Executive Project Summary

The original problems that needed to be solved for this project was trying to address the circumstances where a pet gets lost. When a pet gets lost, the owner may not have a way to find their pet without a GPS tracker of some sort and this project is supposed to help address the issue of losing a pet and mitigating the likelihood of the dog becoming missing.Therefore, this GPS collar allows users to remotely track their pets' geographic location and movement in real time on their cell phones, computers, radios, etc. Whether you are traveling with your dog,or your dog is active, or you are just worried about your dog getting lost, this GPS collar is a great way to prevent your pet from getting lost for good and providing a convenient way to go about finding your pet.

The approach taken on this project was to try and modernize the design of the typical market GPS Dog Tracker that can be bought off-the-shelf or try to implement different features than competing dog collars. One design choice that our group decided to implement was including a USB-C receptacle over the standard USB-A or microUSB receptacle that can be found on other competing dog collars in order to modernize the design in that sense. Another major difference within our group's approach on this project was to avoid the use of cellular as there can be some reliability issues if the tracker does not have service in a particular area. Instead, our group approached this project with the goal of using radio frequencies to transmit the GPS location data. This was done using amateur radio bands that require a license to use, however, there the idea was to use this method to help with reliability issues and mitigating the likelihood of connection loss to get the most up-to-date GPS location of the pet and being able to transmit the frequency without any further issues. Besides specific design choices that our team chose to implement for the project, we approached this project in separate "blocks" that was testing a small part of the system as this provided feedback to ourselves and analyzing different parts of the system and ensuring that other blocks can work together, before implementing a system that includes all different sub-blocks.

Some key takeaways that the team learned was to always ensure that the team is communicating well, especially working in a team atmosphere and before starting to do some of the physical work with tangible progress. Something else that we learned throughout this process is that it is a great idea to stay in-contact with project managers or course instructors and ensure that you are utilizing their feedback and advice as much as possible. Being able to regularly communicate with group members and being able to hold each other accountable is something that our group had no issues with during the second phase/term of the project and we learned quite a bit about how to navigate a team environment when other group members are not communicating and also not making progress on agreed upon project tasks. Another major takeaway from this project was learning how to use a reflow oven and that process made the PCB assembly process much more effective and condensed. Finally, our most important takeaway was to design twice, order once when it comes to PCBs as it ensures reliability and it allows for some improvements and also helps find errors from the design.

Key	RED = Critical Path	Task Champion	Start Date	Due Date	PCT of Task Complete	1	2	3	4	5	6	7	8	9	10
1	Fall Term														
1.1	Project Conception and Initiation	Declan O., Junior V.	10/5/21	10/7/21	100										
1.1	Research APRS Protocal	Declan O., Junior V.	10/7/21	10/23/21	100										
1.2	Market Research	Declan O.	10/21/21	10/24/21	100										
1.3	Research Transmitter and Reciver topologies	Declan O.	10/25/21	11/5/21	100										
1.4	Design Schematic Layout	Declan O., Junior V.	11/1/21	10/10/21	100										
1.5	Order Prototype Parts	Declan O.	11/1/21	11/12/21	100										
1.6	Test GPS Module	Junior V.	11/25/21	11/28/21	100										
1.6	Build Prototype Transmitter and Receiver	Declan O., Junior V.	11/1/21	12/10/21	100										
1.7	Modify Transmitter Receiver Circuit	Declan O., Junior V.	12/5/21	12/10/21	100										
1.8	Check-In with Stakeholder	Declan O., Junior V.	12/1/22	12/30/22	100										

Key	RED = Critical Path	Task Champion	Start Date	Due Date	PCT of Task Complete	1	2	3	4	5	6	7	8	9	10
2	Winter Term														
2.1	PCB Design (during Winter Break)	Declan O., Junior V.	12/1/22	12/30/22	100										
2.2	Solder Transmitter components onto PCB	Junior V.	1/2/22	1/4/22	100										
2.3	Preliminary System/Modular/System Level Testing	Declan O., Junior V.	1/12/22	2/26/22	100										
2.4	Final Fixes	Declan O., Junior V.	2/28/22	3/7/22	100										
2.5	Presentation Preperation	Declan O., Junior V.	3/1/22	3/17/22	100										

						Spring 2022 (Weeks)									
Key	RED = Critical Path	Task Champion	Start Date	Due Date	PCT of Task Complete	1	2	3	4	5	6	7	8	9	10
3	Spring Term														
3.2	Project Documentation	Declan O., Junior V.	3/20/22	5/28/22	100										
3.3	Technology Transfer	Declan O., Junior V.	6/1/22	6/10/22	100										
3.4	Showcase presentation	Declan O., Junior V.	6/3/22	6/3/22	100										

Figure 1: The project timeline.