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***Discussion Forum 1***

***Acoustic Weapons and Hailing Devices***

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# **1. Infrasound**

**1990s: new interest**

**Several devices built and tested, re-discovered what had already been found and published in the 1960s:**

- No impressive effects of infrasound even at very high levels**
- Very difficult to produce considerable levels outside**

**Most R&D cancelled**

## **2. Audio Frequencies**

**Pain close to permanent hearing damage**

**⇒ Systems for communication/hailing and warning**

**Long Range Acoustic Device: to 700 m**

**148 dB at source; guidelines: no full power on targets closer than 15 m**

**Problems: background noise beyond 100 m, in vehicle -30 dB insertion loss**

**At road checkpoints: combine with optical warning**

**Better device: array of traditional loudspeakers, stronger low frequencies**

**Different type: directed stick radiator – linear array, narrow beam**

### **3. Affect Subjects by Noise Type – Psychoacoustic**

#### *Annoying*

**Strongest if unpredictable**

**Tests: some distraction, some slowing, some acceleration**

**Stronger effects: testing at higher levels needed – workplace regulation too strict, attempt to get permission to test at 130 dB (short duration)**

#### *Soothing*

**Before situation gets problematic: play music making people more friendly – culture-specific**

**(Weapon?)**

## **4. Vortex Rings**

**Not acoustic – torus of rotating air „rolling“ on outside air**

**Limited momentum**

**Potential for transport of aerosols – but other means may be more practical**

## **5. Conclusion**

**“It seems unlikely that high-intensity acoustic energy in the audible, infrasound, or low-frequency ranges will provide a device suitable to be used as a non-lethal weapon” (Jauchem/Cook 2007)**

**The final word is not yet out – there may be a possibility for annoying noise at higher levels to provide sufficient distraction**

**Active participation from people who have developed or tested acoustic devices:  
Air Force Research Laboratory (USA), Fraunhofer-Institut für Chemische  
Technologien (Germany), Pennsylvania State University (USA),  
Wehrtechnische Dienststelle 52 (Germany)**

**2 reviews published (Altmann 1999/2001, Jauchem/Cook 2007)**