RED Delivery System
(Recovery and Deployment System)

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Milestone Project Matrix:

Task	Completion %	Andrea	Miguel	Marley	To do
Compare and select technical tools	90%	40%	10%	40%	Select hardware for sensors to identify phases
Compare and select collaboration tools	100%	33%	33%	33%	none
Raspberry Pi to Pixhawk Radio - Communication Demo	100%	33%	33%	33%	none
Requirement Document	50%	50/50%	0/25%	0/25%	Communication requirements
Design Document	25%	25/25%	0/50%	0/25%	Subsystem breakdown, Introduction and Summary
Test Plan	25%	25/25%	0/25%	0/50%	Performance criteria

Discussion (Tasks):

- Compare and select technical tools: Networking capabilities ruled out using one shared Wifi network to connect the two aerial vehicles throughout the mission. The Pixhawk protocol does not allow custom data to be send from one Pixhawk radio to another for custom communication, so there must be another communication component outside of just the Pixhawks and the Raspberry Pis. There are two approaches being investigated for system communication between the two aerial vehicles. The primary approach is to use an independent radio that will be used to form a line of communication between the two Raspberry Pi's. A secondary approach is being investigated as a backup plan if the radio does not meet communication requirements. The secondary approach is to have a mobile Wifi device attached to each Raspberry Pi, so that one Raspberry Pi can SSH into another in order to allow data exchange between the two Raspberry Pis. The secondary approach will only be used if the primary approach cannot fulfil the requirements of the project.
- Compare and select collaboration tools: Collaboration tools have been decided to be Github for revision tracking, slack for team communication, and google drive for team wide documentation.
- Raspberry Pi to Pixhawk Radio communication demonstration: Using a Raspberry Pi, the software team was able to establish a connection to a Pixhawk radio via MavLink Proxy. As of now, through the raspberry the Raspberry Pi has the ability to arm and disarm the Pixhawk visibly.
- Requirement Document: The requirement document has requirements for the subsystem and flight commands. Currently waiting on the communication requirements to be established by other two members of the team.
- Design Document: The software design document has a state machine diagram for the two systems. Waiting on remainder of the team to complete the other portions of the design document.
- Test Plan: Test plan has an introduction, unit testing, and test cases

Discussion (Contributions):

- Compare and select technical tools: Everyone in the group did research and testing, but we are still investing the advantages and disadvantages of using the radio to the SSH over Wifi approach. Radio communication is the first choice if it possible as of now.
- Compare and select collaboration tools: Everyone chose a platform. Andrea chose the revision tracking, Marley chose the team communication, and Miguel chose the team wide documentation sharing.
- Raspberry Pi to Pixhawk Radio communication demonstration: Everyone on the team put efforts toward making an attempt to verify a connection. Andrea found the MavLink Proxy to connect the Pixhawk with the RaspberryPi, Marley discovered how to display a change in mode, and Miguel helped with completing the configuration.
- Requirement Document: Andrea wrote everything in the current version of the requirement document.
- Design Document: Andrea wrote everything in the current version of the design document
- Test Plan: Andrea wrote everything in the current version of the Test Plan

Plan for the next milestone:

Task	Andrea	Miguel	Marley
Constant GPS data exchange with reasonable performance.	Complete implementation/demonstration of data exchange and performance documentation	Research Pixhawk GPS data libraries to extract data from PixHawk GPS	Manage performance issues and implementation
Create functional custom Pixhawk flight commands for success and flight failure/error handling.	PixHawk open source flight commands research and implementation	Bridge between Aerospace and Software to decide appropriate commands for error handling	Testing and implementation
Efficient state machine for phases of mission.	Create state machine according to requirements	Integration	Testing and performance

Discussion (Milestone 2):

- **Constant GPS data exchange with reasonable performance:** Next milestone we should be able to display a true constant exchange of GPS data between the two Raspberry Pi's. The GPS is attached to the PixHawk, so we will need to extract the GPS data and process it in the Raspberry Pi, then create a message/packet to send to the other Raspberry Pi.

- **Create functional custom Pixhawk flight commands:**
  The goal for this task is display that the Raspberry Pi can sent a predetermined flight command to the Pixhawk Radio that can actually move the aircraft accordingly.

- **Mission phase representation with state machine :** In order to keep up with system requirements, we want to deliver a state machine that has all of the requirements of the mission plan/phases incorporated in the software, in a way that is clean and fast.

Feedback from Client current Milestone:

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Feedback from Faculty Sponsor on each task for the current Milestone:

- Compare and select technical tools:

- Compare and select collaboration tools:

- Raspberry Pi to Pixhawk Radio communication demonstration:

- Requirement Document:

- Design Document:

- Test Plan:

Faculty Sponsor Signature: _____ Date: _____

Faculty Sponsor Evaluation

Faculty Sponsor: detach and return this page to Dr. Chan (HC 322)

Score (0-10) for each member: circle a score (or circle two adjacent scores for .25 or write down a real number between 0 and 10)

NOTE: Although the three students are considered to be computer science additions to the group, Andrea is the only student listed as a student enrolled in Dr. Chan's class.

Andrea Swanson	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Miguel Colmenares	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Marley Scott	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Faculty Sponsor Signature: _____ Date: _____