RED Delivery System
(Recovery and Deployment System)

Team Members:
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Milestone Project Matrix:

Task	Completion %	Andrea	To Do
Create Linux VM and download OpenCV	100%	100%	none
Find Marker Detection Tool	100%	100%	none
Create a program to detect markers live on a moving object and determine pose	100%	100%	none

Discussion (Tasks):
- **Create Linux VM and download OpenCV:** Due to hardware setbacks with Florida Tech's COVID-19 policies prohibiting access to the Senior Design Center that housed the hardware for the RED Delivery System, the docking process will be emulated with a Linux machine detecting aruco markers that would be presented on the wing of the mothership to determine the appropriate docking position using pose and distance.
- **Find Marker Detection Tool:** Using a library compatible with OpenCV that has pregenerated aruco markers available for printing at the desired size and an detection API, the

aruco markers can be detected with a camera. For the demonstration of the detection a web camera will be used to emulate a Raspberry Pi running the detection tool with its own camera.

- **Create a program to detect markers live on a moving object and determine pose:** The detection tool API provides variables that determine pose, that will be demonstrated on the screen for proof of pose estimation of the mothership with a visual graphic representing the three axes.

Discussion (Contributions):

- **Create Linux VM and download OpenCV:** Andrea completed this in full.
- **Find Marker Detection Tool:** Andrea completed this in full.
- **Create a program to detect markers live on a moving object and determine pose:** Andrea completed this in full.

Plan for the next Milestone (6):

Task	Andrea
Use detection tool to provide appropriate "flight path" corrections for docking	100%
Use detection tool to display distance in meters to ideal docking position	100%
Display ideal docking position with a graphic	100%

Discussion (Milestone 6):

- **Use detection tool to provide appropriate "flight path" corrections for docking:** Based on the location, pose, and distance of the aruco marker on the object representing the mothership, the program will display the correction that need to made to the flight path of the drone, which is represented by the computer's webcam.
- **Use Detection tool to display distance in meters to ideal docking position:** Based on the size of the aruco marker to the screen compared with the actual size of the printed marker, the distance from the marker will be determined and display to the screen to determine how much closer the camera (representing the drone) must move toward the target marker.
- **Display ideal docking position with a graphic:** When the ideal docking position is determined with the program, the screen will indicate that an ideal docking position is reached, which is the point at which the drone would execute the docking flight command.

Client Meetings:
The project is moving forward without the client.

Client Feedback:
Not applicable.

Faculty Sponsor Meetings:
Bi-weekly Thursdays at 3:30

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

- **Create Linux VM and download OpenCV:**

  Completed based on the changed requirements due to Covid-19

- **Find Marker Detection Tool:**

  Completed based on the changed requirements due to Covid-19

- **Create a program to detect markers live on a moving object and determine pose:**

  Completed based on the changed requirements due to Covid-19

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: _____