**BME Capstone Design Project Weekly Progress Report**

**Project Title:** KK01: Design of extremely small satellite

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**Reporting Week:** Oct22 - 26

**Project Manager of the Week:** Ho Yin Samuel Yeung

**Tasks Outlined in Previous Progress Report:**

* Determine satellite payload ideas relating to Biomedical and Material Sciences

**Progress made in Reporting Week:**

* The Genesat1 project was a cubesat with a biomedical payload
* Possible biomedical research for EDP relating to growing microscopic samples in space
* Propose idea to FLC in regards to disruptive Biomedical design
* Effects of zero gravity on metal oxide frameworks have been studied for research purposes. A possible material sciences research payload could be the growth of a MOF crystal inside of a cubesat

**GENESat1**

The GENESAT1 project was a joint effort between NASA and various universities, in order to develop a nanosatellite that could remotely grow, and record the effects of microbial organisms in a microgravity environment. The Genesat consisted of a pressurized vessel and mircofluidic devices for remotely growing cultures of microorganisms.

Due to the size and power constraints, the GENEsat1’s instrumentation was very simplistic. In regards to analyzing their biological sample, Green Flourescent Protein techniques. Essentially, using ultraviolet or blue light, the sample can be confirmed to be growing if the correct wavelength of light is emitted by the sample.

In total, the GENEsat was a 3U pressurized vessel, with 12 growing units inside and weighed a total of 4kg.

A possible biomedical research payload would be a microfluidics nanosatellite, but for growing an alternative microorganism for medical, or drug research

**METAL OXIDE FRAMEWORKS**

A recent video on Youtube discussed research being done into the growth of Metal Oxide Framework crystals in zero gravity.

However, this study was being done on earth and not in space. Depending on the required mechanics of MOF growth and analysis, a possible material science payload could be a remote growing station similar to the GENEsat, but for MOF crystals instead.

**Tasks for Next Week:**

* Continue research into material sciences and biomedical payload
* Conduct research into required mechanics for biomedical payload
* Conduct research into the growth of MOF crystals

**SOURCES**

[GeneSat 1, 2. (n.d.). Retrieved from https://space.skyrocket.de/doc\_sdat/genesat-1.htm](https://space.skyrocket.de/doc_sdat/genesat-1.htm)

[Seeker. (2018, October 29). These Hybrid Metallic Crystals Are Chemistry's New Miracle Materials. Retrieved from https://www.youtube.com/watch?v=K2u3jn3CuEA](https://www.youtube.com/watch?v=K2u3jn3CuEA)