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Team Bumblebee Critical Design Review

Isaiah Aribal & Kayla Amano

Overview

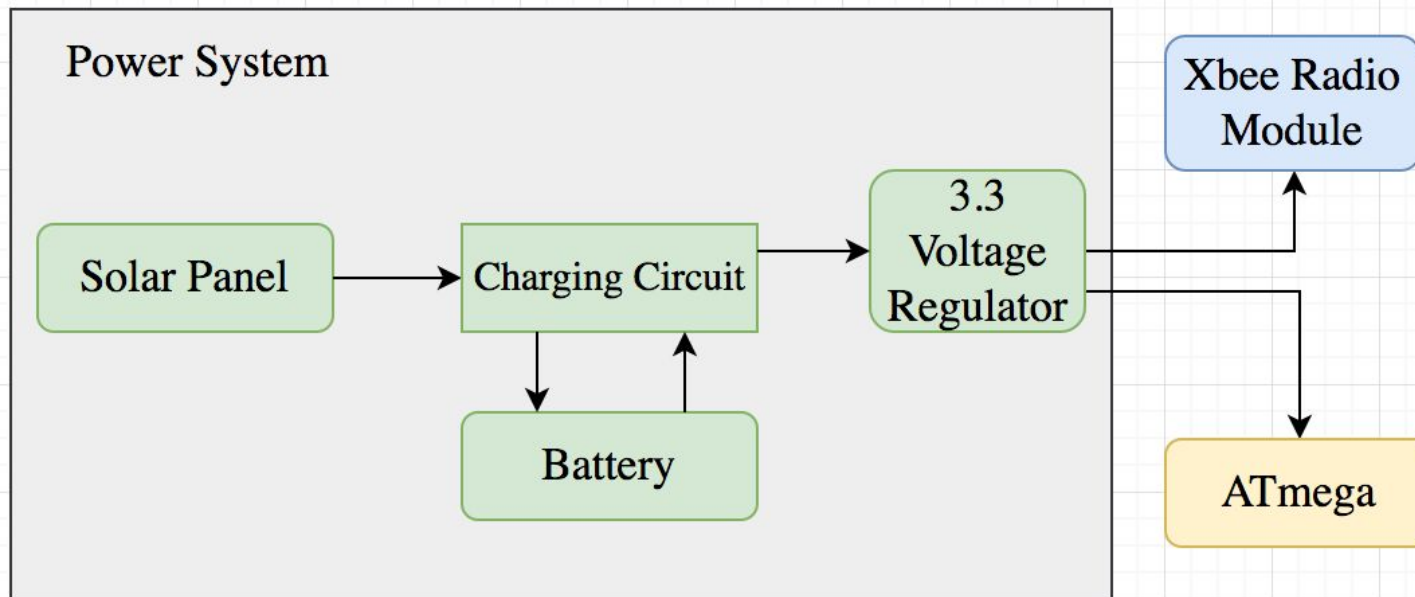
- Updated Block Diagram
- Team Progress
- Updated Gantt Chart
- Problems
- What we have yet to finish?
- Questions



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Block Diagram (Power)

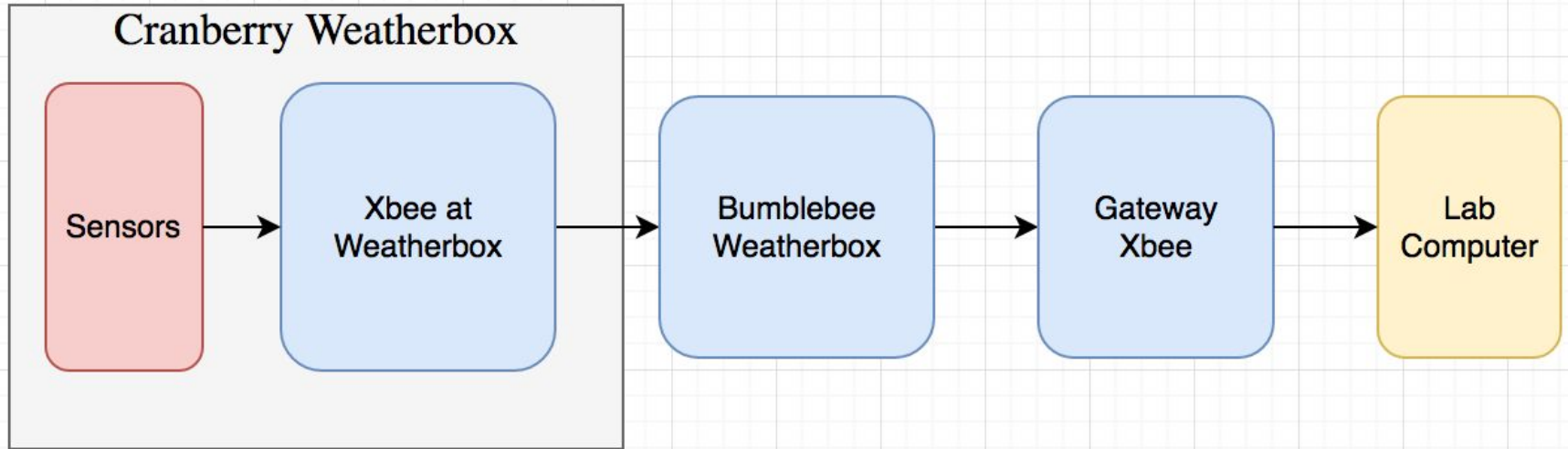




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Block Diagram (Signal/Communication)





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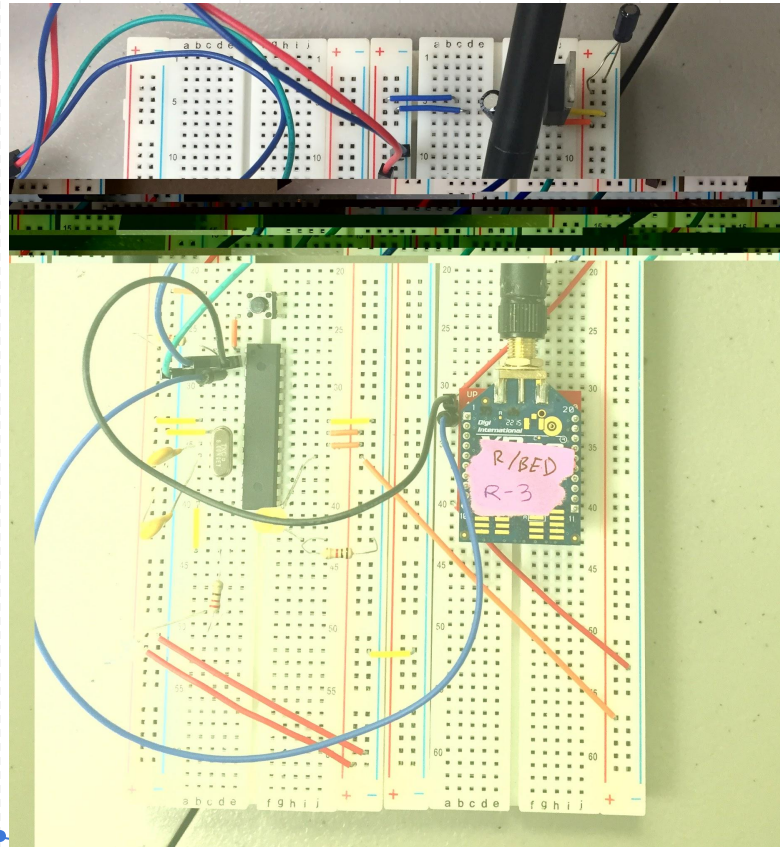
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Team Progress

- Got bare arduino to work
 - Able to relay a packet
- Range Testing
 - Line of sight, non line of sight, floors



Working Bare Arduino Board



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Range Testing




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Radio Range Test

This tool allows you to test the real RF range and link quality between two radio modules in the same network. Before starting the Range Test session you need to select a local device and a remote one or specify a remote destination address.



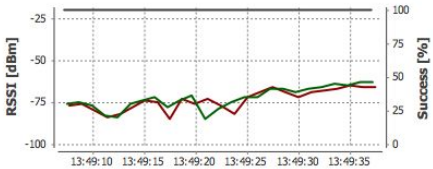
Device selection

Select the local radio device: Bumblebee1 ZigBee API 2

Select the remote radio device:

- Discovered device:
- Specify 64-bit address:
- Specify 16-bit address:

Range Test



Configuration

Range Test type:

Packet payload:

Rx timeout (ms):

Tx interval (ms):

- Number of packets:
- Loop infinitely

Time window:

Local: **-63** dBm

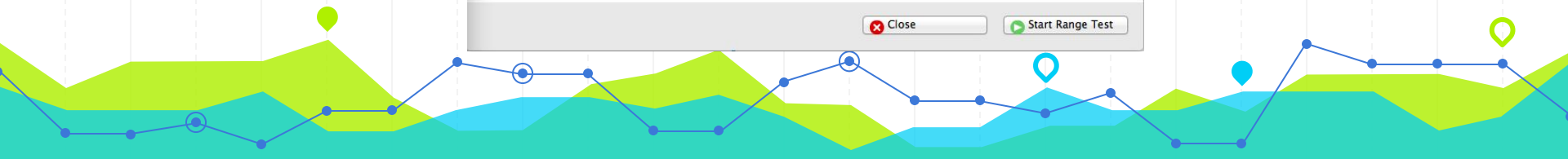
Remote: **-66** dBm

Packets sent: **25**

Tx errors: **0**

Packets received: **25**

Packets lost: **0**





Range Testing



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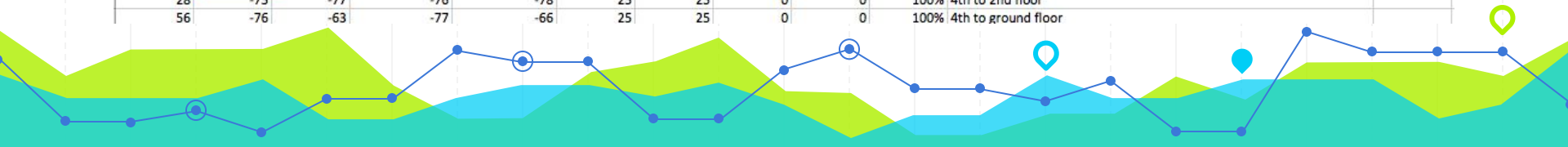
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Distance (ft)	Signal Strength				Sent	Received	Packets			Percentage	Other Variables:	Date
	Local		Remote				Tx Errors	Packets Lost				
30	-40		-41		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Not consistent sign	4/4/17
60	-46		-48		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17
90	-45		-50		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17
120	-51		-52		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17
150	-47		-50		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17
180	-60		-63		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17
210	-54		-58		25	24	0	1	96%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17	
240	-65		-65		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17
270	-67		-71		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17
300	-68		-71		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17
330	-62		-65		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17
360	-65		-66		25	24	0	1	96%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17	
390	-63		-65		25	25	0	0	0	100%	Outside. Holmes hall 4th floor. Weather clear, windy. Line of sight	4/4/17

Distance (ft)	Signal Strength					Sent	Received	Packets			Percentage	Other Variables:	Date
	Local (start)	Local (end)	Remote (start)	Reomote (end)				Tx Errors	Packets Lost				
72	-72	-76	-75	-69	-69	25	18	1	6	72%	Not line sight. Through building	4/6/17	
151	-72	-66	-74	-69	25	13	0	12	52%				
253	-90	-91	-90	-92	25	8	17	0	32%				
332	-89	-89	-89	-89	25	2	23	0	8%				
404	0	0	0	0	25	0	25	0	0%				

Distance (ft)	Local (start)	Local (end)	Remote (start)	Reomote (end)	Sent	Received	Tx Errors	Packets Lost	Percentage	Other Variables:	Date
64	-45	-58	-46	-60	25	25	0	0	100%	Through foliage (by IEEE)	

Distance (ft)	Local (start)	Local (end)	Remote (start)	Reomote (end)	Sent	Received	Tx Errors	Packets Lost	Percentage	Other Variables:	Date
14	-61	-68	-63	-69	25	25	0	0	100%	4th to 3rd floor	
28	-75	-77	-76	-78	25	25	0	0	100%	4th to 2nd floor	
56	-76	-63	-77	-66	25	25	0	0	100%	4th to ground floor	



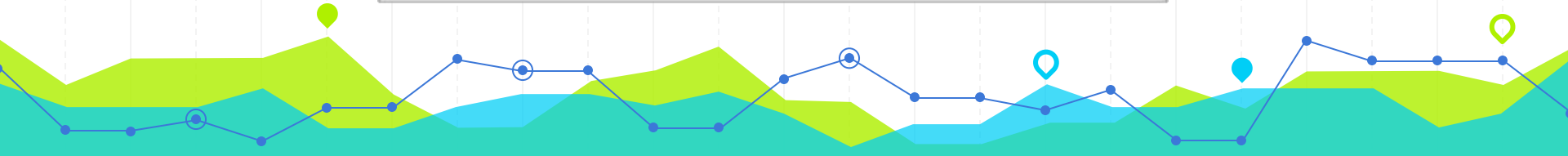
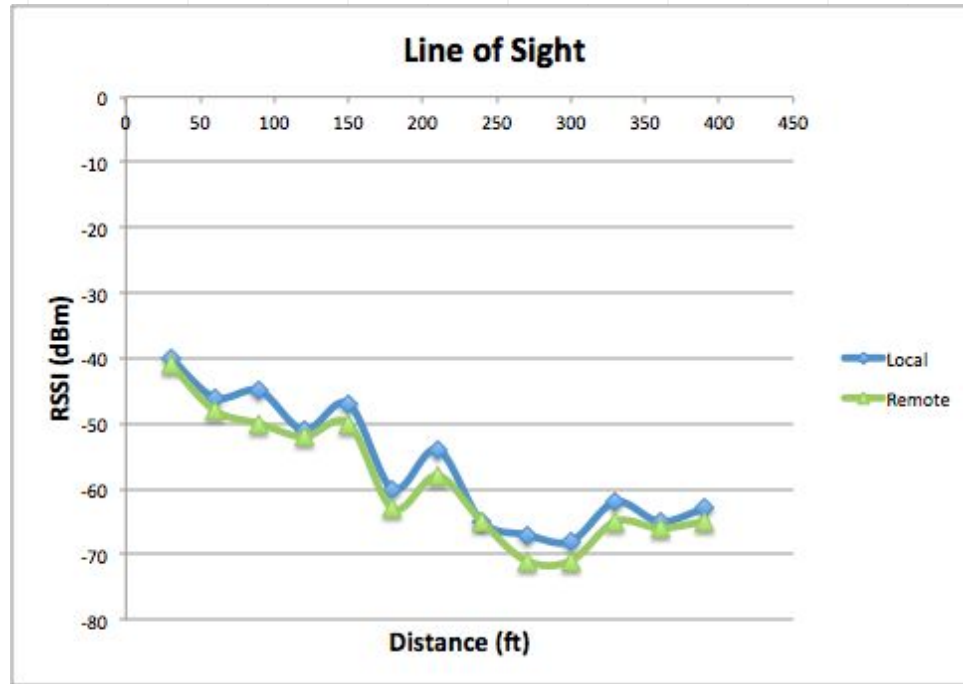


Range Testing



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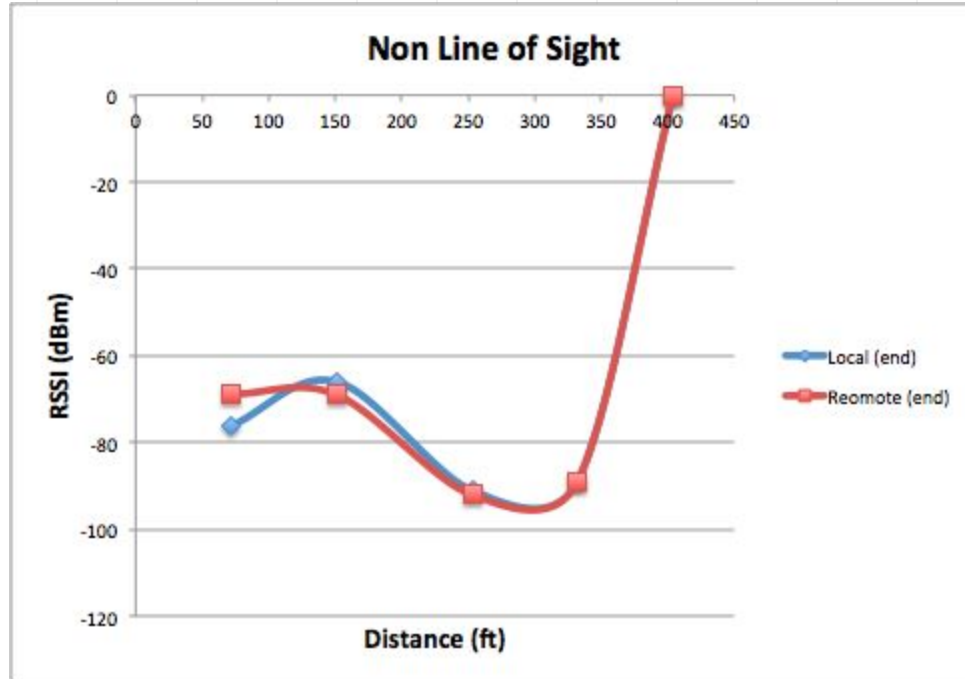


Range Testing



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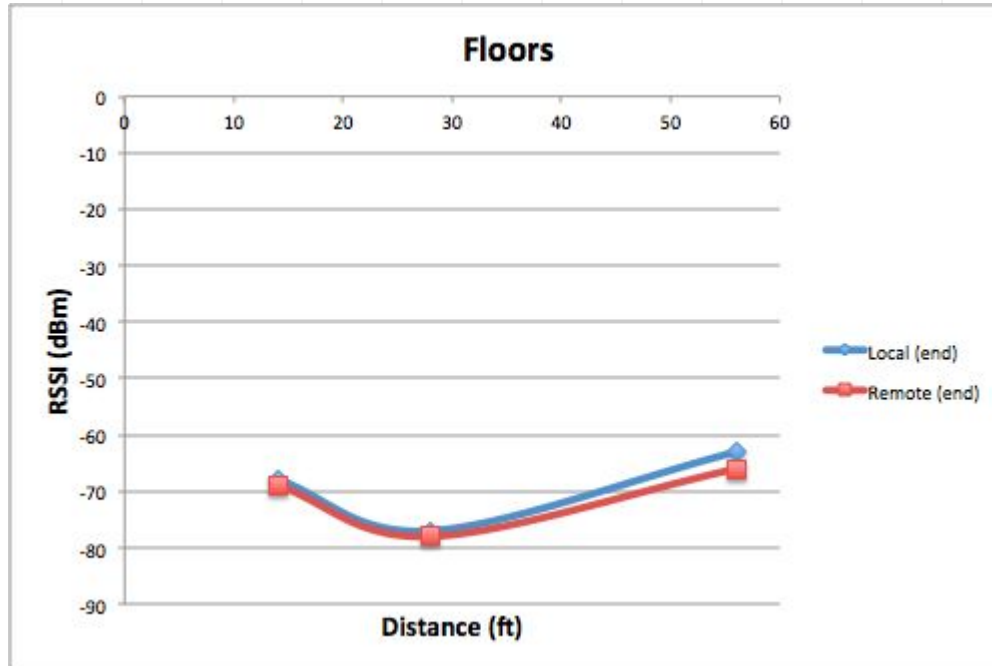


Range Testing



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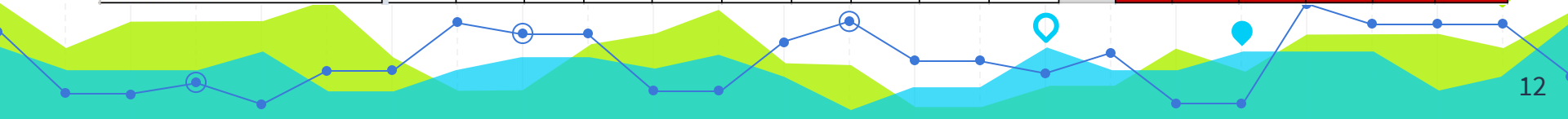


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Updated Gantt Chart

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Jan-21	Jan-28	Feb-4	Feb-11	Feb-18	Feb-25	Mar-4	Mar-11	Mar-18	Mar-25	Apr-1	Apr-8	Apr-15	Apr-22	Apr-29	May-6	May-13
Xbee Testing																	
Distance																	
Weather																	
Networking																	
PCB Design																	
Schematic																	
Board Layout																	
Review																	
Fabrication/Assembly																	
Fabrication Time																	
Populating																	
Testing																	
Final Report																	





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Resolved Problems

- Able to run the Atmega on 3.3 V
 - Reburned bootloader the Atmega for 3.3V at 8Mhz
- Rewired Bare Arduino
 - Helped with times when the Atmega wasn't programming



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Problems/Issues

- Unable to program bare Arduino
 - Temporary fix: Hit the reset button while programming
- Unable to use the 8Mhz internal clock of the ATmega
- Don't have any schematic



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What Needs to Be Finished

- Range testing
 - Distance
 - Weather
 - Obstacles (buildings/walls)
- Designing PCB
- Weatherbox network
 - Working with actual weatherbox packets



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QUESTIONS?

