PortableHUD by SafeVision

AMINA QURBAN
ANASTASIA SUPRUN
PAK LUN HOI (JOEL)
QING ZHUANG (FRANCIS)
YIFENG XIE (WENDY)
XUEMENG LI (MONICA)

Profile

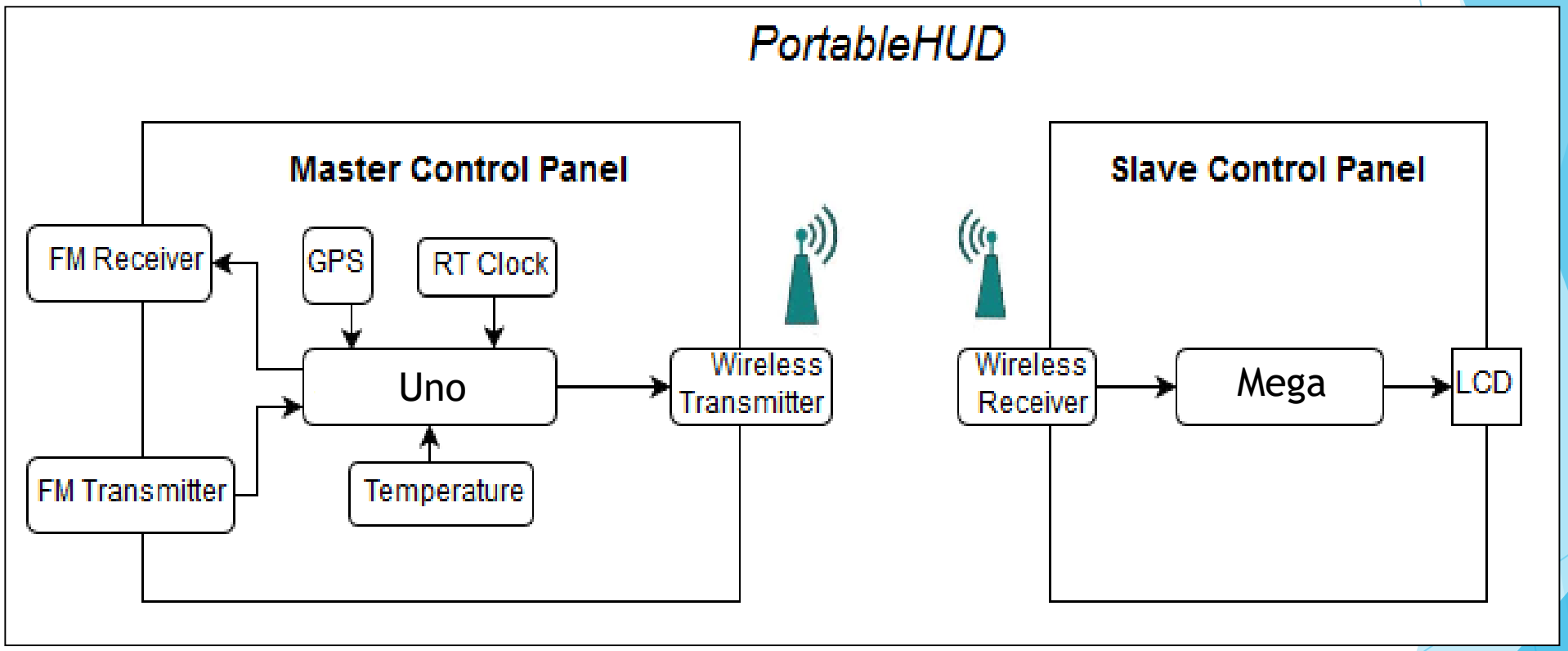
Overview

- Background and Motivation
- High-level Design
- Schedule
- Material and Cost
- Business Case
- Future Foresee

Background and Motivation

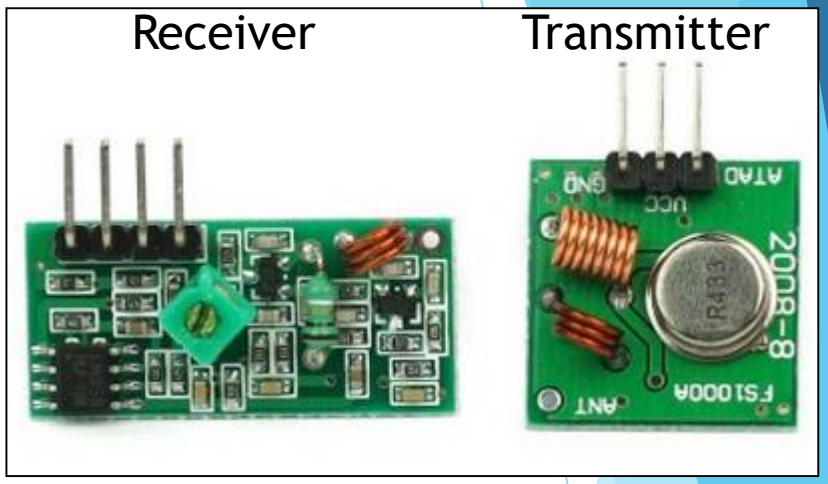
- Background
  - Prevent accidents
  - Eliminate cell phone usage while driving
- Motivation
  - Safety Concern
  - Minimize Distractions

High-level Design-Overview



High-level Design-Wireless Data Transmission

- Main Function
  - Transmitting Data from Master Panel to Slave Panel
  - To make the LCD part (Slave Panel) as lightweight as possible
- Challenges and Approach
  - Different types of data(ie. Direction, Time, Negative Temp.)
  - Limited Interrupt Pins
  - Organization of data for both transmitter and receiver

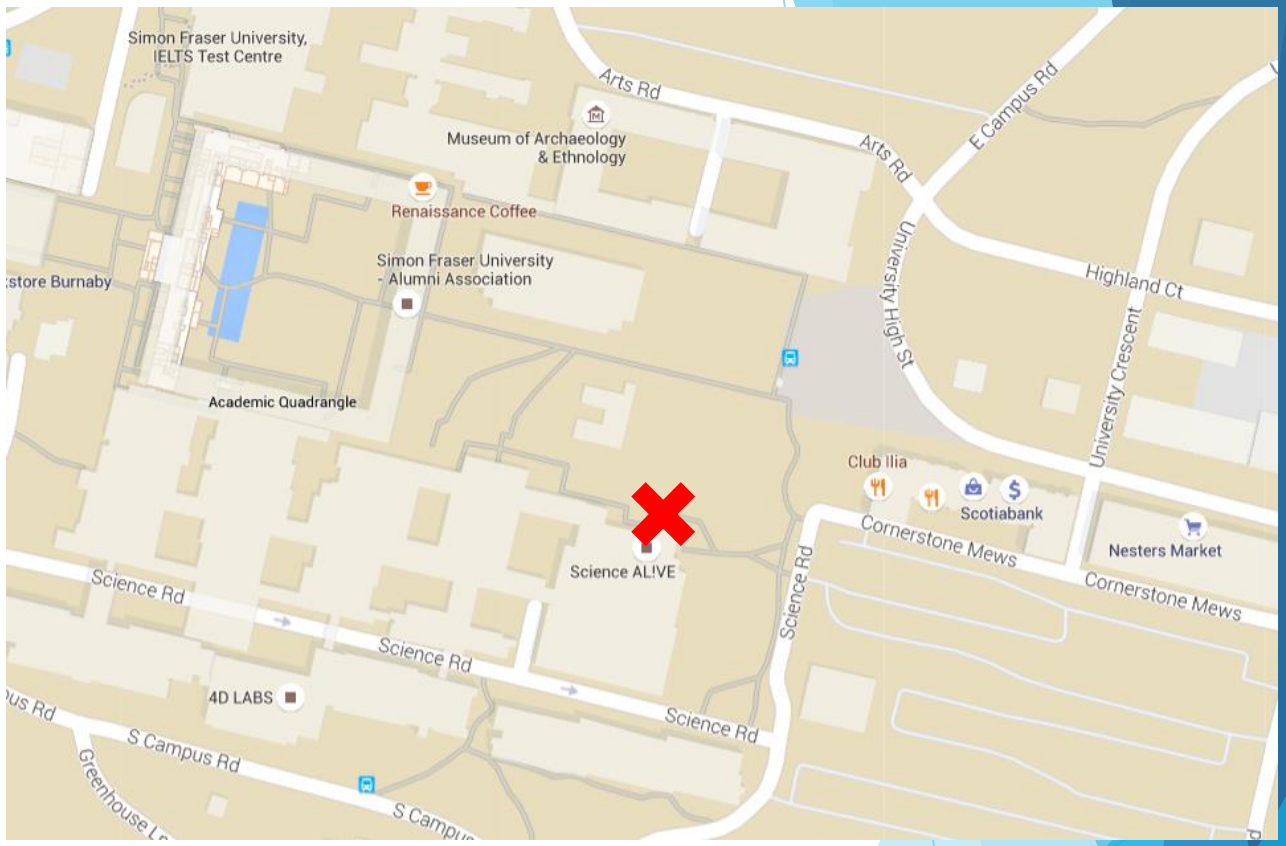


High-level Design-LCD

- Main Function
  - Display information
  - GPS tracking system
- Challenges and Approach
  - Library
  - Loading image
  - Color spectrum
  - Power consumption
  - Uno vs Mega

High-level Design-GPS

- Main Function
  - Acquire GPS Information
  - Trajectory Tracking
- Challenges and Approach
  - Delay in Coordinates Updates
  - Speed Inaccuracy

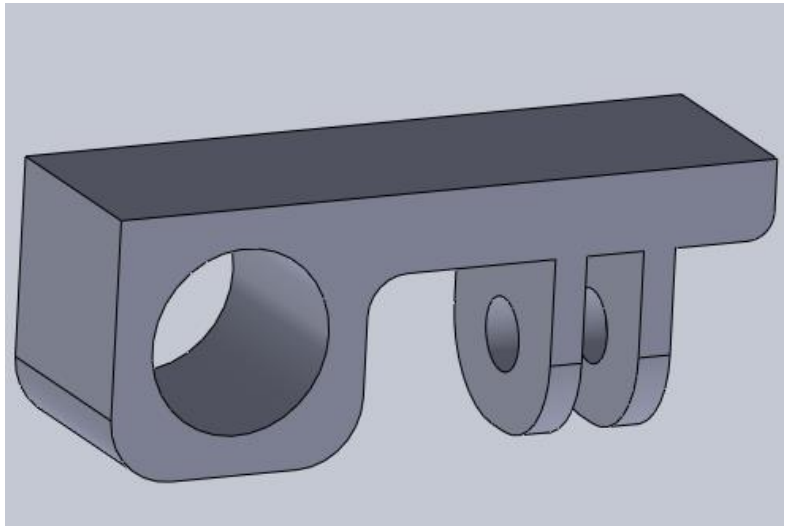


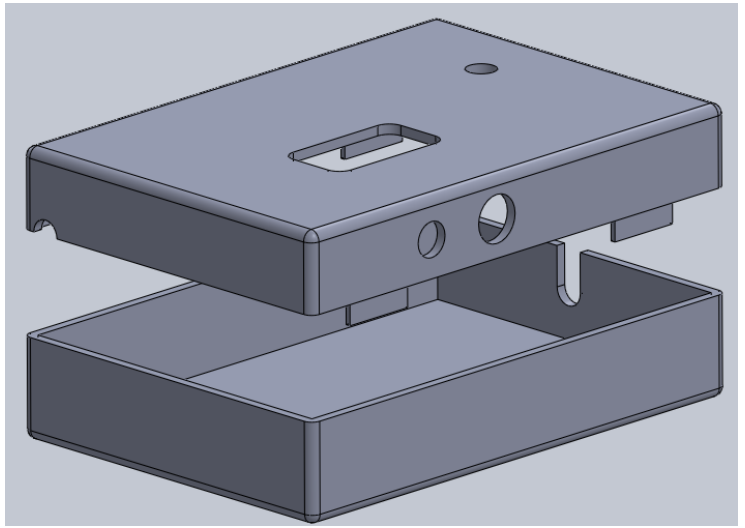
High-level Design-Temperature and RTC

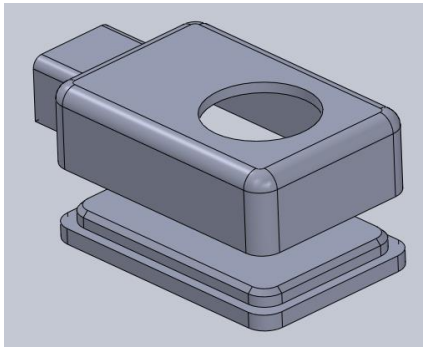
- Main Function
  - Acquire Temperature
  - Acquire Real Time
- Challenges and Approach
  - Temperature effected by circuitry

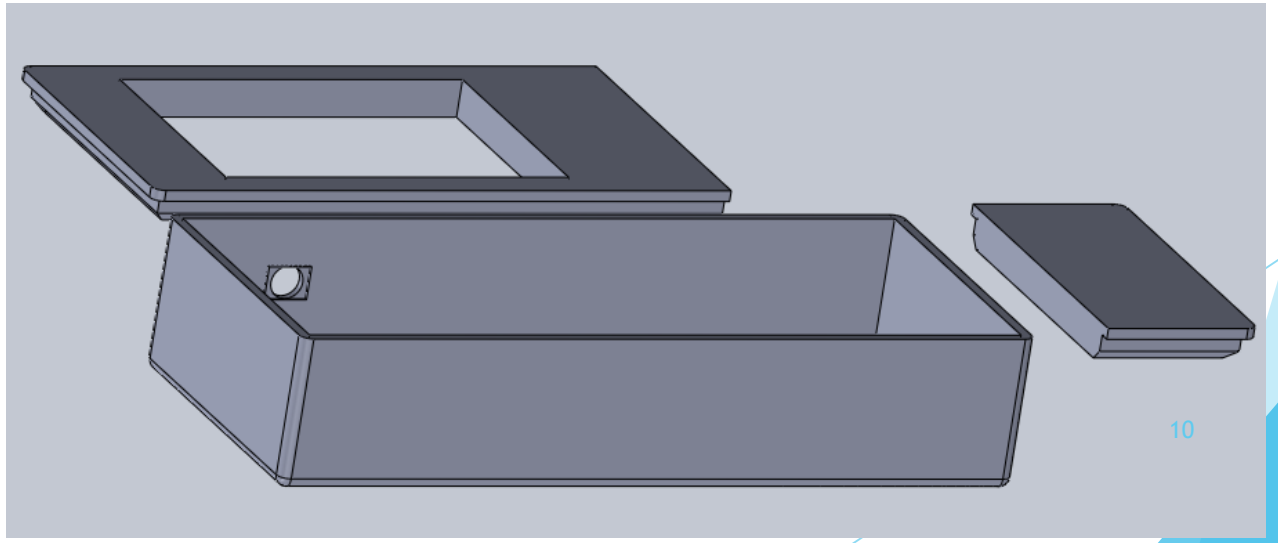
http://physics.about.com/od/glossary/g/temperature.htm

Mechanical Design









High-level Design-Radio Communication

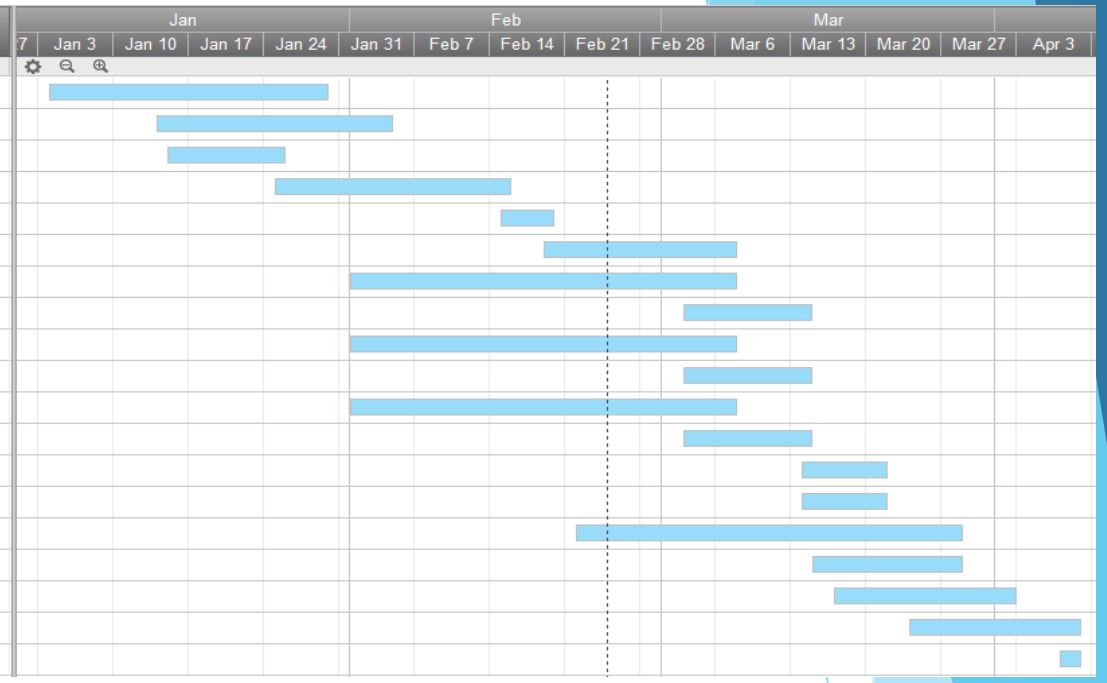
- Main Function
  - Team Communication for Group Sport
  - Multiple Channels Available
  - Radio
- Challenges and Approach
  - Microphone
  - Noise

http://patrickschneider.photoshelter.com/image/I0000.EU6frpNWro

Schedule

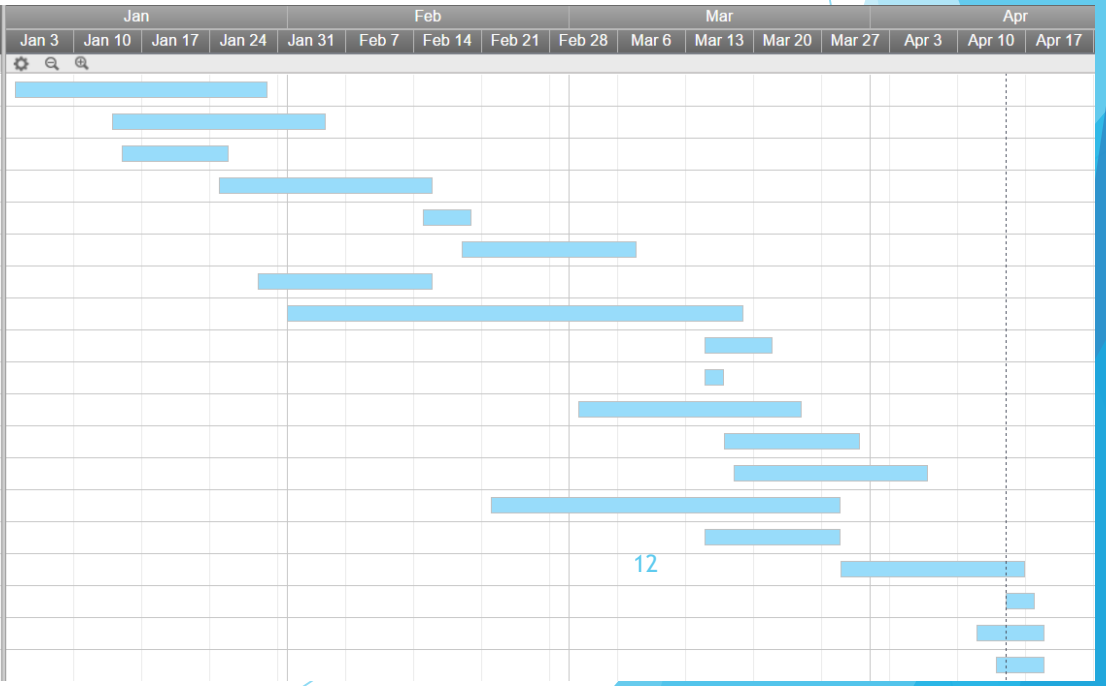
- Original Schedule

Task Name	Start	Finish
Research	01/04/16	01/29/16
Online/Local Purchasing	01/14/16	02/04/16
Proposal	01/15/16	01/25/16
Functional Specifications	01/25/16	02/15/16
Design Reviews	02/15/16	02/19/16
Design Specifications	02/19/16	03/07/16
Assembly of module 1	02/01/16	03/07/16
Debugging and Testing 1	03/03/16	03/14/16
Assembly of module 2	02/01/16	03/07/16
Debugging and Testing 2	03/03/16	03/14/16
Assembly of module 3	02/01/16	03/07/16
Debugging and Testing 3	03/03/16	03/14/16
Overall implementation	03/14/16	03/21/16
Commercial Video	03/14/16	03/21/16
Written Progress Reports	02/22/16	03/28/16
Test Plans	03/15/16	03/28/16
Final Test	03/17/16	04/02/16
Group Presentation/Demos	03/24/16	04/08/16
Post-Mortems	04/07/16	04/08/16



- Actual Schedule

Task Name
Research
Online/Local Purchasing
Proposal
Functional Specifications
Design Reviews
Design Specifications
Code and Debugging of LCD
Code and Debugging of RF Communication
Code and Debugging of Wireless Transmission
Code and Debugging of Temperature Sensor and RTClock
Code and Debugging of GPS
Overall Implementation on Slave
Overall Implementation on Master
Written Progress Reports
Test Plans
Final Test
Commercial Video
Group Presentation/Demos
Post-Mortems



Materials and Costs

- Source of Funding
  - ESSS: $300
  - Team Members Contribution

- Actual Development Cost

Items involved	Actual Cost	Estimated Cost
Arduino Uno	28.41	20
Arduino Mega	71.06	60
2.8' TFT LCD display	9.67	55
TEA5767 FM Stereo radio	6.22	N/A
FM transmit	27.45	N/A
Micro phone Amplifier	10.26	N/A
Ball Speaker	13.51	N/A
GPS Breakout	49.78	60
RTC	13.96	20
Digital Temp Sensor	6.36	15
RF wireless trans&receiver	13.55	25
Solderable breadboards	9.47	25
Jump wires	15.15	15
9V battery *2	9.47	30
GoPro mount	2.50	10
3D printing enclosure	20.00	60
extendable support	10	15
tax & shipping	47.33	50
sum	364.15	460

Business Case

- Current Market
  - Recon Jet: USD 399
  - Google Glass: USD 1500
- Estimated manufacturing Cost
  - Volume Production: Lower than CAD100 each
- Selling Price
  - $150
- Competitive Advantages
  - Attachable to any helmet
  - Flexible
  - Safe

Recon Jet

BMW HUD helmet

Future Foresee

- Camera
- More Channels on RF
- Google Map API
- Move GPS to LCD side
- Antenna
- Lighter & Transparent Display

Conclusion

- Group Dynamics
  - Problems and Solution
  - Future Career
- What We Learned
  - More Research before Buying
  - Ask for more help
  - Etc.

Acknowledgement

- Dr. Andrew
- Steve Whitmore
- Dr. Ash
- Lakshman One
- TAs (Jamal, Hsiu Yang, Mahssa, Mona, and Soroush)

Video

- ..\..\..\Desktop\Final video.mp4

Questions?