APPROVAL PAGE

This Manual of AIR TRAFFIC SERVICES has been prepared by Air Navigation Regulation Directorate to assist the effort of the Ethiopian Civil Aviation Authority to maintain the provision of effective Air Navigation Services with in Ethiopia airspace.

It is important to note that the Manual of AIR TRAFFIC SERVICES improves the safety of Air Navigation Services in Ethiopia.

The Director General of Ethiopian Civil Aviation Authority has here by approved the Manual of AIR TRAFFIC SERVICES on June, 2016 to be used as guidance to ATS Directorate.

Approved by .....
For/ Woesnyeleh Hunegnaw (Col.)
Director General

Date June, 2016

Foreword

This Manual Air Traffic Services is issued by ECAA specifying the national standards and requirements to be met by the air navigation service provider within the Ethiopia Flight Information Region to meet the obligations of Contracting States to the Convention on International Civil Aviation.

The Manual of Air Traffic Services (MOATS) contains the standards, requirements and procedures pertaining to the provision of air navigation services. The standards and requirements in this Manual are based mainly on standards and recommended practices stipulated in Annex 11 (entitled "Air Traffic Services") to the Chicago Convention on International Civil Aviation (as in force and amended from time to time by the Council of the International Civil Aviation Organization) and in the Procedures for Air Navigation Services – Air Traffic Management, and with such modifications as may be determined by ECAA to be applicable in Ethiopia.

Amendments to this Manual of Air Traffic Services are the responsibility of the Air Navigation Regulation Directorate. Readers should forward advice of errors, inconsistencies or suggestions for improvement to this Manual to the addressee stipulated below.

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Contents

Record of Amendments

No	Date	Description
1	June 2016	New QMS Numbering

CHAPTER 1

1.1 DEFINITION AND ACRONYMS

1.1 Definitions existing in ICAO PANS-ATM, chapter 1 shall form part of this Regulation.

CHAPTER 2

ATS SAFETY MANAGEMENT

2.1 GENERAL

2.1.1 The ANSP shall 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, are appropriate and adequate for maintaining an acceptable level of safety in the provision of ATS.

2.1.2 The requirements in respect of services, systems and procedures applicable to airspaces and aerodromes should be established on the basis of securing the highest practicable degree of uniformity in procedures in adjacent airspaces.

2.1.3 To ensure that safety in the provision of ATS is maintained, the ANSP shall implement a safety management system acceptable to Air Navigation Services Regulation Directorate that, as a minimum:

a) Identifies safety hazards;
b) Ensures the implementation of remedial action necessary to maintain agreed safety performance;
c) Provides for continuous monitoring and regular assessment of the safety performance; and
d) Aims at a continuous improvement of the overall performance of the safety management system.

2.1.4 A safety management system shall clearly define lines of safety accountability throughout the air traffic services provider, including a direct accountability for safety on the part of senior management.

Note.— The framework for the implementation and maintenance of a safety management system is contained in ICAO Annex 11, Appendix 6. Guidance on safety management

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

2.2 OBJECTIVES

2.2.1 The objectives of ATS safety management shall be 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.

2.3 ATS SAFETY MANAGEMENT ACTIVITIES

2.3.1 An ATS SMS should include, *inter alia*, 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 of the planned implementation of airspace re-organizations, 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.

2.3.2 All activities undertaken in an ATS SMS shall be fully documented. All documentation shall be kept for a minimum of 3 years.

2.4 MONITORING OF SAFETY LEVELS

2.4.1 Collection and evaluation of safety related data

2.4.1.1 Data for use in safety monitoring programmes should be collected from as wide a range of sources as possible, as the safety-related consequences of particular procedures or systems may not be realized until after an incident has occurred.

2.4.1.2 The ANSP should 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.

Note.— Guidance related to both mandatory and voluntary State incident reporting systems is contained in the Safety Management Manual (SMM) (*Doc 9859*).

2.4.2 Review of incident and other safety-related reports

2.4.2.1 Safety-related reports concerning the operation of air traffic services, including air traffic incident reports, shall be systematically reviewed by the ANSP to detect any adverse trend in the number and types of incidents which occur.

2.4.2.2 Reports concerning the serviceability of ATS facilities and systems, such as failures and degradations of communications, surveillance and other safety significant systems and equipment, shall be systematically reviewed by the ANSP to detect any trend in the operation of such systems which may have an adverse effect on safety.

2.5 SAFETY REVIEWS

2.5.1 General requirements

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

2.5.2 Scope

2.5.2.1 The scope of ATC units' safety reviews should include at least the following issues: Regulatory issues to ensure that:

a) ATC operations manuals, ATC 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

e) minimizing the potential for inadvertent runway incursions are in place. This observation may be performed visually or by means of an ATS surveillance system;

f) Appropriate procedures for low visibility aerodrome operations are in place;

g) Traffic volumes and associated controller workloads do not exceed defined, safe levels and that procedures are in place for regulating traffic volumes whenever necessary;

h) 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

i) Procedures for the reporting of incidents and other safety-related occurrences are implemented, that the reporting of incidents is encouraged and that such reports are reviewed to identify the need for any remedial action.

2.5.2.2 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;

Note.— The ANSP should take into account relevant human factors aspects when designing or certifying equipment and operating procedures and when training and licensing personnel.

c) Equipment, including input/output devices for automation systems, are designed and positioned in the working position in accordance with ergonomic principles;

d) Communications, navigation, surveillance and other safety significant systems and equipment;

1) Are tested for normal operations on a routine basis;

2) meet the required level of reliability and availability as defined by the ANSP;

3) provide for the timely and appropriate detection and warning of system failures and degradation;

4) Include documentation on the consequences of system, sub-system and equipment failures and degradations;

5) Include measures to control the probability of failures and degradations; and

6) Include adequate back-up facilities and/or procedures in the event of a system failure or degradation; and

e) Detailed records of systems and equipment serviceability are kept and periodically reviewed.

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

1)Reliability. The probability that a device or system will function without failure over a specified time period or amount of usage; and

2) Availability. The ratio of the 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; and
f) Standard phraseology is used.

2.6 SAFETY ASSESSMENTS

2.6.1 Need for safety assessments

2.6.1.1A 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 airspace or at an aerodrome;
c) A reorganization of the ATS route structure;
d) A re-sectorization of airspace;
e) Physical changes to the layout of runways and/or taxiways at an aerodrome; and
f) Implementation of new communications, surveillance or other safety-significant systems and equipment, including those providing new functionality and/or capabilities.

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

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

2.6.1.2 Proposals shall be implemented only when the assessment has shown that an acceptable level of safety will be met. When appropriate, the ANSP shall ensure that adequate provision is made for post-implementation monitoring to verify that the defined level of safety continues to be met.

2.6.2 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. Where ADS-B implementation envisages reliance upon a common source for surveillance and/or navigation, the safety assessment shall take account of adequate contingency measures to mitigate the risk of either

degradation or loss of this common source (i.e. common mode failure); and

g) Any significant local or regional weather phenomena.

Note 1.— See also Chapter 5, Section 5.11, concerning reductions in separation minima.

Note 2.— Guidance material on methods of expressing and assessing a safety level and on safety monitoring programmes is contained in ICAO Annex 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).

2.7 SAFETY-ENHANCING MEASURES

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

2.7.2 Except when the risk can be classified as acceptable, the ANSP shall implement appropriate measures to eliminate the risk or reduce the risk to a level that is acceptable.

2.7.3 If it becomes apparent that the level of safety applicable to an airspace or an aerodrome is not, or may not be achieved, the ANSP shall implement appropriate remedial measures.

2.7.4 Implementation of any remedial measure shall be followed by an evaluation of the effectiveness of the measure in eliminating or mitigating a risk.

2.8 Human Resources Management

2.8.1 Objective

2.8.1.1 To ensure that human resources are properly managed with a view to minimizing their contribution to accident/incident in the provision of ATM services.

2.8.2 Requirement

2.8.2.1 The ANSP shall systematically address human resources management in the following key aspects:

(i) Management responsibilities and accountabilities;
(ii) Staff deployment;
(iii) Operational watch rostering ; and
(iv) Operational support arrangements.

2.8.2.2 The ANSP should identify the key personnel responsible for the safe conduct of the ATM services. Their positions, responsibilities, functions, accountabilities and authorities are to be clearly defined.

The ANSP should also develop job descriptions for other ATS staff

- Chief air traffic controllers
- Senior air traffic controllers
- Area air traffic controllers
- Approach air traffic controllers
- Aerodrome air traffic controllers and
- Assistance air traffic controllers & technical staff. Organization chart indicating the specific responsibilities should be provided.

2.8.2.3 The ANSP should document and define the method of determining staffing levels to ensure safe and efficient ATM operations.

2.8.2.4 The ANSP should allocate sufficient number of properly licensed/rated staff to cover the published operating hours of ATC control units.

2.8.2.5 The ANSP should plan the level of ATC staffing requirements taking into account the following factors:

(i) Training requirements;
(ii) Rest days or rest periods between shifts;
(iii) Leave requirements;
(iv) Sick leave reserve;
(v) Traffic volume, pattern and trend; and
(vi)Mid- to long-term projection on the development of ATM system.

2.8.2.6 The ANSP should ensure that adequate operations support staff are trained and maintained to fill established positions of the organization so as to fulfill the necessary functions, such as Flight Service Officers by providing them with adequate training and that their proficiency should be checked on a recurrent basis.

2.8.2.7 The ANSP should develop policies and procedures to enable recruitment and retention of adequate ATS staff.

CHAPTER 3

ATS SYSTEM CAPACITY AND AIR TRAFFIC FLOW MANAGEMENT

3.1 CAPACITY MANAGEMENT

3.1.1 General

3.1.1.1 The capacity of an ATS system depends on many factors, including the ATS route structure, the navigation accuracy of the aircraft using the airspace, weather related factors, and controller workload. Every effort should be made to provide sufficient capacity to provide both normal and peak traffic levels; however, in implementing any measures to increase capacity, the ANSP shall ensure, in accordance with the procedures specified in Chapter 2, that safety levels are not jeopardized.

3.1.1.2 The number of aircraft provided with an ATC service shall not exceed that which can be safely handled by the ATC unit concerned under the prevailing circumstances. In order to define the maximum number of flights which can be safely accommodated, the ANSP should assess and declare the ATC capacity for control areas, for control sectors within a control area and for aerodromes.

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

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

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

3.1.2 Capacity assessment

3.1.2.1 In assessing capacity values, factors to be taken into account should include, *inter alia:*

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

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

3.1.3 Regulation of ATC capacity and traffic volumes

3.1.3.1 Where traffic demand varies significantly on a daily or periodic basis, facilities and procedures should be implemented to vary the number of operational sectors or working positions to meet the prevailing and anticipated demand.

3.1.3.2 In case of particular events which have a negative impact on the declared capacity of an airspace or aerodrome, the capacity of the airspace or aerodrome concerned shall be reduced accordingly for the required time period. Whenever possible, the capacity pertaining to such events should be pre-determined.

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

3.1.4 Enhancement of ATC capacity

3.1.4.1 The ANSP should:

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

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

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

3.1.5 Flexible use of airspace

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

3.1.5.2 Agreements and procedures providing for a flexible use of airspace should specify, *inter alia:*

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

3.2 AIR TRAFFIC FLOW MANAGEMENT

3.2.1 General

3.2.1.1 An air traffic flow management (ATFM) service shall be implemented for airspace where traffic demand at times exceeds the defined ATC capacity.

3.2.1.2 Certain flights may be exempt from ATFM measures, or be given priority over other flights.

3.2.2 Flow management procedures

ATFM should be carried out in three phases:

a) *strategic planning*, if the action is carried out more than one day before the day on which it will take effect. Strategic planning is normally carried out well in advance, typically two to six months ahead;
b) *pre-tactical planning*, if the action to be taken on the day before the day on which it will take effect;
c) *tactical operations*, if the action is taken on the day on which it will take effect.

3.2.3 Strategic planning

3.2.3.1 Strategic planning should be carried out in conjunction with ATC and the aircraft operators. It should consist of examining the demand for the forthcoming season, assessing where and when demand is likely to exceed the available ATC capacity and taking steps to resolve the imbalance by:

a) arranging with the ANSP to provide adequate capacity at the required place and time;
b) re-routing certain traffic flows (traffic orientation);
c) scheduling or rescheduling flights as appropriate; and
d) identifying the need for tactical ATFM measures.

3.2.3.2 Where traffic orientation scheme (TOS) is to be introduced, the routes should, as far as practicable, minimize the time and distance penalties for the flights concerned, and allow some degree of flexibility in the choice of routes, particularly for long-range flights.

3.2.3.3 When a TOS has been agreed, details should be published by the ANSP concerned in a common format.

3.2.4 Pre-tactical planning

Pre-tactical planning should entail fine tuning of the strategic plan in the light of updated demand data. During this phase:

a) certain traffic flows may be re-routed;
b) off-load routes may be coordinated;
c) tactical measures will be decided upon; and
d) details for the ATFM plan for the following day should be published and made available to all concerned.

3.2.5 Tactical operations

3.2.5.1 Tactical ATFM operations should consist of:

a) executing the agreed tactical measures in order to provide a reduced and even flow of traffic where demand would otherwise have exceeded capacity;
b) monitoring the evolution of the air traffic situation to ensure that the ATFM measures applied are having the desired effect and to take or initiate remedial action when long delays are reported, including rerouting of traffic and flight level allocation, in order to utilize the available ATC capacity to the maximum extent.

3.2.5.2 When the traffic demand exceeds, or is foreseen to exceed, the capacity of a particular sector or aerodrome, the responsible ATC unit shall advise the responsible ATFM unit, where such a unit is established, and other ATC units concerned. Flight crews of aircraft planned to fly in the affected area and operators should be advised, as soon as practicable, of the delays expected or the restrictions which will be applied.

Note:- Operators known or believed to be concerned will normally be advised by the regional air traffic flow management service, when established.

3.2.6 Liaison

During all phases of ATFM the responsible units should liaise closely with ATC and the aircraft operators in order to ensure an effective and equitable service.

Note:- Attention is drawn to the guidance material contained in the Air Traffic Services Planning Manual (Doc 9426) regarding flow control as well as to procedures contained in the Regional Supplementary Procedures (Doc 7030)

HAPTER 4

GENERAL PROVISIONS FOR AIR TRAFFIC SERVICES

4. ESTABLISHMENT OF AUTHORITY

The ANSP shall determine those portions of the airspace and aerodromes where air traffic services will be provided. They shall arrange for such services to be established and provided in accordance with the provisions of this Manual. Where air traffic services are established, information shall be published as necessary to permit the utilization of such services.

4.1 RESPONSIBILITY FOR THE PROVISION OF AIR TRAFFIC CONTROL SERVICE

4.1.1 AREA CONTROL SERVICE

Area control service shall be provided:

a) by an area control centre (ACC); or

b) by the unit providing approach control service in a control zone or in a control area of limited extent which is designated primarily for the provision of approach control service, when no ACC is established.

4.1.2 APPROACH CONTROL SERVICE

Approach control service shall be provided:

a) by an aerodrome control tower or an ACC, when it is necessary or desirable to combine under the responsibility of one unit the functions of the approach control service and those of the aerodrome control service or the area control service; or
b) by an approach control unit, when it is necessary or desirable to establish a separate unit.

Note. control service may be provided by a unit co-located with an ACC, or by a control sector within an ACC.

4.1.3 AERODROME CONTROL SERVICE

Aerodrome control service shall be provided by an aerodrome control tower.

Note:- Specifications for flight information region, control areas and control zones, including the minimum flight altitudes, shall be effected in accordance with the provisions of ICAO Annex 11. Areas of responsibility for the control of flights on airways and the units providing this service, as well as control zones dimensions and controlling authorities shall be specified in AIP Ethiopia.

4.1.4 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.

4.1.5 Classification of airspaces

The ANSP shall select the airspace classes appropriate to their needs. The requirements for flights within each class shall be in accordance with Appendix 4 of ICAO Annex 11.

4.1.6 Establishment and identification of ATS routes

When ATS routes are established, a protected airspace along each ATS route and a safe spacing between adjacent ATS routes shall be provided. Designators for ATS routes shall be in accordance with the principles found in ICAO Annex 11, *Appendix 1*. Standard departure and arrival routes and associated procedures shall be identified in accordance with Annex 11, *Appendix 3*.

4.1.7 Establishment and identification of significant points

Significant points shall be established for the purpose of defining an ATS route and/or in relation to the requirements of air traffic services for information regarding the progress of aircraft in flight. Significant points shall be identified by designators.
Significant points shall be established and identified in accordance with the principles set forth in Annex 11, *Appendix 2*.

4.1.8 Establishment and identification of standard routes for taxiing aircraft

Standard routes for taxiing aircraft should be established on an aerodrome between runways, aprons and maintenance areas. Such routes should be direct, simple and where practicable, designed to avoid traffic conflicts. Standard routes for taxiing aircraft should be identified by designators distinctively different from those of the runways and ATS routes.

4.1.9 Aeronautical data

The determination and reporting of air traffic services-related aeronautical data with the accuracy and integrity requirements shall be in accordance with the provisions of ICAO Annex 11, Chapter 2.

4.2 RESPONSIBILITY FOR THE PROVISION OF FLIGHT INFORMATION SERVICE AND ALERTING SERVICE

Flight information service and alerting service shall be provided as follows:

a) *within a flight information region (FIR):* by a flight information centre, unless the responsibility for providing such services is assigned to an air traffic control unit having adequate facilities for the exercise of such responsibilities;
b) *within controlled airspace and at controlled aerodromes:* by the relevant air traffic control units.

Note: - A flight information region shall be delineated to cover the whole of the air route structure and shall include all airspace within its lateral limits.

4.3 DIVISION OF RESPONSIBILITY FOR CONTROL BETWEEN AIR TRAFFIC CONTROL UNITS

4.3.1 General

The ANSP must designate the area of responsibility for each air traffic control (ATC) unit and, when applicable, for individual control sectors within an ATC unit. Where there is more than one ATC working position within a unit or sector, the duties and responsibilities of the individual working positions shall be defined.

4.3.2 Between a unit providing aerodrome control service and a unit providing approach control service

4.3.2.1 Except for flights which are provided aerodrome control service only, the control of arriving and departing controlled flights shall be divided between units providing aerodrome control service and units providing approach control service as follows:

4.3.2.1.1 Arriving aircraft. Control of an arriving aircraft shall be transferred from the unit providing approach control service to the unit providing aerodrome control service when the aircraft:

a) is in the vicinity of the aerodrome, and

1) it is considered that approach and landing will be completed in visual reference to the ground, or
2) has reached uninterrupted visual meteorological conditions, or

b) is at a prescribed point or level, or
c) has landed, as specified in ATS unit instructions.

4.3.2.1.2 Transfer of communications to the aerodrome controller should be effected at such a point, level or time that clearance to land or alternative instructions, as well as information on essential local traffic, can be issued in a timely manner.

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

4.3.2.1.3 Departing aircraft. Control of a departing aircraft shall be transferred from the unit providing aerodrome control service to the unit providing approach control service:

a) when visual meteorological conditions prevail in the vicinity of the aerodrome:

1) prior to the time the aircraft leaves the vicinity of the aerodrome,
2) prior to the aircraft entering instrument meteorological conditions, or

3) when the aircraft is at a prescribed point or level, as specified in ATS unit instructions;

b) when instrument meteorological conditions prevail at the aerodrome:

1) immediately after the aircraft is airborne, or
2) when the aircraft is at a prescribed point or level, as specified in local instructions.

Note.— See Note following 4.3.2.1.2.

4.3.3 Between a unit providing approach control service and a unit providing area control service

4.3.3.1 When area control service and approach control service are not provided by the same air traffic control unit, responsibility for controlled flights shall rest with the unit providing area control service except that a unit providing approach control service shall be responsible for the control of:

a) arriving aircraft that have been released to it by the ACC;
b) departing aircraft until such aircraft are released to the ACC.

4.3.3.2 A unit providing approach control service shall assume control of arriving aircraft, provided such aircraft have been released to it, upon arrival of the aircraft at the point, level or time agreed for transfer of control, and shall maintain control during approach to the aerodrome.

4.3.4 between two units providing area control service

The responsibility for the control of an aircraft shall be transferred from a unit providing area control service in a control area to the unit providing area control service in an adjacent control area at the time of crossing the common control area boundary as estimated by the ACC having control of the aircraft or at such other point, level or time as has been agreed between the two units.

4.3.5 Between control sectors/positions within the same air traffic control unit

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

4.4 FLIGHT PLAN

Note.— Procedures for the use of repetitive flight plans are contained in Chapter 11, Section 11.4.

4.4.1. Flight Plan Form

4.4.1.1. A flight plan form based on the model should be provided and should be used by operators and air traffic services units for the purpose of completing flight plans.

Note.— A different form may be provided for use in completing repetitive flight plan listings.

4.4.1.2 The flight plan form should be printed in English.

4.4.1.3 Operators and air traffic services units should comply with the instructions for completion of the flight plan form and the repetitive flight plan listing.

4.4.1.4 An operator shall, prior to departure:

a) Ensure that, where the flight is intended to operate on a route or in an area where a required navigation performance (RNP) type is prescribed, the aircraft has an appropriate RNP approval, and that all conditions applying to that approval will be satisfied; and

b) Ensure that, where operation in reduced vertical separation minimum (**RVSM**) airspace is planned, the aircraft has the required RVSM approval. The letter W shall be inserted in Item 10 (Equipment) of the flight plan if the aircraft and operator have received RVSM State approval, regardless of the

requested flight level. The aircraft registration shall be inserted in Item 18 of the flight plan.

Note.— Operators must obtain airworthiness and operational approval from the State of Registry or State of the Operator, as appropriate, to conduct RVSM operations.

c) Ensure that, where the flight is intended to operate where an RCP type is prescribed, the aircraft has an appropriate RCP approval, and that all conditions applying to that approval will be satisfied.

4.4.2 Submission of a flight plan

4.4.2.1 Information relative to an intended flight or portion of a flight, to be provided to air traffic services units, shall be in the form of a flight plan.

4.4.2.2 A flight plan shall be submitted prior to operating:

a) any flight or portion thereof to be provided with air traffic control service;
b) any flight within or into designated areas, or along designated routes to facilitate the provision of flight information, alerting and search and rescue services;
c) any flight within or into designated areas, or along designated routes to facilitate coordination with appropriate military units or with air traffic services units in adjacent States in order to avoid the possible need for interception for the purpose of identification;
d) any flight across international borders.

4.4.2.3 PRIOR TO DEPARTURE

4.4.2.3.1 Except when other arrangements have been made for submission of repetitive flight plans, a flight plan submitted prior to departure should be submitted to the aeronautical information service at the departure aerodrome. A flight plan for a flight to be provided with

air traffic control service shall be submitted at least sixty minutes before departure.

4.4.2.3.2 In the event of a delay of 30 minutes in excess of the estimated off-block time for a controlled flight or a delay of one hour for an uncontrolled flight for which a flight plan has been submitted, the flight plan should be amended or a new flight plan submitted and the old flight plan cancelled, whichever is applicable.

4.4.2.4 DURING FLIGHT

4.4.2.4.1 A flight plan to be submitted during flight should normally be transmitted to the ATS unit in charge of the FIR or control area in or on which the aircraft is flying, or in or through which the aircraft wishes to fly or to the aeronautical telecommunication station serving the air traffic services unit concerned. When this is not practicable, it should be transmitted to another ATS unit or aeronautical telecommunication station for retransmission as required to the appropriate air traffic services unit.

4.4.2.4.2 The submission of flight plan during flight should ensure its receipt by the appropriate air traffic services unit at least ten minutes before the aircraft is estimated to reach:

a) the intended point of entry into a control area; or
b) the point of crossing an airway.

4.4.3 Acceptance of a flight plan

The first ATS unit receiving a flight plan, or change thereto, shall:

a) check it for compliance with the format and data conventions;
b) check it for completeness and, to the extent possible, for accuracy;
c) take action, if necessary, to make it acceptable to the air traffic services; and
d) Indicate acceptance of the flight plan or change thereto, to the originator.

4.5 AIR TRAFFIC CONTROL CLEARANCES

4.5.1 Scope and purpose

4.5.1.1 Clearances are issued solely for expediting and separating air traffic and are based on known traffic conditions which affect safety in aircraft operation. Such traffic conditions include not only aircraft in the air and on the manoeuvring area over which control is being exercised, but also any vehicular traffic or other obstructions not permanently installed on the manoeuvring area in use.

4.5.1.2 If an air traffic control clearance is not suitable to the pilot-in-command of an aircraft, the flight crew may request and, if practicable, obtain an amended clearance.

4.5.1.3 The issuance of air traffic control clearances by air traffic control units constitutes authority for an aircraft to proceed only in so far as known air traffic is concerned. ATC clearances do not constitute authority to violate any applicable regulations for promoting the safety of flight operations or for any other purpose; neither do clearances relieve a pilot-in-command of any responsibility whatsoever in connection with a possible violation of applicable rules and regulations.

4.5.1.4 ATC units shall issue such ATC clearances as are necessary to prevent collisions and to expedite and maintain an orderly flow of air traffic.

4.5.1.5 ATC clearances must be issued early enough to ensure that they are transmitted to the aircraft in sufficient time for it to comply with them.

4.5.2 Aircraft subject to ATC for part of flight

4.5.2.1 When a flight plan specifies that the initial portion of a flight will be uncontrolled, and that the subsequent portion of the flight will be subject to ATC, the aircraft shall be advised to obtain its clearance from the ATC unit in whose area controlled flight will be commenced.

4.5.2.2 When a flight plan specifies that the first portion of a flight will be subject to ATC, and that the subsequent portion will be uncontrolled, the aircraft shall normally be cleared to the point at which the controlled flight terminates.

4.5.3 Flights through intermediate stops

4.5.3.1 When an aircraft files, at the departure aerodrome, flight plans for the various stages of flight through intermediate stops, the initial clearance limit will be the first destination aerodrome and new clearances shall be issued for each subsequent portion of flight.

4.5.3.2 The flight plan for the second stage, and each subsequent stage, of a flight through intermediate stops will become active for ATS and search and rescue (SAR) purposes only when the appropriate ATS unit has received notification that the aircraft has departed from the relevant departure aerodrome, except as provided for in 4.5.3.3.

4.5.3.3 By prior arrangement between ATC units and the operators, aircraft operating on an established schedule may if the proposed route of flight is through more than one control area, be cleared through intermediate stops within other control areas but only after coordination between the ACCs concerned.

4.5.4 Contents of clearances

4.5.4.1 Clearances shall contain positive and concise data and shall, as far as practicable, be phrased in a standard manner.

4.5.4.2 Clearances shall, except as provided for in Chapter 6, Section 6.3.2, concerning standard departure clearances,

4.5.5 Departing aircraft

ACCs shall, except where procedures providing for the use of standard departure clearances have been implemented, forward a clearance to approach control units or aerodrome control towers with the least possible delay after receipt of request made by these units, or prior to such request if practicable.

4.5.6 En-route aircraft

4.5.6.1 GENERAL

4.5.6.1.1 An ATC unit may request an adjacent ATC unit to clear aircraft to a specified point during a specified period.

4.5.6.1.2 After the initial clearance has been issued to an aircraft at the point of departure, it will be the responsibility of the appropriate ATC unit to issue an amended clearance whenever necessary and to issue traffic information, if required.

4.5.7 Description of air traffic control clearances

4.5.7.1 CLEARANCE LIMIT

4.5.7.1.1 A clearance limit shall be described by specifying the name of the appropriate significant point, or aerodrome, or controlled airspace boundary.

4.5.7.1.2 When prior coordination has been effected with units under whose control the aircraft will subsequently come, or if there is reasonable assurance that it can be effected a reasonable time prior to their assumption of control, the clearance limit shall be the destination aerodrome or, if not practicable, an appropriate intermediate point, and coordination shall be expedited so that a clearance to the destination aerodrome may be issued as soon as possible.

4.5.7.1.3 If an aircraft has been cleared to an intermediate point in adjacent controlled airspace, the appropriate ATC unit will then be responsible for issuing, as soon as practicable, an amended clearance to the destination aerodrome.

4.5.7.1.4 When the destination aerodrome is outside controlled airspace, the ATC unit responsible for the last controlled airspace through which an aircraft

will pass shall issue the appropriate clearance for flight to the limit of that controlled airspace.

4.5.7.2 ROUTE OF FLIGHT

4.5.7.2.1 The route of flight shall be detailed in each clearance when deemed necessary. The phrase "cleared via flight planned route" may be used to describe any route or portion thereof, provided the route or portion thereof is identical to that filed in the flight plan and sufficient routing details are given to definitely establish the aircraft on its route. The phrases "cleared via (designation) departure" or "cleared via (designation) arrival" may be used when standard departure or arrival routes have been established and published in Ethiopia Aeronautical Information Publication (AIP).

4.5.7.2.2 The phrase "cleared via flight planned route" shall not be used when granting a re-clearance.

4.5.7.2.3 Subject to airspace constraints, ATC workload and traffic density, and provided coordination can be effected in a timely manner, an aircraft should whenever possible be offered the most direct routing.

4.5.7.3 LEVELS

Except as provided for in Chapter 6, 6.3.2 and 6.5.1.5, use of standard departure and arrival clearances.

4.5.7.4 CLEARANCE OF A REQUESTED CHANGE IN FLIGHT PLAN

4.5.7.4.1 When issuing a clearance covering a requested change in route or level, the exact nature of the change shall be included in the clearance.

4.5.7.4.2 When traffic conditions will not permit clearance of a requested change, the word "UNABLE" shall be used. When warranted by circumstances, an alternative route or level should be offered.

4.5.7.4.3 When an alternative route is offered and accepted by the flight crew under the procedures described in 4.5.7.4.2, the amended clearance issued shall describe the route to the point where it joins the previously cleared route, or, if the aircraft will not re-join the previous route, to the destination.

4.5.7.5 READ-BACK OF CLEARANCES

4.5.7.5.1 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, taxi and backtrack on any runway; and
c) runway-in-use, altimeter settings, SSR codes, level instructions, heading and speed instructions and, whether issued by the controller or contained in automatic terminal information service (ATIS) broadcasts, transition levels.

Note.— If the level of an aircraft is reported in relation to standard pressure 1 013.2 hPa, the words "FLIGHT LEVEL" precede the level figures. If the level of the aircraft is reported in relation to QNH/QFE, the figures are followed by the word "FEET".

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

4.5.7.5.2 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.

4.5.7.5.2.1Unless specified by the ANSP, voice read-back of controller-pilot data link communications (CPDLC) messages shall not be required.

4.6 HORIZONTAL SPEED CONTROL INSTRUCTIONS

4.6.1 General

4.6.1.1 In order to facilitate a safe and orderly flow of traffic, aircraft may be instructed to adjust speed in a specified manner. Flight crews should be given adequate notice of planned speed control.

Note 1.— Application of speed control over a long period of time may affect aircraft fuel reserves.

Note 2.— Provisions concerning longitudinal separation using the Mach number technique are contained in Chapter 5, Separation methods and minima.

4.6.1.2 Speed control shall not be applied to aircraft entering or established in a holding pattern.

4.6.1.3 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.

4.6.1.4 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.

4.6.1.5 At levels at or above FL 250, speed adjustments should be expressed in multiples of 0.01 Mach; at levels below FL 250, speed adjustments should be expressed in multiples of 10 knots based on indicated airspeed (IAS).

Note 1.— Mach 0.01 equals approximately 6 kt IAS at higher flight levels.

Note 2.— When an aircraft is heavily loaded and at a high level, its ability to change speed may, in cases, be very limited.

4.6.1.6 Aircraft shall be advised when a speed control restriction is no longer required.

4.6.2 Methods of application

4.6.2.1 In order to establish a desired spacing between two or more successive aircraft, the controller should first either 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.

4.6.2.2 In order to maintain a desired spacing using speed control techniques, specific speeds need to be assigned to all the aircraft concerned.

Note 1.— 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. For the purpose of calculating a desired speed differential between two succeeding aircraft, 6 kt IAS per1 000 ft height difference may be used as a general rule. At levels below 8000 ft, the difference between IAS and TAS is negligible for speed control purposes.

Note 2.— 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.

4.6.3 Descending and arriving aircraft

4.6.3.1 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.

4.6.3.2 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.

4.6.3.3 Speed reductions to less than 250 knots IAS for turbojet aircraft during initial descent from cruising level should be applied only with the concurrence of the flight crew.

4.6.3.4 Instructions for an aircraft to simultaneously maintain a high rate of descent and reduce its speed should be avoided as such manoeuvres are normally not compatible. Any significant speed reduction during descent may require the aircraft to temporarily level off to reduce speed before continuing descent.

4.6.3.5 Arriving aircraft should be permitted to operate in a clean configuration for as long as possible. Below FL 150, speed reductions for turbojet aircraft to not less than 220 knots IAS, which will normally be very close to the minimum speed of turbojet aircraft in a clean configuration, may be used.

4.6.3.6 Only minor speed adjustments not exceeding plus/minus 20 knots IAS should be used for aircraft on intermediate and final approach.

4.6.3.7 Speed control should not be applied to aircraft after passing a point 4 NM from the threshold on final approach.

Note: — The flight crew has a requirement to fly a stabilized approach (airspeed and configuration) typically by 3 NM from the threshold.

4.7 VERTICAL SPEED CONTROL INSTRUCTIONS

4.7.1 General

4.7.1.1 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.

4.7.1.2 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.

4.7.1.3 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.

4.7.1.4 Aircraft shall be advised when a rate of climb/descent restriction is no longer required.

4.7.2 Methods of application

4.7.2.1 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.

4.7.2.2 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.

4.7.2.3 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.

4.7.2.4 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.

4.8 CHANGE FROM IFR TO VFR FLIGHT

4.8.1 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.

4.8.2 No reply, other than the acknowledgment "IFR FLIGHT CANCELLED AT ... (time)", should normally be made by an air traffic services unit.

4.8.3 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.

4.8.4 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.

4.9 WAKE TURBULENCE CATEGORIES

Note.— The term "wake turbulence" is used in this context to describe the effect of the rotating air masses generated behind the wing tips of large jet aircraft, in preference to the term "wake vortex" which describes the nature of the air masses. Detailed characteristics of wake vortices and their effect on aircraft are contained in the Air Traffic Services Planning Manual *(Doc 9426), Part II, Section 5*.

4.9.1 Wake turbulence categories of aircraft

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

a) HEAVY (H) — all aircraft types of 136 000 kg or more;
b) MEDIUM (M) — aircraft types less than 136 000 kg but more than 7 000 kg; and
c) LIGHT (L) — aircraft types of 7 000 kg or less.

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

Note 1.— Helicopters produce vortices when in flight and there is some evidence that, per kilogramme of gross mass, their vortices are more intense than those of fixed-wing aircraft.

4.9.2 Indication of heavy wake turbulence category

For A380-800 aircraft, the letter "J" should be entered into the space allocated to wake turbulence under Item 9 of the ICAO flight plan. For A380-800 aircraft the expression "SUPER" and for aircraft in the heavy wake turbulence category the word "Heavy" should be included immediately after the aircraft call sign in the initial radiotelephony contact between such aircraft and ATS units.

Note.— Wake turbulence categories are specified in the instructions for completing Item 9 of the flight plan .

4.10 ALTIMETER SETTING PROCEDURES

4.10.1 Expression of vertical position of aircraft

4.10.1.1 For flights in the vicinity of aerodromes and within terminal control areas the vertical position of aircraft shall, except as provided for in 4.10.1.2, be expressed in terms of altitudes at or below the transition altitude and in terms of light levels at or above the transition level. While passing through the transition layer, vertical position shall be expressed n terms of flight levels when climbing and in terms of altitudes when descending.

4.10.1.2 When an aircraft which has been given clearance to land is completing its approach using atmospheric pressure at aerodrome elevation (QFE), the vertical position of the aircraft shall be expressed in terms of height above aerodrome elevation during that portion of its flight for which QFE may be used, except that it shall be expressed in terms of height above runway threshold elevation:

a) for instrument runways, if the threshold is 2 metres (7 feet) or more below the aerodrome elevation, and
b) for precision approach runways.

4.10.1.3 For flights en route the vertical position of aircraft shall be expressed in terms of:

a) flight levels at or above the lowest usable flight level;
b) altitudes below the lowest usable flight level; except where, on the basis of regional air navigation agreements, a transition altitude has been established for a specified area, in which case the provisions of shall apply.

4.10.2 Determination of the transition level

4.10.2.1 The ATS unit shall establish the transition level to be used in the vicinity of the aerodrome(s) concerned and, when relevant, the terminal control area (TMA) concerned, for the appropriate period of time on the basis of QNH (altimeter sub-scale setting to obtain elevation when on the ground) reports and forecast mean sea level pressure, if required.

4.10.2.2 The transition level shall be the lowest flight level available for use above the transition altitude established for the aerodrome(s) concerned. Where a common transition altitude has been established for two or more aerodromes which are so closely located as to require coordinated procedures, the ATS units shall establish a common transition level to be used at any given time in the vicinity of the aerodrome and, when relevant, in the TMA concerned.

Note.— See 4.10.3.2 regarding the determination of the lowest usable flight level(s) for control areas.

4.10.3 Minimum cruising level for IFR flights

4.10.3.1 Except when specifically authorized, cruising levels below the minimum flight altitudes established by the State shall not be assigned.

4.10.3.2 ATC units shall, when circumstances warrant it, determine the lowest usable flight level or levels for the whole or parts of the control area for which they are responsible, and use it when assigning flight levels and pass it to pilots on request.

Note 1.— Unless otherwise prescribed, the lowest usable flight level is that flight level which corresponds to, or is immediately above, the established minimum flight altitude.

Note 2.— The portion of a control area for which a particular lowest usable flight level applies is determined in accordance with air traffic services requirements.

4.10.4 Provision of altimeter setting information

4.10.4.1 The ATS units shall at all times have available for transmission to aircraft in flight, on request, the information required to determine the lowest flight level which will ensure adequate terrain clearance on routes or segments of routes for which this information is required.

4.10.4.2 Flight information centres and ACCs shall have available for transmission to aircraft on request an appropriate number of QNH reports or forecast pressures for the FIRs and control areas for which they are responsible, and for those adjacent.

4.10.4.3 The flight crew shall be provided with the transition level in due time prior to reaching it during descent. This may be accomplished by voice communications, ATIS broadcast or data link.

4.10.4.4 The transition level shall be included in approach clearances when requested by the pilot.

4.10.4.5 A QNH altimeter setting shall be included in the descent clearance when first cleared to an altitude below the transition level, in approach clearances or clearances to enter the traffic circuit, and in taxi clearances for departing aircraft, except when it is known that the aircraft has already received the information.

4.10.4.6 A QFE altimeter setting shall be provided to aircraft on request or on a regular basis in accordance with local arrangements; it shall be the QFE for the aerodrome elevation except for:

a) non-precision approach runways, if the threshold is 2 metres (7 feet) or more below the aerodrome elevation, and
b) precision approach runways, in which cases the QFE for the relevant runway threshold shall be provided.

4.10.4.7 Altimeter settings provided to aircraft shall be rounded down to the nearest lower whole hectopascal.

Note 1.— Unless otherwise prescribed by the State concerned, the lowest usable flight level is that flight level which corresponds to, or is immediately above, the established minimum flight altitude.

Note 2.— The portion of a control area for which a particular lowest usable flight level applies is determined in accordance with air traffic services requirements.

4.11 POSITION REPORTING

4.11.1 Transmission of position reports

4.11.1.1 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 4.11.1.3 and 4.11.3. Additional reports over other points may be requested by the ATS unit.

4.11.1.2 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 4.11.1.3. Additional reports at shorter intervals of time may be requested by the ATS unit.

4.11.1.3 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.

Note.— This is intended to apply in cases where adequate flight progress data are available from other sources, e.g. radar or ADS-B and in other circumstances where the omission of routine reports from selected flights is found to be acceptable.

4.11.1.4 The position reports required by 4.11.1.1 and 4.11.1.2 shall be made to the ATS unit serving the airspace in which the aircraft is operated.

4.11.1.5 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.

4.11.2 Contents of voice position reports

4.11.2.1 The position reports required by 4.11.1.1 and 4.11.1.2 shall contain the following elements of information, except that elements (d), (e) and (f) may be omitted from position reports transmitted by radiotelephony:

a) aircraft identification
b) position
c) time
d) flight level or altitude, including passing level and cleared level if not maintaining the cleared level
e) next position and time over
f) ensuing significant point.

4.11.2.1.1 Element (d), flight level or altitude, shall, however, be included in the initial call after a change of air-ground voice communication channel.

4.11.2.2 When assigned a speed to maintain, the flight crew shall include this speed in their position reports. The assigned speed shall also be included in the initial call after a

change of air-ground voice communication channel, whether or not a full position report is required.

Note.— Omission of element d) may be possible when flight level or altitude, as appropriate, derived from pressure-altitude information can be made continuously available to controllers in labels associated with the position indication of aircraft and when adequate procedures have been developed to guarantee the safe and efficient use of this altitude information.

4.11.3 Radiotelephony procedures for air-ground voice communication channel changeover when so prescribed by the ANSP, the initial call to an ATC unit after a change of air ground voice communication channel shall contain the following elements:

a) designation of the station being called;
b) call sign and, for aircraft in the heavy wake turbulence category, the word "Super" or "Heavy";
c) level, including passing and cleared levels if not maintaining the cleared level;
d) speed, if assigned by ATC; and
e) additional elements, as required by The ANSP.

4.11.4 Transmission of ADS-C reports

The position reports shall be made automatically to the ATS unit serving the airspace in which the aircraft is operating. The requirements for the transmission and contents of automatic dependent surveillance — contract (ADS-C) reports shall be established by the controlling ATC unit on the basis of current operational conditions and communicated to the aircraft and acknowledged through an ADS-C agreement.

4.11.5 Contents of ADS-C reports

4.11.5.1 ADS-C reports shall be composed of data blocks selected from the following:

a) Aircraft Identification
b) Basic ADS-C
   - latitude
   - longitude

- altitude
- time
- figure of merit

c) Ground vector
- track
- ground speed
- rate of climb or descent
- d) Air vector
- heading
- Mach or IAS
- rate of climb or descent

d) Projected profile
- next waypoint
- estimated altitude at next waypoint
- estimated time at next waypoint
- (next + 1) waypoint
- estimated altitude at (next + 1) waypoint
- estimated time at (next + 1) waypoint

e) Meteorological information
- wind speed
- wind direction
- wind quality flag
- temperature
- turbulence (if available)
- humidity (if available)

f) Short-term intent
- latitude at projected intent point
- longitude at projected intent point
- altitude at projected intent point
- time of projection

- If an altitude, track or speed change is predicted to occur between the aircraft's current position and the projected intent point, additional information would be provided in an intermediate intent block as follows:
- distance from current point to change point
- track from current point to change point
- altitude at change point
- predicted time to change point

g) Extended projected profile (in response to an interrogation from the ground system) next waypoint estimated altitude at next waypoint

estimated time at next waypoint
(next + 1) waypoint
estimated altitude at (next + 1) waypoint
estimated time at (next + 1) waypoint
(next + 2) waypoint
estimated altitude at (next + 2) waypoint
estimated time at (next + 2) waypoint
[repeated for up to (next + 128) waypoints]

Note. — The specifications for the elements in the meteorological information data block, including their ranges and resolutions, are shown in Appendix 3 to ICAO Annex 3.

4.11.5.2 The basic ADS-C data block shall be required from all ADS-C-equipped aircraft. Remaining ADS-C data blocks shall be included as necessary. In addition to any requirements concerning its transmission for ATS purposes, data block f)

(Meteorological information) shall be transmitted in accordance with ICAO Annex 3, 5.3.1. ADS-C emergency and/or urgency reports shall include the emergency and/or urgency status in addition to the relevant ADS-C report information.

4.11.6 Data format of ADS-B messages

Note.— Data formats of ADS-B messages can be found in ICAO Annex 10 — Aeronautical Telecommunications, Volume III — Communication Systems, Part I — Digital Data Communication Systems, and Volume IV — Surveillance Radar and Collision Avoidance Systems.

4.12 REPORTING OF OPERATIONAL AND METEOROLOGICAL INFORMATION

4.12.1 General

4.12.1.1 When operational and/or routine meteorological information is to be reported, using data link, by an aircraft en route at times where position reports are required in accordance with 4.11.1.1 and 4.11.1.2, the position report shall be given in accordance with 4.11.5.2 (requirements concerning transmission of meteorological information from ADS-C equipped aircraft), or in the form of a routine air-report. Special aircraft observations shall be reported as special air-reports. All air-reports shall be reported as soon as is practicable.

4.12.2 Contents of routine air-reports

4.12.2.1 Routine air-reports transmitted by data link, when ADS-C is not being applied, shall give information relating to such of the following elements as are necessary for compliance with 4.12.2.2:

Section 1.— Position information:

1) aircraft identification
2) position
3) time
4) flight level or altitude
5) next position and time over
6) ensuing significant point

Section 2.— Operational information:

7) estimated time of arrival
8) endurance

Section 3.— Meteorological information:

9) wind direction
10) wind speed
11) wind quality flag
12) air temperature
13) turbulence (if available)
14) humidity (if available).

4.12.2.2 Section 1 of the air-report is obligatory, except that elements (5) and (6) thereof may be omitted. Section 2 of the air-report, or a portion thereof, shall only be transmitted when so requested by the operator or a designated representative, or when deemed necessary by the pilot-in-command. Section 3 of the air-report shall be transmitted in accordance with ICAO Annex 3, Chapter 5.

flight level or altitude, may, in accordance with 4.11.2.1, be omitted from the contents of a position report transmitted by radiotelephony, that element may not be omitted from Section 1 of an air-report.

4.12.3 Contents of special air-reports

4.12.3.1 Special air-reports shall be made by all aircraft whenever the following conditions are encountered or observed:

a) moderate or severe turbulence; or
b) moderate or severe icing; or
c) severe mountain wave; or
d) thunderstorms, without hail that are obscured, embedded, widespread or in squall-lines; or
e) thunderstorms, with hail that are obscured, embedded, widespread or in squalllines; or
f) heavy dust storm or heavy sandstorm; or
g) volcanic ash cloud; or
h) pre-eruption volcanic activity or a volcanic eruption.

Note.— Pre-eruption volcanic activity in this context means unusual and/or increasing volcanic activity which could presage a volcanic eruption.

4.12.3.2 When air-ground data link is used, special air-reports shall contain the following elements:

message type designator
aircraft identification
Data block 1:
latitude
longitude
pressure-altitude
time
Data block 2:
wind direction
wind speed
wind quality flag
air temperature
turbulence (if available)
humidity (if available)
Data block 3:
Condition prompting the issuance of the special air-report; to be selected from the list a) to k) presented under 4.12.3.1.

4.12.3.3 When voice communications are used, special air-reports shall contain the following elements:

Message type designator

Section 1.— Position information

1) aircraft identification
2) position
3) time
4) flight level or altitude

Section 3.— Meteorological information

5)Condition prompting the issuance of the special air report, to be selected from the list a) to k) presented under 4.12.3.1.

4.12.4 Compilation and transmission of air-reports by voice communications

Note.— Increasing use of air-reports in automated systems makes it essential that the elements of such reports be transmitted in the order and form prescribed.

4.12.5 Recording of special air-reports of volcanic activity

Special air-reports containing observations of volcanic activity shall be recorded on the special air-report of volcanic activity form.

Note.— The recording and reporting instructions may conveniently be printed on the back of the special air-report of volcanic activity form.

4.12.6 Forwarding of meteorological information

4.12.6.1 When receiving ADS-C reports which contain a meteorological information block, air traffic services units shall relay the basic ADS-C and meteorological information blocks without delay to the world area forecast centres (WAFCs).

Note._ Specifications concerning the format to be used in the relay of meteorological information to the WAFCs are contained in the Manual on Aeronautical Meteorological Practice (Doc 8896).

4.12.6.2 When receiving special air-reports by data link communications, air traffic services units shall forward them without delay to their associated meteorological watch office and the WAFCs.

4.12.6.3 When receiving special air-reports by voice communications, air traffic services units shall forward them without delay to their associated meteorological watch offices.

4.13 PRESENTATION AND UPDATING OF FLIGHT PLAN AND CONTROL DATA

4.13.1 General

ATC units shall establish provisions and procedures for the presentation to controllers, and subsequent updating, of flight plan and control data for all flights being provided with a service by an ATS unit. Provision shall also be made for the presentation of any other information required or desirable for the provision of ATS.

4.13.2 Information and data to be presented

4.13.2.1 Sufficient information and data shall be presented in such a manner as to enable the controller to have a complete representation of the current air traffic situation within the controller's area of responsibility and, when relevant, movements on the manoeuvring area of aerodromes. The presentation shall be updated in accordance with the progress of aircraft, in order to facilitate the timely detection and resolution of conflicts as well as to facilitate and provide a record of coordination with adjacent ATS units and control sectors.

4.13.2.2 An appropriate representation of the airspace configuration, including significant points and information related to such points, shall be provided. Data to be presented shall include relevant information from flight plans and position reports as well as clearance and coordination data. The information display may be generated and updated automatically, or the data may be entered and updated by authorized personnel.

4.13.2.3 Requirements regarding other information to be displayed, or to be available for display, shall be specified by the appropriate authority.

4.13.3 Presentation of information and data

4.13.3.1 The required flight plan and control data may be presented through the use of paper flight progress strips or electronic flight progress strips, by other electronic presentation forms or by a combination of presentation methods.

4.13.3.2 The method(s) of presenting information and data shall be in accordance with Human Factors principles. All data, including data related to individual aircraft, shall be presented in a manner minimizing the potential for misinterpretation or misunderstanding.

4.13.3.3 Means and methods for manually entering data in ATC automation systems shall be in accordance with Human Factors principles.

4.13.3.4 When flight progress strips (FPS) are used, there should be at least one individual FPS for each flight. The number of FPS for individual flights shall be sufficient to meet the requirements of the ATS unit concerned. Procedures for annotating data and provisions specifying the types of data to be entered on FPS, including the use of symbols, shall be specified by the ATS units.

Note.— Guidance material on the use of paper FPS is contained in the Air Traffic Services Planning Manual (Doc 9426).

4.13.3.5 Data generated automatically shall be presented to the controller in a timely manner. The presentation of information and data for individual flights shall continue until such time as the data is no longer required for the purpose of providing control, including conflict detection and the coordination of flights, or until terminated by the controller.

4.14 FAILURE OR IRREGULARITY OF SYSTEMS AND EQUIPMENT

ATC units shall immediately report in accordance with local instructions any failure or irregularity of communication, navigation and surveillance systems or any other safety significant systems or equipment which could adversely affect

the safety or efficiency of flight operations and/or the provision of air traffic control service.

]

4.15 DATA LINK COMMUNICATIONS INITIATION PROCEDURES

4.15.1 Before entering an airspace where data link applications are required by the ATS unit, data link communications shall be initiated between the aircraft and the ATS unit in order to register the aircraft and, when necessary, allow the start of a data link application. This shall be initiated by the aircraft, either automatically or by the pilot, or by the ATS unit on address forwarding.

4.15.1.1 The DLIC address associated with an ATS unit shall be published in Aeronautical Information Publications.

4.15.2 Aircraft initiation

Whenever the pilot or the aircraft initiates data link communication procedures, an initiation message shall be sent. Except when the initiation message is corrupted, it shall not be rejected by the ATS unit.

4.15.3 ATS unit forwarding

Where the ground system initially contacted by the aircraft is able to pass the necessary aircraft address information to another ATS unit, it shall pass the aircraft updated ground addressing information for data link applications previously coordinated in sufficient time to permit the establishment of data link communications.

4.15.4 Failure

In the case of an initiation failure, the originator of the data link initiation process shall be informed.

4.16 REQUIREMENTS FOR COMMUNICATIONS

4.16.1 Communications are a vital part of the provision of air traffic services (ATS) and their timely and dependable availability have a most significant bearing on the quality of the service provided by ATS. Radiotelephony and/or data link shall be used in air-ground communications for air traffic services purposes. The basic provisions regarding requirements for communications by different air traffic services and ATS units are contained in ICAO Annex 11, Chapter 6 for the ANSP's compliance.

4.16.2 Recording and retention of data for investigative purposes

Surveillance data from primary and secondary radar equipment or other systems (e.g. ADS-B, ADS-C), used as an aid to air traffic services, shall be automatically recorded for use in accident and incident investigations, search and rescue, air traffic control and surveillance systems evaluation and training. Automatic recordings shall be retained for a period of at least thirty days. When the recordings are pertinent to accident and incident investigations, they shall be retained for longer periods until it is evident that they will no longer be required. Paper FPS shall be retained for a period of at least 30 days. Electronic flight progress and coordination data shall be recorded and retained for at least the same period of time.

4.17 TIME IN AIR TRAFFIC SERVICES

4.17.1 Air traffic services units shall use Coordinated Universal Time (UTC) and shall express the time in hours and minutes and, when required, seconds of the 24-hour day beginning at midnight.

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

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

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

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

CHAPTER 5

SEPARATION METHODS AND MINIMA

5.1 INTRODUCTION

Note 1: — With the exceptions stated below, Chapter 5 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 to approaches to parallel runways are contained in Chapter 6. Procedures and separation minima applicable in the provision of aerodrome control service are contained in Chapter 7.

Note 3: — Attention is drawn to the use of strategic lateral offset procedures (SLOP) described in Chapter 11, 11.5.

5.2 PROVISIONS FOR THE SEPARATION OF CONTROLLED TRAFFIC

5.2.1 General

5.2.1.1 Vertical or horizontal separation shall be provided:

a) between all flights in Class A and B airspaces;
b) between IFR flights in Class C, D and E airspaces;
c) between IFR flights and VFR flights in Class C airspace;
d) between IFR flights and special VFR flights; and
e) between special VFR flights, when so prescribed by the ANSP

5.2.1.2 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.

5.2.1.3 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.

5.2.1.4 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.

5.2.2 Performance-based navigation (PBN) operations

In applying performance-based navigation, navigation specifications for designated areas, tracks or ATS routes shall be prescribed by the ANSP. In designating a navigation specification, limitations may apply as a result of navigation infrastructure constraints or specific navigation functionality requirements. The prescribed navigation specification shall be appropriate to the level of communications, navigation and air traffic services provided in the airspace concerned.

5.2.3 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.

5.3 VERTICAL SEPARATION

5.3.1 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 4, Section 4.10. The ANSP shall establish requirements for carriage and operation of pressure-altitude reporting transponders within its airspace so as to improve the effectiveness of air traffic services as well as airborne collision avoidance systems.

5.3.2 Vertical separation minimum

The vertical separation minimum (VSM) shall be:

a) a nominal 1 000 ft below FL 290 and a nominal 2 000 ft at or above this level, except as provided for in b) below; and
b) within designated airspace, where a nominal 1 000 ft below FL 410 or a higher level is so prescribed for use under specified conditions, and a nominal 2 000 ft at or above this level.

Note.— Guidance material relating to vertical separation is contained in the Manual on Implementation of a 1 000 ft Vertical Separation Minimum Between FL 290 and FL 410 Inclusive *(Doc 9574).*

5.3.3 Assignment of cruising levels for controlled flights

5.3.3.1 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.

5.3.3.2 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.

5.3.3.3 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.

5.3.3.4 An aircraft may be cleared to change cruising level at a specified time, place or rate.

Note.— See Chapter 5, 5.3.4.1.1 concerning procedures for vertical speed control.

5.3.3.5 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.

5.3.3.6 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.

5.3.3.7 The cruising levels to be assigned to controlled flights shall be selected from those allocated to IFR flights in:

a) the tables of cruising levels in *Appendix 3* of ICAO Annex 2; or
b) a modified table of cruising levels, when so prescribed in accordance with *Appendix 3* of ICAO Annex 2 for flights above flight level 410; except that the correlation of levels to track as prescribed therein shall not apply whenever otherwise indicated in air traffic control clearances or specified in the AIP Ethiopia.

5.3.4 Vertical separation during climb or descent

5.3.4.1 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; or
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.

5.3.4.1.1 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.

5.3.4.2 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.

5.4 HORIZONTAL SEPARATION

Note 1.— *Nothing in the provisions detailed in Sections 5.4.1 and 5.4.2 hereunder precludes the ATC units from establishing:*

a) other minima for use in circumstances not prescribed; or

b) additional conditions to those prescribed for the use of a given minimum; provided that the level of safety inherent in the provisions detailed in Sections 5.4.1 and 5.4.2 hereunder is at all times assured.

***Note 2**.— Details on track spacing between parallel routes are provided in ICAO Annex 11, Attachments A and B.*

***Note 3**.— Attention is drawn to the following guidance material:*

a) Air Traffic Services Planning Manual *(Doc 9426);*

b) Manual on Airspace Planning Methodology for the Determination of Separation Minima *(Doc 9689); and*

c) Performance-based Navigation (PBN) Manual *(Doc 9613).*

***Note 4**.— Provisions concerning reductions in separation minima are contained in Section 5.11 and in Chapter 2, ATS safety management.*

5.4.1 Lateral separation

5.4.1.1 LATERAL SEPARATION APPLICATION

5.4.1.1.1 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 ANSP and included in the lateral separation minima as an integral part thereof.

***Note.**— In the minima specified in 5.4.1.2 an appropriate buffer has already been included.*

5.4.1.1.2 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.

5.4.1.1.3 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.

5.4.1.2 LATERAL SEPARATION CRITERIA AND MINIMA

5.4.1.2.1 Means by which lateral separation may be applied include the following:

5.4.1.2.1.1 *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 5-1).

5.4.1.2.1.2 *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 15 NM or more from the facility (see Figure 5-2);

b) **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 distance of 15 NM or more from the facility (see Figure 5-3);

c) **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 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 5-4); or d) **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.

5.4.1.2.1.2.1 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 may be reduced.

5.4.1.2.1.3 *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.

5.4.1.2.1.4 Lateral separation of aircraft on published adjacent instrument flight procedures for arrivals and departures

5.4.1.2.1.4.1 Lateral separation of departing and/or arriving aircraft, using instrument flight procedures, will exist:

(a)Where the distance between RNAV 1, Basic RNP 1, RNP APCH and/or RNP AR APCH tracks is not less than 7 NM; or

(b) Where the protected areas of tracks designed using obstacle clearance criteria do not overlap and provided operational error is considered.

Note 1.— The 7 NM value was determined by collision risk analysis using multiple navigation specifications. Information on this analysis is contained in Circular 324, Guidelines for lateral separation of arriving and departing aircraft on published adjacent instrument flight procedures.

Note 2.— Circular 324 also contains information on separation of arrival and departure tracks using non-overlapping protected areas based on obstacle clearance criteria, as provided for in the Procedures for Air Navigation Services – Aircraft Operations, Volume II – Construction of Visual and Instrument Flight Procedures (PANS-OPS, Doc 8168).

Note 3.— Provisions concerning reductions in separation minima are contained in Chapter 2, ATS Safety Management and Chapter 5, Separation Methods and Minima, Section 5.11.

Note 4.— Guidance concerning the navigation specifications is contained in the Performance-based Navigation (PBN) Manual (Doc 9613).

5.4.1.2.1.5 RNAV operations where RNP is specified on parallel tracks or ATS routes. Within designated airspace or on designated routes, where RNP is specified, lateral separation between RNAV-equipped aircraft may be obtained by requiring aircraft to be established on the centre lines of parallel tracks or ATS routes spaced at a distance which ensures that the protected airspace of the tracks or ATS routes does not overlap.

***Note**.— The spacing between parallel tracks or between parallel ATS route centre lines for which an RNP type is required will be dependent upon the relevant RNP type specified. Guidance material related to the spacing between tracks or ATS routes based on RNP type is contained in ICAO Annex 11, Attachment B.*

5.4.1.2.1.6 Lateral separation of aircraft on parallel or non-intersecting tracks or ATS routes. Within designated airspace or on designated routes, lateral separation between aircraft operating on parallel or non-intersecting tracks or ATS routes shall be established in accordance with the following:

a) for a minimum spacing between tracks of 50 NM a navigational performance of RNAV 10 (RNP 10) or RNP 4 shall be prescribed; and
b) for a minimum spacing between tracks of 30 NM a navigational performance of RNP 4 shall be prescribed.

Note 1.– Guidance material for the implementation of the navigation capability supporting 50 NM and 30 NM lateral separation is contained in the Performance-based Navigation (PBN) Manual (Doc 9613).

Note 2– Existing implementations of 30 NM lateral separation minimum require a communication capability of direct controller-pilot voice communications or CPDLC and a surveillance capability by an ADS-C system in which a periodic contract and waypoint change and lateral deviation event contracts are applied.

5.4.1.2.1.7 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.

5.4.1.2.1.7.1 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 5-5).

5.4.1.2.1.7.2 The distance of the lateral separation points from the track intersection shall be determined by collision risk analysis and will depend on complex factors such as the navigation accuracy of the aircraft, traffic density, and occupancy.

Note.— Information on the establishment of lateral separation points and collision risk analyses are contained in the Manual on Airspace Planning Methodology for the Determination of Separation Minima (Doc 9689).

5.4.1.2.1.7.3 Lateral separation exists between two aircraft when at least one of the aircraft is outside the area of conflict.

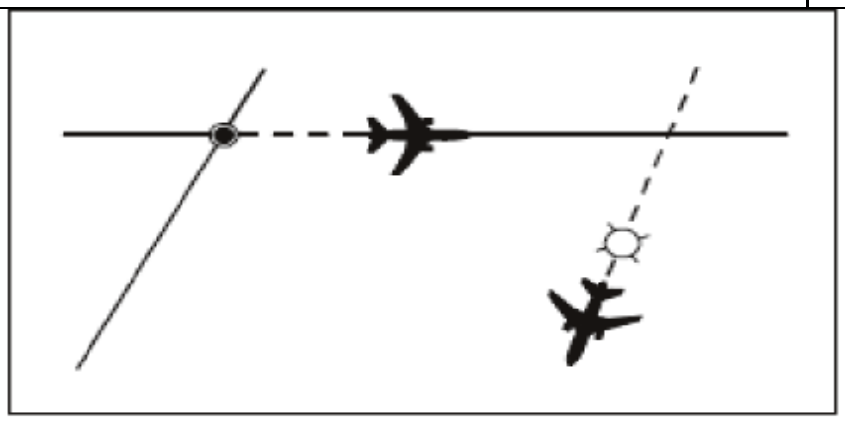


Figure 5-1. Using same or different geographic locations (see 5.4.1.2.1.1)

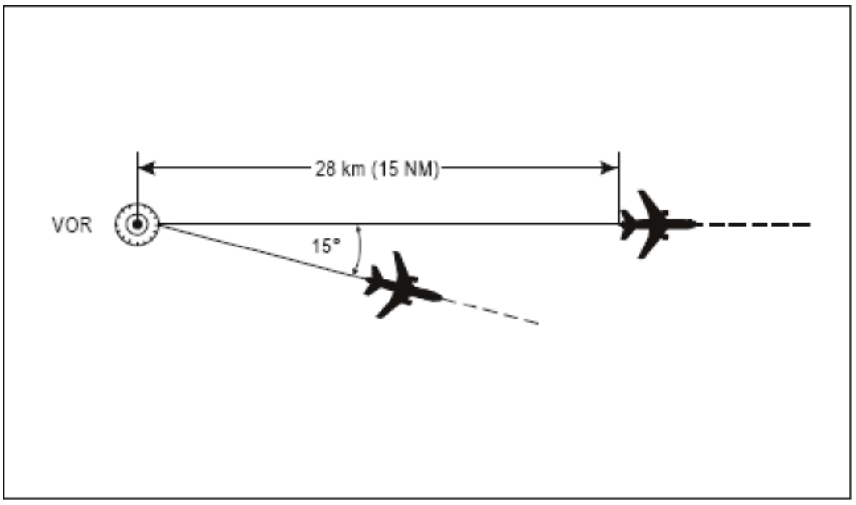


Figure 5-2. Separation using the same VOR (see 5.4.1.2.1.2 a))

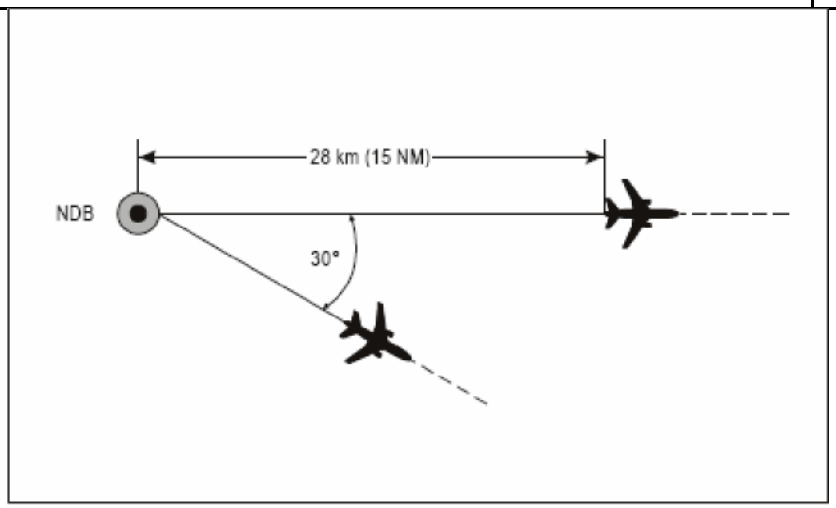


Figure 5-3. Separation using the same NDB (see 5.4.1.2.1.2 b))

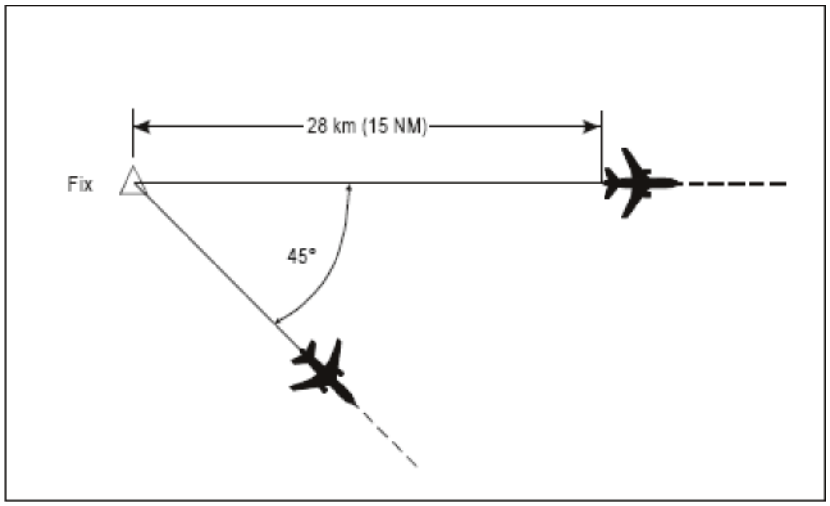


Figure 5-4. Separation using dead reckoning (see 5.4.1.2.1.2 c))

5.4.1.2.1.8 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 ANSP, that aircraft have the navigation capability necessary to ensure accurate track guidance.

5.4.2 Longitudinal separation

5.4.2.1 LONGITUDINAL SEPARATION APPLICATION

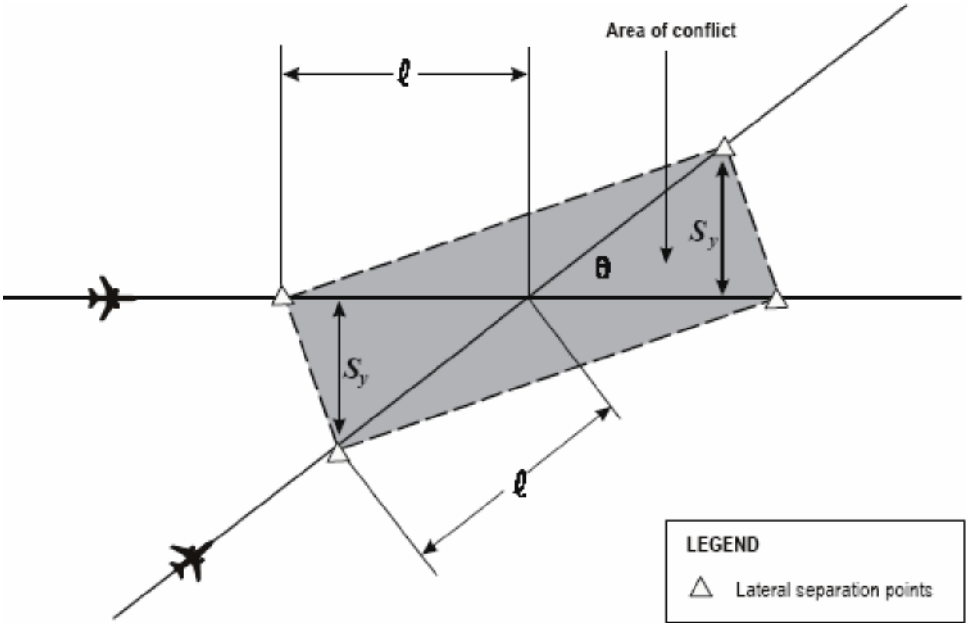
5.4.2.1.1 Longitudinal separation shall be applied so that the spacing between the estimated positions of the aircraft being separated is never less than a prescribed minimum. Longitudinal separation between aircraft following the same or diverging tracks may be maintained by application of speed control, including the Mach number technique.

Note 1.— *Attention is drawn to the guidance material contained in the Air Traffic Services Planning Manual (Doc 9426) regarding the application of the Mach number technique to separation of subsonic aircraft.*

Note 2.— *The Mach number technique is applied using true Mach number.*

5.4.2.1.2 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 air speed 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.

5.4.2.1.3 Longitudinal separation may 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.



Note. — The lateral separation points are calculated by the formula $L = SY / SIN\ \theta$

Where:

SY the lateral distance between the tracks equal to the lateral separation minimum;

L = the distance of the lateral separation point from the intersection; and

θ *= the angle between tracks*

: = S

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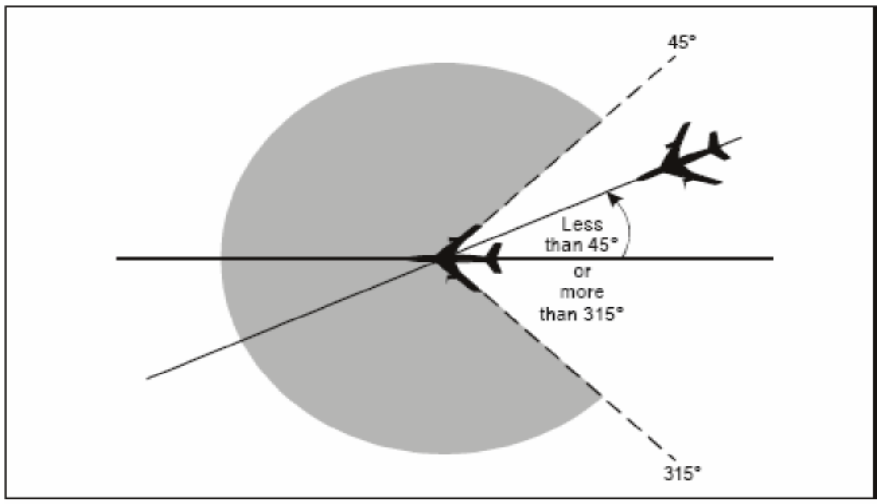

Figure 5-6. Aircraft on same track (see 5.4.2.1.5 a))

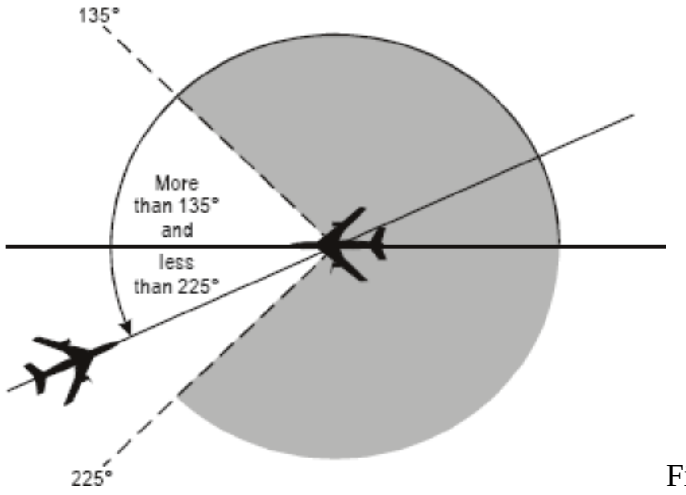

Figure 5-7

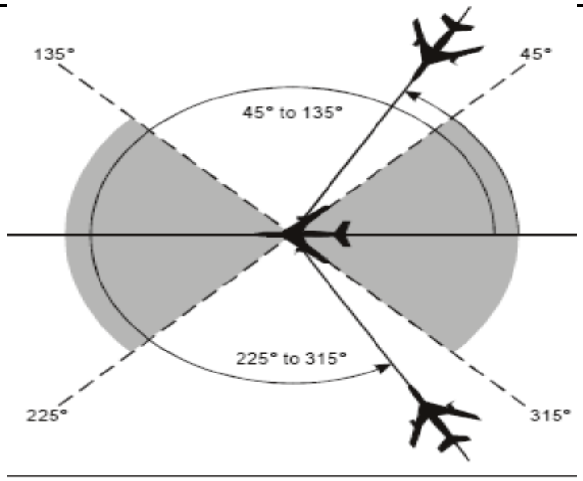

Figure 5-8. Aircraft on crossing tracks (see 5.4.2.1.5 c)) Figure 5-5

5.4.2.1.4 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 5-6): 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 5-7): 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 5-8): intersecting tracks or portions thereof other than those specified in a) and b) above.

5.4.2.1.5 Time-based separation applied in accordance with 5.4.2.2 and 5.4.2.4 may be based on position information and estimates derived from voice reports, CPDLC or ADS-C.

5.4.2.2 LONGITUDINAL SEPARATION MINIMA BASED ON TIME

5.4.2.2.1 AIRCRAFT MAINTAINING THE SAME LEVEL

5.4.2.2.1.1 Aircraft flying on the same track:

a) 15 minutes (see Figure 5-9); or

b) 10 minutes, if navigation aids permit frequent determination of position and speed (see Figure 5-10); or

c) 5 minutes in the following cases, provided that in each case the preceding aircraft is maintaining a true airspeed of 20 kt or more faster than the succeeding aircraft (see Figure 5-11):

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) d) 3 minutes in the cases listed under c) provided that in each case the preceding aircraft is maintaining a true airspeed of 40 kt or more faster than the succeeding aircraft (see Figure 5-12).

5.4.2.2.1.2 Aircraft flying on crossing tracks:

a) 15 minutes at the point of intersection of the tracks (see Figure 5-13); or

b) 10 minutes if navigation aids permit frequent determination of position and speed (see Figure 5-14).

5.4.2.2.2 AIRCRAFT CLIMBING OR DESCENDING

5.4.2.2.2.1 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 5-15A and 5-15B); or b) 10 minutes while vertical separation does not exist, provided that such separation is authorized only where ground-based navigation aids or GNSS permit frequent determination of position

and speed (see Figures 5-16A and 5-16B); or c) 5 minutes while vertical separation does not exist, provided that:

(1) the level change is commenced within 10 minutes of the time the second aircraft has reported over a common point which must be derived from ground based navigation aids or by GNSS; and

(2) When issuing the clearance through third party communication or CPDLC a restriction shall be added to the clearance to ensure that the 10 minute condition is satisfied (see Figures 5-17A and 5-17B).

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 obtain while vertical separation does not exist.*

5.4.2.2.2.2 Aircraft on crossing tracks:

a) 15 minutes while vertical separation does not exist (see Figures 5-18A and 5-18B); or

b) 10 minutes while vertical separation does not exist if navigation aids permit frequent determination of position and speed (see Figures 5-19A and 5-19B).

5.4.2.2.3 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 5-20). Provided it has been determined that the aircraft have passed each other, this minimum need not apply.

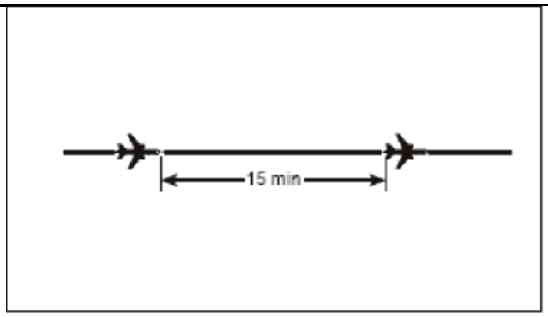

Figure 5-9. Fifteen-minute separation between aircraft on same track and same level (see 5.4.2.2.1.1 a))

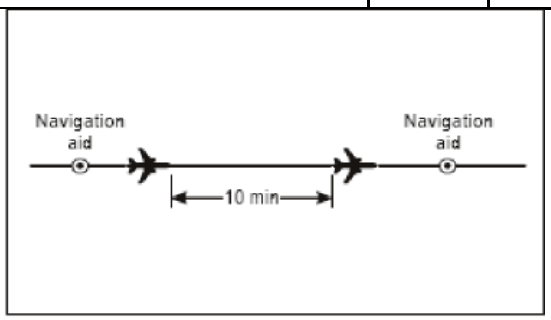

Figure 5-10. Ten-minute separation between aircraft on same track and same level (see 5.4.2.2.1.1 b))

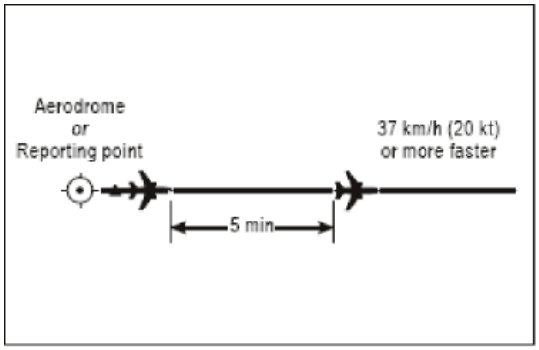

Figure 5-11. Five-minute separation between aircraft on same track and same level (see 5.4.2.2.1.1 c))

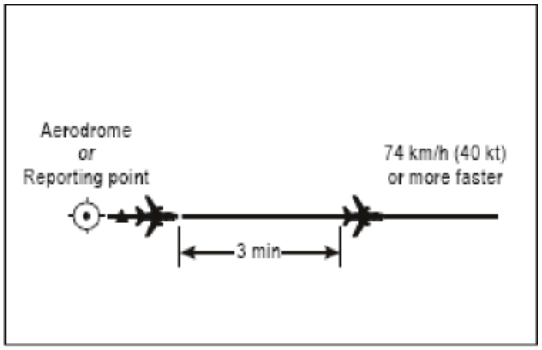

Figure 5-12. Three-minute separation between aircraft on same track and same level (see 5.4.2.2.1.1 d))

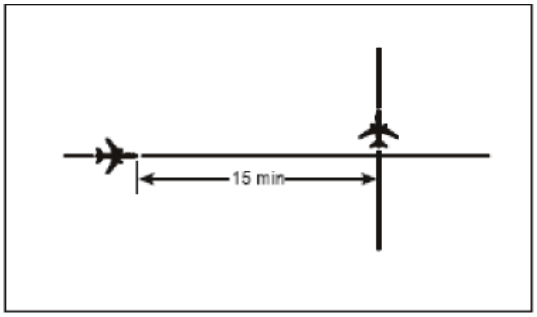

Figure 5-13. Fifteen-minute separation between aircraft on crossing tracks and same level (see 5.4.2.2.1.2 a))

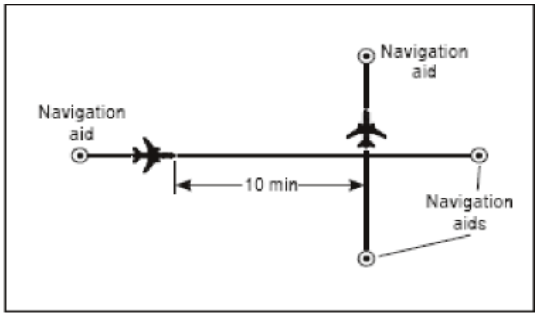

Figure 5-14. Ten-minute separation between aircraft on crossing tracks and same level (see 5.4.2.2.1.2 b))

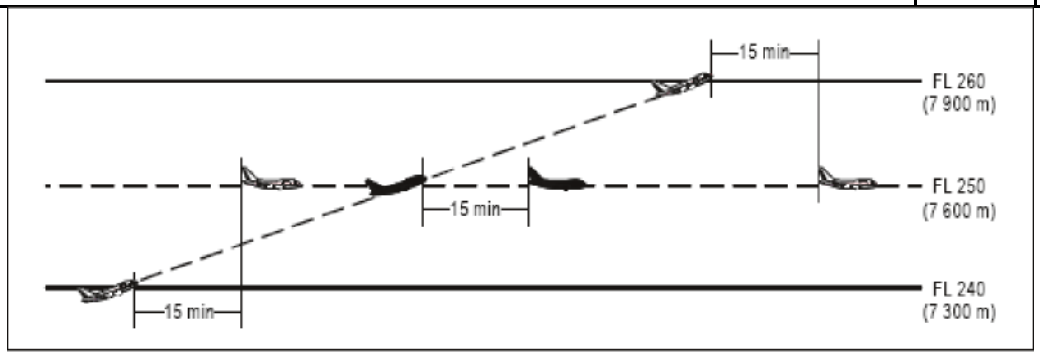

Figure 5-15A. Fifteen-minute separation between aircraft climbing and on same track (see 5.4.2.2.2.1 a))

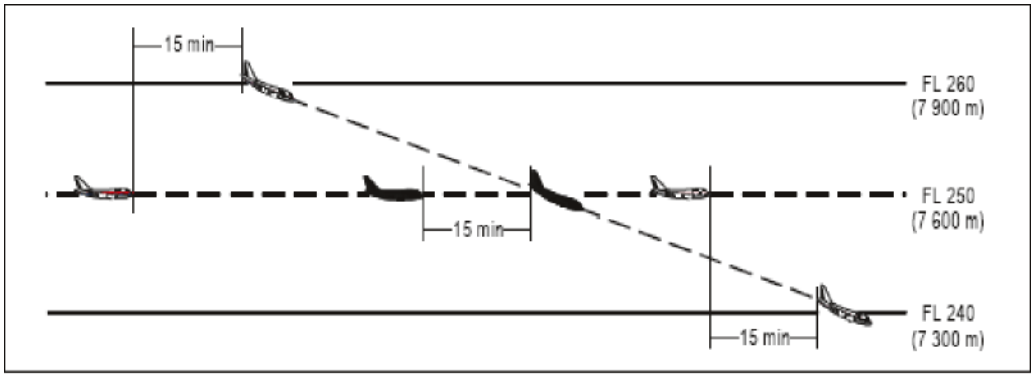

Figure 5-15B. Fifteen-minute separation between aircraft descending and on same track (see 5.4.2.2.2.1 a)

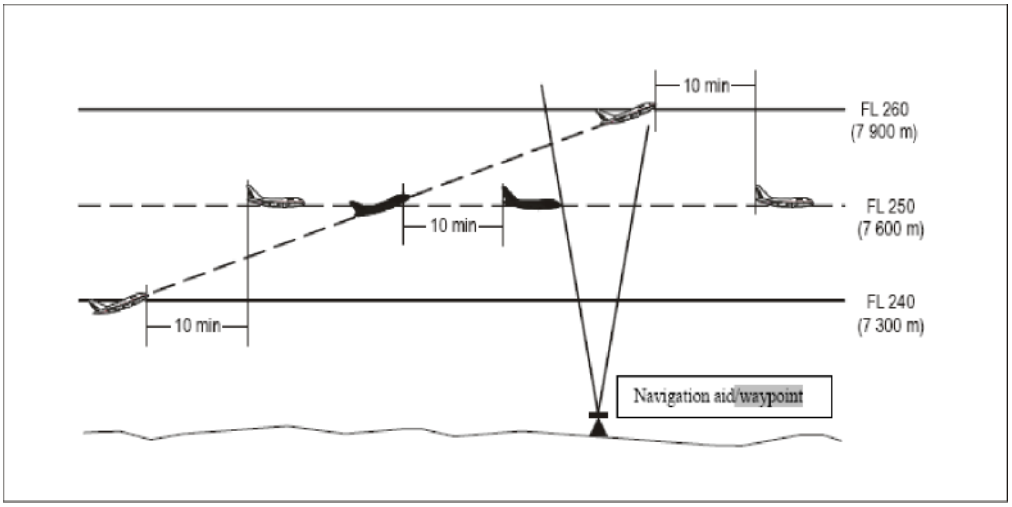

Figure 5-16A. Ten-minute separation between aircraft climbing and on the same track

(see 5.4.2.2.2.1 b)

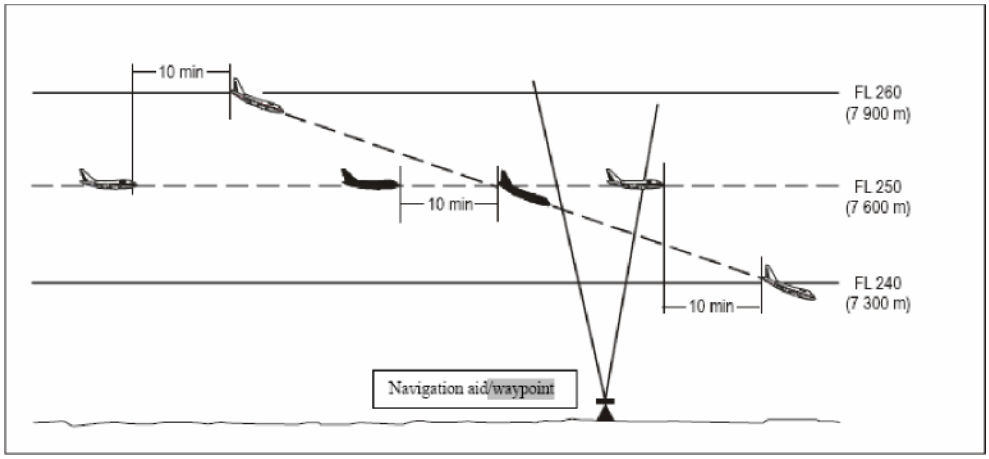

Figure 5-16B. Ten-minute separation between aircraft descending and on same track

(see 5.4.2.2.2.1 b)

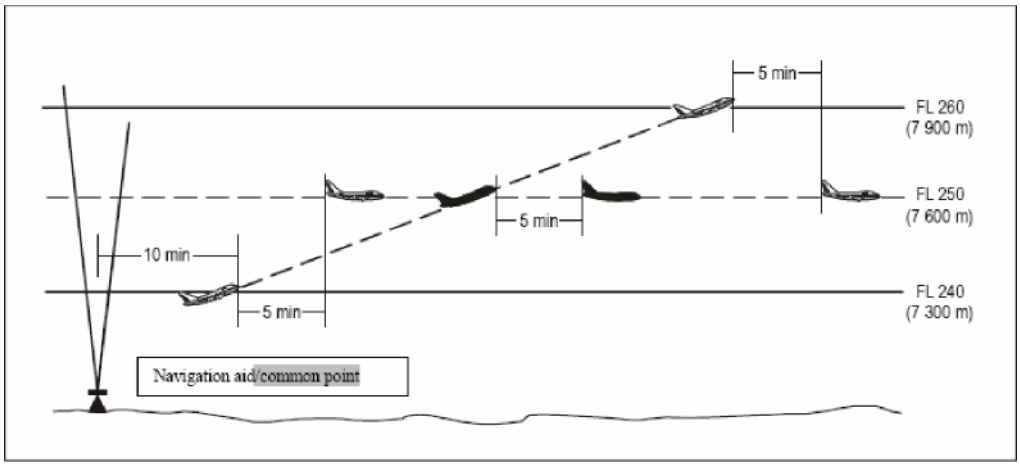

Figure 5-17A. Five-minute separation between aircraft climbing and on same track

(see 5.4.2.2.2.1 c)

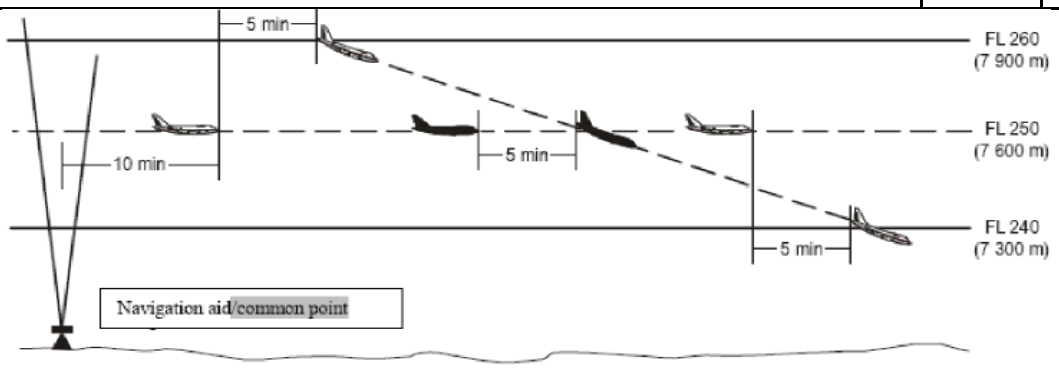

Figure 5-17B. Five-minute separation between aircraft descending and on same track

(see 5.4.2.2.2.1 c)

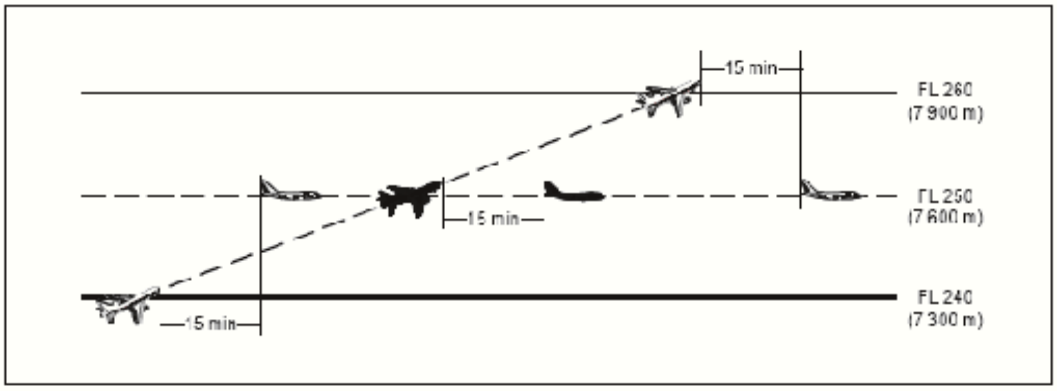

Figure 5-18A. Fifteen-minute separation between aircraft climbing and on crossing tracks (see 5.4.2.2.2.2 a))

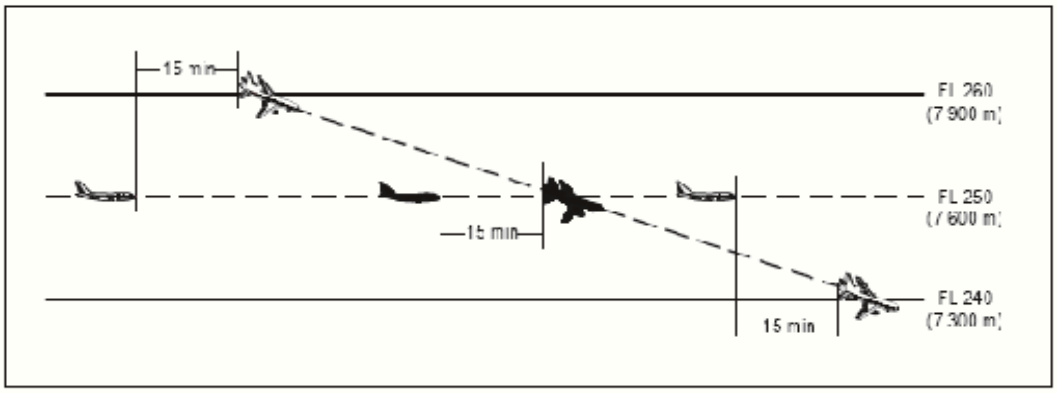

Figure 5-18B. Fifteen-minute separation between aircraft descending and on crossing tracks (see 5.4.2.2.2.2 a))

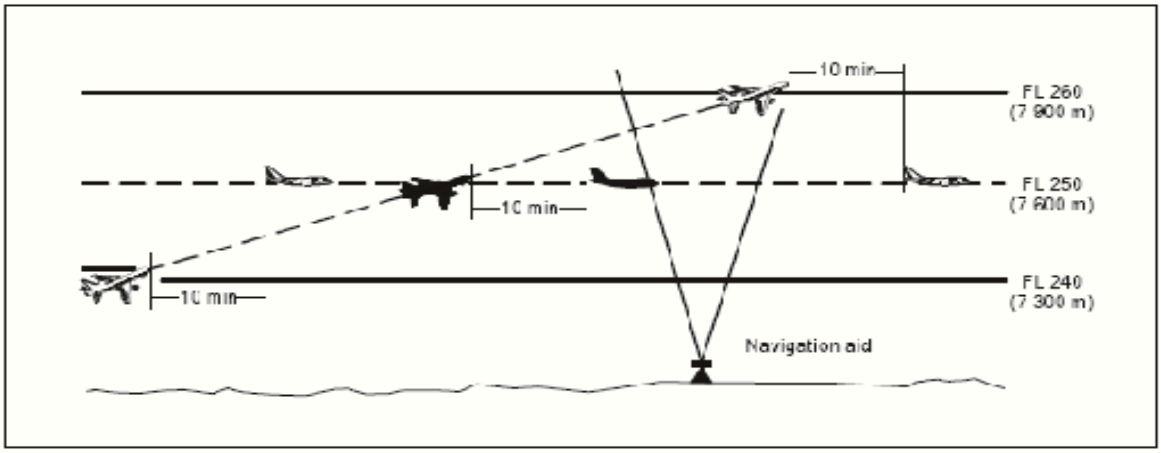

Figure 5-19A. Ten-minute separation between aircraft climbing and on crossing tracks (see 5.4.2.2.2.2 b))

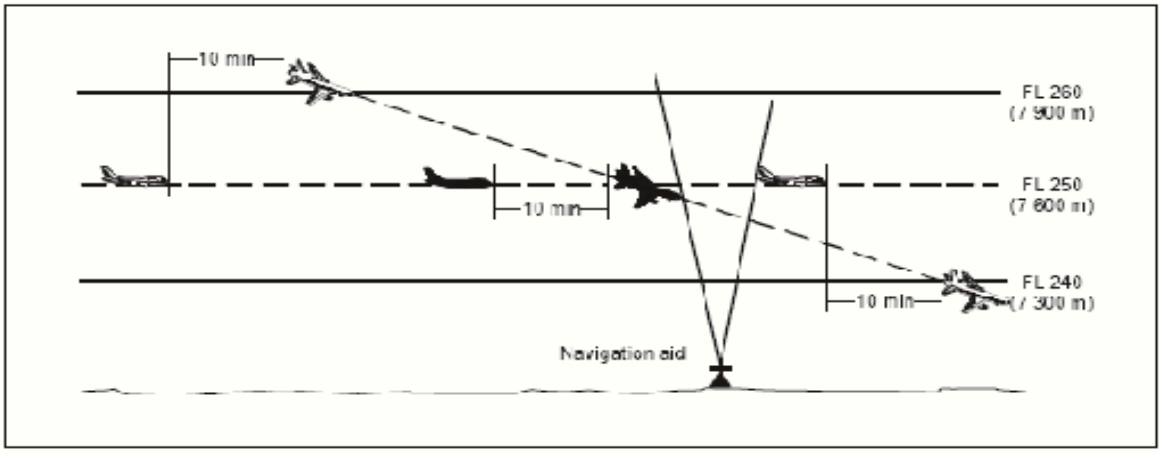

Figure 5-19B. Ten-minute separation between aircraft descending and on crossing tracks (see 5.4.2.2.2.2 b))

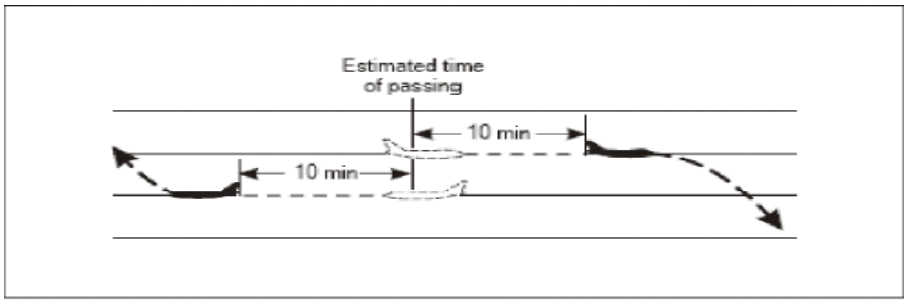

Figure 5-20. Ten-minute separation between aircraft on reciprocal tracks (see 5.4.2.2.3)

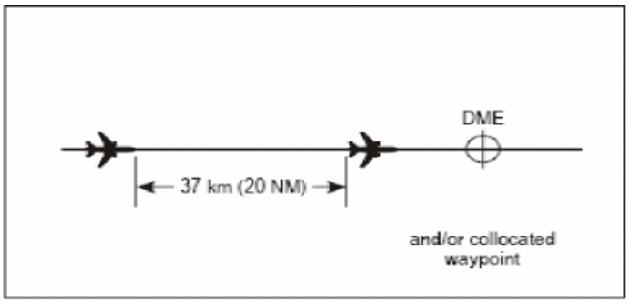

Figure 5-21. 37 km (20 NM) DME or GNSS-based separation between aircraft on same track and same level (see 5.4.2.3.3.1 a))

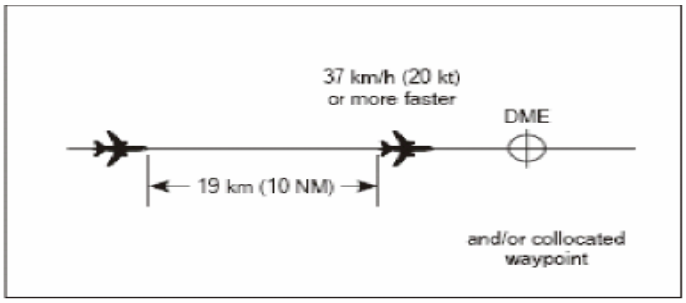

Figure 5-22. 19 km (10 NM) DME or GNSS-based separation between aircraft on same track and same level (see 5.4.2.3.3.1 b))

5.4.2.3 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.*

5.4.2.3.1 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.

5.4.2.3.2 When applying these separation minima between any aircraft with area navigation capability, controllers shall specifically request GNSS-derived distance.

Note.— Reasons making a pilot unable to provide GNSS distance information may include inadequate on-board equipment, no GNSS input into an integrated navigation system, or a loss of GNSS integrity.

5.4.2.3.3 *AIRCRAFT AT THE SAME CRUISING LEVEL*

5.4.2.3.3.1 *Aircraft on the same track:*

a) 20 NM, provided:

1) Each aircraft utilizes:

i) The same "on-track" DME stations 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 5-21);

b) 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

3) 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 5-22).

5.4.2.3.3.2 *Aircraft on crossing tracks.* The longitudinal separation prescribed in

5.4.2.3.3.3 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 5-23A and 5-23B).

5.4.2.3.4 *Aircraft climbing or descending*

5.4.2.3.4.1 *Aircraft on the same track:* 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) eparation is established by obtaining simultaneous DME and/or GNSS readings from the aircraft (see Figures 5-24A and 5-24B).

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 obtain while vertical separation does not exist.*

5.4.2.3.4.2 *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 unit.

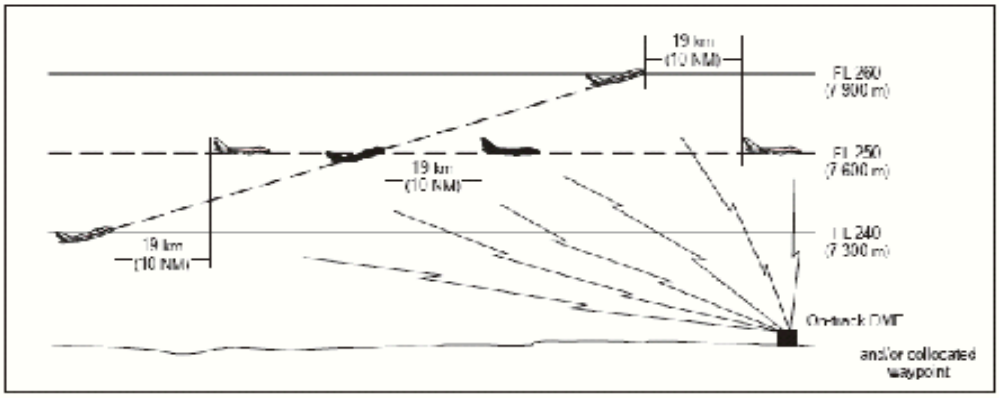

Figure 5-21A. 19 km (10 NM) DME or GNSS based separation between aircraft climbing and on same track (see 5.4.2.3.4.1 c))

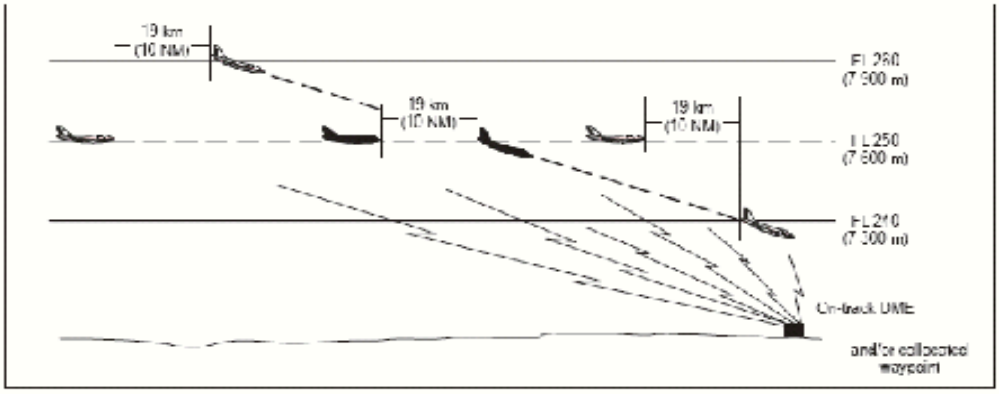

Figure 5-21B. 19 km (10 NM) DME or GNSS based separation between aircraft descending and on same track (see 5.4.2.3.4.1 c))

5.4.2.4 LONGITUDINAL SEPARATION MINIMA WITH MACH NUMBER TECHNIQUE BASED ON TIME

5.4.2.4.1 Turbojet aircraft shall adhere to the true Mach number approved by ATC and shall request ATC approval before making any changes thereto. If it is essential to make an immediate temporary change in the Mach number (e.g. due to turbulence), ATC shall be notified as soon as possible that such a change has been made.

5.4.2.4.2 If it is not feasible, due to aircraft performance, to maintain the last assigned Mach number during en-route climbs and descents, pilots of aircraft concerned shall advise ATC at the time of the climb/descent request.

5.4.2.4.3 When the Mach number technique is applied and provided that:

a) the aircraft concerned have reported over the same common point and follow the same track or continuously diverging tracks until some other form of separation is provided; or
b) if the aircraft have not reported over the same reporting point and it is possible to ensure, by radar, ADS-B or other means, that the appropriate time interval will exist at the common point from which they either follow the same track or continuously diverging tracks; minimum longitudinal separation between turbojet aircraft on the same track, whether in level, climbing or descending flight shall be:
    1) 10 minutes; or
    2) between 9 and 5 minutes inclusive, provided that: the preceding aircraft is maintaining a true Mach number greater than the following aircraft in accordance with the following table:

- 9 minutes, if the preceding aircraft is Mach 0.02 faster than the following aircraft;
- 8 minutes, if the preceding aircraft is Mach 0.03 faster than the following aircraft;
- 7 minutes, if the preceding aircraft is Mach 0.04 faster than the following aircraft;
- 6 minutes, if the preceding aircraft is Mach 0.05 faster than the following aircraft;
- 5 minutes, if the preceding aircraft is Mach 0.06 faster than the following aircraft.

5.4.2.4.4 When the 10-minute longitudinal separation minimum with Mach number technique is applied, the preceding aircraft shall maintain a true Mach number equal to or greater than that maintained by the following aircraft.

5.4.2.5 LONGITUDINAL SEPARATION MINIMA WITH MACH NUMBER TECHNIQUE BASED ON DISTANCE USING RNAV

Note.— *Guidance material on RNAV operations is contained in the* Performance-based Navigation (PBN) Manual *(Doc 9613).*

5.4.2.5.1 Turbojet aircraft shall adhere to the true Mach number approved by ATC and shall request ATC approval before making any changes thereto. If it is essential to make an immediate temporary change in the Mach number (e.g. due to turbulence), ATC shall be notified as soon as possible that such a change has been made.

5.4.2.5.1.1 If it is not feasible, due to aircraft performance, to maintain the last assigned Mach number during enroute climbs and descents, pilots of aircraft concerned shall advise ATC at the time of the climb/descent request.

5.4.2.5.2 RNAV distance-based separation minima shall not be applied after ATC has received pilot advice indicating navigation equipment deterioration or failure.

5.4.2.5.3 Separation shall be established by maintaining not less than the specified distance between aircraft positions as reported by reference to RNAV equipment. Direct controller-pilot communications should be maintained, while such separation is used. Where high frequency or general purpose extended range very high frequency air-ground communication channels are used for area control service and are worked by air-ground communicators, suitable arrangements shall be made to permit direct controller-pilot communications, or monitoring by the controller of all air-ground communications.

5.4.2.5.3.1 To assist pilots to readily provide the required RNAV distance information, such position reports should, wherever possible, be referenced to a common waypoint ahead of both aircraft.

5.4.2.5.4 RNAV distance-based separation may be applied between RNAV-equipped aircraft when operating on designated RNAV routes or on ATS routes defined by VOR.

5.4.2.5.5 A 80 NM RNAV distance-based separation minimum with Mach number technique may be used on same-direction tracks in lieu of a 10-minute longitudinal separation minimum with Mach number technique, provided:

a) each aircraft reports its distance to or from the same "on-track" common point;
b) separation between aircraft at the same level is checked by obtaining simultaneous RNAV distance readings from the aircraft at frequent intervals to ensure that the minimum will not be infringed (see Figure 5-25);
c) separation between aircraft climbing or descending is established by obtaining simultaneous RNAV distance readings from the aircraft (see Figures 5-26A and 5-26B); and
d) in the case of aircraft climbing or descending, one aircraft maintains a level while vertical separation does not exist.

5.4.2.5.6 When the 80 NM longitudinal separation minimum with Mach number technique is applied, the preceding aircraft shall maintain a true Mach number equal to or greater than that maintained by the following aircraft.

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 obtain while vertical separation does not exist.*

5.4.2.5.7 *Aircraft on reciprocal tracks.* Aircraft utilizing RNAV may be cleared to climb or descend to or through the levels occupied by other aircraft utilizing RNAV provided it has been positively established by simultaneous RNAV distance readings to or from the same "on-track" common point that the aircraft have passed each other and are at least 80 NM apart (see Figure 5-27).

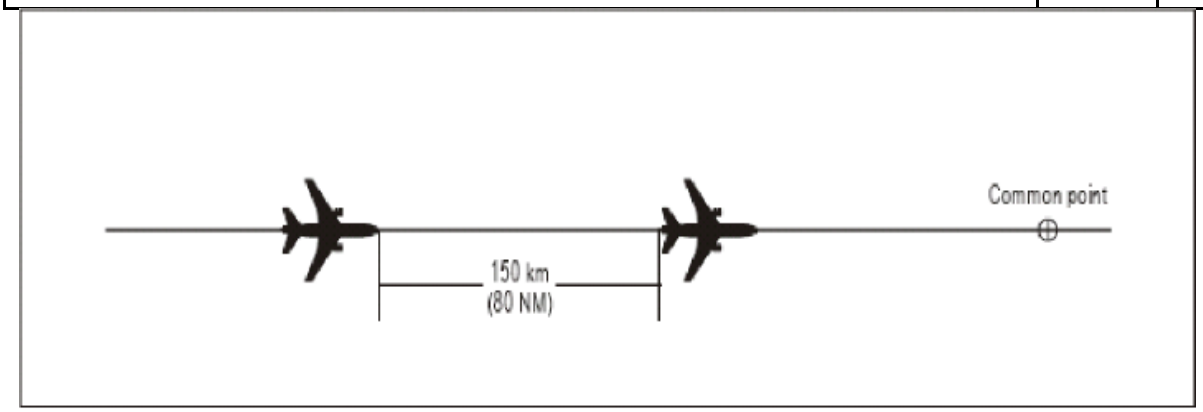

Figure 5-25. 150 km (80 NM) RNAV-based separation between aircraft at the same level (see 5.4.2.5.5 b))

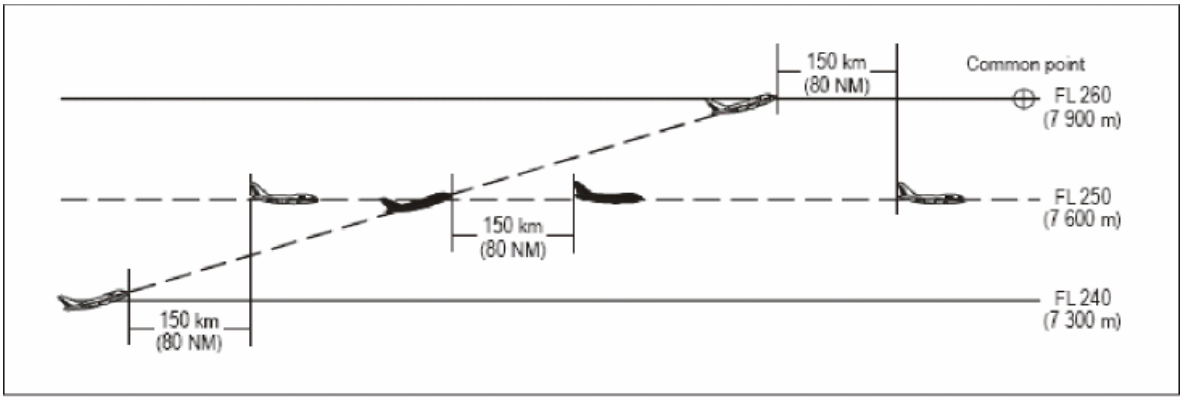

Figure 5-26A. 150 km (80 NM) RNAV-based separation between aircraft climbing and on same track (see 5.4.2.5.5 c))

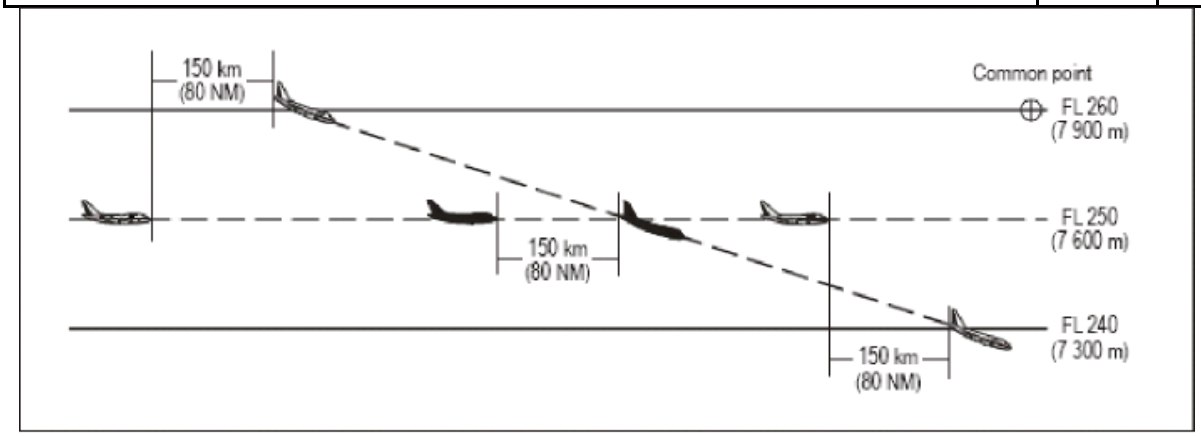

Figure 5-26B. 150 km (80 NM) RNAV-based separation between aircraft descending and on same track (see 5.4.2.5.5 c))

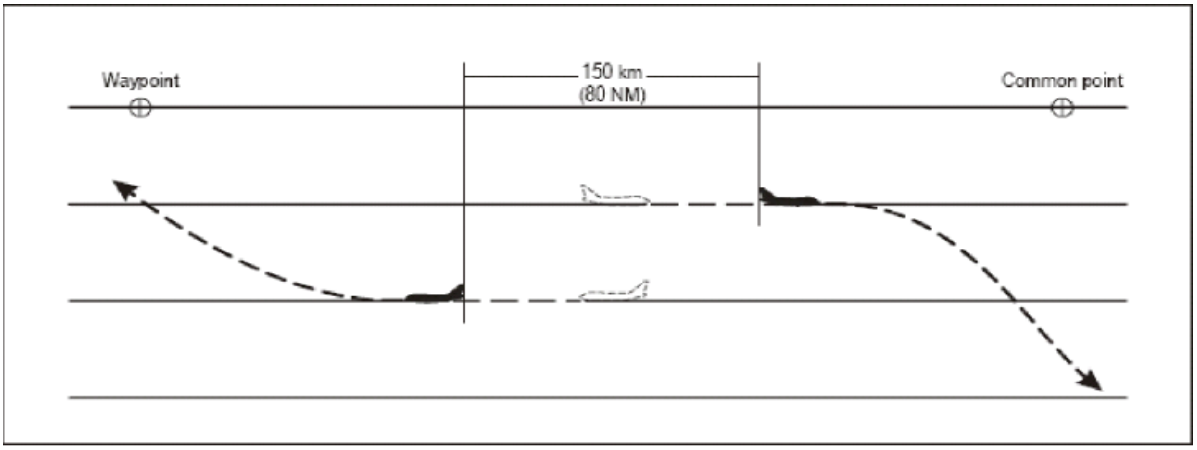

Figure 5-27. 150 km (80 NM) RNAV-based separation between aircraft on reciprocal tracks (see 5.4.2.5.7)

5.4.2.6 LONGITUDINAL SEPARATION MINIMA BASED ON DISTANCE USING RNAV WHERE RNP IS SPECIFIED

Note.— *Guidance material is contained in Attachment B to ICAO Annex 11, the* Performance-based Navigation (PBN) Manual *(Doc 9613), the* Air Traffic Services Planning Manual *(Doc 9426) and the* Manual on Airspace Planning Methodology for the Determination of Separation Minima *(Doc 9689)*.

5.4.2.6.1 Within designated airspace, or on designated routes, separation minima in accordance with the provisions of this section (5.4.2.6) may be used.

5.4.2.6.2 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.*

5.4.2.6.2.1 When information is received indicating navigation equipment failure or deterioration below the navigation performance requirements, ATC shall then, as required, apply alternative separation minima.

5.4.2.6.2.2 Direct controller-pilot communications shall be maintained while applying a distance-based separation minimum. Direct controller-pilot communications shall be voice or CPDLC. The communication criteria necessary for CPDLC to satisfy the requirement for direct controller-pilot communications shall be established by an appropriate safety assessment.

Note.— *The communication criteria which are used as a basis for the derivation of the separation minima in this section are set out in Appendix 5 of the* Manual on Airspace Planning Methodology for the Determination of Separation Minima *(Doc 9689). Guidance material for CPDLC is contained in the* Manual of Air Traffic Services Data Link Applications *(Doc 9694).*

5.4.2.6.2.2.1 Prior to and during the application of a distance-based separation minimum, the controller should determine the adequacy of the available communication link, considering the time element required receiving replies from two or more aircraft, and the overall workload/traffic volume associated with the application of such minima.

5.4.2.6.2.3 When aircraft are at, or are expected to reduce to, the minimum separation applicable, speed control techniques,

including assigning Mach number, shall be applied to ensure that the minimum distance exists throughout the period of application of the minima.

5.4.2.6.3 LONGITUDINAL DISTANCE-BASED SEPARATION MINIMA IN AN RNP RNAV ENVIRONMENT NOT USING ADS-C

5.4.2.6.3.1 For aircraft cruising, climbing or descending on the same track, the following separation minimum may be used:

Separation minimum	*RNP type*	*Communication requirement*	*Surveillance requirement*	*Distance verification requirements*
50NM	*10*	*Direct controller-pilot communications*	*Procedural position reports*	*At least every 24 minutes*

Note 1.— Where a considerable change of level is involved using distance-based separation, 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 (e.g. 4 000 ft or less) to permit a further check on the separation that will be maintained while vertical separation does not exist.

Note 2. — It should be noted that the separation minimum depicted above is based on safety assessments performed specifically for a particular network of tracks or routes. As such, the assessments evaluated traffic characteristics which might be unique to the network being assessed.

Note 3.— The separation minimum above was developed in accordance with a collision risk analysis which dictates conditions under which this separation can be applied.

Note 4.— Detailed information on the analysis used to determine the separation minimum and on performing safety assessments is contained in the Manual on Airspace Planning Methodology for the Determination of Separation Minima *(Doc 9689).*

5.4.2.6.3.2 During the application of the 50 NM separations, when an aircraft fails to report its position, the controller shall take action within 3 minutes to establish communication. If communication has not been established within 8 minutes of the time the report should have been received, the controller shall take action to apply an alternative form of separation.

5.4.2.6.3.3 Where automated position reporting applies, a common time reference shall be used.

5.4.2.6.3.4 Aircraft on reciprocal tracks. Aircraft may be cleared to climb or descend to or through the levels occupied by the other provided that it has been positively established that the aircraft have passed each other and the distance between them is equal to at least the applicable separation minimum.

5.4.2.6.4 LONGITUDINAL DISTANCE-BASED SEPARATION MINIMA IN AN RNP RNAV ENVIRONMENT USING ADS-C

5.4.2.6.4.1 Separation based on the use of ADS-C shall be applied so that the distance between the calculated positions of the aircraft is never less than the prescribed minimum. This distance shall be obtained by one of the following methods:

a) when the aircraft are on the same identical track, the distance may be measured between the calculated positions of the aircraft or may be calculated by measuring the distances to a common point on the track (see Figures 5-28 and 5-29);

Note.— Same identical tracks are a special case of same track defined in 5.4.2.1.5 a) where the angular difference is zero degrees or reciprocal tracks defined in 5.4.2.1.5 b) where the angular difference is 180 degrees.

b) when the aircraft are on same or reciprocal non-parallel tracks other than in a) above, the distance shall be calculated by measuring the distances to the common point of intersection of the tracks or projected track (see Figures 5-30 to 5-32); and

c) when the aircraft are on parallel tracks whose protection areas overlap, the distance shall be measured along the track of one of the aircraft as in a) above using its calculated position and the point abeam the calculated position of the other aircraft (see Figure 5-33).

Note.— In all cases presented in Figures 5-28 to 5-33, "d" is calculated by subtracting the distance of the closer aircraft from the common point from the distance of the more distant aircraft from the common point, except in Figure 5-32 where the two distances are added and the order of the aircraft is not important in the calculation.

5.4.2.6.4.2 When aircraft are at, or are expected to reduce to, the minimum separation applicable, speed control techniques, including assigning Mach number, shall be applied to ensure that the minimum distance exists throughout the period of application of the minima.

5.4.2.6.4.3 For aircraft cruising, climbing or descending on the same track, the following separation minima may be used:

Separation minima	*RNP type*	*Maximum ADS-C periodic reporting interval*
50 NM	10	27 minutes
	4	32 minutes
30 NM	4	14 minutes

Note 1.— Detailed information on the analysis used to determine these separation minima and on performing safety assessments, including examples of communication media and operational assumptions that can satisfy the intervention requirements, are contained in the Manual on Airspace Planning Methodology for the Determination of Separation Minima (Doc 9689). The indicated periodic reporting intervals are specific to the use of ADS-C and are derived from performed safety assessments. As a result, these intervals may differ from those required for use with other procedural RNAV longitudinal separation minima.

Note 2.— The separation minima shown in the above table require specific RNP values and are based on collision risk modelling which determines communications and surveillance requirements. However, this modelling does not include all operational and technical aspects and is dependent upon parameter values that may vary depending on the particular airspace where the minimum will be applied. Therefore, prior to implementation, a system verification of sufficient duration and integrity must be performed to assess such parameters and conditions including weather deviations or other contingency events for the airspace concerned and to demonstrate that operational and technical requirements are met.

5.4.2.6.4.3.1 Operational and technical requirements for the provision of ADS-C services shall comply.

5.4.2.6.4.3.2 The communication system provided to enable the application of the separation minima in 5.4.2.6.4.3 shall allow a controller, within 4 minutes, to intervene and resolve a potential conflict by contacting an aircraft using the normal means of communication. An alternative means shall be available to allow the controller to intervene and resolve the conflict within a total time of 10½ minutes, should the normal means of communication fail.

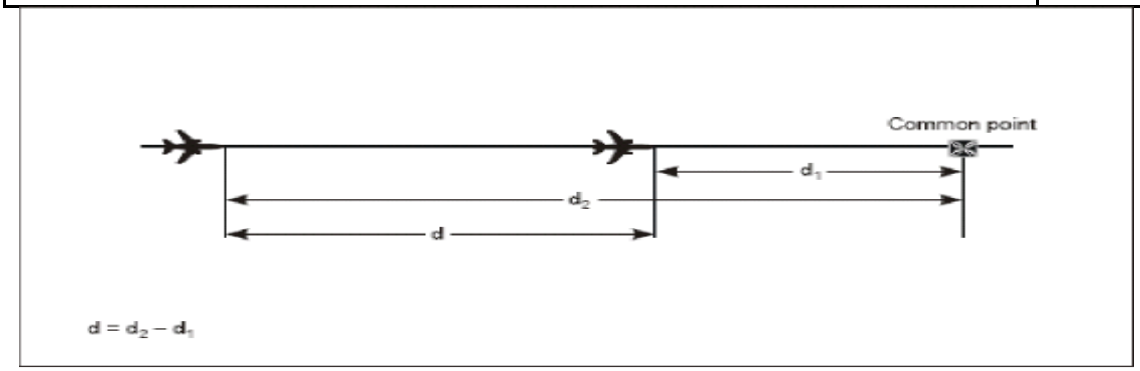

Figure 5-28. Calculation of longitudinal distance between aircraft — identical track, same direction (see 5.4.2.6.4.1 a))

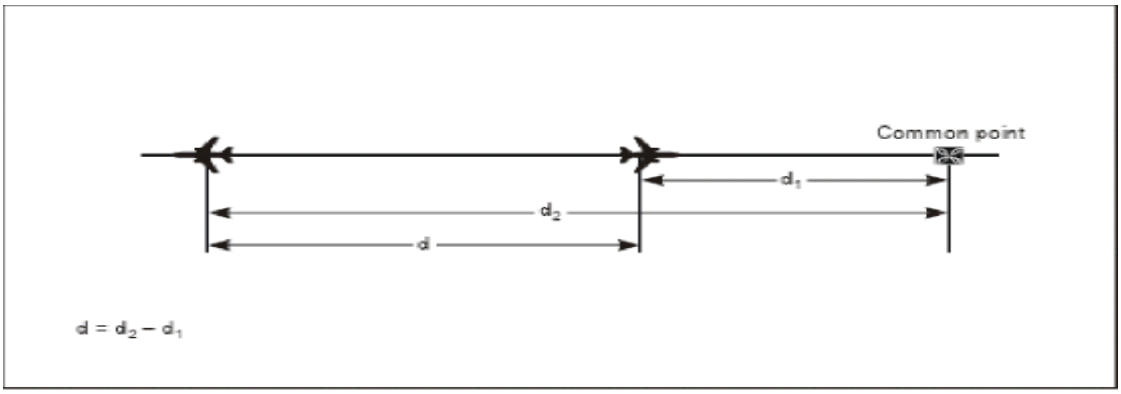

Figure 5-29. Calculation of longitudinal distance between aircraft — identical track, opposite direction (see 5.4.2.6.4.1 a))

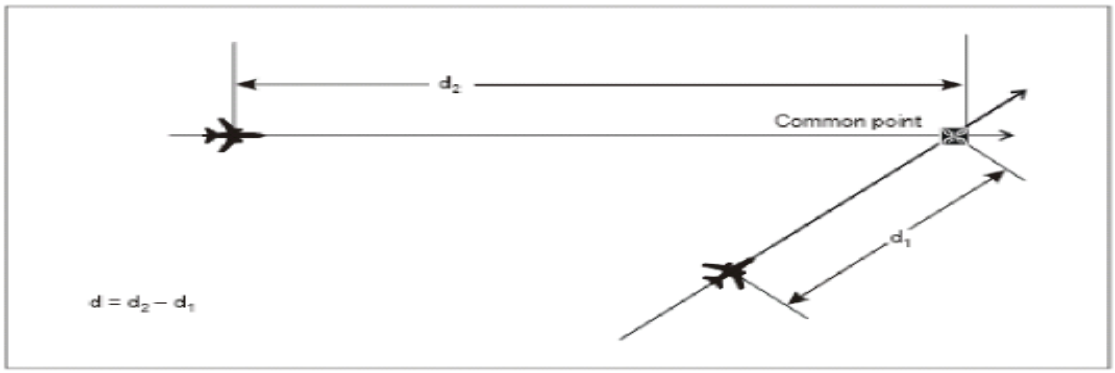

Figure 5-30. Calculation of longitudinal distance between aircraft — same track, but not identical (see 5.4.2.6.4.1 b))

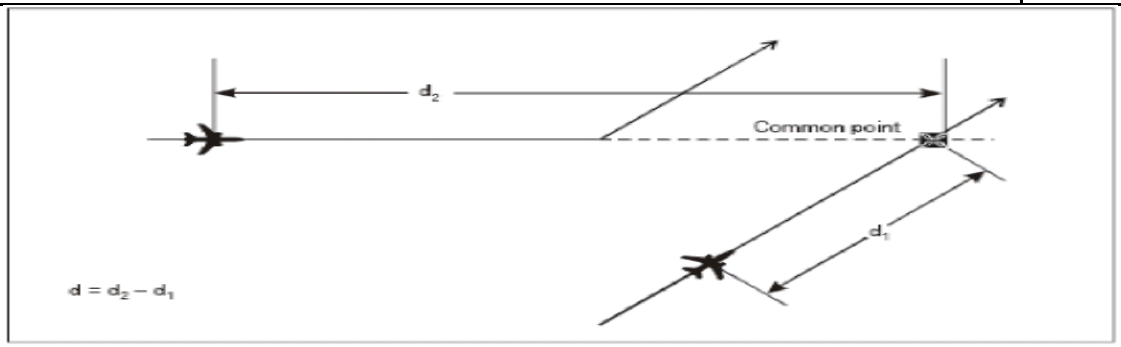

Figure 5-31. Calculation of longitudinal distance between aircraft — same track projected, but not identical (see 5.4.2.6.4.1 b))

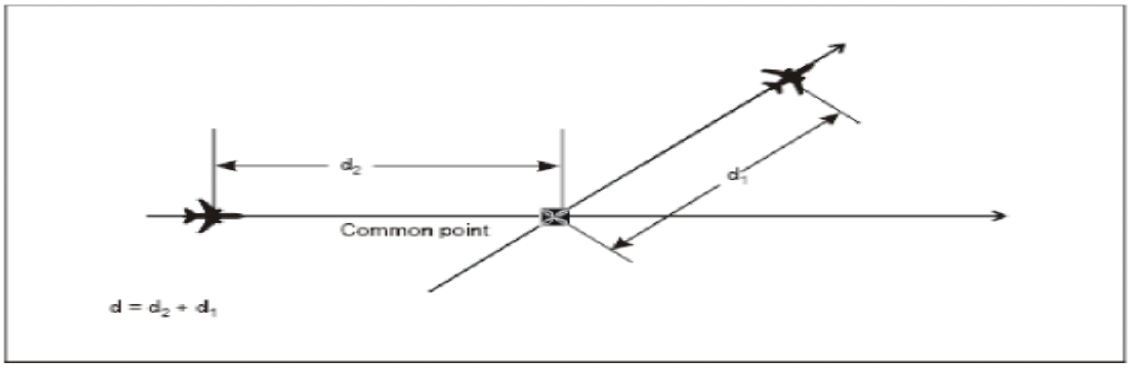

Figure 5-32. Calculation of longitudinal distance between aircraft — opposite sides of the common point (see 5.4.2.6.4.1 b))

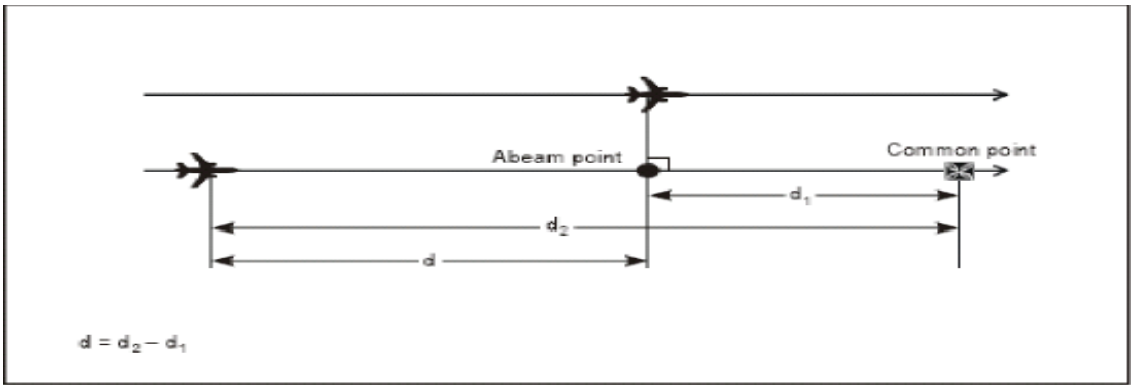

Figure 5-33. Calculation of longitudinal distance between aircraft — parallel tracks (see 5.4.2.6.4.1 c))

5.4.2.6.4.3.3 When an ADS-C periodic or waypoint change event report is not received within 3 minutes of the time it should have been sent, the report is considered overdue and the controller shall take action to obtain the report as quickly as possible, normally by ADS-C or CPDLC. If a report is not received within 6 minutes of the time the original report should have been sent, and there is a possibility of loss of separation with other aircraft, the controller shall take action to resolve any potential conflict(s) as soon as possible. The communication means provided shall be such that the conflict is resolved within a further 7½ minutes.

5.4.2.6.4.4 Opposite-direction aircraft on reciprocal tracks may be cleared to climb or descend to or through the levels occupied by another aircraft provided that the aircraft have passed each other by the applicable separation minimum, calculated in accordance with 5.4.2.6.4.1.

5.5 SEPARATION OF AIRCRAFT HOLDING IN FLIGHT

5.5.1 Aircraft established in adjacent holding patterns shall, except when lateral separation between the holding areas exists as determined by the ANSP, be separated by the applicable vertical separation minimum.

5.5.2 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 by the appropriate authority (See Figure 5-34.).

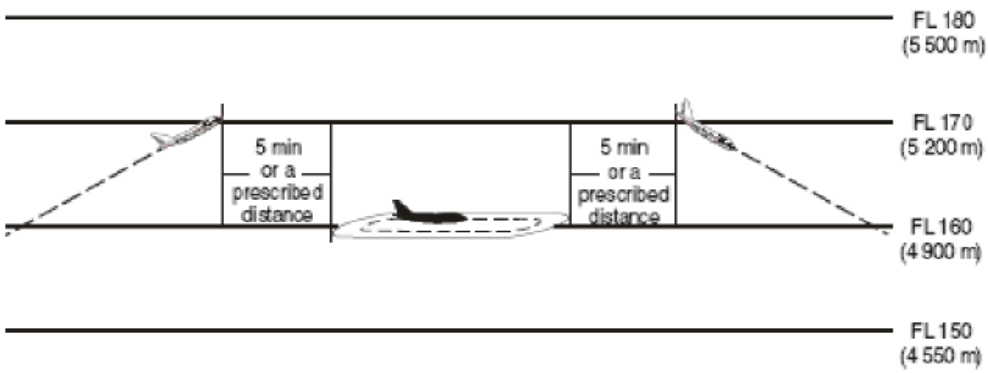

Figure 5-34. Separation between holding aircraft and en route aircraft (see 5.5.2)

5.6 MINIMUM SEPARATION BETWEEN DEPARTING AIRCRAFT

Note.— *The following provisions are complementary to the longitudinal separation minima specified in Section 5.4.2.*

5.6.1 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 5-35). This minimum may be reduced when aircraft are using parallel runways or when the procedure in Chapter 6, 6.3.3.1, is adopted for operations on diverging runways which do not cross, provided instructions covering the procedure have been approved by the ANSP and lateral separation is effected immediately after take-off.

Note 1.— Wake turbulence categories of aircraft are contained in Chapter 4, Section 4.9.1 and longitudinal separation minima are contained in Section 5.9

Note 2.— Detailed characteristics of wake vortices and their effect on aircraft are contained in the Air Traffic Services Planning Manual *(Doc 9426), Part II, Section 5.*

5.6.2 Two minutes are required between take-offs when the preceding aircraft is 40 kt or more faster than the following aircraft and both aircraft will follow the same track (see Figure 5-36).

Note.— *See Chapter 4, Section 4.6, concerning speed control instructions. Calculations, based on TAS, of speed differentials of aircraft during climb may not be sufficiently accurate in all circumstances for determining if the procedure in 5.6.2 can be applied; in which case calculations based on IAS may be more suitable.*

5.6.3 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 5-37). Action must be taken to ensure that the five-minute separation will be maintained or increased while vertical separation does not exist.

5.7 SEPARATION OF DEPARTING AIRCRAFT FROM ARRIVING AIRCRAFT

5.7.1 Except as otherwise prescribed by the ANSP, the following separation shall be applied when take-off clearance is based on the position of an arriving aircraft:

5.7.1.1 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 instrument runway (see Figure 5-38).

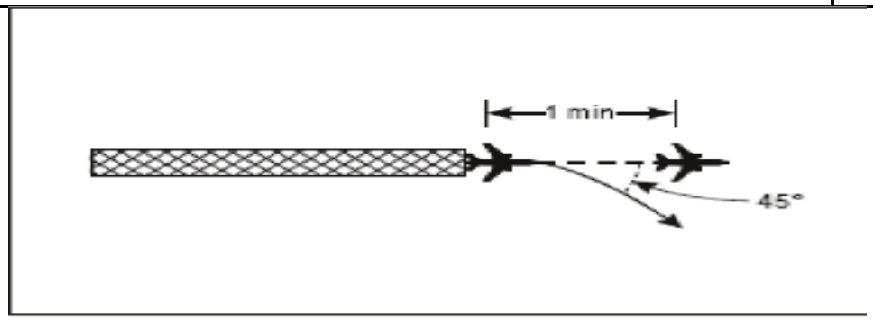

Figure 5-35. One-minute separation between departing aircraft following tracks diverging by at least 45 degrees (see 5.6.1)

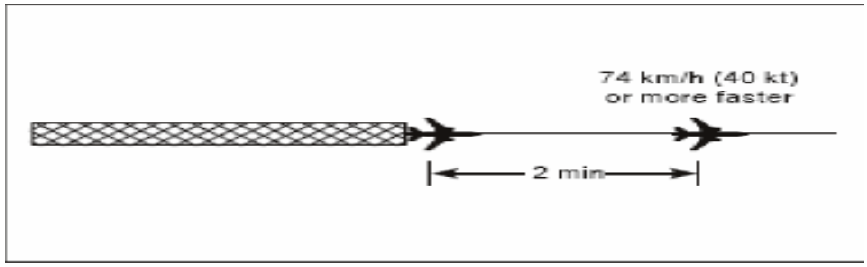

Figure 5-36. Two-minute separation between aircraft following same track (see 5.6.2)

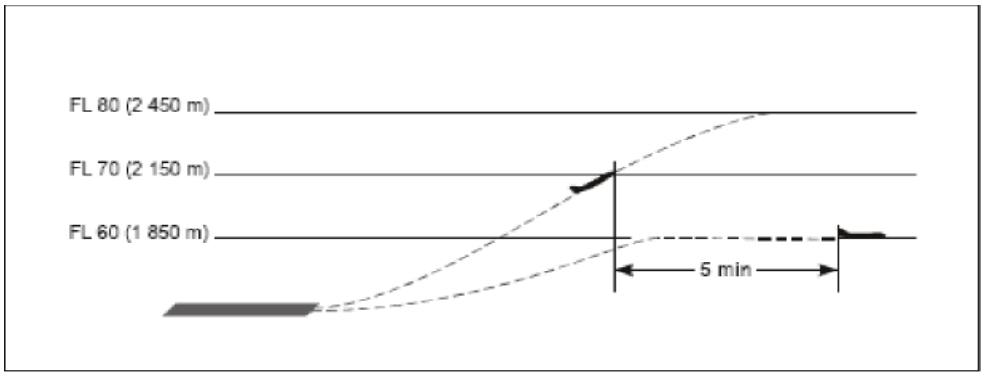

Figure 5-37. Five-minute separation of departing aircraft following the same track (see 5.6.3)

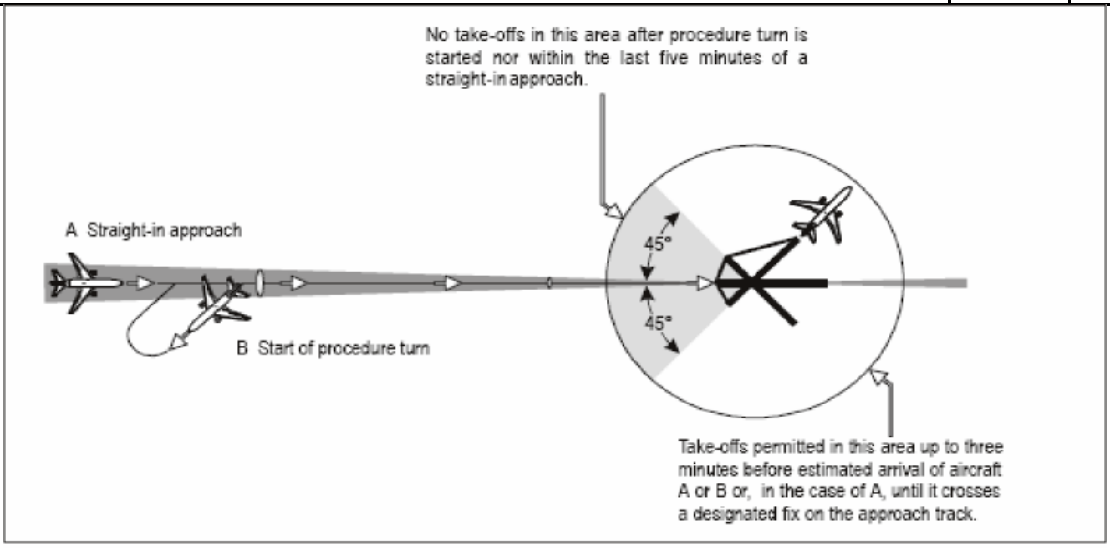

Figure 5-38. Separation of departing aircraft from arriving aircraft (see 5.7.1.1 b) and 5.7.1.2 b))

5.7.1.2 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 5-38), or
   2) before the arriving aircraft crosses a designated fix on the approach track; the location of such fix to be determined by the ANSP after consultation with the operators.

5.8 TIME-BASED WAKE TURBULENCE LONGITUDINAL SEPARATION MINIMA

5.8.1 Applicability

5.8.1.1 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.

5.8.1.2 The ATC unit shall, in respect of the flights specified in 5.8.1.1 (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.

5.8.2 Arriving aircraft

5.8.2.1 Except as provided for in 5.8.1.1 a) and b), the following separation minima shall be applied:

5.8.2.1.1 The following non-radar separation should be applied to aircraft landing behind an A380-800 aircraft; behind a HEAVY or a MEDIUM aircraft:
a) MEDIUM aircraft behind an A380-800 aircraft — 3 minutes;
b) LIGHT aircraft behind an A380-800 aircraft — 4 minutes
c) MEDIUM aircraft behind HEAVY aircraft — 2 minutes;
d) LIGHT aircraft behind a HEAVY or MEDIUM aircraft —3 minutes.

5.8.3 Departing aircraft

5.8.3.1 A minimum separation of 3 minutes shall be applied for a LIGHT or MEDIUM aircraft and 2 minutes for a non-A380-800 HEAVY aircraft taking off behind an A380-800 aircraft when the aircraft are using:

a) the same runway;
b) parallel runways separated by less than 2 500 ft;

c) parallel runways separated by 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 1 000 ft below.

Note.— See Figures 5-39 and 5-40.

5.8.3.2 A separation minimum of 4 minutes shall be applied for a LIGHT or MEDIUM aircraft when taking off behind an A380-800 and 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 2 500 ft.

Note.— See Figure 5-41

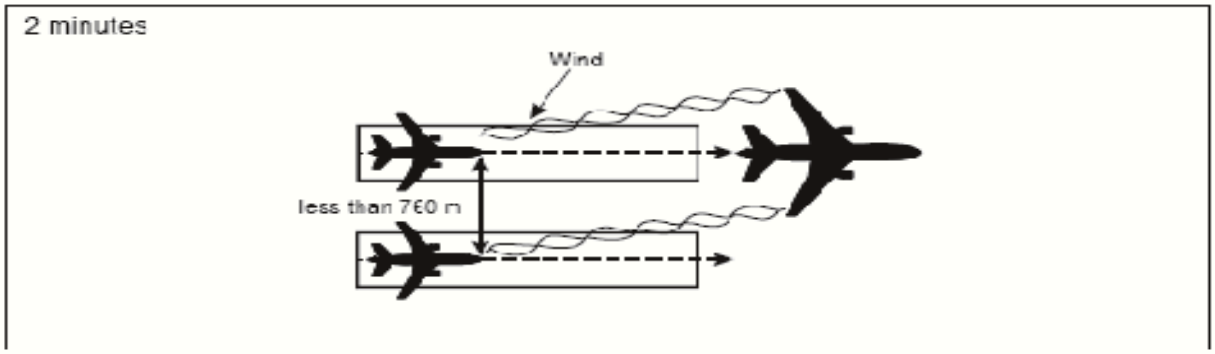

Figure 5-39. Two-minute separation for following aircraft (see 5.8.3.1 a) and b))

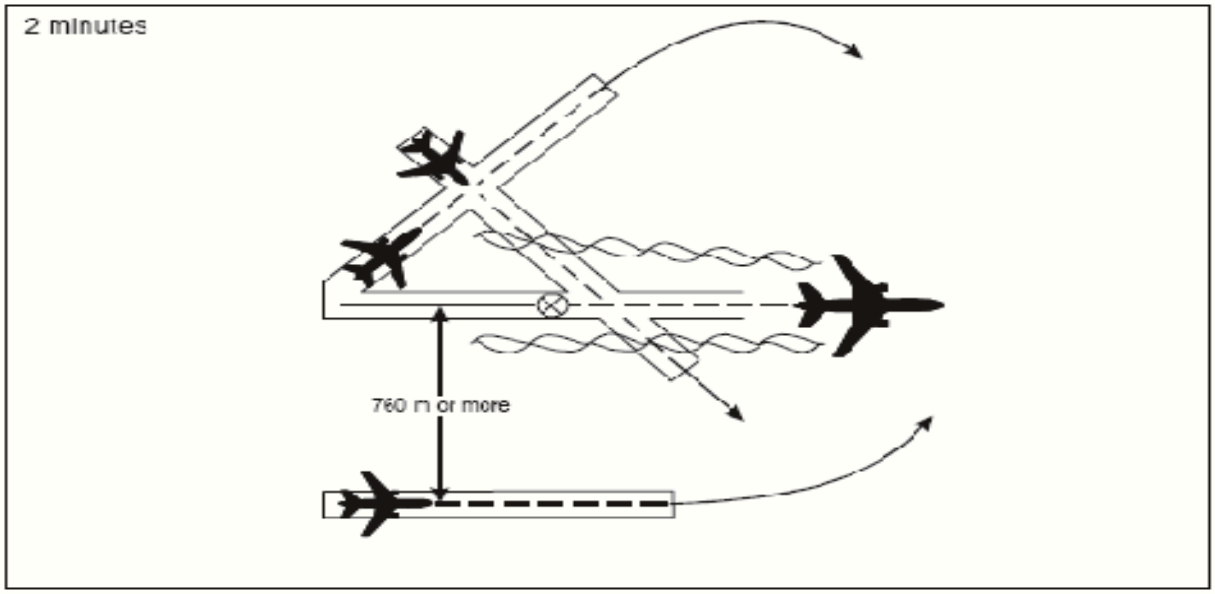

Figure 5-40. Two-minute wake turbulence separation for crossing aircraft (see 5.8.3.1 c) and d))

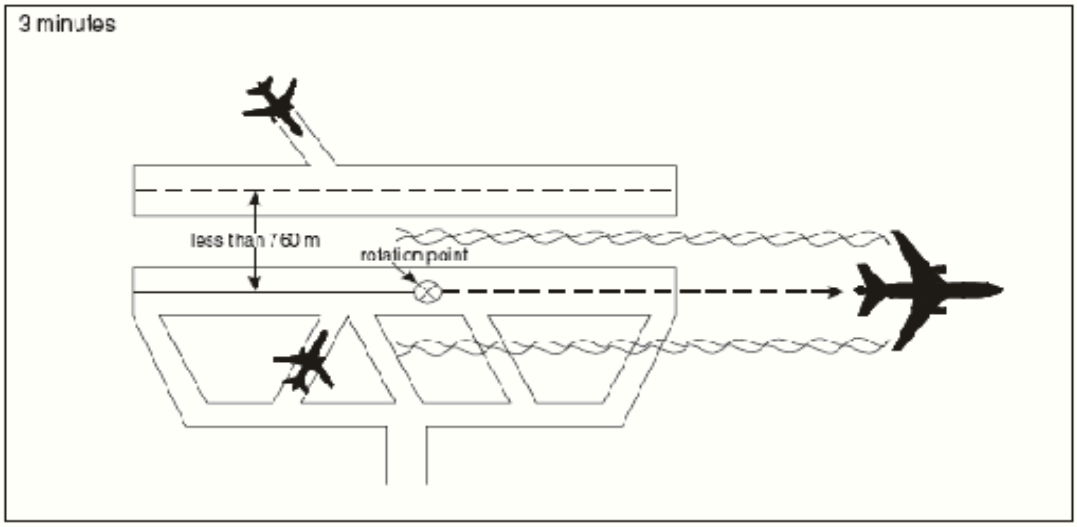

Figure 5-41. Three-minute wake turbulence separation for following aircraft (see 5.8.3.2)

5.8.4 Displaced landing threshold

5.8.4.1 A separation minimum of 3 minutes should be applied between a LIGHT or MEDIUM aircraft and an A380-800 aircraft when operating on a runway with a displaced landing threshold when:

a) a departing LIGHT or MEDIUM aircraft follows an A380-800 aircraft arrival; or
b) an arriving LIGHT or MEDIUM aircraft follows an A380-800 aircraft departure if the projected flight paths are expected to cross.
c)

5.8.4.2 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 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 MEDIUM aircraft follows a HEAVY aircraft departure and an arriving LIGHT aircraft follows a MEDIUM aircraft departure if the projected flight paths are expected to cross.

5.8.5 Opposite direction

5.8.5.1 A separation of 3 minutes should be applied between a LIGHT or MEDIUM aircraft and an A380-800 aircraft when the A380-800 aircraft is making a low or missed approach and the LIGHT or MEDIUM aircraft is:

a) utilizing an opposite-direction runway for take-off; or
b) landing on the same runway in the opposite direction, or on a parallel opposite direction runway separated by less than 2 500 ft.

5.8.5.2 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 Figure 5-42.*

b) landing on the same runway in the opposite direction, or on a parallel opposite direction runway separated by less than 2 500 ft.

Note.— *See Figure 5-43.*

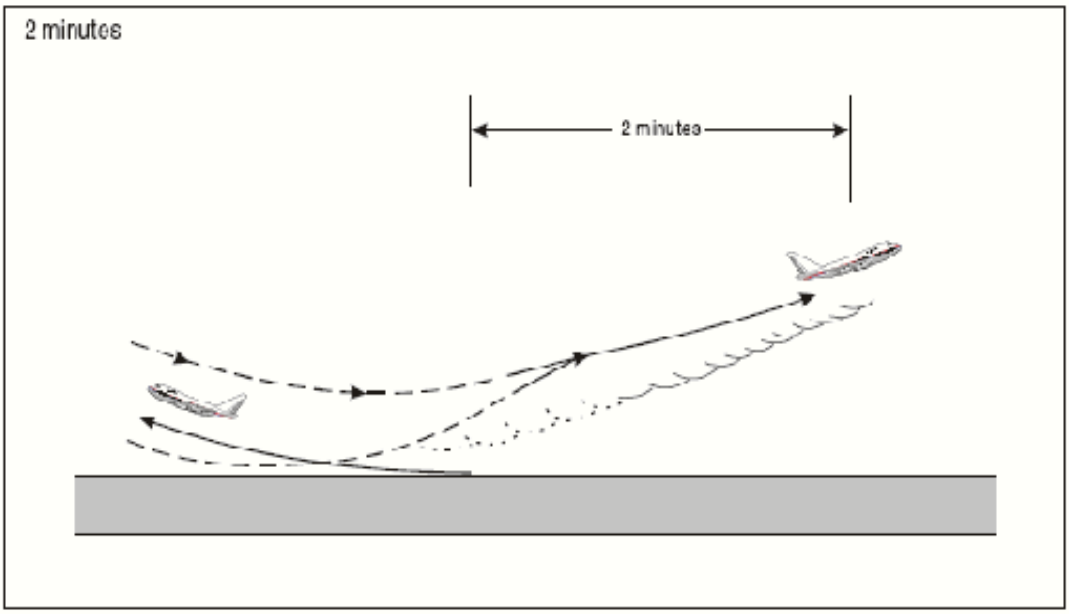

Figure 5-42. Two-minute wake turbulence separation for opposite direction take-off (see 5.8.5 a))

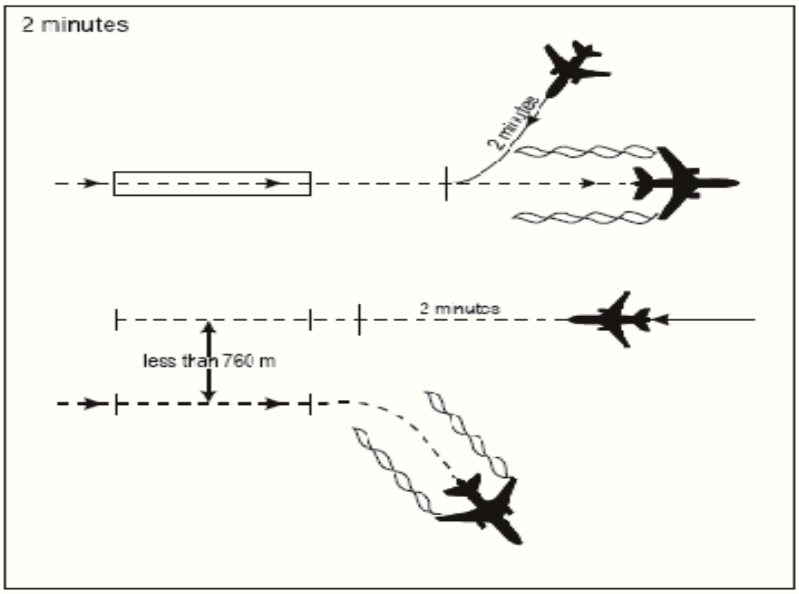

Figure 5-43. Two-minute wake turbulence separation for opposite direction landing (see 5.8.5 b))

5.9 ESSENTIAL TRAFFIC INFORMATION

5.9.1 General

5.9.1.1 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**.— Pursuant to Section 5.2 of Chapter 5, but subject to certain exceptions stated therein, ATC is required to provide separation between IFR flights in airspace Classes A to E, and between IFR and VFR flights in Classes B and C. ATC is not required to provide separation between VFR flights, except within airspace Class B. Therefore, 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 except within Class B airspace.*

5.9.1.2 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.*

5.9.2 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. — Nothing in Section 5.9 is intended to prevent ATC from imparting to aircraft under its control any other information at its disposal with a view to enhancing air safety in accordance with the objectives of ATS as defined in Chapter 2 of ICAO Annex11.

Note 2.— 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.

Note.— See also Chapter 2, ATS safety management

5.10 REDUCTION IN SEPARATION MINIMA

Note.— See also Chapter 2, ATS safety management.

5.10.1 Provided an appropriate safety assessment has shown that an acceptable level of safety will be maintained, and after prior consultation with users, the separation minima detailed in 5.4.1 and 5.4.2 may be reduced in the following circumstances:

5.10.1.1 As determined by the ANSP:

a) when special electronic or other aids enable the pilot-in-command of an aircraft to determine accurately the aircraft's position and when adequate communication facilities exist for that position to be transmitted without delay to the appropriate air traffic control unit; or
b) when, in association with rapid and reliable communication facilities, information of an aircraft's position derived from an ATS surveillance system, is available to the appropriate air traffic control unit; or
c) when special electronic or other aids enable the air traffic controller to predict rapidly and accurately the flight paths of aircraft, and adequate facilities exist to verify frequently the actual aircraft positions with the predicted positions; or

d) when RNAV-equipped aircraft operate within the coverage of electronic aids that provide the necessary updates to maintain navigation accuracy.

Note.— Attention is drawn to the guidance material contained in the Air Traffic Services Planning Manual *(Doc 9426) regarding conditions governing the reduction of separation minima and to the* Manual on Airspace Planning Methodology for the Determination of Separation Minima *(Doc 9689).*

CHAPTER 6

SEPARATION IN THE VICINITY OF AERODROMES

6.1 REDUCTION IN SEPARATION MINIMA IN THE VICINITY OF AERODROMES

In addition to the circumstances mentioned in Chapter 5, 5.11.1, the separation minima detailed in Chapter 5, 5.4.1 and5.4.2, may be reduced in the vicinity of aerodromes if:

a) adequate separation can be provided by the aerodrome controller when each aircraft is continuously visible to this 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.

6.2 ESSENTIAL LOCAL TRAFFIC

6.2.1 Information on essential local traffic known to the controller shall be transmitted without delay to departing and arriving aircraft concerned.

Note 1.— Essential local traffic in this context consists of any aircraft, vehicle or personnel on or near the runway to be used, or traffic in the take-off and climb-out area or the final approach area, which may constitute a collision hazard to a departing or arriving aircraft.

Note 2.— See also Chapter 5, Section 5.10,

6.2.1.1 Essential local traffic shall be described so as to be easily identified.

6.3 PROCEDURES FOR DEPARTING AIRCRAFT

6.3.1 General

6.3.1.1 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.

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

6.3.2 Standard clearances for departing aircraft

6.3.2.1 GENERAL

The ANSP should, wherever possible, establish standardized procedures for transfer of control between the ATC units concerned, and standard clearances for departing aircraft.

Note.— *The provisions applying to standardized procedures for coordination and transfer of control are specified in Chapter 10, Section 10.4.1.*

6.3.2.2 COORDINATION

6.3.2.2.1 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.

6.3.2.2.2 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.

6.3.2.2.3 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.

6.3.2.2.4 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.

6.3.2.3 CONTENTS

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.

6.3.2.4 CLIMB CLEARANCE ABOVE LEVELS SPECIFIED IN A SID

When a departing aircraft on a SID is cleared to climb to a level higher than the initially cleared level or the level(s) specified in a SID, the aircraft shall follow the published vertical profile of a SID, unless such restrictions are explicitly cancelled by ATC.

6.3.2.5 COMMUNICATION FAILURE

6.3.2.5.1 Clearances for departing aircraft may specify an initial or intermediate level other than that indicated in the filed flight plan for the en route phase of flight, without a time or geographical limit for the initial level. Such clearances will normally be used to facilitate the application of tactical control methods by ATC, normally through the use of an ATS surveillance system.

6.3.2.5.2 If applicable, when clearances for departing aircraft containing no time or geographical limit for an initial or intermediate level are utilized, action to be taken by an aircraft experiencing air-ground communication failure in the event the aircraft has been radar vectored away from the route specified in its current flight plan, should be described and published in the AIP.

6.3.3 Departure sequence

6.3.3.1 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 or waiting for take-off in a preferred direction.

6.3.3.2 If departures are delayed, the delayed flights shall normally be cleared in an order based on their estimated time of departure, except that deviation from this order may be made to:

a) facilitate the maximum number of departures with the least average delay;
b) accommodate requests by an operator in respect of that operator's flights to the extent practicable.

6.3.3.3 Air traffic control units should when practicable advise aircraft operators or their designated representatives when anticipated delays are expected to exceed 30 minutes.

6.4 INFORMATION FOR DEPARTING AIRCRAFT

6.4.1 Meteorological conditions

Information regarding significant changes in the meteorological conditions in the take-off or climb-out area, obtained by the unit providing approach control service after a departing aircraft has established communication with such unit, shall be transmitted to the aircraft without delay, except when it is known that the aircraft already has received the information.

Note.— *Significant changes in this context include those relating to surface wind direction or speed, visibility, runway visual range or air temperature (for turbine-engine aircraft), and the occurrence of thunderstorm or cumulonimbus, 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.*

6.4.2 Operational status of visual or non-visual aids

Information regarding changes in the operational status of visual or non-visual aids essential for take-off and climb shall be transmitted without delay to a departing aircraft, except when it is known that the aircraft already has received the information.

6.5 PROCEDURES FOR ARRIVINGAIRCRAFT

6.5.1 General

6.5.1.1 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.

6.5.1.2 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.

6.5.1.3 An IFR flight shall not be cleared for an initial approach below the appropriate minimum altitude as specified in the 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 controller has determined the aircraft's position by the use of an ATS surveillance system, and a lower minimum altitude has been specified for use when providing ATS surveillance services.

6.5.1.4 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.

Note.— *See Section 6.5.2 concerning Standard arrival clearances.*

6.5.1.5 After coordination with the approach control unit, the ACC may clear the first arriving aircraft for approach rather than to a holding fix.

6.5.2 Standard clearances for arriving aircraft

6.5.2.1 GENERAL

The ANSP should, wherever possible, establish standardized procedures for transfer of control between the ATC units concerned and standard clearances for arriving aircraft.

Note.— The provisions applying to standardized procedures for coordination and transfer of control are specified in Chapter 10, Section 10.4.1.

6.5.2.2 COORDINATION

6.5.2.2.1 Where standard clearances for arriving aircraft are in use and, provided no terminal delay is expected, clearance to follow the appropriate STAR will normally be issued by the ACC without prior coordination with or approval from the approach control unit or the aerodrome control tower as applicable.

6.5.2.2.2 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.

6.5.2.2.3 Provision shall be made to ensure that the approach control unit is at all times kept informed of the sequence of aircraft following the same STAR.

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

6.5.2.3 CONTENTS

Standard clearances for arriving aircraft shall contain the following items:

a) aircraft identification;
b) designator of the assigned STAR;
c) runway-in-use, except when part of the STAR description;
d) initial level, except when this element is included in the STAR description; and
e) any other necessary instructions or information not contained in the STAR description, e.g. change of communications.

6.5.2.4 DESCENT BELOW LEVELS SPECIFIED IN A STAR

Note.— See also 11.4.2.6.2.5.

When an arriving aircraft on a STAR is cleared to descend to a level lower than the level or the level(s) specified in a STAR, the aircraft shall follow the published vertical profile of a STAR, unless such restrictions are explicitly cancelled by ATC. Published minimum levels based on terrain clearance shall always be applied.

6.6 INFORMATION FOR ARRIVING AIRCRAFT

6.6.1 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 1 500 m (5 000 ft) or below the highest minimum sector altitude, whichever is greater; cumulonimbus; if the sky is obscured, vertical visibility when available;
5) air temperature;
6) dew point temperature;
7) altimeter setting(s);
8) any available information on significant meteorological phenomena in the approach area; and
9) trend-type landing forecast, when available.

Note.— *The meteorological information listed above is identical to that required in ATIS broadcasts for arriving aircraft as specified in ICAO Annex 11, 4.3.7 j) to r)* .

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.

6.6.2 In applying the provisions in 6.7.3.1.1, it should be recognized that information published by NOTAM or disseminated by other means may not have been received by the aircraft prior to departure or during en-route flight.

6.6.3 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.

6.6.4 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;

Note.— *Significant changes are specified in ICAO Annex 3, Chapter 4. However, if the controller possesses wind information in the form of components, the significant changes are:*

— *Mean head-wind component: 10 kt*
— *Mean tail-wind component: 2 kt*
— *Mean cross-wind component: 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.

6.6.5 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.

CHAPTER 7

ESSENTIAL INFORMATION ON AERODROME CONDITIONS

7.1 FUNCTIONS OF AERODROME CONTROL TOWERS

7.1.1 General

7.1.1.1 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.

7.1.1.2 Aerodrome controllers shall maintain a continuous watch on all flight operations on and in the vicinity of an aerodrome as well a vehicles and personnel on the manoeuvring area. Watch shall be maintained by visual observation, augmented in low visibility conditions by an ATS surveillance system when available. Traffic shall be controlled in accordance with the procedures set forth herein and all applicable traffic rules specified by the ANSP. If there are other aerodromes within a control zone, traffic at all aerodromes within such a zone shall be coordinated so that traffic circuits do not conflict.

7.1.1.3 The functions of an aerodrome control tower may be performed by different control or working positions, such as

— aerodrome operations on the runway and aircraft flying within the area of responsibility of the aerodrome control tower;
— ground controller, normally responsible for traffic on the manoeuvring area with the exception of runways;
— clearance delivery position, normally responsible for delivery of start-up and ATC clearances to departing IFR flights.

7.1.1.4 Where parallel or near-parallel runways are used for simultaneous operations, individual aerodrome controllers should be responsible for operations on each of the runways.

7.1.2 Alerting service provided by aerodrome control towers

7.1.2.1 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.

7.1.2.2 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.

7.1.2.3 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 or rescue sub-centre, in accordance with local instructions.

7.1.3 Information on the operational status of navigation services

ATS units shall be kept currently informed of the operational status of radio navigation services and visual aids essential for take-off, departure, approach and landing procedures within their area of responsibility and those radio navigation services and visual aids essential for surface movement.

7.1.4 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.

7.2 SELECTION OF RUNWAY-IN-USE

7.2.1 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.

Note.— *Separate or multiple runways may be designated runway-in-use for arriving aircraft and departing aircraft.*

7.2.2 Normally, an aircraft will land and take off into 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.

7.2.3 A runway for take-off or landing, appropriate to the operation, may be nominated for noise abatement purposes, the objective being to utilize whenever possible those runways that permit aero planes to avoid noise-sensitive areas during the initial departure and final approach phases of flight.

7.2.4 Runways should not be selected for noise abatement purposes for landing operations unless they are equipped with suitable glide path guidance, e.g. ILS, or a visual approach slope indicator system for operations in visual meteorological conditions.

7.2.5 A pilot-in-command, prompted by safety concerns, can refuse a runway offered for noise-preferential reasons.

7.2.6 Noise abatement shall not be a determining factor in runway nomination under the following circumstances:

a) if the runway surface conditions are adversely affected (e.g. by snow, slush, ice, water, mud, rubber, oil or other substances);
b) for landing in conditions:
   1) when the ceiling is lower than 150 m (500 ft) above aerodrome elevation, or the visibility is less than 1 900 m; or
   2) when the approach requires use to be made of vertical minima greater than 100 m (300 ft) above aerodrome elevation and:
      i) the ceiling is lower than 240 m (800 ft) above aerodrome elevation; or
      ii) the visibility is less than 3 000 m;
c) for take-off when the visibility is less than 1 900 m;
d) When wind shear has been reported or forecast or when thunderstorms are expected to affect the approach or departure; and
e) When the crosswind component, including gusts, exceeds 28 km/h (15 kt), or the tailwind component, including gusts, exceeds 9 km/h (5 kt).

7.3 INITIAL CALL TO AERODROME CONTROL TOWER

For aircraft being provided with aerodrome control service, the initial call shall contain:

a) designation of the station being called;
b) call sign and, for A380-800 aircraft, the expression “SUPER” and non-A380-800 HEAVY aircraft in the heavy wake turbulence category, the word “Heavy”;
c) position; and
d) additional elements, as required by the ANSP.

Note.— See also Chapter 4, 4.11.3.1, for aircraft in the air, making the first call to the aerodrome tower.

7.4 INFORMATION TO AIRCRAFT BY AERODROME CONTROL TOWERS

7.4.1 Information related to the operation of aircraft

7.4.1.1 START-UP TIME PROCEDURES

7.4.1.1.1 When so requested by the pilot prior to engine start, an expected take-off time should be given, unless engine start time procedures are employed.

7.4.1.1.2 Start-up time procedures should be implemented where necessary to avoid congestion and excessive delays on the manoeuvring area or when warranted by ATFM regulations. Start-up time procedures should be contained in local instructions, and should specify the criteria and conditions for determining when and how start-up times shall be calculated and issued to departing flights.

7.4.1.1.3 When an aircraft is subject to ATFM regulations, it should be advised to start up in accordance with its allocated slot time.

7.4.1.1.4 When delay for a departing aircraft is anticipated to be less than a time period specified by the ANSP, an aircraft should be cleared to start-up at its own discretion.

7.4.1.1.5 When delay for a departing aircraft is anticipated to exceed a time period specified by the ANSP, the aerodrome control tower should issue an expected start-up time to an aircraft requesting start-up.

7.4.1.1.6 A start-up clearance shall only be withheld under circumstances or conditions specified by the ANSP.

7.4.1.1.7 If a start-up clearance is withheld, the flight crew shall be advised of the reason.

7.4.1.2 AERODROME AND METEOROLOGICAL INFORMATION

7.4.1.2.1 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 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;
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.

Note.— *The meteorological information listed above is to follow the criteria used for meteorological local routine and special reports,*

7.4.1.2.2 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 in accordance with 7.4.1.2.1;
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.*

7.4.1.2.3 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.

Note.— *The meteorological information listed above is to follow the criteria used for meteorological local routine and special reports,*

7.4.1.3 ESSENTIAL LOCAL TRAFFIC INFORMATION

7.4.1.3.1 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.

7.4.1.3.2 Essential local traffic shall be considered to consist of any aircraft, vehicle or personnel on or near the manoeuvring area or traffic operating in the vicinity of the aerodrome, which may constitute a hazard to the aircraft concerned.

7.4.1.3.3 Essential local traffic shall be described so as to be easily identified.

7.4.1.4 RUNWAY INCURSION OR OBSTRUCTED RUNWAY

7.4.1.4.1 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 mayexpose the airplane to the risk of overrunning the runway. Moreover, a low altitude missed approach may expose the airplane to the risk of a tail strike. Pilots may, therefore, have to exercise their judgment in accordance with ICAO Annex2, 2.4 concerning the authority of the pilot-in-command of an aircraft.

7.4.1.4.2 Pilots and air traffic controllers shall report any occurrence involving an obstruction on the runway or a runway incursion.

Note 1 – Information regarding runway incursion and reporting forms together with instructions for their completion are contained in the Manual on the Prevention of Runway Incursions *(Doc 9870).*

Attention is drawn to the guidance for analysis; data collection and sharing of data related to runway incursions (see Chapter 5 of Doc 9870).

Note 2 – The provisions in 7.4.1.4.2 have the objective of supporting the State's safety programme and safety management system (SMS).

7.4.1.5 UNCERTAINTY OF POSITION ON THE MANOEUVRING AREA

7.4.1.5.1 Except as provided for in 7.4.1.5.2, a pilot in doubt as to the position of the aircraft with respect to the manoeuvring area shall immediately:

a) stop the aircraft; and
b) simultaneously notify the control tower of the circumstances (including the last known position).

7.4.1.5.2 In those situations where a pilot is in doubt as to the position of the aircraft with respect to the manoeuvring area, but recognizes that the aircraft is on a runway, the pilot shall immediately:

a) notify the control tower of the circumstances (including the last known position);
b) if able to locate a nearby suitable taxiway, vacate the runway as expeditiously as possible, unless otherwise instructed by the control tower; and then,
c) stop the aircraft.

7.4.1.5.3 A vehicle driver in doubt as to the position of the vehicle with respect to the manoeuvring area shall immediately:

a) notify the control tower of the circumstances (including the last known position);
b) simultaneously, unless otherwise instructed by the control tower, vacate the landing area, taxiway, or other part of the manoeuvring area, to a safe distance as expeditiously as possible; and then,
c) stop the vehicle.

7.4.1.5.4 In the event the aerodrome controller becomes aware of an aircraft or vehicle that is lost or uncertain of its position on the manoeuvring area, appropriate action shall be taken immediately to safeguard operations and assist the aircraft or vehicle concerned to determine its position.

7.4.1.6 WAKE TURBULENCE AND JET BLAST HAZARDS

7.4.1.6.1 Aerodrome controllers shall, when applicable, apply the wake turbulence separation minima specified in Chapter 5, Section 5.8. 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. Information on hazards due to wake vortices is contained in the* Air Traffic Services

Planning Manual *(Doc 9426), Part II, Section 5. Wake turbulence categories of aircraft are specifiedin Chapter 4, 4.9.1.*

7.4.1.6.2 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.*

7.4.1.7 ABNORMAL AIRCRAFT CONFIGURATION AND CONDITION

7.4.1.7.1 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.

7.4.1.7.2 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.

7.5 ESSENTIAL INFORMATION ON AERODROME CONDITIONS

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

7.5.2 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.

7.5.3 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) water on a runway, a taxiway or an apron;
d) other temporary hazards, including parked aircraft and birds on the ground or in the air;
e) failure or irregular operation of part or all of the aerodrome lighting system;
f) any other pertinent information.

7.5.4 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.

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

7.6 CONTROL OF AERODROME TRAFFIC

7.6.1 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.

7.6.2 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.

Position 1. Aircraft initiates call to taxi for departing flight. Runway-in-use information and taxi clearances given.

Position 2. If there is conflicting traffic, the departing aircraft will be held at this

position. Engine run-up will, when required, normally be performed here.

Position 3. Take-off clearance is issued here, if not practicable at position 2.

Position 4. Clearance to land is issued here as practicable.

Position 5. Clearance to taxi to apron is issued here.

Position 6. Parking information issued here, if necessary.

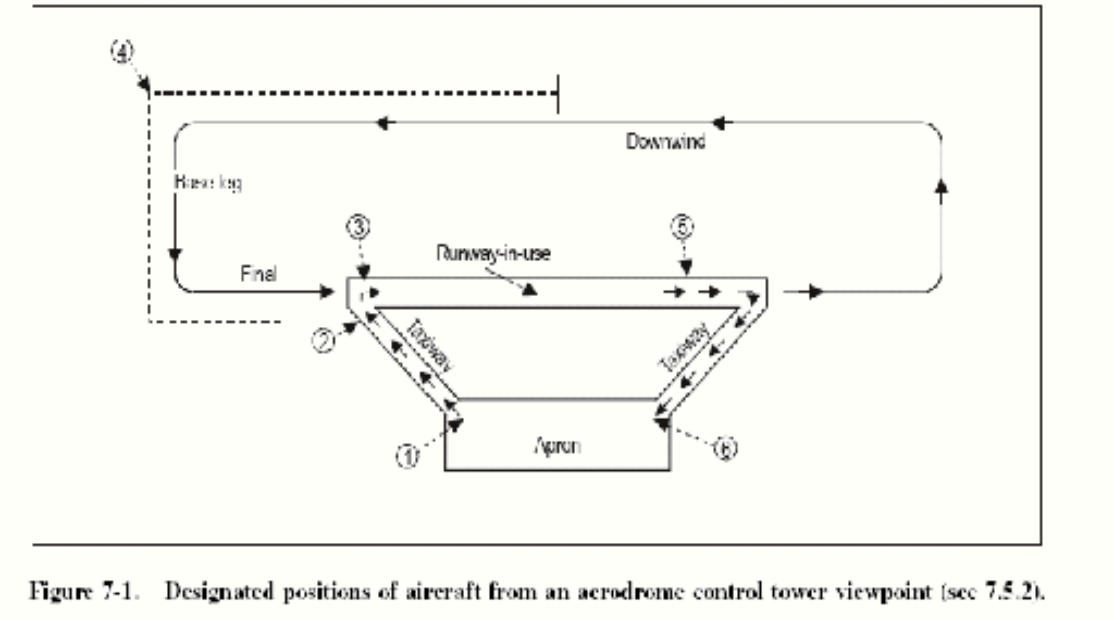

Figure 7-1. Designated positions of aircraft from an aerodrome control tower viewpoint (see 7.5.2).

7.6.3 Traffic on the manoeuvring area

7.6.3.1 CONTROL OF TAXIING AIRCRAFT

7.6.3.1.1 *TAXI CLEARANCE*

7.6.3.1.1.1 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.

7.6.3.1.1.2 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.

7.6.3.1.1.3 The ANSP should whenever practicable publish in Ethiopia AIP standard taxi routes to be used at an aerodrome. Standard taxi routes

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

7.6.3.1.1.4 Where standard taxi routes have not been published, a taxi route should, wherever 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.

7.6.3.1.2 *TAXIING ON A RUNWAY-IN-USE*

7.6.3.1.2.1 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.

7.6.3.1.2.2 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.

7.6.3.1.3 *USE OF RUNWAY-HOLDING POSITIONS*

7.6.3.1.3.1 Except as provided in 7.5.3.1.3.2 or as prescribed by the ANSP, aircraft shall not be held closer to a runway-in-use than at a runway-holding position.

Note .— *Runway-holding position locations in relation to runways are specified in ICAO Annex 14, Volume I, Chapter 5.*

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

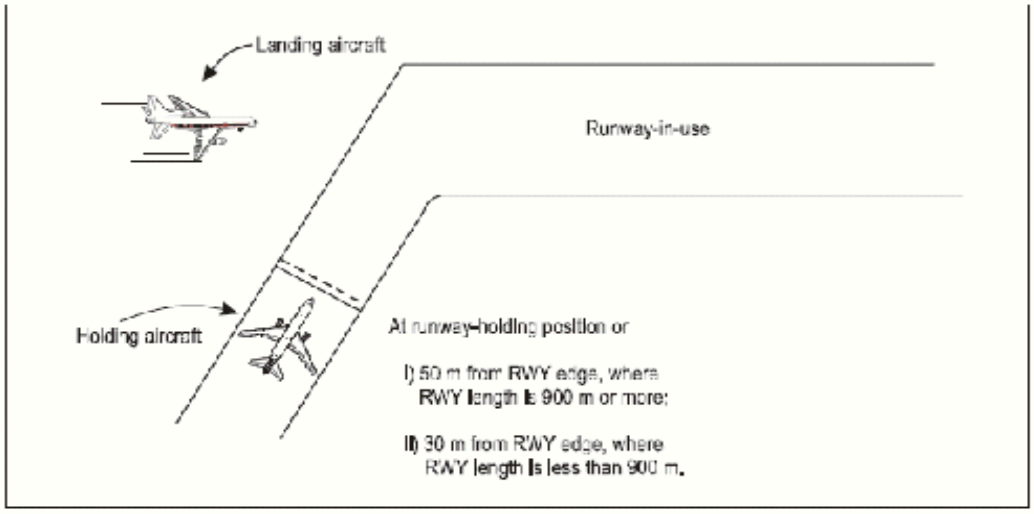

Figure 7-2. Method of holding aircraft (see 7.5.3.1.3.2)

7.6.4 COMMUNICATION REQUIREMENTS AND VISUAL SIGNALS

7.6.4.1 At controlled aerodromes all vehicles employed on the manoeuvring 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 manoeuvring 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.

7.6.4.2 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:

Light signal from aerodrome control	Meaning
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 manoeuvring area in accordance with local instructions

7.6.4.3 In emergency conditions, the signal given hereunder shall be used for runways or taxiways equipped with a lighting system and shall have the meaning indicated therein.

Light signal from aerodrome control	Meaning
Flashing runway or taxiway lights	Vacate the runway and observe the tower for light signal

7.6.4.4 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.

7.6.5 PROCEDURES FOR LOW VISIBILITY OPERATIONS

7.6.5.1 Control of aerodrome surface traffic in conditions of low visibility

Note.— *These procedures apply whenever conditions are such that all or part of the manoeuvring area cannot be visually monitored from the control tower.*

7.6.5.1.1 When there is a requirement for traffic to operate on the manoeuvring area in conditions of visibility which prevent the aerodrome control tower from applying visual separation between aircraft, and between aircraft and vehicles, the following shall apply:

7.6.5.1.2 At the intersection of taxiways, an aircraft or vehicle on a taxiway shall not be permitted to hold closer to the other taxiway than the holding position limit defined by a clearance bar, stop bar or taxiway intersection marking according to the specifications in ICAO Annex 14, Volume I, Chapter 5.

7.6.5.1.1.2 The longitudinal separation on taxiways shall be as specified for each particular aerodrome by the ANSP. This separation shall take into account the characteristics of the aids available for surveillance and control of ground traffic, the complexity of the aerodrome layout and the characteristics of the aircraft using the aerodrome.

7.7 AERONAUTICAL GROUND LIGHTS

7.7.1 Operation

7.7.2 General

7.7.2.1 All aeronautical ground lights shall be operated, except as provided in7.7.2.2 and 7.7.3:

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.

7.7.2.2 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.

7.7.2.3 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.7.7.3 Approach lighting7.7.3.1

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

7.7.3.2 The lights of a visual approach slope indicator system shall be operated during the hours of daylight as well as of darkness and irrespective

7.7.4 Runway lighting

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

7.7.4.1 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.

7.7.4.2 If runway lighting is not operated continuously, lighting following a takeoff 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.

7.7.9 Monitoring of visual aids

7.7.9.1 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.

7.7.9.2 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.

CHAPTER 8

ATS surveillance services
Under development

CHAPTER 9

FLIGHT INFORMATION SERVICE

9.1 FLIGHT INFORMATION SERVICE

9.1.1 Recording and transmission of information on the progress of flights Information on the actual progress of flights, including those of heavy or medium unmanned free balloons, under neither air traffic control service nor air traffic advisory service shall be:

a) recorded by the air traffic services unit serving the FIR within which the aircraft is flying in such a manner that it is available for reference and in case it is requested for search and rescue action;
b) transmitted by the air traffic services unit receiving the information to other air traffic services units concerned, when so required in accordance with Chapter 10, 10.2.2.

9.1.2 Transfer of responsibility for the provision of flight information service The responsibility for the provision of flight information service to a flight normally passes from the appropriate ATS unit in an FIR to the appropriate ATS unit in the adjacent FIR at the time of crossing the common FIR boundary. However, when coordination is required, but communication facilities are inadequate, the former ATS unit shall, as far as practicable, continue to provide flight information service to the flight until it has established two-way communication with the appropriate ATS unit in the FIR it is entering.

9.1.3 Transmission of information

9.1.3.1 MEANS OF TRANSMISSION

9.1.3.1.1 Except as provided in 9.1.3.2.1, information shall be disseminated to aircraft by one or more of the following means as determined by the ANSP:

a) the preferred method of directed transmission on the initiative of the appropriate ATS unit to an aircraft, ensuring that receipt is acknowledged; or
b) a general call, unacknowledged transmission to all aircraft concerned; or
c) broadcast; or
d) data link.

Note.— It should be recognized that in certain circumstances, e.g. during the last stages of a final approach, it may be impracticable for aircraft to acknowledge directed transmissions.

9.1.3.1.2 The use of general calls shall be limited to cases where it is necessary to disseminate essential information to several aircraft without delay, e.g. the sudden occurrence of hazards, a change of the runway-in-use, or the failure of a key approach and landing aid.

9.1.3.2 TRANSMISSION OF SPECIAL AIR-REPORTS AND SIGMET INFORMATION

9.1.3.2.1 Appropriate SIGMET and special air-reports, which have not been used for the preparation of a SIGMET, shall be disseminated to aircraft by one or more of the means specified in 9.1.3.1.1 as determined on the basis of regional air navigation agreements. Special air-reports shall be disseminated to aircraft for a period of 60 minutes after their issuance.

9.1.3.2.2 The special air-report and SIGMET information to be passed to aircraft on ground initiative should cover a portion of the route up to one hour's flying

time ahead of the aircraft except when another period has been determined on the basis of regional air navigation agreements.

9.1.3.3 TRANSMISSION OF INFORMATION CONCERNING VOLCANIC ACTIVITY

Information concerning pre-eruption volcanic activity, volcanic eruptions and volcanic ash clouds (position of clouds and flight levels affected) shall be disseminated to aircraft by one or more of the means specified in 9.1.3.1.1 as determined on the basis of regional air navigation agreements.

9.1.3.4 TRANSMISSION OF INFORMATION CONCERNING RADIOACTIVE MATERIALS AND TOXIC CHEMICAL CLOUDS

Information on the release into the atmosphere of radioactive materials or toxic chemicals, which could affect airspace within the area of responsibility of the ATS unit, shall be transmitted to aircraft by one or more of the means specified in 9.1.3.1.1.

9.1.3.5 TRANSMISSION OF SPECI AND AMENDED TAF

9.1.3.5.1 Special reports in the SPECI code form and amended TAF shall be transmitted on request and supplemented by:

a) directed transmission from the appropriate air traffic services unit of selected special reports and amended TAF for the departure, destination and its alternate aerodromes, as listed in the flight plan; or
b) a general call on appropriate frequencies for the unacknowledged transmission to affected aircraft of selected special reports and amended TAF; or
c) continuous or frequent broadcast or the use of data link to make available current METAR and TAF in areas determined on the basis of regional air navigation agreements where traffic congestion dictates. VOLMET broadcasts and/ or D-VOLMET should be used to serve this purpose (see ICAO Annex 11, 4.4).

9.1.3.5.2 The passing of amended aerodrome forecasts to aircraft on the initiative of the appropriate air traffic services unit should be limited to that portion of the flight where the aircraft is within a specified time from the aerodrome of destination, such time being established on the basis of regional air navigation agreements.

9.1.3.6 TRANSMISSION OF INFORMATION ON HEAVY OR MEDIUM UNMANNED FREE BALLOONS

Note: This section is reserved.

9.1.3.7 TRANSMISSION OF INFORMATION TO SUPERSONIC AIRCRAFT

Note: This section is reserved.

9.1.4 Air traffic advisory service

Note: This section is reserved.

9.2 ALERTING SERVICE

9.2.1 Aircraft

Note.— Whenever applied, the procedures for the provision of air traffic control service take the place of the following procedures, except when relevant procedures do not call for more than hourly position reports, in which case the Operations normal *procedure applies.*

9.2.1.1 When so required by the ANSP to facilitate the provision of alerting and search and rescue services, an aircraft, prior to and when operating within or into designated areas or along designated routes, shall comply with the provisions detailed in ICAO Annex 2, Chapter 3, concerning the submission, completion, changing and closing of a flight plan.

9.2.1.2 In addition to the above, aircraft equipped with suitable two-way radio communications shall report during the period twenty to forty minutes following the time of last contact, whatever the purpose of such contact,

merely to indicate that the flight is progressing according to plan, such report to comprise identification of the aircraft and the words "Operations normal" or the signal QRU.

9.2.1.3 The "Operations normal" message shall be transmitted air-ground to an appropriate air traffic services unit (e.g. normally to the aeronautical telecommunication station serving the air traffic services unit in charge of the FIR in which the aircraft is flying, otherwise to another aeronautical telecommunication station to be retransmitted as required to the air traffic services unit in charge of the FIR).

9.2.1.4 It may be advisable, in case of a SAR operation of a substantial duration, to promulgate by NOTAM the lateral and vertical limits of the area of SAR action, and to warn aircraft not engaged in actual SAR operations and not controlled by air traffic control to avoid such areas unless otherwise authorized by the appropriate ATS unit.

9.2.2 Air traffic services units

9.2.2.1 When no report from an aircraft has been received within a reasonable period of time (which may be a specified interval prescribed on the basis of regional air navigation agreements) after a scheduled or expected reporting time, the ATS unit shall, within the stipulated period of thirty minutes, endeavour to obtain such report in order to be in a position to apply the provisions relevant to the "Uncertainty Phase", "Alert Phase" or "Distress Phase" (ICAO Annex 11, 5.2.1 refers) should circumstances warrant such application.

9.2.2.2 When alerting service is required in respect of a flight operated through more than one FIR or control area, and when the position of the aircraft is in doubt, responsibility for coordinating such service shall rest with the ATS unit of the FIR or control area:

1) within which the aircraft was flying at the time of last air-ground radio contact;

2) that the aircraft was about to enter when last air-ground contact was established at or close to the boundary of two FIRs or control areas;
3) within which the aircraft's intermediate stop or final destination point is located:

    a) if the aircraft was not equipped with suitable two-way radio communication equipment; or
    b) was not under obligation to transmit position reports.

9.2.2.3 The unit responsible for alerting service, in accordance with 9.2.2.2, shall:

- notify units providing alerting service in other affected FIRs or control areas of the emergency phase or phases, in addition to notifying the rescue coordination centre associated with it;
- request those units to assist in the search for any useful information pertaining to the aircraft presumed to be in an emergency, by all appropriate means and especially those indicated in 5.3 of ICAO Annex 11 (Use of communication facilities);
- collect the information gathered during each phase of the emergency and, after verifying it as necessary, transmit it to the rescue coordination centre;
- announce the termination of the state of emergency as circumstances dictate.

9.2.2.4 In obtaining the necessary information as required under 5.2.2.1 of ICAO Annex 11, attention shall particularly be given to informing the relevant rescue coordination centre of the distress frequencies available to survivors, as listed in Item 19 of the flight plan but not normally transmitted.

CHAPTER 10

PROCEDURES RELATED TO EMERGENCIES, COMMUNICATION FAILURE AND CONTINGENCIES

10.1 EMERGENCY PROCEDURES

10.1.1 General

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

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

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

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

10.1.1.3 Changes of radio frequency and SSR code should be avoided if possible and should normally be made only when or if an improved service can be provided to the aircraft concerned. Manoeuvring instructions to an aircraft experiencing engine failure should be limited to a minimum. When appropriate, other aircraft operating in the vicinity of the aircraft in emergency should be advised of the circumstances.

Note.— Requests to the flight crew for the information contained in 10.1.1.2 e) will be made only if the information is not available from the operator or from other sources and will be limited to essential information.

10.1.2 Priority

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

10.1.3 Unlawful interference and aircraft bomb threat

10.1.3.1 Air traffic services personnel shall be prepared to recognize any indication of the occurrence of unlawful interference with an aircraft.

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

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

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

10.1.3.3.1 ATS units shall also:

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

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

d) notify:

1) the operator or its designated representative;
2) the appropriate rescue coordination centre in accordance with appropriate alerting procedures;
3) other appropriate State authority;
4)

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

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

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

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

a) if in direct communication with the aircraft, advise the flight crew without delay of the threat and the circumstances surrounding the threat; or

b) if not in direct communication with the aircraft, advise the flight crew by the most expeditious means through other ATS units or other channels.

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

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

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

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

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

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

followed to the parking position. This route shall be selected with a view to minimizing any security risks to the public, other aircraft and installations at the aerodrome.

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

10.1.4 Emergency descent

10.1.4.1 GENERAL

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

10.1.4.2 ACTION BY THE PILOT-IN-COMMAND

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

10.1.4.3 SUBSEQUENT ACTION BY THE AIR TRAFFIC CONTROL UNIT

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

10.2 SPECIAL PROCEDURES FOR IN-FLIGHT

10.2.1 Introduction

10.2.1.1 Although all possible contingencies cannot be covered, the procedures in 10.2.2 and 10.2.3 provide for the more frequent cases such as:

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

10.2.1.2 With regard to 10.2.1.1 a) and b), the procedures are applicable primarily when descent and/or turn back or diversion is required. The pilot shall take actions as necessary to ensure the safety of the aircraft and the pilot's judgment shall determine the sequence of actions to be taken, having regard to the prevailing circumstances.
Air traffic control shall render all possible assistance.

10.2.2 General procedures

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

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

10.2.2.3 If prior clearance cannot be obtained until a revised clearance is received, the following contingency procedures should be employed and the pilot shall advise air traffic control as soon as practicable, reminding of the type of aircraft involved and the nature of the problem. In general terms, the aircraft should flown at a

flight level and on an offset track where other aircraft are least likely to be encountered.

Specifically, the pilot shall:

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

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

d) having initiated the turn,

   1) if unable to maintain the assigned flight level, initially minimize the rate of descent to the extent that is operationally feasible (pilots should take into account the possibility that aircraft below on the same track may be flying a 1 or 2 NM strategic lateral offset procedures (SLOP)) and select a final altitude which differs from those normally used by 500 ft if at or below FL 410, or by 1000 ft if above FL 410; or
   2) if able to maintain the assigned flight level, once the aircraft has deviated 10NM from the assigned track centreline, climb or descend to select a flight level which differs from those normally used by 500 ft, if at or below FL 410, or by 1 000 ft if above FL 410;

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

f) Maintain a watch for conflicting traffic both visually and by reference to ACAS (if equipped);
g) turn on all aircraft exterior lights (commensurate with appropriate operating limitations); and
h) keep the SSR transponder on at all times.

10.2.2.3.1 When leaving the assigned track:

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

1) Operational limitations on bank angles at cruising altitudes will normally result in overshooting the track to be acquired. In such cases a continuous turn should be extended beyond 180 degrees heading change, in order to re-intercept the offset contingency track as soon as operationally feasible; and
2) furthermore, if executing such a turn back in a 30 NM lateral separation route structure, extreme caution pertaining to opposite direction traffic on adjacent routes must be exercised and any climb or descent, as specified in 10.2.2.3 b) 2), should be completed preferably before approaching within 10 NM of any adjacent ATS route.

10.2.2.4 EXTENDED RANGE OPERATIONS BY AEROPLANES WITH TWO-TURBINE POWER-UNITS (ETOPS)

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

10.2.3 Weather deviation procedures

10.2.3.1 GENERAL

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

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

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

10.2.3.1.2 ACTIONS TO BE TAKEN WHEN CONTROLLER-PILOT COMMUNICATIONS ARE ESTABLISHED

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

10.2.3.2.2 ATC should take one of the following actions:

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

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

10.2.3.2.3 The pilot should take the following actions:

a) comply with the ATC clearance issued; or
b) Advise ATC of intentions and execute the procedures detailed in 10.2.3.3.

10.2.3.3 ACTIONS TO BE TAKEN IF A REVISED ATC CLEARANCE CANNOT

BE OBTAINED

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

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

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

Note.— If, as a result of actions taken under the provisions of 10.2.3.3.1 b) and c), the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

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

10.3 AIR-GROUND COMMUNICATIONS FAILURE

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

Note 3.— See also Chapter 6, 6.3.2.5, concerning departure clearances containing no geographical or time limit for an initial level and procedures to be applied in relation to an aircraft experiencing air ground communication failure under such circumstances.

Note 4. — See also Chapter 5, 5.4.2.6.3.2, for additional requirements applying to communication failure during the application of the 50 NM longitudinal RNAV/RNP 10 separation minimum.

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

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

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

a) if in visual meteorological conditions:

1) continue to fly in visual meteorological conditions;
2) land at the nearest suitable aerodrome; and
3) report its arrival by the most expeditious means to the appropriate air traffic control unit; or

b) if in instrument meteorological conditions or when conditions are such that it does not appear likely that the pilot will complete the flight in accordance with a):

1) in airspace where procedural separation is being applied, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 20 minutes following the aircraft's failure to report its position over a compulsory reporting point and thereafter adjust level and speed in accordance with the filed flight plan; or
2) in airspace where an ATS surveillance system is used in the provision of air traffic control, maintain the last assigned speed and level, or minimum flight altitude if higher, for a period of 7 minutes following:

i. the time the last assigned level or minimum flight altitude is reached; or
ii. the time the transponder is set to Code 7600 or the ADS-B transmitter is set to indicate the loss of air-ground communications; or
iii. the aircraft's failure to report its position over a compulsory reporting point; whichever is later and thereafter adjust level and speed in accordance with the filed flight plan;

3) when being vectored or having been directed by ATC to proceed offset using RNAV without a specified limit, proceed in the most direct manner possible to rejoin the current flight plan route no later than the next significant point, taking into consideration the applicable minimum flight altitude;
4) proceed according to the current flight plan route to the appropriate designated navigation aid or fix serving the destination aerodrome and, when required to ensure compliance with 5), hold over this aid or fix until commencement of descent;
5) commence descent from the navigation aid or fix specified in 4) at, or as close as possible to, the expected approach time last received and acknowledged; or, if no expected approach time has been received and

acknowledged, at, or as close as possible to, the estimated time of arrival resulting from the current flight plan;

6) complete a normal instrument approach procedure as specified for the designated navigation aid or fix; and
7) Land, if possible, within 30 minutes after the estimated time of arrival specified in 5) or the last acknowledged expected approach time, whichever is later.

10.3.4 Action taken to ensure suitable separation shall cease to be based on the assumption stated in 10.3.3 when:

a) it is determined that the aircraft is following a procedure differing from that in 10.3.3; or
b) through the use of electronic or other aids, air traffic control units determine that action differing from that required by 10.3.3 may be taken without impairing safety; or
c) Positive information is received that the aircraft has landed.

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

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

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

10.3.7 As soon as it is known that an aircraft which is operating in its area of responsibility is experiencing an apparent radio communication failure, an air traffic services unit shall forward information concerning the radio

communication failure to all air traffic services units concerned along the route of flight. The ACC in whose area the destination aerodrome is located shall take steps to obtain information on the alternate aerodrome(s) and other relevant information specified in the filed flight plan, if such information is not available.

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

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

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

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

designated representatives, and pilots-in-command of aircraft to determine whether they will resume normal operations or take other action.

10.4 ASSISTANCE TO VFR FLIGHTS

10.4.1 Strayed VFR flights and VFR flights encountering adverse meteorological conditions

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

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

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

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

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

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

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

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

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

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

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

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

d) instructions or suggestions to reduce speed of the aircraft or to lower the landing gear, should, if possible, be carried out clear of cloud.

10.5 OTHER IN-FLIGHT CONTINGENCIES

Note.— The texts of 10.5.1 and 10.5.2 are reproduced from ICAO Annex 11, Chapter 2, and have the status of Standards.

10.5.1 Strayed or unidentified aircraft

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

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

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

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

Note 3.— A strayed or unidentified aircraft may be suspected as being the subject of unlawful interference. See ICAO Annex 11, 2.24.1.3.

10.5.1.1 As soon as an air traffic services unit becomes aware of a strayed aircraft, it shall take all necessary steps as outlined in 10.5.1.1.1 and 10.5.1.1.2 to assist the aircraft and to safeguard its flight.

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

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

a) attempt to establish two-way communication with the aircraft, unless such communication already exists;
b) use all available means to determine its position;

c) inform other ATS units into whose area the aircraft may have strayed or may stray, taking into account all the factors which may have affected the navigation of the aircraft in the circumstances;
d) inform, in accordance with locally agreed procedures, appropriate military units and provide them with pertinent flight plan and other data concerning 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).

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

a) advise the aircraft of its position and corrective action to be taken; and
b) provide, as necessary, other ATS units and appropriate military units with relevant information concerning the strayed aircraft and any advice given to that aircraft.

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

a) attempt to establish two-way communication with the aircraft;
b) inquire of other air traffic services units within the 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.

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

Note.— Requirements for coordination between military authorities and air traffic services are specified in ICAO Annex 11, 2.16.

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

10.5.2 Interception of civil aircraft

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

a) attempt to establish two-way communication with the intercepted aircraft via any means available, including the emergency frequency 121.5 MHz, unless such communication already exists;
b) inform the pilot of the intercepted aircraft of the interception;
c) establish contact with the intercept control unit maintaining two-way communication with the intercepting aircraft and provide it with available information concerning the aircraft;
d) relay messages between the intercepting aircraft or the intercept control unit and the intercepted aircraft, as necessary;
e) in close coordination with the intercept control unit take all necessary steps to ensure the safety of the intercepted aircraft; and
f) inform ATS units serving adjacent FIRs if it appears that the aircraft has strayed from such adjacent FIRs.

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

a) inform the ATS unit serving the airspace in which the interception is taking place, providing this unit with available information that will assist in identifying the aircraft and requesting it to take action in accordance with 10.5.2.1;
b) relay messages between the intercepted aircraft and the appropriate ATS unit, the intercept control unit or the intercepting aircraft.

10.5.3 Fuel dumping

10.5.3.1 GENERAL

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

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

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

10.5.3.2 SEPARATION

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

a) at least 19 km (10 NM) horizontally, but not behind the aircraft dumping fuel;
b) vertical separation if behind the aircraft dumping fuel within 15 minutes flying time or a distance of 93 km (50 NM) by:

1) at least 300 m (1 000 ft) if above the aircraft dumping fuel; and
2) at least 900 m (3 000 ft) if below the aircraft dumping fuel.

Note.— The horizontal boundaries of the area within which other traffic requires appropriate vertical separation extend for 19 km (10 NM) either side of the track flown by the aircraft which is dumping fuel, from 19 km (10 NM) ahead, to 93 km (50 NM) or 15 minutes along track behind it (including turns).

10.5.3.3 COMMUNICATIONS

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

10.5.3.4 INFORMATION TO OTHER ATS UNITS AND NON-CONTROLLED TRAFFIC

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

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

10.6 ATC CONTINGENCIES

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

10.6.1 Radio communications contingencies

10.6.1.1 GENERAL

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

10.6.1.2 GROUND RADIO FAILURE

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

a) where aircraft are required to keep a listening watch on the emergency frequency 121.5 MHz, attempt to establish radio communications on that frequency;
b) without delay inform all adjacent control positions or ATC units, as applicable, of the failure;
c) appraise such positions or units of the current traffic situation;
d) if practicable, request their assistance, in respect of aircraft which may establish communications with those positions or units, in establishing separation between and maintaining control of such aircraft; and
e) instruct adjacent control positions or ATC units to hold or re-route all controlled flights outside the area of responsibility of the position or ATC unit that has experienced the failure until such time that the provision of normal services can be resumed.

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

10.6.1.3 BLOCKED FREQUENCY

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

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

10.6.1.4 UNAUTHORIZED USE OF ATC FREQUENCY

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

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

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

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

10.7 OTHER ATC CONTINGENCY PROCEDURES

10.7.1 Emergency separation

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

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

10.7.2 Short-term conflict alert (STCA) procedures

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

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

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

a) the types of flight which are eligible for generation of alerts;
b) the sectors or areas of airspace within which the STCA function is implemented;
c) the method of displaying the STCA to the controller;

d) in general terms, the parameters for generation of alerts as well as alert warning time;
e) the volumes of airspace within which STCA can be selectively inhibited and the conditions under which this will be permitted;
f) conditions under which specific alerts may be inhibited for individual flights;
g) and
h) procedures applicable in respect of volume of airspace or flights for which
i) STCA or specific alerts have been inhibited.

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

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

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

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

10.7.3.1 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.

10.7.3.2 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".

10.7.3.3 Once an aircraft departs from its ATC clearance or instruction in compliance with an RA, or a pilot reports an RA, the 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.

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

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

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

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

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

10.7.4 Minimum safe altitude warning (MSAW) procedures

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

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

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

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

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

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

10.7.4.3 Following an MSAW event, controllers should complete an air traffic incident report only in the event that a minimum safe altitude was unintentionally

infringed with a potential for controlled flight into terrain by the aircraft concerned.

10.7.5 Change of radiotelephony call sign for aircraft

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

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

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

10.7.5.3 When an ATC unit changes the type of call sign of an aircraft, that unit shall ensure that the aircraft reverts to the call sign indicated by the flight plan when the aircraft is transferred to another ATC unit, except when the call sign change has been coordinated between the two ATC units concerned.

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

CHAPTER 11

MISCELLANEOUS PROCEDURES

11.1 RESPONSIBILITY IN REGARD TO MILITARY TRAFFIC

11.1.1 It is recognized that some military aeronautical operations necessitate noncompliance with certain air traffic procedures. In order to ensure the safety of flight operations the appropriate military authorities shall be asked, whenever practicable, to notify the proper air traffic control unit prior to undertaking such maneuvers.

11.1.2 A reduction of separation minima required by military necessity or other extraordinary circumstances shall only be accepted by an air traffic control unit when a specific request in some recorded form has been obtained from the authority having jurisdiction over the aircraft concerned and the lower minima then to be observed shall apply only between those aircraft. Some recorded form of instruction fully covering this reduction of separation minima shall be issued by the air traffic control unit concerned.

11.1.3 Aircraft shall not be flown in formation except by prearrangement among the pilots-in-command of the aircraft taking part in the flight and, for formation flight in controlled airspace, in accordance with the following conditions:

a) the formation operates as a single aircraft with regard to navigation and position reporting;
b) separation between aircraft in the flight shall be the responsibility of the flight leader and the pilots-in-command of the other aircraft in the flight and shall include periods of transition when aircraft are manoeuvring to attain their own separation within the formation and during join-up and breakaway; and
c) a distance not exceeding 1 km (0.5 NM) laterally and longitudinally and 30 m (100 ft) vertically from the flight leader shall be maintained by each aircraft.

11.1.4 Temporary airspace reservation, either stationary or mobile, may be established for the use of large formation flights or other military air operations. Arrangements for the reservation of such airspace as well as safe access by other airspace users to such reserved airspace shall be accomplished by coordination between the user and the ANSP. Additionally, the coordination of other activities potentially hazardous to civil aircraft shall be effected in accordance with the provisions of ICAO Annex 11, Chapter2 and completed early enough to permit timely promulgation of information in accordance with the provisions of ICAO Annex 15.

11.2 RESPONSIBILITY IN REGARD TO UNMANNED FREE BALLOONS

11.2.1 On receipt of notification of the intended flight of a medium or heavy unmanned free balloon, the air traffic services unit shall arrange for the information to be disseminated to all concerned. The information shall include:

a) the balloon flight identification or project code name;
b) balloon classification and description;
c) SSR code or NDB frequency as applicable;
d) the launch site;
e) the estimated time of the commencement of the launch or the planned period of the launches;
f) the expected direction of ascent;

g) the cruising level(s) (pressure-altitude); and
h) the estimated elapsed time to pass 18 000 m (60 000 ft) pressure-altitude, or to reach cruising level if at or below 18 000 m (60 000 ft), together with the estimated location.

11.2.2 On receipt of notification that a medium or heavy unmanned free balloon has been launched, the air traffic services unit shall arrange for the information to be disseminated to all concerned. The information shall include:

a) the balloon flight identification or project code name;
b) balloon classification and description;
c) SSR code or NDB frequency as applicable;
d) the launch site;
e) the time of launch(es);
f) the estimated time at which 18 000 m (60 000 ft) pressure-altitude will be passed, or the estimated time at which the cruising level will be reached if at or below 18 000 m (60 000 ft), and the estimated location;
g) the estimated date and time of termination of the flight; and
h) the planned location of ground contact, when applicable.

11.2.3 When there is reasonable expectation that a heavy or medium unmanned free balloon will cross international borders, the appropriate ATS unit shall arrange for the pre-launch and the launch notifications to be sent by NOTAM to the ATS unit(s) in the State(s) concerned. The launch notification may be transmitted orally by direct ATS speech circuit between the ACCs/flight information centers involved.

11.2.4 Air traffic services units shall maintain radar and/or ADS-B surveillance of medium and heavy unmanned free balloons to the extent possible and, if necessary and on the request of the pilot of an aircraft, provide separation using an ATS surveillance system between the aircraft and such balloons which are identified or their exact position is known.

11.3 AIR TRAFFIC INCIDENT REPORT

11.3.1 An air traffic incident report shall be submitted to the air traffic services unit concerned for or incidents specifically related to the provision of air traffic services involving such occurrences as aircraft proximity (AIRPROX), or other serious difficulty resulting in a hazard to aircraft, caused by, among others, faulty procedures, non-compliance with procedures, or failure of ground facilities.

11.3.2 Procedures shall be established for the reporting of aircraft proximity incidents and their investigation to ensure high standards of safety in the conduct and control of air traffic. The degree of risk involved in aircraft proximity should be determined in the incident investigation and classified as "risk of collision", "safety not assured", "no risk of collision" or "risk not determined".

11.3.3 Aircraft accidents and incidents are often reported through ATS channels.
Such reports and any associated information shall be recorded by the unit concerned and forwarded to the Aerodrome and Air Navigation Services Regulation (AAR) Division.

Note.— A model air traffic incident report form together with instructions for its completion is at Appendix 4. Further information regarding air traffic incidents is contained in the Air Traffic Services Planning Manual *(Doc 9426)*.

11.3.4 The following categories of occurrences, which are not exhaustive and only serve as guidance, shall be reported to AAR:

(a) Accidents, for example:
  (i) Mid Air collision
  (ii) Controlled Flight into Terrain (CFIT)
  (iii) Collision on the ground between aircraft
  (iv) Collision between an airborne aircraft and vehicle/another aircraft on the ground
  (v) Collision on the ground between aircraft and vehicle, person, or obstruction(s)

(vi) Other accidents of special interest would include "losses of control in flight", due to VORTEX or meteorological conditions.

(b) Incidents, for example:

(i) Instances of near collision (encompassing specific situations where one aircraft and another aircraft/ground terrain/ vehicle/person or object are to be too close to each other) such as:

- Separation minima infringement
- Runway incursion where avoiding action was necessary

(ii) Controlled flight into terrain only marginally avoided.

(iii) Take-offs or aborted take-offs on a closed or engaged runway, on a taxiway or unassigned runway.

(iv) Landings or attempted landings on a closed or engaged runway, on a taxiway or unassigned runway.

(v) Take-off or landing incidents. Incidents such as undershooting, overrunning or running off the side of runways.

(vi) Potential for collision or near collision (encompassing specific situations having the potential to be an accident or a near collision, if another aircraft is in the vicinity):

- Runway incursion where no avoiding action is necessary
- Aircraft deviation from ATC clearance
- Aircraft deviation from applicable ATM regulation
  - Aircraft deviation from applicable published ATM procedures
  - Unauthorized penetration of airspace
  - Deviation from aircraft ATM-related equipment carriage and operations, as mandated in applicable regulation(s)

11.3.5 The example of incidents given in 11.3.4 (b) above may be classified as serious incidents depending on the severity and the risk posed by the occurrences.

11.4 ATS OPERATIONS MANUAL

11.4.1 The ANSP shall provide, for compliance by its personnel, an operations manual or system of manuals for the services listed in its operations manual. The operations manual also serves as a reference document for AAR with respect to the standards, conditions and level of service to be maintained for air traffic services.

11.4.2 The contents of the operations manual should contain:

(a) A description of the provider's organizational structure and the names, qualifications, experience and positions of the key officers of the organization; (b) A statement of the duties and responsibilities of the supervisory positions within the organizational structure;
(b) A statement showing how the provider determines the number of operational staff required, including the number of operational supervisory staff;
(c) A statement setting out the air traffic services, and related functions, that the provider will perform;
(d) The hours of operation of each service;
(e) The airspace within which each service is to be provided. This may be by reference to an aeronautical chart;
(f)If the service is an air traffic service for a controlled aerodrome:
  (i) a chart of the manoeuvring area of the aerodrome showing all runways, taxiways, parking areas, etc.
  (ii) extracts from the Airport Emergency Plan (AEP) relevant to the ATS functions,
  (iii) a copy of the procedures as set out in the aerodrome manual for preventing unauthorized entry of persons or things onto the movement area of the aerodrome, and

(iv) a copy of the procedures set out in the aerodrome manual for the control of surface vehicles operating on or in the vicinity of the manoeuvring area;

(g) A duty statement including the functions, responsibilities and hours of operation, of each operating position.

(h) A description of the arrangements made by the applicant to ensure that it has, and will continue to receive, the information necessary for providing each service:

(i) this requirement includes information that is both internally and externally sourced.

(ii) the description should nominate the information requirement, its use in service provision, its source, and the means of its transfer, receipt and display.

Examples of Data Sources

Examples of data sources normally required are:

- AIS
- NOTAM
- Meteorological information
- Voice coordination
- Aerodrome works and administration coordination
- Local and remote radar data
- Information concerning volcanic activity
- AFTN
- Flight notification
- Meteorological warning service
- Information on aerodrome conditions and the operational status of facilities and navigation aids
- AES coordination
- Information concerning radioactive material and toxic chemical clouds.

(i) A description of the arrangements made by the applicant to ensure that it can, and will continue to be able to, provide the information in relation to its air traffic

services to other organizations whose functions reasonably require that information (e.g. other ATS units and centers);

(j) The requirement for a record keeping system that covers identification, collection, storage, security, maintenance, access and disposal of records necessary for the provision of air traffic services. The record systems shall provide an accurate chronicle of ATS activities for the purpose of reconstruction of events for air safety investigation or for system safety analysis within the Safety Management System;

(k) A copy of any agreement entered into by the provider in relation to the provision of any of the air traffic services;

(l) A copy of the document that sets out the provider's safety management system;

(m) A description of the procedures to be followed to ensure all operational staff is familiar with any operational changes that have been issued since they last performed operational duties;

(n) A description of the provider's training and checking program and provide assurance that any individual performing any functions in air traffic services is competent to perform that function;

(o) The processes for the preparation, authorization and issue of amendments to its operations manual.

(p) 11.4.3 The operations manual is an important document and shall be issued under the authority of the ANSP. The ANSP shall control the distribution of the operations manual and ensure that it is amended whenever necessary to maintain the accuracy of the information in the operations manual and to keep its contents up to date.

11.5 NOTIFICATION OF SUSPECTED COMMUNICABLE DISEASES ON BOARD AN AIRCRAFT OR OTHER PUBLIC HEALTH RISK

11.5.1 The flight crew of an en-route aircraft shall, upon identifying a suspected case(s) of communicable disease, or other public health risk, on board the aircraft, promptly notify the ATS unit with which the pilot is communicating, and provide the information listed below:

a) Aircraft identification;
b) Departure aerodrome;
c) Destination aerodrome;
d) estimated time of arrival;
e) Number of persons on board;
f) Number of suspected case(s) on board; and
g) Nature of the public health risk, if known.

11.5.2 The ATS unit, upon receipt of information from a pilot regarding suspected case(s) of communicable disease, or other public health risk, on board the aircraft, shall forward a message as soon as possible to the ATS unit serving the destination/departure.

11.5.3 When a report is received of a suspected case(s) of communicable disease, or other public health risk, on board an aircraft is landing in Ethiopia, the ATS unit concerned shall notify the appropriate CAAS authority and the aircraft operator or its designated representative.

APPENDIX 1

FACILITY REQUIREMENTS

1 INTRODUCTION

1.1 An applicant for the grant of an air traffic service certificate must establish the following facilities that are appropriate to the air traffic services listed in the applicant's exposition:

(a) aerodrome control towers
(b) approach control offices
(c) area control centres
(d) flight information centres
(e) dedicated training and assessment facilities.

2 AERODROME CONTROL SERVICE

2.1 An applicant for an aerodrome control service must establish procedures to ensure that any aerodrome control tower listed in the applicant's exposition, is provided with equipment for two-way voice communication with:

(a) any aircraft, in or adjacent to airspace for which the applicant has responsibility; and
(b) any aircraft, vehicle, and person, on, or adjacent to, the manoeuvring area.

2.2 2.2 The aerodrome control tower should be provided with the following minimum equipment:

(a) a display system or systems designed to show the disposition of current and pending aerodrome traffic together with ancillary information for individual aircraft;
(b) a power supply;
(c) appropriate and current maps and charts;
(d) binoculars;
(e) clocks;
(f) log keeping system;
(g) outside temperature indicator;
(h) QNH display;
(i) RVR display
(j) signal lamp with green, red, and white functions;
(k) telephone communications;
(l) status monitors for approach and landing aids and any signalling equipment affecting the use of a runway;
(m) visibility checkpoints;
(n) voice and, if applicable, data recording equipment;
(o) wind direction and wind speed display;
(p) an audible emergency alerting system;
(q) means of reception and transmission of information normally conveyed by AFTN;
(r) airfield lighting controls panel; and
(s) 2 independent sources of the current altimeter setting, at least 1 of which must be an aneroid barometer or barometric altimeter situated in the visual control room.

3 AREA CONTROL CENTRE / APPROACH CONTROL UNIT

3.1 The applicant must establish procedures to ensure that an area control centre, a flight information centre, and an approach control unit is provided with equipment enabling to the fullest extent practical, two-way voice communication; and if applicable, data communication with any aircraft in, or adjacent to, airspace for which the applicant has responsibility.

3.2 The area control centre and/or the approach control unit should be provided with the following minimum equipment:

(a) a display system or systems designed to show the disposition of current and pending flights together with ancillary information for individual aircraft;
(b) a power supply;
(c) appropriate and current maps and charts;
(d) clocks;
(e) log keeping system;
(f) status monitors as appropriate for navigation, approach, and landing aids;
(g) telephone communications;
(h) voice recording equipment and, if applicable, data recording equipment;
(i) an AFTN terminal;
(j) for an approach control operating position, an ILS/MLS status monitor at the approach control or approach control radar operating position for the aerodrome concerned:
(k) for an approach control operating position responsible for aircraft on final approach, or aircraft landing or taking off, a wind direction and wind speed display, and RVR fed from the same source as the corresponding equipment in the aerodrome control tower.

3.3 The applicant must establish procedures to ensure that the aeronautical telecommunications equipment required are operated in accordance with the requirements of Annex 10 and the Manual of Standards for Aeronautical Telecommunication.

3.4 The applicant must establish procedures to ensure that any visual display unit used by an air traffic service is positioned with due regard to the relative importance of the information displayed and ease of use by the staff concerned.

3.5 The equipment required must have a level of reliability, availability, and redundancy that minimizes the possibility of failure, non-availability, or significant degradation of performance.

3.6 The applicant must establish procedures to ensure that the status monitors required are fitted with:

(a) an aural signal to indicate a change of status; and
(b) a visual indication of the current status.

APPENDIX-2

DOCUMENTS AND RECORDS
1 General

1.1 Documents

1.1.1 A document control system covers the authorization, standardization, publication, distribution and amendment of all documentation issued by the organization, or required by the organization for the provision of air traffic services.

1.1.2 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.

1.2 Records

1.2.1 A system for records covers identification, collection, indexing, storage, security, maintenance, access and disposal of records necessary for the provision of air traffic services.

1.2.2 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.

1.3 Records to be Kept

1.3.1 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 or obtained through ADS—30 days;
(d) automated flight data processing including on-screen display of aircraft tracks and label blocks—30 days (consistency with sub-paragraph (c) above).

Note: Where possible, provision of synchronous integration of radar and on-screen data with related voice recordings should be facilitated.

1.3.2 Time injection. Automatic recordings must have a means of establishing accurately the time, in hours/minutes/seconds, at which any recorded event occurred.

1.3.3 Document records. The following items must be kept for a minimum of 30 days (ICAO Air Traffic Services Planning Manual):

(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) transcripts of automated weather broadcasts (e.g. ATIS);
(d) log books;

1.3.4 1.3.4 Additional items. Records of the following additional items must be kept for a minimum of 5 years:

(a) Details of interruptions to services;
(b) Details of failures of equipment used for the provision of air traffic services;
(c) Details of facility unavailability;
(d) Staff duty rosters;
(e) Details of actions carried out under the Safety Management System including follow-up corrective and preventative actions;
(f) Directions and instructions issued to staff for the provision of air traffic services.

1.3.5 Personnel Licensing Records. Records of ATS personnel licensing and competency certification 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.

1.3.6 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.

1.4 Maintaining Records

1.4.1 Deletions from communications records are not permitted. All entries must be written in non-erasable ink, and must be legible.

1.4.2 Active forms or strips, fault reports, records and Log Books must be changed, or errors corrected by:

(a) drawing a line through the incorrect data and writing the correct data adjacent thereto; or
(b) cancelling the old and rewriting the record, retaining both the old and the new for later reference purposes.

1.4.3 Methods of recording. Information transmitted or received by verbal means must be recorded by electronic means. Voice records must be supported by one or more of the following methods:

(a) writing on a flight progress strip;
(b) typewritten on authorized forms;
(c) teletyped on page copy machine units;
(d) handwritten in accordance with local requirements;
(e) handwritten on appropriate forms;
(f) entered directly into computer-based equipment.

1.4.4 Flight notifications. A copy of all flight notifications received must be held for 90 days. Printed flight notifications shall be filed with the day's traffic. Electronic records shall be archived via a suitable "off-line" media such as tape, disk array or optical disk.

1.5 Maintaining Operational Log Books

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

1.5.2 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.

1.5.3 All Log Book entries must be recorded against the times of the occurrence, or time of the Log Book entry.

1.5.4 Minimum information to be recorded. The minimum information to be recorded is shown in the following table.

Occasion Information	Occasion Information
At the commencement of each day's operation	– UTC date and time; – Where required, identification of the unit and/or the operating position.
On assuming responsibility for a position	– The UTC date and time of assuming responsibility for a position and the signature of the officer commencing duty (see also voice recordings); – Results of equipment checks; – ATC incidents, including accidents and breaches of the regulations such as noncompliance with ATC instructions;
During operation of the unit	– Actions taken in relation to any SAR activity including distress communications; – 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.; – Times of aerodrome closure and reopening, with

Occasion Information	Occasion Information
	reasons for the closure; – Change in status of facilities, service or procedure including communication difficulties and tests; – Short term changes in staffing or hours of – coverage, including variations to required staffing levels; – Status of navigation aids.
Handover/takeover (where a separate form is not provided and kept as a record)	– A resume of outstanding action and unusual operations which are current or anticipated, relating to the traffic display and/or SAR activity; – The status of communications and equipment; – The time of handover/takeover, against the signatures of the officers involved.
Closure of unit and/or position	– Time of closure and conditions and actions relating to the closure, followed by changes to equipment status, and any outstanding action; – The time of intended reopening, and the signature of the officer closing the unit/position.

1.6 Voice and Data Recording

1.6.1 Where appropriate voice recording facilities are available, details of opening and closing watch, or the identification of staff assuming responsibility for a position may be recorded orally in lieu of a logbook entry. In either case, 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.

1.6.2 When an automatic voice recording facility fails, a manual record of communications must be maintained, to the extent that this is possible.