

CELLULAR TELEPHONE BROADCASTING AND RECORDING STATION

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

Project Description:

As part of a development effort to remotely monitor wildlife, we have proposed cellular telephone communication as transport methods for sound and data to/from a central laboratory to remote stations. These remote stations include cellular telephone, necessary analog and digital logic (including digital signal processing) electronics to effectively broadcast and record environmental sounds.

Project Objectives:

The scope of the LS-LAMP's participation includes remote broadcast and recording system design, field tests of the broadcast apparatus, and performance assessment of the data embedding system.

The student will design an attachment to the telephone earbud capable of broadcast and recording in an outdoor environment (an telephone conferencing system for the outdoor environment). This attachment must be robust and operational for relatively distant sounds over a 360-degree azimuth range and 180-degree elevation (up/down). The design will include analog devices for signal conversion and power conditioning and monitoring, all using a minimum amount of power. The design may be an improvement/adaptation of existing solutions or a new technology idea.

Field test will include environmental sounds simulations by people (a person/team outdoors producing the sounds) while the sounds are verified inside the laboratory. Then the outdoor team will monitor and relay outdoor sounds (as ground truth) to the laboratory.

The effectiveness of the system will be tested in conjunction with the help of ornithology experts: the students and experts will monitor (bird) responses to particular artificially generated vocalization. These tests will determine the adequacy of cellular telephones as communication methods to wildlife.

The student(s) will also test the remote data embedding (say temperature sensing) system by measuring remote sensing data and comparing it to the laboratory numbers.

Prerequisites:

Understanding of basic analog electronic circuit. Working knowledge of microcontrollers desirable. Understanding of cellular communication channel or sound acoustics is an added advantage.