HOW TO CONFIGURE ARCGIS, COLLECTOR FOR ARCGIS, AND EOS TOOLS PRO FOR LASER OFFSET MAPPING AND ORTHOMETRIC HEIGHT

This guide is intended to help you learn how to configure ArcGIS, Collector for ArcGIS® and Eos Tools Pro so you can begin to use laser offsets and log orthometric heights.
(button to learn more about laser offsets)
(button to learn more about orthometric height)
Before beginning, make sure you have the required firmware and software versions. Please note that this workflow is available only for Collector Classic (not Aurora).

REQUIRED MINIMUM FIRMWARE AND APP VERSIONS:

Arrow Bluetooth Firmware: 2.2.822
Eos Tools Pro: 1.74 (build 187)
Collector for ArcGIS: 18.0.2, (build 2109)
ArcGIS Pro: (current version)

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STEP ONE: CREATING YOUR FEATURE ATTRIBUTES IN ARCGIS PRO

If you are new to ArcGIS, you'll need to refer to the Esri ArcGIS documentation on how to create feature attributes in your map layers.

http://pro.arcgis.com/en/pro-app/help/editing/enter-attributes-for-new-features.htm
http://pro.arcgis.com/en/pro-app/help/editing/edit-feature-attributes.htm

Once your feature attributes are created, you'll be able to use your ArcGIS Online web maps to collect laser-offset and orthometric-height measurements from your Arrow receiver.
To do this, you'll need to add the attributes that are required for your workflow, or for quality control. Eos is providing a free Python script that contains all the metadata fields you'll need.

To help you determine which fields to add, we've put together this table that shows you all the possible metadata fields you might want to add. The list is exhaustive — containing measurements and intermediate results related to every step of the three types of laser offset methods we support. To help you understand which attributes possible, we've put together an exhaustive list of all the possible fields, with the mandatory fields displayed in **bold**.

The following table lists all the metadata fields sent by Eos Tools Pro after a laser offset measurement. Bolded fields represent mandatory attributes. The default aliases can freely be changed in the Python script itself or manually in ArcGIS.

Metadata Fields for Laser Offset and Orthometric Height			
Field Name	**Default Field Alias**	**Method***	**Description**
ESRIGNSS_RECEIVER	Receiver Name	1,2,3,4	Arrow GNSS Receiver name
EOSLASER_METHOD	Measurement Method	1,2,3,4	The laser method used for the offset measurements or Orthometric Height
ESRIGNSS_LATITUDE	Offset Point Latitude	1,2,3,4	Latitude of computed point
ESRIGNSS_LONGITUDE	Offset Point Longitude	1,2,3,4	Longitude of computed point
ESRIGNSS_ALTITUDE	Offset Point HAE (ellipsoidal)	1,2,3,4	Ellipsoidal height of computed point
EOS_ORTHO_HEIGHT	Orthometric Height	1,2,3,4	Orthometric height of computed point (if enabled in Eos Tools Pro)
EOS_UNDULATION	Altitude Undulation	1,2,3,4	Altitude undulation
EOS_GEOID_MODEL	Geoid Model	1,2,3,4	Geoid model used for orthometric height computation
EOSLASER_DEVICE	Bluetooth Laser Device	1,2,3,4	Bluetooth laser device model and serial number used
EOSLASER_GNSSANTH	GNSS Antenna Height	1,2,3,4	GNSS antenna height including phase center (when using RTK). Value set in Eos Tools Pro
EOSLASER_DEVICEH	Laser Device Height	1,2,3	Measured laser device height. Value set in Eos Tools Pro
EOSLASER_MAGDEC	Magnetic Declination	1	Magnetic declination used in Method 1. Set in Eos Tools Pro
EOSLASER_CTL1_LAT	CP1 Latitude	1,2,3,4	Control Point 1 latitude
EOSLASER_CTL1_LON	CP1 Longitude	1,2,3,4	Control Point 1 longitude
EOSLASER_CTL1_ALT	CP1 Altitude	1,2,3,4	Control Point 1 altitude (orthometric if enabled)

EOSLASER_CTL1_HRMS	**CP1 HRMS**	**1,2,3,4**	**Control Point 1 estimated horizontal accuracy**
EOSLASER_CTL1_SATS	CP1 Number of Sats	1,2,3,4	Averaged number of satellites used at Control Point 1
EOSLASER_CTL1_FIXTYPE	CP1 Fix Type	1,2,3,4	Fix type of Control Point 1 (RTK Fixed, RTK Float, etc)
EOSLASER_CTL1_AGE	CP1 Diff Age	1,2,3,4	Average age of differential correction at Control Point 1
EOSLASER_CTL1_DIFFID	CP1 Station ID	1,2,3,4	Station ID of the source of differential correction at Control Point 1
EOSLASER_CTL1_AVG	CP1 Points Averaged	1,2,3,4	Number of points averaged for Control Point 1
EOSLASER_CTL1_SLDIST	CP1 Laser Slope Distance	1,2,3,4	Laser slope distance measurement from Control Point 1
EOSLASER_CTL1_AZI	CP1 Laser Azimuth	1,2,3,4	Laser/manual azimuth from Control Point 1
EOSLASER_CTL1_SL	CP1 Laser Inclination	1,2,3,4	Laser inclination measurement from Control Point 1
EOSLASER_BS_LAT	Backsight Latitude	2	Backsight latitude
EOSLASER_BS_LON	Backsight Longitude	2	Backsight longitude
EOSLASER_BS_ALT	Backsight Altitude	2	Backsight altitude (orthometric if enabled)
EOSLASER_BS_HRMS	Backsight HRMS	2	Backsight estimated horizontal accuracy
EOSLASER_BS_SATS	Backsight Number of Sats	2	Averaged number of satellites used at Backsight
EOSLASER_BS_FIXTYPE	Backsight Fix Type	2	Fix type of Backsight (RTK Fixed, RTK Float, etc)
EOSLASER_BS_AGE	Backsight Diff Age	2	Average age of differential correction at Backsight
EOSLASER_BS_DIFFID	Backsight Station ID	2	Station ID of the source of differential correction at Backsight
EOSLASER_BS_AVG	Backsight Points Averaged	2	Number of points averaged for Backsight
EOSLASER_BS_SLDIST	Backsight Slope Distance	2	Laser slope distance measurement from Backsight
EOSLASER_BS_AZI	Backsight Azimuth	2	Laser/manual azimuth from Backsight
EOSLASER_BS_SL	Backsight Inclination	2	Laser inclination measurement from Backsight

EOSLASER_BS_TRUEAZI	**Computed True Azimuth**	**2**	**Computed true azimuth between Control Point 1 and Backsight point**
EOSLASER_BS_AZICORR	Azimuth Correction	2	Azimuth correction / compensation that is applied to the TruAngle encoder reading
EOSLASER_CTL2_LAT	CP2 Latitude	3	Control Point 2 latitude
EOSLASER_CTL2_LON	CP2 Longitude	3	Control Point 2 longitude
EOSLASER_CTL2_ALT	CP2 Altitude	3	Control Point 2 altitude (orthometric if enabled)
EOSLASER_CTL2_HRMS	CP2 HRMS	3	Control Point 2 estimated horizontal accuracy
EOSLASER_CTL2_SATS	CP2 Number of Sats	3	Averaged number of satellites used at Control Point 2
EOSLASER_CTL2_FIXTYPE	CP2 Fix Type	3	Fix type of Control Point 2 (RTK Fixed, RTK Float, etc)
EOSLASER_CTL2_AGE	CP2 Differential Age	3	Average age of differential correction at Control Point 2
EOSLASER_CTL2_DIFFID	CP2 Station ID	3	Station ID of the source of differential correction at Control Point 2
EOSLASER_CTL2_AVG	CP2 Points Averaged	3	Number of points averaged for Control Point 2
EOSLASER_CTL2_SLDIST	CP2 Laser Slope Distance	3	Laser slope distance measurement from Control Point 2
EOSLASER_CTL2_AZI	CP2 Laser Azimuth	3	Laser/manual azimuth from Control Point 2
EOSLASER_CTL2_SL	CP2 Laser Inclination	3	Laser inclination measurement from Control Point 2

To add the required fields to your map, you can either use the Eos Laser Offset Python script to automatically add them, or you can add them manually.
Let's start with the Python script.

HOW TO USE THE EOS LASER OFFSET PYTHON SCRIPT TO ADD FIELDS IN ARCGIS PRO

By running the Eos Laser Offset Python script in ArcGIS Pro, you can automatically add the required laser-offset metadata fields.
Just follow these steps to run the script:

A) DOWNLOAD THE EOS LASER OFFSET PYTHON SCRIPT

First, download the Eos Laser Offset Python script.
(button to download script)

B) ADD THE SCRIPT AS A TOOL IN ARCGIS PRO

1. Open ArcGIS Pro and create a new project (e.g., “MyProjectName”).
2. Expand the “Toolboxes” section in the Catalog pane (defaults on the right).
3. Right-click on “MyProjectName.tbx”.
4. Scroll over “New” and select “Script”. A new window will open and allow you to configure the script as a tool.
5. Click the “Browse” icon next to the script location box. Locate the Eos Laser Offset Python script file on your PC. It should be in your downloads folder unless you saved it elsewhere.
6. Click on the “Parameters” category in the menu on the left.
7. Enter the following information:
    Label -> “Layer”
    Name -> “Layer”
    Data Type -> “Feature Class”

8. Click “Ok”.

C) RUN THE PYTHON SCRIPT (NOW A TOOL) ON A FEATURE CLASS

1. Double-click on the script tool under MyProjectName.tbx.
2. Point the tool at a point-typed feature class.
3. Click “Run”. This will add the required offset fields to your feature class.

If you don’t want to run the Python script, you can add the fields manually in ArcGIS Pro. Here’s how.

HOW TO ADD LASER OFFSET METADATA FIELDS MANUALLY IN ARCGIS ONLINE

There are a couple of things to keep in mind if you decide to add your laser-offset fields manually.
First, note that your metadata fields (such as “fix type”) use domains. But domains cannot be added in ArcGIS Online. This means that the metadata fields will still be populated, but they will be displayed as numbers rather than “DGPS”, “RTK Float”, or “RTK Fixed”.

Second, if you’re not performing laser offsets, and therefore only the orthometric fields are needed, we suggest that you simply add these three fields as attributes:

- EOS_ORTHO_HEIGHT
- EOS_UNDULATION
- EOS_GEOID_MODEL

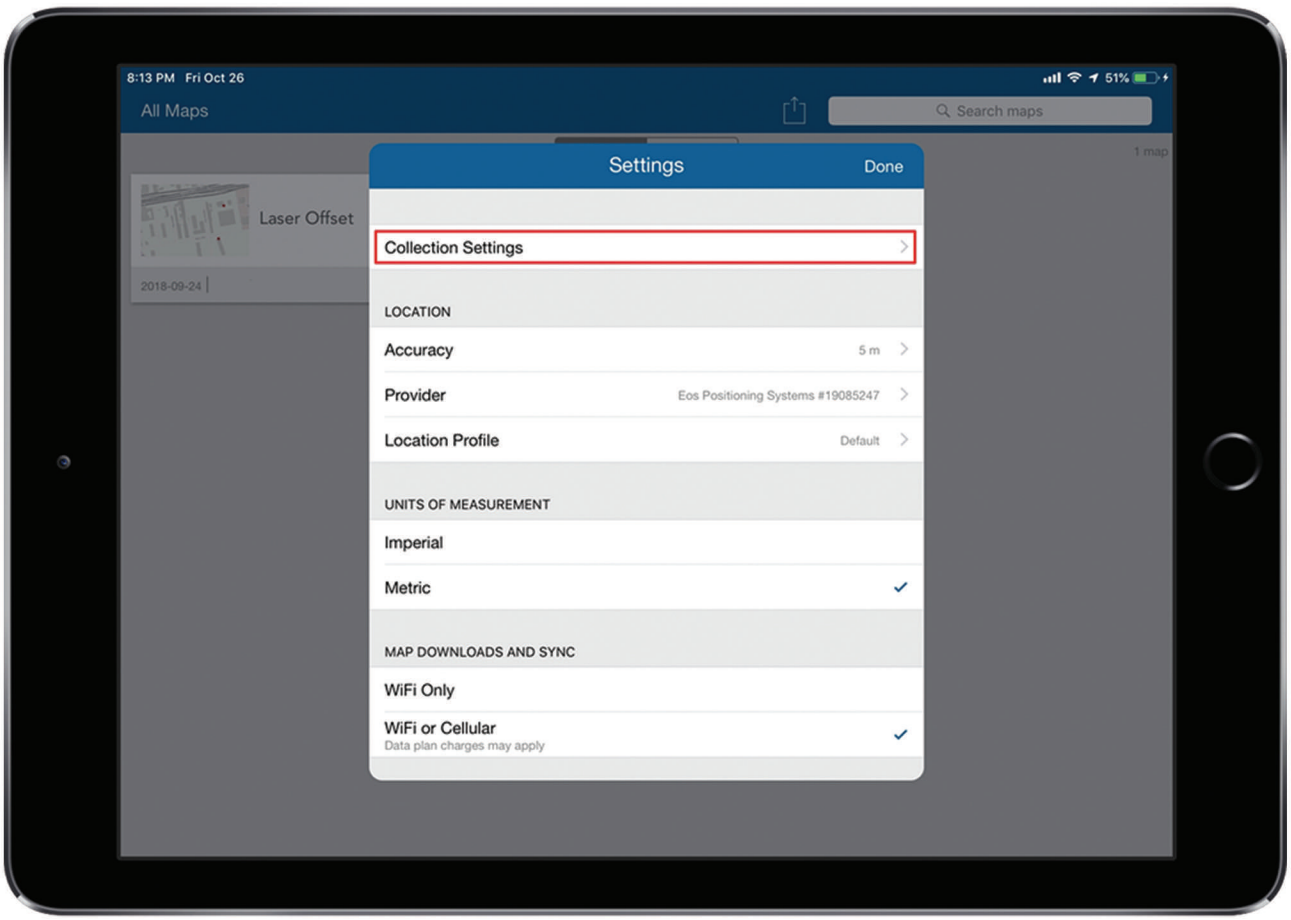
Please refer to the Metadata Fields for Laser Offset and Orthometric Height document.
If you’re ready to add your attribute fields manually, simply follow these ArcGIS documentation steps from Esri.

STEP TWO: CONFIGURING COLLECTOR FOR ARCGIS TO INTERACT WITH EOS TOOLS PRO

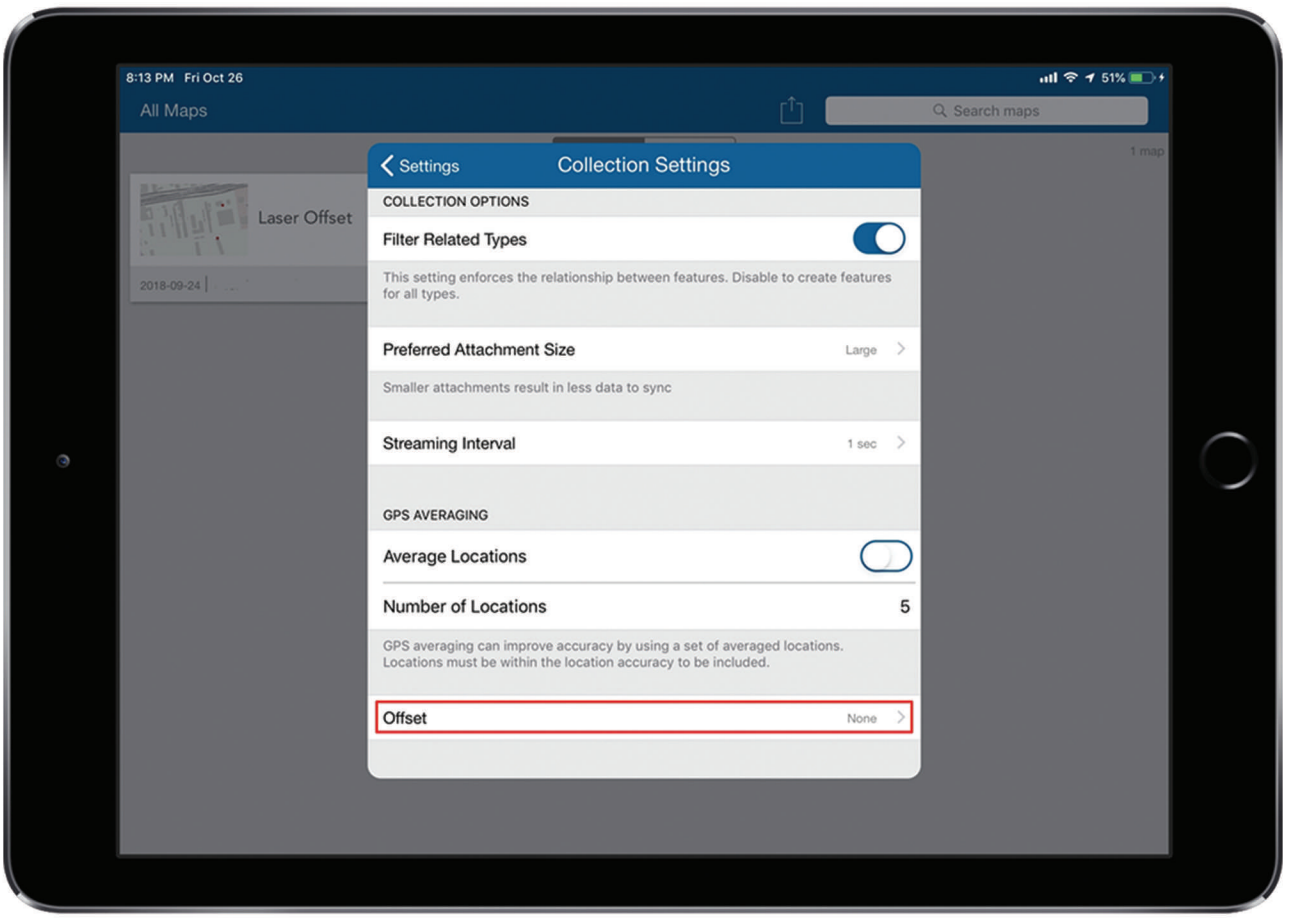
In this section, we will show you how to designate Eos Tools Pro as the app that will be performing both the laser-offset and orthometric-height measurements inside Collector for ArcGIS®.
Before you begin, install Eos Tools Pro. (Eos Tools Pro must be installed on your iOS device for Collector to be able to request and read measurements from it.)
(button to download ETP)
First, let's set up Eos Tools Pro to compute your laser offsets. It takes three steps inside Collector.

HOW TO TELL COLLECTOR TO CALL ON EOS TOOLS PRO FOR LASER OFFSET MEASUREMENTS

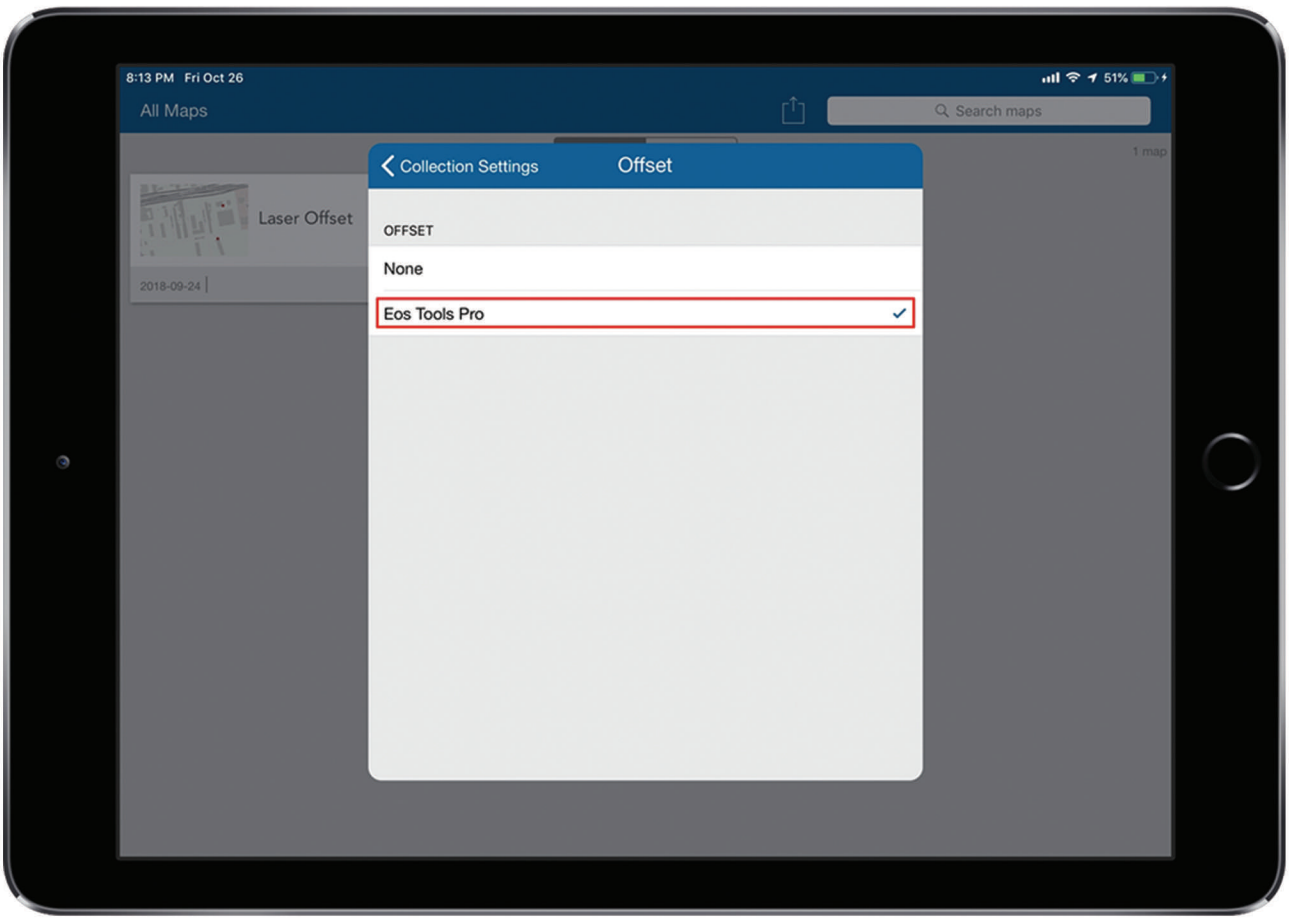
1.Open Collector. In the "Settings" menu, tap on "Collection Settings".



2.Scroll down and tap on “Offset”.



3.Select "Eos Tools” Pro as the source of offset measurements.

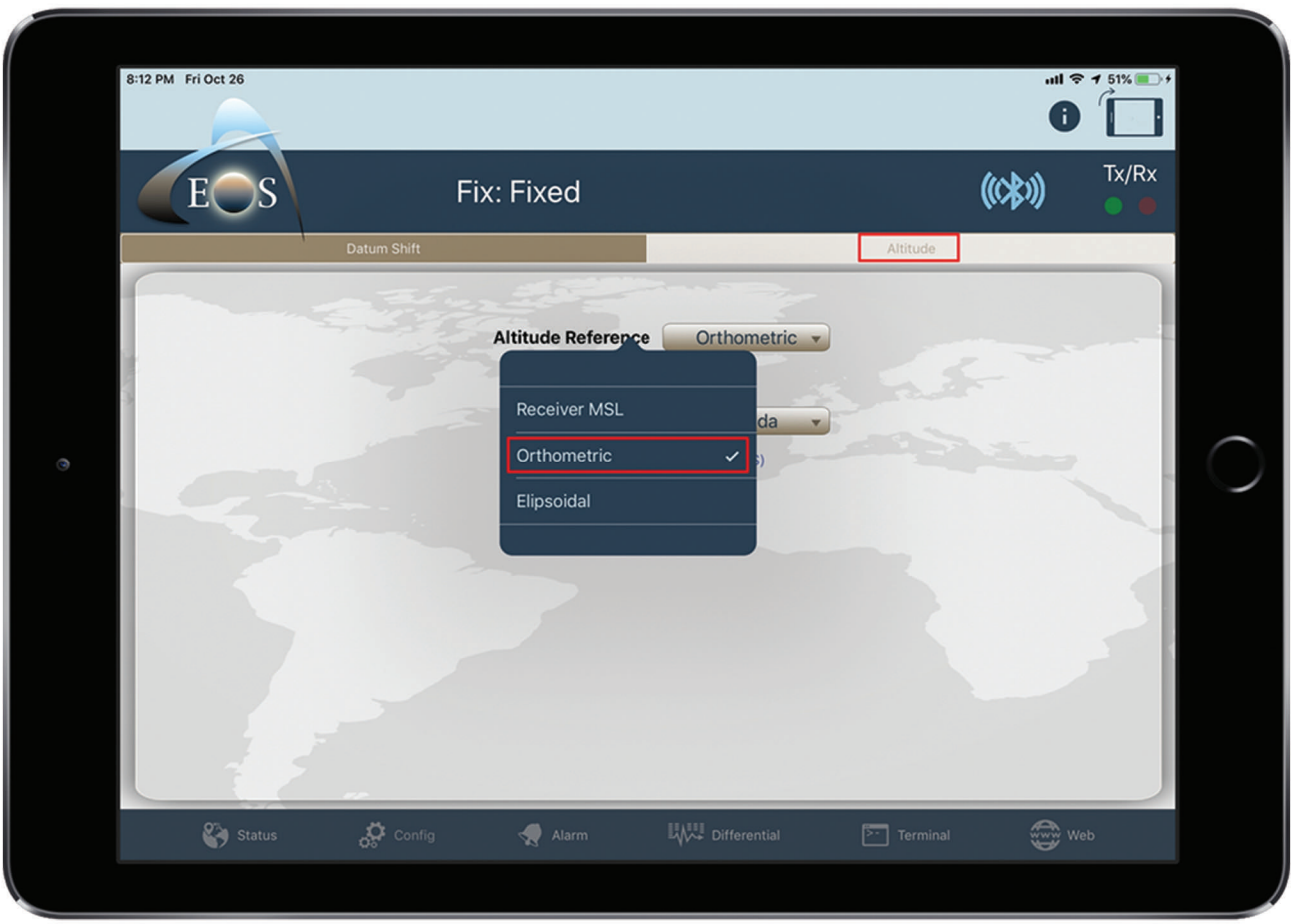


Next, let’s make sure Eos Tools Pro is set up to provide Collector with orthometric heights.

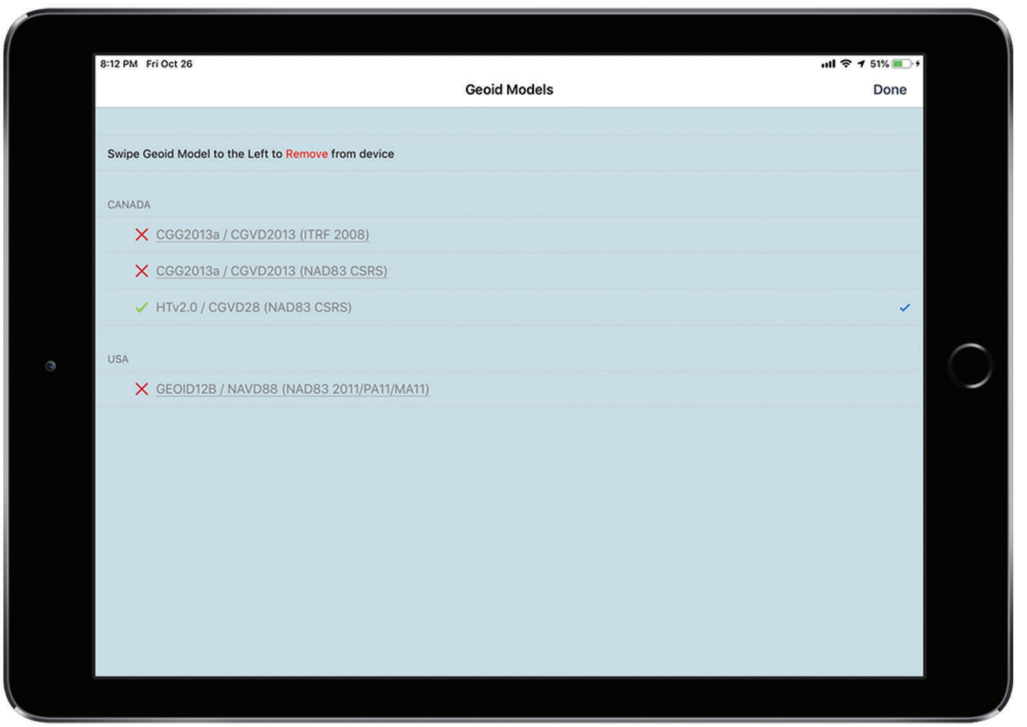
HOW TO CONFIGURE EOS TOOLS PRO FOR ORTHOMETRIC HEIGHTS IN COLLECTOR

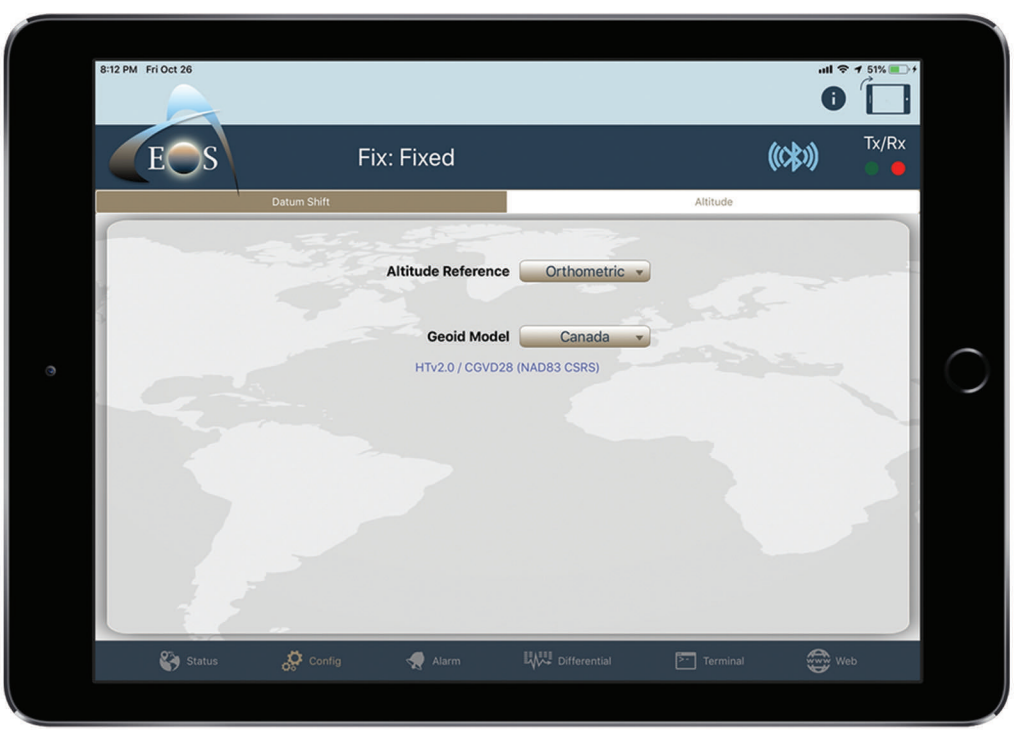
In this section, we will show you how to configure Eos Tools Pro and the Arrow receiver to output orthometric height measurements to Collector, from built-in geoid models within Eos Tools Pro.

2.Select “Altitude” in the upper menu bar. From the “Altitude Reference” pull-down, select “Orthometric”.



3.Now you'll see a list of the available (downloadable) geoid models pop up. Scroll down to your country, and select the geoid model you wish to download. Once you've downloaded the correct geoid model, select it by simply tapping on it. Tap on "Done".

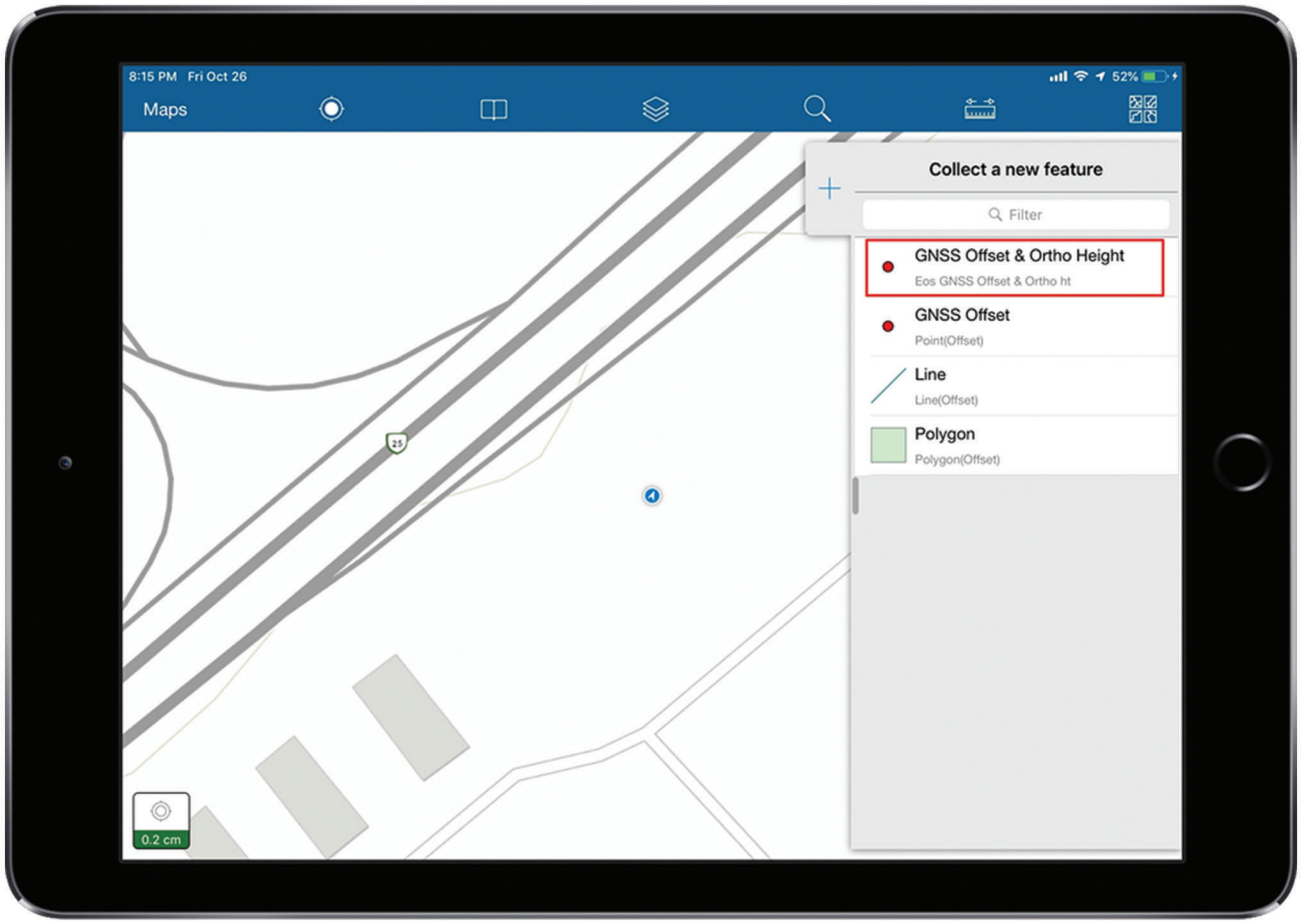




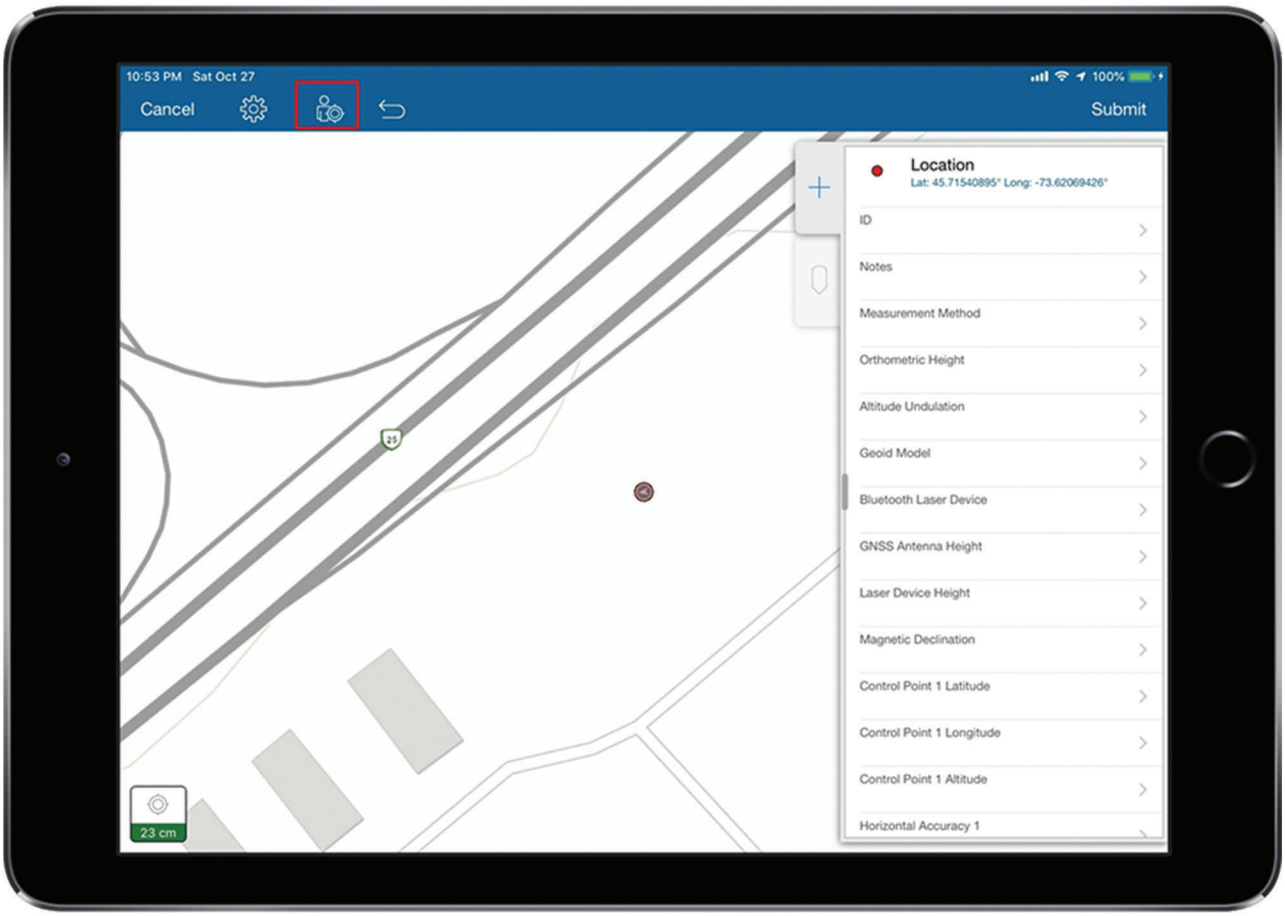
HOW TO CONFIGURE LASER OFFSET SETTINGS IN COLLECTOR AND EOS TOOLS PRO

The last setting to be configured inside Eos Tools Pro takes place in the Laser Offset page. This page is activated only when Collector calls Eos Tools Pro for a measurement.

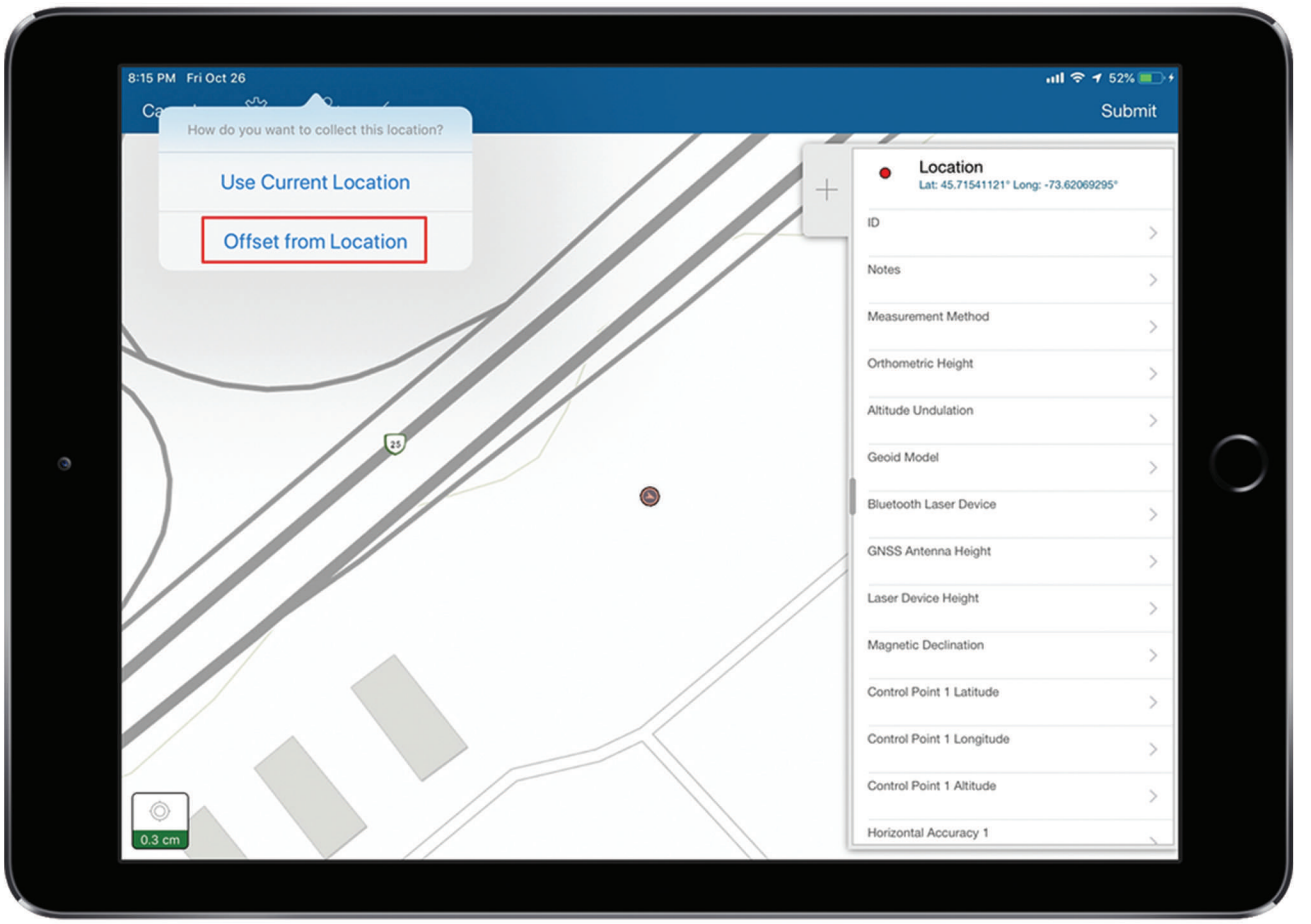
1. With Eos Tools Pro running in the background, open Collector. Select a point feature to be recorded.



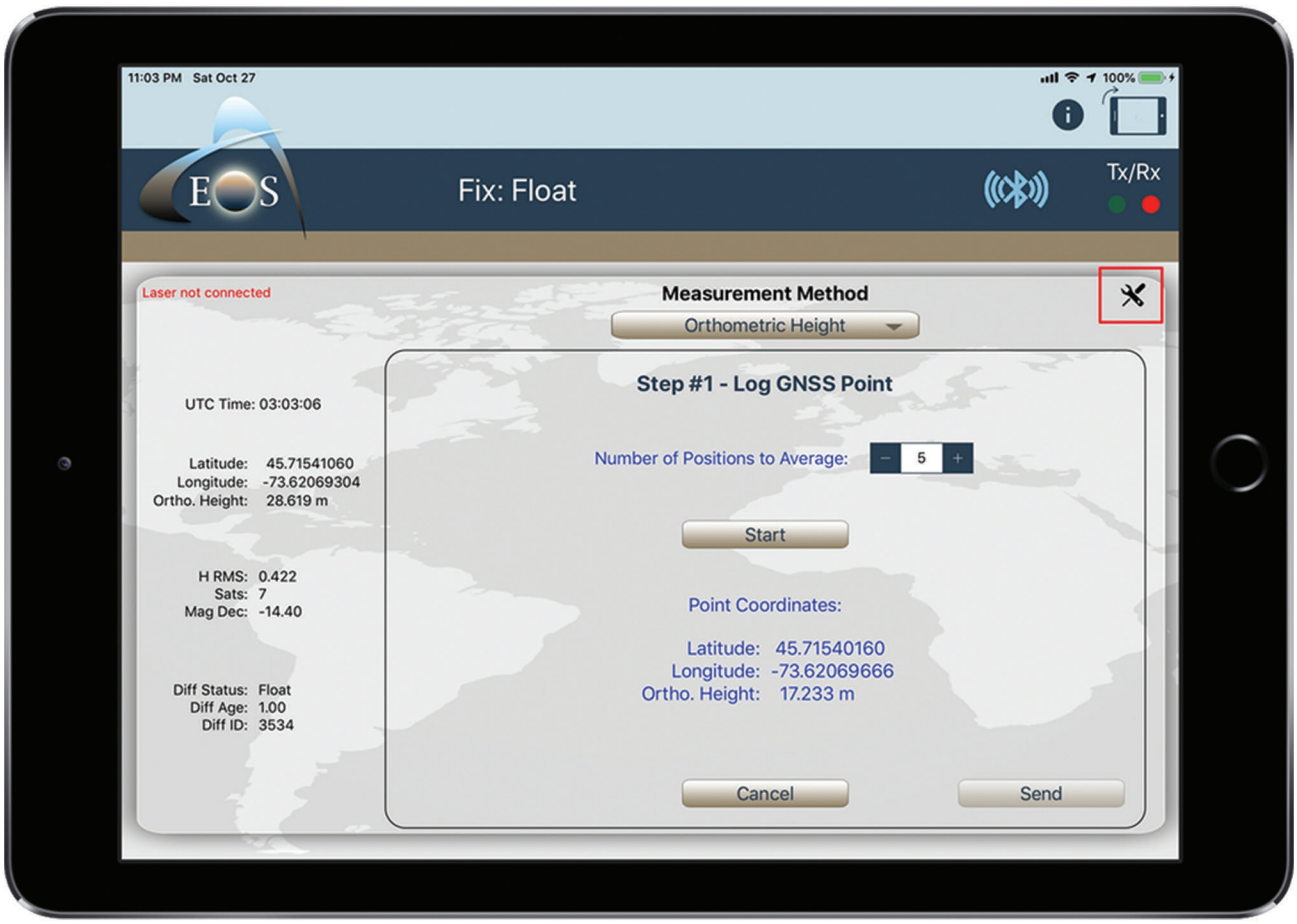
2.Next, select the location icon that appears on the top left of the app.



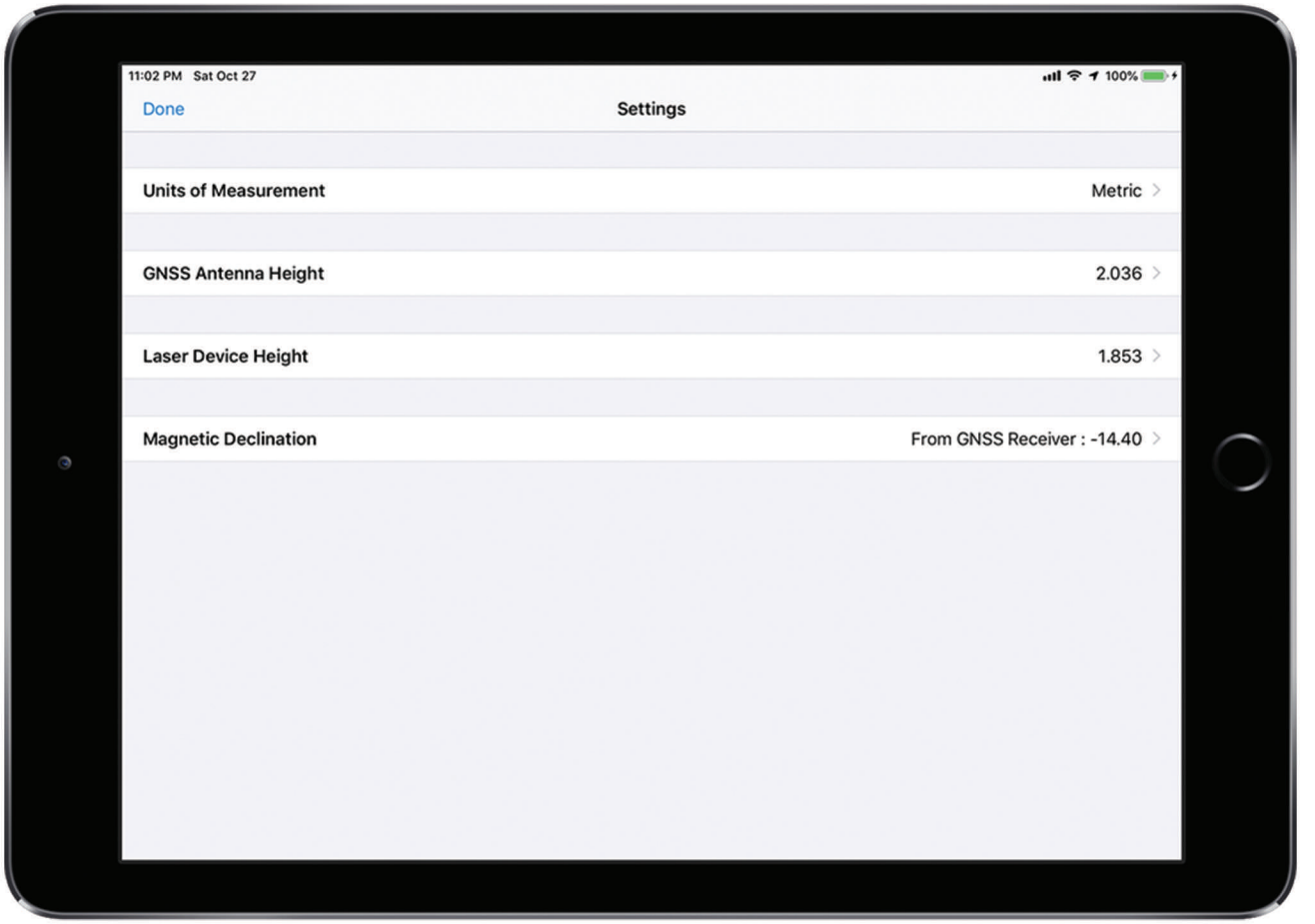
3.Collector will give you a pull-down menu. Select “Offset from Location” in the menu. This is going to call up the Laser Offset page within Eos Tools Pro.



4.Inside the Eos Tools Pro Laser Offset page, tap on the “Settings” tab.



5.Set the “Units of Measurements” to “Metric”. Next, set the proper heights for the antenna and the laser device. To set the "Magnetic Declination,” you have two options: Either Eos Tools Pro can read the magnetic declination from the Arrow, or you can set this value manually. 5. Set the “Units of Measurements” to “Metric”. Next, set the proper heights for the antenna and the laser device. To set the "Magnetic Declination,” you have two options: Either Eos Tools Pro can read the magnetic declination from the Arrow, or you can set this value manually.



Congratulations! You are now ready to collect with orthometric height and/or take laser-offset measurements directly inside your webmaps in Collector.