Maglev

Initial Project Description and Block Diagram

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Project Description

Magnetic levitation or otherwise known as “maglev” technology is a system where propulsion is achieved through magnetic fields. This technology does not use any mechanical method of propulsion such as wheels, axles, et cetera. Our design proposal is that of a scaled-down version of the maglev train technology that is in its infancy today. This technology is in use overseas, albeit, most of the breakthroughs that are related to maglev are strictly experimental. Commercial maglev rails are few and far between as there are only 2 rails in existence today that transport people.

Our maglev rail will feature a modified version of the Inductrack maglev design as well as Electromagnetic Suspension design ideas. The vehicle will feature a 3-phase linear motor mounted on the underside. The vehicle will also be equipped with permanent magnets that will react with the track to create levitation.

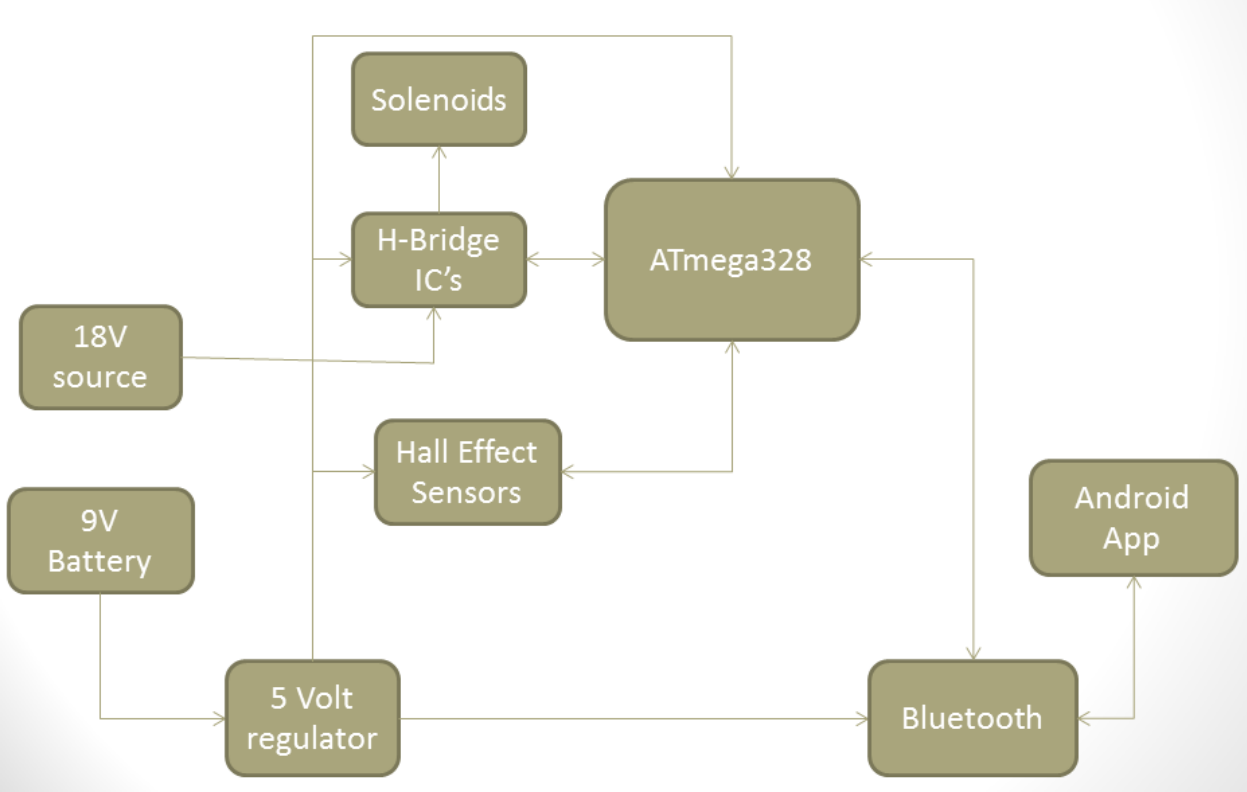
For levitation, the track will be outfitted with two rows of permanent magnets, arranged in a Halbach array. This arrangement will direct the magnetic field towards the underside of the vehicle. The on-board permanent magnets will react with the track as stated above, and will result in levitation. This track will be a circular track to demonstrate the speed capabilities of maglev technology. While our vehicle will have the ability to go forward and backward, with a circular track, we can apply fully power to the vehicle to demonstrate an important feature of maglev technology: high speed.
The vehicle will be controlled via a mobile device. The mobile device will interface with a Bluetooth module on the vehicle and will be able to be controlled wirelessly from the device.

The cost of the project is estimated to be in the range of $600-$900 US dollars. In order for this project to be a success, the vehicle must demonstrate all capabilities of maglev technology which include:

- Levitation achieved via magnetic fields
- Propulsion achieved via magnetic fields
- Controlled via mobile device
- Adequately demonstrate the fundamental features of maglev technology: high speed, frictionless, and clean.

Maglev rail technology has virtually limitless potential. It can effectively change the entire infrastructure of mass land transit to something more efficient, and environmentally friendly. By moving towards maglev technology, our railways can improve upon transit time, maintenance costs, and emission output. Not only will maglev technology improve mass transit, but other transit systems such as military and freight have much to gain from maglev rail technology.

Block Diagram



Budget/Financing

	Financing	Component
	$50.00	Track materials
	$450.00	Track magnets
	$100.00	Vehicle Materials and Drive system
	$40.00	MCU
	$5.00	EM detection
	$10.00	Power source
	$16.00	Wireless Connectivity
	$20.00	Other
Total		
	$691.00	

Project Milestone/Projected Timeline

Summer 2013

- **6/3** Decided on Maglev project
- **6/10** Research on relative projects on how they achieved propulsion
- **6/17** Decide what systems group mates will focus on writing
- **6/24** Individual research and writing on designated subjects
- **7/2** Submit Table of Contents to Dr. Richie
- **7/9** Submit forty page draft
- **7/11** Group meeting with Dr. Richie
- **7/31** Each group member has their respective 30 pages done, and now formatting, printing, and binding of the pages commences.
- **8/1** Final report is due by 9:50 AM

Fall 2013

- **8/19** Order building parts for the track and car, to start construction.
- **8/26** Begin construction of track and car.
- **9/16** Wire Solenoids
- **9/20** Order electrical parts (the rest of the parts that haven't been acquired)
- **9/30** Breadboard circuits for hall effect sensors, LED's and H-bridge IC's
- **10/14** Once final breadboard circuit is working correctly solder the parts to the Arduino Protoshield. Channel wiring to and from the solenoids.
- **10/17** Develop code algorithms and implement onto the microprocessor
- **11/11** Testing, Debugging, implement safety precautions.
- **11/28** Prepare Final Documentation and Presentation