

# DANIIL ANDREEV

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## EDUCATION

**KNOX COLLEGE**  
B.A. Physics

**WASHINGTON UNIVERSITY IN ST. LOUIS - IN-PROGRESS**  
B.S. Electrical Engineering  
M.S. Computer Engineering

## WORK EXPERIENCE

**HARDWARE ENGINEER - KINDRED.AI**  
SUMMER 2016

Collaborated with a team of 15 engineers to build an autonomous robot designed to operate in a wide range of loading, sorting, and cargo management jobs.  
Focused on power management, motor drivers, and pneumatic actuator electronics.

**LAB TECHNICIAN - KNOX COLLEGE**  
FEB. 2016 - JUNE 2017

Repaired and restored lab equipment in defunct mechanical lab. Helped set up physics experiments and introduced students to the equipment. Manage daily operations.

**FREELANCE HARDWARE DESIGNER - FITTANY**  
SUMMER 2015

Designed and realized a prototype for a startup called Fittany. Created a 3D printed sensor that would be used to make accurate measurements of a human foot.

## INDEPENDENT PROJECTS

### ELECTRIC LONGBOARD

A faster and more utile update to the commercially available "Boosted Board". Full stack design and implementation, from hand-made fiberglass board to EV chassis and drivetrain control electronics. Proprietary PCB design, microcontroller software, energy recovery drivetrain control algorithms.

### MAGNETIC BIOCOMPATIBLE IMPLANT

Surgically implanted biocompatible magnet that allowed me to sense magnetic fields created by electrical current. Developed neural connections in my brain to differentiate between AC currents of various intensity and frequencies.

### HYDROPONICS STRAWBERRY GARDEN

A network of planters and a specialized lighting system that efficiently targeted the absorption peaks of chlorophyll in strawberry plants dramatically speed up their harvest cycle.

## ACADEMIC PROJECTS

### ENGINEERING CLUB - KNOX COLLEGE

Founded together with 3 other physics students.  
The club mission is to bringing students together to create multi-disciplinary projects.

### TEAM 8 - FIRST ROBOTICS

Worked with my peers and mentors to create 3 separate robots that competed on the national level.

## RELATED SKILLS

**SOLIDWORKS - 2011 - 6 YEARS**  
**MACHINING - 2011 - 6 YEARS**  
**ELECTRONICS, CIRCUIT THEORY - 2014 - 2 YEARS**  
**PCB DESIGN - 2014 - 2 YEARS**  
**C, C++, ASSEMBLY - 2014 - 2 YEAR**  
**MATHEMATICA - 2015 - 2 YEAR**  
**CNC, CAM SOFTWARE - 2016 - 1 YEAR**

# Electric Longboard Mark II



Open-Source Project by Daniil Andreev

Oct. 16, 2017

## Motivation

The reasoning behind this project it is a natural progression of my interest in longboard and previous mechanics experience, as well as making a resume that I can literally ride to an interview. However, the initiating thought was; I want build something so outrageous it exists only in a Neal Stevenson universe.

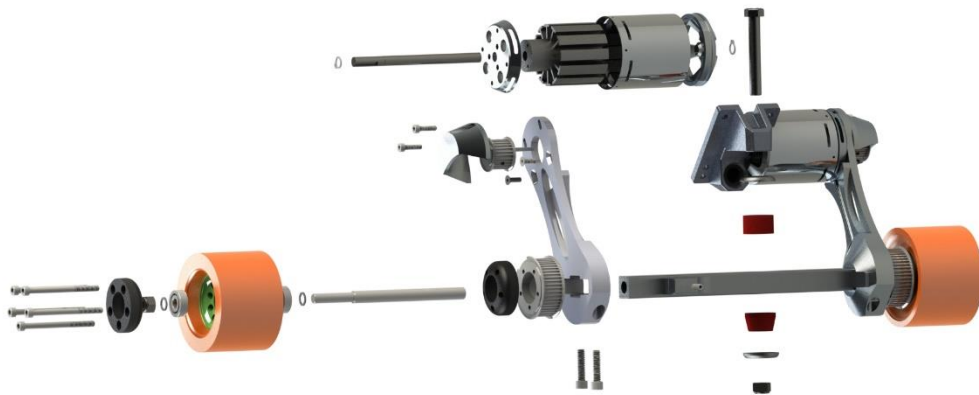
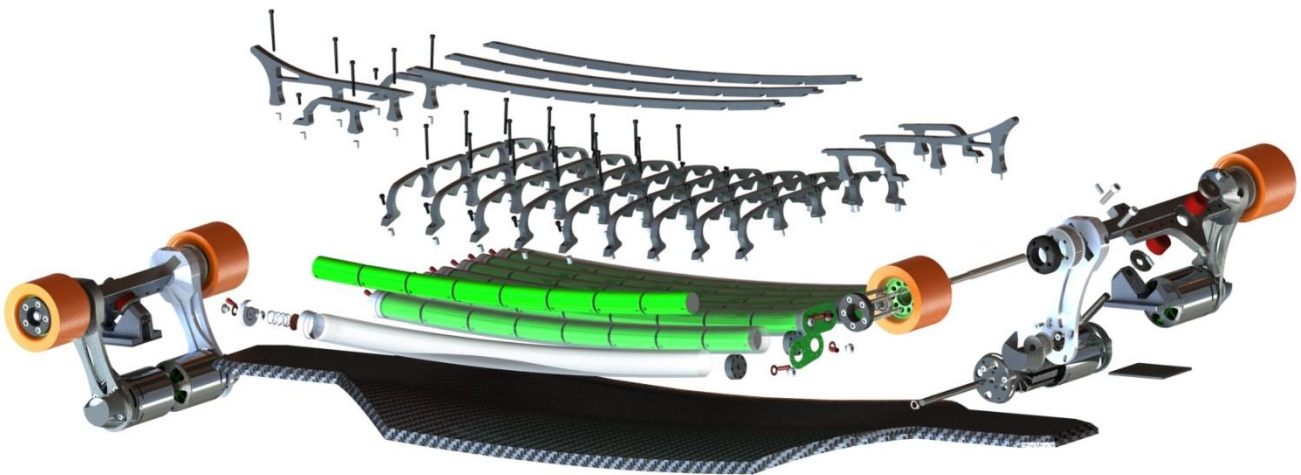
The project started during the end of my first year as an undergrad at Knox College. I had looked at the commercially available Boosted Board and figured I could make something way more powerful.

Having no training in electronics, I spent the rest of the year attempting smaller projects that would help me build the skill required to attempt an electric vehicle. 3 years later I am just starting to see the finish line.



## Mechanical Design and Model

After a year break in the building process I set out to reimagine the mechanical superstructure.





# Completed

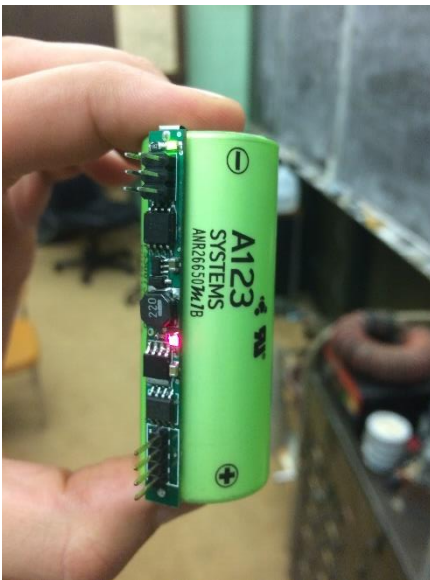
2015-2016



V4 Carbon Fiber Deck  
3 failed designs



V2 10W RGBW Headlights, Backlights  
4 x ILD6150 LED Drivers  
Atmel 328 Micro  
12-65 operating voltage



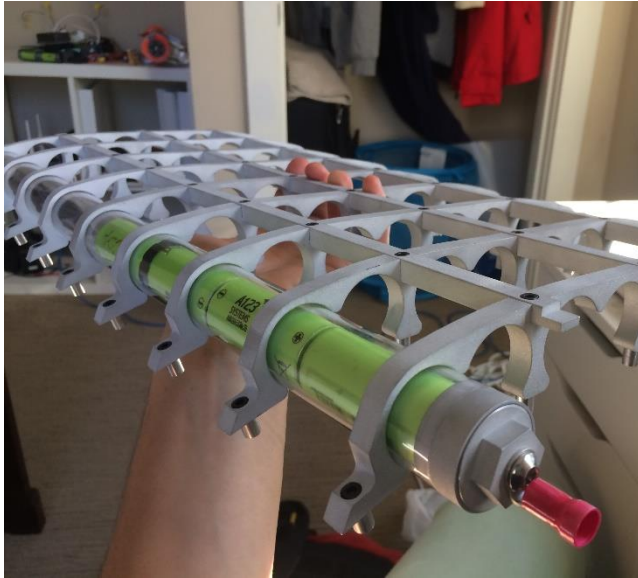
Daisy chainable single cell BMS  
Attiny 85 Micro  
Isolated I2C channel  
Onboard boost converter



V1.5 Truck and Motor Assembly  
8kW Drive train  
2 x Turnigy 7464 BLDC Motors  
2 x Kegel Orangatang 80mm Wheels  
CNCed and turned at Redwood City Techshop.

## In the Pipeline:

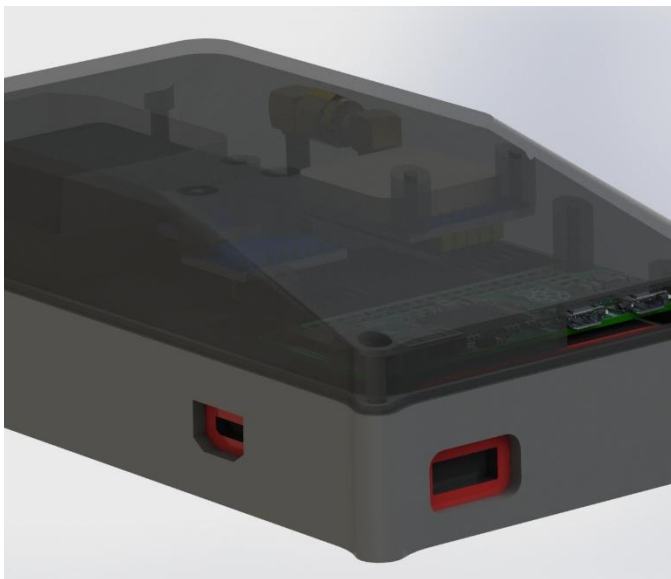
2017-



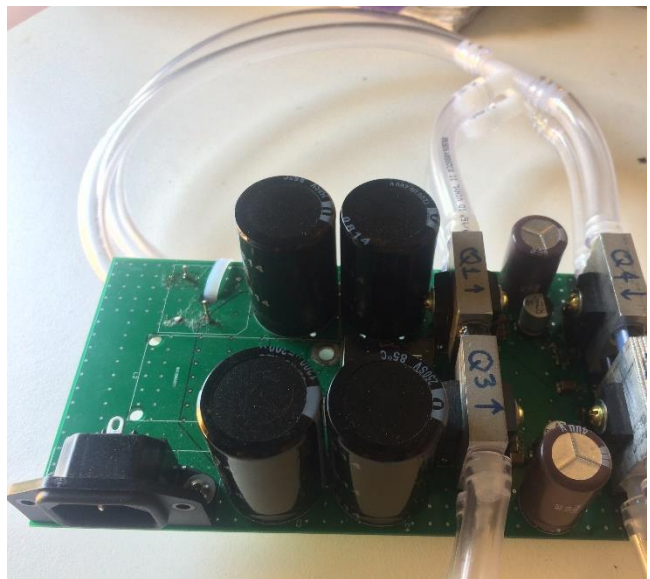
Battery Pack  
64 LiFePO4 cells to deliver 200A @ 60V continuous



Carbon fiber deck  
Molds CNCed  
Carbon fiber bought



Sensor Module  
Raspberry Pi central module  
GPS  
Altimeter  
Design and development in collaboration with Sam Ragsdale



1.5kW charger  
Tested at 900W without water-cooling  
Compatible with 240V for 3kW+ charging  
Design and development in collaboration with Anton Zaytsev

## In the Near Future

Headlight, Backlight enclosure

Integrated battery management system

Water-resistant cover

Remote-control system

2 x V2 trucks and motor mounts for the full 16kW drive train.

## Learning Experience

This project helped me become a full stack developer. Having the opportunity to design and manufacture the whole project from scratch taught me to be very considerate of my design choices; making sure that the hardware is compatible with the electronics and software, striking the balance between aesthetic design and ease of manufacture. To make this board a reality I had to crawl along the entire industrial process, learning the properties of plastics, metals, composites and their respective postprocessing techniques. I learned to do the gritty work as well, to not only design and build, but talk to PCB manufacturers, spend hours on the phone with hardware suppliers, and read endless datasheets, weigh the properties of different chipsets and picking products that integrate with the full stack development process.

The top five skills that I this project taught me:

CAD – Solidworks, Eagle

Electronics – Circuit Design, PCB Design, Manufacture

C programming – Firmware development

Manufacturing – CNC, Lathe, Mill, Carbon Fiber Molding

Self-Teaching – The ability to research, learn and use any new skill or information that I need to push the project along

## In Conclusion

Experiencing the width of the engineering process has inspired me to join a EE master program and join the hardware world to make products that have a physical impact.

## Components not designed or manufacture by project team

VESC – BLDC motor speed controller

Turnigy 6374 BLDC motors

Nyko Wii nunchuck – repurposed for the control of the ESCs

Kegel Orangatang 80mm Wheels

## More Info

[Hackaday Project Page](#)

[Github](#)