Group 5

MEETING AGENDA

Meeting Time: 9:30 AM	Location: Lab 1, ASB SFU Burnaby	Date: 2019/06/06

Meeting called by	Craig Scratchley
Kind of Meeting	Progress Review 1
Facilitator	Craig Scratchley
Note Taker	Jerry
Time Management	Jerry
Attendees:	Keith, Scott, Ryne, Jerry,
Missing Attendees:	Jeff
Guest Attendees:	Mohammad Akbari, Craig Scratchley , Andrew Rawicz
Meeting Called to Order at:	9:20 AM
Meeting End at:	10:20 AM

Topics

Time	Discussion Topic	Presenter	Deadline
9:30 AM	Introduction	Ryne	
9:40 AM	Background/Persuasion	Ryne	
9:45 AM	Outline Market	Scott	
9:47 AM	Progress	Jerry	
9:50 AM	Risk and remediation	Keith	
9:55 AM	Summary	Jeff	
10:00 AM	Questions and discussions	Jerry	

Notes:
1st Progress review
Bring engineering journal

PROGRESS MEETING MINUTES:

Agenda Item: Introduction/Persuasion
Presenter: Ryne
Discussion:

1. Member introduction
    a. Scott - COO
    b. Keith - CTO
    c. Jerry - CEO
    d. Jeffery - CCO
    e. Ryne - CIO
2. Brief overview of Current procedure for search and rescue operations
    a. First responders receive basic information on the way to disaster location
    b. On scene emergency manager create situational data with information given such as last known location of possible trapped victims via word of mouth, and building blueprints
    c. Fire fighters no longer go into fires if not in perfect condition
3. Integration into current operation/procedure for emergency responders
    a. Provide near real time location of possible trapped victims in easy to use and initiutive UI
4. Persuasion
    a. To reduce search and rescue time by providing more reliable and accurate location information
    b. To increase situational awareness for first responders inside building during operations
    c. To create a reliable and modulare system to be able to be installed everywhere

Question:

5. How to handle system failure during disasters? What about destroyed equipment (Beacon?)
    a. Have multiple beacons for backup and increase accuracy (multilateration)
    b. Backup battery for beacons and ID tags
6. What if people are not wearing ID tags
    a. ID tags are Part of access cards for building access
    b. It would be every day carry so no ID tags should be lost

Conclusion:

Agenda Item: Outline markets/incentives
Presenter: **Scott**
Discussion:

7. Stats Canada - 500,000 commercial buildings around canada in 2014, reported in 2016
    a. Search and rescue in urban environment is difficult due to complex building design
8. System would have incentive by the government and regulation for companies to purchase and install
9. Audience - Training & Expertise
    a. Firefighters have minor training to use and understand the basics of system
    b. IT personnel should have training for maintenance of the system
    c. Installation technicians (Our company) to provide training and operation support

Conclusion:

Agenda Item: Progress
Presenter: Jerry
Discussion:

1. Meeting once/twice a week
    a. Tuesday - Sit down meetings
    b. Thursday - Feasibility Testing in Lab 1
2. Technology Feasibility Testing
    a. Started testing with feasibility of proof of concept with 2.4 GHz radio modules
    b. Tried to measure distance using time of flight, but the difference in operation frequency of MCU and process delays is too great to get reliable measurements.
    c. Setting up local Raspberry Pi with web app
    d. Brainstorming on ways of measuring or estimating distance using BLE/wifi chips and rssi to estimate distances
    e. Ordered more BLE chips for feasibility testing on friday
3. Working on Requirements documentation proofreading and final draft formatting
    a. Requirement specification draft in review (90% complete)
4. Planning Design specification Document
5. Still conducting more research on decawave UWB chips (which are more expensive) and trilateration methods, as well as feasibility of RF harvesting technology

Conclusion: Team to perform the following action items

Action Item	**Person Responsible**	**Deadlines**
Feasibility testing with BLE/Wifi	Keith	2019/06/07
Figure out if require voltage regulation between UWB chips and ESP32s	Jerry	2019/06/11
Initial USB connection to server and beacon (Serial)	Scott	2019/06/28
Simple UI - Display data	Scott	2019/06/28
Create project and template for design document on git lab	Jerry	2019/0606
Create arduino serial communication dummy script for usb serial read and write	Jerry	2019/06/10

Agenda Item: Risk/Remediation
Presenter: Keith
Discussion:

10. Three possible solutions for indoor location system
    a. 2.4GHz RF
    b. UWB (ultra wide-band)
    c. BLE (Bluetooth low power)
11. Started testing with 2.4 GHz RF modules and Arduinos
    a. As discovered in testing the nRF24L01 cannot produce reliable ToF time and results, making distance measurement inaccurate. This could be due to the clock speed of the Arduino at 16 MHZ which is too low to capture ToF for 2.4 GHz
    b. Will look at alternatives such as the ESP32 via bluetooth
    c. Does not meet criteria for distance estimation
12. Planning testing BLE/UWB end on this week/ next week
13. Note: Further study required for Electromagnetic Waves travelling through a medium
    a. RSSI reliability during emergencies

Question:
Conclusion: Team to perform the following action items

Action Item	**Person Responsible**	**Deadlines**
Confirmation of ordering UWB chips	Jerry	2019/06/14
Brainstorm solutions for local server reliability issues	Jeff	2019/06/11

Agenda Item: Questions
Presenter: All
Discussion:

14. What are some Solutions for Power management?
    a. ID tag - backup and rechargeable batteries
    b. In development technology RF harvester to trickle charge battery over time
15. What if ID tags not on person?
    a. ID tags should be Integrate into Access Cards as an everyday carry item
    b. Increases survivability of people being located and rescued in time
16. Alternative solutions to problem
    a. Infrared radiation, ultrasonic detection - both unreliable due to complex building designs
    b. Handheld portable device to locate ID tags on people
        i. Firefighters do not enter into fire often in recent years
        ii. Rely on situational awareness of firefighters in extremely stressful situations
        iii. 1-D limitation
        iv. Limits range of actions for firefighters
        v. Reliability as a handheld device
17. What would the distance estimation Resolution
    a. Tracking within 1 meter radius for PoC and 0.5m for Final Product
18. Consider Scalability
    a. Having local servers limits scalability and increase installation cost
        i. Consider substituting server with portable data processing unit
        ii. Consider use cases with/without ethernet access
        iii. Cloud solution for central management service
        iv. portable data processing unit could be very quick and easy to access for operators
    b. Increase communication by using BLE/Wifi mesh if only one local server
19. Journals
    a. Include Page numbers
    b. Cross out mistakes; Do not blackout mistakes

Conclusion: Team to perform the following action items

Action Item	**Person Responsible**	**Deadlines**
Jeff to bring journal to TA	Jeffery	10:30am - 2019/06/11