];</p>

	e) <b>UNABLE</b> (aircraft call sign)[ <b>TRAFFIC IS</b> (details)].
CHANGE OF CLEARANCE	a) <b>MAY WE CHANGE CLEARANCE OF</b> (aircraft call sign) <b>TO</b> (details of alteration proposed);  b) <b>AGREED TO</b> (alteration of clearance) <b>OF</b> (aircraft call sign);  c) <b>UNABLE</b> (aircraft call sign);  d) <b>UNABLE</b> (desired route, level, etc. <b>FOR</b> (aircraft call sign)) [ <b>DUE</b> (reason)] (alternative clearance proposed).
Approval request	a) <b>APPROVAL REQUEST</b> (aircraft call sign) <b>ESTIMATED DEPARTURE FROM</b> (significant point) <b>AT</b> (time);  b) (aircraft call sign) <b>REQUEST APPROVED</b> [(restriction if any)];  c) (aircraft call sign) <b>UNABLE</b> (alternative instructions).
Inbound release	<b>INBOUND RELEASE</b> (aircraft call sign) [ <b>SQUAWKING</b> (SSR Code)] (type) <b>FROM</b> (departure point) <b>RELEASED AT</b> (significant point, or time, or level) <b>CLEARED TO AND ESTIMATING</b> (clearance limit((time) <b>AT</b> (level) [ <b>EXPECTED APPROACH TIME</b> or <b>NO DELAY EXPECTED</b> ] <b>CONTACT AT</b> (time).
Handover	<b>HANDOVER</b> (aircraft call sign)[ <b>SQUAWKING</b> (SSR Code)] <b>POSITION</b> (aircraft position (level).
Expedition of clearance	a) <b>EXPEDITE CLEARANCE</b> (aircraft call sign) <b>EXPECTED DEPARTURE FROM</b> (place) <b>AT</b> (time);  b) <b>EXPEDITE CLEARANCE</b> (aircraft call sign) [ <b>ESTIMATED</b> ] <b>OVER</b> (place) <b>AT</b> (time) <b>REQUESTS</b> (level or route, etc.).
REDUCED VERTICAL SEPARATION MINIMUM (RVSM) OPERATIONS. ..... to verbally supplement estimate messages of aircraft non-approved for RVSM or to verbally supplement an automated estimate message exchange that does not automatically transfer information from item 18 of the flight plan followed by supplementary information , as appropriate.  ..... to communicate the cause of a contingency relating to an aircraft that is unable to conduct RVSM operations due to severe turbulence or other severe meteorological phenomena or equipment failure, as applicable.	a) <b>NEGATIVE RVSM</b> [(supplementary information, e.g State Aircraft )]  b) <b>UNABLE RVSM DUE TURBULENCE (or EQUIPMENT, as applicable).</b>

**GENERAL ATS SURVEILLANCE PHRASEOLOGY**

IDENTIFICATION OF AIRCRAFT	<p>a) <b>REPORT HEADING [AND FLIGHT LEVEL (or ALTITUDE)];</b></p> <p>b) <b>FOR IDENTIFICATION TURN LEFT (or RIGHT) HEADING</b> (three digits);</p> <p>c) <b>TRANSIMIT FOR IDENTIFICATION AND REPORT HEADING;</b></p> <p>d) <b>RADAR CONTACT</b> [position];</p> <p>e) <b>IDENTIFIED</b> [position];</p> <p>f) <b>NOT IDENTIFIED</b> [reason], [<b>RESUME (or CONTINUE) OWN NAVIGATION</b>].</p>
POSITION INFORMATION	<b>POSITION</b> (distance) (direction) <b>OF</b> (signification point) (or <b>OVER</b> or <b>ABEAM</b> (signification point).
VECTERING INSTRUCTIONS	<p>a) <b>LEAVE</b> (signification point) <b>HEADING</b> (three digits);</p> <p>b) <b>CONTINUE HEADING</b> (three digits);</p> <p>c) <b>CONTINUE PRESENT HEADING;</b></p> <p>d) <b>FLY HEADING</b> (three digits);</p> <p>e) <b>TURN LEFT (or RIGHT) HEADING (three digits)</b> [reasons];</p> <p>f) <b>TURN LEFT (or RIGHT)</b> (number of degrees) <b>DEGREES</b> [reasons];</p> <p>g) <b>STOP TURN HEADING</b> (three digits);</p> <p>h) <b>FLY HEADING</b> (three digits), <b>WHEN ABLE PROCEED DIRECT</b> (name) (signification point);</p> <p>i) <b>HEADING IS GOOD.</b></p>
TERMINATION OF RADAR VECTERING	<p>a) <b>RESUME OWN NAVIGATION</b> (position of aircraft)(specific instructions);</p> <p>b) <b>RESUME OWN NAVIGATION [DIRECT]</b> (significant point) [<b>MAGNETIC TRACK</b> (three digits) <b>DISTANCE</b> (number) <b>MILES</b>].</p>
MANOEUVRES  ... (in case of unreliable directional instruments on board aircraft)	<p>a) <b>MAKE A THREE SIXTY TURN LEFT (or RIGHT)</b> [reason];</p> <p>b) <b>ORBIT LEFT (or RIGHT)</b> [reasons];</p> <p>c) <b>MAKE ALL TURNS RATE ONE (or RATE HALF, or (number) DEGREES PER SECOND) START AND STOP ALL TURNS ON THE COMMAND "NOW";</b></p>

<p>Note :- When it is necessary to specify a reason for radar vectoring or for the above manoeuvres, the following phraseologies should be used:</p> <p>a) DUE TRAFFIC;  b) FOR SPACING;  c) FOR DELAY;  d) FOR DOWNWIND (or BASE, or FINAL).</p>	<p>d) <b>TURN LEFT (or RIGHT) NOW;</b></p> <p>e) <b>STOP TURN NOW.</b></p>
<p>SPEED CONTROL</p>	<p>a) <b>REPORT SPEED;</b></p> <p>*b) <b>SPEED (number) KNOTS;</b></p> <p>c) <b>MAINTAIN (number) KNOTS [OR GREATER (or OR LESS) UNTIL(significant point)];</b></p> <p>d) <b>DO NOT EXCEED (number) KNOTS;</b></p> <p>e) <b>MAINTAIN PRESENT SPEED;</b></p> <p>f) <b>INCREASE (or REDUCE) SPEED TO (number) KNOTS[ OR GREATER (or LESS)];</b></p> <p>g) <b>INCREASE (or REDUCE) SPEED BY (number) KNOTS;</b></p> <p>h) <b>RESUME NORMAL SPEED;</b></p> <p>i) <b>REDUCE TO MINIMUM APPROACH SPEED;</b></p> <p>j) <b>REDUCE TO MINIMUM CLEAN SPEED;</b></p> <p>k) <b>NO ATC SPEED RESTRICTION.</b></p>
<p>POSITION REPORTING</p> <p>... to omit position reports</p>	<p>a) <b>OMIT POSITION REPORTS [UNTIL (specify)];</b></p> <p>b) <b>NEXT REPORT AT (significant point);</b></p> <p>c) <b>REPORTS REQUIRED ONLY AT (significant point(s));</b></p> <p>d) <b>RESUME POSITION REPORTING.</b></p>
<p>TRAFFIC INFORMATION AND AVOIDING ACTION</p> <p>... (if known)</p>	<p>a) <b>TRAFFIC (number) O'CLOCK (distance) (direction of flight)[any other pertinent information];</b></p> <p>1) <b>UNKNOWN;</b></p> <p>2) <b>SLOW MOVING;</b></p> <p>3) <b>FAST MOVING;</b></p> <p>4) <b>CLOSING;</b></p> <p>5) <b>OPPOSITE (or SAME DIRECTION);</b></p> <p>6) <b>OVERTAKING;</b></p> <p>7) <b>CROSSING LEFT TO RIGHT (or RIGHT TO LEFT);</b></p> <p>8) <b>(aircraft type);</b></p> <p>9) <b>(level);</b></p> <p>10) <b>CLIMBING (or DESCENDING);</b></p>



<p>... to request avoiding action</p> <p>... when passing unknown traffic</p> <p>... for avoiding action</p>	<p>*b) <b>REQUEST VECTORS</b>;</p> <p>c) <b>DO YOU WANT VECTORS?</b>;</p> <p>d) <b>CLEAR OF TRAFFIC</b> [appropriate instructions];</p> <p>e) <b>TURN LEFT</b> (or <b>RIGHT</b>) <b>IMMEDIATELY HEADING</b> (three digits) <b>TO AVOID [UNIDENTIFIED] TRAFFIC</b> (bearing by clock reference and distance);</p> <p>f) <b>TURN LEFT</b> (or <b>RIGHT</b>) (number of degrees) <b>DEGREES IMMEDIATELY TO AVOID [UNIDENTIFIED] TRAFFIC AT</b> (bearing by clock-reference and distance).</p>
<p>COMMUNICATIONS AND LOSS OF COMMUNICATIONS</p> <p>... if loss of communications suspected</p>	<p>a) <b>[IF] RADIO CONTACT LOST</b> (instructions);</p> <p>b) <b>IF NO TRANSMISSIONS RECEIVED FOR</b> (number) <b>MINUTES</b> (or <b>SECONDS</b>) (instructions);</p> <p>c) <b>REPLY NOT RECEIVED</b> (instructions);</p> <p>d) <b>IF YOU READ</b> (manoeuvre instructions or <b>SQUAWK</b> (code or <b>IDENT</b>));</p> <p>e) (manoeuvre, <b>SQUAWK</b> or <b>IDENT</b>) <b>OBSERVED. POSITION</b> (position of aircraft), [(instructions)].</p>
<p>TERMINATION OF RADAR SERVICE</p>	<p>a) <b>RADAR SERVICE</b> (or <b>IDENTIFICATION</b>) <b>TERMINATED [DUE</b> (reason)] (instructions);</p> <p>b) <b>WILL SHORTLY LOSE IDENTIFICATION</b> (appropriate instructions or information);</p> <p>c) <b>IDENTIFICATION LOST</b> [reasons](instructions).</p>
<p>RADAR AND EQUIPMENT DEGRADATION</p>	<p>a) <b>SECONDARY RADAR OUT OF SERVICE</b> (appropriate information as necessary);</p> <p>b) <b>PRIMARY RADAR OUT OF SERVICE</b> (appropriate information as necessary)</p>

### **SURVEILLANCE RADAR APPROACH**

<p>PROVISION OF SERVICE</p>	<p>a) <b>THIS WILL BE A SURVEILLANCE RADAR APPROACH RUNWAY</b> (number) <b>TERMIANTING AT</b> (distance) <b>FROM TOUCHDOWN, OBSTACLE CLEARACNE ALTITUDE</b> (number) <b>FEET CHECK YOUR MINIMA [IN CASE OF GO AROUND</b> (instructions)];</p> <p>b) <b>APPROACH INSTRUCTIONS WILL BE TERMINATED AT</b> (distance) <b>FROM TOUCHDOWN.</b></p>
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ELEVATION	a) <b>COMMENCE DESCENT NOW TO MAINTAIN A</b> (number) <b>DEGREE GLIDE PATH</b> ;  b) (distance) <b>FROM TOUCHDOWN ALTITUDE SHOULD BE</b> (number and units).
POSITION	(distance) <b>FROM TOUCHDOWN</b>
CHECKS	a) <b>CHECK GEAR DOWN [AND LOCKED];</b> b) <b>OVER THRESHOLD.</b>
COMPLETION OF APPROACH	a) <b>REPORT VISUAL;</b>  b) <b>REPORT RUNWAY [LIGHTS] IN SIGHT;</b>  c) <b>APPROCH COMPLETED [CONTACT (unit)];</b>

### SECONDARY SURVEILLANCE RADAR (SSR) PHRASEOLOGIES

TO REQUEST THE CAPABILITY OF THE SSR EQUIPMENT	a) <b>ADVISE TRANSPONDER CAPABILITY;</b>  *b) <b>TRANSPONDER</b> (as shown in the flight plan);  *c) <b>NEGATIVE TRANSPONDER.</b>
TO INSTRUCT SETTING OF TRANSPONDER	a) <b>FOR DEPARTURE SQUAWK</b> (code);  b) <b>SQUAWK</b> (code)
TO REQUEST THE PILOT TO RESELECT THE ASSIGNED MODE AND CODE	a) <b>RESET SQUAWK [(mode)]</b> (code);  *b) <b>RESETTING</b> (mode (code)).
TO REQUEST THE PILOT TO CONFIRM THE CODE SELECTED ON THE AIRCRAFT'S TRANSPONDER	a) <b>CONFIRM SQUAWK</b> (code);  *b) <b>SQUAWKING</b> (code).
TO REQUEST THE OPERATION OF THE IDENT FEATURE	a) <b>SQUAWK [(code)] [AND] IDENT;</b>  b) <b>SQUAWK LOW;</b>  c) <b>SQUAWK NORMAL;</b>
TO REQUEST TEMPORARY SUSPENSION OF TRANSPONDER OPERATION	<b>SQUAWK STANDBY.</b>
TO REQUEST EMERGENCY CODE	<b>SQUAWK MAYDAY (CODE SEVEN-SEVEN ZERO-ZERO)</b>
TO REQUEST TRANSMISSION OF PRESSURE ALTITUDE	<b>SQUAWK CHARLIE;</b>
TO REQUEST PRESSURE SETTING CHECK AND CONFIRMATION OF LEVEL	<b>CHECK ALTIMETER SETTING AND CONFIRM</b> (level).

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TO REQUEST TERMINATION OF PRESSURE ALTITUDE TRANSMISSION BECAUSE OF FAULTY OPERATION	<b>STOP SQUAWK CHARLIE WRONG INDICATION</b>
TO REQUEST LEVEL CHECK	<b>CONFIRM</b> (level).

**ALERTING PHRASEOLOGIES**

LOW ALTITUDE WARNING	(aircraft call sign) <b>LOW ALTITUDE WARNING, CHECK YOUR ALTITUDE IMMEDIATELY, QNH IS</b> (number) [(units)] <b>[THE MINIMUM FLIGHT ALTITUDE IS</b> (altitude)].
TERRAIN ALERT	(aircraft call sign) <b>TERRAIN ALERT</b> , (suggested pilot action, if possible).

## **CHAPTER 15**

### **ADMINISTRATIVE INSTRUCTIONS**

Before proceeding with the actual work of ATC it is necessary to know the administrative procedures associated with the provision of ATC. When prior instructions have not been issued, the administrative rules included in this manual are applicable.

#### **15.1 DUTIES AND RESPONSIBILITIES**

##### **15.1.1 SUPERVISOR TOWER CONTROLLER (S.T.C)**

The control tower supervisor, shall be responsible for the safe and standard provision of Air Traffic Control by control tower staff. From time to time, the position of supervisor may be filled either by an officer also rostered to perform additional, actual ATC duties or by a person rostered to provide dedicated supervisory duties. In either case, it is necessary to always define the person responsible for the supervisory functions. During his/her period of the facilities of the tower.

- a. ATC services are conducted in accordance with department instructions.
- b. All equipment and activities of the control tower are closely watched and the proficiency of personnel in their respective duties is assessed.
- c. All ATCO's are aware of the precise duties they are to perform and undertake at any given time.
- d. The work- load is distributed evenly so that no one controller is over taxed at any time, however in doing this he should assign personnel to the positions of operation commensurate with the individual capabilities.
- e. No superfluous transmission is made and correct phraseology is used in all transmission on control frequencies.
- f. Flight progress strips are correctly and neatly annotated.
- g. All facility documents and fault reporting registers are up to date.
- h. All ATCO's on duty have signed the appropriate logbooks and are familiar with the contents of standing instructions.
- i. During the watch period notification of any fault is made to the concerned units for any necessary action.
- j. Any outstanding items of importance are brought to the notice of the supervisor responsible for the following shift. This can be done either by face to face hand over or by making an entry in the appropriate logbook .
- k. The console is kept neat and uncluttered at all times;

- l. Action has been taken to initiate any necessary NOTAMS.
- m. Sufficient staff are on duty to man the ATC position safely and efficiently as per the published roster. It is the duty of the supervisor to notify the Shift-in –charge of any absences and to request extra or replacement staff in the event of sickness, emergency situations, etc;
- n. The runway is clear of obstructions at the time of by aircraft.
- o. Proper clearance are given by light signal for the control of vehicles and pedestrians desiring to cross the runway;
- p. Initiate action for search and rescue in accordance with prescribed procedure;
- q. Co-ordinate and cooperate with the concerned units as and when required for the efficient and smooth operation;
- r. Inspect the aerodrome particularly in relation to surface and marking.
- s. To report and work under shift-in-charge.
- t. It shall be understood that the control tower supervisor is responsible for resolving any conflicts of opinion relating to aircraft safety or expedition of aircraft movement.

#### 15.1.2 AERODROME AND APPROACH CONTROLLER

This ATC Officer during his or her period of duty as an controller shall perform traffic separation and coordination tasks in accordance with the Air Traffic Control Manual and any letters of agreement and instructions and in particular;

- a. Ensure the safe, orderly and expeditious flow of air traffic in aerodrome, terminal and maneuvering area;
- b. Maintain separation standards in respect of all aircraft operations within the terminal area;
- c. Integrate arriving aircraft into an orderly landing sequence;
- d. Exercise judgement in the provision of landing and take-off clearances to aircraft.
- e. Exercise control of aircraft making missed approach.
- f. Determine the release of airspace within the terminal area for general aviation training or military purposes;
- g. Close or reopen a runway, the airport or any specific approach landing area.
- h. Determine the use of sector observations to permit aircraft operations as applicable.
- i. Initiate search and rescue or airport emergency action in accordance with prescribed procedures;

### 15.1.3 TOWER FLIGHT DATA

The tower flight data position shall have suitable preparation areas, for flight strips and provide suitable intercom facilities to other operational positions as per the intercom schedule. The tower flight data position also provides the connection point for tele-type machine used for all incoming and outgoing, flight data. This position is also responsible for updating data on the automatic terminal information service (ATIS) recorder and therefore full control and monitoring of the ATIS system is available at this position on a parallel access basis for use during periods of low ATC activity when the TFD position may not be manned.

The flight data position is primarily concerned with assisting the controller in the control of air traffic. His duties shall include the following;

- a. Collect flight data via interphone/teletype and post the information directly on the appropriate flight progress strips;
- b. Calculate estimates on each strip and to pass on to TWR Coordinator.
- c. Relay flight data to appropriate ATS Units;
- d. See the recorders are operating ATS Units;
- e. Assist the tower controllers as directed;
- f. Bring to the attention of the tower controllers any significant irregularities encountered when processing flight data.
- g. To up-date the data in ATIS recorder and to control and monitor the ATIS transmission.

### 15.1.4 TOWER COORDINATION POSITION

The position provides facilities similar to the aerodrome control position in two working areas such as main Display and working Surface.

The Main Display comprises of flight progress boards with a panel incorporating digital clocks intercom in parallel with SMC and a consol intensity control for regulation of the coordination position illumination.

The flight progress board has been designed to present aircraft movement and associated information in an optimum manner to the SMC, COORD, and ADC/APP positions and to permit free exchange of flight progress strip holders between the active controllers.

In the working surface, jacking facilities are provide for monitoring both incoming and outgoing programmes by head set. An information display is incorporated in the working surface for display of operational information required by the coordinator position. The ATC officer working in the tower coordination opposition has to perform traffic coordination tasks, in accordance with the Air Traffic Control Manual and letters of agreement and instructions and in particular.

- a. Coordinate the optimum use of runways having regard to prevailing weather, aircraft operating characteristics, available approach aids and general traffic disposition.
- b. Coordinate airways clearances for departing aircraft.
- c. Coordinate with the aerodrome/approach controller and the ACC the extent to which visual separation can be applied by the control tower.
- d. Coordinate with the aerodrome/approach controller the minimum time interval between landings;
- e. Coordinate the activities of the aerodrome control unit with technical maintenance authorities, emergency services and department officers.
- f. Initiate search and rescue or airport emergency action in accordance with prescribed procedures.
- g. Coordinate with appropriate ATS units for exchange of operational datas.
- h. Coordinate in between SMC and ADC/APP controllers.

#### 15.1.5 SURFACE MOVEMENT CONTROL POSITION (SMC)

The Surface Movement Control position is fitted with specified facilities to aid in the control of traffic on taxiways and ramps associated with arrival and departure clearances and the control of vehicular movement on the airport.

Intercom facilities shall be provided with connections to other control center operational positions including incoming programme volume control.

The Surface Movement Controller shall perform duties as follows:-

- a. Issue by radio or directional light signal specific instructions, approval, or disapproval for the movement of aircraft, vehicle, equipment, or personnel on the movement area.
- b. Issue taxi information, as required, in clear, easy to understand terms as follows:
  - i. Route for the aircraft to follow on the movement area
  - ii. Instruction to hold and traffic information as necessary.
- c. Hold taxiing aircraft a sufficient distance short of runway so that arriving or departing aircraft will not pass over or near the taxiing aircraft.
- d. Issue taxi instruction by including the following:
  - i. Runway.
  - ii. Current surface wind direction and speed, including significant variations.
  - iii. The QNH altimeter setting;

- iv. Air temperature;
- v. Current visibility representative of the direction of take off the initial climb if less than 10km.
- vi. The current time to the nearest half minute.
- e. Obtain approval of the ADC/AP controller prior to utilizing the active runway for taxiing aircraft.
- f. Issue start-up clearance to aircraft preparing for departure in such a manner as to promote fuel efficiency and expeditious of aircraft movements.
- g. Release the departing aircraft to aerodrome approach controller when the aircraft is approaching the holding area, and when other ground traffic is no longer conflicting.
- h. Relay air ways clearances to the departing aircraft.

#### 15.1.6 SUPERVISOR AREA CONTROL (SAC)

- \* The functions contained on the SAC Console are primarily supervisory and monitoring. In addition the following duties and responsibilities are specified for that position.
- a. To ensure A.T.C. Services are provided in accordance with CAAN'S instructions.
- b. To inspect all equipment and facilities within area control center and to ensure normal operation.
- c. To assign all ATCO within A.C.C to a proper position and to monitor proper work load.
- d. To ensure that correct phraseology is used and separation is maintained by timely control judgement.
- e. To ensure operating methods and procedures are maintained in standard way by keeping flight progress strips up to date and postings are complete & correct.
- f. All log books are kept up to date.
- g. Initiate action for search and rescue in accordance with prescribed procedures.
- h. The consoles are kept neat and uncluttered.
- i. To ensure professional manner is maintained by the staff and to inform shift in charge in case of any staff's absence.
- j. To maintain good coordination with other units for normal operation and to report shift in charge in case of difficulty.



### 15.1.7 CONTROLLER POSITION – ACC

Apart from the relevant functions already covered in above, the controller is directly responsible for the passing of ATC clearances and necessary instructions or information to traffic in the area of his/her jurisdiction. In addition his/her primary duties shall include the following activities;

- a. Responsible for a safe expeditious orderly flow of traffic.
- b. Be continuously alert to determine the necessity for administering flight assistance and emergency services;
- c. Maintain fix postings in proper sequence in order to portray the proper traffic picture at all times.
- d. Follow instructions as directed by area control supervisor.
- e. To use correct and unambiguous phraseologies and to maintain separation standard as required for Air Traffic Control Services.
- f. Issue air-ways clearance.
- g. To provide Air Traffic Control Service within the airspace of jurisdiction in accordance with departmental instruction.

### 15.1.8 AREA FLIGHT DATA

In addition to the facilities for handling flight data and information strips a hand set utilizing a non-duplicated audio system is provided for use on inter communication circuits.

- a. All incoming message shall be cleared and distributed to proper position.
- b. All out going messages shall be processed for dispatch.
- c. Collect flight data via inter com/teletype and prepare a flight progress strip.
- d. Calculate estimate on each strip and handed over to coordinator for proper position.
- e. Assist the controller as and when required.

### 15.1.9 ACC COORDINATOR POSITION

A non- duplicated audio system is provided for this position on the area console with access to the system via head phones or when these are not plugged in via an Ericophone type telephone and set. This position is activated only by section from the primary position. The ACC Coordinator Position has access to and control of all ATS & Intercommunication facilities when this position is activated by the primary area controller.

In addition the following duties are assigned to this position:

- a. Coordinate and issue clearances to appropriate units.
- b. Coordinate with the AP for utilizing different kinds of separation.

- c. Coordinate the activities of area control with technical maintenance authorities, emergency services & CAAN Head Office.
- d. To assist the area controller as directed.
- e. T Coordinate with area flight data for incoming message and hand over all outgoing messages to area flight data for dispatch.
- f. To assist the area controller in keeping flight progress strips up to date and correct positing of the data.

## **15.2 CONTROL ROOM DISCIPLINE**

### **15.2.1 VISITORS**

No unauthorized person shall be allowed access to an ATS Operational Room. Allowing such visitors to the control Room is the explicit authority of the watch supervisor and before bringing in authorized visitors a check shall be made with the watch supervisor or the Duty ATCO as to whether the traffic situation permits such a visit. At no time shall visitors be allowed to interfere with the smooth running of the watch.

### **15.2.2 CLEANLINESS**

The watch supervisor or the Duty ATCO depending on the ATS unit, shall ensure that the ATS Unit Room is kept in a clean and tidy condition at all times and particular attention shall be paid to the efficiency of the cleaners and any complaint shall be made promptly to the appropriate authority.

All equipment shall be kept in serviceable condition and stowed away when not in use. Unserviceable equipment shall be returned to the store promptly.

### **15.2.3 SUPERVISION**

The watch supervisor or the ATCO-in-charge, depending on the ATS Unit shall be responsible for the supervision of all staff and the maintaining of a generally high standard conduct becoming of ATS personnel.

## **15.3 PROCEDURES FOR TAKING OVER AND HANDING OVER WATCH**

### **15.3.1 TAKING OVER WATCH**

#### **15.3.1.1 Prior to taking over watch ATCOs shall:**

Ensure that they are fully conversant with the latest promulgated orders, instructions, notices and signals with particular reference where appropriate to the serviceability of the aerodrome and its facilities.

#### **15.3.1.2 Obtain full information and briefing from the MET office regarding the weather position and tendencies for the period of their watch whenever necessary as justified by the general weather condition.**

- 15.3.1.3 Ensure that they have a full understanding of the air traffic situation prevailing with particular reference to separation standards.
- 15.3.1.4 Familiarise themselves with the serviceability of all equipment under their charge and likely to be used during the period of their watch.
- 15.3.1.5 Ensure that they are acquainted with any special movements or maneuvers likely to occur during their watch.
- 15.3.1.6 Having completed the above procedure ATCOs shall sign the ATC watch log as having taken over watch. This signature shall imply that items 1 to 5 inclusive have been complied with and that the ATCAO taking over watch has assumed all the defined responsibilities of the ATCAO handing over watch, including the safe custody of equipment and any secret or confidential document within the place of duty.
- 15.3.1.7 At station where more than one ATCO are employed at one time on ATS units, the ATC watch log shall be signed by the watch supervisor or SATCO on duty. Other ATCOs shall record taking over their specific duties as required. To accommodate all the above work ATCOs shall report to their respective ATS Units at least 10 minutes ahead of relieving the shift.
- 15.3.2 **HANDING OVER WATCH**
  - 15.3.2.1 ATCOs handing over watch shall ensure that they provide their successors with the fullest possible information regarding the current situation including any items of specific interest or urgency which have influenced the development of the situation and which may have a bearing on the progress of the ensuing watch.
  - 15.3.2.2 Should any situation have developed during the watch such as action in the event of distress, emergency or accident whereby in the interests of safety of safety or efficiency it is considered beneficial for the Duty ATCO to complete such actions and subsequent reports and records rather than to transfer the responsibility for completion to another officer. Notwithstanding the fact that watch roster defines the appointed time to hand over, the ATCO handing over watch shall remain on until such time as this responsibility has been discharged.
  - 15.3.2.3 When the ATCO taking over is fully conversant with the air traffic situation and is prepared to assume full responsibility for the watch the ATCO handing over shall sign the ATC watch log as having handed over watch.

## **15.4 TRANSFER OF RESPONSIBILITY TO HIGHER AUTHORITY**

- 15.4.1 Should a situation arise where by the Duty ATCO/watch supervisor considers it necessary to seek the advice of higher authority he should call upon the supervisor or superintendent (SATCO) for assistance. If either of these ATCOs should consider it advisable to act in other than an advisory capacity whether by direction, supervision or the assumption of command, the watch shall be handed over to him and he shall make an entry in the log

book as having taken over the watch there by assuming the responsibilities of the Duty ATCO as defined in the above instructions.

- 15.4.2 In general when Duty ATCOs take action on the advice or directives of higher authority this fact should be recorded in the watch log in order that the reasons for such action and respective responsibilities may be defined.

## **15.5 ATC LOG BOOKS**

### **15.5.1 ATC WATCH LOG**

An aerodrome surface inspection log shall be maintained at all CAAN aerodromes and entries shall be made after a surface inspection has been carried out. Arrangement shall be made to ensure that information on unserviceabilities recorded is forwarded as soon as possible to the authorities concerned.

### **15.5.2 AERODROME LIGHTING INSPECTION LOG**

An aerodrome lighting inspection log shall be maintained at all CAAN aerodromes at which airfield lighting systems have been installed and similar arrangements to those outlined in the above paragraph for distribution of information on unserviceabilities recorded.

## **15.6 PROCEDURES FOR MAINTAINING ATC WATCH LOG**

- 15.6.1 The ATC watch log shall be maintained at all times. Entries shall be made in ink and no erasures shall be made.
- 15.6.2 In no circumstances shall pages be removed from the log book.
- 15.6.3 Entries shall be made in chronological order and as far as possible concurrently with the incident being recorded.
- 15.6.4 When during emergencies or rush periods it is impossible to make detailed entries at the time of the occurrence, rough notes shall be kept with exact times and a detailed entry made as soon as possible. The rough notes should be attached to the log book for future reference, should it appear at all likely that they may be required.
- 15.6.5 Entries shall be in sufficient detail to enable anyone investigating an incident to have a complete understanding of all actions taken during the watch period.
- 15.6.6 Items to be logged shall include changes in the serviceability of radio aids, other essential aerodrome information, reports of incorrect procedures by aircraft, technical failures in aircraft, runway changes, visits of VIPs, clock synchronization checks and any unusual occurrence.

### ***Note:***

- i. *The watch supervisor shall inspect the log book daily taking note of any significant entries and signing as having done so*

- ii *The accident investigation branch have full authority to impound any ATC log book if they consider that its contents throw any light on a particular accident. When such action is taken the log book shall be withdrawn as soon as possible after the request is made and handed over the AIB. In these circumstances a replacement log book shall be opened.*

## **15.7 PROCEDURE FOR INCIDENT REPORTING AND AIRMISS REPORTING**

### **15.7.1 INCIDENT REPORTING**

An incident is an occurrence which might result in an accident. Generally speaking, it may be caused by:

- a. Ground Organization
  - i. Equipment defects, faulty organization and procedure.
  - ii. Personnel error, incompetence, failure to comply with instruction etc.
- b. Aircraft Defects in the aircraft or its equipment, loss of control due to MET conditions, etc.
- c. Aircrew Negligence, incompetence, failure to comply with procedures and instructions, incorrect practices and errors of judgement etc.

### **15.7.2 DIVISION OF INCIDENTS**

A more categorized division of incidents would include:

- a. Pilot Deviations
- b. Operational Errors
  - c. Airmisses
  - d. Bomb Threat/Unlawful Interference Incidents
  - e. Emergencies
  - f. Miscellaneous any not covered by a. through e.

### **15.7.3 DIVISION OF RESPONSIBILITY FOR ACTION**

15.7.3.1 In the case of minor incidents involving installations or personnel or personnel on the aerodrome, or aircraft under Approach or Aerodrome Control, the Airport Manager or Flight Operation Manager & General Manager (in case of TIA) will deal with the matter locally.

15.7.3.2 Those incidents which cannot be dealt with locally shall be reported to CAAN.

15.7.3.2.1 ATC personal shall use the form described in Appendix A 18 for the submission of such report.

15.7.3.2.2 All incidents which call for a statement of weather conditions will be reported to the local MET office without delay.

**15.7.4 BREACHES OF REGULATIONS/INFRINGMENT**

Offences against the Regulations, of published procedures may be one of three basic types:

- a. an offence against the rules of the Air and Air Traffic control or against published procedures;
- b. an offence against regulations based on safety.
- c. an offence against regulations having no direct bearing on safety (e.g. requirements for registration and markings, carriage of documents or customs requirements).

**15.7.5 AIRMISS REPORTING PROCEDURES**

15.7.5.1 An "AIRMISS" report may be filed by a pilot when he considers that his aircraft has been endangered by the proximity of another aircraft during flight, to such an extent that an actual or potential risk of collision existed. In order that such an incident may be investigated as speedily as possible a standard system and form of report been devised. (Refer to appendix A 18 for format of the form)

15.7.5.2 The majority of AIRMISS REPORTS will be made by radio or by telephone shortly after the pilot has landed, which be confirmed in due time.

**15.7.6 ACTION BY PILOT**

15.7.6.1 The pilot will make his initial report to an ATS Unit as soon as after the incident has occurred. If the report is made by R/T the message will include the following:

**AIRMISS REPORT**

1. POSITION
2. TIME OF INCIDENT
3. LEVEL (climbing, descending or cruising)
4. HEADING
5. WEATHER CONDITIONS
6. BRIEF DETAILS OF INCIDENT INCLUDING DISTANCES INVOLVED.

*Note: Should a pilot omit the prefix while reporting on R/T, the ATCO should ask him if it is his intention to file an AIRMISS REPORT.*

15.7.6.2 If the initial report is made by radio or telephone, the pilot will confirm by submitting direct to CAAN H.O. within 7 days of the incident. If this confirmatory form is received by the ATS Unit, it shall be forwarded to CAAN H.O.

*Note: The purpose of following such incidents with immediate proper reporting is to facilitate investigation with the objective of preventing another of similar nature.*

## **15.8 DUTY ROSTER**

- 15.8.1 A watch keeping roster shall be prepared by the ATC-in-Charge of the concerned ATC unit not later than the 20th day of each month and shall show the hours of watch-keeping and hours of duty required of individuals ATCO throughout the following month.
- 15.8.2 ATCOs shall adhere to the time and periods of watch-keeping duties details in this roster and shall arrive at their place of duty in time to carry out the procedures detailed in para 3 (procedures for taking over handing over watch)
- 15.8.3 No alterations are to be made to the watch rosters without reference to, and approval by the ATCO-in-Charge.

## **15.9 LOCAL NOTICES TO STAFF**

Local notices to staff shall be displayed on a board placed preferable in the ATS Reporting office hung specifically for this purpose.

## **15.10 SUGGESTIONS**

ATCOs are encouraged to put forward suggestions for improving the general operating efficiency of the services, such suggestions should be put forward through the normal channels for onward transmission to CAAN as necessary.

## **15.11 RELATIONS WITH PRESS AND GENERAL PUBLIC**

- 15.11.1 Discussions on matters to ATC policy and the operation of control should be avoided with persons other than officials of the ATS services.
- 15.11.2 Reports on accidents, breaches of regulations, reprimands to pilots, or other personnel, etc. shall be treated as confidential matters and shall not be discussed in public or passed to the media.
- 15.11.3 During normal working hours, request for information by representatives of the press should be referred to CAAN, H.O. Outside normal hour these requests will be referred to the CAAN Representative.
- 15.11.4 ATS Units will not normally conduct correspondence direct with operating companies or individuals, except when and where authority to do so has been expressly given by Director General of Civil Aviation. Complaints received regarding specific incidents shall be submitted to CAAN after acknowledgement has been made to the originator.
- 15.11.5 The movement of VVIPs and other special Flights and their position reports shall be treated as confidential. On request from the public such information shall not be give out except to the appropriate bodies.

## **CHAPTER 16**

### **MAPS AND CHARTS**

Maps and charts shall be prepared and published in respective SOPs of the concerned airports as per the Standards as mentioned in CAR-4 (Aeronautical Charts).



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## APPENDICES

Following appendices are presented in the following pages.

- A. Wake Turbulence Separation Standards
- B. Model Coordination Phraseology
- C. Symbols and Codes
- D. Operational Letter of Agreement between Nepal and India (Kathmandu ACC and Kolkata ACC, Kathmandu ACC and Banarasi ACC, Kathmandu ACC and Delhi ACC)
- E. Operational Letter of Agreement between Nepal and Bhutan
- F. Operational Letter of Agreement between Nepal and China
- G. Air Traffic Incident Report Form
- H. Departure Separation: Faster Following Aircraft climbing to Higher Level
- I. Tables of Cruising Levels
- J. Strip Marking Procedures

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**APPENDIX A****Wake Turbulence Separation Standards**

1. For the purpose of **WAKE TURBULENCE SEPARATION STANDARDS** aircraft are classified as three categories as follows:

2.

a) <b>HEAVY (H)</b>	All aircraft types of 136,000 kg or more
b) <b>MEDIUM (M)</b>	All aircraft types less than 136,000 kg but more than 7000 kg.
c) <b>LIGHT (L)</b>	All aircraft types of 7000kg or less.

2. The following wake turbulence separation standards shall be applied between the relevant classes of aircraft.

<b>CATEGORY</b>		<b>SEPARATION MINIMA IN MINUTES</b>	
<b>LEADING AIRCRAFT</b>	<b>FOLLOWING AIRCRAFT</b>	<b>DEPARTURE</b>	<b>ARRIVAL</b>
HEAVY	MEDIUM	2	2
MEDIUM	LIGHT	2	3
HEAVY	LIGHT	2	3

3. A separation minimum of 3 minutes shall be applied between a **LIGHT** or **MEDIUM** aircraft when taking off behind a **HEAVY** aircraft or a **LIGHT** aircraft when taking off behind a **MEDIUM** aircraft from an intermediate part of the same runway.
4. The appropriate wake turbulence separation standard shall be applied between:
- Aircraft not vertically separated.
  - Landing aircraft using the same runway.
  - If aircraft making intersection using the same runway, add one minute

**Note:**

*Caution shall be exercised by light aircraft behind heavier departing aircraft, to ensure that touchdown is made prior to reaching the point of rotation of the departing aircraft where heavy wake turbulence may exist. Controllers shall use their judgment in such situations for caution pilots of wake turbulence when deemed necessary.*

4. All landing separation minima apply at the threshold of the landing runway except, where the flight paths of aircraft landing on different runways cross.
5. Helicopters should be kept clear of light aircraft when hovering or while air taxiing.

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**APPENDIX B**

**MODEL COORDINATION PHARASEOLOGY**  
**Among ADC, APP and ACC**

**International Flight**

<b>CASE</b>	<b>CONDITION</b>	<b>FROM</b>	<b>TO</b>	<b>PHARASEOLOGY</b>
<b>INT'L DEPT</b>	COZ601 requesting start up for VIDP	ADC	APP	Request clearance and release for COZ601 to VIDP calculated departure time at 0215 F360.
	In case of no traffic	APP	ADC	COZ601 cleared to VIDP via flight planned route maintain F260, request level change enroute for F360, make D1A departure, SQUAWK 2505 release now. (APP will coordinates level with ACC)
	In case of traffic	APP	ADC	COZ601 make D1A departure initial altitude 12500ft , expect higher passing 26 DME KTM
	COZ601 departed	ADC	APP ACC	Departure, COZ601 at 0220 for VIDP.
<b>INT'L ARVL</b>	ACC has received the position of aircraft from VECC on available channel or aircraft in contact	ACC	APP	Inbound, THA319 B772 from VTBS to VNKT estimates ROMEO at 0645 F340, request clearance.
		APP	ACC	(Clearance for THA319) For THA319, F180 available over NOPEN, expect VOR/DME RWY02 APPROACH, no delay expected, squawk 2501.
	If any change in estimate and holding is expected	ACC	APP	Revised estimate, THA319 over ROMEO at 0702
		APP	ACC	Roger, THA319 now EAT 0702
	Approach has received the inbound position	APP	ADC	Inbound, THA319 from VTBS ETA VNKT at 0656.
	In case of missed approach	ADC	APP	THA319 carrying out missed approach due unstable approach, over to you now.
		APP	ACC	THA319 carrying out missed approach, will make a successive approach.

**Domestic Arrival**

CASE	CONDITION	FROM	TO	PHRASEOLOGY
9NAHY VNNG/ VNKT VFR F155	ACC has received the position from domestic fixed communication on available channel or aircraft in contact.	ACC	APP	Inbound estimate, 9NAHY from VNNG to VNKT F155 estimates BHP at 0650.
		APP	ACC	(Clearance for 9NAHY) 9NAHY inter TMA at F155.
		APP	ADC	Inbound, 9NAHY from VNNG ETA VNKT at 0702
BHA552 VNSI/ VNKT	In case unable to land at VNKT.	ADC	APP	BHA552 going around due runway blocked by disabled aircraft maintaining 5500ft diverting to VNSI, transfer to you now.
BHA404 VNNG/ VNKT IFR F210	If delay is expected.	APP	ACC	(Clearance for BHA404) BHA404 enter TMA at F190; expect VOR/DME RWY02 APPROACH via 20 DME ARC to NOPEN EAT at 1430 squawk0102.
		APP	ADC	Inbound, BHA404 from VNNG ETA VNKT at 1437.
BHA101 MTN/ VNKT VFR F240	Position is received from the aircraft in contact.	ACC	APP	Inbound estimate, BHA101 from MTN to VNKT F240 estimates TMA at 0220
		APP	ACC	(Clearance for BHA101), BHA101 enter TMA descending to F180.
		APP	ADC	Inbound, BHA101 from MTN ETA VNKT at 0232.
	Holding information.	APP	ADC	BHA101 holding over BHAKTA at 6500ft for sequence.
9NABU VNLK/ VNKT A085	Requesting SVFR due weather.	APP	ADC	Inbound, 9NABU from VNLK ETA VNKT at 0320 will make SVFR and will be entering control zone at or below 6500ft.
		ADC	APP	Roger, visibility now 3000m improving.

**Domestic departure**

<b>CASE</b>	<b>CONDITION</b>	<b>FROM</b>	<b>TO</b>	<b>PHRASEOLOGY</b>
9NAHV VNKT/ MTN F210	9NAHV requesting start up for MTN flight	ADC	APP	Request clearance and release for 9NAHV to MTN F210.
	In case of no traffic	APP	ADC	(Clearance for 9NAHV) 9NAHV leave TMA at F210 for MTN squawk 0101 release now.
	In case traffic holding over KTM at F150	APP	ADC	For 9NAHV initial altitude 13500ft expect higher passing 25 DME KTM, release now.
	9NAHV departed.	ADC	APP ACC	Departure, 9NAHV at 0122 for MTN.
BHA852 VNBW/ VNKT F155	BHA852 requesting start up for VNKT at VNBW	ADC/ APP (VNBW)	ACC	Request clearance for BHA852 (VNBW) to VNKT F155 calculated departure time at 1115.
	In case of no traffic	ACC	ADC/ APP (VNBW)	BHA852 cleared to VNKT via flight planned route maintain F155.
	In case of traffic	ACC	ADC/ APP (VNBW)	BHA852 cleared to VNKT via flight planned route IA 11500ft request level change enroute for F155.
BHA352 VNKT/ VNBW A125	BHA352 requesting start up for VNBW	ADC	APP	Request clearance and release for BHA352 (VNKT) to VNBW Altitude 12500ft
	In case of no traffic	APP	ADC	BHA352 is cleared to VNBW maintain (altitude) 12500ft, release now.
	In case of traffic	APP	ADC	BHA352 (specify turn) cross over head at or above (altitude) 7500ft due traffic.
9NAHS VNKT/ VNPB A085	9NAHS requesting start up for VNPB	ADC	APP	Request clearance and release for 9NAHS (VNKT) to VNPB expect departure after 0945.
		APP	ADC	9NAHS leave TMA at (altitude) 8500ft for VNPB, depart after 0945 only.
	9NAHS departed	ADC	APP	Departure 9NAHS at 0950 for VNPB



CASE	CONDITION	FROM	TO	PHRASEOLOGY
RAN31 VNKT/ VNSI A060	RAN31 starting up for VNSI rescue flight.	ADC	APP	Request clearance and release for RAN31 to VNSI (altitude) 6000ft rescue flight.
		APP	ADC	RAN31 leave control zone at 6000ft for VNSI follow river lane release now.
		ADC	APP	Departure RAN31 at 0945 following river lane.
9NAGU VNKT/ VNMG A065	9NAGU requesting start up for VNMG SVFR due visibility.	ADC	APP	Request clearance and release for 9NAGU to VNMG SVFR.
		APP	ADC	9NAGU leave control zone at or below (altitude) 6500ft for VNMG on SVFR.
BHA201 VNKT/ MTN F250.	BHA201 requesting start up for mountain flight, IFR DEP due visibility.	ADC	APP	Request clearance and release for BHA201 for MTN , IFR departure
		APP	ADC	BHA201 maintain F250 on 103 RADIAL KTM make I1B departure SQAWK 0111 release now or subject to your traffic. (APP coordinates level with ACC accordingly)
		ADC	APP	Departure, BHA201 at 0150 for MTN transfer O/H.
		ADC	ACC	Departure BHA201 at 0150 for MTN.
9NAHW VNKT/ VNCG F155	9NAHW requesting start up for VNCG, IFR DEP due weather.	ADC	APP	Request clearance and release for 9NAHW for VNCG IFR departure sequence after BHA201.
		APP	ADC	9NAHW cleared to IGRIS maintain 13500ft I1B departure SQUAWK 0112, release after BHA201.
		ADC	APP	Departure 9NAHW at 0155 for VNCG transfer O/H.
		ADC	ACC	Departure 9NAHW at 0155 for VNCG.

**APPENDIX C****Symbols and Codes**

- 1 It has been found in practice that message of routine nature can be taken by down at the same as that at which a clearly spoken transmission is made, by the use of approved abbreviation, contractions and symbols.
- 2 The abbreviations and symbols which follow are authorized for the use in making entries on flight progress strips in copying or writing traffic
3. Unauthorized abbreviations and symbols shall not be used.


**Clearance limits**

A = Cleared to aerodrome (point of first intended landing)

V = Cleared to reporting point

H = Holding instructions issued

MB = Cleared to Min Beacon

 = Cleared to leave control area

OM = Cleared to an Outer Marker

X = Cleared to cross the airway in the vicinity of reporting position

V = Cleared over a reporting point (over flight)

**Clearance Instruction**

C = ATC CLEARANCE .....

^ = NO delay expected

RSYD = Release subject to your discretion with regard to .....

CE = Clearance expires..... (time)

..... = Release not before ..... (time)

RLCE = Request level change en-route

 = Maintain ..... (level) .....

↓ = Descend

– = To : (used to indicate "Form ..... to ..... )

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( )	= Alternative instruction
—	= Restriction written below this line
/	= After passing
0	= Aircraft has reported at an altitude other than that proposed
<u>→</u>	= Joining Flight
RL	= Report Immediately on reaching (level)
RR	= Report Immediately on Reacting (level)
TFC	= Traffic is ..... (c/s of aircraft 0)
MA	= Missed approach
SI	= Straight-in approach
↙	= Left turnout
↘	= Right turnout
OTP	= VFR conditions on top
RLS	= Release
NDB	= Non-directional Radio Beacon
⊥	= Abeam
VR	= VOR approach
CAF	= Cleared a filed
DLA	= Delay
EAC	= Expect approach clearance (time)
EFC	= Expect further clearance (time)
RP	= Report passing
TCP	= Transfer of Control point

UFN = Until Further Notice



= For step climb followed by level information



= For step descent followed by level information

Some other useful symbol and abbreviation frequently used in practice



= Control Area



= To enter control area

&

= and



= Pilot cancelled IFR Flight plan



= Out of control zone



= Enter Control Zone

@

= At

ABV = Above ..... ft =+ .....

BLO = Below ..... ft =+ .....

> = Before

< = After

TKOF = Take off

V< (TIME) = Clearance void after .....(time)

ADNL TFC = Additional traffic is .....

RC = Reserve Course

UFA = Until further advise

INDEF = Delay indefinite



= Information forwarded



= Coordination effected

---

C	= Climb coordinated
↕	= Descent coordinated
.....+	= At or above ..... ft
.....-	= At or below ..... ft
↑ <sup>CC</sup>	= Climb cruise
Z	= Delay not determined

**APPENDIX D****Operational Letter of Agreement between Nepal and India (Kathmandu ACC and Kolkata ACC, Kathmandu ACC and Banarasi ACC, Kathmandu ACC and Delhi ACC)**

As and when prior coordination has not been possible, these co-ordination procedures for various ATC routes are applicable:

**B-345**

Bhairahawa is transfer point of ATS responsibility from Kathmandu ACC to Delhi ACC and aircraft to be released by Kathmandu at appropriate semi-circular/quadrantal levels.

**G- 598**

The aircraft on G-598 will be advised by Calcutta ACC to descend to an appropriate level so as to be at Simara at flight level 150 or above depending upon its number in approach sequence.

**G-590**

Aircraft will be descended by Calcutta ACC to an appropriate level so as to be at Simara at flight level 150 or above depending upon its number in approach sequence. The aircraft departing Kathmandu on G- 590 will be released to Calcutta ACC at or below 13,500 ft. and advise for further climb will be given by Calcutta ACC.

**G-336**

Aircraft will be descended by Calcutta ACC to an appropriate level so as to be at Simara at flight level 150 or above depending upon its number in approach sequence.

**G-335**

Aircraft departing Kathmandu on G-335 will be released to Calcutta ACC at or below 13,500 ft. and advise for further climb will be given by Calcutta ACC . The transfer point of ATS responsibility is Janakpur.

**R-581**

Aircraft will be cleared by Calcutta ACC to an appropriate level so as to be at Romeo at flight level 150 or above depending upon its number in approach sequence.

**R- 325**

Aircraft will be cleared by Kathmandu ACC so as to enter Calcutta FIR within a level band of flight levels 190 to 230. The advice for climb above flight level 230 will be obtained by the aircraft from Calcutta ACC. Transfer point of ATS responsibility is Janakpur.

**R-344**

Biratnagar is the transfer point of ATS responsibility from Kathmandu ACC to Calcutta ACC. Co-ordination procedure between VNKT and VECC with regard to releasing EAST bound traffic on ATS Route R344 is at F270 over Biratnagar when no prior co-ordination achieved with VECC ACC.

**Note:**

Longitudinal separation of 15 minutes for aircraft on the same level and the same track shall ensured for any flights to be released to Delhi/Calcutta ACCs.

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**APPENDIX E****Operational Letter of Agreement between Nepal and Bhutan****1. Air Route**

- 1.1 The following route shall be designated for the flight between Kathmandu and Paro.

Kathmandu – Tumlingtar-exit/entry boundary point 27°08'N 088°00'E-Paro and vice versa.

- 1.2 The following route shall be designated for over flying Nepalese airspace for the flights between Paro and Delhi.

Paro – Kathmandu route is same as in 1.1 and for Kathmandu-Delhi the route shall be as follows:

- 1.2.1 Kathmandu-B345-Bharatpur-Dang-Nepalgunj-Delhi and Vice-Versa. and /or  
1.2.2 Kathmandu –B345 – Bharatpur-Bhairahawa-Lucknow-R460 Delhi and Vice Versa.

*Note: The proposed route is specified in Para 1.2.1 and 1.2.2 are not yet implemented existing route is as follows:*

Paro-Delhi: Kathmandu- B345 – Bharatpur – Bhairahawa- Lucknow- Delhi

Delhi-Paro: Delhi - Lucknow – G598 – Simra - Kathmandu.

**2. Air Traffic Service Transfer point**

For the route mentioned in 1.1 the point 27°08' N 88°00'E in the Kathmandu flight information region is hereby designated as Air Traffic Service transfer point for the flight to and from Paro requiring to enter/exit Nepalese airspace.

For the route mentioned in 1.2.1 Nepalgunj shall be designated as Air Traffic service transfer point.

For the route mentioned in 1.2.2. Bhairahawa shall be designated as Air Traffic service transfer point.

The aircraft shall be released at a designated transfer point to appropriate Air Traffic Service unit at appropriate semi circular/ quadrantal level.

**3. Unit Providing Air Traffic Services**

- 3.1 For aircraft operating within Kathmandu Flight information Region, Air Traffic Service and other relevant services shall be provided by Kathmandu Area Control Centre.
- 3.2 Flights from Paro to Kathmandu shall be transferred to Kathmandu Area Control Center on frequency 126.5 MHz and flights from Kathmandu to Paro shall be



transferred to Calcutta Flight Information Center/ Bagdogra Tower on appropriate frequency.

Identification	Significant Point	Mag Tracks	Distance (MM)	Upper Limit  Lower Limit	MEA	Width (NM)	Status
	KTM  VOR						ATC Service
		102 <sup>0</sup>	42	<u>FL 460</u>  12500ft	13500ft	5	
	LIMA  (ABM JKP)						ATC Service  from LIMA to
KTM-  PARO-KTM		102 <sup>0</sup>	59	<u>FL 460</u>  160 ft	FL 170	5	KIMTI
	Tumlingtar	102 <sup>0</sup>	45	<u>FL 460</u>  160 ft	FL 170	5	Appropriate ATS Services
	FIR Boundary  27 <sup>0</sup> 08'34"N  88 <sup>0</sup> 00'E						

**APPENDIX F****Operational Letter of Agreement between Nepal and China****1. Designated Air Route**

Lhasa-Xigaze-NONIM (27<sup>0</sup>50N 087<sup>0</sup>26'E) – Tumlingtar (27<sup>0</sup>19N 087<sup>0</sup>12'E)- Kathmandu and Vice-versa.

**2. Procedures of Control**

2.1 The procedures of transfer of control and co-ordination agreed upon by both parties on Kathmandu-Lhasa-Kathmandu air route are as follows:

**2.1.1 Transfer of Control point**

The transfer of control point: Ladang 27<sup>0</sup>50N 087<sup>0</sup>26'E

**2.1.2 ATC Unit(s)**

Lhasa ACC and Kathmandu ACC shall respectively provide appropriate air traffic services to all aircraft flying along Lhasa-Kathmandu air route.

**2.1.3 Vertical Separation**

When flying over the geographical co-ordinate of 27<sup>0</sup>50N087<sup>0</sup>26'E. All aircraft shall maintain a level of configuration. The vertical separation shall comply with the relevant provisions under 2.1.5 set down hereunder.

**2.1.4 Longitudinal separation**

The longitudinal separation between aircraft flying on the same course and at the same level shall maintain a separation of not less than, 15 minutes

**2.1.5 Flight level assignment and adjustment**

Flight level change from flight level system adopted in the territory of China to that adopted in the territory of Nepal and vice versa shall be initiated respectively in the responsible areas of Lhasa ACC and Kathmandu ACC and shall be completed 30 km in advance prior to the geographical co ordinate of 27<sup>0</sup>50N 087<sup>0</sup>26'E. Flying over the geographical co-ordinate shall be made at a prearranged flight level.

2.1.5.1 Lhasa and Kathmandu ACC's will adopt flight in feet for transfer of control. Aircraft flown from Lhasa CTA to Kathmandu FIR shall over the transfer of control point (27<sup>0</sup> 50N 087<sup>0</sup>26E) at FL 310 or FL 350, from Kathmandu FIR to Lhasa CTA at FL 330 or FL 370.

2.1.5.2 Flight level in meters shall be used within the territory of the P.R. China. Transitional area for converting the flight level from feet to meter ad vice versa shall be from the transfer of control point (27<sup>0</sup> 50N 087<sup>0</sup>26E) extending to the point of 80 km in the territory of China. Aircraft entering the transitional area shall change the flight level system subject to the permission from Lhasa ACC.

- 2.1.5.3 Flight Level assignments for aircraft flying on Lhasa-Kathmandu air route are as follows:

Flight levels on route segment between Lhasa and the geographical coordinate of (27° 50N 087°26E) shall be 9000 and 11000 meters.

Flight levels on route segment between the geographical coordinate of (27° 50N 087°26E) and Kathmandu shall be FL 310 and FL 350 feet

Flight levels on route segment between Kathmandu and the geographical coordinate of (27° 50N 087°26E) shall be FL 330 and FL 370 feet

Flight levels on route segment between the geographical coordinate of (27° 50N 087°26E) and Lhasa shall be 10000 and 12000 meters.

The use of the above flight levels or the change of the above flight levels shall be subject to the permission from the relevant ACC unit.

- 2.1.6 Aircraft shall be strictly flown along the specified air route. When an aircraft is unable to fly on the specified route under exceptional circumstances. The transferring ACC shall without delay, notify the accepting ACC, reporting at same time the position and course of the aircraft. The aircraft concerned can enter the airspace of the accepting ACC only after having obtained permission of the accepting ACC.
- 2.1.7 In case there occur emergencies and/or special circumstance jeopardizing flight safety of an aircraft, both ACC shall take immediate measures to ensure flight safety in accordance with relevant regulations.
- 2.2 If an air crew violates flight regulations or a controller violates control procedures. Both ACCs shall duly notify each other and take corresponding measures. The claim, if any should be forwarded to aeronautical authority not later than seven days after the occurrence of the incident.

### **3. Transfer of control and coordination procedures**

- 3.1 Responsibility of air traffic control over an aircraft shall not be transferred from one control unit to another without the consent of the accepting ACC. Subject to 4.1
- 3.2 The transfer of control and co-ordination shall be effected in accordance with the flight information exchange between both ACCs and request from air crew, transferring ACCs and accepting ACC.
- 3.3 Co-ordination procedures for transfer of Control.
- 3.3.1 Time of co-ordination:
- Co-ordination shall be effected not less than 10 minutes prior to the time at which the aircraft concerned is estimated to cross the geographical coordinate of 27°50N087°26E. Subject to 4.1

- 
- 3.3.2 Accepting ACC shall immediately confirm and notify the specific requirements for flight upon receipt of co-ordination notice.
- 3.3.3 When an estimated time at which an aircraft flights over the transfer of control point differs by 3 minutes or more from the one originally coordinated, co-ordination must be remade.
- 3.3.4 When an aircraft in flight encounters special circumstances, the ACC of either party may change the entry requirement originally agreed upon by the other party, provided the ACC concerned notifies the ACC of the other party and receives a new country clearance prior to the overlying of the geographical coordinate of 27°50N087°26E by the said aircraft.
- 4. Means of coordination implementation. The direct speech circuit on common carrier mode.**
- 4.1 The direct speech circuit on common carrier mode between Lhasa and Kathmandu is the principal means of communication.
- 4.2 In case the direct speech circuit becomes unavailable, transfer of control and coordination shall be implemented through air/ground radio communication of the aircraft to be flying over the transfer of control point.
- 4.3 When transfer and co-ordination are implemented through the aircraft to be flying over the transfer of control point following procedures must be actions observed.
- 4.4 The transferring ACC shall notify the flight crew 10/15 minutes in advance before the aircraft overlying the transfer of control point so as to allow the flight crew to establish radio contact with and relay the transfer and coordination information to the accepting ACC.
- 4.5 In order to ensure the aircraft to enter the airspace of the accepting ACC in accordance with the request from the accepting ACC, the air crew must notify the entry requirements received from the accepting ACC to the transferring ACC and meet the requirements of the accepting ACC under the instruction of the transferring ACC.
- 4.6 When an aircrew is unable to contact the accepting ACC or fails to notify the transferring ACC of the requirements of entering the FIR of the accepting ACC, the transferring ACC shall instruct the aircrew to hold 50 km away from the geographical coordinate of 27°50N087°26E. If unable to contact the accepting ACC within 10 minutes the aircraft shall return and land at the aerodrome of departure.
- 4.7 When an aircraft contacts Lhasa ACC or Kathmandu ACC the aircrew must use the frequencies and the call signs published by both parties and maintain a continuous radio contact with the party concerned.
- 5. Transfer of air/ground radio communication**
- After the transferring ACC has obtained the permission from the accepting ACC for an aircraft overlying the transfer of control point, the transferring ACC shall notify the aircrew to establish radio communication with the accepting ACC at least 5 minutes in
-

advance prior to over flying the transfer of control point and maintain communication with the aircraft until it passes over the transfer of control point.

Identification	Significant Point	Mag Tracks	Distance (MM)	<u>Upper Limit</u> <u>Lower Limit</u>	MEA	Width (NM)	Status
KTM-LHASA-KTM	KTM VOR	102 <sup>0</sup>	42	<u>FL 460</u> 12500ft	13500ft	5	ATC Service
	LIMA (ABM JKP)	102 <sup>0</sup>	59	<u>FL 460</u> 160 ft	FL 170	5	ATC Service up to KIMTI
	Tumlingtar (TTR)	102 <sup>0</sup>	45	<u>FL 460</u> 160 ft	FL 170	5	Appropriate ATS Services
	Ladang (FIR Boundary ) 27 <sup>0</sup> 50'N 87 <sup>0</sup> 26'E						

**APPENDIX G****Air Traffic Incident Report Form**

For use when submitting and receiving reports on air traffic incidents. In an initial report by radio, Block, Underline & *Italic* items should be included.

**A-AIRCRAFT IDENTIFICATION****B- TYPE OF INCIDENT**

**AIRPROX/ROCEDURE/FACILITY\***

(\* Delete as appropriate)

**C- THE INCIDENT***General*

*Data/time of incident* ..... *UTC*

*Position* .....

**2. Own aircraft**

*Heading and route* .....

*True airspeed* ..... *measured in ( ) Kt ..... ( ) km/h*

*Level and altimeter setting* .....

*Aircraft climbing or descending*

☐ *Level flight* ☐ *Climbing* ☐ *Descending*

**e) Aircraft bank angle**

☐ Wings level ☐ Slight bank ☐ Moderate bank

☐ Steep bank ☐ Inverted ☐ Unknown

**f) Aircraft direction of bank**

☐ Left ☐ Right ☐ Unknown

**g) Restrictions to visibility (select as many as required)**

☐ Sun glare ☐ Windscreen pillar ☐ Dirty windscreen

☐ Other cockpit structure ☐ None

**h) Use of aircraft lighting (select as many as required)**

☐ Navigation lights ☐ Strobe lights ☐ Cabin lights

☐ Red anti-collision lights ☐ Landing/taxi lights

**i) Traffic avoidance advice issued by ATS**

☐ Yes, based on radar ☐ Yes, based on visual sighting

☐ Yes, based on other information ☐ No

- j) Traffic information issued  
☐ Yes, based on radar ☐ Yes, based on visual sighting  
☐ Yes, based on other information ☐ No
- k) Airborne collision avoidance system-ACAS  
☐ Not carried ☐ Type ☐ Traffic advisory issued  
☐ Resolution advisory issued ☐ Traffic advisory or resolution advisory not issued
- l) Radar identification  
☐ No radar available ☐ Radar identification ☐ No radar identification
- m) Other aircraft sighted  
☐ Yes ☐ No ☐ Wrong aircraft sighted
- n) Avoiding action Taken  
☐ Yes ☐ No
- o) Type of flight plan IFR/VFR none\*  
 (\* Delete as appropriate)
3. *Other aircraft*
- a) *Type and call sign/registration (if known) .....*
- b) *If a) above not known, describe below*  
☐ High wing ☐ Mid wing ☐ Low wing  
☐ Rotocraft  
☐ 1 engine ☐ 2 engine ☐ 3 engine  
☐ 4 engine ☐ More than 4 engines

Marketing, color or other available details

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- c) Aircraft climbing or descending  
☐ Level flight ☐ Climbing ☐ Descending ☐ Unknown
- d) Aircraft bank angle  
☐ Wings level ☐ Slight bank ☐ Moderate bank  
☐ Steep bank ☐ Inverted ☐ Unknown

- e) Aircraft direction of bank  
☐ Left ☐ Right ☐ Unknown
- f) Lights displayed  
☐ Navigation lights ☐ Strobe lights ☐ Cabin lights  
☐ Red anti-collision lights ☐ Landing/taxi lights
- g) Traffic avoidance advice issued by ATS  
☐ Yes, based on radar ☐ Yes, based on visual sighting  
☐ Yes, based on other information ☐ No ☐ Unknown

Traffic information issued

- ☐ Yes, based on radar ☐ Yes, based on visual sighting  
☐ Yes, based on other information ☐ No ☐ Unknown

Avoiding action taken

- ☐ Yes ☐ No ☐ Unknown

*Distance*

Closest horizontal distance

Closest vertical distance

Flight weather conditions

IMC/VMC\*

Above/below\* clouds/fog/haze or between layers\*

Distance vertically from cloud ----- m/ft\* below ---- m/ft\* above

In cloud/rain/snow/sleet/fog/haze\*

Flying into/out of\* sun

Flight Visibility ----m/km\*

6. Any other information considered important by the pilot-in command

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## D- MISCELLANEOUS

1. Information regarding reporting aircraft

Aircraft registration \_\_\_\_\_



Aircraft type \_\_\_\_\_

Operator \_\_\_\_\_

Aerodrome of departure \_\_\_\_\_

*Aerodrome of first landing destination* \_\_\_\_\_

Reported by radio or other means to ..... (name of ATS unit) at time- UTC

Date/time/place of completion of form \_\_\_\_\_

(\*Delete as appropriate)

2. Function, address and signature of person submitting report

Function \_\_\_\_\_

Address \_\_\_\_\_

Signature \_\_\_\_\_

Telephone number \_\_\_\_\_

3. Function and signature of person receiving report

a) Function \_\_\_\_\_ b) Signature \_\_\_\_\_

E. SUPPLEMENTARY INFORMATION BY ATS UNIT CONCERNED

1. Receipt of report

Report received via AFTN/radio/telephone/other (specify)\* \_\_\_\_\_

Report received by \_\_\_\_\_ (name of ATS unit)

2. Details of ATS action

Clearance, incident seen (radar/visually, warning give, result of local enquiry, etc)

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3. Instructions for the completion of the Air Traffic Incident Report From Item

A Aircraft identification of the aircraft filing the report.

B An AIRPROX report should be filed immediately by radio

C1 Date/time UTC and position in bearing and distance from a navigation aid or in LAT/LONG.

C2 Information regarding aircraft filing the report, tick as necessary.

C2c) e.g. FL 350/1013 hpa or 2500 ft/QNH 1007 hpa or 1200 ft/ QFE 998 hpa.

C3 Information regarding the other aircraft involved.

- C4 Passing distance-state units used.
- C6 Attach additional papers as required. The diagrams may be used to show aircraft's positions.
- D1f) State name of ATS unit and date/time in UTC.
- D1g) Date and time in UTC.
- E2 Include details of ATS unit such as service provided, radiotelephony frequency, SSR Codes assigned and altimeter setting. Use diagram to show the aircraft's position and attach additional papers as required..

(\*Delete as appropriate)

AIR TRAFFIC INCIDENT REPORT FORM		
For use when submitting and receiving a report on an air traffic incident and when preparing for transmission of a message on such incidents. Shaded boxes contain items to be included in an initial report by radio.		
Section 1 - GENERAL INFORMATION		
Type of incident	A	INCIDENT: NEAR COLLISION/PROCEDURAL/FACILITY*
Name of pilot-in-command	B	
Operator	C	
Identification markings of aircraft	D	
Aircraft Type	E	
Radio call sign-in communication with Frequency at time of incident	F	
Aerodrome of departure	G	
Aerodrome of first intended landing and destination, if different	H	
Type of flight plan	I	IFR/VFR/NONE*
Position at time of incident-Heading or route-True airspeed	J	
FL, altitude or height- Altimeter setting-Altitude	K	Level flight/climbing/descendign/turning*
Flight weather condition at time of incident	L	IMC/VMC ..... above/below cloud/flog/haze ..... horizontally from cloud Between cloud layers In cloud/rain/snow/sleet/fog/haze Flying into/out of sun ..... flight visibility

Date and time of incident UTC	M	Reported by radio to ..... AFIS/TWR/APP/ACC/FIC* at .... (date/time)	
Section 2- DETAILED INFORMATION			
Description of other aircraft, if relevant: Type, high/low wing, number of engines..... Radio call sign, registration ..... Markings, color, lighting ..... Other available details .....	N		
Descriptin of incident if desired add comment or suggestion, including your opinion on the probable cause of the incident. (In case of near-collision give information on respective flight paths, estimated vertical and horizontal sighting and miss distances between aircraft and avoiding action taken by either aircraft.	O	(Continue overleaf if necessary)	
Date ..... Time ..... Place..... ..... of completion of from .....	Funtion and signature of person submitting report .....		Function and signature of person receiving report .....
Section 3- SUPPLEMENTARY INFORMATION BY ATS UNIT CONCERNED			
How report received	P	Radio/telephone/teleprinter*at ARO/AFIS/TWR/APP/ACC/FIC* .....	
Details of ATS action: Clearance, Incident observed on radar, warning given, result of local enquiry.	Q	(Continue overleaf if necessary)	
* Delete as appropriate		Signature of ATS Officer ..... Date/Time UTC .....	

**APPENDIX H****Departure Separation: Faster Following Aircraft climbing to Higher Level**

1. This procedure provides an alternative method of separating two departing aircraft when a faster following aircraft requires a higher cruising level than the leading aircraft.
2. Depending on the vertical distance between the aircraft and the DME distance of the leading aircraft from the departure aerodrome the following aircraft may be cleared for climb to the higher level.
  - 2.1 In the application of this procedure, separation of not less than 15 mile is provided when the following aircraft reaches 1000 feet above the cruising level or the level at which the leading aircraft has been maintained.
3. The procedure to be followed is:
  - a) request the DME distance and level of each aircraft, if both are airborne, other wise the DME distance and level of the leading aircraft may also be used but, in this case, the level/distance requirement must be updated at a later stage(see Note 2 below)
  - b) from the table below, using the vertical distance between the aircraft, determine the appropriate distance and subtract it from the DME distance of the leading aircraft:
  - c) instruct the following aircraft to reach 1000 feet above the cruising level, or the level to which the leading aircraft has been maintained, by the DME distance obtained from (b) above.

<b>Vertical Distance</b>	<b>5000 ft to 7000 ft</b>	<b>7000 ft to 10000 ft</b>	<b>10000 ft to 20000 ft</b>	<b>More than 20000 ft</b>
Aircraft Subtracted	15	10	5	0

- Note:*
1. The procedure shall be applied only when the leading aircraft has reached 5000 feet or above.
  2. The procedure may be applied with both aircraft on the ground. The former procedure is preferable, as a less restrictive level distance requirement will apply for the following aircraft. Should the procedure be applied when the following aircraft is on the ground an updated requirement shall be evaluated and issued immediately after that aircraft departs.

**Examples:**

- i A F27 climbing to F1 160 reports 50 DME; a B 727 ready for departure is required to reach FL 170 by 45 DME. After departing the B727 reports 7000' at 9 DME and the F27 report 65 DME cruising FL 160; the B727 may be given an updated requirement to reach FL 170 by 55 DME.
- ii A F27 climbing to FL 180 reports 45 DME and is maintained at FL130 A DC 9 after departing and climbing through 4000 feet is required to reach FL 140 by 35 DME.

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**APPENDIX I****Tables of Cruising Levels**

- a) The pilot-in-command of an IFR or VFR flight at or above FL 150, shall select a level corresponding to the appropriate magnetic track as indicated in the following semi-circular cruising levels

**Table 1 : Semi - Circular cruising levels within Kathmandu FIR VNSM**

TRACK							
From 000 degrees to 179 degrees				From 180 degrees to 359 degrees			
IFR Flight		VFR Flight		IFR Flight		VFR Flight	
Flight Level	Altitude (Ft)	Flight Level	Altitude (Ft)	Flight Level	Altitude (Ft)	Flight Level	Altitude (Ft)
150	15000	155	15500	160	16000	165	16500
170	17000	175	17500	180	18000	185	18500
190	19000	195	19500	200	20000		
210	21000			220	22000		
230	23000			240	24000		
250	25000			260	26000		
270	27000			280	28000		
290	29000			300	30000		
310	31000			320	32000		
330	33000			340	34000		
350	35000			360	36000		
370	37000			380	38000		
390	39000			400	40000		
410	41000			430	43000		
450	45000						

- b) The pilot-in-command of a VFR or IFR flight at or above 3000 ft, below altitude 13500 ft AMSL shall select a level corresponding to the appropriate magnetic track as indicated in the following quadrantal cruising levels

**Table 2: Quadrantal Cruising Levels**

000° - 089°	090° - 179°	180° - 269°	270° - 359°
ODD Thousand	ODD +500 ft	EVEN Thousand	EVEN +500 ft
3000 ft	3500 ft	4000 ft	4500 ft
5000 ft	5500 ft	6000 ft	6500 ft
7000 ft	7500 ft	8000 ft	8500 ft
9000 ft	9500 ft	10000 ft	10500 ft
11000 ft	11500 ft	12000 ft	12500 ft
13000 ft	13500 ft		

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## APPENDIX J

## STRIP MARKING PROCEDURES

## INTRODUCTION

- 1.1 The following sections specify the procedures and standards application to the processing of flight data by Air Traffic Controllers. Data concerning the current and planned progress of flight to be provided with ATS are normally displayed on flight progress strips to facilitate the prediction and resolution of conflicts between aircraft. The strips are coded by color to indicate general direction of flight and the flight category and rules under which the flight is operating.

## 1.2 DEFINITIONS

- 1.2.1 **THE FLIGHT PROGRESS BOARD** shall comprise one or more bays to accommodate flight progress strip holder on which are displayed necessary for control of air traffic or the provision of a flight information service.

**A bay** is a division on a flight progress board on which strip holders are arranged.

**Bay dividers** are used to sub-divide bays as required to denote airspace boundaries or position reporting points or transfer of control points.

**Bay dividers** are labeled to indicate their purpose.

**Suspense bays** shall be used to accommodate strips prior to their being required for control purposed.

**Active bay** is a bay or bays shall be used to accommodate being actively used for Air Traffic Control purposes.

**Strip holders** shall be used to hold flight progress strips.

**Flight progress** strips consist of paper strips, color coded for particular purposes to record and display all data necessary for the control of air traffic.

A box is sub-divided area on a flight progress strips used to segregate particular information.

**A Departure** strip is a strip used to display essential details of an departing flight.

**An arrival** strip is a strip used to display essential details of an arriving flight.

**En-route strip** is used to display essential details of flight at each displayed reporting point over which the flight will pass.

**Entry strip** is an en-route strip used at the first reporting point within the area of responsibility.

**Exit strip** is en-route strip used at the reporting point on the route of the flight within the area of responsibility.

## 1.3 STRIP MARKING AND OPERATION OF THE FLIGHT PROGRESS BOARD

Only such data as are required for the efficient operation of a particular operating position need to be encoded on a flight progress strip. However, it must be borne in mind that in



addition to being an aide-memoires, the data should be sufficient to enable a change of watch to be effected with the minimum of verbal briefing on the current traffic situation.

Strips shall be maintained on all flights within the Kathmandu FIR.

A flight progress strip shall be reared whenever information is received that a flight is scheduled to take place or is already in flight.

Strips of different colors shall be used as follows:

- a) AREA CONTROL CENTRE
  - i) Buff for east-bound
  - ii) Blue for west-bound
- b) CONTROL TOWER
  - i) Buff for departures
  - ii) Blue for arrivals
  - iii) Pink for local flights

Unless otherwise noted all markings in the strip shall be written in black pen do not erase or overwrite any item. Draw horizontal line through it and write the new item immediately adjacent to it and within same space

Letters should be in printed capitals

Arabic numerals should be used to record figures and time should be recorded in 4 digits.

When the hour changes, line through all four digits and place new time beneath the original time.

Example:     ~~1402~~  
                  1355

When the minute changes, line through last two digits and place new time beneath the original time.

Example:     13 ~~59~~  
                  55

Altitude and level changes should be tabulated downwards as they occur.

Levels to be checked in climb or descent should be shown separately alongside the climb/descent symbol.

Estimated time of arrivals (ETAs) should be tabulated downward in order of occurrence.

Any item of an aircraft report not in accordance with a previously issued clearance, should be recorded alongside the correct data and circled and such incorrect data should be immediately checked with the aircraft.

## 2. AERODROME CONTROL

### 2.1 GENERAL

- a) Do not erase or overwrite any item. Draw a horizontal line through it and write the new item immediately adjacent to it and within the same space.
- b) Revised altitude  
To correct and amend an altitude, draw a horizontal line through the altitude to be corrected or amended and write the new altitude to the right of the old.

Example : ~~70~~ 50

- c) The absence of an airway or route number between two fixes in the route of flight indicates " DIRECT" no symbol or abbreviation is required.

### 2.1 Departure strip marking

- a) The departure strip is of standard format.
- b) "Buff" color shall be used.
- c) Data required for aerodrome control purpose shall be recorded position as specified below.

1	3a 3b	b	5	6a	7a	8	9	C T A B
la		4		6b	7b			
2		c d e/f	10	11	12	13a 13b		

- (1) The estimated time of departure.
- (1a) Calculated time of departure passed to APP
- (2) Time setting course (if required).
- (3a) Planned cruising level.
- (3b) Level cleared by ATC

*Note: In case aircraft requests level other than Flight Plan - level, note the level and circle the planned cruising level.*

- (4) Aircraft identification.
- (4b) Type of aircraft
- (4c) Symbol of flight rule if other than IFR.
- (4d) Beacon code.
- (4e) True airspeed.
- (4f) Speed during climb (if available).

- (5) RWY –in-use.
- (6a) Time start up clearance issued.
- (6b) Time taxi clearance issued.
- (7a) Time of release and ATC clearance requested to APP.
- (7b) Time Airways/ TMA clearance issued to aircraft.
- (8) Time-take off.
- (9) Miscellaneous items such as:
  - All control data and coordination
  - Airways clearance etc.
- (10) Aerodrome of departure
- (11) Route of flight
- (12) Destination or aerodrome of first intended landing
- (13a) Point of release to other control unit (fix, time, or altitude).
- (13b) Actual time aircraft is instructed to contact the unit.

### 2.1.1 Departure strip handling

- (a) Time shall be entered immediately after actions being taken.
- (b) A departure strip shall be placed under the "TAXYING" designator immediately as taxing commences and shall be palced under the RUNWAY Designator when entered the runway.
- (c) The departure strip shall be displayed 5 minutes after traffic has been handed over to the Approach control.

## 2.3 Arrival strip marking

- a) The arrival strip is of standard format.
- b) Blue color shall be used.
- d) Data required for aerodrome control purpose shall be recorded in position as specified below.

1		a	b	5	6	7	8	9	C T A B
		4		10a			13a		
2	3	c	d/e	10b	11	12	13b		

- (1) Estimated time of arrival.
- (2) The actual time over the fix serving the aerodrome when aircraft requires holding.
- (3) Latest Cruising level or level descending to or subsequent level reported by pilot.
- (4) Aircraft identification.
- (4a) Point of departure.
- (4b) Type of aircraft.
- (4c) Type of flight if other than IFR.
- (4d) True airspeed.
- (4e) Speed during descend (if available)
- (5) RWY-in-use
- (6) Time over the LTH or base leg of the traffic circuit if landing clearance is not issued at that time.
- (7) Blank
- (8) Previous fix/time
- (9) Miscellaneous items such as:
  - ATC clearance and other instructions supplied by APP;
  - Control data etc.
- (10a) Release point (fix, time or altitude) from APP
- (10b) Time of first contact.
- (11) Type of approach.
- (12) Expected approach time.
- (13a) Time clearance to land.
- (13b) Landing time.

### **3. APPROACH RADAR CONTROL**

#### **a. Departure strip marking**

- (a) The departure strip is of standard format.
- (b) "Buff" color strip shall be used for all departures from Kathmandu.
- (c) Data required for Approach control purpose shall be recorded in positions as specified below.

1	a	b	a	b	5	6a	7a	8	9a
			4			6b	7b		
2	3				10a	11a	12	13a	C
2a		c	d	e	10b	11b		13b	T
									H

- (1) Estimated off block time.
- (2) Calculated time of departure (provided by ADC)
- (2a) Time over the fix/NAVAID serving the aerodrome (if available).
- (3a) Cruising level as per FPL . (Subsequently level cleared by ATC).
- (3b) Assigned or available level. (Subsequently level reorted by PIC).
- (3) Aircraft identification.
- (4a) Destination or aerodrome of first landing.
- (4b) Type of aircraft.
- (4c) Symbol of flight Rule other than IFR.
- (4d) Beacon code.
- (4e) True airspeed.
- (5) RWY -in –use.
- (6a) Time of release clearance requested by ADC.
- (6b) Time of release clearance issued to ADC.
- (7a) Time of route clearance requested to ACC.
- (7b) Time of route clearance issued by ACC.
- (8) Airborne time.
- (9) Miscellaneous items such as:
- ATC clearace and other instructions sulied by ACC;
  - Release clearance issued by APP;
  - Heading;
  - Speed; etc.
- (9a) Time of identification.
- (10a) Release point (fix, time or altitude) from ADC.

- (10b) Time of contact with APP.
- (11a) Point of departure.
- (11b) Route of flight.
- (12) Position reorting under APP 25 DME).
- (13a) Transfer point.
- (13b) Time of transfer to ACC or next ATS unit.

### 3.2 Departure strip handling.

- (a) Time of Radar identification shall be entered immediately in the corner of miscellaneous box (9a).
- (b) Departure strips shall be palced on the basis of EOBT on holding bay and activated under departure designator after the issuance of release clearance.
- (c) The departure strip shall be on the bay until 5 minutes after traffic has been transferred to concerned ATS units.

### 3.3 Arrival strip marking

- (a) The arrival strip is of standard format.
- (b) Blue color strips shall be used for all arrivals to Kathmandu.
- (c) Data required for approach control purpose shall be recorded in positions specified as below.

1a		a	b	5	6	7	8a	9a
		4					8b	
1	3			10a	11	12	13a	9 T
2		c	d	e	10b		13b	B

- (1) The estimated time of arrival over the aerodrome or the fix serving the aerodrome.
- (1a) The name of the fix, the aircraft being ceared.
- (2) The actual time, over the fix (divide the box if aircraft requires holding, upper box for entry & lower for leveling the holding).
- (3) Latest cruising level when transferred from ACC, subsequently level repted by PIC and assigned level.
- (4) Aircraft identificatin.

- (4a) Point of departure.
- (4b) Type of aircraft.
- (4c) Symbol of flight rule other than IFR.
- (4d) Beacon code.
- (4e) True airspeed.
- (5) RWY-in-use.
- (6) Time over NOPEN or IGRIS (if necessary to hold, divide box) and for VFR traffic, position report at 15 DME).
- (7) Time of approach clearance issued by APP and for VFR traffic, position report at 25 DME.
- (8a) Previous reported fix.
- (8b) Time of previous reported fix.
- (9) Miscellaneous items such as:
  - all control data and co-ordinations;
  - heading;
  - speed; etc.
- (9a) Time of identification.
- (10a) Release point (from ACC or order ATS units)
- (10b) Time of first radio contact with aircraft.
- (11) Type of approach.
- (12) Expected approach time.
- (13a) Transfer point.
- (13b) Time of transfer to ADC.

#### **4. AREA CONTROL CENTER**

##### **4.1 Strip making**

- a. The strip is of standard format
- b. Buff color strip shall be used for eastbound flight and blue color strip for westbound both for domestic and international as well.
- c. Strips shall be prepared for Entry, En route and Exit points.
- d. Data required for the Area control purpose shall be recorded in positions specified as below.

1a	3a	3b	4e	4a	5	6a	7	8a	9a	
			4			6b		8b		
1					10a	11a	12a	13a	9b	
2			4b	4d	4c	10b	11b	12b	13b	

1. ATC estimate time at which an aircraft is estimated over a reporting point as shown in 1a.
- 1a. The position to which the time in 1 refers (approved abbreviations will be used).
2. The time at which the aircraft was over position to which the strip corresponds. If holding is required over the fix, divide the box into two; lower part for entry and upper for exit.
- 3a. The cruising level as per FPL (subsequently level cleared by ATC)
- 3b. Assigned or available level (subsequently level reported by pilot).
4. Aircraft identification
- 4a. Type of aircraft/ Wake turbulence category
- 4b. Type of flight other than IFR.
- 4c. Speed of the aircraft
- 4d. Assigned beacon code.
- 4e. Destination airport
5. RWY in Use if available in exit strip only. This will be vacant in case of entry and en route strip.
- 6a. Time, Airways or TMA clearance requested
- 6b. Time, Airways or TMA clearance issued.
7. Pilot estimate over the position.
- 8a. Abbreviations of previous reporting point and / or location
- 8b. Actual time over that positions or actual time of departure in entry strip only.
- 9a. EOBT of departure airport in entry strip.
- 9b.
  - (1) The control data's and details of AWY clearance (if other than FPL route, level or any restriction issued).



- (2) Other related data's and if release point is other than prescribed procedure, will be mentioned e.g. RLS/45DME
- 10a/b. Time, place or altitude at which aircraft is in initial contact on entry strip.
- 11a. Point of departure
- 11b. Route of the flight.
- 12a. Type of approach in exit strip
- 12B. EAT issued in exit strip.
- 13 a/b. Time, place or altitude at which aircraft has been instructed to contact APP/ADC/adjacent ACC and other ATS unit.
- A1 Immediately on receipt of the flight plan, the strips shall be prepared for the fixes on route for which designators are held in the flight progress board.
- A2 On receipt of the setting course time, the estimates for each fix shall be calculated and entered as the ATC estimate.
- A3. When the strip on which basic data has been posted are no more required, it shall be crossed diagonally upward to the right or downward to the left. If the aircraft does not come in contact or transfer directly from one unit to other without transferring to ACC, then the strip shall be crossed diagonally upward to the left or downward to the right.
- A4. The strip shall be placed under the designators strip as soon as the clearance for that flight has been issued or when no clearance is required, as soon as the departure time is received.
- A5 The strip for a fix shall remain posted below the designators strip until data on that strip is no longer required, and
  - a) The position report for a subsequent fix in the sector has been received.
  - b) In case of an exit strip for a period equaling the prescribed route longitudinal time separation.
  - c) For a period of 5 mins after releasing the control of aircraft to APP, ADC or other unit.

#### **4.2 Processing of flight data on strips to be utilized in area control center.**

- 4.2.1 Immediately on receipt of the flight plan, strips shall be prepared for all fixes on the route for which designators are held in the flight progress board, including any aircraft which is exempted from reporting.
- 4.2.2 On receipt of a time of setting course, the estimate for each fix shall be calculated and entered as the ATC estimate on each strip. As flight progresses and position reports are received, the pertinent elements shall be entered in the appropriate places on flight strips.
- 4.2.3 When strips on which basic data has been posted are not required immediately, that shall be placed in a suspense bay.

- 4.2.4 The strip for the departure fix shall be placed above the designation immediately after flight plan data has been entered there on. This strip shall be placed below the designator strip as soon as a clearance for that flight has been issued or, when no clearance is required, as soon as the departure time is received. Other strips shall be placed under the designator strip as soon as an estimate for each fix is calculated. Strips shall be placed under the designator strip in time sequence so that the strip representing the flight which the earliest estimate appears at the bottom of the appropriate bay. A strip for a fix shall remain posted below the designator strip until data on that strip is no longer required, and;
- b) The position report for a subsequent fix in the sector has been received; or
  - c) In case of an exit strip for a period equaling the prescribed route longitudinal time separation; or
  - d) For a period of 5 minutes after releasing the control of aircraft to APP; or
  - e) In case of an aircraft leaving control area, the strip shall be retained for a period of 5 minutes after the time of leaving the controlled area.
- 4.2.5 When a strip has been removed from the flight progress board, it shall be taken from the strip holder and filed in chronological order, strips for each sector being filed separately.

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