Catheter Rotation Measuring Device

FAMU-FSU Engineering

Vivian Bernard | Sarah Churchwell | Lauren Kazzab | Katelyn Kennedy Zach Leachman

Samuel McMillan | Diana Shaughnessy | Hunter Walsh

Biosense Webster
PART OF THE Johnson & Johnson FAMILY OF COMPANIES

Mission

Build a measurement device that measures manual inputs and evaluates those inputs against a 1:1 promise.

Distal end of a catheter does not match the inputs at the proximal end.

Assumptions

- Demographic that will benefit from the success of the project will be those with heart issues.
- Measuring Device will only be designed to be applied to the Biosense Webster Catheters.
- One catheter will be used at one time.

Targets

Detect Deflection

- Product will detect the distal end output translation and puller wire orientation with an accuracy of **0.5 degrees**.

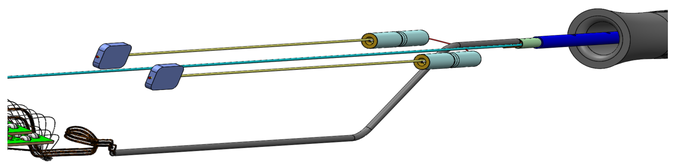
Reproducibility

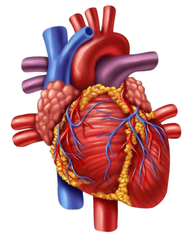
- Product can be used more than once.
- Product can be replicated following procedure.

Stabilization

- Product will be made of either **metal or wood** to ensure a firm foundation to test within.

What is a Catheter?





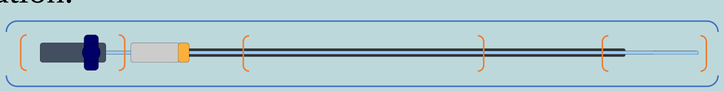
- A cardiac catheter is used in medical procedures to diagnose or treat certain heart conditions.
- The team will not be changing the internal hardware of the Biosense Webster Catheter.
- Using stepper motors, the Senior Design team will create a mold for the handle and use stepper motors to adjust the torsional input in 15-degree increments.

Key goals

- Design a testing rig.
- Stable and Consistent fasteners.
- Develop a measurement extraction procedure.
- Measure the catheter's torsional deflection.

Functions

- The main functions identified are sensibility, data collection, compatibility, and environment simulation.
- The most critical function was deemed to be sensibility, encapsulating detects rotation, detects translation, detects deflection, is dependent on a live-positioning visual, and ensures stabilization.



Current Testing

- The team recently conducted a wet lab with the sponsor and his team to better understand how a catheter moves within flesh.
- Experiment was run in mixture of only water – important to note the Senior Design team will be using a mixture of water and glycerol.

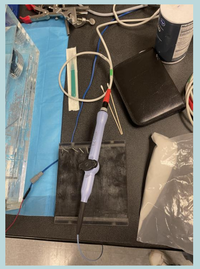


Image Analysis

- Current analysis will be recorded and tracked using MATLAB.
- Videos of the catheter's distal end will be recorded, analyzed, and compared with the true torsional movement.
- ANOVA test will be used to validate data.

Future work

- Spring Project Plan.
- Prototype development.
- Construct mold for handle.
- Continue analysis of image processing.
- Trip to Gainesville to witness live-procedure.