**The Sonic Eye: A device for ultrasonic human echolocation**

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**Introduction: Echolocation**
- Many non-human animals, and even some blind humans, use active echolocation vocalizations to aid in navigation and object perception.
- The **Sonic Eye** presents users with rich ultrasonic echolocation cues that are not otherwise available to humans, or difficult to control.
- Minimal processing of cues exploits the auditory system's inherent ability to process spatial and object information.

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**Information Flow Overview**

**Sonic Eye Prototype**
- Single centrally placed ultrasonic emitter
- Artificial pinnae (mimicking bat ears) capture elevation information
- PC generates waveforms, manages GUI and processes echo input
- Time-stretched output through stereo earbuds

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**Preliminary Behavioral Data**
- One sighted blindfolded volunteer localized a 30cm disk held at various positions at a 1m distance.

*Detection* was perfect (absences always reported).

*Localization* was above chance, with 72% of responses within one sector of the correct location.

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**Future Directions**
We will characterize the envelopes of object detection, localization, discrimination, and navigation; refine the user interface for on-line user customization of echo parameters (e.g. tone, rate, intensity); and move to more robust, compact hardware and software platforms.

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**Emitter/Mic Power Cones**

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**Pulse & Echo Spectrograms**

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**Configuration (100 trials) Responses**