

Inspiration

Honey bees have the ability to detect the Earth's magnetic field and use it for orientation and navigation^[2]. Nowadays, Radio Frequency (RF) is omnipresent. Previous work, showed a strong evidence of north-seeking ability disruption in european robins upon exposure to RF. Bees are easy to work with and require no IRB approval.

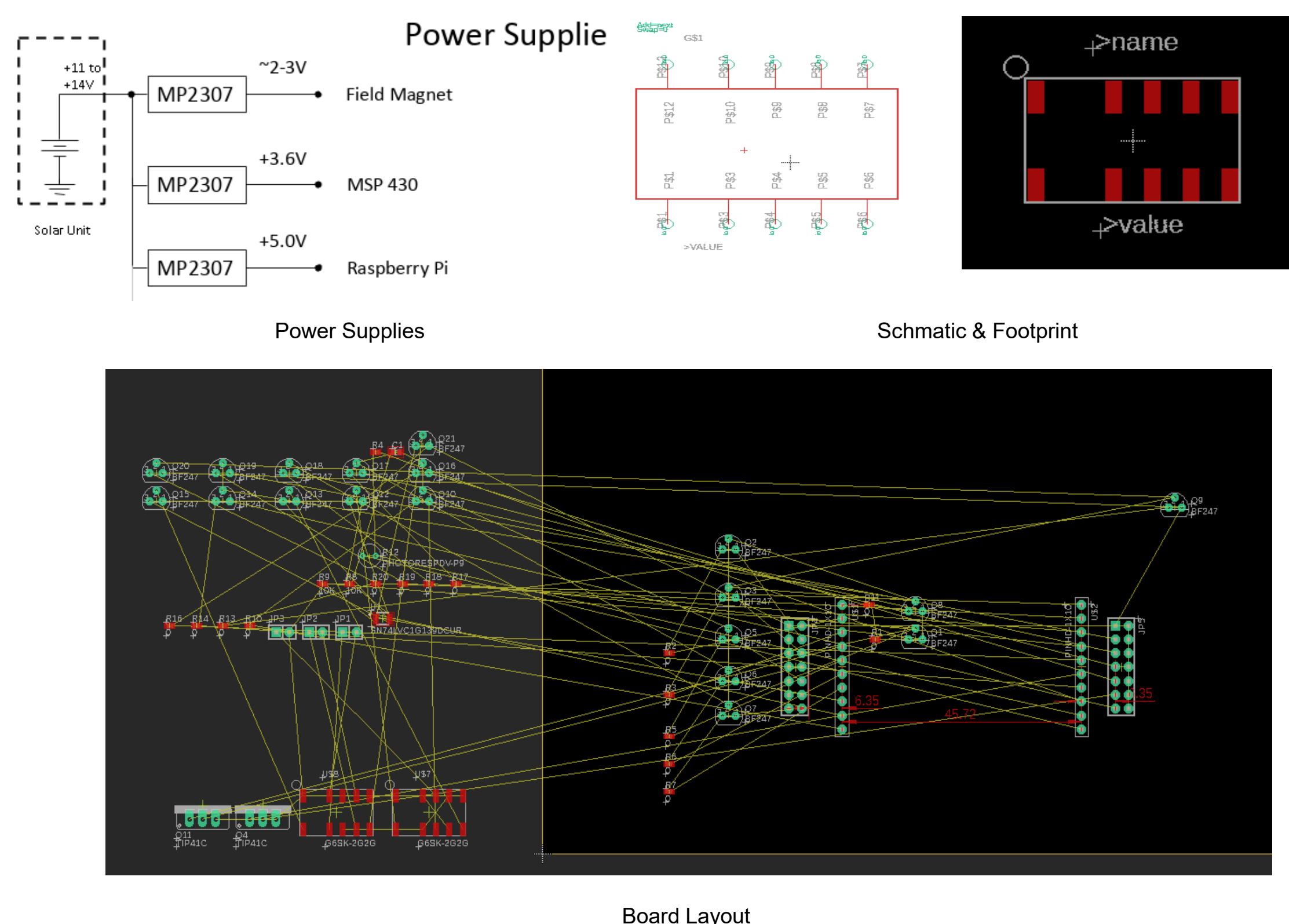
Overview

We seek to examine honeybee sensitivity to modern RF transmissions, which although their impact on the static field is small, with the explosion of wireless transmissions are much more pervasive than in the past.

Our approach, is based solely on a reward. We will not capture and train individual bees, but rather allow individuals to associate the RF stimulus with food without requiring a capture and direct reward or punishment.

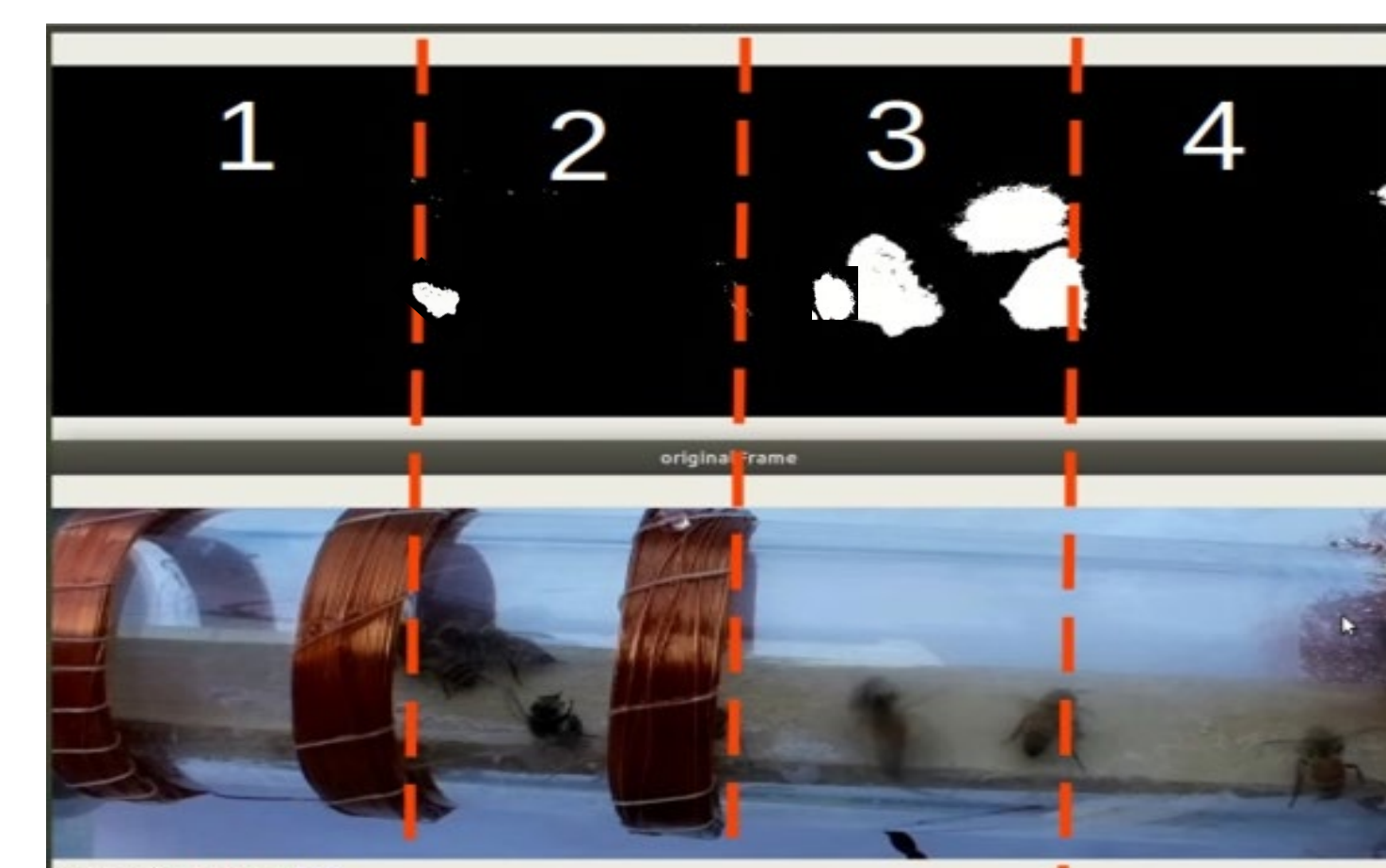
Control System & PCB

- A power distribution for our control system.
- Customized EAGLE Library.
- We designed our PCB and develop board view of it. (work in progress)



Computer Vision

- Counts bees and analyzation of bee movement utilizing a Python library (OpenCV)
 - Splits video into 4 segments to track number of bees found in each section of tube.



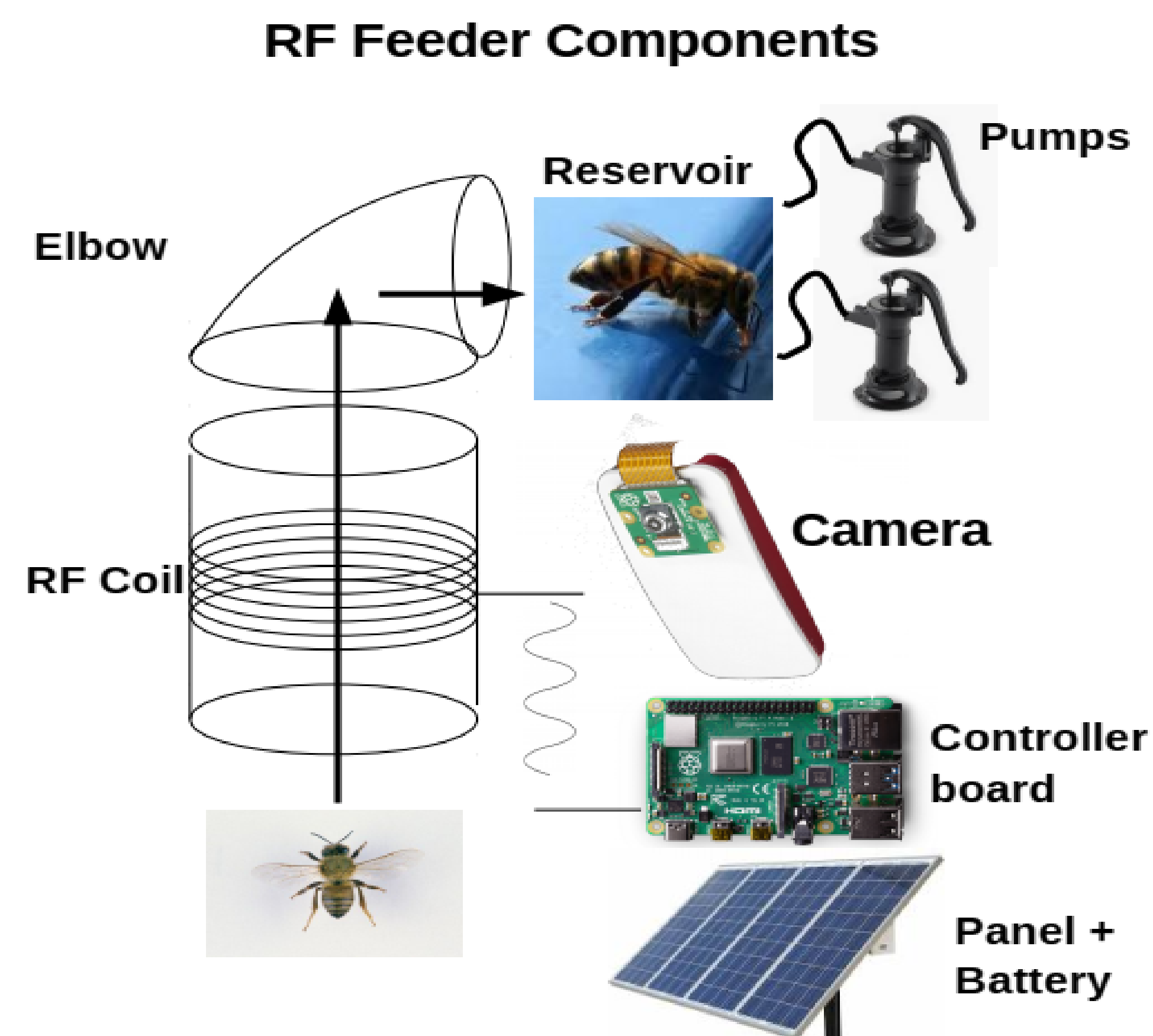
- Another program we are working on:
 - Fiducial marker generation and detection to determine direction of bee movement.



Tiny 2mmx2mm
Aruco Marker placed
on thorax of bee

- Currently also transfer training various object detection models with tensorflow ML.

Latest Feeder Design



Future Work

- Continue collecting data until October 31st
 - Prepare for next spring
- Revise feeder design → isolate polarized light
- Further automate data collection
 - Long range wireless data transfer?
- Work on more training (Audio and RF)
- Improve software aspect → object detection

