**RF Transmitter Proposal**

RF communication between the student’s hovercrafts and the track requires that both systems be very carefully synced. The hovercraft will be the receiver and the track controller will be the transmitter, and both must work at the same frequency and use the same libraries for writing and reading packets. The same frequency RF signal is used to ensure that packets can be exchanged and the same library is used to ensure that once packets are received the Arduino can differentiate the packet’s contents from the packet header and footer. It is possible for an experienced coder to write a program to parse a packet, but would overwhelm a freshman team with no previous RF communication experience. Thus, the two things that the student must be provided with are an Arduino library for handling packet parsing and a type of antenna that they should purchase.

We have identified a promising Arduino library, called rc-switch, available here: <https://code.google.com/p/rc-switch/downloads/detail?name=RCswitch_2.51.zip&can=2&q=>. We do not yet have any experience with it and are unfamiliar with potential pitfalls that may arise from the code, but it appears that other users have been relatively satisfied with the performance of the library’s code.

In order to use this library the students would have to limit their purchases to devices that this library expects, mainly the “Seeedstudio 433MHz RF Low Cost Transmitter / Receiver Pair” <http://www.seeedstudio.com/depot/433mhz-rf-link-kit-p-127.html>. Which is available for about $5 from fast shipping websites and $1 from foreign websites. There are other brands which might work with this library for about the same cost.

An example of the Arduino using this configuration is available here: <http://ninjablocks.com/blogs/how-to/7501042-adding-rf-433mhz-to-your-arduino>.

Because RF has a reasonably wide range, we would not be able to give each pedestal its own transmitter, as this would cause a lot of interference. We propose that there should be a track hub responsible for all of the track’s transmissions, it would continually send out a packet containing “A#B#C#” so that each hovercraft can read from this packet the information relative to their track. An image is shown of this set up, below.

Track C

Track B

Track A

“A#B#C#”

“A#B#C#”

Concerns: We are concerned that since this is a very cheap and easy solution to utilizing RF communications, it would not provide the necessary challenge and struggle that students should experience in an engineering design course. Since the equipment is available at little cost and since the libraries for the hardware must be provided to the students, we feel incorporating RF communication in this semester’s challenge is not in the educational and creative spirit of the class.