Senior Design Project Data Sheet

Project #	Project Name	Project Track	Project Family
14026	Portable Emergency Ventilator	Biomedical Systems and Technologies Track	Medical Device
Start Term	**Team Guide**	**Project Sponsor**	**Doc. Revision**
Fall 2013	Edward Hanzlik	Jeff Gutterman Roman Press	1

Project Description

Project Background:

A Portable Emergency Ventilator (PEV) is a device that can provide positive pressure ventilation to a person who is incapable of breathing on their own. In the early 1990s, a PEV device known as the Mediresp-III was developed by Jeff Gutterman and Roman Press. Nearly two decades later, Rochester Institute of Technology adopted the project and Multidisciplinary Senior Design Team 13026 was assigned the task of updating the device. Currently, a third revision is under development by team 13027 in order to enhance the features of the Mediresp-IV. Hence, as the technology for this device continues to develop there exists a growing need for a test system capable of measuring the functionality of the PEV prototypes. The team assigned this task will be divided into several subgroups, namely mechanical and electrical, and all members will be given different component level tasks.

Problem Statement:

Design and develop a system to test and record flow rates, pressure levels, and oxygen concentration while providing a way to make adjustments to tidal volume, residual lung volume, lung compliance, and airway resistance to simulate the human respiratory system under both normal conditions and conditions of disease.

Objectives/Scope:

1. Design functional test fixture that simulates an active lung
2. Record and measure test data on Mediresp-III, Mediresp-IV, and Mediresp-V
3. Testing will cover neonatal up to adult patients at room temperature (24ºC)

Expected Project Benefits:

- Provide measurements and data for UUT's
- Prove or disprove that prototypes are meeting standards
- Provide comprehensive data on the functionality of the prototypes including prevalence of errors
- Apply and develop team's engineering knowledge

Core Team Members:

- Kristeen Yee– Project Manager (IE)
- Michael Allocco (ME)
- Danielle Koch (ME)
- Andrew Miller (ME)
- Soham Chakraborty (EE)
- Leslie Havens (EE)
- Stephanie Zambito (EE)

Deliverables:

- Functional test fixture simulating the pulmonary system
- Recorded measurements and test data to support product to market of the PEV

Strategy & Approach

Assumptions & Constraints:

1. Team must first understand how ventilation is performed.
2. Team understanding of how the current PEV device aids in this process.
3. Working with an existing model will help the team understand its functions, and also help in the testing of the device.
4. Team will focus on design issues critical to meeting engineering requirements and customer needs.
5. Testing will comply with FDA 510k and follow standards for breathing machines (ANSI Z79.7), adult and infant lung care (ISO 5469:1967), and ventilators for use in critical care (ASTM F 1100-90).
6. Proposed budget: $1,000.

Issues & Risks:

- This project is a new area of study for most, which limits knowledge and experience.
- This project is a branch off of a current project.
- How to obtain both appropriate and working components.
- How to design customized components and have them work within an automated system.
- Lead time from part orders can lead to delays.
- Testing may lead to unexpected and unaddressed concerns.