

# **Testing System for a Pressure Sensitive Cardiovascular Catheter**

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**Team Members:**

**Danielle Ebben  
Erik Yusko  
Anthony Wampole  
Anita Zarebi**

**Client:**

**Colette Wagner  
Nancy Sweitzer, M.D., Ph.D.**

**Advisor:**

**Professor William Murphy**

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## I. Abstract

Blood pressures within the heart and surrounding vessels are often measured using catheters that are equipped with pressure transducers. The accuracy of blood pressure measurements from these catheters has been called into question as calibration data is not provided by the manufacturer. A product is needed to calibrate and verify the pressure transducer measurements while simulating in vivo conditions.

A product is being developed to encase the catheter in saline solution while achieving pressures up to 200mmHg. An air pump increases pressure in the chamber through manual or micro-controller control. Pressure in the chamber is monitored with an additional pressure transducer imbedded in the tank.

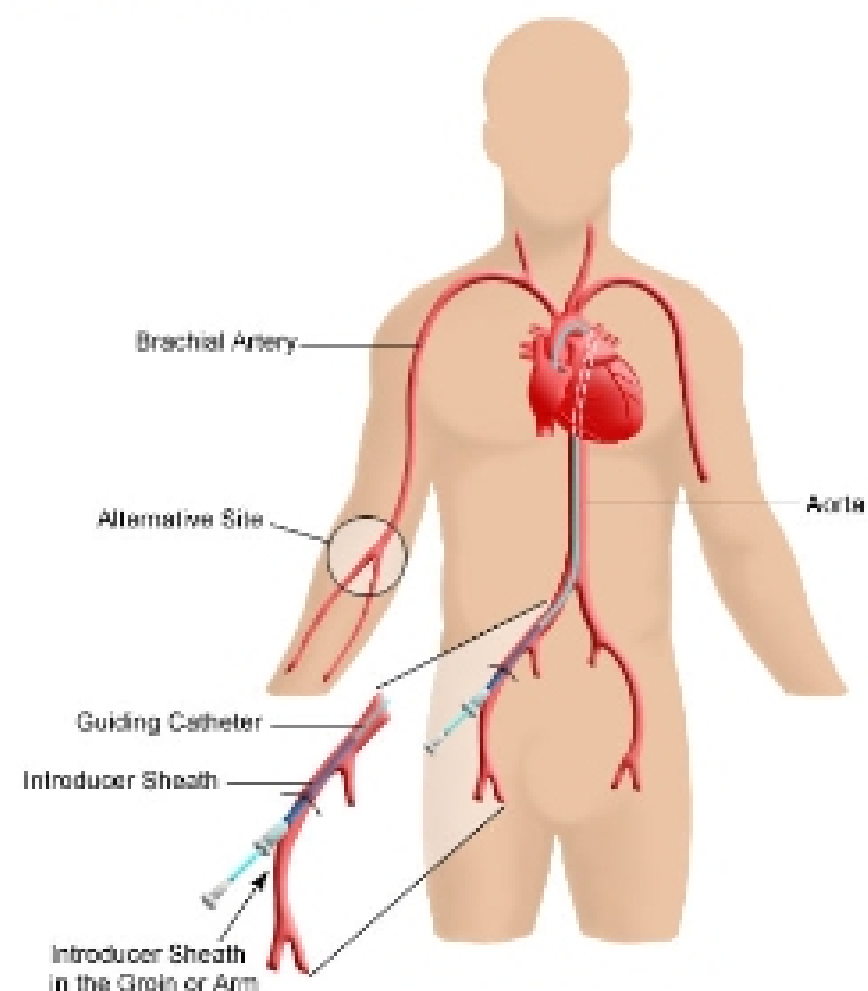
In a second-generation prototype a feedback loop will pressurize the chamber to a value specified by the user via a pressure sensor, micro-controller, and air pump.

## II. Problem Statement

Internal blood pressures within the heart and surrounding vessels are typically measured with catheters that are equipped with pressure transducers. Properly calibrated catheters are required to ensure valid blood pressure measurements during diagnosis and clinical trials. Current calibration techniques are thought to be unreliable. A product is needed to calibrate and verify catheter pressure transducer measurements while simulating in vivo conditions.

## III. Background

The traditional process of catheter use in cardiovascular surgery begins with a one hour evaluation of the patient's heart and body. After consent for surgery is granted, the catheter is guided into the heart via the femoral artery and aorta (Figure 1). A drug is then administered to lower the pressure within the heart's walls. Finally, pressure measurements are obtained with the catheter. Clinical trials are being conducted by our client to verify a new blood pressure monitoring technology. The pressure readings of the new technology are compared to those given by the catheter and EKG. The readings between these devices are expected to be nearly identical (within 2 mmHg). However,



**Figure 1: The catheter is inserted into the aorta and guided into the heart [1].**