



EMESENT CORTEX 3.3.3 RELEASE NOTES

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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. It is therefore recommended to 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.

Warning

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.



This document contains a summary of new features, changes, improvements, fixes, and known issues in Emesent Cortex releases. The following table lists the supported version for each platform:

Platform	Supported Drone Firmware
DJI M210v1	01.02.0000 01.02.0301 01.02.0450
DJI M300	03.00.0101 and above
DJI M350	09.01.01.02 and above
DJI M600 (Mapping missions only)	01.00.01.67
Spot	3.3.0 and above
Freefly Astro	1.4.6 and above

Emesent Cortex Releases

Scroll down to review notes from previous Hovermap Software releases.

- [Emesent Cortex 3.3.3 \(Current\)](#)
- [Emesent Cortex 3.3.2](#)
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- [Emesent Cortex 3.3](#)
- [Emesent Cortex 3.2.3](#)
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Emesent Cortex 3.3.3 (Current)

This update **removes the restrictions** for Freefly Astro users and is compatible with all supported platforms.

Fixed in this release

- Timing Synchronization Fix for Long-Scan Operations
 - Resolved issues with Double PPS (Pulse Per Second) and timing synchronization failures associated with long-scan operations, ensuring greater data accuracy and reliability during extended scans.
 - Trimble R10/R12 and R12i Support (Available with Aura 1.8 and upcoming hardware support)
- Leica GNSS Support (Available with an upcoming Aura release and upcoming hardware support)
- Firmware Downgrade Prevention
 - Prevented downgrades to firmware version 3.2.3 to maintain system integrity and avoid compatibility issues.

Emesent Cortex 3.3.2

Attention Freefly Astro users: This update is **NOT RECOMMENDED** for your device. We will soon release a version compatible with Astro, which includes the same updates as this version. If you are unsure about which update applies to you, contact **Emesent Technical Support Services** at customer-success@emesent.io.

Fixed in this release

- Resolved an issue where scans, in rare cases, could not be downloaded from the Hovermap when offloading via USB.



Known Issues

- Changes to the Return to Home (RTH) performance may result in Hovermap not taking the most direct route home and this failsafe may therefore trigger earlier than expected. This issue occurs predominantly in open spaces but can be mitigated by cancelling the RTH action and landing your aircraft when appropriate.



Emesent Cortex 3.3.1

Attention Freely Astro users: This update is **NOT RECOMMENDED** for your device. We will soon release a version compatible with Astro, which includes the same updates as this version. If you are unsure about which update applies to you, contact **Emesent Technical Support Services** at customer-success@emesent.io.

Fixed in this release

- Resolved an issue affecting some Hovermap ST-X units where time synchronization errors occurred during long scans (around 26 minutes or more) in challenging thermal conditions, causing RTK georeferencing to fail.



Emesent Cortex 3.3

Attention Freely Astro users: This update is **NOT RECOMMENDED** for your device. We will soon release a version compatible with Astro, which includes the same updates as this version. If you are unsure about which update applies to you, contact **Emesent Technical Support Services** at customer-success@emesent.io.

- [Major Changes](#)
- [Minor Changes](#)
- [Fixed in this release](#)

Major Changes

Fast Data Offload

Improvements to the handling and compression of scan files now result in significantly reduced offload times, whether to USB devices or over Wi-Fi.

Minor Changes

RTK Status in Emesent Commander

In this release, RTK status information is now accessible in Emesent Commander, allowing users to easily monitor key details when using Vehicle RTK or Backpack RTK, including:

- RTK Status (Fixed, Float, Single, No GPS, Offline)
- number of satellites in use by the GNSS receiver
- the GNSS receiver's reported location and precision

With RTK information directly available in Emesent Commander, users can stay updated without switching to the GNSS receiver's native application to check for information. In addition, this release features enhanced support for Emlid RS2/RS2+/RS3 receivers.



Improved Backpanel USB Ethernet Connectivity

For users with Wi-Fi turned off and connecting via the back panel USB Ethernet, the connection now features a built-in DHCP server. While the traditional method of connecting via the back panel USB Ethernet remains functional, this latest update streamlines the connection process by eliminating the need for static network configuration. Simply connect your machine to the Ethernet port and navigate to **hover.map** or **192.168.3.115** to access the network.

Dynamic SSID Renaming for Long Range Radio (LRR)

When connected to Hovermap, the Long Range Radio's SSID is dynamically renamed to match the Hovermap, ensuring that the SSID always reflects the Hovermap it is currently paired with.

Previously, the LRR's SSID was hard-coded with the Hovermap serial number during production. This meant that the SSID remained regardless of the Hovermap it was connected to. With this update, when a Hovermap is booted up with an LRR attached, the Hovermap checks the LRR's SSID and if different, automatically renames to reflect the Hovermap's serial number ensuring clear identification and alignment between the devices.

By simplifying identification in multi-drone environments, users can interchange LRR's between Hovermap units without confusion caused by mismatched SSIDs.

Hovermap Wi-Fi Password Change Support

Users can now change the Hovermap Wi-Fi password directly through the Web UI. In previous versions, the password was preset during production and not customizable. In this release, users have the flexibility to set and modify the password according to their security preferences and operational needs.

Hovermap Wi-Fi Disable Confirmation

To prevent unintentional deactivation of the Hovermap Wi-Fi, a confirmation checkbox has been implemented in the Web UI. This change prevents scenarios where users might inadvertently disable Wi-Fi without an alternative connection, potentially causing operational disruptions or difficulties in re-establishing connectivity.

Automatic Robotic Platform Detection Enhancement

Enhancements were made to enable the automatic detection of Backpack RTK and Vehicle RTK data in Emesent Aura to allow for a more seamless user experience.



Fixed in this release

- Fixed an issue that occasionally prevents transitioning from Autonomous to Pilot Assist mode.
- Fixed an issue that could prevent the Hovermap from stopping a scan during a handheld mission.



Emesent Cortex 3.2.3

Fixed in this release

- Addressed an issue with yaw control stuttering during Pilot Assist missions when Hovermap detects that it has drifted from its desired position. This is now limited to scenarios where the aircraft is "locked in" by Shield constraints. In such instances, pilot-initiated yaw control will temporarily pause while Hovermap readjusts to its designated position to ensure stable flight.



Emesent Cortex 3.2.2

This is a critical update for all Emesent Cortex version 3.1 and above users.

The **Hovermap Software** has been renamed as **Emesent Cortex**. All future software releases will be under this new name.

Minor Changes

- Minor change to support the Emlid RS2/2+ RTK GNSS Receiver for Vehicle RTK.
- Minor change to support a Freefly Astro firmware update (1.5.18).
- Improvements to reduce Emesent Cortex memory bandwidth usage.
- Reduced the time to enable the full **Shield** from 15 seconds to 7 seconds in Pilot Assist (Plus) missions.

Fixed in this release

- Fixed an issue in Pilot Assist (Plus) mode where an aircraft could slowly drift and crash if locked in by obstacles for a long period.
- Fixed an issue where the Hovermap would issue multiple “Hovermap Ready” alerts after passing pre-mission checks.
- Greatly improved an issue in Pilot Assist (Plus) flights where very small obstacles may be reported, even when none are visible. This issue is very rarely observed now.



Hovermap Software 3.2.1

This is a critical update for all Hovermap Software version 3.1 users.

Fixed in this release

- Fixed an issue that may cause loss of perception for short periods during flight, resulting in the inability to detect obstacles and potentially leading to a collision during a Pilot Assist flight.

Known Issues

- An issue exists with Pilot Assist flights where it may report the presence of very small obstacles, such as single points, even when there are no visible obstacles. Performing a clearing turn does not eliminate these false obstacle signals, and they could trigger a dust failsafe if the user switches to Autonomous mode.
- An issue exists that occasionally prevents transitioning from Autonomous to Pilot Assist mode and then landing, forcing the user to wait for the battery failsafe to trigger and land the drone automatically.
- Changes to the Return to Home (RTH) performance may result in Hovermap not taking the most direct route home and this failsafe may therefore trigger earlier than expected. This issue occurs predominantly in open spaces but can be mitigated by cancelling the RTH action and landing your aircraft when appropriate (e.g. when the remaining battery passes 20%).



Hovermap Software 3.2

Major Change

Freefly Astro Drone Support

This update introduces support for Freefly Astro drones utilizing the Hovermap as a payload.

Fixed in this release

- Enhanced the USB size detection for data offload procedure.
- Fixed a bug that, in rare cases, causes the DJI M350 to fail to disarm on auto-landing.
- Fixed a bug that would occasionally result in scans being unable to be processed.



Hovermap Software 3.1

- [Major Changes](#)
- [Minor Changes](#)
- [Fixed in this release](#)

Major Changes

M350 Drone Support

This update introduces support for DJI M350 drones utilizing the Hovermap as a DJI payload. Note the following key changes:

- The activation process for the Hovermap payload has been eliminated.
- To configure the Hovermap on an M350 or M300, adjusting the baud rate within the OSDK settings is required. Other components remain unaffected by this adjustment.

Auto power-on

A new **Auto power-on** option has been introduced in the Web UI to facilitate automatic activation. When enabled, the Hovermap will boot automatically as soon as power is supplied. This setting persists until manually disabled.

Enhanced Pose Estimation for Improved Safety

Drone safety has been improved with significant upgrades to the accuracy and reliability of the drone position estimation. This ensures safer flights and results in smoother flight experiences.



Minor Changes

- Data offload
 - Improved support for Sandisk USB Extreme Pro and USB 3.2 Gen 1x1 (USB 3.1 Gen 1 or USB 3.0)
- Perception system improvement
 - The perception safety system has been improved to allow more robust flying around obstacles.
- External device support
 - Added ability to connect to an external RTK device for future integrations.
- Backpanel LED
 - LEDs immediately respond to button presses and maintain for at least 7 seconds or until released, whichever comes first.
 - USB data offloads on a Hovermap ST will have a wiping blue bar instead of a light blue breathing pattern.
- Failsafes
 - A new logic for the **Lidar Data Integrity** failsafe has been introduced, including an additional warning. For more information, refer to the *Hovermap Operational Failsafes* and *Hovermap Notifications* sections in the [Hovermap User Manual](#).
- Web UI
 - USB logs now present information in a more structured or clearer format.
 - GPS Status indicator is present when a supported GPS or RTK module is attached.

Fixed in this release

- Fixed an issue where starting a scan with batter level under the low battery threshold caused the battery failsafes to not trigger.



Hovermap Software 3.0.4

This is a critical update for Hovermap 100 users.

Fixed in this release

- Fixed an issue where the IMU configuration occasionally failed to initialize correctly due to a timing issue in the boot sequence. This ensures consistent and proper IMU configuration upon system startup.
- Fixed an issue preventing the safe upgrade of very old Hovermap Software versions to 3.0 on Hovermap 100.



Hovermap Software 3.0.3

Fixed in this release

- Fixed the startup process for mission management, reducing CPU load during operation.



Hovermap Software 3.0.0

- [Major Changes](#)
- [Minor Changes](#)
- [Known Issues](#)

Major Changes

Advanced Navigation (State Estimation)

Commander automatically determines the environment it is in and automatically selects the most appropriate navigation source (SLAM, GPS, INS), removing the guesswork so you can confidently perform mission objectives.

- SLAM is always used as the primary navigation source. In the event of any issues with SLAM, the drone will Return to Home.
- In a GPS environment, the system will drop to GPS if SLAM is lost. If GPS is subsequently lost, then it will drop into drone INS.

Improved Perception

A new perception pipeline (with increased precision, accuracy, and range) has been introduced to fix known issues with the previous system.

- The drone can now fly up to 1.5 meters further away from obstacles, whenever the environment allows it. This improvement has helped the robot reach its target speed of 2 meters per second more frequently. Additionally, there's less interference from LiDAR occlusion and shadowing, resulting in better mapping coverage.
- When running a mission in Pilot Assist mode, the obstacle proximity indicators for Hovermap's collision avoidance system (Shield) have been improved to ensure a safe distance is kept from even the most hard-to-detect obstacles for safer flying.
- The robot can no longer land while rotating when Shield is enabled.



Dust Filtering

An advanced algorithm has been introduced to effectively eliminate noise and artifacts, caused by dust particles, from LiDAR data captured on a Hovermap ST-X while preserving the original surrounding data.

- Allows Hovermap ST-X to operate better in dusty environments.
- Prevents misrepresentation of objects or terrain due to dust interference.
- Ensures the Hovermap ST-X can continue data collection without the need for frequent interruptions.

Improved Notifications

The usability of the app notifications for the built-in failsafes including the pre-flight checks has been improved.

- **Critical Errors and Warning notifications:** Displayed at the top of the screen, including solutions so users know how to respond.
- **Caution notifications:** Only shown in the Notification panel to avoid overwhelming the user with too much information.
- **Status and Success notifications:** Notifies users of successful actions and state changes that do not need interaction. These notifications clear automatically after 10 seconds.

Notifications are color-coded according to severity. For more information, refer to the *Hovermap Operational Failsafes* and *Hovermap Notifications* sections in the [Hovermap User Manual](#).

Improved LiDAR Lockout Handling

Environmental factors such as the presence of fog or gas can cause a LiDAR point drop, leading to Hovermap's inability to perceive its surroundings. In the past, a point drop would result in a LiDAR lockout, which required users to contact Emesent to unlock their system. In this version, Hovermap will no longer lock the LiDAR. The system will simply return home when a LiDAR point drop occurs. After experiencing a LiDAR point drop and successfully returning home, Hovermap will be ready for continued use.

**Note**

To minimize the chance of a point drop, Emesent recommends using anti-fog spray and allowing some time for Hovermap to adjust to the ambient temperature of its surroundings.

Networking

- Hovermap ST users can now disable Wi-Fi on their payloads from the Web UI.
- Users can configure the network address assigned to the Ethernet on the Fischer connector via the Web UI.
- Connecting a USB-Ethernet adaptor to the back panel USB now provides a rescue interface:
 - Hovermap 100: 192.168.2.115/24
 - Hovermap ST: 192.168.3.115/24
- Network hostnames are now based on device serial numbers.

Minor Changes

- DJI M300 low battery mark is set globally at 20%.
- The take off height is set at 1m.
- The Direct RTH feature has been removed.
- The **Start** button on the Web UI has been changed to **Start Mapping Mission**, which launches a mission in Mapping mode.
- RTK PPS signals logging has been added to the public bag files.
- Solid red lights indicate a microcontroller firmware is being upgraded.

Known Issues

- When an RTH (Return to Home) Failsafe is already in progress and another RTH Failsafe is activated, a brief and noticeable interruption occurs in the RTH sequence.
- There is a delay (less than 10 seconds) in the time it takes for the user to take off again after landing. During the period when the state estimation is stabilizing, the system will indicate a "Degraded" state to ensure that take-off is not allowed.



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