

RA 3228 – Separation Standards

Rationale

► *Separation standards are provided in accordance with the airspace classification the Air System (AS) is operating within and any extra military specific requirements. A reduction in separation may impact on the Risk to Life (RTL) associated with mid air collision (MAC). Prescribed separation criteria is required in order to maintain a safe and expeditious flow of air traffic.* ◀

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Regulation 3228(1)

Standard Separation - Lateral

3228(1) Controllers **shall** apply standard lateral separation between AS.

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Standard Separation - Lateral

1. Controllers **should** apply standard lateral separation between:
 - a. All flights in Class A airspace.
 - b. Instrument Flight Rule (IFR) flights in Class C, D and E airspace.
 - c. IFR flights and Visual Flight Rule (VFR) flights in Class C airspace or at the request of the pilot if operating in Class E airspace.
 - d. IFR flights and Special VFR flights.
 - e. Special VFR flights.
2. Lateral separation **should** normally be 5nm, except when safety and/or technical assessments require alternative separation standards.
3. In Class G airspace, lateral separation between AS is ultimately the responsibility of the pilot; however, when providing a Deconfliction Service, controllers **should** provide information and advice aimed at achieving the lateral separation standards defined in [CAP 774, UK Flight Information Services](#).
4. Separation standards are not prescribed between VFR flights or between VFR and IFR flights in Class D and E airspace. However, Air Traffic Control (ATC) has a responsibility to prevent collisions between known flights; therefore, controllers **should**, where practicable, pass appropriate Traffic Information (TI) and instructions to assist pilots to see and avoid each other.

Reduced Lateral Separation

5. Controllers **should** only apply reduced lateral separation of 3nm in accordance with the following requirements:
 - a. Both AS are in surveillance coverage and within the assured range of the surveillance system¹ in use.
 - b. Both AS are in receipt of an ATS from the same controller or are the subject of coordination.
 - c. The surveillance system in use provides a data refresh rate of 5 seconds or better.
 - d. Both AS are outside Controlled Airspace (CAS), other than Class D and

¹ Air Traffic Service (ATS) Surveillance System: Primary Surveillance Radar (PSR), Secondary Surveillance Radar (SSR), Automatic Dependant Surveillance Broadcast (ADS-B) or any comparable system (Wide Area Multilateration (WAM)) that is used to determine the position of an AS in range and azimuth.

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active Temporary Reserved Areas (TRAs) 001 – 008.

e. When the AS is operating within Class E airspace and surveillance data is provided by National Air Traffic Services (NATS) and NATS has stipulated alternative separation minima.

6. **Secondary Surveillance Radar (SSR)²**. Reduced Lateral Separation **should not** be applied when providing SSR-Alone ATS.

7. **Formations**. Reduced lateral separation **should not** be applied when either speaking unit is a formation due to the fact that formation elements may be displaced by up to 1 nm, except where covered by a Safety Assessment as per para 2 and [RA 1200³](#).

8. **Class E Airspace.**

IFR:

a. **IFR v VFR Traffic**. IFR AS **should** be provided with TI, as far as is practical, on VFR AS. The controller **should** update the TI if it continues to constitute a definite hazard, or if requested by the pilot.

b. **Against Unknown Mode C Transponding Responses**. If the intentions of a transponding VFR AS are unknown, radar returns, however presented, **should not** be allowed to merge unless the AS in receipt of TI advises that he intends to avoid the other AS without the controller's assistance.

c. IFR flights **should** be provided with avoiding action when requested by the pilot. If the pilot reports that he has the unknown AS in sight further controller action may then be limited to passing traffic information. [CAP 413 Radiotelephony Manual](#) contains detail of avoiding action Radiotelephony (RT).

d. Where Class C airspace lies above Class E airspace, separation requirements **should** be assumed to be required on descending En-Route traffic, unless it is known that such AS will operate under VFR on entering Class E.

VFR:

e. Where a pilot requests a VFR service, such services **should** be provided in accordance with [RA 3223⁴](#) and [CAP774, UK Flight Information Services](#).

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Standard Separation - Lateral

9. Lateral separation based on radar exists when the distance between the centres of radar contacts does not represent less than the prescribed minimum, provided that the contacts do not touch or overlap⁵.

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Standard Separation - Vertical

3228(2) Controllers **shall** apply standard vertical separation between AS.

² Throughout this RA, any reference to SSR is equally applicable to Wide Area Multilateration (WAM) and Automatic Dependant Surveillance Broadcast (ADS-B).

³ Refer to RA 1200 – Defence Air Safety Management

⁴ Refer to RA 3223 – Provision of ATS Inside Controlled Airspace

⁵ Associated with primary surveillance radar (PSR) returns at extremes of radar range.

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Standard Separation - Vertical

10. Controllers **should** apply the following vertical separation standards:

		Conflicting Traffic					
		Class D or E VFR	Class D or E IFR	Known Traffic in Class A	Known Traffic in Class C above FL195 excluding active TRAs.	Known Traffic outside CAS below FL195 or within active TRAs	Unknown traffic outside CAS below FL195 or within active TRAs
Own Traffic	Class D or E VFR	TI (where practicable in Class E)	TI (where practicable in Class E)	-	-	-	-
	Class D or E IFR	VFR will avoid IFR. TI provided on VFR traffic, separation only provided when requested by the pilot. ^{Note 1.}	a. 1000 ft by co-ordination b. 5000 ft by use of Mode C	a. 1000 ft by co-ordination b. 5000 ft by use of Mode C	a. 1000 ft by co-ordination b. 5000 ft by use of Mode C	a. 1000 ft by co-ordination b. 5000 ft by use of Mode C c. 1000 ft by CAS deeming	a. 1000 ft by CAS deeming
	In Class A			a. 1000 ft by co-ordination b. 5000 ft by use of Mode C	a. 1000 ft by co-ordination b. 5000 ft by use of Mode C	a. 1000 ft by co-ordination b. 5000 ft by use of Mode C c. 1000 ft by CAS deeming.	a. 1000 ft by CAS deeming
	In Class C above FL195 excluding active TRAs			a. 1000 ft by co-ordination b. 5000 ft by use of Mode C	a. 1000 ft (2000ft above FL290) by co-ordination b. 5000 ft by use of Mode C	a. 1000 ft by co-ordination b. 5000 ft by use of Mode C c. 1000ft by Class C deeming.	a. 1000 ft by Class C deeming.

Note:

Where such a request is made, controllers **should** endeavour to achieve standard separation; however, it is recognized that this may not be possible in all circumstances.

11. In Class G airspace, vertical separation between AS is ultimately the responsibility of the pilot; however, when providing a Deconfliction Service, controllers **should** provide information and advice aimed at achieving the separation standards defined in [CAP774, UK Flight Information Services](#).

12. **Coordination.** When agreeing co-ordination, controllers **should** apply no less than the following vertical separation:

- a. Between subsonic AS:
 - (1) Up to FL290 – 1000 ft.
 - (2) Above FL290 – 2000 ft. [For Reduced Vertical Separation Minima (RVSM) Airspace see para 16]

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- b. When one or both AS are supersonic:
 - (1) Up to FL450 – 2000 ft.
 - (2) Above FL450 – 4000 ft.

Reduced Vertical Separation

13. Controllers **should** only apply reduced vertical separation of 500 ft in accordance with the following requirements:

Terminal Radar.

- a. Both AS are in surveillance coverage and within the assured range of the surveillance system in use.
- b. Both AS are in receipt of an ATS from the same controller or are the subject of military to military coordination.
- c. Both AS are below FL100 and outside CAS other than Class D.

14. The application of reduced vertical separation to civil AS **should** be exceptional rather than routine and only following agreement with the civil pilot.

15. **Formations.** Reduced vertical separation **should not** be applied when either speaking unit is a formation due to the fact that formation elements may be displaced by up to 100 ft, except where covered by a Safety Assessment as per para 2 and [RA 1200³](#).

16. **Reduced Vertical Separation Minima (RVSM).** Area radar controllers can apply RVSM of 1000 ft within the vertical and lateral limits of airspace notified as RVSM or RVSM transition airspace provided that:

- a. Both AS are RVSM approved.
- b. The surveillance display system shows the RVSM approval status of all AS involved to the respective controllers and the AS are subject to Standing Agreement Co-ordination Procedures, or ►◄ coordination has been effected.

Separation Using SSR Transponder Mode C

17. When SSR is used to assess vertical separation, transponder Mode C responses **should** be continuously monitored to ensure that the vertical distance is never less than the prescribed minimum.

18. An AS in receipt of a surveillance service, whether transponding Mode C or not may be separated from other AS which are transponding Mode C but **should** be subject to the following:

- a. When the transponder Mode C of the conflicting AS has been verified, the following minimum vertical separation **should** apply:
 - (1) **Inside CAS.** 5000 ft.
 - (2) **Outside CAS.** 3000 ft (Unless the SSR transponder code indicates that the transponder Mode C data has been verified, the surveillance returns, however presented, **should not** merge).
- b. **SSR Transponder Code A 0000.** Vertical separation using transponder Mode C **should not** be applied against conflicting traffic with SSR transponder code A 0000.

19. **SSR Transponder Mode C.** If an AS under control is within Class A or D airspace, the following deeming conventions **should** be employed:

- a. When transponder Mode C indicates a conflicting AS to be outside the vertical limits of CAS, radar responses can be allowed to merge provided that the SSR transponder code is not that of a unit with approval to penetrate CAS and at least 1000 ft vertical separation exists. Controllers **should** exercise caution when controlling AS crossing CAS with lateral variations in base levels to ensure separation is not eroded against traffic that is subsequently crossing a lower portion of CAS.
- b. When the AS under control is at or above FL110, any traffic transponding

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SSR code A 7000, 7001 or 7002 without transponder Mode C can be deemed to be outside the vertical confines of CAS and radar contacts can be allowed to merge.

20. **Vacation of Levels.** The practice whereby a controller undertakes, through use of transponder Mode C alone, to follow the climb or descent of another AS is potentially hazardous. In order to safeguard separation criteria, any stop-off level **should** be based upon a level already vacated by the other AS and not on a level expected to be reached.

Avoidance of unknown traffic

21. Standard separation **should** be provided for IFR traffic if it is known or suspected that an unknown AS:

- a. Is lost or has experienced radio failure.
- b. Has inadvertently penetrated CAS.
- c. Is not squawking/transponding.
- d. Is squawking SSR transponder code A 0000.
- e. Is joining CAS.

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Standard Separation - Vertical

22. Nil.

**Regulation
3228(3)**

Increased Vertical Separation Standards For Typhoon

3228(3) Controllers **shall** apply specified vertical separation standards to Typhoon AS when requested by the pilot.

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Increased Vertical Separation Standards For Typhoon

23. Controllers **should** apply the following increased vertical separation standards when requested by the Typhoon pilot:

- a. Typhoon vs Typhoon AS: 3000 ft.
- b. Typhoon vs other AS: 2000 ft.
- c. Supersonic. Standard separation **should** be applied in accordance with RA 3228(2) paragraph 10.

24. If a controller is unable to provide increased separation, the pilot **should** be advised and will either delay acceleration or reduce speed and/or manoeuvre to comply with standard separation. This proviso is reflected in the Typhoon Release-to-Service.

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Increased Vertical Separation Standards For Typhoon

25. Due to possible altimeter inaccuracies at certain airspeeds and/or when manoeuvring above specified parameters at all speeds, pilots of Typhoon AS may request controllers to provide increased vertical separation against other AS. At all times the onus for providing increased terrain clearance and requesting the increased vertical separation against other AS rests entirely with the pilot.

**Regulation
3228(4)**

Separation Standards for Radar to Visual Recoveries and Radar to Straight In Approaches

3228(4) Controllers sequencing AS for radar to visual recoveries and radar to straight in approaches **shall** ensure that Deconfliction minima are applied until specified conditions are met.

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3228(4)****Separation Standards for Radar to Visual Recoveries and Radar to Straight In Approaches**

26. **Radar to Visual Recoveries.** Deconfliction minima **should** be applied until:
- a. The point of conflict is in a Military Air Traffic Zone (MATZ) or Carrier Control Zone, and;
 - b. The pilot of the AS conducting the radar to visual recovery is visual with an AS conducting an instrument approach, and;
 - c. TI is passed to the pilot of the AS conducting the instrument approach, regarding the AS conducting the radar to visual approach.
 - d. In the event that the AS on an instrument recovery is a civil AS, the sequencing of radar to visual approaches against civil instrument traffic **should** be exceptional rather than routine and the civil pilots' agreement **should** be sought.
27. **Radar to Straight In Approaches.** AS performing radar to straight in approaches **should** also be subject to the conditions in RA 3228(4) para 26.

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28. Nil.