

**OCCUPATIONAL AND ENVIRONMENTAL
MEDICINE WING**

NOISE AND VIBRATION DIVISION

Report: OEM/05/25

Dated: MAY 25

**A REPORT ON A MILITARY AVIATION NOISE
CONTOUR OF AIRCRAFT ACTIVITY AT RAF
CRANWELL**



(Original signed)

██████████
Wing Commander
Officer Commanding
Environmental and Occupational Health Wing

(Original signed)

██████████
C1
Head of the Noise and Vibration Division

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**OCCUPATIONAL AND ENVIRONMENTAL MEDICINE WING
NOISE AND VIBRATION DIVISION**

ROYAL AIR FORCE CENTRE OF AEROSPACE MEDICINE

Report No: OEM/05/25

**A REPORT ON A MILITARY AVIATION NOISE CONTOUR OF AIRCRAFT ACTIVITY
AT RAF CRANWELL**

Executive Summary

1. The Noise and Vibration Division of the Royal Air Force Centre of Aerospace Medicine was tasked by Chief Environmental and Safety Officer (CESO) RAF to produce a Military Aviation Noise Contour for RAF Cranwell. This was undertaken in accordance with Joint Service Publication 418 and included station-based and visiting aircraft activity.
2. A Military Aviation Noise Contour was produced using the Federal Aviation Administration's Aviation Environmental Design Tool Version 3f.
3. The Military Aviation Noise Contour shown at Annex A should be used as a basis for assessing the noise environment around RAF Cranwell. The contour shows the combined impact of station-based and visiting aircraft at RAF Cranwell in 2017. This baseline year was chosen as it is considered a representative year of normal operations.

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- A. RAF Cranwell Military Aviation Noise Contour for $L_{Aeq,16hr}$.

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Author: [REDACTED]

INTRODUCTION

1. The Noise and Vibration Division (NVDiv) of the Royal Air Force Centre of Aerospace Medicine (RAF CAM) was tasked by Chief Environmental and Safety Officer (CESO) RAF to produce a Military Aviation Noise Contour (MANC) for RAF Cranwell.

BACKGROUND

2. RAF Cranwell in Lincolnshire is one of the RAF's busiest stations as the hub of RAF recruitment, officer training and elementary flight training. It is located beside the village of Cranwell, 3 nautical miles north of Sleaford. In 2017 (the year on which the MANC in this report is based), RAF Cranwell was home to the Grob Tutor (57 Sqn, 703 Naval Air Squadron (NAS) & East Midlands Universities Air Squadron (EMUAS)), the Grob Prefect (57 Sqn & 703 NAS) and the Beechcraft King Air (45 Sqn). Several other military aircraft also visited RAF Cranwell during 2017.

3. RAF Cranwell has two runways, 08/26 and 01/19 which 2081m long and 45m wide and 1461m long and 45m wide respectively¹.

4. An environmental noise review of RAF Cranwell was conducted in 2001 by NVDiv under the Noise Insulation Grant Scheme (NIGS). This was produced using physically measured data from 1989² and was reviewed in report OEM/79/01³.

RELEVANT LEGISLATION AND GUIDANCE

5. The primary legislation regarding environmental noise is set out in the Environmental Protection Act 1990⁴. The MOD has exemption from clause 79(1)(g) of this Act [noise and noise emitted from premises for operational and training activities so as to be prejudicial to health or a nuisance (this exemption extends to Scotland and Northern Ireland)]. MOD policy regarding environmental noise is outlined in JSP 418 Leaflet 04-1: Environmental Noise⁵, which states that the MOD must mitigate, as far as reasonably practicable, the effects of the environmental noise which its activities produce.

¹ UK MIL AIP, CRANWELL/CRANWELL NORTH, AD 2-EGYD-1-1, dated 21 May 2020.

² Wimpey Report: ER0325/11, 12 dated 18 Sep 1989.

³ NVDiv Report: OEM/79/01, dated 7 Dec 2001.

⁴ Environmental Protection Act 1990.

⁵ JSP 418 Leaflet 04-1: Environmental Noise.

6. The MANC at Annex A was created in accordance with the Environmental Noise Regulations 2006, No. 2238, Statutory Instruments⁶.

SCOPE AND DISCUSSION

7. The MANC at Annex A includes combined total aircraft flight movements for station-based and visiting aircraft at RAF Cranwell during 2017. It also includes Engine Ground Run (EGR) operations for station-based aircraft.

8. Areas of higher noise on station are visible due to EGR activity undertaken for necessary maintenance.

ANALYSIS

9. The MANC detailed at Annex A was created using the Federal Aviation Administration's (FAA's) Aviation Environmental Design Tool (AEDT). This is an internationally recognised noise prediction packages that is used for the modelling of civil/commercial aircraft operations. AEDT 3f was used, which allows a three-dimensional geometric model of the airfield to be constructed including the runway, flight tracks and aircraft flight profiles⁷. Aircraft noise models work by taking a core dataset of Noise-Power-Distance (NPD) source levels and then predicting the noise levels emitted from the modelled aircraft.

10. To produce a representative MANC, station held data is required (e.g. aircraft movement figures). In accordance with JSP 418, this data must cover a period of at least 12 months. The RAF Cranwell station data used to produce the MANC at Annex A was taken from 01 Jan 17 – 31 Dec 17. The baseline year of 2017 was chosen as it is considered a representative year of normal operations. The total number of aircraft flight movements over this period was obtained from Air Traffic Control (ATC) and broken down into Average Daily Movement (ADM) figures.

11. Flight tracks, profiles and EGR data was supplied to NVDiv by station personnel from EMUAS, 45 Sqn, Central Flying School (CFS) and ATC.

12. AEDT contains built-in aircraft flight profiles from the International Civil Aviation Organisation (ICAO), Base of Aircraft Operation version 3, and the Air Noise and Performance (ANP) databases from the European Union Aviation Safety Agency. These databases were utilised alongside custom defined profiles to model all aircraft.

13. General airfield data such as runway end locations and elevations was obtained from AIDU publications⁸.

RESULTS

14. The RAF Cranwell MANC is shown at Annex A. This contains a contour for the $L_{Aeq,16hr}$ – 16-hour averaged noise metric.

⁶ Environmental Noise Regulations 2006, No. 2238, Statutory Instruments.

⁷ Altitude, speed and engine power setting at different distances from the runway threshold.

⁸ UK MIL AIP, CRANWELL/CRANWELL NORTH, AD 2-EGYD-1-1, dated 21 May 2020.

RECOMMENDATIONS

15. It is recommended that the MANC at Annex A is used as a basis for assessing the noise environment around RAF Cranwell.



ANNEX A TO
OEM/05/25
DATED MAY 25

Key

- 54dB $L_{Aeq, 16hr}$ contour.
- 57dB $L_{Aeq, 16hr}$ contour.
- 60dB $L_{Aeq, 16hr}$ contour.
- 63dB $L_{Aeq, 16hr}$ contour.
- 66dB $L_{Aeq, 16hr}$ contour.
- 69dB $L_{Aeq, 16hr}$ contour.
- 72dB $L_{Aeq, 16hr}$ contour.



RAF CENTRE OF AEROSPACE MEDICINE
NOISE AND VIBRATION DIVISION
OEM WING
RAF HENLOW
BEDFORDSHIRE
SG16 6DN

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