

**OCCUPATIONAL AND ENVIRONMENTAL  
MEDICINE WING**

**NOISE AND VIBRATION DIVISION**

Report: OEM/08/17

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A REPORT ON A MILITARY AVIATION NOISE  
CONTOUR OF F15MK/C AND F15MK/E AIRCRAFT  
ACTIVITY AT RAF LAKENHEATH

Approved for publication

*(Original signed)*



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 AVIATION MEDICINE**

Report No: OEM/08/17

**A REPORT ON A MILITARY AVIATION NOISE CONTOUR OF F15MK/C AND F15MK/E AIRCRAFT  
ACTIVITY AT RAF LAKENHEATH**

**EXECUTIVE SUMMARY**

1. The Noise and Vibration Division of the Royal Air Force Centre of Aviation Medicine was tasked by [REDACTED] to conduct an environmental aviation noise model and produce a Military Aviation Noise Contour based on current F15MK/C and F15MK/E aircraft activity at RAF Lakenheath.
2. Concerns have been raised about the noise levels, generated by aircraft activity at RAF Lakenheath.
3. Using the Federal Aviation Administration's Integrated Noise Model, version 7.0d, 16-hour  $L_{Aeq}$  noise contours at 72, 66 and 63dB were produced. These contour levels are in accordance with those specified in Joint Service Publication 418.
4. It is recommended that the noise contours shown at Annex A are used as a basis for assessing the noise environment around RAF Lakenheath.



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# OCCUPATIONAL AND ENVIRONMENTAL MEDICINE WING

## NOISE AND VIBRATION DIVISION

### ROYAL AIR FORCE CENTRE OF AVIATION MEDICINE

Report No: OEM/08/17

#### A REPORT ON A MILITARY AVIATION NOISE CONTOUR OF F15MK/C AND F15MK/E AIRCRAFT ACTIVITY AT RAF LAKENHEATH

Authors: [REDACTED]

#### INTRODUCTION

1. The Noise and Vibration Division (NVD) of the Royal Air Force Centre of Aviation Medicine (RAFCAM) was tasked at Reference A by [REDACTED] to conduct an environmental aviation noise model and produce a Military Aviation Noise Contour (MANC) based on current F15MK/C and F15MK/E aircraft activity at RAF Lakenheath to the contour noise levels specified at Reference B.

#### BACKGROUND

2. RAF Lakenheath is a U.S. flying station situated in Suffolk, approximately 20 miles northeast of Cambridge, 6 miles North of RAF Mildenhall and 26 miles South of RAF Marham. It is home to Europe's only F15 fighter wing.

3. RAF Lakenheath has one runway (06/24), which is 2743m long and 46m wide.

6. The last environmental noise survey of RAF Lakenheath was conducted in October 2015 and is detailed at Reference C.

#### RELEVANT LEGISLATION

7. The main legislation regarding environmental noise control is set out at Reference D. The MOD has exemption from clause 79(1)(g) of the EPA 90 [smoke 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 set out at Reference B, which states that the MOD must mitigate, as far as is reasonably practicable, the effects of the environmental noise which its activities produce. The environmental aviation noise model in Annex A, was created in accordance with the Environmental Noise Regulations, 2006, No. 2238, Statutory Instruments, specified at Reference E.

9. The MANC is based on the 16 hour, equivalent, Sound Pressure Level (SPL) ( $L_{Aeq,16h}$ ) noise contours of 72, 66 and 63dB(A) specified at Reference B.

## **LIMITATIONS AND EXCLUSIONS FROM THE SCOPE**

10. The noise model includes F15MK/C and F15MK/E aircraft activity *only* as this is considered to be the dominant source of aviation noise emitted at RAF Lakenheath.
11. The noise model includes Engine Ground Run (EGR) operations as well as flight operations.
12. The noise model does *not* include aircraft activity originating from RAF Mildenhall.

## **ANALYSIS**

13. The noise contours were produced using the Federal Aviation Administration's Integrated Noise Model (INM), which is an internationally recognised noise prediction package and is used extensively within the UK for civil/commercial aircraft operations. INM 7.0d is the latest version which allows a 3-dimensional geometric model to be constructed including the runway, flight tracks, aircraft flight profiles and Engine Ground Run (EGR) operations. Aircraft noise models work by taking a core data set of aircraft Noise-Power-Distance (NPD) source noise levels and then predicting the noise impacts emitted from the modelled aircraft.
14. In order to produce a representative MANC, the required data must cover a period of at least 12 months, in accordance with Reference B.
15. F15MK/C and F15MK/E flight profile data was gathered and entered into INM 7.0d as custom flight profiles, as opposed to using the pre-set flight profiles built into INM.
16. Remaining data such as runway end locations and elevations was obtained from Reference F.
17. The total number of aircraft flight movements for the period 1 Oct 15-30 Sep 16 was obtained from Air Traffic Control (ATC) flight movement logs and 48<sup>th</sup> Fighter Wing operations logs and broken down into Average Daily Movement (ADM) figures, based on a flying year of 220 days. The total number of EGRs for the period Oct 15-Oct 16 (from the beginning of Oct 15 to the end of Oct 16) was also obtained and broken down into ADMs.

## **ASSUMPTIONS**

18. The F15MK/C and F15MK/E were modelled as one aircraft because both use the Pratt & Whitney F100 series engine and both use the same flight profiles. Therefore they are both considered to have the same NPD curves and noise profiles.

## **RESULTS**

19. The resulting noise contour is shown at Annex A.

## **RECOMMENDATIONS**

20. It is recommended that the MANC with noise contour levels of 72, 66 and 63 dB  $L_{Aeq,16hr}$ , shown at Annex A, is used as a basis for assessing the noise environment around RAF Lakenheath.

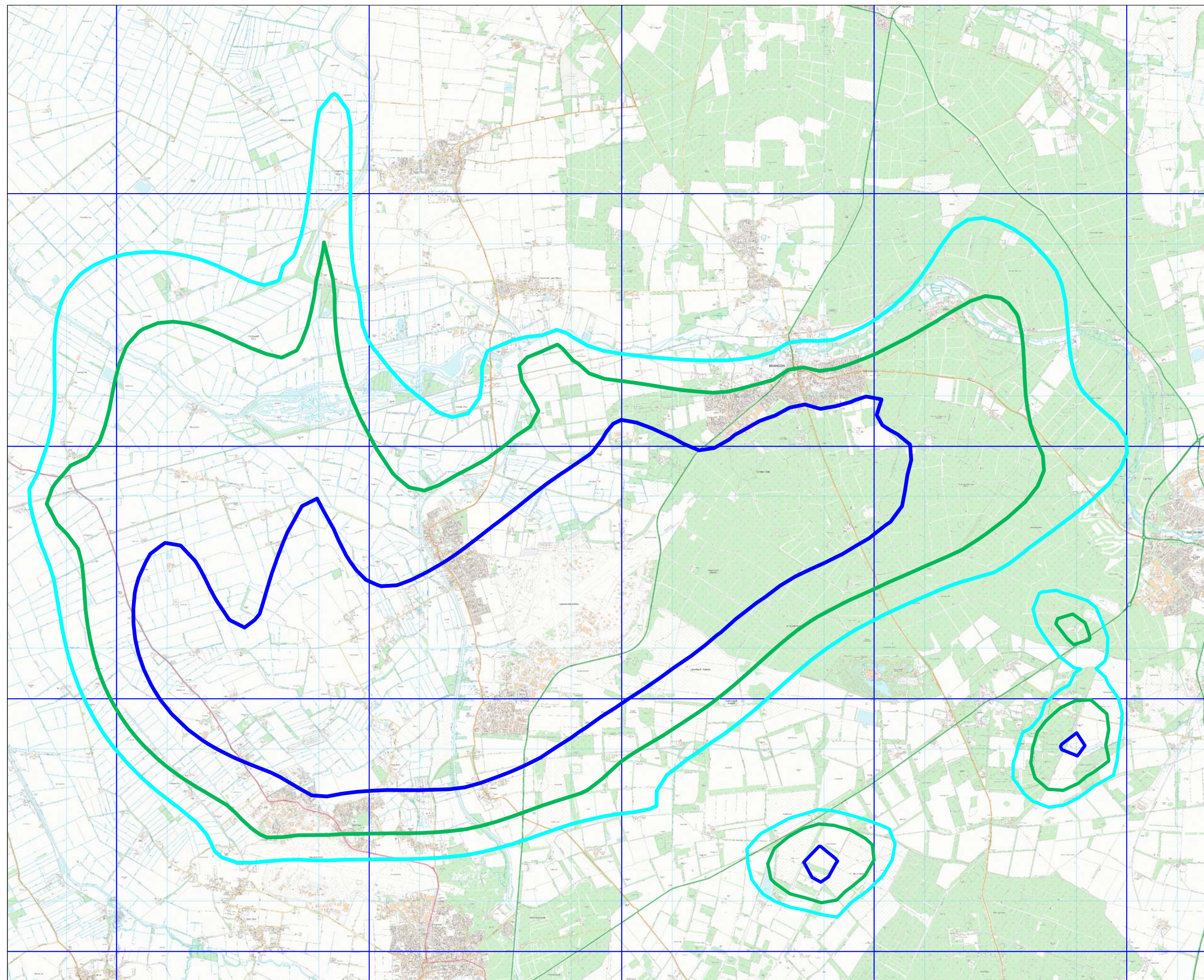
## **ACKNOWLEDGEMENTS**

21. NVD would like to thank the personnel of RAF Lakenheath who assisted with the data collection to support the production of the MANC.




## **REFERENCES**

- A. [REDACTED]
- B. JSP 418 Leaflet 04-1: Environmental Noise.
- C. RAF CAM Report No. OEM/47/15, dated Oct 2015.
- D. Environmental Protection Act 1990.
- E. Environmental Noise Regulations, 2006, No. 2238. Statutory Instruments
- F. UK MIL AIP AD 2 – EGUL – 1 – 1 10 DEC 15.





Key

-  - 72dB L<sub>Aeq,16h</sub> Contour.
-  - 66dB L<sub>Aeq,16h</sub> Contour.
-  - 63dB L<sub>Aeq,16h</sub> Contour.



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