

Progress Report Week 9: Week of October 30th to November 5th 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 9 Goals

- Write program for control of relay switch
- Experiment with relay switch and program and flow pump
- Continue vasculature creation
- Receive parts for creation of enclosure and begin construction
- Set up meeting with client to discuss lab space, and any difficulties

Week 9 Activities

Team Member	Accomplishments	Hours	Running Total (Hours)
Benjamin Engel	Team meeting, vascular creation, research in Labjack DAQ units for flow pump control	6	34.5
Ryan Carroll	Team meeting, client meeting, vascular creation	5.5	38.5
Justin Schmidt	Team meeting, client meeting, vascular creation, research of box construction	6	34
Eric Printz	Set up team client meeting, requested lab space at WIMR, vascular creation.	6	34

Week 9 Accomplishments

- Contacted and met with client to further discuss approach
- Successfully created multiple vascular junctions (waiting on parts for further work)
- Requested keycard access to WIMR building and lab space
- Discussed approach to controlling flow pump through use of analog signal. (current relay switch approach was deemed insufficient)
- Contacted support at company called Labjack who makes data acquisition and signal developing devices controlled by computer program
- Discussed vascular details with liver surgeon (little insight due to variability)

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

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

- We are currently at somewhat of a standstill due to the lack of parts. We didn't expect them to take this long to arrive and will need to increase our work when parts arrive.

Expenses

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