Team Bumblebee

FINAL PRESENTATION

Spring 2019

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Presentation Overview

- Background and Motivation
- Team Progress
- New Block Diagrams
- New PCB Layout
- Problems We Encountered
- Bill of Material
- Final Status
- Future Work
- Questions

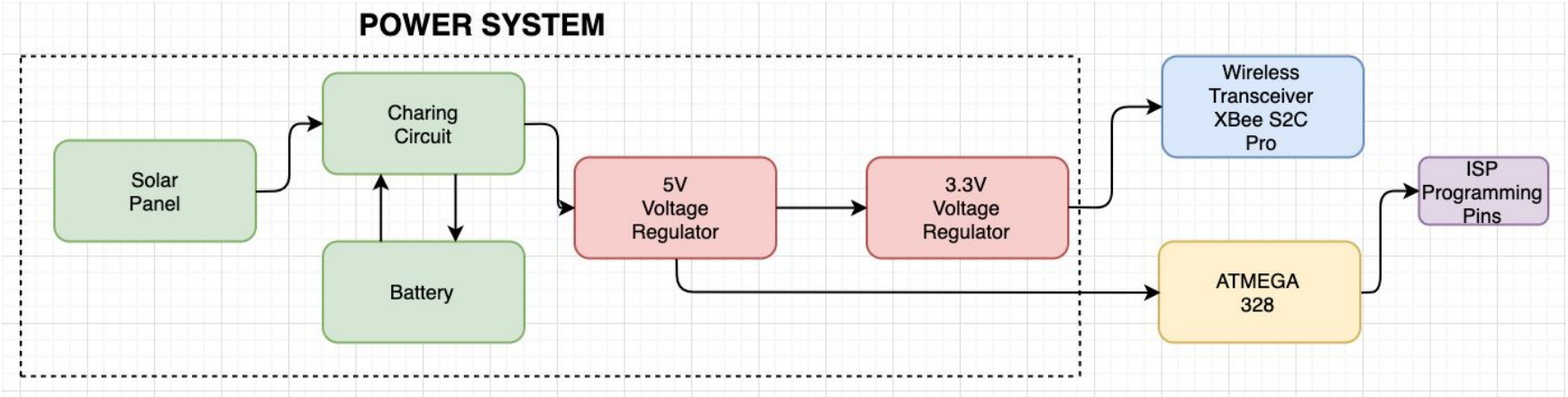
Motivation/Approach

The Bumblebee Weatherbox is the second generation communications module designed to relay meteorological data collected by the other weatherboxes. Its purpose is to increase the effective range of the weatherboxes.

Team Progress

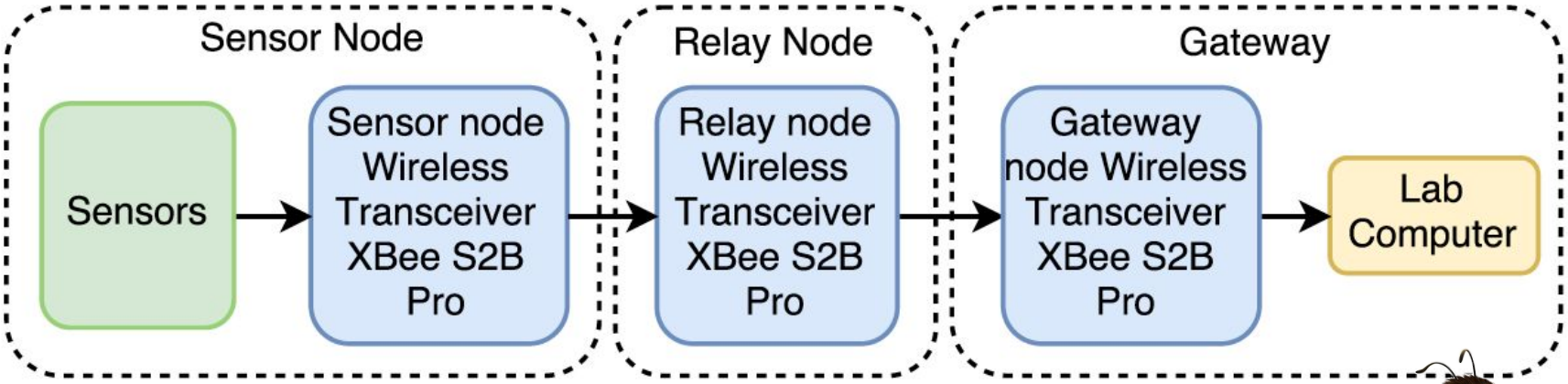
- 2nd Design
  - Debugged by comparing to Bare Bumblebee board
- 3rd Design
  - Fabricated and ordered
  - Populated and debugging

Block Diagram



Block Diagram - Signal/Communication

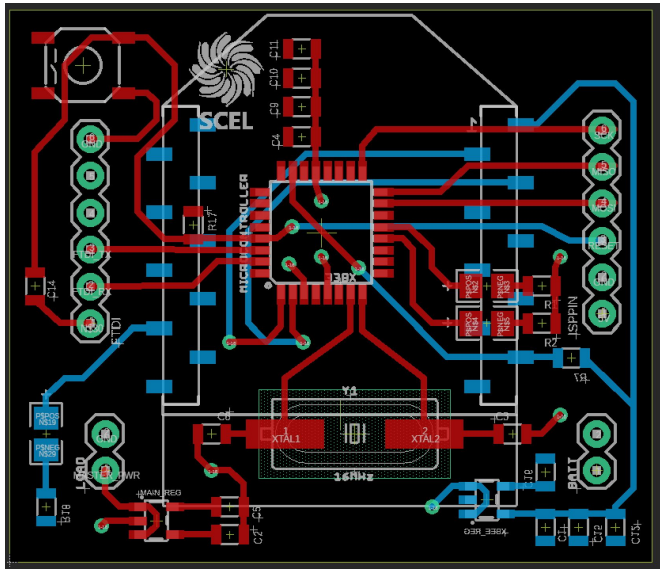
SCEL



2nd Design - Debugging Process

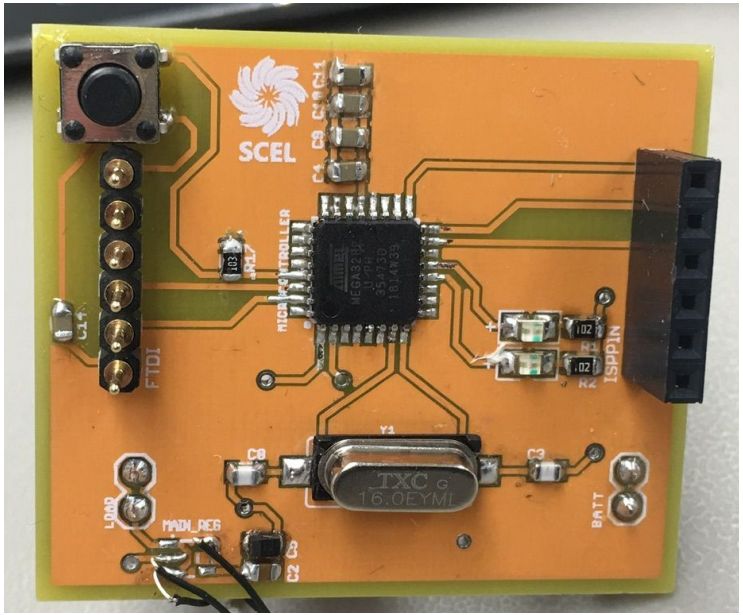
- Relay code does not work
  - Bare Arduino:3.3V, 16MHz
  - Tested voltages in clock
  - Changed clock from 8MHz → 16MHz
- Might have to alter code to work on 3.3V, 8MHz

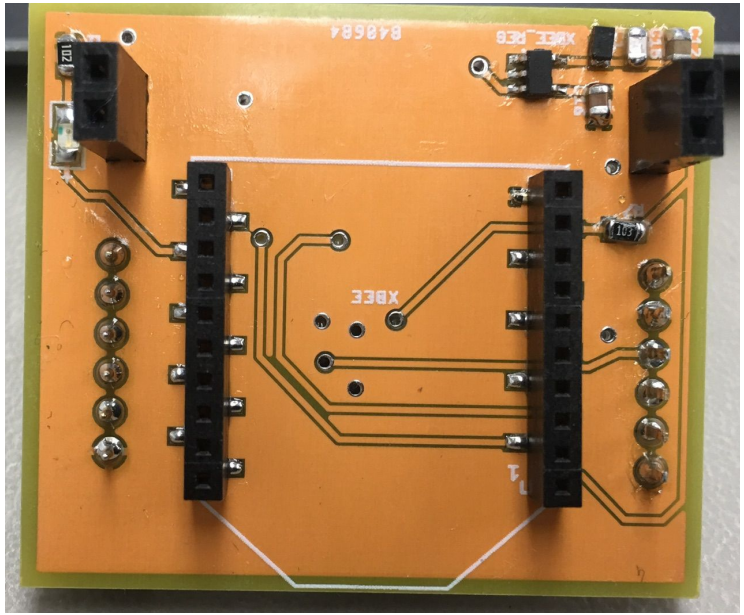
New PCB Layout (3rd Design)



- Atmega runs on 5V
  - 2 voltage reg. (5V, 3.3V)
- 16MHz clock
- Fixed TX and RX connections
- Wiring orientation

New PCB Design

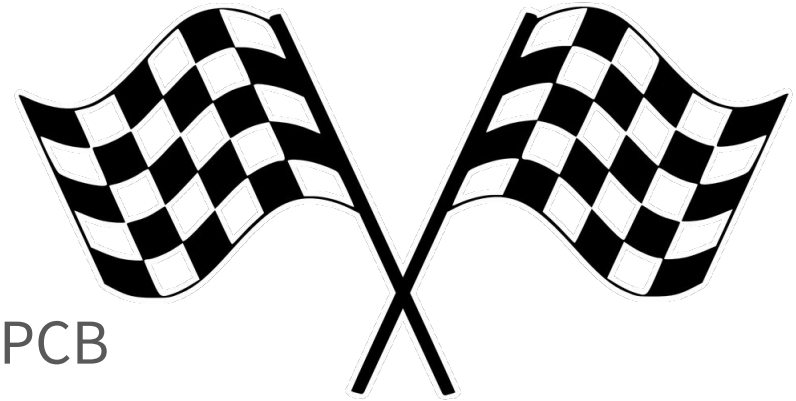




Bill of Material

Team Bumblebee's Bill of Materials			
Part Name	quantity	Unit cost	Total Cost
Assorted Resistors	5	$0.54	$2.70
Assorted Capacitors	13	$0.56	$7.28
Assorted Diodes	3	$0.40	$1.20
Microprocessor	1	$2.08	$2.08
XBee Headers	2	$0.95	$1.90
Xbee Pro S2C	1	$28.50	$28.50
FTDI and headers	1	$6.75	$6.75
Xbee Breakout Board	1	$2.95	$2.95
Duck Antenna	1	$10.50	$10.50
Battery	1	$29.50	$29.50
16 Mhz clock crystal	1	$0.34	$0.34
3.3 volts voltage regulator	1	$0.92	$0.92
5 Volt step up Voltage regulator	1	$6.50	$6.50
Reset Button	1	$2.94	$2.94
PCB	1	$0.50	$0.50
Adafruit Solar Charger	1	$17.50	$17.50
		Total Parts Cost	$122.06

Final Status



- Designed three different versions of PCB
  - *Each one is better than previous designs*
- Populated 3rd PCB that needs to be debugged

Future Works

- Debug PCB Hardware and software
- Have a working and stable Bumblebee
- **Deploy!!**
- Establish network with more than one weatherbox