SETUP TRIMBLE R10/ R10-2 AND R12/R12I FOR EMESENT RTK

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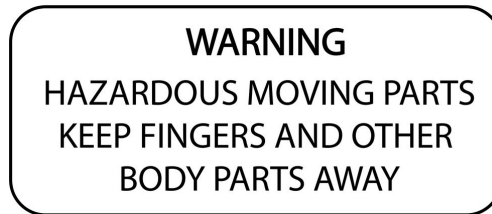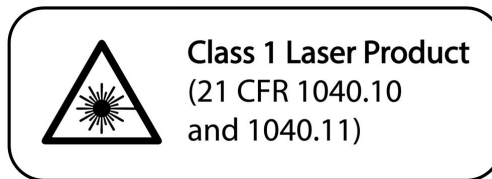
By using this product, you hereby agree that you are solely responsible for your own conduct while using it, and for any consequences thereof. You also agree to use this product only for purposes that are in accordance with all applicable laws, rules and regulations.

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.

Class 1 Laser Product
(21 CFR 1040.10 and 1040.11)

WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER
BODY PARTS AWAY

Contents

1.   Overview

This document shows how to configure and set up supported Trimble receivers for use with Emesent's Backpack or Vehicle RTK units.

> ℹ️   The term "Trimble receiver", used throughout this guide, refers specifically to the devices supported by Vehicle RTK and Backpack RTK devices. Currently, these include the Trimble R12/R12i and R10/R10-2 receivers.

2.   Scope

This document will not cover the setup of the Trimble receiver from scratch, connecting the receiver to the Field Controller, or connecting to a base station or network corrections service.

> ⚠️   It is recommended that the receiver be configured through the Trimble web interface rather than the Trimble controllers to avoid overriding the receiver's settings.

3.   Requirements

The following are required to set up the Trimble receiver:

Hardware	Details
Computer	• PC or Laptop • Latest version of Chrome, Firefox, Safari, or Edge
Emesent RTK unit	• Backpack RTK • Vehicle RTK
Emesent accessories	• GNSS adaptor • Mounting plate
Cable	• Emesent Trimble GNSS cable

4.   Configuring the Trimble Receiver

4.1   Connecting to the Trimble Receiver

1.   Turn on the Trimble receiver then connect to the receiver's Wi-Fi network.

2.   Once connected, enter **192.168.142.1** in the URL address bar on your Web browser.

3.   Enter your credentials on the **Login** page.

    a.   The default username is **admin**

    b.   The default password is **password**
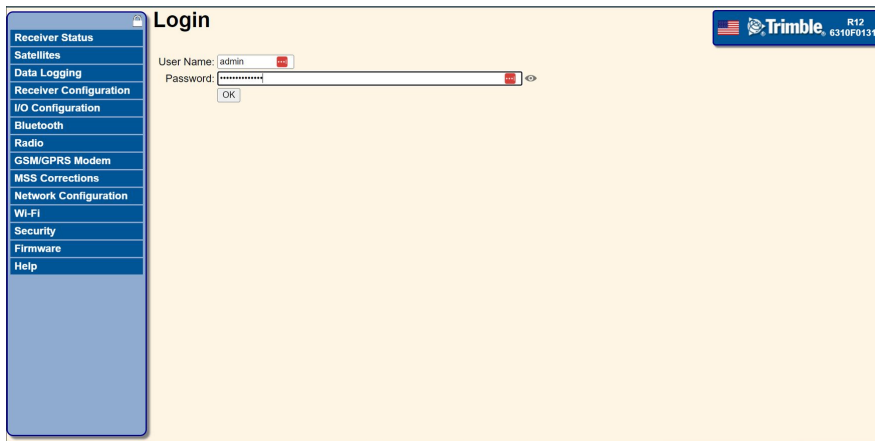
4.2   Checking the NMEA Installation

To avoid issues, check if the NMEA option is properly installed.

1.   Go to **Receiver Status** > **Receiver Options** from the panel on the left. From the panel on the right, click **Option Detail** located at the bottom.

2.   In the **Options** column, find **NMEA** in the list. Then in the **Installed** column, ensure an "X" is marked next to NMEA.

4.3 Configuring the NMEA Settings

Once connected, configure the NMEA settings to make sure the Trimble receiver can communicate properly with the Hovermap.

1. Go to **I/O Configuration** > **Port Summary** on the left panel. On the right panel, click **Serial** (under the **Type** column).

2. In the configuration window that appears, locate the two fields at the top of the page. Click on the drop-down arrow for the first field and select **Serial1/Lemo** from the list. Then for the second field, choose **NMEA**.

3. Under **Serial Port Setup**, configure the following settings:

   ◦ Baud = 115200

   ◦ Parity = N

   ◦ Flow = Disabled

4. In the **Input/Output** section, you will see a list of NMEA messages. Click on the drop-down arrow beside each of the following messages and configure their settings:

   ◦ GGA = 5 Hz

   ◦ GSA = 5 Hz

   ◦ GST = 5 Hz

   ◦ ZDA = 5 Hz

   ◦ SVG = 1 Hz

5. Click **OK** to save your settings. The screenshot below shows the Port Summary page after configuration.

4.4   Configure the Tilt and Antenna Height

1.   Go to **Receiver Configuration** > **Antenna** on the left panel.

2.   From the available options on the right panel, configure the following settings:

     ◦   Antenna Measurement Method = Antenna Phase Centre

     ◦   Antenna Height = 0.000
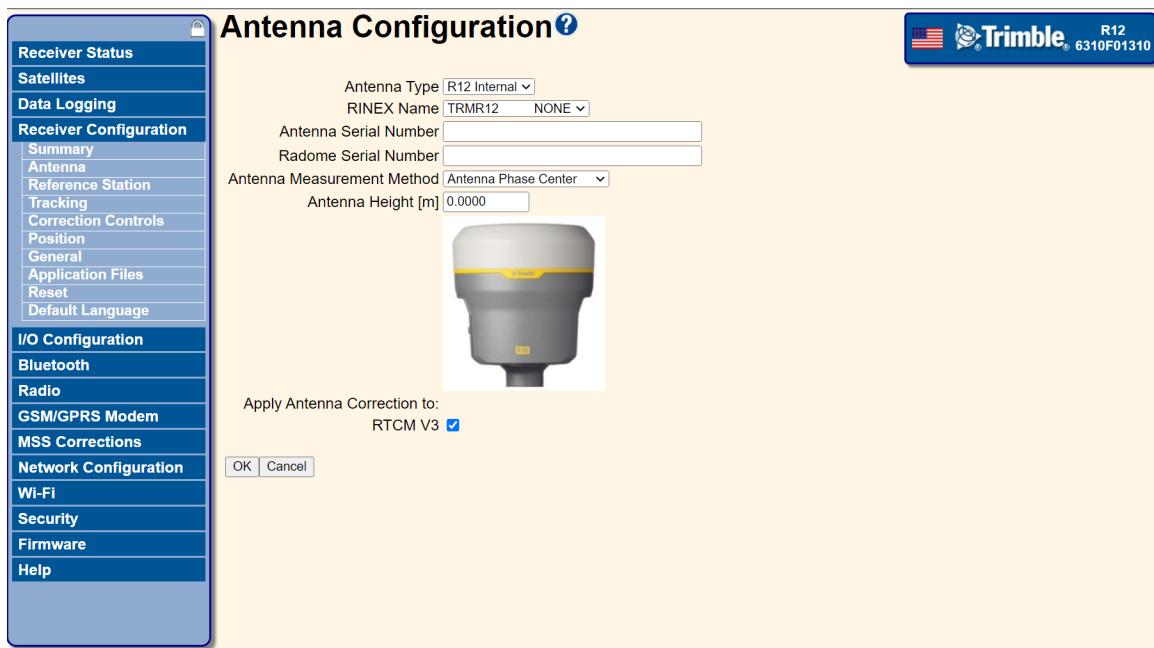
4.4.1   Using Tilt Compensation

If the **Antenna Height** is set to **0.000**, tilt compensation settings will not apply. However, it is still recommended to disable tilt compensation for optimal performance. To do this, go to **Receiver Configuration** > **INS** then unselect the **INS Enable** option, then press **OK** to save the settings.
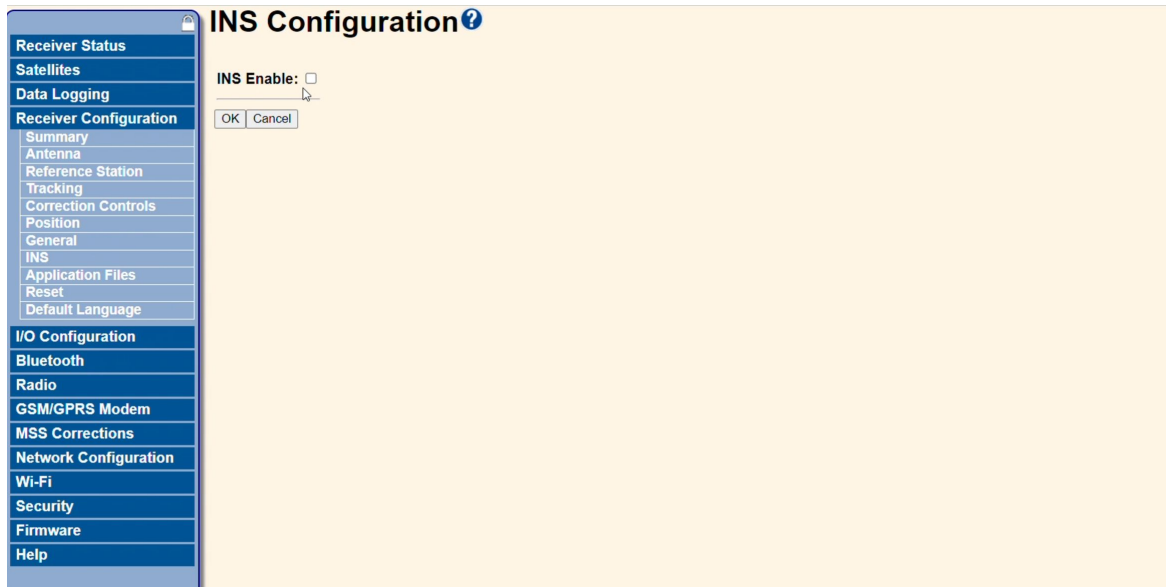
4.4.2   Receiver Motion Profile

If your Trimble receiver is mounted on a vehicle, to get the best results make sure that **Receiver Motion** is set to **Kinematic** or another appropriate model. This setting can be found under **Receiver Configuration** > **Position**. Click **OK** to save the setting.
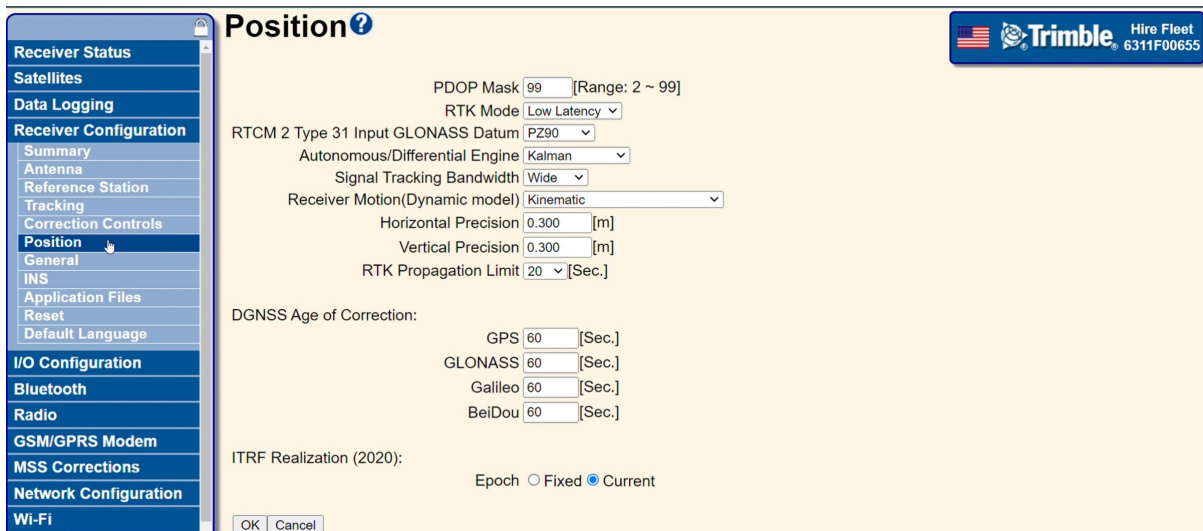
5.   Connecting to Hovermap

1.   Attach the Hovermap and Trimble receiver to the Vehicle RTK or Backpack RTK unit. Refer to the https://4999118.hs-sites.com/en/knowledge/vehicle-rtk-user-manual and https://4999118.hs-sites.com/en/knowledge/backpack-rtk-user-manual for instructions.

> ⚠️   When using the R12, use the Trimble 50mm quick-release spacer and the 100mm Emesent spacer to ensure the correct offset.

2. Once attached, plug the GNSS adaptor cable into the RTK mount and fasten the adaptor to the magnetic plate.

3. Plug the Trimble cable with the wire loop into the receiver and the other end (Black Lemo) into the **Adaptor** port. The Trimble receiver should now be set up to work with your Vehicle RTK or BackpaclRTK unit.

6.   Monitoring RTK Status

The **Emesent Commander** application provides clear visibility of the RTK status before and during the mission. This enables you to monitor RTK quality without leaving the app to check for information via Trimble's native application.

> ℹ️   If the settings are configured correctly and the Trimble receiver is properly connected, Emesent Commander will display the Position and Accuracy without errors. Any communication errors are displayed as a warning notification in the app.

> ⚠️   Hovermap cannot detect an incorrectly set antenna height so ensure it is properly configured.

7.   Processing RTK Data

> ⓘ   You must have **Emesent Aura version 1.8** or newer to process Trimble RTK data.

1.   Open Emesent Aura and in the **Process** tab, click **Process Scan**.

2.   In the **Configure New Scan Job** panel, select the **Process** workflow.

3.   Click **Add Dataset** then browse for the folder that contains the raw RTK data to be processed. Select that folder.

4.   You will be prompted once RTK data is detected in your dataset. Toggle on **Use RTK data**.
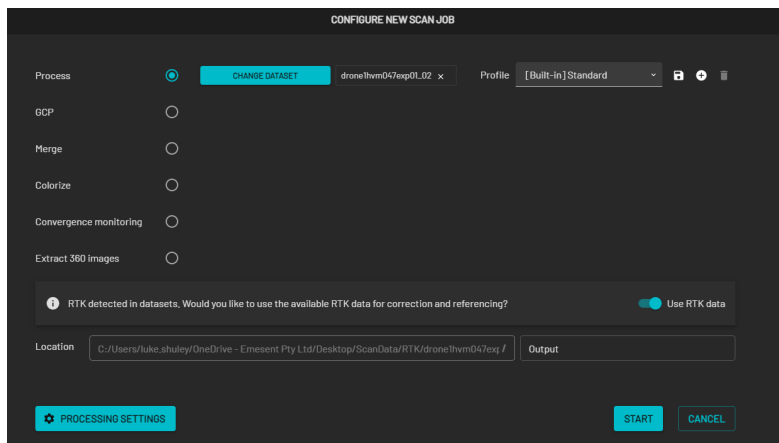
5.   In the **Location** field, enter the preferred name for the output folder. A subfolder is created, which stores all the processed results and data.

6. Click **Processing Settings**. Under **Georeferencing** in the **General** tab, select the RTK device and GNSS receiver used to capture the RTK data.
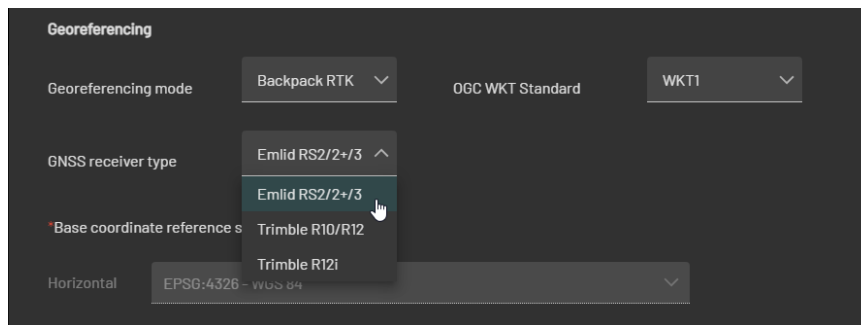
⚠ For optimal results, ensure that the **Georeferencing mode** and **GNSS receiver type** match the hardware used during data collection. While the resulting point cloud remains usable, the accuracy may be affected.

7. Under **Base coordinate reference system**, set the Coordinate Reference System in which the data was originally collected. This information is essential for accurate transformations and reprojections to the target CRS if you are reprojecting the point cloud.
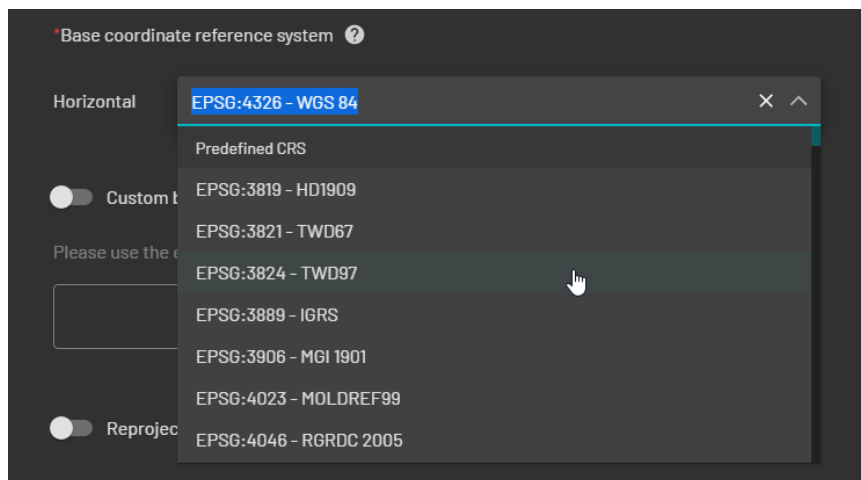
8. Click **Save** to apply the settings and return to the main screen. Then, click **Start** to process the scan.

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