International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

Tel.: +1 514-954-8219 ext. 6710

15 June 2020

Ref.: AN 13/2.1-20/27

Subject: Approval of Amendment 9 to the PANS-ATM

Action required: a) Implementation of the amendment on 5 November 2020; and b) Publication of any differences as of 5 November 2020

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission, acting under delegated authority, on 5 March 2020, approved Amendment 9 to the fifteenth edition of the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), for applicability on 5 November 2020. The amendment was approved on 19 May 2020 by the President of the Council on behalf of the Council in accordance with established procedure. Copies of the amendment are available as attachments to the electronic version of this State letter on the ICAO-NET (http://portal.icao.int) where you can access all other relevant documentation.

2. Amendment 9 stems from proposals to revise the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), Annex 3 — *Meteorological Service for International Air Navigation*, Annex 10 — *Aeronautical Telecommunications*, Volume II — *Communication Procedures including those with PANS status*, Annex 11 — *Air Traffic Services* and Annex 15 — *Aeronautical Information Services* as a result of the work of the second meeting of the Separation and Airspace Safety Panel (SASP/2), the tenth meeting of the Wake Turbulence Specific Working Group (WTSWG/10), the fourth meeting of the Meteorology Panel (METP/4) and the Task Force on Risks to Civil Aviation arising from Conflict Zones (TF RCZ) (C-DEC 203/1) and the Secretariat.

3. An implementation task list, including an outline of guidance material, and an impact assessment for the amendment are presented in Attachments B and C, respectively.

4. Your Government is invited by the Council to implement the provisions of the PANS-ATM as amended. In this connection, I draw your attention to the decision taken by the Council, on 1 October 1973, to discontinue the publication of differences in Supplements to the PANS documents and, instead, to request States to publish up-to-date lists of significant differences from PANS documents in their Aeronautical Information Publications (AIPs).

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5. May I, therefore, invite your Government to publish in your Aeronautical Information Publication a list of any significant differences which will exist on 5 November 2020 between the amended provisions of the PANS-ATM and your national regulations and practices.

Accept, Sir/Madam, the assurances of my highest consideration.

Fang Liu
Secretary General

Enclosures:

A — Amendment to the Foreword of the PANS-ATM
B — Implementation task list and outline of guidance material in relation to Amendment 9 to the PANS-ATM
C — Impact assessment in relation to Amendment 9 to the PANS-ATM

ATTACHMENT A to State letter AN 13/2.1-20/27

AMENDMENT TO THE FOREWORD OF THE PANS-ATM (DOC 4444), FIFTEENTH EDITION

Add the following element at the end of Table A:

Amendment	***Source(s)***	***Subject***	***Approved Applicable***
9	The second meeting of the Separation and Airspace Safety Panel (SASP/2), the tenth meeting of the Wake Turbulence Specific Working Group (WTSWG/10) and the fourth meeting of the Meteorology Panel (METP/4).	Reduced lateral and longitudinal performance based separation minima, reduced wake turbulence separation minima, ATS surveillance separating minima where VHF is not available, special procedures for in flight contingencies in oceanic airspace, strategic lateral offset procedures (SLOP), alignment of reporting of heavy dust and sand storms with Annex 3, and alignment with Annex 19 terminology for safety risk assessment.	19 May 2020 5 November 2020

— — — — — — — —

ATTACHMENT B to State letter AN 13/2.1-20/27

IMPLEMENTATION TASK LIST AND OUTLINE OF GUIDANCE MATERIAL IN RELATION TO AMENDMENT 9 TO THE PANS-ATM (DOC 4444)

1. IMPLEMENTATION TASK LIST

1.1 Essential steps to be followed by a State in order to implement Amendment 9 to the PANS-ATM:

a) conduct a gap analysis between the amendment and national regulatory framework;

b) identification of the rule-making process necessary to transpose the amendment concerning the following subjects into the national requirements, where necessary;

c) drafting of the modification to the national requirements and means of compliance;

d) official adoption of the national requirements and means of compliance;

e) identification and publication of significant differences, if any, in the State's aeronautical information publication (AIP);

f) modification of surveillance programmes to include new requirements, if applicable;

g) revision of guidance material and checklists for safety oversight inspectors;

h) training of inspectors based on the revised inspector guidance material; and

i) ensure compliance by industry (air navigation services provider (ANSP) and operator) through safety oversight activities.

2. STANDARDIZATION PROCESS

2.1 Approval date: 19 May 2020.

2.2 Applicability date: 5 November 2020.

2.3 Embedded date(s): None.

3. SUPPORTING DOCUMENTATION

3.1 ICAO documentation

Title	Type (PANS/TI/Manual/Circ)	Planned publication date
Performance-based Navigation (PBN) Manual (Doc 9613)	Manual	Available
Air Traffic Services Planning Manual (Doc 9426)	Manual	Available
Global Operational Data Link (GOLD) Manual (Doc 10037)	Manual	Available
*Manual on Monitoring the Application of Performance-based Horizontal Separation Minima (*Doc 10063)	Manual	Available
Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services (Doc 9377)	Manual	Available
Manual for Separation Minima Using ATS Surveillance Systems Where VHF Voice Communication is not Available (Doc 10116)	Manual	November 2020
Aircraft Type Designators (Doc 8643) – (Amendment)	Manual	Online database available August 2020
Guidelines for the Implementation of Lateral Separation Minima (Cir 349) (replaces Cir 341)	Circular	November 2020
Manual on the Implementation of Performance-based Longitudinal Separation Minima (Doc 10120) (replaces Cir 343)	Manual	November 2020
Manual on Implementation of Wake Turbulence Separation Minima (Doc 10122)	Manual	August 2020

3.2 External documentation

Title	External Organization	Publication date
None		

4. IMPLEMENTATION ASSISTANCE TASKS

Type	Global	Regional
Regional workshop as resources permit		ICAO regional offices or States offering to host regional events

5. UNIVERSAL SAFETY OVERSIGHT AUDIT PROGRAMME (USOAP)

5.1 No major changes to the USOAP CMA protocol questions are needed.

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ATTACHMENT C to State letter AN 13/2.1-20/27

IMPACT ASSESSMENT IN RELATION TO AMENDMENT 9 TO THE PANS-ATM (DOC 4444)

1. INTRODUCTION

1.1 Amendment 9 to the PANS-ATM is intended to address the requirements and procedures for the following:

— separation methods and minima;

— ATS surveillance services;

— procedures related to in flight contingencies in oceanic airspace;

— wake turbulence categories of aircraft;

— special air-reports; and

— strategic lateral offset procedures (SLOP).

2. IMPACT ASSESSMENT

Amendment concerning reduced separation minima, special procedures for in flight contingencies in oceanic airspace and strategic lateral offset procedures (SLOP)

2.1 *Safety impact*: Positive. The amendment related to reduction in lateral separation for aircraft on parallel or non-intersecting tracks or ATS routes will bring a consequent increase in the availability of clearances to achieve optimal flight levels. At times, this will also mean the facilitation of level changes for hazardous meteorological conditions.

2.1.1 The amendment related to aircraft on reciprocal tracks clarifies the applicability of an existing separation Standard, thereby providing a nominal enhancement to safety.

2.1.2 The amendment related to Mach number technique removes a limitation to the application of the Standard, thereby providing a nominal enhancement to safety.

2.1.3 The amendment related to performance-based longitudinal separation minima capitalizes on the availability of reduced longitudinal separation to facilitate continued safe separation when an aircraft needs to deviate from its assigned route. More frequent ADS-C reports enable early identification of unexpected deviations as is required for this proposal.

2.1.4 The amendment related to separation minima using ATS Surveillance systems where VHF voice communications are not available provides new longitudinal and lateral separation minima where ATS surveillance data is available, but VHF is not. This will bring a consequent increase in the availability of clearances to achieve optimal flight levels. At times this will also mean the facilitation of level changes for hazardous meteorological conditions.

2.1.5 The amendment related to special procedures for in-flight contingencies in oceanic airspace provides clarification and enhances provisions related to in-flight contingencies in oceanic airspace, aligning them with new separation minima.

2.1.6 The amendment related to SLOP provides clarification and enhances provisions related to strategic lateral offset procedures, aligning them with new separation minima and traffic realities.

2.2 *Financial impact.* Negligible. The proposals either provide clarification to current provisions, or are not materially different from current procedures. As a result, there should be little impact on States although some new documentation will be required. Most of the oversight processes (certification/operational approvals) exist and will therefore be of little additional imposition to a State.

2.3 *Security impact*: None of these proposals are related to security.

2.4 *Environmental impact*: Positive. The reductions in separation (and the associated enabling proposals for amendment), with consequent increased availability of clearances to achieve optimal flight levels and reduce track mileage, will result in an overall reduction of emissions.

2.5 *Efficiency impact*: Positive. The increased availability of clearances to achieve optimal flight levels will result in an overall increase in efficiency, with a resultant decrease in fuel cost. Reduced separation resulting in reduced track mileage and flight time will result in other reduced aircraft operating costs (i.e. maintenance).

2.6 *Expected implementation time*: One to two years. This is largely dependent on the State process for the regulation of amendments.

Amendment concerning wake turbulence

2.7 *Safety impact:* Positive. The addition of a new aircraft category, applicable for the Airbus A380-800, or other future aircraft types exceeding the “HEAVY” wake categories, will allow for a harmonized, safe and more efficient manner of ensuring that the suitable wake turbulence separation is applied.

2.7.1 The respective safety cases for RECAT-EU and RECAT 1.5 represent significant research and new knowledge which provides the safety arguments for both the ICAO wake turbulence groups proposal and refinement to existing separations. The safety arguments are reinforced by implementation and operational experiences.

2.8 *Financial impact:* Negligible. The financial impact of the amendment is limited and consists of oversight both in terms of change management (e.g. local safety case review, publications) and ongoing operational review.

2.9 *Security impact:* This proposal is not related to security.

2.10 *Environmental impact:* Positive. The amendment is expected to demonstrate reductions in delays at capacity constrained aerodromes leading to a decrease in flight times and a corresponding reduction in fuel use and CO_2 emissions. These benefits have been identified through the implementation and operational experience of RECAT-EU and RECAT 1.5, both in terminal airspace and in the taxi out.

2.11 *Efficiency impact:* Positive. The amendment is an alternative means to existing ICAO provisions that States can choose to adopt at capacity constrained aerodromes, or where improvement in operational efficiency is deemed necessary. It will provide efficiency benefits through increased runway throughput (experience with RECAT-EU and RECAT 1.5 implementation has demonstrated benefits of more than 10 per cent increase in throughput) as well as reduced delays, especially during peak traffic periods and quicker recovery time from degraded operating conditions (e.g. low visibility procedures) to normal operations.

2.12 *Expected implementation time:* One to two years. This timeframe is needed to integrate the amendment into the national regulatory framework, to understand and monitor the change process put in place by the ANSP, to review and approve safety related material and to observe the initial impacts of the changes through post-implementation monitoring.

Amendment concerning heavy dust and sand storms

2.13 *Safety impact:* Positive. The safety of aircraft operations is enhanced with better access to improved information on current and expected atmospheric conditions. This is expected to manifest in improved decision-making, particularly in the planning phase, to mitigate potential negative safety impacts.

2.14 *Financial impact:* Negligible.

2.15 *Security impact:* This proposal is not related to security.

2.16 *Environmental impact:* Positive. More precise planning for mitigation of hazardous meteorological conditions, as well as space weather, produces safer, more efficient routes, less fuel burn, and reduction of emissions due to fewer ground hold/delay actions and environmentally optimized routing.

2.17 *Efficiency impact:* Positive. The efficiency of aircraft operations is enhanced with more timely access to and incorporation of digital meteorological information in flight planning, flow management and aircraft management.

2.18 *Expected implementation time:* One year.

— END —

AMENDMENT No. 9

TO THE

PROCEDURES
FOR
AIR NAVIGATION SERVICES

AIR TRAFFIC MANAGEMENT

(Doc 4444)

INTERIM EDITION

The text of Amendment No. 9 to the PANS-ATM (Doc 4444) was approved by the President of the Council of ICAO on behalf of the Council on **19 May 2020** for applicability on **5 November 2020**. This interim edition is distributed to facilitate implementation of the amendment by States. Replacement pages incorporating Amendment No. 9 are expected to be distributed in October 2020. (State letter AN 13/2.1-20/27 refers.)

May 2020

INTERNATIONAL CIVIL AVIATION ORGANIZATION

NOTES ON THE EDITORIAL PRESENTATION
OF THE AMENDMENT 9 TO THE PANS-ATM

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1. ~~Text to be deleted is shown with a line through it.~~	text to be deleted
2. New text to be inserted is highlighted with grey shading.	new text to be inserted
3. ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.	new text to replace existing text

TEXT OF AMENDMENT 9 TO THE

PROCEDURES FOR AIR NAVIGATION SERVICES

AIR TRAFFIC MANAGEMENT
(PANS-ATM, DOC 4444)

Editorial note.— Replace the term "safety assessment" by "safety risk assessment" throughout the document.

Chapter 4

GENERAL PROVISIONS FOR AIR TRAFFIC SERVICES

. . .

4.9 WAKE TURBULENCE ~~CATEGORIES~~

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

4.9.1 Wake turbulence categories and groups of aircraft

4.9.1.1 Except as provided for in 4.9.1.2, ~~W~~wake turbulence separation minima shall be based on a grouping of aircraft types into ~~three~~ four categories according to the maximum certificated take-off mass as follows:

a) SUPER (J) — aircraft types specified as such in ICAO Doc 8643, *Aircraft Type Designators*;

~~a)~~b) HEAVY (H) — ~~all~~ aircraft types of 136 000 kg or more, with the exception of aircraft types listed in Doc 8643 in the SUPER (J) category;

~~b)~~c) MEDIUM (M) — aircraft types less than 136 000 kg but more than 7 000 kg; and

~~c)~~d) LIGHT (L) — aircraft types of 7 000 kg or less.

Note.— The wake turbulence category for each aircraft type is contained in Doc 8643, Aircraft Type Designators.

4.9.1.2 When approved by the appropriate ATS authority, wake turbulence separation minima may be applied utilizing wake turbulence groups and shall be based on wake generation and resistance characteristics of the aircraft. These depend primarily on maximum certificated take-off mass, wing characteristics and speeds; the group designators are described as follows:

a) GROUP A — aircraft types of 136 000 kg or more, and a wing span less than or equal to 80 m but greater than 74.68 m;

b) GROUP B — aircraft types of 136 000 kg or more, and a wing span less than or equal to 74.68 m but greater than 53.34 m;

c) GROUP C — aircraft types of 136 000 kg or more, and a wing span less than or equal to 53.34 m but greater than 38.1 m;

d) GROUP D — aircraft types less than 136 000 kg but more than 18 600 kg, and a wing span greater than 32 m;

e) GROUP E — aircraft types less than 136 000 kg but more than 18 600 kg, and a wing span less than or equal to 32 m but greater than 27.43 m;

f) GROUP F — aircraft types less than 136 000 kg but more than 18 600 kg, and a wing span less than or equal to 27.43 m;

g) GROUP G — aircraft types of 18 600 kg or less (without wing span criterion).

Note 1. — Information on the wake turbulence group for each aircraft type is contained in Doc 8643 Aircraft Type Designators.

Note 2. — Guidance on the implementation of wake turbulence separation between wake turbulence groups can be found in the Manual on Implementation of Wake Turbulence Separation Minima *(Doc 10122).*

4.9.1.2.1 Essential information, including the wake turbulence group designator as necessary, shall be provided to the controller when separation based on wake turbulence groups is to be applied.

4.9.1.~~2~~3 Helicopters should be kept well clear of light aircraft when hovering or while air taxiing.

Note 1.— Helicopters produce vortices when in flight and there is some evidence that, per kilogram of gross mass, their vortices are more intense than those of fixed-wing aircraft. When hovering in ground effect or air taxiing, helicopters generate downwash producing high velocity outwash vortices to a distance approximately three times the diameter of the rotor.

Note 2.— The provisions governing wake turbulence separation minima are set forth in Chapter 5, Section 5.8, and Chapter 8, Section 8.7.3.

…

4.9.2 Indication of super or heavy wake turbulence category

For aircraft in the SUPER or ~~heavy~~ HEAVY wake turbulence ~~category~~ categories the word "super" or "~~H~~heavy" shall be included, as appropriate, immediately after the aircraft call sign in the initial radiotelephony contact between such aircraft and ATS units.

Note 1.— Wake turbulence categories are specified in the instructions for completing Item 9 of the flight plan in Appendix 2.

Note 2.— Wake turbulence Group A is equivalent to the SUPER wake turbulence category, and Groups B and C are equivalent to the HEAVY category.

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4.11 POSITION REPORTING

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4.11.3 Radiotelephony procedures for air-ground voice communication channel changeover

When so prescribed by the appropriate ATS authority, the initial call to an ATC unit after a change of air-ground voice communication channel shall contain the following elements:

a) designation of the station being called;

b) call sign and, for aircraft in the SUPER and ~~heavy~~ HEAVY wake turbulence ~~category~~ categories, the word "super" or "~~H~~heavy" respectively;

c) level, including passing and cleared levels if not maintaining the cleared level;

d) speed, if assigned by ATC; and

e) additional elements, as required by the appropriate ATS authority.

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Chapter 5

SEPARATION METHODS AND MINIMA

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5.4 HORIZONTAL SEPARATION

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5.4.1 Lateral separation

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Table 5-2. Lateral separation of aircraft on parallel or non-intersecting tracks or ATS routes

Minimum Spacing Between Tracks		*Performance Requirements*			*Additional Requirements*
Airspace where SLOP is not authorized, or is only authorized up to 0.5 NM	*Airspace where SLOP up to 2 NM is authorized*	*Navigation*	*Communication*	*Surveillance*	

Minimum Spacing Between Tracks		*Performance Requirements*			*Additional Requirements*
93 km (50 NM)	93 km (50 NM)	RNAV 10 (RNP 10) RNP 4 RNP 2	Types of communication other than direct controller-pilot VHF voice		
37 km (20 NM)	42.6 km (23 NM)	RNP 4 RNP 2	RCP 240	RSP 180	Conformance monitoring shall be ensured by establishing an ADS-C event contract specifying a lateral deviation change event with a maximum of 5 NM threshold and a waypoint change event
37 km (20 NM)	42.6 km (23 NM)	RNP 2 or GNSS equipage	Types of communication other than direct controller-pilot VHF voice		While one aircraft climbs/descends through the level of another aircraft remaining in level flight
27.8 km (15 NM)	~~N/A~~ 33.4 km (18 NM)	RNP 2 or GNSS equipage	Direct controller-pilot VHF voice communication		
16.7 km (9 NM)	~~N/A~~ 22.3 km (12 NM)	RNP 4 RNP 2	RCP 240	RSP 180	While one aircraft climbs/descends through the level of another aircraft remaining in level flight
13 km (7 NM)	~~N/A~~ 19 km (10 NM)	RNP 2 or GNSS equipage	Direct controller-pilot VHF voice communication		While one aircraft climbs/descends through the level of another aircraft remaining in level flight

. . .

5.4.2 Longitudinal separation

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5.4.2.1 L**ONGITUDINAL SEPARATION APPLICATION**

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5.4.2.3.4.2 *Aircraft on reciprocal tracks*. Aircraft utilizing on-track DME and/or collocated waypoint or same waypoint may be cleared to climb or descend to or through the levels occupied by other aircraft utilizing on-track DME and/or collocated waypoint or same waypoint, provided that it has been positively established that the aircraft have passed each other and are at least 10 NM apart, or such other value as prescribed by the appropriate ATS authority.

. . .

5.4.2.4 LONGITUDINAL SEPARATION MINIMA WITH MACH NUMBER TECHNIQUE BASED ON TIME

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

. . .

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

a) the aircraft concerned have reported over the same common point and follow the same track or continuously diverging tracks until some other form of separation is provided; or

b) if the aircraft have not reported over the same common point and it is possible to ensure, by radar, ADS-B or other means, that the appropriate time interval will exist at the common point from which they either follow the same track or continuously diverging tracks;

minimum longitudinal separation between ~~turbojet~~ aircraft on the same track, whether in level, climbing or descending flight shall be:

. . .

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

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

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

. . .

5.4.2.9 PERFORMANCE-BASED LONGITUDINAL SEPARATION MINIMA

Note.— Guidance material for implementation and application of the separation minima in this section is contained in the Performance-based Communication and Surveillance (PBCS) Manual *(Doc 9869), the* Global Operational Data Link (GOLD) Manual *(Doc 10037), the* Satellite Voice Operations Manual *(SVOM) (Doc 10038) and the* ~~Guidelines~~ Manual on ~~for~~ the Implementation of Performance-based Longitudinal Separation Minima *(~~Circular 343~~ Doc 10120), and the* Manual on Monitoring the Application of Performance-Based Horizontal Separation Minima *(Doc 10063).*

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

5.4.2.9.2 The following separation minima may be used for aircraft cruising, climbing or descending on:

a) the same track; or

b) crossing tracks, provided that the relative angle between the tracks is less than 90 degrees.

Separation minima	*RNP*	*RCP*	*RSP*	*Maximum ADS-C periodic reporting interval*
93 km (50 NM)	10	240	180	27 minutes
	4	240	180	32 minutes
55.5 km (30 NM)	2 or 4	240	180	12 minutes
37 km (20 NM)	2 or 4	240	180	192 seconds (3.2 minutes)
5 minutes	2 or 4 or 10	240	180	14 minutes

~~*Note.— Detailed information on the analysis used to determine these separation minima monitoring procedures is contained in the* Guidelines for the Implementation of Performance-based Longitudinal Separation Minima *(Circular 343).*~~

Note.— The 192 seconds (3.2 minutes) maximum ADS-C periodic reporting interval is intended for use during application of the 37 km (20 NM) separation minimum between specific aircraft pairs and is not intended for use as a default periodic reporting interval for all aircraft. Attention is drawn to the guidance regarding ADS contract – periodic in the Global Operational Data Link (GOLD) Manual *(Doc 10037).*

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5.6 MINIMUM SEPARATION BETWEEN DEPARTING AIRCRAFT

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Note 1.— Wake turbulence categories ~~of aircraft~~ and groups are contained in Chapter 4, Section 4.9.1 and longitudinal separation minima are contained in Chapter 5, Section 5.8 and in Chapter 8, Section 8.7.3.

. . .

5.8 TIME-BASED WAKE TURBULENCE LONGITUDINAL SEPARATION MINIMA

Note.— Distance-based wake turbulence separation minima are set forth in Chapter 8, 8.7.3.~~4.~~

5.8.1 Applicability

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

a) for arriving VFR flights landing on the same runway as a preceding landing SUPER, HEAVY or MEDIUM aircraft; and

b) between arriving IFR flights executing visual approach when the aircraft has reported the preceding aircraft in sight and has been instructed to follow and maintain own separation from that aircraft.

. . .

5.8.2 Arriving aircraft

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

~~5.8.2.1.1 The~~ following minima shall be applied to aircraft landing behind a SUPER, a HEAVY or a MEDIUM aircraft:

a) HEAVY aircraft landing behind SUPER aircraft — 2 minutes;
b) MEDIUM aircraft landing behind SUPER aircraft — 3 minutes;
c)~~a)~~ MEDIUM aircraft landing behind HEAVY aircraft — 2 minutes;
d) LIGHT aircraft landing behind SUPER aircraft — 4 minutes;
e)~~b)~~ LIGHT aircraft landing behind a HEAVY or MEDIUM aircraft — 3 minutes.

5.8.3 Departing aircraft

5.8.3.1 ~~A minimum separation of 2 minutes shall be applied between a LIGHT or MEDIUM aircraft taking off behind a HEAVY aircraft or a LIGHT aircraft taking off behind a MEDIUM aircraft when~~When using wake turbulence categories contained in Chapter 4, 4.9.1.1 and when the aircraft are using:

a) the same runway (see Figure 5-42);
b) parallel runways separated by less than 760 m (2 500 ft) (see Figure 5-42);
c) crossing runways if the projected flight path of the second aircraft will cross the projected flight path of the first aircraft at the same altitude or less than 300 m (1 000 ft) below (see Figure 5-43);
d) parallel runways separated by 760 m (2 500 ft) or more, if the projected flight path of the second aircraft will cross the projected flight path of the first aircraft at the same altitude or less than 300 m (1 000 ft) below (see Figure 5-43);

the following minimum separations shall be applied

1) HEAVY aircraft taking off behind a SUPER aircraft — 2 minutes;
2) LIGHT or MEDIUM aircraft taking off behind a SUPER aircraft — 3 minutes;
3) LIGHT or MEDIUM aircraft taking off behind a HEAVY aircraft — 2 minutes;
4) LIGHT aircraft taking off behind a MEDIUM aircraft — 2 minutes.

5.8.3.2 When using wake turbulence groups contained in Chapter 4, 4.9.1.2 and when the aircraft are using:

a) the same runway (see Figure 5-42);
b) parallel runways separated by less than 760 m (2 500 ft) (see Figure 5-42);
c) crossing runways if the projected flight path of the second aircraft will cross the projected flight path of the first aircraft at the same altitude or less than 300 m (1 000 ft) below (see Figure 5-43);
d) parallel runways separated by 760 m (2 500 ft) or more, if the projected flight path of the second aircraft will cross the projected flight path of the first aircraft at the same altitude or less than 300 m (1 000 ft) below (see Figure 5-43);

the following separations shall be applied:

Preceding aircraft wake turbulence group	*Succeeding aircraft wake turbulence group*	*Time-based wake turbulence separation minima*
A	B	100 seconds
	C	120 seconds
	D	140 seconds
	E	160 seconds
	F	160 seconds
	G	180 seconds
B	D	100 seconds
	E	120 seconds
	F	120 seconds
	G	140 seconds
C	D	80 seconds
	E	100 seconds
	F	100 seconds
	G	120 seconds
D	G	120 seconds
E	G	100 seconds

~~*Note. — See Figures 5-42 and 5-43.*~~

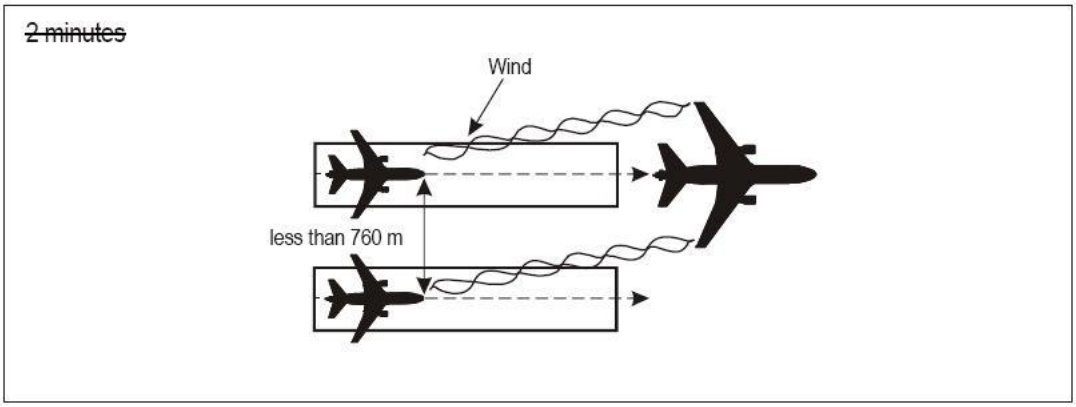

Figure 5-42. ~~Two-minute~~ Wake turbulence separation for following aircraft (see 5.8.3.1 a) and b) and 5.8.3.2 a) and b))

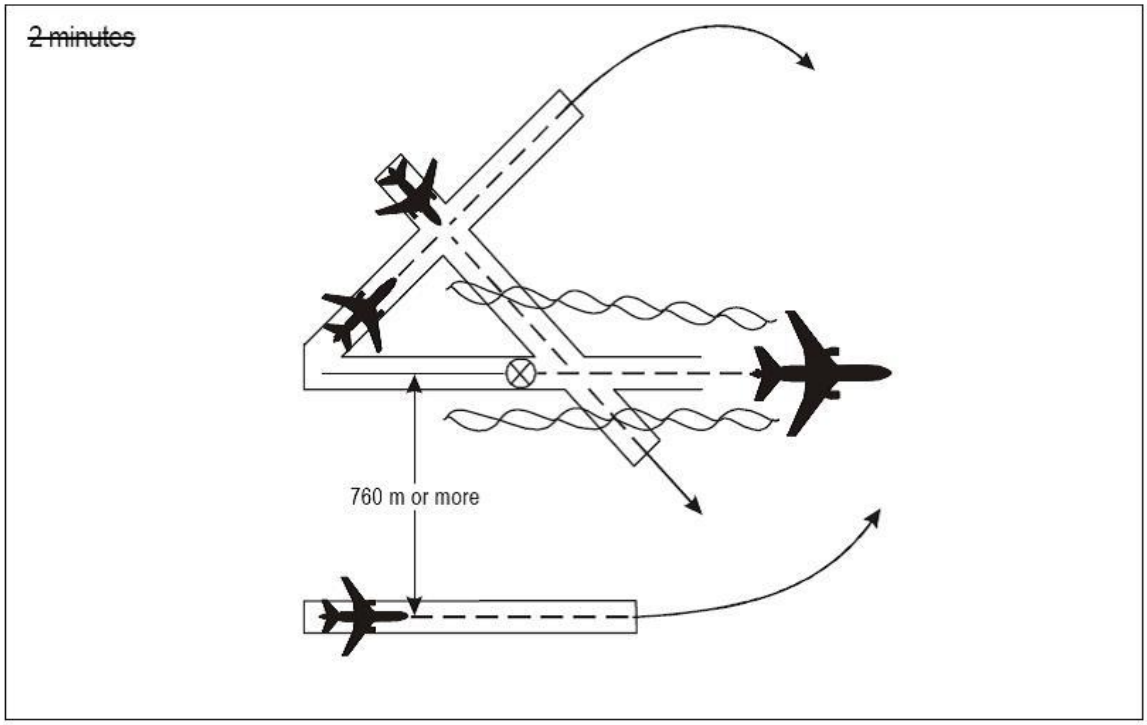

Figure 5-43. ~~Two-minute~~ Wake turbulence separation for crossing aircraft (see 5.8.3.1 c) and d) and 5.8.3.2 c) and d))

…

5.8.3.2~~3~~ ~~A separation minimum of 3 minutes shall be applied between a LIGHT or MEDIUM aircraft when taking off behind a HEAVY aircraft or a LIGHT aircraft when taking off behind a MEDIUM aircraft from:~~

~~a) an intermediate part of the same runway; or~~

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

When using wake turbulence categories contained in Chapter 4, 4.9.1.1 for aircraft taking off from an intermediate part of the same runway or an intermediate part of a parallel runway separated by less than 760 m (2 500 ft) (see Figure 5-44), the following minimum separations shall be applied:

a) HEAVY aircraft taking off behind a SUPER aircraft — 3 minutes;
b) LIGHT or MEDIUM aircraft taking off behind a SUPER aircraft — 4 minutes;
c) LIGHT or MEDIUM aircraft taking off behind a HEAVY aircraft — 3 minutes;
d) LIGHT aircraft taking off behind a MEDIUM aircraft — 3 minutes.

~~*Note.— See Figure 5-44.*~~

5.8.3.4 When applying the wake turbulence groups in Chapter 4, 4.9.1.2 for aircraft taking off from an intermediate part of the same runway or an intermediate part of a parallel runway separated by less than 760 m (2 500 ft) (see Figure 5-44), the following minimum separations shall be applied:

Preceding aircraft wake turbulence group	*Succeeding aircraft wake turbulence group*	*Time-based wake turbulence separation minima*
A	B	160 seconds
	C	180 seconds
	D	200 seconds
	E	220 seconds
	F	220 seconds
	G	240 seconds
B	D	160 seconds
	E	180 seconds
	F	180 seconds
	G	200 seconds
C	D	140 seconds
	E	160 seconds
	F	160 seconds
	G	180 seconds
D	G	180 seconds
E	G	160 seconds

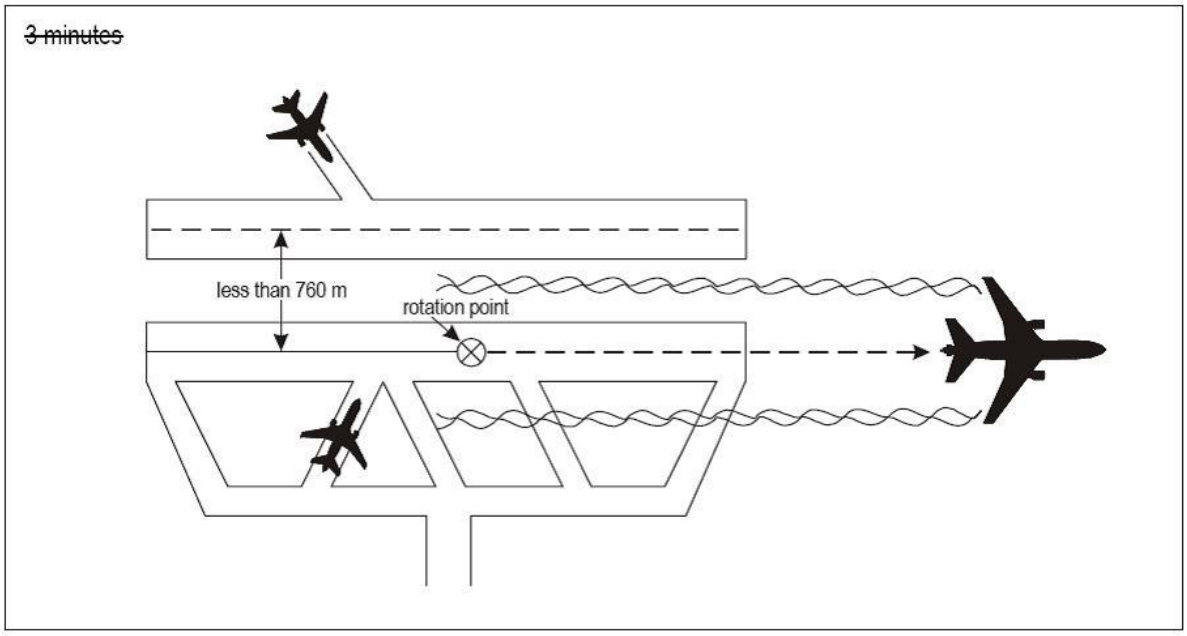

Figure 5-44. ~~Three minute~~Wake turbulence separation for following aircraft (see 5.8.3.~~2~~3 and 5.8.3.4)

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5.8.4 Displaced landing threshold

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

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

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

5.8.4.1 When using wake turbulence categories contained in Chapter 4, 4.9.1.1 and when operating a displaced landing threshold, the following minimum separations shall be applied if the projected flight paths are expected to cross:

a) a departing HEAVY aircraft following a SUPER aircraft arrival — 2 minutes;
b) a departing LIGHT or MEDIUM aircraft following a SUPER aircraft arrival — 3 minutes;
c) a departing LIGHT or MEDIUM aircraft following a HEAVY aircraft arrival — 2 minutes;
d) a departing LIGHT aircraft following a MEDIUM aircraft arrival — 2 minutes;

e) a HEAVY aircraft arrival following a SUPER aircraft departure — 2 minutes;
f) a LIGHT or MEDIUM aircraft arrival following a SUPER aircraft departure — 3 minutes;
g) a LIGHT or MEDIUM aircraft arrival following a HEAVY aircraft departure — 2 minutes;
h) a LIGHT aircraft arrival following a MEDIUM aircraft departure — 2 minutes.

5.8.4.2 When using wake turbulence groups contained in Chapter 4, 4.9.1.2 and when operating a displaced landing threshold, the following minimum separations shall be applied when a departing aircraft follows an arriving aircraft, if the projected flight paths are expected to cross:

Preceding arriving aircraft group	*Succeeding departing aircraft group*	*Time-based wake turbulence separation minima*
A	B	100 seconds
	C	120 seconds
	D	140 seconds
	E	160 seconds
	F	160 seconds
	G	180 seconds
B	D	100 seconds
	E	120 seconds
	F	120 seconds
	G	140 seconds
C	D	80 seconds
	E	100 seconds
	F	100 seconds
	G	120 seconds
D	G	120 seconds
E	G	100 seconds

5.8.4.3 When using wake turbulence groups contained in Chapter 4, 4.9.1.2 and when operating a displaced landing threshold, the following minimum separations shall be applied when an arriving aircraft follows a departing aircraft, if their projected flight paths are expected to cross:

Preceding departing aircraft group	*Succeeding arriving aircraft group*	*Time-based wake turbulence separation minima*
A	B	100 seconds
	C	120 seconds
	D	140 seconds
	E	160 seconds
	F	160 seconds
	G	180 seconds
B	D	100 seconds
	E	120 seconds
	F	120 seconds
	G	140 seconds
C	D	80 seconds
	E	100 seconds
	F	100 seconds
	G	120 seconds
D	G	120 seconds
E	G	100 seconds

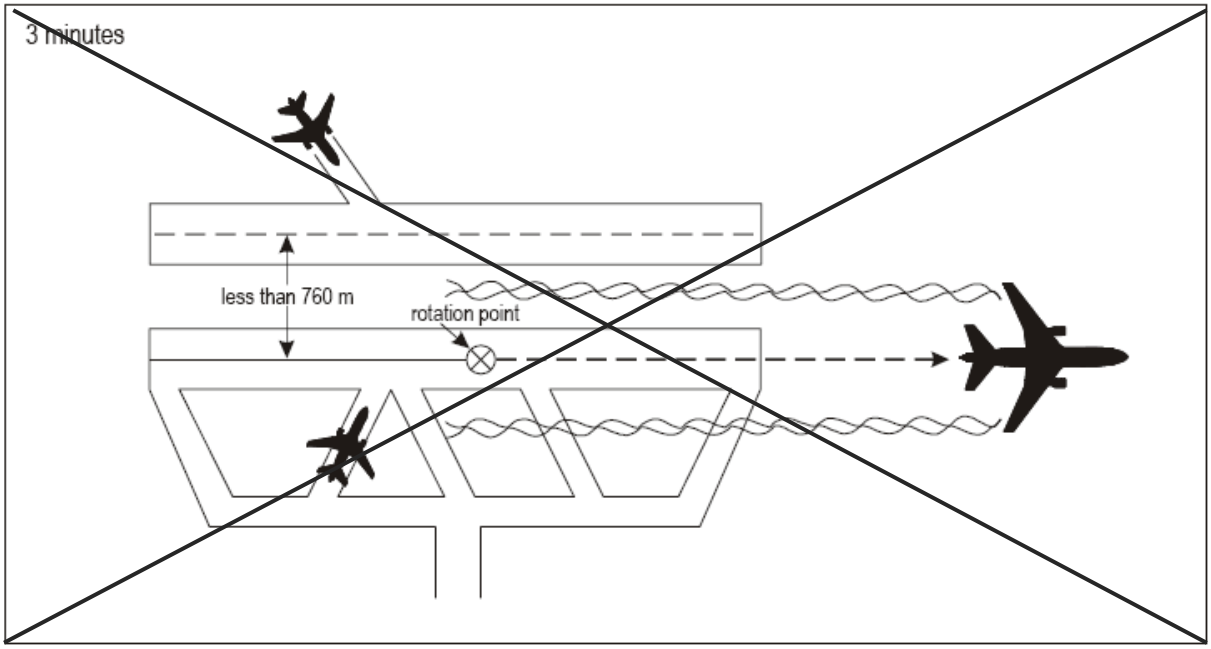
5.8.5 Opposite direction

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

~~a) utilizing an opposite-direction runway for take-off; or~~

~~*Note. — See Figure 5-45.*~~

~~b) landing on the same runway in the opposite direction, or on a parallel opposite-direction runway separated by less than 760 m (2 500 ft).~~
~~*Note. — See Figure 5-46.*~~



~~Figure 5-44. Three-minute wake turbulence separation for following aircraft (see 5.8.3.2)~~

Editorial Note.— Figure relocated after 5.8.3.4

5.8.5.1 When using wake turbulence categories contained in Chapter 4, 4.9.1.1 for a heavier aircraft making a low or missed approach and when the lighter aircraft is:

a) using an opposite-direction runway for take-off (see Figure 5-45); or

b) landing on the same runway in the opposite direction, or on a parallel opposite-direction runway separated by less than 760 m (2 500 ft) (see Figure 5-46);

the following minimum separations shall be used:

a) between a HEAVY aircraft and a SUPER aircraft — 3 minutes;
b) between a LIGHT or MEDIUM aircraft and a SUPER aircraft — 4 minutes;
c) between a LIGHT or MEDIUM aircraft and a HEAVY aircraft — 3 minutes;
d) between a LIGHT aircraft and a MEDIUM aircraft — 3 minutes.

5.8.5.2 When applying the wake turbulence groups in Chapter 4, 4.9.1.2 and a heavier aircraft is making a low or missed approach and the lighter aircraft is:

a) utilizing an opposite-direction runway for take-off (see Figure 5-45); or

b) landing on the same runway in the opposite direction, or on a parallel opposite-direction runway separated by less than 760 m (2 500 ft) (see Figure 5-46),

the following minimum separations shall be used:

Preceding aircraft group	*Succeeding aircraft group*	*Time-based wake turbulence separation minima*
A	B	160 seconds
	C	180 seconds
	D	200 seconds
	E	220 seconds
	F	220 seconds
	G	240 seconds
B	D	160 seconds
	E	180 seconds
	F	180 seconds
	G	200 seconds
C	D	140 seconds
	E	160 seconds
	F	160 seconds
	G	180 seconds
D	G	180 seconds
E	G	160 seconds

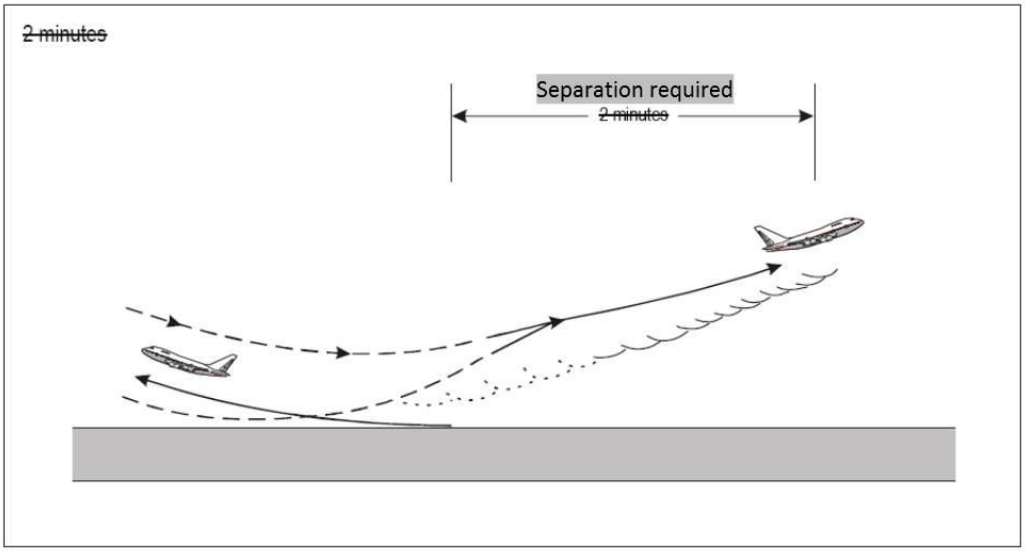


Figure 5-45. ~~Two-minute~~ Wake turbulence separation for opposite-direction take-off (see 5.8.5.1 a) and 5.8.5.2 a))

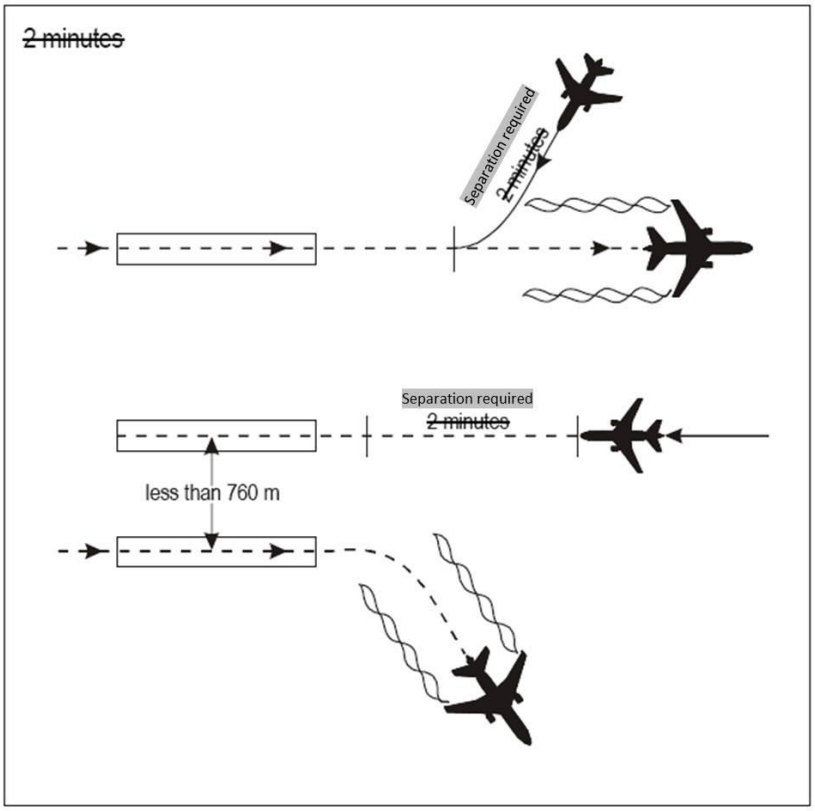


Figure 5-46. ~~Two-minute~~ Wake turbulence separation for opposite-direction landing (see 5.8.5.1 b) and 5.8.5.2 b))

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Chapter 7

PROCEDURES FOR AERODROME CONTROL SERVICE

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7.3 INITIAL CALL TO AERODROME CONTROL TOWER

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

a) designation of the station being called;

b) call sign and, for aircraft in the SUPER or ~~heavy~~ HEAVY wake turbulence category, the word "super" or "~~H~~heavy";

c) position; and

d) additional elements, as required by the appropriate ATS authority.

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

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7.9 CONTROL OF DEPARTING AIRCRAFT

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7.9.2 Separation of departing aircraft

Except as provided in 7.11 and Chapter 5, Section 5.8, a departing aircraft will not normally be permitted to commence take-off until the preceding departing aircraft has crossed the end of the runway-in-use or has started a turn or until all preceding landing aircraft are clear of the runway-in-use.

Note 1.— See Figure 7-3.

Note 2.— Wake turbulence categories and groups are contained in Chapter 4, Section 4.9 and time-based wake turbulence longitudinal separation minima are contained in ~~Chapter 4, Section 4.9 and~~ Chapter 5, Section 5.8~~, respectively~~. Distance-based wake turbulence separation minima are contained in Chapter 8, Section 8.7.

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7.10 CONTROL OF ARRIVING AIRCRAFT

7.10.1 Separation of landing aircraft and preceding landing and departing aircraft using the same runway

Except as provided in 7.11 and Chapter 5, Section 5.8, a landing aircraft will not normally be permitted to cross the runway threshold on its final approach until the preceding departing aircraft has crossed the end of the runway-in-use, or has started a turn, or until all preceding landing aircraft are clear of the runway-in-use.

Note 1.— See Figure 7-3.

Note 2.— Wake turbulence categories ~~of aircraft~~and groups are contained in Chapter 4, Section 4.9 and time-based wake turbulence longitudinal separation minima are contained in ~~Chapter 4, Section 4.9 and~~ Chapter 5, Section 5.8~~, respectively~~.

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7.10.3 Landing and roll-out manoeuvres

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7.10.3.2 In requesting a landing aircraft to perform a specific landing and/or roll-out manoeuvre, the type of aircraft, runway length, location of exit taxiways, reported braking action on runway and taxiway, and prevailing meteorological conditions shall be considered. A SUPER or HEAVY aircraft shall not be requested to land beyond the touchdown zone of a runway.

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Chapter 8

ATS SURVEILLANCE SERVICES

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8.7 USE OF ATS SURVEILLANCE SYSTEMS IN THE AIR TRAFFIC CONTROL SERVICE

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8.7.2 Separation application

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8.7.2.1 Except as provided for in 8.7.2.8, 8.7.2.9 and 8.8.2.2, the separation minima specified in 8.7.3 and 8.7.4 shall only be applied between identified aircraft when there is reasonable assurance that identification will be maintained.

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8.7.3 Separation minima based on ATS surveillance systems

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8.7.3.4 When using wake turbulence categories contained in Chapter 4, 4.9.1.1, the ~~The~~ following distance-based wake turbulence separation minima shall be applied to aircraft being provided with an ATS surveillance service in the approach and departure phases of flight in the circumstances given in 8.7.3.~~4.1~~6.

Aircraft category		
Preceding aircraft	*Succeeding aircraft*	*Distance-based wake turbulence separation minima*
SUPER	HEAVY	9.3 km (5.0 NM)
	MEDIUM	13.0 km (7.0 NM)
	LIGHT	14.9 km (8.0 NM
HEAVY	HEAVY	7.4 km (4.0 NM)
	MEDIUM	9.3 km (5.0 NM)
	LIGHT	11.1 km (6.0 NM)
MEDIUM	LIGHT	9.3 km (5.0 NM)

~~*Note.— The provisions governing wake turbulence aircraft categorization are set forth in Chapter 4, Section 4.9.*~~

8.7.3.5 When applying the wake turbulence groups in Chapter 4, 4.9.1.2, the following distance-based wake turbulence separation minima shall be applied to aircraft being provided with an ATS surveillance service in the approach and departure phases of flight, in the circumstances given in 8.7.3.6:

Preceding aircraft group	*Succeeding aircraft group*	*Distance-based wake turbulence separation minima*
A	B	7.4 km (4.0 NM)
	C	9.3 km (5.0 NM)
	D	9.3 km (5.0 NM)
	E	11.1 km (6.0 NM)
	F	11.1 km (6.0 NM)
	G	14.9 km (8.0 NM)
B	B	5.6 km (3.0 NM)
	C	7.4 km (4.0 NM)
	D	7.4 km (4.0 NM)
	E	9.3 km (5.0 NM)
	F	9.3 km (5.0 NM)
	G	13.0 km (7.0 NM)
C	D	5.6 km (3.0 NM)
	E	6.5 km (3.5 NM)
	F	6.5 km (3.5 NM)
	G	11.1 km (6.0 NM)
D	G	7.4 km (4 NM)
E	G	7.4 km (4 NM)

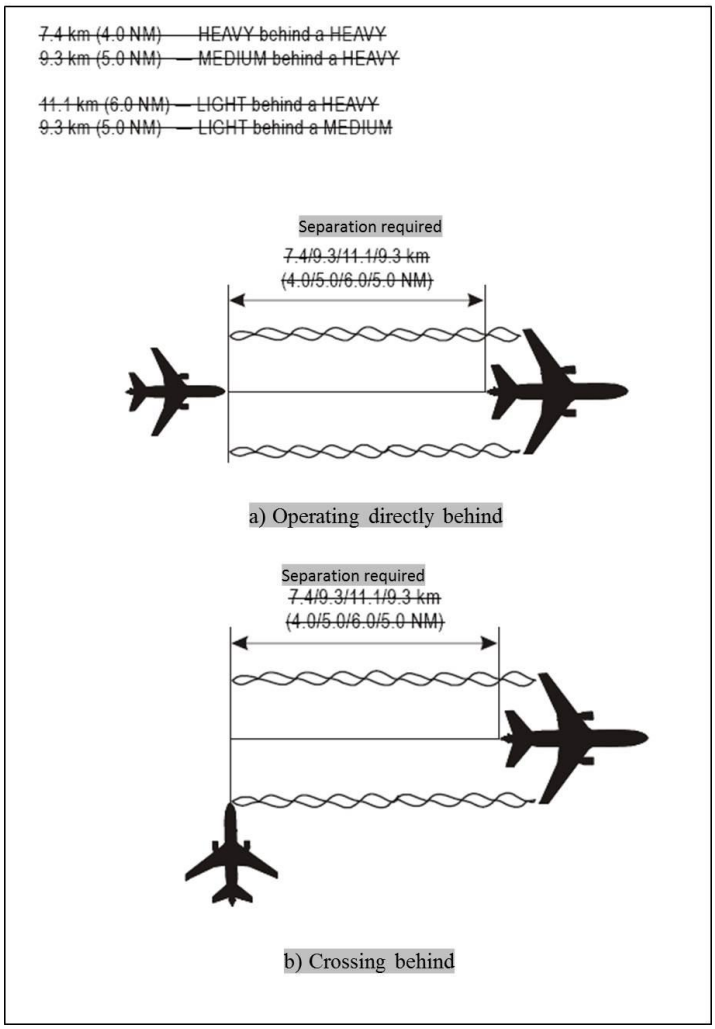
8.7.3.~~4.1~~6 The minima set out in 8.7.3.4 and 8.7.3.5 shall be applied when:

a) an aircraft is operating directly behind another aircraft at the same altitude or less than 300 m (1 000 ft) below (see Figure 8-1); or

b) both aircraft are using the same runway or parallel runways separated by less than 760 m (2 500 ft); or

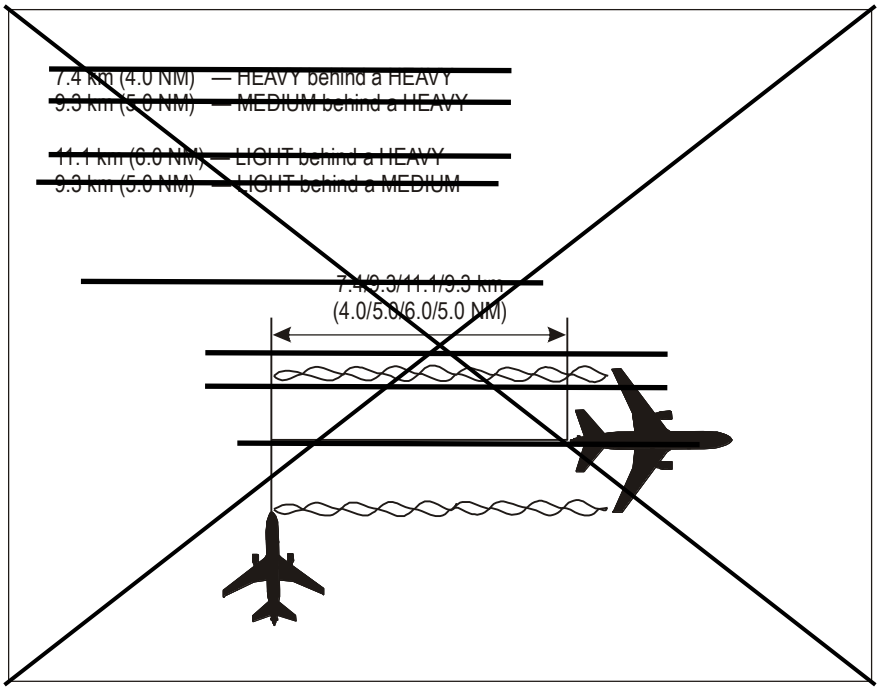
c) an aircraft is crossing behind another aircraft at the same altitude or less than 300 m (1 000 ft) below (see Figure 8-1).

~~*Note.— See Figures 8-1A and 8-1B.*~~



. . .

Figure 8-1A. Operating directly behind or crossing behind (see 8.7.3.4 and 8.7.3.4.1 8.7.3.5)



~~Figure 8-1B. Crossing behind (see 8.7.3.4 and 8.7.3.4.1)~~

Insert new text as follows

8.7.4 Separation minima using ATS surveillance systems where VHF voice communication is not available

Note 1.— Guidance material for the implementation of the navigation capability supporting the separation minima in 8.7.4.2, 8.7.4.3 and 8.7.4.4 is contained in the Performance-based Navigation (PBN) Manual *(Doc 9613).*

Note 2.— Guidance material for the implementation of communication and surveillance capability supporting the separation minima in 8.7.4.2, 8.7.4.3 and 8.7.4.4 is contained in the Performance-based Communication and Surveillance (PBCS) Manual *(Doc 9869) and the* Global Operational Data Link (GOLD) Manual *(Doc 10037).*

Note 3.— Detailed information on the analysis used to determine these separation minima, as well as their implementation considerations, tolerable values for occupancy and deviation rates and associated monitoring procedures, are contained in the Manual for Separation Minima Using ATS Surveillance Systems Where VHF Voice Communication is not Available *(Doc 10116).*

Note 4.— Application of the separation minima in 8.7.4.2, 8.7.4.3 and 8.7.4.4 includes elements of both procedural control and ATS surveillance services; refer to Annex 1 — Personnel Licensing *for applicable air traffic controller rating requirements.*

8.7.4.1 Where direct controller-pilot VHF voice communication is not available, separation minima described in 8.7.4.2, 8.7.4.3 and 8.7.4.4 may be applied utilizing positioning information derived from an ATS surveillance system, provided the following requirements are met:

a) a navigational performance of RNP 4 or RNP 2 shall be prescribed;

b) the communication system shall satisfy RCP 240;

c) an alternate means of communication shall be available so as to allow the controller to intervene and resolve a conflict within a total time of nine minutes, should the normal means of communication fail; and

Note.— The total time specified in c) includes the four minutes allocated to RCP 240.

d) route conformance monitoring shall be ensured by the use of ATS surveillance system lateral deviation alerts with a warning threshold normally set at a maximum 3 NM.

1) Warning thresholds greater than 5.6 km (3.0 NM) may be set, provided the lateral separation minima in 8.7.4.2 a) and 8.7.4.3 are increased by 1.9 km (1.0 NM) for each 1.9 km (1.0 NM) that the warning threshold is increased; and

2) ATS surveillance systems shall provide for the display of alerts in a clear and distinct manner, to enable immediate action by the controller in the event of a lateral deviation.

8.7.4.2 Unless otherwise prescribed in accordance with 8.7.4.3 and 8.7.4.4, the separation minima shall be:

a) 35.2 km (19.0 NM) lateral spacing between parallel or non-intersecting tracks;

b) 35.2 km (19.0 NM) lateral separation of aircraft operating on intersecting tracks applied in accordance with section 5.4.1.2.1.5 a) and b);

c) 31.5 km (17.0 NM) longitudinal separation of aircraft operating on same tracks or crossing tracks applied in accordance with section 5.4.2.9.5 provided that the relative angle between the tracks is less than 90 degrees; and

d) opposite direction aircraft on reciprocal tracks may be cleared to climb or descend to or through the levels occupied by another aircraft, provided that surveillance position reports have been received from both aircraft demonstrating the aircraft have passed each other by 9.3 km (5.0 NM).

8.7.4.3 The separation minimum in 8.7.4.2 a) may, if so prescribed by the appropriate ATS authority, be reduced, but not below 27.8 km (15.0 NM), provided either:

a) the density of traffic in the airspace, as measured by occupancy, is less than 0.6; or

b) the proportion of total flight time spent by aircraft off the cleared track does not exceed the following:

1) for aircraft deviating 13.0 km (7.0 NM) or more off the cleared track, 3×10^{-5} per flight hour; and

2) for aircraft deviating 20.4 km (11.0 NM) or more off the cleared track, 1×10^{-5} per flight hour.

8.7.4.4 The separation minimum in 8.7.4.2 c) may be reduced to 26 km (14 NM), provided that the relative angle between the tracks is less than 45 degrees.

8.7.4.5 Vectoring shall not be used in the application of these separation minima.

Editorial Note.— Renumber subsequent paragraphs accordingly while verifying references.

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Chapter 12

PHRASEOLOGIES

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12.3 ATC PHRASEOLOGIES

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12.3.4 Phraseologies for use on and in the vicinity of the aerodrome

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12.3.4.7 TAXI PROCEDURES	
... for departure	*a) *[aircraft type] [wake turbulence category if "super" or "heavy"] [aircraft location]* REQUEST TAXI *[intentions]*; *b) *[aircraft type] [wake turbulence category if "super" or "heavy"] [aircraft location] (flight rules)* TO *(aerodrome of destination)* REQUEST TAXI *[intentions]*; c) TAXI TO HOLDING POINT *[number]* [RUNWAY *(number)*] [HOLD SHORT OF RUNWAY *(number)* (*or* CROSS RUNWAY *(number)*)] [TIME *(time)*];
... where detailed taxi instructions are required	*d) *[aircraft type] [wake turbulence category if "super" or "heavy"]* REQUEST DETAILED TAXI INSTRUCTIONS;

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CHAPTER 15

PROCEDURES RELATED TO EMERGENCIES, COMMUNICATION FAILURE AND CONTINGENCIES

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15.2 SPECIAL PROCEDURES FOR IN-FLIGHT CONTINGENCIES IN OCEANIC AIRSPACE

15.2.1 Introduction

15.2.1.1 Although all possible contingencies cannot be covered, the procedures in 15.2.2 ~~and~~, 15.2.3 and 15.2.4 provide for the more frequent cases such as:

a) the inability to comply with assigned clearance due to meteorological conditions, ~~aircraft performance or pressurization failure~~(15.2.4 refers);

b) en-route diversion across the prevailing traffic flow (for example, due to medical emergencies (15.2.2. and 15.2.3 refer)); and

c) the loss of, or significant reduction in, the required navigation capability when operating in an airspace where the navigation performance accuracy is a prerequisite to the safe conduct of flight operations, or pressurization failure (15.2.2. and 15.2.3 refer).

Note.— Chapter 5, Section 5.2.2 contains procedures for degraded navigation capabilities.

15.2.1.2 ~~With regard to 15.2.1.1 a) and b), the procedures are applicable primarily when descent and/or turnback or diversion is required.~~ The pilot shall take action as necessary to ensure the safety of the aircraft, and the pilot's judgement shall determine the sequence of actions to be taken, having regard to the prevailing circumstances. Air traffic control shall render all possible assistance.

15.2.2 General procedures

Note.— Figure 15-1 provides an aid for understanding and applying the contingency procedures contained in Sections 15.2.2 and 15.2.3.

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

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

~~15.2.2.3~~ If prior clearance cannot be obtained, ~~until a revised clearance is received~~ the following contingency procedures should be employed until a revised clearance is received~~and the pilot shall advise air traffic control as soon as practicable, reminding them of the type of aircraft involved and the nature of the problem~~. In general terms, the aircraft should be flown at an offset ~~flight~~ level and on an offset track where other aircraft are ~~least~~ less likely to be encountered. Specifically, the pilot shall:

a) leave the ~~assigned~~ cleared ~~route or~~ track or ATS route by initially turning at least ~~45~~30 degrees to the right or to the left, in order to ~~acquire~~ establish and maintain a parallel, ~~a~~ same ~~or opposite~~ direction track or ATS route offset ~~1~~5.0 NM (~~28~~9.3 km) ~~from the assigned track centreline~~. ~~When possible, t~~The direction of the turn should be based on one or more of the following factors ~~determined by the position of the aircraft relative to any organized route or track system. Other factors which may affect the direction of the turn are~~:

1) aircraft position relative to any organized track or ATS route system;

2) the direction of flights and flight levels allocated on adjacent tracks;

~~1~~3) the direction to an alternate airport;

~~2) terrain clearance;~~

~~3~~4) any strategic lateral offset being flown; and

5) terrain clearance;

~~4) the flight levels allocated on adjacent routes or tracks;~~

~~b) having initiated the turn:~~

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

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

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

~~d~~b) maintain a watch for conflicting traffic both visually and by reference to ACAS (if equipped), leaving ACAS in RA mode at all times, unless aircraft operating limitations dictate otherwise;

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

~~f~~d) keep the SSR transponder on at all times and, when able, squawk 7700, as appropriate and, if equipped with ADS-B or ADS-C, select the appropriate emergency functionality;

e) as soon as practicable, advise air traffic control of any deviation from their assigned clearance;

f) use means as appropriate (i.e. voice and/or CPDLC) to communicate during a contingency or emergency;

g) if voice communication is used, the radiotelephony distress signal (MAYDAY) or urgency signal (PAN PAN) preferably spoken three times, shall be used, as appropriate;

h) when emergency situations are communicated via CPDLC, the controller may respond via CPDLC. However, the controller may also attempt to make voice contact with the aircraft;

Note.— Guidance on emergency procedures for controllers, radio operators, and flight crew in data link operations can be found in the Global Operational Data Link (GOLD) Manual (Doc 10037).

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

j) the controller should attempt to determine the nature of the emergency and ascertain any assistance that may be required. Subsequent ATC action with respect to that aircraft shall be based on the intentions of the pilot and overall traffic situation.

~~15.2.2.3.1 When leaving the assigned track:~~

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

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

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

~~2) furthermore, if executing such a turnback in a 56 km (30 NM) lateral separation route structure, extreme caution pertaining to opposite direction traffic on adjacent routes must be exercised and any climb or descent, as specified in 15.2.2.3 b) 2), should be completed preferably before approaching within 19 km (10 NM) of any adjacent ATS route.~~

~~15.2.2.4 EXTENDED RANGE OPERATIONS BY AEROPLANES WITH TWO-TURBINE POWER-UNITS (ETOPS)~~

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

15.2.3 Actions to be taken once offset from track

Note. — The pilot's judgement of the situation and the need to ensure the safety of the aircraft will determine the actions outlined to be taken. Factors for the pilot to consider when deviating from the cleared track or ATS route or level without an ATC clearance include, but are not limited to:

a) operation within a parallel track system;

b the potential for user preferred routes (UPRs) parallel to the aircraft's track or ATS route;

c) the nature of the contingency (e.g. aircraft system malfunction); and

d) weather factors (e.g. convective weather at lower flight levels).

15.2.3.1. If possible, maintain the assigned flight level until established on the 9.3 km (5.0 NM) parallel, same direction track or ATS route offset. If unable, initially minimize the rate of descent to the extent that is operationally feasible.

15.2.3.2 Once established on a parallel, same direction track or ATS route offset by 9.3 km (5.0 NM), either:

a) descend below FL 290, and establish a 150 m (500 ft) vertical offset from those flight levels normally used, and proceed as required by the operational situation or if an ATC clearance has been obtained, in accordance with the clearance; or

Note 1. — Flight levels normally used are those contained in Annex 2 — Rules of the Air, *Appendix 3.*

Note 2. — Descent below FL 290 is considered particularly applicable to operations where there is a predominant traffic flow (e.g. east-west) or parallel track system where the aircraft's diversion path will likely cross adjacent tracks or ATS routes. A descent below FL 290 can decrease the likelihood of conflict with other aircraft, ACAS RA events and delays in obtaining a revised ATC clearance.

b) establish a 150 m (500 ft) vertical offset (or 300 m (1000 ft) vertical offset if above FL 410) from those flight levels normally used, and proceed as required by the operational situation, or if an ATC clearance has been obtained, in accordance with the clearance.

Note. — Altimetry system errors (ASE) may result in less than 150 m (500 ft) vertical spacing (less than 300 m (1000 ft) above FL410) when the above contingency procedure is applied.

Insert new figure as follows

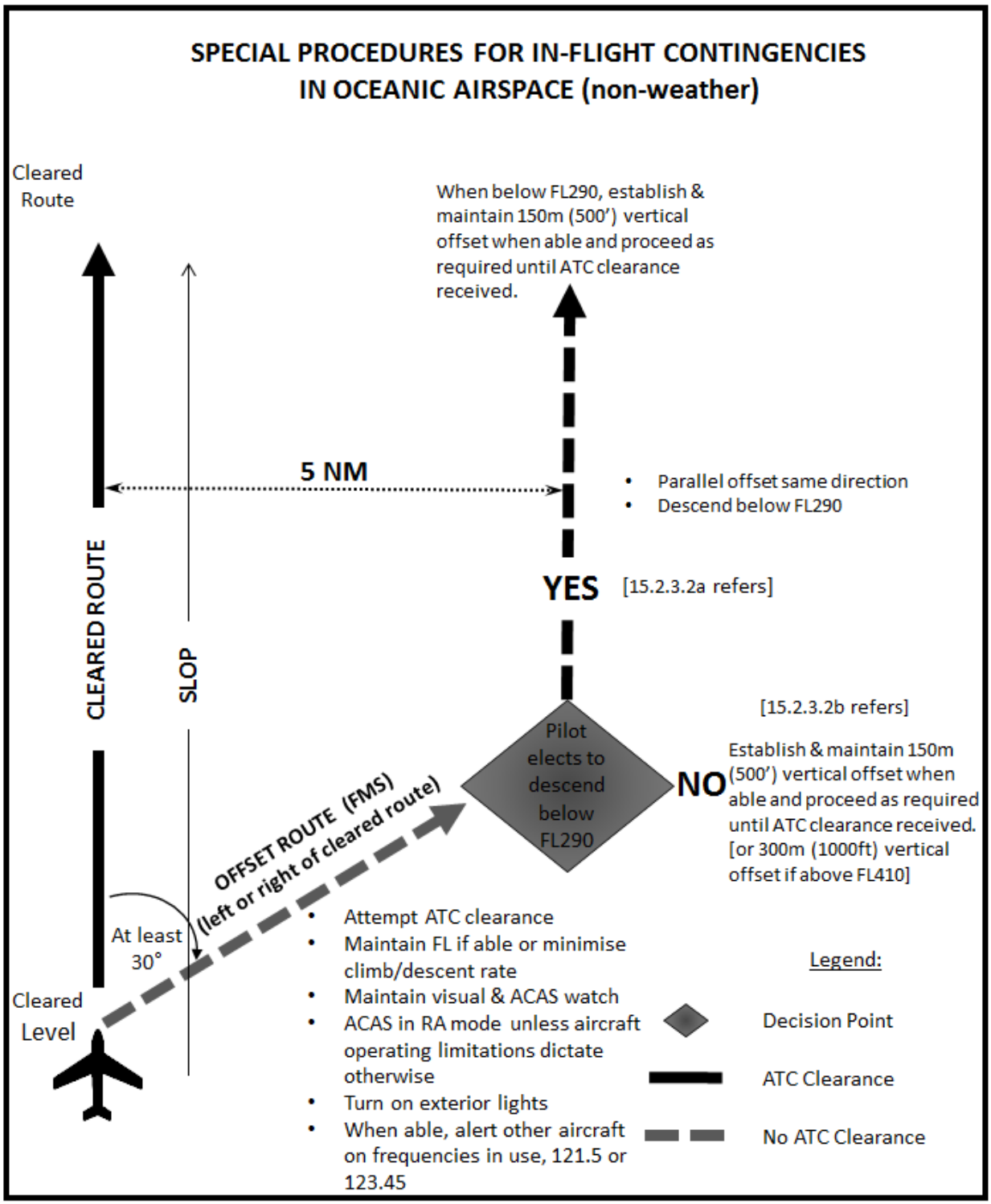

Figure 15-1. Visual aid for contingency procedures guidance

15.2.~~3~~4 Weather deviation procedures

15.2.~~3~~4.1 GENERAL

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

15.2.~~3~~4.1.1 When weather deviation is required, the pilot should initiate~~s~~ communications with ATC via voice or CPDLC.~~,~~ ~~a~~A rapid response may be obtained by either:

a) stating "WEATHER DEVIATION REQUIRED" to indicate that priority is desired on the frequency and for ATC response; or

b) requesting a weather deviation using a CPDLC lateral downlink message.

15.2.4.1.2 When necessary, the pilot should initiate the communications using the urgency call "PAN PAN" (preferably spoken three times) or by using a CPDLC urgency downlink message.

15.2.~~3~~4.1.~~2~~3 The pilot shall inform ATC when weather deviation is no longer required, or when a weather deviation has been completed and the aircraft has returned to its cleared route.

15.2.~~3~~4.2 ACTIONS TO BE TAKEN WHEN CONTROLLER-PILOT COMMUNICATIONS ARE ESTABLISHED

15.2.~~3~~4.2.1 The pilot should notify ATC and request clearance to deviate from track or ATS route, advising, when possible, the extent of the deviation ~~expected~~ requested. The flight crew will use whatever means are appropriate (i.e. voice and/or CPDLC) to communicate during a weather deviation.

Note.— Pilots are advised to contact ATC as soon as possible with requests for clearance in order to provide adequate time for the request to be assessed and acted upon.

15.2.~~3~~4.2.2 ATC should take one of the following actions:

a) when appropriate separation can be applied, issue clearance to deviate from track; or

b) if there is conflicting traffic and ATC is unable to establish appropriate separation, ATC shall:

1) advise the pilot of inability to issue clearance for the requested deviation;

2) advise the pilot of conflicting traffic; and

3) request the pilot's intentions.

15.2.~~3~~4.2.3 The pilot should take the following actions:

a) comply with the ATC clearance issued; or

b) advise ATC of intentions and execute the procedures detailed in 15.2.~~3~~4.3.

15.2.~~3~~4.3 ACTIONS TO BE TAKEN IF A REVISED ATC CLEARANCE CANNOT BE OBTAINED

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

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

a) if possible, deviate away from an organized track or ATS route system;

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

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

~~*Note. If, as a result of actions taken under the provisions of 15.2.3.3.1 b) and c), the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.*~~

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

e) for deviations of less than ~~19 km (10 NM)~~ 9.3 km (5.0 NM) from the originally cleared track or ATS route, remain at a level assigned by ATC;

f) for deviations greater than, or equal to ~~19 km (10 NM)~~ 9.3 km (5 NM) from the originally cleared track or ATS route, when the aircraft is approximately ~~19 km (10 NM)~~ 9.3 km (5.0 NM) from track, initiate a level change in accordance with Table 15-1;

g) if the pilot receives clearance to deviate from cleared track or ATS route for a specified distance and, subsequently, requests, but cannot obtain a clearance to deviate beyond that distance, the pilot should apply an altitude offset in accordance with Table 15-1 before deviating beyond the cleared distance;

~~g~~h) when returning to track or ATS route, be at its assigned flight level when the aircraft is within approximately ~~19 km (10 NM)~~ 9.3 km (5.0 NM) of the centre line; and

~~h~~i) if contact was not established prior to deviating, continue to attempt to contact ATC to obtain a clearance. If contact was established, continue to keep ATC advised of intentions and obtain essential traffic information.

Note.— If, as a result of actions taken under the provisions of 15.2.4.3.1, the pilot determines that there is another aircraft at or near the same flight level with which a conflict may occur, then the pilot is expected to adjust the path of the aircraft, as necessary, to avoid conflict.

Table 15-1

~~*Route centre line track*~~ *Originally cleared track or ATS route centre line*	*Deviations* *> ~~19 km (10 NM)~~ ≥ 9.3 km (5.0 NM)*	*Level change*
EAST (000º – 179º magnetic)	LEFT	DESCEND 90 m (300 ft)
	RIGHT	CLIMB 90 m (300 ft)
WEST (180º – 359º magnetic)	LEFT	CLIMB 90 m (300 ft)
	RIGHT	DESCEND 90 m (300 ft)

. . .

CHAPTER 16

MISCELLANEOUS PROCEDURES

. . .

16.5 STRATEGIC LATERAL OFFSET PROCEDURES (SLOP)

…

Note.— Information concerning the implementation of strategic lateral offset procedures is contained in the Implementation of Strategic Lateral Offset Procedures *(Circular ~~331~~354).*

16.5.2 Strategic lateral offsets shall be authorized only in en-route airspace as follows:

a) where the lateral separation minima or spacing between route centre lines is ~~42.6 km (23 NM)~~ 28 km (15 NM) or more, offsets to the right of the centre line relative to the direction of flight in tenths of a nautical mile up to a maximum of 3.7 km (2 NM); and

b) where the lateral separation minima or spacing between route centre lines is 19 km (10 NM) or more and less than 28 km (15 NM), while one aircraft climbs/descends through the level of another aircraft, offsets to the right of the centre line relative to the direction of flight in tenths of a nautical mile up to a maximum of 3.7 km (2 NM); and

~~b~~c) where the lateral separation minima or spacing between route centre lines is 11.1 km (6 NM) or more and less than ~~42.6 km (23 NM)~~ 28 km (15 NM) , offsets to the right of the centre line relative to the direction of flight in tenths of a nautical mile up to a maximum of 0.9 km (0.5 NM).

Note.— Refer to 5.4.1.2.1.6 for lateral separation of aircraft on parallel or non-intersecting tracks or ATS routes.

. . .

Appendix 1

INSTRUCTIONS FOR AIR-REPORTING BY VOICE COMMUNICATIONS

. . .

3. Forwarding of meteorological information received by voice communications

. . .

Section 3

Item 9 — PHENOMENON PROMPTING A SPECIAL AIR-REPORT. Record the phenomenon reported as follows:

. . .

- thunderstorm with hail as “TSGR”
- heavy ~~duststorm or~~ sandstorm as “HVY SS”
- heavy duststorm as “HVY DS”

. . .

Appendix 2

FLIGHT PLAN

. . .

2. Instructions for the completion of the flight plan form

. . .

2.2 Instructions for insertion of ATS data

. . .

ITEM 9: NUMBER AND TYPE OF AIRCRAFT AND WAKE TURBULENCE CATEGORY

. . .

Wake turbulence category (1 character)

INSERT an oblique stroke followed by one of the following letters to indicate the wake turbulence category of the aircraft:

J — SUPER, to indicate an aircraft type specified as such in ICAO Doc 8643, *Aircraft Type Designators*;

H — HEAVY, to indicate an aircraft type with a maximum certificated take-off mass of 136 000 kg or more, with the exception of aircraft types listed in Doc 8643 in the SUPER (J) category;

M — MEDIUM, to indicate an aircraft type with a maximum certificated take-off mass of less than 136 000 kg but more than 7 000 kg;

L — LIGHT, to indicate an aircraft type with a maximum certificated take-off mass of 7 000 kg or less.

. . .

7. Instructions for the completion of the repetitive flight plan (RPL) listing form

. . .

7.4 Instructions for insertion of RPL data

Complete Items A to Q as indicated hereunder.

. . .

ITEM M: TYPE OF AIRCRAFT AND WAKE TURBULENCE CATEGORY

(Item 9 of the ICAO flight plan)

INSERT appropriate ICAO designator as specified in ICAO Doc 8643 — *Aircraft Type Designators*.

INSERT J, H, M or L indicator as appropriate:

J — SUPER, to indicate an aircraft type specified as such in ICAO Doc 8643, *Aircraft Type Designators;*

H — HEAVY, to indicate an aircraft type with a maximum certificated take-off mass of 136 000 kg or more, with the exception of aircraft types listed in Doc 8643 in the SUPER (J) category;

M — MEDIUM, to indicate an aircraft type with a maximum certificated take-off mass of less than 136 000 kg but more than 7 000 kg;

L — LIGHT, to indicate an aircraft type with a maximum certificated take-off mass of 7 000 kg or less.

. . .

Appendix 3

AIR TRAFFIC SERVICES MESSAGES

. . .

1. Message contents, formats and data conventions

. . .

1.8 Accuracy in the preparation of ATS messages

. . .

Field Type 9 — Number and type of aircraft and wake turbulence category

. . .

OBLIQUE STROKE

(c) *Wake turbulence category*

1 LETTER to indicate ~~maximum certificated take-off mass~~wake turbulence category of the aircraft:

J	—	Super
H	—	Heavy
M	—	Medium
L	—	Light

— END —