

Senior Design Project Data Sheet

06Project #	Project Name	Project Track	Project Family
P09026	Hemodynamic Flow Simulator II	Biomedical Engineering	
Start Term	Team Guide	Project Sponsor	Doc. Revision
2008-1	Dr. Phillips	Dr. Phillips	1.3

Project Description

Project Background:

Hemodynamic Flow Simulator is a modular system that replicates the flow and pressure related to the hemodynamic system. The long term goal of this project is to analyze and redesign some of the features of the module and make it fully compliant to customer's needs. The prototype designed by project P08026 team would be utilized in an attempt to achieve a final unit which is both self contained and aesthetically pleasing. In addition, the module should be able to perform in equally well, in educational and research applications.

Problem Statement:

The primary objectives of this project are to redesign the pump to its initial requirements, redevelop the data acquisition software and develop computer control for all system parameters. In addition, the final product must be self contained, and easy to transport from one classroom to another.

Objectives/Scope:

1. Initially, the pump must be redesigned in order to better replicate the pumping of the heart, which includes appropriate blood pressure and volume from the heart.
2. The final product must contain a data acquisition system that would monitor blood pressures, volumes, flow rates at desired locations. In addition, the measured data must be easily accessible to the user.
3. Furthermore, develop a computer system that would allow a user, access to all the parameters of the flow simulator. Hence, providing the user with a better control of the entire unit.

Deliverables:

- To have a portable, aesthetically appealing, and fully functioning re-modeled blood flow simulator that would appropriately replicate the operations of the heart (left-ventricle).

- To have a fully remodeled Graphical User Interface that would provide users full control of the unit, and is simple to operate.

Expected Project Benefits:

- The module would provide faculty members with a tool that may be utilized for instructional purposes.
- This will soon incorporate the testing of the school's LVAD prototypes to prove their effects of the circulatory system.

Core Team Members:

- Alexander Baxter
- Joseph Featherall
- Mark Frisicano
- Clarissa Gore
- Liliane Pereira
- Jonathan Peyton
- Gaurav Zirath

Strategy & Approach

Assumptions & Constraints:

1. Simulate actual flow rates and pressures as produced by the human heart.
(*ie. Match pressure waves in aorta and left ventricle, other properties to be emulated by the system include proper system resistance and compliance.*)
2. Must provide electrically and mechanically safe operation.
3. Must be portable, easy to transport from one class to another.
4. Heart chamber must be easily visible and data must be clearly displayed and recorded for use.

Issues & Risks:

- Redesigning the pump in an attempt to replicate the blood flow of the human heart.
- Developing a GUI that would allow user to fully control the system, including flow rates, and blood volume.