

► This RA has been substantially rewritten; for clarity no change marks are presented – please read RA in its entirety ◀

RA 3228 – Separation Standards

Rationale

Separation standards are provided in accordance with (iaw) the airspace classification that the Aircraft are operating within, taking into account any military specific requirements. If the prescribed separation standards are not conformed with there is an increased Risk to Life in an Aviation Duty Holder's (ADHs) / Accountable Manager (Military Flying)'s (AM(MF)) operation due to the increased likelihood of Mid Air Collision (MAC). This Regulatory Article requires the application of prescribed separation criteria to reduce the likelihood of MAC and maintain a safe and expeditious flow of air traffic.

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Regulation

3228(1)

Separation Requirements

3228(1) Head of ADH-Facing Organizations and AM(MF)-Facing Organizations (AA-Facing Organizations) and Head of Establishments (HoEs) **shall** ensure that appropriate separation standards are applied between Aircraft iaw the airspace classification¹ within which they are operating.

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Separation Requirements

1. Vertical or lateral separation iaw Table 1 **should** be applied 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.
 - d. IFR flights and Special VFR (SVFR) flights.
 - e. SVFR flights, except where a reduction is authorized by a Letter of Agreement.

Table 1 – Separation Requirements

Class	Flight Rules	Aircraft Requirements	Separation Requirements
A	IFR only	Air Traffic Control (ATC) clearance before entry. Comply with ATC instructions.	Separate all Aircraft from each other ^{Note 1} .
C	IFR and VFR	ATC clearance before entry. Comply with ATC instructions.	(a) Separate IFR flights from other IFR and VFR flights; (b) Separate VFR flights from IFR flights; (c) Pass Traffic Information (TI) to VFR flights on other VFR flights

¹ Airspace Classes A to E are Controlled Airspace (CAS) and Class G is Uncontrolled Airspace.

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			and give traffic avoidance advice if requested.
D	IFR, SVFR and VFR	ATC clearance before entry. Comply with ATC instructions ^{Note 2} .	(a) Separate IFR / SVFR flights from other IFR / SVFR flights ^{Note 3} ; (b) Pass TI to IFR flights and SVFR flights on VFR flights and give traffic avoidance advice when requested; (c) Pass TI to VFR flights on all other flights and provide traffic avoidance advice when requested.
E	IFR and VFR	IFR flights to obtain ATC clearance before entry and comply with ATC instructions. VFR flights do not require clearance ² .	(a) Separate IFR flights from other IFR flights; (b) Provide IFR flights, wherever practicable, TI and if requested by the pilot provide traffic avoidance advice on participating and non-participating VFR flights; (c) Provide VFR flights TI iaw Civil Air Publication (CAP) 774 ³ .
G	IFR and VFR	None.	Refer to para 2.

Note 1:

Controllers **should** be cautious when controlling Aircraft operating at the base levels of CAS or when 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.

Note 2:

Class D usually has a sole controlling authority (unless a shared agreement is in place). Any entry into Class D **should** be approved by the controlling authority.

Note 3:

Controllers will be cognisant of the condition of the SVFR clearance. Vertical / lateral separation may result in the Aircraft not being able to comply with the condition of that clearance⁴.

2. In Class G airspace, separation between Aircraft is ultimately the Responsibility of the pilot; however, when providing a Deconfliction Service, Controllers **should** provide information and advice aimed at achieving the defined deconfliction minima in CAP 774³.

3. 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 the traffic will be operating under VFR upon entering Class E airspace.

Avoidance of Unknown traffic

4. In all classifications of airspace and iaw the type of Air Traffic Service (ATS) being provided, standard separation **should** be provided for IFR traffic if it is known or suspected that an unknown Aircraft:

- a. Is lost or has experienced radio failure.
- b. Is not squawking / transponding.
- c. Is squawking Secondary Surveillance Radar (SSR) transponder code A 0000, 7400, 7500, 7600 or 7700.

5. Separation standards are a minima and **should** be increased when either requested by the pilot or a Controller considers it to be necessary.

² Refer to RA 3223 – Provision of Air Traffic Service Inside Controlled Airspace.

³ Refer to CAP 774 – UK Flight Information Services.

⁴ Refer to CAP 493 Chapter 2 paragraph 8 – Special VFR.

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Separation Requirements

6. When a Controller issues an avoiding action to IFR Aircraft operating within Class D or E airspace and the pilot reports that they have the unknown Aircraft in sight and have positively stated that they will maintain their own separation, further Controller action can be limited to passing TI.
7. When a Search and Rescue Aircraft is escorting an Aircraft in an emergency, standard separation between them may be reduced. A minimum is not laid down within UK Flight Information Regions, therefore separation may be reduced to that which allows the Aircraft to be maintained visually or with airborne surveillance.

**Regulation
3228(2)**

Separation Standards – Lateral

- 3228(2) Head of AA-Facing Organizations and HoEs **shall** ensure that appropriate lateral separation standards are applied between Aircraft.

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Compliance
3228(2)**

Separation Standards – Lateral

8. Standard lateral separation in all classifications of airspace is 5 nm and **should** be applied as a minimum, except where reduced lateral separation is allowed.

Reduced Lateral Separation

9. Reduced lateral separation of 3 nm **should** only be applied iaw the following requirements:
- The surveillance system⁵ in use has been assured and approved for this purpose.
 - Both Aircraft are within assured surveillance coverage.
 - The surveillance system in use provides a data refresh rate of 5 seconds or less.
 - Both Aircraft are in receipt of an ATS from the same Controller or are the subject of coordination.
 - Both Aircraft are outside CAS, other than Class D and active Temporary Reserved Areas (TRAs) 001 – 008.
 - When the Aircraft is operating within Class E airspace and surveillance data is provided by National Air Traffic Services (NATS) and NATS has stipulated alternative separation minima.
10. **Cooperative Only Surveillance System.** Provision of an ATS using only a cooperative surveillance system **should** only be applied if the surveillance system has been assured and approved for this purpose and the HoE / AA-Facing Organization has completed the requisite Safety work.
11. **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 and / or technical Assessment and RA 1200⁶.

**Guidance
Material
3228(2)**

Separation Standards – Lateral

12. 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 overlap⁷.

⁵ ATS Surveillance System: Primary Surveillance Radar (PSR), SSR, Wide Area Multilateration (WAM), Automatic Dependant Surveillance Broadcast (ADS-B) or any comparable system that is used to determine the position of an Aircraft in range and azimuth.

⁶ Refer to RA 1200 – Air Safety Management.

⁷ Associated with PSR returns at extremes of radar range.

**Regulation
3228(3)**

Separation Standards – Vertical

3228(3) Head of AA-Facing Organizations and HoEs **shall** ensure that appropriate vertical separation standards are applied between Aircraft.

**Acceptable
Means of
Compliance
3228(3)**

Separation Standards – Vertical

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

a. When the transponder Mode C of the conflicting Aircraft has been verified, the following minimum vertical separation **should** apply:

(1) **Inside CAS.** 5000 ft.

(2) **Outside CAS.** 3000 ft (If the SSR transponder code indicates that the transponder Mode C data has not been verified, the surveillance returns, however presented, **should not** merge).

14. **SSR Transponder Mode A 0000.** Vertical separation using transponder Mode C **should not** be applied against Aircraft transponding Mode A 0000.

15. **Co-ordination.** When agreeing co-ordination, Controllers **should** apply no less than the following vertical separation:

a. Between subsonic Aircraft:

(1) Up to FL 290 – 1000 ft.

(2) Above FL 290 – 2000 ft. For Reduced Vertical Separation Minima (RVSM) Airspace see para 16.

b. When one or both Aircraft are supersonic:

(1) Up to FL 450 – 2000 ft.

(2) Above FL 450 – 4000 ft.

16. **RVSM.** RVSM of 1000 ft within the vertical and lateral limits of airspace notified as RVSM or RVSM transition airspace **should** only be applied if:

a. Both Aircraft are RVSM approved.

b. The surveillance display system shows the RVSM approval status of all Aircraft involved to the respective Controllers and the Aircraft are subject to Standing Agreement Co-ordination Procedures, or co-ordination has been effected.

Reduced Vertical Separation

17. Reduced vertical separation of 500 ft **should** only be applied at Terminal Units and iaw the following requirements:

a. Both Aircraft are within the assured surveillance coverage.

b. Both Aircraft are in receipt of an ATS from the same Controller or are the subject of military to military co-ordination.

c. Both Aircraft are below FL 100 and outside CAS other than Class D.

18. The application of reduced vertical separation to civil Aircraft and Military Aircraft equipped with a Airborne Collision Avoidance System⁸ **should** be exceptional rather than routine and only following agreement with the pilot.

19. Where CAS is adjoined vertically by Class G airspace, Aircraft can operate at the lower limit of Control Areas (CTA) (including Terminal Manoeuvring Areas) and are deemed to be operating outside CAS. Pilots operating at these levels and in communication with an ATC Unit **should** be provided with UK Flight Information Services iaw CAP 774³. Controllers providing an ATS to such flights **should**, as

⁸ Refer to RA 3235 – Airborne Collision Avoidance Systems (ACAS) and Terrain Awareness and Warning Systems – Controllers Responsibilities.

Acceptable Means of Compliance 3228(3)

necessary, include a wake turbulence caution when providing TI on controlled flights operating at the lowest available level⁹.

20. **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 and / or technical Assessment and RA 1200⁶.

21. **Level Occupancy using SSR** - To ensure separation standards are maintained when following an Aircraft that is in the climb or descent, only levels that will maintain standard or reduced vertical separation iaw RA 3226(3)¹⁰ **should** be applied. Controllers **should not**, under any circumstances, attempt to apply vertical separation based on the level that the other Aircraft is expected to reach at an assumed rate of climb / descent.

Guidance Material 3228(3)

Separation Standards – Vertical

22. Nil.

Regulation 3228(4)

Separation Standards for Aircraft Operating in Controlled Airspace

3228(4) Head of AA-Facing Organizations and HoEs **shall** ensure that appropriate separation standards against conflicting Aircraft¹¹ are applied iaw the classification of CAS in which an ATS is being provided.

Acceptable Means of Compliance 3228(4)

Separation Standards for Aircraft Operating in Controlled Airspace

23. When a Controller observes a conflicting Aircraft¹¹, the following actions within Table 2 **should** be taken iaw the classification of CAS.

Table 2 – Actions against conflicting Aircraft¹¹

Class	Actions to be taken by the Controller
A	<p>Radar tracks can merge if the Aircraft receiving the ATS is 1000 ft above / below the lower or upper limit of CAS and the Mode A Code is not that of a unit with Approval to enter CAS.</p> <p>Radar tracks can merge if the non-transponding conflicting Aircraft has not been notified as operating in CAS by the relevant Civil Sector and the Aircraft receiving the ATS is 1000 ft above / below the lower or upper limit of CAS.</p> <p>If the Aircraft receiving the ATS is at or above FL 110 and the conflicting Aircraft is transponding Mode A 7000, 7001 or 7002 without Mode C, it can be deemed to be outside the vertical confines of CAS and radar tracks can merge.</p>
C	<p>Conflicting Aircraft can be deemed to be outside CAS (outwith active TRAs 001-008) and radar contacts can merge so long as its Mode A is not that of a Unit with Approval to penetrate CAS.</p> <p>Aircraft receiving an ATS at FL 200, or at FL 250 above an active TRA, should be passed TI regarding conflicting Aircraft¹¹; however, the radar contacts may be allowed to merge. This dispensation should not apply to Aircraft within 5 nm of the Class C boundary in respect of conflicting Aircraft¹¹ operating within Military Training Areas and active TRAs.</p>

⁹ Refer to CAP 413 – Radiotelephony Manual Chap 9.

¹⁰ Refer to RA 3226(3): Level Occupancy using SSR.

¹¹ In the context of this RA, 'conflicting Aircraft' refers to non transponding, Mode A only traffic or if the Mode C indicates that the traffic is outside CAS.

Acceptable Means of Compliance 3228(4)	Class	Actions to be taken by the Controller
	D	When SSR Mode C derived information indicates that the conflicting Aircraft is outside the vertical limits of the airspace and provided that at least 1000 ft separation is evident, the radar responses can be allowed to merge and TI is not required to be passed. Where 1000 ft separation does not exist, Controllers should ensure that the contacts do not merge and TI is passed.
	E (with a Transponder Mandatory Zone)	Radar tracks can merge if the Aircraft receiving the ATS is 1000 ft above / below the lower or upper limit of CAS (and the Mode A Code is not that of a unit with Approval to enter CAS). Radar tracks can merge if the non-transponding conflicting Aircraft has not been notified as operating in CAS by the relevant Civil Sector

Guidance Material 3228(4)**Separation Standards for Aircraft Operating in Controlled Airspace**

24. Nil.

Regulation 3228(5)**Increased Vertical Separation Standards for Typhoon**

3228(5) Head of AA-Facing Organizations and HoEs **shall** ensure increased vertical separation standards are provided to Typhoon Aircraft, when requested by the pilot.

Acceptable Means of Compliance 3228(5)**Increased Vertical Separation Standards for Typhoon**

25. Increased vertical separation of either 2000 ft or 3000 ft, Aircraft speed dependant, **should** be applied when requested by the pilot. Standard separation for supersonic flight **should** be applied iaw para 15b.

26. If increased separation is unable to be provided, 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.

Guidance Material 3228(5)**Increased Vertical Separation Standards for Typhoon**

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

Regulation 3228(6)**Separation Standards for Radar to Visual Recoveries**

3228(6) Head of AA-Facing Organizations and HoEs **shall** ensure that until specified conditions are met, the required separation standards for radar to visual recoveries are correctly applied.

Acceptable Means of Compliance 3228(6)**Separation Standards for Radar to Visual Recoveries**

28. **Radar to Visual Recoveries.** Separation standards **should** be applied until:
- The point of confliction is in a Military Air Traffic Zone and;
 - The pilot of the Aircraft conducting the radar to visual recovery is visual with an Aircraft conducting an Instrument Approach, and;
 - TI is passed to the pilot of the Aircraft conducting the Instrument Approach, regarding the Aircraft conducting the radar to visual approach.

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29. When civil Aircraft are on an instrument recovery , the sequencing of radar to visual approaches **should** be exceptional rather than routine and the civil pilots' agreement **should** be sought.

**Guidance
Material
3228(6)**

Separation Standards for Radar to Visual Recoveries

30. Nil.

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