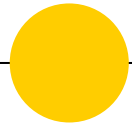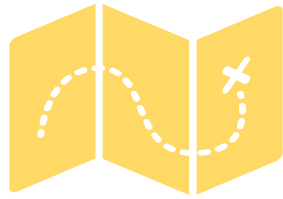# Team Bumblebee

CRITICAL DESIGN REVIEW PRESENTATION

Spring 2019
Advisor : Dr. Anthony K

Presentation Overview

- Team Progress
- Problems
- New PCB Layout
- Range Testing
  - Line of sight
  - Holmes Hall floors
  - Not line of sight
- Gantt Chart

Team Progress

- Fabricated new PCB layout

- Ordered new PCB and components

- Range Testing

- Populated new PCB
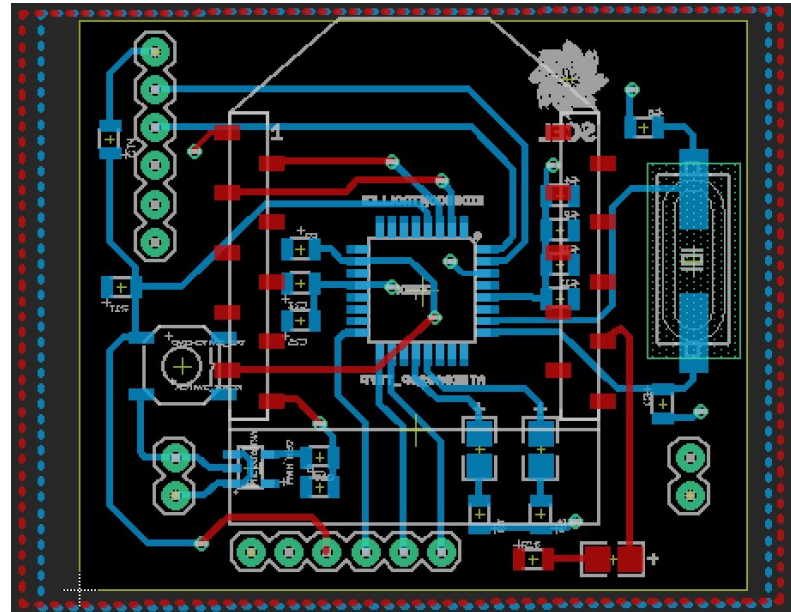
- Debugging new PCB

Problems

- Bare Bumblebee board with XBee S2C not working; Couldn't upload program due to not in sync error

- Board turned off mid-range testing

- RX-TX lines

- Code: Gateway format → XCTU

New PCB Layout
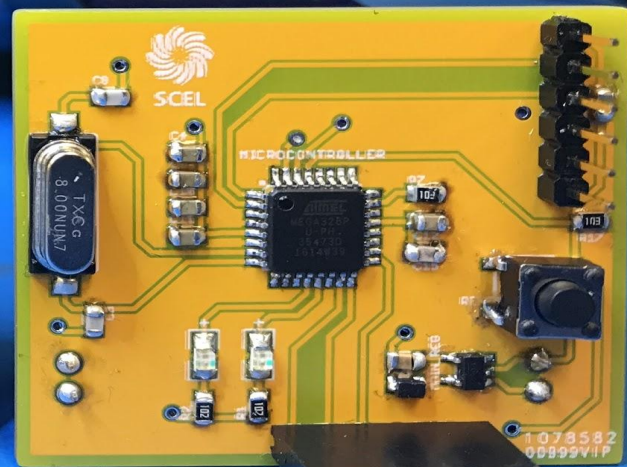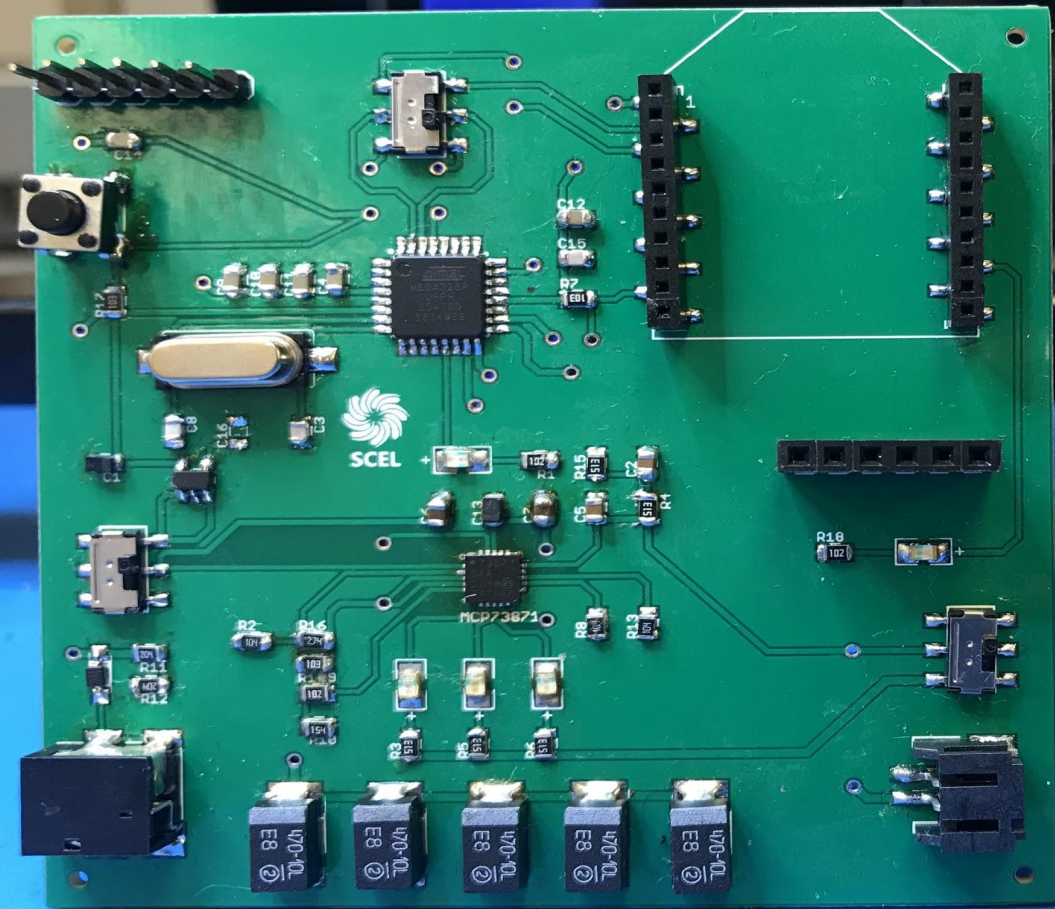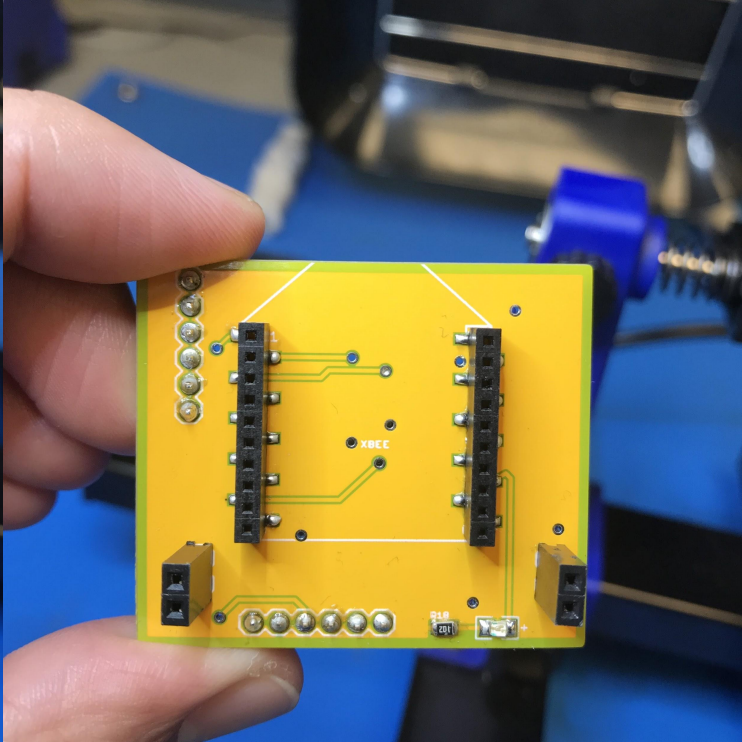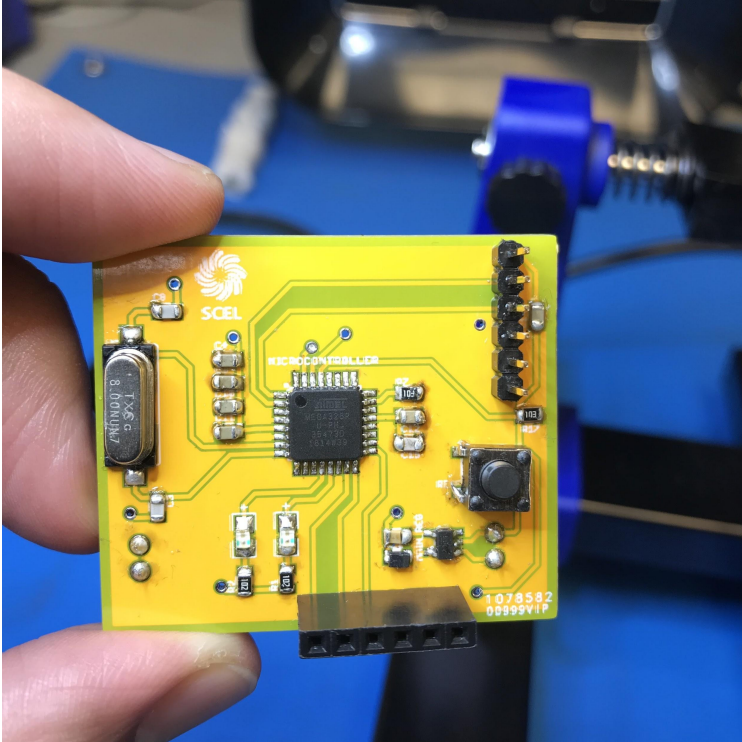
- Solar Charging Circuit → Breakout Board
- Remove switch
- Add debug LEDs
  - Transmitting
  - Receiving
- Wiring Orientation
- Add more vias

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New PCB Design

Range Testing

- Line of sight

- Holmes Hall Floors

- Not in line of sight

  - *McCarthy Mall*

  - *Holmes Hall Hallway through walls*

  - *Holmes Hall rooms through walls*

XBee A

Local XBee

XBee B

Remote XBee

Line of sight

Distance (ft)	Local		Remote		Sent	Received	Tx Error	Packets Lost	%	Other variables
30 - 180	-75		-70		15	15	0	0	100	Sunny, Windy
210	-10		-93		15	12	2	1	80	Sunny, Windy
	-10		-86		15	15	0	0	100	Sunny/windy
	-10		-90		16	13	2	0	86.67	Sunny/windy
240	-95		-93		16	7	8	0	46.67	Sunny, Windy
	-94		-94		16	4	11	0	26.67	Sunny/windy
a.	0		0		15	0	15	0	0	*NO PACKET*
b.	-9		-92		16	7	8	0	46.67	Sunny/windy
270	-93		-92		15	13	2	0	86.67	Sunny, Windy
	-94		-93		16	14	1	0	93.33	Sunny/windy
	-9		-94		16	8	6	1	53.33	Sunny/windy
300	-9		-89		15	15	0	0	100	Sunny, Windy
330	-9		-93		15	15	0	0	100	Sunny, Windy
	-91		-90		15	11	4	0	73.33	Sunny/windy
360	-12		-89		16	5	10	0	33.33	Sunny, Windy
	-12		-89		15	15	0	0	100	Sunny/windy
390	-9		-91		15	15	0	0	100	Sunny, Windy

Holmes Hall floors

Distance (ft)	Local		Remote		Sent	Received	Tx Error	Packets Lost	%	Other Variables
4th-3rd	-58		-59		15	15	0	0	100	WINDY, placed under bench
	-63		-63		15	15	0	0	100	WINDY, placed under bench
	-62		-63		15	15	0	0	100	WINDY, placed under bench
4th-2nd	-43		-90		15	13	2	0	86.7	not too windy compared to 3rd floor, under bench
	-42		-87		15	15	0	0	100	not too windy compared to 3rd floor, under bench
	-87		-87		16	12	3	0	80	not too windy compared to 3rd floor, under bench
4th-1st	-78		-86		15	15	0	0	100	less wind, less obstacles
	-80		-80		15	15	0	0	100	less wind, less obstacles
	-81		-78		15	15	0	0	100	less wind, less obstacles

Not line of sight - McCarthy Hall

Distance (ft)	Local		Remote		Sent	Received	Tx Error	Packets Lost	%	Other Variables
90										
Trial 1	-81		-79		15	15	0	0	100	Sunny, little wind
175										
Trial 1	-72		-69		15	15	0	0	100	Sunny, little wind
Trial 3	-91		-88		15	13	0	2	86.67	Sunny, little wind
244										
Trial 1	-91		-90		15	15	0	0	100	Sunny, little wind
324										
Trial 1	-93		-93		15	7	8	0	47.67	Students in front 1st tree
Trial 2	-94		-93		15	6	9	0	40	people walking/passing by
Trial 3	-94		-110		15	3	12	0	20	people walking/passing by
403										
Trial 1	-6		-94		15	3	11	1	20	
Trial 2	-6		-110		15	1	14	0	6.67	
Trial 3	0		0		15	0	15	0	0	
477										
Trial 1	0		0		15	0	15	0	0	

Not line of sight - through walls

- Holmes Hall hallway through walls
  - No packets received due to thick walls and other variables
- Holmes Hall rooms through walls
  - Locations:
    - From SCEL break room (through 1 wall) to SCEL lab
    - From SCEL break room (through 2 walls) to HH491
    - From HH493 (through 3 walls) to HH496
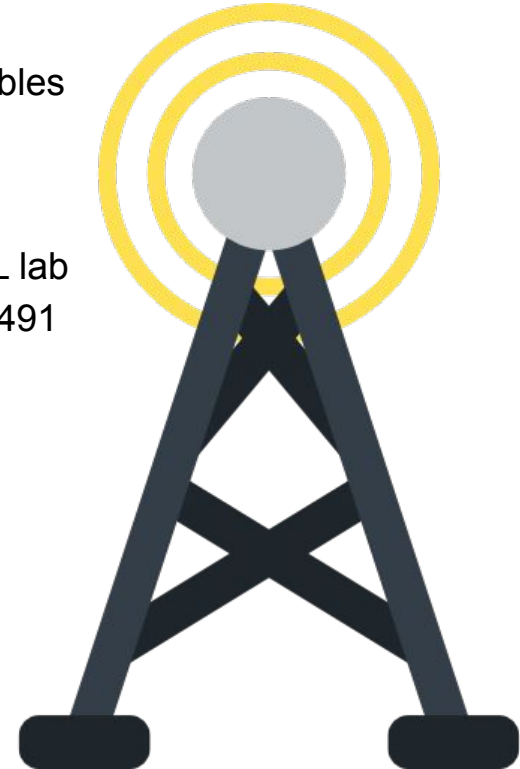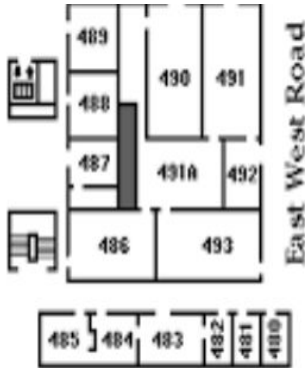
Gantt Chart

Week	12	13	14	15	16
	Apr-1	Apr-8	Apr-15	Apr-22	Apr-29
Presentations					
Proposal Presentation					
Preliminary Design Review					
Critical Design Review					
Final Presentation				Apr-27	
PCB Fabrication/Assembly					
Fabrication Time					
Populating					
Debugging					
RangeTesting					
Firmware					
Housing					
Fabrication					
Deployment					
Final Report					

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