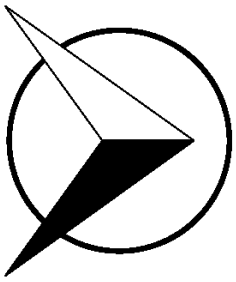

CIVIL AVIATION
SAFETY AUTHORITY
AUSTRALIA

Manual of Standards Part 172—Air Traffic Services

VERSION 1.1: MARCH 2003

UNCONTROLLED VERSION

Manual of Standards Part 172—Air Traffic Services

This is a CASA policy manual. It contains specifications (standards) prescribed by CASA, of uniform application, determined to be necessary for the safety of air navigation.

This manual is incorporated in the Civil Aviation Safety Regulations Part 172 – Air Traffic Services by reference.

Copies of this manual are available from:

Civil Aviation Safety Authority
73 Northbourne Avenue
CANBERRA CITY, ACT 2601

or by mail from

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Civil Aviation Safety Authority
GPO Box 2005
CANBERRA CITY, ACT 2601

The current manual can be viewed at any time via CASA's website at www.casa.gov.au.

This manual may be amended from time to time. Such amendment service will be provided by the Document Control Unit, Civil Aviation Safety Authority.

Any comments about the content or requests for clarification should be directed to:

Branch Head, Airspace, Air Traffic and Aerodrome Standards Branch, Aviation Safety Standards, CASA.

Version 1.1: March 2003

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AMENDMENT RECORD

The amendments listed below have been incorporated into this copy of Manual of Standards Part 172—Air Traffic Services.

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FOREWORD

The Civil Aviation Safety Authority is responsible under section 9(1)(c) of the Civil Aviation Act 1988 for developing and promulgating appropriate, clear and concise aviation safety standards.

CASA is also responsible under section 9(2)(b) and section 16 of the Act for promoting full and effective consultation and communication with all interested parties on aviation safety issues, and must, in performing its functions and exercising its powers, where appropriate, consult with government, commercial, industrial, consumer and other relevant bodies and organisations.

The Manual of Standards (MOS) is the means CASA uses to meet its responsibilities under the Act for promulgating aviation safety standards. The MOS prescribes the detailed technical material (aviation safety standards) that is determined to be necessary for the safety of air navigation.

The MOS is referenced in the particular regulation. You should refer to the applicable provisions of the Civil Aviation Act and Civil Aviation Safety Regulations, together with this manual, to ascertain the requirements of, and the obligations imposed by or under, the civil aviation legislation.

Amendments to the manual are the responsibility of the Branch Head, Airspace, Air Traffic and Aerodrome Standards Branch. Readers should forward advice of errors, inconsistencies or suggestions for improvement to that officer.

The content of this MOS is authorised by:

Jim Shirley
Head
Airspace, Air Traffic and Aerodrome Standards Branch

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CHAPTER 1: INTRODUCTION

Section 1.1: General

1.1.1 Background

1.1.1.1 This Manual of Standards (MOS) amplifies the requirements established in Civil Aviation Safety Regulations (CASRs) Part 172. CASRs Part 172 sets the standards and methods to be used in regulating:

(a) how an entity becomes an ATS service provider, and includes:

(i) the functions of ATS providers;

(ii) who can provide these services;

(b) what is required to accompany an application for an ATS Provider's Certificate;

(c) the requirements and standards for compliance, including:

(i) the Operations Manual;

(ii) aircraft separation;

(iii) the provider's organisation, facilities and equipment, personnel, and check and training system, interface arrangements, safety management system and records; and

(d) discontinuance of the service.

1.1.2 Document Set

1.1.2.1 The document hierarchy consists of:

(a) relevant Civil Aviation Safety Regulations (CASRs);

(b) the Manual of Standards (MOS); and

(c) Advisory Circulars (ACs).

1.1.2.2 The regulatory documents establish, for service providers, a comprehensive description of system requirements and the means of meeting them.

1.1.2.3 **CASRs** establish the regulatory framework *(Regulations)* within which all service providers must operate.

1.1.2.4 The **MOS** comprises specifications *(Standards)* prescribed by CASA, of uniform application, determined to be necessary for the safety of air navigation. In those parts of the MOS where it is necessary to establish the context of standards to assist in their comprehension, the sense of parent regulations has been reiterated. The **MOS** is a disallowable instrument. This means that it is a legislative instrument that becomes effective on publication in the Government Gazette and it must be tabled in Parliament within fifteen sitting days from when it was made and is subject to scrutiny by Parliament.

1.1.2.5 Readers should understand that in the circumstance of any perceived disparity of meaning between MOS and CASRs, primacy of intent rests with the regulations. Where there is any inconsistency between the regulations and the MOS, the regulations prevail.

1.1.2.6 Service providers must document internal actions *(Rules)* in their own operational manuals, to ensure the maintenance of and compliance with standards.

1.1.2.7 **ACs** are intended to provide recommendations and guidance to illustrate a means, but not necessarily the only means of complying with the Regulations. ACs may explain certain regulatory requirements by providing interpretive and explanatory materials. It is expected that service providers will document internal actions in their own operational manuals, to put into effect those, or similarly adequate, practices.

1.1.3 Differences Between ICAO Standards and those in MOS

1.1.3.1 Notwithstanding the above, where there is a difference between a standard prescribed in ICAO documents and the Manual of Standards (MOS), the MOS standard shall prevail.

1.1.4 Differences Published in AIP

1.1.4.1 Differences from ICAO Standards, Recommended Practices and Procedures are published in AIP Supplement.

1.1.5 Standards Change Management

1.1.5.1 Responsibility for the approval of the publication and amendment of the Manual of Standards (MOS) resides with the Branch Head, Airspace, Air Traffic and Aerodrome Standards Branch, of the Aviation Safety Standards Division, Civil Aviation Safety Authority.

1.1.5.2 This document is issued and amended under the authority of the Branch Head, Airspace, Air Traffic and Aerodrome Standards Branch.

1.1.5.3 Requests for **any change** to the content of the MOS may be intimated from:

(a) Technical areas within CASA;

(b) ATS Service Providers;

(c) Other Aviation Industry Service Providers.

1.1.5.4 The need to **change standards** in the MOS may be initiated by a number of causes. These may be to:

(a) ensure safety;

(b) ensure standardisation;

(c) respond to changed CASA standards;

(d) respond to ICAO prescription;

(e) accommodate new initiatives or technologies.

1.1.5.5 CASA may approve trials of new procedures or technologies in order to develop appropriate standards.

1.1.6 Related Documents

1.1.6.1 These standards should be read in conjunction with:

(a) CASR Part 172

(b) ICAO Annex 10 – Aeronautical Telecommunications, Volume II – Communications Procedures;

(c) ICAO Annex 11 – Air Traffic Services;

(d) ICAO Annex 15 – Aeronautical Information Services;

(e) ICAO Air Traffic Services Planning Manual (Doc 9426);

(f) ICAO Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM) (Doc 4444);

(g) ICAO Regional Supplementary Procedures (Doc 7030);

(h) Australian Aeronautical Information Publication (AIP);

(i) Australian Aeronautical Information Publication (AIP) Supplement.

1.1.7 Abbreviations

1.1.7.1 Unless otherwise stated, the meaning of any abbreviation in this MOS is as defined in the AIP.

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CHAPTER 2: OPERATIONS MANUAL

Section 2.1: General

2.1.1 Introduction

2.1.1.1 An Operations Manual shows how and where an ATS provider provides, or proposes to provide, air traffic services.

2.1.2 Content of the Operations Manual

2.1.2.1 An operations manual must contain:

(a) a table of contents based on the items in the manual, indicating the page number on which each item begins;

(b) a description of the provider's organisational structure and a statement setting out the functions that the provider performs, or proposes to perform under CASR Part 172;

(c) a description of the chain of command established, or proposed to be established, by the provider and a statement of the duties and responsibilities of any supervisory positions within the organisational structure;

(d) a statement showing how the provider determines the number of operational staff required including the number of operational supervisory staff;

(e) a list of the air traffic services that the provider provides, or proposes to provide;

(f) a statement for each air traffic service, showing the hours of operation of the service;

(g) a statement, for each air traffic service, that identifies the particular airspace within which the service is provided, or proposed to be provided;

(h) a statement, for each air traffic service, that identifies the location from where the service is provided, or proposed to be provided;

(i) if the provider provides, or proposes to provide, an air traffic service for a controlled aerodrome:

(i) a description of the manoeuvring area of the aerodrome; and

(ii) copy of the parts of the aerodrome emergency plan, set out in the aerodrome operator's aerodrome manual that are relevant to the provision of the service; and

(iii) a copy of the procedures set out in the aerodrome operator's aerodrome manual for preventing the unauthorised entry of persons or things onto the manoeuvring area of the aerodrome; and

(iv) a copy of the procedures set out in the aerodrome operator's aerodrome manual for the control of surface vehicles operating on or in the vicinity of the manoeuvring area;

(j) a statement of the responsibilities and functions for each operating position;

(k) a description of the arrangements made or proposed to be made by the provider to ensure that it has, and will continue to receive, on a daily basis, the information necessary for providing the service;

(l) a description of the arrangements made or proposed to be made by the provider to ensure that it has, and will continue to be able to provide, information in connection with its air traffic services to another person whose functions reasonably require that information (includes SAR alerting);

(m) a description of the provider's document and record keeping system;

(n) a copy of any agreement entered into by the provider in relation to the provision of any of the air traffic services;

(o) a copy of the document that sets out the provider's safety management system;

(p) a copy of the provider's contingency plan;

(q) a copy of the provider's security program;

(r) a description of the processes and documentation used to present to staff the relevant standards, rules and procedures contained in ICAO Annexes 10 and 11, ICAO PANS-ATM, ICAO Regional Supplementary Procedures, Chapter 10 of this MOS, and any of the provider's site-specific instructions for the provision of air traffic services;

(s) a description of the processes and documentation used to provide operational instructions to staff;

(t) a description of the procedures to be followed to ensure all operational staff are familiar with any operational changes that have been issued since they last performed operational duties;

(u) a description of the provider's training and checking program;

(v) a description of the procedures to be used in commissioning new facilities, equipment and services;

(w) the procedures to be followed for revising the operations manual.

CHAPTER 3: ATS FACILITIES AND EQUIPMENT

Section 3.1: General

3.1.1 Introduction

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

3.1.2 Control Towers

3.1.2.1 **Visibility.** A control tower first commissioned after 1 July 2000, must enable the controller to have:

(a) adequate visibility to all the manoeuvring area and airspace which are under the controllers' area of responsibility;

(b) a view of all runway ends and taxiways, with suitable depth perception, (refer Advisory Circular);

(c) maximum visibility of airborne traffic patterns with primary consideration given to the view from the aerodrome control position(s);

(d) unobstructed lines of sight from the control tower eye level (refer Advisory Circular) to:

(i) the manoeuvring area of the aerodrome;

(ii) the runway approach lights and/or graded areas at ground level for distance of 300 M from the threshold along the extended centreline, then upward and outward within the take-off climb area normally at an angle not less than 2.5 degrees;

(iii) the first 150 M of any fire routes service roads adjacent to the areas mentioned in (a) and (b) above;

(iv) sections of aprons used as a taxiway to a line, at ground level, 15 M from the apron edge, towards the building line;

(e) sufficient visual resolution of all aerodrome movement areas for which he/she has a responsibility;

(f) ability to detect movement of a departing aircraft as soon as possible after it has commenced its take-off run; response times must be kept below 4 seconds, although an upper limit of 5 seconds may be approved in exceptional circumstances.

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

(a) protection from glare, reflection and noise;

(b) unobstructed view from an existing control tower cab.

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

(a) an appropriate power supply to service the facilities identified in this Section;

(b) facilities capable of two-way communications with aircraft, vehicles and persons within its area of responsibility;

(c) facilities capable of providing two-way communications:

(i) between operational positions within the control tower;

(ii) with adjacent ATS units;

(iii) with aerodrome rescue and fire fighting services;

(d) a means of alerting emergency services;

(e) a means of recording air/ground/air and ground/ground communications;

(f) AFTN terminal or other means to provide information normally conveyed by AFTN;

(g) binoculars;

(h) signal lamp, with white, red and green functions.

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

(a) flight data displays (e.g. flight progress boards);

(b) meteorological displays which meet the accuracy criteria specified in Annex 3 and which provide at least the following information:

(i) wind velocity;

(ii) barometric pressure;

(iii) temperature.

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

(c) operational data displays for:

(i) other significant weather information;

(ii) NOTAMS;

(iii) handover/takeover;

(iv) essential aerodrome information;

(v) relevant maps and charts;

(d) a time display at each operational position.

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

(a) runway lighting;

(b) approach lighting;

(c) high intensity approach and runway lighting;

(d) taxiway lighting;

(e) VASIS;

(f) obstruction lighting;

(g) illuminated wind indicator; and

(h) aerodrome beacon.

3.1.2.6 A control tower must have a means to readily recognise the failure of any terrestrial navigation aid being used for the control of aircraft.

3.1.2.7 A control tower must have a means of ensuring that the ILS Glide Path is not radiating if the associated Localiser is not operating.

3.1.3 Area and Approach Control Units

3.1.3.1 Area and Approach Control Units must incorporate the following facilities:

(a) air/ground RTF and/or datalink communications equipment on assigned frequencies, in accordance with ICAO Annex 11, Chapter 6;

(b) ground/ground voice and/or datalink equipment to enable communication between adjacent air traffic service units including control towers and the parent area control centre or approach control unit, in accordance with ICAO Annex 11, Chapter 6;

(c) time display at each operational position;

(d) flight data display;

(e) operational data display;

(f) appropriate maps and charts;

(g) external communications;

(h) a means to readily recognise the failure of any terrestrial navigation aid used in providing separation to aircraft;

(i) voice and, where applicable, data recording equipment;

(j) AFTN terminal or other means to provide information normally conveyed by AFTN.

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

3.1.4 Commissioning of New Facilities and Equipment

3.1.4.1 Any new facilities must be commissioned in accordance with procedures stated in the provider's Operations Manual.

3.1.4.2 The procedures must describe how the provider has determined that;

(a) the functional and performance requirements for the facility have been met; and

(b) all ATS operating procedures have been validated; and

(c) sufficient trained ATS personnel are available to operate the facility; and

(d) all support arrangements for the facilities, including any necessary agreements, are in place.

CHAPTER 4: PERSONNEL

Section 4.1: General

Note: This chapter is reserved.

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CHAPTER 5: TRAINING AND CHECKING PROGRAM

Section 5.1: General

5.1.1 Introduction

5.1.1.1 This Chapter sets out the standards for a Training and Checking program.

5.1.2 Program

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

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

5.1.3 Competency

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

(a) licensed, where the function can only be performed by the holder of a licence;

(b) rated, where the function can only be performed by the holder of an appropriate rating;

(c) endorsed, where the function can only be performed by the holder of an appropriate endorsement;

(d) qualified, where the function can only be performed by the holder of an appropriate qualification;

(e) trained and proven to be proficient in the performance of functions that are not covered by sub-paragraphs (a) to (d) above; and

(f) recent in the performance of the function and knowledge and skills in emerging matters identified as essential to task performance.

Note: Competency standards for licensed functions are contained in CASR Part 65.

5.1.4 Training Courses

5.1.4.1 The term ‘training course’ has wide application and includes all training for a particular competency required for the provision of an air traffic service and includes training on new equipment.

5.1.4.2 Training courses must be provided on the basis of a MOS Part 65 requirement, or training needs analysis or similar method.

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

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

5.1.4.5 The method of assessment, both theoretical and practical, must utilise qualified assessors and appropriate processes and facilities and must be consistent with CASR Part 65.

5.1.5 Emergency Training

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

5.1.6 Refresher Training

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

5.1.7 On-going Training

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

5.1.8 Remedial Training

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

5.1.9 Checking

5.1.9.1 The purpose of checking is to ensure that the individual subject to the check meets the competency standards specified in CASR Part 65, and the ATS provider's own standards where these are additional to CASR Part 65. Checks must be carried out as required by CASR Part 65.

5.1.10 Qualifications of Trainers and Checkers

5.1.10.1 Persons carrying out training and/or checking functions must be appropriately qualified for the functions as required by CASR Part 65.

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CHAPTER 6: SAFETY MANAGEMENT SYSTEM

Section 6.1: General

6.1.1 Components of the Safety Management System

6.1.1.1 An Safety Management System (SMS) defines the policies, procedures, and practices for managing the safety of the provision of services, and managing any changes in their provision.

6.1.1.2 An SMS is a system that:

(a) is issued under the authority of the chief executive of the organisation;

(b) is kept under review for effectiveness by key personnel of the organisation;

(c) is available to, and complied with by, key persons of the organisation, and all personnel involved in the provision of air traffic services;

(d) defines the organisation's safety objectives;

(e) defines the safety responsibilities of key personnel and ATS officers of the organisation;

(f) establishes processes for quality assurance including self-audit;

(g) establishes processes for the communication and processing of safety concerns within the organisation;

(h) defines the interface arrangements between internal groups of the organisation;

(i) defines or references any other procedures or systems to ensure the safe operation of services and facilities.

6.1.2 Safety Case Preparation

6.1.2.1 Safety Cases provide evidence and argument that a service, facility or equipment, or a proposed change to the design of a service, facility or equipment, meets safety objectives for the service. Safety Cases must be based on a recognised methodology for safety risk assessment.

6.1.2.2 Safety Cases are prepared to support proposed changes to the design, operation or maintenance of a service, facility or equipment, or the associated procedures.

6.1.2.3 The safety risk assessment in a Safety Case must:

(a) identify all potential safety hazards associated with the operation of each service, in normal and abnormal modes of operation;

(b) assess the safety risk of each hazard;

(c) identify the means of mitigation of the safety risk of each hazard.

Note: Guidelines for the preparation of Safety Cases, and for design and support of software used in safety critical systems, have been published by CASA in Civil Aviation Advisory Publication (CAAP) Airways Nos 1 and 2 respectively. Safety Management System processes meeting those guidelines will satisfy CASA requirements for Safety Cases and software design and support.

CHAPTER 7: CONTINGENCY PLANS

Section 7.1: General

7.1.1 Introduction

7.1.1.1 This Chapter sets out the standards for contingency plans in the provision of air traffic services.

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

7.1.2 Minimum Contents

7.1.2.1 A contingency plan must include to the extent of the particular services authorised on the provider's certificate, but is not limited to, arrangements for the following:

(a) airspace management:

(i) transfer of responsibility;

(ii) redesignation;

(iii) emergency traffic;

(b) air traffic flow management;

(c) air traffic separation;

(d) alternatives for the continuing provision of the services (e.g. alternative operating positions or ATS units);

(e) alternative services (e.g. traffic information);

(f) SAR alerting;

(g) information transfer/coordination;

(h) notifications to affected parties;

(i) letters of agreement with other providers on any of the above matters;

(j) restoration of staff, facility or equipment to normal levels;

(k) measures to test the suitability of the plan;

(l) staff training requirements to ensure the plan can be safely implemented.

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CHAPTER 8: SECURITY PROGRAM

Section 8.1: General

8.1.1 Introduction

8.1.1.1 This Chapter sets out the standards for a security program.

8.1.2 Security Measures

8.1.2.1 A security program must specify the physical security measures, and the procedures to be followed for the purpose of:

(a) preventing and detecting intentional and unintentional damage to any personnel, facility or equipment used by the provider in providing an air traffic service;

(b) responding to a threat of intentional and unintentional damage to a facility or equipment used by the provider in providing an air traffic service; and

(c) preventing unauthorised people from having access to any facility or equipment used by the provider in providing an air traffic service.

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CHAPTER 9: DOCUMENTS AND RECORDS

Section 9.1: General

9.1.1 Documents

9.1.1.1 A document control system covers the authorisation, standardisation, publication, distribution and amendment of all documentation issued by the organisation, or required by the organisation for the provision of air traffic services.

9.1.1.2 These processes must ensure:

(a) authorisation is by a designated authority appropriate to the management and safety accountability structures;

(b) currency can be readily determined;

(c) availability at locations where needed by ATS personnel;

(d) only current versions are available;

(e) a master copy is securely held;

(f) archival where superseded.

9.1.1.3 **Reference Materials.** For the purposes of sub-regulation 172.160(g), the manuals and documents to be maintained are the following:

(a) manuals for equipment used by staff in the provision of air traffic services;

(b) the relevant sections of the Aerodrome Emergency Plan (aerodrome services only).

9.1.2 Records

9.1.2.1 A system for records covers identification, collection, indexing, storage, security, maintenance, access and disposal of records necessary for the provision of air traffic services.

9.1.2.2 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.

9.1.3 Records to be Kept

9.1.3.1 **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—14 days;

(d) automated flight data processing including on-screen display of aircraft tracks and label blocks—14 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. (ICAO Air Traffic Services Planning Manual, Chapter 8.4).

9.1.3.2 **Time injection.** Automatic recordings must have a means of establishing accurately the time, in hours/minutes/seconds, at which any recorded event occurred.

9.1.3.3 **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;

(e) handover/takeover details, including, if not electronically recorded, the identification of the person taking over.

9.1.3.4 **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;

(g) technical manuals used for the provision of air traffic services.

9.1.3.5 **Personnel Licensing Records.** Records of ATS personnel licensing and competency certification under CASR Part 65 must be kept for a minimum of 7 years, including after an employee ceases to be employed by the ATS provider. This includes details of:

(a) training;

(b) renewal and currency of ratings, endorsements and qualifications; and

(c) other proficiencies required by the ATS provider to be demonstrated.

9.1.3.6 **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.

9.1.4 Maintaining Records

9.1.4.1 Records must not be completed in anticipation of the recorded action being completed.

9.1.4.2 Deletions from communications records are not permitted. All entries must be written in non-erasable ink, and must be legible.

9.1.4.3 Non-active forms or strips on which an error is noted may be replaced. 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.

9.1.4.4 **Methods of recording.** Information transmitted or received by verbal means must be recorded by electronic means in accordance with CASR Part 172. Voice records must be supported by one or more of the following methods:

(a) writing on a flight progress strip;

(b) typewritten on authorised 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.

9.1.4.5 **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.

9.1.5 Maintaining Operational Log Books

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

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

9.1.5.2 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 with an explanatory note as to why it is out of sequence.

9.1.5.3 All Log Book entries must be recorded against the times of the occurrence, or time of the Log Book entry.

9.1.5.4 **Minimum information to be recorded.** The minimum information to be recorded is shown in the following table.

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. **Note:** these may be incorporated in the station date stamp.
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; • Result of time check.
During operation of the unit	• Air Safety Incidents, including accidents and breaches of the Regulations such as non-compliance with ATC instructions; **Note**: This is in addition to the completion of incident reporting actions. • 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 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; • Any dispensation given against the Regulations • 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.

9.1.6 Voice and Data Recording

9.1.6.1 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.

9.1.6.2 When an automatic voice recording facility fails, a manual record of communications must be maintained, to the extent that this is possible.

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CHAPTER 10: STANDARDS FOR THE PROVISION OF AIR TRAFFIC SERVICES

Section 10.1: General

10.1.1 Purpose

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

10.1.2 Air Traffic Services Commensurate with Airspace Classification

10.1.2.1 Unless otherwise authorised by CASA, air traffic services must be provided commensurate with the airspace classifications as notified in the AIP.

10.1.3 Traffic Priorities

10.1.3.1 Aircraft in a state of emergency must be given priority over all other traffic.

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Section 10.2: Radar

10.2.1 Radar Identification

10.2.1.1 **Additional Method.** Radar identification may also be achieved by correlating a particular radar position to the position of an aircraft observed visually.

10.2.2 Use of Speed Control

10.2.2.1 Speed Control must not be applied to formation flights or fuel critical flights.

10.2.3 Termination of Radar Control Services

10.2.3.1 Where an aircraft exits controlled airspace into an area in which radar services will continue, the pilot must be advised.

10.2.4 Obstacle Clearance

10.2.4.1 When radar vectoring a minimum of 1,000 FT vertical clearance must be provided over any obstacle:

(a) 3 NM of the aircraft when the range scale in not greater than 50 NM;

(b) 5 NM of the aircraft when the range scale is greater than 50 NM.

10.2.4.2 The above obstacle clearance requirements do not apply:

(a) when radar vectoring as part of an issued radar SID; or

(b) when a visual departure is authorised; or

(c) in VMC by day only, when responsibility for arranging obstacle clearance is specifically assigned to the pilot; or

(d) when conducting a ‘Radar Cloud Break Procedure’.

10.2.5 Vectoring Special VFR

10.2.5.1 Special VFR aircraft must not be radar vectored except when warranted by emergency conditions.

10.2.6 Issuing Radar Derived Distance

10.2.6.1 Radar derived distance and appropriate altitude assignments may be issued to an arriving aircraft using a track for which a DME or GPS Arrival procedure is specified, when:

(a) DME is not available; or

(b) if a pilot conducting a GPS arrival reports the loss of RAIM.

(c) When radar derived distances are used as a substitute for DME or GPS derived distance information, the reference datum being utilised for the distance information (e.g. DME site) must be displayed on the video map.

10.2.7 Surveillance Radar Approach (SRA) Procedures

10.2.7.1 For civil aircraft, Surveillance Radar Approach Procedures, as specified in ICAO PANS-ATM are not authorised, unless by pilot request, or in the case of emergency.

10.2.8 Radar Cloud Break Procedure

10.2.8.1 The radar cloud break procedures may only be applied to non-military aircraft at Sydney, Melbourne, Essendon, Brisbane, Adelaide and Perth provided that:

(a) the requirements in Table 10.2-1 associated with the applicable flight conditions are complied with;

(b) the aircraft is in direct communication with the radar controller;

(c) the radar range from the aerodrome is decreasing;

(d) radar–derived ranges are passed with the descent instructions; and

(e) reduction of normal terrain clearance standards associated with these procedures is within 10 NM of the aerodrome.

10.2.8.2 The altitude assigned to aircraft between 10 NM and 4 NM radar range from the aerodrome must not be more than 500 FT below the minimum altitude, in accordance with the Radar Vectoring and Terrain Clearance standards specified earlier in this part.

10.2.8.3 Radar cloud break procedures must not be used:

(a) on tracks for which a DME arrival procedure is prescribed;

(b) to runways served by an instrument approach aid providing a straight-in approach procedure.

Table 10.2-1

Flight conditions	Requirements
Visual flight **is certain** at or above altitude assigned assigned in accordance with paragraph 10.2.8.1(e) above.	1. The reported cloud base in the applicable sector is at least 300 FT above the assignable altitude (e.g. in a 2,000 FT minimum altitude sector where descent to 1,500 FT is permissible, the cloud base must be at or above 1,800 FT); 2. The aircraft is on a radar heading which will cause it to pass within 3 NM of the centre of the aerodrome as shown on the radar map.

Flight conditions	Requirements
Visual flight **is probable** at or above altitude assigned in accordance with paragraph 10.2.8.1(e) above, but is certain after further descent clearance to the prescribed minimum altitude at 4 NM range from the aerodrome.	1. The reported cloud base in the applicable sector is at the assignable altitude, between the assignable altitude and 300 FT above it (e.g. in a 2,000 FT minimum altitude sector where descent to 1,500 FT is permissible, the cloud base must be at least 1,500 FT or between 1,500 FT and 1,800 FT); 2. The procedure is applied to DME-equipped aircraft only; 3. The aircraft is on a radar heading which will cause it to pass within 3 NM of the centre of the aerodrome as shown on the radar map, but after passing 4 NM the aircraft must be on a radar heading which will cause it to track directly towards the centre of the aerodrome; 4. A 'LOSS OF COM' procedure is issued with the initial descent instructions at 10 NM.
Visual flight **is not possible** at altitude assigned in accordance with paragraph 10.2.8.1(e) above, and is not possible until at or above prescribed minimum altitude after a further descent clearance is issued at 4 NM radar range from the aerodrome.	1. The reported cloud base in the applicable sector is at the prescribed minimum altitude, or between the prescribed minimum altitude, and the assigned altitude; 2. The procedure is applied to DME-equipped aircraft only; 3. The aircraft is on a radar heading which will cause it to pass within 3 NM of the centre of the aerodrome as shown on the radar map, but after passing 4 NM the aircraft must be on a radar heading which will cause it to track directly towards the centre of the aerodrome, **or** is established on the extended runway centre-line before reaching 4 NM; 4. The aircraft is instructed to report at 4 DME when the initial descent instruction is issued at 10 NM; 5. A 'LOSS OF COM' procedure is issued with the initial descent instructions at 10 NM.

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Section 10.3: Circuits and Runways

10.3.1 Selection of Runway in Use

10.3.1.1 **Use of other than nominated runways.** Controllers must not nominate a particular runway for use if an alternative runway is available, when:

(a) for runway conditions that are completely dry:

(i) the cross-wind component, including gusts, exceeds 20 KT;

(ii) the downwind component, including gusts, exceeds 5 KT.

(b) for runway conditions that are not completely dry;

(i) the cross-wind component, including gusts, exceeds 20 KT;

(ii) there is a downwind component.

10.3.1.2 **Authorising intersection departures.** A controller may authorise a departure from a runway intersection when requested by the pilot or may offer an intersection departure to assist traffic flow. The pilot must be advised of the remaining runway length if such information is not readily available to the pilot.

10.3.2 Simultaneous Parallel Runway Operations

10.3.2.1 The procedures in this part must not be used at GAAP aerodromes.

10.3.2.2 In addition to ICAO PANS-ATM applications, parallel runways may be used for Simultaneous Opposite Direction Operations (SODPROPS) (see paragraph 10.4.8).

10.3.2.3 Whenever parallel runway operations are in progress, pilots must be notified by inclusion of such advice and an expectation of the type of approach or departure on the ATIS.

10.3.2.4 The use of SODPROPS must be broadcast on the ATIS including the runway configuration being used for the procedure.

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Section 10.4: Departures and Arrivals

10.4.1 Arriving Aircraft

10.4.1.1 To provide for the possibility of radio failure, aircraft under procedural control, cleared to the same holding point or holding points not laterally separated, must not be assigned the same level while flying within 10 MIN of the holding point. However, this requirement does not preclude two arriving aircraft on laterally separated flight paths, which are at least 90 degrees apart, being:

(a) cleared to make simultaneous visual approaches; or

(b) instructed to descend visually to the coordinated common level or different levels when, due to traffic, a visual approach cannot be made provided:

(i) there is no significant cloud at or below the levels assigned to the aircraft;

(ii) visibility is 30 KM or more; and

(iii) both aircraft have been instructed to report at a distance outside the point at which lateral separation would be infringed and at which distance it is known that visual separation can be applied.

10.4.1.2 When a delay of more than 5 MIN is expected, pilots must be notified of:

(a) the Expected Approach Time (EAT) (non-radar); or

(b) the Expected Time of Landing (ETL) (radar).

10.4.2 Independent Parallel Approaches in IMC

10.4.2.1 Independent parallel approaches may be conducted to parallel runways with centrelines separated by more than 1,035 M provided that:

(a) for runways separated by greater than 1,525 M, suitable surveillance radar with a minimum azimuth accuracy of 0.3 degrees (one sigma) and update period of 5 seconds or less is available; or

(b) for runways separated by less than 1,525 M, a suitable surveillance radar with a minimum azimuth accuracy of 0.06 degrees (one sigma) and update period of 2.5 seconds or less and a high resolution display providing position prediction and deviation alert, is available; and

(c) a No-Transgression Zone (NTZ) is depicted on the radar display. The NTZ is 610 M wide and is established equidistant between runway centre-lines, beginning from the point where adjacent aircraft first lose vertical separation, and extends to 0.5 NM beyond the farthest Departure End of Runway (DER); and

(d) the aircraft are making straight-in approaches; and

(e) Instrument Landing System (ILS) approaches are being conducted to both runways; and

(f) a minimum of 1,000 FT vertical or 3 NM radar separation is provided until aircraft are established on the ILS localiser course; and

(g) when aircraft are established on the ILS localiser course, a minimum of 1,000 FT vertical separation or 2 NM radar separation must be provided between aircraft on adjacent localiser until the higher aircraft reaches the ILS PRM glide path intercept point; and

(h) aircraft established on the same ILS localiser course are radar separated by a minimum of 3 NM unless increased longitudinal separation is required due to wake turbulence; and

(i) the missed approach track for one approach diverges by at least 30 degrees from the missed approach track of the adjacent approach; and

(j) when radar vectoring an aircraft to intercept the ILS localiser course, ensure the final vector permits the aircraft to intercept at an angle not greater than 30 degrees and provide for at least 1 NM straight flight prior to ILS localiser course intercept; and

(k) the aircraft are cleared to descend to the appropriate glide path intercept altitude soon enough to provide a period of level flight to dissipate excess speed; and

(l) if required, the pilot is advised of the altitude to be maintained until the ILS PRM glide path intercept point; and

(m) the aircraft are established on the respective aerodrome control frequency and monitoring the relevant PRM frequency no later that 2 NM prior to the higher ILS PRM glide path intercept point.

10.4.2.2 **Radar monitoring approaches.** Regardless of weather conditions, aircraft must be radar monitored as being established on the ILS localiser course until:

(a) for runways separated by greater than 1,525 M:

(i) visual separation is applied; or

(ii) the aircraft is 1 NM or less from the runway threshold.

(b) for runways separated by less than 1,525 M:

(i) visual separation is applied; or

(ii) the aircraft reports the approach lights in sight; or

(c) the aircraft has landed; or

(d) in the event of a missed approach, the aircraft is 0.5 NM beyond the DER.

10.4.2.3 When the radar indicates a track will penetrate the NTZ, ATC must advise the aircraft of the deviation.

10.4.2.4 When an aircraft is observed penetrating the NTZ, that aircraft and affected aircraft on the adjacent localiser course will be issued with appropriate heading and altitude instructions to resolve the confliction. Where either

aircraft is 1 NM or less from the runway threshold, it may be allowed to continue its approach and land if provided with traffic information on the relevant aircraft.

10.4.2.5 Independent parallel approaches to parallel runways spaced less than 1,525 M must be suspended during periods of severe weather such as thunderstorms, windshear, turbulence, downdrafts, or crosswinds which might increase ILS localiser course deviations to an unacceptable level of deviation alerts.

10.4.3 Dependent Parallel Approaches in IMC

10.4.3.1 Dependent parallel approaches may be conducted to parallel runways with centre-lines separated by more than 915 M provided that:

(a) the aircraft are making straight-in approaches;

(b) instrument landing system (ILS) approaches are being conducted on adjacent runways;

(c) a minimum of 1,000 FT vertical or 3 NM radar separation is provided between aircraft during the turn-on to parallel ILS localiser courses;

(d) aircraft established on the same ILS localiser course are radar separated by a minimum of 3 NM unless increased longitudinal separation is required due to wake turbulence;

(e) successive aircraft on adjacent ILS localiser courses are separated by a minimum of 2 NM by radar; and

(f) the missed approach track for one approach diverges by at least 30 degrees from the missed approach track of the adjacent approach.

10.4.4 Independent Parallel Departures

10.4.4.1 Independent departures may be conducted provided:

(a) ATC instructions permit the courses of the respective aircraft to diverge by at least 15 degrees immediately after take-off; and

(b) the radar is capable of identifying the aircraft within 1 NM of the upwind end of the departure runway.

10.4.5 Independent Parallel Visual Approaches

10.4.5.1 Independent visual approaches may be conducted to parallel runways with centre-lines separated by at least 760 M provided that:

(a) the aircraft are making straight-in approaches commencing at the outer marker or 4 NM from the runway threshold; and

(b) a minimum 1,000 FT vertical or 3 NM radar separation is maintained between aircraft until:

(i) one aircraft is established within the furthest Initial Approach Fix (IAF), when both aircraft are established on their respective localiser in visual conditions; or

(ii) one aircraft is established on the localiser in visual conditions, and the other is established on a heading to intercept final inside the furthest IAF with the runway reported in sight; or

(iii) both aircraft are established on a heading to intercept final inside the furthest IAF with the runway reported in sight; and

(c) when vectoring an aircraft to intercept the final course, ensure that the final vector permits the aircraft to intercept at an angle not greater than 30 degrees.

10.4.5.2 When an independent visual approach is anticipated, ATC must advise pilots on first contact with approach.

10.4.5.3 If a pilot does not report the runway in sight by a position 3 NM from the centre-line of the adjacent parallel runway, the controller may, if necessary, vector the aircraft away from the final approach for sequencing for a dependent approach. The “VISUAL” report is the only report required when established on the localiser.

10.4.6 Dependent Parallel Visual Approaches

10.4.6.1 Dependent visual approaches to parallel runways may be conducted in accordance with the procedures and requirements for visual approaches (see paragraph 12.2.4).

10.4.7 Segregated Parallel Operations in IMC

10.4.7.1 ILS Precision, radar and visual approaches may be conducted in segregated parallel runway operations in IMC provided that:

(a) the centrelines are separated by more than 760 M;

(b) the nominal departure track diverges immediately after take-off by at least 30 degrees from the missed approach track of the adjacent approach.

10.4.8 Simultaneous Opposite Direction Parallel Runway Operations

10.4.8.1 Simultaneous Opposite Direction Parallel Runway Operations (SODPROPS) may be conducted subject to the following conditions:

(a) runway centrelines are separated by a minimum of 860 M;

(b) operations are conducted in meteorological conditions equal to, or better than, the minimum radar vectoring level, or the lowest minimum commencement level for instrument approaches to the arrival runway, whichever is lower. (without prior approval, the minima shall not be less

than cloud base 2,500 FT and visibility 8 KM, in the arrival and departure sector concerned);

(c) traffic information is passed to conflicting aircraft;

(d) the departure runway course diverges by 15 degrees from the approach course to the other runway.

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Section 10.5: Separation Standards—General Name

10.5.1 Application of Separation Standards

10.5.1.1 The longitudinal, lateral, vertical, time and wake turbulence standards that follow, take precedence over those standards in ICAO PANS-ATM.

10.5.2 Separation of VFR using navigation aids

10.5.2.1 Time separation standards requiring the use of radio aids to determine position must not be applied to VFR flights. However other separation standards may be applied to VFR flights.

10.5.3 Formation or In-company Flights

10.5.3.1 Separation from a formation must be applied to the outer dimensions applicable to the type of formation.

10.5.3.2 Before applying Vertical Separation with a formation, controllers must check the levels of the other formation aircraft as necessary to establish the full vertical extent of the formation.

10.5.3.3 A group of civil aircraft conducting the same flight (e.g. an air safari), which require the aircraft to operate at separation distances greater than those specified for formation flights must be considered to be separate aircraft when applying separation.

10.5.4 Airspace Boundaries

10.5.4.1 Where applicable, separation must be provided from the time an aircraft enters controlled airspace until the time an aircraft leaves controlled airspace. Separation is not required between aircraft within controlled airspace and any aircraft in close proximity but remaining outside controlled airspace.

10.5.4.2 Unless prior coordination has been effected, aircraft must be separated from adjacent sectors by the appropriate separation standard.

10.5.4.3 Except when the transfer of radar control is to occur, or when coordination has been performed with an adjoining sector, an appropriate tolerance must be applied to system map boundaries to ensure the separation of aircraft operating on either side of the boundary.

10.5.4.4 Where an airspace boundary in radar coverage divides two sectors, aircraft must not be radar vectored closer than half the applicable radar standard from the displayed system map boundary. The standard of half the applicable radar separation can be used under the following conditions:

(a) that the adjacent sector, in controlled airspace, has the same radar processing and display system; or

(b) that the restricted area flying activity is subject to:

(i) ADF applying half the applicable radar separation standard between its aircraft under radar control and the restricted airspace boundary;

(ii) ensuring that an appropriate navigation tolerance is applied to aircraft operating in the restricted area by the ADF (i.e. that the aircraft are contained within the restricted airspace);

(c) that the restricted area non-flying activity is subject to the appropriate tolerances being applied by the restricted airspace user to ensure containment of the activity within the restricted area.

10.5.4.5 Where different radar separation standards are applied on either side of a boundary, aircraft must not be vectored closer than half the larger of the two standards.

10.5.4.6 Unless local agreements are in place, a tolerance of not less than the applicable radar standard must be applied to a system map boundary that divides sectors where one of the sectors is authorised to operate up to the boundary.

10.5.5 Radar Separation Minima

10.5.5.1 Unless otherwise prescribed in accordance with paragraphs 10.4.2, 10.4.3, 10.5.5.2, and ICAO PANS-ATM wake turbulence separation minima, the horizontal radar separation minimum must be 5.0 NM.

10.5.5.2 The horizontal radar separation minimum in paragraph 10.5.5.1 may be reduced to 3.0 NM, provided the aircraft are under the control and within the boundaries of a Terminal Control Unit, and are:

(a) within 30 NM of a radar sensor, using:

(i) military high definition (scan rate of 12 RPM or greater) Terminal Approach Radar (TAR); or

(ii) primary data from a civil high definition TAR (scan rate of 16.4 RPM); or

(b) within 100 NM of an MSSR sensor providing radar data to EUROCAT 2000 displays.

10.5.5.3 **Radar separation between aircraft leaving controlled airspace.** Radar separation may be applied between aircraft about to leave controlled airspace provided that:

(a) radar separation is not less than 5 NM; and

(b) mutual traffic information is passed to the aircraft concerned prior to their leaving controlled airspace.

10.5.5.4 **Separation between aircraft within and outside of radar coverage.** Radar separation continues to exist between aircraft when one of the aircraft has passed out of radar range provided that when proceeding:

(a) **on the same track**, radar separation existed at the time the leading aircraft passed out of range, and procedural separation is established before the following aircraft arrives within 5 NM of the last observed position of the leading aircraft; or

(b) **on reciprocal tracks**, the aircraft in radar coverage has passed the last observed position of the outbound aircraft by the applicable radar standard.

10.5.5.5 Radar separation may be provided between an aircraft under radar control and the procedural navigation tolerance appropriate to the clearance issued to an aircraft not under radar control until the latter has been identified. Separation on this basis must only be applied if the procedural navigation tolerance is shown on the radar display.

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Section 10.6: Separation Standards–Longitudinal

10.6.1 Mach Number Technique

10.6.1.1 Mach number technique may only be applied between jet aircraft with serviceable LRNS, and must not be applied when block level clearances have been approved.

10.6.2 Application of Longitudinal Time Minima

10.6.2.1 The time interval between aircraft must be calculated at the speed of the following aircraft.

10.6.3 Cross Check Calculations

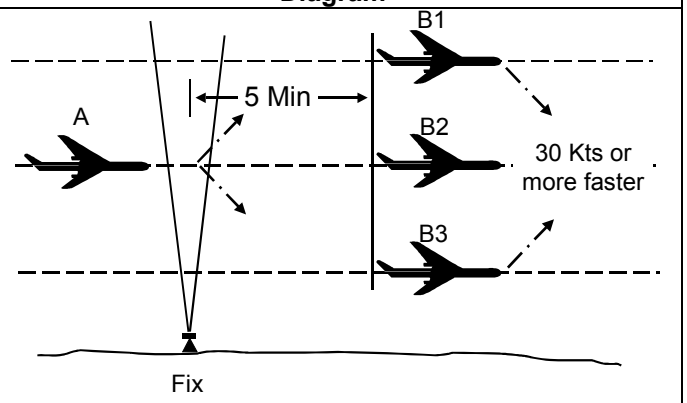
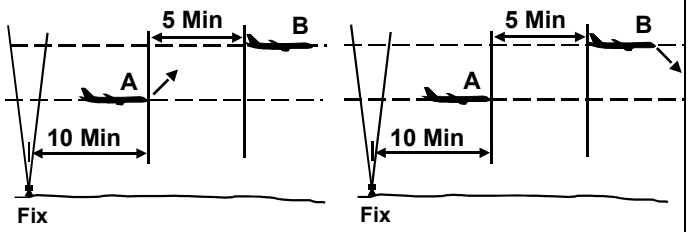
10.6.3.1 Separation requirements must be cross-checked to ensure the integrity of calculations. The cross-check is to validate the initial calculation and to confirm that the calculation is consistent with the traffic disposition.

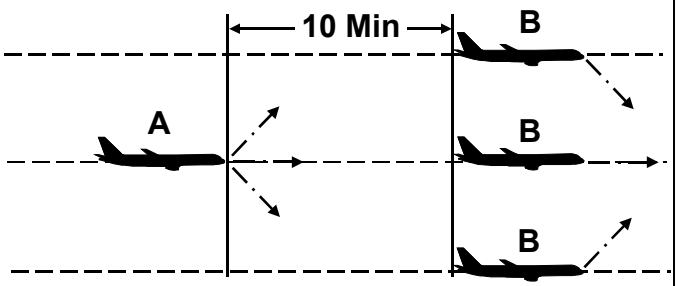
10.6.3.2 The method used to cross-check calculations need to be sufficiently accurate to confirm that the original calculation has merit. Where a significant discrepancy or inconsistency is found:

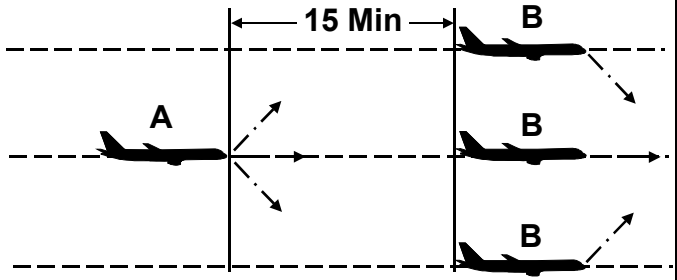
(a) the initial calculation must be performed again and the integrity cross-check reapplied; or

(b) further verification using an alternative means must be performed.

10.6.4 Longitudinal Time Separation Minima

Minima	Application	Conditions	Diagram
T1a **5 MIN**	Aircraft cruising, climbing or descending	1. B1, B2 or B3 has maintained and will continue to maintain an IAS at least 30 KT greater than A; 2. 5 minute separation has been established by the passage of both aircraft over the same positive radio fix, or the same ATC observed radar position; and 3. One aircraft maintains level while vertical separation does not exist; and 4. The vertical separation at the commencement of the level change does not exceed 4,000 FT.	
T1b **5 MIN**	Aircraft climbing or descending, where: 1. the preceding aircraft descends through the level of a following aircraft; or 2. the following aircraft climbs through the level of a preceding aircraft.	1. No closing speed (IAS or Mach No) exists; 2. The 5 minute separation has been established by the passage of both aircraft over the same positive radio fix, or the same ATC observed radar position; 3. The level change is commenced within 10 MIN of the time the second aircraft passed over the positive radio fix, or the ATC observed radar position; 4. One aircraft maintains level while vertical separation does not exist; and 5. The vertical separation at the commencement of the change does not exceed 4,000 FT.	

Minima	Application	Conditions	Diagram
T1c **5 MIN**	Aircraft cruising in a continuation of Departure Standard D4.	The cruising IAS of the following aircraft is at least 10 KT less than and not more than 90% of the cruising IAS of the preceding aircraft.	
T2 **10 MIN**	Aircraft cruising, climbing or descending.	Frequent determination of position and speed is possible by: 1. Use of navigation aids; 2. Use of LRNS (INS/IRS min. G/S 300 KT) or DME on the route sections within: (a) CTA; (b) OCA as described below: (i) BN VOR – 350 BN (outbound); (ii) All routes contained in the airspace bounded by: SY VOR – BN VOR – LHI NDB and Lord Howe–Sydney routes; (iii) PH VOR – 350 PH (outbound); (iv) POKIP – EGAVI (northbound); 3. Aircraft operating on routes or within airspace designated as RNP10, provided the aircraft indicates compliance with the requirements of RNP; or 4. Visual reference to the ground by day (or night for VFR aircraft).	

<table>
<tr><th>Minima</th><th>Application</th><th>Conditions</th><th>Diagram</th></tr>
<tr><td>T3
15 MIN</td><td>Aircraft cruising, climbing or descending, within all CTAs and OCAs except when T2 is applicable.</td><td></td><td> 
</td></tr>
<tr><td>T4
10 MIN
Mach No. Technique</td><td>Aircraft cruising, climbing or descending.</td><td>1. Aircraft are on the same track and have reported over a common point, being:
(a) a geographical point on the aircraft's track over which both aircraft will fly; or
(b) a point along the individual track of each aircraft which is equidistant from the geographical point described in (a) above;
and 10 MIN will be maintained until another form of separation is established; or
2. Aircraft are on converging tracks and it is confirmed that 10 MIN separation will exist at the point the aircraft enter lateral conflict and 10 MIN separation will be maintained until another form of separation is established.</td><td>
<table>
<tr><th rowspan="2">Difference in Mach No</th><th colspan="5">Distance to fly and separation (in MIN) required at entry point</th></tr>
<tr><th>000–600 NM</th><th>601–1200 NM</th><th>1201–1800 NM</th><th>1801–2400 NM</th><th>2401–3000 NM</th></tr>
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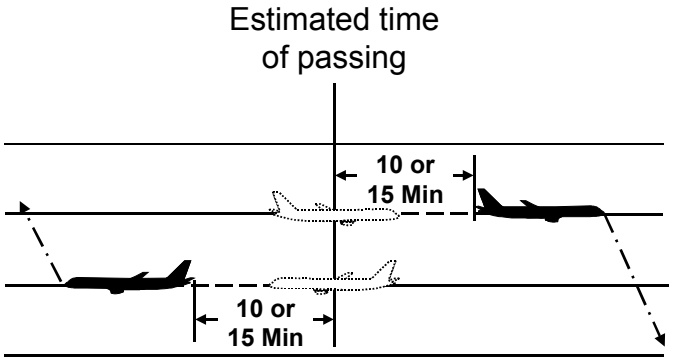
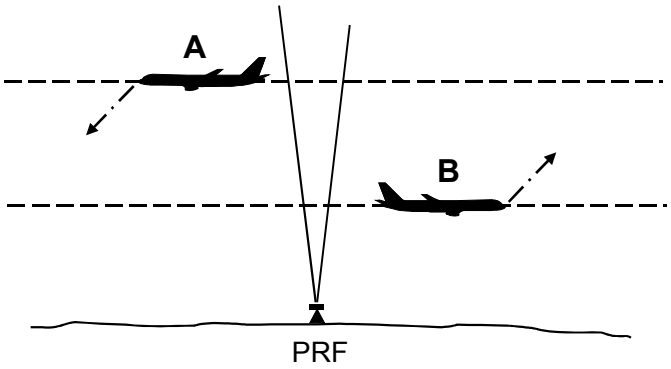
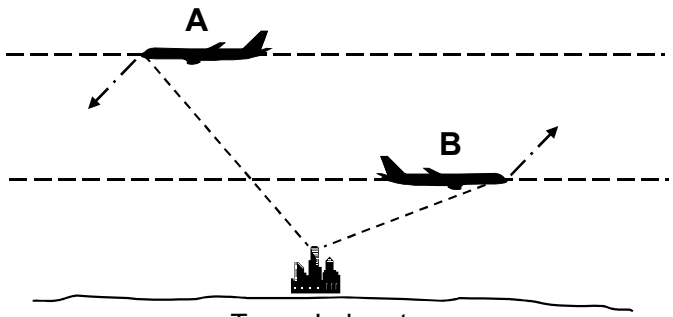
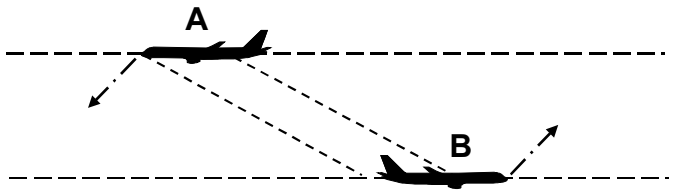
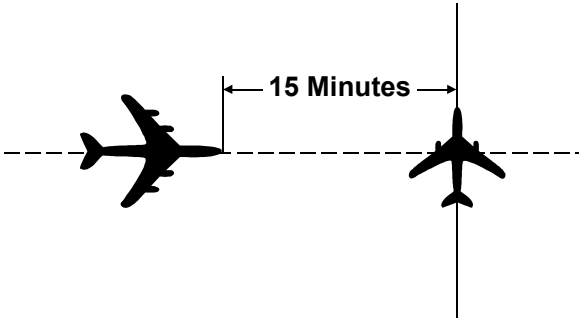
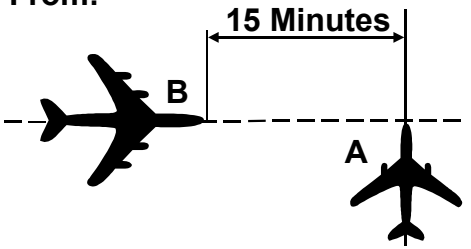
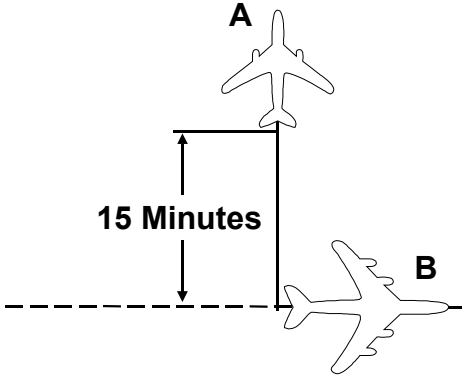
<tr><th>Minima</th><th>Application</th><th>Conditions</th><th colspan="2">Diagram</th></tr>
<tr><td rowspan="6">T5
9–5 MIN
Mach No. Technique</td><td rowspan="6">Aircraft cruising, climbing or descending where opening speed exists using the Mach Number Technique.</td><td rowspan="6">1. Radar observation or passage over the same, on-track, positive radio fix confirms that the required time interval will exist at the common point; and
2. The preceding aircraft is maintaining a greater Mach number than the following aircraft, in accordance with the adjacent table.</td><td>Time</td><td>Mach No</td></tr>
<tr><td>9 MIN</td><td>Mach 0.02 faster</td></tr>
<tr><td>8 MIN</td><td>Mach 0.03 faster</td></tr>
<tr><td>7 MIN</td><td>Mach 0.04 faster</td></tr>
<tr><td>6 MIN</td><td>Mach 0.05 faster</td></tr>
<tr><td>5 MIN</td><td>Mach 0.06 faster</td></tr>
<tr><td>T6
10 or 15 MIN
Aircraft on Reciprocal Tracks</td><td>Aircraft on reciprocal tracks.</td><td>1. Where lateral separation is not provided, vertical separation must be provided for at least 10 or 15 MIN, as applicable to the route (see T2 and T3 conditions), prior to and after the time the aircraft are estimated to pass, or are estimated to have passed.
2. In addition to the T2 conditions for application, the 10 minute time minimum may also be applied between aircraft equipped with approved LRNS.</td><td colspan="2"> 
</td></tr>
<tr><td>T7a
Definite Passing (radio fix)</td><td></td><td>Both aircraft report passing the same positive radio fix.</td><td colspan="2"> 
</td></tr>
</table>

Minima	Application	Conditions	Diagram
T7b **Definite Passing (visual fix)**		1. Both aircraft report passing the same visual fix, by day, or by night if both aircraft are NIGHT VFR; and 2. The visual fix must be a prominent topographical feature within 10,000 FT of the levels of each aircraft.	
T7c **Definite Passing (sight and pass)**		1. Both aircraft report sighting and passing the other by day (and in OCA by night); 2. Both aircraft are above FL125; and 3. ATC ensures there is no possibility of incorrect identification by either aircraft.	
T7d **Definite Passing (radar observed)**		Aircraft are observed by radar to have definitely passed.	

Minima	Application	Conditions	Diagram
T8a **15 MIN** **Crossing Tracks**	15 MIN **exists** at the crossing point.	1. Both aircraft have one of the following LRNS approvals: (a) NAV/AUSEP; (b) NAV/GPSOCEANIC; or (c) NAV/GPSRNAV; (d) MNPS; and (e) RNP10 (within RNP10 airspace); 2. Relevant aircraft have a groundspeed of at least 300 KT; and 3. For T8b only: Vertical separation must exist from 15 MIN prior to the estimate for B at the intersection; until 15 MIN after A has passed the intersection.	
T8b **15 MIN** **Crossing Tracks**	15 MIN **does not exist** at the crossing point.		**From:**  **Until:** 

10.6.5 Application of Time Departure Minima

10.6.5.1 Time departure minima are only applicable during initial climb until reaching the cruising level.

10.6.5.2 Where the planned speed differential between aircraft subject to these departure minima is at or near the minimum prescribed, climbing/cruising speeds must be specified where appropriate to ensure the integrity of the standard.

10.6.5.3 The planned CLIAS notified by GA VFR shall not be amended. The CLIAS of other VFR flights may be altered if agreed to by the pilot.

10.6.5.4 Departure (DEP) Minima 1 to 6 may be applied when:

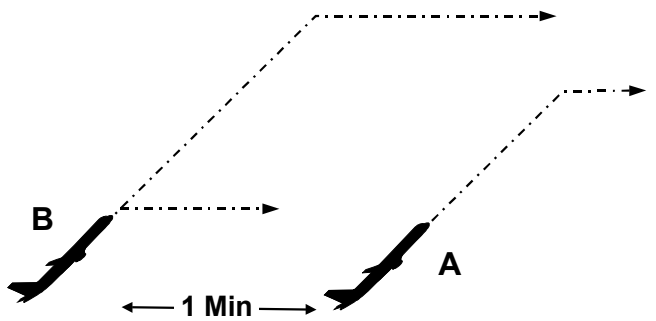
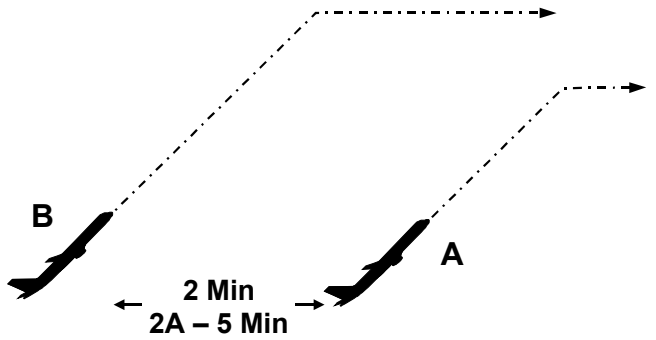
(a) both aircraft proceed on the same route where a turn of 40 degrees or less is specified; or

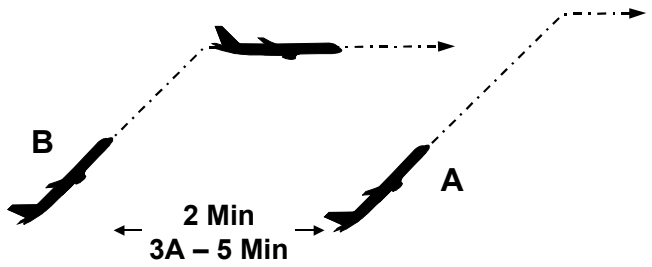
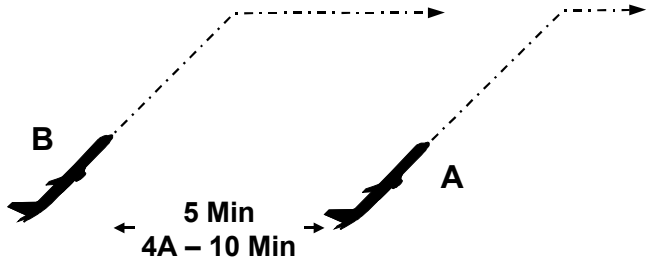
(b) the following aircraft's route involves a turn of more than 40 degrees, the preceding aircraft must continue straight ahead or turn by 30 degrees or less;

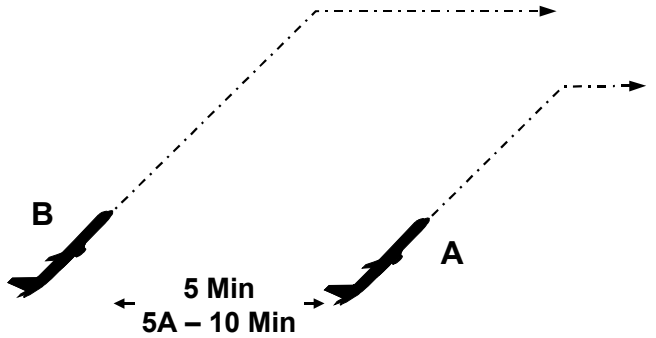
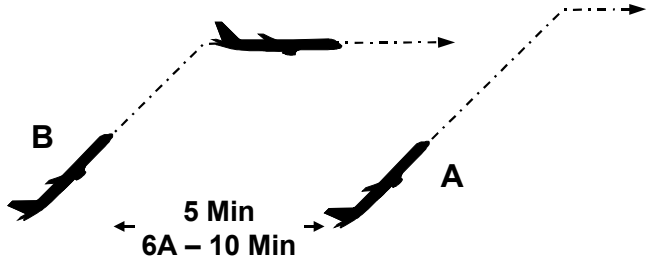
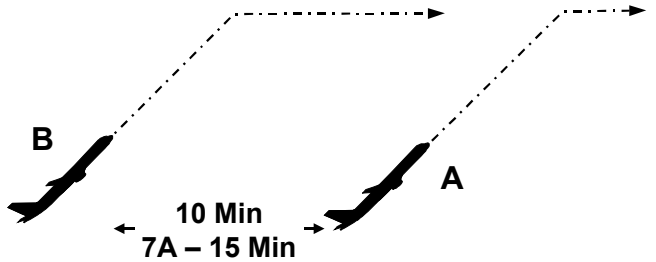
(c) when the turn in track is 31 degrees to 40 degrees, Departure standard 5 may only be used if the turning point is defined by a radio navigation aid, or radar is used to observe the turn and ensure the departure standard does not decrease until the aircraft is established on the new track.

10.6.5.5 Departure (DEP) minima 2A, 3A, 4A, 5A and 6A may be applied when both aircraft proceed on the same route on which a turn of 41 degrees to 65 degrees is specified.

10.6.6 Time Departure Separation Minima

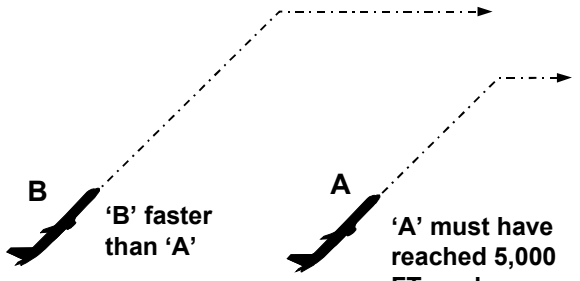
Minima	Application	Conditions	Diagram
Dep 1 **1 MIN**	Following aircraft climbing to a higher or lower level.	1. CLIAS of the first aircraft is at least 50 KT faster than the CLIAS of the second and at least 30 KT faster than the cruising IAS of the second; and 2. Either: (a) the bearing from a point 1 NM along the runway extension to a point 5 NM along the departure track is within 30 degrees of the runway bearing; or (b) the aerodrome controller can visually separate the aircraft until they have intercepted the departure track with the required separation.	
Dep 2/2A **2/5 MIN**	Following aircraft climbing to the higher level	CLIAS of the second aircraft is at least 10 KT slower and not more than 90% of the CLIAS or Mach No. of the first aircraft.	

Minima	Application	Conditions	Diagram
Dep 3/3A **2/5 MIN**	Following aircraft climbing to the lower level.	1. Both aircraft report reaching the lower cruising level; 2. If the following aircraft reaches the cruising level first, another form of separation must be applied immediately; 3. CLIAS of the second aircraft is at least 10 KT slower, and not more than 90% of the CLIAS or Mach No. of the first aircraft; and 4. Cruising IAS of the second aircraft is less than or equal to the CLIAS or Mach No. of the first aircraft.	
Dep 4/4A **5/10 MIN**	Following aircraft climbing to the same level.	1. Both aircraft report reaching the cruising level; 2. If the second reaches that level first, another form of separation must be applied; and 3. CLIAS and cruising IAS of the second aircraft is at least 10 KT slower, and not more than 90% of the CLIAS and cruising IAS or Mach No. of the first aircraft.	

Minima	Application	Conditions	Diagram
Dep 5/5A **5/10 MIN**	Following aircraft climbing to a higher level.	1. CLIAS of the second aircraft is less than or equal to the CLIAS of the first aircraft; and 2. If the turn in track is between 31 and 40 degrees, the turning point must be defined as a radio navigation aid, or radar must be used to observe the turn and ensure the departure standard does not decrease until the aircraft is established on the new track.	
Dep 6/6A **5/10 MIN**	Following aircraft climbing to a lower level.	1. Both aircraft report reaching the lower cruising level; 2. If the second aircraft reaches cruising level first, another form of separation must be applied immediately; 3. CLIAS of the second aircraft is less than or equal to the CLIAS of the first aircraft; and 4. If the turn in track is between 31 and 40 degrees, the turning point must be defined as a radio navigation aid, or radar must be used to observe the turn and ensure the departure standard does not decrease until the aircraft is established on the new track.	
Dep 7/7A **10/15 MIN**	Following aircraft climbing to the same level.	1. Both aircraft report reaching the cruising level; 2. If the second reaches that level first, another form of separation must be applied; and 3. CLIAS of the second aircraft is less than or equal to the CLIAS of the first aircraft.	

<table>
<tr><th>Minima</th><th>Application</th><th>Conditions</th><th>Diagram</th></tr>
<tr>
<td>Dep 8

Distance Determined by Speed</td>
<td>Faster following aircraft climbing to higher level.</td>
<td>1. Only useable when the first aircraft has reached 5,000 FT or above;
2. The vertical difference between the aircraft must be used to determine the appropriate distance required between the aircraft. This distance must be subtracted from the DME distance of the leading aircraft (see table);
3. The following aircraft must be instructed to reach 1,000 FT above the leading aircraft's cruising or maintain level, by the DME distance determined at 2;
4. Where both aircraft are airborne, the DME distance and levels of both aircraft must be required. Otherwise, only that of the leading aircraft is required; and
5. When the procedure is applied to a following aircraft that has not departed, the requirement must be updated once that aircraft has departed.

Note: Separation of not less than 15 NM is provided when the following aircraft reaches 1,000 FT above the level the leading aircraft has maintained.</td>
<td>


<table>
<tr><td>Vertical Distance Between Aircraft</td><td>5,000–7,000 FT</td><td>7,001–10,000 FT</td><td>10,001–20,000 FT</td><td>More than 20,000 FT</td></tr>
<tr><td>Miles to be Subtracted</td><td>15</td><td>10</td><td>5</td><td>0</td></tr>
</table>
</td>
</tr>
</table>

Minima	Application	Conditions	Diagram
Dep 8 **Distance Determined by Speed (cont)**		**Examples** 1. An F50 climbing to FL160 reports 50DME; an A320 ready for departure is required to reach FL 170 by 45 DME. After departing, the A320 reports 7,000 FT at 9 DME and the F50 65 DME, cruising FL160; the A320 may be given an updated requirement to reach FL170 by 55 DME. 2. A DHC8 reports cruising 9,000 FT at 30 DME. A B737 just departed is required to reach 10,000 FT on climb to FL250 by 20 DME. 3. An F50 climbing to FL180 reports 45 DME and is maintained at FL130. A B737 after departing and climbing through 4,000 FT is required to reach FL140 by 35 DME. 4. A C130 climbing to FL230 reports at 45 TACAN leaving 10,000 FT. An F18 ready for departure is instructed to reach FL240 by 35 TACAN.	

10.6.7 Application of Longitudinal Distance Separation

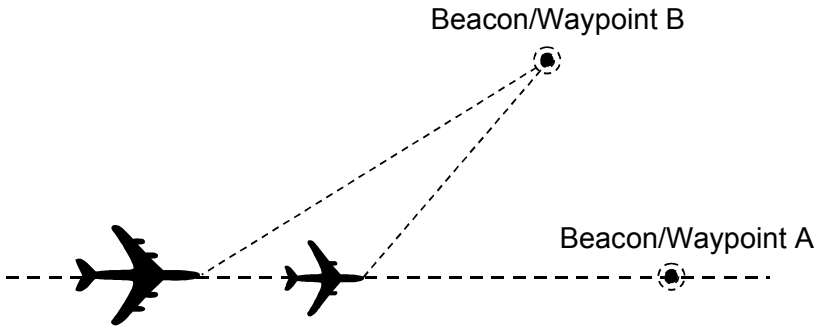
10.6.7.1 Distance based longitudinal separation minima must only be applied when:

(a) Direct Controller Pilot Communications (DCPC) exist; or

(b) ATC monitors all distance reports made by the aircraft.

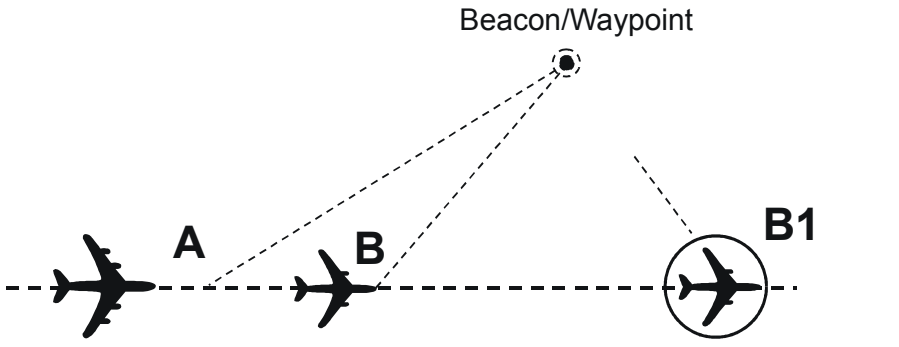
Note: The requirement for DCPC is met by the use of Controller Pilot Datalink Communications (CPDLC).

10.6.7.2 All distance reports must be made with reference to the same DME beacon or waypoint.



Beacon/Waypoint A or B can be used provided both aircraft use the same beacon/waypoint

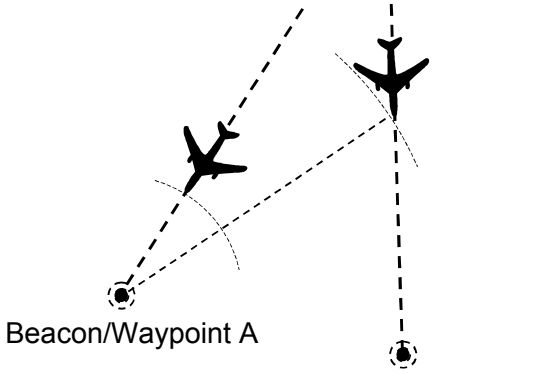
10.6.7.3 When applying same direction distance separation, an off-track waypoint or beacon may be used provided the positions of the aircraft relative to the beacon/waypoint are such that the distance readings are together increasing or decreasing.



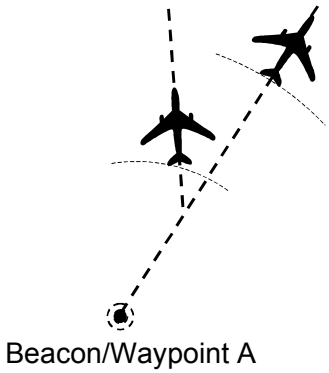
Distance minima cannot be applied if aircraft B1 is in this position relative to A

10.6.7.4 A DME beacon must be considered to be co-sited with a waypoint or the azimuth navigation aid providing tracking guidance when the DME site is located within 600 M of the waypoint or azimuth aid.

10.6.7.5 Where aircraft have been issued with different route clearances, and the difference in routes would apply during the period when distance separation is required, the leading aircraft must be tracking directly to or from the beacon/waypoint or co-sited navaid.



Beacon/Waypoint A in use with the leading aircraft tracking directly to that beacon/waypoint



Leading aircraft tracking directly from the beacon/waypoint

10.6.7.6 Where distance information is required from a specific navigation source, the source must be included in the request (e.g. “REPORT DISTANCE FROM NWN DME”, “REPORT GPS DISTANCE FROM BEZZA” or “REPORT RNAV DISTANCE FROM PONAN”).

10.6.7.7 During the application of same direction distance minima, the distance between aircraft must be checked at sufficient intervals to ensure that the required separation is maintained. The frequency of these regular distance

checks will depend on the performance and disposition of the aircraft, but must be made at intervals not exceeding 30 MIN.

10.6.7.8 When the radar distance between the aircraft is less than the sum of the longitudinal distance and radar separation standard, a distance check must be made before the first aircraft leaves radar coverage.

10.6.7.9 Separation minima D4, D7 and R3 (change of level) may also be applied between two aircraft in the following circumstances:

(a) The aircraft are confirmed to be on opposite sides of an en-route navigation aid, and one aircraft's distance is established by RNAV/DME to be not closer to that aid than the distance required by the standard.

(b) When the distance determined by radar, or by the position of one radar identified aircraft and an RNAV/DME report from the other, establishes that the distance between the aircraft is not less than the distance required by the longitudinal standard plus the applicable radar standard.

(c) If one aircraft's distance is established by RNAV/DME and the second aircraft's position is established, by day, with reference to a visual fix, provided that:

(i) the fix is a prominent topographical feature within 10,000 FT of the aircraft; and

(ii) the feature is displayed on maps available to ATC.

10.6.7.10 Except for standard R6, closing speed between aircraft may exist provided that:

(a) separation is in excess of the minimum distance required;

(b) distance checks are made at intervals not exceeding 15 MIN; and

(c) when aircraft are cruising at levels not vertically separated, the closing speed is not greater than 35 KT IAS or M 0.06.

10.6.8 Use of DME/GPS Separation

10.6.8.1 In the description and application of these separation minima, 'DME' includes TACAN for distance measurement. TACAN distances may be used for the same purpose as DME provided that all tolerances and conditions shown for DME are applied.

10.6.8.2 In CTA only, GPS distance information may be provided by GPSRNAV or GPSOCEANIC aircraft for the application of minima D1-4, subject to the following conditions:

(a) where a mix of GPS and DME distances is used, distance reports must not be used if one aircraft is within 20 NM of the reference point;

(b) when GPS is used by both aircraft, the standard may also be applied with reference to published waypoints.

10.6.9 RNAV Separation

10.6.9.1 RNAV distance minima may be applied between aircraft with approved LRNS, or between an aircraft with approved LRNS equipment and an aircraft with DME.

10.6.9.2 RNAV minima must not be applied after pilot advice of:

(a) operation of LRNS equipment outside prescribed criteria, including deterioration or failure;

(b) operation of an INS/IRS outside the time limits specified in the operational approval:

(i) CTA – 5 hours multiple sensor/3 hours single sensor; or

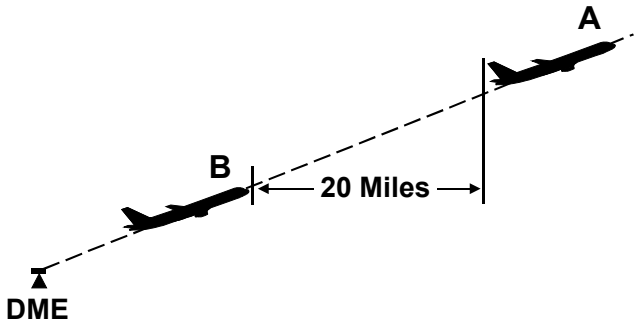
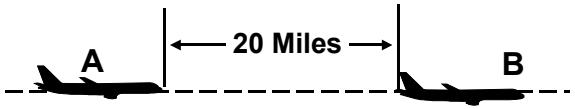
(ii) OCA – 12 hours multiple sensor/5 hours single/4.5 hours MNPS; or

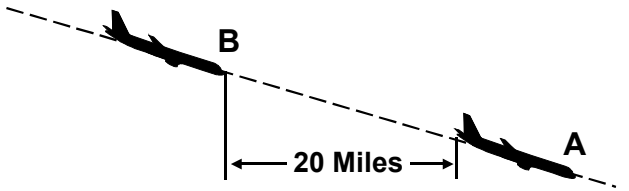
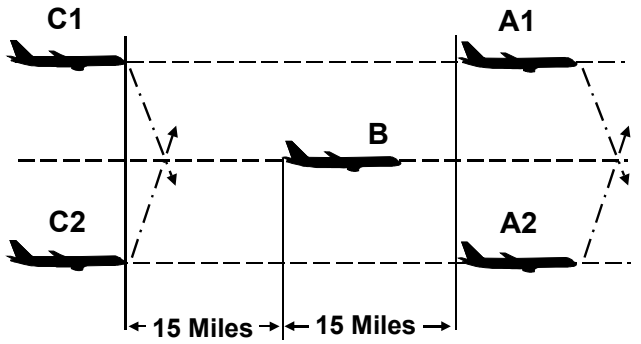
(c) continuous operation of GPSRNAV equipment in the DR mode for one minute or more; or

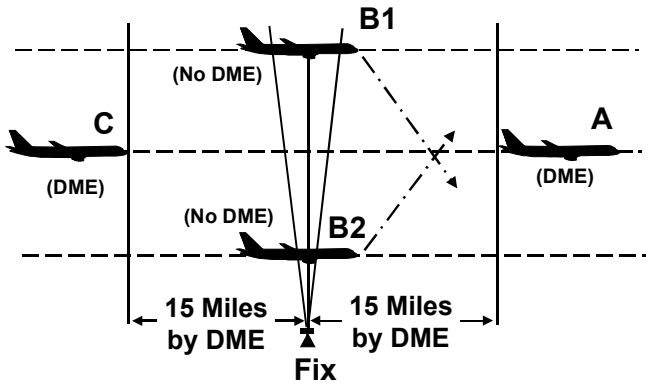
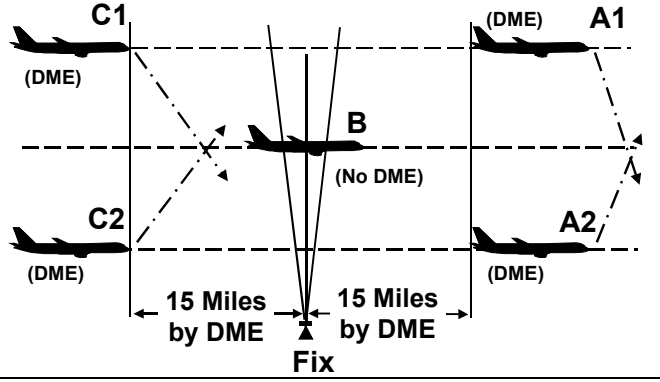
(d) non-RAIM operation for 10 MIN or more.

10.6.9.3 If doubt exists that the update criteria described above might not be met throughout the application of an RNAV standard, the time of the last update must be obtained from the pilot.

10.6.10 Distance Separation Minima

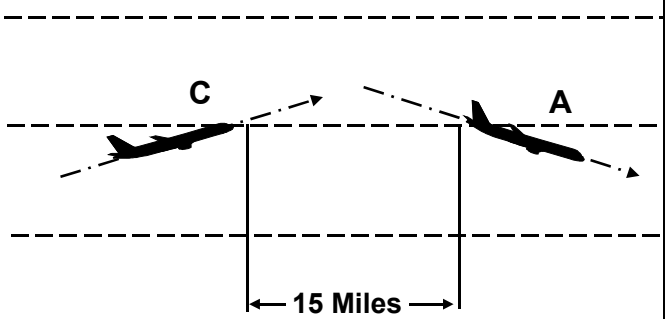
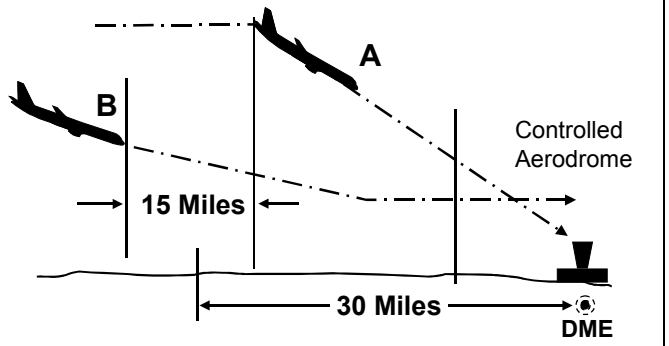
Minima	Application	Conditions	Diagram
D1 **20 NM**	Climbing (for aircraft on climb to cruise).	1. Separation checked at sufficient intervals to ensure minimum separation is maintained; 2. Where B is climbing to the lower cruising level or both aircraft are climbing to levels which are not vertically separated, both A and B must report reaching their cruising levels; 3. If aircraft B reports at cruising level first, immediate action must be taken to apply an alternative standard; and 4. Aircraft must be equipped: (a) with DME; or (b) in CTA only, with approved: (i) GPSRNAV; or (ii) GPSOCEANIC.	
D2 **20 NM**	Cruising (at levels not vertically separated).	1. Separation is checked at sufficient intervals to ensure that minimum separation is maintained; and 2. Aircraft must be equipped: (a) with DME; or (b) in CTA only, with approved: (i) GPSRNAV; or (ii) GPSOCEANIC.	

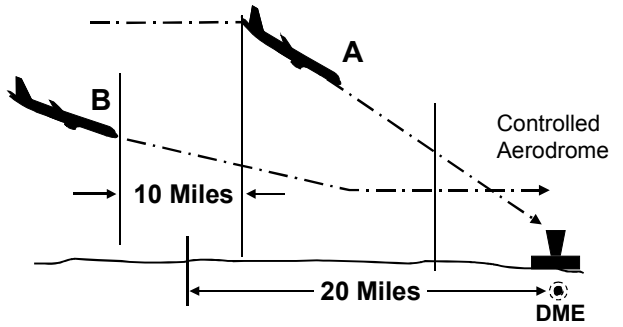
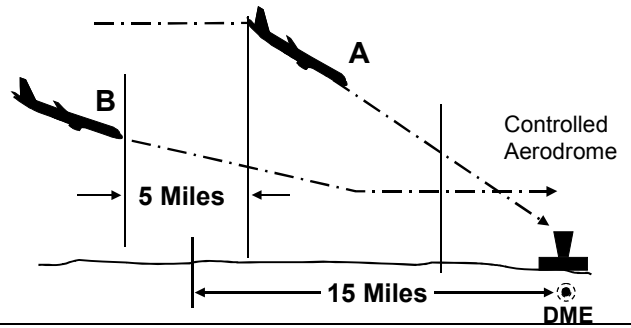
Minima	Application	Conditions	Diagram
D3 **20 NM**	Arriving aircraft.	1. Separation is checked at sufficient intervals to ensure minimum separation is maintained; and 2. Aircraft must be equipped: (a) with DME; or (b) in CTA only, with approved: (i) GPSRNAV; or (ii) GPSOCEANIC.	
D4A **15 NM**	Change of level.	1. A1, A2 or C1, C2 climbing descending whilst B maintains level; and 2. Aircraft must be equipped: (a) with DME; or (b) in CTA only, with approved: (i) GPSRNAV; or (ii) GPSOCEANIC. 3. Not useable for a change of level above FL290 when a DME distance is supplied by either aircraft unless both aircraft are on the same side of the DME beacon.	

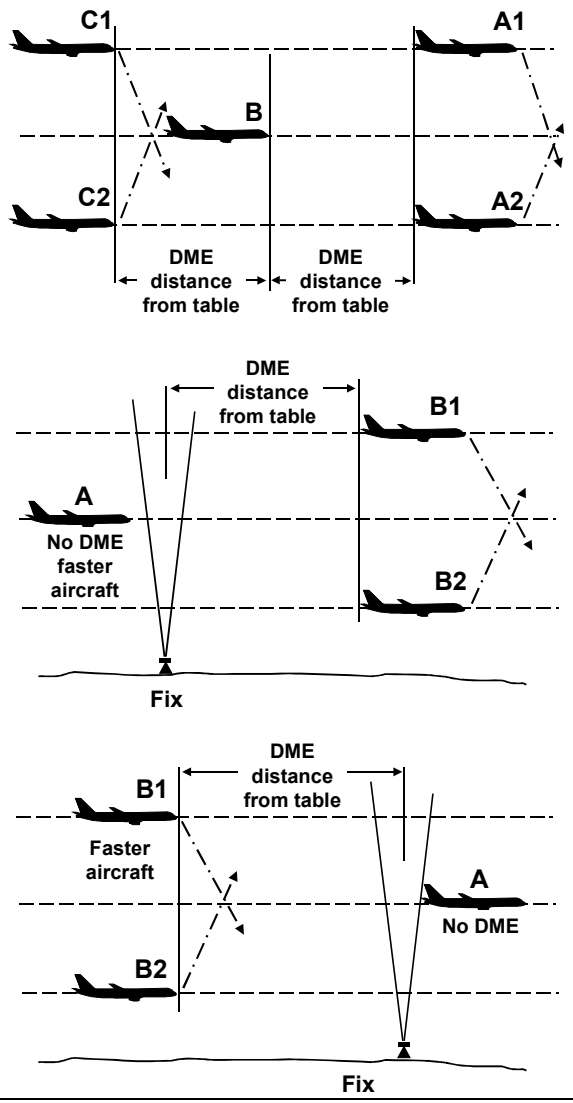
Minima	Application	Conditions	Diagram
D4b **15 NM**	Change of level (one aircraft equipped with DME and non-DME aircraft climbing/descending). Also applicable if B is on the safe side of the aid at the commencement of level change.	1. Non-DME B1 or B2 descending/climbing whilst A or C maintain level. 2. Aircraft A or C must be equipped: (a) with DME; or (b) in CTA only, with approved: (i) GPSRNAV; or (ii) GPSOCEANIC.	
D4c **15 NM**	Change of level (non-DME aircraft maintains level whilst DME equipped aircraft climbing/ descending). Also applicable if B is on the safe side of the aid at the commencement of level change.	1. A1, A2 or C1, C2 climbing or descending whilst non-DME B maintains level; 2. Aircraft A or C must be equipped: (a) with DME; or (b) in CTA only, with approved: (i) GPSRNAV; or (ii) GPSOCEANIC.	

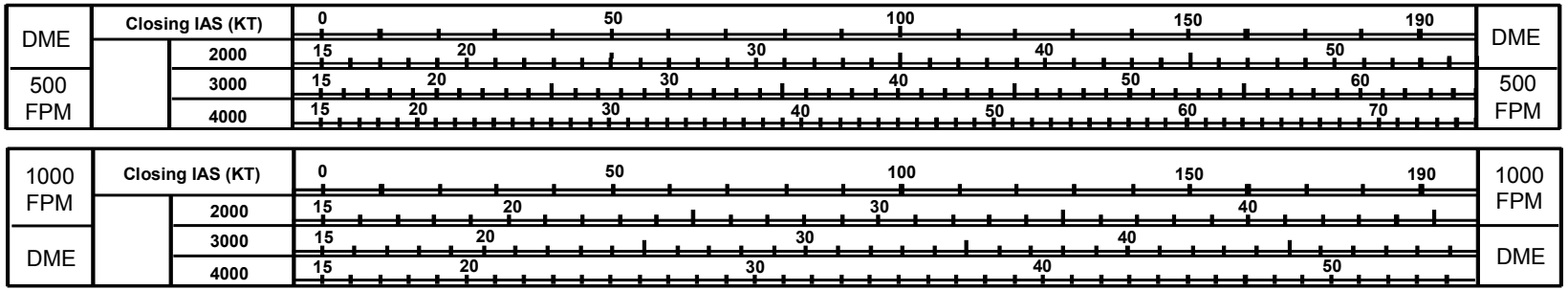
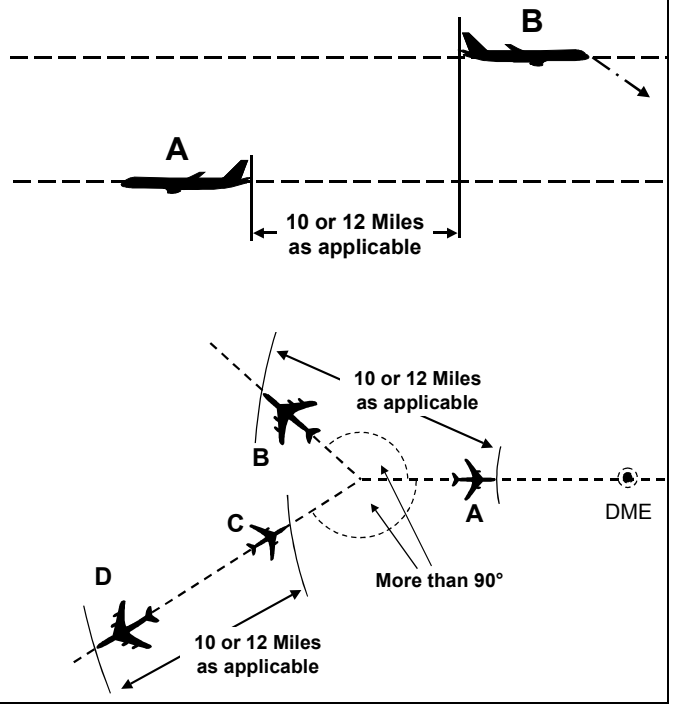
Notes:

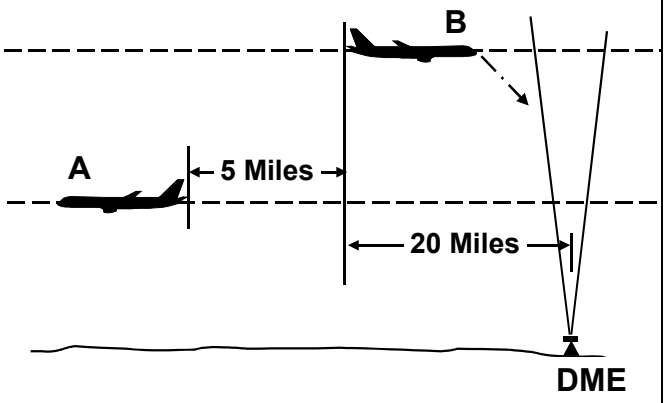
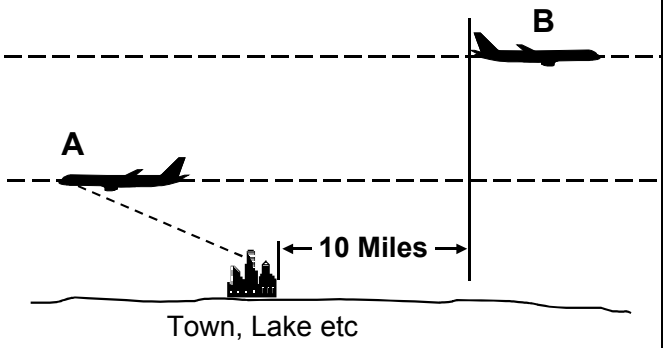
1. In 4a, 4b and 4c, if the distance obtained is close to the minimum, then consideration must be given to a descending aircraft being faster than the cruising aircraft, or a climbing aircraft being slower than the cruising aircraft. Speed restrictions/ requirements may be used to ensure the standard is maintained.
2. In 4b and 4c where the position of one aircraft is determined by radar, the applicable radar standard must be added.

Minima	Application	Conditions	Diagram
D4d **15 NM**	Leading aircraft descending through level of following climbing aircraft. Also applicable if B is on the safe side of the aid at the commencement of level change.	1. The leading aircraft A is descending through the level of C (climbing); 2. DME distances must be checked in sufficient time to ensure vertical separation is maintained if insufficient distance exists to apply this standard. 3. Aircraft must be equipped: (a) with DME; or (b) in CTA only, with approved: (i) GPSRNAV; or (ii) GPSOCEANIC. 4. Not useable for a change of level above FL290 when a DME distance is supplied by either aircraft unless both aircraft are on the same side of the DME beacon.	
D4e **15 NM** **Arriving Aircraft**	Inbound aircraft to a controlled aerodrome.	1. Both A and B are inbound aircraft and the leading aircraft A is within 30 miles of a controlled aerodrome with DME; 2. The aircraft are assigned levels which are vertically separated. 3. Aircraft must be equipped: (a) with DME; or (b) in CTA only, with approved: (i) GPSRNAV; or (ii) GPSOCEANIC.	

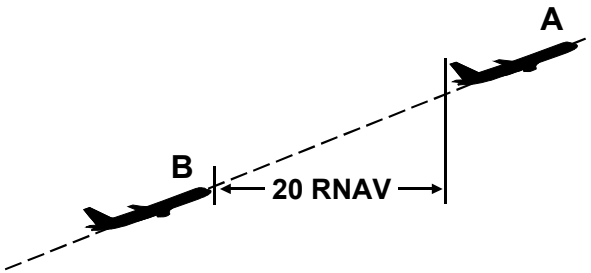
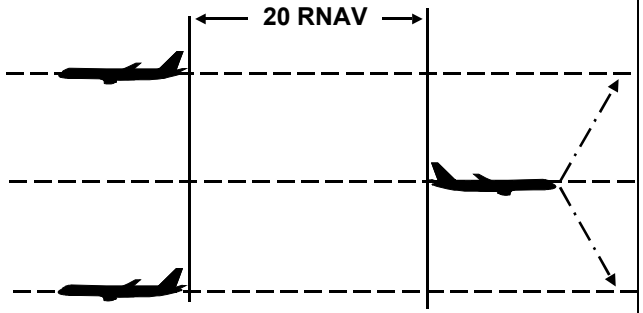
Minima	Application	Conditions	Diagram
D5 **10 NM** **Arriving Aircraft**	Change of level.	1. Both A and B are inbound aircraft and the leading aircraft A is within 20 miles of a controlled aerodrome with DME; 2. The aircraft are assigned levels which are vertically separated; and 3. Both aircraft are DME equipped.	
D6 **5 NM** **Arriving Aircraft**	Change of level.	1. Both A and B are inbound aircraft and the leading aircraft A is within 15 NM of a controlled aerodrome with DME; 2. The aircraft are assigned levels which are vertically separated; 3. Both aircraft are DME equipped; and 4. Wake turbulence standards are applied.	

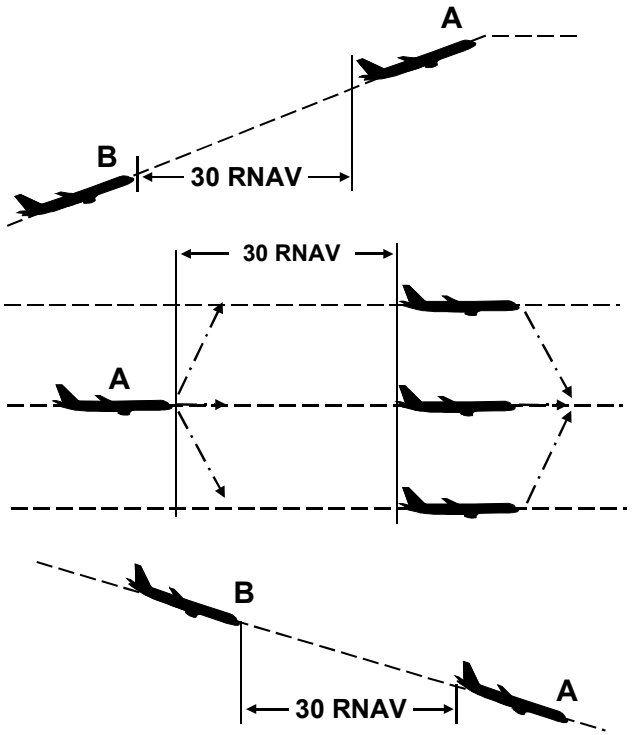
Minima	Application	Conditions	Diagram
D7 **A DME distance proportional to the rate of closure (IAS) as determined from the DME separation tables (below) for aircraft rate and amount of level change**	Change of level. Also applicable if a non-DME equipped aircraft is on the safe side of the aid at the commencement of level change.	1. One aircraft maintains level whilst vertical separation does not exist; 2. DME distances are checked when the aircraft are vertically separated by the minimum amount appropriate to the DME table to be used. 3. The level change is commenced within 1 minute of obtaining DME distances. When the separation is on the minimum, instructions must be issued to ensure that the level change is commenced within this time; 4. Where the position of one aircraft is determined by radar, the applicable radar standard must be added. 5. Not useable for a change of level above FL290 when a DME distance is supplied by either aircraft unless both aircraft are on the same side of the DME beacon. **Note:** When applying this standard to an aircraft transiting the transition level and the Area QNH is higher than 1,013 HPa, 1,000 FT must be added to the amount of level change and the applicable value in the table must then be utilised (e.g. for a 3,000 FT level change, use 4,000 FT table).	

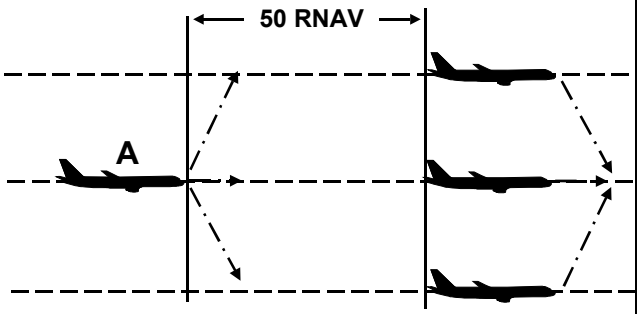
Minima	Application	Conditions	Diagram
			
D8a **Definite Passing** **10 NM** **(12 NM at distances greater than 180 NM)**	Reciprocal tracks and tracks differing by more than 90 degrees.	Reports indicate that the aircraft have passed and DME distance is opening.	

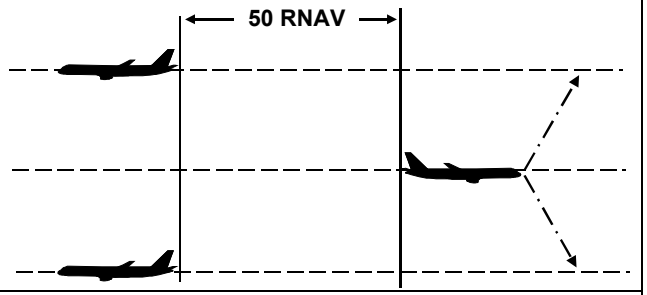
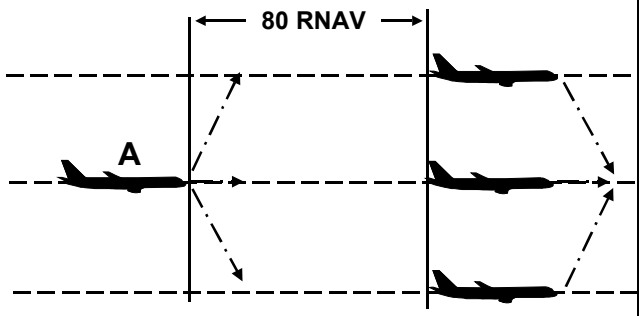
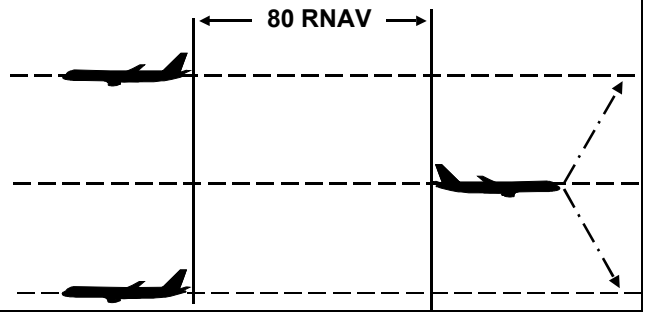
Minima	Application	Conditions	Diagram
D8b **Definite Passing** **5 NM**	Reciprocal tracks.	1. Reports indicate that the aircraft have passed and DME distance is opening; and 2. One aircraft is within 20 NM of the DME beacon.	
D8c **Definite Passing** **10 NM**	Reciprocal tracks.	1. Reports by reference to a prominent topographical feature by one aircraft and a DME beacon by the other aircraft indicate that the aircraft have passed by at least 10 NM; 2. The non-DME equipped aircraft passes over and within 10,000 FT of the topographical feature; and 3. The topographical feature together with its distance from the DME beacon is specified in local Instructions.	

10.6.11 RNAV Distance Separation Minima

Minima	Application	Conditions	Diagram
R1 **20 RNAV**	Departing aircraft on climb to vertically separated cruising levels.	1. Where B is climbing to the lower level, both A and B must report reaching their cruising levels; 2. If B reports at the cruising level first, immediate action must be taken to apply an alternative standard; 3. Useable only in CTA; and 4. Aircraft must be approved: (a) AUSEP; (b) GPSRNAV; or (c) GPSOCEANIC.	
R2 **20 RNAV** **Definite Passing**		1. Using the same waypoint, reports indicate that the aircraft have passed and the distance between them is opening; and 2. Whenever a DME derived distance is 30 miles or less, a correction for DME Slant Range Error is applied. 3. Useable only in CTA; and 4. Aircraft must be approved: (a) AUSEP; (b) GPSRNAV; or (c) GPSOCEANIC.	

Minima	Application	Conditions	Diagram
R3 **30 RNAV**	Climbing, cruising or descending.	1. When both aircraft are climbing to non-vertically separated levels: (a) both A and B must report reaching their cruising levels; and (b) if B reports at the cruising level first, immediate action must be taken to ensure separation is maintained; 2. Useable only in CTA; and 3. Aircraft must be approved: (a) AUSEP; (b) GPSRNAV; (c) GPSOCEANIC (d) Both aircraft comply with RNP10 or better and are within RNP10 airspace. 4. Not useable for a change of level above FL290 when a DME distance is supplied by either aircraft unless both aircraft are on the same side of the DME beacon.	

Minima	Application	Conditions	Diagram
R4 **50 RNAV**	Aircraft cruising, climbing or descending on same track.	1. Separation must be established by reference to the same 'on-track' waypoint, whenever possible ahead of both aircraft or by means of an automated position reporting system; 2. Distance reports obtained by CPDLC must be sent by both aircraft at the same time or from the leading aircraft first; 3. When aircraft are at, or expected to reduce to the minimum, speed control techniques, including assigning Mach number, must be applied to ensure that the minmum distance exists throughout the period of application of the standard; 4. The adequacy of the available communications link, considering the time element required to receive replies from two or more aircraft, and the overall workload/traffic volume associated with the application of the minimum, should be determined prior to application of the minimum; 5. If an aircraft fails to report its position within 3 MIN, immediate action must taken to establish communication. If communication is not established within 8 MIN from the time the report should have been received, an alternative form of separation must be applied; and 6. Both aircraft comply with RNP10 or better and are within RNP10 airspace.	

Minima	Application	Conditions	Diagram
R5 **50 miles** **Definite Passing**		1. Reports (including ADS) indicate that the aircraft have passed and the distance between them is opening; and 2. Both aircraft comply with RNP10 and are within RNP10 airspace.	
R6 **80 RNAV** **Mach No. Technique**	Aircraft cruising, arriving and changing levels when not vertically separated.	1. No closing Mach number; 2. The Mach Number Technique (MNT) is applied during the application of the standard; and 3. Aircraft must be approved: (a) AUSEP; (b) GPSOCEANIC; or (c) MNPS. 4. Requirement for 'no closing' may not be waived.	
R7 **80 miles** **Definite Passing**		1. Using the same waypoint, reports indicate that the aircraft have passed and the distance between them is opening; and 2. Aircraft must be approved: (a) AUSEP; (b) GPSOCEANIC; or (c) MNPS.	

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Section 10.7: Separation Standards—Vertical

10.7.1 Vertical Buffers between Aircraft Inside and Outside Controlled Airspace

10.7.1.1 Levels assigned to VFR aircraft must provide a buffer of at least 500 FT with the base of CTA.

10.7.1.2 Where the base of CTA is a VFR level, levels assigned to IFR aircraft must provide a buffer of at least 500 FT with the base of CTA. Where it is known that an IFR aircraft is operating less than 500 FT from the base, levels assigned must provide a buffer of at least 1,000 FT with the base of CTA.

10.7.1.3 Where the base of CTA is an IFR level, levels assigned to IFR aircraft must provide a buffer of at least 1,000 FT with the base of CTA, unless it is known that no IFR traffic is operating at the base of CTA. In this instance a buffer of at least 500 FT must be applied.

10.7.2 Vertical Separation Below High Altitude Balloons

10.7.2.1 Unless visual separation is applied, aircraft in CTR/CTA must not be permitted to transit vertically below the 15 NM radius of the balloons position while the balloon is ascending until the balloon has passed FL600.

10.7.3 Step Climbs and Descents

10.7.3.1 The Step Climb Procedure may be used to simultaneously climb aircraft to vertically separated levels provided that the lower aircraft is progressively assigned levels that provide vertical separation with the higher aircraft.

10.7.3.2 When applying the step climb or step descent procedures, pilots must be advised that they are subject to a step climb or descent.

10.7.4 Specifying Rates of Climb

10.7.4.1 Except for international aircraft, a rate of climb or descent must be described in each level clearance when a specified rate is required to ensure the vertical separation is maintained.

10.7.4.2 When it is necessary to specify a rate of climb or descent to an international aircraft, the rate must always be specified in feet per minute, **not** ‘standard rate’.

10.7.4.3 ATC must endeavour to avoid prescribing rate of climb or descent if it is believed that an aircraft is:

(a) operating in close vertical proximity to the control area lower limit; or

(b) descending VISUAL or VFR to an assigned level and maintaining clearance from terrain or cloud.

10.7.4.4 A rate of descent must not be specified to any aircraft instructed to make a ‘VISUAL APPROACH” or “DME ARRIVAL”, or to an aircraft on that part of an instrument approach below the lowest holding altitude.

10.7.5 Rate in Step Climb/Descent

10.7.5.1 During a Step Climb or Step Descent where a rate of climb or descent has been specified, the rate must apply to all level clearances issued in the course of the climb or descent. The rate must be specified in the initial clearance using the phrase: "... STEP CLIMB (or STEP DESCENT) - STANDARD RATE (or at FEET PER MINUTE)".

10.7.6 Assigning Vacated Levels

10.7.6.1 A level vacated by one aircraft may be assigned immediately to a second aircraft provided that:

(a) the required vertical separation has not been increased because of the possibility of turbulence;

(b) the first aircraft has been assigned a level requiring a level change of at least the minimum being applied; and

(c) both aircraft have been instructed to change level at a specified rate which will ensure that the applicable vertical separation standard is not infringed.

10.7.6.2 The lowest holding altitude may be assigned to a second aircraft when the first aircraft has reported, "ON FINAL - LEFT (final approach altitude)", provided that the following aircraft is instructed to descend at "STANDARD RATE" (or at 500 FT per minute).

10.7.7 Transition Layer, Altitude and Level

10.7.7.1 The system of altimetry used in Australia makes use of a Transition Layer between the Transition Altitude of 10,000 FT and the Transition Level of FL110, to separate aircraft using QNH from those using 1013 Hpa. Cruising in the transition layer must not be permitted.

10.7.8 Common Altimeter Settings

10.7.8.1 In the application of vertical separation at or below the transition altitude, aircraft using terminal QNH and aircraft using Area QNH may be considered to be using common settings.

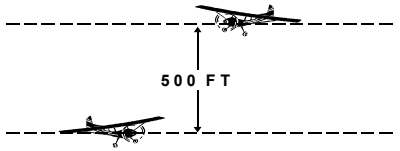
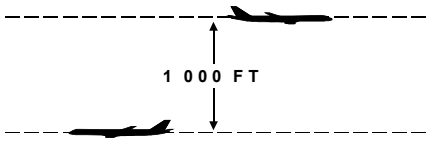
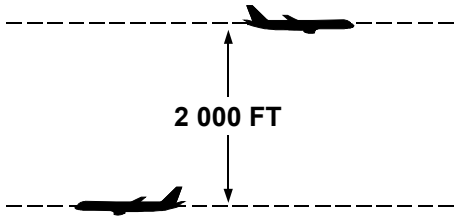
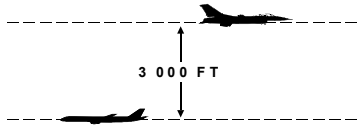
10.7.9 Levels Unavailable when QNH less than 1013

10.7.9.1 Whenever the QNH/Area QNH is less than 1013 HPa, certain flight levels at or above the transition level are precluded from use in accordance with Table 10.7-1:

Table 10.7-1

QNH less than	Level not available
1013 HPa	FL110
997 HPa	FL115
980 HPa	FL120

10.7.10 Vertical Separation Minima

Minima	Application	Conditions	Diagram
V1 **500 FT**	1. Between IFR and VFR flights; or 2. Between SVFR flights, where SVFR clearance is due to visibility.	1. Both aircraft are 7,000 KG or less; 2. Both aircraft are at or below 10,000 FT; and 3. Traffic information is provided to the IFR flight, unless it is impracticable.	
V2 **1,000 FT**	All aircraft.	Up to and including FL290.	
	Aircraft with RVSM approval operating in RVSM-designated airspace.	From FL290 to FL410 inclusive.	
V3 **2,000 FT**	1. In RVSM-designated airspace: (a) when at least one aircraft is not RVSM approved; (b) following pilot report of an inability to comply with RVSM; or 2. In non-RVSM airspace.	FL290 and above.	
	All aircraft.	Above FL410.	
	In known standing wave conditions or severe turbulence.	All levels.	
V4 **3,000 FT**	All levels, when one or more aircraft is operating at supersonic speeds.		

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Section 10.8: Separation Standards—Lateral

10.8.1 Lateral Separation Buffer

10.8.1.1 The Lateral Separation buffer is 1 NM between the possible positions of two aircraft. (ICAO PANS-ATM, Chapter 5.)

10.8.2 Application of Lateral Separation

10.8.2.1 Means for the application of lateral separation are:

(a) establishing an aircraft's position outside the BLSP; or

(b) applying an appropriate radar separation standard; or

(c) application of a 1 NM buffer to the track or position of an aircraft which is determined relative to a prominent topographical feature provided that:

(i) the aircraft is tracking visually; and

(ii) the aircraft is not more than 10,000 FT above the topographical feature; and

(iii) this procedure is used by day only.

10.8.2.2 Entry and Exit Points must be established by:

(a) application to a BLSP of slant range and DME equipment error corrections;

(b) application of RNAV tolerances;

(c) passage over a visual fix located on the opposite side of a BLSP from the area of conflict;

(d) passage over a positive radio fix (PRF) located on the opposite side of a BLSP from the area of conflict;

(e) expiration of a time calculated using an estimate for a BLSP minus/plus:

(i) 5 MIN, provided the estimate for the BLSP is within 30 MIN of an ATD, passage over a visual fix, PRF, way point or radar position; otherwise

(ii) half of the longitudinal time separation standard applicable to the aircraft.

10.8.2.3 Aircraft transiting into an airspace in which larger tolerances are applied than that being exited are considered to be separated provided that:

(a) the smaller separation standard exists; and

(b) the aircraft are established on flight paths that will diverge by 15 degrees or more until the larger separation standard is established; and

(c) the aircraft are RNAV approved to either AUSEP, MNPS, GPSOCEANIC or RNP10 (within RNP10 airspace).

10.8.2.4 A DME-based lateral separation entry/exit point must be calculated by:

(a) determining the ground distance from the DME site to the BLSP; then

(b) if the area of conflict (or part of it) is between the BLSP and the DME site, adding the slant range correction from Table 10.8-1 to the ground distance; then

(c) applying the correction for DME equipment error from Table 10.8-2 ensuring it is applied to a position outside the area of conflict.

10.8.2.5 Where the navigation tolerance is determined with reference to ground-based navigation aids, GPS distance may be used in lieu of a co-sited DME in the steps above.

10.8.2.6 Where the lateral separation point is less than 60 NM from, and between the area of conflict and the reference DME site, an extra 1NM must be subtracted from the DME-derived distance.

10.8.3 Navigation Tolerances

10.8.3.1 To determine the possible position of an aircraft, the following tolerance areas and range limitations must be applied.

10.8.3.2 When manual means are used for the calculation of lateral separation, the radio navaid tolerances specified below must be rounded up to the next higher half-degree.

10.8.3.3 The minimum tracking tolerance is ±1 NM.

10.8.3.4 The maximum tracking tolerance is ±30 NM in CTA and ± 50 NM in OCA.

10.8.3.5 Slant range corrections are as follows.

Table 10.8-1

Ground Distance	Slant Range Correction (in NM)			
	< = FL150	< = FL290	< = FL460	< = FL600
3 NM	2	3	6	8
4–5 NM	1	3	5	7
6–7 NM	1	2	4	6
8 NM	1	2	4	5
9–10 NM	1	2	3	5
11–12 NM	1	2	3	4
13–14 NM	1	1	3	4
15 NM	1	1	2	4
16–24 NM	1	1	2	3
25–30 NM	1	1	2	2
31–50 NM	1	1	1	2
>50 NM	1	1	1	1

10.8.3.6 Slant Range Error is negligible and corrections need not be applied at or below:

(a) 2,000 FT AGL at distances of 10 NM or greater from the DME site; or

(b) 4,000 FT AGL at distances of 30 NM or greater from the DME site.

Note: Where required for a particular lateral separation problem, Local Instructions may specify a lateral separation point based on a precise slant range correction for the levels concerned.

10.8.3.7 DME equipment error corrections are as follows:

Table 10.8-2

<table>
<tr><th colspan="3">DME Equipment Error</th></tr>
<tr><th>Tolerance</th><th colspan="2">Conditions</th></tr>
<tr><td rowspan="6">± 0.25 NM plus 1.25% of the slant range.</td><td colspan="2">Controllers may use figures from the table below.
DME Equipment Error Correction</td></tr>
<tr><td>Slant Range</td><td>Correction</td></tr>
<tr><td>300 NM or less</td><td>4 NM</td></tr>
<tr><td>220 NM or less</td><td>3 NM</td></tr>
<tr><td>140 NM or less</td><td>2 NM</td></tr>
<tr><td>60 NM or less</td><td>1 NM</td></tr>
</table>

10.8.3.8 The following tolerances are applicable to short range navigation aids:

Table 10.8-3

Navigation Aid	Tolerance for Precise Plotting	Tolerance for Manual Plotting	Conditions
ILS Localiser Front Beam	± 2.4 °	± 2.5°	Within 25 NM except: 1. Above 2,000 FT AGL, within ±5° of course line 25 NM; 2. Below A050 30 NM; 3. A050 and above 50 NM.
VOR radials (or TACAN)	± 5.2°	± 5.5°	Range (based on height above the navaid): Below 5,000 FT 60 NM 5,000 to 9,999 FT 90 NM 10,000 to 14,999 FT 120 NM 15,000 to 19,999 FT 150 NM At or above 20,000 FT 180 NM* **Note:** For published lateral separation diagrams that are displayed for controller reference, a maximum range of 150 NM must be used. The tolerance can be applied outside the listed range when an inbound aircraft has reported established on the VOR/TACAN.
NDB/Locator	± 6.9°	± 7°	Range as per ERSA.
DME arc	± 2.5 NM	± 2.5 NM	Includes DME equipment error.

10.8.3.9 The following Circular Error of Position (CEP) tolerances are applicable to long range navigation systems:

Table 10.8-4

Navigation Aid	Tolerance	Conditions
Approved LRNS – complies with specified RNP.	25 NM – CEP	Where both aircraft meet RNP10 capability, and in OCA, where RNP10 is specified. **Note:** 1 NM buffer between tolerances not required (refer 'Lateral Separation Table').
Approved LRNS – General method.	14 NM – CEP	CTA – when manual plotting or calculation is required. Approved LRNS for application of this tolerance are those indicating: • AUSEP • GPSOCEANIC • GPSRNAV.

Navigation Aid	Tolerance	Conditions
Approved GPS	12 NM – CEP	CTA – for use on fixed/published routes. Approved LRNS for application of this tolerance are those indicating: • GPSOCEANIC; • GPSRNAV.
Approved INS/IRS	Expanding formula	In CTA. The following formula may only be used in the preparation of an approved Lateral Separation diagram. Applicable to AUSEP aircraft only. The tolerance is a circle of radius: • 3 NM on departure; or • 4 NM at update; and • expanding at 3 NM per hour since departure or update to a maximum of 14 NM. ATC can assume update when the following conditions exist: • within 180 NM of both DME stations for a DME/DME fix where the position lines cross at an angle between 30° and 150°; • from a collocated VOR/DME beacon provided the aircraft is not more than 25 NM past that beacon; • overhead a VOR beacon at or below FL200.

10.8.3.10 The following tolerances are applicable to visual tracking and position fixing:

Table 10.8-5

Conditions	Tolerance	
By day—powered aircraft	0 to 2,000 FT AGL	±1 NM
	2,001 to 5,000 FT AGL	±2 NM
	5,001 to 10,000 FT AGL	±4 NM
By day—non-powered glider aircraft	0 to 10,000 FT AGL	±5 NM
By night	0 to 2,000 FT AGL	±2 NM
	2,001 to 5,000 FT AGL	±3 NM
	5,001 to 10,000 FT AGL	±5 NM
By day and night	10,001 FT AGL to FL200	±8 NM
	FL201 to FL300	±12 NM
	FL301 to FL400	±16 NM

10.8.3.11 The following miscellaneous tolerances are applicable:

Table 10.8-6

Means of Position Fixing	Tolerance	Conditions
Navigation Training	20 NM CEP	Flight Notification specifies SAN/NAVEX or FTS/NAVEX. Allows for along track and cross-track errors.
Dead Reckoning	± 12°	
	± 9°	Where initial track guidance has been provided by NDB, VOR, or TACAN and there is no subsequent change in track
Radar Monitor	± 9°	Aircraft is observed to maintain track on radar. Tolerance applied from the edge of a circle of 5 NM centred on the last observed position. Distance from the radar site is less than 200 NM.

Section 10.9: Separation Standards—Applicable to En-route Area Navigation by Aircraft Using Inertial Navigation Systems

10.9.1 Introduction

10.9.1.1 This section is concerned with the horizontal (that is, lateral and longitudinal) separation standards to be employed by ATC in respect of aircraft equipped for en-route area navigation (RNAV) and approved for such operations.

10.9.1.2 The standards must not be applied when ATC is aware that the time since the last opportunity to update the RNAV system's present position exceeds the limit, or after pilot advice of:

(a) navigation equipment failure; or

(b) operation of the equipment outside the approved tolerances.

10.9.2 Lateral Separation

10.9.2.1 The following tolerances across track may be applied to RNAV derived position for lateral separation:

(a) ±15 NM in CTA/TCTA and in OCA provided that the update interval (that is, the flight time since departure or a waypoint suitable for updating present position) does not exceed 3 hours for aircraft equipped with single RNAV equipment or 5 hours for aircraft with 2 or more RNAV equipments; or

(b) ±30 NM in OCA.

10.9.2.2 For lateral separation the across-track tolerance to be applied is to equal the CEP of the INS/IRS-derived position plus the FTE.

10.9.2.3 The CEP is determined from the following:

(a) at departure point the INS/IRS position can be assumed to be within a circle of radius 3 NM;

(b) the INS/IRS position can be assumed to be within a circle of radius 4 NM at a designated waypoint suitable for updating inertial present position;

(c) the CEP of the INS/IRS position expands at a rate corresponding to an increase in radius of 3 NM per hour (e.g. for a groundspeed of 300KT, divergence is 1 NM per 100 NM track flown).

10.9.2.4 The FTE when the autopilot is not coupled to the INS/IRS for steering guidance is ±2 NM across track.

10.9.2.5 Within the coverage of a short-range radio navigation aid (e.g. VOR, NDB, DME) defining the route, the tolerance applicable to that aid is to be used if it is less than that of the RNAV system.

10.9.3 Longitudinal Separation

10.9.3.1 The longitudinal separation minima based on time are derived by taking the following factors into account:

(a) the along-track navigational tolerances, assumed to be:

(i) the same for each aircraft;

(ii) equal to the magnitude of the radial error of position of the least accurate navigation system; and

(iii) calculated at the end of a route section, the end being defined as either:

(A) A waypoint satisfying the parameters for updating present position; or

(B) A 'gate-in' waypoint marked by NDB, VOR, DME or a combination thereof, for entry into the radio-navigation air route structure; or

(C) A waypoint beyond which a larger separation standard is specified;

(b) the tolerance of each aircraft's estimated arrival time at the next reporting point (taken as ±3 MIN);

(c) an estimation tolerance of ±2 MIN to allow for errors in the ATC's estimation of future positions of the aircraft in conflict;

(d) a control tolerance of ±2 MIN for control factors such as communications delays, clock errors and human factors;

(e) each of these tolerances is combined by the root sum square (RSS) method; and

(f) a buffer of 3 MIN added arithmetically.

10.9.3.2 The minimum time separation between two aircraft which are neither laterally nor vertically separated, therefore, equals:

$$Tsep = \left(\sqrt{2}.\sqrt{\left(\frac{d.60}{G/S} \right)^2 + 3^2 + 2^2} \right) + 3 \text{ MIN},$$

Where:

d = magnitude of the CEP (NM) and
G/S = minimum groundspeed (KT).

10.9.3.3 10 MIN separation between aircraft flying the same or reciprocal tracks may apply within controlled airspace provided that:

(a) for aircraft equipped with single INS/IRS the average groundspeed on a route section is not less than:

(i) 240 KT in CTA/TCTA/OCA and the update interval does not exceed 3 hours; or

(ii) 330 KT in OCA and the update interval does not exceed 5 hours; and

(b) for aircraft equipped with two or more INS/IRS, the average groundspeed on a route section is not less than 240 KT and the update interval does not exceed 5 hours.

10.9.3.4 15 MIN separation between aircraft flying the same or reciprocal tracks may apply within controlled airspace provided that:

(a) for aircraft equipped with single INS/IRS, the update interval does not exceed 5 hours; and

(b) for aircraft equipped with two or more INS/IRS, the average groundspeed on a route section is not less than 240 KT and the update interval does not exceed 12 hours.

10.9.3.5 20 MIN separation between aircraft flying the same or reciprocal tracks may apply within controlled airspace provided that:

(a) for aircraft equipped with single INS/IRS, the update interval does not exceed 5 hours; and

(b) for aircraft equipped with two or more INS/IRS, the update interval does not exceed 12 hours.

10.9.4 Distance Standards

10.9.4.1 The longitudinal separation minima based on distance are derived using the following assumptions and methods:

(a) the along-track navigational tolerance of an aircraft is taken as the same as for the time standards;

(b) when “NO CLOSING SPEED” is stipulated as a condition, minor variations of 4% of TAS of each aircraft, taken as 450 KT for the initial climb and 600 KT maximum thereafter, are allowed;

(c) when separation is to be checked at “FREQUENT INTERVALS” to ensure that the minimum will not be infringed, the maximum interval between checks is taken as 15 MIN;

(d) each of these tolerances is combined by the RSS method;

(e) except in the case of the R2 (definite passing) standard, a buffer of 10 NM is added arithmetically. The distance standard, therefore, equals:

$$\left(\sqrt{2}.\sqrt{d^2+(d_c)^2}\right)+d_b \text{ nm}$$

where:

d = magnitude of the CEP (NM)

d_c = ‘closure’ distance of each aircraft owing to TAS variation
= 3 NM for initial climb
= 6 NM for cruise, arrival and change of level

d_b = buffer
=10 NM (except in case of R2)
= 0 (R2 only).

10.9.4.2 The method of application of distance separation minima, together with relevant minima are contained in paragraphs 10.6.7 to 10.6.11.

10.9.5 Explanation of Derivation of Longitudinal Separation Standards

10.9.5.1 Tolerances used in the deviation of longitudinal separation standards are:

(a) initial climb:

(i) INS/IR ± 5 NM along track

(ii) DME ± 5 NM.

(b) cruise, arrival, change of level and definite passing:

(i) Single INS/IRS:

± 8.5 NM along track up to 1.5 hours

± 12.4 NM along track up to 3 hours

± 18.2 NM along track up to 5 hours

(ii) Dual INS/IRS:

± 12.9 NM along track up to 5 hours

± 27.7 NM along track up to 12 hours

(iii) DME:

± 6 NM.

For flight times exceeding 1.5 hours, INS/IRS tolerances are the largest.

10.9.5.2 The minimum time separation (Tsep) between two aircraft is given by:

$$Tsep = \left(\sqrt{2}.\sqrt{\left(\frac{d.60}{G/S}\right)^2 + 3^2 + 2^2} \right) + 3 \text{ MIN},$$

where:

d = magnitude of the CEP (NM)
G/S = minimum groundspeed (KT)

Alternatively, the equation can be expressed as:

$$G/S = 60d\left(\frac{\sqrt{(Tsep-3)^2 - 13}}{2}\right)^{-1} \text{ knots}$$

(a) 10 MIN separation (Tsep = 10 MIN):

(i) For single INS/IRS with 3 hourly updating (d = 12.4 NM)

G/S = 219 KT.

(ii) for single INS/IRS with 5 hourly updating (d = 18.2 NM)
G/S = 322 KT.

(iii) for dual INS/IRS with 5 hourly updating (d = 12.9 NM)
G/S = 228 KT.

(iv) or dual INS/IRS with 12 hourly updating (d = 27.7 NM)
G/S = 490 KT.

(b) 15 minute separation (Tsep = 15 min):

(i) for single INS/IRS with 3 hourly updating (d = 12.4 NM)
G/S = 97 KT.

(ii) for single INS/IRS with 5 hourly updating (d = 18.2 NM)
G/S = 142 KT.

(iii) for dual INS/IRS with 5 hourly updating (d = 12.9 NM)
G/S = 101 KT.

(iv) for dual INS/IRS with 12 hourly updating (d = 27.7 NM)
G/S = 216 KT.

(c) 20 minute separation (Tsep = 20 MIN):

(i) for single INS/IRS with 3 hourly updating (d = 12.4 NM)
G/S = 65 KT.

(ii) for single INS/IRS with 5 hourly updating (d = 18.2 NM)
G/S = 95 KT.

(iii) for dual INS/IRS with 5 hourly updating (d =12.9 NM)
G/S = 67 KT.

(iv) for dual INS/IRS with 12 hourly updating (d = 27.7 NM)
G/S = 145 KT.

(d) for simplicity, these minimum groundspeeds are rationalised as follows:

(i) a minimum groundspeed of 150 KT is assumed unless otherwise stated.

(ii) the situation requiring a minimum groundspeed of 490 KT is ignored.

(iii) the remaining minimum groundspeeds are rounded-up to the next multiple of 30 knot (that is, 240 and 330 KT).

10.9.5.3 The minimum distance separation (Rsep) between two aircraft is given by:

$$Rsep = \left(\sqrt{2}.\sqrt{d^2 + (d_c)^2} \right) + d_b \text{ nm}$$

where
d = magnitude of the CEP (NM)
d_c = closure distance of each aircraft owing to TAS variation
= 3 NM for initial climb
= 6 NM for cruise, arrival and change of level
d_b = buffer
= 10 NM (except in case of R2)
= 0 NM (R2 only)

(a) aircraft on climb to cruising level (R1):

$$Rsep = \left(\sqrt{2}.\sqrt{5^2 + 3^2} \right) + 10 \text{ nm}$$

=18 NM.

Rounded up R1 = 20 NM.

(b) definite passing (R2 and R2A):

(i) For dual INS/IRS with 5 hourly updating

$$Rsep = \left(\sqrt{2}.\sqrt{12.9^2 + 6^2} \right) \text{nm}$$

= 20 NM = R2.

(ii) For dual INS/IRS with 12 hourly updating,

$$Rsep = \left(\sqrt{2}.\sqrt{27.7^2 + 6^2} \right) \text{nm}$$

= 40 NM = R2A.

(c) aircraft cruising, arriving or changing level (R3 and R3A):

(i) R3 = R2 + 10 NM (buffer) = 30 NM

10.9.5.4 R3A = R2A + 10 NM = 50 NM.

Section 10.10: Separation Standards—Visual

10.10.1 Application

10.10.1.1 Visual separation may be achieved:

(a) by the use of visual procedures; or

(b) by assigning visual separation responsibility to a pilot.

10.10.1.2 When applying visual separation, controllers consideration must be given to aircraft performance characteristics, particularly in relation to faster following aircraft. When necessary, corroborative evidence from the pilot of one aircraft on the relative position of another aircraft must be obtained.

10.10.1.3 Responsibility for separation must only be assigned to a pilot as follows:

(a) for arriving aircraft above FL125, by instructing the pilot of one aircraft to follow on the same track, behind another aircraft, provided the pilot has reported sighting the other aircraft, and at least one of the aircraft is on descent; or

(b) when the aircraft to be separated are operating at or below FL125 and will continue to do so during the application of this standard, the pilot of one aircraft reports sighting the other aircraft and is instructed to maintain visual separation with or to follow that aircraft.

10.10.1.4 Before altering the clearance of an aircraft with which visual separation has been assigned to another aircraft, the controller must ensure that visual separation can continue to be maintained.

10.10.1.5 Alternative instructions must be issued to provide separation if there is any doubt of the pilot's ability to keep the other aircraft in sight or maintain separation.

10.10.1.6 Positive identification must be established before visual separation is provided as follows:

(a) by day:

(i) identification by type;

(ii) identification by distinguishing markings if aircraft are of the same type;

(iii) identification by observing a change of heading or altitude of one of the relevant aircraft.

(b) by night:

(i) momentarily extinguish navigation lights;

(ii) select flashing navigation lights to steady;

(iii) extinguish hazard beacon;

(iv) momentarily switch on landing lights;

(v) change heading.

10.10.1.7 Visual Separation between an aircraft and a high altitude balloon may be applied provided that:

(a) the confirmed drift of the balloon is away from the aircraft;

(b) the balloon is ascending; and

(c) the operations are being conducted during daylight.

10.10.1.8 Relevant traffic information must be passed in sufficient time and detail to enable the pilot to identify and maintain separation from the other aircraft.

10.10.1.9 In circumstances where an aircraft has been instructed to maintain separation from, but not follow, an IFR aircraft, traffic information must be issued to the IFR aircraft, including advice that responsibility for separation has been assigned to the other aircraft.

10.10.1.10 The traffic information provided must contain as much as is necessary of the following to assist the pilot in identifying the other aircraft:

(a) type, and description if unfamiliar;

(b) level;

(c) position information either by clock reference, bearing and distance, relation to a geographical point, reported position and estimate, or position in the circuit;

(d) intentions, or direction of flight.

10.10.2 Separation Using Visual Observation

10.10.2.1 When weather conditions permit, the aerodrome controller may provide separation based on visual observations as coordinated with Approach Control provided that:

(a) the aerodrome controller is in agreement and accepts responsibility for the provision of such visual control;

(b) where required, the aircraft concerned are on the aerodrome control frequency;

(c) where required, specific airspace is released to the aerodrome controller for the purpose of providing such control.

10.10.2.2 Aerodrome controllers may also separate by the use of visual observation of aircraft position and projected flight paths.

10.10.2.3 When aircraft are operating visually as aerodrome traffic or in an Aerodrome Traffic Zone, ATC must issue clearances designed to maintain separation, and/or sequencing instructions, and provide traffic information.

10.10.2.4 Pilots must be advised of their number in the landing sequence to assist in identification of traffic.

10.10.2.5 ATC must maintain, as far as possible, a continuous visual watch to detect and determine the position, and ensure the safety of, aircraft.

10.10.3 Separating Approaching Aircraft Beyond Tower View

10.10.3.1 Two approaching aircraft are deemed to be separated while the second approaching aircraft is on final approach beyond the view of the tower controller if, before commencing such final approach, the first approaching aircraft:

(a) has been sighted by the tower controller, there is reasonable assurance that a landing can be accomplished, and it is clear that no confliction will occur; or

(b) has reported commencing a missed approach, and is proceeding from a point and on a clearance such that separation could readily be maintained should the second approaching aircraft miss its approach.

10.10.3.2 Unless cleared at or before passing 10 NM from the aerodrome, this form of separation is not acceptable and another must be provided.

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Section 10.11: Separation Standards—Miscellaneous

10.11.1 Parachute Jumping Exercise (PJE)

10.11.1.1 Separation between aircraft involved in PJE at the same drop zone is the responsibility of the pilots of the PJE aircraft. Separation between PJE aircraft and the parachutist is the sole responsibility of the pilots of the PJE aircraft.

10.11.1.2 ATC must provide traffic information to PJE aircraft, and, except in Class E or G airspace, apply separation between parachutists and non-PJE aircraft.

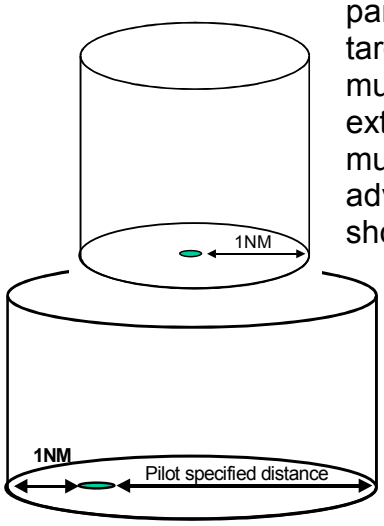
10.11.1.3 ATC must make a broadcast on the appropriate frequency before the drop as an alert to pilots of flights operating in the airspace.

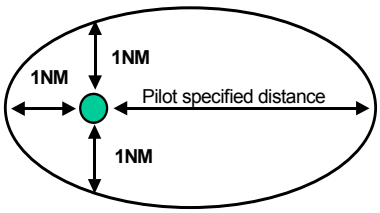
10.11.1.4 In Class E airspace, ATC must also provide traffic information to IFR non-PJE aircraft about PJE aircraft.

10.11.1.5 Where two or more PJE Drop Zones are located in close proximity and parachute operators have mutually agreed to accept self-separation, ATC is required to pass only traffic information to the participating operators. A participating pilot may request a separation service, but must continue to self-separate until ATC is satisfied that a separation standard has been achieved, and can be maintained. Agreements established between parachute operators to self-separate must be documented in ATS Local Instructions.

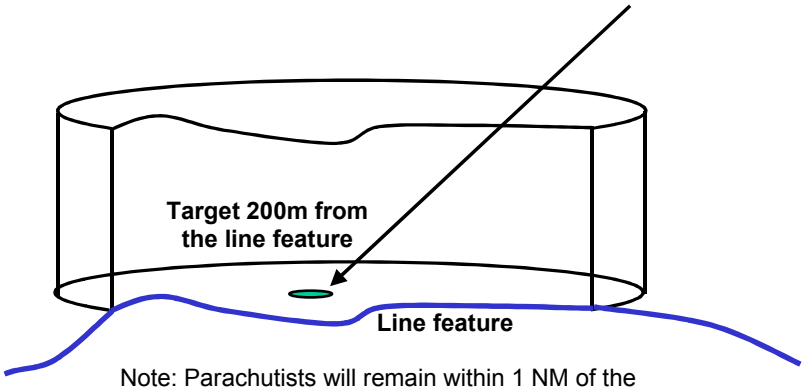
10.11.2 Limitations and Extensions – PJE

10.11.2.1 For separation purposes, ATC must base separation on the fact that the parachutist will be dropped within a 1 NM radius of the target. If an extension of this area is necessary, the pilot must advise ATS of the distance and direction this extension is required. The navigational tolerance area must be extended in the advised direction until receipt of advice that the drop is completed. These requirements should be reiterated in any briefing.





10.11.2.2 Where parachutists agree to remain to one side of a defined line feature, and the target is set at least 200 M away from the closest point of the line feature, the navigational tolerance area of the parachutists may be reduced to the line feature. The line feature may only be used when the drop will occur from 10,000 FT or below, by day in VMC, and the service provider agrees to the use of the line feature. A letter of agreement between the parachute jumping group and ATS must be established.



Note: Parachutists will remain within 1 NM of the target on the same side of the line feature

10.11.2.3 The instructions described above should be issued by directly briefing the parachutists prior to the exercise. They may also be relayed to the parachutists by the PJE aircraft pilot.

10.11.2.4 Parachutists may be assigned responsibility to remain within certain limits of, and on a particular side of a geographical fix (e.g. “PARACHUTISTS REMAIN WITHIN 1 NM OF THE TARGET AND TO THE WEST OF (line feature)”).

10.11.2.5 Responsibility for separation of parachutists from another aircraft must only be assigned to the PJE aircraft.

10.11.2.6 Lateral separation may be achieved between the parachutists and the non-PJE aircraft by a requirement stipulated to the parachutists in accordance with the use of a line feature for separation, and the application of visual tracking tolerances to the aircraft.

10.11.2.7 After the parachutists have exited, and the PJE aircraft has commenced descent, only the pilot of the PJE aircraft can be assigned the responsibility for separation from other aircraft.

10.11.2.8 Visual separation between the parachutists and a non-PJE aircraft, by TWR or the PJE pilot is limited to circumstances where that aircraft is 7,000 KG or less. This accounts for wake turbulence.

10.11.2.9 When TWR is applying visual separation in the circuit area, the 7,000 KG weight limitation does not apply, so long as ATC is satisfied that the parachutists will remain safely clear of the wake turbulence.

10.11.3 High Altitude Balloons

10.11.3.1 A letter of agreement must be signed between the relevant Operations Centre and the balloon operator prior to commencement of operations, and must detail:

(a) notification procedures;

(b) communication requirements;

(c) launch and cutdown procedures; and

(d) restrictions on particular time blocks for launches due to increased RPT traffic on adjacent upper air routes.

10.11.3.2 A navigation tolerance of ±15 NM must be applied to high altitude balloons. ATC must apply a 1 NM buffer between the navigation tolerances of an aircraft and a high altitude balloon.

10.11.3.3 When plotting the predicted track of the balloon, ATC must apply a tolerance of ±15 NM radius drawn at:

(a) the departure point;

(b) the FL200 predicted position; and

(c) the FL600 predicted position.

10.11.3.4 The predicted track must be redrawn using the FL200 actual position, and must incorporate and updated track information.

10.11.4 Manned Balloon Operations

10.11.4.1 Balloons must be separated from other airspace users, and issued relevant information at all altitudes according to the classification of airspace in which the balloon is flown.

10.11.4.2 Separation requirements that apply to aircraft weighing less than 5,700 KG must also apply to balloons.

10.11.4.3 Passing traffic information on other balloons within an authorised formation is not required.

10.11.5 Unmanned Aerial Vehicles (UAV)

10.11.5.1 Unmanned Aerial Vehicles must be separated from other aircraft using the separation standards applicable to manned aircraft when:

(a) capable of presenting real time navigational information using approved navigation systems; and

(b) continuous two way communications is maintained between the operator and the ATC unit.

10.11.6 ACAS/TCAS Resolution Advisory Action

10.11.6.1 Once the aircraft has begun a manoeuvre in response to an Resolution Advisory (RA), the controller is not responsible for providing separation between the aircraft that is responding to a RA and any other aircraft, airspace, terrain or obstruction.

10.11.6.2 If an aircraft advises that it is responding to an ACAS/TCAS RA, ATC shall:

(a) not issue instructions that contradict those issued by the RA;

(b) issue safety alerts; and

(c) provide relevant traffic information as appropriate.

10.11.6.3 Responsibility for separation resumes when separation is re-established after:

(a) the responding aircraft has returned to its assigned level;

(b) the aircraft advises that the ACAS/TCAS manoeuvre is completed; or

(c) the responding aircraft has executed an alternate clearance.

10.11.7 Unspecified Operations

10.11.7.1 Separation requirements from operations for which standards have not been specified must be:

(a) distributed by NOTAM; or

(b) determined through direct liaison with the affected ATS unit.

10.11.7.2 The following buffers must be added to the parameters of the operations:

(a) 1 NM buffer to the notified geographical coordinates of the activity;

(b) 15 MIN before and after the notified time of the activity;

(c) at least 500 FT to the maximum notified altitude of the activity.

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Section 10.12: Separation Standards—Wake Turbulence

10.12.1 Interpretation

10.12.1.1 **Lateral extent.** Wake turbulence is considered to extend to ½ NM laterally behind the subject aircraft.

10.12.1.2 **'Intermediate part'—ICAO PANS-ATM.** An 'intermediate part' of the same runway means a point more than 150 M after the take-off commencement point of the preceding aircraft using the same runway.

10.12.2 Additional Minima

10.12.2.1 **HEAVY aircraft.** As an exception to prescribed wake turbulence separation minima, when a following HEAVY aircraft is in excess of 200,000 KG MTOW a wake turbulence separation minimum of 3 NM or 1.5 MIN must be applied. This reduction does not apply when the following HEAVY aircraft commences take-off from an intermediate point.

10.12.3 Application

10.12.3.1 In addition to the circumstances specified in ICAO PANS-ATM, wake turbulence separation standards must be applied to aerodrome traffic when:

(a) an aircraft taking-off behind a landing heavier wake turbulence category aircraft is expected to become airborne before the touchdown point of the landing aircraft;

(b) an aircraft is taking-off and a preceding departing aircraft on a crossing runway has rotated at or before the runway intersection;

(c) an aircraft is landing and could still be airborne at the intersection of a crossing runway and a preceding departing aircraft on that crossing runway has rotated at or before the intersection; and

(d) a LIGHT aircraft during its landing run will cross the intersection of a crossing runway behind a departing HEAVY aircraft on that crossing runway which has rotated at or before the intersection.

10.12.3.2 Wake turbulence separation is not required:

(a) when a LIGHT aircraft will cross the track or follow the track of a MEDIUM fixed-wing aircraft of less than 25,000 KG maximum certificated take-off;

(b) in respect of VFR flights operating in Class D airspace, except in the application of landing or departure separation;

(c) between an aircraft landing behind an aircraft taking off on the same runway, except as required in paragraph 10.12.3.1(a) above;

(d) if a pilot has advised ACCEPT WAIVER on departure; or

(e) if visual separation has been assigned to the pilot, in situations other than between:

(i) departing aircraft; or

(ii) between aircraft on final approach to the same runway where ATC must ensure that the appropriate wake turbulence minima are applied at the landing threshold.

10.12.3.3 A waiver must not be applied when a LIGHT or MEDIUM fixed wing aircraft:

(a) will commence take off behind a HEAVY aircraft from a point along the runway more than 150 M beyond where the HEAVY aircraft commenced its take-off roll; or

(b) will take off using the opposite-direction runway to a HEAVY aircraft that has taken-off or made a low or missed approach.

10.12.3.4 A wake turbulence caution must be issued when:

(a) less than the applicable wake turbulence separation minima may exist;

(b) the applied wake turbulence separation minima may be infringed;

(c) the pilot accepts a WAIVER; and

(d) visual separation has been assigned to the pilot.

10.12.3.5 In applying wake turbulence separation minima, air traffic controllers must:

(a) when using a time minimum between aircraft taking-off, ensure that a following aircraft does not become airborne until the specified time interval has elapsed since the leading aircraft became airborne;

(b) when using a time minimum between an aircraft executing a missed approach and the following aircraft taking-off, not issue the take-off clearance until the specified time interval has elapsed since the preceding aircraft crossed the threshold or initiated the missed approach (whichever occurs later);

(c) when using a radar minimum between aircraft taking off, ensure that the appropriate radar separation exists between the aircraft at or before the time the following aircraft becomes airborne;

(d) when aircraft are using the same runway, ensure that the landing minimum will exist at the time the leading aircraft is over the landing threshold;

(e) when crossing runways are in use, apply the full length minima and ensure that the required separation exists at the intersection.

10.12.3.6 Where the required separation can be determined by distance using an aircraft report or radar, the time minima for the arriving or departing aircraft affected need not be applied.

10.12.3.7 Due to the wake turbulence characteristics of the B757 and H47, for the purpose of wake turbulence separation, these aircraft must be classified as a HEAVY aircraft if leading and as a MEDIUM aircraft if following.

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Section 10.13: Separation Standards—Aerodrome

10.13.1 Taxiing and Runway Standards

10.13.1.1 The separation of aircraft taxiing on the manoeuvring area is a joint pilot and controller responsibility.

10.13.1.2 When providing runway separation, the wake turbulence standards must be applied in conjunction with the runway standards.

10.13.1.3 Runway separation standards apply equally to runway operations or to a strip having a single landing and take-off path.

10.13.1.4 When take-off or landing separation is based on the position of a preceding landing or taxiing aircraft and visual determination is limited, particularly at night or in reduced visibility, by poor azimuth resolution or other factors, the pilot of that aircraft must be instructed to report when the aircraft has:

(a) crossed and is clear of a runway intersection; or

(b) stopped short of a runway strip; or

(c) vacated the runway.

10.13.1.5 As local circumstances such as aerodrome configuration and day/night visibility conditions may restrict controller visibility, unit Instructions must specify when mandatory confirmation of position is required from the pilot.

10.13.2 Arriving Aircraft and an Aircraft Taking Off

10.13.2.1 Lateral separation is considered to exist between an arriving aircraft that subsequently commenced final approach, and a departing aircraft that has been cleared on a segregated flight path.

10.13.2.2 For this purpose, a segregated flight path is considered to exist when the departing aircraft will not be manoeuvring within 45 degrees either side of the reciprocal of the final approach path while the arriving aircraft is on the final approach track.

10.13.2.3 Except as specified below, take-offs must not be permitted after an arriving aircraft has commenced final approach until:

(a) it is sighted by the tower controller; and

(b) reasonable assurance exists that a landing can be accomplished; or

(c) separation standards can be applied between an arriving aircraft which misses its approach and an aircraft desiring take-off clearance.

10.13.2.4 When the take-off direction differs by at least 45 degrees from the reciprocal of a straight-in final approach, a departing aircraft may commence take-off:

(a) before an arriving aircraft on final approach passes a point as determined by a radar observation 5 NM from the landing threshold; or

(b) a DME report from the aircraft of 5 NM, adjusted as necessary for the variation in final approach distance between the landing threshold in use and the DME site.

10.13.2.5 In the application of this standard, the controller must estimate that the required separation will exist at the time the take-off is commenced, and radar observation or DME report must be used to confirm that separation is not infringed.

10.13.2.6 When TAR is used to determine aircraft position, the controller must ensure that an arriving aircraft is not closer than 3 NM from the landing threshold at the time a departing aircraft:

(a) commences take-off on the runway to be used by the landing aircraft; or

(b) crosses the intersection of the runway to be used by the landing aircraft.

10.13.3 Simultaneous Parallel Operations

10.13.3.1 Use by fixed wing aircraft of more than one landing/take-off path in the same direction on the one aerodrome is permissible if, the paths proposed to be used are treated as one runway for separation purposes.

10.13.3.2 The suitability of a landing area for simultaneous parallel landings or take-offs by fixed wing aircraft and the associated control procedures must be established in consultation with CASA.

10.13.4 Training Approaches

10.13.4.1 If an aircraft on a controlled aerodrome, is likely to be overflown by an aircraft making a training approach, the controller must:

(a) Instruct the training aircraft not to descend below the relevant minimum altitude for the approach, or not below 300 FT AGL in the case of a practice visual approach; and

(b) Pass traffic information to the other aircraft before it enters the flight path over which the approaching aircraft will fly.

10.13.5 Land and Hold Short Operations (LAHSO)

10.13.5.1 Notwithstanding aerodrome separation standards, operations by an aircraft landing on one runway and another aircraft either taking off or landing simultaneously on a crossing runway may be permitted subject to the provisions of LAHSO.

10.13.5.2 LAHSO are to be considered a ‘dependent’ procedure, with participating aircraft classified as either:

(a) **Active:** when an aircraft is issued a hold short requirement and is alerted about traffic on a crossing runway; or

(b) **Passive:** when an aircraft has unrestricted use of the full runway length and is alerted about traffic on a crossing runway.

10.13.5.3 Active participation in LAHSO is available only to pilots of aircraft with to performance categories A, B, or C aircraft in the following conditions:

(a) Australian registered aircraft engaged in operations conducted under the AOC of a check and training organisation authorised under CAR 217;

(b) Australian registered aircraft where the pilot holds a log book endorsement for LAHSO;

(c) Australian military aircraft; and

(d) foreign military aircraft subject to a Letter of Agreement between the relevant military authority and the ATS provider.

10.13.5.4 Passive participation in LAHSO, at pilot discretion, is available to:

(a) all pilots of Australian civil and military aircraft of performance category A, B and C; and

(b) pilots of RAAF F111 and F18 aircraft; and

(c) pilots of foreign military aircraft subject to a Letter of Agreement between the relevant military authority and the ATS provider. The Letter of Agreement will exclude foreign military aircraft of performance category D.

10.13.5.5 Pilots who at the time expect and elect to participate actively in LAHSO, must on receipt of an ATIS broadcast that advises LAHSO in progress, confirm ability to participate by advising “LAHSO APPROVED” to the last en-route ATS provider prior to descent into the destination terminal area or on initial contact with Tower or Approach.

10.13.5.6 Pilots of civil aircraft operating under a flight number as advised in flight notification, and pilots of Australian military aircraft, may omit the words “LAHSO APPROVED” as required above. ATC may sequence these aircraft for LAHSO unless the pilot expressly states an intention not to participate.

10.13.5.7 Notwithstanding the provisions above, pilots of foreign registered civil aircraft and of Australian registered aircraft operating under foreign air carrier flight numbers must not be permitted to participate actively or passively in LAHSO.

10.13.5.8 LAHSO must only be permitted as follows:

(a) runways are equipped with standard LAHSO signs, lights and runway markings as specified in AIP Aerodromes (AD);

(b) the ceiling is not less than 1,000 FT and visibility is not less than 5,000 M;

(c) ‘active’ participation is restricted to runways where the crosswind component including gusts does not exceed 20 KT;

(d) simultaneous landings may be permitted by day and night;

(e) a simultaneous take-off and landing is only permitted by day;

(f) a “HOLD SHORT” requirement must not be given when low level wind shear of intensity greater than LIGHT is reported;

(g) when the runway is damp or wet, a “HOLD SHORT” requirement must only be issued if the braking characteristics are assessed as GOOD by a pilot of an aircraft in the same performance category.

10.13.5.9 In the application of LAHSO, controllers must:

(a) ensure that the published distance from the landing threshold to the hold short point of the crossing runway is adequate for the performance category of the aircraft as detailed in the Landing Distance Required (LDR) table below;

(b) alert aircraft that land and hold short runway operations are in progress by notification on the ATIS;

(c) issue directed traffic information to both aircraft participating in the procedure;

(d) ensure readback of a hold short requirement;

(e) withhold issuing a take-off clearance to a departing aircraft while another aircraft is landing on a crossing runway having been issued with a duly acknowledged hold short requirement, until such time that in the opinion of the controller, there is no possibility that both aircraft could occupy the intersection at the same time should the landing aircraft subsequently fail to hold short.

10.13.5.10 When circumstances warrant, controllers may require a pilot issued with a hold short requirement to report “(callsign) HOLDING SHORT”.

10.13.5.11 When an issued hold short instruction no longer applies, pilots must be advised that “FULL RUNWAY LENGTH NOW AVAILABLE”.

10.13.5.12 When a landing aircraft has been issued with requirements to hold short of a crossing runway strip, aircraft and vehicles may be approved to cross the ‘non operational’ end of the runway in the following circumstances:

(a) by day;

(b) at the discretion of, and under the jurisdiction of the aerodrome controller;

(c) traffic information must be provided.

10.13.6 Landing Distance Required (LDR) for LAHSO

10.13.6.1 ATC may sequence participating aircraft for LAHSO regardless of category of aircraft if the controller is aware that the aircraft may be able to land within the landing distance available (LDA). In all circumstances, the pilot is responsible for determining that the LDA is sufficient in the prevailing conditions. ATC may sequence non-jet Category B aircraft below 5,700 KG MTOW for LAHSO using Category A LDRs.

10.13.6.2 The LDR table below shows the approved minimum LDR for an aircraft Performance Category (PC) in the conditions specified and must be used as a guide for ATC when determining whether an aircraft can land in the available runway distance while participating in LAHSO.

10.13.6.3 Reduced LDRs, as determined by CASA, may be applied provided a Letter of Agreement between the ATS Provider/Department of Defence and an aircraft operator that has been approved by the local CASA District Office. These LoAs must be promulgated in Local Instructions.

Table 10.13-1: Landing Distance Required

	Temperature	30° and Below		Above 30°	
	RWY Status	Dry	Damp/Wet	Dry	Damp/Wet
PC	Headwind (KT)	LDR in Metres			
A	30	780	900	810	930
	20	820	940	840	970
	10	860	990	890	1020
	0	900	1040	930	1070
	–5	990	–	1020	–
B	30	1220	1400	1250	1440
	20	1270	1460	1610	1510
	10	1330	1530	1370	1580
	0	1400	1610	1440	1660
	–5	1540	–	1590	–
C	30	1570	1800	1610	1850
	20	1640	1880	1690	1940
	10	1710	1970	1760	2030
	0	1800	2070	1850	2130
	–5	1980	–	2040	–

1. These figures apply only to aerodromes 0 to 500 FT.
2. For operations at aerodromes between 500 and 2,500 FT the LDR is calculated by multiplying the figure obtained from the table by a factor of 1.2.
3. For QNH below 997 HPa, multiply the LDR by a factor of 1.1.
4. Interpolation is permitted between rows and columns (for similar conditions of temperature and runway status) for each aircraft PC.
5. The table must not be used when the runway slope exceeds one percent down.

10.13.7 Letters of Agreement for LAHSO

10.13.7.1 A Letter of Agreement between the relevant ATS provider and any foreign military authority must be raised by the ATS unit following an initial request from the relevant military authority.

10.13.7.2 The Letter of Agreement must include, but is not limited to, the following items:

(a) the specific aerodrome at which the Agreement is valid;

(b) the ATC service provider bound by the Agreement;

(c) foreign military authority bound by the Agreement;

(d) a validity period;

(e) the LAHSO procedures that are the subject of the Agreement;

(f) a statement authorising active and/or passive participation by pilots of specified aircraft types and categories.

10.13.8 Separation and Traffic Information—GAAP

10.13.8.1 In VMC within a GAAP CTR, the pilot in command is primarily responsible for ensuring separation from other aircraft. ATC must control runway operations with landing and take-off clearances and facilitate a high movement rate by providing traffic information and/or sequencing instructions.

10.13.8.2 ATC must advise when wake turbulence or thrust stream turbulence is a hazard.

10.13.8.3 Controllers must provide separation with other aircraft within the control zone until an IFR aircraft in the CTR becomes visual.

10.13.8.4 The minimum distance between runway centrelines for unrestricted simultaneous parallel runway operations at Archerfield is 167 M.

10.13.8.5 The minimum distance between runway centrelines for unrestricted simultaneous parallel runway operations at all other GAAP aerodromes is 210 M.

10.13.8.6 Traffic information must be issued when:

(a) the pilot of one aircraft is required to give way to, follow, or otherwise adjust the aircraft's flight path relative to that of another aircraft or manned balloon;

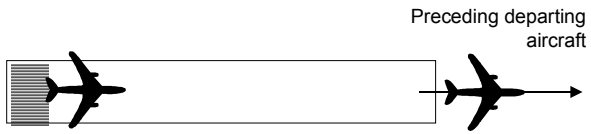
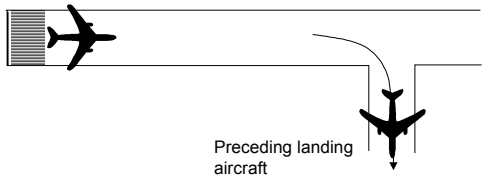
(b) the relative positions of aircraft cannot be established, and a collision or near miss may be likely unless one or both aircraft adjust their respective flight paths. In this case an alerting service must be prefixed by the cautionary word "ALERT".

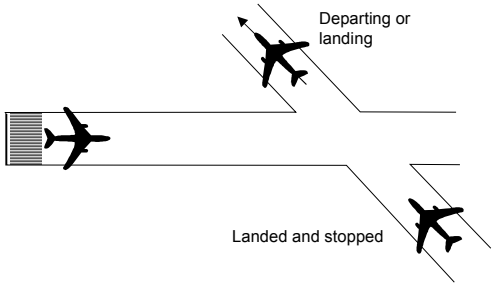
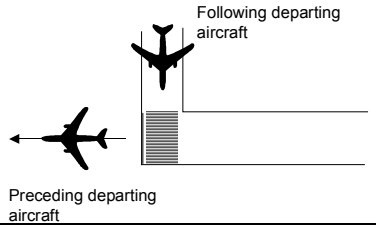
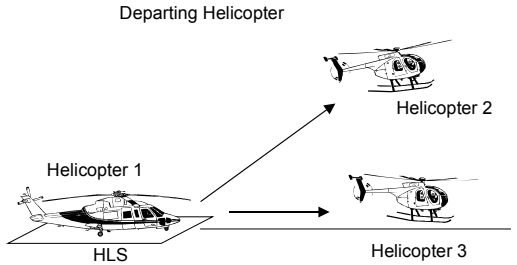
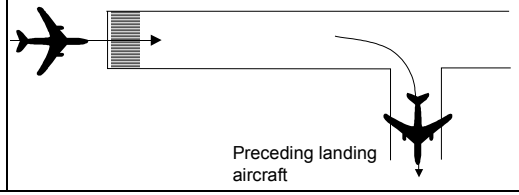
10.13.8.7 Traffic information must be provided to all aircraft concerned about aircraft operating on base leg or final in an opposing circuit when:

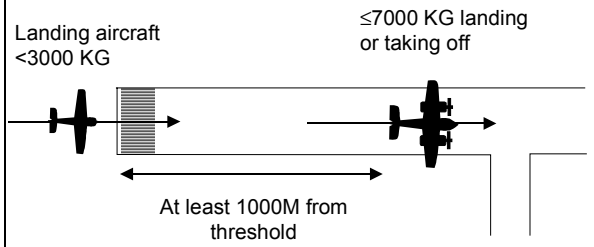
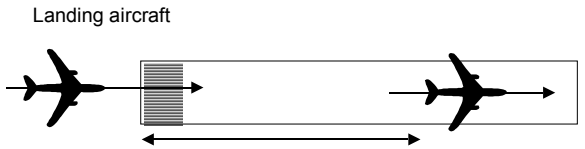
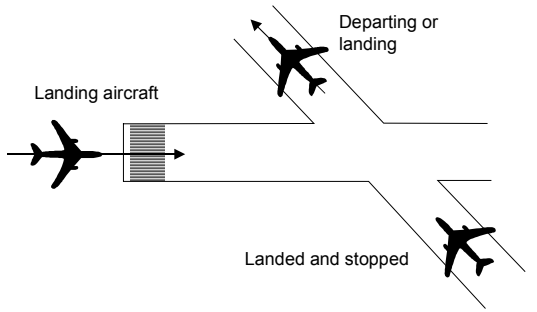
(a) aircraft are operating on contra-circuits to parallel runways whose centrelines are separated by a distance of less than 210 M; and

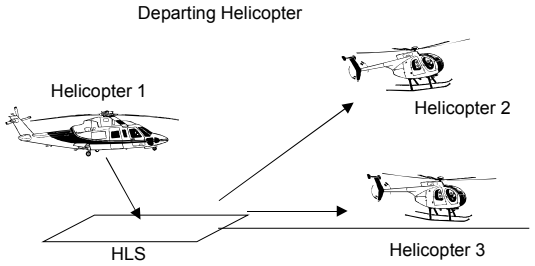
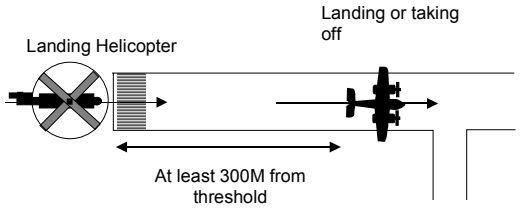
(b) it is likely that aircraft in opposite circuits will turn final at about the same distance from the threshold.

10.13.9 Runway Separation Minima

Minimum	Application	Conditions	Diagram
Take-off behind a preceding departing aircraft	Fixed Wing Aircraft	A departing aircraft must not be permitted to commence take-off unless the preceding departing aircraft: 1. has crossed the up-wind end of the runway-in-use; or 2. has commenced a turn; or 3. is airborne and has reached a point at least 1,800 M (6,000 FT) ahead of the following aircraft where the runway is longer than 1,800 M (6,000 FT) and the distance can be readily determined; or 4. is airborne and has reached a point at least 600 M (2,000 FT) ahead of the following aircraft, provided: (a) the preceding aircraft has a MTOW of 7,000 KG or less; (b) the following aircraft has an MTOW of less than 2,000 KG; and (c) the following aircraft is slower than the preceding aircraft; or 5. is airborne and has reached a point at least 600 M (2,000 FT) ahead of the following aircraft, provided both aircraft have an MTOW of less than 2,000 KG.	
Take-off behind preceding landing aircraft	Fixed Wing Aircraft	The departing aircraft must not be permitted to commence take-off until the preceding aircraft has vacated and is taxiing away from the runway; and, if applicable, the appropriate wake turbulence separation has been achieved.	

Minimum	Application	Conditions	Diagram
Take-off behind landing or departing aircraft on intersecting runways	Fixed Wing Aircraft	A departing aircraft must not be permitted to commence take-off until: 1. a preceding departing aircraft on an intersecting runway has crossed the intersection; or 2. an aircraft landing on the crossing runway has either crossed the intersection or stopped short.	
Take-off after an aircraft has departed in the opposite direction	Fixed Wing Aircraft	A departing aircraft must not be permitted to commence take-off until: 1. the preceding aircraft has crossed the point at which the following aircraft will commence take-off; and 2. if applicable, the appropriate wake turbulence separation standard has been achieved.	
Take-off **Helicopter**	Departing Helicopter	Helicopter (1) may be cleared for take-off when a preceding departing helicopter (2) has departed the HLS, or a preceding arriving helicopter (3) has moved clear of the HLS.	
Landing behind a preceding landing aircraft	Fixed Wing Aircraft	A landing aircraft must not be permitted to cross the runway threshold until the preceding aircraft has vacated and is taxiing away from the runway.	

Minimum	Application	Conditions	Diagram
Landing behind preceding departing or landing aircraft	Fixed Wing Aircraft	A landing aircraft must not be permitted to cross the runway threshold unless, in the opinion of the tower controller, no collision risk exists, and: 1. the landing aircraft has an MTOW below 3,000 KG and is a Performance Category A aircraft; and 2. the preceding aircraft has an MTOW of 7,000 KG or less; and 3. if landing, will vacate the runway without backtracking; or 4. if departing, is at least 1,000 M from the runway threshold, and has commenced its take-off run.	
Landing behind a preceding departing aircraft	Fixed Wing Aircraft	The landing aircraft must NOT be permitted to cross the runway threshold until the preceding aircraft is airborne and: 1. has commenced a turn; or 2. is beyond the point on the runway at which the landing aircraft could be expected to complete its landing roll; and 3. there is sufficient distance to enable the landing aircraft to manoeuvre safely in the event of a missed approach.	
Landing after intersecting runway traffic	Fixed Wing Aircraft	The landing aircraft must **not** be permitted to cross the runway threshold until a preceding departing or landing aircraft on an intersecting runway has either crossed the intersection or stopped short.	

Minimum	Application	Conditions	Diagram
Landing **Helicopter Landing – HLS**	Helicopter	A helicopter (1) may be cleared to land when a departing helicopter (2) has left the HLS, or a preceding arriving helicopter (3) has moved clear of the HLS.	
Landing **Helicopter Landing – Runway**	Helicopter	1. The landing helicopter may be permitted to land when: (a) the preceding landing or departing aircraft is at least 300 M down the runway from the landing threshold; and (b) in the opinion of tower controller, no collision risk exists; and 2. Not useable at GAAP Aerodromes.	

CHAPTER 11: INFORMATION PROVIDED TO PILOTS

Section 11.1: General

11.1.1 Essential Aerodrome Information—GAAP

11.1.1.1 The requirement to provide essential aerodrome information need not apply at a GAAP aerodrome during daylight unless it is considered unreasonable for a pilot to observe the conditions.

11.1.1.2 Essential aerodrome information should be provided at night but may, if appropriate, be covered by pre-flight briefing or through advice on the ATIS.

11.1.2 Take-off or Landing Information

11.1.2.1 Changes to ATIS wind information must be provided to pilots with a take-off or landing clearance if it is considered that it would be of significance to the aircraft operation.

11.1.2.2 The ATIS code 'ZULU' must be retained exclusively in all locations for use only with ATIS broadcasts relating to out of hours operations or when a control zone is de-activated.

11.1.2.3 ATIS ZULU may include such operational information, of an unchanging nature, considered to provide immediately useful information to pilots. The information may include:

(a) the expected reopening time of the Tower;
(b) MBZ and PAL frequencies;
(c) preferred runway;
(d) noise abatement procedures; and
(e) works in progress.

11.1.3 Safety Alerts

11.1.3.1 A safety alert must be issued to an aircraft when a controller is aware the aircraft is in a situation which is considered to place it in unsafe proximity to terrain, obstructions, or other aircraft.

11.1.3.2 Once the pilot advises that action is being taken to resolve the situation, the issuance of further alerts may be discontinued.

11.1.4 Altimetry

11.1.4.1 Information concerning Transition Altitude and Transition Layer can be found in AIP ENR 1.7.

11.1.4.2 The differences between Area QNH for adjacent zones and terminal areas must not exceed 5 hectopascals. On the occasions that ATS observe a difference greater than 5 hectopascals between the terminal QNH and the

forecast Area QNH, ATS must notify the appropriate meteorological office immediately.

11.1.5 Traffic Information

11.1.5.1 In providing radar services within controlled airspace, including Class E airspace, or designated restricted airspace, ATC has no responsibility to initiate avoiding action in respect of unknown aircraft which can reasonably be assumed to be outside controlled airspace.

11.1.5.2 ATC must advise aircraft leaving controlled airspace of observed traffic within the airspace to be entered where:

(a) the Mode C level information of observed traffic indicates it is operating within 2000 FT of the base of CTA; or

(b) in the opinion of the controller other information indicates a potential conflict exists.

CHAPTER 12: INFORMATION TRANSFER

Section 12.1: General

12.1.1 Validity of an ATC Clearance

12.1.1.1 An ATC clearance, and its amendments during the flight apply only:

(a) to the first point at which the aircraft leaves controlled airspace; or

(b) to the first landing point if the flight is wholly within controlled airspace; or

(c) to the clearance limit if issued; or

(d) until the expiration of a clearance void time; or

(e) until cancelled by a controller.

12.1.2 Level Assignment

12.1.2.1 Clearances issued must enable the pilot to comply with CAR 157.

12.1.2.2 Block Level Clearances must not be issued to:

(a) civil aircraft in Class E airspace; or

(b) aircraft to which the Mach Number Technique has been applied.

12.1.3 Clearances for Special VFR Aircraft

12.1.3.1 At pilot request, a SPECIAL VFR clearance may be issued for a VFR flight when:

(a) within a control zone;

(b) in a control area next to a control zone for the purpose of entering or leaving the zone;

(c) by day;

(d) when VMC do not exist; and

(e) an IFR flight will not be unduly delayed.

12.1.3.2 In the application of Special VFR, the following are Australian requirements, which differ from those stated in ICAO PANS-ATM:

(a) Special VFR is not available in Class E airspace.

(b) Visibility assessment is the responsibility of the pilot.

12.1.4 Clearances Below LSALT

12.1.4.1 A pilot may be assigned a level below the LSALT provided that:

(a) the pilot has reported “VISUAL”; and

(b) “VISUAL” is appended to the level assigned; and

(c) by night, the clearance is prefixed with “WHEN ESTABLISHED IN THE CIRCLING AREA”.

12.1.4.2 ATC may authorise operations below the LSALT to the pilot of a military or Coastwatch flight when requested by the pilot of the operation for operational reasons. This procedure does not substitute for the conditions of a visual approach at night.

12.1.5 Clearance Limits

12.1.5.1 When a clearance limit is cancelled, an onwards clearance specifying the level and route to be flown from that point must be issued.

12.1.5.2 A description of a holding path to be flown at the clearance limit is not required when:

(a) the holding point is published in aeronautical documents;

(b) a clearance limit has been imposed temporarily and it is expected that the requirement to hold will have elapsed before the aircraft arrives at the designated holding point.

12.1.6 Clearance Readbacks

12.1.6.1 ATS personnel must ensure that those elements identified in AIP are to be read back correctly by the pilot.

Section 12.2: En-route/Terminal Clearances

12.2.1 Departure Clearances

12.2.1.1 Where SIDs are published, they must be issued to IFR aircraft departing at night, or by day in IMC.

12.2.1.2 Tracking instructions must be specified when:

(a) SIDS are not published; or

(b) a SID is cancelled; or

(c) a visual departure clearance is issued in VMC by day in lieu of a SID; or

(d) aircraft or ground based navigation aid(s) are not available.

12.2.1.3 ATC must notify the pilot of the expectation for a visual departure.

12.2.2 ATC Route Clearances

12.2.2.1 An ATC route clearance must include at least the first position at which the flight-planned route is joined.

12.2.2.2 Route clearances issued to aircraft operating VFR at night must be in accordance with the flight-planned route except:

(a) when the pilot specifically requests another route; or

(b) when an amended route is deemed satisfactory in relation to the planned route (e.g. coastline flying); or

(c) for short-term route variations:

(i) by radar vectoring; or

(ii) within 30 NM of a controlled aerodrome, by visual tracking.

12.2.2.3 Route clearances authorising RNAV tracking must only be permitted for flight segments contained within radar coverage unless:

(a) the route is published in AIP; or

(b) prior coordination has been conducted between affected units.

12.2.3 STAR Clearances

12.2.3.1 A STAR clearance must contain:

(a) STAR identifier;

(b) a TRANSITION route when applicable;

(c) a RUNWAY when applicable; and

(d) an instrument or visual termination procedure when applicable; and

(e) a LEVEL assignment.

12.2.3.2 Descent must be assigned in sufficient time to allow pilots to comply with vertical navigation requirements.

12.2.3.3 When an aircraft is radar vectored away from a Transition Route associated with a STAR, and the intention is that the aircraft will rejoin the Transition to complete the STAR procedure, ATC must re-state any restrictions/requirements applicable to the Transition Route. When an aircraft is radar vectored, the aircraft must be re-positioned to enable the Arrival Route to be flown and re-cleared.

12.2.4 Approach Clearances

12.2.4.1 A controller must not issue an air traffic clearance which authorises or requires a pilot to descend in IMC below the lowest safe altitude for the route segment in a manner different from that specified in:

(a) DME, DME or GPS, or GPS Arrival procedures;

(b) the procedures, plan and profile diagram of IAL charts published in AIP/FLIP Terminal;

(c) an approved instrument approach procedure published in NOTAM;

(d) approved radar procedures.

12.2.4.2 When a flight other than that described in paragraph 12.2.4.3 is within 30 NM of an aerodrome, a visual approach may be authorised by day or night to:

(a) a VFR flight; or

(b) an IFR flight when:

(i) the pilot has established and can continue flight to the aerodrome with continuous visual reference to the ground or water; and

(ii) the visibility along the flight path is not less than 5,000 M (or by day, the aerodrome is in sight).

12.2.4.3 In addition to the requirements of paragraph 12.2.4.2, with the exception of Australian and New Zealand operators and aircraft conducting independent visual approaches at Sydney, HEAVY jet aircraft may only be assigned a visual approach when:

(a) specifically requested by the pilot and the pilot has reported the landing runway is in sight; or

(b) the straight-in approach aid is unserviceable.

12.2.4.4 In the case of the straight-in approach aid being unserviceable, the aircraft must be:

(a) radar vectored to intercept final no closer than 8 NM from the runway threshold, at an altitude not less than 2,500 FT above aerodrome level (AAL); and

(b) assigned a straight-in visual approach when:

(i) established on final or on a heading to intercept final course at an angle of not more than 30 degrees;

(ii) visual glideslope guidance (VASIS/PAPI) is available; and

(iii) the pilot has reported the runway in sight.

12.2.4.5 When being radar vectored at night, an IFR aircraft other than a HEAVY jet aircraft as described at paragraph 12.2.4.3, may be assigned a visual approach at any distance from an aerodrome, if:

(a) the aircraft has been assigned the minimum radar LSALT;

(b) given heading instructions to intercept final or to position the aircraft within the circling area of the aerodrome; and

(c) the following phraseology is used to assign the visual approach:

(i) “WHEN ESTABLISHED IN THE CIRCLING AREA CLEARED VISUAL APPROACH”; or

(ii) “WHEN ESTABLISHED ON THE VASIS/GLIDEPATH CLEARED VISUAL APPROACH”.

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Section 12.3: Aerodrome Clearances

12.3.1 General

12.3.1.1 In addition to the provisions of ICAO PANS-ATM, Chapter 7.1, aerodrome controllers must issue information and clearances with the object of preventing collisions between aircraft and vehicles operating on the helicopter movement area, but excluding helicopter landing sites situated on apron areas or beyond the sight of the tower controller.

12.3.1.2 Whenever more than one runway is in use, the runway number must be included in the line up, take-off or landing clearance.

12.3.1.3 When issuing clearances or instructions, controllers must take into account the hazards that may be caused by thrust stream turbulence. When such hazards may not be obvious to other aircraft, vehicles and personnel, an appropriate caution must be issued.

12.3.2 Taxi and Pre-Taxi Instructions

12.3.2.1 A taxi instruction which contains a taxi limit beyond a runway must include a “CROSS RUNWAY (number)” instruction.

12.3.2.2 Aircraft required to hold short of a runway intersecting the taxi route, must be issued a taxi instruction limit of the holding point associated with the intersecting runway. Taxi instructions must not include a position beyond that of a required intermediate holding point.

12.3.2.3 Departing and arriving aircraft must be issued with an instructions to “CROSS RUNWAY (number)” if previously issued with:

(a) a taxi instruction limit of the holding point of a runway intersecting the taxi route; or

(b) an instruction to “HOLD SHORT” of a runway.

12.3.3 Line Up and Take-off Clearances

12.3.3.1 When aircraft are authorised to line up on the same or intersecting runways simultaneously, traffic information must be provided as appropriate.

12.3.3.2 An aircraft delayed by the traffic situation must be issued traffic information if appropriate, and instructed to hold position off the runway, or must be issued a conditional line-up clearance.

12.3.3.3 When an instruction to line up does not include a take-off clearance and is issued with the departure instructions, the appropriate holding instruction must be given.

12.3.3.4 The words “TAKE-OFF” must be used only for clearing an aircraft for take-off.

12.3.3.5 The words “TAKE-OFF” must be used as the last words of a take-off clearance, except when the following information must be appended:

(a) an instruction specifying a turn or circuit direction; or

(b) at a military airfield the state of the arrestor system;

12.3.3.6 In all other cases, the words “TAKE-OFF” must be used as the last words of the take- off clearance.

12.3.3.7 Unless requested, a take-off clearance must not be issued to a helicopter when the tailwind component exceeds 5 KT.

12.3.3.8 Within controlled airspace and at a controlled aerodrome, helicopters may be granted an airways and/or take-off clearance from any area which is nominated by ATC or the pilot, and assessed by the pilot as being suitable as a HLS.

12.3.4 Landing Clearances

12.3.4.1 Clearance to land must not be issued before:

(a) the aircraft has commenced final approach of a PAR or straight in instrument approach; or

(b) the aircraft has been sighted by the tower controller:

(i) on the late downwind leg of the circuit pattern;

(ii) on base leg; or

(iii) on final in the case of a straight in visual approach.

12.3.4.2 Observation by radar satisfies the sighting requirement.

12.3.4.3 Unless requested by the pilot, a landing clearance must not be issued to a helicopter when the tailwind exceeds 5 KT.

12.3.4.4 When a tower controller has been advised that a general aviation aircraft with retractable undercarriage has experienced abnormal operations, a check gear down call must be made with the landing clearance.

12.3.4.5 A military aircraft must be instructed to check gear down when being cleared for an overshoot, cleared to land or cleared for a touch-and-go landing. Controllers must issue the instruction as soon as possible after a pilot indicates that his undercarriage is down and locked. Where a pilot neglects to declare his undercarriage status, the controller must instruct the pilot to check gear down.

12.3.4.6 If an arriving aircraft reports at a position where it should normally have been seen but has not been sighted, the aircraft must be advised of not being in sight by the controller when cleared to land.

12.3.4.7 Landing clearances must apply to aircraft which are restricted to the same or crossing landing paths. However, when such aircraft are permitted to land in parallel paths, clearances may be given for simultaneous landings. In these circumstances, notwithstanding that the pilot of each aircraft must be responsible for the maintenance of separation, the tower controller must issue alternative instructions should the possibility of a confliction arise.

12.3.4.8 The tower controller must allocate one landing sequence number to a landing formation, thus treating the formation as one aircraft.

12.3.4.9 When the landing area is occupied by another aircraft or is obstructed, arriving aircraft may be issued with a clearance to:

(a) continue approach if there is no immediate assurance that the landing areas will become available. This must be followed by the appropriate clearance; or

(b) go around, or orbit if in a position to do so, should the landing area not be available. When required, a clearance to commence a second approach or hold must follow these instructions. The nature of the obstruction must be advised if not apparent to the approaching aircraft.

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Section 12.4: General Aviation Aerodrome Procedures

12.4.1.1 Within the GAAP Control Zone, ATC shall:

(a) apply runway separation standards;

(b) issue instructions and/or traffic information to regulate traffic;

(c) provide relevant traffic information INSIDE THE CONTROL ZONE; and

(d) where practicable, maintain surveillance of aircraft activity within the control zone and on the aerodrome.

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Section 12.5: Circuit Operations GAAP

12.5.1 Circuit Operations—GAAP

12.5.1.1 Whenever parallel runways are utilised for simultaneous contra-circuits at a GAAP aerodrome, the circuit direction must be:

(a) right-hand where runway RIGHT is nominated; and

(b) left-hand where runway LEFT is nominated.

12.5.1.2 Simultaneous contra-circuits on parallel runways may be permitted in VMC by day only and conducted utilising separate tower frequencies.

12.5.1.3 Whenever more than one runway direction is in use, the runway number shall be included in a line-up, take-off or landing clearance.

12.5.1.4 When sequencing aircraft, ATC may issue a sequence number and must:

(a) indicate the position of the preceding aircraft by reference to a leg of the circuit or as a clock bearing relative to the aircraft; and

(b) describe it, either as a specific type or in general terms (e.g. Cessna or Twin).

12.5.1.5 ATC may issue a sequencing instruction with a take-off or touch-and-go clearance.

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Section 12.6: GAAP Aerodrome Clearances

12.6.1 General

12.6.1.1 A clearance must be issued prior to an aircraft operating in a GAAP CTR. Clearances must be issued to all aircraft for:

(a) take-off and landing;

(b) taxiing across active runways;

(c) circuit or contra-circuit entry;

(d) a turn in a direction contrary to the circuit for a particular runway;

(e) circuits at an altitude different from the circuit altitude published in ERSA;

(f) operations on routes or at altitudes different from those published in ERSA.

12.6.1.2 A clearance to take-off, or instruction for circuit entry or transit is a clearance to operate within a GAAP CTR.

12.6.1.3 Taxi clearances are not required at GAAP aerodromes.

12.6.1.4 Entry to the CTR must be in accordance with the procedures specified in ERSA for the particular GAAP CTR.

12.6.1.5 Clearance requirements for flights in IMC are as for Class C CTRS.

12.6.1.6 A landing clearance may be issued to a following aircraft while the preceding aircraft occupies the runway, provided that in the opinion of the tower controller no collision risk exists.

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CHAPTER 13: ABNORMAL OPERATIONS

Section 13.1: Oceanic Diversion Procedures

13.1.1 Introduction

13.1.1.1 In order to indicate priority, the pilot may initiate communication by stating "WEATHER DEVIATION REQUIRED". The pilot retains the option of initiating the communications using the urgency call "PAN PAN" three times to alert all listening parties of a special handling condition which will receive ATC priority for issuance of a clearance or assistance.

13.1.1.2 When a pilot requests clearance to deviate from track, the controller must:

(a) issue a clearance to deviate from track, if there is no conflicting traffic in the lateral dimension; or

(b) establish vertical separation and issue a clearance to deviate from track, if there is conflicting traffic in the lateral dimension; or

(c) if unable to establish vertical separation, and there is conflicting traffic in the lateral dimension;

(i) advise the pilot that clearance for the requested deviation is not available;

(ii) provide traffic about, and to, all affected aircraft; and

(iii) request pilot intentions.

13.1.1.3 Position can be expressed as direction and distance, or actual or estimated location, or ATS route/track code.

13.1.2 Aircraft Equipment Failures in RVSM Airspace

13.1.2.1 If a pilot of an RVSM approved aircraft operating in the RVSM flight level band advises "NEGATIVE RVSM", the controller must, as required:

(a) pass traffic information;

(b) obtain the pilot's intentions;

(c) provide alternative separation;

(d) update the FDR; and

(e) advise adjacent ATC facilities/sectors of the situation.

13.1.2.2 If a pilot advises that redundancy in primary altimetry systems is lost, but the remaining altimetry system is functioning normally, the controller should acknowledge the situation and continue to monitor the flight's progress.

Note: RVSM separation may still be applied in this instance.

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Section 13.2: In Flight Emergency Response

13.2.1 Emergency Changes of Level

13.2.1.1 As an emergency measure, the use of flight levels separated by 500 FT (below FL290 or in RVSM airspace) or 1,000 FT (at or above FL290 in non-RVSM airspace) may be used temporarily when standard procedural separation cannot be applied provided that traffic information is issued.

13.2.1.2 If an emergency makes it necessary to clear all traffic from a particular area, ATC must broadcast the following message:

(a) "EMERGENCY TO ALL CONCERNED. EMERGENCY CLIMB/DESCENT AT… (location)." Then as required by circumstances;

(b) (for aircraft in holding pattern) "ALL AIRCRAFT ABOVE/BELOW ... (level) TURN RIGHT 90 DEGREES (for left hand holding pattern or left 90 degrees for right hand pattern)".

13.2.2 Fuel Dumping

13.2.2.1 Airspace affected by the fuel dumped from an aircraft in flight is known as the 'vapour zone' and is defined as that airspace at least 1,000 FT above, 2,000 FT below, 5 NM horizontally behind and ½ NM on each side of the aircraft.

13.2.2.2 In an emergency, or when fuel must be dumped without adequate warning or delay, controllers must make every effort to keep other aircraft clear of the 'vapour zone'. Additionally, ATS is responsible for:

(a) noting the area where jettison was affected;

(b) recording weather conditions and reporting the incident to the appropriate authority without delay.

13.2.2.3 In other than emergency circumstances ATS must specify which section of a nominated track may be used for the dumping of fuel and recommend that aircraft maintain a minimum height of 6,000 FT AGL. For safety reasons fuel is not to be dumped in a circular or race-track pattern.

13.2.2.4 For the purpose of providing separation, all the airspace containing the track specified, the selected altitude and a full allowance for the 'vapour zone' must be treated as reserved airspace from the time dumping is expected to commence until 5 MIN after it has been completed.

13.2.2.5 Known aircraft in Class G airspace likely to be affected are to be warned of the fuel dumping and the approximate location of the 'vapour zone'.

13.2.2.6 The warning must also be broadcast on the appropriate frequencies. Warnings are to continue during the period of fuel dumping and for 5 MIN after it has been completed.

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CHAPTER 14: AERONAUTICAL COMMUNICATIONS

Section 14.1: General

14.1.1 Acknowledging Receipt of Verbal Coordination

14.1.1.1 When an ATS unit receives a verbal clearance or instruction from another ATS unit that includes any of the following, it must read back:

(a) any ATS route number or name;

(b) any tracking point;

(c) assigned level;

(d) any SID or SID Radar;

(e) any STAR identifier, including any runway specified;

(f) assigned SSR code;

(g) an assigned Mach No.;

(h) any heading, including direction of turn;

(i) any item notified in the clearance as “AMENDED” or “RECLEARED”;

(j) cancellation of a clearance;

(k) a level requirement/restriction;

(l) any clearance limit imposed;

(m) the word “VISUAL” when appended to level, heading, or turn instructions.

14.1.1.2 When an ATS unit receives a position report, a level check or a change of level from another ATS unit, the acknowledgment must include:

(a) the aircraft callsign;

(b) the advised level.

14.1.1.3 The originating unit must obtain a correct readback. Under no circumstances must receipt of a message be acknowledged by the callsign only of the acknowledging unit.

14.1.1.4 An acknowledgment must not be given until the receiving operator is satisfied that the transmitted information has been received correctly.

14.1.2 Telephony Protocols

14.1.2.1 The use of radiotelephony on aeronautical channels is to be in accordance with ICAO Annex 10, Vol. II, ICAO PANS-ATM and the Australian Aeronautical Information Publication (AIP). However, the AIP takes precedence in the event of any inconsistency.

14.1.3 Aeronautical Fixed Telecommunications Network

14.1.3.1 The use of the Aeronautical Fixed Telecommunication Network (AFTN) must be in accordance with the provisions of ICAO.

REVISION HISTORY

Version	Date	Chapter Section Paragraph	Details
1.1	March 2003	1.1.1.1 1.1.2.4 and 1.1.6.1 1.1.4.1 1.1.5.4 1.1.5.5	'CASR' inserted Major changes to Paragraphs 'Gen 1.7' replaced by 'Supplement' Minor text changes. New paragraph added.
		2.1.2.1 (l) (iii) 2.1.2.1 (j)	Minor text change 'and hours of operation' deleted
		3.1.2.1 (a) 3.1.2.1 (d) (iii)	Minor text changes.
		5.1.2.1	Minor change
		9.1.3.1 (a), (b), (c) 9.1.3.3 9.1.4.5	Reference to ICAO deleted. 90 days changed to 30 days Major change
		10.1.1.1 10.1.4 10.2.4.1 10.3.2 10.4.8.1 (b) 10.6.5.3 10.6.11, Row R3, subpara 3 10.8.4 10.11.1.2 10.11.6	Changes to text Deleted Changes to text Of version 1.0 deleted (subsequent paragraphs renumbered) New text added Text inserted Text added to 'Condition' column in table Entire paragraph deleted Text added New paragraph inserted (subsequent paragraphs renumbered)
		11.1.2.1	Changed.
		12.2.3.4 12.2.4.2 Section 12.4 and Section 12.5	Paragraphs deleted (subsequent paragraphs renumbered) Two new sections added: Previous Section 12.4 renumbered as Section 12.6.
		14.1.1.1	Changed
1.0	June 2002	All	First issue of MOS Part 172

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