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**ThinSat Project Proposal**

The goal of the ThinSat project is to demonstrate the capabilities of the Global Navigation Satellite System Reflectometry (GNSS-R) to map and detect rouge waves. The GNSS-R is a passive radar that can generate a map of the surface of the ocean, which would help provide information on the height of waves. Through this information, we can obtain greater evidence on rouge waves, which will help give us a better understanding of these waves. For years, rouge waves have been the cause of destruction for many offshore oil sites and ships. With our satellites ability to map these rouge waves with image processing, it can lead to a better understanding of this phenomena and allow for safety measures to be set in place to prevent future destruction.

This project will be run by a collection of undergraduate physics students and myself. I will oversee the development the computer science aspects of the ThinSat development, along with assistance from my mentor, Giulia Franchi. The computer science aspects that are needed for this project include being responsible for designing the needed algorithms that allow the ThinSat to run properly and be able to detect rouge waves specifically. Additionally, our group will be responsible for the circuitry of the satellite.

With this current pandemic going on now, it is hard to give an exact timeline as launch dates are being pushed back for other previous projects. This pandemic has also led to delays in our project this semester, resulting in this extension. Still over the course of this semester, our group has been able to complete several necessary components for this project. Specifically regarding the computer science aspect, we have been able to develop a prototype of the circuit and acquire the needed files for them. We also spent a good portion of the semester researching about image processing, our GPS and antenna connection, and how to incorporate the Arduino Uno we plan to use. Our group will continue to have weekly calls to discuss our findings and develop algorithms for the code next semester. Our groups final goal is to finalize the project and be able to produce a satellite that can use image processing to determine the occurrence of rouge waves.