

Eos Locate™ for ArcGIS Apps

For Subsite® line locator models



User Manual

(March 2021)

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Welcome to Eos Locate™ for ArcGIS apps! Eos Locate™ is a solution that allows a mobile worker to map underground assets, and associated data. This solution is based within the Eos Tools Pro app and requires the use of Esri's ArcGIS apps, such as ArcGIS Collector and ArcGIS Field Maps. The data collected using Eos Locate™ includes all parameters from your locator device (such as depth below cover and frequency) and high-accuracy GNSS locations and metadata from your Arrow GNSS receiver.

This guide will walk you through the steps required to perform your first Eos Locate™ workflow. In the following sections, you will learn how to create your locate layer in ArcGIS Pro using the Eos Locate™ Toolbox and then publish this layer to your web map. After that, you will learn to configure initial setting in Eos Tools Pro, your locator device, your ArcGIS app (either Collector or Field Maps), and the Eos Locate™ interface page. You will then be ready to collect accurate 3D locations of underground assets and automatically sync these with your ArcGIS Online map!

User Guide Locator Compatibility and Terms

This user manual is intended for teams using specific Subsite Electronics line locator models, specifically the UtiliGuard® Series. Examples given are for the most popular UtiliGuard2 locator. Throughout this manual, the words "UtiliGuard2," "MFLRX" and "locator" will be used interchangeably. Find more user manuals on the eos-gnss.com website, or by contacting support@eos-gnss.com.

Also, the term "Eos Locate™ page" will be used to refer to the Eos Locate™ solution interface within Eos Tools Pro on iOS. This page is a hidden interface and will show up only when you are using the Eos Locate™ solution.

Throughout this guide, you will find helpful *tips (green)* and *important notes (red)* that are meant to anticipate common questions. For instance:

Important Note: This manual does not cover the principles and science of underground locates. It is assumed that the user is familiar with his locate instrument and qualified to perform the locate data collection.

Let's begin.

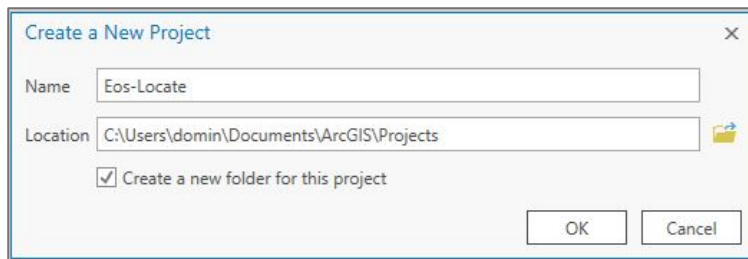


1. ArcGIS Pro: Prepare your Eos Locate™ Feature Layer

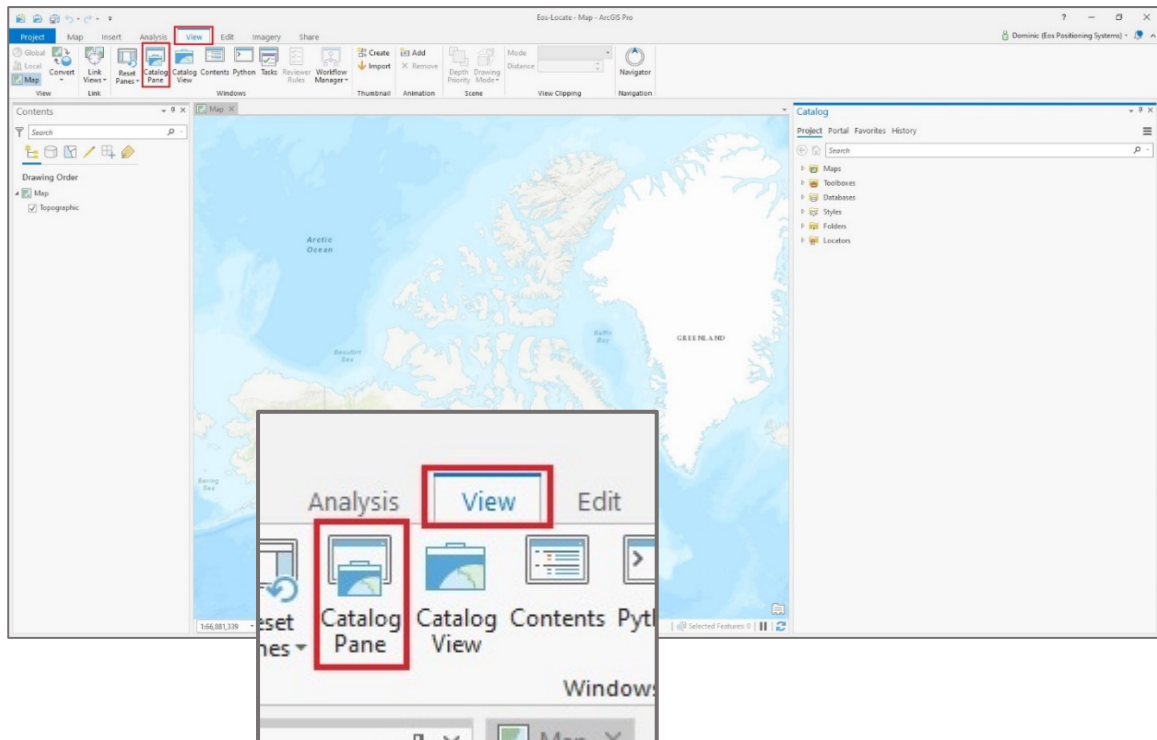
1.1 Using Toolbox, Create your Feature Class

Tip: Before you start, make sure your ArcGIS Pro software license is up to date with the latest version.

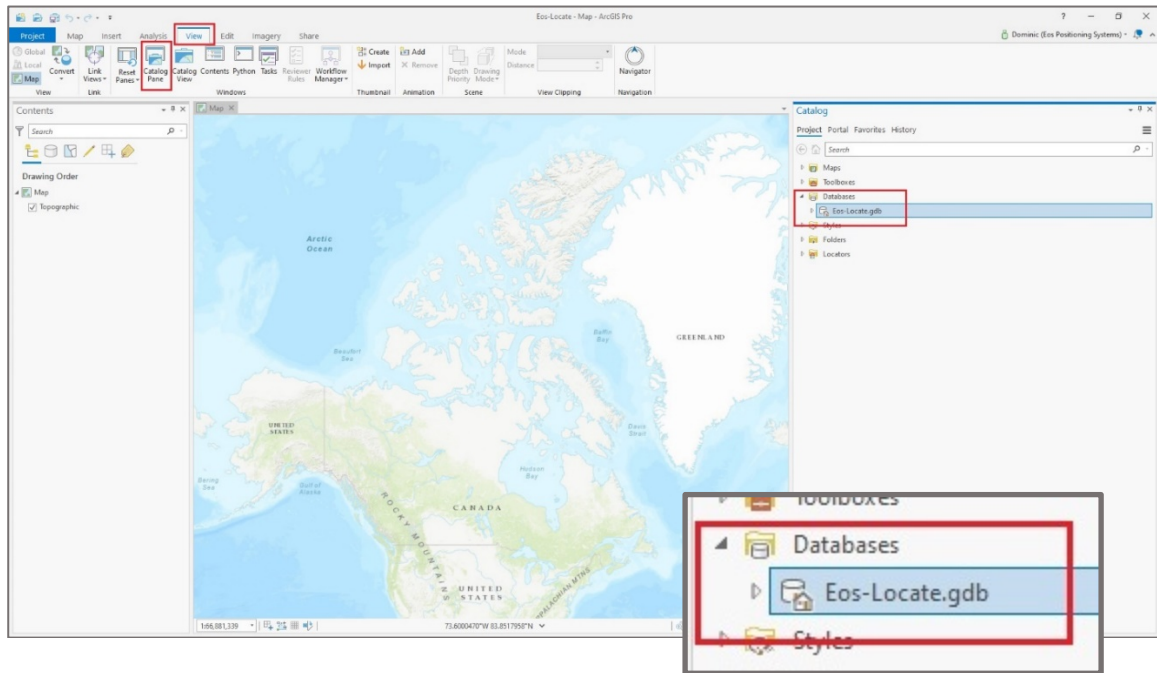
- a) Open ArcGIS Pro and log in to your ArcGIS account (enterprise).
Create or Open a **New Project**.



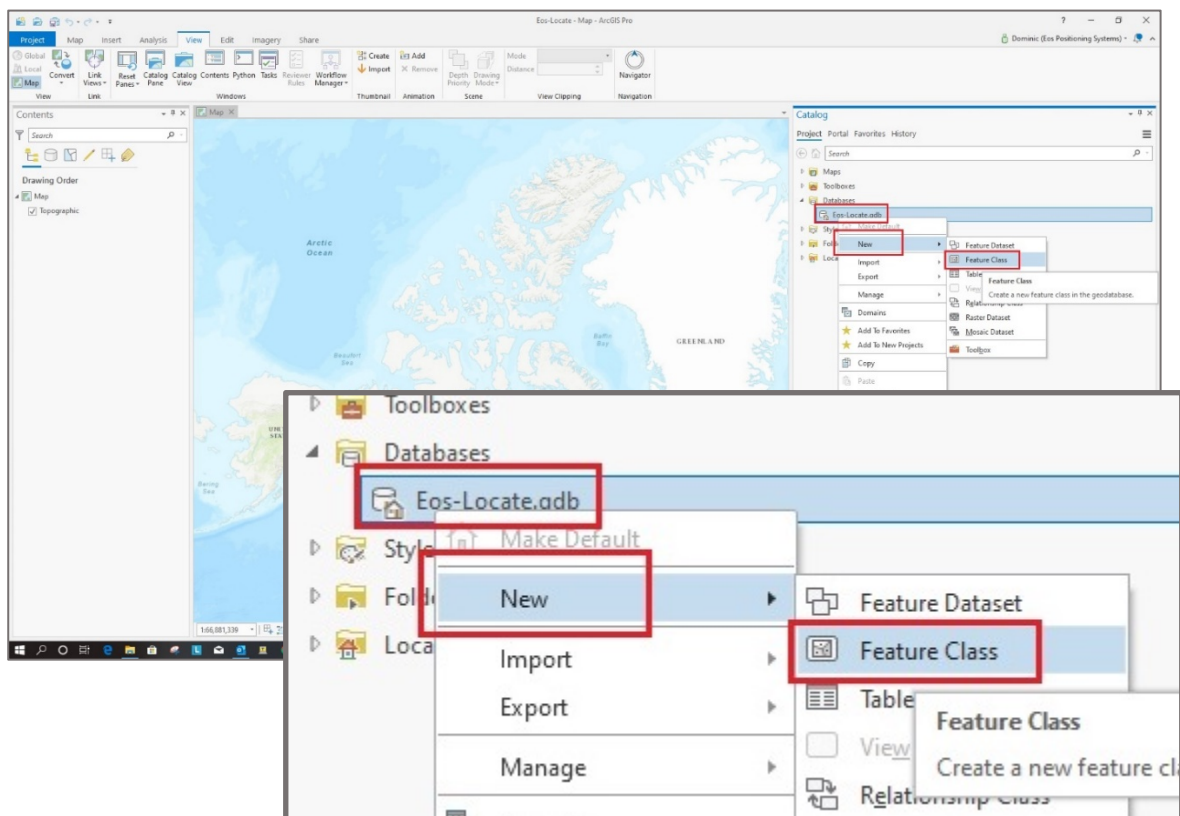
- b) Click on **View** and select **Catalog Pane**.



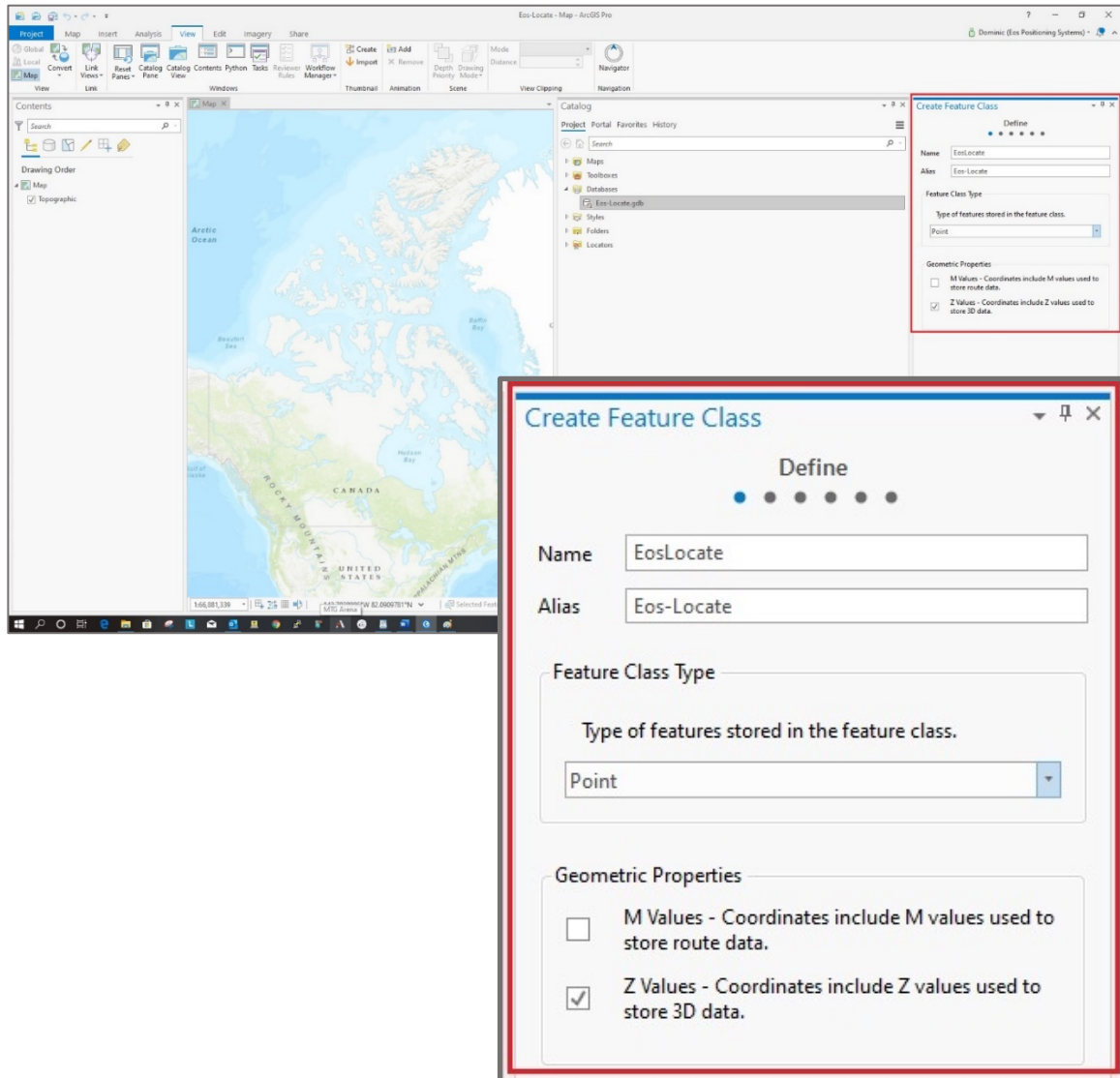
- c) On the **Catalog Pane** (on the right) select **Databases** and right click on the database of your map.



- d) Select **New/Feature Class** to create the feature class that will be used with the Locator metadata.



- e) On the **Define** page, name your feature class/alias and select **Point** as the **Feature Class Type**. Make sure to check the **“Z-Values”** box in the **Geometric Properties**. Click on **Next** twice.

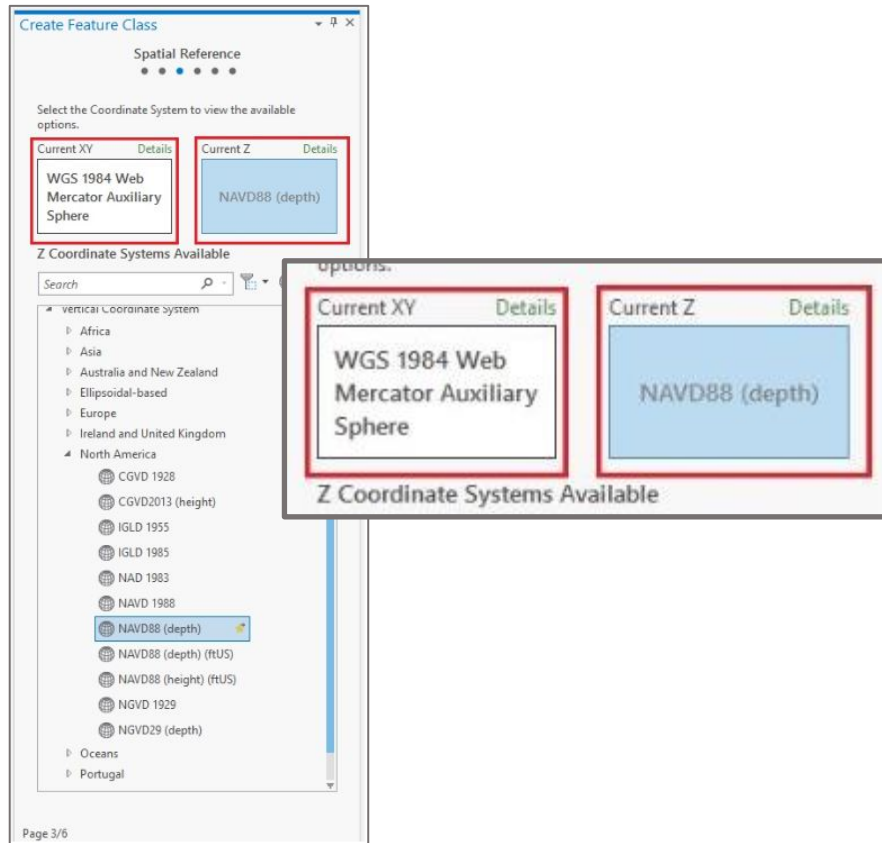


- f) In the Spatial Reference menu select your horizontal and vertical datum.

Tip: For the United States, the most used are WGS 1984 Web Mercator Auxiliary Sphere and NAVD88 (vertical datum).

Click **Finish**.

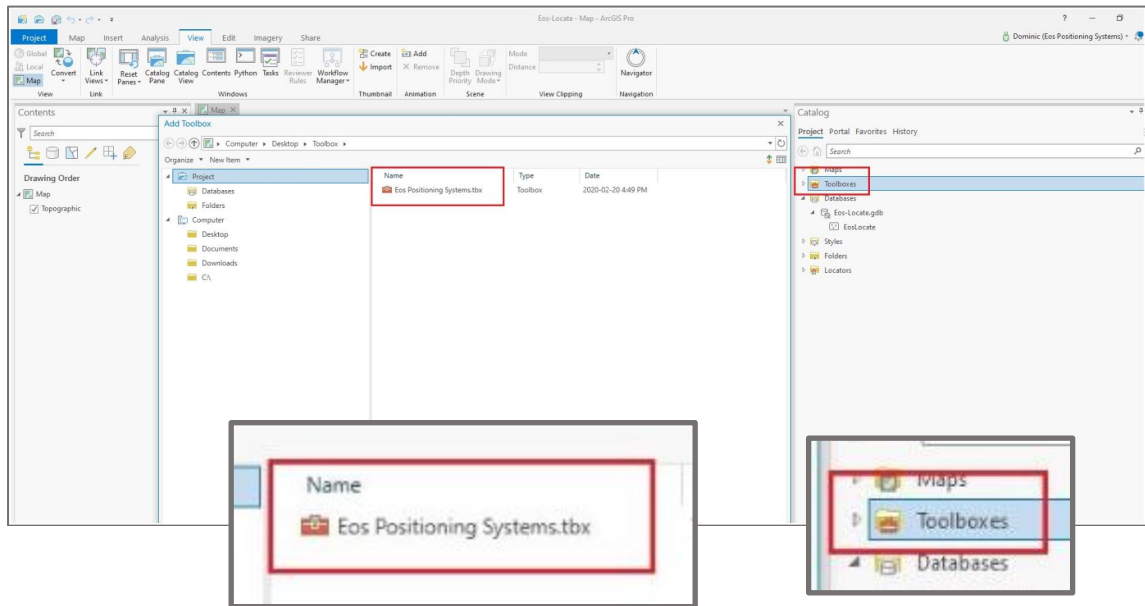
Important Note: If you are unsure of which coordinate system/datum to use, consult with your GIS specialist.



Your feature class is now prepared. Next, you will add fields for locate and GNSS metadata to the feature class you just created ...

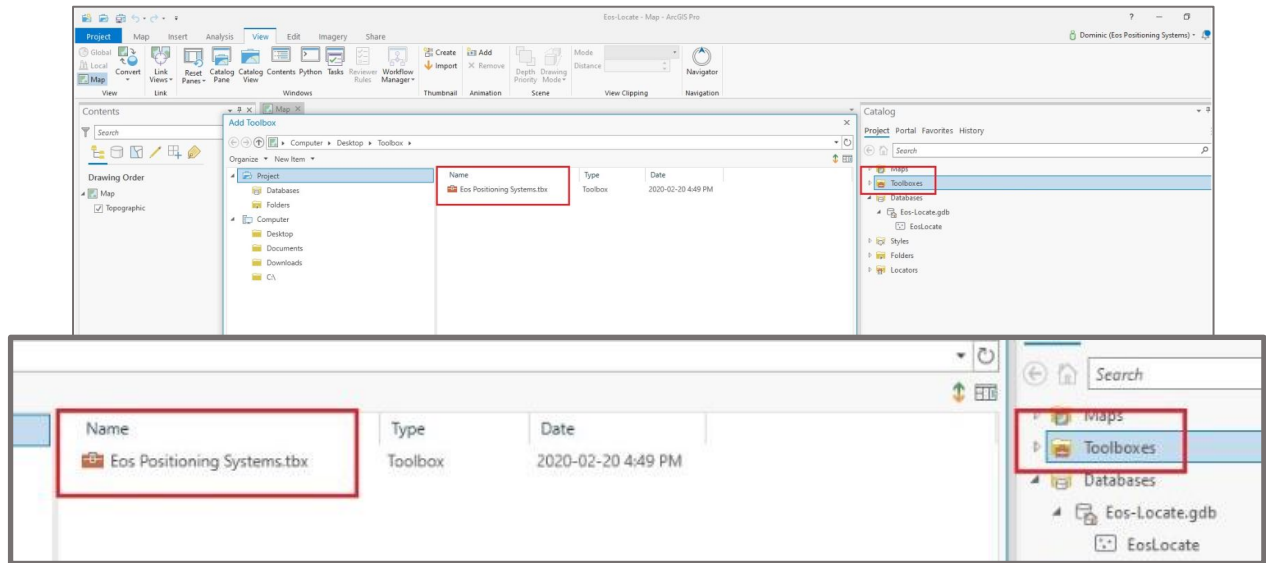
1.2 Add Locate fields and GNSS metadata to your Feature Class

- a) From the **Catalog Pane**, right click on **Toolbox** and select **Add Toolbox**.

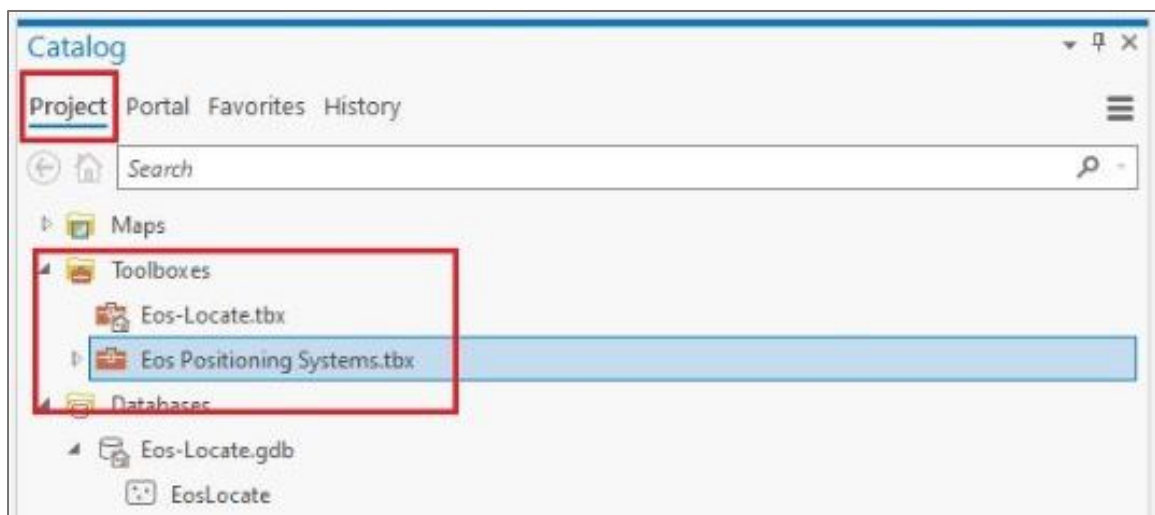


- b) [Download the Eos Toolbox for ArcGIS](#) zip file to your PC and extract the content.

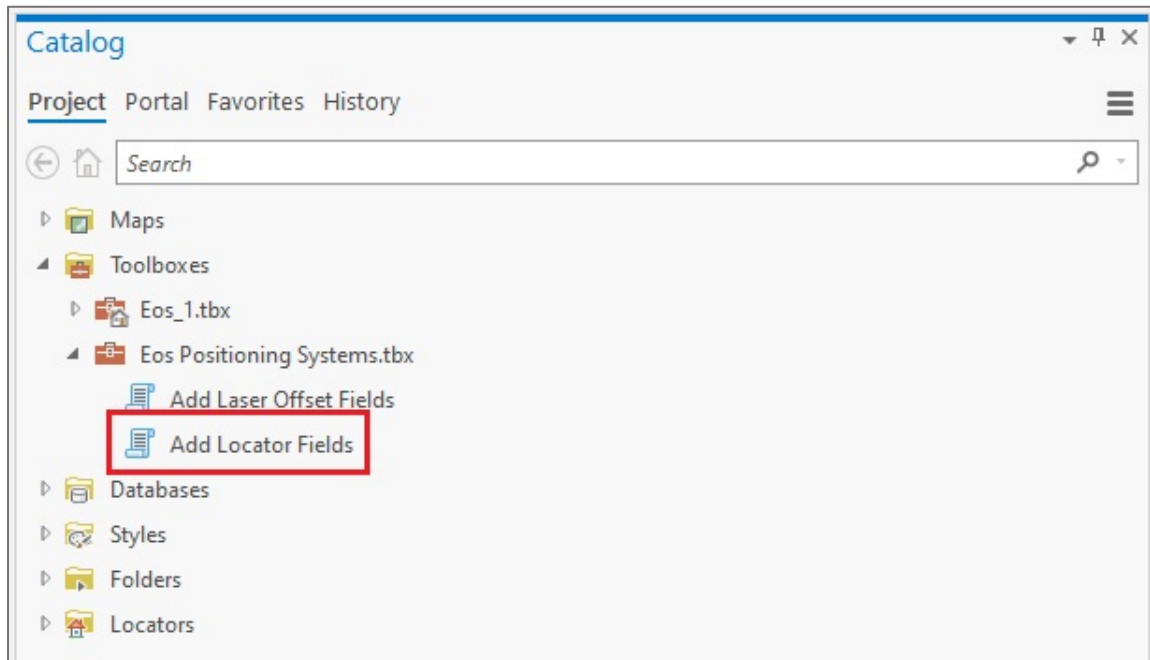
- c) Browse and select the extracted **Eos Positioning Systems.tbx** Toolbox. Click **OK**.



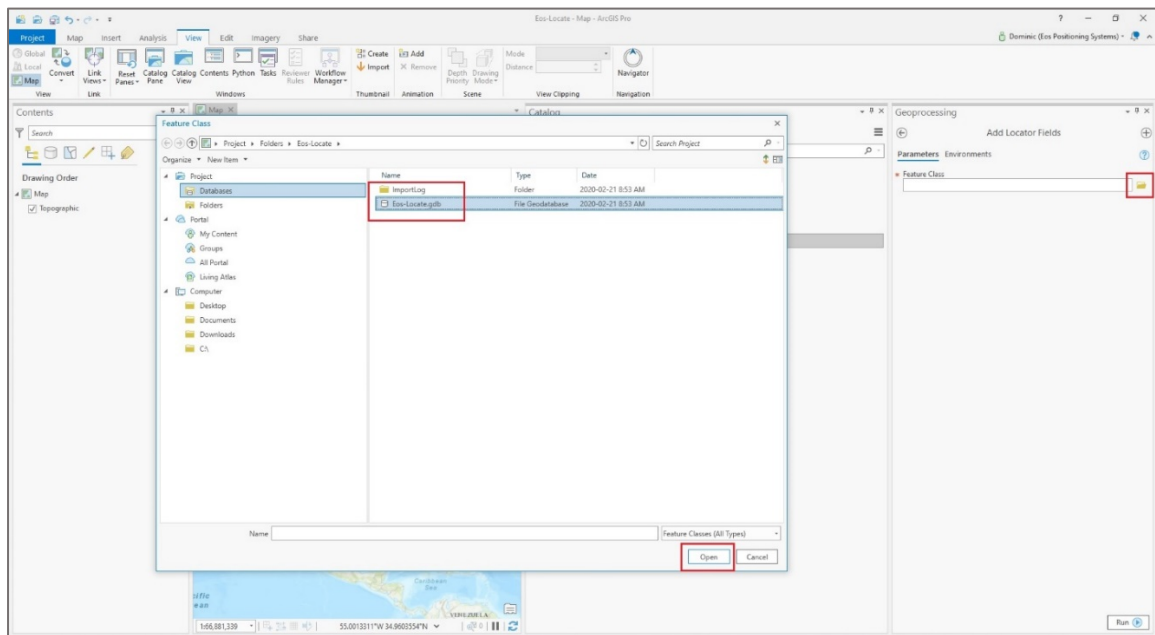
The **Eos Positioning Systems.tbx** toolbox should now be listed under the **Toolboxes** menu.



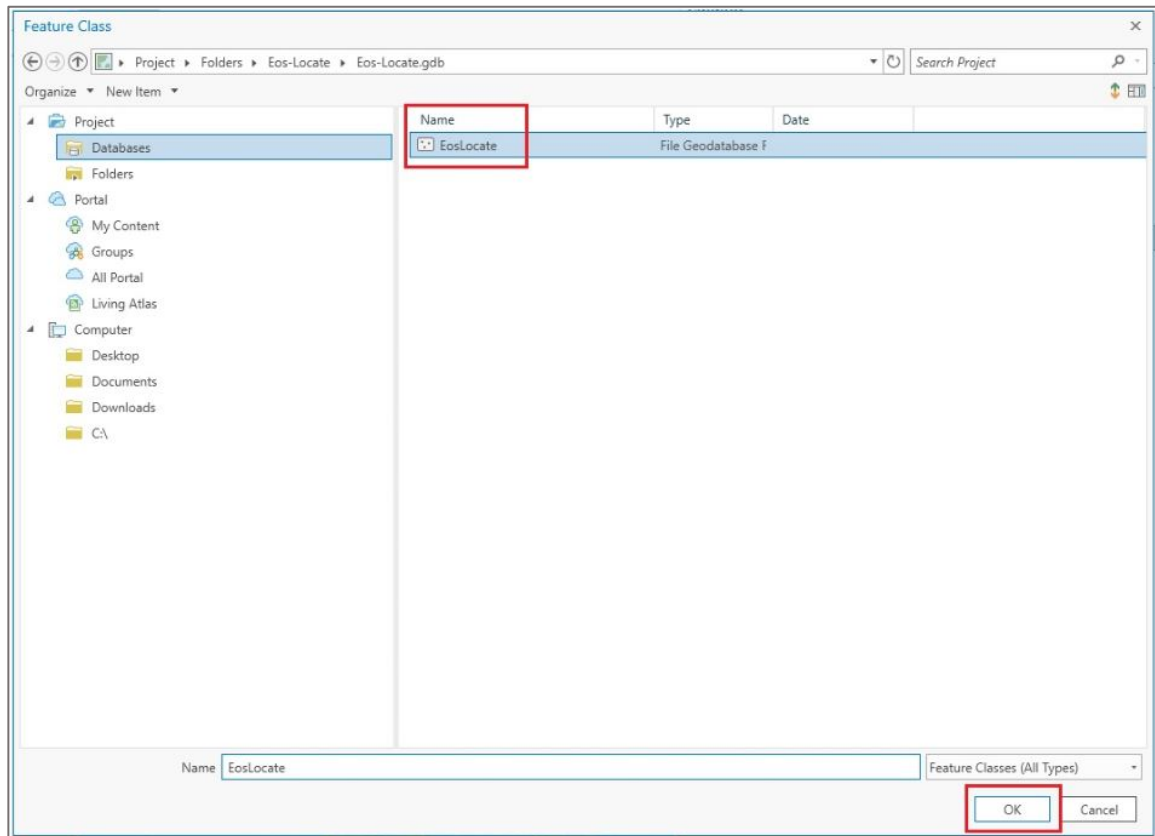
- d) Right click on **Add Locator Fields** and click **Open**.



- e) In the **Geoprocessing** Pane, click the file folder icon to generate a popup asking you to select your feature class. Select the point feature class for which you want to populate the metadata and click **OK**.

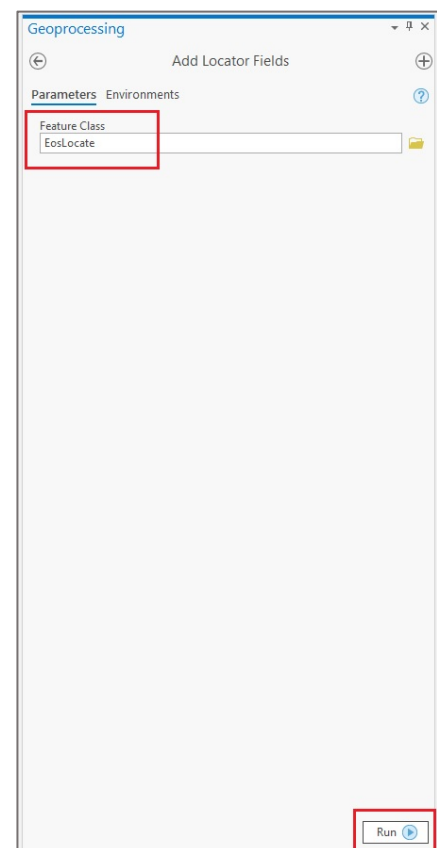


- f) Once the Geodatabase is opened, select the **EosLocate** feature class and click **OK**.

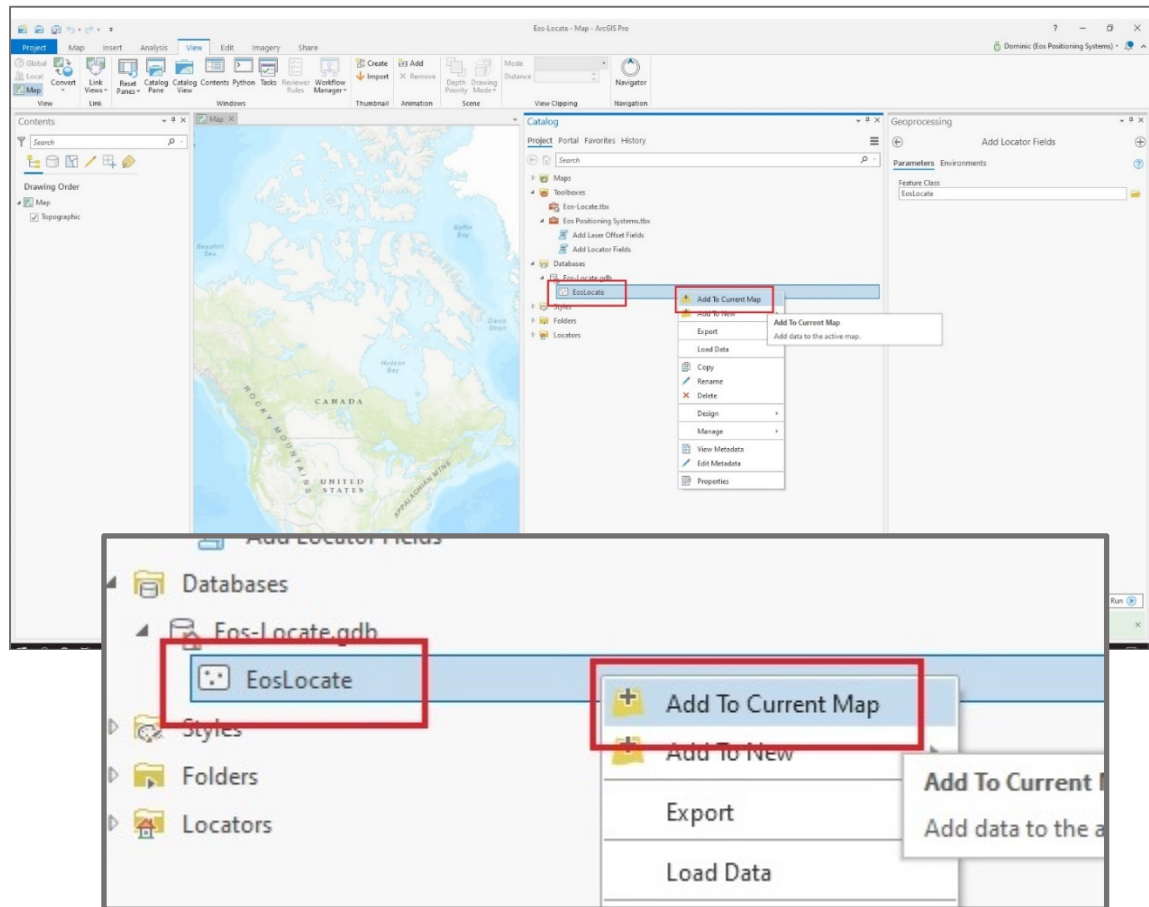


- g) Click **Run** to add the metadata to the feature class (point).

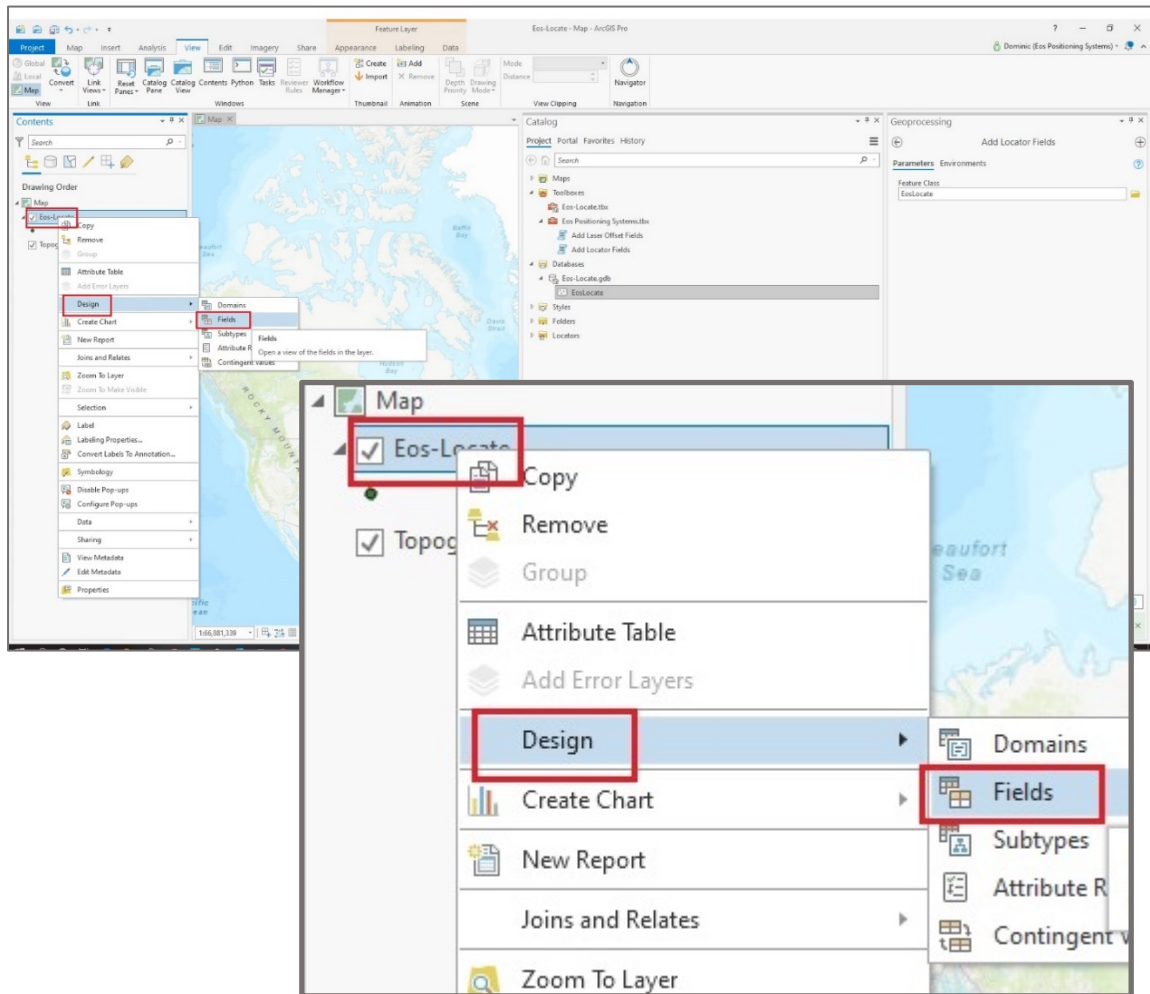
Tip: This process may take a few minutes to complete



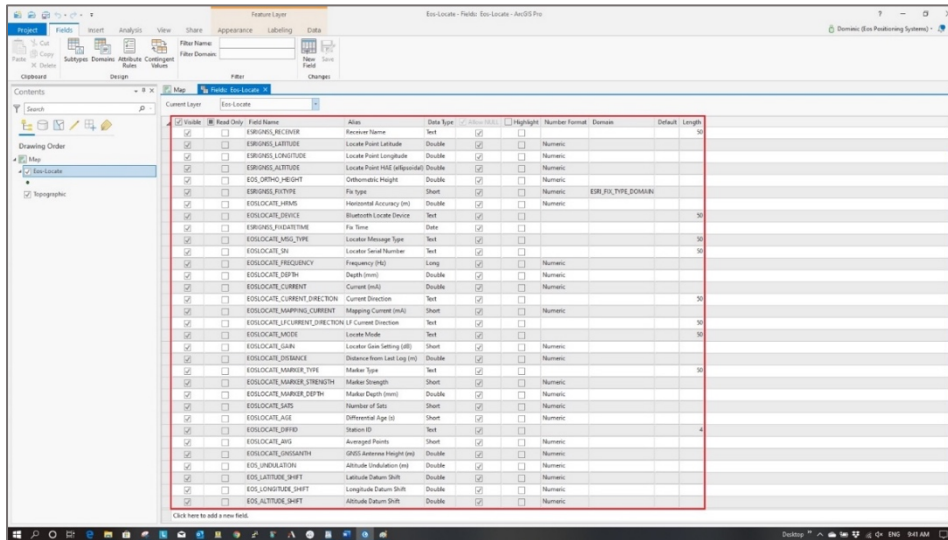
h) Under **Catalog / Project / Database**, right click on **Eos_Locate** and **Add To Current Map**



- i) Your Point Feature Class now has the GNSS metadata and Eos Locate™ fields. To verify that this is the case, select the Feature Class and right click on **Design/Fields**.



You should see all your GNSS and locate fields:



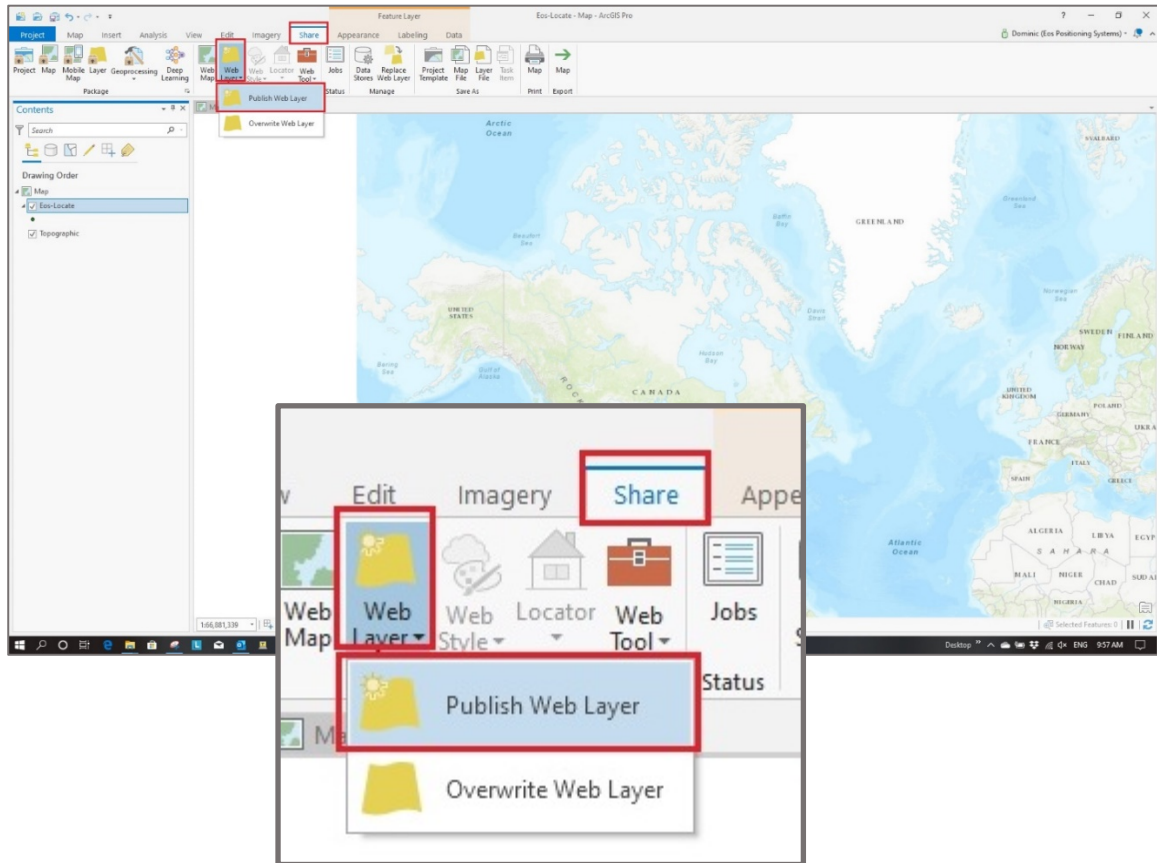
Here is a zoomed view of some of the field names you should see:

Field Name	Alias
ESRIGNSS_RECEIVER	Receiver Name
ESRIGNSS_LATITUDE	Locate Point Latitude
ESRIGNSS_LONGITUDE	Locate Point Longitude
ESRIGNSS_ALTITUDE	Locate Point HAE (ellipsoidal)
EOS_ORTHO_HEIGHT	Orthometric Height
ESRIGNSS_FIXTYPE	Fix type
EOSLOCATE_HRMS	Horizontal Accuracy (m)
EOSLOCATE_DEVICE	Bluetooth Locate Device
ESRIGNSS_FIXDATETIME	Fix Time
EOSLOCATE_MSG_TYPE	Locator Message Type
EOSLOCATE_SN	Locator Serial Number
EOSLOCATE_FREQUENCY	Frequency (Hz)
EOSLOCATE_DEPTH	Depth (mm)
EOSLOCATE_CURRENT	Current (mA)
EOSLOCATE_CURRENT_DIRECTION	Current Direction
EOSLOCATE_MAPPING_CURRENT	Mapping Current (mA)
EOSLOCATE_LFCURRENT_DIRECTION	LF Current Direction

Now that you have added fields for GNSS and locator metadata to your feature class, you will publish your web layer ...

1.3 Publish your Web Layer

a) From the **Share** tab select **Web Layer/Publish Web Layer**.



- b) Under the **General** tab enter the following **Item Details**: Name, Summary and the specific Add this **Tag**: “Eos_Locate”.

Important Note: You must add the “Eos_Locate” tag before sharing the Map as a Web layer otherwise the solution will not work.

Share As Web Layer

Sharing Map As A Web Layer

General Configuration Content

Item Details

Name
EosLocate

Summary
EosLocate

Tags
eos_locate X Add Tag(s)

Layer Type ⓘ

☒ Feature
☐ Tile
☐ Vector Tile

Location

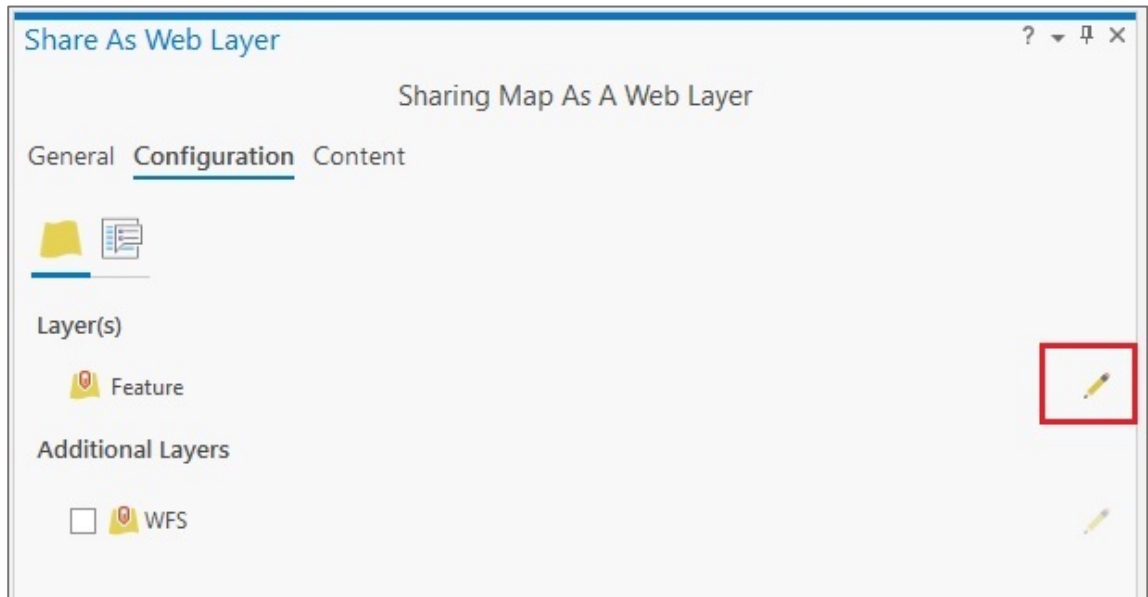
Folder
Select or create folder

Share with

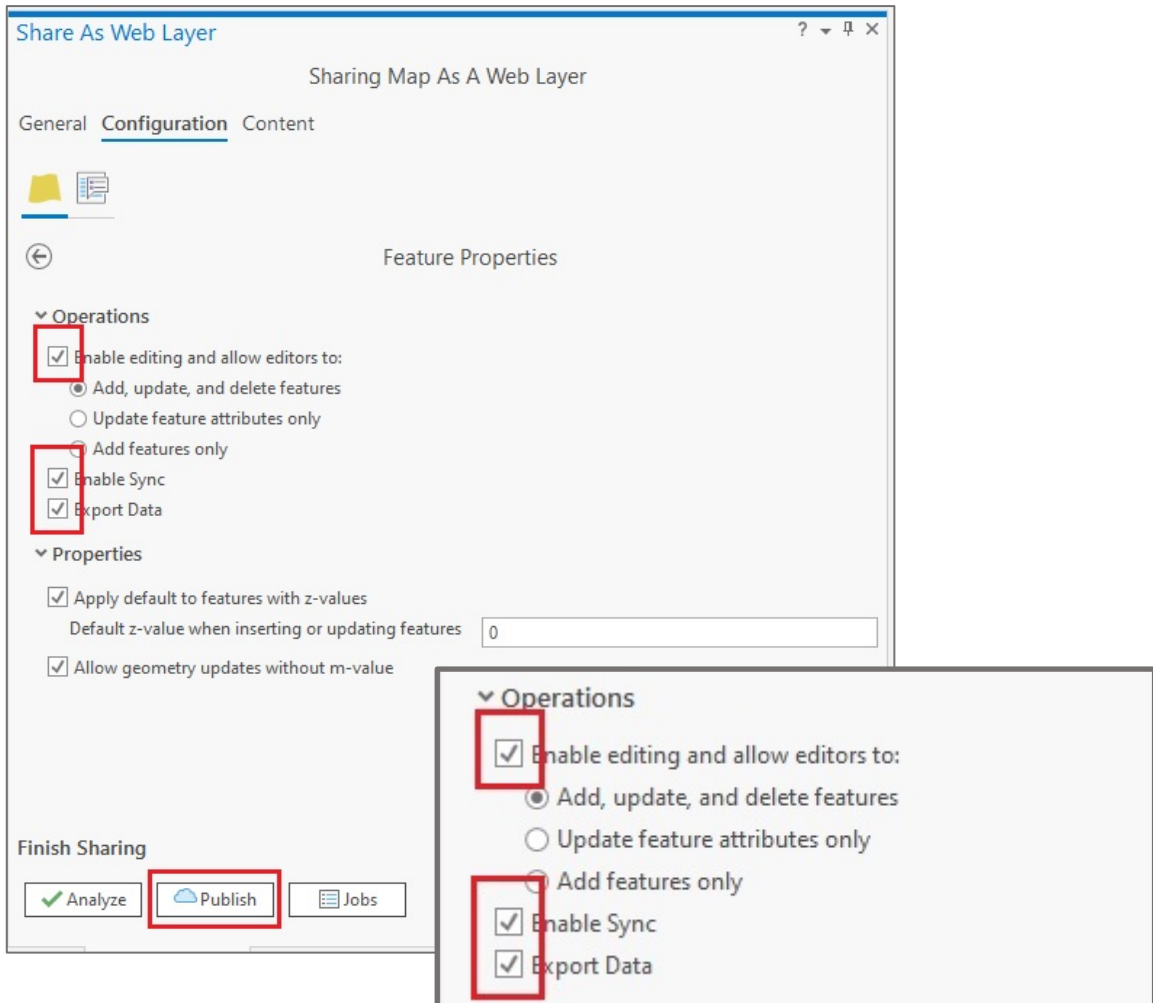
☐ Everyone
☒ Eos Positioning Systems
Groups ▾

Finish Sharing

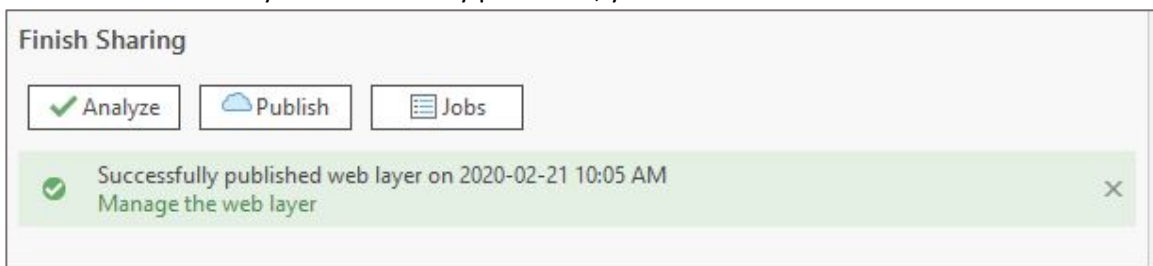
- c) Tap the **Configuration** tab and enter the **Feature Properties** for your layer by pressing the Edit button (pen icon on the right).



- d) Check the following boxes under the **Operations** property:
"Enable editing and allow editors to:";
"Enable Sync"; and
"Export Data".
Next click **Publish**.



- e) To confirm that the layer is successfully published, you should receive this confirmation:



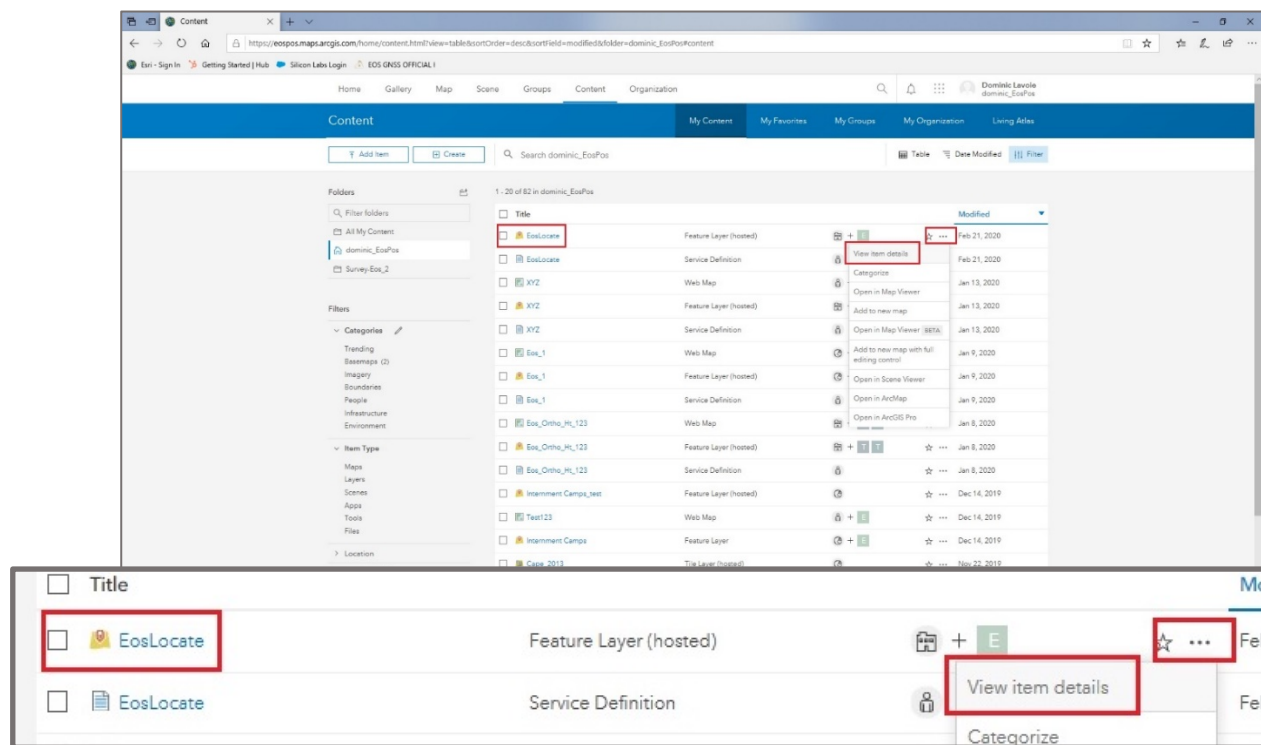
With the Web layer successfully published, you can move on to creating your Web map ...

1.4 ArcGIS Online: Create your Web Map

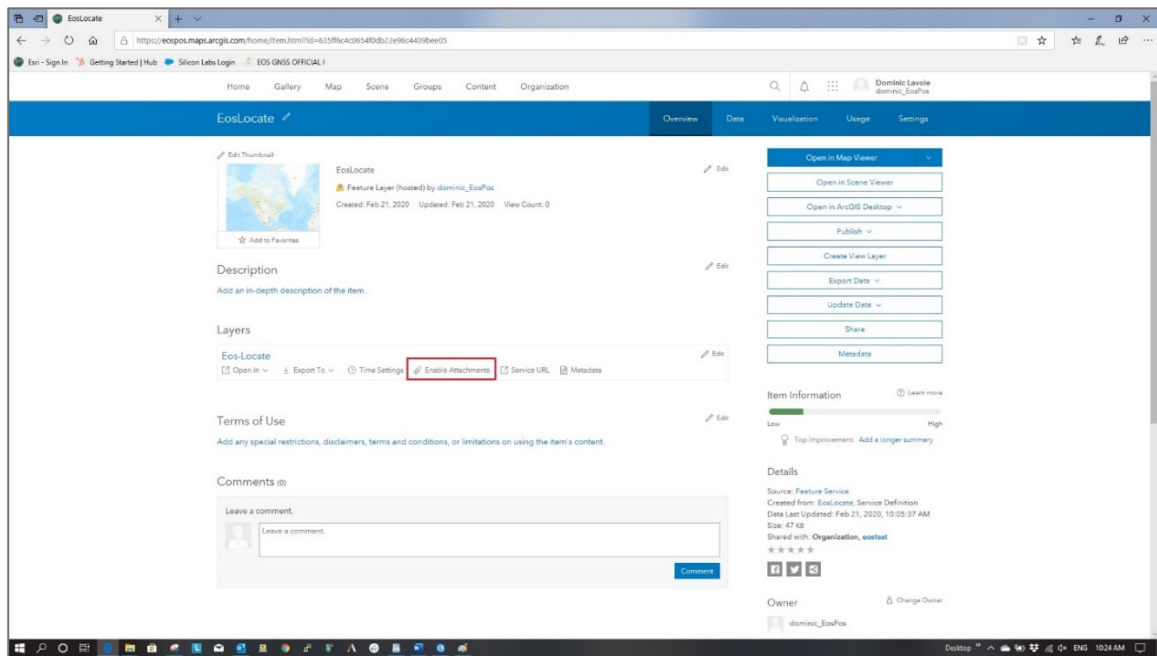
a) Log into **ArcGIS Online** and click **Content**.



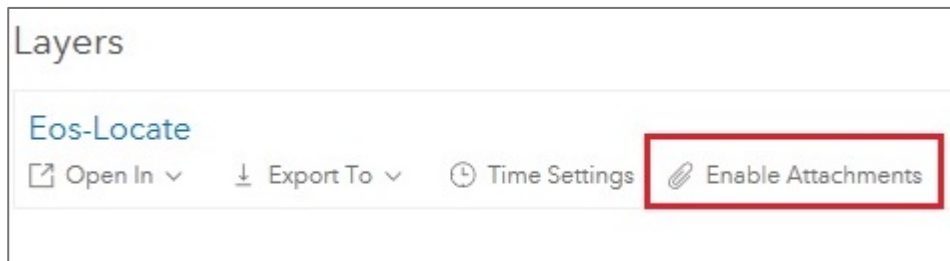
b) If you wish to enable attachments (e.g., photos) to your Feature Class, follow these steps:
First, identify your **Feature Layer** from the list and click on the three-dot ellipses ("...") to the right. This will prompt you to select **View item details** from a list.



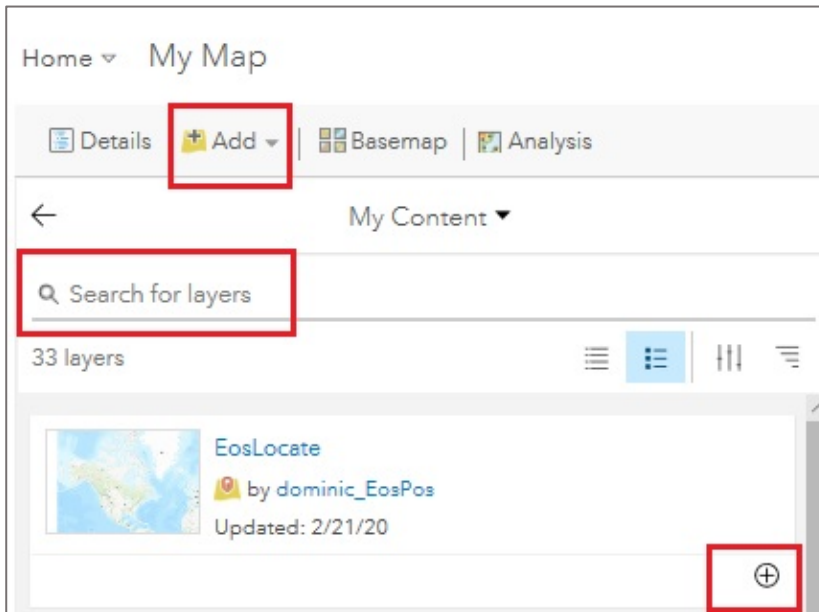
Your **Item Details** will appear:



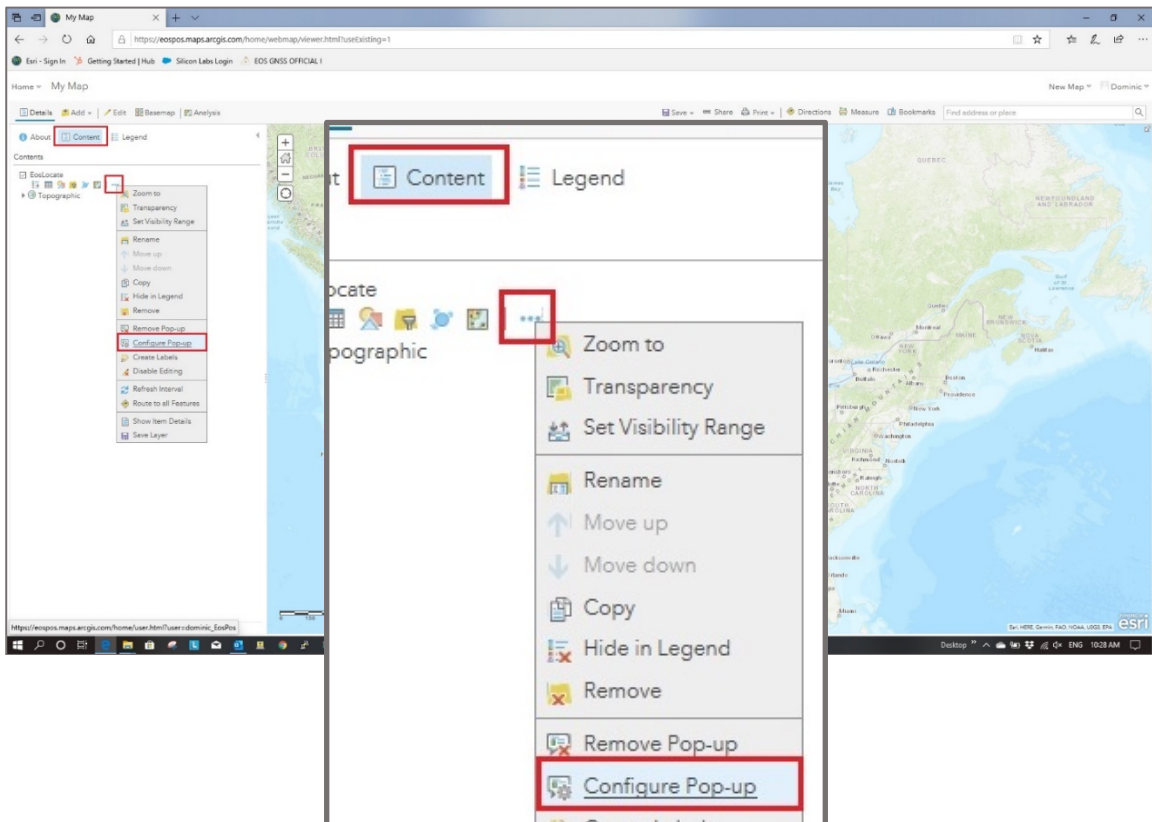
c) In the **Item Details**, click **Enable Attachments**. Then click **Save**.



- d) Next, in the **My Map** section, click on **New Map**. Click **Add**.
Now, in the **Search for Layers**, find the layer you want to add to your Web map.



- e) Once the layer is added to the Web map, navigate to the **Content Pane**. Expand the options by clicking the ellipses (...) and select **Configure Pop-up**.



- f) In the **Configure Pop-up** section, click **Configure Attributes**.

Home ▾ My Map

Details Add ▾ | Edit Basemap Analysis

Configure Pop-up

EosLocate

☒ Show Pop-ups

Pop-up Title

{ESRIGNSS_RECEIVER}

Pop-up Contents

Display: A list of field attributes ▾

These field attributes will display:

OBJECTID {OBJECTID}

Receiver Name {ESRIGNSS_RECEIVER}

Locate Point Latitude {ESRIGNSS_LATITUDE}

Locate Point Longitude {ESRIGNSS_LONGITUDE}

Configure Attributes

☐ Show feature attachments as links

- g) In the **Configure Attributes** pop-up, select all fields that contain **Latitude** and **Longitude** values. Set the **Format** to “8 decimal places” and then click **OK**.

Configure Attributes

Check the fields you want to display and edit. Select a field to change its alias, order it, and format it.

☐ Display	☐ Edit	Field Name	Field Alias
☒	☐	{OBJECTID}	OBJECTID
☒	☒	{ESRIGNSS_RECEIVER}	Receiver Name
☒	☒	{ESRIGNSS_LATITUDE}	Locate Point Latitude
☒	☒	{ESRIGNSS_LONGITUDE}	Locate Point Longitude
☐	☐	{ESRIGNSS_ALTITUDE}	Locate Point HAE

Format

8 decimal places ▾

☒ Use 1000 Separator

Hint

OK CANCEL

- h) Still in the **Configure Attribute** pop-up, select all fields that will contain **Altitude** values. Set the **Format** to “3 decimal places” and click **OK**.

Configure Attributes

Check the fields you want to display and edit. Select a field to change its alias, order it, and format it.

☐ Display	☐ Edit	Field Name	Field Alias
☐	☐	ER}	Receiver Name
☒	☒	{ESRIGNSS_LATITUDE}	Locate Point Latitude
☒	☒	{ESRIGNSS_LONGITUDE}	Locate Point Longitude
☒	☒	{ESRIGNSS_ALTITUDE}	Locate Point HAE (ellipsoidal)
☒	☒	{EOS_ORTHO_HEIGHT}	Orthometric Height

Format
3 decimal places

☒ Use 1000 Separator

Hint

OK CANCEL

- i) When done, go back to the **Configure Pop-up Pane**, click **OK**.

Configure Pop-up

EosLocate

☒ Show Pop-ups

Pop-up Title

{ESRIGNSS_RECEIVER}

Pop-up Contents

Display: A list of field attributes

These field attributes will display:

OBJECTID {OBJECTID}

Receiver Name {ESRIGNSS_RECEIVER}

Locate Point Latitude {ESRIGNSS_LATITUDE}

Locate Point Longitude {ESRIGNSS_LONGITUDE}

[Configure Attributes](#)

☐ Show feature attachments as links

Attribute Expressions

Adding expressions allows you to create new information from existing fields for use in pop-ups.

ADD

Pop-up Media

Display images and charts in the pop-up:

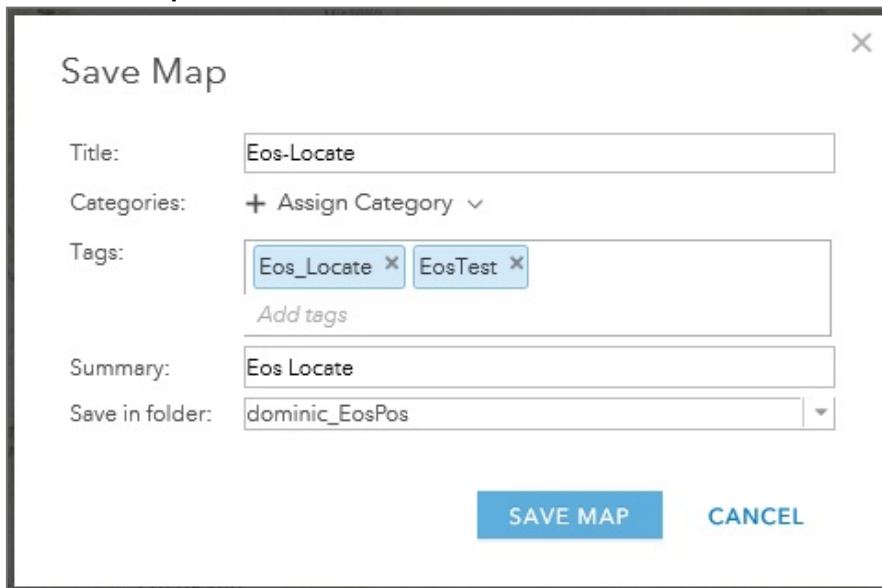
ADD

No images or charts.
Click 'Add' to add one.
Use the arrows to order.

OK CANCEL

Trust Center Contact Esri Report Abuse

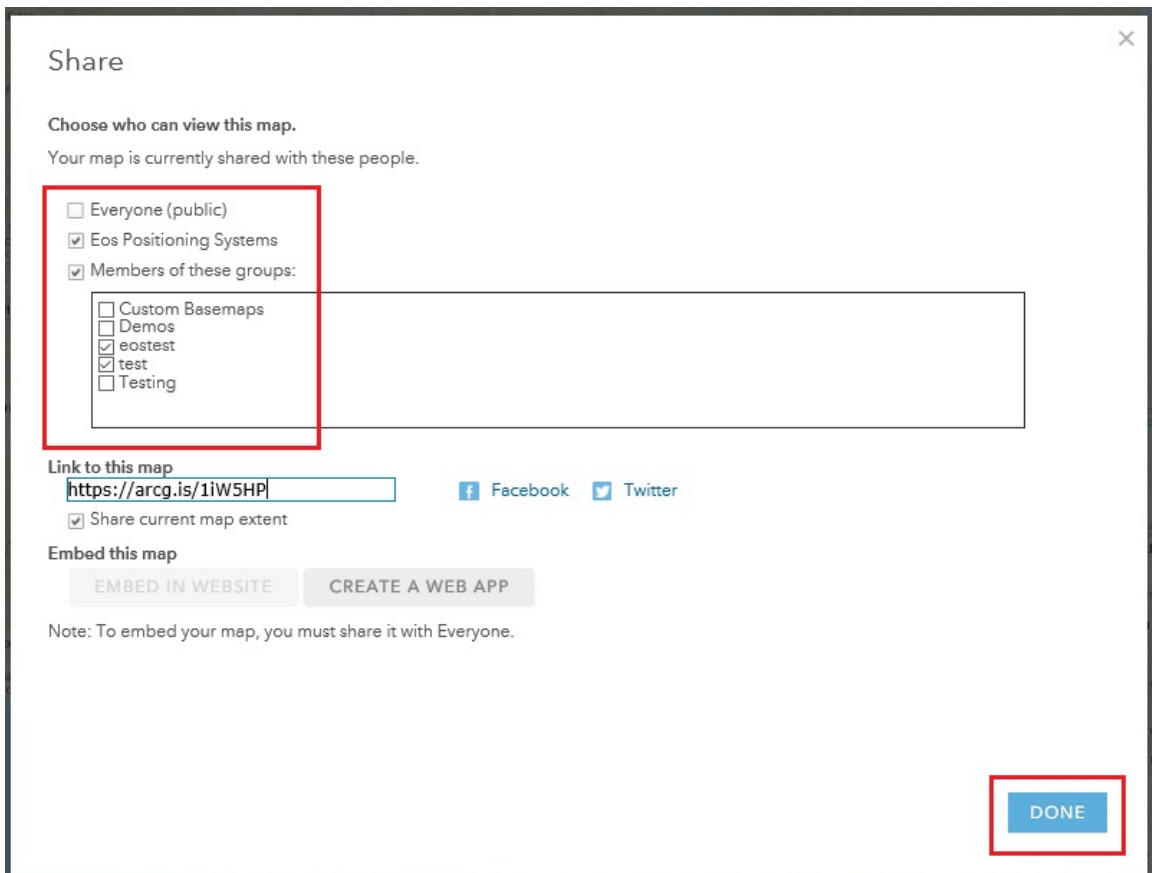
j) Click **Save Map**.



The 'Save Map' dialog box contains the following fields and controls:

- Title:** Text input field with 'Eos-Locate' entered.
- Categories:** A button labeled '+ Assign Category' followed by a dropdown arrow.
- Tags:** A container with two tag buttons, 'Eos_Locate' and 'EosTest', each with a close 'x' icon. Below them is a text input field with the placeholder 'Add tags'.
- Summary:** Text input field with 'Eos Locate' entered.
- Save in folder:** A dropdown menu showing 'dominic_EosPos'.
- Buttons:** 'SAVE MAP' and 'CANCEL' buttons at the bottom right.

Now **Share** your map with its desired user groups by choosing from the options. Click **Done**.

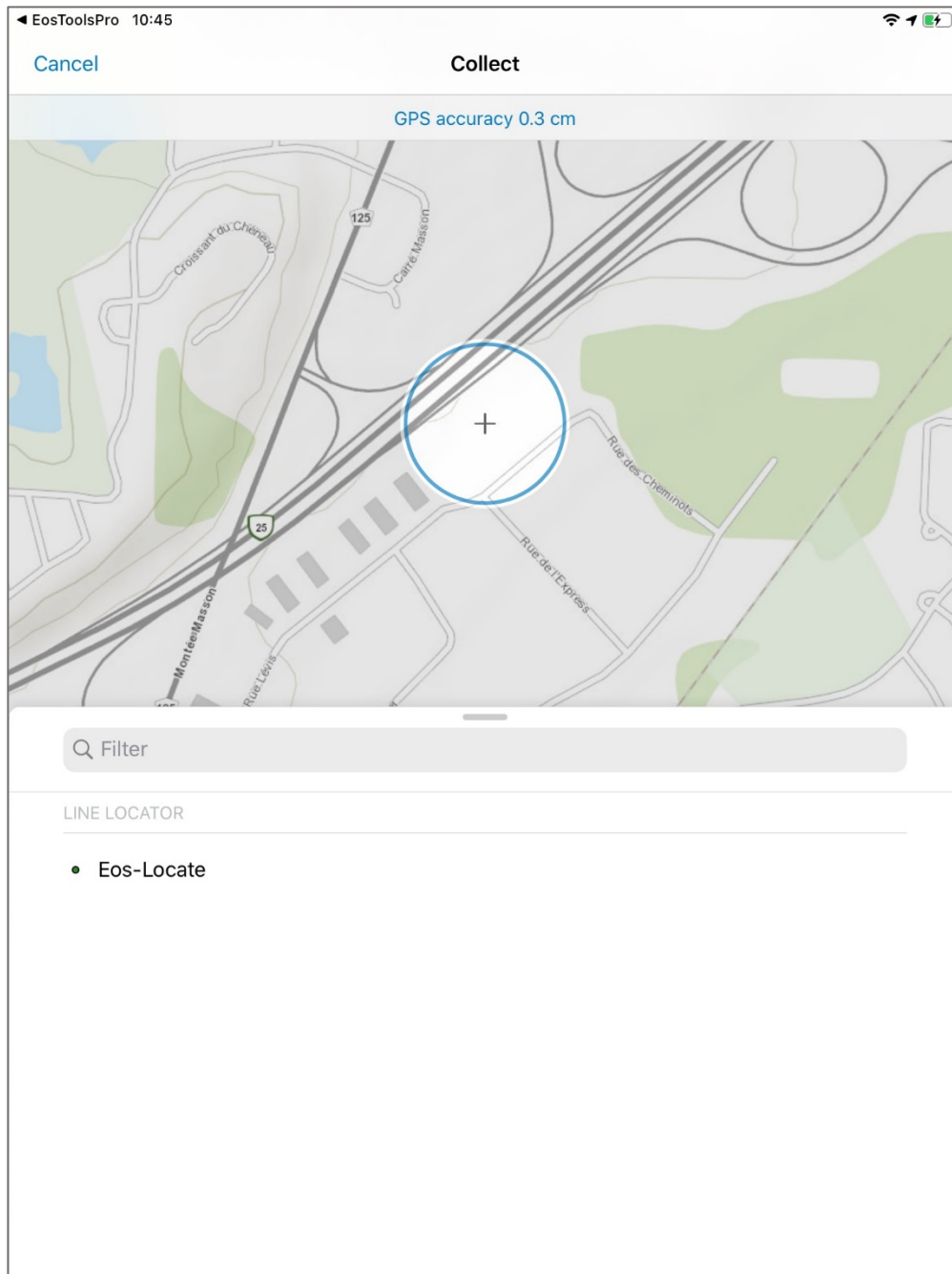


The 'Share' dialog box contains the following sections and controls:

- Choose who can view this map.**
 - Text: 'Your map is currently shared with these people.'
 - Group selection list (highlighted with a red box):
 - ☐ Everyone (public)
 - ☒ Eos Positioning Systems
 - ☒ Members of these groups:
 - ☐ Custom Basemaps
 - ☐ Demos
 - ☒ eostest
 - ☒ test
 - ☐ Testing
- Link to this map**
 - Text input field containing the URL 'https://arcg.is/1iW5HP'.
 - Social media buttons for Facebook and Twitter.
 - ☒ Share current map extent
- Embed this map**
 - Buttons: 'EMBED IN WEBSITE' and 'CREATE A WEB APP'.
 - Note: 'Note: To embed your map, you must share it with Everyone.'
- Done Button:** A blue button labeled 'DONE' at the bottom right, highlighted with a red box.

Now let's verify your map has been saved and shared ...

- k) To verify that your map is properly published, open **ArcGIS Collector** or **ArcGIS Field Maps** on your iOS device. **Browse to the group** that you have shared the map with and **open the map**. Click on the **+** button. The newly created **Eos Locate™** layer should be listed.



Your Web map is configured. Now, let's now set up Eos Tools Pro ...

2. Eos Tools Pro: Initial Setup

2.1 Ensure Minimum Requirements

The Eos Locate™ solution is currently available only on iOS with the latest version of ArcGIS Collector or ArcGIS Field Maps.

Tip: Before starting this field software configuration, make sure you have the minimum required firmware and software versions.

Ensure you have the following **Required Minimum Firmware and App Versions**:

- **Eos Tools Pro**: 1.80 (build 321) and above
- **Arrow Bluetooth® Communication Firmware**: 2.2.905 and above (found in the “About” menu of Eos Tools Pro)
- **ArcGIS Collector or ArcGIS Field Maps** on iOS and **ArcGIS Pro®** (latest versions)
- **UtiliGuard2** series locator from Subsite Electronics with Bluetooth option fitted

2.2 Eos Tools Pro: Configure Alarms and Orthometric Heights

Install the latest version of Eos Tools Pro on your iOS device. [Eos Tools Pro is available for free on the App Store.](#)

Important Note: Eos Tools Pro must be installed on your iPad or iPhone for Collector/Field Maps to be able to request and receive locate measurements from it.

Tip: Note that the Eos Locate™ menu is not displayed in Eos Tools Pro and is only activated by Collector/Field Maps upon a locate request.

2.2.1 Configure GNSS Alarms for Thresholds

When acquiring a GNSS location in Eos Locate™, you can make sure of the quality of the position by setting threshold values in Eos Tools Pro. There will be audible alarms for GNSS conditions in Eos Locate™ and for Eos Tools Pro, and certain parameters (e.g., estimated accuracy, differential status, age of differential correction) will be displayed in red color when their threshold values are exceeded.

Important Note: your Arrow receiver must be turned ON and connected via Bluetooth® to your iOS device for Eos Tools Pro to show its menus.

- a) To set the GNSS alarms, open **Eos Tools Pro**, and tap on the “**Alarm**” tab at the bottom of the main menu.



b) In the **Alarm** menu, set the alarms required for the job.

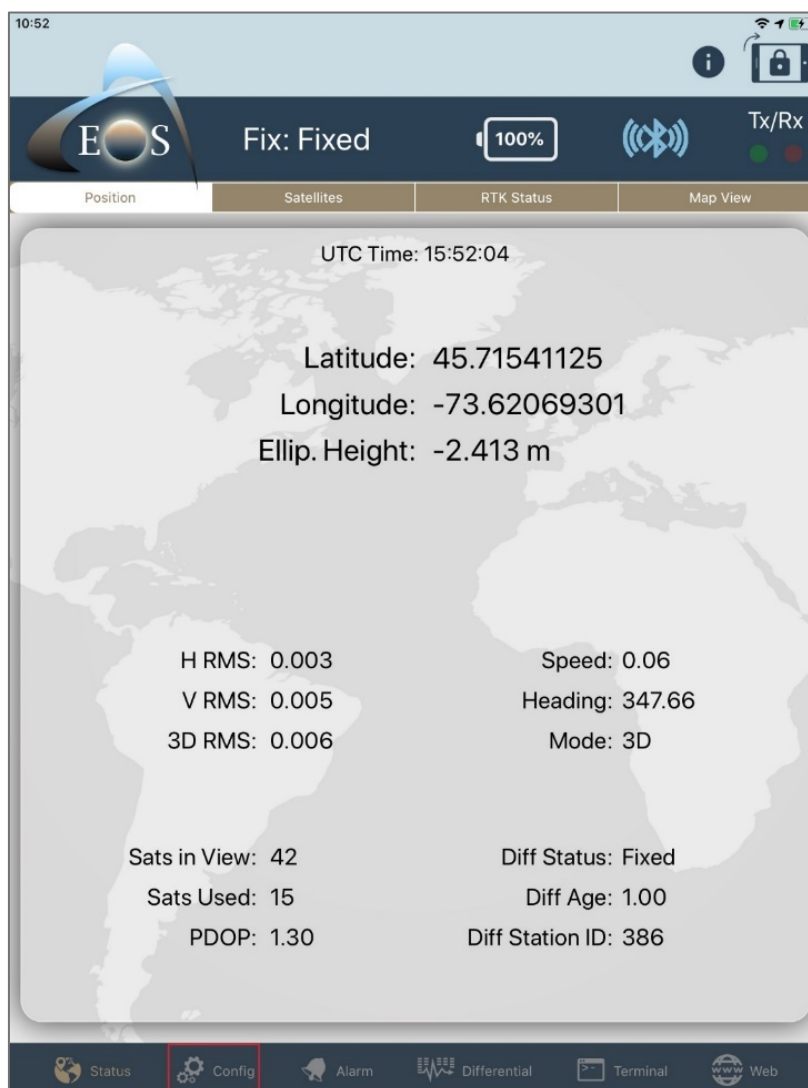


2.2.2 Configure Orthometric Heights for Elevation

If precise elevation is required for your workflow, we strongly suggest taking a moment to configure real-time orthometric heights to match your vertical datum. In this section, we will show you how to configure Eos Tools Pro so that it outputs orthometric height measurements in the Z-value of the point geometry in Collector/Field Maps. This is possible thanks to built-in geoid models within Eos Tools Pro. If your work does not require this, you may skip to the next section.

- a) Open **Eos Tools Pro** and tap the **Config** tab at the bottom of the main menu.

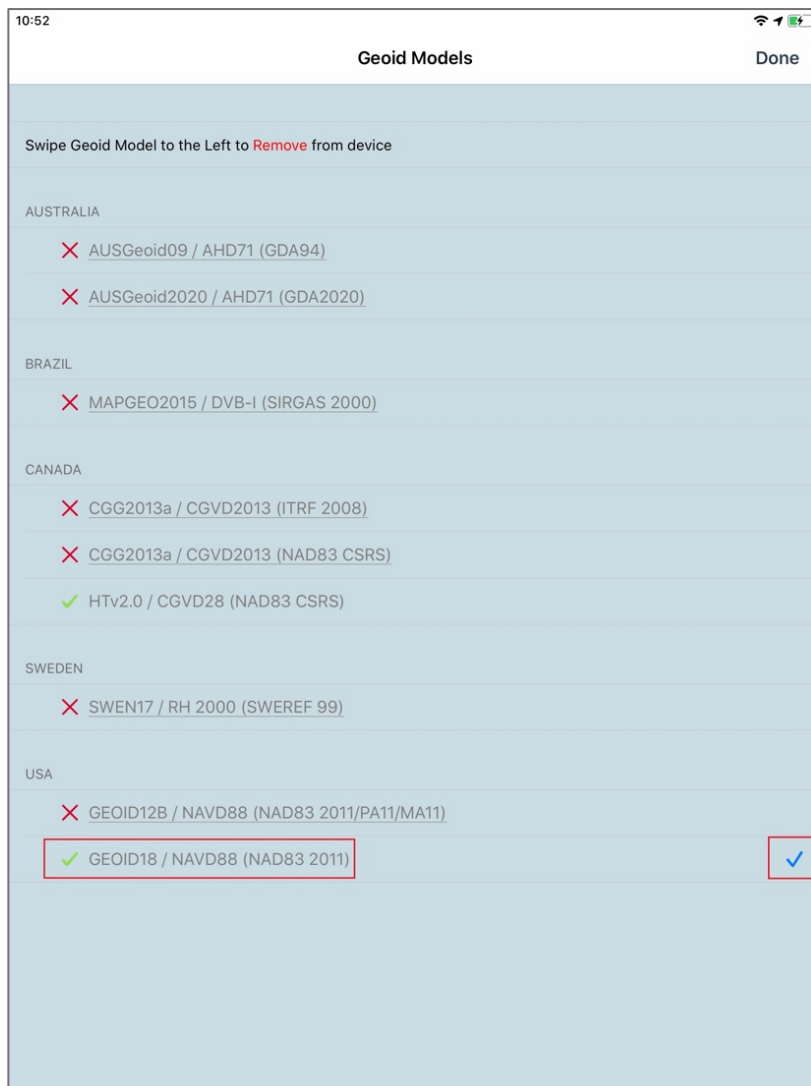
Important Note: Your Arrow receiver must be turned ON and connected via Bluetooth® to your iOS device for Eos Tools Pro to show its menus.



- b) Select **Altitude** in the upper menu bar.
From the **Altitude Reference** drop-down, select **Orthometric**.

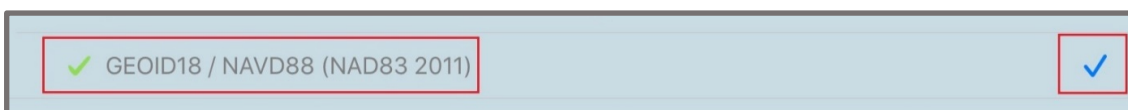


You will be presented with a list of supported (downloadable) geoid models. Scroll down to your country and select the geoid model you wish to download.

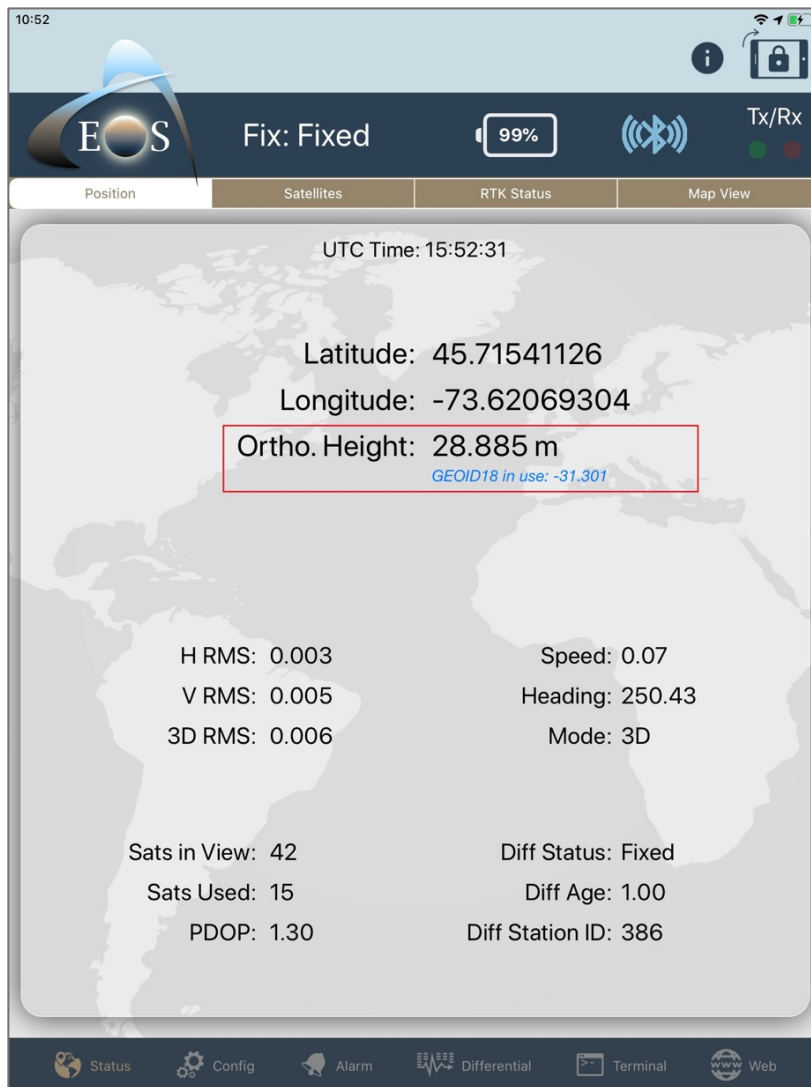


The geoid model will download to your device. Once downloaded, select the model by simply tapping on it (a selection checkmark will appear to the right). Then tap **Done**.

For this example, we have selected "GEOID18 / NAVD88" for fieldwork in the USA:



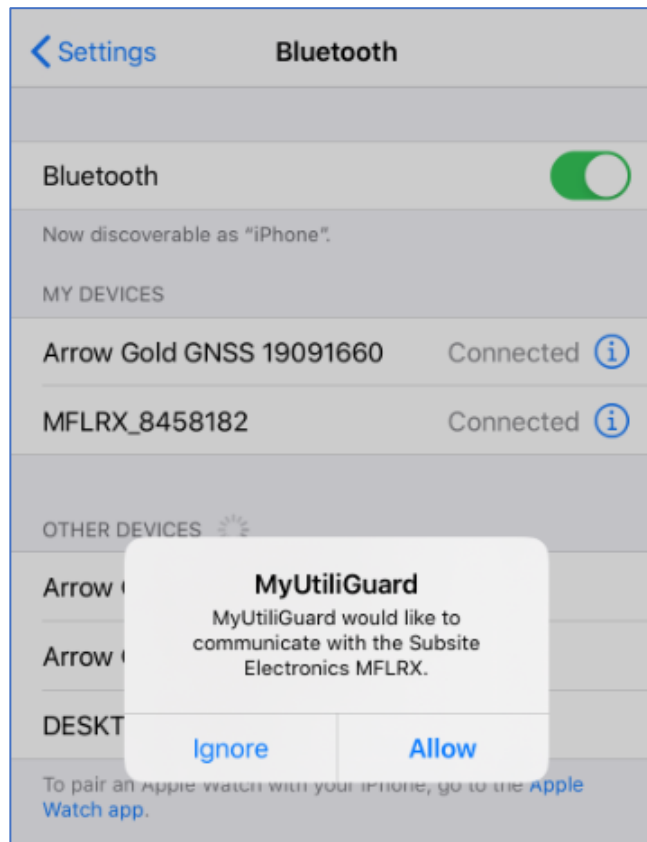
Back in your Eos Tools Pro **Position** tab you will now see your orthometric height.



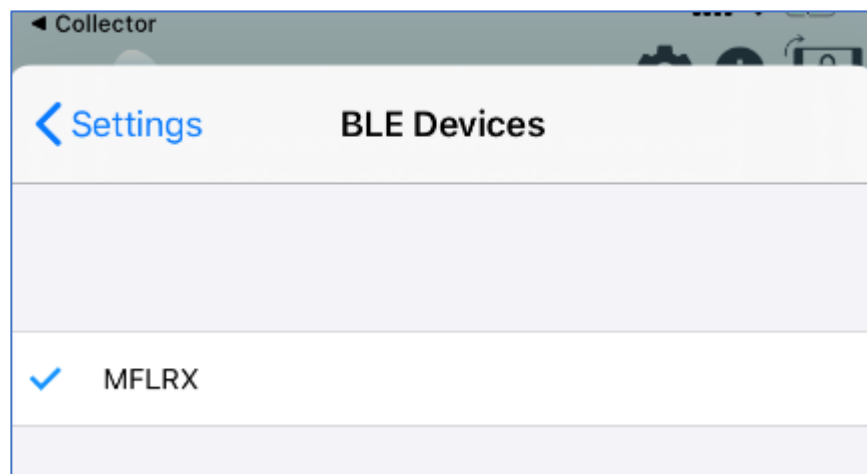
With Eos Tools Pro configured, now you can pair your locator ...

3. Connect to your Locator via Bluetooth®

- a) Power on the Utiliguard2.
- b) Go to your iOS Settings under Bluetooth and click on the **MFLRX**. When prompted with a MyUtiliGuard message, click on Ignore. Make sure the **MFLRX** displays connected.



- c) In Eos Locate™, click on the setting icon, and click on **Select Locator Accessory** and select the MFLRX. The UtiliGuard2 will beep once when connected.



Important note: If you power cycle the UtiliGuard2, or restart your iOS device, you will have to repeat step 3 b) and 3 c).

- d) Go back to the main screen of Eos Locate™ and you should see the MFLRX in blue in the upper left corner of the application.



- e) You are now ready to take a measurement with the UtiliGuard2 and Eos Locate.

4. Mobile Apps Settings

4.1 Ensure Minimum Requirements

The Eos Locate™ solution is currently available only on iOS with the latest version of ArcGIS Collector or ArcGIS Field Maps.

This next section will walk you through the locate measurement workflow.

By this stage, you should have all the **required hardware components**:

- * Arrow GNSS Receiver
- * Subsite Electronics UtiliGuard2
- * iOS Device (iPhone or iPad)
- * Wearable field gear for Arrow GNSS: (One of) Chest pack, Shoulder/Belt Pouch, Survey Range Pole, Vest Pouch. Refer to the following chapter for more details on selecting a setup.

And all the **required software components**:

- Eos Tools Pro (latest version installed)
- ArcGIS Collector for ArcGIS Field Maps (latest version installed)
- Locate layer (created as directed in chapter 1) in your ArcGIS Online Web map

Before we guide you through configuring your settings, it is important to understand how each of the components above will fit together when used in the field. Here is a brief summary of how the complete solution operates:

- * Both the Arrow receiver and the UtiliGuard2 locator are now independently connected to your iPhone/iPad via Bluetooth® (and not connected to each other directly).
- * In Collector/Field Maps, add a point to your locate layer.
- * This automatically calls the Eos Locate™ interface page within Eos Tools Pro (at this point, we will configure the Eos Locate™ settings).
- * Locate the underground asset using the UtiliGuard2. (Consult your UtiliGuard2 manual for further details.)
- * Locate data is then populated in your Eos Locate™ page. Your GNSS point is acquired, and all data is transferred from Eos Locate™ to Collector/Field Maps. Collector/Field Maps can then submit manually or automatically to ArcGIS Online, depending on your Eos Locate™ Settings (see below).
- * Once Collector/Field Maps submits to ArcGIS Online, it calls back the Eos Locate™ page so that you are ready to take another measurement.
- * Optional: You may choose to configure an alarm within Eos Tools Pro so that, at a given distance from the last point collected, Eos Locate™ will audibly indicate to the user that it is time to collect another point. This is helpful if you want to ensure a point is collected every 25 meters, or other distance, for instance.

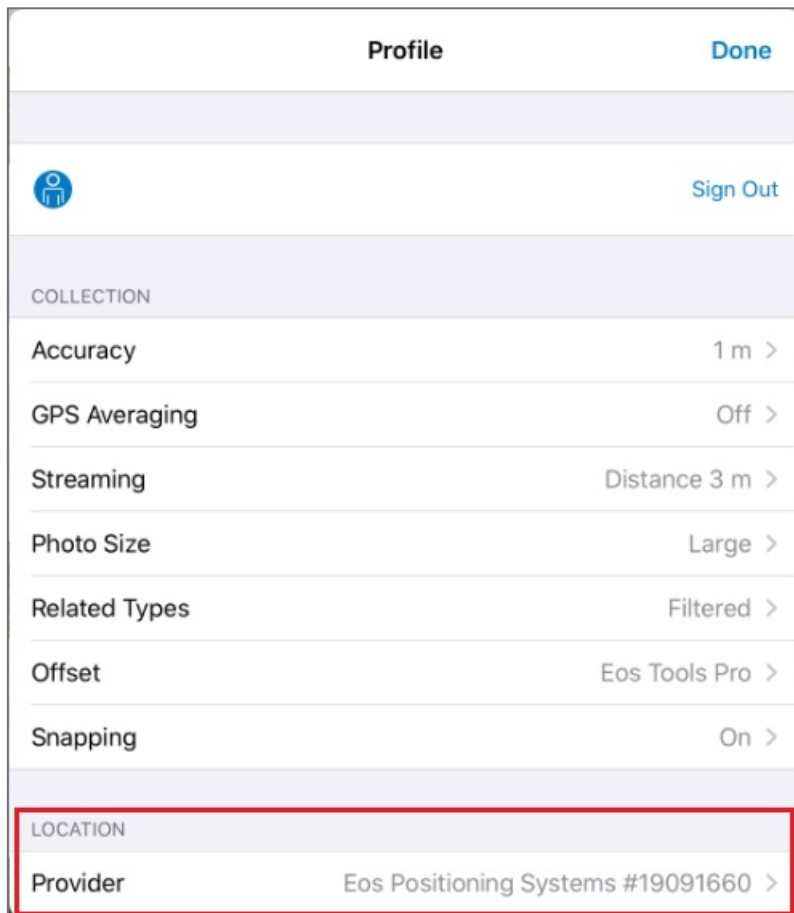


Important Note: Since the Eos Locate™ interface can only be activated by Collector/Field Maps, the Eos Locate™ settings will have to be configured once Collector/Field Maps requests a locate measurement for the first time. In the next section, we will first configure Collector/Field Maps and then call Eos Locate™ from Collector/Field Maps to do the initial settings.

4.2 Configure Settings

4.2.1 ArcGIS Collector or ArcGIS Field Maps: Location Provider Setting

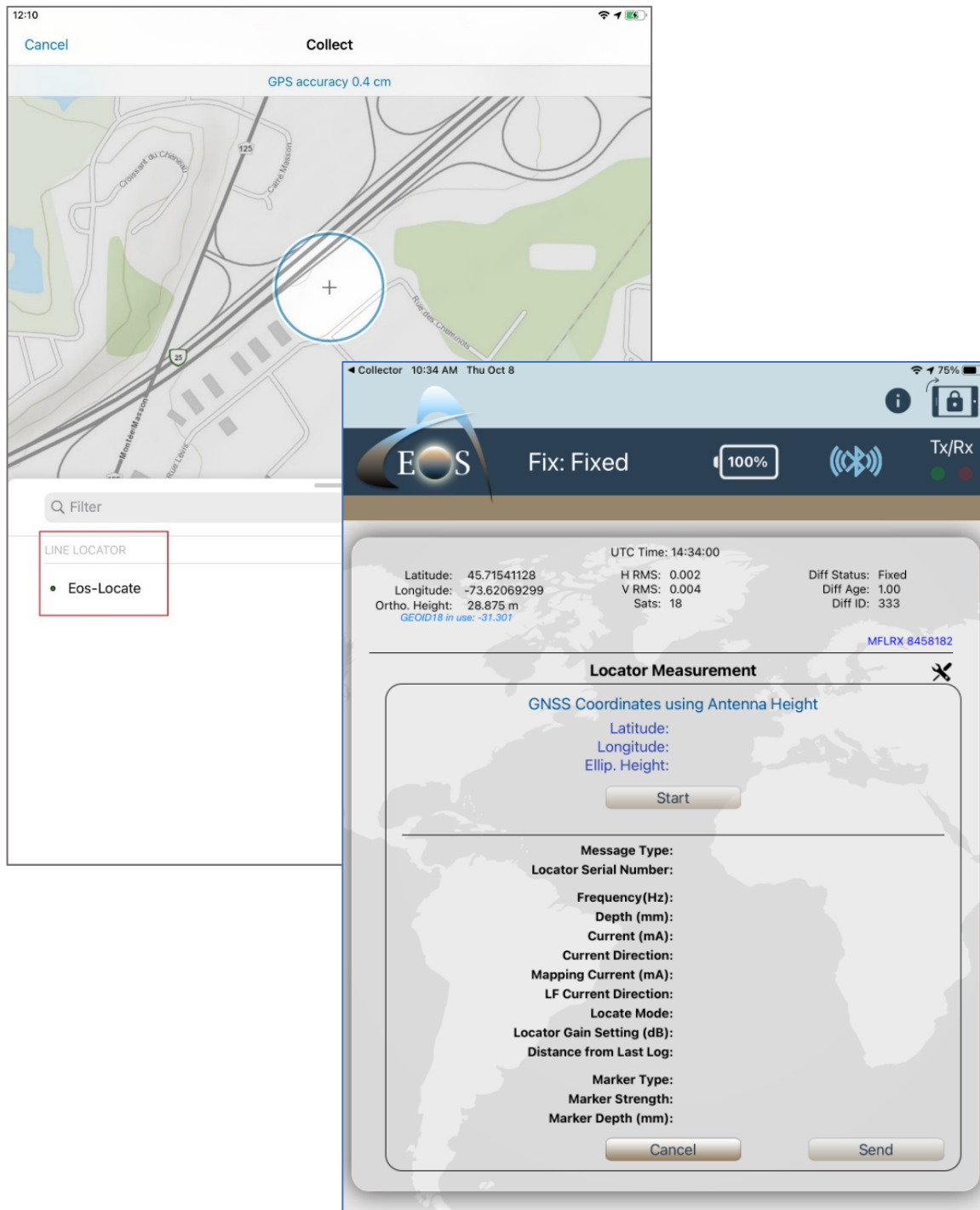
Launch Collector/Field Maps. Navigate to the **Settings** menu, and then select the Bluetooth®-paired Arrow GNSS receiver as your **Location Provider**:



In the Collector/Field Maps **Location Profile**, you will also need to configure the required datum transformation. Refer to your GIS person if you are not familiar with these Collector/Field Maps settings.

4.2.2 ArcGIS Collector or ArcGIS Field Maps: Select your Locate Layer

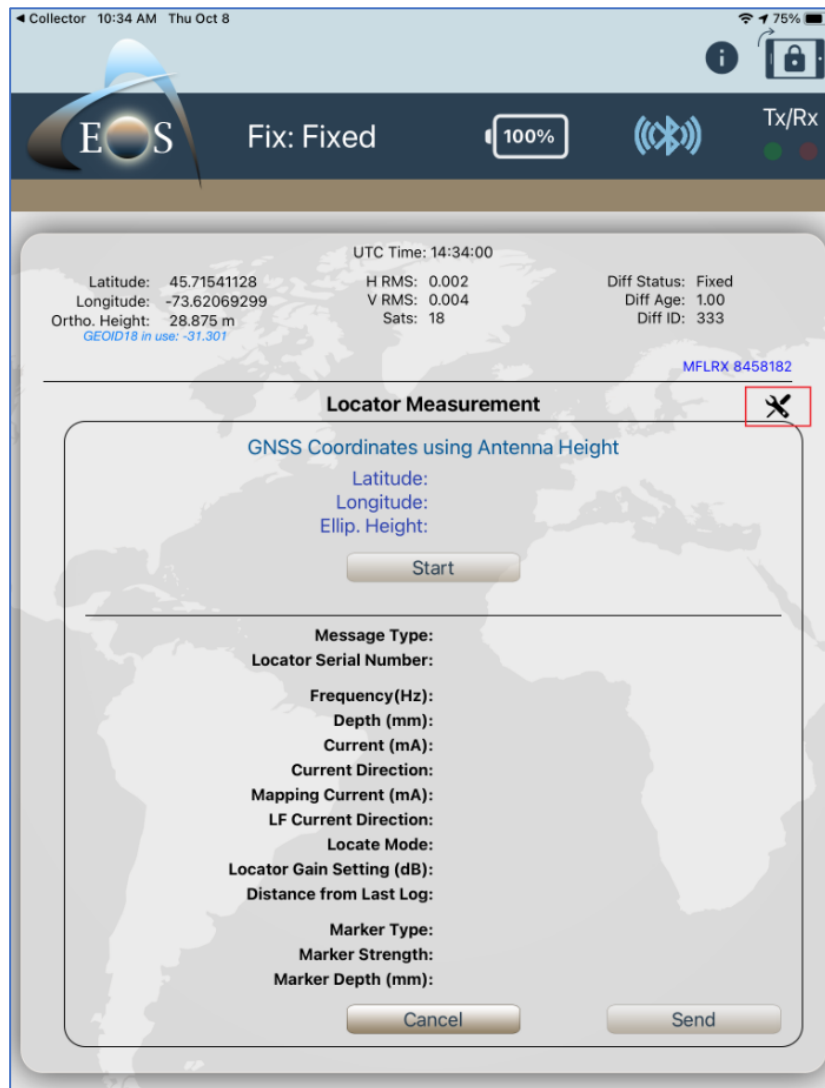
In Collector/Field Maps, **Select your Map** and tap on the **Locate Layer** you created. This will automatically launch the Eos Locate™ interface.



4.2.3 Eos Locate™: Configuration Options (and Default Values)

When you use the Eos Locate™ solution for the very first time, there are some basic settings that should be reviewed and adjusted based on your requirements.

Begin on the Eos Locate™ page within Eos Tools Pro. In the Eos Locator Measurement section, tap the “**Settings**” tab. The **Settings** tab is represented by a crossed wrench-and-screwdriver icon.



The **Settings** menu allows you to configure different parameters. Each one of these parameters is explained below.

Default Settings:

The default parameter values allow for a fully automated process, which is triggered by the single push of a button on the UtiliGuard2. In this order, the automated process will occur:

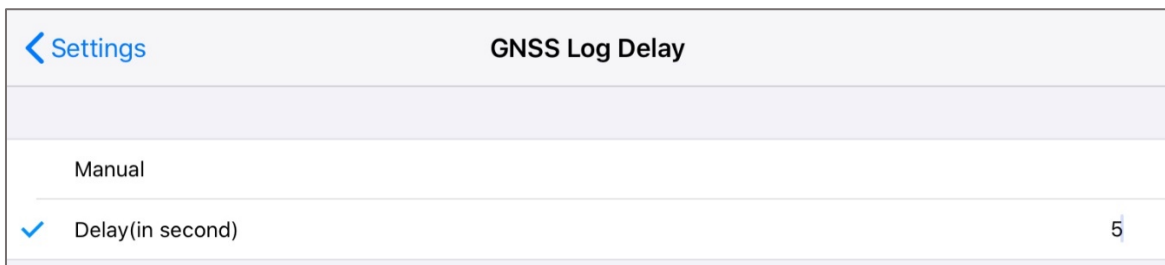
1. Depth button on the UtiliGuard2.
2. Data is sent to the Eos Locate™ page.
3. Eos Locate™ collects a GNSS point.
4. Eos Locate™ sends the complete measurement to Collector/Field Maps.
5. Collector/Field Maps submits all the locate and GNSS metadata automatically to ArcGIS Online.
6. Collector/Field Maps re-launches the Eos Locate™ page so that you may take another measurement.
7. As you walk the line, the Eos Locate™ page shows you the distance traveled from last locate point taken. If configured to do so, it will also ring with an audible alarm when your desired threshold (e.g., 25 meters, 30 feet) is reached.

The screenshot shows the 'Settings' screen of the Eos Locate application. At the top, the status bar displays '10:40 AM Thu Oct 8' and '74%' battery. The screen has a 'Done' button in the top left and a 'Settings' title in the top center. The settings are organized into a list of rows, each with a label on the left and a value or selection on the right, often followed by a chevron icon. The settings include: 'Select Locator Accessory' set to 'MFLRX', 'Distance Units' set to 'Meters', 'GNSS Antenna Height (m)' set to '0.000', 'GNSS Log Delay' set to '5', 'GNSS Average Positions' set to '5', 'Transfer Method to Collector' set to 'Automatically Send', 'Collector Auto-Submit' set to 'Yes', and 'Distance from Last Point Alarm' set to '0.00 m'. There is a large empty space at the bottom of the settings list.

Setting	Value
Select Locator Accessory	MFLRX
Distance Units	Meters
GNSS Antenna Height (m)	0.000
GNSS Log Delay	5
GNSS Average Positions	5
Transfer Method to Collector	Automatically Send
Collector Auto-Submit	Yes
Distance from Last Point Alarm	0.00 m

Setting Definitions for Manual Configuration:

- * **Select Locator Accessory:** This setting is used to select the locator device you want to use. This information is saved within the app. Your locator must be Bluetooth®-paired to your iOS device for it to appear in the list.
Default: The most recently used locator will automatically be selected next time you use the software.
 - * **Distance Units:** This setting is used to configure the unit of measurement used to measure the distance from the user's current GNSS position to his last locate point. Select meters or feet.
The default unit is "meters".
 - * **GNSS Antenna Height (m):** This is the total height of the Arrow antenna above ground. If accurate elevation is required, this height should be measured. When doing RTK, the antenna phase center must also be added to the height. The antenna phase center information is found on the label underneath your Arrow Gold or Arrow 200 antenna. This value is used to compute the absolute elevation of the underground asset (by taking into account the depth below cover measured by the locator). The final computed elevation of the underground asset is passed in the Z-value of the point geometry in Collector/Field Maps.
The default value is 0 meters.
- Important Note: When using Eos Locate™, the antenna height entered in Collector/Field Maps is not used; therefore, this value must be set in Eos Locate™ if precise elevation is required.**
- * **GNSS Log Delay:** This setting configures when the GNSS point should be acquired by Eos Locate™ after the locate measurement is received. Possible choices are **Manual** or **Automatic** (with an optional delay).



GNSS Log Delay	
Manual	
✓ Delay(in second)	5

- **Manual:** Select "Manual" mode to acquire a GNSS location manually after a measurement has been received from the locator. User will tap on the "Start" button to initiate the acquisition.
- **Automatic (Delay in seconds):** Select this mode to initiate an automatic acquisition of the GNSS location after a measurement is received from the locator. If required, enter a suitable delay in seconds that can allow the user to position the GNSS antenna above the locate point before the GNSS position is acquired.
This Automatic setting is the default, with a default 5 second delay.

- * **GNSS Average Positions:** This sets the number of positions (from 1 to 60) that will be averaged for the GNSS point.

The default is 5 positions.

- * **Transfer Method to Collector/Field Maps:** This setting allows you to define how the measurements are transferred to Collector/Field Maps after the locate and the GNSS measurements are both acquired. The choices are: “**Manually**” or “**Automatically Send**” (with an optional delay).

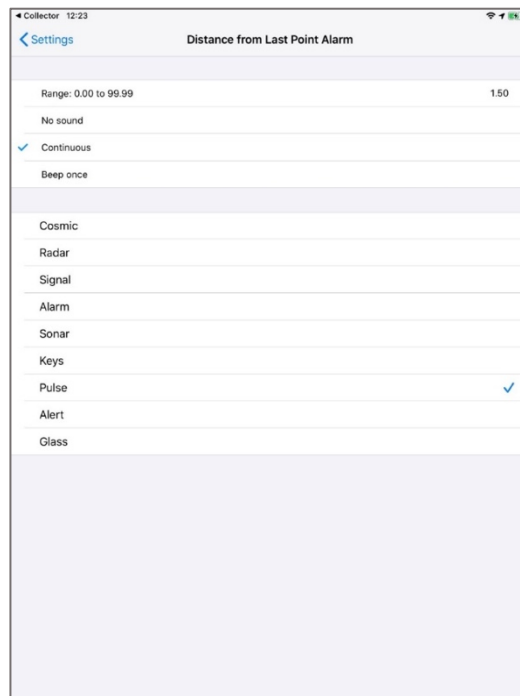
Settings		Transfer Method to Collector
	Send Manually	
✓	Automatically Send	
	Automatic Send Delay	3

- **Send Manually:** When you select “Send Manually”, you will have to tap the “Send” button to transfer the locate measurement to Collector/Field Maps.
 - **Automatically Send:** When you select “Automatically Send” our measurements will automatically be transferred to Collector/Field Maps once the GNSS point has been recorded.
Automatically Send is the default setting.
 - **Automatically Send Delay:** This is an optional delay (in seconds) before the measurement is automatically transferred to Collector/Field Maps. Value range is from 0 to 30 seconds. This delay can be useful if you wish to take a quick look at your measurements before it is automatically sent to Collector/Field Maps.
The default delay is 3 seconds.
- * **Collector/Field Maps Auto-Submit:** This feature instructs Collector/Field Maps on how to submit (sync) the locate point to ArcGIS Online once it is received from Eos Locate™. Possible values are “Yes” or “No”.
The default is set to “Yes”.
 - If you select “Yes”, Collector/Field Maps auto-submits the point.
 - If you select “No”, you will have to tap on the “Submit” button in Collector/Field Maps to manually submit the point.

In both cases, Collector/Field Maps relaunches Eos Locate™ for subsequent measurements once the point is submitted.
 - * **Distance from Last Point Alarm:** This setting is useful when you want to perform a locate measurement at regular distance intervals (e.g., every 25 meters). You may set both a range threshold and a threshold audible alarm.

How it works: The range between the field worker's current GNSS location and the previous locate point is constantly monitored by Eos Locate™. In addition, this value is constantly displayed in the “Distance from Last Log” field of the main Eos Locate™ menu. Once the user exceeds a distance threshold that you configure (e.g., every 25 meters), the distance will turn from black to red, and an audible alarm (if set) will sound. Both stimuli indicate that the field worker should stop and collect another point in order to comply with your desired data-collection workflow. To configure this parameter, set up the following fields:

- **Range 0.00 to 99.99:** This represents the distance (in meters or feet, based on the “Distance Units” setting) for the alarm.
The default range value is 0: disabled.
- Possible values for the audible alarm settings are:
 - No sound. *This is the default setting.*
 - Continuous: A audible tone of your choice every second.
 - Beep once: A single audible tone at the moment the distance threshold is exceeded.
- A selection of tones is available for the “Continuous” and “Beep Once” modes.

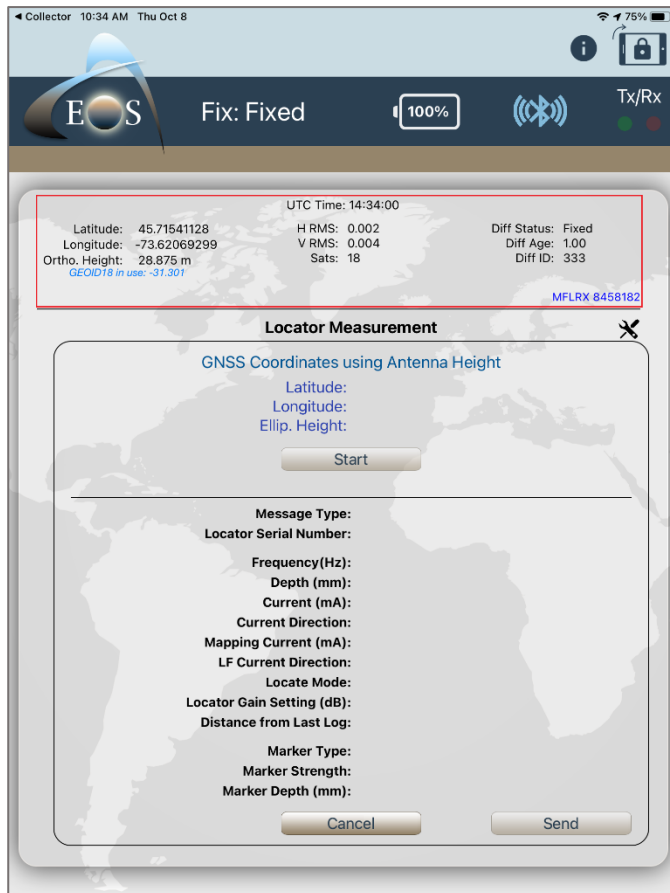


Now it is time to perform your very first locate measurement ...

5. Initiate Workflow

5.1 Locate an Underground Asset

First, make sure your Arrow receiver is computing a valid position by looking at the **GNSS Information** section of the Eos Locate™ page. Confirm that the location is continuously updating and that the quality values are acceptable.

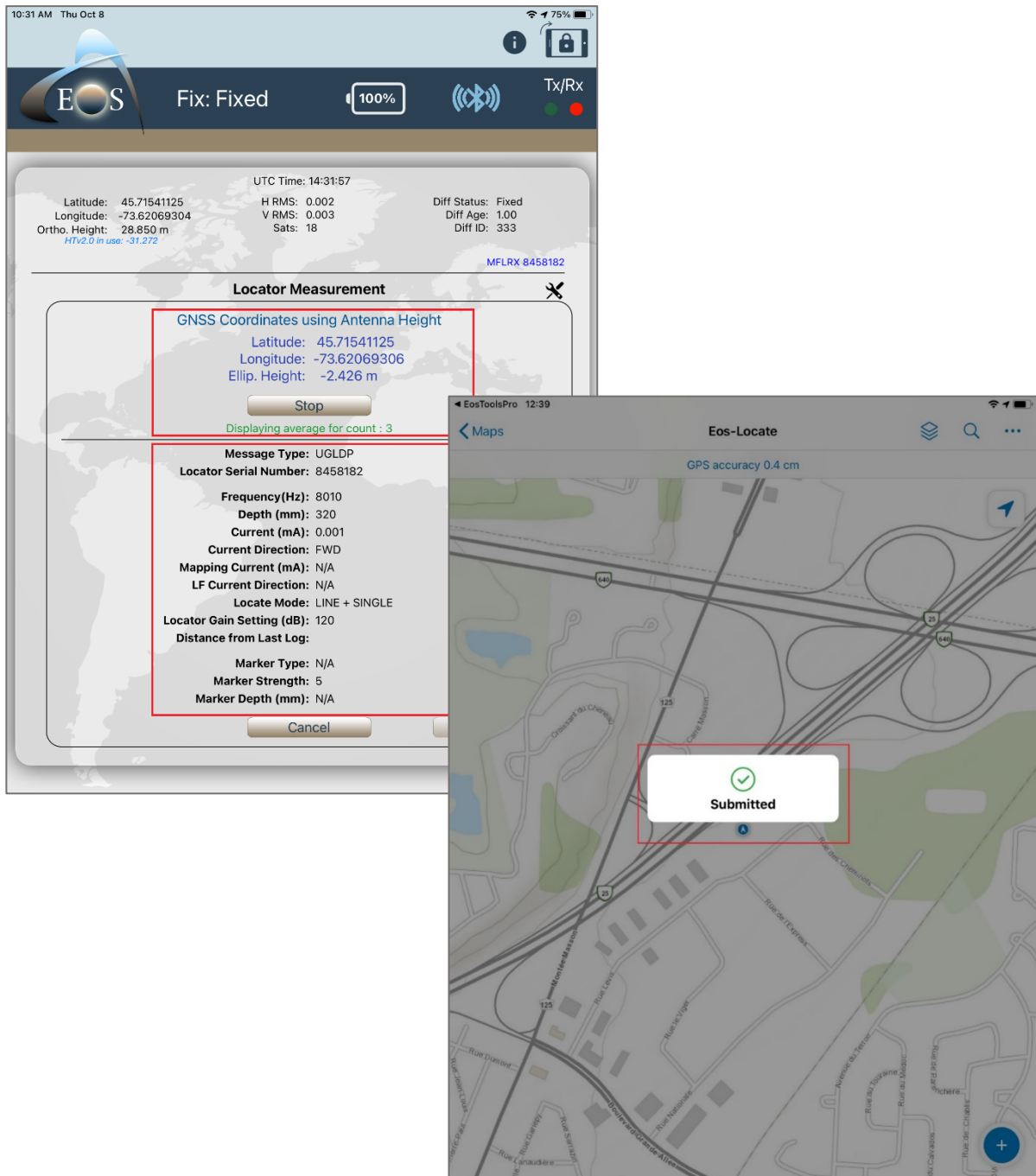


(Note that your iPhone screen might differ from this iPad screen.)

Locate an underground asset using the UtiliGuard2. Then send the measurement to Eos Locate™ by pressing on the locator's Depth button.

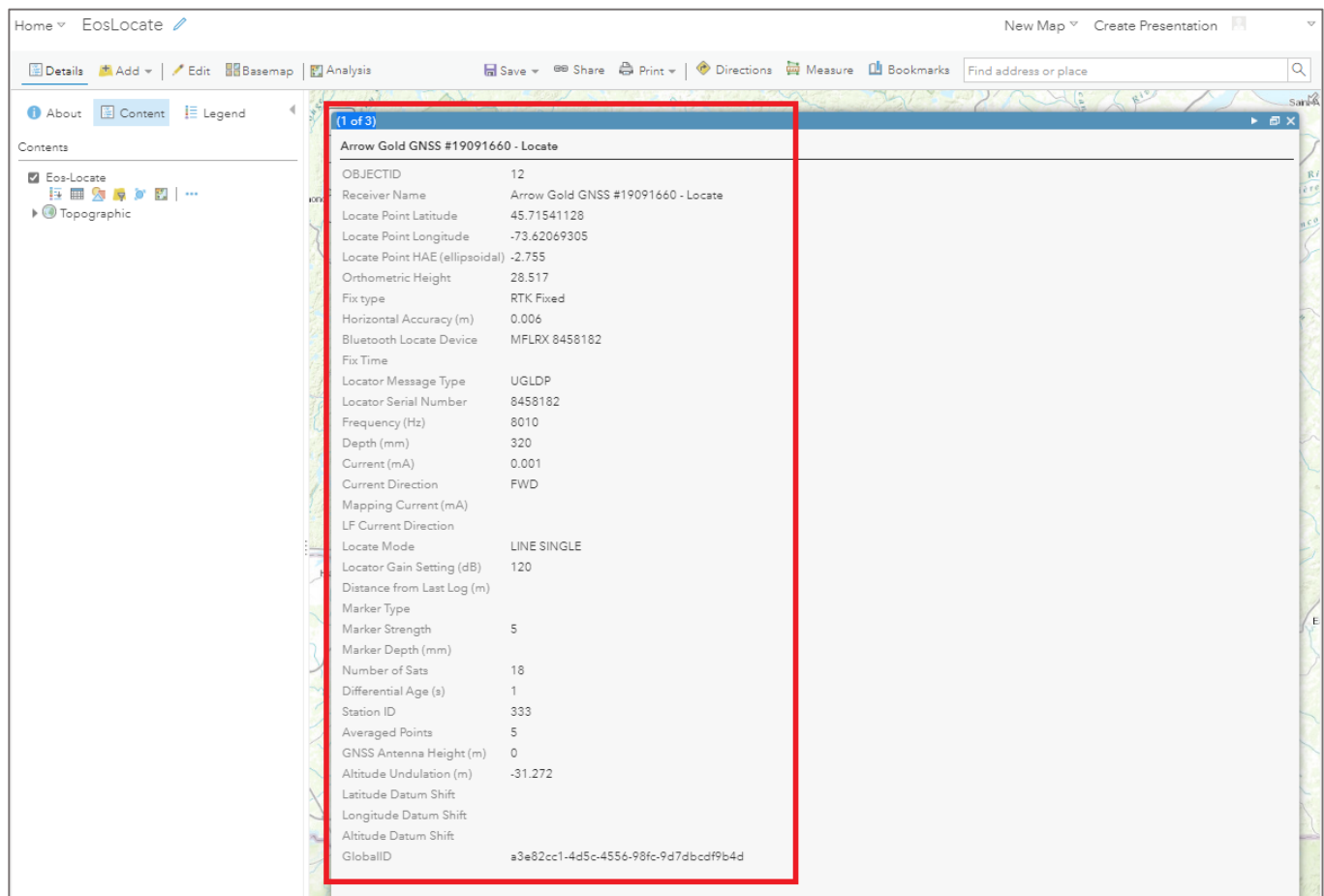


The Locator data will be displayed on the Eos Locate™ page. The GNSS location will also be logged. The entire measurement will be transferred to Collector/Field Maps. Collector/Field Maps will submit to the cloud. Collector/Field Maps will call back Eos Locate™ for another measurement.



You can view the metadata for each point on ArcGIS Online or by selecting a collected point in Collector/Field Maps.

Important Note: All values (e.g., elevation, measurements, metadata) will be submitted to Collector/Field Maps in metric format to stay consistent with the standards of ArcGIS Online. You can create fields in your layer to convert to imperial units (refer to your ArcGIS manual on how to create such fields).



The screenshot shows the ArcGIS Online interface with the EosLocate layer selected. A pop-up window displays the metadata for a specific point. The metadata is organized into a table with two columns: the field name and its corresponding value.

(1 of 3)	
Arrow Gold GNSS #19091660 - Locate	
OBJECTID	12
Receiver Name	Arrow Gold GNSS #19091660 - Locate
Locate Point Latitude	45.71541128
Locate Point Longitude	-73.62069305
Locate Point HAE (ellipsoidal)	-2.755
Orthometric Height	28.517
Fix type	RTK Fixed
Horizontal Accuracy (m)	0.006
Bluetooth Locate Device	MFLRX 8458182
Fix Time	
Locator Message Type	UGLDP
Locator Serial Number	8458182
Frequency (Hz)	8010
Depth (mm)	320
Current (mA)	0.001
Current Direction	FWD
Mapping Current (mA)	
LF Current Direction	
Locate Mode	LINE SINGLE
Locator Gain Setting (dB)	120
Distance from Last Log (m)	
Marker Type	
Marker Strength	5
Marker Depth (mm)	
Number of Sats	18
Differential Age (s)	1
Station ID	333
Averaged Points	5
GNSS Antenna Height (m)	0
Altitude Undulation (m)	-31.272
Latitude Datum Shift	
Longitude Datum Shift	
Altitude Datum Shift	
GlobalID	a3e82cc1-4d5c-4556-98fc-9d7dbcdf9b4d

5.2 Use the Optional “Distance from Last Log” Alarm

Collector/Field Maps will call back Eos Locate™ to record the next point of your locate session. You will notice that the value in the field “Distance from Last Log” will start increasing as you move away from your last locate point. You can use this field to record assets at fixed distances from previous locations (see the Eos Locate™ Settings).

If the range limit entered in the settings is reached or exceeded, the value displayed will turn to red.

Collector 11:06 AM Thu Oct 8

EOS Fix: Fixed 100% Tx/Rx

UTC Time: 15:06:06

Latitude: 45.71541128 H RMS: 0.003 Diff Status: Fixed
Longitude: -73.62069300 V RMS: 0.005 Diff Age: 2.00
Ortho. Height: 28.862 m Sats: 12 Diff ID: 333
GEOID18 in use: -31.301

MFLRX 8458182

Locator Measurement

GNSS Coordinates using Antenna Height

Latitude:
Longitude:
Ellip. Height:

Start

Message Type:
Locator Serial Number:
Frequency(Hz):
Depth (mm):
Current (mA):
Current Direction:
Mapping Current (mA):
LF Current Direction:
Locate Mode:
Locator Gain Setting (dB):
Distance from Last Log: 0.00 m
Marker Type:
Marker Strength:
Marker Depth (mm):

Cancel Send

6. Choose your Field Gear: Four Options for a One-Man Operation

There are four options for wearing your Arrow GNSS hardware in the field. Each of these options enables one single field worker to perform the locate workflow.

To purchase a specific setup, contact your local Eos dealer.

6.1 Chest Pack: Best Screen Viewer

Pros:

- iPad or iPad mini screen is constantly visible
- Arrow receiver fits in a pocket on the chest pack

Cons:

- Not very accurate for elevation measurements
- Care must be taken to position the antenna above the locate point after locator measurement is received



6.2 Survey Rangepole: Most Accurate

Pros:

- Optimal horizontal and vertical accuracy for the location
- Ideal when RTK is used

Cons:

- Not convenient for spraying paint during the locate



6.3 Belt/Shoulder Pouch with Antenna on Security Hat: Best for iPhone

Pros:

- Ideal for iPhone which can be carried in hand or attached to the arm via a wrist band
- Arrow receiver fits in the carrying pouch with shoulder straps or belt loop
- Arrow Antenna mounted on a security hat or in a ball cap

Cons:

- Not very accurate for elevation measurements
- Care must be taken to position the antenna above the locate point after locator measurement is received



6.4 Safety Vest: Best for Wrist-Mounted Phone

Pros:

- Ideal for iPhone which can be carried in hand or attached to the arm with a wrist band
- Arrow receiver fits in a pouch on the vest
- Arrow Antenna mounted on a security hat, in a ball cap, or on a backpack rangepole

Cons:

- Not very accurate for elevation measurements
- Care must be taken to position the antenna above the locate point after locator measurement is received



Now it's time to locate all your underground assets ...

Happy Locating!!!