

Acoustic Bioeffects Research for Non-Lethal Applications

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Funded by the US Army and the National Institute of Justice, the US Air Force Research Laboratory conducted bioeffects research on acoustics for non-lethal applications.

Four narrow-band, high-intensity acoustic devices were tested: (1) compressed-air-driven siren (CADS); (2) combustion-driven siren, Dismounted Battlefield Battle Laboratory (DBBL); (3) impulsive acoustic device, Sequential Arc Discharge Acoustic Generator (SADAG); and (4) a complex waveform generator, the Gayl Blaster. The CADS significantly affected the equilibrium performance of some rhesus monkeys, probably due to the substantial airflow produced by the siren. The effects of the DBBL siren on goal-directed behavior of goats were both minimal and transient. Exposure to the SADAG failed to significantly effect equilibrium performance in rhesus monkeys. It did have a marked impact on the operant behavior of swine, but this could have been due to non-acoustic factors, such as the light, flash, and ozone associated with SADAG operation. The Gayl Blaster had no effect on operant behavior in goats.

We used four devices: to test low-frequency effects (1) Mobil Acoustic System (MOAS); (2) subwoofer speakers (SWS); (3) industrial pressure chamber (TEAM); and (4) a custom acoustic chamber, Infrasound Test Device (ITS). The only potentially useful effect was an apparent panic response shown by rhesus monkeys in the ITS at greater than 160 dB.

Other than producing brief startle and distraction, and possibly annoyance at longer duration, audible acoustic energy appears to have little utility for non-lethal applications. The panic response we saw in monkeys might be a useful, but the required intensity of infrasound would probably be hard to sustain in the “battlespace” at any distance. Modulated acoustic energy still needs to be evaluated for non-lethal applications.

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