September 8th, 2022: Met with team, TA, and professor Ahkbas. Created GitHub and Discord for communication. Discussed some project goals and information.

September 11th 2022: Met with team over Discord. We discussed our vision statements and finished getting ZenHub implemented using a chrome extension that syncs in GitHub.

September 12th, 2022: Met with the team, went over the project again with Professor Akbas. As a team, we fixed an issue we had with Zenhub and filled in the product backlog.

September 15th, 2022: Finalized the README.md, which contains our vision statement and where to access our backlog. Met with team,

September 16th, 2022: Attended flight. Met with the hardware team and discussed a collaborative Discord for communication. Observed current Jetson – Drone communication.

September 19th, 2022: Integrated a Software – Hardware communication line through Discord. Setup discord to allow for separate work environments.

September 20th, 2022: Went through and assigned documentation roles. Assigned sections in SRS and SDD. Talked about Friday's flight and deliverables to Professor Akbas. Discusses getting a Jetson and creating a design doc illustrating the steps to work on the Jetson.

September 22nd, 2022: Started running through a sample tutorial that was provided alongside the turtle database. Familiarized myself with the python virtual environment and setup on a local machine. Wrote some documentation to the SRS and SDD.

September 23rd, 2022: Continued working on documentation.

September 26th, 2022: Finished up my portion of the documentation. Captured screenshots from turtle video footage for additional training images.

September 29th, 2022: Hurricane

October 4th, 2022: Documentation

October 6th, 2022: Documentation

October 9th, 2022: Organized and labeled all turtle images (375 images). Assigned 2 labels: "turtle" and "turtle_tracks".

October 13th, 2022: Continued working on Nvidia Jetson Dev Kit. Tried to set up an SSH connection with my "host" laptop. I was unsuccessful. Next step is going to be getting a usb dock for my laptop (which includes an ethernet adapter), and plugging in directly to the Jetson. Also started documentation for "next steps" and defining versions for version control.

October 15th , 2022: Worked on presentation

October 16th, 2022: Worked on presentation

October 18th, 2022: Presented for Sprint1

October 21st, 2022: Assigned tasks for Sprint 2 (was unsure if Sprint 2 already started due to hurricane, I am aware this should have already been done at this point of the Sprint).

October 24th, 2022: Added new branch "dev" to github where development of the code will exist. Also defined additional structure to the project.

October 25th, 2022: Defined and distributed different sections of the test plan doc. I also added the Sprint 1 presentation to the github and put all associated documents from sprint 1 into a "Sprint 1" folder.

October 26th, 2022: completed section 6(environment) of the test plan.

October 27th, 2022: Created requirements.txt, I also finished getting the Tensorflow API running. This has been a long challenging task. Been through many videos and documents to see what is needed. Installed Cuda and cudnn.

October 29th, 2022: Troubleshot some additional issues with building the model. This includes using a different prebuilt model.

October 30th, 2022: Trained model using basic pipeline from default pre-build model. Success with a mean average precision of 58%. Also added some extra functions that help randomize the testing of the turtle images.

November 1st and 2nd, 2022: Worked on Test Plan.

November 3-5th, 2022: Site visit for Pratt Miller (out of class).

November 8th, 2022: Put the current code base and most recent checkpoint from trained neural network onto Jetson Nvidia Nano. Installed dependencies, Tensorflow requires special install steps. Tried running ipynb, as I would on a desktop, but it crashed the kernel. Need to troubleshoot Jetson Nano.

November 11th, 2022: Tried a different model - EfficientDet D1 640x640. Since the current one I was working with is considered a "lite" version, I assumed a different model would perform better. Without and image preprocessing, it seemed to perform way worse, with a 28% mean average precision. Conclusion: stick with old prebuilt model and use preprocessing techniques for better accuracy.

November 13-15th, 2022: Prep for presentation and present

November 18th, 2022: Worked on resolving the Jetson Nano dev kit issue that results in crashing the program when trying to load Tensorflow. I uninstalled and reinstalled all dependencies associated with tensorflow 2.4; I used a different method this time to try and prevent the issue again. This did not fix the issue. I did some additional research and others have mentioned you need to run these libraries in a Python virtual environment (venv). So I created an environment and installed the libraries. This still did not fix the issue.

November 22nd, 2022: Continued working on the Jetson nano devikit. I fixed the issue by uninstalling and reinstalling tensorflow using 2 different documentations I found on the internet. However, I ran into a new issue regarding protocol buffers. They are needed for some of the object_detection libraries I am using. There does not seem to be a good way to adapt the Jetson to use these buffers. Need to continue researching.

November 26th, 2022: Decided to rebuild the Neural Network using a very clean method. This would not use a pre-built model and everything would be accomplished by me. The first issue I ran into was needing JSON files for this method. I tried converting the old .xml files for the new NN. However, the new NN I was building required some additional information the .xml files did not contain. So I relabeled all 375 images again using a different image labeler (labelMe). Continuing through the process, I had a lot of issues running multiple labels (turtle, turtle_tracks). This is something I will revisit at a later date as this seems to be very time consuming.

- Between both days on working on this new model, I've discovered the real difficulties of performing image preprocessing on a dataset of images that have:
    - Different file extensions
    - Different Pixel width and height
- This is the part I have failed at (besides the multilabel classification) regarding the new NN I was creating.

November 27th, 2022: Continued working on the new NN, however, I noticed a lot more work needs to be done and research. So I went back to old NN using pre-built tensorflow model for the time being. The goal is to optimize the current NN to have a better mAP. Not much information is out there on altering the pipeline (this is what compressed the image and labels associated with them). So I will fine-tune what I can and try some other models. Tried training EfficientDet D3, D2, and D1; compresses to 896x896, 768x768, and 640x640 respectively. Only one that can be run on my machine currently is EfficientDet D1. This compresses the image to 641, but is slightly slower and has a better mAP associated with the model.

November 29th, 2022: Went over recent changes to the code and reflected them on the SRS and SDD

December 1st, 2022: Addressed feedback from SRS and SDD. Also worked on slides for presentation. At the end of the day, I received some more RAM for my PC in hopes to train the NN. I was not thinking, since I'm training the NN on my GPU, it uses the RAM on my GPU. Looked into removing it and training on CPU.

December 2nd, 2022: I trained the NN using 8 batches for 12,000 and had a result of 73% mAP. Then I trained the NN using 8 batches and 16,000 epochs, this seemed to be the optimal size. Received a 77% mAP. This is the model we will keep and use for the Jetson Nano, while still working on V2 of the new NN.

December 3rd, 2022: Reached out to members and ensured everyone completed portions of SRS and SDD, and submitted them.

December 6th, 2022: Final presentation

December 7th, 2022: Worked on test plan

December 8th, 2022: Finished up test plan and recorded 3-minute video.