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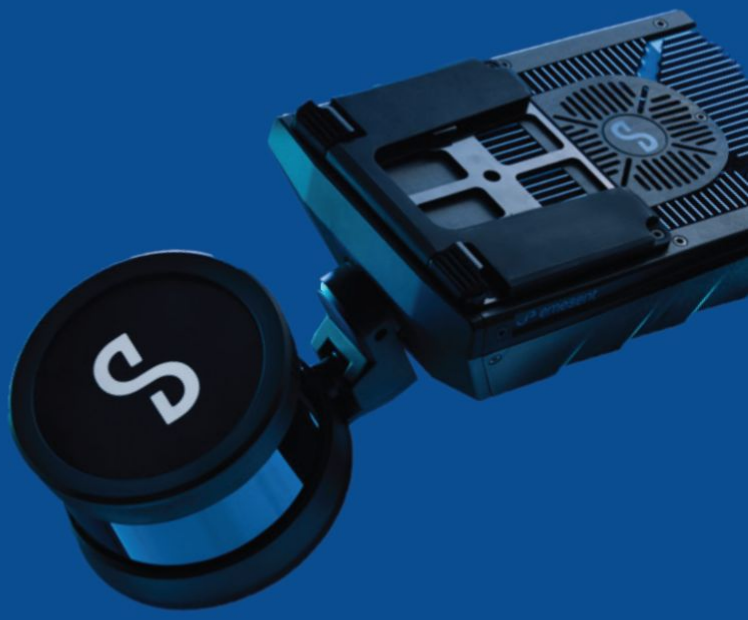
EMERGENCY FLIGHT RECOVERY GUIDE

DOCUMENT NUMBER: INSTR-014
REVISION NUMBER: 2.8
RELEASE DATE: 27 MAY 2024



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Using this manual

Hovermap is a powerful system that can be used as a LiDAR mapping payload, but also as an advanced autopilot for drones and other platforms. We therefore recommended that you read the user manual thoroughly to make use of all its capabilities in a safe and productive way.

Disclaimer and safety guidelines

This product is *not* a toy and must not be used by any person under the age of 18. It must be operated with caution, common sense, and in accordance with the instructions in the user manual. Failure to operate it in a safe and responsible manner could result in product loss or injury.

By using this product, you hereby agree that you are solely responsible for your own conduct while using it, and for any consequences thereof. You also agree to use this product only for purposes that are in accordance with all applicable laws, rules and regulations.

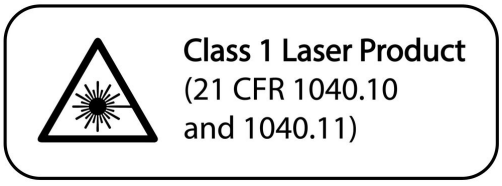
The use of Remotely Piloted Aircraft Systems (RPAS) may result in serious injury, death, or property damage if operated without proper training and due care. Before using an RPAS, you must ensure that you are suitably qualified, have received all necessary training, and read all relevant instructions, including the user manual. When using an RPAS, you must adopt safe practices and procedures at all times.

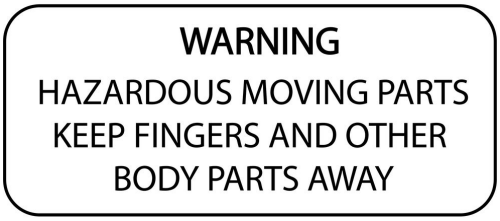
Warnings

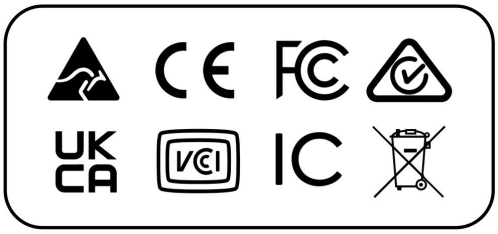
- This document is legally privileged, confidential under applicable law and is intended only for the use of the individual or entity to whom it is addressed. If you have received this transmission in error, you are hereby notified that any use, dissemination, distribution or reproduction is strictly prohibited. If you are not the intended recipient, please notify the sender and delete the message from your system.

- Do not attempt to disassemble, repair, tamper with, or modify the this product. This product contains no user-serviceable parts inside. Any disassembly of the product enclosure will invalidate the IP65 rating and disrupt the factory calibration of LiDAR. Contact Emesent for any repairs or modifications.

- Always be aware of moving objects that may cause serious injury, such as spinning propellers or other components. *Never* approach a drone while the propellers are spinning or attempt to catch an airborne drone.







FCC and IC regulatory information

Please note the following regulatory information related to the radios in the device.

Regulatory notes, statements, health and authorization for use

Radio frequency electromagnetic energy is emitted from radio devices. The energy levels of these emissions, however, are far less than the electromagnetic energy emissions from radio devices such as mobile phones. Radio devices are safe for use by consumers because they operate within the guidelines found in radio frequency safety standards and recommendations. The use of radio devices may be restricted in some situations or environments, such as:

- On board an airplane
- In an explosive environment
- In situations where the interference risk to other devices or services is perceived or identified as harmful.

In cases in which the policy regarding use of radio devices in specific environments is not clear (for example in airports, hospitals, chemical/oil/gas industrial plants, private buildings), obtain authorization to use these devices prior to operating the equipment.

Regulatory information/disclaimers

Installation and use of this radio device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment. The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, or the substitution or attachment of connecting cables and equipment other than those specified by the manufacturer. It is the responsibility of the user to correct any interference caused by such unauthorized modification, substitution or attachment.

The manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failure to comply with these guidelines. This device must not be co-located or operated in conjunction with any other antenna or transmitter.

Federal Communications Commission and Industry Canada Compliance statement

This device complies with Part 15 of FCC rules and Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of this device.

Déclaration d'Industrie Canada

Cet appareil est conforme à la RSS concernant les appareils exempt s de licence par Industrie Canada. Son fonctionnement est soumis aux deux condition s suivantes :

1. cet appareil ne doit pas causer d'interférence nuisib le.
2. cet appareil doit accepter toutes les interférences reçues, y compris celles pouvan t causer un mauvais fonctionnement de l'appareil.

FCC interference statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

FCC radio frequency exposure statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines. This equipment should be installed and operated keeping the radiator at least 20 cm or more away from person's body.

Déclaration d’Industrie Canada

Cet équipement est conforme aux limites d'exposition aux rayonnements de la FCC définies pour un environnement non contrôlé et aux directives d'exposition aux radiofréquences (RF) de la FCC. Cet équipement doit être installé et utilisé en gardant le radiateur à au moins 20 cm ou plus du corps de la personne

Export restrictions

This product or software contains encryption code which may not be exported or transferred from the US or Canada without an approved US Department of Commerce export license. Modifications not expressly authorized by manufacturer may invalidate the user’s right to operate this equipment.

Ce produit ou logiciel contient du code de chiffrement qui ne peut être exporté ou transféré du Canada ou des États-Unis sans un permis d’exportation du département du commerce des États-Unis. Toute modification n’ayant pas été expressément approuvée par la société peut annuler le droit de l’utilisateur de se servir du matériel.

Contents

In most situations, you can rely on Hovermap's failsafes to help keep your system safe. However, if you find yourself in a situation where your drone is behaving erratically and you need immediate control, use one of the following procedures.

> Before operation, make sure that you are familiar with your platform-specific emergency procedures.

> For more information on failsafes, refer to the Operational Failsafes article in Knowledge Base.

1. Critical error or erratic drone behavior

Switch to drone control mode

If a critical error (in red) appears, or if your drone is behaving erratically, do the following:

1. Switch to drone control by changing the flight mode switch out of Hovermap mode.
   If GPS is available, switch to the appropriate position hold mode.
   For DJI drones:
   If GPS is not available, switch to Atti mode (for DJI).
   For Freefly Astro (Hovermap ST-X only) or Astro Max (Hovermap ST and Hovermap ST-X):
   Hovermap ST-X will automatically revert to Altitude mode if there is no adequate GPS available.
2. Manually fly the drone home safely.
3. Keep a close eye on your drone, as the controls will be sensitive and it will move at greater speed.
4. Contact Technical Support Services with flight logs and scan data for more details about any errors encountered.

> This procedure should *only* be used in an emergency. Avoid flying in drone control mode unless you are an experienced pilot.

> For more detailed information on errors, refer to the Warnings and Notifications article in Knowledge Base.

2. Loss of tablet control

Switch to Pilot Assist mode

If you are flying in Autonomous mode and need to revert to Pilot Assist mode, use the following procedure. There are a number of reasons why you would want to do this, such as losing the connection between the drone and the tablet (for example, if the Wi-Fi connection has been lost or the tablet battery has been drained).

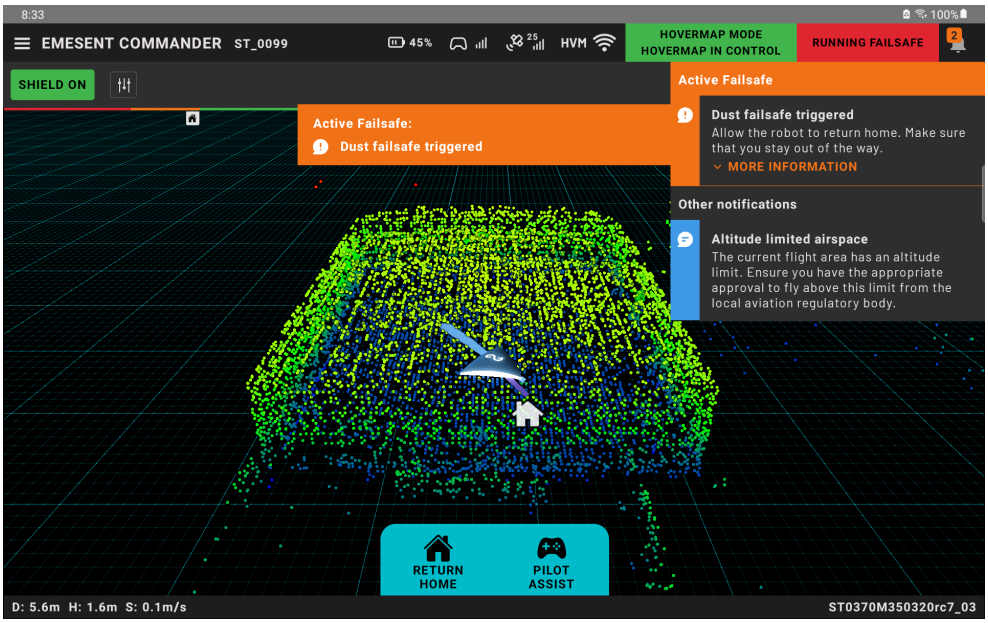
1. Tap the **Pilot Assist** button then confirm the action when prompted. Ensure that the switch is returned to the Hovermap position.
2. The system will change to Pilot Assist mode. Shield will be activated and position control will be active.
3. Manually fly the drone back to the home location or a safe recovery location.
4. Once you have reached this location, land the drone by one of the following methods:
    - Descend until the Shield limit is reached, then switch to drone control using the flight mode switch.
      If no GPS is available, this will put the system into Atti mode.
      Carefully land the drone.
    - Allow the drone to hover at the home location until the critical battery autolanding failsafe is activated. Once the failsafe is triggered, the drone will autonomously initiate its landing procedure.

3. Hovermap Operational Failsafes

Hovermap has been engineered to operate autonomously when attached to a compatible robot or vehicle. It can take these platforms into unsafe places, or where it is simply impossible to go with other systems. In response to a failure during Autonomy-assisted missions, Hovermap has a range of operational smart failsafes to ensure safe and reliable operation.

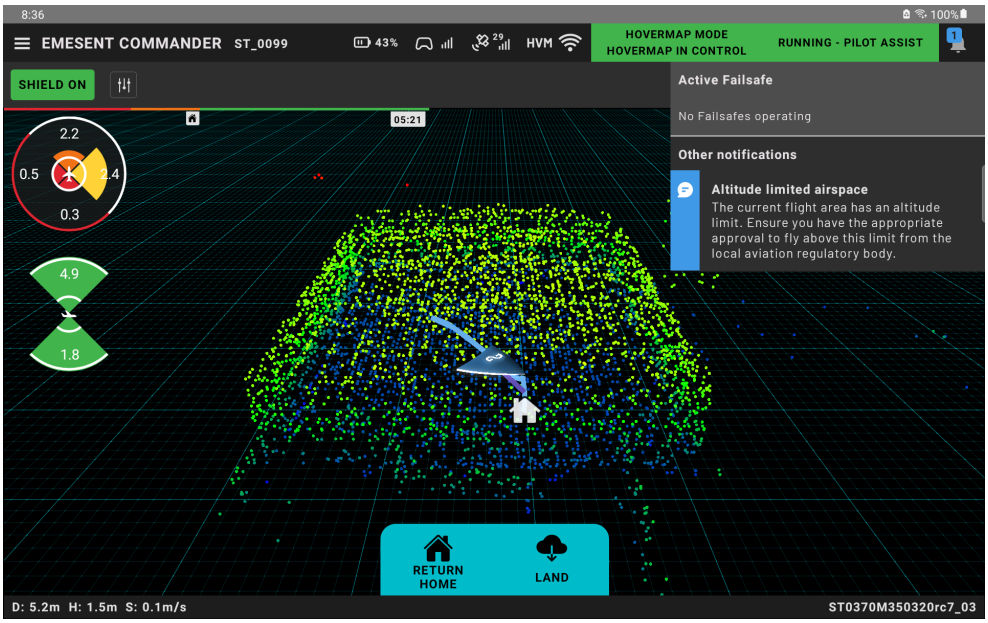
> Only one failsafe can be active at any given time. Therefore, failsafes are ordered in a prioritized list as indicated by the priority number in the table below. In case multiple failsafes are triggered, the one with the lowest priority number will be prioritized.

When a failsafe is triggered, it will be displayed as a notification in the **Active Failsafe** area beside the **Notification** button. Click that notification to see more detailed information about the failsafe. All other notifications (if any) are shown below the failsafe in order of severity.



> When a failsafe is active, no other notifications will appear in the **Main View**. They can still be shown by clicking the **Notification** button.

Once the failsafe has been completed, it will be removed from the **Active Failsafe** area and notifications are displayed as per normal operation.



Priority	Description	Operator Action	Pre-requisite	Abort-able
Robot Link Loss				
1	The link between the robot and Hovermap has been lost. Hovermap will try to re-establish a connection with the robot and take control of the robot.	Take manual control of the robot and land immediately. Do not take off if the robot is on the ground.	N/A	This failsafe will self-abort when the connection to the robot has been re-established.
Control Authority Denied				
2	The robot is not allowing Hovermap to take control. Hovermap will keep requesting control of the robot.	Land the robot immediately. Do not take off if the robot is on the ground.	N/A	The failsafe will self-abort when the robot allows Hovermap to take control.

Control Authority Loss				
3	Hovermap has lost control and authority over the robot. Hovermap will attempt to re-acquire control of the robot	Take manual control of the robot and land immediately. Do not take off if the robot is on the ground.	N/A	The failsafe will self-abort when Hovermap re-acquires control of the robot.
Robot Control Not Take-able				
4	Hovermap indicates that it can't take control of the Robot. Hovermap will monitor the state of the robot to check when it can take control.	Land the robot immediately. Do not take off if the robot is on the ground.	N/A	The failsafe will self-abort when Hovermap assesses that it is safe to do so.
Hardware Integrity				
5	Hovermap has detected that the robot has sustained physical damage. Hovermap will attempt to put the robot into a safe state.	If safe to do so, take manual control of the robot, land, and disarm the motors immediately.	N/A	Not abort-able

Launch Error				
6	Hovermap has aborted a take-off.	Monitor the drone as it disarms or lands. Ensure that the shield settings are set appropriately, there are no objects in the vicinity of the robot, and attempt to re-launch.	N/A	Not abort-able
State Estimation Critical				
7	Hovermap has lost all of its navigation sources (SLAM and GPS). Hovermap will Land the robot.	Take manual control of the robot and land immediately. Do not take off if the robot is on the ground.	N/A	Not abort-able
Battery Critical				
8	Hovermap has detected that the robot's battery source has reached a critical level. Hovermap will land the robot.	Monitor	N/A	Not abort-able

Path Planner Stuck (Heavy Dust)				
9	Hovermap has detected that it is not able to navigate through the environment. The robot will retrace its path back through the environment for 30 meters or until it gets to home. During this period, Hovermap is unable to register any new obstacles that have moved into its path. After Hovermap has retraced its path for 30 meters, it will initiate a Return to Home sequence.	Monitor	N/A	The user can abort the failsafe at any time via the Commander app. The user can abort the failsafe at any time by toggling the flight mode switch out and back into Hovermap mode twice (double toggle).

Lidar Data Integrity				
10	Hovermap has detected that its lidar points are starting to not be able to reach the objects around it due to atmospheric conditions. Hovermap will start to Return to Home immediately to remove itself from the atmospheric conditions.	Monitor	N/A	The user can abort the failsafe at any time via the Commander app. The user can abort the failsafe at any time by toggling the flight mode switch out and back into Hovermap mode twice (double toggle). **Note:** Once the Lidar Data Integrity failsafe triggers there will be a constant notification advising to return home immediately. This notification will persist for the remainder of the mission, even after the Lidar Data Integrity failsafe has been aborted by the user.

State Estimation Degraded				
11	Hovermap has lost its primary source of navigation. Hovermap will wait for up to 10 seconds to regain a navigation source (SLAM or GPS) If a navigation source is acquired, Hovermap will initiate a Return to Home. If after 10 seconds a navigation source is not acquired, the 'State Estimation Critical' failsafe will be triggered.	Monitor Take control in Pilot-Assist mode and land as soon as possible.	N/A	The user can abort the failsafe at any time via the Commander app. The user can abort the failsafe at any time by toggling the flight mode switch out and back into Hovermap mode twice (double toggle). **Note:** Once the State Estimation Degraded failsafe has been aborted, it will not trigger again until the robot has landed and disarmed.
Battery Low				
12	Hovermap has detected that the robot's battery source has reached a low level. Hovermap will initiate a Return to Home sequence	Monitor	N/A	The user can abort the failsafe at any time via the Commander app. The user can abort the failsafe at any time by toggling the flight mode switch out and back into Hovermap mode twice (double toggle). **Note:** Once the low battery failsafe has been aborted, it will not trigger again until the robot has landed and disarmed.

GCS Link Loss				
13	Hovermap has detected that it has lost its connection to the Commander App and has reached its final waypoint with no further instruction. Hovermap will initiate a Return to Home sequence	Monitor	The GCS Link Loss failsafe will only trigger if the robot arrives at the last user-defined waypoint and the GCS link has been lost	The failsafe will self-abort when Hovermap regains connection to the GCS and arrives at either the Home point or the Rally point. The user can abort the failsafe at any time via the Commander app after the GCS link has been restored. The user can abort the failsafe at any time by toggling the flight mode switch out and back into Hovermap mode.
RC Link Loss				
14	Hovermap has detected that the robot no longer has a link to its remote control unit and is being operated in Teleoperate mode. Hovermap will initiate a Return to Home Sequence	Monitor	The RC Link Loss failafe will only trigger if the robot is being operated in Pilot Assist mode and the RC link is lost.	The failsafe will self-abort when Hovermap regains an RC connection and arrives at either the Home point or the Rally point. The user can abort the failsafe at any time via the Commander app. The user can abort the failsafe at any time by toggling the flight mode switch out and back into Hovermap mode.
Data Recording Stopped				
15	The remaining data storage is below 2GB.	Land	N/A	Not abort-able

Data Storage Critical				
16	The remaining data storage is below 5GB. Hovermap will initiate a Return to Home Sequence	Monitor	N/A	The user can abort the failsafe at any time via the Commander app.
Not Ready to Arm				
17	Hovermap has detected that it is not yet in a state for the robot to be armed. Hovermap will send a notification to the user.	Do not attempt to take off.	N/A	Not abort-able
18	Hovermap has detected that its CPU temperature is reaching a high limit. Hovermap will send a notification to the user.	Take care when handling the Hovermap payload. The heatsink on the payload may be hot.	N/A	Not abort-able
Data Storage Low				
19	The remaining data storage is below 20GB. Hovermap will send a notification to the user.	Monitor Consider returning to home before data storage is exhausted	N/A	Not abort-able

4. Hovermap Warnings and Notifications

Notifications provide situational information regarding the status of your mission, including the Hovermap and your robot. In addition, a notification may also include the recommended operator action.

4.1 Notification Types

There are two different types of notifications.

- Pre-mission Notifications: Shown in the mission workflow only when starting a scan, during pre-checks. They will not occur once pre-checks have been passed.
- Notifications During Mission: These can occur at any point after a scan has started. If failures are associated with an active failsafe, the system will report it is running degraded.

Additional notifications are also available from the following sources:

- Platform Notifications
- DJI Notifications (only when connected to a remote control)
- Tablet Notifications
- Commander Status Notifications

4.2 Notification Severities

4.2.1 Error Notifications

When a problem is encountered, notifications appear as a popup at the top of the application. In addition, you can tap the **Notification** button on the main view to see the list of all active critical errors, warnings, and status notifications. The list is ordered by severity and reported time (the highest severity with the most recently reported time is displayed at the top).

Notification	Description
Critical	Indicated by a red icon and accompanied by three successive “beep” sounds. This notification indicates that the problem requires immediate attention. Swipe on the notification to close it.
Warning	Indicated by an orange icon. This notification indicates that the problem may impact operation so continued observation is required. Swipe on the notification to close it.
Caution	Indicated by a blue icon. This notification indicates that the problem requires monitoring but presents no hazard. This notification is only displayed when you tap the **Notification** button.

4.2.2 Operational Status Notifications

Operational Status notifications provide information on ongoing actions and let you know when these actions are successful. They look similar to and appear in the same place as error notifications in the Main View, but have different icons. Also, there is no option to tap (for further action) or close these types of notifications.

Notification	Description
Status	Indicated by a blue background. This notification provides information on system actions currently in progress. This notification automatically clears after 10 seconds.
Success	Indicated by a green background. This notification shows when an action has been completed successfully (e.g. “Ready for mission”). This notification automatically clears after 10 seconds.

4.3 Pre-mission Notifications

Notification	Description	Recommended Action
Critical		
Hovermap battery critical	The remaining battery capacity is insufficient to start a mission.	Replace or charge the battery.
Hovermap hardware link not connected	The hardware connection between the Hovermap and the robot is not working. The connecting cable may be faulty or unplugged.	Check the cable connection. If the failure persists, try using a different cable.
Please wait until Hovermap is ready before starting a mission	Hovermap's state estimation is not ready. A possible cause is a payload hardware error, but there are other possibilities.	

Notification	Description	Recommended Action
Robot baud rate incompatible	The data rate on the robot connection is set to an unsupported value. Consult the Hovermap user manual and reconfigure the robot.	Use DJI assistant to change the baud rate on the robot.
Robot firmware incompatible	The version of firmware on the robot is unsupported.	Change your firmware version to continue.
Robot platform type not supported	The robot is not supported for autonomous operations.	Change the type of robot connected to continue.
Robot hardware failure	There is a critical hardware error. For example, the system has crashed.	Refer to the user manual provided by the manufacturer or reach out to their customer support team.
Autonomous flight unavailable	Autonomous missions cannot be performed as planning the path between waypoints or detecting potential collisions is currently not possible.	Restart Hovermap and contact Technical Support Services via https://emesent.com/customer-support/
Robot requires restart	The robot requires a restart before pre-mission checks can be completed.	Restart the robot.
Warning		
License Expired	The mission cannot be started as the license for the current mission type has expired.	Update your software license. Contact licensing@emesent.io
Hovermap storage full	The remaining storage capacity is insufficient to start a mission.	Transfer scans off of Hovermap before starting a new mission. Once transferred, delete the scans from Hovermap to free up storage space.
Remote control not detected	The robot's remote control unit is not connected.	Power on the remote control unit, and ensure it can be used to control the robot.

Notification	Description	Recommended Action
Cannot arm - not ready	All pre-conditions required to allow arming have not been met. Other pre-mission checks failures may or may not indicate why this is.	Ensure all required pre-mission checks are completed.
Robot's onboard health checks failed	The robot's own onboard health checks have failed	Refer to the user manual provided by the manufacturer or reach out to their customer support team.
Robot's position not stable	The initial state estimation reports that the robot is not stationary.	If the robot is stationary, the robot will need to be restarted.
Caution		
Waiting for robot's position to stabilize	The robot or our own state estimation indicates that the robot is moving. This is likely because of errors induced by a previous landing, or the environment.	If the robot is stationary, the robot will need to be restarted.
Robot communication is not activated	The robot SDK has not been activated, which results in Hovermap being unable to communicate with the robot.	Refer to SDK activation with the DJI M300 and Hovermap for more information on how to activate the SDK.
Connection between Hovermap and user device not detected	There is no link to the Hovermap ground control station.	Ensure ground control station hardware is connected to the Hovermap Wi-Fi or Long Range Radio network.
Robot sensor error	The robot's sensors are providing the data required by Hovermap.	Refer to the user manual provided by the manufacturer or reach out to their customer support team.
Robot internal error	The robot is not ready for some unspecified reason.	Refer to the user manual provided by the manufacturer or reach out to their customer support team.

4.4 Notifications During Mission

Notification	Description	Recommended Action
Critical		
Hovermap battery critical	The remaining battery capacity has dropped to a level where the robot needs to land (if it's a UAV) and disarm.	
Lost Hovermap control	The robot has unexpectedly taken back control of the robot from Hovermap.	Switch to robot control mode.
Hovermap control refused	The robot has unexpectedly denied control to Hovermap.	Switch to robot control mode.
Robot hardware failure	There has been a failure in the robot or Hovermap hardware integrity. Generally, this means the robot has crashed.	Switch to robot control mode to return home. Check the robot's condition and restart the robot.
Lost robot link	The control and telemetry link to the robot has been lost. This may be caused by a failure in the interface cable, or it becoming unplugged.	Switch to robot control mode and land as soon as possible.
Navigation solution failure - lost navigation	No usable state estimate is available. The robot will return home via the rally point set.	Switch to robot control mode and manually return to home safely.
SLAM solution failed	The local SLAM solution has failed. This indicates that the data captured in this mission will not result in a good map.	Stop then restart your mission to continue.
Warning		
High Hovermap temperature	The CPU has undergone throttling events recently, and the heatsink may be hot to the touch.	Avoid touching the Hovermap body while hot.

Notification	Description	Recommended Action
Hovermap battery low	The remaining battery capacity has dropped to a level where the robot needs to return home. The robot will return home via the rally point if set.	Allow the failsafe to complete.
Connection between Hovermap and user device was lost	The link to the ground control station has been lost, at a time in the mission where it is required. The robot will return home.	Monitor for safe flight.
Take off aborted	The robot encountered difficulty in executing the takeoff procedure. This can occur when there are obstacles near the robot.	Check for obstacles near the robot.
LiDAR point loss	The LiDAR has encountered an environment in which it cannot operate effectively. The robot will return home via the rally point if set.	Allow the failsafe to complete.
Dust failsafe triggered	The path planner is unable to make a plan, and is 'stuck'. This is most likely to happen because of excessive dust. The robot will return home via the rally point if set.	Allow the failsafe to complete.
Navigation solution degraded	Hovermap's state estimate accuracy is decreasing due to environmental conditions causing the SLAM system to be degraded. The robot will return home via the rally point if set.	Monitor for safe flight and switch to robot control mode if required.
Hovermap cannot take control	The preconditions required to allow Hovermap to take control of the robot are not satisfied.	Switch to robot control mode.
Robot’s position not stable	The requirements for arming the robot have not been met. Hovermap is not ready.	The robot will need to be restarted if it is reporting this while the robot is actually stationary.

Notification	Description	Recommended Action
Robot outside geofence	The robot indicates it is outside a geofence.	Return the robot to a safe distance inside the geofence to ensure a mission can be started and control maintained during a mission.
LiDAR point data unstable	This will appear if a **LiDAR point loss** notification has already appeared during a mission.	Return to home using Pilot Assist and avoid the area where the LiDAR point loss occurred.
Caution		
Remote control has been disconnected	The link to the remote control unit has been lost, at a time in the mission where it is required. The robot will return home.	To intervene when connection to the remote control has been recovered, change to Pilot Assist mode first then to robot control mode if required.

4.5 Platform Notifications

Notification	Description	Recommended Action
Robot Module		
The robot reported an error	Autonomy has reported a problem with the robot which is not captured by any other notifications.	Review the information provided by the robot and refer to manufacturer's instructions.
Hovermap Module		
The Hovermap reported an error	Autonomy has reported a problem with the Hovermap which is not captured by any other notifications.	Review the information provided by the Hovermap and contact Emesent support for further details.
Camera Module		

Notification	Description	Recommended Action
The camera reported an error	Autonomy has reported a problem with the Camera which is not captured by any other notifications.	Review the information provided by the camera and refer to manufacturer's instructions.

4.6 DJI Notifications

Notification	Description	Recommended Action
Critical		
Hovermap is using a different robot than the connected remote control	The RC and the Hovermap are connected to different, incompatible models.	Ensure the correct Hovermap is connected. If the problem persists, land and restart the mission.
Take off failed	DJI reported that take off has failed for an unknown reason.	Investigate using the DJI Pilot app.
DJI: Critical warnings present	DJI is reporting a critical issue which needs investigation.	Land as soon as possible. Investigate using the DJI Pilot app.
DJI configuration changes: Multiple flight modes disabled	The Multiple Flight Modes setting could not be enabled, or it is currently trying to update to being enabled but the changes have not been applied yet.	The **Multiple Flight Modes** setting needs to be enabled for safe flight control with Hovermap.
DJI configuration changes: Enabling Multiple flight modes failed	Attempting to enable the **Multiple Flight Modes** setting with DJI failed.	
DJI configuration changes: Novice mode enabled	The **Novice mode** setting is reported as enabled.	The **Novice mode** setting needs to be disabled for safe flight control with Hovermap.

Notification	Description	Recommended Action
DJI configuration changes: Downward vision positioning enabled	The **Downward vision positioning** setting is reported as enabled.	The **Downward vision positioning** setting needs to be disabled for safe flight control with Hovermap.
DJI configuration changes: Precision landing enabled	The **Precision landing** setting is reported as enabled.	The **Precision landing** setting needs to be disabled for safe flight control with Hovermap.
DJI configuration changes: Changing collision avoidance state failed	Attempting to change the state of the **Collision avoidance** setting through DJI failed.	
DJI configuration changes: Changing RTH obstacle avoidance state failed	Attempting to change the state of the **RTH obstacle avoidance** setting through DJI failed.	
DJI configuration changes: Landing protection enabled	The **Landing protection** setting is reported as enabled.	The **Landing protection** setting needs to be disabled for safe flight control with Hovermap.
DJI configuration changes: Changing landing protection state failed	Attempting to change the state of the Precision Landing setting through DJI failed.	
DJI configuration changes: Enabling Landing protection failed	Attempting to enable the **Landing protection** setting with DJI failed.	
Battery overheating	DJI has reported that the batteries in the drone are too hot. Robot may shut down mid-air.	Land immediately.
Warning		

Notification	Description	Recommended Action
DJI: App is not registered	The DJI SDK registration could not be completed, which means you are unable to connect to the DJI RC.	Connect to the internet and restart the application to continue.
DJI: Low GPS signal	GPS signal is poor, or satellite search produced an error.	Move the robot to an open area to use GPS.
DJI: Warnings present	DJI reported a warning which needs investigation.	Investigate using the DJI Pilot app.
DJI: Flight Status unkown	The DJI flight assistant could not be contacted on the DJI remote control.	Reconnect the robot or restart the app if this persists.
DJI configuration changes: Battery critical threshold different	The critical battery threshold reported by DJI is different to the expected values.	
DJI configuration changes: Setting battery critical threshold failed	Attempting to set the new critical battery threshold with DJI failed.	
DJI configuration changes: Battery critical warning different	The warning battery threshold reported by DJI is different to the expected values.	
DJI configuration changes: Setting battery warning threshold failed	Attempting to set the new warning battery threshold with DJI failed.	
DJI configuration changes: Smart RTH enabled	The **Smart RTH** setting is reported as being enabled by DJI.	The **Smart RTH** setting needs to be disabled for safe flight control with Hovermap.
DJI configuration changes: Disabling Smart RTH failed	Attempting to disable the **Smart RTH** setting through DJI failed.	
Geofence could not be disabled	DJI has detected low GPS signal, reported after the drone has been armed or while airborne.	Connect the RC to the tablet.

Notification	Description	Recommended Action
Caution		
DJI: Low GPS signal	GPS signal is poor, or satellite search produced an error.	Move the robot to an open area to use GPS.
Drone downward sensors need to be covered with stickers to resolve the current DJI error	DJI reported that its sensors have detected a problem. This is likely caused by the downward sensors being uncovered during takeoff.	
Altitude limited airspace	DJI reported that there is a maximum altitude limit which must be observed in the current flight area. Pilots must not exceed the altitude limit without authorisation (e.g. from CASA).	Ensure you have the appropriate approval to fly above this limit from the local aviation regulatory body.
DJI Visual Positioning is active	DJI reported that the in-flight vision positioning system has been activated due to low GPS for navigation.	Use DJI Pilot app to switch off if required.
DJI configuration changes: Multiple flight mode settings unknown	The current **Multiple Flight Modes** setting could not be determined from DJI.	
DJI configuration changes: Battery critical threshold unknown	The current critical battery threshold could not be provided by DJI.	
DJI configuration changes: Battery warning threshold unknown	The current warning battery threshold could not be provided by DJI.	
DJI configuration changes: Smart RTH status unknown	The current **Smart RTH** setting could not be provided by DJI.	
DJI configuration changes: Novice mode setting unknown	The current **Novice mode** setting could not be provided by DJI.	

Notification	Description	Recommended Action
DJI configuration changes: Disabling novice mode failed	Attempting to disable the **Novice mode** setting through DJI failed.	
DJI configuration changes: Downward vision positioning status unknown	The current **Downward vision positioning** setting could not be provided by DJI.	
DJI configuration changes: Changing downward vision positioning failed	Attempting to change the state of the **Downward vision positioning** setting through DJI failed.	
DJI configuration changes: Changing vision assisted positioning state failed	Attempting to change the state of the **Vision assisted positioning** setting through DJI failed.	
DJI configuration changes: Precision landing status unknown	The current **Precision Landing** setting could not be provided by DJI.	
DJI configuration changes: Changing active obstacle avoidance state failed	Attempting to change the state of the **Active obstacle avoidance** setting through DJI failed.	
DJI configuration changes: Changing upward collision avoidance state failed	Attempting to change the state of the **Upwards collision avoidance** setting through DJI failed.	
DJI configuration changes: Changing RTH obstacle avoidance state failed	Attempting to change the state of the **RTH obstacle avoidance** setting through DJI failed.	

Notification	Description	Recommended Action
DJI configuration changes: Changing horizontal vision obstacle avoidance failed	Attempting to change the state of the **Horizontal vision obstacle avoidance** setting through DJI failed.	
DJI configuration changes: Landing protection status unknown	The current **Precision Landing** setting could not be provided by DJI.	
DJI configuration changes: Changing advanced pilot assistance state failed	Attempting to change the state of the **Advanced pilot assistance** setting through DJI failed.	
Battery high age or wear	DJI has reported that the drone's batteries have a high level of age or wear.	
Battery too cold	DJI has reported that the drone's batteries are too cold.	
Battery cell broken	DJI has reported that one of drone's batteries has a broken cell.	
Geofence enabled	The Geofence applied by DJI is active.	Use DJI Pilot to disable geofence.
Geofence disabled	The Geofence applied by DJI is not active.	Use DJI Pilot to enable geofence.

4.7 Tablet Notifications

Notification	Description	Recommended Action
Warning		
Tablet battery critical and may shut down. Hovermap control can be lost. Bring the robot home as soon as possible.	The tablet battery is critical and the tablet is about to shut down.	Bring the robot home as soon as possible.
Caution		
Tablet battery very low	The tablet battery is very low.	
Tablet storage is low. It is recommended to free up space before starting your mission	The storage space on the tablet is low.	Free up storage space
Tablet storage very low. Free up storage space.	The storage space on the tablet is very low.	Free up storage space
Wi-Fi lost - attempting to connect	The tablet Wi-Fi was not available.	

4.8 Commander Status Notifications

Notification	Description	Recommended Action
Critical		
No Hovermap connected. Please check and turn off any unsupported networks (e.g. Mobile data)	A Hovermap is currently not connected to Commander, but an unsupported network has been detected which may be preventing connection.	You need to approve connection to a Wi-Fi that does not have internet access, or turn off mobile data.
Commander - Hovermap version mismatch	The Emesent Cortex version is not compatible with Emesent Commander. A mission cannot be started unless both versions are compatible.	Download the latest versions of Emesent Cortex and Emesent Commander from the Emesent Customer Portal (https://emesent.com/software-downloads), then reconnect.
Failed to change Shield Settings. Please try again.	Attempting to change the Shield settings failed for an unknown reason.	Try changing the settings again.
Failed to change Mission Settings. Please try again.	Attempting to change the Mission Settings failed for an unknown reason.	Try changing the settings again.
Location services MUST be turned on	The tablet's location services are turned off, resulting in the Wi-Fi information not being published. It needs to be turned back on for reliable payload reconnection.	Enable the Location Services on your device.
Warning		
Commander - Hovermap version mismatch	The Emesent Cortex version is not compatible with Emesent Commander. A mission cannot be started unless both versions are compatible.	Download the latest versions of Emesent Cortex and Emesent Commander from the Emesent Customer Portal (https://emesent.com/software-downloads), then reconnect.

Notification	Description	Recommended Action
Status		
Starting Scan	A scan has been started by the user.	
Stopping scan	A scan has been stopped by the user.	
Establishing onboard communications	The connection from the tablet to the payload is not receiving data and the tablet is waiting for a response from the server.	
The preferred Hovermap Wi-Fi is available	When a Hovermap drops out of Wi-Fi range and a new non-Hovermap network is connected, the last Hovermap network will be saved. When the Hovermap comes back in Wi-Fi range, you will receive this notification.	If the Wi-Fi does not automatically reconnect, re-select the preferred Hovermap from the Android Wi-Fi Manager. Disable the auto reconnect option for all other networks.
A new Hovermap has been connected	When a scan is running and the Wi-Fi connection is changed to a new Hovermap network.	
A new Wi-Fi network has been connected	The Hovermap being used to run the scan is no longer connected. The Wi-Fi connection is changed to a new non-Hovermap network.	You will need to manually reconnect using the Android Wi-Fi Manager.
Success		
Ready for mission	An autonomous scan has been started, all pre-checks have been completed, and the mission is ready to commence.	Arm your robot then press Take Off to start your mission.
Ready for mission	A mapping scan has been started, all pre-checks have been completed, and the mission is ready to commence.	Start your mission.

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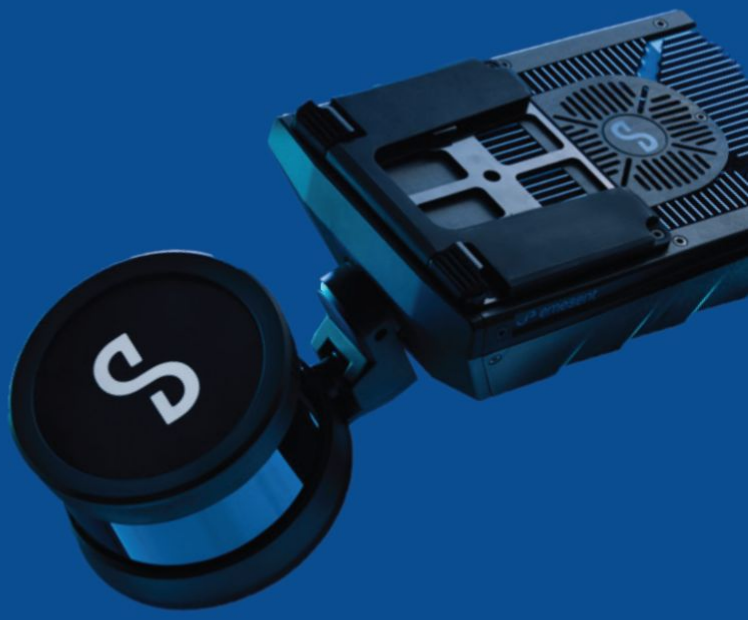

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