

23May14

To Do:

PLAYER:

- T -Skirt
- T -Radar dish
- T -Brake / Release valve holes
- T -Fine tune kicker slots
- T -New Prop? or trim prop?
- R -Write / Test kicking function—NOTE: Will not kick if energy level is 1
- T/R -Test ESC initialization
- J -Clean up wiring/zipties
- All -Test/tune LiFKIM code
 - Tagout
 - Tag detected
 - Unpair
 - Lift levels
- ALL ————Test lift/thrust/steering!
- J ————Seal up any pressure leaks
- All -Test with other teams COACHs

COACH:

- M -Test tagout code
- M/J -Test PLAYER reset code
- M -Test 7seg code
- M -Test master SM?
- M -Wire E128 Battery connection
- T -Test final COACH assembly
- All -Test with other teams PLAYERS
- All -Calculate power consumption

22May14

To Do:

PLAYER:

- T -Skirt
- T -Radar dish
- T -Release valve holes
- T -Fine tune kicker slots
- T/R -Test ESC initialization
- J -Clean up wiring/zipties
- All -Test/tune LiFKIM code
 - Tagout
 - Tag detected
 - Unpair

~~-Lift levels~~
ALL ~~_____~~ ~~-Test lift/thrust/steering!~~
J ~~_____~~ ~~-Seal up any pressure leaks~~

COACH:

M ~~_____~~ ~~-Test tagout code~~
M/J ~~_____~~ ~~-Test PLAYER reset code~~
M ~~_____~~ ~~-Test 7seg code~~
M ~~_____~~ ~~-Test master SM?~~
M ~~_____~~ ~~-Wire E128 Battery connection~~
T ~~_____~~ ~~-Test final COACH assembly~~

19May14

To do:

PLAYER:

~~-Test LiFKIM levels, need to find "good" base setting~~
T ~~_____~~ ~~-Power switch~~
T ~~_____~~ ~~-Intake holes~~
T ~~_____~~ ~~-Skirt~~
T ~~_____~~ ~~-Radar dish~~
J ~~_____~~ ~~-Team select switch on protoboard~~
T/J ~~_____~~ ~~-Mount/wire protoboard~~
T/J ~~_____~~ ~~-Mount/wire xBee board~~
T/J ~~_____~~ ~~-Mount/wire LiFKIM~~
T ~~_____~~ ~~-Release valve holes~~
J ~~_____~~ ~~-MCLR reset circuit~~

R ~~_____~~ ~~-Test/tune servo code~~ Note: could not get ESC to work Tyler you may have to play with this it is getting a good 1-2ms pulse but there may be some settings that are off.

R ~~_____~~ ~~-Test PIC-PIC code~~
R ~~_____~~ ~~-Update LiFKIM firmware~~
R ~~_____~~ ~~-Test LiFKIM code (tag_out only, everything else is working)~~
R ~~_____~~ ~~-Continue LED code~~
EVERYONE ~~_____~~ ~~-Test/debug xBee comm~~

COACH:

M/J ~~_____~~ ~~-Wire power switch~~
M/J ~~_____~~ ~~-Wire player reset button (add code)~~ Need to retest this, wasn't working on last test
T ~~_____~~ ~~-Finish nunchuk code~~
M ~~_____~~ ~~-7 seg display code~~
M ~~_____~~ ~~-Test master SM~~
M ~~_____~~ ~~-Wire E128 Battery connection~~
EVERYONE ~~_____~~ ~~-Test/debug xBee comm~~

Tagout Procedure:

PLAYER hits tagout button in on deck region

TagDetected (with position) message broadcast by field to everyone

PLAYER xBee receives TagDetected, forwards to LiFKIM

LiFKIM starts 2 sec timer

COACH sends TAGOUT message (with position) from controller

PLAYER xBee receives TagOut, forward to LiFKIM

IF LiFKIM TagDetected position matches TagOut position and 2 sec hasn't elapsed, successful TAGOUT

Pairing procedure:

COACH selects player # and team color using joystick

COACH presses PAIR button

COACH broadcasts to everyone pair_requested message with player # and team color

PLAYER xBee receives message

IF player # and team color match their own and currently unpaired

PLAYER sends pair_successful message to COACH

PLAYER sends "go to active" message to LiFKIM

LiFKIM goes to active state, turns lift fan on to default lift value

PLAYER begins sending STATUS messages to COACH

COACH indicates successful pair by not blinking and showing PLAYER energy level

17May14

To do:

- Nunchuk connector
- Coach power switch
- Coach reset button
- Cut COACH board
- COACH pair/tagout buttons

15May14

- Lots of testing on XBee communications today. Pairing is now working. Status/control messages are almost working - control messages are being sent, but no statuses are coming back, and control messages are not timing out after 1 second.
- NOTE: When checking checksum, check to see if the total sums up to a **multiple of FF**. i.e. It's possible that the sum results in 1FF or 2FF so account for that.

14May14

COACH

- board mostly done, just missing a few power connectors
- worked on I2C, but still not getting data from nunchuck
- mechanicals almost done, will be done and assemble(able) by Friday

-we can put the power switch in the extra holes on the Xbee board and it will be

accessible through the hole in the bottom of the "can"

-need to either vinyl cut or laser/mask/paint some labels on the lid

-need to test Xbee communication through the hole in the bottom

PLAYER

-needs reinforcements on the kicker slots (printing now, will install tomorrow)

-filed a groove for the skirt

-glued the dome mold together, will sand/prep tomorrow for forming on

Frida

-working on a skirt pattern now, we can print it out and trace it onto the skirt material

13May14

- Coach schematic done
- Player schematic done

12May14

Hardware

1 - PLAYER finish work - Tyler

1 - PLAYER create skirt - Jing

2 - PLAYER cover - Robert, Tyler

2 - COACH - Design - print guts - Tyler

3 - COACH - Cut out lid / install electronics - Tyler

Electrical

1 - ~~Create wiring diagrams / Pin outs~~ — COACH - Melinda

PLAYER - Jing

2 - ~~Wire/Solder COACH electronics~~ — Melinda

~~Wire/Solder PLAYER electronics~~ — Jing

Programming

2 - Fully test XBee to XBee code with class comm protocol (pairing) - Jing /

Melinda

~~1 - Test LiFKIM code~~ — Robert

2 - I2C code - Tyler

~~2 - PLAYER to PLAYER code~~ — Jing

3 - E128 Master SM code - Melinda

3 - 7 seg display code - Melinda

3 - LED strip code - Robert

~~2 - Servo code (test / debug)~~ — Robert

11May14

PIC - decode received messages - DONE

To do:
Xbee board overheat issue - ask TA
COACH design
E128-XBee - interpretation of received messages

10May14

Pic-XBee - transmit and receive working
E128-XBee - receive working, keystroke events for checkoff done
To do (checkpoint 1):
Pic - decode received messages
LiFKIM - test? (board is soldered)
Platform

09May14

E128-XBee - transmit is working

08May14

ES Framework on PIC - Done & Tested

Notes:

Pic C compiler #defines work differently the bits include already include the port. This means you can access the pins directly instead of through the port.

Dont use	INTCON = T0IE
Use	T0IE = 1

E128-XBee state machine - coded and compiled
Master state machine - set up
E128 Event checkers - done with most software based events
E128 Comm module - set up, lots of details missing... need comm protocol!!

06May14

Design review - Done
Skirt prototyping - Done
ES Framework porting to PIC - Done

Notes:

Dont use interrupts (if you really need to I can show you how)
See LED_PIC_C_code for ported code
Still need to test code with simple blinking type program
Dont use printf or puts (it wont work)

Sparkfun parts - ordered
End mill for machining body - ordered
Diet Coke Safe ??
E128-XBee board - Done

05May14

Mechanical

- Overall chassis design Tyler
- Thrust motor mounting Tyler
- Rudder system Tyler
- Kicker system Tyler
- ~~-Skirt design/prototyping Robert~~
- Glove Jing
- Dome/energy display Tyler
- Brakes?

Software/Comm

- Hovercraft
 - ~~-ES services port over to PIC~~
 - Xbee to PIC (ES framework) SCI Jing
 - LED strip to PIC SCI Robert
 - LiFKIM to PIC SCI(assembly)
- Robert
 - PIC to PIC SPI Robert
 - PWM on PIC (ES framework) Jing
- Controller (ES framework)
 - Main state machine Melinda
 - Xbee to E128 SCI
- Melinda
 - Wii to E128 I2C Tyler
 - 7-segment display to E128 Multiplex Melinda
- Electrical
 - Solder Xbees Jing / Melinda

01May14

Next Steps:

- Check for glove - Tyler
- Design review powerpoint - Tuesday

PLAYER

- Mechanical - Tyler
- Communications - Robert
- Electrical - Jing

COACH

- Mechanical - Melinda
- Communications - Robert
- Electrical - Jing

Weigh components - All

Parts sourcing

Electrical

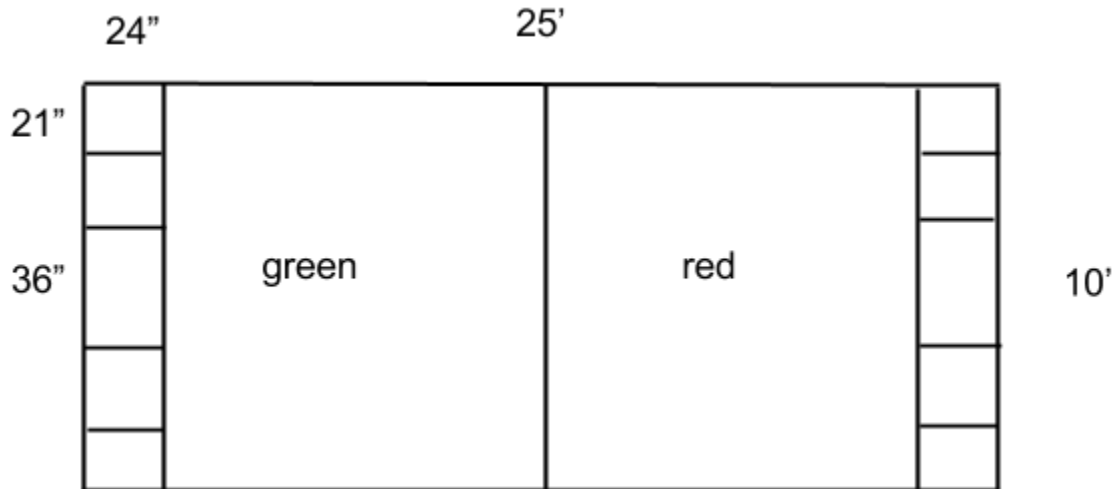
- 3 protoboard Jameco - 2125034
- 1 addressable LED strip
- <https://www.sparkfun.com/products/12027>
- 1 LED bar graph -
- 1 Resistors for bar graph Jameco

	1	unlit keypad :(
		https://www.sparkfun.com/products/8653	
	1	7Seg display	
		https://www.sparkfun.com/products/9481	
	1	Resistors for display	Jameco
	4	Mosfets for display	Jameco
	1	rudder servo	-
	2	kicker servo	-
	1	thrust motor/ESC/prop	- (smaller prop,
hobbyking)	1	PLAYER team select switch	-
	2	COACH team select lit buttons (green/red)	Using keypad
# and * keys	5	7.2V 4200mAh NiMH battery	Hobbyking
	4	9V battery	Use big batts with switching reg not linear
reg	3	PIC16F690	SPDL
	1	MC9S12E128	-
	2	5V reg	Jameco - 245569
	2	Inductor (for Vreg)	Jameco - 371856
	4	Capacitor (for Vreg)	Jameco - 31181
	2	Diodes (Vreg)	Jameco - 177990
	1	Wii nunchuk	-
	1	finger controlled pot (LiFKIM)	
		https://www.sparkfun.com/products/11620	
.10lbs ea.	2	brake solenoid	Jameco - 1919203
	3	battery connectors	Hobbyking
		heavy gauge	
		twisted pair	
		multi-conductor	
Mechanical			
	1	pink foam	tyler
	1	tarp for skirt	robert
	1	glove	melinda
	1	fanny pack	melinda
	1	foam core	tyler

Goal: score as many goals as possible in 8min

Game ball: 3"

Arena: 25' x 10', 24" x 21" ON DECK regions, 18" walls, 36" W x 24" H goal opening



Gameplay:

- 6 PLAYERS per team
- 3 active PLAYERS per team
- 3 COACHS
- PLAYERS "energy" depletes proportionally to lift
- When < 10% energy:
 - no kicking
 - move to ON DECK
 - physically "tag" paddle in ON DECK (field will broadcast "TagDetected")
 - COACH receives "TagDetected", sends "TagOut" to PLAYER
 - PLAYER receives "TagDetected" and if "TagOut" within 2 seconds, power down

Other requirements:

- 1 person each: comm committee, comm on the PLAYER, comm on the coach
- either COACH or PLAYER must have at least 2 actively communicating processors
- \$200 max
- project logbook (this document?)
- no purchased platforms

Important dates:

- | | | |
|------------------------------------|--------|----------|
| Design Review: | May 6 | 10am-3pm |
| Comm standard (1st draft): | May 7 | 5pm |
| Comm standard (final): | May 9 | |
| 1st check-point: | May 13 | |
| 2nd check-point: | May 20 | |
| Project preview: | May 23 | |
| Grading session: | May 27 | |
| Public presentation: | May 28 | 6pm |
| Report draft: | June 2 | 4pm |
| Report final: | June 6 | 5pm |

Player

Requirements:

Max size: 21" W x 24" L x 12" H
Lift: supplied LiFKIM-controlled blower
Thrust: free (can't use ground)
Steering: free (drag can't support weight)
Batteries: NiCd or NiMH
Control: remote via XBee
Energy Display: electro-mechanical (whimsy encouraged)
Impact bumper: 1.5" from ground, no gaps > 0.5"
Kicker: mechanical, on command, disabled when <10% power
Jersey: with clearly visible number
Perimeter shape: convex
Other:
 must remain hovering except in ON DECK
 may not hold the ball
 communicate with COACH at no more than 5Hz
 communication with LiFKIM must be PIC16F690 programmed in
assembly
 LiftControl
 TagOut
 Active/On-Deck status
 Energy status

Brainstorm:

Chassis:
 CNC'd insulation foam (UFO)

Lift:
 supplied blower
 maximize surface area/minimize weight

Thrust:
 rear-facing fan

Steering:
 servo-controlled rudder
 L/R draggers

Battery(ies):
 7.2V NiMH (x2)

Energy display:
 LEDs

Impact bumper:
 integrated

ball-retaining cutouts in front?

Kicker:
servo-controlled flappers

Jersey:

Inputs:
XBee (async serial)
LiFKIM (SPI)
Team select switch IO3

Outputs:
XBee (async serial) Rx1, Tx1 (PIC)
LiFKIM (SPI) Rx2, Tx2, CLK, SS (PIC)
Thrust motor PWM1
Kicker servos PWM2
Rudder servo PWM3
L/R draggers IO1, IO2
Energy display Tx3

Coach

Requirements:

Max size: 30" x 30" x 60", portable by 1 person

Batteries: sufficient for 8 hours of continuous operation (need to show calculations)

Input:

at least 3 sensing modalities (use of unusual interface methods encouraged)

intuitive and interesting (making the operator look and feel foolish encouraged)

non-engineer can learn controls in < 8min.

team select switch (red or green)

PLAYER select switch (1-13)

Output:

indication of active communication with its associated player
energy level of PLAYER to which it is currently connected

Other:

capable of controlling any PLAYER

communicate with PLAYER at no more than 5Hz

Brainstorm:

Basic construction:

wii nunchuck/glove/wristband/fanny pack thing

Batteries:

7.2V NiMH

Necessary controls:

thrust/brakes

GLOVE X rotation

steering

GLOVE Y rotation

lift (4 choices)

GLOVE middle finger curling

team select (red/green)

WRIST lit red green buttons

player select (1-13)

WRIST lit 0-9 keypad

kick (digital)

GLOVE Z acceleration

Inputs:

GLOVE Rx1, CLK

Team select IO1

Player select IO2-11

Outputs:

XBee Tx2, Rx2

Team indicator IO12, IO13

Player indicator IO14-IO23

Energy indicator IO24-IO33

Energy level display:

LED bar graph

Comm state display:

lit buttons