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# DAT/EM Capture™ for ArcGIS Pro® User's Guide

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## Introduction

DAT/EM Capture for ArcGIS Pro ("Capture") is an extension to activate communication between the DAT/EM Summit Evolution ("Summit") stereoplotter application and Esri ArcGIS Pro. With the extension enabled, Summit becomes a 3D digitizing device for ArcGIS Pro. DAT/EM Capture also offers mapping-specific tools and settings. The goal with this software is to view, digitize, and edit vector objects in ArcGIS Pro layers while viewing the vectors superimposed on a stereo imagery view in Summit.

As of DAT/EM version 8.0, DAT/EM Capture for ArcGIS Pro is considered a "beta". We would like it to be more fully developed and thoroughly tested before full release. Any user of Capture for ArcGIS Pro should be aware of its "beta" status. Please contact DAT/EM Support at [support@datem.com](mailto:support@datem.com) if you have any comments, concerns, or priorities for new tools to be added to Capture for ArcGIS Pro.

## Prerequisites

DAT/EM Capture™ for ArcGIS Pro® requires a compatible version of ArcGIS Pro to be installed on the computer before installing DAT/EM software. Compatible versions are listed in the DAT/EM Release Notes for the version of DAT/EM software in use. DAT/EM cannot guarantee that Capture will work for ArcGIS Pro versions that were released after the date of the DAT/EM software release. Please contact [support@datem.com](mailto:support@datem.com) to verify version numbers.

If ArcGIS for Desktop (ArcMap) is installed on the computer, DAT/EM Capture for ArcGIS will install for both ArcMap and ArcGIS Pro. Either one may be used.

## Installation

DAT/EM's ArcGIS Pro extension, "DAT/EM Capture for ArcGIS Pro" is loaded through DAT/EM's software "setup" installer. Install and license ArcGIS Pro before installing DAT/EM software. Exit ArcGIS Pro before running the DAT/EM software installer.

The system and operating system requirements are the same as for the general DAT/EM installer. These are listed in the DAT/EM Release Notes for the version of DAT/EM software in use.

The Capture for ArcGIS extension is installed as *unregistered*. That means if you launch ArcGIS Pro immediately after DAT/EM software installation, *you will not see DAT/EM Capture tab on the ribbon!* You must enable it first. See below for instructions on how to enable and disable the Capture extension.

## Enable or Disable the Capture Extension

The DAT/EM CAD Enabler tool is provided to enable and disable the Capture for ArcGIS Pro extension. The tool is located in the DAT/EM Administration Tool application.

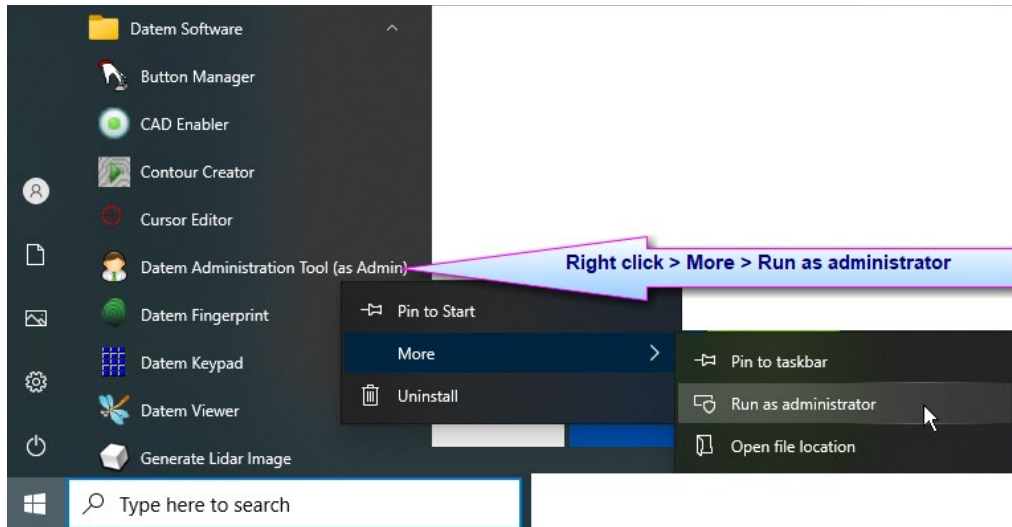
When enabled, "Capture" and "Esri ArcGIS type" licenses are used from the DAT/EM hardware lock as ArcGIS Pro starts. When disabled, no license is used from the DAT/EM hardware lock when ArcGIS Pro starts.

To avoid attempting to check out two each of these license types, do not run ArcMap and ArcGIS Pro at the same time if both have their Capture extensions enabled. If you must run ArcMap and ArcGIS Pro at the same time, it is usually best to disable the extension in one of them. Enable only the one that will be used to communicate with Summit, even if you have a network lock with plenty of Capture and ArcGIS-type licenses available. Although Summit can have two sources of superimposition, it becomes difficult to know which ArcGIS application is receiving Summit digitizer input if two Captures are running at the same time.

The CAD Enabler is available from within the DAT/EM Administration Tool in DAT/EM versions 8.0 and higher.

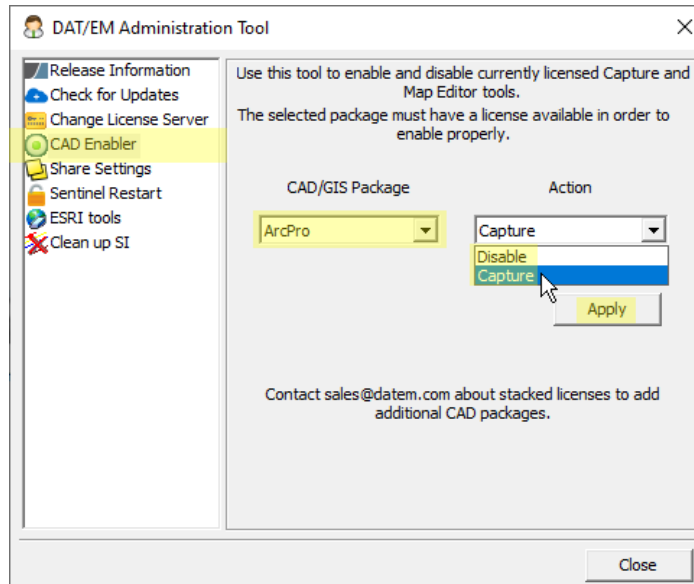
1. Exit ArcGIS Pro.
2. Start **Windows Start > Datem Software > DAT/EM Administration Tool**. If available, start it “As administrator” or with “Elevated” permissions. The tool is also set to start with elevated permissions; you may need to additionally answer “Yes” to run it.

*Note: The Administration Tool's CAD Enabler does not check the current status; it will not tell you whether it is currently enabled or disabled.*



*Windows Start > Datem Software > Datem Administration Tool > (right click) More > Run as Administrator*

3. Select CAD Enabler from the list on the left. Set CAD/GIS Package to **ArcGIS Pro** and Action to **Capture** to register the DAT/EM extension or **Disable** to unregister it. Select the **Apply** button.



**CAD Enabler > ArcGIS Pro > Capture** to register the extension or **Disable** to unregister it

## Feature Creation

Feature Creation is performed through ArcGIS Pro's own object creation tools. Basic types (digitizing a simple polygon/polyline) are the most supported. Some DAT/EM tools affect how the ArcGIS Pro digitizing tools work, for example, segments will be squared if DAT/EM **Squaring Mode** is on.

The ArcGIS Map View is always panned with Summit, as digitizing should always happen within the current view. Certain functionality, such as Plotter Snapping, may not work if geometry is being created outside of the Map View.

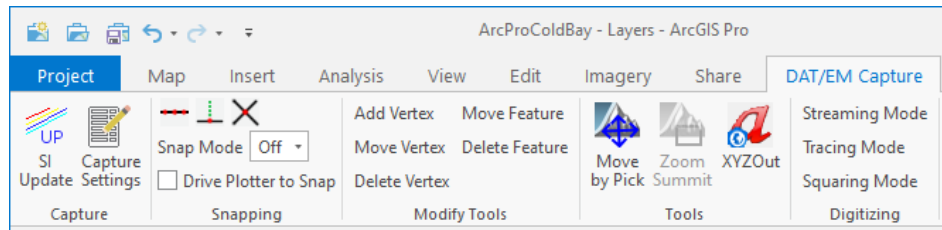
## Feature Modification

Basic modification tools are provided under the DAT/EM Capture Tab (see Modify Tools starting on page 9 below). These tools do not function through the ArcGIS Interface, and as such, do not also accept input from clicking within the map view.

The modification tools display their input step in superimposition (SI), and are canceled upon activation of another tool.

## The DAT/EM CAPTURE Ribbon Tab

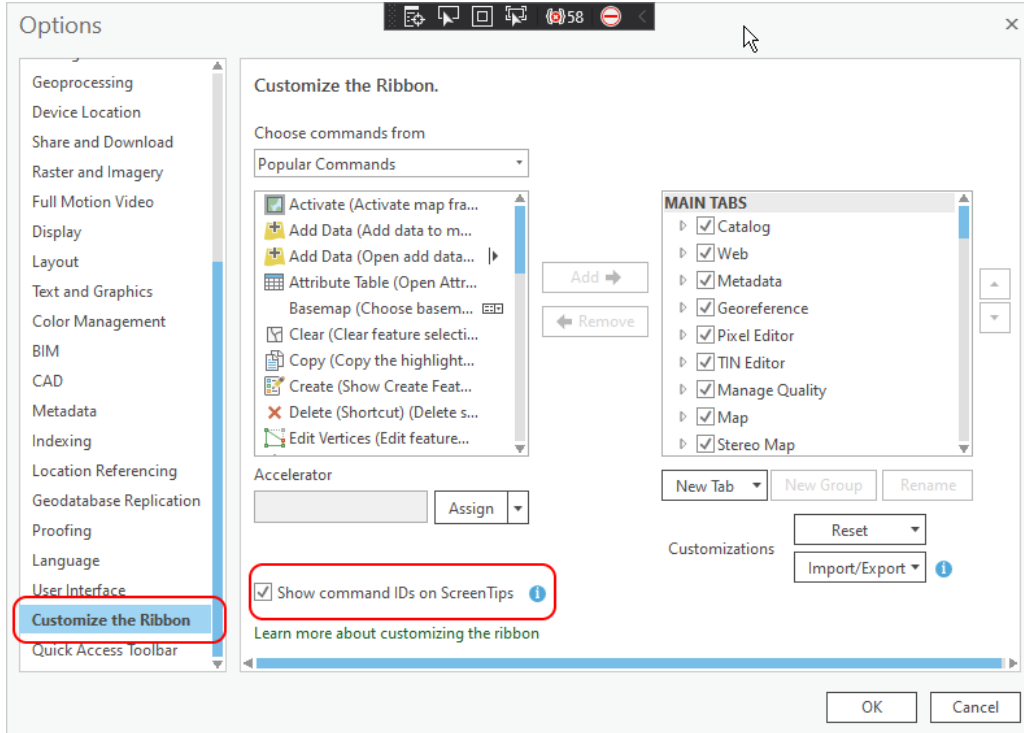
If you have Capture for ArcGIS Pro enabled (See “To Enable or Disable the Capture Extension” on page 2 above), you will see a “DAT/EM CAPTURE” tab in the ribbon menu area in ArcGIS Pro:



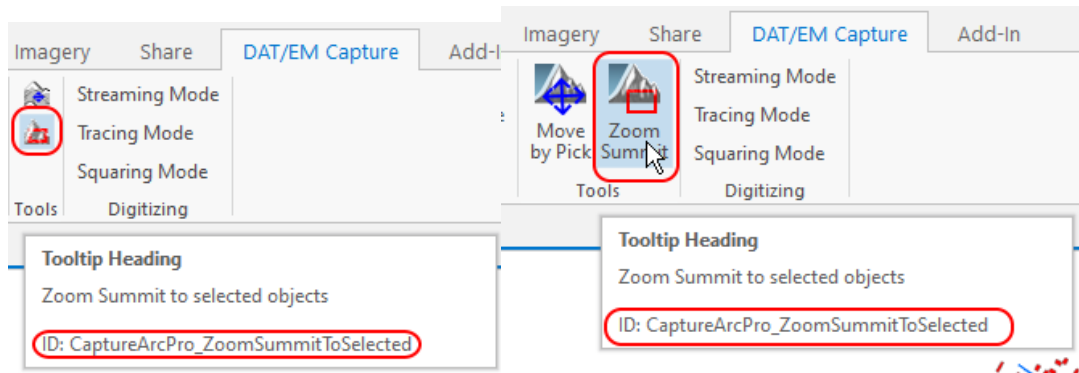
*DAT/EM CAPTURE for ArcGIS Pro ribbon tab*

DAT/EM Capture tab basics:

- It is currently limited to supporting only ArcGIS Maps (other types include layout views, etc.).
- It currently only supports basic geometry types (Point, Polygon, Polyline, and Multipoint) in Summit's superimposition.
- It relies on ArcGIS Pro's geographic translation functionality. The accuracy of editing Features that are not in the same Spatial Reference as the current Map is limited by the functionality of ArcGIS Pro.
- Two sizes are offered for the tool icons in ArcGIS Pro, small and large. Both icon sizes are available in ArcGIS Pro's **Project > Options > Customize the Ribbon**. The default is currently Large Icons. See example image below.
- Command IDs, which may be called from the DAT/EM Keypad and DAT/EM Button Manager digitizer buttons, may be displayed in the icon tooltips. To display the Command IDs in the Ribbon screen tips, check on **Show command IDs on ScreenTips**. See example images below.



*Hint to be able to see the DAT/EM command IDs in the ribbon menu icon's tooltip*

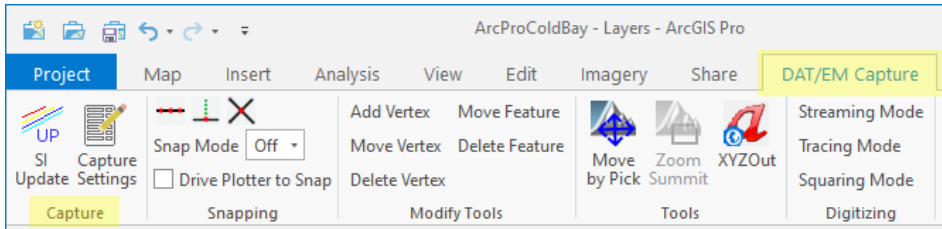


*DAT/EM Capture ribbon icon size set to small icons (left) and large icons (right)*

*“Show command IDs on Screen Tips” on*

Each of the options on the DAT/EM Capture tab is described below.

Capture Group

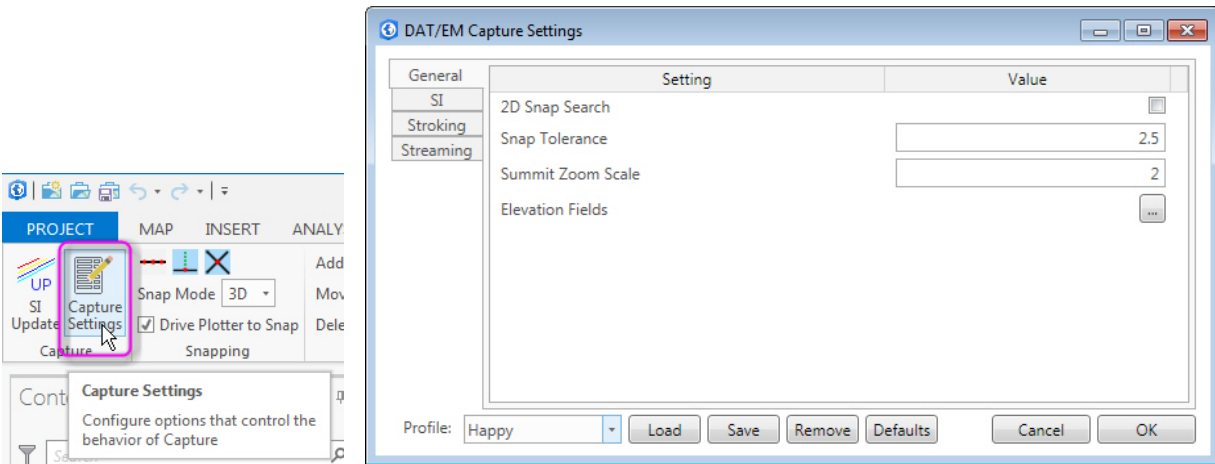


SI Update

**SI Update** performs a complete refresh of superimposition (SI) and resets the DAT/EM Cursor. This will cause either all geometry currently visible in the map or all geometry currently visible within the current Summit model (if clip SI is on) to be redrawn. Since this operation can take a lot of time on large maps, normally SI only receives notification of changes.

Capture Settings

**Capture Settings** opens the settings dialog where various settings related to Capture's behavior can be changed (detailed below).



- **General**

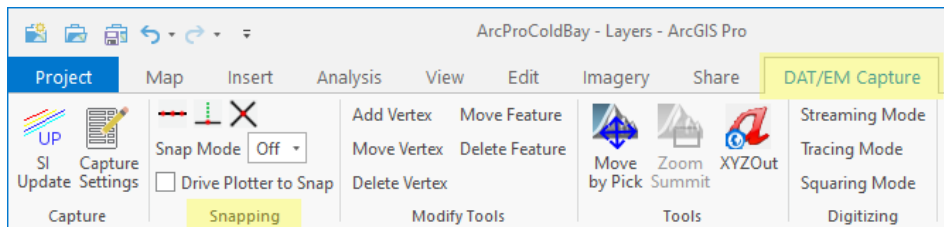
- **2D Snap Search** - if set, snaps are found by first searching in only the xy direction. If multiple possibilities are found, then they are prioritized by xyz distance. If this setting is not set, snaps are found by searching in 3D.
- **Snap Tolerance** - This sets the radius around the cursor (in ground units) that will be searched for potential snap locations.
- **Summit Zoom Scale** - This setting is a scaling factor between Summit's zoom and ArcGIS's zoom. Larger values will cause the map view to be zoomed to a wider area compared to Summit.

- **SI (superimposition)**




- **Clip SI** - Limits SI Updates to the current Summit model area. If no model is loaded in Summit, SI updates will not occur until one has been loaded.

- **SI Text** - Incomplete support for annotation layers. May cause poor performance on SI Update. If text shows at Z=0, may require one of the draping settings below.
- **Show Snap Ring** - Shows a ring around the summit cursor with radius equal to the snap tolerance.
- **Drape Z-less objects over SI Vectors** - If set, geometry that does not have a Z value will be moved in SI a Z value taken from surrounding 3D geometry, provided the geometry is currently visible.
- **Drape Z-less objects over Draping DTM Files** - If set, geometry that does not have a Z value will be moved in SI to a Z value gathered from the selected DTM files in the "Draping DTM Files" setting.
- **Draping DTM Files** - See above
- **Draping Z Offset** - Applies a vertical offset (in ground units) to 2D objects currently being draped in SI.
- **SI Line Width Scale** - Multiplies the ArcGIS line symbol size to get a line width for use in SI. Larger values will naturally cause lines in SI to be thicker.
- **SI Arc Transient Segments** - Sets the number of segments drawn in an arc transient from ArcGIS Pro to Summit's superimposition. The default setting is 32, and you may try settings either larger or smaller to make the desired simulated arc appearance in SI. For large files, drawing SI transients is too slow, and this setting allows you to disable it.
- **Stroking** – These are the arc stroke settings. All arcs are simulated by multiple straight segments.
- **Streaming** – These are the streamed line settings that regulate the density of vertices added automatically to the feature.

## Snapping Group



### Snap Type Buttons

**Snap Type Buttons** allow selection of **Vertex** , **Nearest** , and **Intersection**  snap. **Intersection** snap may cause a noticeable delay when panning.

### Snap Mode

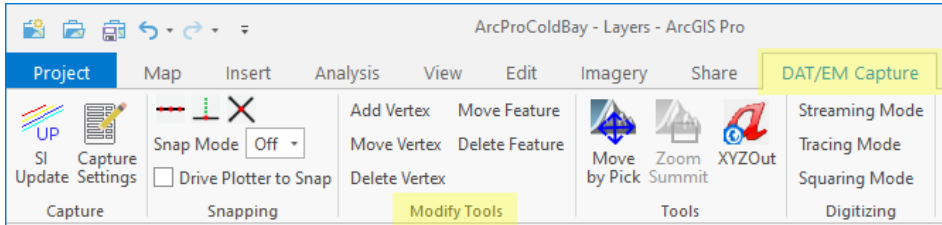
**Snap Mode Selection** allows selection between **2D/3D** snapping or to disable snapping. When set to **2D**, snapping will only snap to the X and Y of the target location and keep the stereoplotter's elevation. When set to **3D**, snapping will be to the full X, Y, Z of the target location. Set to **Off** to disable snap completely.



*Drive Plotter to Snap*

**Drive Plotter to Snap**, if set on, moves the stereoplotted location upon pick.

Modify Tools



*Add Vertex*

**Add Vertex** adds a vertex to a polygon/polyline/multipoint. To add a vertex to a point layer, use the appropriate creation tool.

*Move Vertex*

**Move Vertex** moves a polygon/polyline/multipoint/point vertex.

*Delete Vertex*

**Delete Vertex** removes a vertex from a polygon/polyline/multipoint.

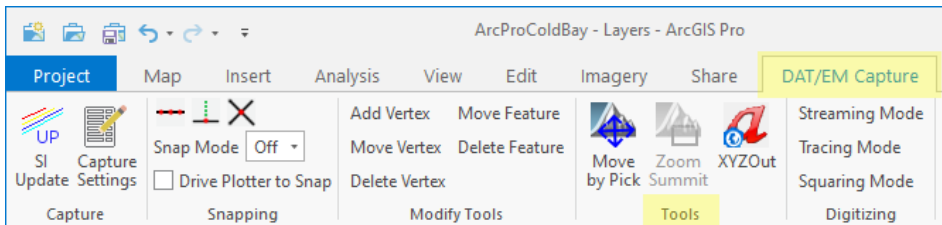
*Move Feature*

**Move Feature** moves a feature in 3D using the stereoplotted.

*Delete Feature*

**Delete Feature** deletes a feature using the stereoplotted.

Tools Group

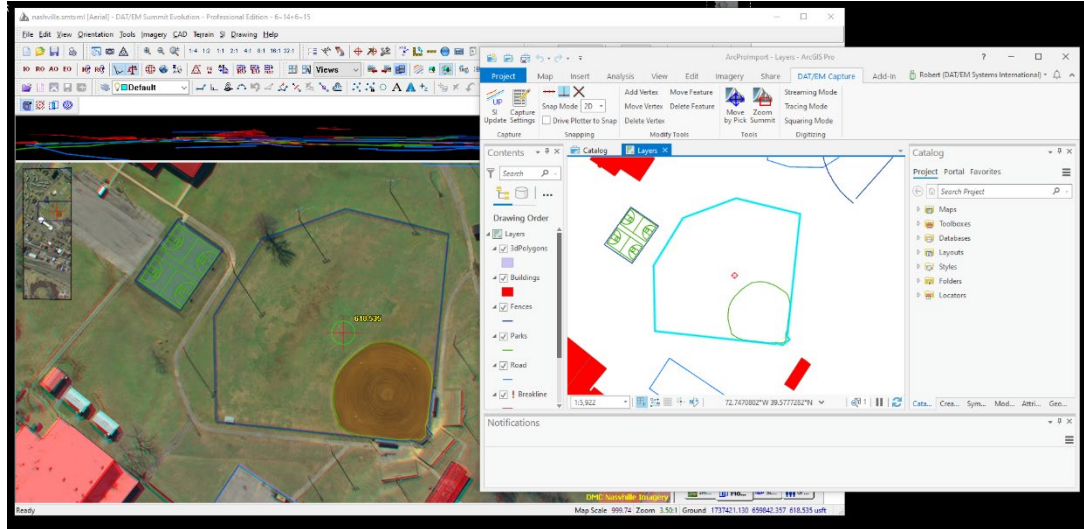


*Move by Pick*

**Move by Pick** allows you to pick a point using the system mouse in the ArcGIS Pro view. Summit will move to the picked point if the coordinate exists in the model or project. If the picked point is outside the currently open Summit model and a model change is needed, **Summit > Tools > Options > Project > Automatically load next...** must be on in order to both move and load the model at the location.

*Zoom Summit (to selected object)*

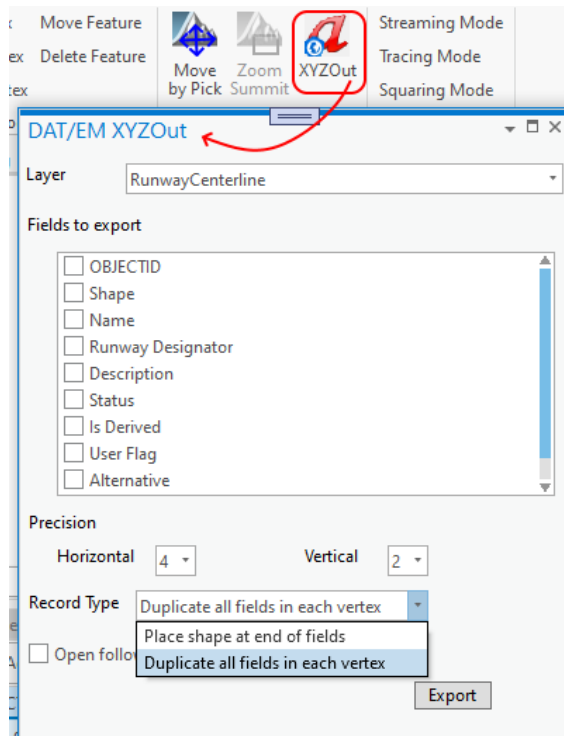
**Zoom Summit (to selected object)** zooms Summit to the features currently selected in ArcGIS Pro. To use **Zoom Summit**, first select an existing object in ArcGIS Pro. Then select the **Zoom Summit** tool from the DAT/EM Capture tab or by calling its keyword from the DAT/EM Keypad (see “Keypad/Button Keyword Commands” on page 12).



*Summit and ArcGIS Pro zoomed to the selected object using **Zoom Summit***

*XYZOut*

**XYZOut** exports selected information from an ArcGIS Pro feature layer to an ASCII text file.

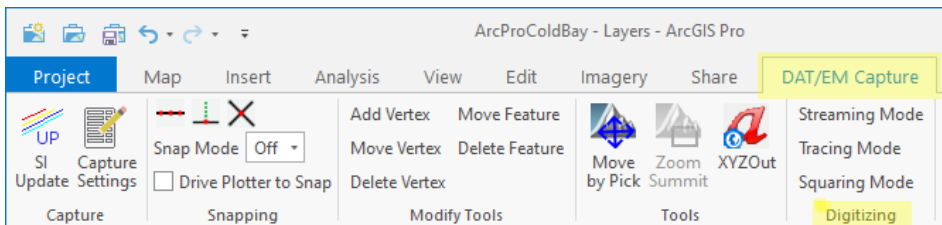


***XYZOut** toolbar button and dialog*

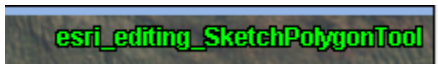
To use **XYZOut**:

- ✓ Start the command from the DAT/EM Capture tab or by calling its keyword from the DAT/EM Keypad (see “Keypad/Button Keyword Commands” on page 12):
- ✓ Select the layer to be exported using the **Layer** drop-down menu.
- ✓ Select the fields to export using the **Fields to export** list. Fields will be exported in the order of the list. The order of the list cannot be modified at this time.
- ✓ Adjust the decimal precision using the **Precision** controls (**Horizontal** for x,y and **Vertical** for z).
- ✓ The **Record Type** control identifies the method that will be used to export each object on the layer. Select the type most appropriate for your use: **Place shape at end of fields** will create 2 lines per object. The first line will contain the field contents, and the second field will contain the vertices that make up the shape of the object. **Duplicate all fields on each vertex** writes a new line that includes all fields for every vertex in the object.
- ✓ **Open following export** will call the system to open the output file following export. This may cause a CSV file to be opened by a spreadsheet tool, for example, or Windows may ask you which application should open the file type, depending on your system settings.
- ✓ The **Export** button performs the export.

## Digitizing Group

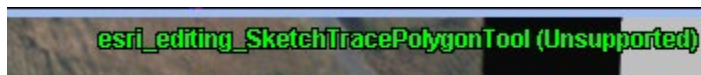


The **Digitizing Group** options, when on (highlighted), affect the behavior of ArcGIS Pro's basic digitizing tools for basic geometry types (Point, Polygon, Polyline, and Multipoint). If a digitizing tool is supported to work with these toggles, it will show the command in the Summit CAD text area and allow drawing in that mode.



*Example SI text for a supported command*

If a digitizing tool is not supported, it will show “(Unsupported)” next to the command name.



*Example SI text for an unsupported command*

**Hint:** To turn on this SI text display in Summit, check on **Summit > Tools > Options > Main Text > Commands > Show**. Color and other options are also offered.

*Streaming Mode*

When **Streaming Mode** is on (highlighted), it changes the point-to-point-type ArcGIS Pro digitizing tool to place vertices automatically based on the vertex density settings found in **Capture Settings > Streaming**.

*Tracing Mode*

When **Tracing Mode** is on (highlighted), it changes the point-to-point-type ArcGIS Pro digitizing tool to select the beginning and ending vertices along another object to trace for an exact shared edge.

*Squaring Mode*

When **Squaring Mode** is on (highlighted), it changes the point-to-point-type ArcGIS Pro digitizing tool to enforce the new segment to be exactly 90 degrees from the previous segment. The first two segments set the initial angle, and the squaring mode is enforced for the third and subsequent segments.

Keypad/Button Keyword Commands

Capture for ArcGIS Pro supports several commands that can be input using the Summit Button Manager's "User CAD" buttons or from the DAT/EM Keypad Controller using "Capture" output keys.

Commands are not case sensitive with one exception: The command IDs that follow "CallCommand" are case sensitive.

Keypad/Button Keyword	Description
<b>CallCommand &lt;command ID&gt;</b>	<p>Calls a specific command ID from ArcGIS Pro, the DAT/EM Capture extension, or any other extension.</p> <p>The "CallCommand" keyword is not case sensitive, but the command ID is case sensitive.</p> <p>Example: To call the ArcGIS Pro selection tool from the Keypad or a digitizer button, use:</p> <p><i>CallCommand esri_mapping_selectByRectangleTool</i></p> <p><b>Hint:</b> To show command IDs in the ribbon screen tooltips, see instructions in the "DAT/EM Capture tab basics" list above in "The DAT/EM CAPTURE Ribbon Tab" starting on page 5. That is, the setting is found in <b>ArcGIS Pro &gt; Project &gt; Options &gt; Customize the Ribbon &gt; Show command IDs on screen tips</b>.</p> <p><b>Hint:</b> For DAT/EM Capture command IDs, it's usually easier (and shorter!) to use the equivalent command keyword found in this table. Command IDs are more helpful for ArcGIS Pro and third-party extension command IDs, since they do not have alternate keywords.</p>
<b>datem_addvertex</b>	Launches the "Add Vertex" modify tool.
<b>datem_deletefeature</b>	Launches the "Delete Feature" modify tool.
<b>datem_deletevertex</b>	Launches the "Delete Vertex" modify tool.

<b>datem_movefeature</b>	Launches the "Move Feature" modify tool.
<b>datem_movevertex</b>	Launches the "Move Vertex" modify tool.
<b>drivetosnap &lt;true/false&gt;</b>	Sets the "Drive Plotter to Snap" setting as seen in the Snapping category of the DAT/EM Capture Tab.  Example: <i>drivetosnap true</i>
<b>settings</b>	Launches the Capture Settings dialog.
<b>setting &lt;"setting by name"&gt; &lt;true/false/+n/-n&gt;</b>	Sets a given setting by name (as displayed in the Capture Settings dialog). Settings with spaces must be contained within quotes.  Accepted values for a boolean setting are "true" or "false". Example:  <i>Setting "Clip SI" true</i>  Additionally, this command supports modifiers of "+" and "-" for settings for numeric values. Example to increase the snap tolerance by 1 ground unit:  <i>Setting "Snap Tolerance" +1</i>
<b>siup</b>	Performs an SI Update to refresh superimposition.
<b>snapmode</b>	Sets the current snap mode; valid inputs are 3d, 2d, and off. Example:  <i>snapmode 3d</i>
<b>snaptypes &lt;type&gt;</b>	Sets the current snap types. Valid types are <b>vertex</b> , <b>nearest</b> , and <b>intersection</b> . Putting a "!" before the type turns it off. Snap types are separated by a space, and multiple types can be specified.  Example to turn off vertex snap, turn on nearest snap, and turn off intersection snap:  <i>snaptypes !vertex nearest !intersection</i>
<b>toggle_squaring</b>	Toggles the drawing mode between squaring and point-to-point.
<b>toggle_streaming</b>	Toggles the drawing mode between vertex streaming and point-to-point.
<b>toggle_tracing</b>	Toggles the trace drawing mode.
<b>xyzout</b>	Launches the "XYZOUT" ASCII (text) file export tool.
<b>ZoomSummitToSelected</b>	Launches the "Zoom to Selected Object" tool.

## FAQs

**Q:** The "DAT/EM Capture" ribbon tab is not there.

**A:** The Capture extension is disabled. See "Enable or Disable the Capture Extension" on page 2.

**Q:** After changing Map Properties, especially the spatial reference, the Creation tool stops working. How do I prevent this?

**A:** Relaunch the creation tool by selecting another tool in the "Create Features" panel and then reselecting the original.

**Q:** The icons on the DAT/EM Capture tab are too small.

**A:** You can set the icons to small or large. See the "DAT/EM Capture tab basics" list in "The DAT/EM CAPTURE Ribbon Tab and Tab Components" starting on page 5.