

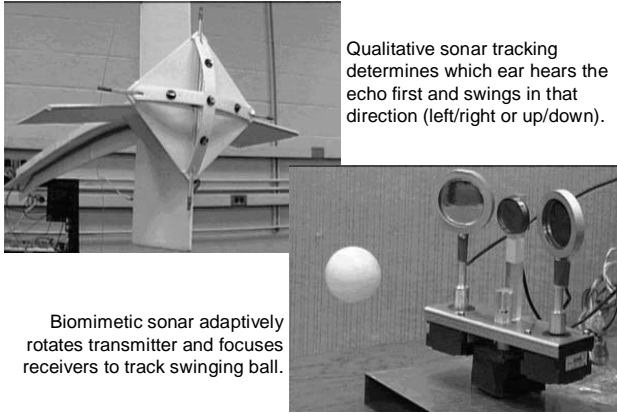


Intelligent Sensors Laboratory

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Tracking sonars

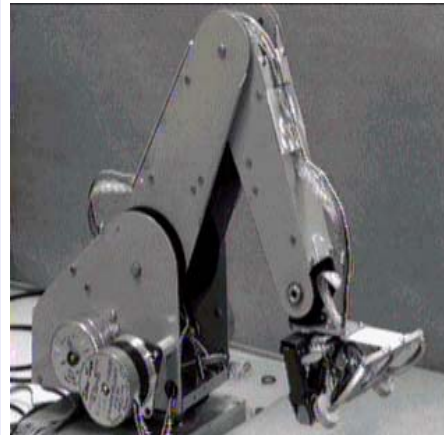


Qualitative sonar tracking determines which ear hears the echo first and swings in that direction (left/right or up/down).

Biomimetic sonar adaptively rotates transmitter and focuses receivers to track swinging ball.

Robot dolphin – Rodolph

Rodolph is arguably the most sensitive robot in the world. It can differentiate the head and tail sides of a coin from echoes with 6 mm wavelength.



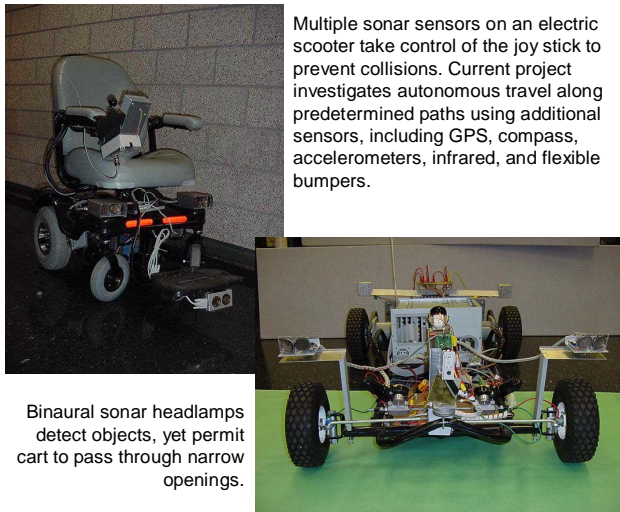
Robot motion controlled by echoes to detect and approach object, and then position it at a repeatable location with respect to the sonar.

Sonar-guided camera

Horizontal and vertical sonar arrays control pan/tilt mechanism to point camera toward closest object. Microcontroller and battery are contained in base.



Obstacle avoidance sonars



Multiple sonar sensors on an electric scooter take control of the joy stick to prevent collisions. Current project investigates autonomous travel along predetermined paths using additional sensors, including GPS, compass, accelerometers, infrared, and flexible bumpers.

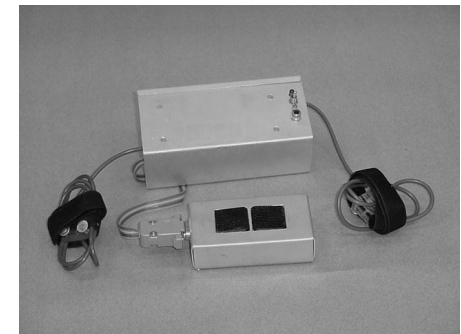
Binaural sonar headlamps detect objects, yet permit cart to pass through narrow openings.

Center transducer emits probing acoustic pulses. Ears focus on object to maximize echo bandwidth for optimal recognition.



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Vibrotactile travel aid for the blind



Binaural sonar vergence provides a robust indication on whether an object lies to left or right of the sonar axis through vibrating motors shown at end of cables. Blind users can recognize landmarks, to perceive motion, and to classify plants.