ACOUSTIC DIRECTION FINDING SENSOR ASSESSMENT

Mentor: Dale Joachim Electrical Engineering and Computer Science 217 Stanley Thomas Hall 504-862-3297 E-mail: joachimd@tulane.edu

Project Description:

In this project we use closely positioned microphones to estimate the location of sound source emitters. This design is part of a miniaturization project that will shrink a complete acoustic direction finding sensor into an inch-sized dice. Large-scale prototypes designed in the laboratory will be tested in this summer's student project.

Project Objectives:

The LS-LAMP sponsored student will design a web-based test suite for a large scale acoustic direction-finding sensor, investigate the performance of smaller geometries by modifying the algorithms and the current apparatus, and will determine the performance limits on the algorithm and associated processing environment. The student will also design an apparatus for testing the tracking potential of a system comprising of two or more direction finding sensors, a computer and a pan-tilt-zoom camera.

Acoustic direction-finding sensors "listen" to sounds and estimate the direction-of-arrival (DOA, the direction from which the sound was emitted) of a particular sound source. In a sound source localization environment, several DOAs are processed simultaneously to estimate the spatial location of a sound emitter.

The student will design a test suite to assess the performance of the apparatus in finding the DOAs of different sounds and locations. This experiment will provide researchers in the laboratory the data necessary to improve on the existing design. The students (depending on their background) may participate in the enhancement projects.

In addition to the localization experiments, the student will design an apparatus for testing the tracking potential of a larger system of sensors and programmable steerable camera for movable sound sources. This apparatus design will involve mechanical/electrical components, as well as "Matlab" programming.