



# Automated bird and amphibian species identification computer program

07-345

## Background:

Our understanding of biological systems is inadequate because our knowledge is based on very limited spatial and temporal coverage. In most biomes, data collection is concentrated in a few sites (e.g. research stations), and this highly aggregated distribution of information limits our ability to understand large-scale ecological processes and to properly manage large areas. From both a conceptual and management perspective there is an urgent challenge to increase biological data collection over large areas and this will create a need for new data management and analytical tools.

## Objective:

To meet this challenge, the objectives of this project during the first year were to produce: 1) a prototype of an inexpensive wireless remote automated digital recording system that will continuously monitor bird and amphibians calls and 2) an open source program for automated species identification.

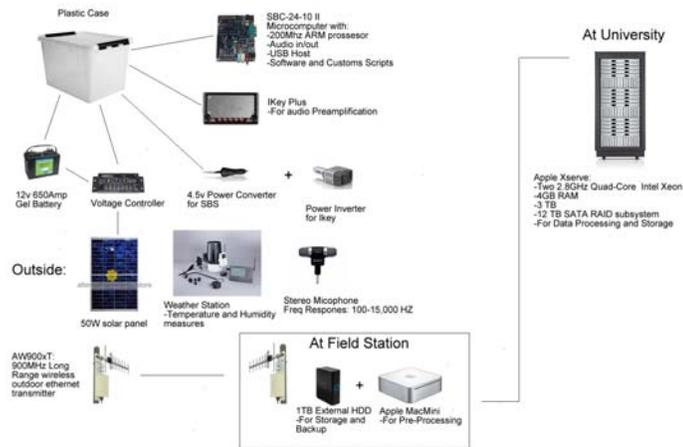


Figure 1. Permanent recording station.

## Summary of Approach:

The project team includes a group of biologists (PI, Ph.D. graduate student, and an undergraduate student) and computer scientists (CoPI, MS graduate student, and an undergraduate student). During the first year of this project we have dedicated most of our effort to developing the hardware and software. We have developed working prototypes of both the portable and permanent recording stations, they have been field tested, and during the second year we will be deploying them to three DOD installations. A web-based interface has been developed that allows the user to visualize, listen, and annotate recordings. The system is being test by the team and will be available to the public during the next year.



Figure 2. Portable recording station.

## Benefit:

The project will benefit the military mission by greatly reducing the costs of biodiversity monitor and at the same time improve the quantity and quality of the data. In addition, the information produced by the system, could easily be incorporated into public outreach and education activities at each installation.

## Accomplishments:

We have established permanent recording stations (Fig. 1) at the University of Puerto Rico Primate Research Station in Sabana Seca and at the El Verde Research Station in the Luquillo Mountains. Both sites are working well, recording one minute of sound every ten minutes, 24 hours/day. We now have over 10,000 recordings from each site. In addition to the permanent recording stations, we have developed portable recording stations (Fig. 2) that record one minute every ten minutes for two days. In terms of software development, we have developed the database structure to receive the recordings and to store all analyses. The major advances in the analyses component have been: 1) developing a web interface for visualizing, listening, and annotating the recordings, 2) automating the signal detections, 3) developing the statistical analysis for grouping similar calls for species identification, and 4) developing the algorithms for automating species identification.

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