

RA 2330 – Low Flying

Rationale

Low Flying (LF) is a core Defence Aviation skill which delivers operational effects and reduces operational Risk. It is necessary both on operations and in training for operations and requires significant derogation from the Air Navigation Order (ANO). Historically, flight at low level has been a factor in a number of fatal Accidents and Mid-Air Collisions (MAC). It reduces the margin for error in Air System operations and can cause annoyance to the public. To enable Risk to Life (RtL) to be managed to As Low As Reasonably Practicable (ALARP) and Tolerable, this Regulatory Article (RA) requires those engaged in the conduct and supervision of LF to ensure the highest standards of governance, flying discipline, pre-flight preparation and briefing are maintained.

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Definitions

Definitions Relevant to this RA

Low Flying.

1. **Day.** By day, Aircraft ►will◄ be considered to be conducting LF when:
 - a. **Fixed Wing¹ (FW) Aircraft.** FW Aircraft when operating at less than 2000 ft Above Ground Level (AGL) / Above Mean Sea Level (AMSL).
 - b. **Light FW Aircraft² and Rotary Wing (RW) Aircraft.** Light FW Aircraft and RW Aircraft are considered to be LF when operating at less than 500 ft AGL / AMSL.
2. **Night.** By Night, all Aircraft are considered to be LF when operating at less than 2000 ft AGL / AMSL.
3. Aircraft will not be considered to be LF:
 - a. If they are being directed by Air Traffic Control.
 - b. During departure or arrival at an airfield, Helicopter Landing Site or maritime platform.
 - c. During an emergency, or when making a precautionary or forced landing.
4. **UK Low Flying System (UKLFS)³** ³. The UKLFS refers to military use⁴ of shared Class G airspace from surface to 2000 ft AGL / AMSL throughout the London Flight Information Region (FIR) and Scottish FIR. It does not include any airspace within Aerodrome Traffic Zones (ATZ), Military Aerodrome Traffic Zones (MATZ), Restricted Areas (except for EGR610; the Highlands Restricted Area) or Danger Areas. Civilian Air Traffic operates freely within the UKLFS. Aircrew planning to conduct LF will plan to do so under Visual Flight Rules (VFR) to ensure that see and avoid remains effective, unless specific circumstances accommodated within RA 2307⁵ apply.

¹ Excluding light Fixed Wing Aircraft – see footnote 2.

² Propeller driven Aircraft with a Maximum Take-Off Mass (MTOM) of 2730 Kg or less.

³ Definition is taken from the UK Military Low Flying Handbook (UKMLFH).

⁴ This includes all UK military registered Aircraft and those operating under RA 1166 – UK Civil-Registered Aircraft Utilized and Piloted by the Ministry of Defence.

⁵ Refer to RA 2307 – Rules of the Air.

**Regulation
2330(1)**
Low Flying Governance

2330(1) LF and the UKLFS **shall** be governed.

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Low Flying Governance

5. Aircraft **should** comply with the LF rules of the country over which they are flying, unless UKLFS criteria or Aviation Duty Holders (ADH) and Accountable Managers (Military Flying) (AM(MF)) orders and instructions are more restrictive, in which case the most restrictive **should** be applied.

6. **Air Officer Commanding Number 2 Group (AOC 2 Gp) should:**

- a. As an ADH / AM(MF) Facing organization⁶, provide a UKLFS that is appropriately managed in order to actively support ADHs / AM(MF)s to mitigate Risk in the delivery of LF.
- b. Provide LF policy for use of the UKLFS by UK military-registered Aircraft.
- c. Provide a data service to promulgate activity throughout the UKLFS and state the policy for its use.
- d. Publish the policy and processes for use of the UKLFS in the UKMLFH, to include as a minimum:
 - (1) The geographic boundaries of the UKLFS by day and Night, including definitions of specific designated areas and their uses.
 - (2) UKLFS operating hours.
 - (3) Booking and post-flight procedures.
 - (4) Action to be taken in the event of unauthorized LF.
 - (5) Communications procedures.
 - (6) Policy for airspace allocation priorities.
 - (7) Exercise restrictions.
 - (8) General and specific restrictions within the UKLFS.
 - (9) Airspace Reservations, Transit Areas, Avoidance Areas and warnings.
 - (10) Reporting of Hazards, Incidents and Accidents, including uncharted obstructions.
- e. Provide a LF Booking Cell that is established as the co-ordinating authority for all UKLFS bookings; authority may be delegated to specified areas.
- f. As the Defence Aeronautical Information Authority, AOC 2 Gp **should** appoint an Aeronautical Information Service Provider (AISP) who will provide an Aeronautical Information Management Service (AIMS) in accordance with (iaw) RA 1030⁷ and JSP 495.

No 1 Aeronautical Information Documentation Unit (AIDU)

7. As an AISP, No 1 AIDU **should** produce accurate planning documents as part of the AIMS.

Regulation and Compliance

8. RA 2307⁵, RA 2335⁸ and the Manual of Military Air Traffic Management also contain relevant supporting Regulations and **should** be followed.

⁶ Refer to RA 1032 – Aviation Duty Holder-Facing Organizations and Accountable Manager (Military Flying)-Facing Organizations - Roles and Responsibilities.

⁷ Refer to RA 1030 – Defence Aeronautical Information Management and JSP 495 - Aeronautical Information Policy.

⁸ Refer to RA 2335 – Flying Displays, Display Flying, Display Parachuting, Role Demonstrations and Flypasts.

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Low Flying Governance

9. The UKLFS may not always be a VFR environment. Rules for deviation from standard Instrument Flight Rules, conduct of tactical maritime sorties and non-tactical maritime sorties, operating in helicopter instrument practice areas and descent below Safety Altitude are detailed in RA 2307⁵.
10. Military Aircraft⁹, including those conducting LF are exempt from provisions contained in the Air Navigation Order 2016. The UK Military LF Regulations described in this RA and the procedures described in the UKMLFH must be followed, including where military Aircrew are flying civil registered Air Systems not owned by UK MOD or foreign military, or any other Air System not contained on the UK Military Aircraft Register.
11. The orders and instructions created by the ADH and AM(MF) together with the relevant parts of the Military Aviation Authority (MAA) Regulatory Publications (MRP) and the Armed Forces Act 2006, provide the disciplinary framework governing the flying of UK military registered Aircraft.
12. There are several offences which may arise from the manner in which an Air System is flown. These offences include: dangerous flying (Section 33 Armed Forces Act 2006 or its amendments), LF (Section 34 Armed Forces Act 2006 or its amendments) and annoyance by flying (Section 35 Armed Forces Act 2006 or its amendments). In addition, an offence may be committed where Aircrew contravene standing orders (Section 13 Armed Forces Act 2006 or its amendments) or perform their duty negligently (Section 15 Armed Forces Act 2006 or its amendments).
13. Users of the UKLFS must be aware that the restrictions in this RA and the UKMLFH do not apply to General Aviation (GA) traffic and that GA is not obliged to recognize some elements such as flow arrows, MATZ, Danger Areas etc.

**Regulation
2330(2)**

**Aviation Duty Holders / Accountable Managers (Military Flying)
Orders and Instructions**

- 2330(2) ADH and AM(MF) **shall** publish procedures, orders and instructions to ensure that the Risk associated with LF of Aircraft in their Area of Responsibility (AoR) is ALARP and Tolerable.

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**Aviation Duty Holders / Accountable Managers (Military Flying)
Orders and Instructions**

14. ADH and AM(MF) **should**:
- Ensure that crews within their AoR are appropriately trained and Competent to conduct LF.
 - Assure that the Risk associated with LF and use of the UKLFS is ALARP and Tolerable;
15. ADH and AM(MF) **should** publish appropriate orders and instructions to ensure that crews within their AoR comply with LF policy. As a minimum, these orders and instructions **should** include:
- The required Aircrew qualifications and Competence levels to conduct LF on Aircraft within their AoR.
 - The Approval, Authorization and supervision process to conduct LF on Aircraft within their AoR.
 - Any specific Authorization procedures for LF activity. As a minimum the Authorization **should** include:
 - Details of the route or area of operation.

⁹ Refer to MAA 02 – MAA Master Glossary.

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- (2) **FW¹ Aircraft.** For all flying below 2000 ft AGL / AMSL the Minimum Separation Distance (MSD) **should** be stated.
- (3) **Light FW Aircraft² and RW Aircraft.** For all flying below 2000 ft AGL / AMSL, the MSD, or Minimum Separation Criteria (MSC) in conjunction with AGL / AMSL, **should** be stated.
- d. Separation / height minima for LF **should not** be less than:
 - (1) **All FW Aircraft¹⁰.** 250 ft MSD unless Authorized to conduct Operational Low Flying (OLF).
 - (2) **RW Aircraft.** 100 ft AGL / AMSL unless a lower minima is Approved within ADH or AM(MF) orders and instructions for specific manoeuvres¹¹ (see para 16);
 - (3) **Light FW Aircraft² conducting Practice Forced Landings (PFL).** 100 ft AGL / AMSL.
- e. The use and employment of Aircraft Collision Avoidance Systems and Ground Collision Avoidance Systems, where fitted, including serviceability go / no-go criteria.
- f. Any additional criteria to be applied for LF at Night in consideration of the following:
 - (1) Mitigation for unmarked obstacles.
 - (2) Additional minima to be applied to terrain and obstacle separation criteria.
 - (3) Equipment serviceability and minimum equipment requirements.
 - (4) Supervision, Authorization and currency.
 - (5) Minimum safe operating light levels (millilux) / environmental conditions pertinent to night vision systems used.
 - (6) Aircraft de-confliction in time and space.
 - (7) Aircraft lighting.
- g. OLF, if applicable, as a minimum:
 - (1) OLF may be authorized lower than 250 ft MSD but **should not** be authorized below 100 ft MSD.
 - (2) OLF **should** only be conducted within designated areas, such as Tactical Training Areas (TTA).
- h. Weather minima for LF, which **should not** be less restrictive than the weather minima detailed in RA 2307⁵ unless in possession of a valid Public Display Authorization (PDA) or Display Authorization when operating at a Flying Display or PDA work-up⁸.
- i. Any prohibited flight profiles, training events or manoeuvres during the conduct of LF on Aircraft within their AoR.
- j. Reporting of uncharted obstructions.
- k. Minimum avoidance criteria for ships and oil / gas installations.
- l. For high energy FW Aircraft, detail the specific activities and maximum times when the speed limits at paras 51a and 51b can be applied.
- m. Where the see and avoid principle is relied upon as a means of Aircraft deconfliction, ADH and AM(MF) **should** define how this ►will◄ be employed and give directions on the use of other MAC, Controlled Flight into Terrain (CFIT) or Loss of Safe Separation (LoSS) mitigation barriers.

¹⁰ Including light FW Aircraft.

¹¹ May include, but are not limited to, Concealed Approach and Departures, LF at 50 ft and winching activity.

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16. Where the ADH or AM(MF) approve RW Aircraft within their AoR to operate below 100 ft AGL / AMSL / MSD this activity **should** be specifically reflected within the Air System Safety Case (ASSC)¹².

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**Aviation Duty Holders / Accountable Managers (Military Flying)
Orders and Instructions**

17. ADH and AM(MF) orders and instructions will provide specific direction to their AoR as to how this RA **will** be applied and define the minimum requirements to ensure that the RtL associated with the conduct of LF of Aircraft within their AoR remains ALARP and Tolerable.

Authorization

18. Subject to MOD (AOC 2 Gp)¹³ Approval and allocation of airspace, ADH and AM(MF) may authorize LF exercises in the UK or overseas subject to the following provisions:

- a. Aircraft will be routed so as not to cause unnecessary annoyance to the public, commensurate with meeting operational and training requirements.
- b. Aircraft may not be routed within:
 - (1) Danger Areas without the permission of the controlling authority.
 - (2) Any area subject to LF avoidance criteria as detailed in this RA, UKMLFH, RA 2307⁵ or promulgated by Notice to Aviation (NOTAM).

19. Sponsors of all exercises within the UK FIR will notify OC Military Airspace Management Cell (MAMC) of the numbers and types of participating Air Systems together with details of proposed routes, targets, planned sortie rate and operating times, no later than 30 days in advance of the start of the activity / exercise. Procedures and information required are contained in the UKMLFH Annex A¹⁴ and RA 2309¹⁵.

**Regulation
2330(3)**

Low Flying - General

2330(3) LF **shall** be conducted to a common set of Regulations and processes.

**Acceptable
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2330(3)**

Low Flying - General

20. **LF Areas.** Unless written Authorization to the contrary has been obtained from ADH or AM(MF), LF **should** be conducted only within the confines of the UKLFS and along routes and in areas abroad which have been formally approved by the appropriate national / local authority for use by UK military registered Aircraft.

21. **Communications.** LF crews **should** monitor a common Low Level frequency together with 243.0 MHz (Guard), whenever possible, iaw local or national procedures.

22. **Use of Identification Friend or Foe (IFF) / Secondary Surveillance Radar (SSR) Transponder.** Aircraft **should not** LF without a serviceable IFF / SSR transponder. Aircraft **should** "squawk" the mode 3A / C conspicuity (and mode S where fitted) code appropriate to Aircraft type when conducting flights within the UKLFS or iaw local national procedures outside of the UKLFS unless authorized in ADH orders for the purpose of preventing the compromise of Operational Security.

23. **Low Flying over¹⁶ Congested Areas or Public Assemblies¹⁷ (excluding Flypasts over **Congested Areas** or **Public Assemblies** conducted iaw**

¹² Refer to RA 1205 – Air System Safety Cases.

¹³ Approval can be sought via Officer Commanding (OC) Low Flying Operations Flight.

¹⁴ Refer to UKMLFH Annex A - Use of the UK Low Flying System - A Planning Guide for Exercise Sponsors.

¹⁵ Refer to RA 2309(19): Air Exercise Planning and Airspace Integration.

¹⁶ For the purpose of this RA, an Aircraft is considered to be overflying a Congested Area or Public Assembly if the lateral separation is less than 500 ft MSD.

¹⁷ For the purpose of this RA, a Public Assembly is deemed to exist where there is a gathering of more than 1000 people.

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RA 2335¹⁸). The minimum Height for Aircraft flying over Congested Areas of cities, towns and settlements¹⁹ or Public Assemblies (excluding Flypasts over **► Congested Areas or ◄** Public Assemblies conducted iaw RA 2335) **should** be 2000 ft AGL (1000 ft AGL in the case of Light FW Aircraft and RW Aircraft). Furthermore, if required, this Height **should** be increased to permit a safe emergency landing or safe abandonment outside the Congested Area in the event of a power unit failure.

24. **Environmental, Industrial, Medical and Nature Sites.** Aircraft **should** avoid environmental, industrial, medical and nature sites by a minimum of 2000 ft AGL and 0.25 nm laterally unless otherwise specified by local or national procedures.

25. **Free-fall Parachute Areas.** Aircraft **should** avoid free-fall parachute areas by a minimum of 2000 ft AGL and 1 nm laterally unless otherwise specified by local or national procedures.

26. **Small Arms Ranges.** Aircraft **should** avoid small arms ranges by a minimum of 500 ft AGL unless otherwise specified by local or national procedures.

Planning Considerations

27. All LF **should** be planned on the latest Special Air Chart (Low Flying Chart (LFC) or M5219-Air), applicable 1:50,000 series chart or ADH / AM(MF)-approved electronic planning equipment.

28. All charts used for the planning of LF **should** include latest Chart Amendment Low Flying (CALF), NOTAM and any other relevant LF information.

29. Where an ADH or AM(MF) allows the use of electronic planning tools for LF on Air Systems within their AoR, the ADH or AM(MF) **should** ensure:

- a. Electronic charts are updated with the latest CALF, NOTAM and any other relevant LF information.
- b. The information contained within electronic LFC has been appropriately assured.
- c. Electronic planning tools used on Air Systems within their AoR are appropriately approved for flight.
- d. The use of electronic planning tools is specifically reflected within the ASSC iaw RA 1205¹².

30. **Weather Limitations.** Weather limitations for LF outside UK Airspace **should** be iaw the most restrictive of ADH or AM(MF) orders and instructions, RA 2307⁵ or the Regulations promulgated by the national or local authorities.

31. **Flying near Ships and Oil / Gas Installations at Sea.** ADH and AM(MF) **should** issue orders and instructions that specify the minimum avoidance criteria for warships²⁰, other shipping, and fixed and mobile oil / gas installations. When determining the minimum avoidance criteria, ADH and AM(MF) **should** consider: safe separation with any Aircraft operating to / from the ship / installation; the avoidance of interference with ship or Aircraft operations; the avoidance of any high-power radio / radar Hazards associated with the ship / installation; and any relevant local or national procedures. The following margins **should** be considered the minimum unless there is a justifiable and valid Service or Defence Contractor Flying Organisation (DCFO)²¹ requirement for lower and the Aircraft is specifically authorized to operate to / from / with a particular ship for a particular sortie:

- a. **Aircraft Carriers and Warships Known to be Operating FW Aircraft.** Avoidance margin of 5 nm laterally or above 3000 ft AMSL.
- b. **Other Warships:**

¹⁸ Refer to RA 2335 – Flying Displays, Display Flying, Display Parachuting, Role Demonstrations and Flypasts, Issue **► 14 ◄**, para **► 93 and 104. ◄**

¹⁹ For the avoidance of doubt, Congested Areas are in accordance with the definition in MAA02 – Master Glossary and not those listed in the UKMLFH Section 2.

²⁰ ADHs and AM(MF)s **should** ensure that flights near any foreign warships are iaw with any relevant standing Operation Orders and / or Directives and that any relevant political and / or diplomatic considerations are observed.

²¹ As approved under the Contractor Flying Approved Organization Scheme (refer to RA 1028 – Contractor Flying Approved Organization Scheme).

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(1) For FW Aircraft, 2 nm laterally or above 2000 ft AMSL.

(2) For RW Aircraft, sufficient to avoid interference with other Aircraft operations.

c. **Shipping.** Avoidance margin sufficient to avoid interference, disturbance or disruption with any ship or Aircraft operations, but not less than 250 ft MSD, or as specified by local or national procedures (if more restrictive).

d. **Fixed or Mobile Gas Installations.** Avoidance margin sufficient to avoid interference, disturbance or disruption of operations including Aircraft operations, but not less than 1.5 nm laterally or 2000 ft AMSL, or as specified by local or national procedures (if more restrictive).

32. **Flying near Russian Ships.** In addition to the provisions above, Air System Commanders **should** be aware of Article IV of the Bi-lateral UK / Russia Agreement on the Prevention of Incidents at Sea, which states:

“Commanders of Air System of the Parties shall use the greatest caution and prudence in approaching Air System and ships of the other Party, in particular ships engaged in the launching or landing of Air System, and, in the interests of mutual safety, shall not permit simulated attacks by the simulated use of weapons against Air System or ships of the other Party, or dropping objects near them in such a manner as to be hazardous to ships or constitute a hazard to navigation. Such actions shall also not be taken by Air System of each Party against non- military ships of the other Party.”

And

“Air System of the Parties flying in darkness or under instrument conditions shall, wherever feasible, display navigation lights.”.

33. **Retention of Sortie Data.** Air System Head Up Display (HUD) and sensor data media **should** be retained for a minimum of 4 weeks, or iaw RA 1207²², before re-use unless further retention has been requested. It is accepted that electronic data retention is limited by the volume of available electronic media; units **should** make best effort where a 4 week retention period is not achievable.

34. **Records of Flight.** A Record of Flight (RoF) for each low-level sortie **should** be completed prior to the sortie and amended post-flight to indicate any deviations. RoF **should** be retained for 6 months.

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Low Flying - General

35. **Minimum Separation Considerations.** In the sea areas of the UKLFS, outside 3 nm from the coastline, or in international waters, ADH and AM(MF) may authorize LF below the minima specified in para 15.d for specialised operational training or trials.

36. **Flying near Ships and Oil / Gas Installations at Sea.** For UK military ships and compatible UK military Aircraft, Embarked Aviation Orders, BRd 766²³ specifies the minimum approach distance when appropriate Electromagnetic field (EMF) Hazard mitigations may not have been applied and clearance to close has not been granted by the platform.

37. **Operations in support of HM Coastguard or Fishery Protection Tasks.** FW and RW Aircraft briefed for sorties in co-operation with HM Coastguard or for fishery protection tasks may be authorized to approach ships and fishing vessels not closer than 100 metres at a minimum Height of 200 ft AMSL. Approaches will be made across the ship's quarter and on a diverging heading.

²² Refer to RA 1207 – Air Safety Data Management and Exploitation.

²³ Refer to BRd 766 - Embarked Aviation Orders.

**Regulation
2330(4)**
UK Low Flying System - Specific

2330(4) Aircraft operating in the UKLFS **shall** conform to common standards to minimize Risk and to avoid nuisance to the public.

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UK Low Flying System - Specific

38. **UKMLFH.** Aircraft LF in the UK **should** comply with the UKMLFH.
39. **Communication.** The full UKLFS communications procedures are detailed in the UKMLFH and **should** be used when operating in the UKLFS.
40. **Exercises Involving Warships.** SSR **should** only be selected to standby if required for tactical purposes, and in this circumstance, only for the minimum time needed to achieve the aim.
41. **Avoidance Criteria.** The avoidance criteria contained in this RA, RA 2307⁵ and the UKMLFH **should** be adhered to when operating in the UKLFS.
42. **TTA.** OLF **should** be pre-booked iaw the procedure detailed in the UKMLFH. When TTA are active, the airspace is allocated to a single military Aircraft / Formation; activity in the overlapping LFAs **should** be subject to Height restrictions and detailed in the UKMLFH.
43. **Transit Areas.**
- a. FW Aircraft **should not** overfly Transit Areas below 2000 ft AGL;
 - b. RW Aircraft (Maximum All Up Mass >5700 kg) **should not** overfly Transit Areas below 1000 ft AGL;
 - c. All other Aircraft **should not** overfly Transit Areas below 500 ft AGL in rural areas, and 1000 ft AGL in Congested Areas;
 - d. Transit Areas **should** be considered as Congested Areas for the purposes of conducting a flypast under RA 2335⁸.
44. **Avoidance Areas.**
- a. FW Aircraft¹ **should not** enter Avoidance Areas without the prior Approval of OC MAMC¹³. When approved, the Height **should not** be less than 2000 ft AGL, except when complying with RA 2335⁸.
 - b. RW and light FW Aircraft² may enter Avoidance Areas but **should** remain above 500 ft AGL in rural areas and 1000 ft AGL in Congested Areas unless prior Approval from OC MAMC has been granted and a Waiver against the requirements of para 25 has been obtained.
45. When transiting the Thames Valley Avoidance Area (TVAA) under Controlled Airspace the limits from the UKMLFH apply. If sufficient Height cannot be maintained (consider if forced down by weather or other cause), a flight path **should** be chosen to avoid overflight of the Congested Area, wherever possible, unless doing so would endanger the Aircraft.
46. Flypasts over Central London (eg R160 'the Specified Area') **should** obtain prior Approval from AOC 2 Gp through OC MAMC¹³.
47. **Speed Limitations Within the UKLFS.** The following speed limitations **should** be adhered to:
- a. A maximum cruise speed of 450 Kts.
 - b. For specific tactical flying activities approved by the ADH or AM(MF):
 - (1) Operating Height at or below 150 ft MSD. Maximum speed for short-term activity **should** be 500 KIAS.
 - (2) Operating Height above 150 ft MSD. Maximum speed for short-term activity **should** be 550 KIAS.

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c. When in connection with Flying Displays, Role Demonstrations or Flypasts, these **should** be iaw with RA 2335⁸.

48. **Use of Reheat.** Reheat **should not** be used within the UKLFS except for essential training requirements, Air System emergencies or Authorized Flying Displays, Role Demonstrations or Flypasts conducted iaw RA 2335⁸.

49. **UKLFS Warnings.** Aircrew **should** ensure they are familiar with the warnings listed in the UKMLFH when operating within the UKLFS.

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2330(4)****UK Low Flying System - Specific**

50. Nil.

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