

## ENR 1.6 — RADAR SERVICES AND PROCEDURES

## ENR 1.6.1 — USE OF RADAR IN AIR TRAFFIC SERVICES

**1 General**

1.1 The UK generally subscribes to the procedures for the use of radar in ATS which are given in ICAO Doc 4444 Part X with the important difference that the radar service provided outside Controlled Airspace will be either an advisory service or an information service as described below. In addition, in order to clarify the exact arrangements in use within each type of Airspace in the UK FIR, the UK has found it necessary to amplify certain of the ICAO statements.

**2 Types of Radar Service****2.1 ICAO References.**

Doc 4444, Part VI, paras 8 and 11.

2.2 The provision of Radar Control, Radar Advisory and Radar Information Services is dependent upon specific types of airspace. Details of the services provided are stated in the table below.

**Table** (see also maps at ENR 6-1-6-1/2 and ENR 6-3-2-1/2).

Type of Airspace	Type of Service	ATC action with regard to Unknown Aircraft
Class A Airspace, Controlled Airspace subject to IFR at all times and Class D Airspace, Controlled Airspace below FL 245 in which all flights are subject to the authority of ATC.	Radar Control Service	Traffic information and avoiding action will not be given unless information has been received which indicates that a radar echo may be a particular aircraft which is lost or experiencing radio failure.
Class E Airspace, Controlled Airspace in which VFR flight without ATC clearance is permitted.	Radar Control Service	Traffic information will be passed provided this does not compromise radar sequencing of traffic or separation of IFR flights. Avoiding action will be given at the request of pilots but to limits decided by the radar controller or if information has been received which indicates that a radar echo may be a particular aircraft which is lost or experiencing radio failure.
→ Class C Airspace, Upper Airspace Control Area	Radar Control Service	(a) <b>Within the Military Mandatory Radar Service Areas (MRSA).</b> Procedures exist to ensure separation between aircraft operating in the Upper Airspace but under the control of different ATS Units. In general, all aircraft operating off the promulgated Upper ATS routes will be vectored clear of those operating on the routes. In order to eliminate the possibility of a radar induced conflict, neither traffic information nor avoiding action will be given unless information received indicates that an unknown aircraft is lost or has experienced radio failure.  (b) <b>Outside the Military Mandatory Radar Service Areas (MRSA).</b> Whenever practicable traffic information will be given. Avoiding action will be given if controllers consider it necessary or if it is requested by pilots.  <b>Note:</b> Because of the sudden appearance and unpredictable movement of unknown aircraft it is not always possible to provide the requisite separation. See ENR 1-1-1-6, para 4.3.4.
Class F Airspace, Advisory Routes	Radar Advisory Service or Radar Information Service	Traffic information will be passed followed by advice on avoiding action.
Class G Airspace, All other Airspace		Traffic information will be passed but no avoiding action is to be given. The pilot is responsible for his own separation.

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**3 Radar Service Outside Controlled Airspace****3.1 Radar Advisory Service (RAS)**

3.1.1 RAS is an air traffic radar service in which the controller will provide advice necessary to maintain prescribed separation between aircraft participating in the advisory service, and in which he will pass to the pilot the bearing, distance, and, if known, level of conflicting non-participating traffic, together with advice on action necessary to resolve the confliction. Where time does not permit this procedure to be adopted, the controller will pass advice on avoiding action followed by information on the conflicting traffic. Under a RAS, the following conditions apply:

- (a) The service will only be provided to flights under IFR irrespective of meteorological conditions;
- (b) controllers will expect the pilot to accept vectors or level allocations which may require flight in IMC. **Pilots not qualified to fly in IMC should accept a RAS only where compliance with ATC advice permits the flight to be continued in VMC;**
- (c) there is no legal requirement for a pilot flying outside Controlled Airspace to comply with instructions because of the advisory nature of the service. However, a pilot who chooses not to comply with advisory avoiding action must inform the controller. The pilot will then become responsible for initiating any avoiding action that may subsequently prove necessary;
- (d) the pilot must advise the controller before changing heading or level;
- (e) the avoiding action instructions which a controller may pass to resolve a confliction with non-participating traffic will, where possible, be aimed at achieving separation which is not less than 5 nm or 3000 ft, except when specified otherwise by the regulating authority. However, it is recognised that in the event of the sudden appearance of unknown traffic, and when unknown aircraft make unpredictable changes in flight path, it is not always possible to achieve these minima;
- (f) information on conflicting traffic will be passed until the confliction is resolved;
- (g) the pilot remains responsible for terrain clearance, although ATSU's providing a RAS will set a level or levels below which a RAS will be refused or terminated.

**3.2 Radar Information Service (RIS)**

3.2.1 RIS is an air traffic radar service in which the controller will inform the pilot of the bearing, distance, and, if known, the level of the conflicting traffic. No avoiding action will be offered. **The pilot is wholly responsible for maintaining separation from other aircraft whether or not the controller has passed traffic information.** Under a RIS, the following conditions apply:

- (a) The service may be requested under any flight rules or meteorological conditions;
- (b) the controller will only update details of conflicting traffic, after the initial warning, at the pilot's request or if the controller considers that the conflicting traffic continues to constitute a definite hazard;
- (c) the controller may provide radar vectors for the purpose of tactical planning or at the request of the pilot. However, vectors will not be provided to maintain separation from other aircraft, which remains the responsibility of the pilot. There is no requirement for a pilot to accept vectors;
- (d) the pilot must advise the controller before changing level, level band or route;
- (e) RIS may be offered when the provision of RAS is impracticable;
- (f) requests for a RIS to be changed to a RAS will be accepted subject to the controller's workload; prescribed separation will be applied as soon as practicable. If a RAS cannot be provided the controller will continue to offer a RIS;
- (g) for manoeuvring flights which involve frequent changes of heading or flight level, RIS may be requested by the pilot or offered by the controller. Information on conflicting traffic will be passed with reference to cardinal points. The pilot must indicate the level band within which he wishes to operate and is responsible for selecting the manoeuvring area, but may request the controller's assistance in finding a suitable location. The controller may suggest re-positioning on his own initiative, but the pilot is not bound to comply;
- (h) the pilot remains responsible for terrain clearance. ATSU's providing a RIS will set a level or levels below which vectors will not be provided, except when specified otherwise by the regulating authority.

**3.3 Establishing a Service**

3.3.1 In order to establish a radar service the pilot and controller must reach an 'accord'. When requesting a radar service the pilot must state the flight rules under which he is operating and whether he requires a RAS or RIS. If the controller is able to offer a service he will attempt to identify the aircraft. When he is satisfied that he has positively identified the aircraft, the controller will confirm the type of service he is about to provide, and the pilot must give a read-back of the service. **The identification procedure does not imply that a radar service is being provided and the pilot must not assume that he is in receipt of a RAS or a RIS until the controller makes a positive statement to that effect.** If a controller is unable to provide a service he will inform the pilot.

3.3.2 Should the pilot fail to specify the type of service required, the controller will ask the pilot which service he requires before endeavouring to provide any service.

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## 3.3.3 London Control - Requests for RAS or RIS

3.3.3.1 In order to avoid excessive RTF conversations on the frequencies used by 'London Control', pilots who intend to request such a service from 'London Control' are to make their initial request on the FIS frequency ('London Information') appropriate to their geographical position. The FIS controller will co-ordinate with the appropriate Radar Sector and subsequently inform the pilot whether or not a RAS or RIS can be provided and, if so, on what frequency.

3.3.3.2 Pilots should note that no RAS or RIS will be available on any London Control Frequency below FL 70. In any case a serviceable transponder will be a pre-requisite for either service.

## 3.4 Limitations of Service

3.4.1 Outside Controlled Airspace any radar service may be limited. If a radar controller considers that he cannot maintain a full radar service he will warn the pilot of the nature of the limitations that may affect the service being provided. Thereafter, the pilot is expected to take the stated limitation into account in his general airmanship. In particular, warning of the limitation will be given to the pilot in the following circumstances:

- (a) When the aircraft is close to lateral or vertical limits of solid radar cover;
- (b) when the aircraft is close to areas of permanent echoes or weather returns;
- (c) when the aircraft is operating in areas of high traffic density;
- (d) when the controller considers that the performance of his radar is suspect;
- (e) when the controller is providing service using SSR data only.

3.4.2 When a RAS or RIS is provided by an Approach Control Unit it is normally limited to a range of 40 nm from the aerodrome.

## 4 Radar Vectoring — Controlled Airspace

4.1 At certain aerodromes where the associated Controlled Airspace does not encompass the Radar Vectoring Area, aircraft may be vectored outside the notified airspace for approaches to certain runways. The aerodromes and runways to which this procedure may apply are listed below:

Aerodromes	Runways	Aerodromes	Runways
Birmingham	24	Edinburgh	30
Bournemouth	08	Leeds Bradford	14
Durham Tees Valley	05	London/City	28

**Note:** Whilst the aircraft is outside Controlled Airspace a Radar Advisory Service will be provided.

## 5 Radar Vectoring for ILS Approach

## 5.1 ICAO Reference

Doc 4444, Chapter 8, paragraph 8.9.4.

5.2 Aircraft being positioned for final approach will be given a heading to close with the localizer at a range of at least 5 nm from the runway threshold and at a level below the glide path. The pilot will be told to complete the turn on and to report established on ILS, but at this point if he requests it, ATC will give another vector to bring the aircraft on to the localizer. If the pilot wishes to lock himself on to the localizer, he must ask permission from ATC when there is still time for the action to take place without crossing the localizer.

5.3 On occasions in order to maintain the correct spacing between aircraft, ATC will deliberately vector the aircraft through the localizer for approach from the other side. Pilots will be warned when this manoeuvre is being given.

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Doc 4444, Chapter 8, paragraphs 8.6.5.2 and 8.6.5.3.

6.2 Controllers will ensure that levels assigned to IFR flights when in receipt of a Radar Control Service and to flights in receipt of a RAS will provide at least the minimum terrain clearances given below:

6.2.1 Within 30 nm of the radar antenna but excluding the Final and Intermediate Approach Area:

1000 ft above any fixed obstacle which is closer than 5 nm to the aircraft or which is situated within the area 15 nm ahead of and 20 degrees either side of the aircraft's track. These distances may be reduced to 3 nm and 10 nm respectively where official CAA approval has been promulgated. Levels assigned to aircraft during initial approach will also provide this terrain clearance.

6.2.2 Outside 30 nm from the Radar Antenna, for flights on Airways or Advisory Routes, 1000 ft above any fixed obstacle within 15 nm of the centre-line; otherwise 1000 ft above any fixed obstacle within 30 nm of the aircraft.

6.2.3 Radar Controllers have no responsibility for the terrain clearance of, and will not assign levels to, aircraft in receipt of a RIS or aircraft operating Special VFR or VFR which accept radar vectors.

**Note 1:** In sections of Airways where the base is defined as a Flight Level, the lowest usable level normally provides not less than 1500 ft Terrain Clearance.

**Note 2:** ATSUs providing a RAS outside Controlled Airspace will set a level or levels below which the service will be refused or terminated.

**6.2.4 Radar Vectoring Area Charts**

6.2.4.1 A Radar Vectoring Area is a defined area in the vicinity of an aerodrome, in which the minimum safe levels allocated by a radar controller vectoring IFR flights have been predetermined.

6.2.4.2 Charts for individual aerodromes appear at the end of this Section. Each chart shows the following:

- (a) Outline of the Radar Vectoring Area;
- (b) significant obstructions and spot heights;
- (c) minimum safe altitude within the Radar Vectoring Area;
- (d) each Final Approach Track;
- (e) aerodrome elevation;
- (f) Transition Altitude;
- (g) loss of communication procedures.

**6.2.5 Radar Minimum Altitude Charts**

6.2.5.1 ICAO (through its Obstacle Clearance Panel - OCP) has introduced new charting requirements for the application of minimum altitudes to aircraft being vectored in the vicinity of an aerodrome. In November 2004, a new Charting Standard was introduced under the title Radar Minimum Altitude Chart.

6.2.5.2 The purpose of the Radar Minimum Altitude Chart is to provide information that will enable flight crews to monitor and cross check altitudes assigned whilst receiving radar vectoring instructions. This is comparable to the function of the Radar Vectoring Area Charts.

6.2.5.3 In order to conform to the ICAO Standard, the UK intends to adopt the term Radar Minimum Altitude Chart (RMAC) and the ICAO Standard for chart design.

6.2.5.4 For the purposes of the UK application of Radar Minimum Altitude Charts, the following definition will apply:

'A Radar Minimum Altitude Chart depicts a defined area (Radar Minimum Altitude Area) in the vicinity of an aerodrome, in which the minimum safe levels allocated by a radar controller vectoring IFR flights have been predetermined.'

6.2.5.5 Current RVA charts (as shown in the AD 2-EGXX-5 pages of the UK AIP) will be renamed and progressively updated to reflect the revised RMAC design.

6.2.5.6 Further information about the criteria used in the design of RMACs will be included in a revised edition of CAP 709 that will be renamed as 'Radar Minimum Altitude Charts in the UK - Policy and Design Criteria'.

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Doc 4444, Chapter 8, paragraph 8.6.6.

7.2 Identified aircraft operating within Controlled Airspace are deemed to be separated from unknown aircraft flying in adjoining uncontrolled airspace. Whenever practicable, however, the radar controller will aim to keep aircraft under his control at least 2 nm within the boundary of Controlled Airspace.

**8 Weather Avoidance****8.1 ICAO Reference**

Doc 4444, Chapter 8, paragraph 8.6.9.

8.2 As far as possible aircraft which have planned to operate within Controlled Airspace will be vectored so that they remain at least 2 nm inside the Controlled Airspace boundary. If on the evidence of clutter on the radar display ATC considers it expedient for the aircraft to leave Controlled Airspace in order to avoid weather, the pilot will be advised and will be responsible for accepting the detour into uncontrolled airspace. If a pilot using his aircraft radar intends to detour observed weather he should when operating within Controlled Airspace obtain clearance from the radar controller to do so, and if under these circumstances it is necessary to leave Controlled Airspace the pilot shall request permission to re-join.

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