

Sonic weapon deterrents would-be aggressors

Developed after al-Qaeda's 2000 attack on the *USS Cole* off Yemen, the Long Range Acoustic Device (LRAD) is a loudhailer and warning system that enables military and police authorities to control crowds and clear buildings, while luxury cruise liners can ward off pirate attacks

Volume control: High-pitched warning tone or message
151dB at 1 metre, full power
105dB at 500m
95dB at 1,000m
(Smoke alarm 80-90dB)

Maximum effective range:
300m over land,
500m over water

Microphone: For voice communication

MP3 player: Stores and plays back messages and warning tones

Phraselator: Translates spoken messages into different languages

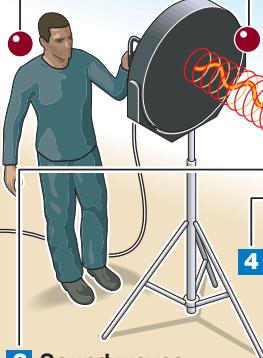
CROWD CONTROL

1 Operator:

Unaffected behind dish

2 Speaker dish:

Emits tightly-focused sonic "beam" at 15-30° angle



3 Sound waves:

Two ultrasonic waves travel at slightly different frequencies

4 Target: Waves combine when they meet object or person. Original sound heard at that point with almost no loss in clarity

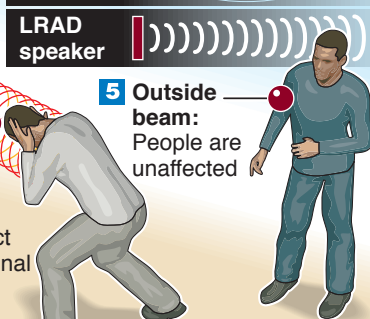


Standard speaker

LRAD speaker

5 Outside beam:

People are unaffected



Warning tone can cause nausea or fainting

