

10/24/2018

Meeting minutes

Team members in attendance

Mareyna, Dev, and Dr.Law

New Business-

Brandon presenting his new "Reese's rotating" Design to group

Carissa presents new update on syringe design, replacing syringes with twist top Eppendorf tubes that are Forensic DNA Grade

Discussion-

Positive to look at new ideas- Dr.Law

Remarks on Reese's Design:

- This device collects through media- where does the air exit? These need to be thought out and this also conflicts with the compressed gas motion idea for sealing.
- Dr. Law is sceptic of the rotation "This is a beginning of an idea. But needs to be expanded."
- Gause Johnson laboratory, first floor has the wind tunnel to test Reese's Design
- Maybe two different collection medias could be advantageous for the first flight simulation to determine which is the superior collection media. Filter paper has been determined to be the easiest we have determined there is approximately 1 microbe in each liter of air

Pros of accent sampling- more time, more stable

- ***It seems the team agrees that we want to carry on with all designs intending to sample on the accent.***

Pros of decent sampling- more air flow velocity.

Going Over Eppendorf Design-

- **10³- 10⁴ total cells per cubic meter are in the stratosphere**
- This information is from Mareyna. This is VERY key information, after calculating microbial density we are looking at 1-10 microbes in one liter of air (**m³=1000L**)
- This fact leads us to TOSS out the Eppendorf and syringe design
- Mareyna thinks not having DNA media is not a peril problem

Fornia Lab- Life Science South on campus is where the DNA replication and sequencing is done.

(PCR is preset for how many amplifications of DNA is done when the sampling is being tested in the lab)

Going over the Microcontrollers-

You do need licensed to have radio and communications, we need amateur radio licenses

- Dev says if we have a device that does not interrupt signal, Lowest priority signal, we do not need license. Talk to Caleb about how this process works, he can put you in contact with people of the communications.
- battery source must survive the environment. Team currently used 14.7 Volts
- Get cost estimate for iridium tracking
- keep this simple Joe-law doesn't seem to like the Reese's design.
- design review is in three weeks solid design needs to be finished- so the microelectronics
- things that are still unknowns, tracking system, high and low altitude GPS, spot tracker is a satellite-based system that is a great locator
- SPOT Is another location system and is approximately \$500
- Start document for weight of components

Reflection- This was a productive meeting; two new designs were presented. We learned about the microbial density of the atmosphere and agreed that we want to sample on the accent.

Call to Action for Next Week (10/31/2018)

Brandon- further develop Reeces design meet with Andres Thursday to get advice

Carissa- Keep prototyping, research tracking devices more

Tian and Alex- further develop electronics. Begin compiling list of sensors that meet our requirements

Meeting minutes 10/31/2018

All members in attendance

Dev, Mareyna

No Dr.Law

No Andres

Introduction-

Review of Brandon's New Bullet design. Thoughts from Dev and Mareyna.

- each petri dish opens independently. There is a control dish as well.
- dotted section is detachable for the autoclave.
- Calculate the force/ Torque required for the stepper motor in this design

-Dev would like these designs to be done in Solid works.

- Arduino on the side of the design? Brandon- "Keep it close for simplicity. Drives the motion."

- Impact resistance, what is the maximum velocity this device can hit the ground and not break?

- These engineering calculations need to be done for next week- Carissa & Brandon do

- spring or compressor? Calculate worst case scenario as if the impact landed on a rock and see if we predict the Force.

Sensors-

Tian and Alex need to work on Sensor list for Next week.

-Carissa proposes Thermocouple for temperature. Dev clarifies that we cannot use a thermocouple due to a thermocouple needing a reference room temperature.

Presentation for Client- Design Review

This will be done for Joe and Mareyna.

- November 14th, 2018 in the BEL 328 at 3:30 ***
- For this meeting a very clear intentions list of sensors should be prepared and Two very well thought out designs that are drafted in SOLID works

Barometer-

- We do not *need* an additional altitude sensor the GPS system should be able to do this portion.
- Tatar-tots system does this, however having an altitude sensor as a backup is worth considering.

Tian Presents his Design Idea-

- Slow rotating metal plates that interlock after sampling period.

Venere.com

- I looked this up after meeting and it just brought me to a hotel site. Bring this back up on 11/7/2018.

Reflection- The sensor progress this week I feel was behind, we will make that the EE's priority this following week. The BE's are being pushed to get our designs to the modelling phase and need to start working with solid works. We have a lot to prepare for the client design review and a full plate for the following week.

Call to action for week 10/31/2018-11/7/2018

Email Matt Swenson to Confirm our Design Review Date

BE Students- model designs and cement clearer ideas to get closer to a design conclusion (model in Solid works) make calculations of force for different designs and payload landing in worst case senerio

EE Students- Look up temperature, humidity and GPS sensors to present during next meeting.

Carissa- Spruce up and re-organize team portfolio it is due 10/8/2018

Team Meeting this Friday at 3:30 in GJ computer lab with Andres to go over solid works and talk about designs

10/10/2018

The team ended up having no official meeting due to Dev, Dr.Law's, and Mareyna's inability to attend.

Week's accomplishments:

- **Snap Shot # 1 10/9/2018**
- **Lab tour of Tatar-tots and observed all the photos and their design and payload and work area 10/11/2018**
- **10/14/2018 attended High Altitude Balloon launch over the weekend with the VAST club on campus. This was an incredible experience. The team know has a good idea of what the requirements are to accomplish a launch.**

11/7/2018 meeting Minutes

All members in attendance

Dev no J law, Andre, or Mareyna

Intro Alex questions about temperature profile of the stratosphere

- Dev temperature minimum of stratosphere is negative 60 degrees Fahrenheit
- Sensor environment may need to be in a warmer environment during sampling, a thermocouple may be needed to adjust for true air reading because of their reference temperature.
- Some sensors that have been found are not rated for below negative 55 degrees.
- Dev says to keep looking for the sensor portion of the project

Contact Vast president or Micheal adkins for reference for the sensors to use with this temperature.

- **RTD** very small temperature sensors should be suitable for the project.
- **Humidity** sensor is very difficult to find, due to temperature range. Many temperature and humidity are combined sensors. PLUS at this altitude the water is frozen so what is the advantage of measuring humidity? **Solid state humidity measurements?? How??**

Impactor design Papers

- The air flow models of these articles are very important. We don't know how the flow rate is going to be affected when we make up our own new designs. Flow is so crucial in these designs
- Rotate the top of Brandon's Design to make it more similar to the impactor design
- Incorporator 45 degrees angle to top of Brandon's design or even 90 degrees air flow
- Reynolds Number will be needed, and we want turbulence to break the boundary layer.
- A laminar flow would not expose the entire air flow into the sampling unit.
- We need to do the fluid dynamic analysis of this design
- Looking at 2 designs for client review calculate Reynolds number
- **Montana space grant conservatorium**
- **Pat Blount one of the 27 to launch for this program. Moscow High Physics Teacher**
For more reference on GPS and sensors.

Call to action for the following week:

-Citizenship form is due on next Friday.

EEs: Get better functioning list of sensors

Bes: finalize engineering modeling

Everyone: Get a awesome complete presentation together for Client Review!

Everyone: contact VAST for sensor and GPS advice.

11/28/2018

Meeting before Team Snap Shot 2

All in attendance

Introduction:

Going over the Client Review

- Brandon- thinks he should have gone into deeper detail in the design
- Dev- Need to materialize the Plan we have. Dimensions, materials, and code. Need to have full "Blue Print" of final design.
- Still needs need's a model and animations for the model. Visualize the entire design before full approval including where the sensors and batteries will be placed.
- Make a cardboard hobby lobby mock-up of the design to visualize. 3d printing is also an option.

Can we print model by Friday for this Friday?

- Make card board design with mini-windmills?

Goals for rest of semester

- Have dimensions of design and sizes of sensors, start a weight manifest
- Aluminum and Brass for contact- there is less friction between these
- Impactor material,
- Maybe really look at TATOR tots design very closely
- Check if motors are in stock and how long they will take to get here.
- Purchase all the electro controllers
- Programming plan being presented by Alex

Remember goal is to have the prototype ready to go by spring break for launch. March 11, 2019.

Back track and see what has to happen. We need to get going hard at the start of next semester.

Can Andre figure out charges for the construction? One of can get trained then have chaperone for construction.

Is there any way to detect that your sensors are not working? Arduino should have a fail code.

Diagnostic that sensor is not working well. This is important because of the temperature parameters.

*May be have Arduino set to collect for a certain amount of time as a back-up in case things go wrong**

There needs to be a feedback to the controller that the design has opened. Consider limit switch that will indicate that the sampler has actually opened this switch then needs to send signal that confirms it has opened.

Make software as robust as possible there are always problems you don't see until you try to start using them.

Remember that you need to subtract starting altitude from the ground, Tator Tots has this problem.

- All documents need to be put into the OneDrive file that DEV will create

Next week- Alex and Tian

Present programming next week during meeting

Carissa have the process written up for snap shot day of the collection media

Brandon and Carissa- Create a card board Prototype