Team 05: Smart Luggage
Bi-Weekly Update 3

Assem Abdelkhalek, Angus Mckellar, Tien Le
Sponsor: Prof. Stavros Kalafatis
**TA: Eric Robles**

Project Summary

Problem statement:
- Luggage can be a challenge for elderly and disabled people due to the luggage weight.
- Luggage are subject to theft or loss.

Smart Luggage will:
- Follow the user and alert them if the luggage is out of range.
- Avoid Obstacles.
- Allow the user to locate their luggage in the event of theft or loss using a phone application.

Project/Subsystem Overview
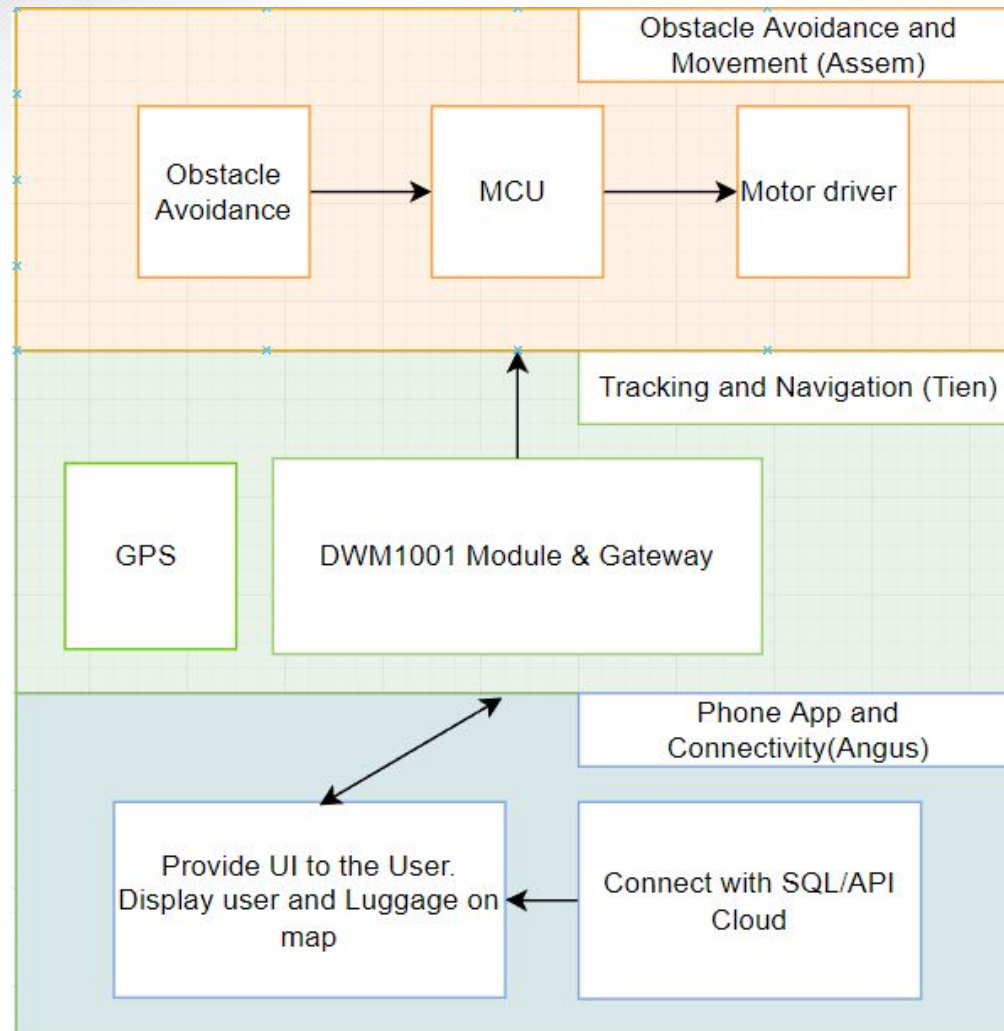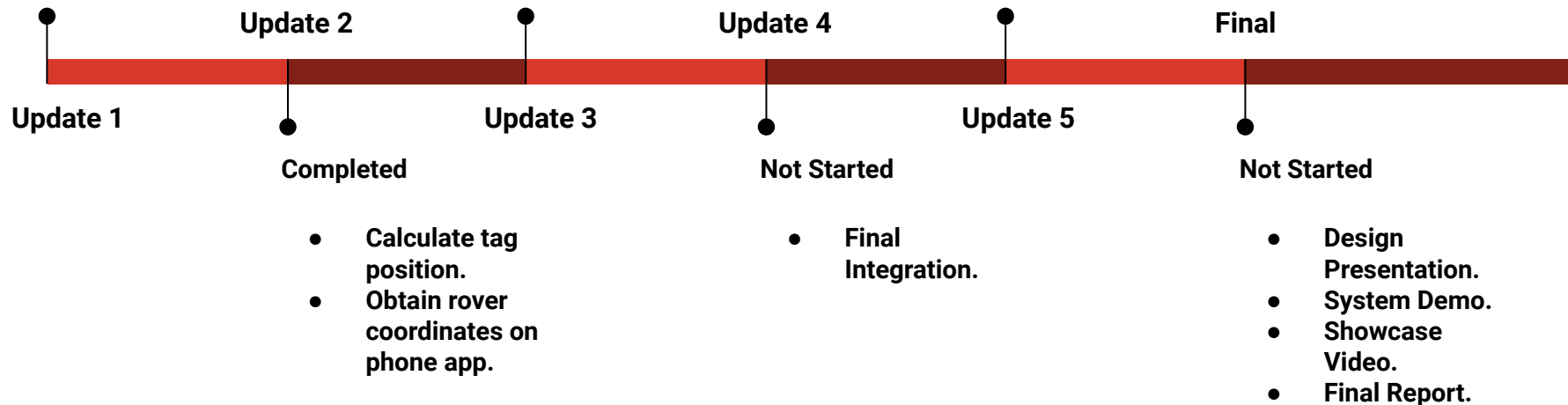
Project Timeline

Completed

- **Movement and Obstacle avoidance 100% complete.**
- **Phone App 100% complete.**
- **Tracking and navigation 100% complete.**

In Progress

- **Command rover based on (x,y) values.**
- **Transfer tag position.**
- **Update rover location on phone app.**

Not Started

- **System Validation.**

Update 2

Update 4

Final

Update 1

Update 3

Update 5

Completed

- **Calculate tag position.**
- **Obtain rover coordinates on phone app.**

Not Started

- **Final Integration.**

Not Started

- **Design Presentation.**
- **System Demo.**
- **Showcase Video.**
- **Final Report.**

Movement and Obstacle Avoidance

Assem Abdelkhalek

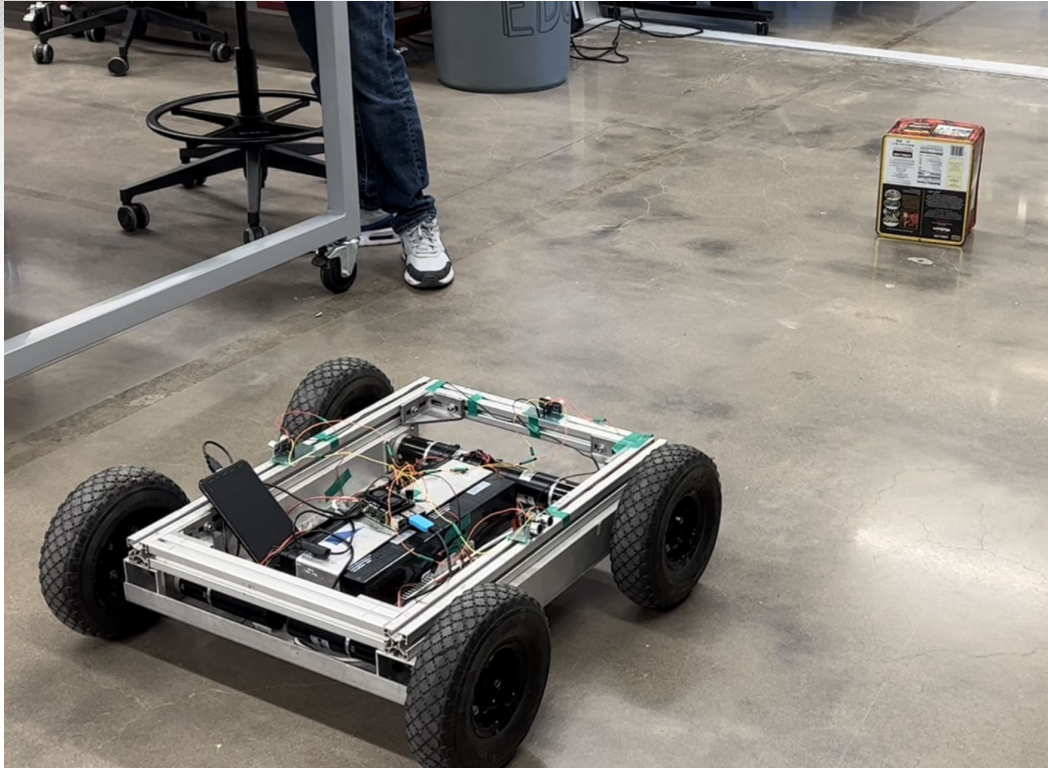| Accomplishments since Status Update 2 9 hrs of effort	Ongoing progress/problems and plans until the next presentation
- Tested the obstacle avoidance from 403. - Recalibrated the movement system with the new batteries. - Soldered the ultrasonic sensors circuits on Perf Boards.	- Starting the integration between the movement system and the tracking system. - Observing and the debugging the the integration between the movement and tracking systems.
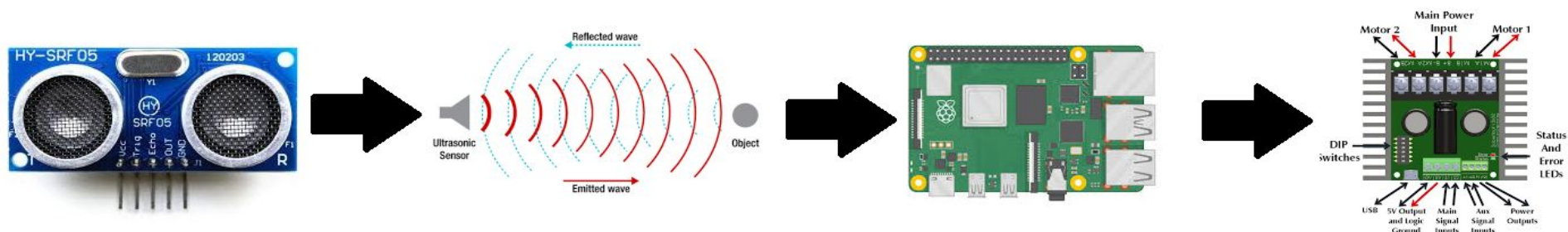
Movement and Obstacle Avoidance

Assem Abdelkhalek

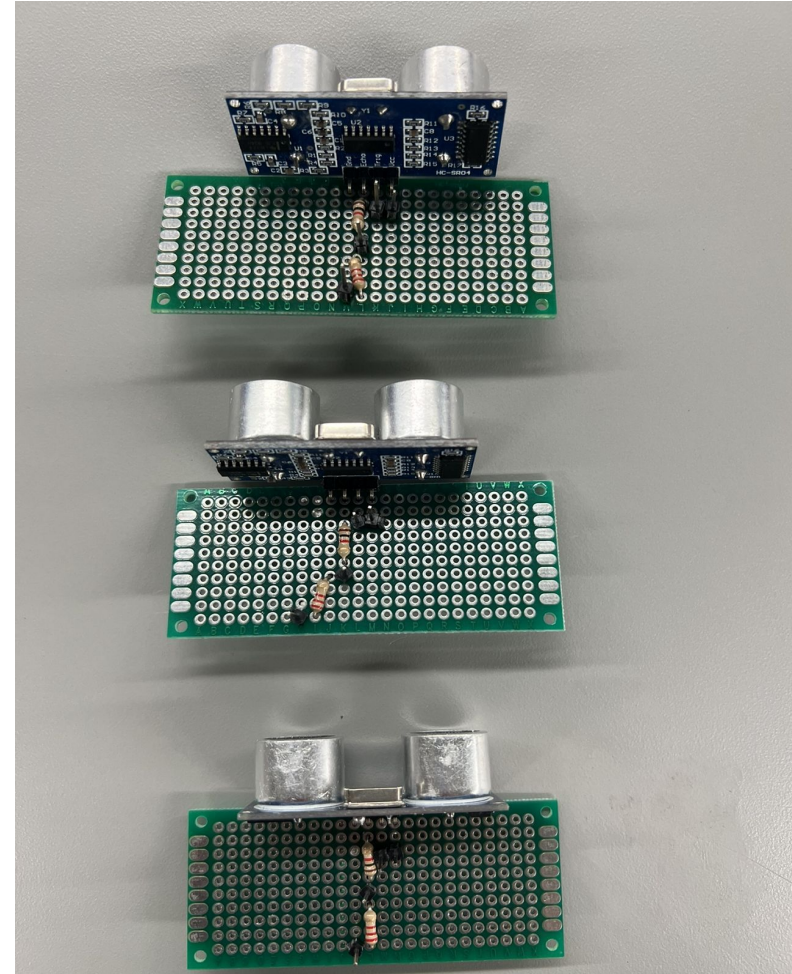**Figure 1.** Rover Current Set up.

Figure 2. Ultrasonic Sensors.

Phone App

Angus Mckellar

Accomplishments since status update 2	Ongoing progress/problems and plans until the next presentation
- Set up raspberry pi with gps module. - Display vector map of users journey on map.	- Obtain coordinates from gps module. - Send and receive data between phone and raspberry pi. - Upload the raspberry pi coordinates on the phone map.

Phone App

Angus Mckellar
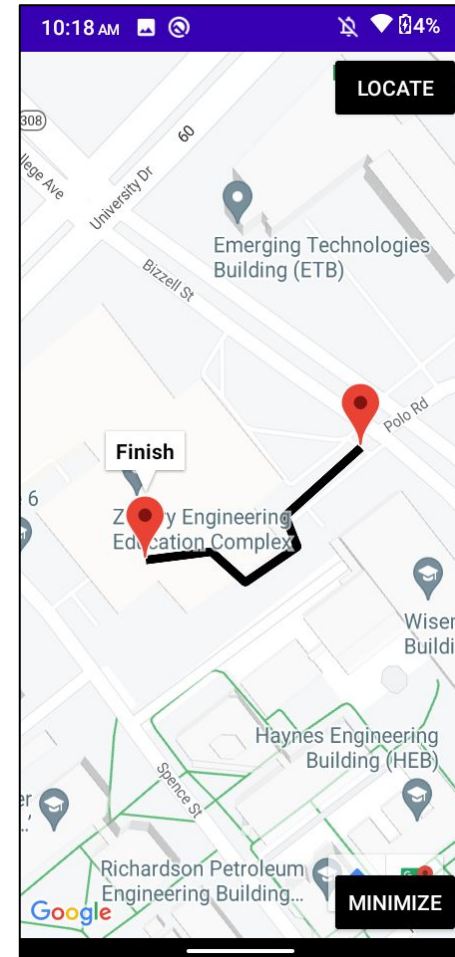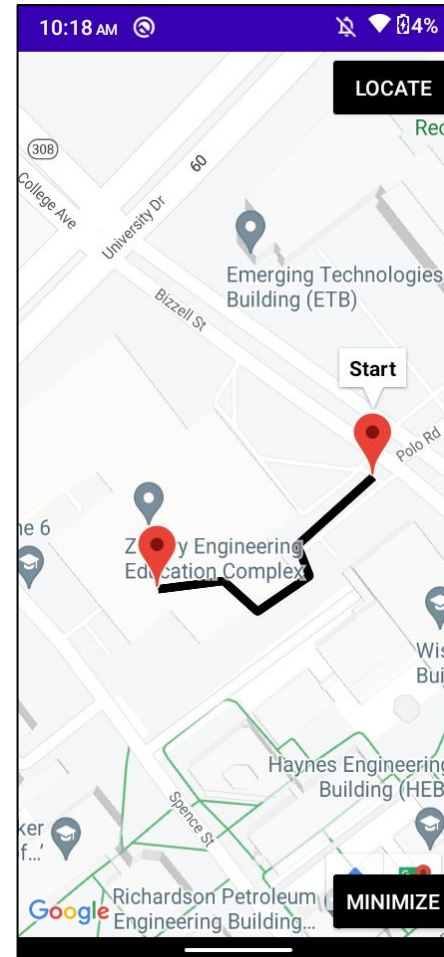
Phone App

Angus Mckellar

Tracking and Navigation

Tien Le

Accomplishments since status update 2	Ongoing progress/problems and plans until the next presentation
● Finished setting the hardware with anchors, tag & gateway. ● Collecting and calculating the distance between the tag to each anchors and tag position as x, y coordinate. ● Verified the correct distance and cleaned the data.	● Sending data to Movement subsystem. ● Providing GPS data for the phone app.

Tracking and Navigation

Tien Le

3 Anchors

1 Tag

Gateway

Execution Plan

	8/29/22	9/5/22	9/12/22	9/19/22	9/26/22	10/3/22	10/10/22	10/17/22	10/24/22	10/31/22	11/7/22	11/14/22	11/21/22	11/28/22	12/5/22
Status Update 1	🟩														
Replace the rover's batteries - Assem		🟩													
Test the new rover's battery and the movement system			🟩												
(x,y) recieving feature from Tracking -Assem/Tien				🟩											
Setting up the Gateway - Tien Le	🟩														
Add vector map to phone app - Angus	🟩														
Status Update 2			🟩												
Recaliberate the Movement System with the new batteries			🟩	🟩											
Retest the obstacle avoidance System			🟩	🟩											
Solder the ultrasonic sensors circuits on Perf Boards			🟩	🟩											
Collecting the distance from tag to the anchors - Tien Le			🟩	🟩											
Calculating the tag position - Tien Le			🟩	🟩											
Set up raspberry pi and gps module - Angus			🟩	🟩											
Status Update 3					🟨										
Give commands to the rover based on the (x,y) of the user -Assem	🟨	🟨	🟨	🟨											
Transfering the tag position to Movement system & Phone App - Tien Le					🟨										
Update map with luggage position - Angus					🟨										
Status Update 4							🟫								
Complete Final Integration							🟫	🟫							
Status Update 5									🟫						
System Validation									🟫	🟫					
Final Design Presentation												🟫			
Final System Demo													🟫		
Virtual Project Showcase Video												🟫			
Final Report														🟫	

Legend:
- 🟫 Not Started
- 🟨 In Progress
- 🟩 Completed
- 🟥 Behind Schedule

Validation Plan

Test Name	Success Criteria	Methodology	Status	Passed/Failed	Responsibility
Retest the movement system with the new batteries	Consistent movements of the rover given the same commands	Send different commands to the motor driver and observe the response of the rover	Tested	Passed	Assem Abdelkhalek
Test the re-calibration of the movement and obstacle avoidance with new batteries	Getting the desirable speed and rotational angle of the rover	Change the timing and speed of the rover and observe for consistency	Tested	Passed	Assem Abdelkhalek
Test the ultrasonic sensors after being soldered on Perf Boards	Circuit is functioning	Check for shorts and discontinuities & check that I receive the correct distances from the sensors by RPI	Tested	Passed	Assem Abdelkhalek
Test the response to the (x, y) coordinates	The program shall be able to give the right command depending on the coordinates	Test and debug until we get the desirable result	In Progress		Assem Abdelkhalek

Validation Plan

Test Name	Success Criteria	Methodology	Status	Passed/Failed	Responsibility
Vector Map	Successfully display users journey as a vector map	Walk around a large area on campus with wifi coverage in order to see if map display a polyline of the journey	Tested	Passed	Angus Mckellar
Phone and Raspberry pi communication	Successfully connect with the raspberry pi from the phone	Utilize wifi in order to connect with each device and attempt to send data across the connection	In Progress		Team
Coordinates	Obtain the coordinates of the raspberry pi on the phone	Successfully obtain the raspberry pi coordinates and save them in a variable on the phone app	Untested		Team
Luggage on map	Display both the user and luggage location on map	Upon launching phone app be able to see a marker representing both the user and luggage	Untested		Team

Validation Plan

Test Name	Success Criteria	Methodology	Status	Passed/Failed	Responsibility
Collecting the data from tag and anchor	Showing the tag location with x,y,z coordinate	Moving the tag around the anchors	In Progress	In Progress	Team
Processing the data and calculating the distance from tag to the anchor	Get the right distance and the position of the tag compare to the robot	Changing location of the tag, verifying the distance with real measurement	Untested		Team

Parts Ordering Status

Part Description	Status (order approved/order placed/part received)
Rover Batteries	Received

**Thank you!
Questions?**