USER MANUAL

WILDLIFE DRONES AND FLIGHT PLANS

Stakeholders

Matthew Evans
Reinhardt Eiselen
Bryan Janse van Vuuren
Andreas Louw
Deane Roos

Team DR BAM
drbam301@gmail.com

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1. System Overview

The primary use of the system is to aid wildlife rangers in protecting wildlife. The system uses tracking data of animals to predict their next location within the next 2 hours. This will allow optimal flight plans to be created for the drone pilot. Rangers will also be able to receive optimal patrol routes for conservation.
Pilots and rangers will be able to poach incidents on the map, to be taken into account when creating flight/ patrol routs.

The administrator of the system will be able to add new users, delete existing users, specify/update reserve properties, add animal tracking data.

Jargon

- Node JS is an open-source, cross-platform JavaScript run-time environment that executes JavaScript code server-side.

- Point of interest is a point or points that the user deems as important this could be because of a poaching incident, fence that needs repairs, dead animal or other suspicious activities.

- User: refers to either an administrator, pilot or ranger registered on the system.

1 Deployment model

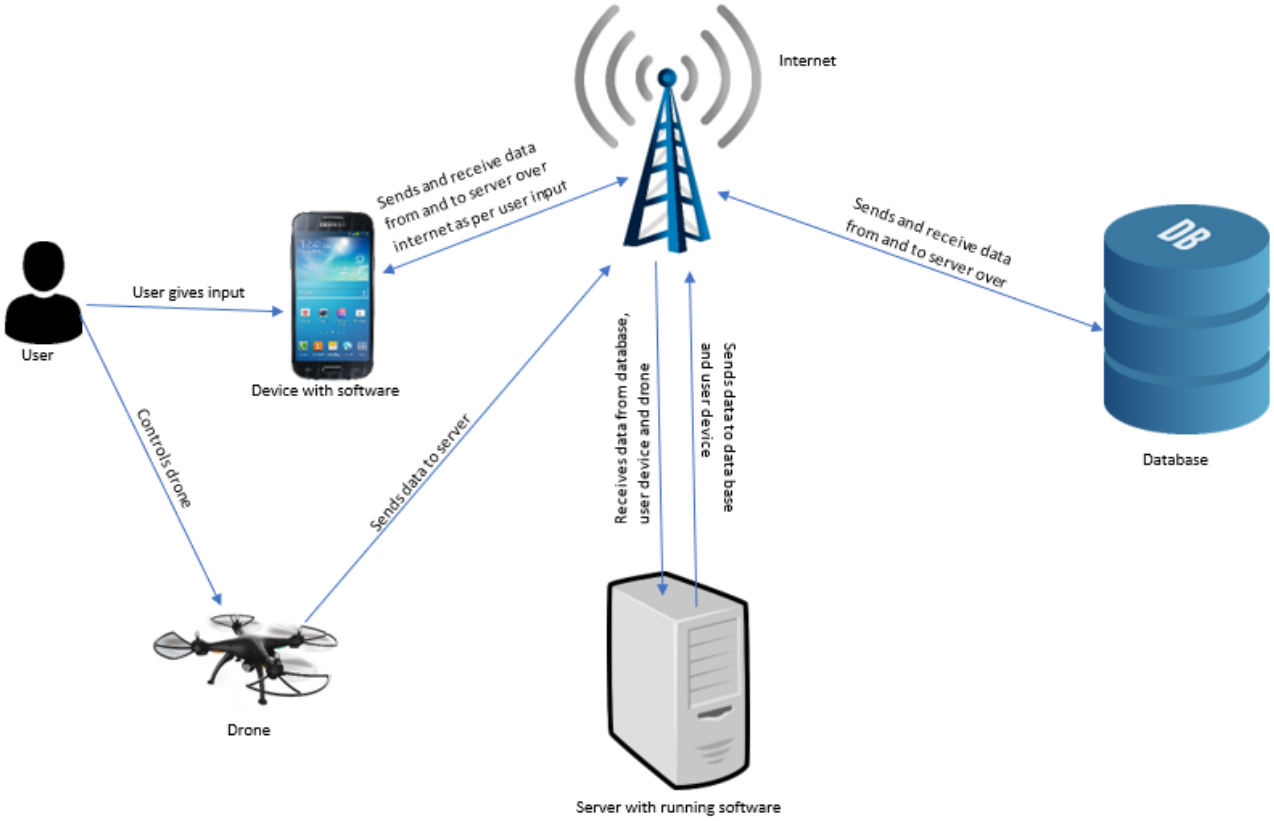

Figure 1 Deployment diagram

2. System Configuration

Devices:

- For client side of software:
  - Android smartphone such as Samsung Galaxy S5 or similar.
  - Any personal computer that can run a web browser.
- For server:
  - The server hardware should be sufficiently capable of supporting multiple clients and performing necessary functions.
  - Minimum recommended system specifications are: 4GB RAM, 4-core CPU

General:

- All devices must have an internet connection to be able to function correctly, some functionalities are available offline.

1. Installation

Required software: Node JS for server.

1.1 Install NodeJS

1.1.1 Download https://nodejs.org/en/
1.1.2 Run the installer.
1.1.3 Follow the prompts in the installer.
1.1.4 Restart your computer.

The **Wildlife Drones and Flight Plan** software will be available on the following GitHub link: https://github.com/cos301-2019-se/Wildlife-Drones-and-Flight-Plans.git.

1.2 Downloading Wildlife Drones and Flight Plan

1.2.1 Go to the link https://github.com/cos301-2019-se/Wildlife-Drones-and-Flight-Plans.git
1.2.2 On the GitHub page click on Clone or download.
1.2.3 Select Download ZIP.
1.2.4 Once the zip file has been downloaded unzip the folder.

1.3 Installing/running server

1.3.1 In the extracted folder go into the server folder.
1.3.2 Open a command prompt in the server folder.
1.3.3 In the command prompt type: *npm install*.
1.3.4 After the download and installation is complete, in the command prompt type: *npm run start*.

1.4 Installing/running client

1.4.1 In the extracted folder go into the client folder.

1.4.2 Open a command prompt in the client folder.
1.4.3 In the command prompt type: *npm install*.
1.4.4 After the download and installation is complete, in the command prompt type: *npm run start*.

3. Getting started

Users can only be added to the system via the administrator, the administrator can only be added by the system administrator when setting up the database.

A user can access the system by entering their email and password on the log in page further described at on page 5.

After a user has logged-in to the system, the following can be done depending on the role of the user:

- The Pilot will be able to generate a flight plan for his/her shift via the client application on the provided computer that has the software installed.
- The Ranger will be able to generate patrol routes via the client application that will be on the provided smartphone.
- The user will be able to toggle features on the map such as routs used, points of interest and hotspots.
- The user will be able to add poaching incident points to the system.

4. Using the system

Pre-condition:

-The user has basic skills to work with a computer and/or smartphone.

1. Logging in

1.1. The user starts the application on the platform used.
1.2. Start the mobile/desktop application with the name *Wildlife Drones and Flight Plans.*
1.3. The user will be presented with a login screen with the following fields: username and password. After the application has loaded and opened. Shown in Figure 2.
1.4. The user has to fill in the username and password in the corresponding fields. Shown in Figure 3.
1.5. The user will have to click the login button underneath the password box at the bottom centre of the screen. Shown in Figure 3
1.6. The user will be notified of successful or unsuccessful login
1.6.1. If login was successful, the user will be shown the map and related features. Shown in Figure 5.
1.6.2. If the login was unsuccessful the user will be notified of an unsuccessful login, shown in Figure 4, and will be able to repeat step 1.1.1.3.

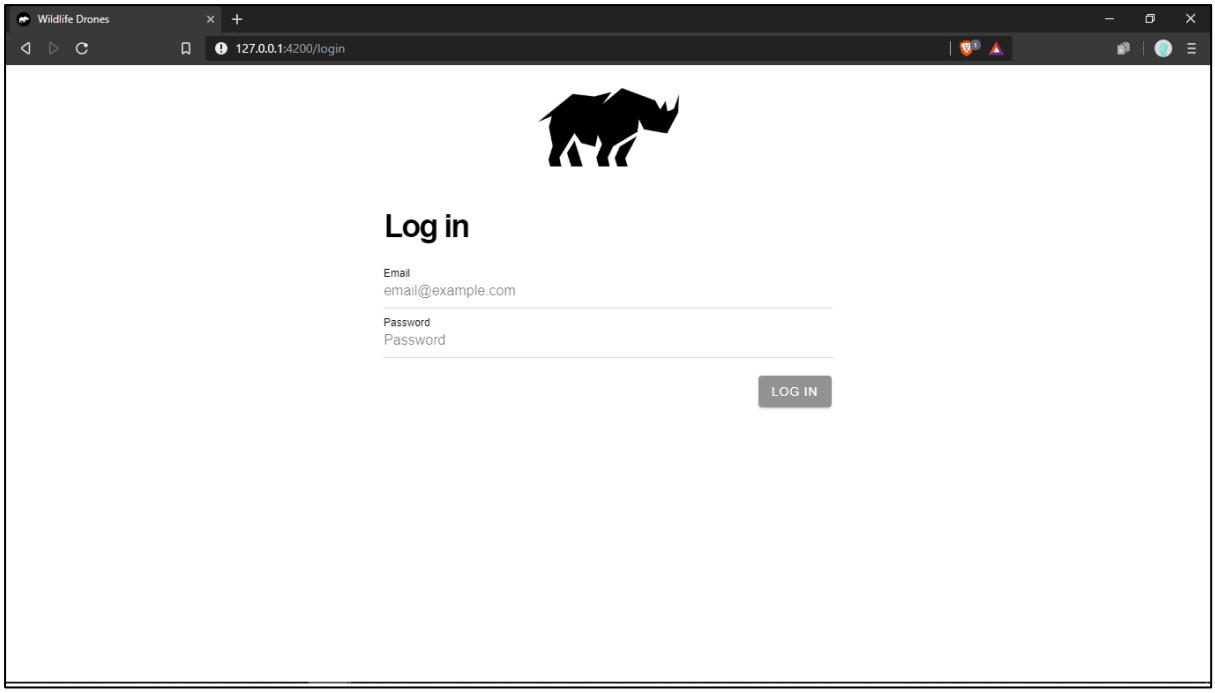

Figure 2 Login

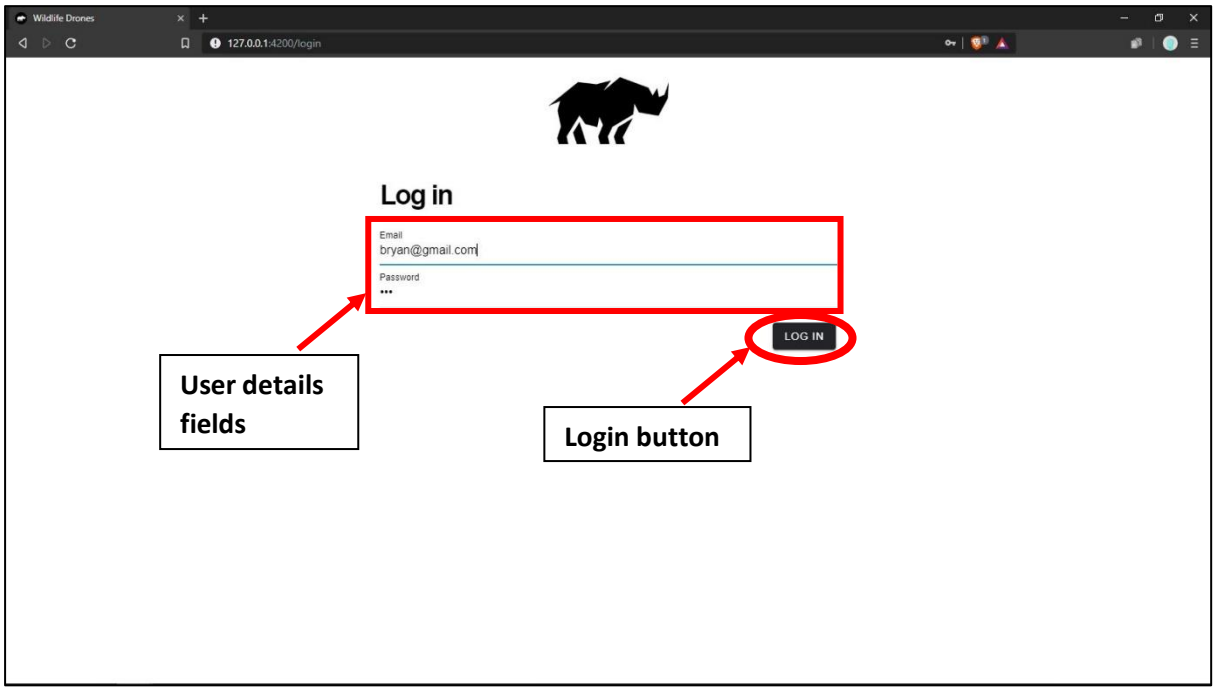

Figure 3 Login with details

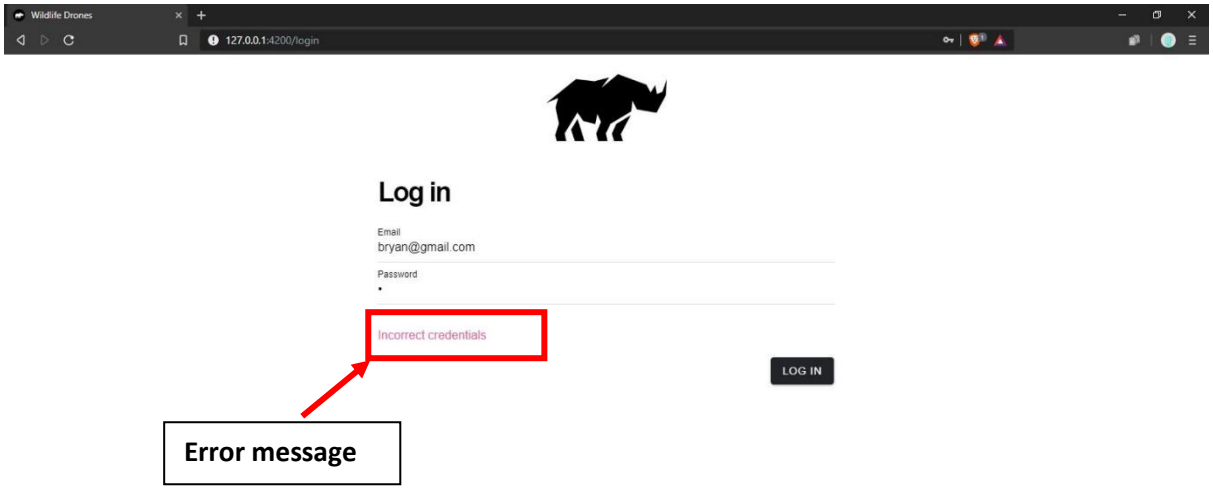

Figure 4 Login failure

Pre-condition: (For 2 - 7)

- The user is logged into the system.

2. Map features

2.1. Reserve boarder shown with white lines (Figure 6 Figure 5) the reserve will be the non-greyed out area (Figure 6), user location is the blue dot with a white outline (Figure 5), poaching incidents are red dots (Figure 5), drone route is the blue and white dotted line (Figure 7)

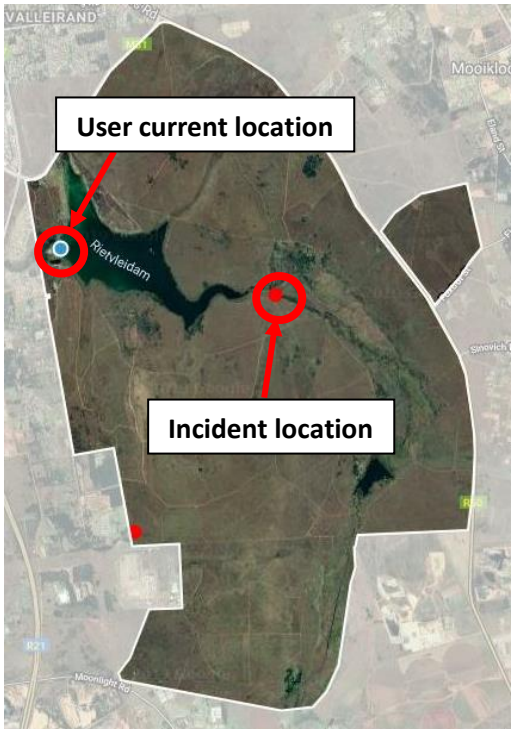

Figure 5 User location, incident point

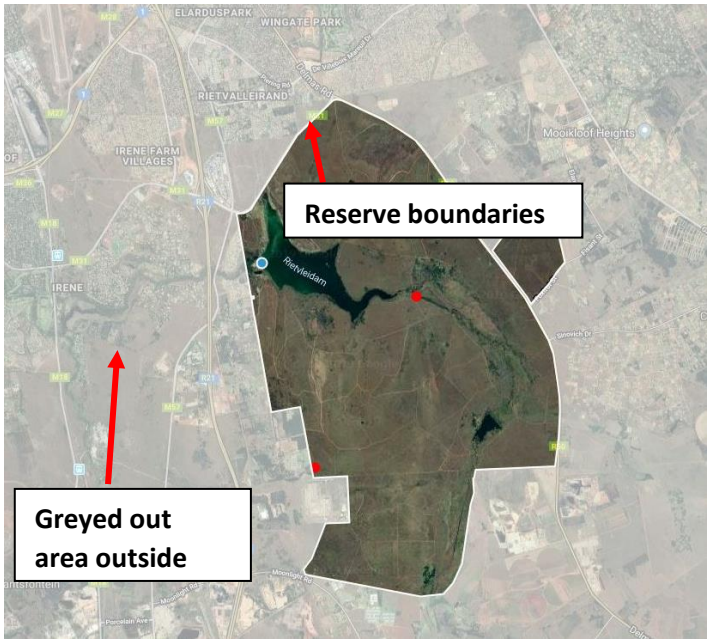

Figure 6 Reserve boundary and greyed out area

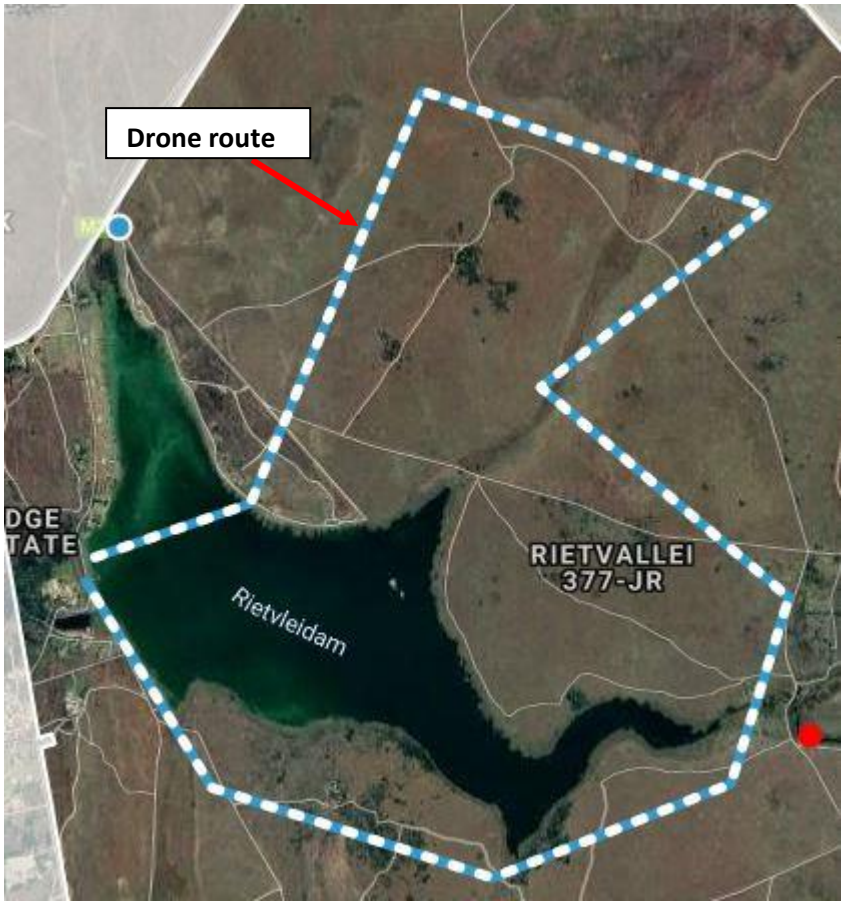

Figure 7 Drone route

3. Adding Drone

3.1. The user *clicks on* the paper plane on the bottom left of the screen, shown in Figure 8.

3.2. The user will then be presented with a popup and three new buttons (a cross, an add and a check mark) at the bottom centre of the screen, the pop up will have 4 fields namely: *Drone name*, *Drone name*, *Average flight time (minutes)* and *Average speed (km/h)* shown in Figure 9. Last 3 fields used to add a new drone, shown in Figure 10.

3.3. The second Drone name is an editable text field where the new drone name should be entered, shown in Figure 11.

3.4. The *Average flight time (minutes)* and *Average speed (km/h)* fields are also editable text fields where the average flight time (in minutes) and average speed (in kilometre per hour) can be added for the new drone as shown in Figure 12.

3.5. Once the *Drone name*, *Average flight time (minutes)* and *Average speed (km/h)* fields have been filled in the drone can be added by pressing the *plus* button, shown in Figure 13.

3.6. If one wants to cancel adding the drone the *cross* button, shown in Figure 14.

3.7. Once the new drone has been added it can be selected from the drop-down list *Drone name* shown in Figure 15 and Figure 16.

Figure 8 Adding drone

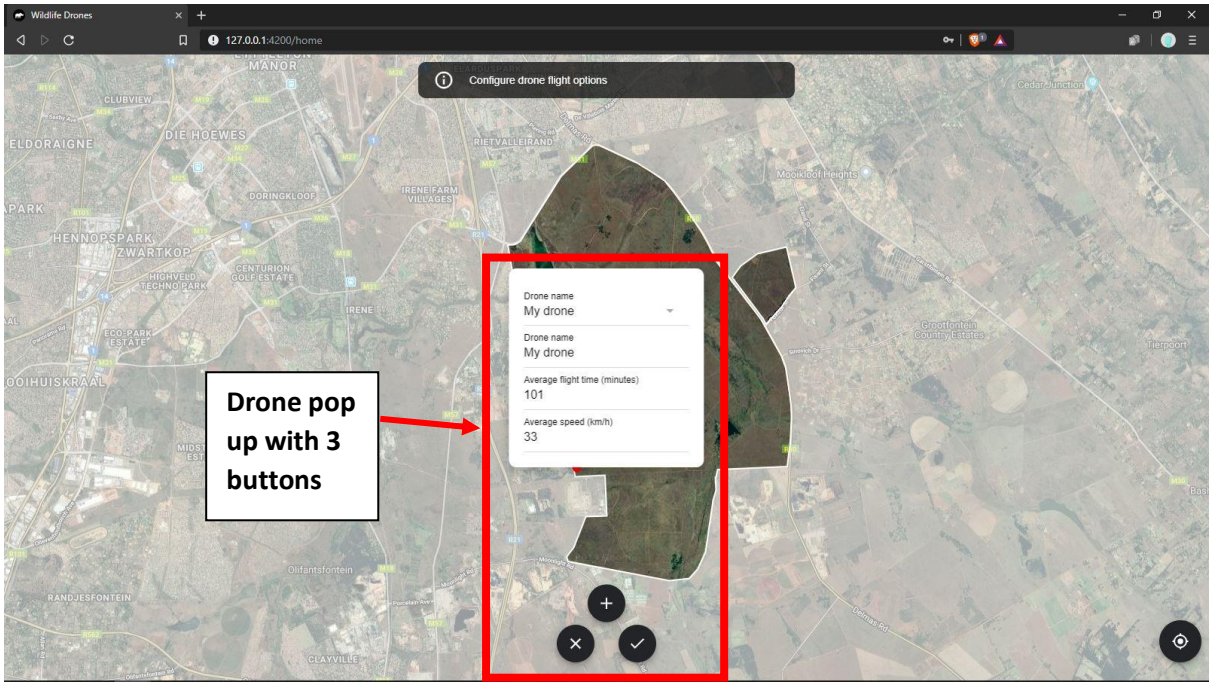

Figure 9 Add drone popup

Figure 10 Add new drone fields

Figure 11 Name of new drone

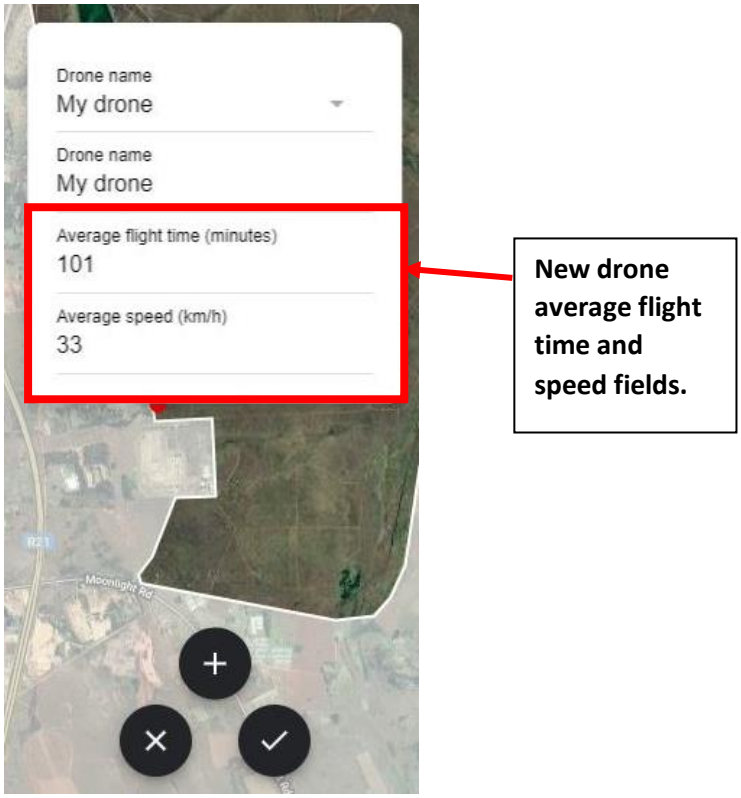

Figure 12 Average flight time and speed of new drone

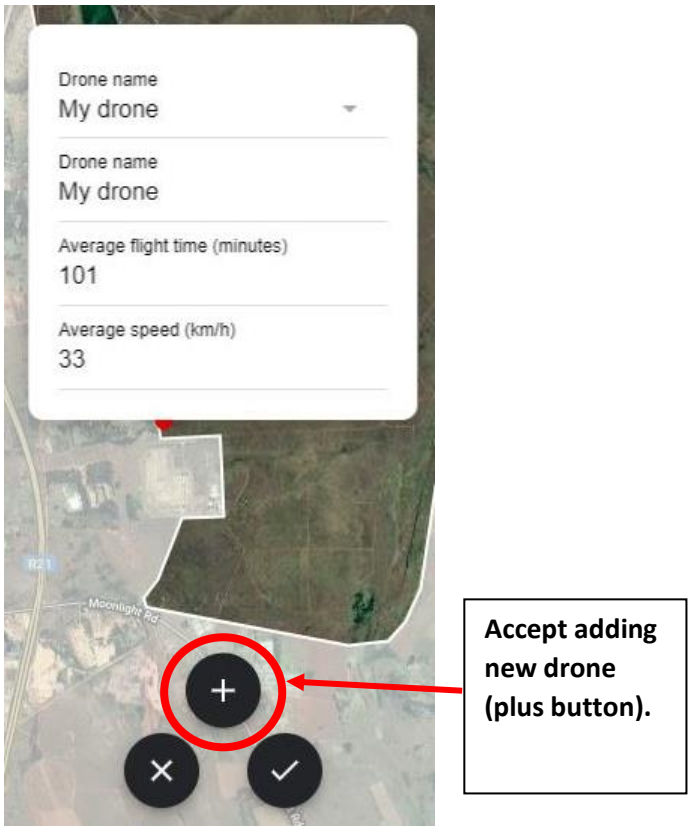

Figure 13 Add new Drone

Figure 14 Cancel adding a drone

Figure 15 Select drone drop-down

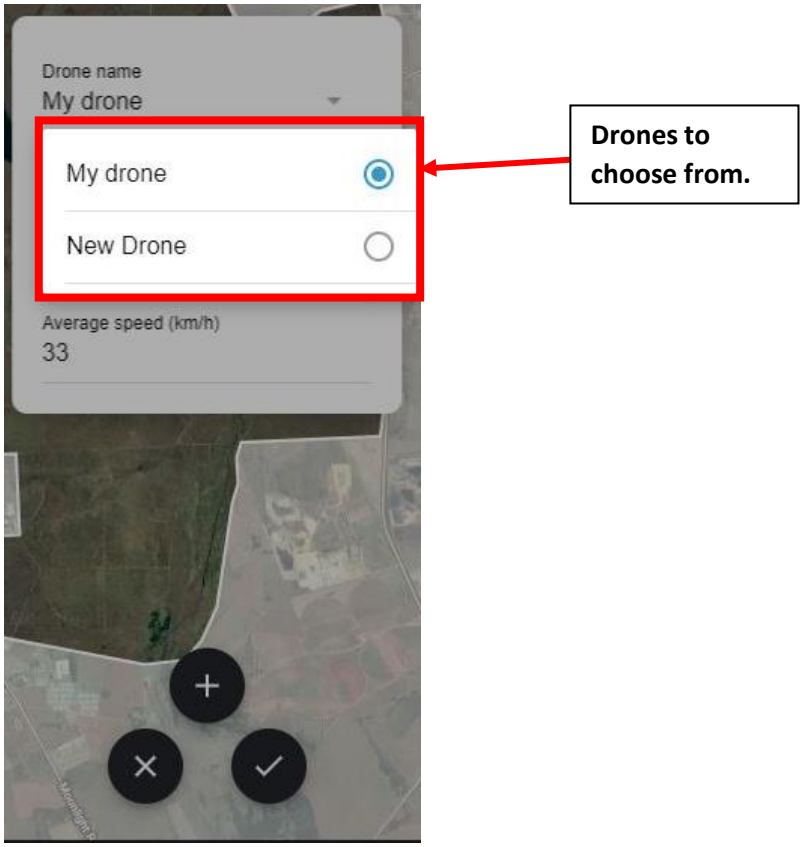

Figure 16 Select new added drone

4. Creating Drone Route

4.1. The user *clicks on* the *paper plane* button on the bottom left of the screen, shown in Figure 8.

4.2. The user will be presented with a popup and three new buttons (a cross, an add and a check mark) at the bottom centre of the screen, the pop up will have 4 fields namely: *Drone name*, *Drone name*, *Average flight time (minutes)* and *Average speed (km/h)* shown in Figure 9.

4.3. The drone for which the route should be created is selected from the drop-down list, shown in Figure 17 and Figure 18.

4.4. The average flight time and average speed can be edited for the selected drone in the *Average flight time (minutes)* and *Average speed (km/h)* fields, shown in Figure 19.

4.5. The user then presses the *check mark* button, shown in Figure 20, to create the route.

4.6. The drone route is then displayed on the map, shown in Figure 21

4.7. To confirm the created route the user presses the *check mark* button on the bottom centre of the screen shown in Figure 22.

Figure 17 Selecting drop down drone list

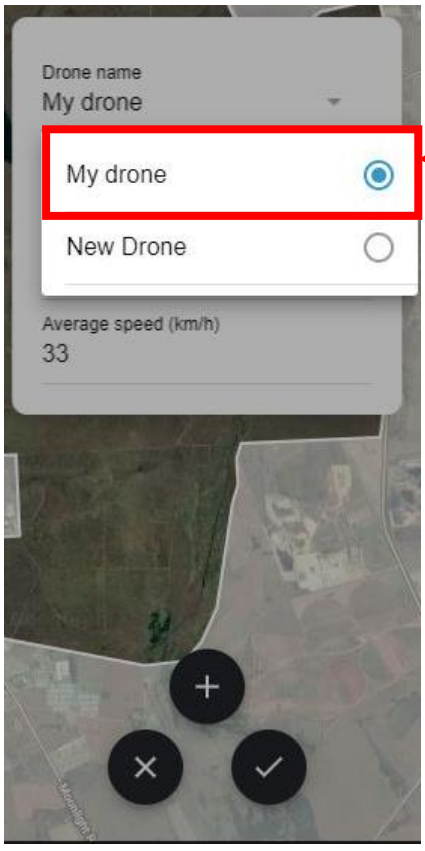

Figure 18 Selecting drone to create route for

Figure 19 Edit average speed and flight time

Figure 20 Confirming route creation

Figure 21 Created drone route

Figure 22 Confirm drone route

5. Plotting poaching incident

5.1. The user clicks on the *point of interest* button on the bottom left corner of screen, shown in Figure 23.

5.2. The user will be shown a red location point on the map, which can be moved around the map by moving the map, shown in Figure 24.

5.3. In addition to the place marker a *cross* and *check mark* will appear on the bottom centre of the screen shown in Figure 25.

5.4. Once the marker is on the desired spot the user clicks the check mark shown in Figure 26.
5.5. An incident pop up will appear with an *Incident type* drop down list and a *Description* text field, shown in Figure 27.
5.6. The user chooses the appropriate incident from the drop-down list shown in Figure 28 and Figure 29.
5.7. The user can add a description in the *Description* text field shown in Figure 30
5.8. The user clicks the *check mark* button, shown in Figure 31, to add the incident.
5.9. The new incident is shown on the map, shown in Figure 32.
5.10. Alternatively, the user can press the *cross* button to cancel placing the poaching incident at any time, shown in Figure 33.

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Figure 23 Interest point button

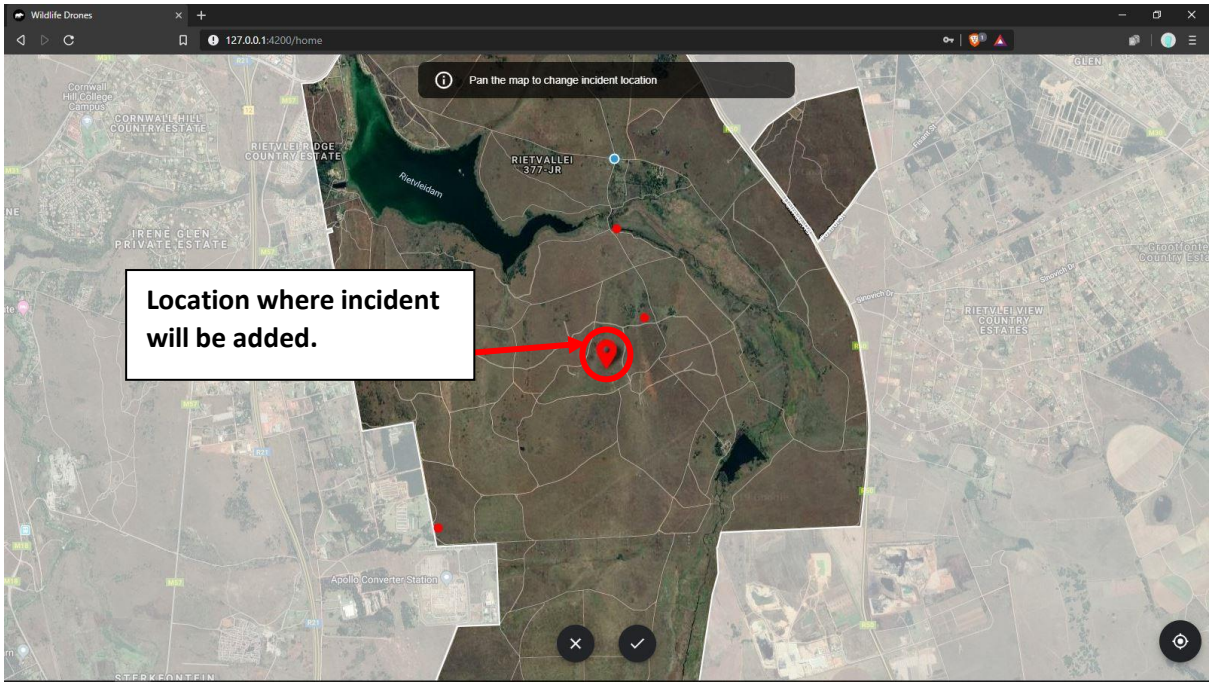


Figure 24 Place point of interest

Figure 25 Cross and check mark

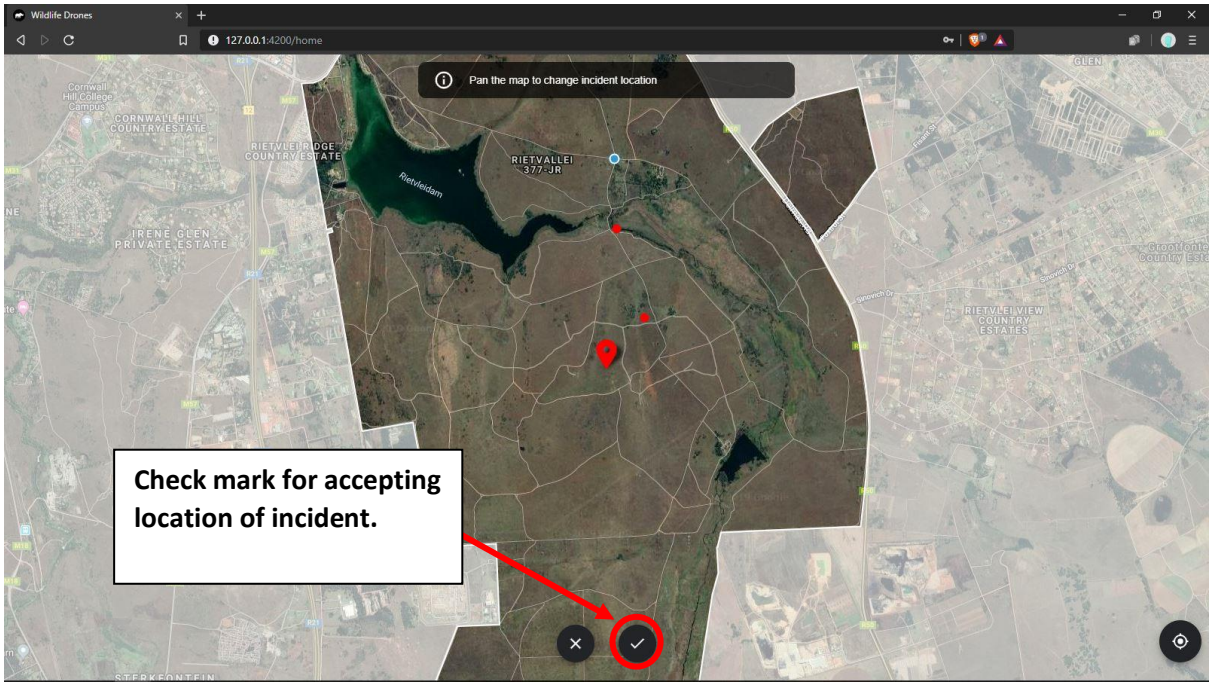


Figure 26 Check mark to add incident

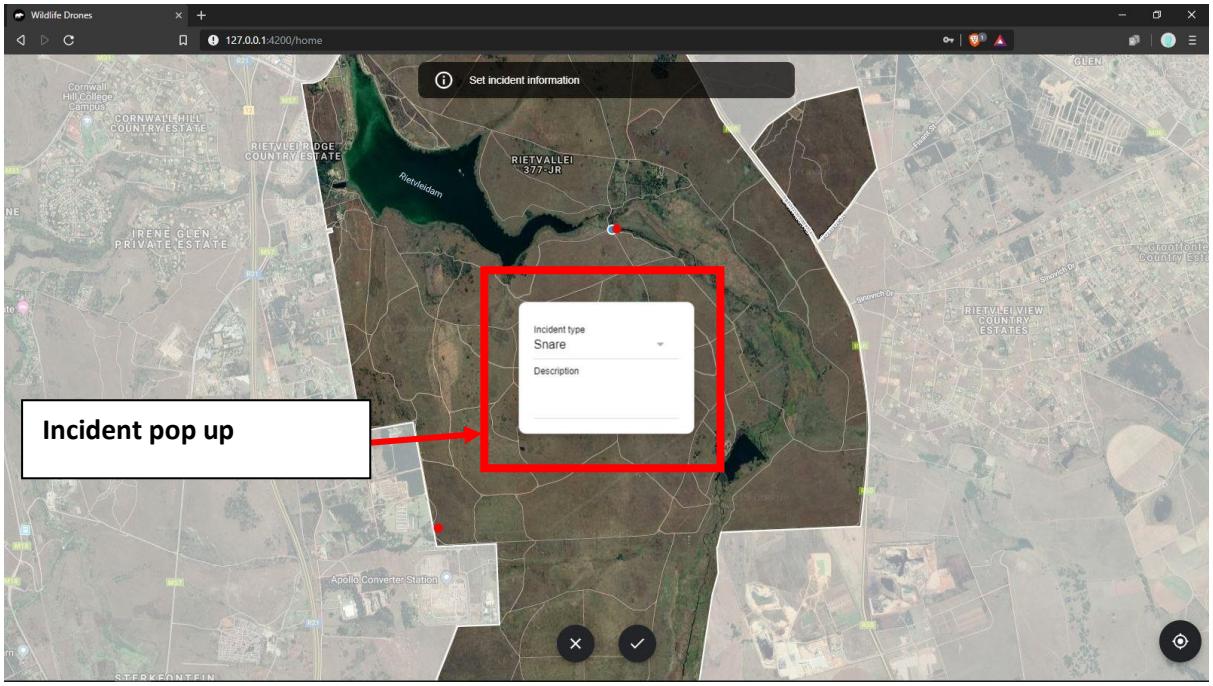
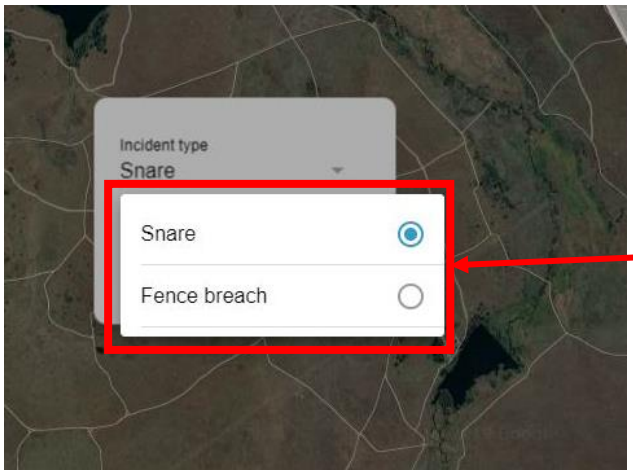


Figure 27 Incident pop up

Incident type dropdown.

Figure 28 Incident drop down list



Incident types to choose from.

Figure 29 Select incident type

Description field for adding description to incident.

Figure 30 Add incident description

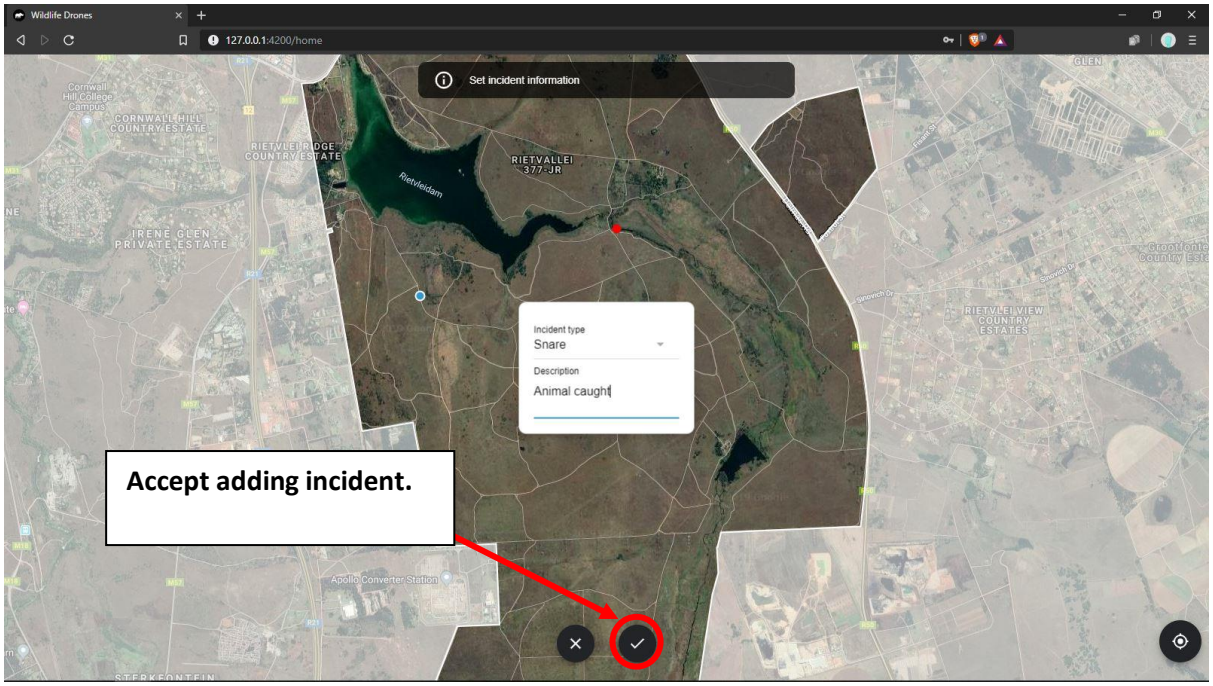


Figure 31 Confirm incident point

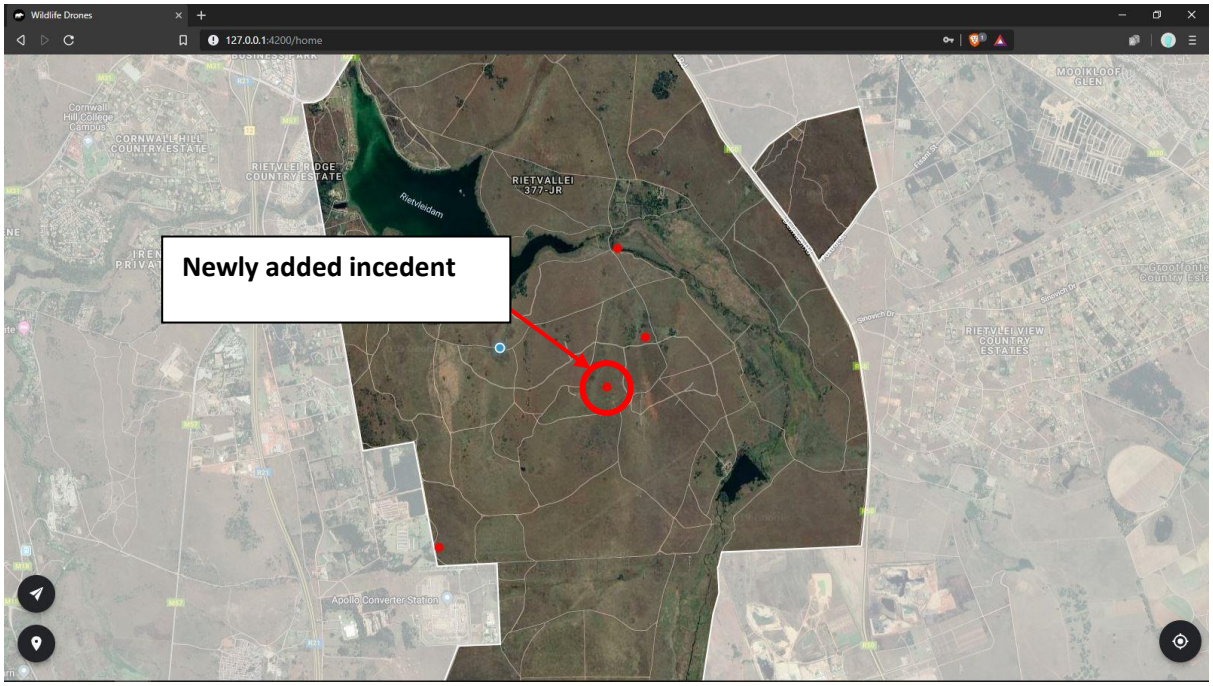


Figure 32 Newly added incident point

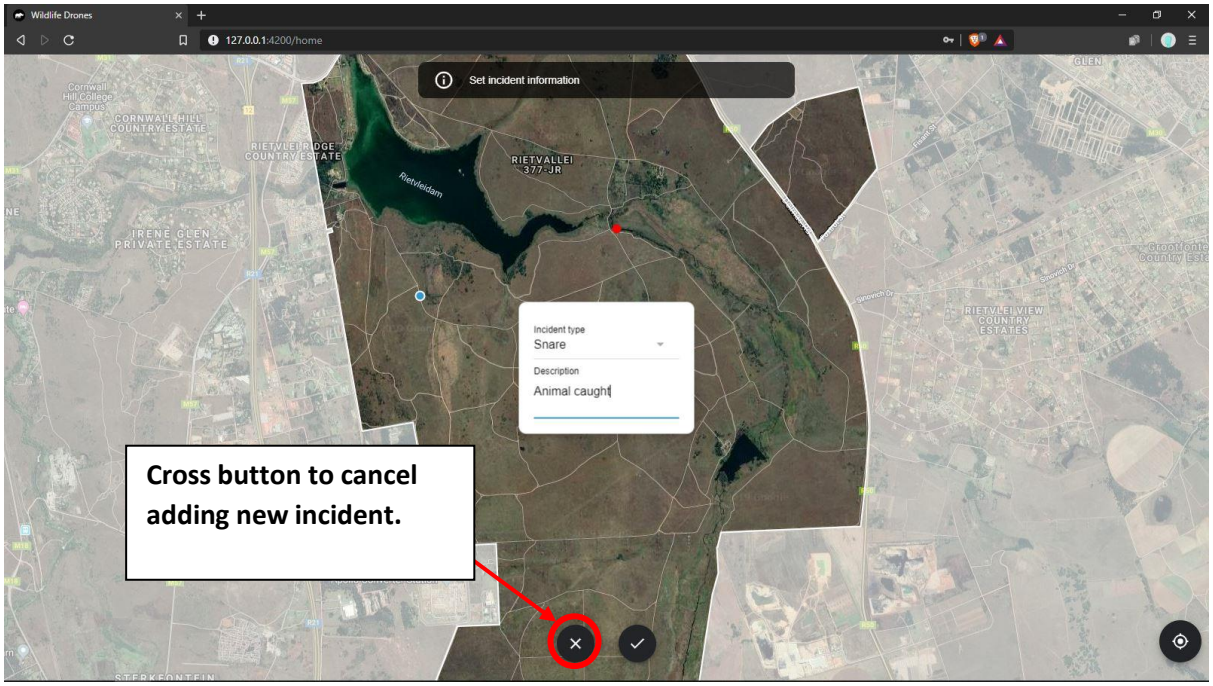


Figure 33 Cancel placing poaching incident

6. Centre map on current location

6.1. The user clicks the location button on the bottom left of the screen, shown in Figure 34

6.2. The map will centre on the users' current location shown in Figure 35.

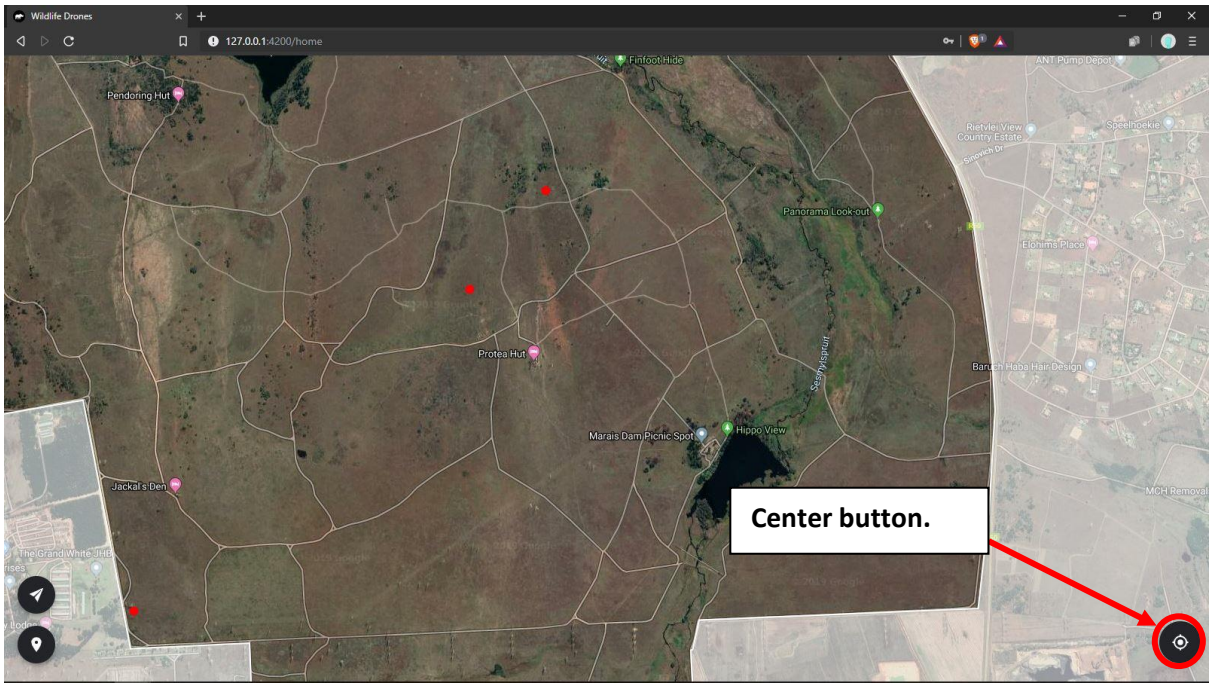


Figure 34 Centre button

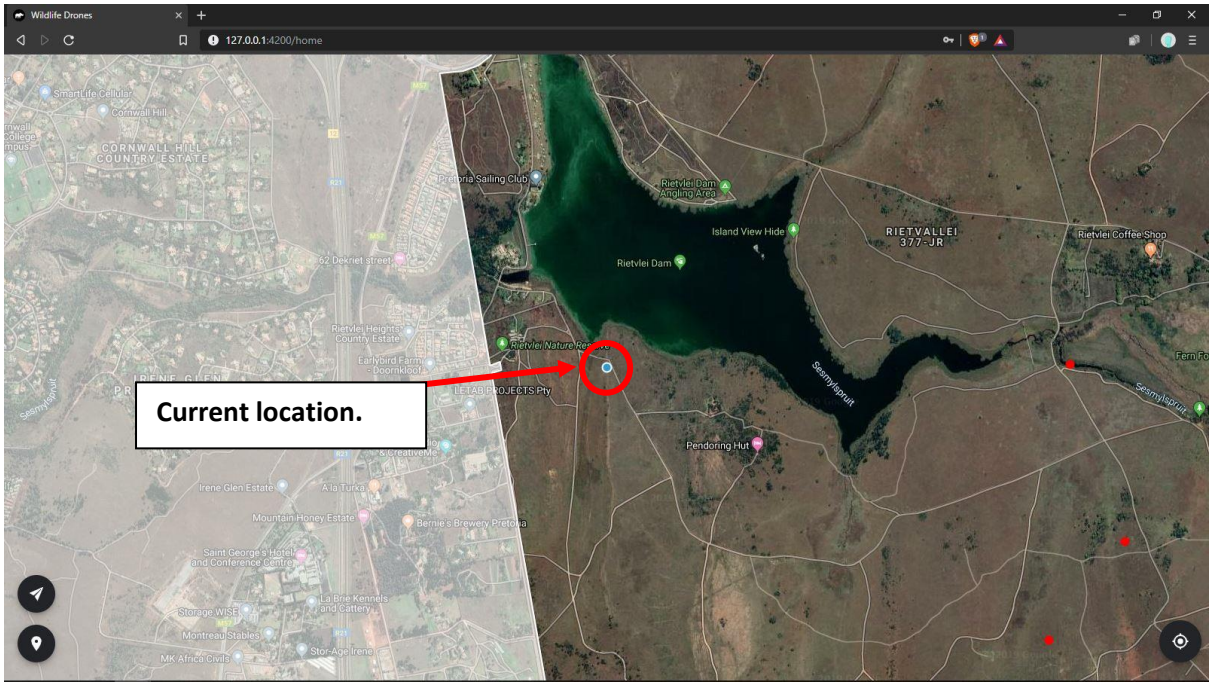


Figure 35 Map centred

5. Troubleshooting

1. No data received

1. **If no map data is being downloaded/ received.**
   1.1. Make sure device is connected to internet.

2. Login failed

2. **If login fails with correct authentication details (email and password)**
   2.1.1. Make sure device is connected to internet.
3. **If log in fails and device is connected to internet**
   3.1.1. An incorrect credential message will appear on the screen as shown in Figure 36

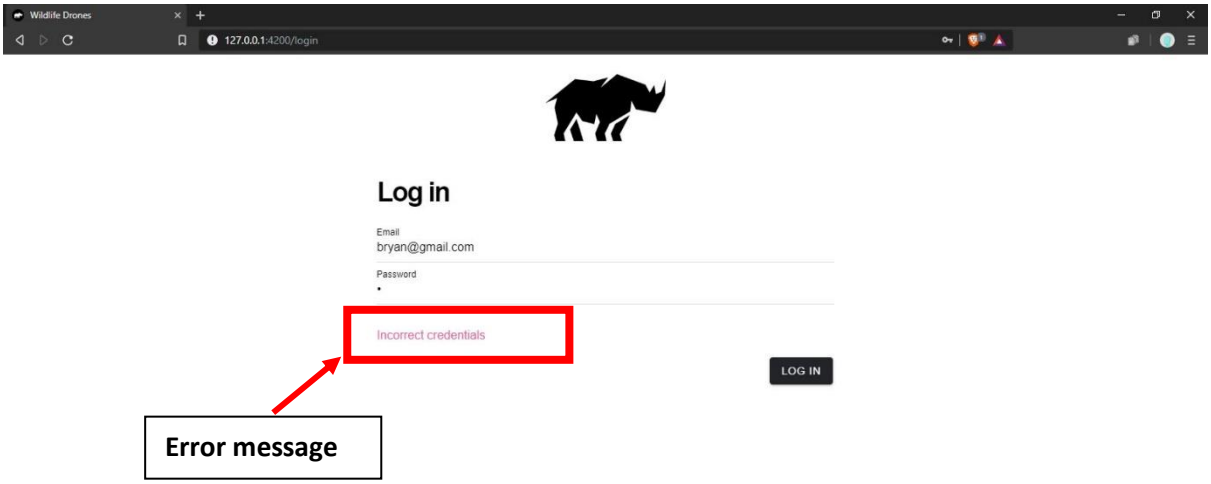


Figure 36 Incorrect credentials