INTRODUCTION

At Optimaus, we wish to provide an automated feeder solution for assisting research in animal laboratories. Our project, AutoFeed, will automatically feed rats in laboratories in order to relieve students or lab technicians from manually performing this mundane task. Our user interface is based off Google Calendar where Calendar events correspond to feeding periods. This document was written to serve as a progress report of our development of AutoFeed. The elements found below include finances, where we stand relative to our original schedule, and progress details.

FINANCES

Outlined in Table 1 below is the current expenditure for the development of AutoFeed. Note that Table 1 outlines the cost of five prototypes, only one of which will be used for the final product.

Mechanical Design	269.66
Controller and appliances	75.01
Chassis and Wiring	126.66
Total	**471.33**
Funds Received from ESSEF	500.00
ESSEF Funds Remaining	**28.67**

Table 1: Financial breakdown for the development of AutoFeed

SCHEDULE

Our original plan was to have functional door control through the Google Calendar interface along with a working mechanical prototype of the feeder by November 15th. Having successfully met this deadline, we are now moving forward with further design iterations and optimizations.

PROGRESS DETAILS

For increased readability, progress details have been split between the following subsections: Google Communication, Door Control, and Mechanical.

1. Google Communication

Our Google communication module can successfully query Google Calendars from the Raspberry Pi. The queries will only return events that are currently active. We also have access to the start and end time information of the returned events. Therefore, with the current time from the raspberry pi system clock, we compare the start and end time of the returned events to the current time. If

either the start time or end time is equal to the current time, then the Google communication module will return that information to the door control module. These time comparisons are accurate to the minute; further increasing the accuracy is unfeasible because that would require us to poll Google at the exact second that an event is scheduled to begin or end. Remaining tasks include the development of two modules: one to send out email notifications for error handling, and another to parse a text file containing relevant calendar IDs. The Google communication module is fully modularized and tested and it is functioning as expected.

2. Door Control

The door control module can open/close a door and wait for its respective Hall Effect sensor to trip and stop the door from opening/closing any further. The module utilizes the Google communication module to acquire a list of actions to perform. Door control progress is currently on track with our originally proposed deadlines.

Remaining tasks include:

- Implement multi-threading for the open/close door actions
    - Stop the action after a fixed amount of time and send an email notification if the Hall Effect sensor is never triggered
- Develop a function to check the status of the cage door before executing an open/close command on it

3. Mechanical

Rapid prototyping was used to create the mechanical design for the dispensing mechanism. Using the laser cutter allowed quick turnaround for assembling prototypes and assessing to find an optimal design. Currently the design and manufacturing method has been finalized for the acrylic hopper. The aluminum frame design has also been finalized. Making use of the SFU milling machine is necessary to quickly produce accurate frames. The controller box (which holds the servo motors and the feedback sensors) requires testing to ensure that it can be disassembled, cleaned, and reassembled by our users without risk of damage to the components. Our controller is currently using a breadboard, and therefore, we still need to solder the servo driver onto a PCB to eliminate breadboard utilization. With our current design, we are confident that we are able to dispense and retract food from the animals without mechanical malfunction or infliction of bodily harm.

CONCLUSION

At Optimaus, we feel as though we have set ourselves up to successfully complete final product by the project deadline. As we move forward with our design and prototyping iterations we will keep scalability as a priority in every step of our design. We plan to have two functioning feeders completed by the demonstration date, and it is our ambition to have 16 feeders installed in SFU's Animal Research Centre by the Spring 2015 semester.