Skadi Series™

Skadi Smart Handle™

User Manual

Version 1.0

Last Updated: March 2025

Positioning Systems

Skadi Series™

Skadi Smart Handle™

User Manual

Version 1.0

Made for iOS®, Android™, and Windows®.

"Made for" means that an electronic accessory has been designed to connect specifically to an iOS®, Android™, and Windows® device and has been certified by the developer to meet performance standards. Third parties, such as Apple®, are not responsible for the operation of this device or its compliance with safety and regulatory standards. Please note that the use of this accessory with mobile devices may affect wireless performance.

Contents

Skadi Smart Handle™: The User Manual

The Skadi Smart Handle™ uses LiDAR and other powerful sensors to provide a one-of-a-kind RTK In Your Hand™ experience. It is an advanced GNSS accessory that eliminates the need for a surveying range pole. Additionally, crews can measure an asset located on the ground up to 7 meters (about 20 feet) away without having to physically occupy that location.

https://eos-gnss.com/knowledge-base/manuals/skadi-smart-handle

FIND THIS MANUAL ONLINE

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eos-gnss.com/knowledge-base/manuals/skadi-smart-handle

Important Safety Information

Do not skip this section before operating the Skadi Smart Handle.

Lasers are classified into safety classes based on their potential for causing injury to human eyes and skin. As such, laser products are typically required by law to have a label listing their class. The visible green laser pointer used in the Skadi Smart Handle is a low-powered Class 3B (IIIb). The power output of Class 3B lasers ranges from 5 milliwatts (mW) to 499 mW. The Skadi Smart Handle laser's power output ranges from 4-20 mW. This puts it at the very low end of Class 3B.

At the low end of Class 3B, defined as ~5 to 50 mW, a laser poses a moderate risk of eye injury when aimed at the eye. According to LaserSafetyFacts.com:

> ***It is unlikely that a handheld beam aimed from more than a few dozen feet away would cause injury — laser light could not stay on one spot on the retina long enough for heat to build up to injurious levels. However, the risk is increased if the beam is held steady or if the laser is relatively close to the eye.***

To further mitigate risk of injury, the smart handle's laser pointer blinks in a duty cycle, significantly reducing exposure time.

In certain regions where maximum mW is legally delimited below 5 mW, the Skadi Smart Handle's power output can be restricted to the maximum mW allowed via the Eos Tools Pro app.

The Skadi Smart Handle is designed to prioritize safety under normal operational conditions and comply with applicable laser safety standards. However, improper use of the laser, including intentionally pointing it at a person's eyes, may result in injury. By using the Skadi Smart Handle, the user agrees to operate it responsibly and assumes all risks associated with misuse or failure to follow the instructions outlined in this user manual. The manufacturer disclaims all liability for injuries or damages arising from improper use, intentional misuse, or failure to comply with safety standards.

What is Required to Use the Skadi Smart Handle?

There are several required items to take advantage of the Skadi Smart Handle.

Before you get started with the Skadi Smart Handle, make sure you have the following items:

Hardware:

- A Skadi 200™, Skadi 300™, or Skadi Gold™ GNSS receiver
- The Skadi Smart Handle (an upgrade from the standard handle)
- An Android™, iOS®, or Windows® mobile device
- Skadi Series™ Phone Mounting Bracket (SKA-KITPHONE) or Skadi Series™ Tablet Mounting Bracket (SKA-KITTABLET) (included with purchase of any Skadi GNSS receiver)

Software:

- Eos Tools Pro

GNSS Corrections:

- An RTK corrections source

Once you have all of these items, you may apply the following information in this manual.

SKADI 200

The Skadi 200 is a dual-frequency RTK GNSS receiver. It is our most affordable RTK receiver in the Skadi Series. Learn more about this GNSS receiver on our website:

eos-gnss.com/products/hardware/skadi-200

https://eos-gnss.com/products/hardware/skadi-200

SKADI 300

The Skadi 300 is a powerful triple-frequency GNSS receiver that includes SafeRTK® for when you temporarily lose Internet connection. Learn more about this GNSS receiver on our website:

eos-gnss.com/products/hardware/skadi-300

https://eos-gnss.com/products/hardware/skadi-300

SKADI GOLD

The Skadi Gold is our most robust, productive, and flexible GNSS receiver. It includes all the features of the Skadi 300 while supporting all GNSS constellations, frequencies, signals, and corrections for unmatched accuracy and productivity. Learn more about this GNSS receiver on our website:

eos-gnss.com/products/hardware/skadi-gold

https://eos-gnss.com/products/hardware/skadi-gold

SKADI SMART HANDLE™

The Skadi Smart Handle™ uses LiDAR and other powerful sensors to provide a one-of-a-kind RTK In Your Hand™ experience. This is an additional purchase to qualified Skadi GNSS receivers. Contact your Eos representative for purchasing information.

eos-gnss.com/products/hardware/skadi-smart-handle

https://eos-gnss.com/products/hardware/skadi-smart-handle

https://eos-gnss.com/products/accessories/mobile-device-mounting-and-bracket/skadi-series/smartphone

SKADI SERIES PHONE MOUNTING BRACKET (SKA-KITPHONE)

SKA-KITPHONE is a standard accessory included with all Skadi Series™ GNSS receiver purchases, regardless of model. Learn more about this GNSS accessory on our website:

eos-gnss.com/products/accessories/mobile-device-mounting-and-bracket/skadi-series/smartphone

https://eos-gnss.com/products/accessories/mobile-device-mounting-and-bracket/skadi-series/tablet

SKADI SERIES TABLET MOUNTING BRACKET (SKA-KITTABLET)

SKA-KITTABLET is a standard accessory included with all Skadi Series™ GNSS receiver purchases, regardless of model. Learn more about this GNSS accessory on our website:

eos-gnss.com/products/accessories/mobile-device-mounting-and-bracket/skadi-series/tablet

Overview of the Skadi Smart Handle's Two Modes

Your Skadi Smart Handle has two modes of operation: Extensible Virtual Range Pole™ and Invisible Range Pole™. Both modes are powered by a cutting-edge combination of sensors, including LiDAR. This section provides an understanding of each mode.

Mode 1: Extensible Virtual Range Pole™

Extensible Virtual Range Pole mode is the default mode of the Skadi Smart Handle. When you initialize your smart handle, this will be the mode that turns on automatically.

This mode is characterized by the use of a green laser pointer and the smart handle trigger.

The purpose of this mode is to streamline the precise measurement of targets that cannot be safely or quickly occupied by standing on them, such as a fixture in a trench. It may also be used to measure the positions of assets located in areas with partially obstructed line-of-sight to the sky, such as a meter on the side of a building.

Extensible Virtual Range Pole mode is designed for capturing nearby assets on the ground from about 7 meters (~20 feet) or less away.

Mode 1 Limitations

- ***Distance:*** The Extensible Virtual Range Pole mode has a distance limitation of about seven meters, or ~20 feet. If your target falls outside this range, you will need to move closer.
- ***Reflectivity:*** Your target must be able to reflect light. The functioning distance between the Skadi and the target is impacted by the reflectivity of the target. Darker and more porous targets, such as matte black surfaces and puddles of water, could prove challenging and require closer distance. Metallic, colored, and other targets that reflect lots of light are more suitable.

  If your target falls outside the LiDAR's range, moving closer should help.
- ***Height***: This mode is not designed to capture assets above the head, but rather those on the ground, such as assets in trenches.

  Neither is this mode designed to replace a laser rangefinder. A laser rangefinder will still be needed to perform laser offsets of long-distance assets, those above the head, and other select situations.

Mode 2: Invisible Range Pole™

The Invisible Range Pole mode is the second mode of the Skadi Smart Handle.

This mode makes no use of the green laser pointer and trigger.

The purpose of this mode is to provide flexibility in the field when a surveying range pole is not required. Invisible Range Pole mode continuously computes the X, Y, and Z positions of whatever is located directly underneath the Skadi receiver in the smart handle (i.e., any asset over which you position the receiver). This mimics the performance of a physical surveying range pole while you retain your 3D, survey-grade positional accuracy.

Invisible Range Pole mode is designed to continuously measure the X, Y, and Z position of the location of the ground or asset directly below the receiver.

Steps to Enable and Initialize the Skadi Smart Handle

Follow these steps to enable and initialize your smart handle from a cold start.

This chapter assumes you are starting from a cold start with the receiver powered off. If you are transitioning to the Skadi Smart Handle™ from Skadi Tilt Compensation™ on a range pole, please skip ahead to the **Transitioning from Skadi Tilt Compensation™** section later in this manual.

A. Mount Your GNSS Receiver to the Skadi Smart Handle

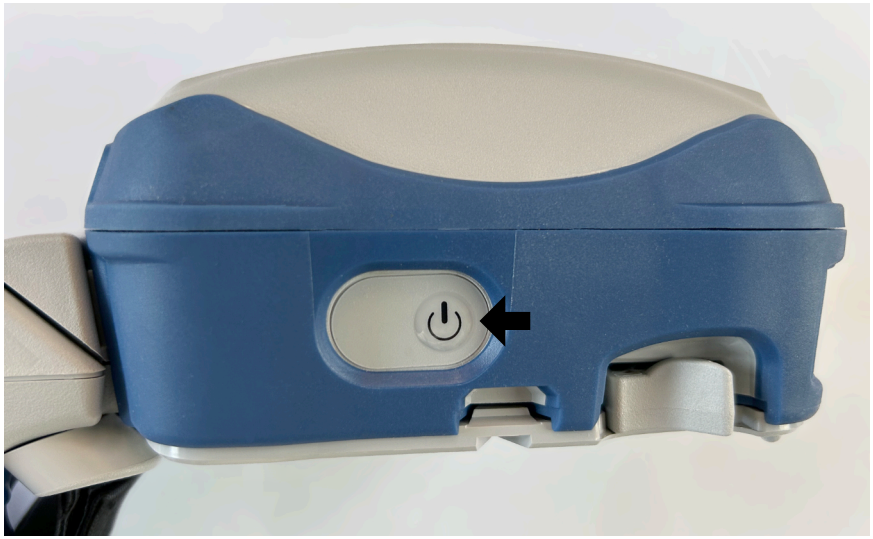
Release the battery pack from your Skadi receiver by pressing the two release latches on both sides of your receiver. They must be pressed at the same time. Insert the battery pack into the empty compartment at the base of your Skadi Smart Handle. Finally, insert the smart handle into the now-empty receiver battery compartment until it locks into place.

Power on the receiver.

Push the two battery release latches on both sides of your Skadi GNSS receiver and pull to release the battery pack.

Insert the battery pack into the empty compartment at the base of your smart handle.

Finally, insert the smart handle into the now-empty receiver battery compartment.



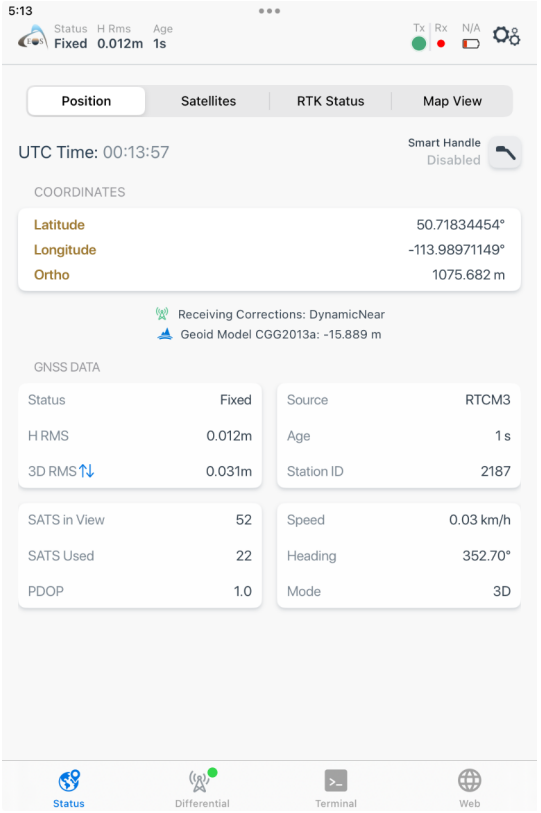
Power on the receiver.

B. Enable the Smart Handle

With the receiver powered on, there are three methods you may use to enable your smart handle.

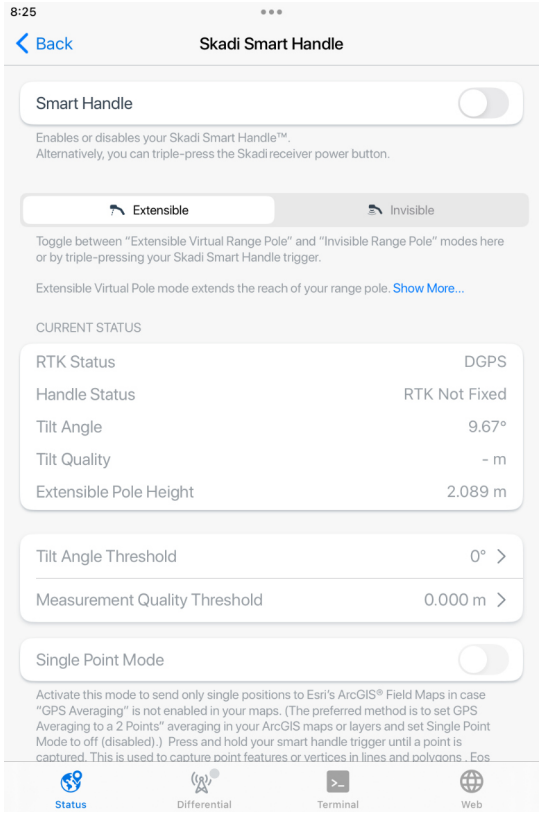
Method 1: Eos Tools Pro

Open the Eos Tools Pro app and navigate to the **Position** page. In the top-right corner of this page, you will see a grayed-out **Smart Handle** icon, which indicates the Skadi Smart Handle is currently disabled.



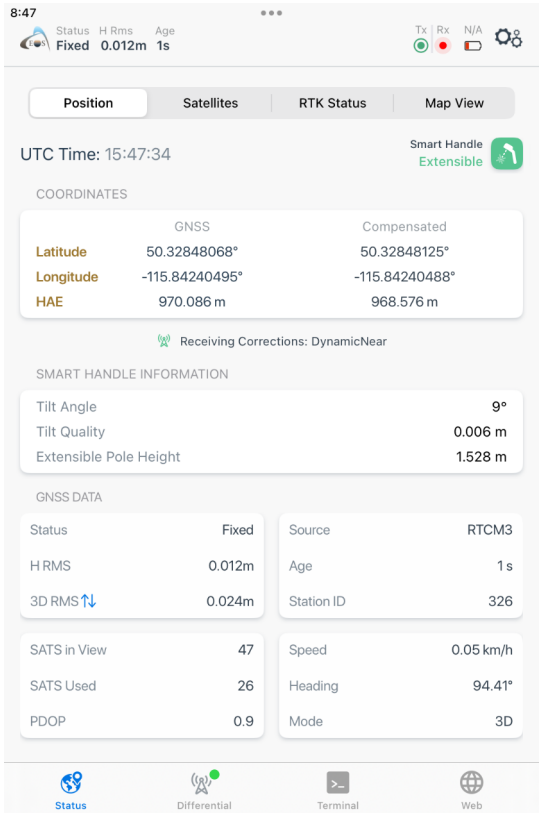
A grayed-out **Smart Handle** icon in the top-right corner of the **Positions** page in the Eos Tools Pro app indicates the Skadi Smart Handle is currently disabled.

Tap the **Smart Handle** icon to launch the **Skadi Smart Handle** settings page. Next, toggle on the **Smart Handle** switch.



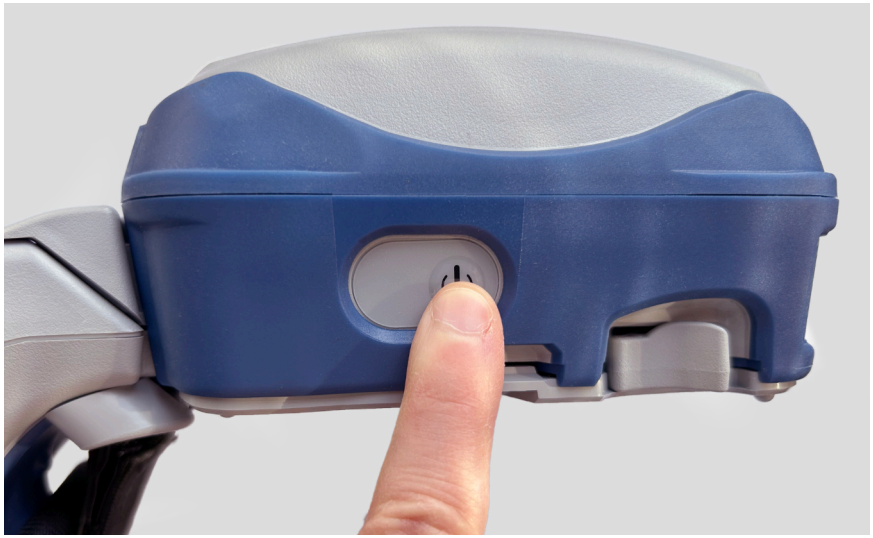
Toggle on the **Smart Handle** switch at the top of the Eos Tools Pro **Skadi Smart Handle** settings page.

The smart handle will vibrate, a visible green laser pointer will begin blinking beneath the handle, and the **Tilt** LED on the Skadi receiver will turn on (blinking red). If you return to the **Positions** page of Eos Tools Pro, you will see that your **Smart Handle** icon has turned green, and the word **Disabled** below it has turned to **Extensible**.



After you toggle on the **Smart Handle** switch in the Eos Tools Pro **Skadi Smart Handle** settings page, return to the **Positions** page. Your **Smart Handle** icon is now green, and beneath it is the word **Extensible**, indicating your current mode.

This method may also be used to turn off the Skadi Smart Handle.



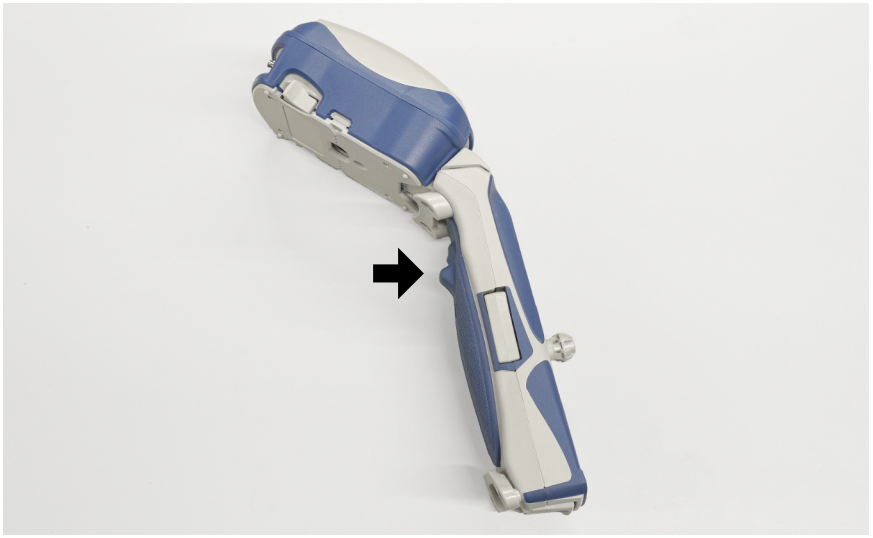
Triple-press the power button on your Skadi GNSS receiver.

Method 2: Power Button

Triple-press the Skadi receiver power button. The smart handle will vibrate, a visible green laser pointer will begin blinking beneath the handle, and the **Tilt** LED on the Skadi receiver will turn on (blinking red).

The same Eos Tools Pro settings manually toggled in **Method 1** will have now been automatically activated by this triple-press.

This method may also be used to turn off the Skadi Smart Handle.



Triple-press the trigger on your Skadi Smart Handle.

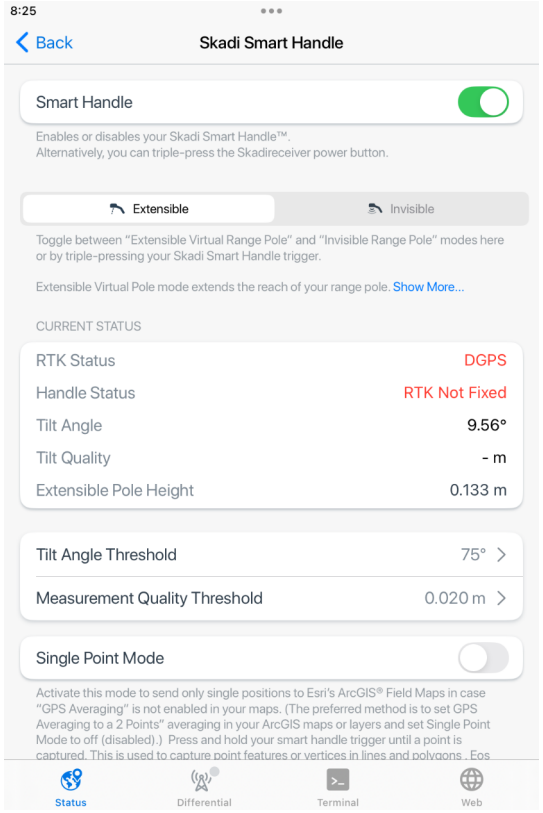
Method 3: Trigger

Triple-press the Skadi Smart Handle trigger. The smart handle will vibrate, a visible green laser pointer will begin blinking beneath the handle, and the **Tilt** LED on the Skadi receiver will turn on (blinking red).

The same Eos Tools Pro settings manually toggled in **Method 1** will have now been automatically activated by this triple-press.

*The trigger method may **not** be used to turn off the Skadi Smart Handle. Once the smart handle is enabled, triple-pressing the trigger will merely toggle between modes (i.e., Extensible Virtual Range Pole and Invisible Range Pole).*

***Note:** In some cases, your **Tilt** LED might blink green and red instead of just red upon enablement. This will happen if your NTRIP settings are in **Auto-start streaming** (thus causing an immediate RTK fixed GNSS status) and if you are also in a walking motion. This simply means you have already RTK fixed and initialized, and therefore you may skip the next two steps (C and D) in this section.*

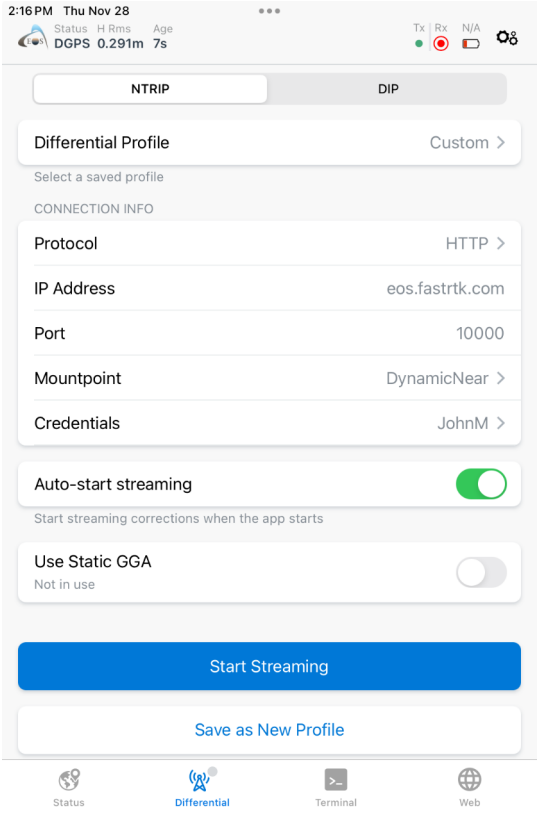


Next step: Acquire RTK fixed status.

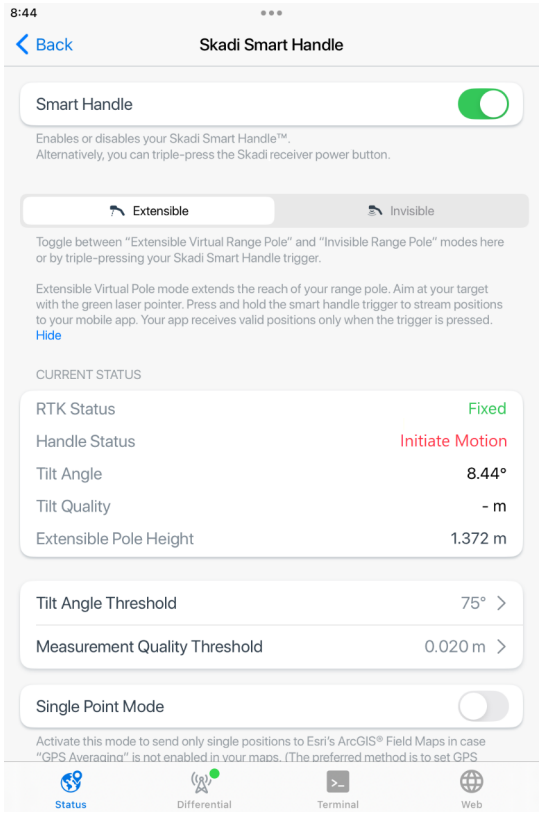
C. Acquire "RTK Fixed" Position

The Skadi Smart Handle requires an RTK fixed status to operate.

Within Eos Tools Pro, follow your normal procedure to connect to your local RTK corrections source.



In the **Differential** menu of Eos Tools Pro, you will see your RTK network connection information.



Your screen will look like this when Eos Tools Pro is ready for you to initialize the Skadi Smart Handle.

If you do not have access to RTK corrections, contact your authorized Eos representative for help finding the best RTK source for your region.

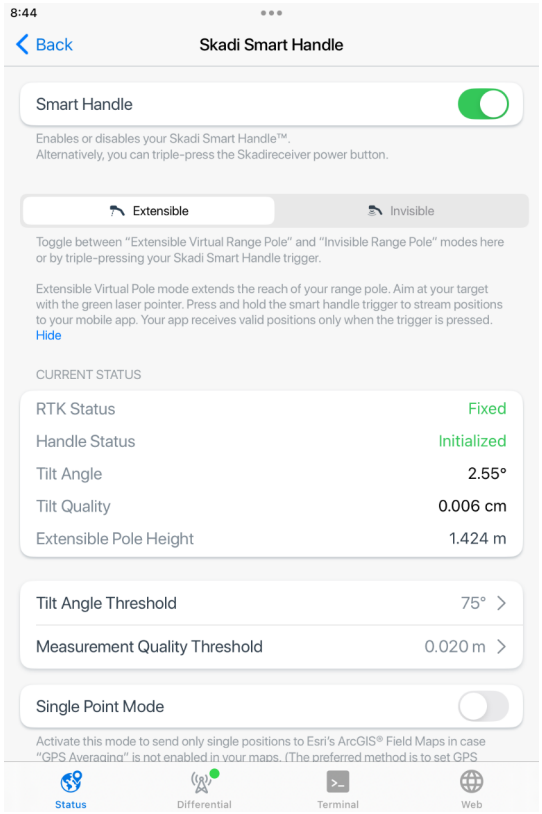
D. Initialize the Skadi Smart Handle

To perform the initialization, swing the Skadi Smart Handle in any wide motion at a rate of about one meter (three feet) per second or simply start walking at a moderate pace. Keep in mind that the antenna should have a relatively clear line-of-sight to the sky during this initialization.

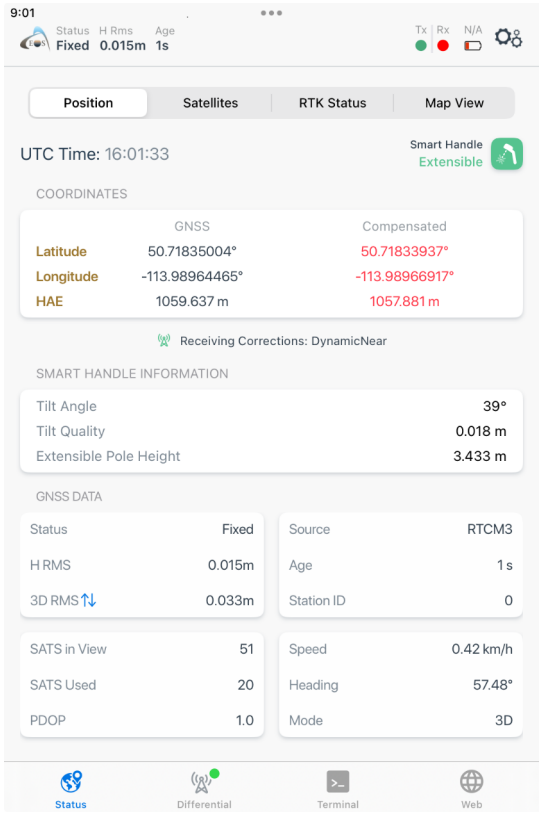
When your initialization is complete, the **Tilt** LED on your receiver will turn solid green.

You are now in Extensible Virtual Range Pole mode.

Hint: *For faster subsequent initializations, set your NTRIP connection to* ***Auto-start streaming*** *in the* ***NTRIP*** *menu of your Eos Tools Pro* ***Differential*** *settings. Once your Skadi is in RTK fixed mode, you will have to initialize only by performing the initialization motion.*



Your settings will look like this when the Skadi Smart Handle has been successfully initialized. The Skadi Smart Handle initializes in the Extensible Virtual Range Pole mode by default.



If your smart handle is not initialized or loses initialization, the values in the **Compensated** coordinates column of the **Position** page in Eos Tools Pro will turn red. Simply perform the initialization movement again until initialization has been re-established.

Understanding "GNSS" versus "Compensated" Coordinate Values in Eos Tools Pro

Back in the Eos Tools Pro **Position** page, you will see a **Coordinates** section toward the top of the page. This section has two columns of values labeled **GNSS** and **Compensated**. The **GNSS** coordinate values represent the positions at the physical location of your GNSS receiver. Meanwhile, the **Compensated** values represent the GNSS positions being processed using the smart handle (no matter which mode is being used).

After initialization, your **Compensated** coordinate values should differ from your raw GNSS coordinates, as the Skadi receiver now calculates an offset from your location using the handle's built-in sensors. In some cases, the **Compensated** values will turn red. (Your smart handle will concurrently single-vibrate to indicate an invalid position. See **Troubleshooting Invalid Positions** toward the end of this manual for further information.) This could happen if you lose initialization or RTK fixed status, or if you are in Extensible Virtual Range Pole mode and are not pressing the trigger. In any case, when the values are red, ***the important thing to note is that no data is being sent your third-party data collection software.***

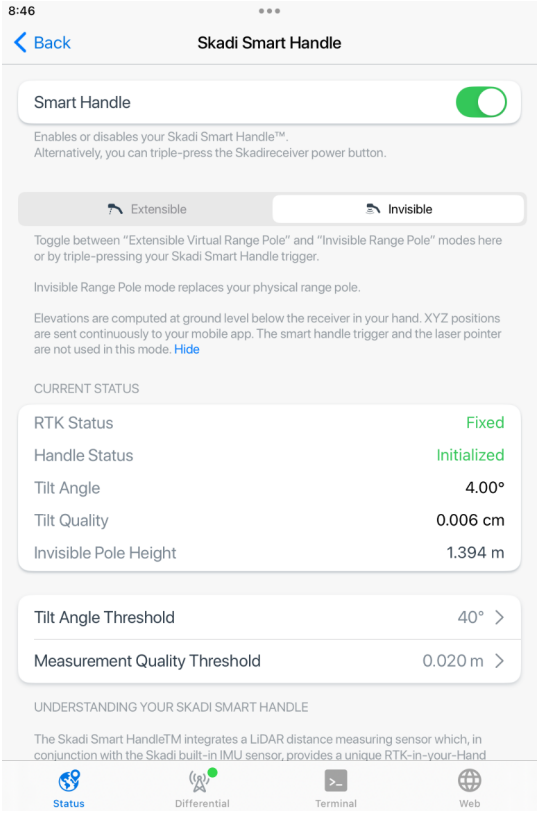
Toggling Between Modes

You may toggle between Extensible Virtual Range Pole mode and Invisible Range Pole mode in one of two ways.

Once your smart handle is enabled and initialized, you may wish to quickly toggle between its two operational modes. This section will show you how to use either the app or trigger to do so, as well as how to easily verify which mode you are in.

Method 1: Toggle in Eos Tools Pro

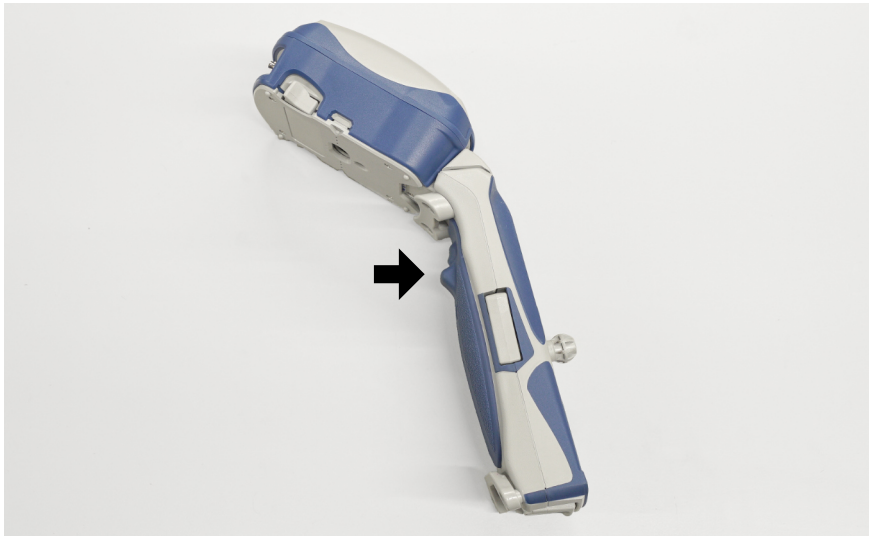
In the **Skadi Smart Handle** settings of the Eos Tools Pro app, select your desired mode by tapping the tab labeled either **Extensible** or **Invisible**.



In this screenshot, the Invisible Range Pole mode is selected.

Method 2: Toggle Using Trigger

You may also toggle between modes by using the Skadi Smart Handle trigger. Simply triple-press the trigger to toggle your desired mode.



Triple-press the trigger on your Skadi Smart Handle.

Verify Your Mode

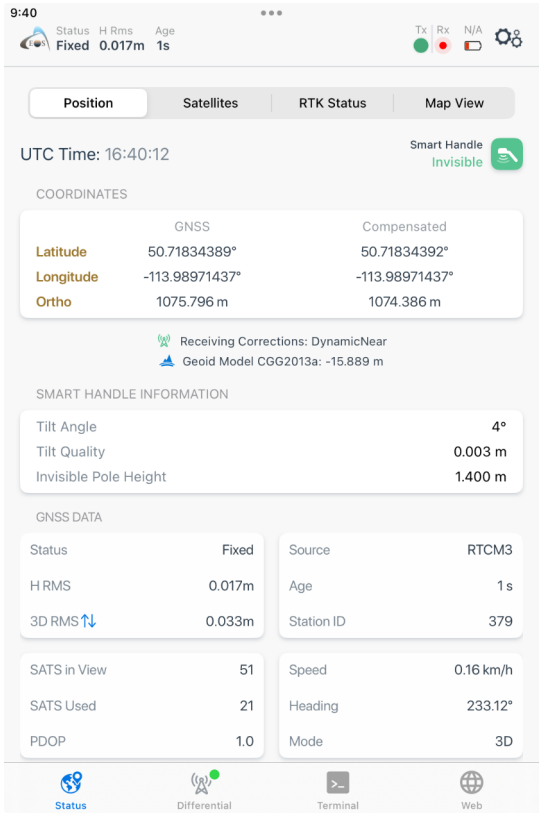
There are two ways to quickly verify what mode you are in.

1. Look for the Laser Pointer

First, you may also use the smart handle's green laser to determine what mode you are in. If the green laser pointer is visible, you are in Extensible Virtual Range Pole mode.

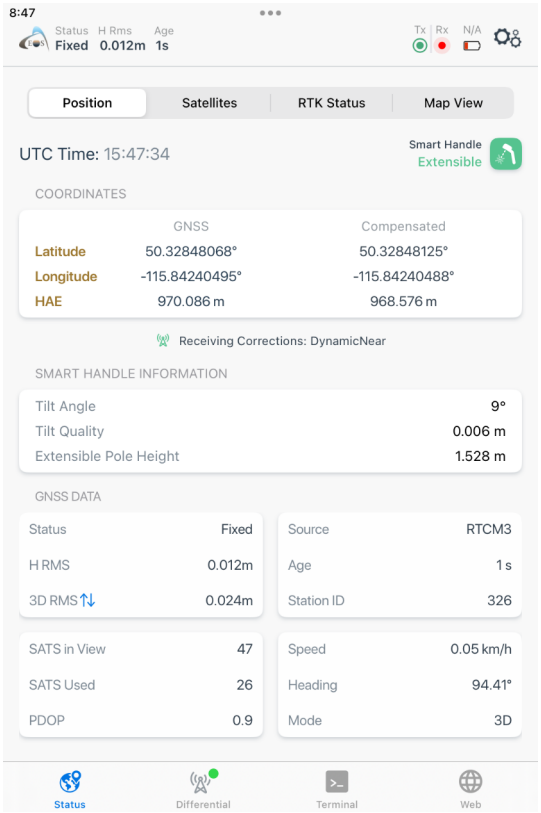
2. Check Eos Tools Pro

Alternatively, you may check Eos Tools Pro. In the **Position** page of the app, in the top-right corner you'll see the **Smart Handle** icon. Below this, you'll see in green either the word **Extensible** or **Invisible**, indicating which mode you are in.

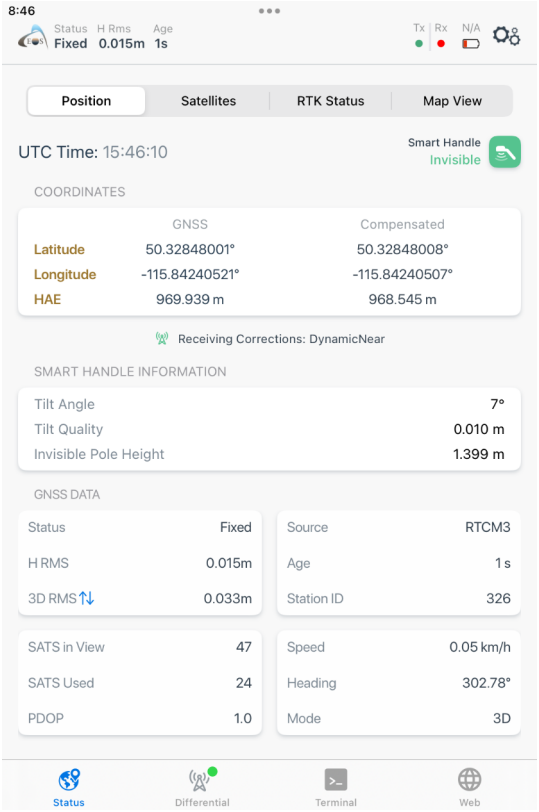


In this screenshot, the user is currently in Invisible Range Pole mode, indicated by the word "Invisible" in green.

Here is what each mode will look like in Eos Tools Pro:



This user is in Extensible Virtual Range Pole mode.



This user is in Invisible Range Pole mode.

Note: *It is possible that you might see the words,* ***RTK Not Fixed*** *or* ***Initiate Motion*** *(in red) instead of* ***Extensible*** *and* ***Invisible*** *under the* ***Smart Handle*** *icon. In this case, you have lost one of the settings you previously achieved. To check your mode, simply tap the* ***Smart Handle*** *icon to launch the* ***Skadi Smart Handle*** *settings page and see which tab is active.*

Sending Positions to Your Third-Party App

Please note this user manual covers only the transmission of high-accuracy positions from the Skadi Smart Handle to your third-party app. Actually collecting data in your third-party app is not covered; consult the supplier of your third-party app for more information on data collection.

Please note that your receiver must be initialized at this stage. If your receiver is not initialized, no valid GNSS data can be sent to any third-party app. Consult the previous section to ensure your smart handle is initialized.

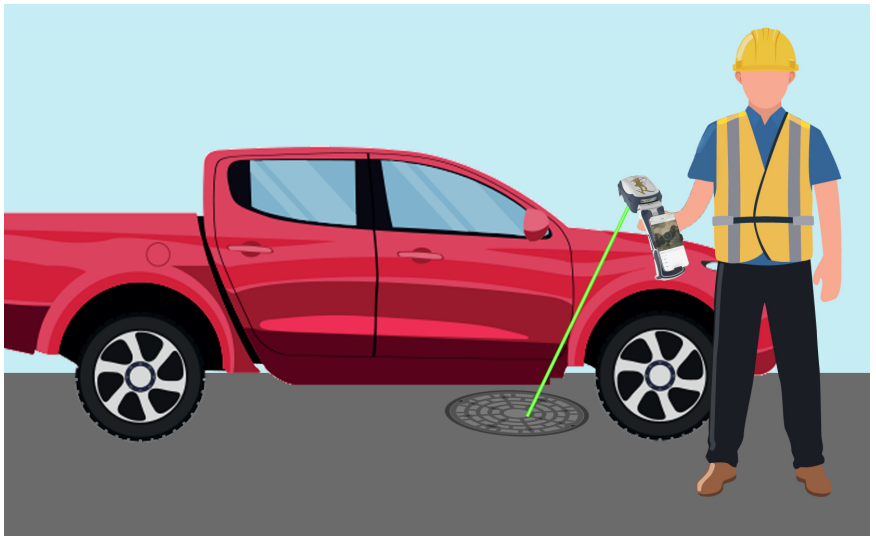
Mode 1: Extensible Virtual Range Pole

In Extensible Virtual Range Pole mode, you will use the smart handle's laser pointer and trigger to stream data to your third-party app. Each of these topics will be explained in detail next.

Overview of the Laser Pointer

Recall that the Extensible Virtual Range Pole mode is the only mode to make use of the Skadi Smart Handle's laser pointer. In this mode, the green laser pointer is always visible. The laser's location represents the position your receiver is measuring. In other words, wherever it points, you are measuring.

The laser is designed to be visible in strong sunlight. Do not point the laser in anyone's eye as this could cause damage.



The laser is designed to be visible in strong sunlight. Do not point the laser in anyone's eye.

Overview of the Trigger

The Extensible Virtual Range Pole mode uses a trigger to send data to your third-party app. This trigger is found on the underside of the smart handle.

The trigger is used only in Extensible Virtual Range Pole mode and is how you will send data to a third-party app in this mode.

Remember: *Triple-pressing this trigger will cause your mode to change to Invisible Range Pole mode. Be wary of this as you perform your field work.*

Overview of Streaming Positions in Extensible Virtual Range Pole Mode

The Extensible Virtual Range Pole mode uses a trigger to send data to your third-party app. This trigger is found on the underside of the smart handle.

To stream positions to your third-party app, simply press and hold the trigger (for a minimum of two seconds) while aiming the laser pointer at your target. Your Skadi will continuously stream positions to your third-party app as long as this trigger is pressed and held.

Remember that only while you press and hold the trigger will the values in the **Compensated** column of the **Position** page of Eos Tools Pro be green. If these values turn red while in this mode, it typically means you are not pressing the trigger. However, if you are pressing the trigger and the values are red, you have probably lost your initialization or RTK fixed status.

Tip: *Only when you press and hold the trigger in this mode will your **Compensated** values be green. Once you release the trigger, the values will be red, and positions will no longer be sent to your third-party app.*

While holding the trigger, the Skadi Smart Handle will double-vibrate once per second to indicate that the GNSS positions being sent to your third-party app are valid. If the handle single-vibrates, your GNSS positions are invalid. Consult the **Troubleshooting Invalid Positions** section toward the end of this manual to resolve invalid positioning.

Important Information for ArcGIS® Field Maps Users

Enable GPS Averaging to Stream Positions

If you are using the Esri® ArcGIS® Field Maps app as your data-collection app, you must enable a **2 Points** GPS averaging (i.e., a minimum of two points) in your ArcGIS map before using the Skadi Smart Handle to stream positions. We recommend pausing here to do so before continuing.

Note that this is a configuration that must be set in Esri's software, not Eos's.

HOW TO SET UP GPS AVERAGING IN ARCGIS

Follow these instructions on Esri's website to enable GPS averaging in your ArcGIS maps.

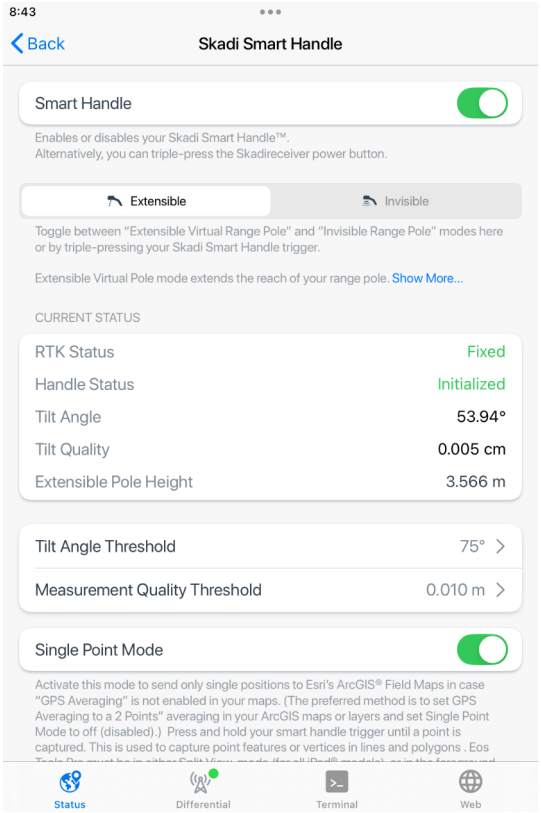
doc.arcgis.com/en/field-maps/android/use-maps/configure-field-maps.htm#ESRI_SECTION1_2F528862F6824C63A5A30448E23F0A2F

https://doc.arcgis.com/en/field-maps/android/use-maps/configure-field-maps.htm#ESRI_SECTION1_2F528862F6824C63A5A30448E23F0A2F

In most cases, we strongly recommend using this method (i.e., enabling GPS averaging and streaming positions) for data collection in ArcGIS Field Maps. However, if you do not wish to use GPS averaging, there is also an optional feature you may enable in Eos Tools Pro called **Single Point Mode**, which we will explain next.

Single Point Mode: Built for ArcGIS Field Maps Users Not Using GPS Averaging

The **Single Point** feature was designed for ArcGIS Field Maps users who are not using GPS averaging. To activate Single Point mode, open the **Skadi Smart Handle** settings in the Eos Tools Pro app. Make sure you are in the **Extensible** tab. Next, toggle on the **Single Point Mode** switch.



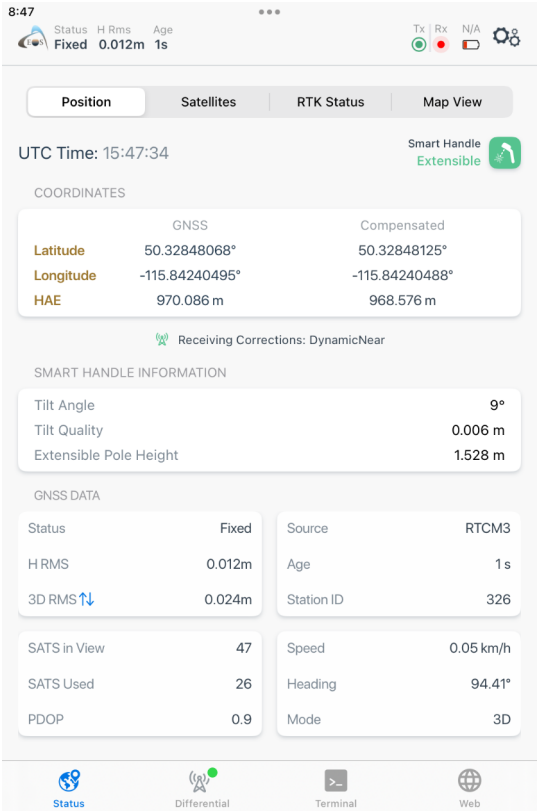
Toggle on the **Single Point Mode** switch in Eos Tools Pro to activate Single Point mode.

Note for iOS® Users: Eos Tools Pro Must Be Active Before Each Trigger-Press

If you are using an iOS® device in Single Point mode, Eos Tools Pro must be the active app (i.e., app in foreground) before you send a valid position to ArcGIS Field Maps.

On iPad® (including iPad mini®), set Eos Tools Pro and ArcGIS Field Maps in Split View mode. This satisfies the need to keep Eos Tools Pro active in the foreground.

On iPhone®, there is no Split View mode. Instead, you must simply call Eos Tools Pro to the foreground before each measurement.



Eos Tools Pro must be in the foreground when using Single Point mode. On iPad, use Split View. On iPhone, call Eos Tools Pro to the foreground before measuring each point.

For Android™ Users: Disable Picture-in-Picture

If you are using an Android™ device in Single Point mode, picture-in-picture (PiP) must be disabled for the Single Point mode to operate properly. Please disable PiP before using this method.

To Send Data in Single-Point Mode

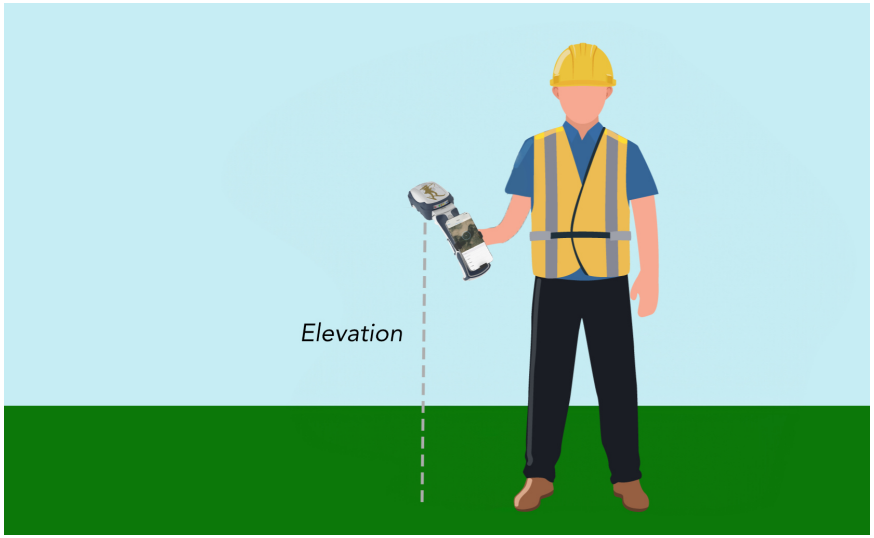
To send data to ArcGIS Field Maps in "Single-Point mode" make sure Eos Tools Pro is your active app (for iOS users only) and make sure PiP has been disabled (for Android users only). Next, press and hold the smart handle trigger until you feel a double vibration. The double-vibration indicates Eos Tools Pro has transmitted a valid position to ArcGIS Field Maps. (This equates to you having tapped the **Add Point** button in ArcGIS Field Maps to capture a location.) At this point, you may continue entering attributes and submitting your data as you normally would in ArcGIS Field Maps. Repeat the process to send another position to ArcGIS Field Maps.

***Note:** The Skadi Smart Handle will double-vibrate to indicate that the GNSS position being sent to ArcGIS Field Maps is valid. If the handle single-vibrates, your GNSS position is invalid. Consult the **Troubleshooting Invalid Positions** section toward the end of this manual to resolve invalid positioning.*

Mode 2: Invisible Range Pole

If Invisible Range Pole mode is selected, you will not use the laser or trigger to send data to your third-party app. Instead, while you are in this mode, the X, Y, and Z positions of the location under your receiver are streamed constantly to your third-party app without you needing to do anything else.

To collect this location data in a third-party app, simply perform the data collection as you normally would in your app.



Once Invisible Range Pole mode is successfully initialized, the X, Y, and Z positions of any asset/surface under your receiver are streamed constantly to your third-party app — without you needing to do anything else.

Verifying Valid Positions

While you are in Invisible Range Pole mode, the Skadi Smart Handle will double-vibrate once every other second to indicate your GNSS positions being calculated are *valid*. If the handle presents single vibrations, your positions are *invalid*. The most common cause for invalid positions when using Invisible Range Pole mode is the loss of initialization or RTK fixed status. However, please consult the **Troubleshooting Invalid Positions** section toward the end of this manual to verify the cause of, and to resolve, invalid positioning.

Understanding Smart Handle Vibrations

A double-vibration indicates your GNSS positions are valid.

While you are in *Extensible Virtual Range Pole* mode, the smart handle will vibrate only when you are pressing and holding the trigger for two or more seconds. While you are in *Invisible Range Pole* mode, the handle will vibrate continuously at regular intervals.

When successfully initialized in either mode, your smart handle will *double-vibrate* at regular intervals to indicate *valid GNSS positions*. If your smart handle is double-vibrating, you do not need to troubleshoot any positioning issues.

However, *single vibrations* indicate *invalid GNSS positions*. Consult the **Troubleshooting Invalid Positions** section of this manual to diagnose and resolve the problem.

Transitioning from Skadi Tilt Compensation™

Follow the steps in this section if you are transitioning from Skadi Tilt Compensation™ to the Skadi Smart Handle.

With the Skadi receiver already operating on your range pole with Skadi Tilt Compensation™ activated, you may transition seamlessly to the Skadi Smart Handle. A built-in, hot-swap battery will retain power, RTK connectivity, and initialization for up to 10 minutes while you make this transition.

First, simply pull your Skadi GNSS receiver off the Pole Mounting Cradle Assembly (SKA-POL-CRADLE) attached to your range pole (this is the easiest way to dismount the Skadi GNSS receiver from your surveying range pole and quickly mount it back at a later time).

Pull the GNSS receiver off the Skadi Pole Mounting Cradle Assembly, leaving the cradle assembly still threaded into the surveying range pole for future use.

Next, follow the steps from the **Steps to Enable and Initialize the Skadi Smart Handle** chapter section **A. Mount Your GNSS Receiver to the Skadi Smart Handle.** The only thing you will not do is turn your receiver on or off. Rather it will remain on during the entire setup thanks to the built-in hot-swap battery.

Troubleshooting Invalid Positions

Consult this section if you need to identify the cause of, and resolve, invalid GNSS positioning. There are several possible causes of an invalid position when using the Skadi Smart Handle. This section explains how to interpret alerts of invalid positioning, including the Skadi receiver's ***Tilt*** *LED behavior and various Eos Tools Pro app indications.*

Interpreting "Tilt" LED Behaviors and Eos Tools Pro Screens

The following chart allows you to identify the cause of invalid GNSS positions. To use this chart, you will first identify the current behavior of your Skadi receiver's **Tilt** LED. Next, read the associated issue causing invalid positioning. In some cases, where indicated, Eos Tools Pro will also provide visual warnings to call attention to an error in positioning. Once you have identified the issue, follow the resolution provided to fix the issue.

TILT LED	MODE	ISSUE	RESOLUTION
Red: Slow Blinking 	Either mode	Skadi Smart Handle enabled but not initialized. In Eos Tools Pro ***Skadi Smart Handle*** settings, ***Handle Status*** states, ***"Initiate Motion"*** in red. In ***Position*** page, ***Compensated*** coordinate values are red. ***Note:*** If the Skadi Smart Handle sits idle for 10 minutes, it will automatically de-initialize.	Perform initialization movement again to re-initialize it.
Red: Medium Blinking 	Either mode	No RTK fixed status. In Eos Tools Pro, ***Handle Status*** states, ***"RTK Not Fixed"*** in red.	Acquire RTK fixed status.
Red: Fast Blinking 	Either mode	Target is falling outside LiDAR range. This may be from poor target reflectivity (e.g., porous materials, very dark targets) or by too much/ little distance between you and target. In the ***Eos Tools Pro Position*** tab, ***"Extensible Pole Height"*** are dashes, and ***Compensated*** coordinates are red.	Get close to target to decrease LiDAR range if too much. If within 10 cm of target, move away.
Red & Green: Blinking 	Extensible Virtual Range Pole	Smart handle initialized, but you are not pressing the trigger to stream positions. In Eos Tools Pro ***Position*** page, ***Compensated*** coordinate values are red.	No error to fix. Press trigger to begin data transmission from smart handle to mobile app. LED will turn green, ***Compensated*** values will turn black.

TILT LED	MODE	ISSUE	RESOLUTION
Orange: Blinking 	Extensible Virtual Range Pole	Trigger is pressed, but GNSS status is not RTK Not Fixed. In Eos Tools Pro, ***Handle Status*** states, ***"RTK Not Fixed"*** in red.	Acquire RTK fixed status .
Orange & Red: Blinking 	Extensible Virtual Range Pole	Trigger is not pressed, and GNSS status is not RTK fixed. In Eos Tools Pro, ***Handle Status*** states, ***"RTK Not Fixed"*** in red.	Acquire RTK fixed status.
Green: Blinking 	Extensible Virtual Range Pole	Trigger is pressed, and valid positions are streaming to mobile device. A strong double-vibration is felt every second.	No fix needed.
Orange: Double Blinking 	Invisible Range Pole	GNSS status is not RTK fixed. In Eos Tools Pro, ***Handle Status*** states, ***"RTK Not Fixed"*** in red.	Acquire RTK fixed status.
Green: Slow Blinking 	Invisible Range Pole	A slow, low intensity double-vibration is felt every second. Valid positions are streaming to mobile device.	No fix needed.

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Additional Resources

The Eos Positioning Systems website has a number of helpful resources for getting started and going further in your GNSS journey.

Our other GNSS-related products: **eos-gnss.com/products**

GNSS accessories - from antennas to mounts and poles: **eos-gnss.com/products/accessories**

Eos GNSS software & utilities: **eos-gnss.com/products/software**

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Frequently asked questions (FAQs): **eos-gnss.com/frequently-asked-questions**

Knowledge base: **eos-gnss.com/knowledge-base**

Technical support form: **eos-gnss.com/technical-support**

Technical Support

If you have additional questions, contact technical support

Our technical support team is available to help you with any questions or problems you may have with your Skadi Smart Handle™.

CONTACT TECHNICAL SUPPORT

Have you followed the steps for your configuration, but things are not working as expected? Reach out to our technical support team with a question.

eos-gnss.com/technical-support

https://eos-gnss.com/technical-support