PRIMECOR

INSTALL BEFORE FLIGHT

PRIMECOR ZERO

INTEGRATION MANUAL

Version: 1.0

Table of Contents

1.1. Glossary

Geofence or Operational Volume: Predetermined area where the UAS is allowed to fly. Outside its boundaries, the UAS is prohibited from flying and the FTS must be activated.

Buffer or Contingency Volume: Safety zone between the geofence limit and the nominal zone, designed to prevent the UAS from exiting the geofence.

UAS: Unmanned Aircraft System (UAS).

SGCS: Safety Ground Control Station.

IMU: Inertial Measurement Unit. It is an electronic device that measures and reports a body's specific force, angular rate and the orientation of the body.

Pilot: The person who directly controls the drone during flight.

Operator: The person or entity that owns and manages the drones.

Contingency: An unexpected situation that may occur and requires a response or action to manage it.

Available Actions in case of Contingency:

- **RTH** (Return to Home): A contingency action to return in a straight line from the current location to the take-off point and landing on it when the contingency is triggered.
- **HOVER**: A Contingency action to hold position and remain stationary in the air.
- **LAND**: A contingency action to land immediately at the current location.
- **FTS** (Flight Termination System): A contingency action to shut down the motors. This action can activate other mechanisms, such as deploying a parachute.
- **RALLY**: A contingency action to move to a predefined rally point and land.
- **GPP** (Go to Previous Point): A contingency action to head to the previous waypoint.
- **RTHS** (Return to Home Safely): A contingency action to return and land at the take-off point by flying back through the defined waypoints making the same flight path in reverse.

Note: In case PrimeCor Zero is not connected to the autopilot, the only contingency action enabled is to trigger *FTS*.

2. PrimeCor Zero User Manual

Overview

PrimeCor Zero, paired with the PrimeCor Cloud platform, provides an intuitive and robust solution for drone operators. This manual guides users through the setup, configuration, and operation of PrimeCor Zero. Follow the instructions carefully to ensure optimal performance.

Getting Started

To use PrimeCor Zero for the first time, you need to register in PrimeCor Cloud. This platform serves as the main interface for setting up and operating PrimeCor Zero. If you already have completed the registration process, proceed to section 2.1.2.

2.1. PrimeCor Cloud

PrimeCor Cloud displays telemetry, notifications, alerts, and data received from PrimeCor Zero. It also enables users to send commands and configure parameters.

To access PrimeCor Cloud, you need to do it through the following **URL** in your web browser:

https://app.cloud.dd.primecorsys.com

2.1.1. Signing up

1. On the startup screen, click on the **“Get Started”** button.

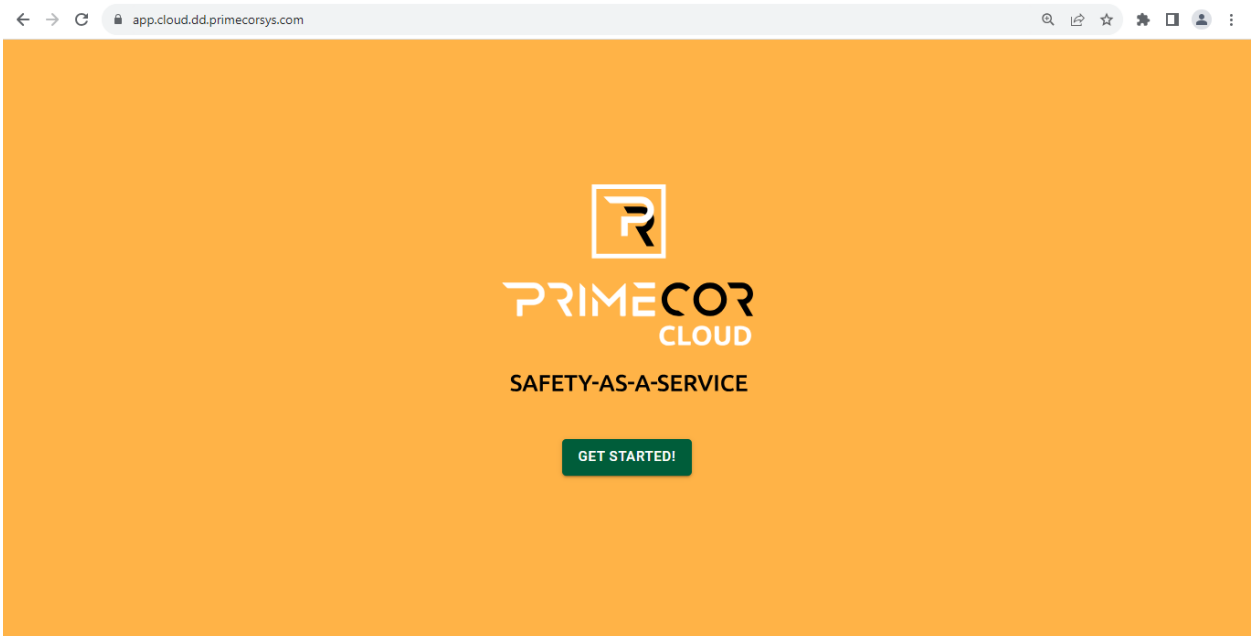


Figure 1: Startup PrimeCor Cloud screen.

2. On the login page, click on **“Don’t have an account? Register"**.

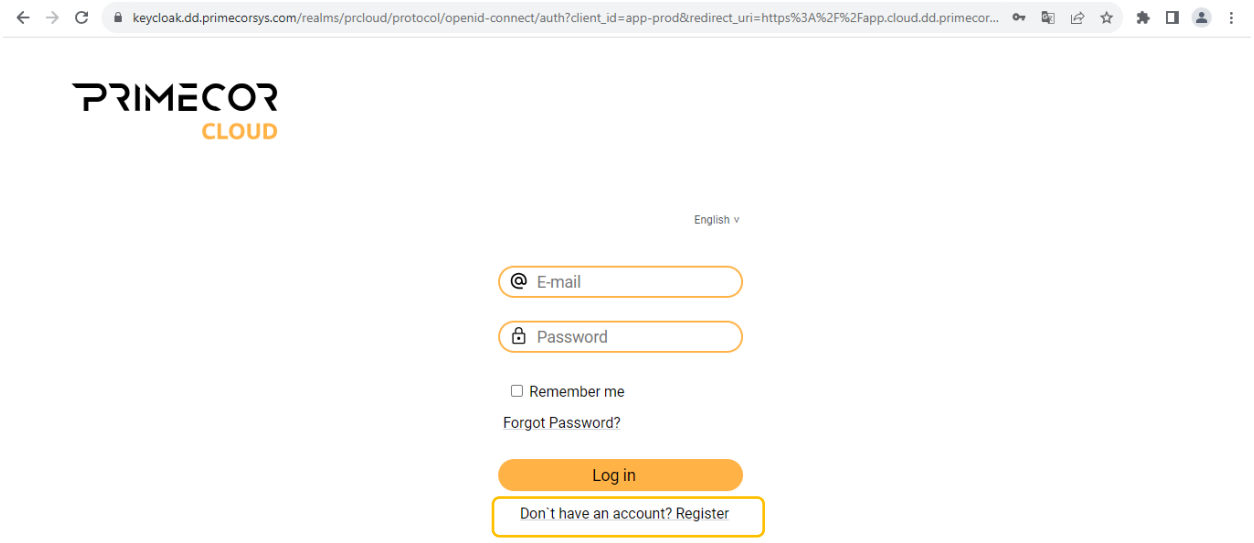


Figure 2: Login page.

3. Fill up the registration form and click on **“Register”**.

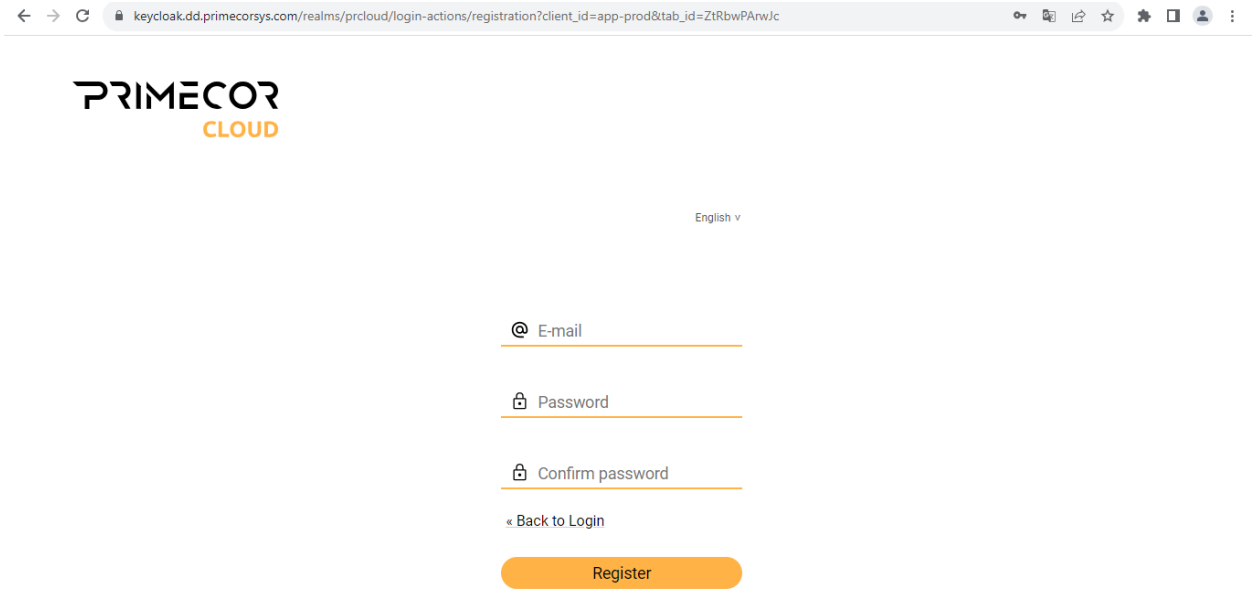


Figure 3: Register page.

2.1.2. Logging In

1. Go to the Log In page (https://app.cloud.dd.primecorsys.com) and enter your credentials.

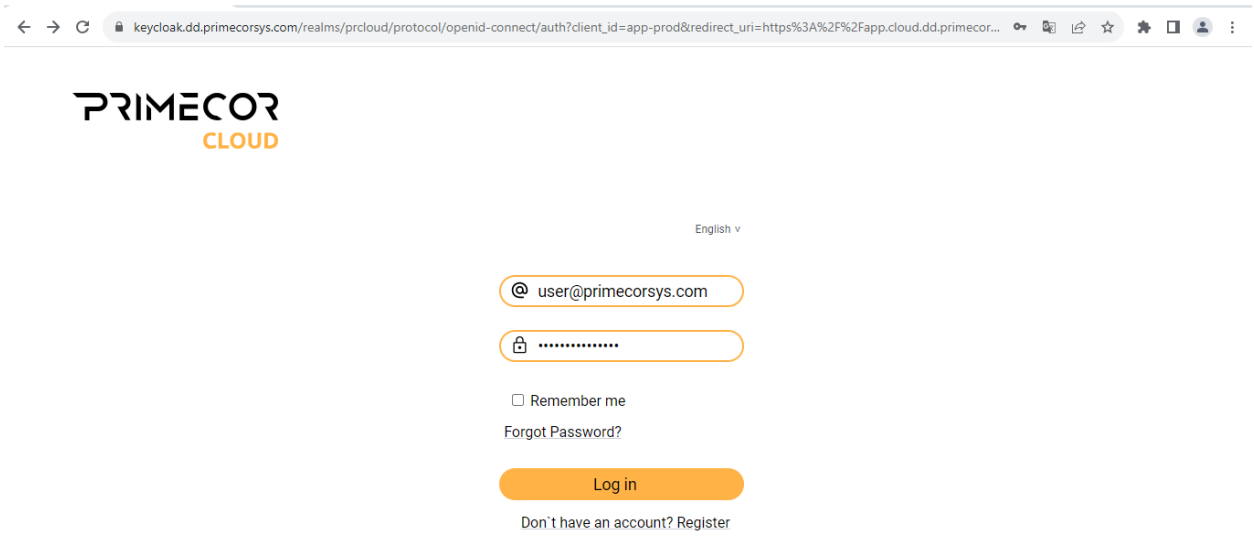


Figure 4: Login page.

2. Click on **"Log In"**. If successful, the browser will redirect you to PrimeCor Cloud home page.

Figure 5: PrimeCor Cloud user main page.

2.1.3. Utilities

2.1.3.1. Creating a new operator

1. On the main user page, click on the button in the upper right corner and select **"New Service"**.

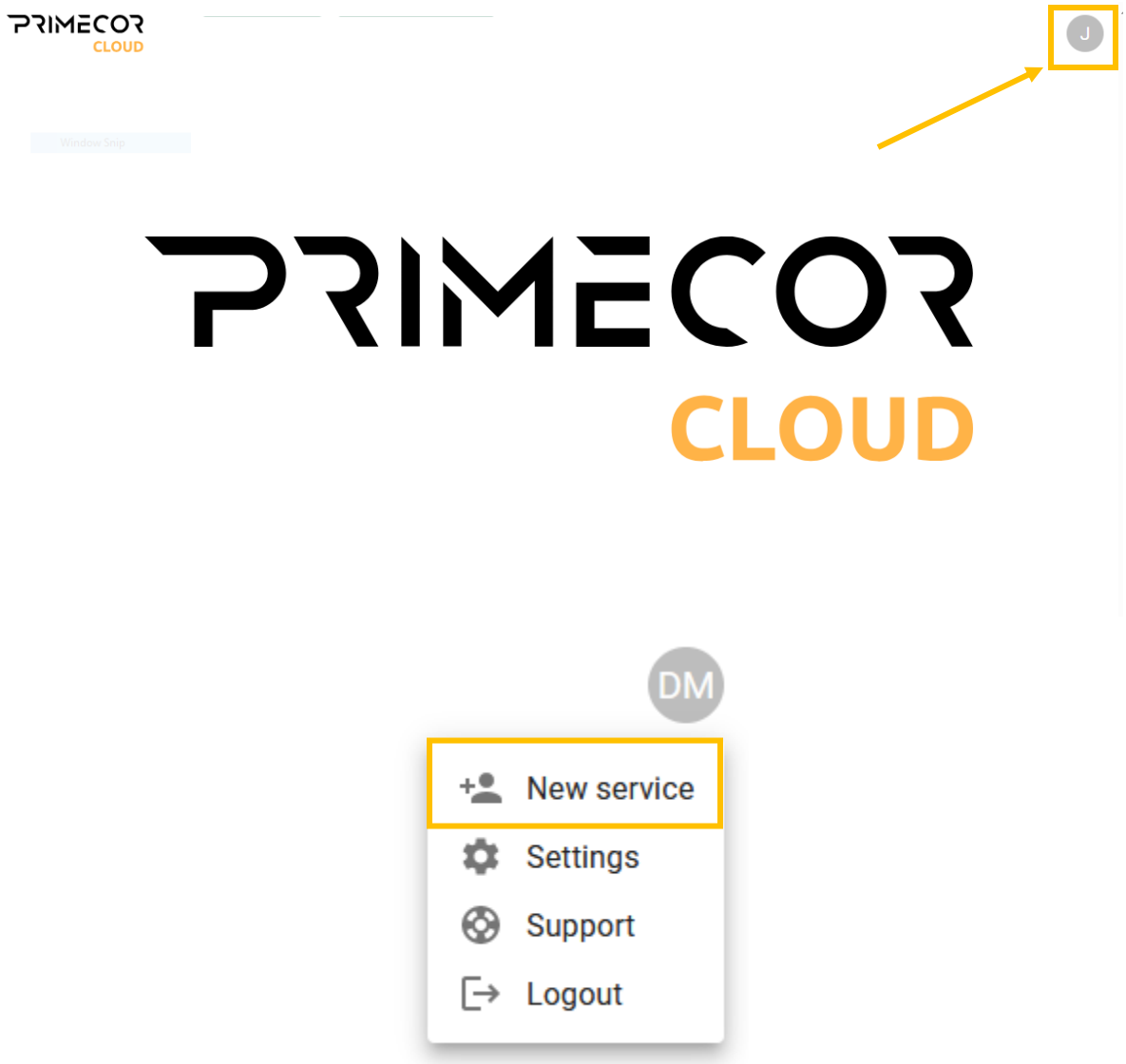


Figure 6: New service

2. On the New Service page, click on **"New Operator"**. If an operator already exists, this button will be disabled.

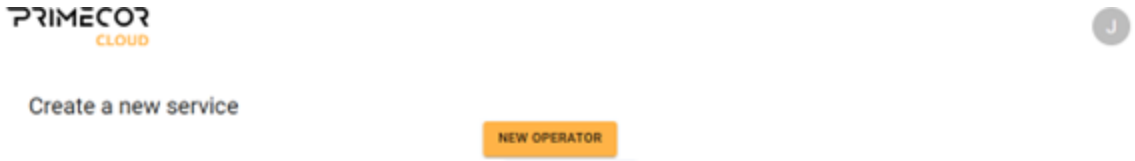


Figure 7: Create a new operator button.

3. Fill out the information about the operator and click on **"Create"**.

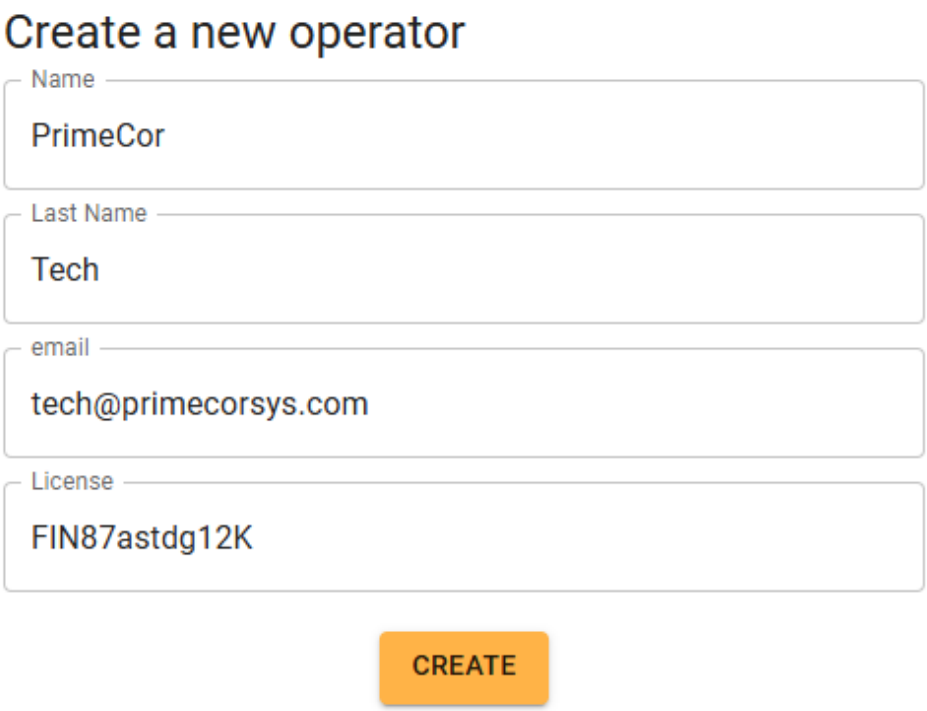


Figure 8: Create a new operator's page.

2.1.3.2. Settings

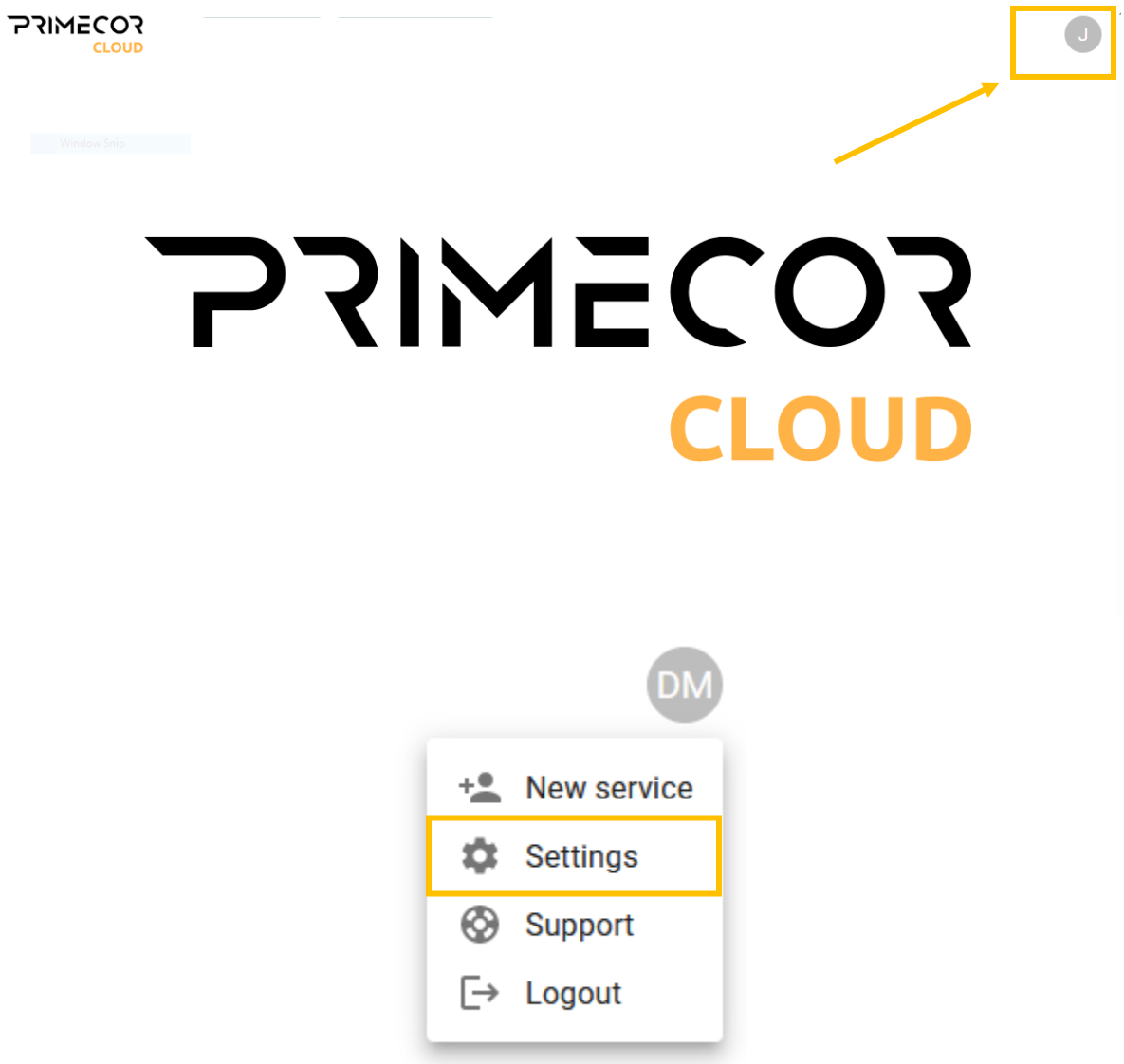


Figure 9: Settings

The Settings page enables users to manage their account credentials, including updating their username and password. It also allows the customization of preferences such as language and time zone.

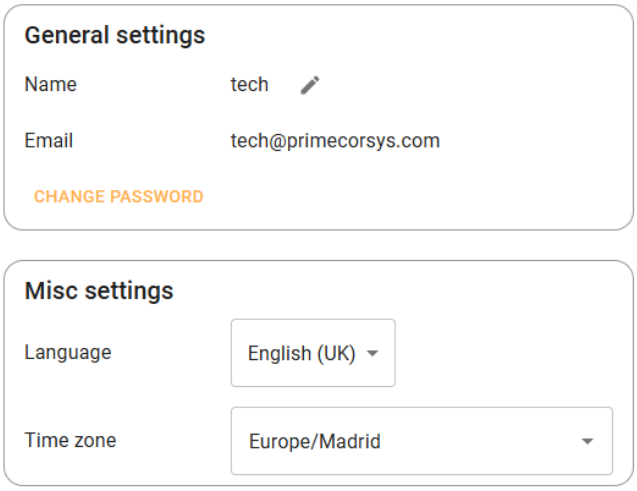


Figure 10: Settings Page.

2.1.3.3. Support

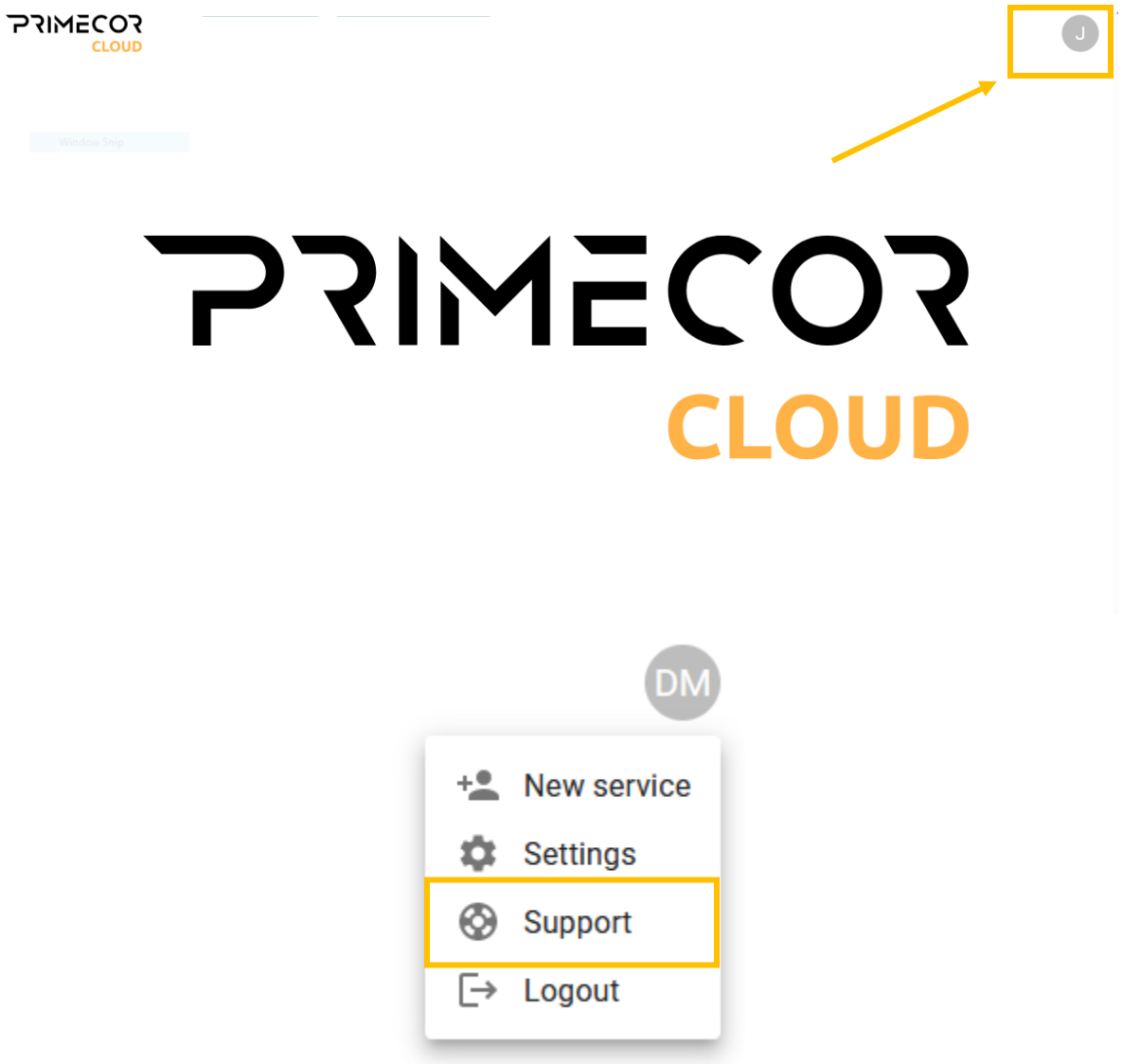


Figure 11: Support

On the Support page, users can reach PrimeCor Support by filling out and submitting the provided contact form.

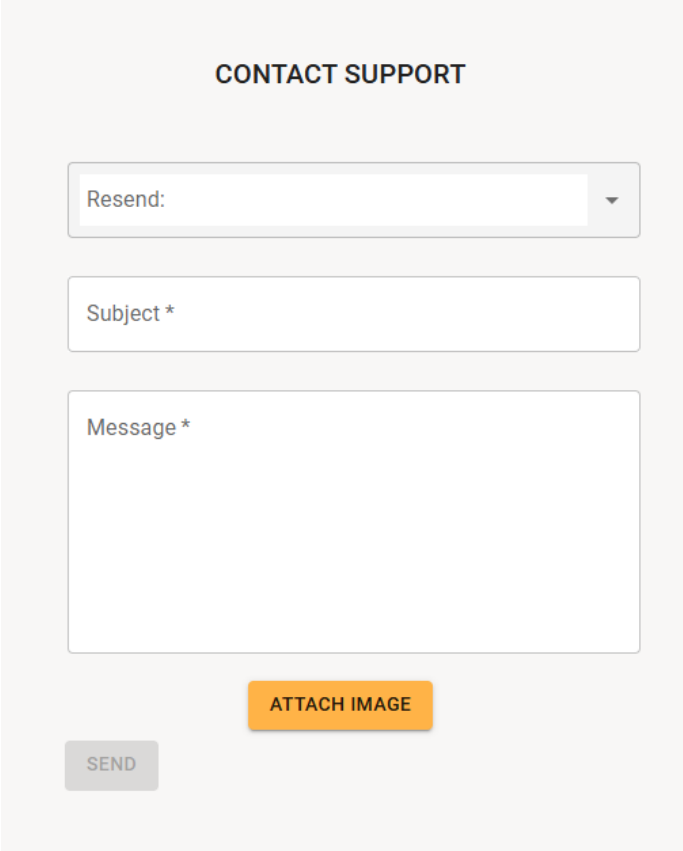


Figure 12: Support Form.

2.1.3.4. Logout

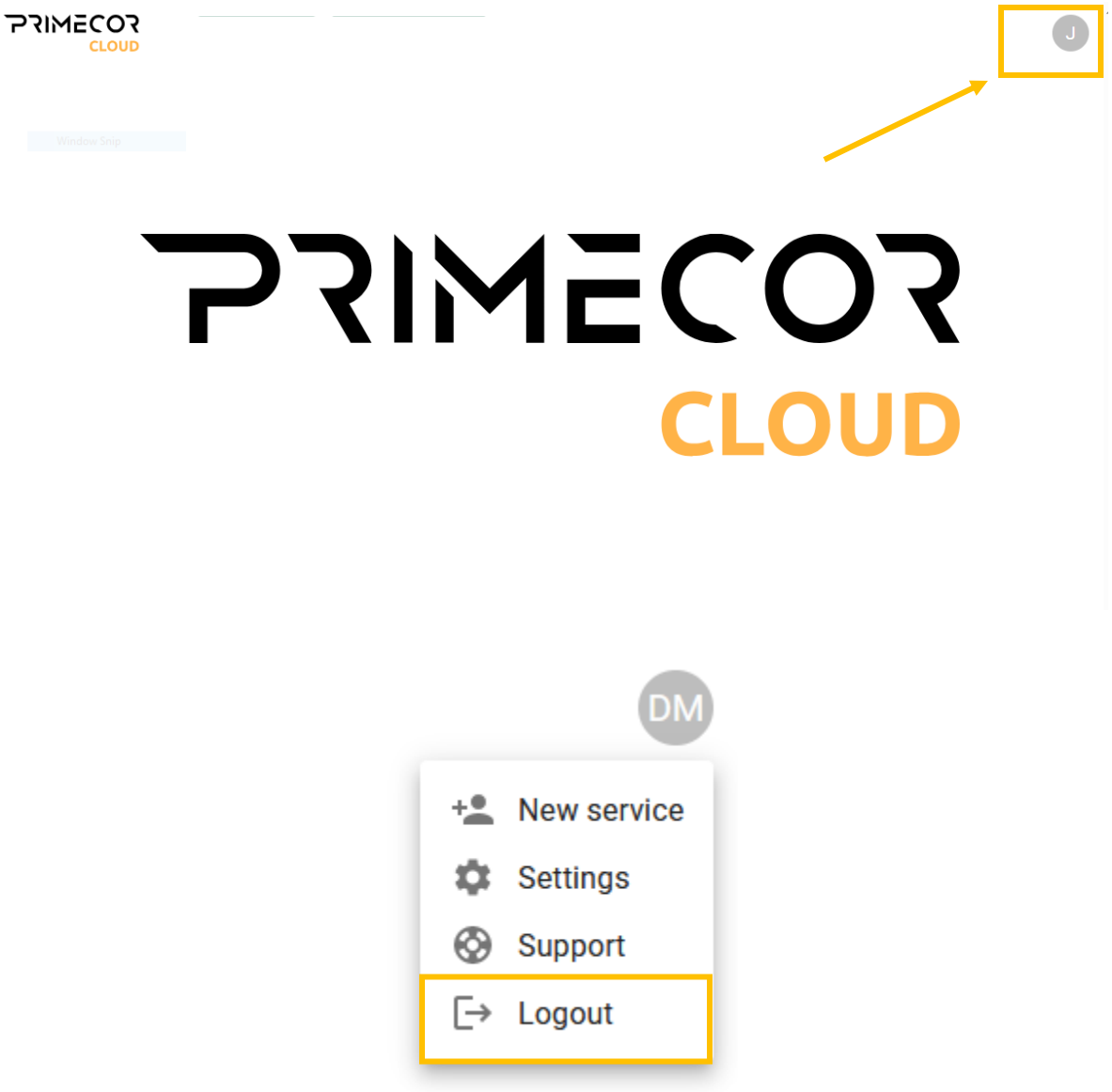


Figure 13: Logout

The Logout feature allows users to securely sign out of their accounts, ensuring account safety and data privacy.

2.1.4. Adding a Pilot

1. Navigate to the “Operator Zero” management page.

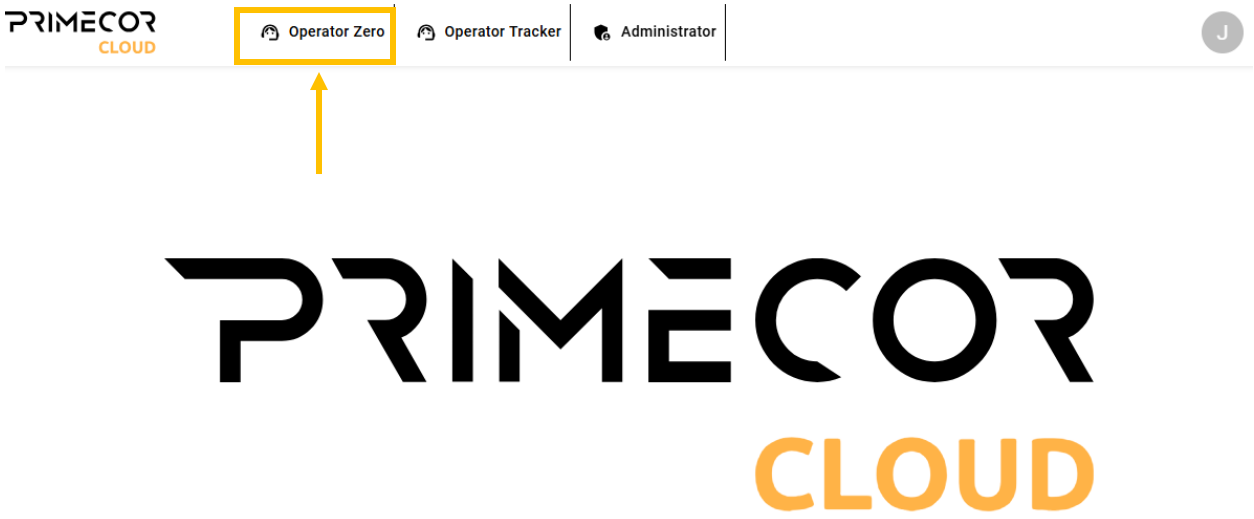


Figure 14: Operator Tab

2. Click on the "+" button within the **"Pilot List"** table.

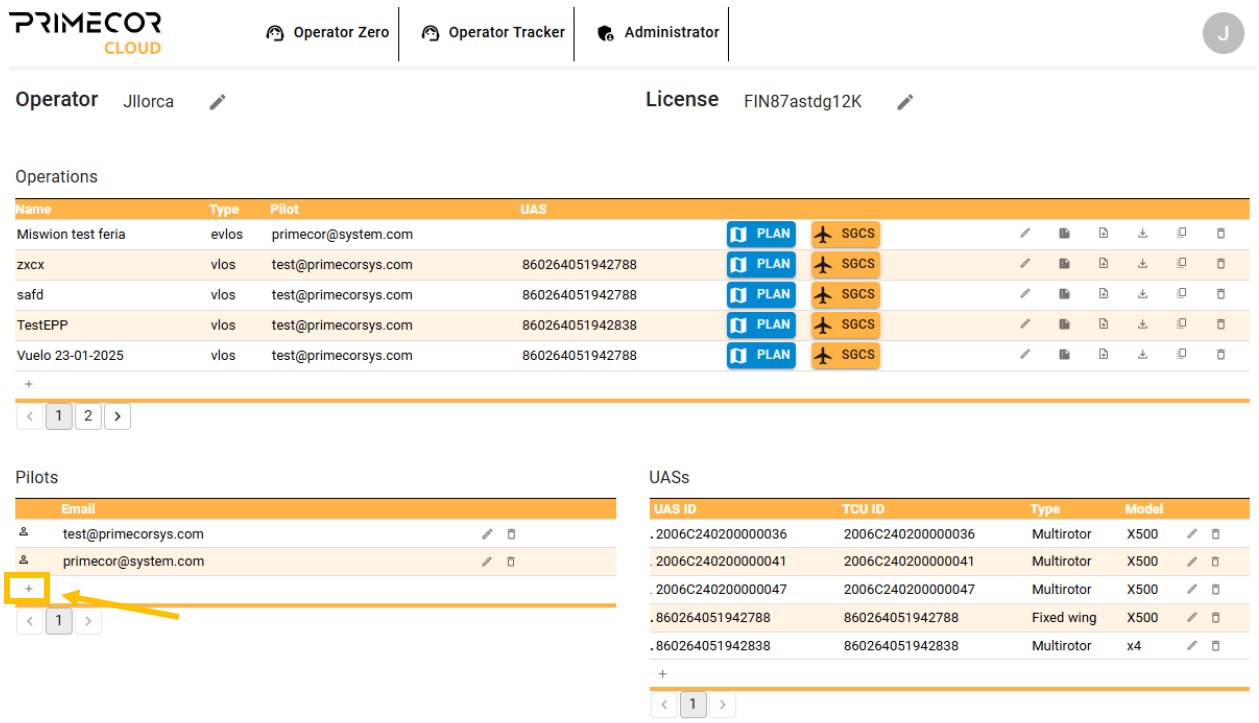


Figure 15 Add pilot.

3. Enter the pilot's details in the pop-up window and click on **"Add"**.

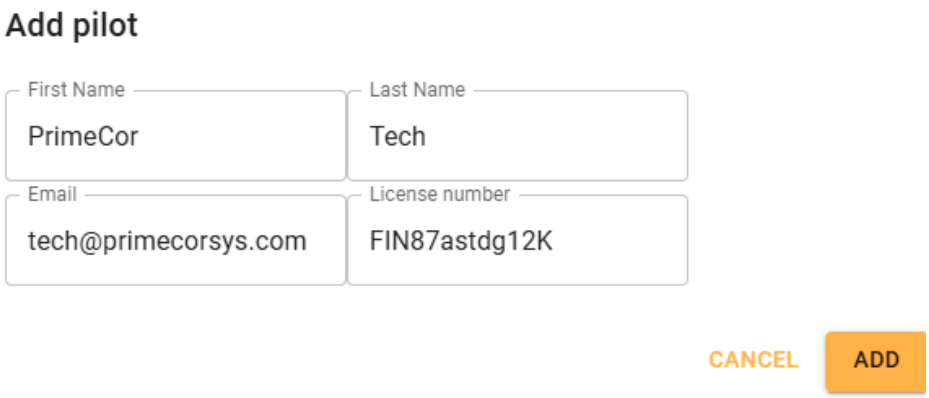


Figure 16: Pilot Add Tab

2.1.5. Adding a UAS

1. Navigate to the **“Operator”** management page if you are not there yet.

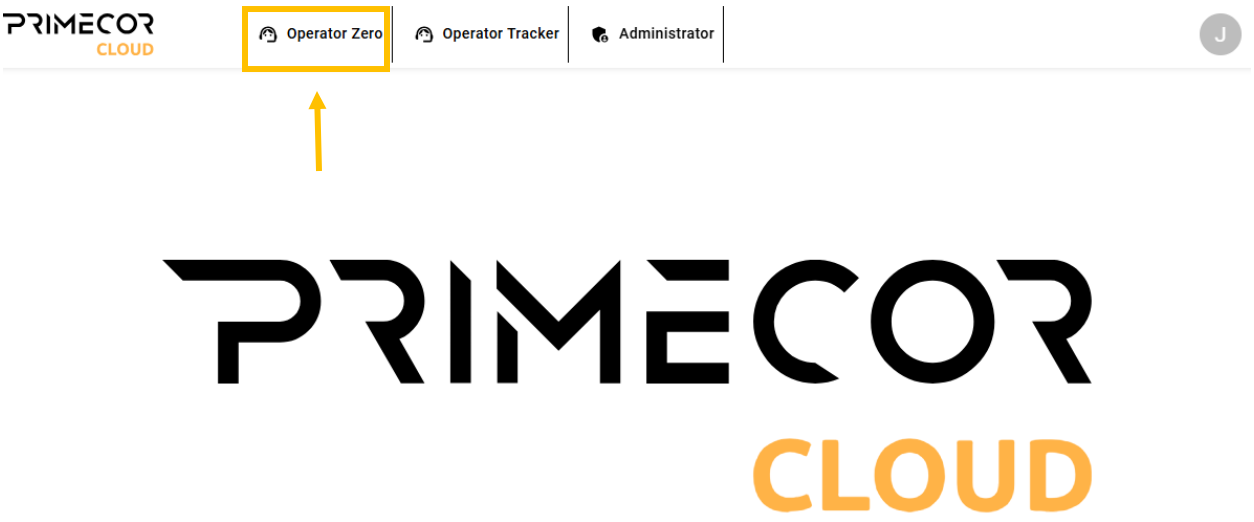


Figure 17: Operator Tab

2. Click on the "+" button within the **"UAS List"** table.

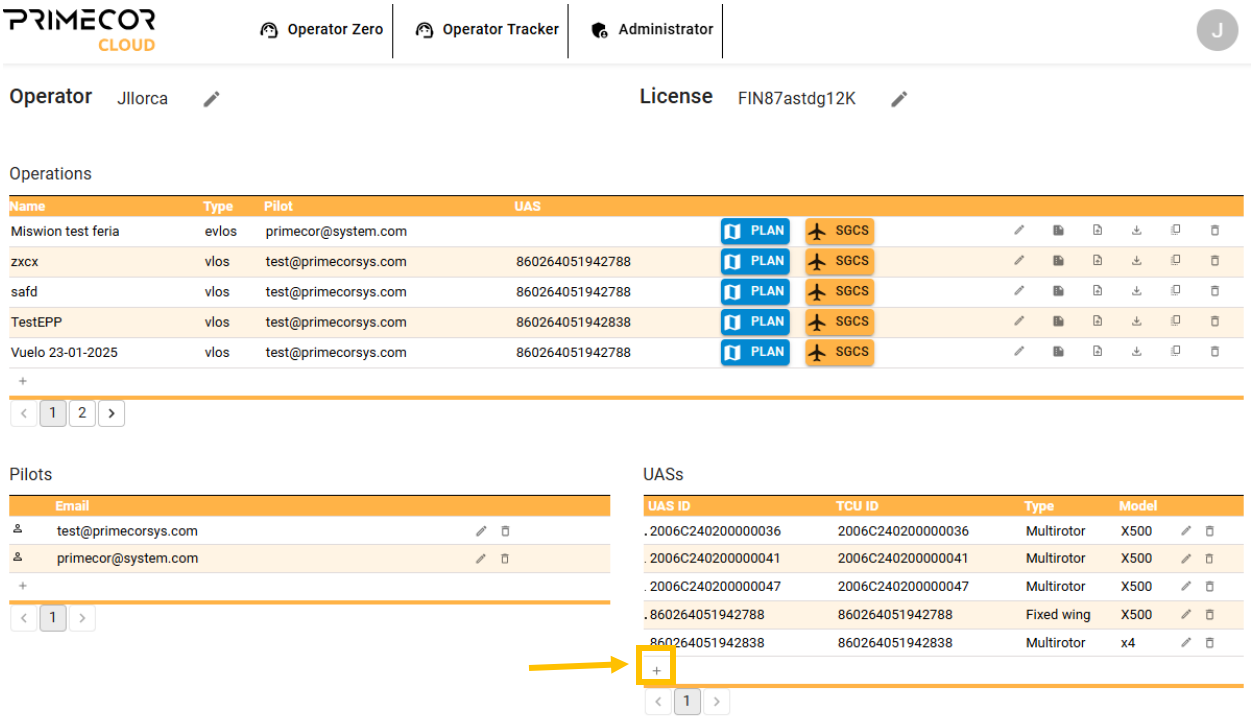


Figure 18: Add UAS window.

3. Enter the UAS details, ensuring the **"TCU ID"** matches the TCU number provided and click on **"Add"**.

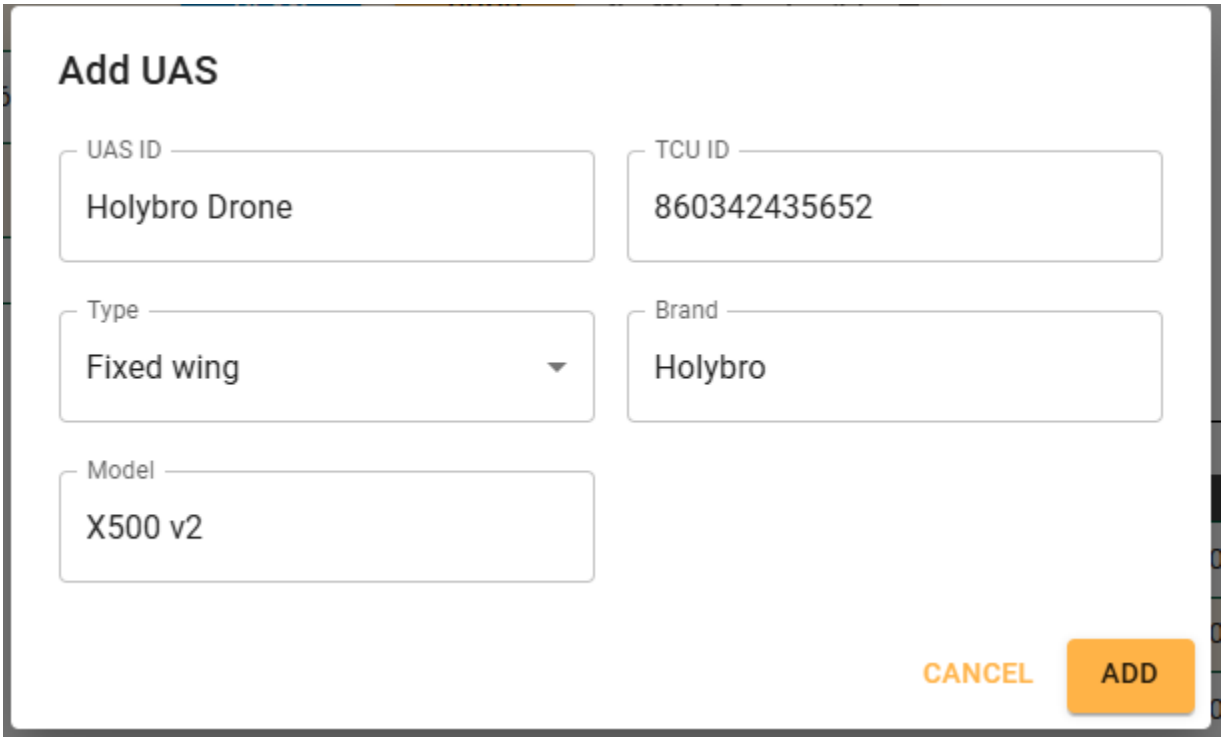


Figure 19: UAS list.

To edit the details of an existing UAS, click on the pencil icon located to the right of the UAS entry in the register.

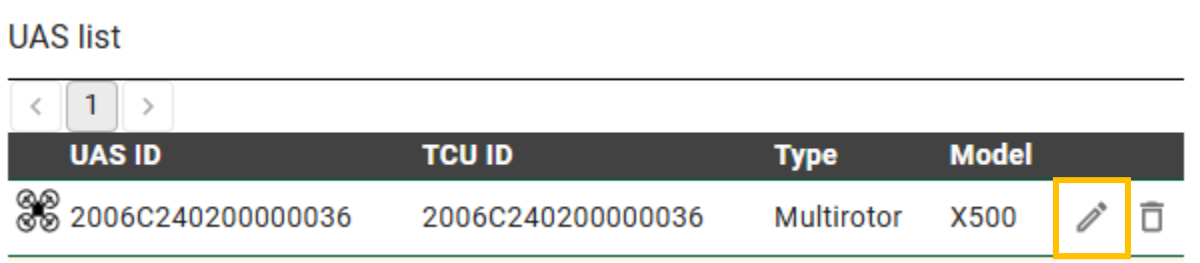


Figure 20: Edit UAS

2.1.6. Add a New Operation

The creation of a new operation is required to plan a new mission. This involves defining general information about the mission, such as the name, date, and associating the previously created UAS and pilot. Additionally, it includes defining various parameters used during the mission, such as actions to be taken when contingencies are met, battery configuration, time parameters, and others.

1. Navigate to the **"Operator"** management Tab if you are not there yet.

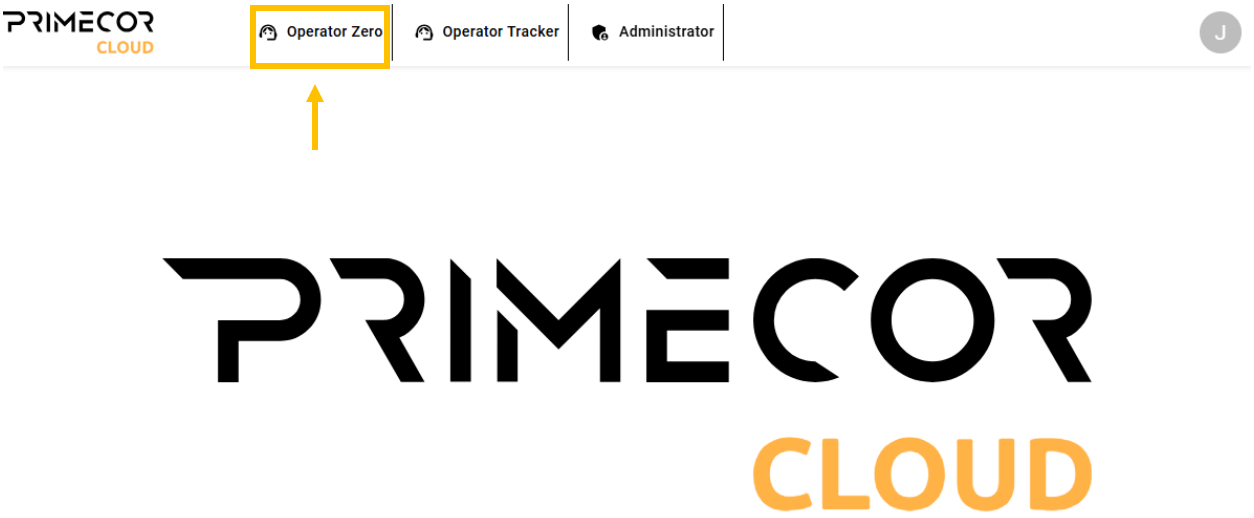


Figure 21: Operator Tab

2. Ensure that both the pilot and the UAS are registered.

3. Click on the "+" button within the **"Operations"** table.

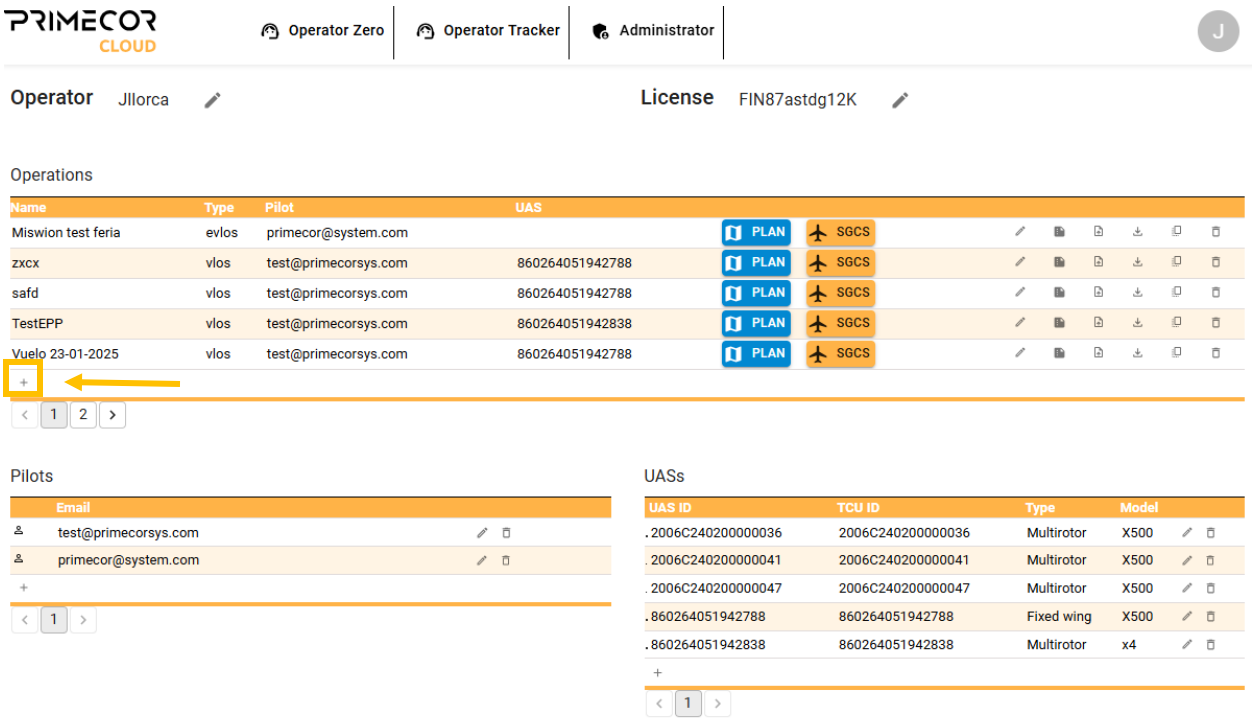


Figure 22: Add operation

4. Fill out the flight details.

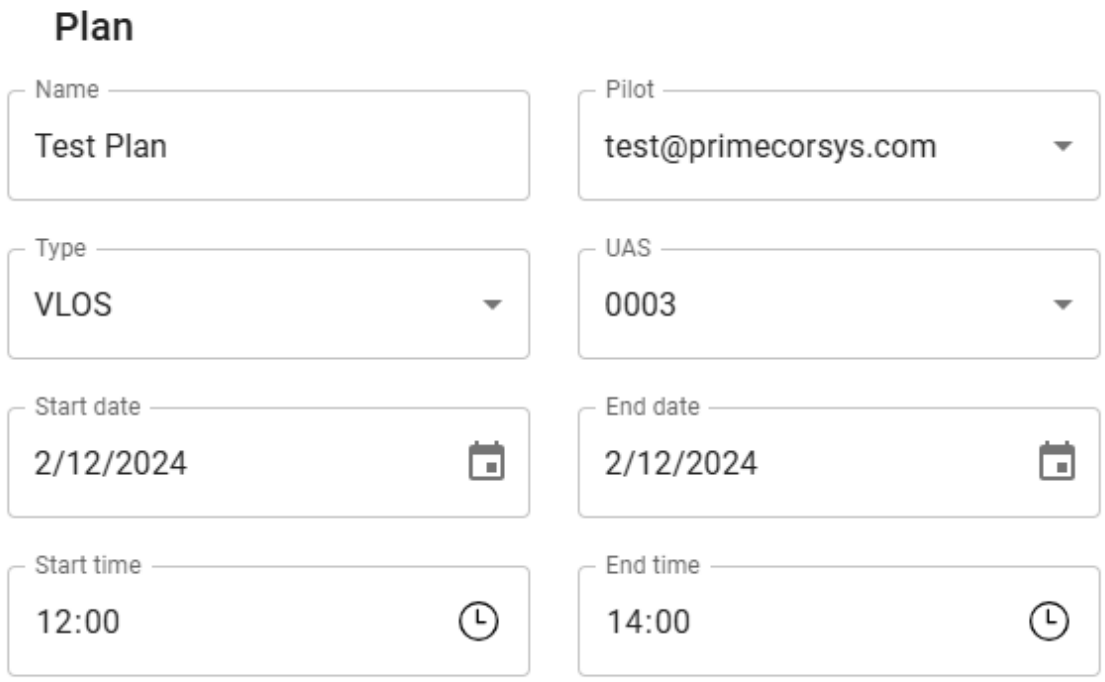


Figure 23: New flight plan

5. **Autopilot Beat monitoring [0 Disabled – 1 Enable]:** When this option is enabled, an alert will appear on the screen if communications with the autopilot are lost.

Important: In case PrimeCor Zero is not connected to the autopilot, 0 must be selected.

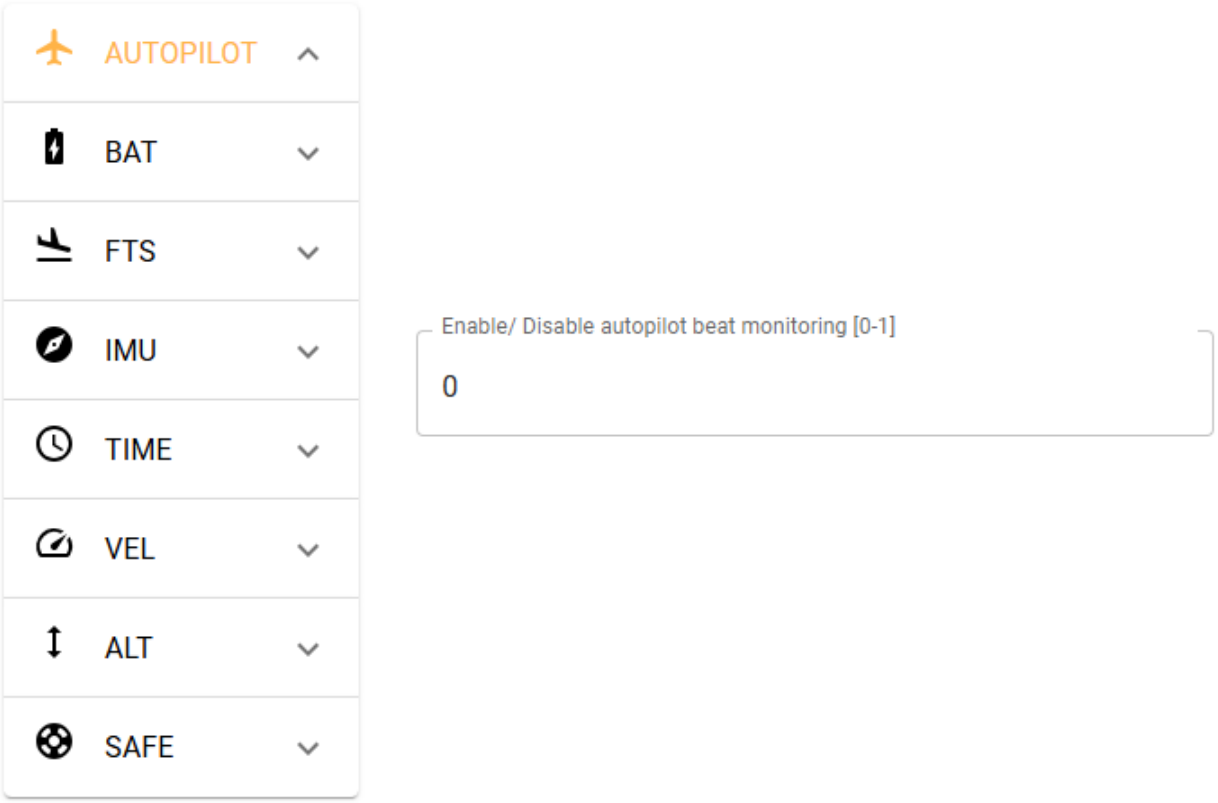


Figure 24: Autopilot Tab

6. **Battery Data:**
    - **Number of cells of the main battery.**
    - **Number of cells of the 2nd battery**: In case of not having a 2nd battery insert 0.
    - **V measurement for low battery (main battery) [0 –100 %]:** When the selected threshold is exceeded, an alert will appear on the screen, and the selected contingency will be activated.
    - **V measurement for low battery (2nd battery) [0 –100 %]:** When the selected threshold is exceeded, an alert will appear on the screen, and the selected contingency will be activated.
    - **V measurement for critic battery (main battery) [0 –100 %]:** When the selected threshold is exceeded, an alert will appear on the screen, and the selected contingency will be activated.
    - **V measurement for critic battery (2nd battery) [0 –100 %]:** When the selected threshold is exceeded, an alert will appear on the screen, and the selected contingency will be activated.

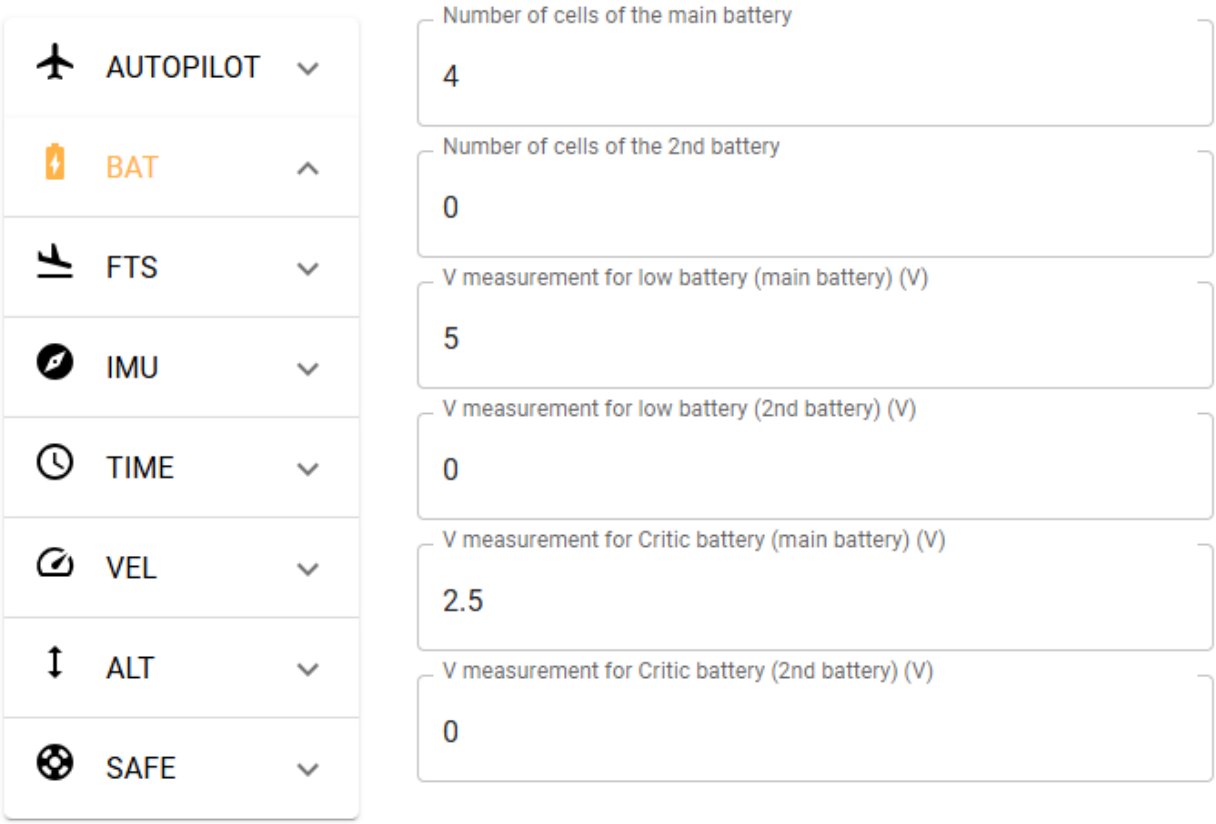


Figure 25: Battery Tab

7. **FTS Data:**
    - **Logical Output for the FTS activation [0-1]:** If 0 is selected, FTS activation output will be 0 V and when FTS activated it raise to 3,3 V. If 1 is selected, FTS activation output will be 3.3 V and when FTS activated it goes to 0 V.
    - **Time to activate parachute after FTS trigger [ms].**

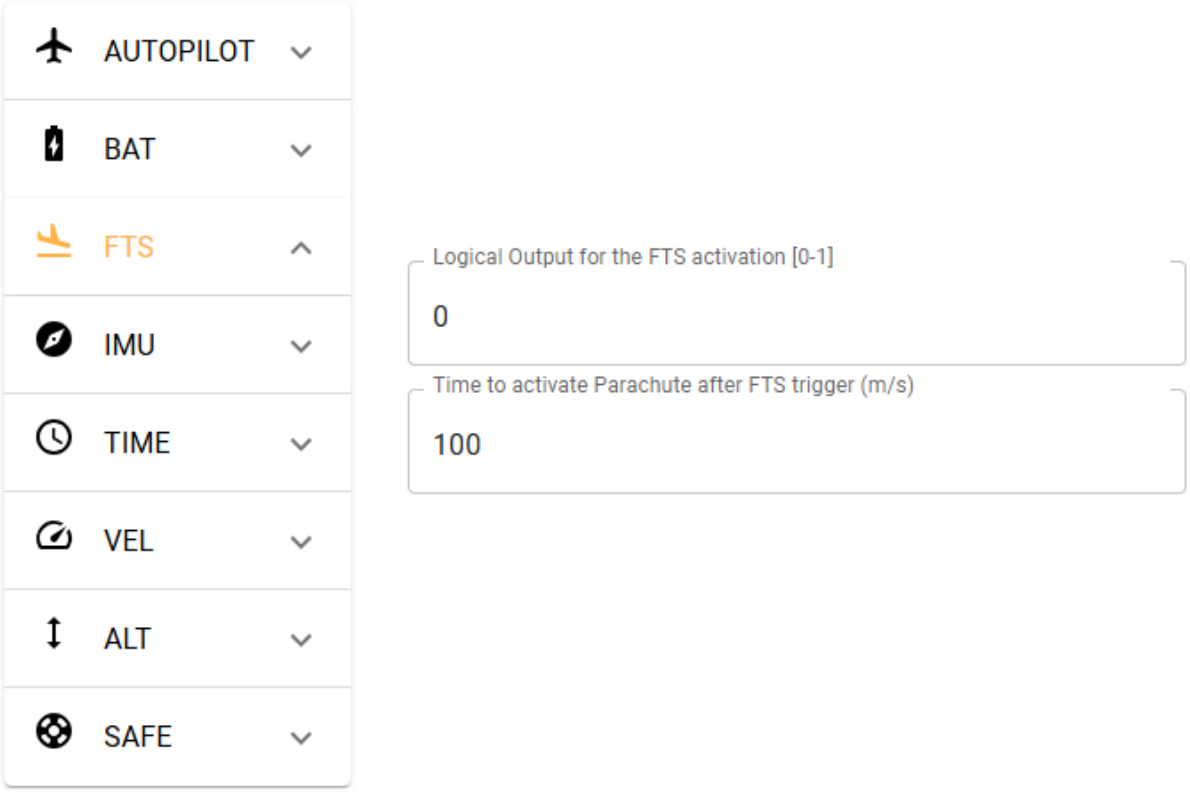


Figure 26: FTS Tab

8. **IMU (Inertial Measurement Unit) Data (Where the ERU is placed relative to the center of gravity of the drone):**
    - **IMU position from the CG in X axis [mm].**
    - **IMU position from the CG in Y axis [mm].**
    - **IMU position from the CG in Z axis [mm].**
    - **IMU rotation in X axis [deg].**
    - **IMU rotation in Y axis [deg].**
    - **IMU rotation in Z axis [deg].**

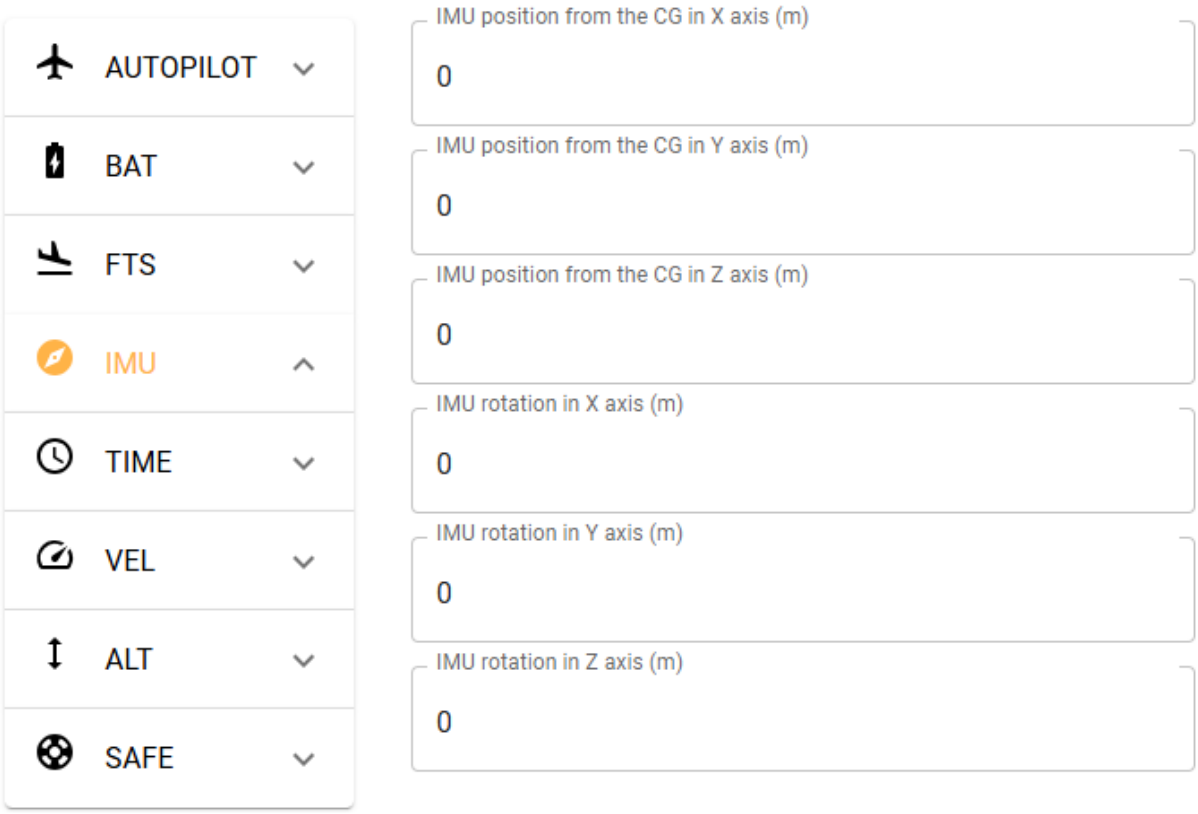


Figure 27: IMU Tab

9. **Time Data:**
    - **Time between first and second contingency in case of GNSS signal loss [ms].**
    - **Time between first and second contingency in case of Link radio signal loss [ms].**
    - **Time before starting contingency volume [ms].**

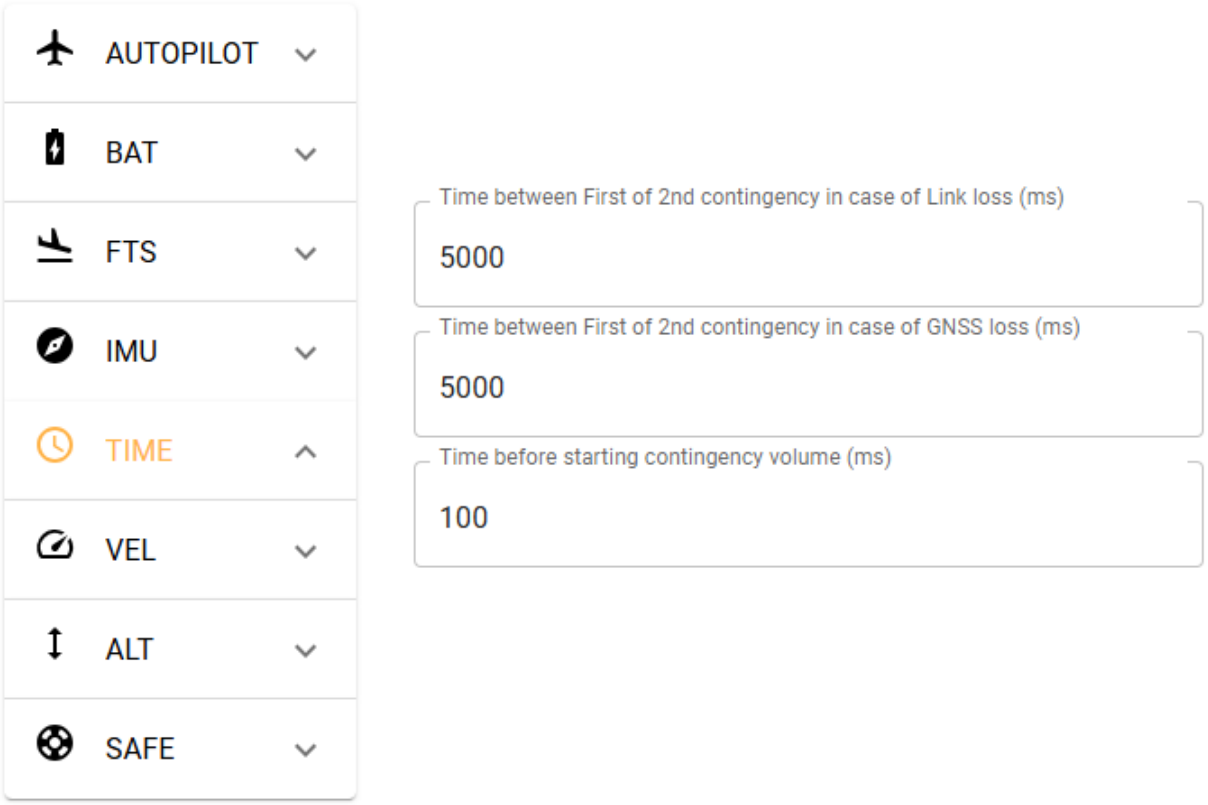


Figure 28: Time Tab

10. **Velocity data:**
    - **Vehicle Cruise velocity [1 – 20 m/s].**
    - **Maximum Manual Velocity [1 –20 m/s].**

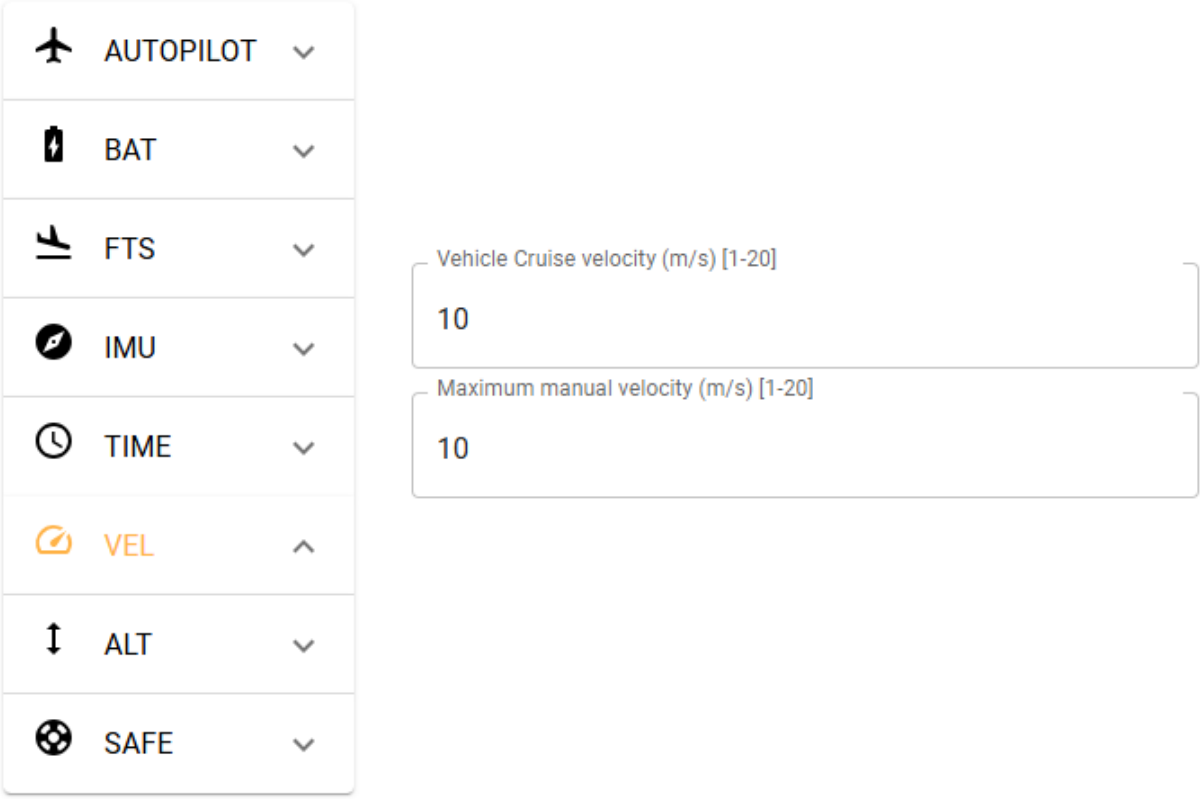


Figure 29: Velocity Tab

11. **Altitude of the path to return to home [5 – 110 m].**

Figure 30: Altitude Tab

12. Contingency Data:

PrimeCor Zero supports different contingency actions:

- **RTH (Return to Home):** Return to the take-off point in a straight line.
- **HOVER:** Hold position.
- **LAND:** Land at the current location.
- **FTS (Flight Termination System):** Shut down motors. This action can activate other mechanisms, such as deploying a parachute.
- **RALLY:** Move to a predefined rally point.
- **GPP (Go to Previous Point):** Return to the previous waypoint.
- **RTHS (Return to Home Safely):** Retrace the flight path to the take-off point.

Important: In case PrimeCor Zero is not connected to the autopilot, the only contingency action enabled is to trigger *FTS*.

If no action is required when a specific failure event takes place, *"NONE"* must be selected from the dropdown menu.

Important: If multiple contingencies trigger simultaneously, the most recent one takes effect, except for **FTS** and geofence exit contingencies, which have priority.

- Contingency/emergency action in case of leaving the operational volume.
- Contingency/emergency action in case of being inside the contingency volume for more than the time defined in the TIME tab.
- Contingency/emergency action in case of trespassing the vertical limits of the operational volume.
- Immediate contingency/emergency action in case of loss of GNSS.
- Contingency/emergency action in case of not recovering GNSS signal for more than the time defined in the TIME tab.
- Contingency/emergency action in case of degraded GNSS signal (high refresh rate or low precision).
- Immediate contingency/emergency action in case of loss of communications.
- Contingency/emergency action in case of not recovering communications in the period indicated in the TIME tab.
- Contingency/emergency action in case of communication data link degradation (reduced message frequency or loss of messages).

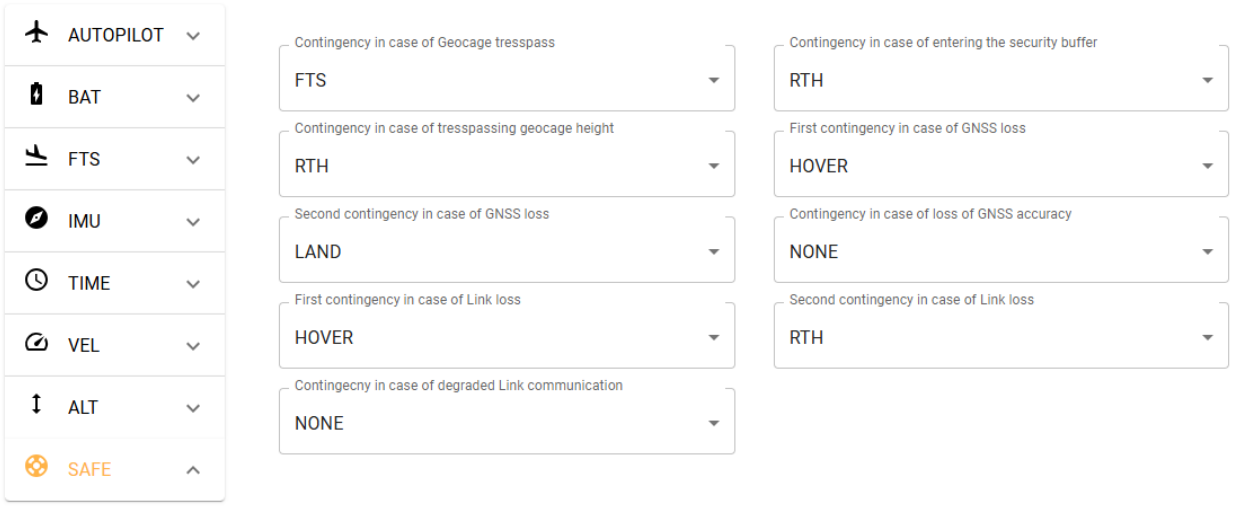


Figure 31: Contingency Tab

13. Click on “Save” Button

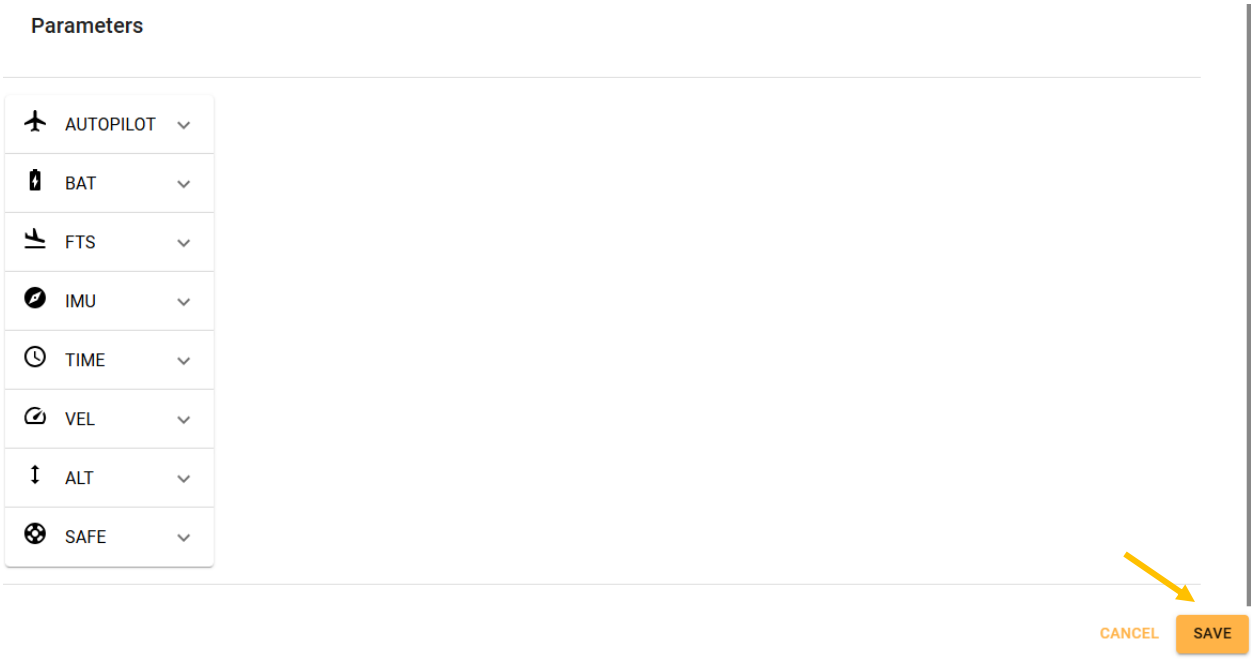


Figure 32: Save button

2.2. Flight Plan

When clicking on the **PLAN** button, the following screen will open:

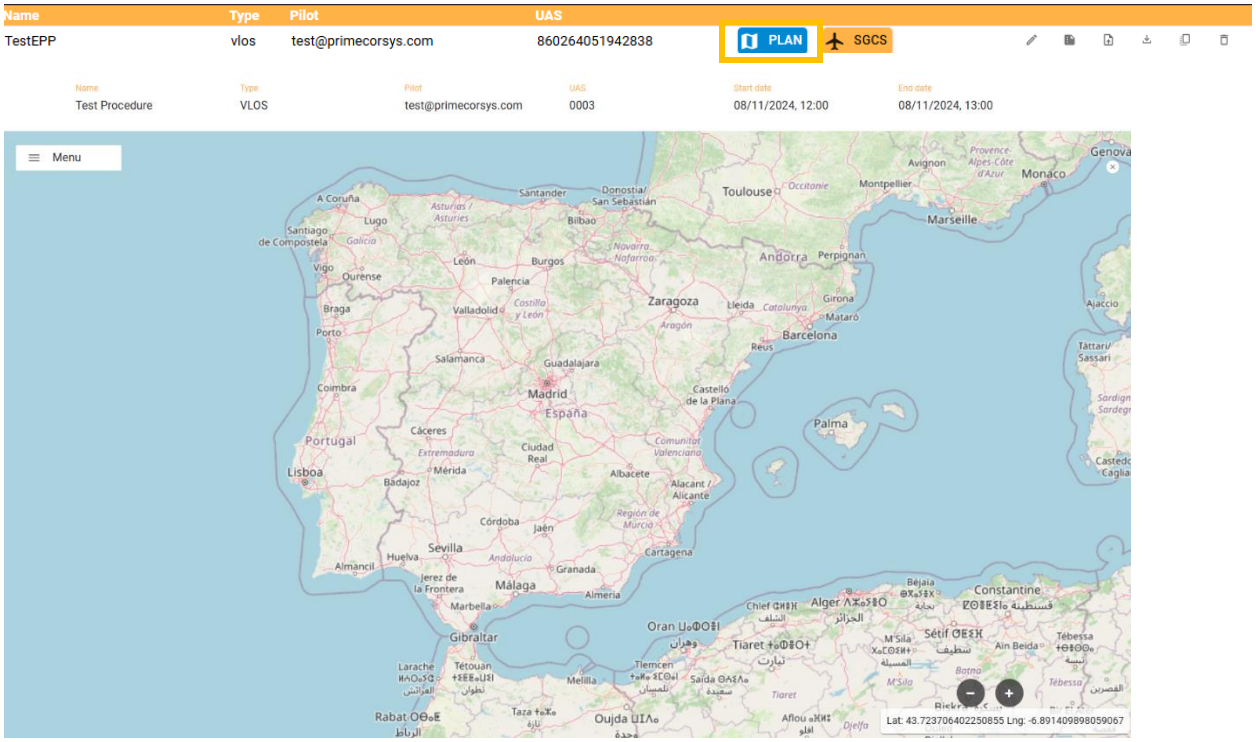


Figure 33: Configuration flight plan

2.2.1. Menu

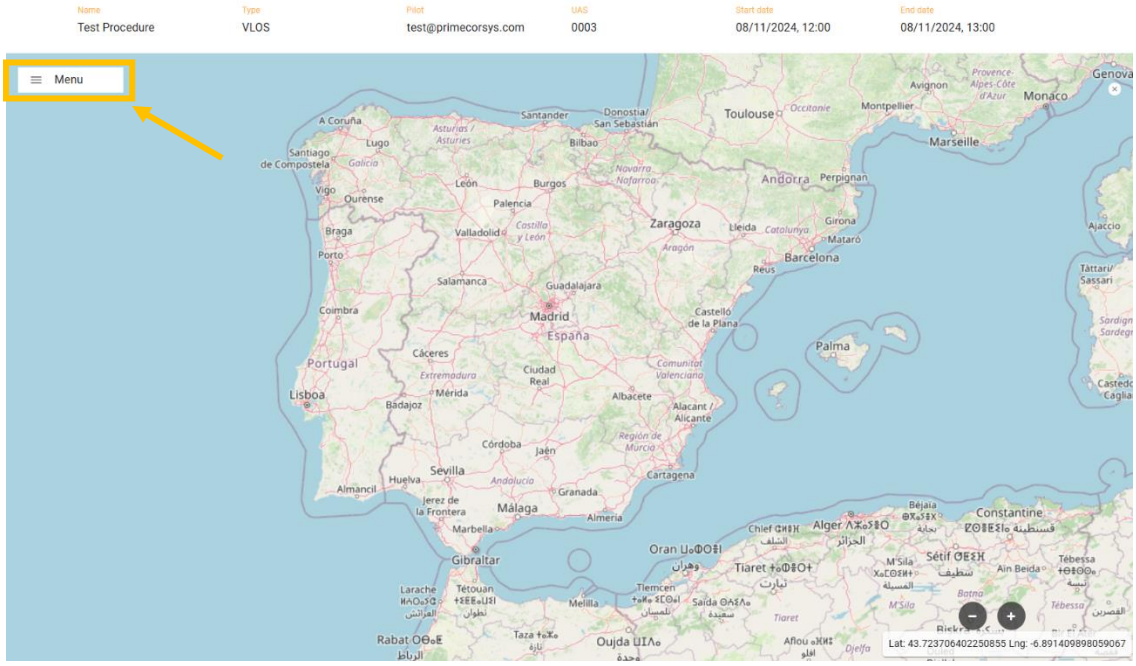


Figure 34 Menu

- **Legend:** Opens a pop-up displaying information about mission points.

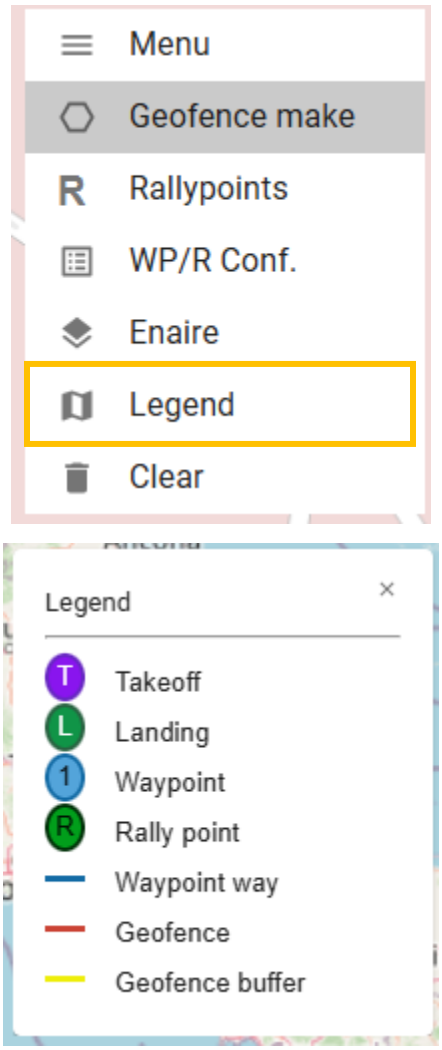


Figure 35 Legend

- **Clear:** Removes all mission points created, including geofences and rally points.

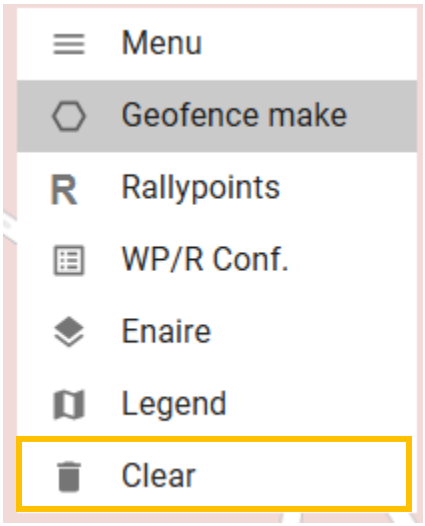


Figure 36: Clear

2.2.2. Mission Trajectory

To create a mission trajectory:

1. **Right-click** on the screen and select Waypoints.

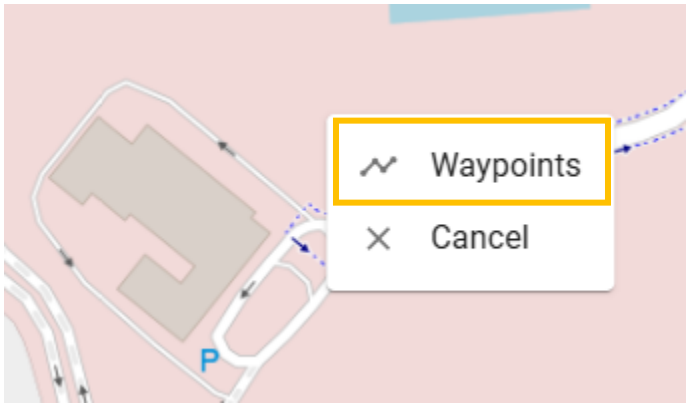


Figure 37 Right Click

2. Select the points on the map and click on **Save**.

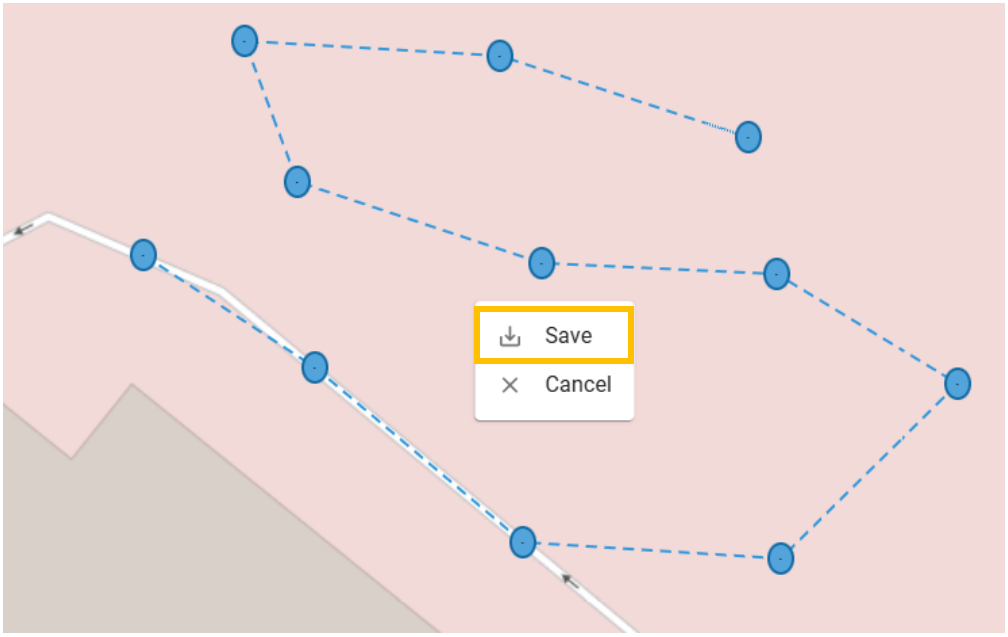


Figure 38 Select Points

2.2.3. Adding a Geofence

To add a Geofence to the current mission, simply follow these steps:

1. Right-click on the screen and select Create geofence.

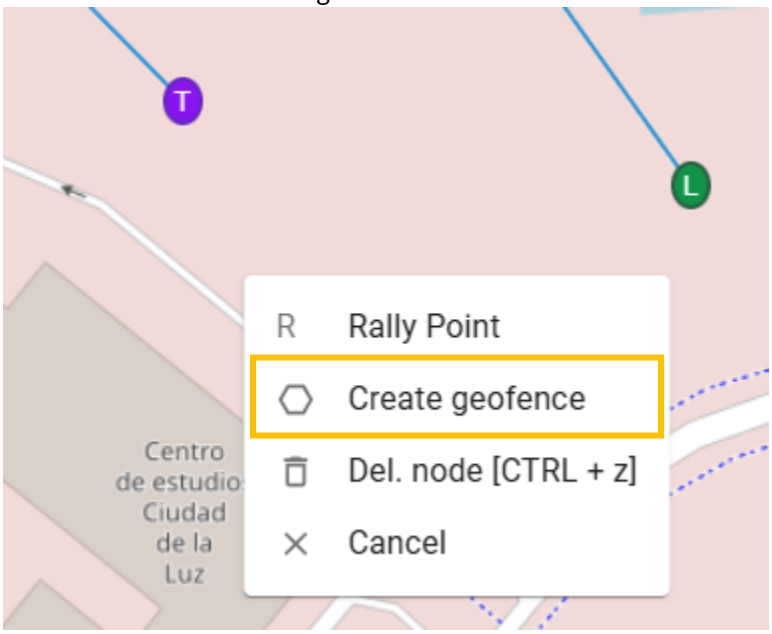


Figure 39 Right Click

2. Select **"Create geofence"** and mark the points to form a polygon. Connect the last point with the first, and then click on **Save**.

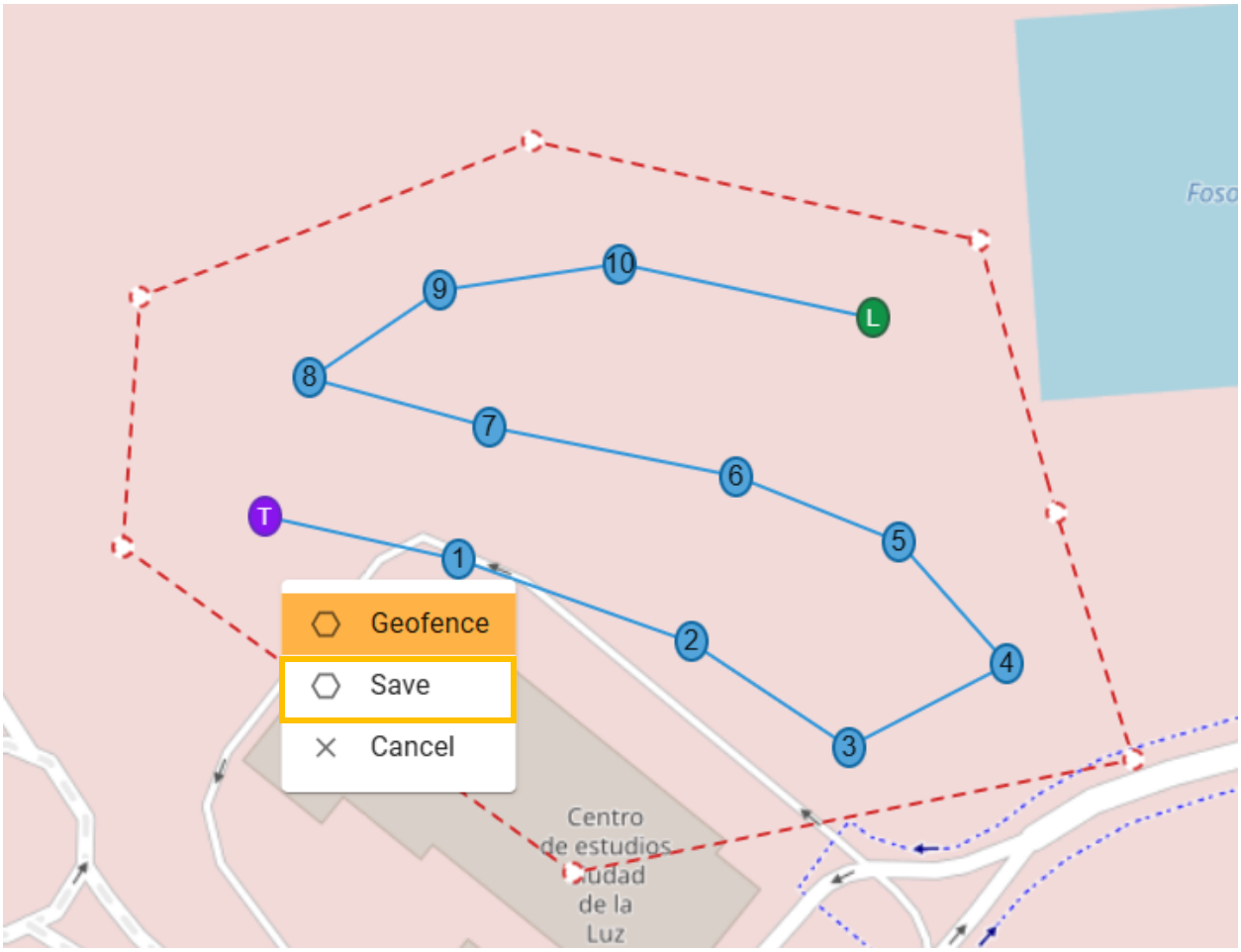


Figure 40 Select Points

2.2.4. Adding a Safety Buffer

To add a buffer (contingency volume), simply follow these steps:

1. Click on the geofence's red line and enter the desired buffer distance (in meters) in the **"Buffer"** section of the pop-up. Once completed, click on **Save**.

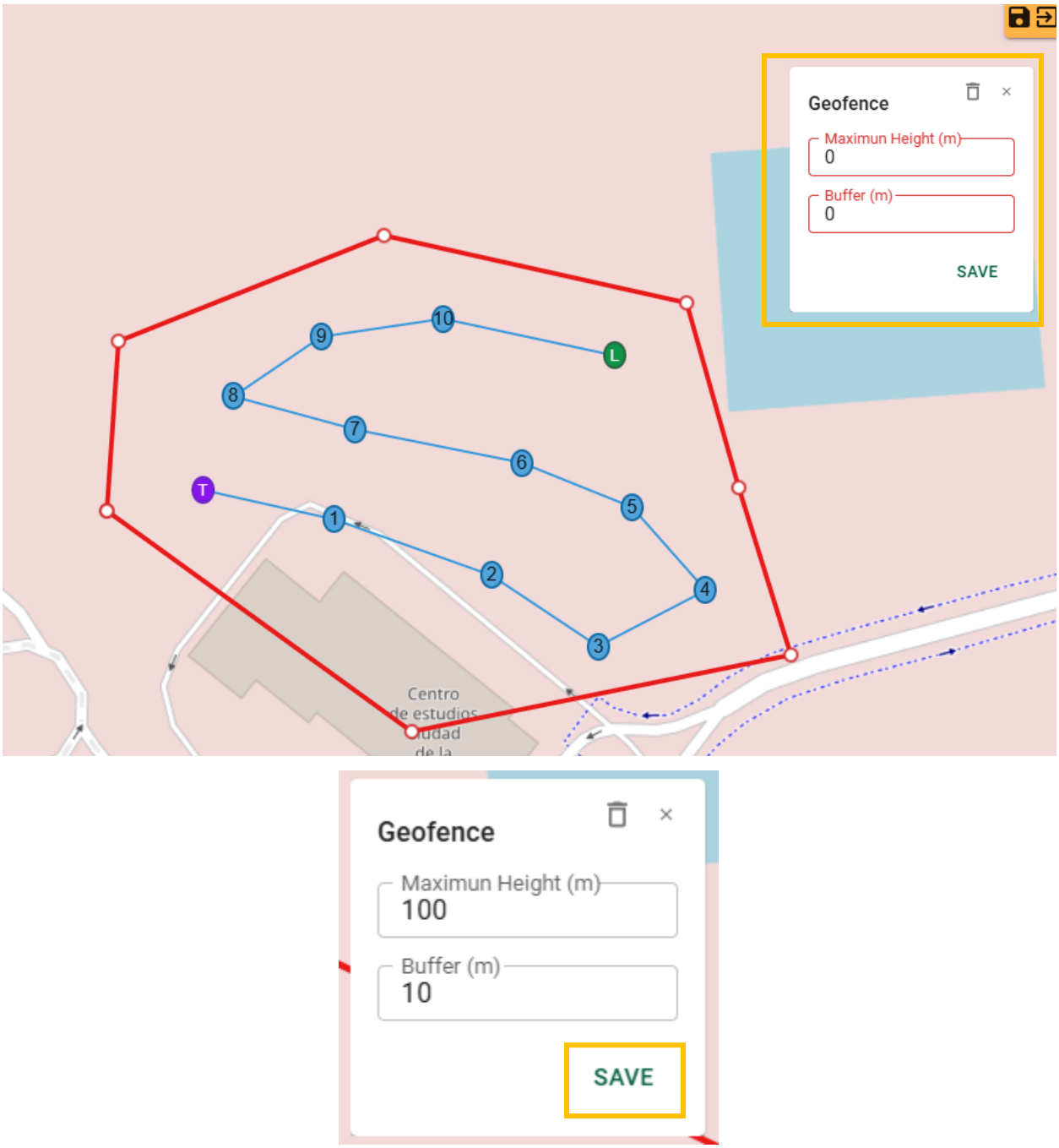


Figure 41 Popup

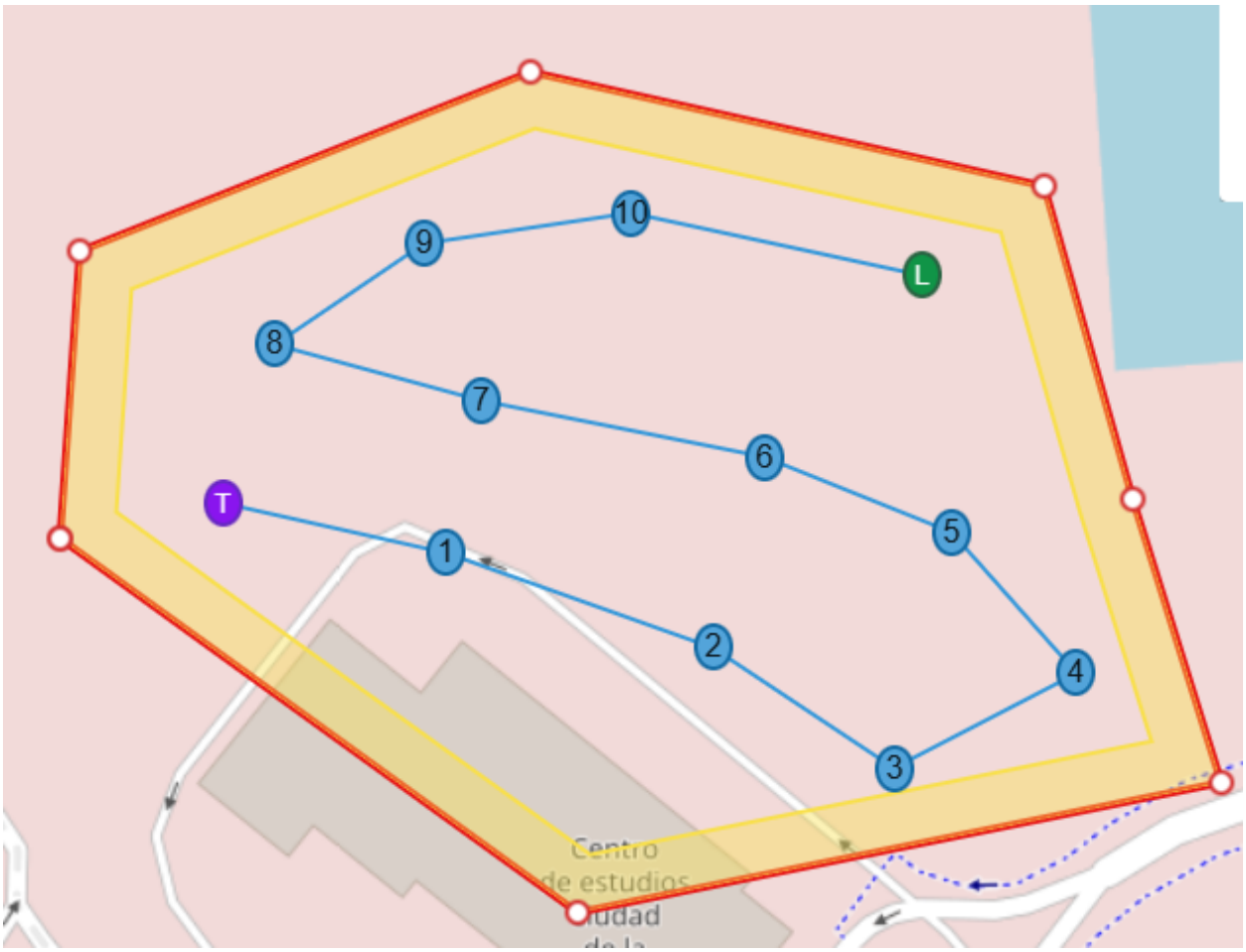


Figure 42 Buffer

2.2.5. Adding Rally Points

To add a rally point, follow these steps:

1. Right-click on the screen and select **“Rally Point”**.

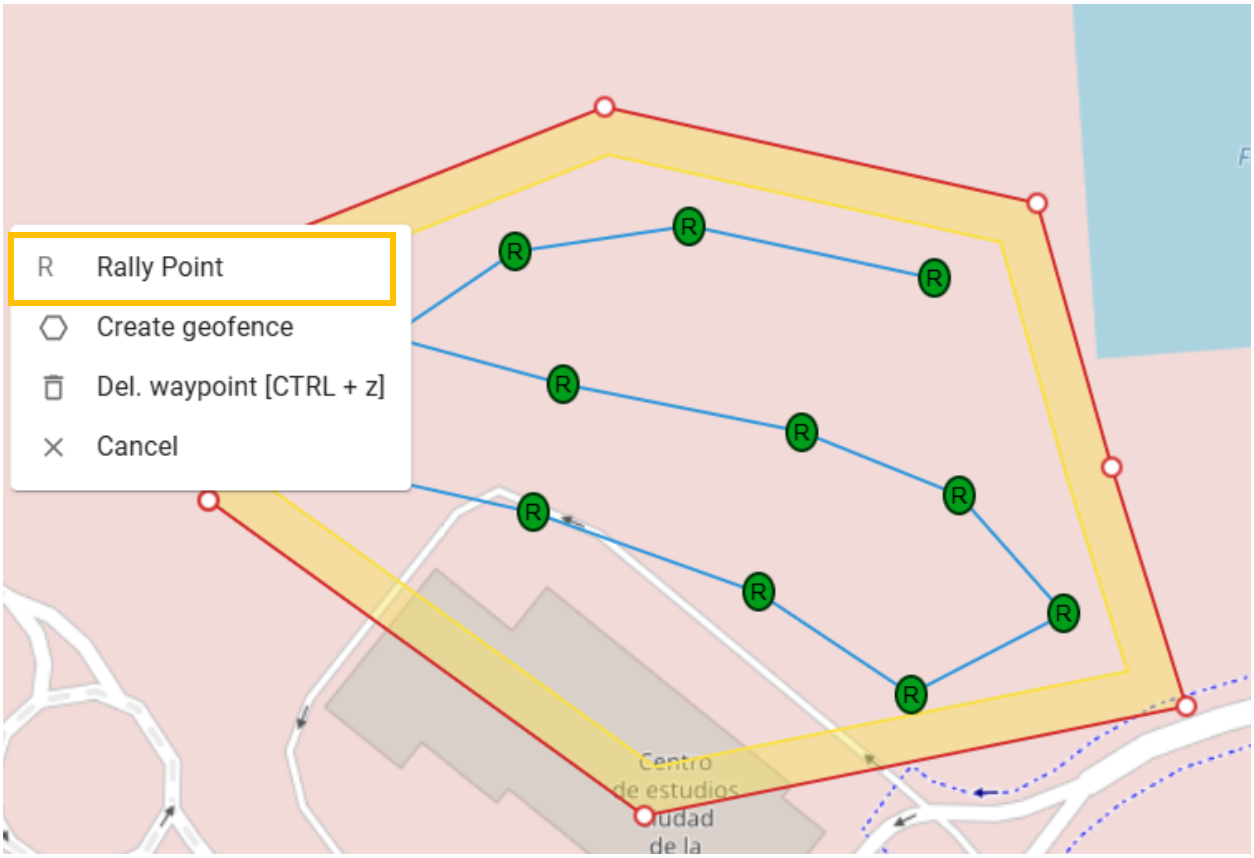


Figure 43 Right Click

2. By default, every rally point is assigned to Home, except for the last one, which is assigned to Landing. To change the position, select the rally you want to modify, click on the new position, and then click on **Save**.

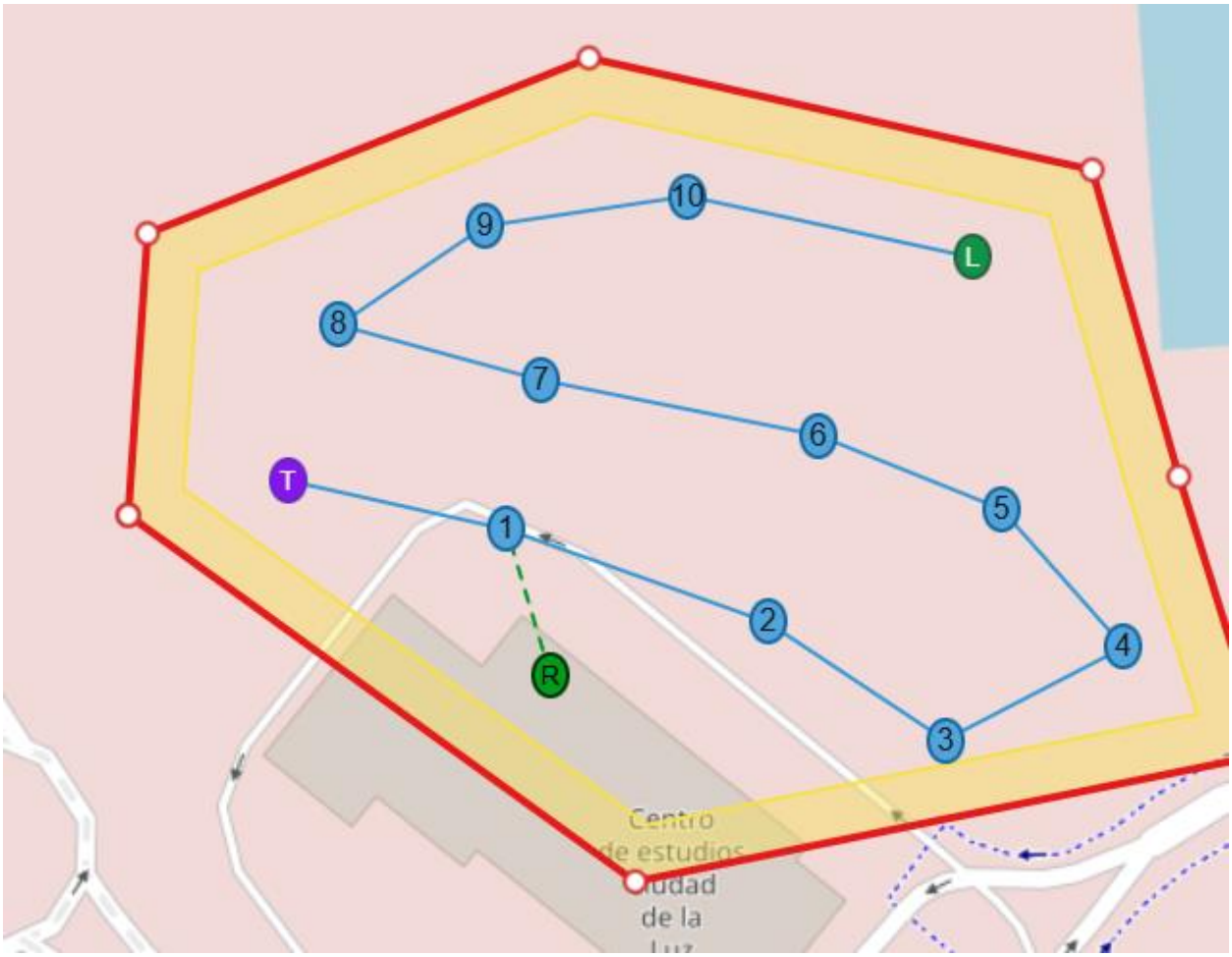


Figure 44 New Rally Point

2.2.6. Modifying Point Values

To modify the altitude of any point:

1- Click on a point and, in the pop-up on the right, modify the corresponding altitude parameter. Then click on **Save**

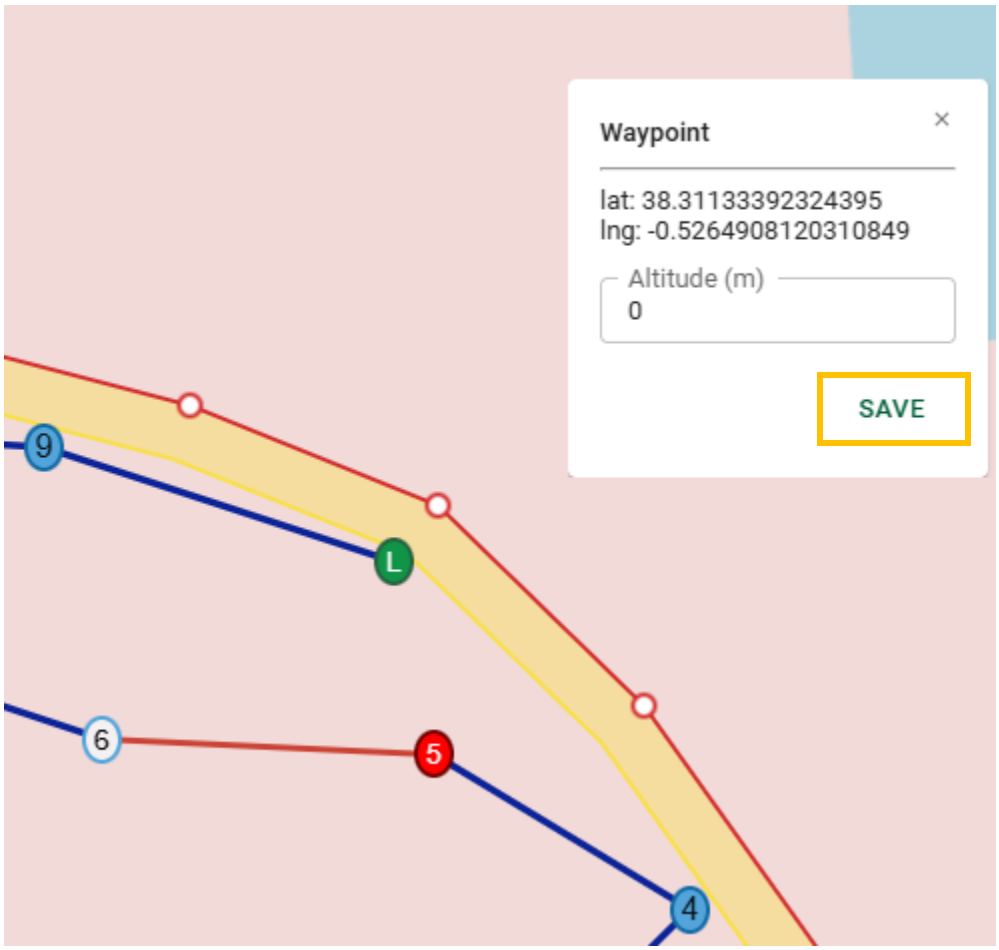


Figure 45 Popup

Multiple points can also be edited in bulk. To do this, click on the menu.

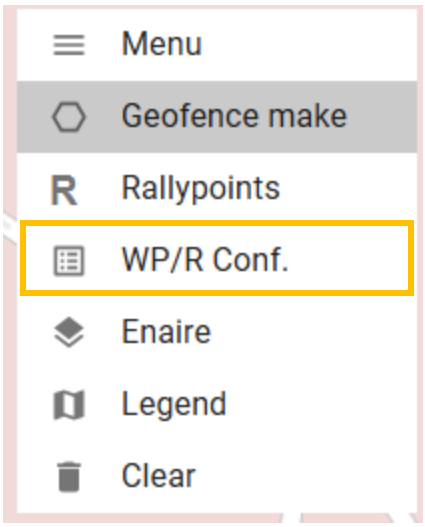


Figure 46: Points Config

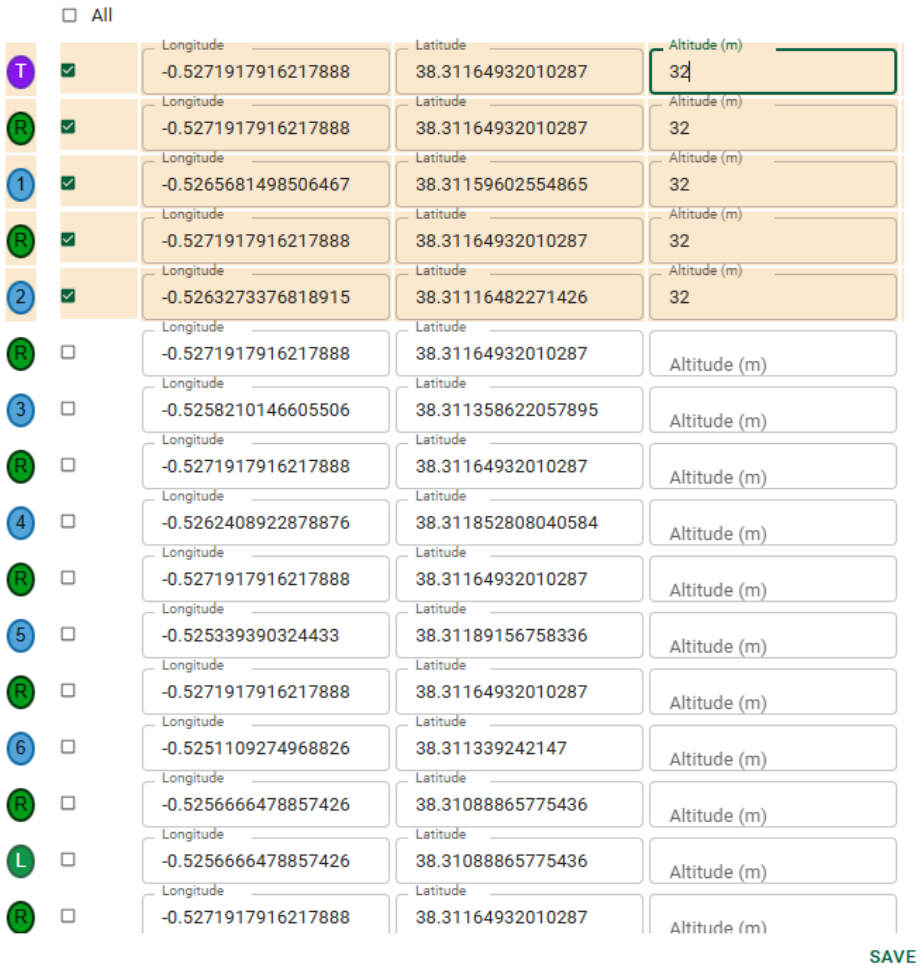


Figure 47: Points Config PopUp

1- Select all the points you want to modify by clicking on the checkbox on the left.
2- Modify the field “Altitude”.
3- Click on “Save”.

2.2.7. Exit Plan Definition

Once all the parameters and properties are defined, close the screen by clicking on the icon in the top right corner.

Figure 48: Exit Flight Plan

2.2.8. Edit Operation

Once the flight plan is created, it will appear in the flight list with the "***SGCS***" button enabled, along with several options, which are as follows:

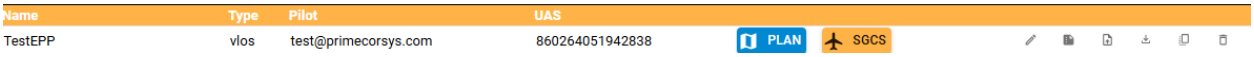


Figure 49: Operation Utilities

	Edit Flight plan
	Download Flight data log (JSON format, follows the MAVLINK message format)
	Upload Flight plan (JSON format)
	Download Flight plan
	Duplicate Flight plan
	Remove Flight plan

2.2.8.1. How to upload a Flight plan.

Uploading a flight plan is as simple as importing a JSON document. This document can be generated using various flight planning programs. Below is an example using QGroundControl.

1- Create a new plan in QGroundControl and click on "Save".

Figure 50: QGroundControl

2- Click on "Save As".

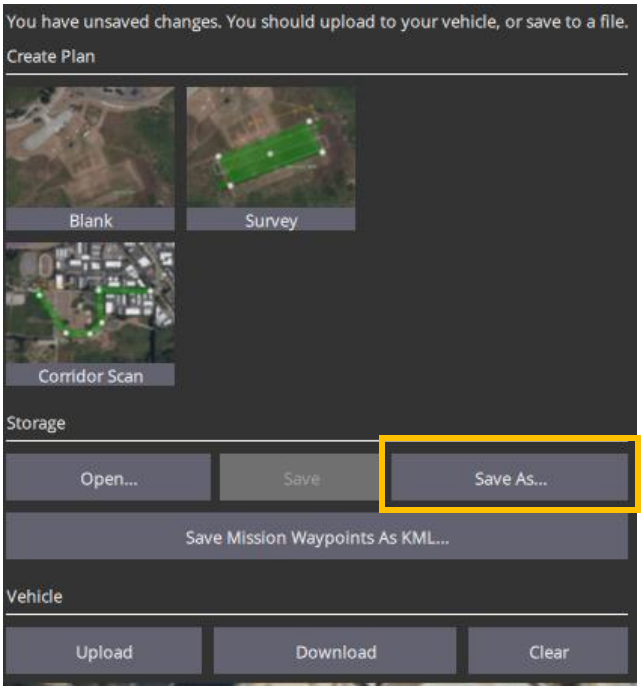


Figure 51: QGroundControl Save

3- In the Cloud section, click on "Upload," select the saved document, and confirm.

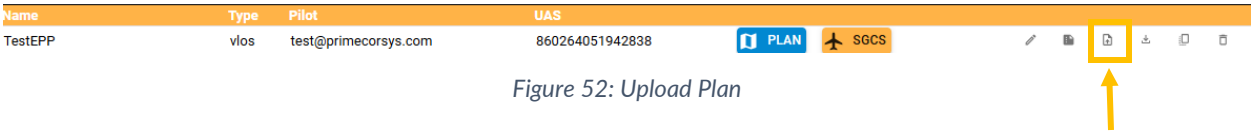


Figure 52: Upload Plan

4- Enter the PLAN section, and you will see the mission previously created in the cloud.

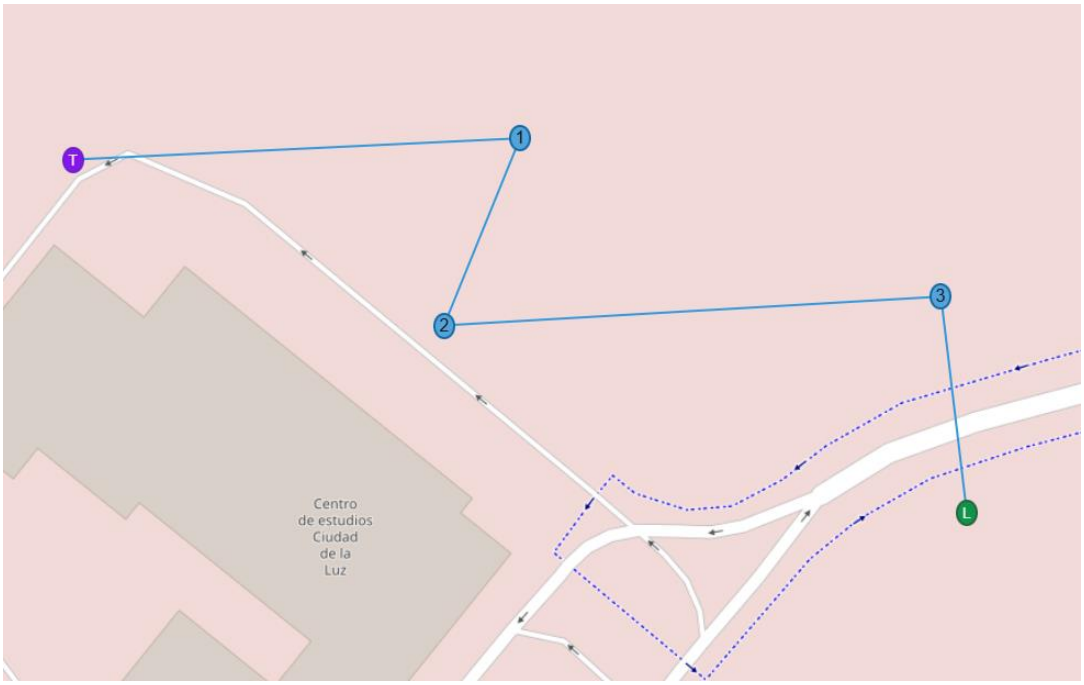


Figure 53: Upload Plan Cloud

2.3. Safety Ground Control Station User Interface

After successfully creating a new plan, you can start monitoring the operation.

2.3.1. Home Screen

To enter the SGCS, click on the corresponding button.

Figure 54: SGCS Button

The SGCS is the interface where the remote pilot can view telemetry sent from the UAV in real time, send commands, and visualize parameters.

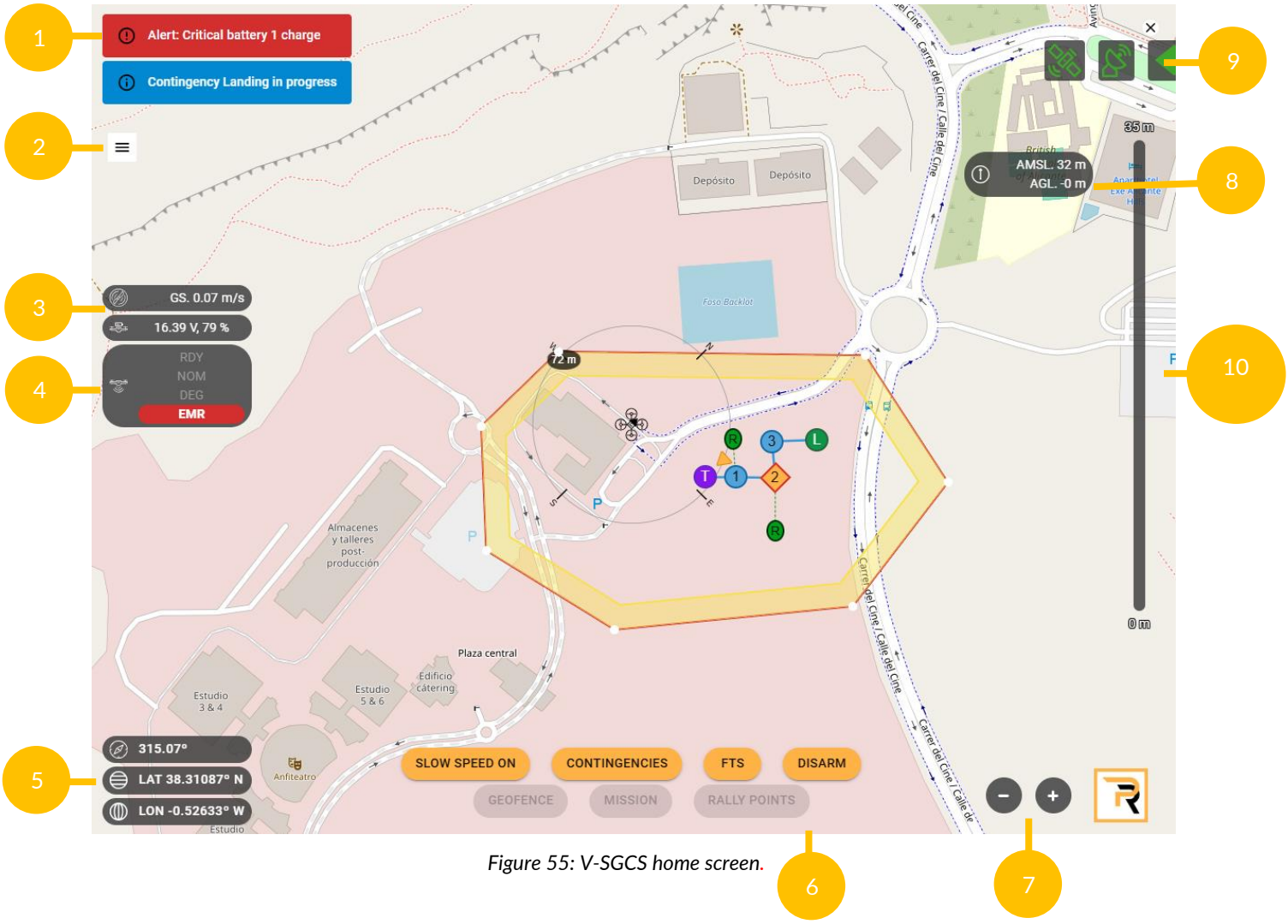
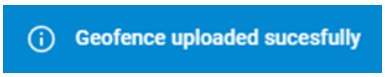
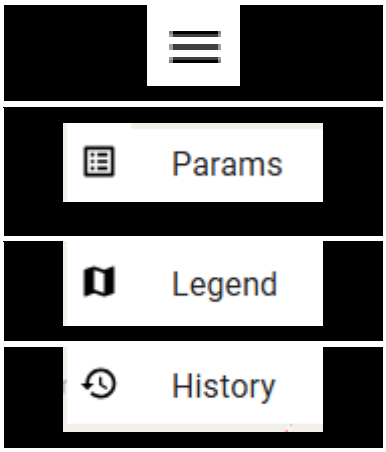


Figure 55: V-SGCS home screen.

1 **Event message:** Messages sent to the Pilot and displayed on the V-SGCS. Event message types are:

Information.	**Warning.**	**Alert.**
Provides relevant information to the pilot on the status, modes or actions run by the system.	Provides a warning message whenever the operation or PrimeCor Zero enters into an abnormal or degraded state.	Informs from high-risk conditions of the operation or PrimeCor Zero system.
		

2 **Settings:** List of settings.



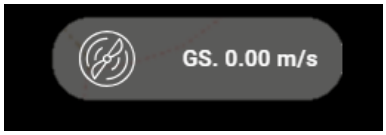
Params: Displays all configured parameters during pre-flight planning for verification.

Legend: Provides a visual representation of the icon and the meaning to aid navigation and understanding.

History: Lists the most recent commands and events executed, presented in chronological order for an easy review.

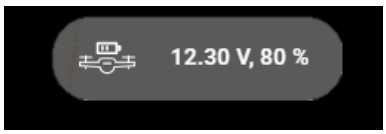
3 **UAS speed:** Indicates the speed of the UAS measured by the GNSS receiver (Ground Speed).

GS: Indicates the horizontal speed in meters/seconds (m/s) of the UAS.



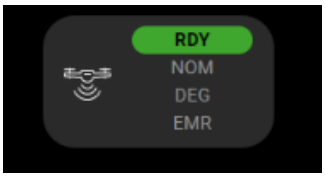
Battery voltage: Indicates the measured voltage of the batteries.

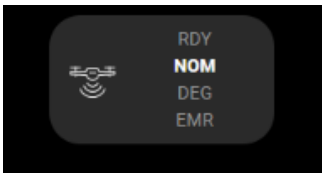
Indicates the voltage reading of the aircraft batteries and battery level (%).

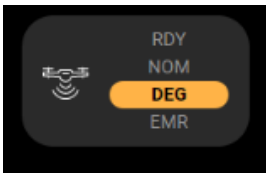


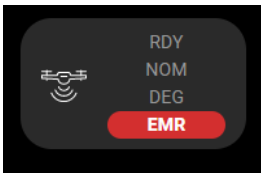
4 **Modes:** Indicates PrimeCor Zero mode. System modes are:

Ready (RDY).	**Nominal (NOM).**	**Degraded (DEG).**	**Emergency (EMR).**
PrimeCor Zero is disarmed, but indicates that all systems are OK; the geofence has been successfully loaded and PrimeCor Zero is ready to be armed.	PrimeCor Zero is armed and ready to start the flight.	PrimeCor Zero reports a non-critical failure, but it indicates that some systems are not working properly.	PrimeCor Zero reports a critical failure: one or more systems have failed; the aircraft has trespassed the operational limit; or the remote pilot has manually activated an emergency action.





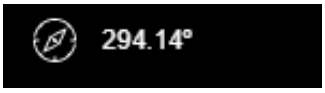




5 **GNSS position indicator:** provides information about the position and orientation of the UAS.

The information reported consists of:

Heading.	**Latitude.**	**Longitude.**
Orientation of the velocity axis of the aircraft relative to magnetic north, also known as aircraft heading.	UAS geographic coordinate system information.	UAS geographic coordinate system information



6 **Action buttons:** facilitates sending and triggering different commands to the aircraft. Those are:

Arm/Disarm.

Arms or disarms PrimeCor Zero.

FTS.

Triggers the Flight Termination System.

Geofence.

Uploads Geofence.

Mission.

Uploads mission.

Slow Speed On/Off.

Activates or Deactivate the Slow Speed mode (5m/s).

Contingencies.

Manually commands contingencies.

Rally Points.

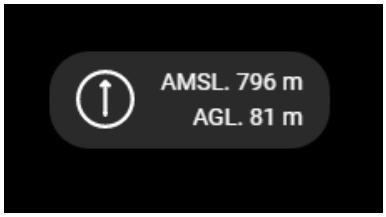
Uploads rally points.

7 **Zoom in/out:** Zoom in or out keeping the UAS in the center, thus varying the scale on the map. The same action can be performed using touch screen control.

8 **AMSL/AGL:** provides height and altitude information.

AMSL: represents the altitude of the UAS in meters (m) above sea level.

AGL: represents the height of the UAS in meters (m) above the *"Home"* point.



9 **GNSS signal quality:** reports GNSS signal quality from PrimeCor Zero. It provides three potential states:

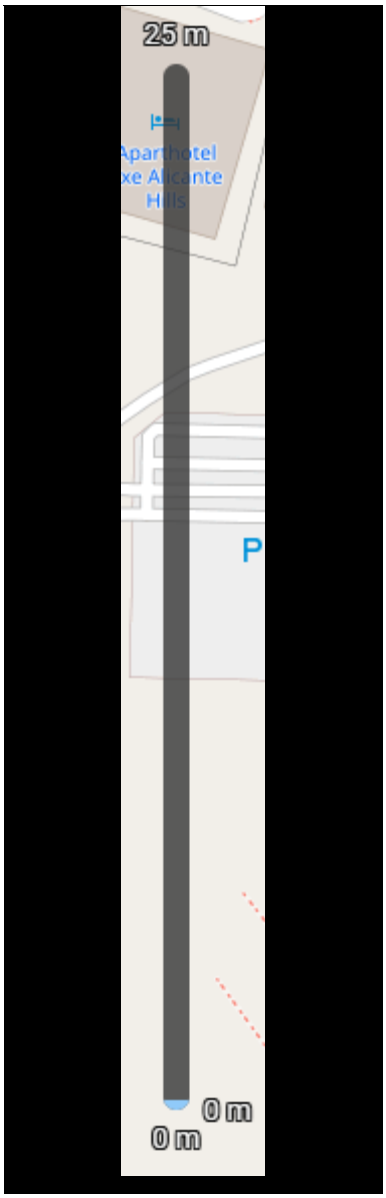
GNSS signal in good condition.	**The system is waiting for the GNSS to start and no information is received yet from it.**
	

Uplink/Download signal quality: indicates the signal quality of PrimeCor Zero communications radio link. It provides two potential states:

Established connection	**Radio connection loss**
	

RSSI in good condition	**RSSI in degraded condition**	**RSSI in bad condition**
		

10 **Altitude bar:** Represents the height of the UAS relative to the maximum height of the geofence.



2.4. Mission

Upon completion of the initial configuration, it is necessary to transmit the data from PrimeCor Cloud to PrimeCor Zero. This is done through the Geofence, Mission, and Rally buttons. Each of these buttons sends the corresponding information to PrimeCor Zero. It is mandatory to send this data prior to any flight.

Click on each Button and wait for confirmation.

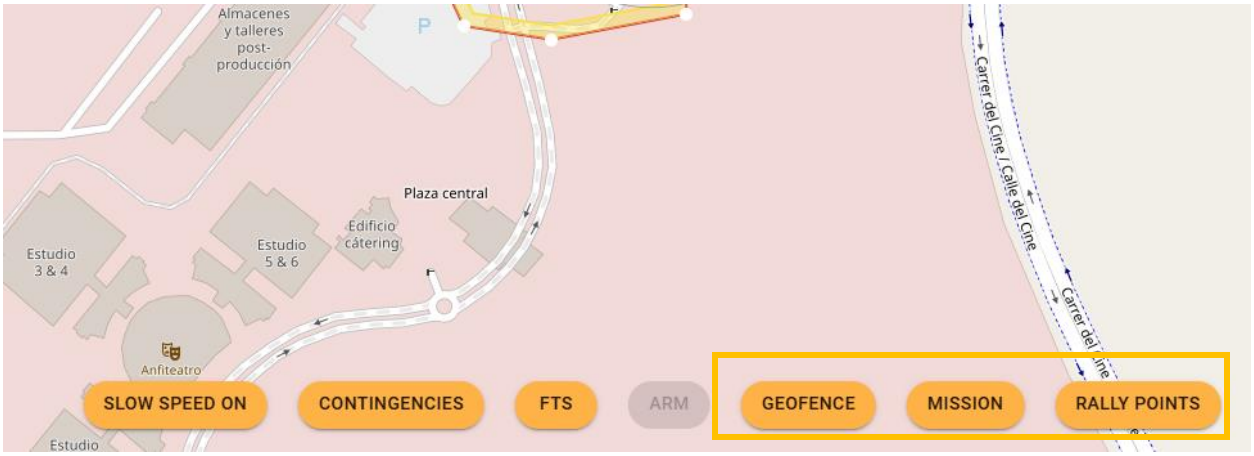


Figure 56: Mission Buttons

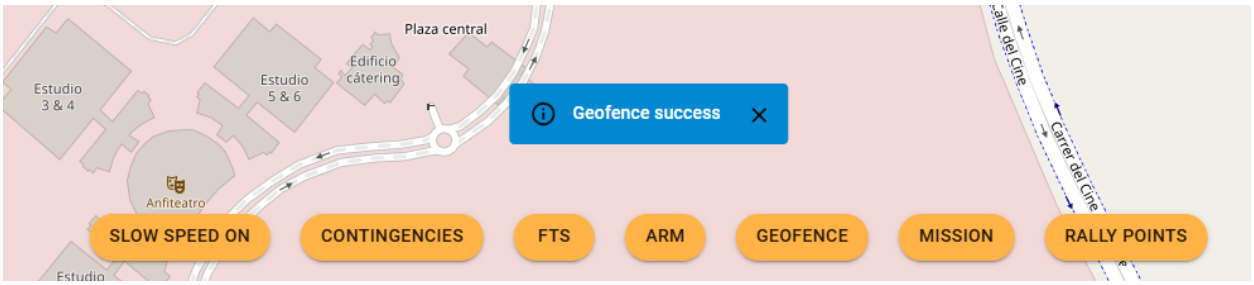


Figure 57: Geofence Upload

After a successful geofence upload, proper GNSS signal must be acquired for system readiness.

Once these conditions are satisfied, the system will:

1. Switch to "Ready" mode
2. Initiate comprehensive systems monitoring
3. Prepare for operational deployment

Note: Successful system activation is exclusively dependent on geofence configuration. Unlike waypoints and rally points, the geofence is a mandatory prerequisite for system activation. The system cannot be armed until the geofence has been properly uploaded and validated.

2.5. Arm/Disarm PrimeCor Systems

2.5.1. Arm

If all GNSS systems and the communication link are operational and error-free, the UAS arming process can be initiated.

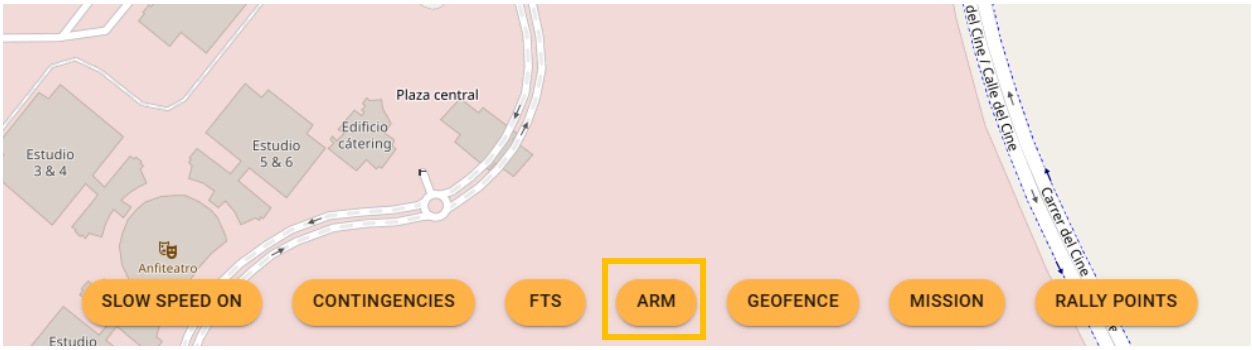


Figure 58: Arm Button

Once the "Arm" button is clicked, the following steps are performed:

1) Contingency actions associated with various events are activated.
2) The *"Home"* point is established.
3) The altitude reference above ground level and PrimeCor Zero are set.
4) The PrimeCor Zero switches to *"Nominal (NOM)"* mode.

2.5.2. Disarm

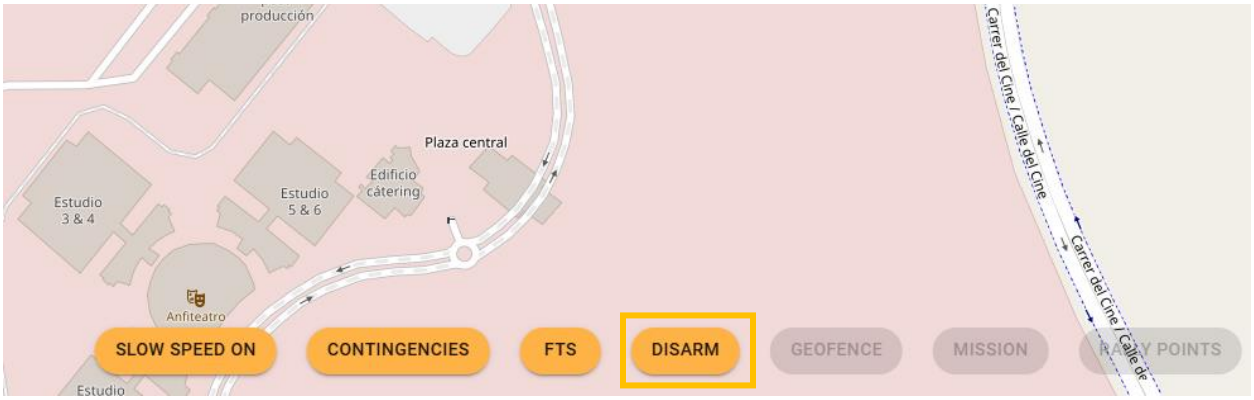


Figure 59: Disarm Button

Once PrimeCor Zero is armed, the "Arm" button changes to "Disarm," indicating the option to disarm the system. If the "Disarm" button is selected, the disarming process will be executed as follows:

1) The execution of contingencies associated with various events is deactivated.
2) The "Home" point location remains unchanged until a new arming action reestablishes the "Home" point.
3) PrimeCor Zero switches to "Ready (RDY)" mode.

*Note: PrimeCor Zero can be disarmed during flight.

3. Information, Contingency and Emergency Events

3.1. Information Events

Information events are always provided during the preparation of the operation. They inform the pilot about the procedures executed and request relevant information or confirmation acknowledgment from the pilot.

All information events are displayed as a blue message on the screen, describing the event.

3.1.1. Booting or PrimeCor Systems Start

This message shows up during PrimeCor Zero startup process. The System waits until robust GNSS signal is assured. System and flight Plan parameters are loaded.

Event	PrimeCor Systems starts
Action	V-SGCS message: ***"Booting"***
PrimeCor Zero state	Disabled

3.1.2. Geofence uploaded successfully

This message is sent to confirm the receipt of the geofence validated on the ground and the successful validation process.

Event	Geofence uploaded successfully
Action	V-SGCS message: ***"Geofence uploaded successfully"***
PrimeCor Zero state	Disabled

3.1.3. Waiting for GNSS fix

Once the geofence is loaded, the system waits for a valid GNSS position. When it obtains the GNSS signal, the PrimeCor Zero change to *"Ready (RDY)"* mode.

Event	Waiting for GNSS signal
Action	V-SGCS message: ***"Waiting for GNSS fix"***
PrimeCor Zero state	Disabled

3.1.4. Mission uploaded

This message is sent to confirm the receipt of the mission validated on the ground and the successful validation process.

Event	Mission uploaded successfully
Action	V-SGCS message: ***"Mission uploaded"***
PrimeCor Zero state	Disabled

3.1.5. Rally Points uploaded

This message is sent to confirm the receipt of the rally points validated on the ground and the successful validation process.

Event	Rally points uploaded successfully
Action	V-SGCS message: ***"Rally Points uploaded"***
PrimeCor Zero state	Disabled

3.2. Degraded Events

Contingency events occur whenever the operation or PrimeCor Zero enters into abnormal or degraded conditions. Immediately, the remote pilot will be warned until the operation is recovered back to nominal conditions or an Emergency event (EMR) takes place.

All contingency events display an orange *"Warning"* message on the screen, naming the event occurred. Contingency events may change Primecor Zero state, turning it to *"Degraded (DEG)"* mode.

3.2.1. Radio comm degraded

The radio link communication quality is considered degraded as long as the signal received from the V-SGCS is received within period from two (2) to five (5) seconds.

Event	C2Link communications degraded
Contingency	Remote pilot warning
Action	V-SGCS message: ***"Warning: Radio comm degraded"***
PrimeCor Zero state	Degraded (DEG)

3.2.2. Inside contingency volume

In the event of exceeding the delimited security zone, the UAS falls within the contingency volume established during the preparation of the operation. This volume is defined by using the geofence management parameters.

Event	Exceeding the limit of the safe geographical zone
Contingency	Remote pilot warning
Action	V-SGCS message: ***"Warning: Inside safety buffer"***
PrimeCor Zero state	Degraded (DEG)

3.2.3. Low GNSS accuracy

The quality of GNSS accuracy is obtained by using the dilution of accuracy, both horizontal and vertical. The confidence of the GNSS signal is considered limited if the measurement is greater than four (4).

Event	Deterioration of GNSS position accuracy
Contingency	Remote pilot warning
Action	V-SGCS message: ***"Warning: Low GNSS accuracy"***
PrimeCor Zero state	Degraded (DEG)

3.3. Emergency Events

Emergency events occur whenever the operation or PrimeCor Zero enters into a high-risk situation. These events warn the pilot and trigger an immediate emergency action.

All emergency events show a red alert message on the screen, defining the event that occurred and modify the UAS mode, passing it to emergency mode.

3.3.1. Radio comm is lost

Communications between PrimeCor Zero and the V-SGCS are considered lost if no ground signal is received for a period of more than five (5) seconds.

Event	Total loss of communications
Contingency	Remote pilot warning
Action	V-SGCS message: ***"Alert: Radio comm is lost"***
PrimeCor Zero state	Emergency (EMR)

In case the signal is recovered, PrimeCor Zero returns to the mode prior to the emergency situation.

3.3.2. Out of geofence

In the event of exceeding the geographical limits of the geofence horizontally, the associated contingencies will be triggered immediately.

Event	Leaving operational zone: horizontal limits of the geofence are trespassed.
Contingency	Remote pilot warning
Action	V-SGCS message: ***"Alert: Out of geofence"***
PrimeCor Zero state	Emergency (EMR)

3.3.3. Above max. Height

In case of exceeding the height (AGL) defined in the geofence, the associated contingencies occur with immediate effect.

Event	Trespass vertical limit of the geofence
Contingency	Remote pilot warning
Action	V-SGCS message: ***"Alert: Above max. height"***
PrimeCor Zero state	Emergency (EMR)

Once height is reduced to permitted limits within the volume of the geofence, PrimeCor Zero returns to its mode prior to the emergency situation.

3.3.4. GNSS is lost

The GNSS connection is considered lost whenever the GNSS fix is less than three (3) or the received GNSS signal is not updated within a period of three (3) seconds ('').

Event	Loss of GNSS signal
Contingency	Remote pilot warning
Action	V-SGCS message: ***"Alert: GNSS is lost"***
PrimeCor Zero state	Emergency (EMR)

In case of recovering the GNSS position, PrimeCor Zero returns to its mode prior to the emergency situation.

3.3.5. FTS activated

The pilot has always the authority to trigger the FTS from the start to the shutdown of the System.

In case the remote pilot initiates the FTS by click on the FTS button, a confirmation message will be displayed requesting confirmation of the action, as shown in Figure 51.

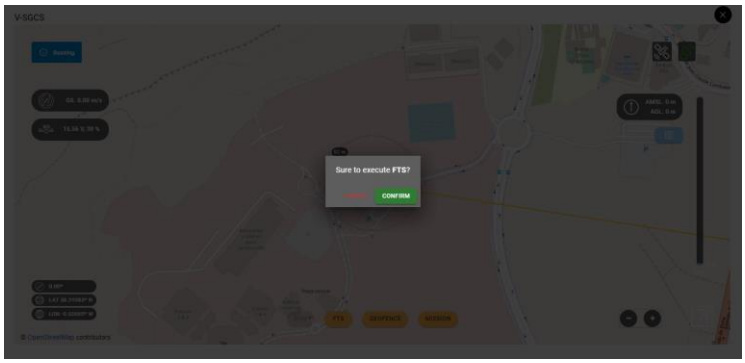


Figure 60: FTS confirmation button

Once the command is sent to PrimeCor Zero, the System will trigger the FTS with no delay.

Event	Flight Termination System manual trigger
Contingency	Remote pilot confirmation FTS trigger
Action	Confirmation message V-SGCS message: ***"Alert: FTS activated"***
PrimeCor Zero state	Emergency (EMR)

3.4. Contingency Events

Contingency events can be initiated through manual activation.

Figure 61: Contingency actions

Upon activation, two messages will be displayed on the screen. The upper label indicates the selected contingency form the PrimeCor Cloud, while the lower label shows the contingency currently being executed by PrimeCor Zero. It is imperative that both labels correspond to the same contingency. If they do not, please verify that the Mission and Rally Points have been correctly uploaded.

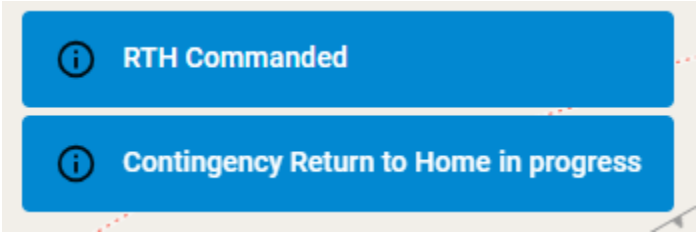


Figure 62: Contignency notifications

After the activation of any contingency, there will be an option to deactivate it.

4. Flight Log Download

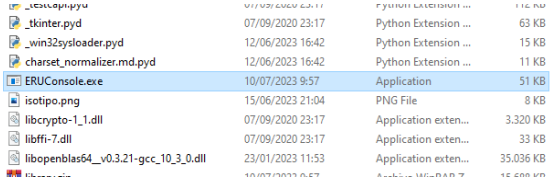
Together with PrimeCor Zero Kit, an application will be provided that allows the download of the data log, as well as the update of the ERU Firmware.

In addition to these logs, which are saved within the ERU, there is also the option to download logs saved in the Cloud. To do so, please refer to section 2.2.8.

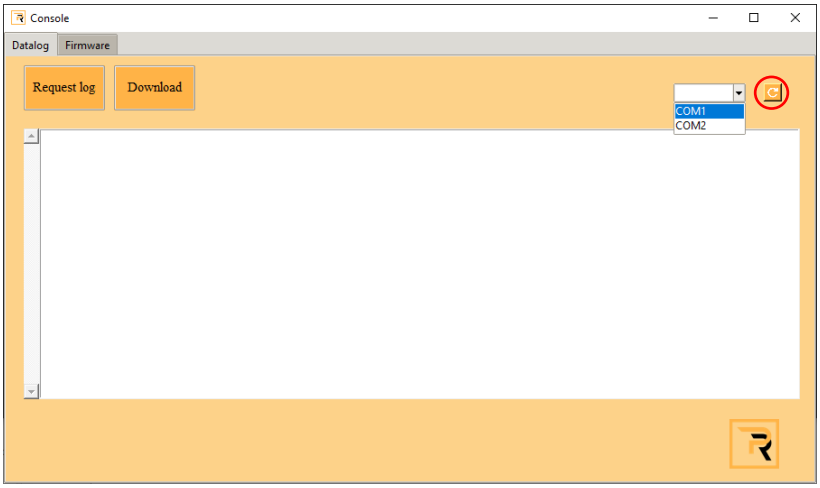
"Flight Log" stored during flight can be downloaded using the USB type C cable connect the ERU with a PC.

Flight log download procedure is as follows:

1 Open APP “ERUConsole.exe”, located in the *“Console”* folder



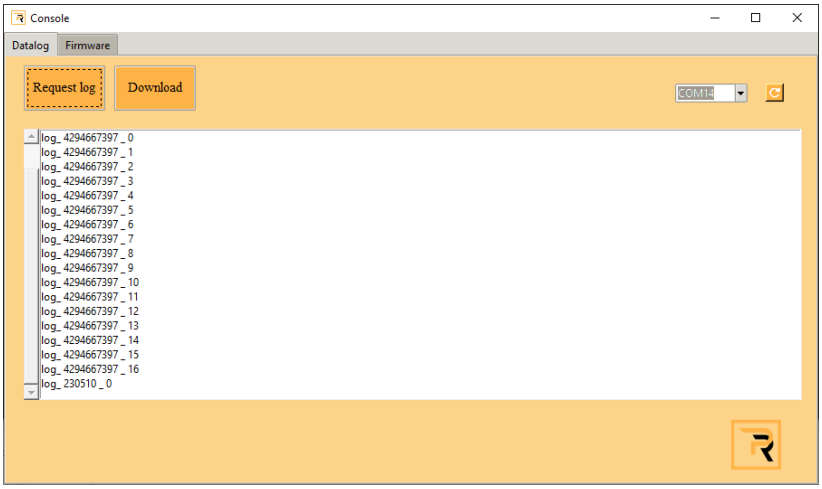
2 Choose communication port from the list. In case the port does not appear in the drop-down menu, click on the *"refresh"* button



4 Click on the *“Request log”* button. A list will appear with all the Logs stored in PrimeCor Zero ERU.
Name format: “Log_YYMMDD_Number”

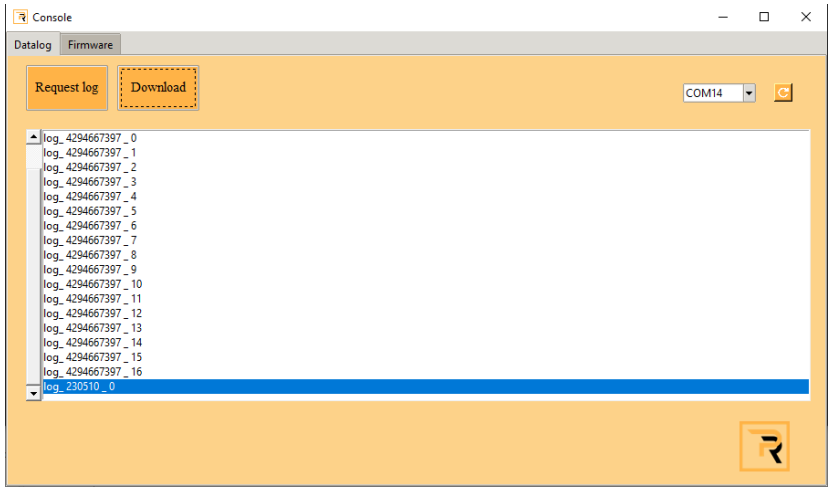
Example:
Flight on May 10, 2023, first flight of the day:

Log_230510_0.



5 Select the data log you want to download and click on the *"Download"* button.

The data log will be saved in the *"Logs"* directory located inside the *"List"*



Note: This app has been tested on Windows 10.

4.1. Data Log Format

Message	Description

GNSS	**GNSS, Timestamp, Posix time, Latitude, Longitude, Height, HDOP, VDOP, Ground speed, CoG, Number satellites, Fix**
	• Timestamp: Times since boot (milliseconds)
	• Posix time:
	• Latitude *1e7 (deg)
	• Longitude *1e7 (deg)
	• Height -height above ellipsoid- (mm)
	• HDOP
	• VDOP
	• Ground speed (mm/s)
	• Course Over Ground (deg)
	• Number satellites -Number of satellites used in navigation solution-
	• Fix:
	  ○ 0: no fix
	  ○ 1: dead reckoning only
	  ○ 2: 2D-fix
	  ○ 3: 3D-fix

POW	POW, Timestamp, Voltage1, Voltage2 • Timestamp: Times since boot (milliseconds) • Voltage1: Voltage of Power supply 1 • Voltage2: Voltage of Power supply 2 • % Battery 1: Remaining Battery 1 percentage • % Battery 2: Remaining Battery 2 percentage

EVENT	EVENT, Timestamp, severity, idEvent
	• Timestamp: Times since boot (milliseconds)
	• Severity:
	  ○ 1: Alert
	  ○ 4: Warning
	  ○ 6: Information
	• idEvent:
	  ○ 10 Booting
	  ○ 18 Waiting GNSS fix
	  ○ 19 Upload geofence
	  ○ 20 RTH Commanded
	  ○ 21 LAND Commanded
	  ○ 29 Geofence uploaded successfully
	  ○ 50 Autopilot-ERU link loss
	  ○ 51 Autopilot-ERU link degraded
	  ○ 59 Geofence not valid
	  ○ 60 Critical battery 1 charge
	  ○ 61 Battery 1 low charge

	○ 62 Critical battery 2 charge ○ 63 Battery 2 low charge ○ 64 Critical battery 3 charge ○ 65 Battery 3 low charge ○ 67 Warning: PrimeCor Radio comm degraded ○ 68 Warning: PrimeCor Low GNSS accuracy ○ 69 Inside of Contingency Volume ○ 79 Above max. height ○ 81 Aircraft detected, air collision risk ○ 84 Critical battery charge ○ 87 Alert: PrimeCor Radio comm loss ○ 88 PrimeCor GNSS loss ○ 89 Out of geofence ○ 99 FTS activated ○ 190 GPP Commanded ○ 192 RALLY Commanded ○ 193 HOVER Commanded ○ 201 RTHS Commanded
COMMAND	COMMAND, Timestamp, Action (This commands refers to the manual actions commanded by the pilot) • Timestamp: Times since boot (milliseconds) • Action ○ ARMED (Arm PrimeCor System) ○ DISARMED (Disarm PrimeCor System) ○ FTS DEPLOYED ○ RTH (Return to Home) ○ LAND (Land in the current position) ○ HOVER (Hold position) ○ GPP (Go to Previous Point) ○ RALLY (Go to Rally point) ○ RTHS (Return to Home Safely) ○ LOW_VEL (Low Mode Velocity – 5m/s)
GEOFENCE	MISSION, Timestamp, Latitude, Longitude, Altitude_max, Volume_contingency, Waypoint_number, Type. • Latitude: Latitude of the points • Longitude: Longitude of the points • Altitude maximum (m) • Volume contingency (m) • Waypoint_number • Type: ○ 0: Flight path ○ 1: Geofence ○ 2: Rally Point