



## TEAM PRESENTATION

# System Goals

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1. The drones should fly to sites to deliver needed medical supplies.
2. The flight patterns should be optimized to serve the sites as quickly as possible.
3. The drones need to fly safely.
4. The system should be able receive calls for help
5. The system should have an admin gui

# Use Case: Request Assistance

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*The user uses the Med Fleet Application (MFA) to request an Emergency Medical Product*

## **Scenario:**

1. User opens Med Fleet App
2. User Request Assistance
3. User gets a response from server

# Use Case: Delivery of Medical Packages

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*The Drone flies to GPS coordinates sent from the flight control and delivers medical packages.*

## **Scenario:**

1. Mission Control sends Flight control new instructions for a drone.
2. Flight control updates the flight path for the drone and sends that information to the drone
3. The Drone flies to the requested site

# Use Case: Med-Fleet Monitor

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*Administrator is able to monitor the drone(s) at any point in the mission*

**Scenario:**

1. Admin opens the console.
2. The GUI is updated to show the currently locations of drones and sites needing assistance.

# Use Case: Drones rerouted to speed up delivery to all sites

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*When new requests for supplies arrive the system needs to recalculate the flight paths to accommodate the new drop sites*

## **Scenario:**

1. New Requests for help come into the system
2. In order for the system to accommodate the new requests and to make the flight paths as efficient as possible, Mission Control recalculates the missions
3. The new missions are forwarded to the drones

# Use Case: Drone Changes altitude to avoid hitting another drone

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*Drones' flight paths are too close to be safe. Drone altitude is changed in order to ensure safety*

## **Scenario:**

1. Two or more drones paths may collide
2. To avoid this the flight control system changes the altitude of drones.

# Summarized FMECA

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- Problem: Drones can hit passenger aircrafts
  - Potential Effects:
    - Cause of an emergency landing / accident
    - Serious Injury/Death
    - Possible Arrest
  - Potential Causes:
    - No way to detect other aircrafts
    - Flying above a safe altitude
  - Recommended Actions
    - Maintain Compliance w/ FAA Regulations
    - Ensure area is not a public flight path
    - Enable manual override mode
- RPN - 10 (SEV - 10, OCC - 1, DET - 1)





# Summarized FMECA

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- Problem: Drones can crash into each other
  - Potential Effects:
    - Damage/Destruction of Drones
    - Possible Injury to self or others
  - Potential Causes:
    - Low/Empty Battery
    - Logic Error
    - Mathematical Miscalculation
  - Recommended Actions
    - Pre-Programmed RTL command
    - Adjust altitude if near other drone
    - Enable manual override mode
- RPN - 105 (SEV - 7, OCC - 3, DET - 5)



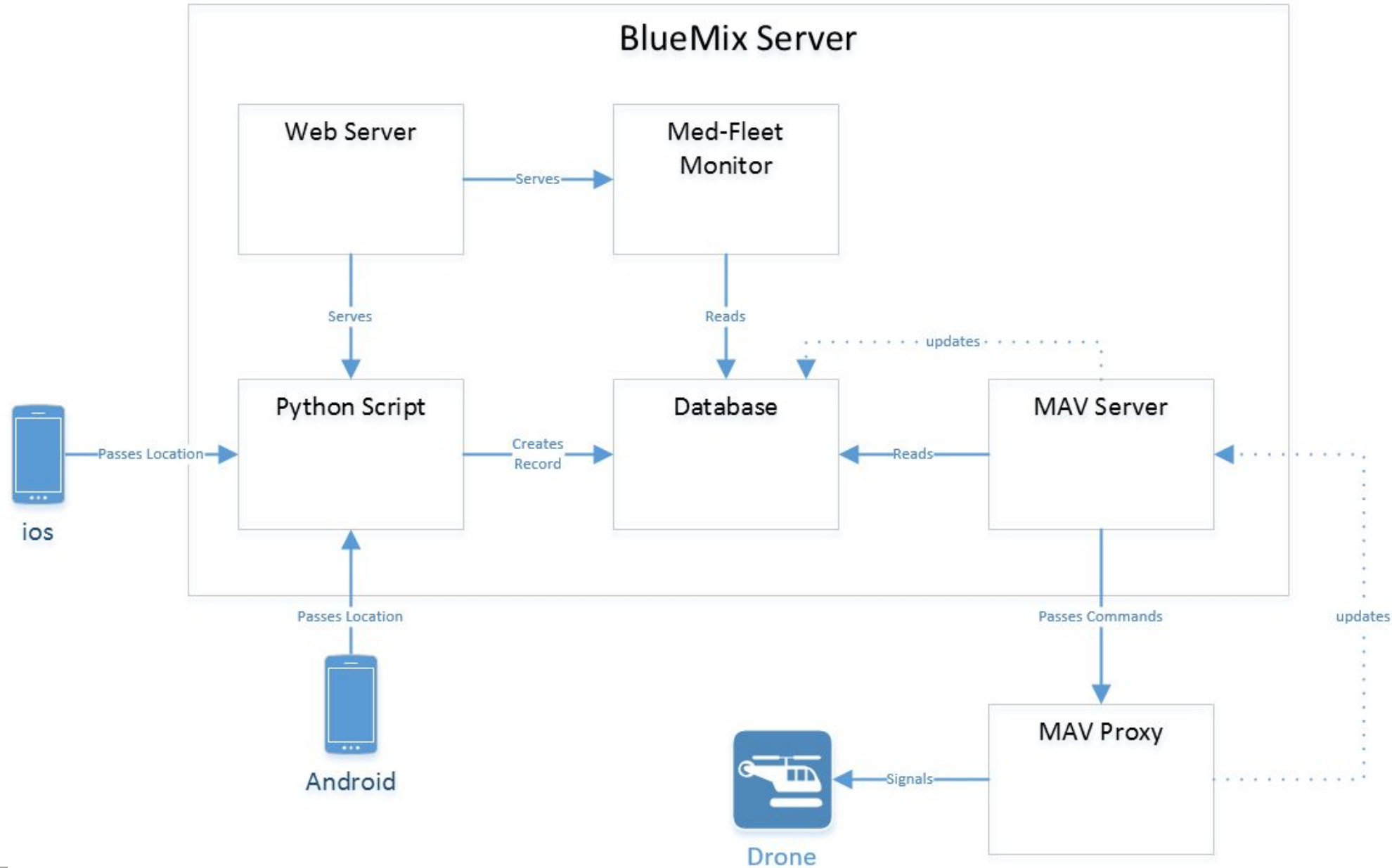
# Summarized FMECA

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- Problem: Drone is attacked by an eagle
  - Potential Effects:
    - Drone is lost or destroyed
    - Eagle is injured
  - Potential Causes:
    - No way to detect predatory birds
    - Eagle mistakes drone for prey
    - Drone is flying in a wildlife habitat
  - Recommended Actions
    - Fly drone at a higher altitude when in wildlife
    - Fly drone at a faster speed so not easily attacked
    - Enable manual override mode
- RPN - 10 (SEV - 10, OCC - 1, DET - 1)



# Deployment Diagram



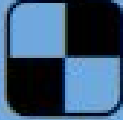
GUI

# Login Page

SE 491 Med Fleet

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 Med-Fleet Monitor

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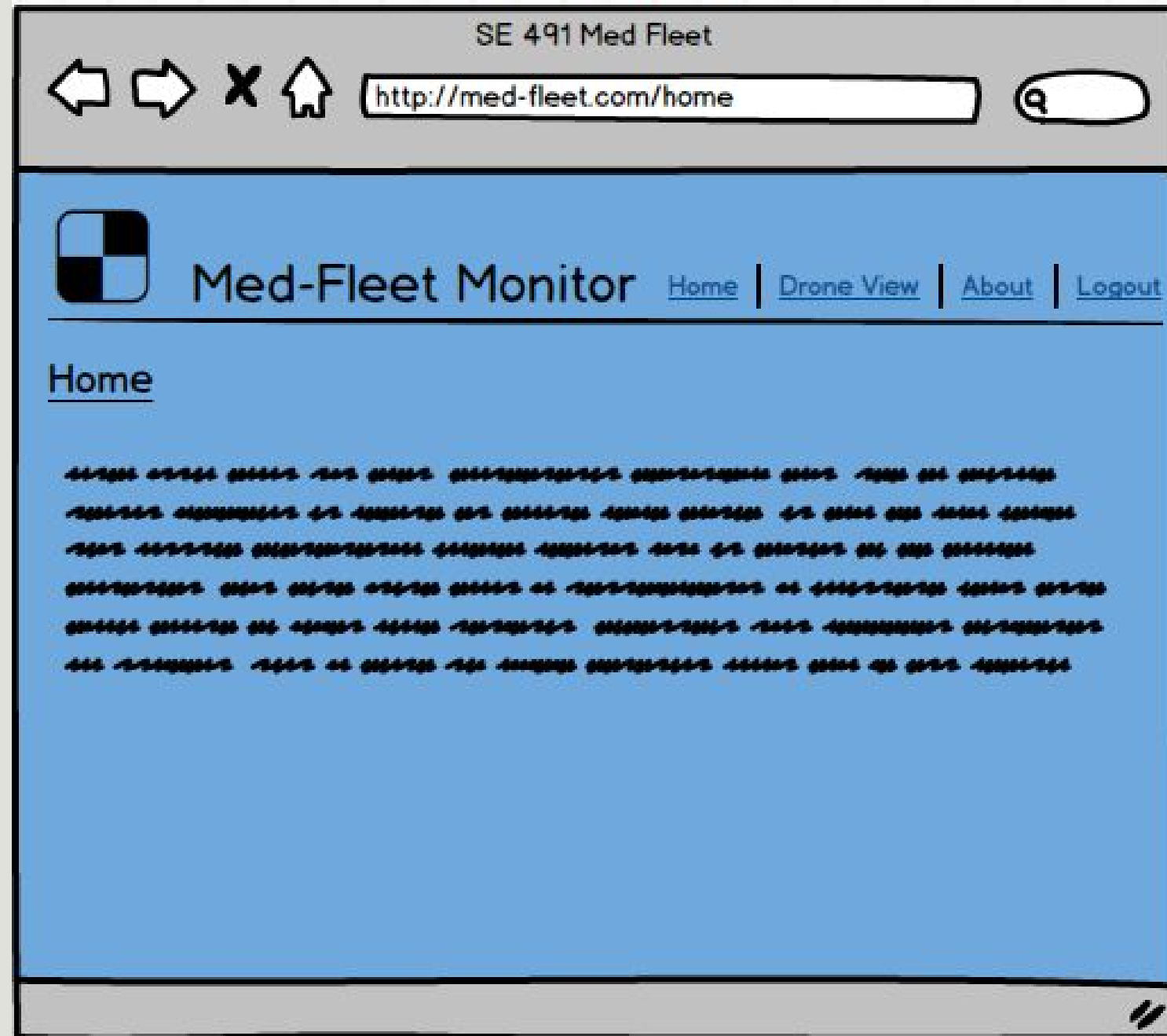
Log in

Username:

Password:


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# Home Page



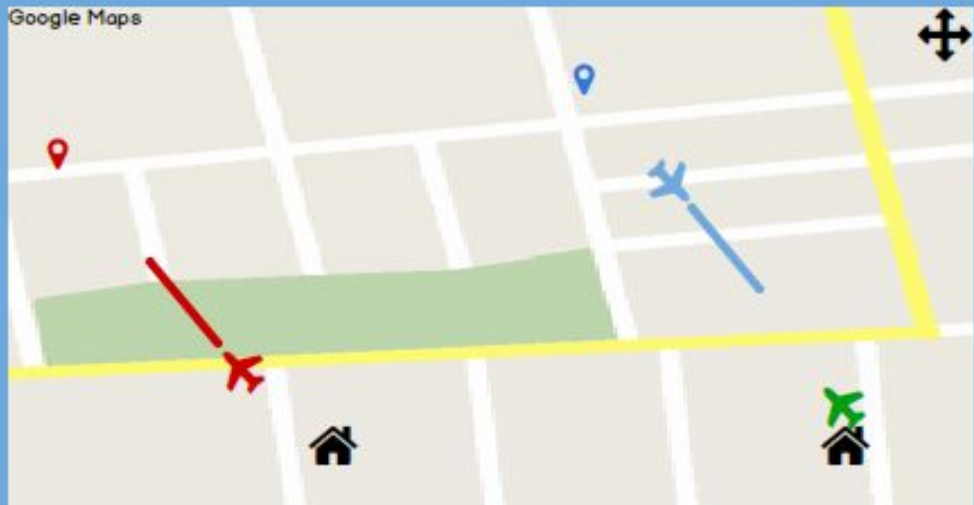
# Drone View

SE 491 Med Fleet



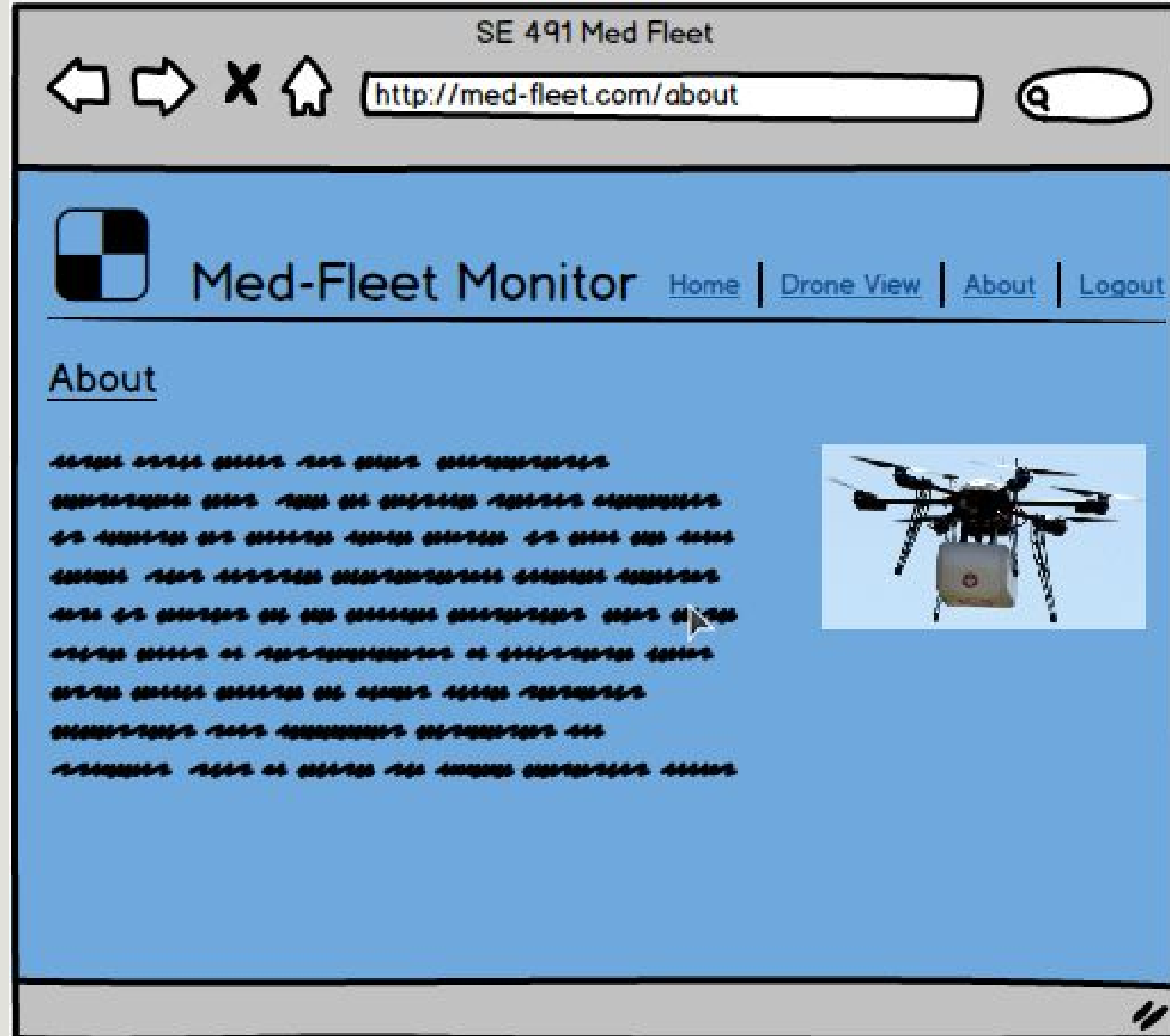
 Med-Fleet Monitor [Home](#) | [Drone View](#) | [About](#) | [Logout](#)

Drone View



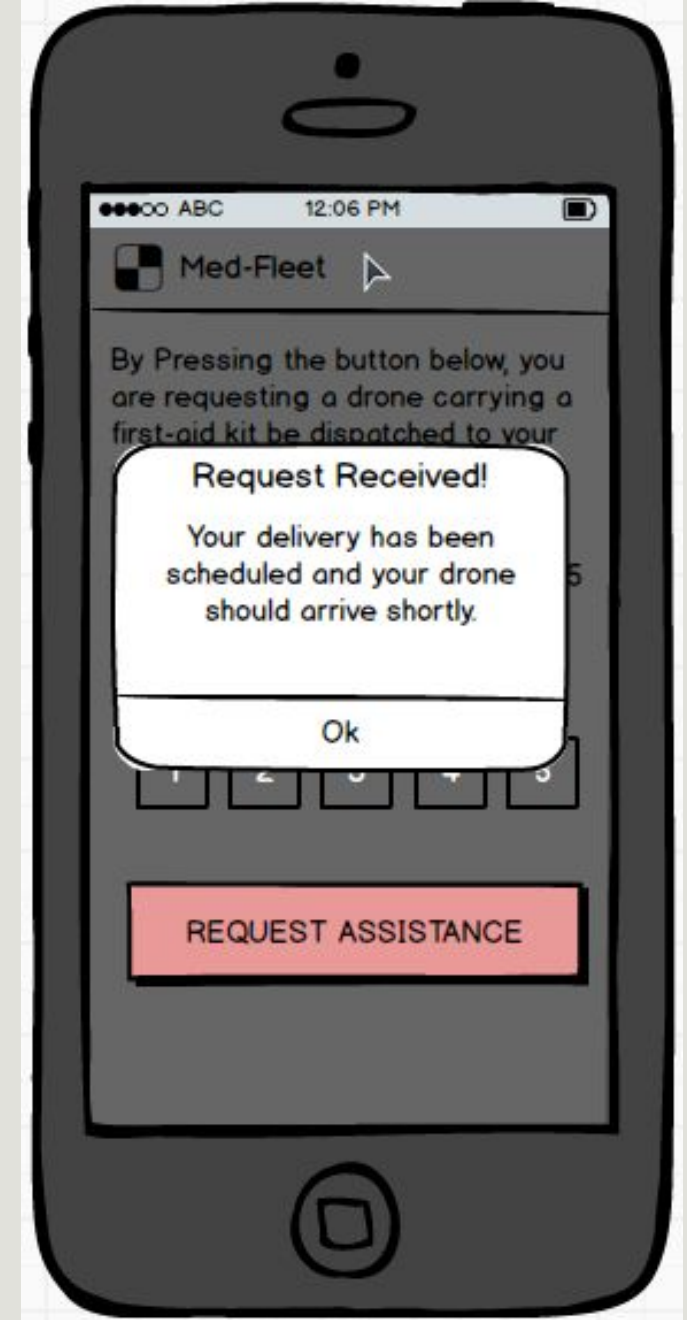
Drone 1	Drone 2	Drone 3
Status: On Mission	Status: On Mission	Status: Ready
Map Color: Red	Map Color: Blue	Map Color: Green
Destination Latitude: 41.754281	Destination Latitude: 41.754211	Destination Latitude: N/A
Destination Longitude: -88.060747	Destination Longitude: -88.060147	Destination Longitude: N/A
Battery Remaining: 95%	Battery Remaining: 69%	Battery Remaining: 100%

# About





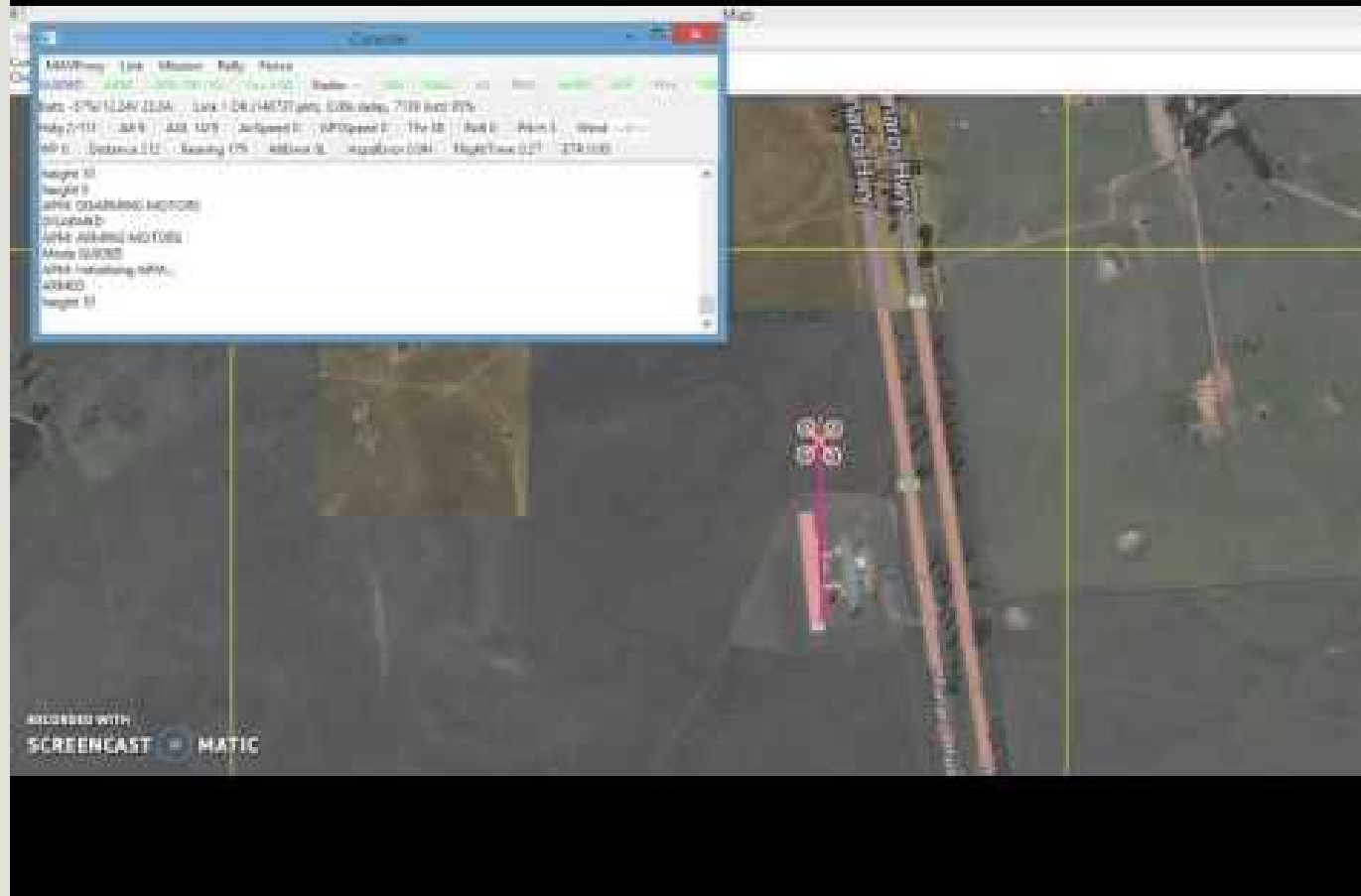
# Mobile View



# Project Glossary (Truncated)

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- Return To Launch (RTL): A GPS feature that when enabled, returns the aircraft to the “home” position where it took off.
- Electronic Speed Control (ESC): The ESC is used to convert signal from Flight controller or radio receiver, and apply the right current to the electric motors.
- Flight Controller: The brain of your multirotor. System used to keep track of alerts, and schedule drones.
- Radio Control (RC): A device used to control remote controlled vehicles.
- Radio Frequency (RF): Common frequency bands RC hobby use are 5.8GHz, 2.4GHz, 1.2GHz, 433mHz, 900mHz Not all bands are available in all countries, and some require a HAM (Amateur Radio Operator) license.
- Revolutions per minute (RPM): the number of times a motor shaft rotates a full cycle in 60 seconds.



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