Support Bulletin

Penmap for Android and R12i

GEOSPATIAL

December 2021

Penmap for Android has supported TIP-measurement with the R12i receiver since version **11.3.0.2058**. Penmap **always** uses TIP tilt compensation.

If the Inertial Measurement Unit (IMU) is aligned and the measurement accuracy matches the quality settings, Penmap measures as usual.

Requirements:

- Penmap for Android version 11.3.0.2058 or higher
- Trimble Mobile Manager version 2.8.1.1050 or higher

This Support Bulletin describes the steps to configure the receiver, Trimble Mobile Manager, and Penmap for Android to work with the R12i. Please expect to take some time for the configuration.

I) Configuration for first use

1. Install Trimble Mobile Manager
2. Configure Trimble Mobile Manager
3. Process the pole bias with Trimble Mobile Manager
4. Install Penmap for Android

II) Using R12i with Penmap for Android

1. Setting up the receiver in Penmap for Android
2. Connect to Receiver
3. Start Measurement

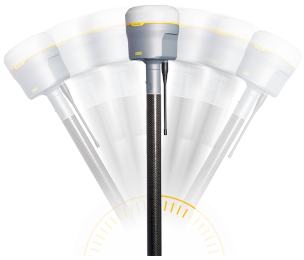
Notifications and how to handle them are listed at the end.

https://geospatial.trimble.com/

Definitions

Trimble TIP™

A New Angle of Productivity. Trimble is pleased to announce the release of the Trimble® R12i GNSS receiver. Featuring Trimble TIP™ tilt compensation technology for measurement and stakeout, built on the industry-leading Trimble ProPoint™ GNSS positioning engine, the Trimble R12i enables surveyors to get more done with their rover system than ever before.



Trimble TIP™ tilt compensation offers a completely different way of working because you can:

- Measure accurate points quickly while standing or walking without having to level the pole.
- Concentrate on where the pole tip needs to go, which is especially useful during stakeout.
- Easily survey hard-to-reach locations such as building corners and pipe inverts.
- No longer worry about movement of the pole when measuring, because the receiver automatically corrects for “pole wobble” when the pole tip is stationary.

Trimble Mobile Manager

Trimble Mobile Manager is the gateway to Trimble Catalyst-based solutions as well as the Trimble Subscription ecosystem.

Trimble Mobile Manager is required by Penmap when using the Catalyst on demand service or when an adjustment is needed for the R12i, such as pole bias adjustment and the IMU calibration.

Pole bias adjustment

The pole bias adjustment corrects errors introduced when using a pole that may have become damaged during normal use and is no longer perfectly straight, or if the pole tip is no longer true and perfectly aligned with the center of the pole. Pole bias adjustment should be performed in an optimal RTK environment with a good IMU alignment.

Trimble recommends that you perform the pole bias adjustment:

- When the receiver is using a pole and quick release in sub-optimal condition.
- Each time you change to a different pole.

IMU bias calibration

If poor quality data is detected, such as excessive IMU bias, the user is notified and can perform an “IMU bias calibration” via Trimble Mobile Manager.

Excessive IMU bias can be caused by any of the following:

- The receiver may have been dropped or suffered from some other form of physical abuse.

- The receiver has experienced a large temperature variation since the last time an IMU bias calibration was carried out, or the temperature is very different (many tens of degrees Celcius) from the time of the previous calibration.
- The internal biases inside the IMU increase as the sensors age over a long period of time.

Tilt/eBubble calibration

The GNSS eBubble uses the accelerometers in the receiver to provide an electronic representation of the degree of tilt of the receiver. In the case of an AINS receiver, the GNSS eBubble operates independently of the IMU sensors in the receiver.

GNSS eBubble calibration aligns the accelerometers in the receiver to the physical sensor used to measure tilt.

Note: Penmap for Android does not support the eBubble so the tilt calibration is not needed.

I) Configuration for first use

For the first use of the R12i with Penmap for Android we need to perform some configuration steps.

I.1 Install Trimble Mobile Manager

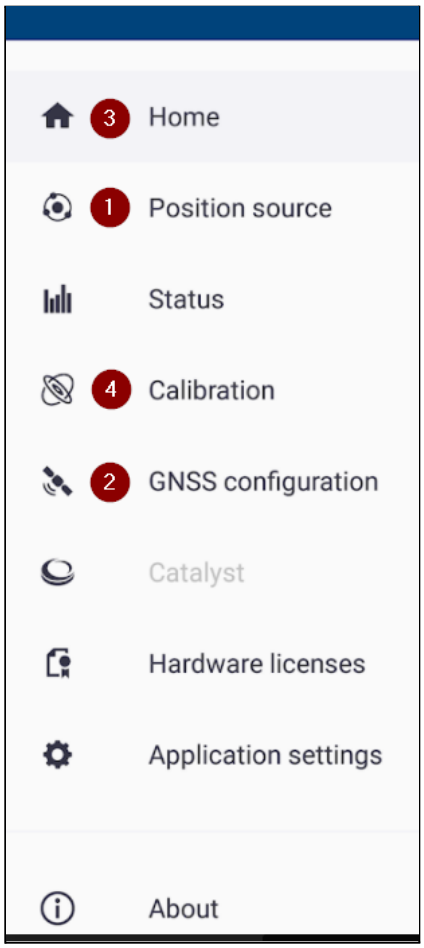
Install Trimble Mobile Manager from the Google Play Store.

I.2 Configure Trimble Mobile Manager

At launch you must allow 1) access to photos, media, and files on the device, 2) access to the device location, to take pictures and record videos, and then accept the End User License Agreement.

To connect the R12i and Trimble Mobile Manager some settings are required. The settings are saved for later use.

Login in to Trimble Mobile Manager with the same TID that is used in Penmap for Android.



1. Set R12i via **Main menu | Position source**
    a. **GNSS receiver type** -> Bluetooth Receiver
    b. **[List connected Devices] | Show all** -> Select R12i
    c. **Connect** the device

    Note: if the receiver is not displayed switch off and on or check if pairing via webUI is active

2. Set the correction service via **Main menu | GNSS configuration**
    a. GNSS correction source
        i. GNSS correction source -> e.g. Auto if Trimble Correction Hub can be used or Custom local to set up a specific Caster
    b. Server parameters
        i. Protocol -> NTRIP
        ii. Set your Server URL e.g. www.vrsnow.de
        iii. Port -> e.g. 2101
        iv. Mount point name -> e.g. TVN_RTCM_32
        v. GNSS source reference frame -> e.g. Auto
    c. Server Account
        i. Set username
        ii. And password for correction service
    d. GNSS output
        i. Detection mode -> Auto
        ii. Geoid -> e.g. EGM96 (global)
3. **Home**
    a. Connect to R12i
4. **Calibration**

I.3 Process the Pole bias adjustment with Trimble Mobile Manager

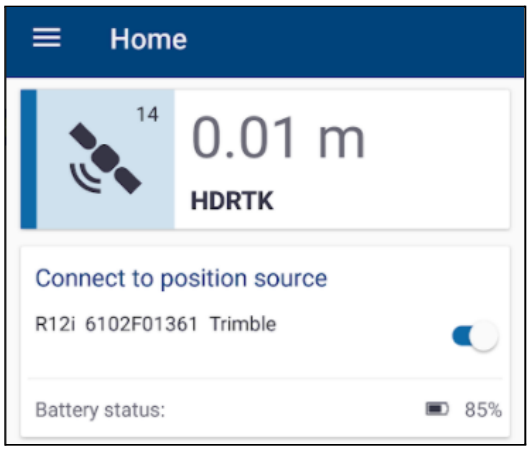
The first time a pole is used as well as each time a pole is changed a **pole bias adjustment** is recommended.

The pole bias adjustment requires:

- Connection to the Receiver
- RTK correction data
- Precision of 0.02m or better
- Aligned IMU

Complete the following steps to perform the pole adjustment:

1. Launch Trimble Mobile Manager
2. **Login** in to Trimble Mobile Manager with the **same TID** that is used in Penmap for Android
3. **Connect** to the receiver on the **Home** Screen



4. Make sure the connection to the correction service is established and the accuracy is 0.02 m or better
5. Go to **Calibration | Pole Bias adjustment**
6. Follow the instructions step by step until the calibration is complete
7. **Disconnect** R12i on the **Home** Screen

I.4 Install Penmap for Android

Install Penmap for Android from the Google Play Store.

At launch you must allow 1) access to photos, media, and files on the device, 2) access to the device location, to take pictures and record videos, and then accept the End User License Agreement.

II) Using R12i with Penmap for Android

If the configuration for Trimble Mobile Manager is ok, we can start setting up Penmap for Android

II.1 Setting up the Receiver in Penmap for Android

1. **Start Penmap for Android**
2. Create or **open a project**
3. Go to **GNSS | GNSS receiver**
4. Select **Trimble**
5. Model **R12i**
6. Connect via **Bluetooth**
7. Set **GNSS | RealTime Correction** (check the manual if assistance is needed)

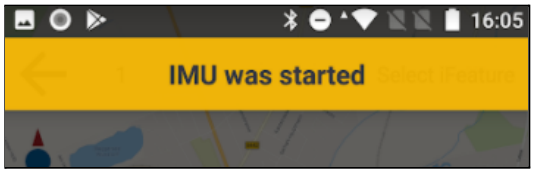
   Note: if the receiver is not displayed check if pairing via webUI is active

   *Note: if the pole has changed since the last adjustment **Start TMM to calibrate**… to Process the Pole bias adjustment with Trimble Mobile Manager*

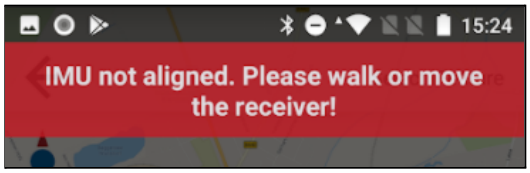
II.3 Connect to the receiver

1. **Start GNSS** to establish a connection to the receiver
2. Enter the correct antenna height - this is important for tilt measurement.

   Penmap will start the IMU (Inertial Measurement Unit) if it is disabled.

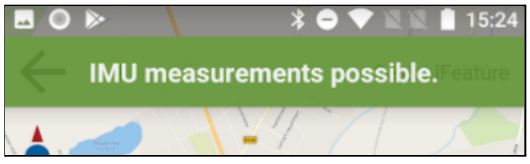


3. To start the measurement the IMU must be aligned. If the IMU is not aligned, the following message appears.



   Move the pole so that the receiver experiences acceleration and position change. This can range from rocking the survey pole back and forth while keeping the pole tip on the ground, to walking a short distance with some changes in direction.

4. Once the IMU is aligned the measurement can begin

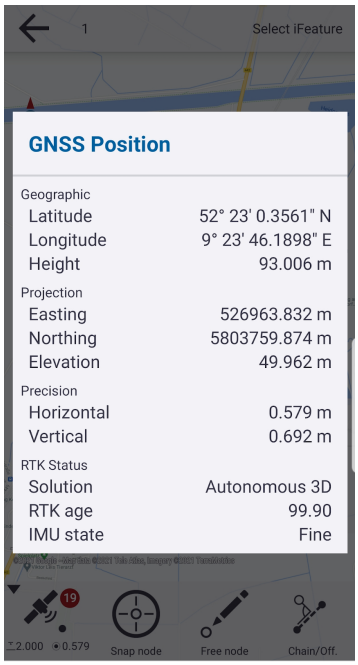


II.4 Measure

Measurement is possible when the IMU is aligned by tapping **Start GNSS**. Penmap for Android shows the horizontal accuracy at the GNSS Icon.

Precision values are displayed under **GNSS Settings |Position**.

Measurement is only possible if the IMU status is Fine. Coordinates and precision values are displayed at the pole tip.



Notifications in Penmap for Android

The receiver constantly monitors the IMU sensor for data quality and indicates the current quality. The following notifications in Penmap are possible:

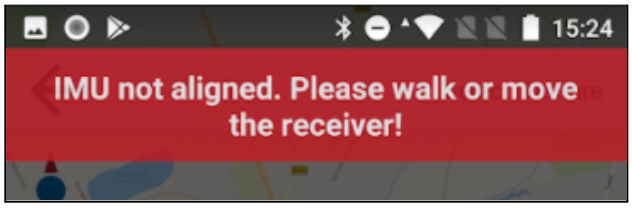
- IMU not aligned
- IMU state is unknown
- IMU error detection
- IMU excessive bias detection
- Pole bias adjustment expired

The following describes how to handle the message.

IMU not aligned

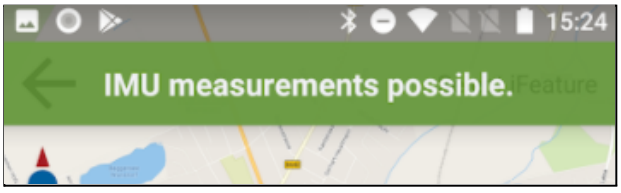
To use IMU tilt compensation, the IMU in the receiver must be aligned. The alignment process is simple and straightforward, and mimics normal use of the receiver.

If the IMU is not aligned the following message will be displayed.



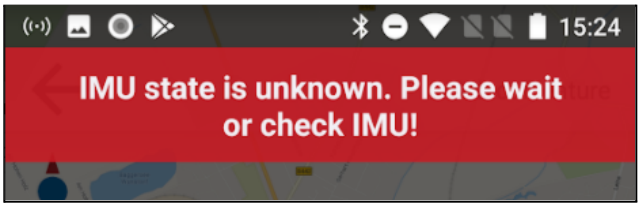
Move the pole so that the receiver experiences acceleration and position change. This can range from rocking the survey pole back and forth while keeping the pole tip on the ground, to walking a short distance with some changes in direction.

Once the IMU is aligned the measurement can begin.



IMU state is unknown

The IMU state is unknown. This is displayed e.g. when connecting to the real-time correction service. After connection, the message disappears and measurement is possible.



IMU error detection

If the IMU integrity monitoring feature detects the IMU sensor has become temporarily saturated due to an impact such as a pole drop, Penmap displays the warning message "**IMU has an error.**" In this case you must restart the receiver to reset the sensor.

Actions to deal with the warning are provided with the warning message. To immediately restart the receiver, tap **Restart**. To disconnect, tap **Disconnect** and try to restart the receiver.

IMU excessive bias detection

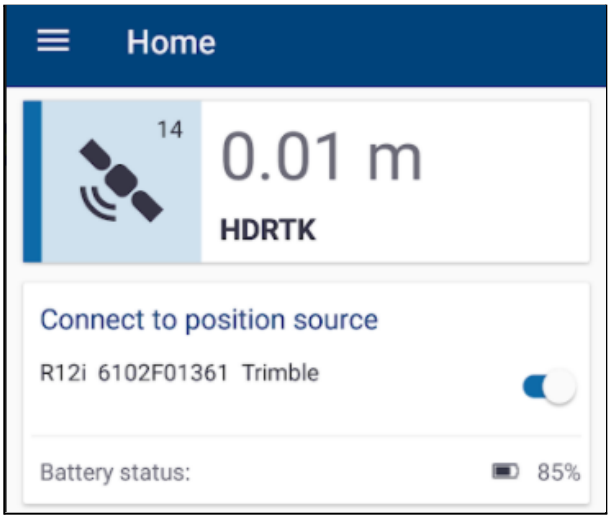
If poor quality data is detected, such as excessive IMU bias, Penmap displays the warning message "**IMU has an excessive bias error.**"

Follow the steps from IMU bias calibration in Trimble Mobile Manager:

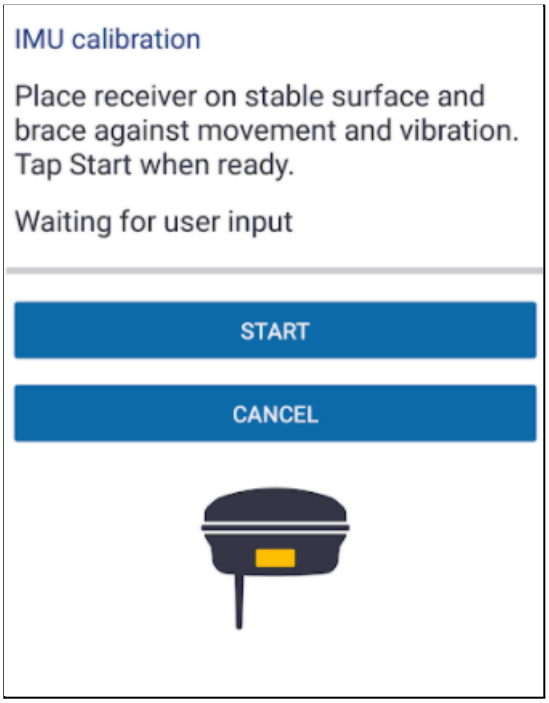
The IMU bias calibration requires:

- Connection to the receiver
- RTK correction data

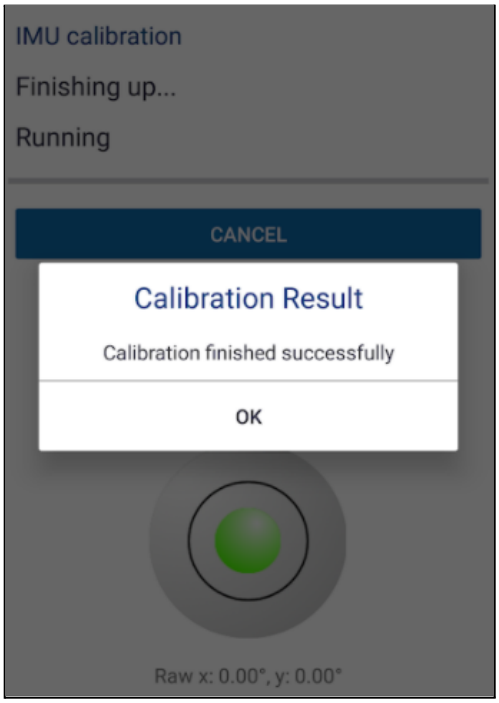
1. Start Trimble Mobile Manager
2. Connect to the receiver in the **Home** Screen



3. Go to **Calibration | IMU Calibration**
4. Follow the instructions step by step until the calibration is complete.
   Note: the picture shows how the receiver needs to be placed in each step.

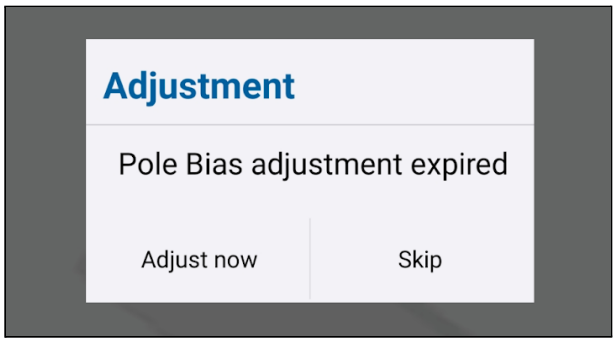


...Follow the steps...



Pole bias adjustment expired

The Pole bias adjustment may have an expiration date. If this message comes up during measurement you can skip it temporarily. If you want to do the adjustment just press **Adjust now** and follow the steps from Pole bias adjustment in Trimble Mobile Manager.



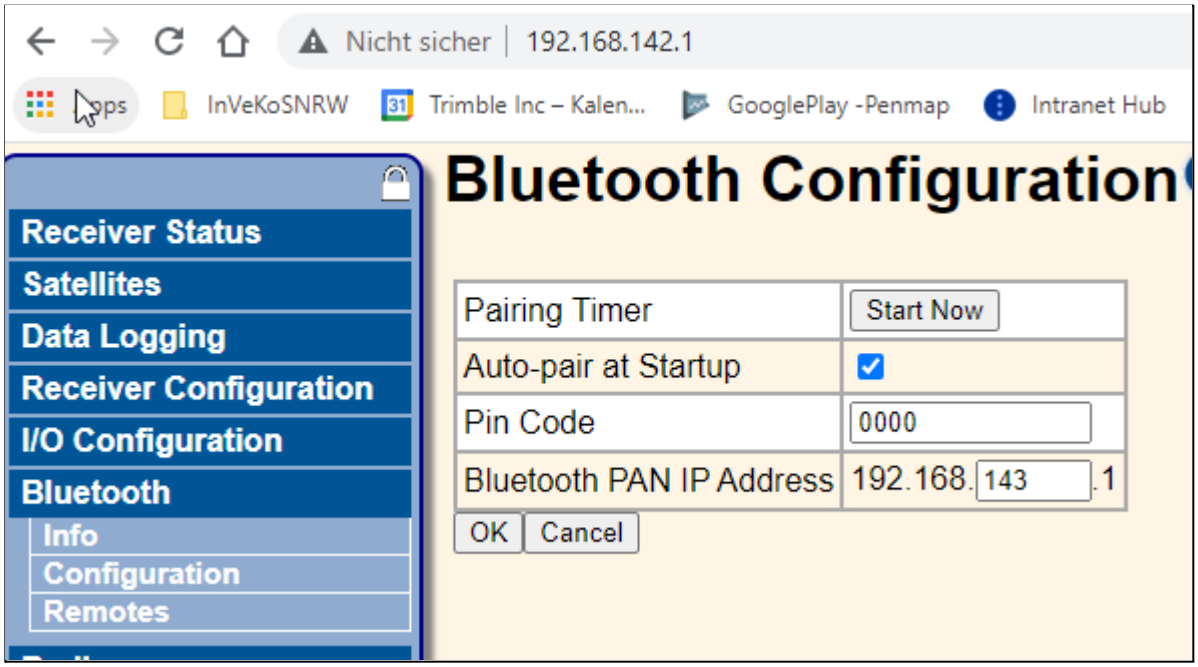
Activate pairing for R12i

To be able to pair the R12i via Bluetooth with your mobile device, the receiver configuration needs to allow this. To find out if the setting is correct, you can use the web UI built in to the receiver.

We recommend doing this via PC and WiFi.

1. Open the Wifi on your PC
2. Select the R12i (e.g. named “Trimble GNSS 1234”)
3. Connect the receiver

4. Open the webui in your internet browser http://192.168.142.1/
5. Enter username and password
6. Go to **Bluetooth|Configuration**
7. Click on **[Start Now]** at the **Pairing Timer**
8. Enable Auto-pair at Startup



Contact

For more information or questions contact the Trimble Penmap community.

https://community.trimble.com/groups/penmap-for-andriod