

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

RA 2320 – Flight Procedures: Role Specific S2 and Certified Remotely Piloted Air Systems

Rationale

Remotely Piloted Air Systems (RPAS) offer capabilities and challenges that are distinct from other Air Systems. Failure to appropriately address RPAS-specific Hazards could lead to an increased Risk to Life (RtL). This Regulatory Article requires Aviation Duty Holders (ADH) and Accountable Managers (Military Flying) (AM(MF)) operate their RPAS with consideration of these Hazards, to ensure RtL is As Low As Reasonably Practicable (ALARP) and Tolerable.

Contents

2320(1): Remotely Piloted Air Systems Collision Avoidance

2320(2): Control of Remotely Piloted Air Systems

2320(3): Management of Remotely Piloted Air Systems data links

2320(4): Remotely Piloted Air Systems Operating Locations

Regulation

2320(1)

Remotely Piloted Air Systems Collision Avoidance

2320(1) ADHs / AM(MF)s **shall** operate RPAS with due consideration for the Safety of other Aircraft, vessels, vehicles, Structures and persons.

Acceptable Means of Compliance 2320(1)

Remotely Piloted Air Systems Collision Avoidance

1. ADHs / AM(MF)s **should** ensure RtL from collision between Aircraft and any vessels, vehicles, Structures, persons or the surface (land or sea) is ALARP and Tolerable. Where safe separation cannot be maintained through Visual Line of Sight (VLOS) operations or the use of an appropriate Detect and Avoid capability¹, this **should** be achieved using a Layered Safety Approach.

Inside UK Airspace

2. Beyond Visual Line of Sight (BVLOS) operations **should** only be conducted if:
 - a. An appropriately approved² Detect and Avoid capability enables compliance with Rules of the Air³ appropriate to the class of airspace, or;
 - b. They are flown using a Layered Safety Approach that specifically requires flight in Segregated Airspace¹, or in Controlled Airspace (Classes A-D) with the informed consent of the Air Navigation Services Provider (ANSP)⁴.
3. RPAS operations within designated UK Danger Areas^{1,5} **should** be approved by the relevant Danger Area Airspace Controlling Authority. Relevant ADH / AM(MF) orders **should** as a minimum:
 - a. Meet the requirements of the Danger Area Airspace Controlling Authority.
 - b. Meet the range Safety requirements⁵ and any other orders or conditions issued by the Danger Area Airspace Controlling Authority.
 - c. Where applicable, meet the requirements of Standard Agreement (STANAG) 2402 and take into account range / area specific advice. The details of STANAG 2402 are available to Defence Contractor Flying Organizations⁶ by request to the MAA.

¹ Refer to MAA02 – MAA Master Glossary.

² Approved for use within the Letter of Endorsed Categorization (LEC) and appropriately certified.

³ Refer to RA 2307 – Rules of the Air.

⁴ Informed consent means prior permission from the ANSP based on a full understanding of RPAS behaviour and capability, including lost link procedures – such that an equivalent level of Air Safety to that of any other Aircraft permitted to enter that class of airspace can be demonstrated.

⁵ Refer to DSA 03.OME Part 3 (Formerly JSP 403 Volume 2) – Defence Code of Practice (DCOP) for Ranges.

⁶ Refer to RA 1028 – Contractor Flying Approved Organization Scheme – Responsibilities.

Acceptable Means of Compliance 2320(1)

Outside UK Airspace

4. ADH **should** ensure that RPAS operations within another sovereign nation's territorial Airspace are conducted either:
 - a. For operations conducted with the nation's consent, in accordance with (iaw) the relevant local, national, and international legal requirements, and satisfy diplomatic clearance requirements, or
 - b. For operations conducted without the nation's consent (ie conducted lawfully under the Law of Armed Conflict, UN Security Council resolution or other legal mandate), under 'Due Regard'³ and outside Controlled Airspace¹; unless the Controlled Airspace has been created or assigned for the purposes of the Operation.
5. AM(MF)s **should** ensure that RPAS operations within another sovereign nation's territorial Airspace and with that nation's consent are conducted iaw the relevant local, national, and international legal requirements and satisfy diplomatic clearance requirements⁷.
6. ADH / AM(MF)s **should** ensure that RPAS operations in international Airspace are conducted iaw relevant international legal requirements and under 'Due Regard'³.

Guidance Material 2320(1)

Remotely Piloted Air Systems Collision Avoidance

7. **Layered Safety Approach.** The Layered Safety Approach concept requires the following, as a minimum, to be considered by the ADH / AM(MF)⁸:
 - a. Utilization of Segregated Airspace which will be notified using the appropriate aeronautical notification methods^{9, 10}. This will include a notified means of separating the Remotely Piloted Aircraft (RPA) from other Aircraft operating within the same Segregated Airspace including appropriate contingency actions.
 - b. Provision of suitable surveillance of the operating area which allows for the detection of intruding Aircraft during the period of operation of the RPA.
 - c. A method of communication between the surveillance provider(s) and the Remote Pilot (RP).
 - d. A method of providing the precise location(s) of the RPAS at all times.
 - e. A method of providing conspicuity to other airspace users (eg Automatic Dependent Surveillance-Broadcast (ADS-B)).
 - f. A method of maintaining safe separation from other Air Systems (ability to manoeuvre the RPAS out of harm's way, immediate termination in flight, etc) while remaining within the notified area.
 - g. Appropriate Assurance for equipment and training supporting the Layered Safety Approach.
8. **Segregated Airspace.** Segregated Airspace for RPAS operations will:
 - a. Be established with appropriate warnings issued for the purpose of RPAS operations (even if within an existing Danger Area or other airspace reservation)¹⁰, and;
 - b. Have specific geographic, horizontal, vertical, and time boundaries, and;

⁷ Refer to AP1158 – Approval and Diplomatic Clearance for Flights to Destinations Abroad.

⁸ The MAA RPAS LEC may highlight additional areas for consideration.

⁹ Except for those covered by paragraph 2b; without an approved Detect and Avoid capability, operations in the UK Flight Information Region (FIR) must be conducted in Segregated Airspace or approved on a case-by-case basis if there is an Operational Imperative to do so by the RPAS Commander (refer to RA 1020 – Aviation Duty Holder and Aviation Duty Holder-Facing Organizations - Roles and Responsibilities). The MAA may be contacted for further guidance ahead of approving such operations.

¹⁰ A Notice to Aviation (NOTAM) will be issued. The Danger Area Authority (DAA) – usually through a Danger Area Airspace Manager, will provide advice on notification procedures specific to the Danger Area – details of approved Danger Areas and appropriate DAA may be found in the UK Aeronautical Information Publication (UK AIP Part 2, Enroute 5.1). Where RPAS (also known as Uncrewed Air Systems (UAS)) activities are not listed, Defence Airspace and Air Traffic Management (DAATM) can advise on submission of an Airspace Change request (see Civil Air Publication 1616).

**Guidance
Material
2320(1)**

- c. Where necessary, include transit corridors from / to the take-off / landing area to / from the planned operating area, and;
- d. If outside a designated UK Danger Area, be agreed with the Civilian Aviation Authority (CAA) Safety and Airspace Regulation Group.

**Regulation
2320(2)**

Control of Remotely Piloted Air Systems

2320(2) ADHs / AM(MF)s **shall** detail the procedures to be followed for either piloted control or automated flight of RPAS.

**Acceptable
Means of
Compliance
2320(2)**

Control of Remotely Piloted Air Systems

- 9. Where periods of automated flight are planned:
 - a. The RP or RPAS Commander **should** be able to intervene immediately at any stage of the flight or;
 - b. Where it is not possible to intervene immediately (eg handover between Remote Pilot Stations (RPS) or automated take-offs and landings), ADHs / AM(MF)s **should** specify additional mitigation (eg lost link procedures) in orders.
- 10. Orders **should** specify the responsibilities and procedures for any Air System command and control transfers, including flight preparation, flight servicing, ground taxi, take-off, landing, and flight¹¹.
- 11. ADHs / AM(MF)s **should** detail in orders the emergency procedures applicable to each RPAS type, including any requirements for pre-planned emergency recovery sites.

**Guidance
Material
2320(2)**

Control of Remotely Piloted Air Systems

- 12. Nil.

**Regulation
2320(3)**

Management of Remotely Piloted Air Systems data links

2320(3) ADHs / AM(MF)s of RPAS utilizing RPAS data links **shall** detail in orders, the protocols required to manage the RPAS data links.

**Acceptable
Means of
Compliance
2320(3)**

Management of Remotely Piloted Air Systems data links

- 13. **Electromagnetic (EM) Spectrum Management.** Appropriate spectrum management **should** be employed to minimize the probability of loss of, or interference to, the RPAS data links.
- 14. **RPAS Data Link Protection.** Measures **should** be implemented to protect the RPAS data link in areas such as: protection and / or redundancy of power supplies; ability to hand-off to another site and robust land-line communications.
- 15. **Management of RPAS data link loss.** Suitable lost link procedures **should** be implemented to maintain safe flight (or safe termination), safe separation from other Aircraft and to enable Aircraft recovery. In the event of an emergency in the RPS that requires abandonment, or the loss of return feed data link that precludes safe control, lost link procedures **should** be followed.
- 16. Orders to manage the loss of the RPAS data link **should** detail the following as a minimum:
 - a. Pre-flight planning of RPAS data link loss strategy, automated recovery routes and altitudes.
 - b. Deconfliction procedures.

¹¹ Refer to RA 2301 – Responsibility for an Air System.

**Acceptable
Means of
Compliance
2320(3)**

- c. Communications, including:
 - (1) Transponder codes¹².
 - (2) Agencies to be contacted.
- d. Emergency recovery protocols and locations.
- e. Flight Termination protocols.

**Guidance
Material
2320(3)**

Management of Remotely Piloted Air Systems data links

- 17. Nil.

**Regulation
2320(4)**

Remotely Piloted Air Systems Operating Locations

- 2320(4) ADHs / AM(MF)s **shall** detail in orders, RPAS specific Safety and administration considerations for all RPAS operating locations within their Area of Responsibility.

**Acceptable
Means of
Compliance
2320(4)**

Remotely Piloted Air Systems Operating Locations

- 18. ADHs / AM(MF)s **should** provide detailed orders for RPAS operating locations to include, as a minimum:

- a. An operating Risk Assessment.
- b. Airspace management, including: Air Traffic Control or surveillance provision; lost link protocols; and any NOTAM requirements.
- c. EM Spectrum management (eg Electromagnetic Compatibility) and control links.
- d. Ground operations, including: post crash management; ground manoeuvre; medical facilities; personnel and equipment Safety; and procedures for managing hazardous materials.
- e. Flight plan requirements³ and Diplomatic clearance requirements¹³.

**Guidance
Material
2320(4)**

Remotely Piloted Air Systems Operating Locations

- 19. Nil.

¹² When the RPA is required to be fitted with a Transponder.

¹³ Refer to RA 2305 – Supervision of Flying.