Project ReSaLT, Respiration Sensing and Logging Technology

Sponsor: Dr. Dan Carey, professor of Health and Human Performance at the University of St. Thomas.

Sponsor's Mission: Dr. Carey is currently conducting research on physiological markers of the anaerobic threshold and identifying the effects of gastric bypass surgery on weight loss, body composition changes and metabolism.

University of St. Thomas School of Engineering Academic Advisor:
Dr. AnnMarie Thomas

Team Member Names:
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Senior Design Clinic I-II (ENGR 480-1) 2007-8 Project Mission Statement: Project ReSaLT, Respiration Sensing and Logging Technology, has as its objective it to develop an integrated system for measuring human respiration rates. This information can be used in a variety of ways including physical training for athletes as well as detection of breathing abnormalities, an example of which is sleep apnea.

Major Design Requirements:

1. User can use this device at home or in the gym, as opposed to needing to be in a lab.
2. User can play back and analyze recent respiratory rates.
3. A real time display so that the user can see their current respiratory rate.
4. A clock implementation for user to see statistics about when specific events occurred.
5. System should store respiratory data for minimum of 8 hours.
6. Display updates at a minimum of 30 seconds.

Senior Design Project Summary:

The two primary components of our proposed system are a chest sensor and a receiver. The role of the chest sensor is to detect the outward and inward movement of the chest which correlates to respiration. The sensor will transmit information over a wireless connection to a receiver each time a respiratory unit is detected. The type of receiver used will depend on the application in which the sensor is used. Athletes would benefit from a receiver that resembles a wrist watch and displays current respiratory rate. Patients being tested for sleep apnea could better utilize a Personal Data Assistant or personal computer as a receiver to store the raw data, and plot the respiration rate over a specified time interval. Different components were tested before a final decision was reached. The system was tested in simulations that we felt matched the environment that it would be used. They started off basic, sometimes testing different parts separately, until we got closer to what we wanted our actual design to be. We then tested this system as a whole against Dr. Carey's equipment for accuracy. This allowed us to debug our system and create a working final design.