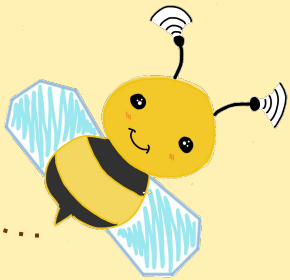# Preliminary Design Review

Team Bumblebee
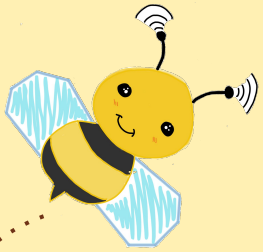Spring 2021

# Members

**Brian Griswold**
EE396, EE- EP

**Francis Sonoda**
EE496, EE- EP

**Thant Thiri**
EE396, EE- EP

**Lauryn Corpuz**
EE496, EE-EP

**Yin Aye**
EE396, EE-EP

# Presentation Overview

- Block Diagrams
  - Power
  - Signal/Communication
- Team Progress
- Problems
- Gantt Chart
- Upcoming Tasks
- Questions

# Block Diagram- Power
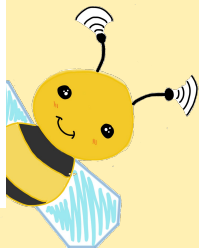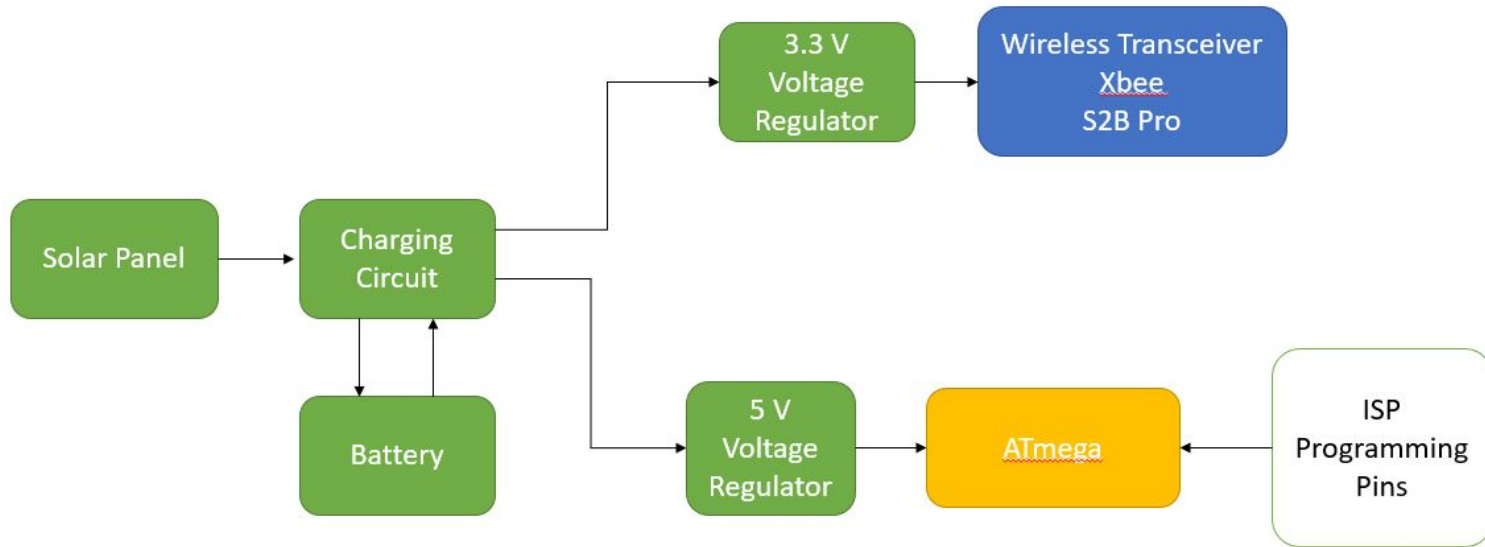
# Block Diagram- Signal/ Communication

# Team Progress

- Got new members up to speed with Bumblebee PCB
- Learned how to solder
- Started populating v4.0 and v4.1 board
- Reviewed Arduino code for XBees
- Reviewed XCTU for XBees to detect each other
- Range Tested

# Line of Sight Testing

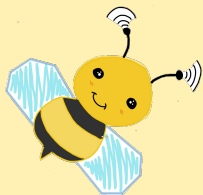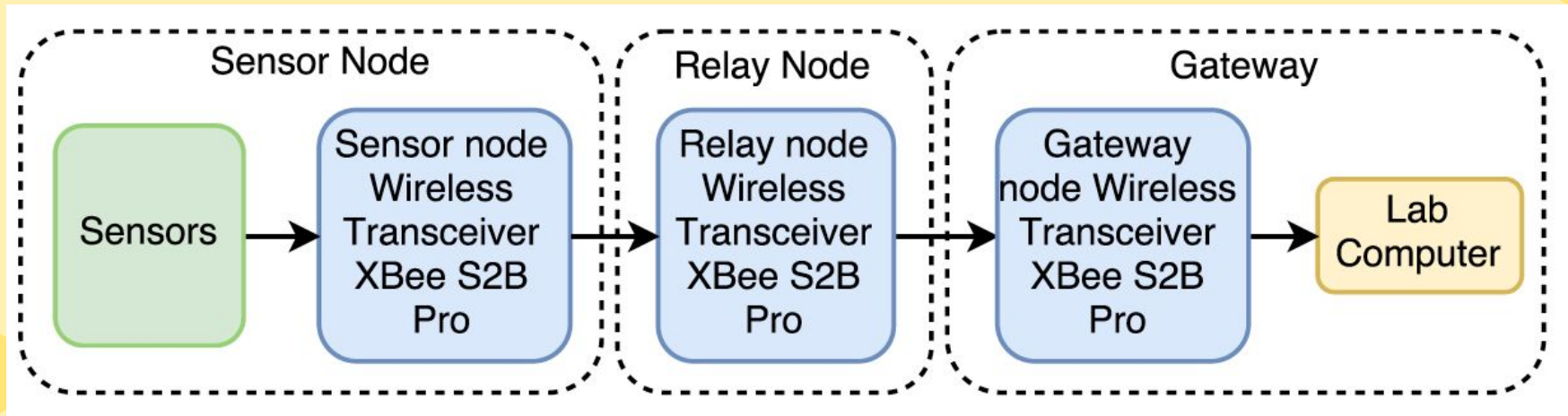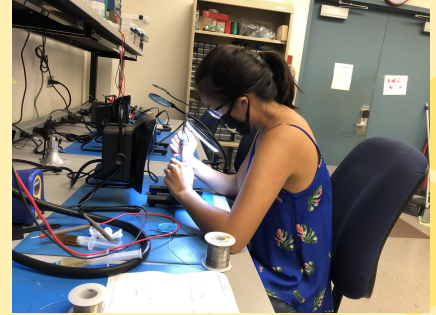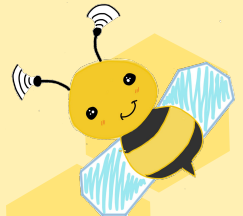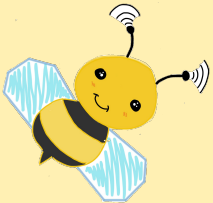| LINE OF SIG | LINE OF SIG | LINE OF SIG | LINE OF SIG | LINE OF SIG | LINE OF SIG | LINE OF SIG | LINE OF SIG | LINE OF SIG | LINE OF SIGHT | LINE OF SIG |
|---|---|---|---|---|---|---|---|---|---|---|
| 30 | | | | | | | | | | |
| Trial 1 | -50 | | -46 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -48 | | -49 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -46 | | -50 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 60 | | | | | | | | | windy,sunny | |
| Trial 1 | -52 | | -53 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -52 | | -52 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -55 | | -52 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 90 | | | | | | | | | windy,sunny | |
| Trial 1 | -61 | | -61 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -52 | | -53 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -53 | | -55 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 120 | | | | | | | | | windy,sunny | |
| Trial 1 | -63 | | -63 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -60 | | -59 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -63 | | -63 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 150 | | | | | | | | | | |
| Trial 1 | -59 | | -59 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -64 | | -64 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -64 | | -68 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 180 | | | | | | | | | | |
| Trial 1 | -53 | | -52 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -53 | | -52 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -54 | | -53 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 210 | | | | | | | | | windy,sunny | |
| Trial 1 | -58 | | -58 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -60 | | -58 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -57 | | -56 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 240 | | | | | | | | | windy,sunny | |
| Trial 1 | -58 | | -58 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -57 | | -58 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -61 | | -62 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 270 | | | | | | | | | windy,sunny | |
| Trial 1 | -58 | | -59 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -58 | | -58 | | 15 | 15 | 0 | 0 | 100 windy,sunny | |
| Trial 3 | -57 | | -56 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 300 | | | | | | | | | windy,sunny | |
| Trial 1 | -61 | | -62 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -63 | | -63 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -62 | | -62 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 330 | | | | | | | | | windy,sunny | 1/24 |
| Trial 1 | -59 | | -59 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -61 | | -61 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -58 | | -58 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| 360 | | | | | | | | | windy,sunny | 1/24 |
| Trial 1 | -62 | | -62 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 2 | -62 | | -63 | | 15 | 15 | 0 | 0 | 100 windy,sunny | 1/24 |
| Trial 3 | -59 | | -59 | | 15 | 15 | 0 | 0 | 100 windy,sunny | |

# McCarthy Mall - Tree Testing

| Distance (ft) | THROUGH WALLS MCCARTHY MALL | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **90** | | | | | | | | | |
| Trial 1 | -52 | -50 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 2 | -64 | -56 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 3 | -56 | -56 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| **175** | | | | | | | | | |
| Trial 1 | -66 | -66 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 2 | -63 | -64 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 3 | -64 | -68 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| **244** | | | | | | | | | |
| Trial 1 | -61 | -63 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 2 | -63 | -64 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 3 | -65 | -67 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| **324** | | | | | | | | | |
| Trial 1 | -73 | -75 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 2 | -74 | -74 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 3 | -73 | -75 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| **403** | | | | | | | | | |
| Trial 1 | -80 | -81 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 2 | -73 | -74 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 3 | -74 | -74 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| **477** | | | | | | | | | |
| Trial 1 | -84 | -84 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 2 | -81 | -83 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |
| Trial 3 | -86 | -86 | 15 | 15 | 0 | 0 | 100 | sunny | 1/31 |

# Problems
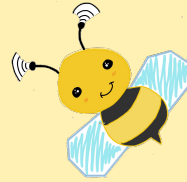
- Updating new members
  - Soldering help
  - Did bare arduino tutorial
- Trouble with boot loading to v4.0 & v.4.1
  - Read old documentation & articles online
  - Asked other members for help
- Uploading code using the FTDI
  - Yin and Thiri were able to figure out solution while working on Bare Bumblebee
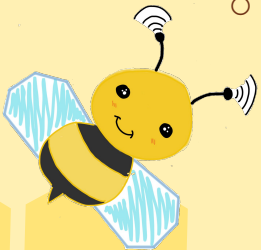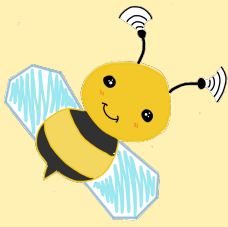
# Upcoming Tasks

- Continue to boot load
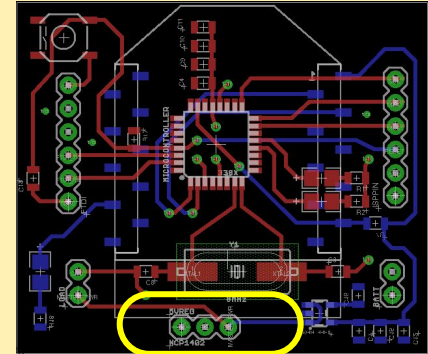  - Meet with Dr. Kuh in two weeks
- Conduct more complex Range Testing
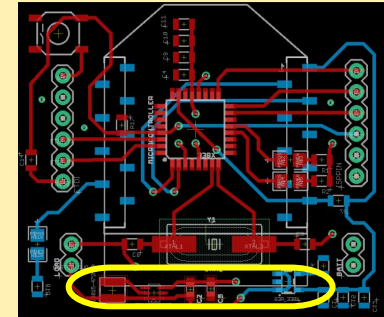  - Through walls
  - Range test on different floors of Holmes Hall
- Update wiki with past presentation
- Document troubleshooting process to make it easier for future members



**Ver 4.0:** 5V Step Up Breakout board



**Ver 4.1:** 5V regulator SMD (TPS61222DCKR)

| TEAM BUMBLEBEE | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Spring 2021** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| **Date** | 1/18/21 | 1/25/21 | 2/1/21 | 2/8/21 | 2/15/21 | 2/22/21 | 3/1/21 | 3/8/21 | 3/22/21 | 3/29 | 4/5/21 | 4/12/21 | 4/19/21 | 4/26/21 | 5/3/21 |
| **Presentations** | | | | | | | | | | | | | | | |
| Proposal | | ■ | | | | | | | | | | | | | |
| PDR | | | | | ■ | | | | | | | | | | |
| CDR | | | | | | | | | | ■ | | | | | |
| Final | | | | | | | | | | | | | | ■ | |
| **Bare Bumblebee** | | | | | | | | | | | | | | | |
| Build Bare Board | | | | | | | | | | | | | | | |
| Test Board | | | | | | | | | | | | | | | |
| Relay Testing | | | | | | | | | | | | | | | |
| **PCB Bumblebee** | | | | | | | | | | | | | | | |
| Fabricate New Board | | | | | | | | | | | | | | | |
| Order New Parts | | | | | | | | | | | | | | | |
| Populate | | | | | ■ | | | | | | | | | | |
| Test Board | | | | | ■ | ■ | ■ | ■ | | | | | | | |
| Relay Testing | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | |
| **Research** | | | | | | | | | | | | | | | |
| Raspberry Pi | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| WiFi Method | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| **Reports** | | | | | | | | | | | | | | | |
| Final Report | | | | | | | | | | | | | | ■ | ■ |
| **New Plan** | | | | | | | | | | | | | | | |
| Range Testing | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ |
| Documentation | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ |
| Research | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

Questions?