FAMU-FSU College of Engineering

Senior Design Team 103
Biosense Webster Catheter

Sarah Churchwell & Samuel McMillan

Team Introductions

Vivian Bernard
Biomedical Engineer

Sarah Churchwell
Mechanical Design Engineer

Lauren Kazzab
Biomedical Engineer

Katelyn Kennedy
Biomedical Engineer

Zach Leachman
Biomedical Engineer

Samuel McMillan
Electrical Engineer

Diana Shaughnessy
Mechanical Design Engineer

Hunter Walsh
Electrical Engineer

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Sponsors and Advisor

Development Mentor
Charles Lindholm
Director of R&D

Engineering Mentor
Amar Patel
R&D Engineer II

Academic Advisor
Stephen Arce, Ph.D.
BME Professor

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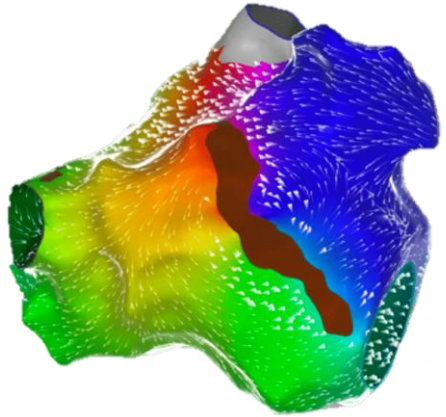
Biosense Webster



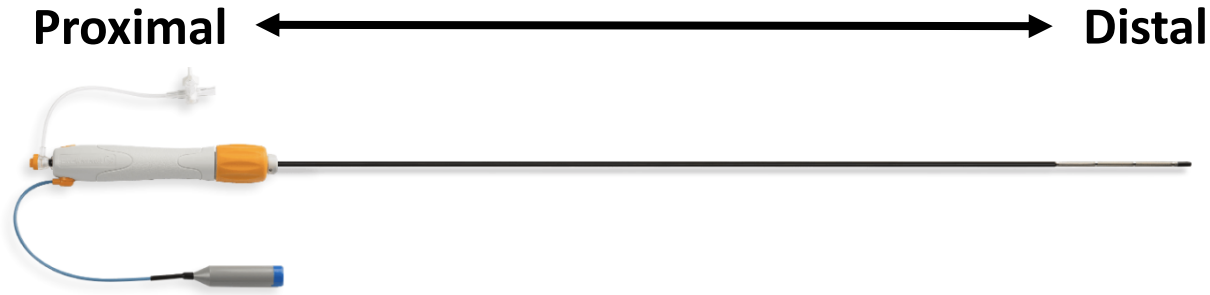
Biosense Webster®
PART OF THE Johnson & Johnson FAMILY OF COMPANIES

"At Biosense Webster, Inc. we have one goal –
To help those with cardiac arrhythmias live the lives they want."

Sarah Churchwell

Objective

Design, build, and test a measurement device that measures manual inputs at the proximal end of a catheter and evaluates those inputs against a promise of a 1:1 translation of those inputs at the distal end.



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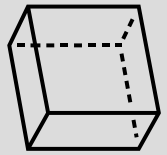
Key Goals



Develop the testing arena that will be utilized for all proceeding manners

Determine the torsional deflection using the developed measuring system

Read the signals of angular deflection with a +/- 0.5° of freedom

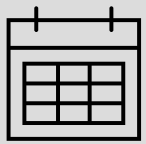
Sarah
Churchwell=

Primary & Secondary Markets

Primary			Secondary
Cardiac Surgeons	**Cardiology Researchers**	**Cardiology Centers**	**Biotech Resell Companies**
			

Assumptions

Demographic that will benefit from the success of the project will be those with heart issues (ex. Atrial Fibrillation)



Prototype will be design and in-production by the end of Fall 2023

Measuring Device will only be designed to be applied to the Biosense Webster Catheters

Stakeholders

Engineering Mentor
Shayne McConomy, Ph.D.
ME Senior Design Coordinator

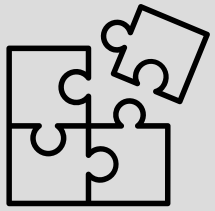
Engineering Mentor
Jerris Hooker, Ph.D.
EE Senior Design Coordinator

Development Mentor
Charles Lindholm
Director of R&D

Sponsor Company
Johnson & Johnson
Family of Companies

Customer Needs

Compatibility

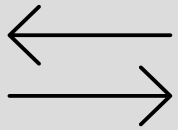


1:1 Rotational

Promise

Measures

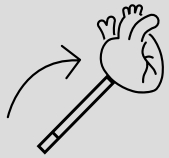
Translation



- Compatibility allows for a more concise and efficient way to measure across catheters
- Ensure that rotation at proximal end matches output at distal end
- Translation is just as crucial to the measurements as rotation

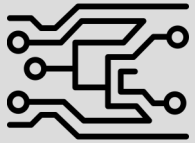
Customer Needs Cont.

Simulated Environment of Veins



Sensor Interchangeability

Non-invasive Electronics

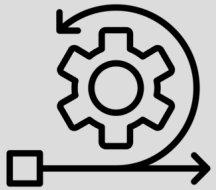


- Allows for more real-life augmented prototyping and testing
- Multiple tips of catheters that the sensors will need to be able to adapt with
- Electronics will not interfere with the user's ability to use the catheter

Customer Needs Cont.

Collect and Analyze Data

Maintains Functionality



Sensor Durability

- Procedure will be developed to allow for consistent, reliable, and valid results
- Measuring device does not interfere with the catheter's current functions/abilities
- Sensors can withstand movement through the vein and in the heart without getting deteriorated

Functional Decomposition

Customer Needs

↓

Main Functions/Systems

Develop Testing Arena

- Environment Simulation

Read the Signals of Angular Deflection

- Live-Positioning Visual

Main Functions/Systems

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Functions/Subsystems

Environment Simulation

- Veinal Replication
  - Sterilization
  - Stabilization

Functional Decomposition Table

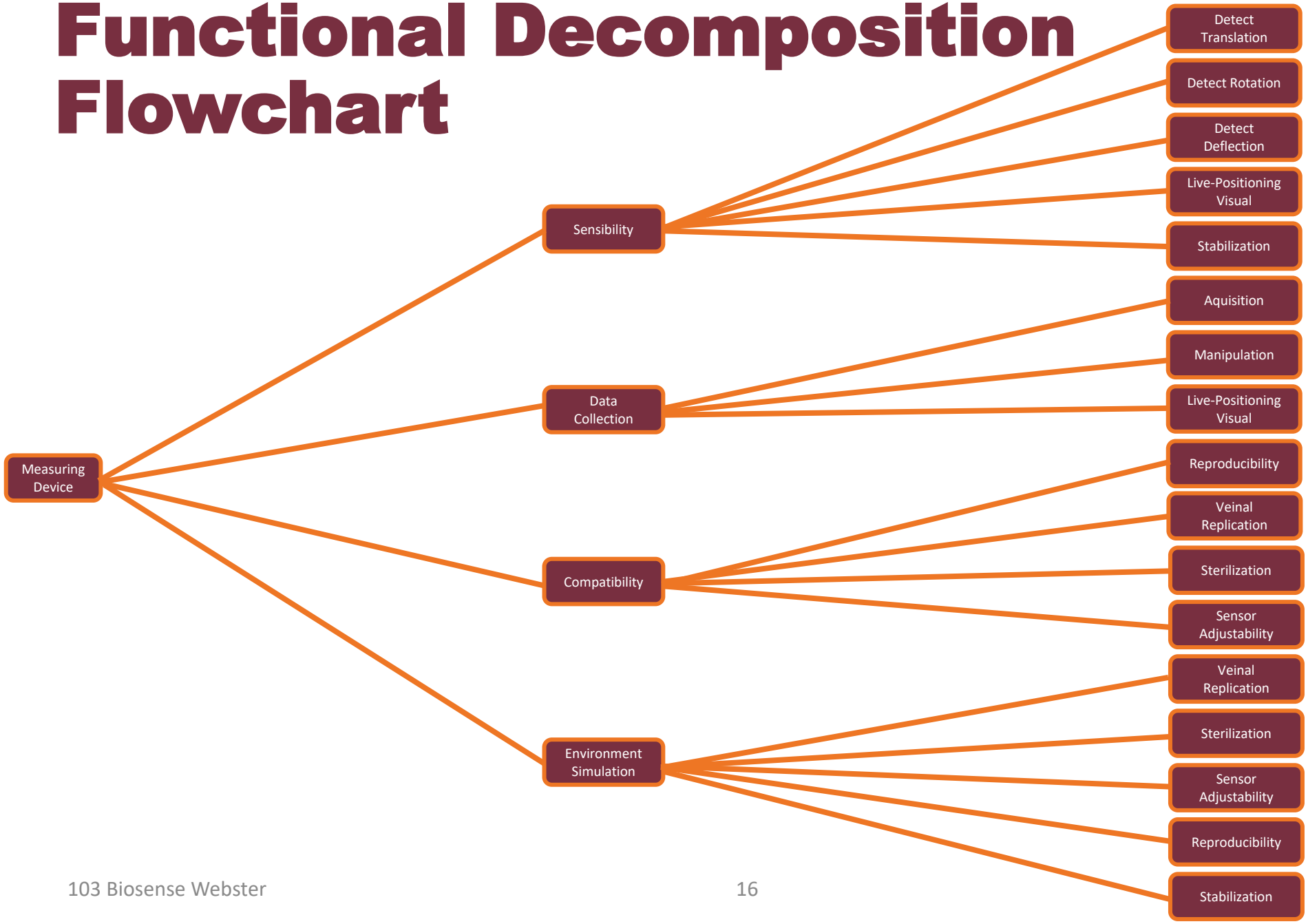
Functional Cross Reference Table				
	Sensibility	Data Collection	Compatibility	Environment Simulation
Detects Translation	x			
Detects Rotation	x			
Detects Deflection	x			
Data Aquisition		x		
Data Manipulation		x		
Live-Positioning Visual	x	x		
Veinal Replication			x	x
Sterilization				x
Sensor Adjustability			x	x
Reproducibility		x		x
Stabilization	x			x

Function Interrelations

- Live-Positioning Visual
- Sensor Adjustability
- Veinal Replication
- Stabilization

Functional Cross Reference Table				
	Sensibility	Data Collection	Compatibility	Environment Simulation
Detects Translation	x			
Detects Rotation	x			
Detects Deflection	x			
Data Aquisition		x		
Data Manipulation		x		
Live-Positioning Visual	x	x		
Veinal Replication			x	x
Sterilization				x
Sensor Adjustability			x	x
Reproducibility		x		x
Stabilization	x			x

Functional Decomposition Flowchart



Samuel McMillan

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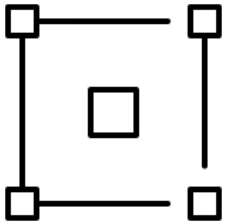
Prioritization

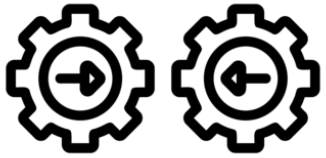
Sensibility

Environment Simulation



Data Collection

Compatibility

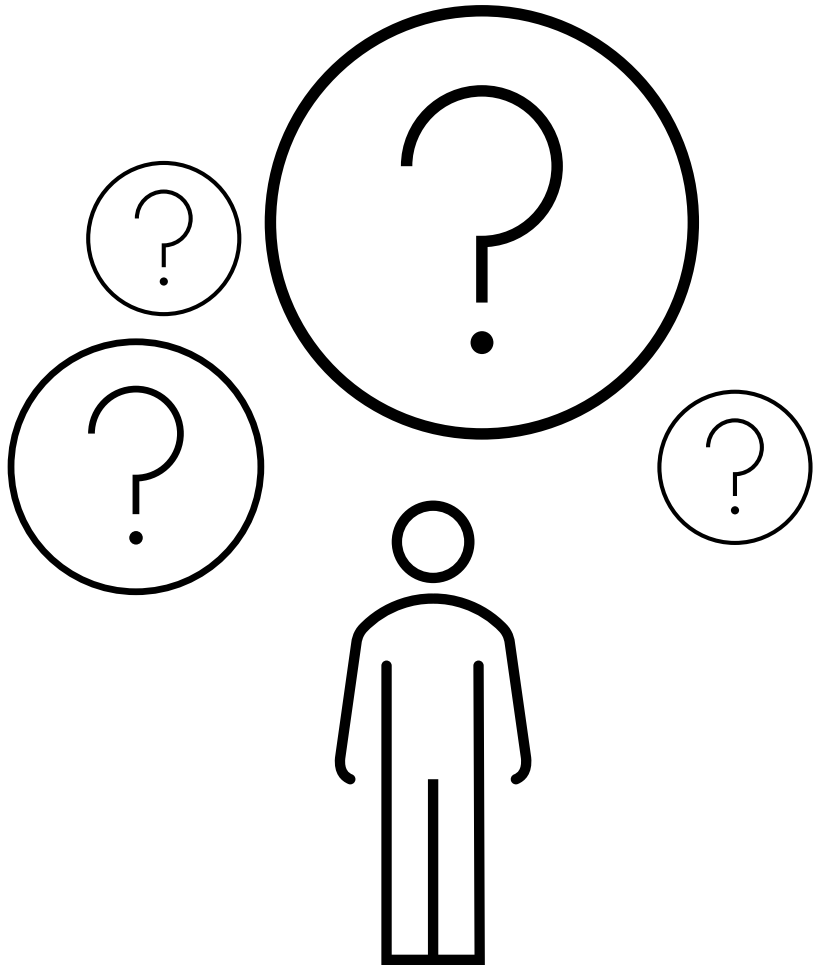


Future Work

- Targets (11/3)
- Concept Generation (11/10)
- Concept Selection (11/10)
- Risk Assessment (11/24)
- Bill of Materials (12/4)
- Spring Project Plan (12/8)

Questions?

Thank you for listening!



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