



DEPARTMENT OF THE AIR FORCE
6TH AIR MOBILITY WING (AMC)
MACDILL AIR FORCE BASE, FLORIDA

20 November 08

MEMORANDUM FOR NOAA

FROM: 6 AMDS/SGPB

SUBJECT: Octave Band Analysis during Flight

- Background:** On 7 Nov 08, SrA Hernandez from the Bioenvironmental Engineering Flight conducted an octave band analysis of the G4 Aircraft in-flight during a mission to attain data on Hurricane Paloma in order to establish a baseline and assist NOAA with their decision to purchase new computer equipment for their aircraft. The octave band analysis was conducted in accordance with DOD Instruction 6055.12, *DOD Hearing Conservation Program* and AFOSH Standard 48-20, *Occupational Noise and Hearing Conservation Program*.
- Survey Instrumentation:** Quest Model 2700 (serial #HUB090020) with an OB-100 Octave Band Filter (serial HWB100010) was used to conduct the survey. These instruments were calibrated by PMEL on 31 Jan 08 (calibration valid for two years). Please note, the Octave Band Filter is only calibrated from the 125 Hz – 8000 Hz range.
- Findings:** Measurements were obtained from the all workstations throughout the aircraft during ascent and descent. Measurements were as follows:

Ascent:

Frequency Evaluated (Cockpit)	Measured Sound Level dB (A)	Measured Sound Level dB (C)
31.5 Hz	41.6	64
63 Hz	56.4	76.2
125 Hz	57.6	71.3
250 Hz	68.7	90.6
500 Hz	73.1	80.2
1000 Hz	72.8	75.3
2000 Hz	66.1	65.3
4000 Hz	63	57.8
8000 Hz	60.8	49.2
16000 Hz	45.2	50.8

Frequency Evaluated (Cabin)	Measured Sound Level dB (A)	Measured Sound Level dB (C)
31.5 Hz	44.2	62.5
63 Hz	57.3	74
125 Hz	57.8	73.7
250 Hz	65.2	85.3
500 Hz	69.9	79.2
1000 Hz	71.4	77.6
2000 Hz	71.6	72.1
4000 Hz	67.5	64
8000 Hz	63.6	59.9
16000 Hz	50.1	54.2

Frequency Evaluated (Aft)	Measured Sound Level dB (A)	Measured Sound Level dB (C)
31.5 Hz	43	72.5
63 Hz	54.8	77.6
125 Hz	67.9	75.8
250 Hz	72.4	77
500 Hz	75.1	79.1
1000 Hz	71.1	74.3
2000 Hz	70.9	67.2
4000 Hz	64.2	67
8000 Hz	59.3	63.4
16000 Hz	52.3	59.2

Cruise:

Frequency Evaluated (Forward)	Measured Sound Level dB (A)	Measured Sound Level dB (C)
31.5 Hz	41.9	76
63 Hz	57.3	82.4
125 Hz	72.9	75.5
250 Hz	67.8	76.1
500 Hz	71.8	73.5
1000 Hz	68.4	68.6
2000 Hz	68.2	60.6
4000 Hz	59.2	56.3
8000 Hz	53.6	52.8
16000 Hz	47.5	58.1

Frequency Evaluated (Cabin)	Measured Sound Level dB (A)	Measured Sound Level dB (C)
31.5 Hz	42.2	77.2
63 Hz	49.9	79
125 Hz	71	76.2
250 Hz	71.2	74.8
500 Hz	69.5	72.6
1000 Hz	65.2	70
2000 Hz	66.1	65.5
4000 Hz	62.7	65.8
8000 Hz	62.3	59.8
16000 Hz	58.4	60.1

Frequency Evaluated (Aft)	Measured Sound Level dB (A)	Measured Sound Level dB (C)
31.5 Hz	44.3	76.5
63 Hz	48.2	78.2
125 Hz	68.9	77.6
250 Hz	69.8	75
500 Hz	67.5	75.3
1000 Hz	63.1	74.6
2000 Hz	67.6	72.2
4000 Hz	68.2	70.3
8000 Hz	64.1	65.8
16000 Hz	60.4	64.5

Descent:

Frequency Evaluated (Forward)	Measured Sound Level dB (A)	Measured Sound Level dB (C)
31.5 Hz	41.9	76
63 Hz	57.3	82.4
125 Hz	72.9	75.5
250 Hz	67.8	76.1
500 Hz	71.8	73.5
1000 Hz	68.4	68.6
2000 Hz	68.2	60.6
4000 Hz	59.2	56.3
8000 Hz	53.6	52.8
16000 Hz	47.5	58.1

Frequency Evaluated (Cabin)	Measured Sound Level dB (A)	Measured Sound Level dB (C)
31.5 Hz	43.1	74.2
63 Hz	56.6	78.8
125 Hz	64.8	77.6
250 Hz	69.9	78.5
500 Hz	72.4	76.2
1000 Hz	71.1	72.7
2000 Hz	70	67.3
4000 Hz	62.5	63.2
8000 Hz	54.6	61.1
16000 Hz	50.2	61.2

Frequency Evaluated (Aft)	Measured Sound Level dB (A)	Measured Sound Level dB (C)
31.5 Hz	41.3	73.5
63 Hz	48.5	77.6
125 Hz	53.4	77.5
250 Hz	62.3	79.1
500 Hz	69.1	78.6
1000 Hz	70.3	75.7
2000 Hz	71.2	71.4
4000 Hz	65.3	67.3
8000 Hz	60.2	64.8
16000 Hz	55.7	64.3

4. **Conclusion:** The highest decibel level during the mission was 75.1 dB (A) which occurred at a frequency of 500 Hz during the ascent. This high value can attest to the fact that the reading was taken at the rear of the aircraft where the jet engines are located. According to AFOSH Std. 48-20, *Occupational Noise and Hearing Conservation Program*, when noise levels are within a range of 70-80 dB (A) person to person communication is satisfactory only up to 2 ft with raised voices, anything above that will become difficult. However, since all members use communication headsets, this should not be a problem. Please be aware that 85 dB (A) is the hazardous noise limit and warrants hearing protection, however noise levels for this mission were well below this level. If you have any further questions concerning this evaluation, please contact SrA Hernandez at 7-9570.



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cc: 6 AMDS/ SGPM