Cycle Bright Solutions

Always be Seen

Cycle Bright Solutions

Ahmed Medhioub (CFO)
Chief Financial Officer

Arta Ahrabi (CTO)
Chief Technology Officer

Wael Jendli (CEO)
Chief Executive Officer

Ibrahim Appiah (CIO)
Chief Informational Officer

Chakaveh Ahmadizade (COO)
Chief Operation Officer

Key Roles

Cycle Bright Solutions

Outline

- **Goal**
- **Background**
  - **Motivation**
- **High-level Overview**
  - **Main Features**
  - **Videos**
- **Schedule**
- **Budget**
  - **Business case**
- **Major Changes**
  - **Future additions and limitations**
  - **Learning outcome**

Cycle Bright Solutions

Goal

- Safety
- Portability
- Usability

Background

- Cyclists were involved in **1400 incidents** over the last 5 years with 100% injury rate [1]

- Miscommunication between cyclists and road users is the main reason for these incidents [2]

Cycle Bright Solutions

Motivations

- Adopt a solution to decrease the number of accidents between cyclists and other road users

- Ensure a higher visibility of the cyclists in all weather conditions

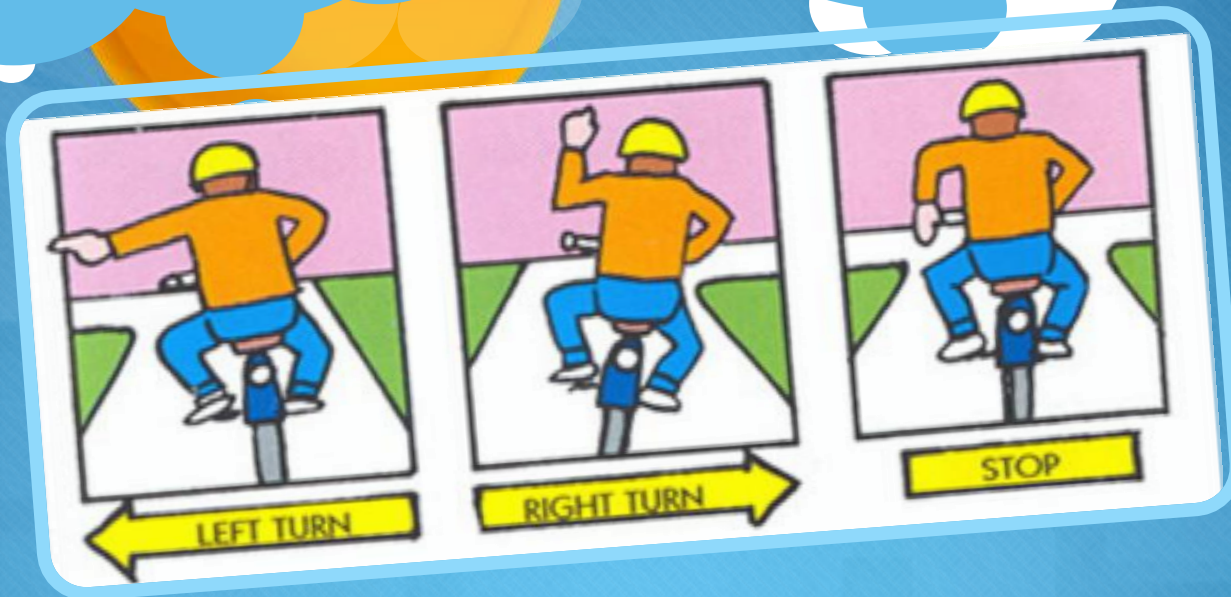- Follow the conventional patterns and colors of signalling used by cars and motorcycles

Cycle Bright Solutions

Needs extra wiring and can be easily confused with the reflecting lights

Not highly visible and requires wearing gloves

A Jacket needs to be worn all 4 seasons
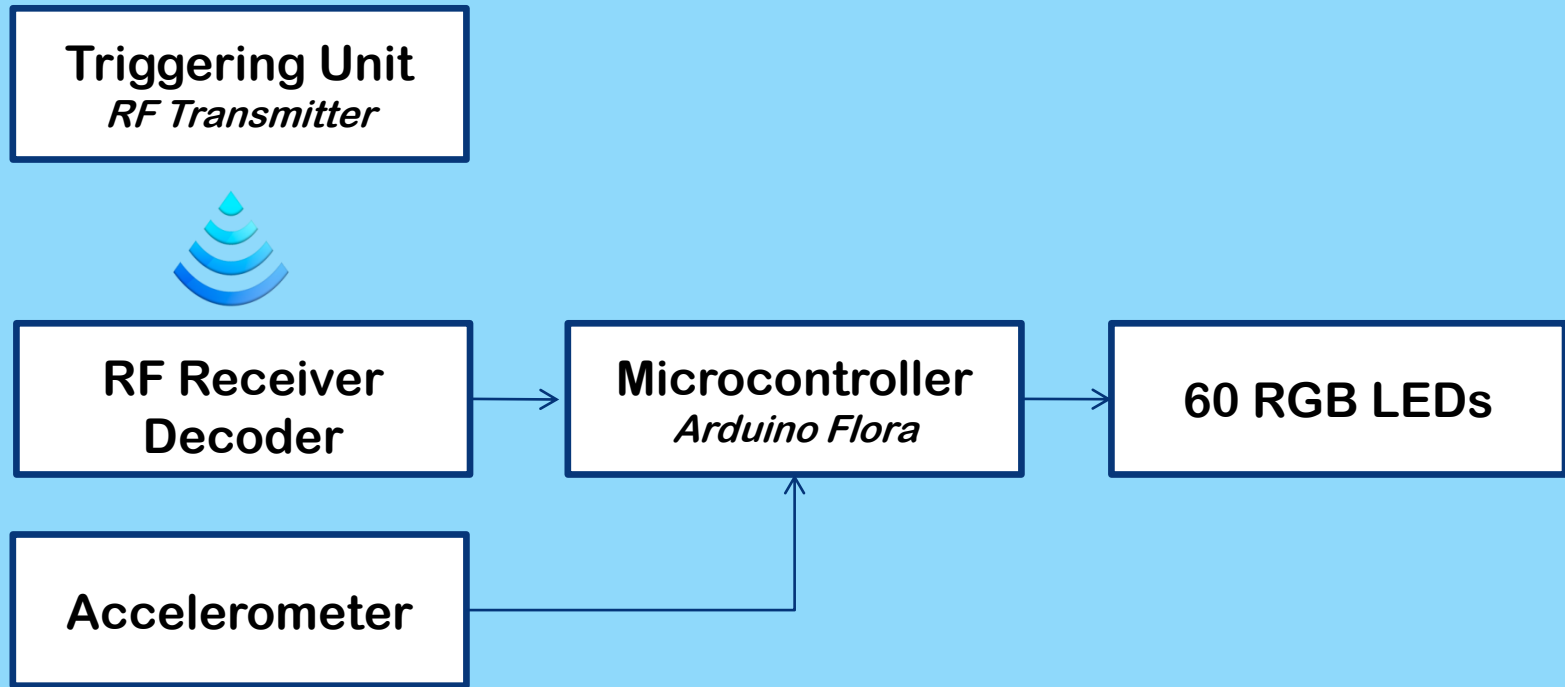

Existing Solutions

Motivations (cont'd)

- In British Columbia, wearing a helmet is required by law

- It is safer to keep both hands on the handle to keep a straight line

➡ The ultimate solution is the Smart Helmet for safer experience

Cycle Bright Solutions

System Overview

Main Features

- Speaks the language of cars for turn signals

- Bright LEDs for visibility in all weather conditions

- Extra Safety features:

  - Notify other road users of sudden brakes
  - Alert falling movements through hazardous signals

- Rechargeable via USB connection

- Two brightness levels: standard and energy saving modes

Cycle Bright Solutions
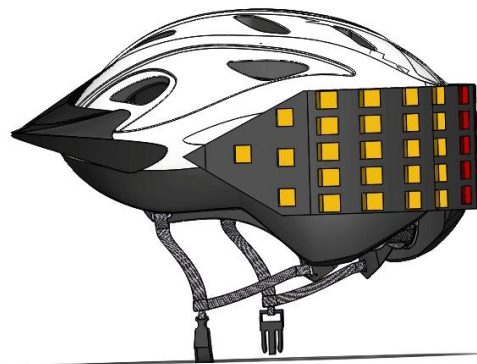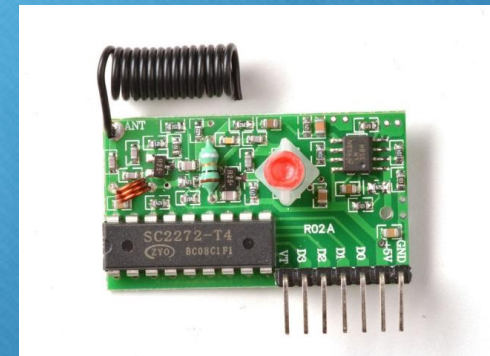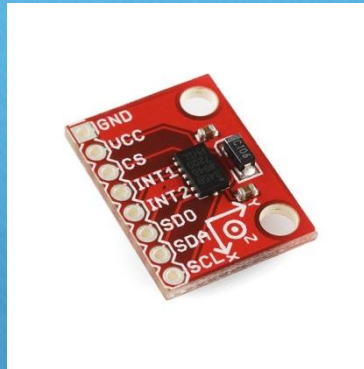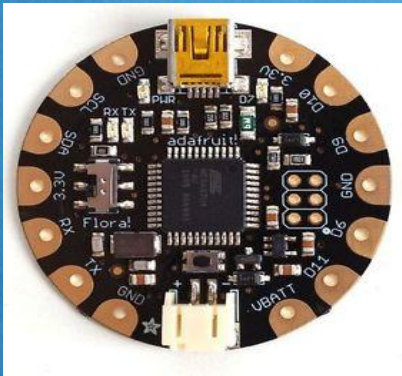
Triggering Unit

○ **User Interface with the system**

   ○ Provides a separate button to turn signals off

   ○ Prevents confusion

   ○ Easy to clip on any bike handle
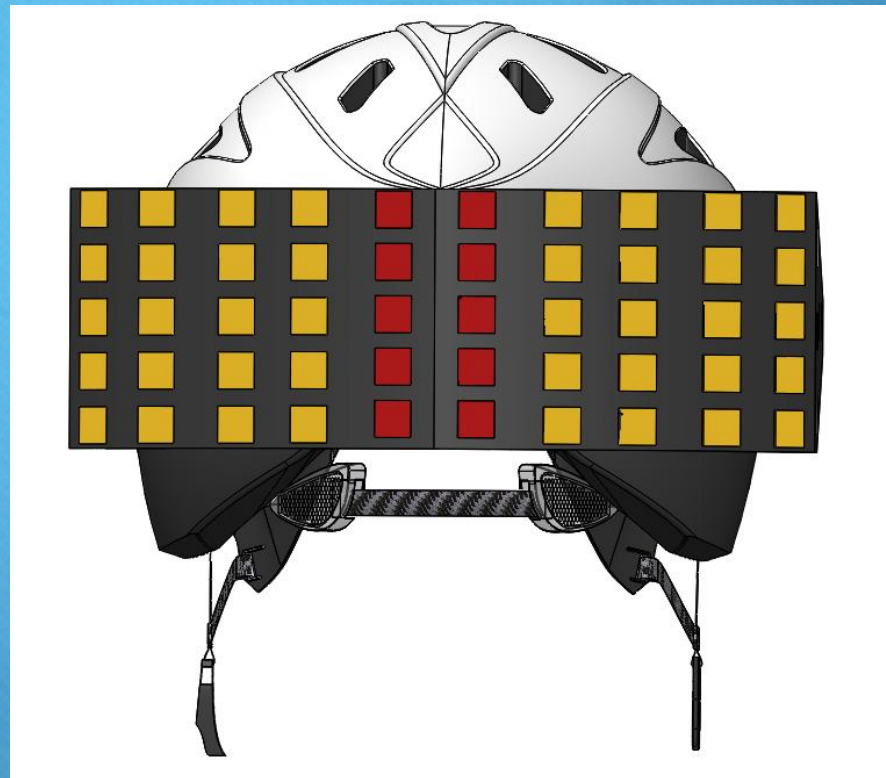
   ○ Portable, small, and lightweight
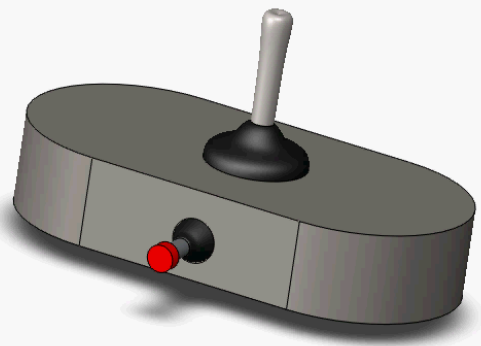
Control Unit

- Arduino Microcontroller ➡ **The brain of the helmet**

- RF Receiver ➡ **Receive user inputs**
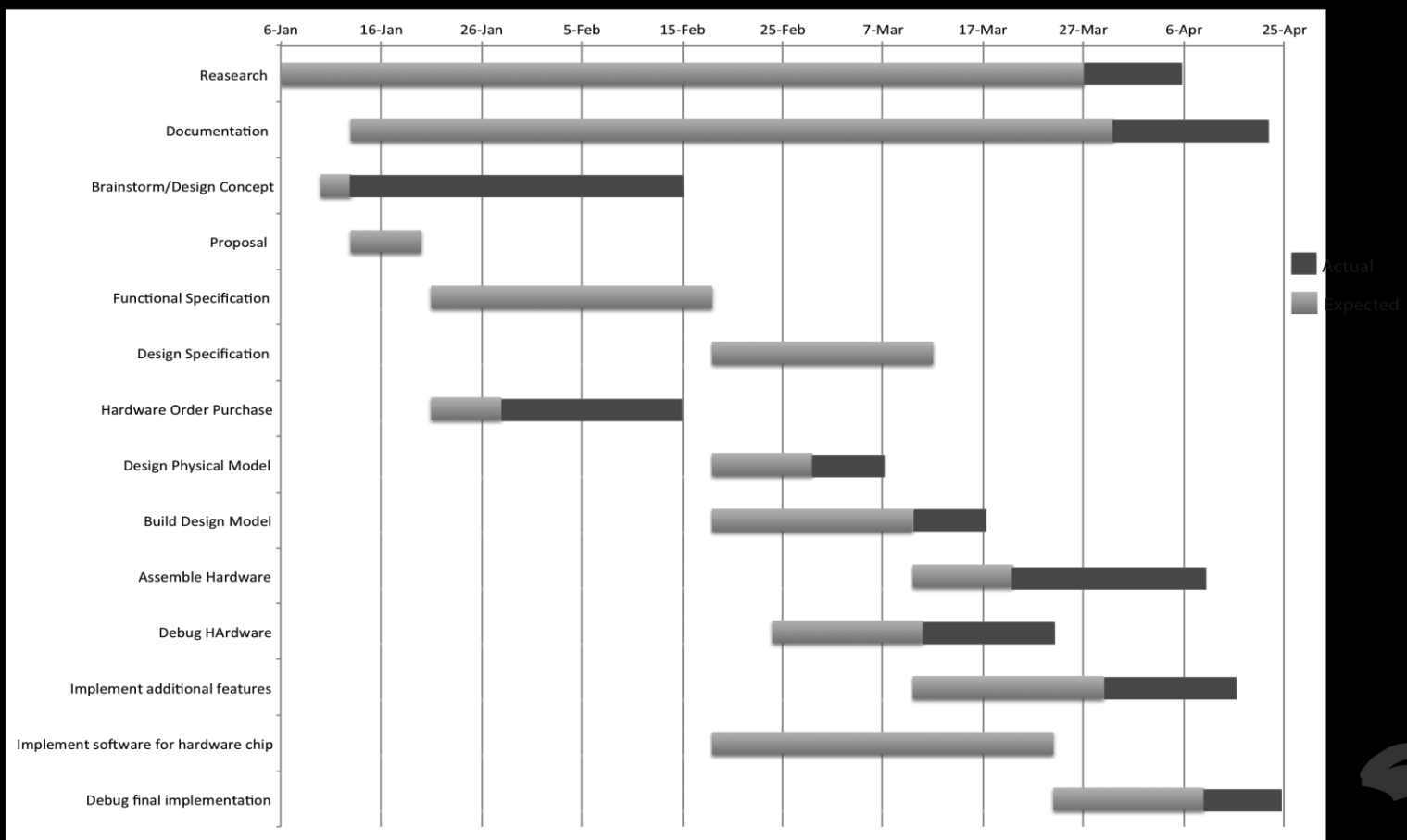
- Accelerometer ➡ **Protection mechanism**

LED Unit

○ **60 bright RGB LEDs That offers an extended visibility and a wider angle**

Cycle Bright Solutions

Schedule

Budget

○ The ISSEF fund run by ESSS was our only source and we got $350. The details are summarized in following table:

Component	Projected cost (Canadian $)	Actual cost (Canadian $)
Helmet	100	35
Microcontroller	120 (for 2)	30 (for 1)
Bluetooth	60 (for 2)	N/A
RF transmitter receiver	N/A	20
LED Strips	85	40
Microphone/Speaker	N/A	30
Miscellaneous	200	170
Tax + shipping	124	100
Total	689	425

Business case

- **<u>Market:</u>**

  - **Casual cyclists in North America**
  - **The helmet can be also used for other users such as: Skate board, Scooter, and Rollerblades**

- **<u>Competition:</u>**

  - **There is no similar product to the Smart Helmet available on the market ☺**

Cycle Bright Solutions

Business case

Estimated cost for mass production is shown in the table below:Note: mass production prices are estimated from Alibaba.com

Subsystems	Estimated
Helmet with LEDs & Bluetooth	$20 / unit
PCB printing and assembly	$10 /unit
➔Total	$30 / unit
Mass production outsourced to China	10.000 unit/year
➔ Production cost	$300.000 /year
Admissive cost	$10000 / year
Final cost	➔ $310.000

Business case

Financing options could be Shark Tank & Dragons' Den TV shows

Cost	$310.000
Projected price	$1.000.000
Projected revenue	$690.000

Cycle Bright Solutions

Major changes to original design

- Added energy saving mode

- Support of USB charging

- Didn't integrated Bluetooth headset for weight purposes

Future addition & limitations:

- Improve the braking algorithm

- Acquiring a smaller and lighter Bluetooth headset

- Improved packing

- Print the PCB design
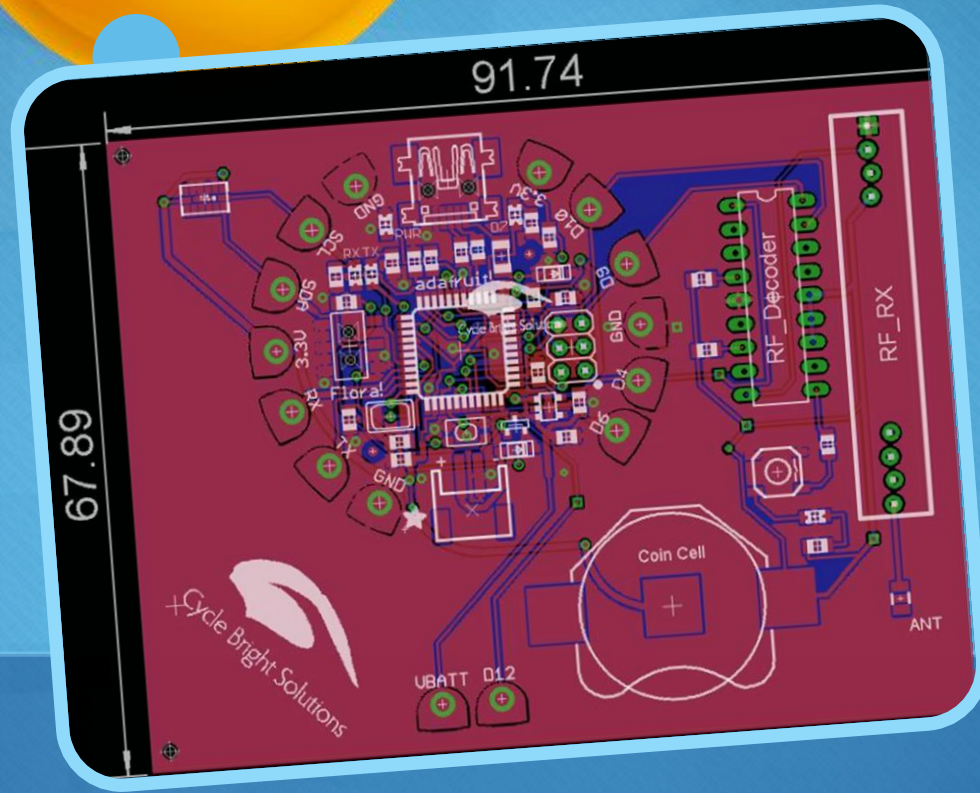
PCB design

Learning outcome

- Project Management

- Arduino coding and development

- Eagle PCB design

- Interfacing with different modules (ie. Accelerometer, RF Trigger)

- Scheduling and timelines

- Remediate from problems

- Importance of team work & collaboration

Acknowledgment:

Special

- Dr. Andrew Rawicz
- Mr. Steve Whitmore
- Mr. Lukas-Karim Merhi
- Mr. Jamal Bahari
- Ms. Rohini Ishwariya

Thank You

- Mr. Moataz Billeh Mednini
- Mr. Kyle Griffith
- Engineering Student Society
- Family and Friends for their support ! ☺

Cycle Bright Solutions

References:

○ [1] "Quick Statistics". Internet: http://www.icbc.com/about-ICBC/Newsroom/quick-statistics.pdf, September 2013, [19 Jan 2014]

○ [2] "What are the dangers in term of cycling safety?". Internet: http://www.sharetheroad.ca/what-are-the-dangers-in-terms-of-cycling-safety--p128277, [19 Jan 2014]

○ [3] "Cycling safety tips and regulations". Internet: http://vancouver.ca/streets-transportation/cycling-safety-tips-and-regulations.aspx, 20 Septembre 2013, [20 Jan 2014]

Cycle Bright Solutions

Video

Questions?????