

CAPSTONE PROJECT: *Portable Digital Stethoscope*

Project Purpose: In recent discussions with the Primate Research Laboratory at Holloman AFB, there is a need to extend the recently-completed digital stethoscope project for use with the primates at the facility. The current design would need to be modified to be appropriate technology for use in the primate lab where the animals can be expected to try to play with the wiring and other activities that would not be found in a human setting. The students would need to work with the primate scientists as the “customers” for the project.

Project Schedule:

- Begin spring 2009
- Project end date – December 2009

Funding Sources:

- ECE capstone design funds.

Disciplines Needed:

- Power (batteries, power distribution, power control)
- Data acquisition (sensor data acquisition and component control)
- Communications (it is expected that the revised unit will probably need wireless components such as Bluetooth)
- Electronics (sensors and support electronics)
- Systems Engineering (requirements, test, evaluation, verification, project control)

Project Constraints:

- Safety (electrical and structural) – must meet IACUC
- System form factor must meet customer specifications

Number of students desired: 3 to 5

Faculty Sponsor: Stephen Horan & Charles Creusere

Methodology:

1. Student team will need to meet with the animal care customers to develop needs, constraints, and performance requirements
2. Student team will need to develop detailed mission requirements and mission success criteria
3. Student team will need to develop subsystem concepts and associated subsystem requirements
4. Students will need to produce a design that addresses customer needs and constraints

5. Student team will need to develop an engineering prototype to work out hardware and software, develop assembly and test procedures, and run simulated operations
6. Student team will need to assemble and validate a working prototype unit with the primate laboratory.

Project deliverables:

1. Mission statement
2. Acceptance criteria
3. Requirements documents document and verification matrix
4. Software and hardware design details (analysis, schematics/drawings, parts list)
5. Working prototype by CDR
6. Assembly procedures
7. Test procedures
8. Working payload by launch integration date

Project Reviews:

1. System Concept Review
2. Preliminary Design Review
3. Critical Design Review
4. Launch Readiness Review
5. Final Review

Outreach Requirements:

1. Student team will be required to present the project to at least one precollege group/visit
2. Students will need to make a 5-minute (maximum) video describing the project and showing it working