Research Completed

As nobody in our group has any experience gardening with hydroponics we had a considerable amount of learning to do before beginning our project. We began by talking with professors and persons in industry about general design considerations and possible sensor choices, in addition to doing general web research over winter break. We quickly found a fantastic beginners guide to hydroponic gardening which gives a basic overview of pretty much everything involved in the process of growing indoors. Found locally, Santa Cruz Hydroponics has been a great resource for both sourcing our components and drawing upon their employee’s knowledge base.

When asking for reccomentations for literature from both Santa Cruz Hydroponics and Steve Frambro there was one book recommended above all other for beginners, “Gardening Indoors with Soil and Hydroponics” by George F. Van Patten. This 384 page book has 670 full color illustrations and has been an invaluable resource for pretty much every aspect of our design, from giving us an idea of the ideal levels for our enviromental factors to how often the air in our room needs to be recirculated. Van Patten’s book devotes several chapters to different types of hydroponic setups and various methods of controlling the enviroment to encourage healthy and happy plant growth. This tome has helped us tremendously and has earned its reputation as “the bible”amongst indoor gardeners.

We identified pH and conductivity sensors as a problem point early on, and soon after our project was approved we sent an email to Doug Au of MBARI asking for help in choosing a pH sensor. We received confirmation that in situ pH sensors are notorious for losing their calibration after a few months in solution. It was pretty evident from this point that a commercial system for monitoring pH and total dissolved solids was our only real solution.

We were debating the merits of hacking the data output of a compto pH/TDS meter into our micro when we discovered Atlas Scientific while searching on the internet. It seems their company really specializes in enviromental monitoring projects and had sensors that can interface easily with a microcontroller via UART for ph/TDS/dissolved oxygen and even sells solar panels and charge ciruits for off grid monitoring. After another week or so of discussion it seemed pretty clear that there was no other competitor for pH monitoring and we ordered a kit which came with sensor and calibration solutions. After we found how easy the Atlas sensors were to use we ordered the TDS sensor as well for our nutrient monitoring. Several weeks later we were so happy with our first two atlas sensors we purchased their submersible temperature sensor as well.

Speaking to Santa Cruz Hydroponics has consistantly been a great source of information and guidance for our project. They have a huge selection of everything one needs to equip an indoor garden, and have provided us our water table, pumps, reservoir, and interior coating so far. We expect to be purchasing the bulk of our remaining equiment from them as well, as they have very competetive pricing and are happy to demo whatever we are purchacing in store as well as answer any of our questions. When we were purchasing our water table serveral weeks ago an employee talked through our project with us, showed us similar large scale commercial solutions, and even drilled out holes for our pump and drainage from the reservoir in store.

Justin had a similar web controlled relay project completed in fall quarter which gave some insight into how our final communcation between web-server and rasperry pi would work for remote control. He has also has been talking with Luca De Alfaro in the computer science department about wheter it will be best to adapt last quarters Web2py based project for our uses or start from scratch with another web framework such as Django or Drupal. Additionally it is still not clear if approaching this with a web server hosted externally is the best solution as the raspberry pi can act as a full fledged web server on its own.