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## Snapping Guide for the Summit Evolution Stereoplotter with DAT/EM Capture for ArcGIS 10.x

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## Snapping Guide for the Summit Evolution Stereoplotter with DAT/EM Capture for ArcGIS 10.x

This guide gives you hints for snapping methods using the DAT/EM Summit Evolution stereoplotter (Summit) and DAT/EM Capture (Capture) for ArcGIS 10.x (ArcMap). It includes how to set 2D and 3D snaps, ArcMap settings, and keywords to use on the DAT/EM Keypad and Summit's buttons.

### Do Not Use the ArcMap Snapping Toolbar Options (turn them off!)

First let's talk about a type of snapping you should *not* use.

ArcMap offers a toolbar called **Snapping**. DAT/EM was disappointed to discover that the Snapping tools were not usable in the Capture environment. They could not be modified to accept both 2D and 3D snap choices. They behave very strangely with the auxiliary input device, that is, Summit's cursor. This means you must turn off the Snapping tools and use the Classic Snapping Environment tools instead.

Turn off the Snapping toolbar tools as follows:

1. If it is not already displayed, select ArcMap > **Customize** > **Toolbars** > check on **Snapping** to temporarily display the toolbar.

2. Pull down the **Snapping** menu on the **Snapping** toolbar. If you find it checked on, uncheck **Use Snapping**. The remaining icons on the toolbar should change to inactive / light gray.



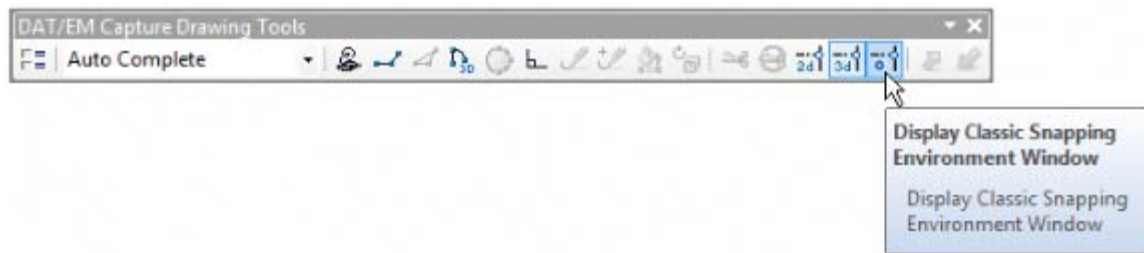
3. Click on "x" at the upper right corner of the **Snapping** toolbar to turn it off. This prevents users from accidentally turning on this type of snapping again.

**Note:** Snapping toolbar snapping will conflict with Classic Snapping if they are both on. It can cause very confusing behaviour when selecting a snap with Summit. If snapping seems to be “acting crazy”, turn on this toolbar again and make sure **Use Snapping** is off.

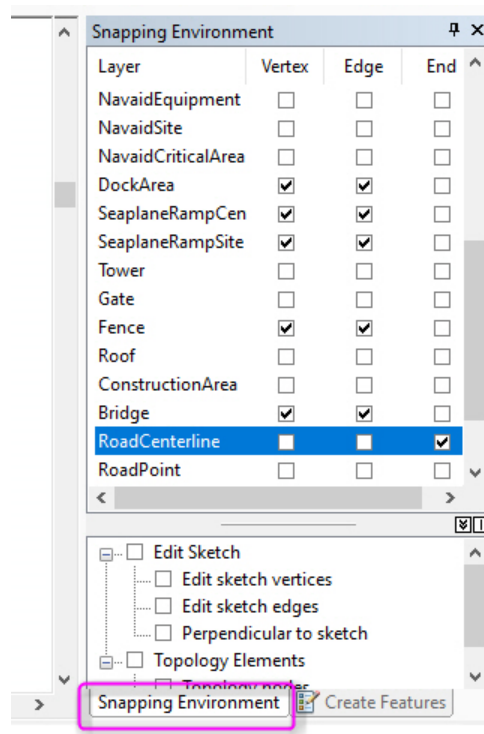
### Use the Classic Snapping Environment

ArcMap's Classic Snapping Environment must be used when Summit is the digitizing device.

If it is not already displayed, activate the Classic Snapping Environment from the DAT/EM Capture Drawing Tools toolbar next to the 3d snap tool:



**Note:** This window is often docked by default together with Create Features and other windows to the right side of the ArcMap window. In this case, they will appear as tabs, something like the example below. If you can't find it, just select it from the DAT/EM Capture Drawing Tools toolbar again to bring it to the top display:



*Classic Snapping Environment docked with a lower tab*

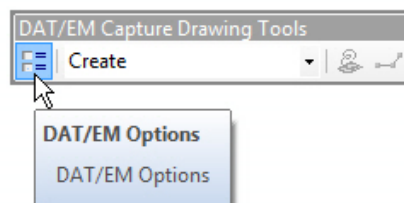
Check on only those layers and snap types that you need to snap to at the time. If you check on too many layers, especially layers with many-vertex lines or polygons, it could become slow. ArcMap's snapping algorithm is very inefficient, especially in the presence of many-vertex objects, but we must use it anyway.

## Save Snap States

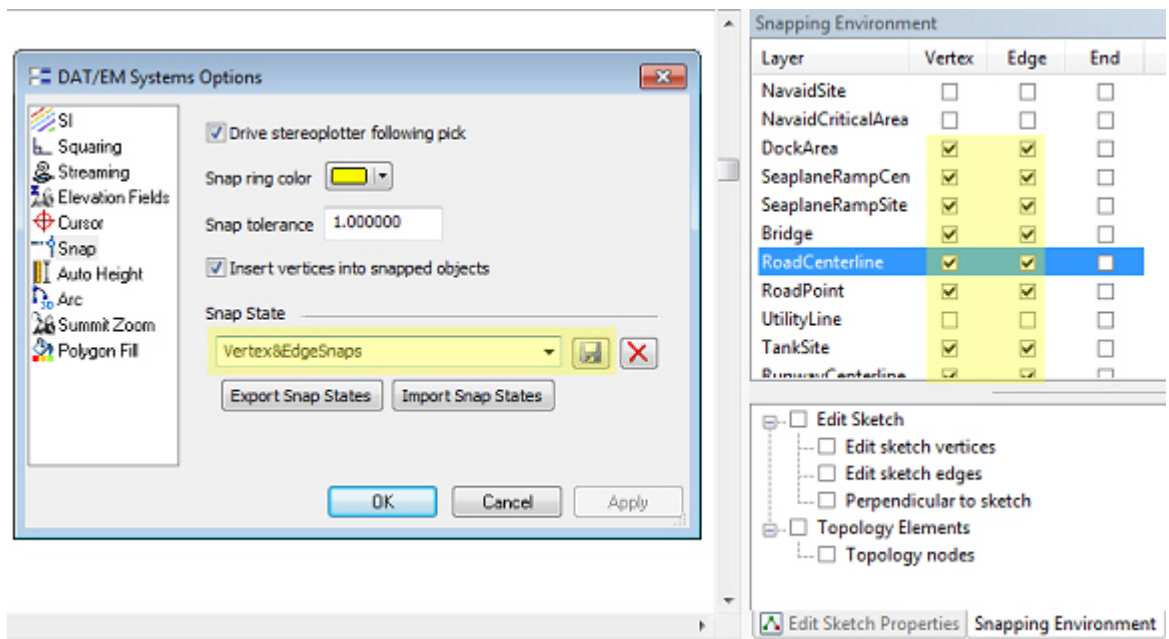
It can be very time consuming to change a set of checkboxes in the Classic Snapping Environment, only to decide you want to reset the previous checkbox states a few minutes later. Capture offers a method to save and retrieve named check box states.

To save Classic Snapping checkbox states:

1. Check the snaps you want on and want to save in the Classic Snapping Environment.
2. Activate the ArcMap-side DAT/EM Capture Options > Snap settings:



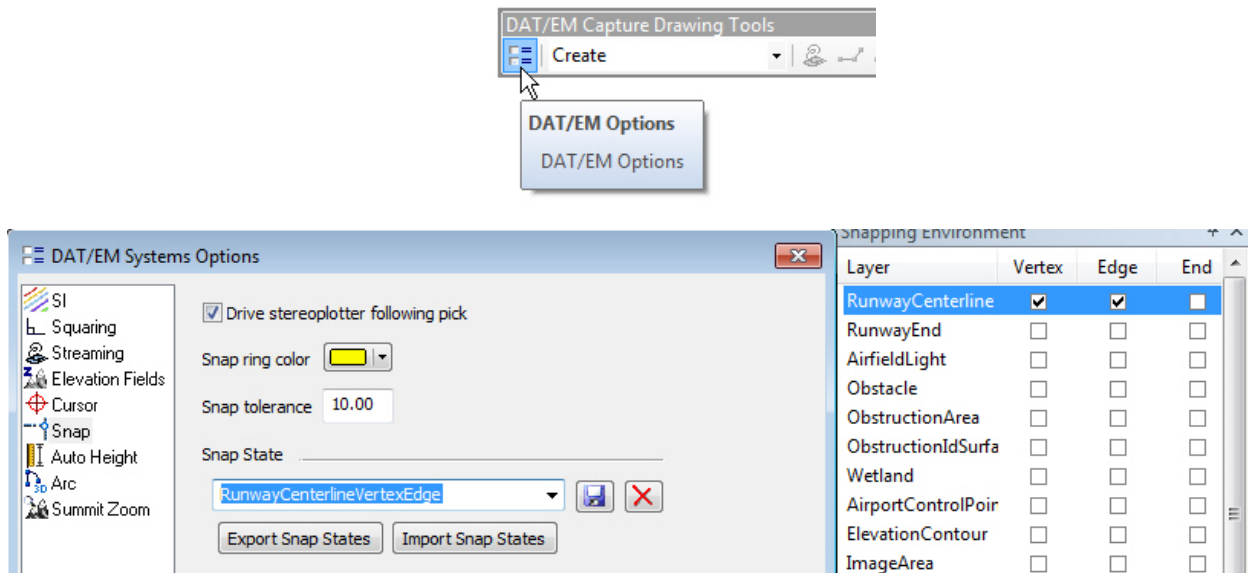
3. Enter a name for the snap state you'd like to save and press the save icon to the right of the entry field. This will save the checkbox states you currently see in the Classic Snapping Environment.



## Retrieve Snap States

To retrieve the snap states at any time, use any of the following methods:

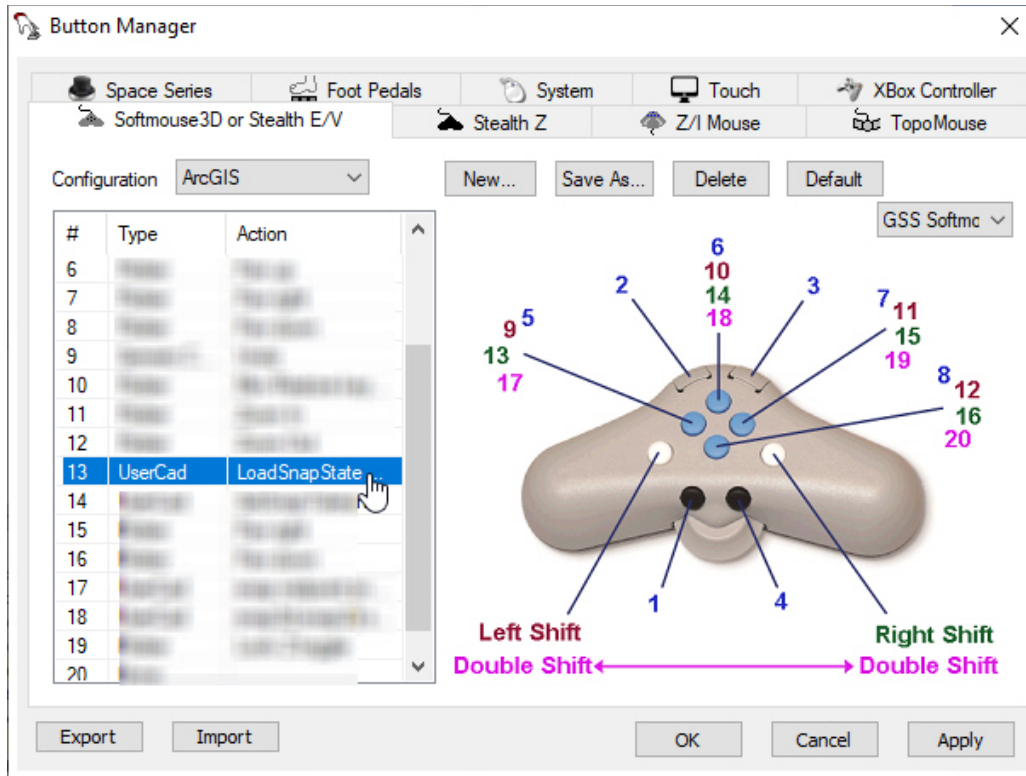
1. **From the DAT/EM Systems Options Dialog:** Activate a previously saved snap state by picking it from the same **DAT/EM Systems Options > Snap > Snap State** area menu that you used to save it earlier.



*Example of a retrieving a snap state from the **DAT/EM Systems Options**  
> **Snap** > **Snap State** menu*

2. **From a Summit Digitizer Button:** Activate a previously saved snap state by setting a Summit Button Manager "Custom CAD" button to the keyword string that retrieves the snap state:

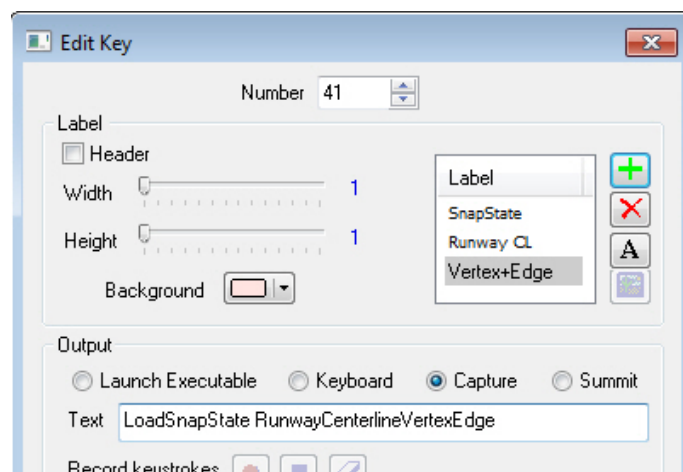
**LoadSnapState <snap state name>**



Example of retrieving a snap state from a Button Manager **UserCad** button. The entire **Action** line would be **LoadSnapState <snap state name>**

3. **From a DAT/EM Keypad Key:** Activate a previously saved snap state by setting DAT/EM Keypad Controller "Capture" key to the keyword string that retrieves the snap state:

**LoadSnapState <snap state name>**

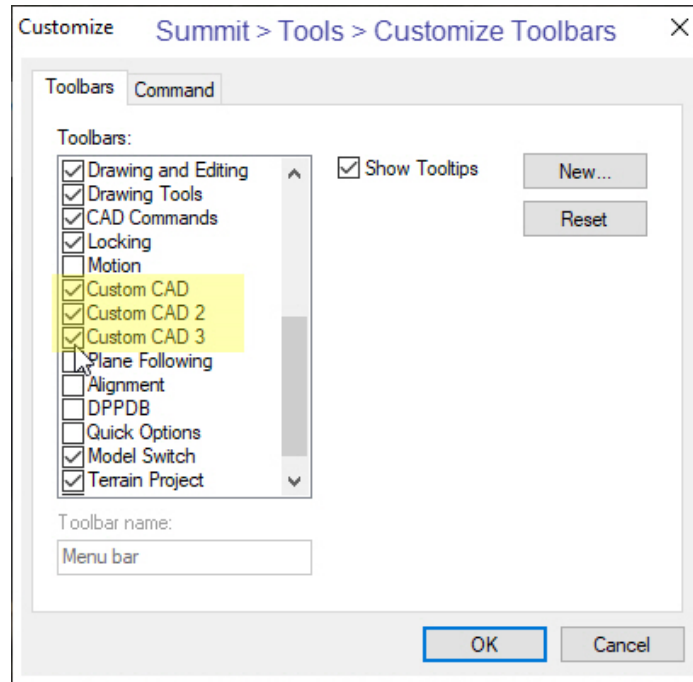


Example of retrieving a snap state using a DAT/EM Keypad Controller **Capture** key

4. **From a Summit Custom CAD Toolbar:** Activate a previously saved snap state by setting a Summit Custom CAD toolbar button to the keyword string that retrieves the snap state:

**LoadSnapState <snap state name>**

To set Custom CAD toolbars, first turn on the three “Custom CAD...” toolbars in **Summit > Tools > Customize Toolbars:**

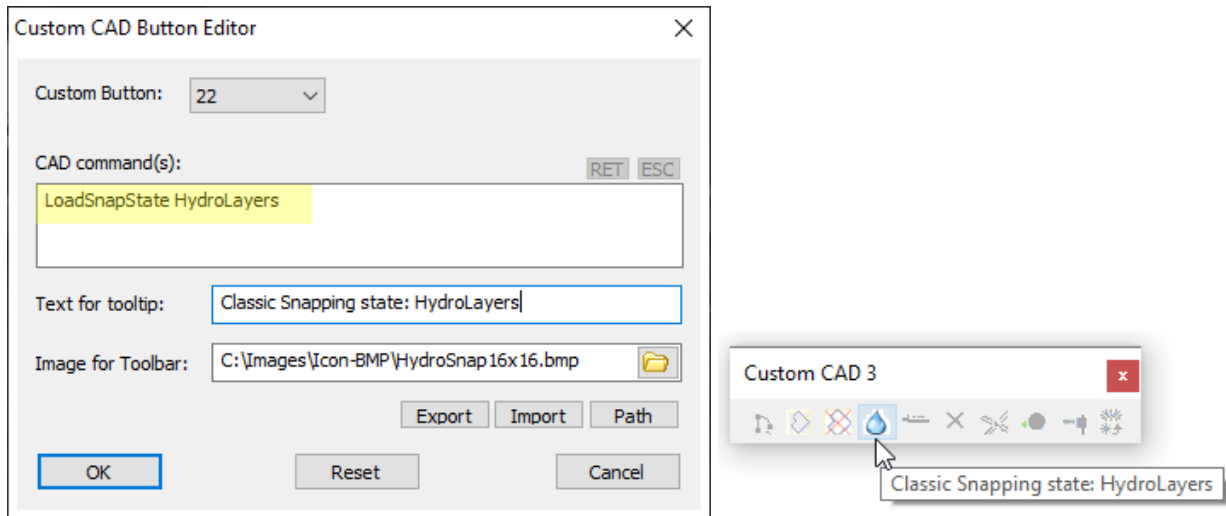


*Turn on the Custom CAD toolbars if they are not already on*

Use the button editing tool on the first Custom CAD toolbar:



Set the button number, the keyword with the snap state name, text for a tooltip (does not need to match the keyword string), and an optional image for the toolbar position:



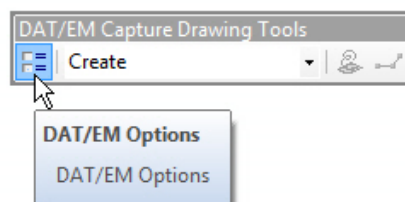
*Example of settings to retrieve a snap state using a Summit Custom CAD toolbar button*

5. **From a Summit Function Key:** You can set a Summit function key to load a snap state, but it's not always convenient to use. The problem with function keys is that the application with the function key set (in this case, Summit) has to have Windows focus in order for the function key to be activated in that application. A Summit function key will not work when ArcMap has focus, for example; instead, the function key will be sent into ArcMap and perform any task that ArcMap might have set for that same function key. Knowing this, if you still want to set a function key in Summit, first set the snap state to a button on one of the Custom CAD toolbars as shown above. Then use **Summit > Tools > Shortcuts** and select the button number from the "CAD:Custom CAD Buttons:..." area. Assign an as-yet-unused shortcut keyin to that toolbar button.

## Snap Behavior Settings

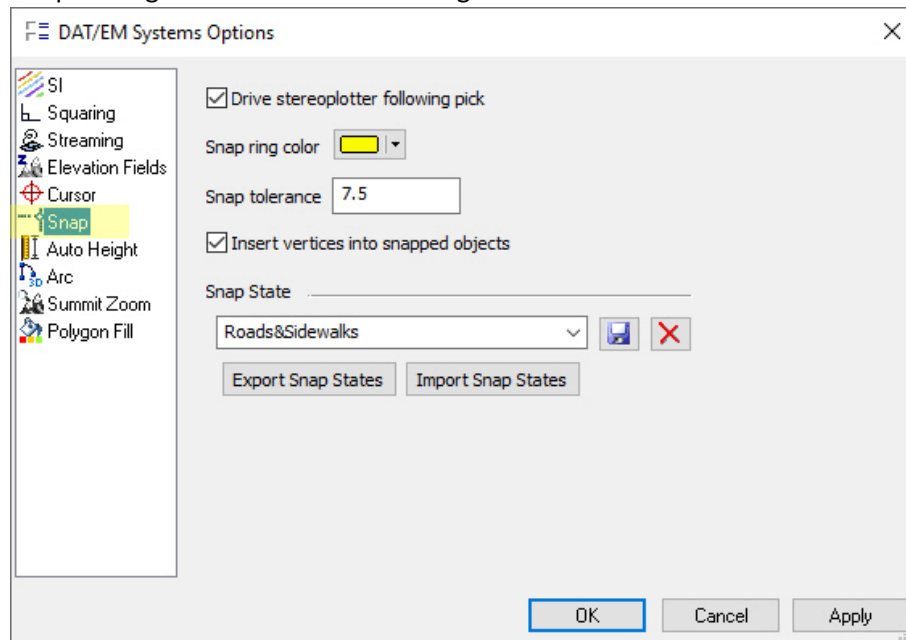
Before snapping to objects, make the settings for how you want the snap to appear and behave in Summit's superimposition (SI) and for the snap ring size:

1. On the ArcMap side, open the DAT/EM Systems Options dialog:





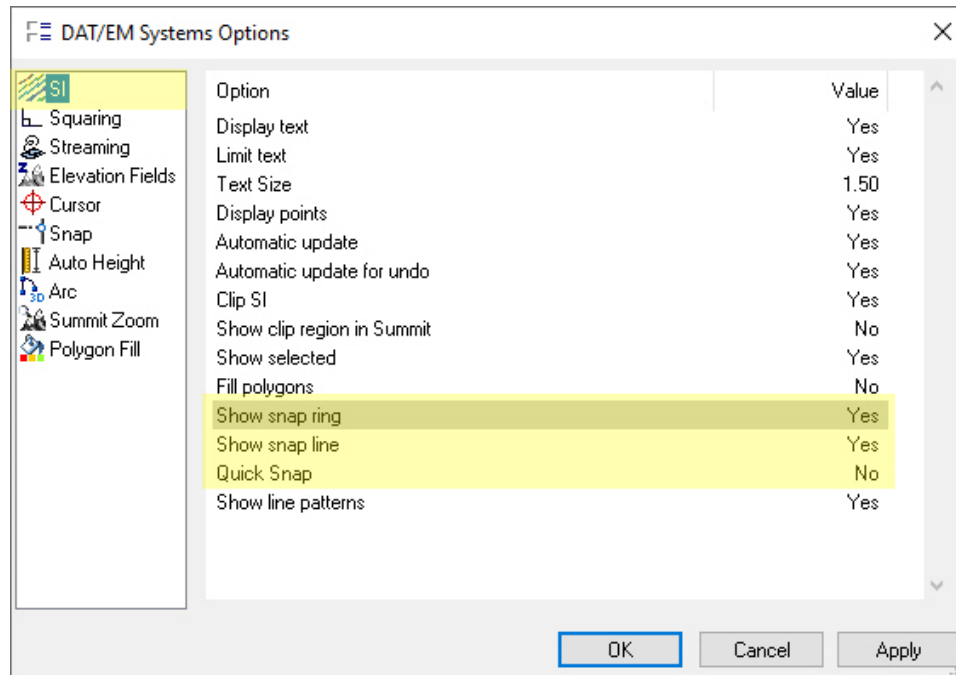
2. Select the Snap settings on the left. Make settings:



*DAT/EM Systems Options > Snap*

- **Drive stereoplotter following pick** – moves Summit’s cursor to the snap location.
- **Snap ring color** – sets the color of the snap ring that will appear in Summit’s superimposition. The snap ring shows the **Snap tolerance** size.
- **Snap tolerance** – sets the radius in ground units for snapping. Snapping will be offered within this radius for segments and/or vertices within the **Snap tolerance**, but only if they are on a layer that is checked on for snapping in the Classic Snapping Environment.  
**Note:** The keyword for **Snap tolerance** is **SetSnapTolerance <snap ring radius>**. This may be set on a DAT/EM Keypad Capture key or a Summit Custom CAD toolbar button.
- **Insert vertices into snapped objects** – optionally add a vertex (node) at each snapped location on any objects that were snapped to, ensuring a noded intersection.
- **Snap State** – save the current Classic Snapping Environment checkbox states. See more information in “Save Snap States” starting on page 3 and “Retrieve Snap States” starting on page 5.
- **Export Snap States** – export snap states, which can then be imported by other same-versioned Capture workstations. Or, use this as a snap states backup for your own workstation, in case you accidentally delete a named snap state.
- **Import Snap States** – import previously saved snapped states from same-versioned DAT/EM Capture workstations.

3. Select the SI settings on the left. Make settings:



*DAT/EM Systems Options > SI > snap-related settings*

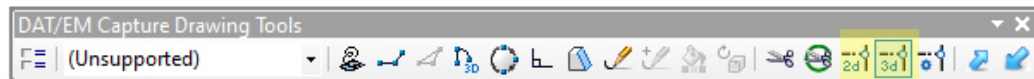
- **Show snap ring** – draws a circle around the Summit cursor to show the size of the snap radius. (Set the color and size in the **Snap** options described above.)
- **Show snap line** – draws a stereo line to the potential snap location.
- **Quick Snap** – Leave this off unless needed. Turn it on if the minimum number of checkboxes necessary for the snapping task are on in the Classic Snapping Environment and snapping is still much too slow. When on, **Quick Snap** will filter out some of the many potential snaps streamed in from ArcMap's snapping tool. When a snap is accepted, it will be sure to find the actual closest snap, even if that snap had been filtered previously. The advantage to **Quick Snap** is faster response when snapping is on. The disadvantage is you might not see the actual true snap at the snap line before accepting the snap (but it will be close).

## 2D Snap, 3D Snap, and Snap Off

Default ArcMap snaps are always 3D, but Summit with Capture offers to modify the ArcMap snap for a choice of 2D or 3D snapping. It can also turn snapping off without unchecking any layers in the Classic Snapping Environment.

To choose a snap mode, use any of the following methods:

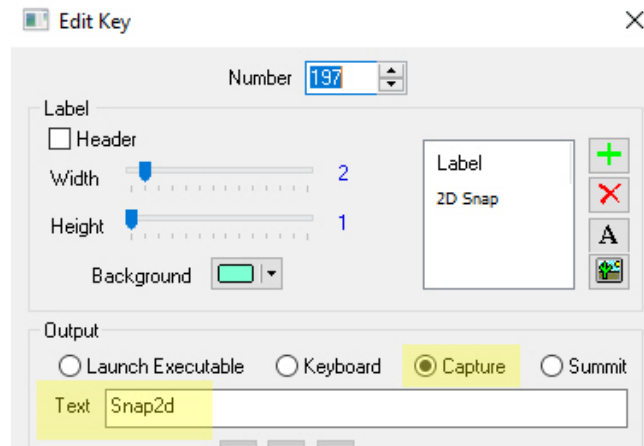
1. **From the DAT/EM Capture Drawing Tools toolbar:** Select the 2D or 3D buttons on the DAT/EM Capture Drawing Tools toolbar. The snap is on when the button has a blue highlight box around it. When neither button is highlighted, snapping is off, no matter how many checkboxes are still on in the Classic Snapping environment.



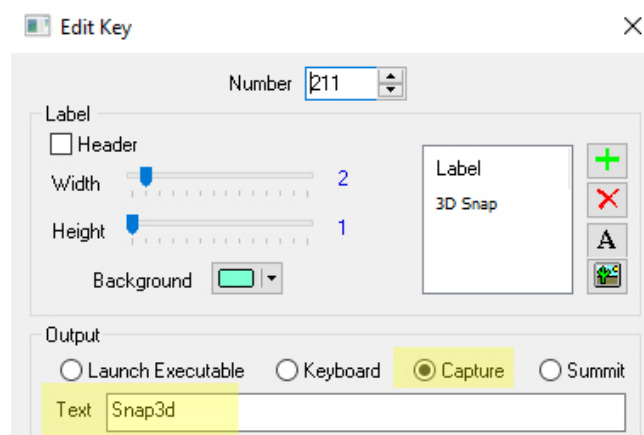
*Here, 3D Snap has a highlight box showing it is on. 2D snap is off.*

2. **From the DAT/EM Keypad:** Set three buttons using the DAT/EM Keypad Controller's Edit Key dialog. Set **Capture** output and each of the **Snap2D**, **Snap3D**, and **SnapOff** keywords:

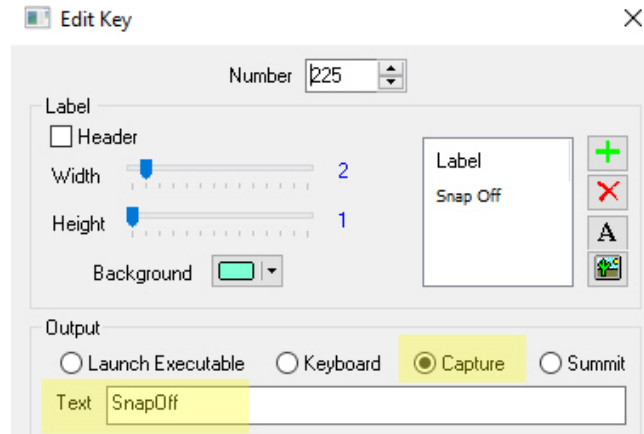
- **Snap2D**



- **Snap3D**



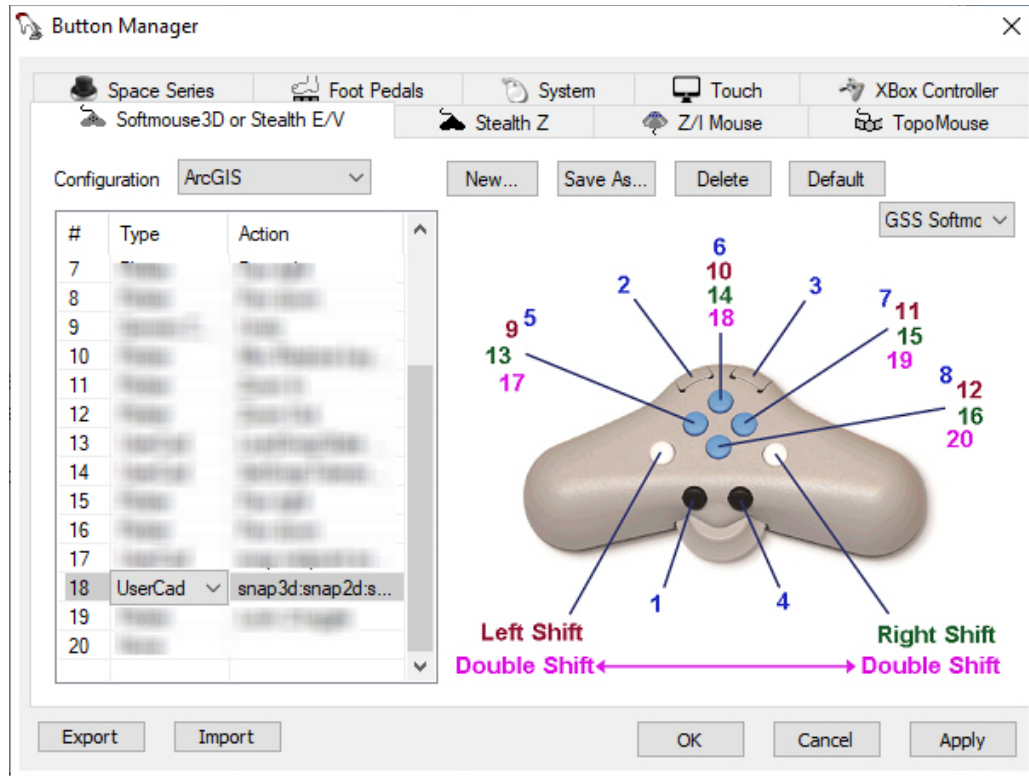
- **SnapOff**



3. **\*Best, Fastest Method!\* From a Summit digitizer button:** Using a Summit digitizer button to toggle to the next snap option is the most efficient way to set the snap mode, because the user does not need to look away from Summit to change the snap. Use the Button Manager to set a **UserCad** button to a combination of the **Snap2D**, **Snap3D**, and **SnapOff** keywords separated by the colon character, :, between keywords:

**Snap3D:Snap2D:SnapOff**

As you press the button repeatedly, it issues the next keyword past the : or starts the first keyword over again. As the commands are issued, you'll see the reaction on the DAT/EM Capture Drawing Tools toolbar as the 2D and 3D icon gain or lose their highlights.



*Button Manager key set to **Type=UserCad** and **Action=Snap3D:Snap2D:SnapOff***

4. **From Summit's Custom CAD Toolbars:** You can set three individual Custom CAD toolbars to the keywords, **Snap2D**, **Snap3D**, and **SnapOff**; however, this will not be as efficient as using a Summit digitizer button. Nevertheless, it can be done if you want to do it! Use the instructions above on page 7 to set **Snap2D**, **Snap3D**, and **SnapOff** on Custom CAD toolbar buttons.
5. **From a Summit Function Key:** Since you can set each of the snap modes to a Summit Custom CAD toolbar button, you can also set each of the Custom CAD toolbar buttons to a Summit function key; however, the same issues discussed on page 8 above apply here. Summit will need to have Windows focus in order for Summit to accept the function key. Knowing this, if you still want to set a Summit function key, first set the snap keywords to Summit's Custom CAD toolbars as shown directly above, then use the instructions on page 8 to set the Custom CAD toolbar buttons to Summit function keys.

## DAT/EM MultiSnap

DAT/EM-enhanced snapping for ArcMap uses what we call “MultiSnap” when the Summit digitizer is doing the snapping, a DAT/EM drawing tool is active in ArcMap, and 2D or 3D snap is on. This section will show you how MultiSnap works.

Before you try a MultiSnap, make sure you have all the snap settings ready to use as described above, such as:

- ✓ Snapping checkmarks are on for desired snapping layers in the Classic Snapping environment
- ✓ The snap tolerance is set well for the project
- ✓ The snap ring and snap lines are on
- ✓ You’ve selected whether to add a vertex (node) on the snapped-to object
- ✓ You’ve selected whether to have Summit move to snapped locations
- ✓ You’ve picked a target layer in the Create Features pane (or used a Keypad key to do it)
- ✓ You’ve set a DAT/EM drawing tool, such as Point-to-Point, Stream, or Arc, or you’ve set a DAT/EM editing tool such as Move Vertex or DAT/EM Cut Polygon
- ✓ 2D or 3D snap is on

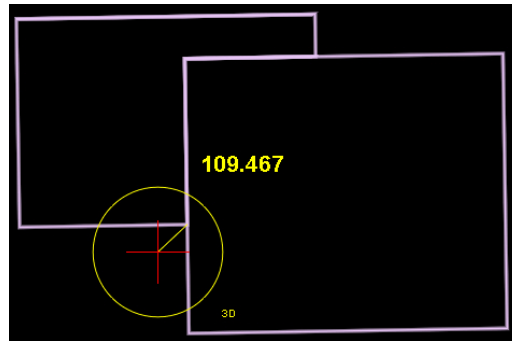
You’re ready to draw using MultiSnap. Do the following:

1. With the DAT/EM drawing or editing tool active, move the Summit cursor near to the object to be snapped. You’ll see the snap ring and snap line extending to a potential snap location when the object is within the snapping tolerance of the Summit cursor.

**Note:** You can help get the right snap the first time by positioning the cursor as close to the desired object in (x,y,z) as possible, but remember, it is ArcMap returning the snap location to DAT/EM, and we have to take the snap it gives us. Just getting close might not be enough. You might still need MultiSnap.

2. Watch the snap lines. They are drawn in stereo, so by using your stereo display system, your snap lines should appear to be a single line extending to the snap-to object. The snap line will end...
  - ... at the (x,y,z) of the snap-to object if 3D snap is set,
  - ... at the (x,y) of the snap-to object and the Summit cursor’s (z) if 2D snap is set.

You will also see a small “3D” next to the snap ring when 3D snap is set.



*A small “3D” appears near the cursor if 3D snap is set. The snap line will also be 3D.*

**Note:** 2D snap has no text, but has a 2D snap line visible in the stereo display.

**Note:** When snap is off or the layer is not checked on in the Classic Snapping Environment, there will be no snap ring or snap line. Check settings.

- If the first snap line goes to the object you want to snap to, just pick to accept it and move the stereoplottor’s cursor away in (x,y) to continue the sketch.
- If there is more than one potential snap at the same location, such as two building rooflines at the same (x,y), but different (z) values, the snap line might go to the wrong one. MultiSnap will help you get the right one.
- Keep the cursor in the same (x,y) location and keep picking. Each pick will send the snap line to another potential snap location and then cycle through them again.
- When you see the snap you want, just move the cursor (x,y) position (do not pick again). The snap will be accepted and a vertex will be added to the sketch.
- If you move the cursor by accident before the best snap is offered, just issue an “Undo” and try again.

## MultiSnap Example

### Example:

In this example, the buildings have a little offset or distance between them for demonstration purposes; however, real buildings might all share edges and/or corners in (x,y), while having different roof elevations. MultiSnap can help snap to the desired building.

Let's say you have the Point-to-Point tool running and want to snap to the lower left rectangle. There are three buildings and three potential vertex snaps within the snapping radius.



*1<sup>st</sup> pick, not the right snap*



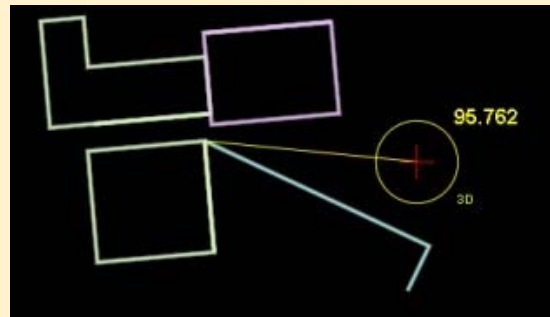
*Hold still and pick again. Still not right.*

**Note:** The cursor is positioned where it is for demonstration purposes! You could put it closer to the desired snap to help get the right snap faster.

Keep the cursor (x,y) still and keep picking until the snap line goes to the desired location.



*Hold still and pick again. Right one!*



*Move the cursor to accept.*

Now that the snap line is at the desired vertex, simply move the cursor's (x,y) to accept it. Do not pick again here! When the cursor moves, the snap location is accepted. In this case, the tool is sketching, so a vertex is added to the sketch at the snap location.

Some edit tools might perform an object selection or single vertex pick instead of a sketch, but they work with MultiSnap using the same concept: Pick again until the snap is right, then move.