

Progress Report Week 10: Week of November 6th to November 12th 2008

Liver Phantom for MRI Guided Trans-arterial Chemoembolization Simulation

Client: Dr. Wally Block Ph.D. University of Wisconsin – Biomedical Engineering Department
Advisor: Dr. William Murphy Ph.D. University of Wisconsin – Biomedical Engineering Department
Team: Benjamin Engel, Leader
Ryan Carroll, BWIG
Eric Printz, Communicator
Justin Schmidt, BSAC

Problem Statement

Liver cancer treatment can often involve higher, more targeted doses of chemotherapy if delivered directly to the liver. Professor Block's MRI lab is integrating capabilities to guide cancer treatment to the liver using magnetic resonance imaging. Current x-ray treatments significantly over treat the liver because while x-ray can be useful in the visualization of catheters, they can't visualize soft tissue, specifically the tumor. It is proposed to develop a liver phantom that will simulate the arterial vessels of the abdomen as well as the liver in an effort to simulate treatments and train interventional radiologists on the use of the new MRI guided techniques. The project will include adding flow capabilities through the use of a programmable fluid pump to simulate pulsatile flow.

Week 10 Goals

- Create and finish vasculature (depending on arrival of parts)
- Begin creation of enclosure (depending on arrival of parts)
- Further research and possibly purchase Labjack data acquisition unit for flow pump control
- Look into necessary amplification to increase Labjack analog signal from the range of -5 to 5 to -10 to 10
- Finalize parts list for remaining parts

Week 10 Activities

Team Member	Accomplishments	Hours	Running Total (Hours)
Benjamin Engel	Team meeting, vascular creation, continued to research analog signal output/ amplification techniques, helped develop parts list	6	40.5
Ryan Carroll	Team meeting, vascular creation, helped develop parts list	5.5	43.5
Justin Schmidt	Team meeting, client meeting, vascular creation, began constructing enclosure (practice runs) to develop technique, helped develop parts list, sent in parts orders	6.5	40.5

Eric Printz	Team meeting, helped develop parts list, vascular creation, responded to client requests	6	40
--------------------	--	---	----

Week 10 Accomplishments

- Significant progress in vascular creation (waiting on more parts to finalize)
- Developed parts list to complete phantom and sent in purchase
- Researched analog signal amplification and determined best method to boost analog signal from LabJack DAQ to be suitable for controlling the pump
- Began developing technique for enclosure creation (will continue with this approach)

Week 11 Goals

- Create and finish vasculature (depending on arrival of parts)
- Begin/finish creation of enclosure
- Once finished begin mounting connectors and vasculature within enclosure
- Build amplification circuit on LJ Proto Board for future use
- Study software that arrives with LabJack to determine how to program analog sinusoidal waveforms to the analog output terminal (may require coding in C)

Schedule

Scheduled
Completed
Monday of Required Presentation

	9/1	9/8	9/15	9/22	9/29	10/6	10/13	10/20	10/27	11/3	11/10	11/17	11/24	12/1	12/8	12/15
Propose project																
Conduct background research																
Discuss parameters w/ client																
Develop PDS																
Brainstorm/solidify design ideas for initial prototype																
Midsemester presentation																
Order materials																
Construct prototype																
Safety Testing/improvements																
Usability Testing w/ interventional radiologists																
Final Presentation Preparation																
Final Paper																

Project Difficulties

- Again waiting on our second large order of parts, but progress is continuing.

Expenses

- Currently do not have detailed list of expenses. This will be added at a later time.