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 unnecessary 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 flying discipline, pre-flight preparation and briefing are maintained.

Definitions Relevant to this RA

2330(1): Low Flying Governance
2330(2): Aviation Duty Holders / Accountable Managers (Military Flying) Orders and Instructions
2330(3): Low Flying - General
2330(4): UK Low Flying System - Specific

Definitions Relevant to this RA

Low Flying.

1. **Day.** By day, Air Systems are to be considered to be conducting LF when:
   a. **Fixed Wing** (FW). FW Air Systems when operating at less than 2000 ft Above Ground Level (AGL) / Above Mean Sea Level (AMSL);
   b. **Light Air System and Rotary Wing** (RW). Light propeller-driven Air Systems and RW are considered to be LF when operating at less than 500 ft AGL / AMSL.

2. **Night.** By night, all Air Systems are considered to be LF when operating at less than 2000 ft AGL / AMSL.

3. Air Systems will not be considered to be LF:
   a. If they are 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.

Low Flying Governance

2330(1) LF and the UK Low Flying System (UKLFS) shall be governed.

Acceptable Means of Compliance

4. Air Systems should normally 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.

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1 Including Texan but excluding light propeller-driven Aircraft.
Assistant Chief of the Air Staff (ACAS)

5. **ACAS should:**
   a. Provide tri-service military LF policy;
   b. Provide a UKLFS that is appropriately managed to assure that the hazards associated with its use are reduced to a level that can it be recommended to ADH and AM(MF) as ALARP\(^2\);
   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 UK Military Low Flying Handbook (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 use;
      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 Low Flying 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, ACAS **should** appoint an Aeronautical Information Service Provider (AISP) who will provide an Aeronautical Information Management Service (AIMS) in accordance with (iaw) RA 1030 and JSP 495\(^3\).

Aeronautical Information Documentation Unit (AIDU)

6. As the AISP, AIDU **should** produce accurate planning documents as part of the AIMS.

Regulation and Compliance

7. RA 2307\(^4\), RA 2335\(^5\) and the Manual of Military Air Traffic Management (MMATM) also contain relevant supporting regulations with respect to weather conditions and unusual air activity / exercises and **should** be followed.

Low Flying Governance

8. LF is a specific area in which the UK military claims exemption from the civilian Rules of the Air under ANO 2016. The UK Military Low Flying Regulations described in this RA and the procedures described in the UKMLFH must be followed, including where the exemption under the ANO is applied by an organization to a civilian registered Air System which is under the command of a member of Her Majesty’s naval, military or air forces.

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\(^2\) This applies only to hazards impacting aerial activity in the UKLFS that ACAS can reasonably influence. There may be other factors, such as horses and riders, that present a third-party risk that cannot be reasonably influenced but **should** be considered by ADH and AM(MF).
\(^3\) Refer to RA 1030 – Defence Aeronautical Information Management and JSP 495.
\(^4\) Refer to RA 2307 – Rules of the Air.
\(^5\) Refer to RA 2335 – Flying Displays and Flypasts.
9. 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), low flying (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).

10. 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 military flying.

11. Users of the UKLFS must be aware that the restrictions in this RA and the UKMLFH do not apply to General Aviation (GA) traffic; attention is drawn to flow arrows and choke points where GA are not obliged to follow the flow direction depicted on the Low Flying Charts.

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 on Air Systems in their Area of Responsibility (AoR) is ALARP and Tolerable.

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

12. ADH and AM(MF) should:
   a. Ensure that crews within their AoR are appropriately trained and competent to conduct LF;
   b. Assure that the risk associated with LF and use of the UKLFS is ALARP and Tolerable;
   c. Ensure that crews within their AoR comply with LF policy through the publication of appropriate orders and instructions.

13. As a minimum, orders and instructions should include:
   a. The required Aircrew qualifications and competence levels to conduct LF on Air Systems within the AoR;
   b. The approval, authorization and supervision process to conduct LF on Air System within their AoR;
   c. Any specific authorization procedures for LF activity. As a minimum the authorization should include;
      (1) Details of the route or area of operation;
      (2) FW³. For all flying below 2000 ft AGL / AMSL the Minimum Separation Distance (MSD) should be stated;
      (3) Light Air Systems and RW. For all flying below 2000 ft AGL / AMSL, the minimum AGL / AMSL or MSD should be stated. At or below 500 ft AGL / AMSL the MSD, or Minimum Separation Criteria (MSC) and AGL, should be stated;
   d. Minimum heights for LF, which should not be below:
      (1) FW. 250 ft AGL / MSD unless authorized to conduct Operational Low Flying Training (OLFT);
Acceptable Means of Compliance 2330(2)

(2) RW. 100 ft AGL unless a lower minima is approved within ADH or AM(MF) orders and instructions for specific exercises (see Para 14).

e. The use and employment of Air System 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) Air System de-confliction in time and space;
   (7) Air System lighting;

g. Operational Low Flying (OLF), if applicable, as a minimum:
   (1) OLF or OLF may be authorized lower than 250 ft MSD but should not be authorized below 100 ft MSD;
   (2) OLF and 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 2307 for Visual Flight Rules flight;

i. Any prohibited flight profiles, training events or manoeuvres during the conduct of LF on Air Systems within their AoR;

j. Reporting of uncharted obstructions;

k. Minimum avoidance criteria for ships and oil / gas installations;

l. For high energy FW detail the specific activities and maximum times when the speed limits at paras 49a and 49b can be applied;

m. Where the see and avoid principle is relied upon as a means of Air System deconfliction ADH and AM(MF) should define how this is to be employed and give directions on the use of other MAC mitigation barriers.

14. Where the ADH or AM(MF) approve RW within their AoR to operate below 100 ft, this activity should be specifically reflected within the Air System Safety Case (ASSC) law RA 1205.

Guidance Material 2330(2)

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

15. Due to the range of activity that takes place on military registered Air Systems within the UKLFS, ADH and AM(MF) orders and instructions will provide specific direction to their AoR as to how this RA is to be applied and define the minimum requirements to ensure that the RTL associated with the conduct of LF on Air Systems within their AoR remains ALARP and Tolerable.

Authorization

16. Subject to MOD (ACAS) approval and allocation of airspace, ADH and AM(MF) may authorize LF exercises in the UK or overseas subject to the following provisions:

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6 Such as Concealed Approach and Departures, LF at 50 ft, winching activity etc.
7 Refer to RA 1205 – Air System Safety Cases.
8 Approval can be sought via OC Low Flying Operations Flight.
a. Air System will be routed so as not to cause unnecessary annoyance to the public, commensurate with meeting operational and training requirements.

b. Air System 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 2307\(^4\) or promulgated by Notice to Airmen (NOTAM).

17. Sponsors of all exercises within the UK Flight Information Region (UK FIR) will notify Officer Commanding Military Airspace Management Cell (OC MAMC) of the numbers and types of participating Air System, 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 A\(^2\).

**Low Flying - General**

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

**Low Flying - General**

18. **Rules of the Air.** RA 2307\(^4\) **should** also be complied with when conducting LF.

19. **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 Air Systems.

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

21. **Use of Identification Friend or Foe (IFF) / Secondary Surveillance Radar (SSR) Transponder.** Air System **should not** LF without a serviceable IFF / SSR transponder.

22. All Air Systems **should** “squawk” the mode 3/A/C conspicuity (and mode S where fitted) code appropriate to Air System type when conducting flights within the UKLFS or iaw local National procedures outside of the UKLFS.

23. **Minimum Separation Considerations.** When authorizing LF, the following **should** be used:
   a. **FW\(^1\).** Flying below 2000 ft AGL / AMSL **should** be iaw MSD;
   b. **Light Air Systems and RW:**
      (1) Flying below 2000 ft AGL / AMSL, **should** be iaw AGL / AMSL or MSD;
      (2) Flying at or below 500 ft AGL / AMSL **should** be iaw MSD or MSC in conjunction with AGL.

24. **Low Flying over Congested Areas\(^\text{10}\) and Public Assemblies.** Air System flying over Congested Areas of cities, towns and settlements **should** be flown at an altitude sufficient, in the event of a power unit failure, to permit a safe emergency landing or safe abandonment outside the Congested Area. The transit height **should not** be less than 2000 ft AGL (1000 ft AGL in the case of RW Air Systems and light propeller driven Air Systems) over those cities, towns and settlements detailed in Section 2 of the UKMLFH, except when complying with RA 2335\(^5\).

25. **Environmental, Industrial, Medical and Nature Sites.** Air Systems **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.

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\(^10\) Refer to MAA02 – MAA Master Glossary for definition.
26. **Free-fall Parachute Areas.** Air Systems 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.

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

### Planning Considerations

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

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

30. 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 include 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 law RA 1205².

31. **Weather Limitations.** Weather limitations for LF outside UK Airspace should be iaw ADH or AM(MF) orders and instructions or RA 2307 unless the regulations promulgated by the national or local authorities are more restrictive, in which case they should be adhered to.

32. **Flying near Ships and Oil / Gas Installations at Sea.** Where ADH or AM(MF) orders and instructions do not specify a minimum, Air Systems should avoid ships and fixed or mobile oil / gas installations at sea by the following margins:
   a. **Aircraft Carriers and Ships Known to be Operating FW Air Systems.** 5 nm laterally or above 3000 ft AMSL.
   b. **Other Warships:**
      1. **FW Air Systems.** 2 nm laterally or above 2000 ft AMSL. No ship is to be over flown deliberately more than twice.
      2. **RW Air Systems.** By a margin sufficient to avoid interference with other RW Air Systems or ships operations.
      3. Some warships, such as the Royal Navy Type 45, present a hazard through High Intensity Radio Transmission Area (HIRTA) and should be afforded avoidance according to Air System susceptibility and HIRTA classifications detailed in the UKMLFH.
   c. **Fixed or Mobile Gas Installations.** 1.5 nm laterally or above 2000 ft AMSL.
   d. **Other Shipping.** By a margin sufficient to obviate disturbance and disruption of operations, but not less than 250 ft MSD.

33. **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.”.

34. 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 120711, 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.

35. 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.

Low Flying - General

36. Minimum Separation Considerations. In the sea areas of the UKLFS, outside 3 nm from the coastline, ADH and AM(MF) may authorize LF below 250 ft MSD for specialised operational training or trials.

37. Flying near Ships and Oil / Gas Installations at Sea. For the avoidance of doubt, when specifically authorized by ADH or AM(MF), Air Systems are permitted closer than the limits detailed in paras 32a to 32d. Additionally, Air Systems specifically authorized to operate to/from with a particular ship for a particular sortie are not required to abide by the minimum avoidance criteria detailed in paras 32a to 32d.

38. Operations in support of HM Coastguard or Fishery Protection Tasks. FW and RW Air Systems 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.

UK Low Flying System - Specific

2330(4) Air Systems operating in the UKLFS shall conform to common standards to minimize risk and to avoid nuisance to the public.

UK Low Flying System - Specific

39. Communication. The full UKLFS Communications Procedures are detailed in the UKMLFH and should be used when operating in the UKLFS.

40. IFF / SSR. Air Systems operating within the UKLFS should transmit iaw the UKMLFH.

41. 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.

42. Avoidance Criteria. The avoidance criteria contained in this RA, RA 23074 and the UKMLFH should be adhered to when operating in the UKLFS.

43. 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 Air System / Formation; activity in the overlapping LFAs should be subject to height restrictions and detailed in the UKMLFH.

44. Transit Areas.

a. FW Air Systems should not overfly Transit Areas below 2000 ft AGL;

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11 Refer to RA 1207 – Air Safety Data Management and Exploitation.
b. RW Air Systems (Maximum All Up Mass >5700 kg) should not overfly Transit Areas below 1000 ft AGL;
c. All other Air Systems 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 2335\(^5\).

45. Avoidance Areas.
   a. FW Air Systems should not enter Avoidance Areas without the prior approval of OC MAMC. When approved, the transit height should not be less than 2000 ft AGL, except when complying with RA 2335\(^5\).
   b. RW and light propeller-driven Air Systems may enter Avoidance Areas but, without the prior approval of OC MAMC, should remain above 500 ft AGL in rural areas and 1000 ft AGL in Congested Areas.

46. 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 Air System.

47. Flying over any place where large numbers of people are assembled, or a public assembly is taking place should be prohibited below 1000 ft AGL except when:
   a. Approved by MOD\(^6\);
   b. In connection with Flying Displays, Role Demonstrations or Flypasts conducted in iaw RA 2335\(^5\);
   c. It is necessary to do so while carrying out arrival or departure.

48. Flypasts over Central London (eg R160 ‘the Specified Area’) should obtain prior approval from ACAS through OC MAMC.

49. Speed Limitations Within the UKLFS. For specific tactical flying activities approved by the ADH or AM(MF), accept in connection with Flying Displays, Role Demonstrations or Flypasts conducted in iaw with RA 2335\(^5\), the following speed dispensation is permitted:
   a. Operating Height at or below 150 ft MSL. Maximum speed for short-term activity should be 500 KIAS
   b. Operating height above 150 ft MSL. Maximum speed for short-term activity should be 550 KIAS.

50. At all other times the maximum cruise speed within the UKLFS should be 450 kts.

51. 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 in iaw RA 2335\(^5\).

52. UKLFS Warnings. The UKMLFH lists warnings Aircrew should be aware of when operating within the UKLFS.