| **Week** | **Goals (completed by end of week)** |
| --- | --- |
| 10/4 | * Interview >= 3 pilots ✔ * Compile all interview notes ✔ * Find common themes in what pilots are looking for ✔ |
| 10/11 | * Functions are fully determined ✔ * Requirements are fully determined ✔ * Thorough research on existing AHRS and INS   + Cost   + Accuracy   + Abilities   + Temperature, g-force operating conditions   + Ability to use it in large (or at least replicable) scale manufacturing   + + Vibration * Thorough research on which hardware to use for data storage, data processing, and data transmission   + Cost   + Abilities   + Temperature, g-force operating conditions   + Ability to use it in large (or at least replicable) scale manufacturing   + + Vibration * Presentation slides for Shark Tank ✔ * (PDRR due next week ✔) |
| 10/18 | (Shark tank this week ✔)   * Compare functions vs. means ✔ * Decide which hardware and models to use - by Tuesday   + Choose AHRS/INS module - Pai, Allen,Wenjun ✔   + Choose Camera module - Pai,Wenjun ✔ * Order parts for first prototype ✔ * Choose components for the app   + Choose 3D visualization method - Darcy, Rex, Wenjun ✔   + Choose backend - Darcy, Rex ✔   + UI Mockup - Darcy ✔ |
| 10/25 | * Order parts for first prototype ✔ * Wireframe for app   + Screen navigation - Darcy   + Cloud service (firebase?) for authentication / storing data - Darcy * Pilot input tracking   + Figure out how to orient the camera in the plane to see the cables - Pai, Wenjun * Discuss data transfer preference with client ✔ |
| 11/1 | * App   + Insert a test 3D visualization - * Working demo to extract data from the sensors   + Extract GPS data into the raspberry pi - Allen, Wenjun   + Extract orientation data - Allen, Wenjun * AHRS/INS   + Collect GPS, AHRS data into one file on the raspberry pi -   + Figure out an algorithm to interpolate between the GPS points using the INS data - * Pilot input tracking   + Make an algorithm to find the positions of the pilot’s controls based on the location of the tape on the cables - |
| 11/8 | * First prototype of hardware   + Use Bluetooth to transfer data - * App   + Use Bluetooth to receive data - * Pilot input tracking   + Record the airspeed dial from the dashboard     - Figure out where to place the camera     - Find an algorithm to convert the image to the airspeed |
| 11/15 | * App   + Visualize the plane’s location based on the data from AHRS/INS - * AHRS/INS   + Test that the GPS (latitude, longitude, altitude) and AHRS (pitch, roll, yaw) data is all collected correctly - * Pilot input tracking   + Test that the pilot’s inputs are tracked correctly - |
| 11/22 | * Second prototype of hardware   + More testing to make sure that GPS, AHRS, Pilot input data are correct and transferred over bluetooth to the app - * App   + Add visualization for pilot’s controls, and airspeed - |
| 11/29 | (Start working on next week’s goals)   * App   + Add UI to control camera angle for visualization - |
| 12/6 | * Third prototype of hardware * Plan for manufacturing the hardware * Beta for software |

Milestones Plan A – No hardware shipping delays

Visualization/App

* Basic mechanics by 11/8 (logging in, navigations between screens, a basic 3D view)
* Working 3D visualization of a plane with some dummy data by 11/22
* Visualization based on data collected through bluetooth, add in airspeed and pilot’s inputs by 12/6

Hardware

* Able to extract data from AHRS/INS sensors into the Raspberry Pi by 11/15
* Prototype for pilot input/cable tracking by 11/22
* Prototype for transferring all data to the visualization by 12/6

Milestones Plan B – Significant hardware shipping delays

Visualization/App

* Basic mechanics by 11/8 (logging in, navigations between screens, a basic 3D view)
* Working 3D visualization of a plane with some dummy data by 11/15
* Completely functional visualization with dummy data for attitude, position, airspeed, and pilot input by 11/22
* Visualization based on real-world data by whenever the hardware is ready

Hardware

* Able to extract data from AHRS/INS sensors into the Raspberry Pi by 11/22
* Prototype for pilot input/cable tracking by 11/29
* Prototype for transferring all data to the visualization by 12/6

Subtasks

Mobile app

* Wireframe - which screens to include
* Choose a framework (React native?)
* Integrate backend (Firebase?)
* Data transfer from sensors to phone app

3D Visualization

* Choose a game engine (Unity?)
* 3D Plane model
* 3D visualization of path

AHRS/INS/Raspberry pi integration

* Research on which hardware to buy
* Extract data from the sensors into the pi
* Algorithm to compile INS and AHRS data, and combine it with camera data
* Data transfer from sensors to phone app

Cable tracking for analog pilot inputs

* Research on which camera and tape to use
* Algorithm for tracking the tape
* Figure out how to attach the camera
* Algorithm for calibrating the setup

Airspeed tracking with image processing

* Research on which camera to use
* Algorithm for converting image of dial to airspeed
* Figure out how to attach the camera