

Be the bat (electronically)

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Outline

- Take initial measurement
- What is echolocation?
 - Human echolocation
 - echolocation in signal processing
- In class measurements

In class measurement

underwater acoustics



- Detection and localization of underwater sources
- Sea bottom surveys
- Acoustic communications ...



how the system works

- Microphones measure tiny changes in atmospheric pressure caused by sound waves
- Sound has to travel fast
 - What is the speed of sound?
- Speed of sound relates travel time to distance



range of object

- $c = 343$ meters / second
- Travels 34.3 centimeter per millisecond
- Close enough to 1 foot per millisecond

