As a first-year engineering project commissioned by Ocean Networks Canada, I was tasked with creating a robot designed to simulate the automated functionality that would be necessary to expand and connect ONC’s Vancouver-Island wide observation network. Alongside the environmental research opportunities afforded by the system’s many observation nodes, the project expanded and improved BC’s earthquake and tsunami early warning system.

The robot performed in a simulated 2m x 2m arena and was designed using using VEX robotics equipment and RobotC. The robot was to detect and approach an infrared beacon (see below), attaching a self-made connector to the beacon’s target receiver to simulate a cable connection. Although the task was simple in principle, concerns regarding tolerances and edge cases associated with infrared readings (sunlight caused many problems) proved to complicate the project greatly.

I programmed the robot entirely from scratch, and used the opportunity to first understand the benefits of machine learning, since nearly all its decision making was based on conditional statements. The code, which can be found on my GitHub, was a conditional Finite State Machine that performed well in testing and successfully attached to the target beacon during final trails.

I joined UVic Satellite Design in September 2017 as a member of the Onboard Computer (OBC) team. I spent the entire semester learning the use of FreeRTOS, the kernel used for the satellite’s operating system, and Satellite Toolkit (STK), a space simulator used to produce orbital data for stress testing.

In January 2018 I became the OBC software lead for the Homathko satellite, taking over from the UVSD’s past Co-op student. Our current project, Homathko, is the UVSD’s entry to the Canadian Satellite Design Competition (CSDC) that will conclude in Jun 2018 with shake table testing at the David Florida Lab in Ottawa. The satellite has two major payloads consisting of laser system, designed to monitor the impact of atmospheric disturbances on dark energy waves and a radio repeater, created to contribute to the pre-existing network of amateur radio repeater satellites. To learn more about the project and our club, please visit [www.uvsd.ca](http://www.uvsd.ca).

The software team is responsible for the “brains” of the satellite: we design the operating system and the interfaces that are used to interact with the physical systems on Homathko. The OBC schedules its tasks to prioritize mission-critical tasks, polling external sensors, firing the payload, and reacting to events in real time.

To date, this has been both the most difficult and rewarding software project that I’ve participated in. It’s required rapid learning of the hardware and software framework behind the Homathko OBC through active questioning and research, and has developed my leadership and project management skills as I plan and organize that work done by our 6-person software team. I plan to participate as a member of the UVSD until graduation, and want to pursue a Co-op through the club as my final work term at UVic.

As a self-admitted hypebeast, I have a great interest in limited edition clothing and streetwear. I have spent many early mornings attempting to manually purchase limited-edition items unsuccessfully, leading me to develop a python-based “Sneakerbot”, and automatic add-to-cart script capable of nearly instantly checking out an item online. It’s a continuous project for me, as I improve its speed and ability to function on many websites across the internet. I’ve uploaded it to my public Github repo, to make the code open-source an open source project.