



DAT/EM CAPTURE[™]

Stereoplotter Interface and Mapping Tools

**for use with Esri ARCGIS[®] for Desktop
and SUMMIT EVOLUTION[™]**

Operation Manual

DAT/EM CAPTURE for ArcGIS Document

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List of Changes

The following lists show changes in this document for DAT/EM software versions 6.3, 6.0, and 5.4. There were no changes to the user DAT/EM CAPTURE for ArcGIS interface for version 6.1 or 6.2.

Changes for Version 6.3

Ver.	Page	Description
6.3.	(no page)	This is the first version that supports ArcGIS 10.0.
6.3.	3-1	Some additional graphics have been added to this chapter to show what the menus and dialogs look like in ArcGIS 10.x versions.
6.3.	6-1	There is a new "classic task" field on the DAT/EM Capture Drawing Tools toolbar when it is activated from ArcGIS 10.x. The classic tasks are Create, Modify, and Cut.
6.3.	6-6	The Airfield3D command is on the DAT/EM Capture Tools toolbar. It is mentioned in this document as a cross reference to the DAT/EM "Airfield3D Operation Manual" publication.
6.3.	6-10	"ASCII Import" has been added to the "DAT/EM Capture Tools and Commands" chapter.
6.3.	6-23	Close Polyline Sketch is a new tool to close a polyline sketch. It snaps the last vertex to the first vertex.
6.3.	6-27	"Display Classic Snapping Environment" displays the classic snapping environment window. This helps to use classic snapping when the DAT/EM cursor is on and for all 3D snaps.
6.3.	6-28	"Draw Point and Measure Fields" is a new tool to draw a point and measure or set its rotation angle and/or size fields.
6.3.	6-47	The Draw Streamed Vertices tool may not be used with the Cut Polygon Features task.
6.3.	6-72	TIN layers may be used as input for the Elevation Layers command. This may have been available in previous versions, but was omitted from the document.
6.3.	6-77	MeasureHeight has been added as a measurable field for Field Update. This was previously omitted from the documentation.
6.3.	6-77	PlotterMean has been added as a measurable field for Field Update. This was previously omitted from the documentation.
6.3.	6-88	"Select Images on Image Server" has been added to the "DAT/EM Capture Tools and Commands" chapter.
6.3.	6-93	"Select Summit Models Area" has been added to the "DAT/EM Capture Tools and Commands" chapter.
6.3.	B-1	A link has been added to go directly to the Esri ArcMap Command ID list within help.arcgis.com .
6.3.	B-1	"CaptureArcInfo.ClosePolyline" has been added to the Command ID list.

List of Changes

Ver.	Page	Description
6.3.	B-2	"CaptureArcInfo.ImageServerSelectTool" has been added to the Command ID list.
6.3.	B-2	"CaptureArcInfo.SelectPlotterModelArea" has been added to the Command ID list.
6.3.	B-2	"CaptureArcInfo.SetRotationPoint" has been added to the Command ID list.

Changes for Version 6.0

Ver.	Page	Description
6.0.	A-1	The "Airfield" keyword has been added. This activates the Airfiled3D Field Update dialog and generates the surfaces in Summit Evolution's superimposition display.
6.0.	B-2	There is a new CommandID called "CaptureArcInfo.ImportAscii" that starts the new ASCII Import command.

Changes for Version 5.3

Ver.	Page	Description
5.3.	6-2	Autolist can now move the stereoplotter cursor to a vertex that is double clicked in the Autolist "Vertices" list.
5.3.	6-5	The "3D Editing" tool has been completely removed. It has been replaced by the new "Shift Vertices XY/XYZ/Z" vertex editing tools.
5.3.	6-13	Autolist can now move the stereoplotter cursor to a vertex that is double clicked in the Autolist "Vertices" list.
5.3.	6-13	Autolist can now highlight a selected vertex in the Summit Evolution view. This is in addition to the existing highlight in the ArcMap view.
5.3.	6-30	The Draw Arc tool may now be used with the Cut Polygon Features task.
5.3.	6-37	The Draw Point-to-Point tool may now be used with the Cut Polygon Features task.
5.3.	6-42	The Draw Squared Segments tool may now be used with the Cut Polygon Features task.
5.3.	6-56	Draw Trace Single Features may be used during a Cut Polygon Features sketch that is started and ended by another drawing tool.
5.3.	6-97	"Shift Vertex in XY Only" is a new command to edit a vertex in XY.
5.3.	6-98	"Shift Vertex in XYZ" is a new command to edit the full 3D coordinate of a vertex.
5.3.	6-99	"Shift Vertex in XY Only" is a new command to edit a vertex in XY.
5.3.	A-2	Added three new Keywords. VertexShift2D, VertexShift3D, VertexShiftZ.
5.3.	B-3	Added three new Command IDs. CaptureArcInfo.VertexShift2D, CaptureArcInfo.VertexShift3D, CaptureArcInfo.VertexShiftZ.

Chapter 1. Introduction to DAT/EM CAPTURE for ArcGIS

DAT/EM's Specialty

DAT/EM Systems International specializes in the SUMMIT EVOLUTION digital stereoplottter and interfacing popular Computer Aided Drafting (CAD) and Geographic Information System (GIS) packages to a variety of stereoplottter mapping instruments. With DAT/EM CAPTURE™, all data sampling and editing takes place in real time directly from the stereoplottter into the CAD or GIS system.

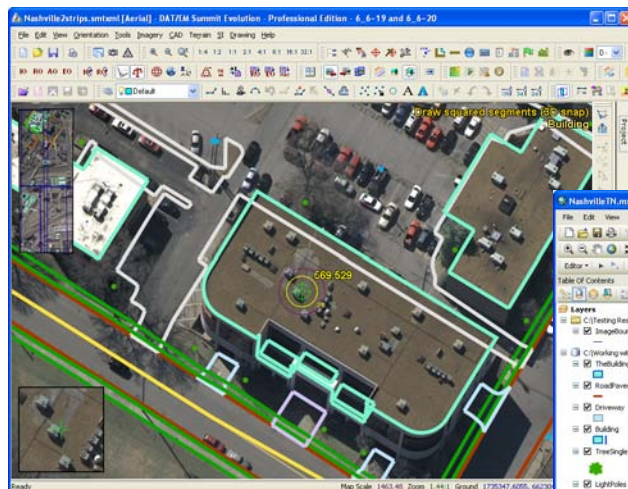
See *Appendix C* for DAT/EM's mailing address, web address, email addresses, and technical support information.

DAT/EM CAPTURE

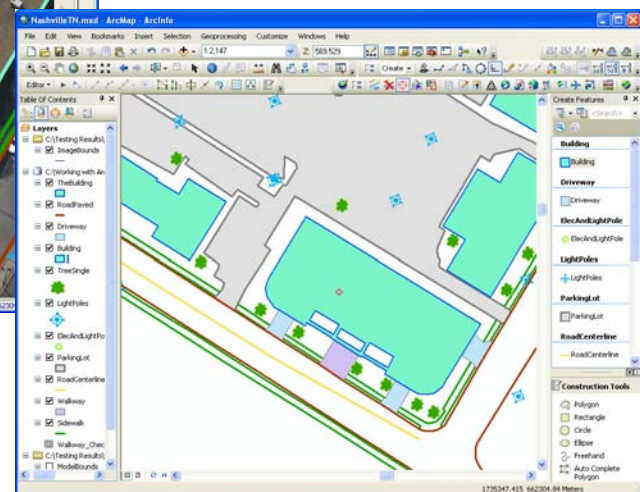
DAT/EM CAPTURE interfaces DAT/EM's SUMMIT EVOLUTION digital stereoplottter directly to Esri's ArcGIS editor, ArcMap. Features are viewed in stereo in the SUMMIT EVOLUTION Image View and digitized in 3D directly into ArcMap. The ArcGIS modules compatible with DAT/EM CAPTURE for ArcGIS are ArcView, ArcEditor, and ArcInfo. ArcReader may not be used, because it does not have object drawing capabilities.

DAT/EM CAPTURE is also available for AutoCAD and MicroStation, two popular 3D CAD software packages. It is possible to install DAT/EM CAPTURE for ArcGIS, AutoCAD, and MicroStation on the same computer workstation, then choose which program to launch based on each project's requirements.

Because DAT/EM CAPTURE for ArcGIS is used with SUMMIT EVOLUTION digital stereoplottter, color SUPER/IMPOSITION of digitized features is provided. This means that when a feature is digitized directly into the ArcMap file, a "copy" of that feature's image appears superimposed over the photo images in the SUMMIT EVOLUTION view. This makes it easy to see features that have been digitized and to verify that they are correct. It also makes updates easy, because new roads and buildings in the new photo images show up as obvious omissions in the superimposed view.



SUMMIT EVOLUTION stereoplottter with aerial model open



Esri ArcGIS ArcMap with DAT/EM CAPTURE interface active

The Advantages of DAT/EM CAPTURE Over a System Digitizer

DAT/EM CAPTURE for ArcGIS and the SUMMIT EVOLUTION digital stereoplotter allow the ArcGIS user to enter the powerful world of 3D digitizing, stereo viewing, and stereo SUPER/IMPOSITION of digitized features.

A system mouse or digitizing tablet offers 2D (X,Y) positioning and digitizing. The SUMMIT EVOLUTION digital stereoplotter offers full 3D stereo viewing, digitizing, and stereo SUPER/IMPOSITION capabilities for all project types that support two overlapping images. And for inherently mono (single image) projects such as orthophotos, it offers the advantage of SUPER/IMPOSITION, faster image zooming, Z-tracking based on a Digital Terrain Model, and advanced cursor positioning tools.

In ArcGIS, the Z functionality is handled differently depending on the target layer in ArcGIS:

- Take advantage of full Z functionality by using shapefiles that include a Z element. Each vertex within a feature obtains SUMMIT EVOLUTION's Z value at the time the vertex is digitized.
- Or, define a personal geodatabase feature class to have individual vertex Zs.
- Or, define a personal geodatabase feature class to have one Z elevation per feature. This Z is stored in a user-defined elevation field. SUMMIT EVOLUTION fills in the elevation field with the cursor Z at the time the feature's first vertex is digitized. Only one elevation can exist for the entire feature in this case.

Chapter 2. Software Installation

Software installation for DAT/EM CAPTURE for ArcGIS consists of three main tasks:

- Install the software according to the instructions in the *SUMMIT EVOLUTION Operation Manual*. Before you begin, read the additional instructions in “DAT/EM Software Installation” below.
- After a DAT/EM software update, reset the toolbars. See page 2-3 below.
- Check on the **DAT/EM Capture Tools** and **DAT/EM Capture Drawing Tools** toolbars in ArcMap. See page 2-3 below.
- Configure the digitizer buttons. See page 2-4 below.

In the future, Esri may release a new ArcGIS for Desktop upgrade or service pack. Before installing it, please see “What to do When an ArcGIS Upgrade or Service Pack is Available” on page 2-7.

DAT/EM Software Installation

DAT/EM software may be installed from the following sources:

- **DAT/EM Disk:** For new systems, all of the DAT/EM CAPTURE for ArcGIS software is delivered on a single disk that contains DAT/EM CAPTURE, SUMMIT EVOLUTION, the hardware lock driver, **pdf** versions of the manuals, and other accessories. All the DAT/EM software is installed by a single run of **setup.exe** on the CD. This must be run in the correct order after SUMMIT EVOLUTION hardware installation and CAD/GIS software installation.
- **Web Updates:** Web updates are available for customers who have a current Support contract. To save space, web updates do not contain “extras” such as the manuals and elevation database updates; these can be downloaded separately.

Follow the installation directions given in the *DAT/EM Installation Instructions Series: Software Installation and Configuration (DATEM Software Installation.pdf)* document, which is available on the DAT/EM disk or at www.datem.com. If the DAT/EM KEYPAD has been purchased, follow the installation directions given in the *DAT/EM Keypad Operation Manual*.

A software serial number key is provided by DAT/EM at purchase time or by DAT/EM’s Support staff. The serial number key determines which DAT/EM packages to install. Note that it is possible to purchase and install DAT/EM CAPTURE for ArcGIS, AutoCAD, and MicroStation all on the same computer workstation. If installing DAT/EM CAPTURE for ArcGIS as an addition to an existing SUMMIT EVOLUTION workstation, please be sure to tell DAT/EM’s staff which CAD packages are in use so that they can create the correct serial key.

In summary:

1. Obtain a serial number key from DAT/EM that includes all the CAD packages in use on this SUMMIT EVOLUTION workstation (ArcGIS for Desktop, AutoCAD, and/or MicroStation). A serial number is automatically provided in the shipment for new systems.

2. Install the Esri ArcGIS ArcView/ArcEditor/ArcInfo or ArcGIS for Desktop Basic/Standard/Advanced software.

Compatible ArcGIS Versions

Please verify that your version of ArcGIS software is compatible with the version of DAT/EM software you intend to install. If you have any questions about these versions, please contact DAT/EM Support (see *Appendix C*).

Do not install ArcReader, because it does not have object drawing capabilities.

3. Install from the DAT/EM CD or the web update. Follow the hardware and software installation instructions in the *DAT/EM Installation Instructions Series: Software Installation and Configuration (DATEM Software Installation.pdf)* document.
4. For updates, reset the DAT/EM toolbars in ArcMap (below).
5. Check on the DAT/EM toolbars in ArcMap. See page 2-3.
6. Set a 3D Mouse button to ArcMap-specific functions. See page 2-4.

In the future, Esri may release a new ArcGIS version or ArcGIS service pack. Before installing it, please see “What to do When an ArcGIS Upgrade or Service Pack is Available” on page 2-7.

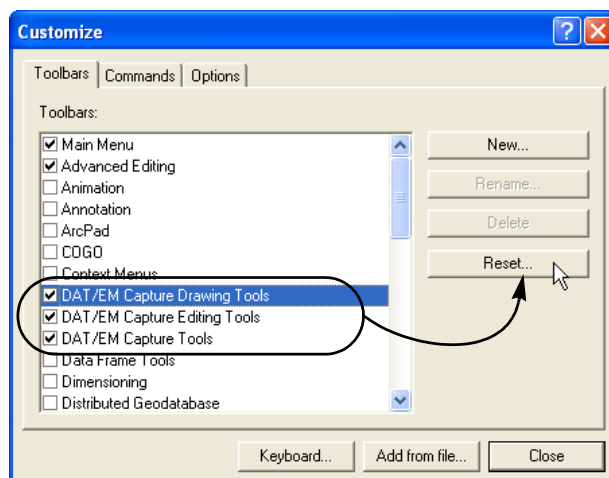
Reset the Toolbars After a DAT/EM Software Update

After a DAT/EM software update, reset the toolbars in ArcMap. Perform the following steps:

Step 1) Activate the Customize dialog:

- **ArcMap 9.x:** Select **Customize** from the **Tools** pull-down menu in ArcMap.
- **ArcMap 10.x:** Select **Customize Mode** from the **Customize** pull-down menu in ArcMap.

Step 2) On the **Toolbars** tab, select the first DAT/EM toolbar and select the **Reset** button. Repeat for all other DAT/EM toolbars.



For software updates:

- Select the **Toolbars** tab.
- Select each **DAT/EM** toolbar and select the **Reset** button.

Check on the DAT/EM Toolbars

After installing the DAT/EM software, check on the DAT/EM toolbars in ArcMap. Perform the following steps:

Step 1) Activate the Customize dialog:

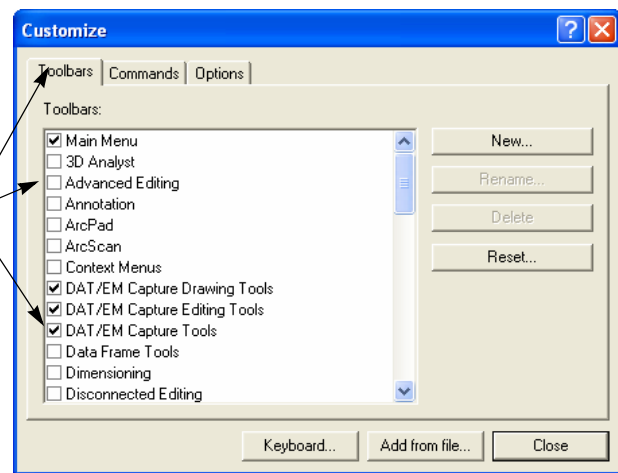
- **ArcMap 9.x:** Select **Customize** from the **Tools** pull-down menu in ArcMap.
- **ArcMap 10.x:** Select **Customize Mode** from the **Customize** pull-down menu in ArcMap.

Step 2) Select the **Toolbars** tab. Check on all DAT/EM toolbars:

- DAT/EM Capture Tools**
- DAT/EM Capture Drawing Tools**
- DAT/EM Capture Editing Tools**
- Any other toolbar with a name starting with “DAT/EM”

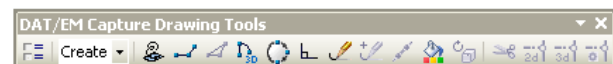
- Select the **Toolbars** tab.
- Check on **DAT/EM Capture Tools**.
- Check on **DAT/EM Capture Drawing Tools**.
- Check on **DAT/EM Capture Editing Tools**.

Note: After a software update, the toolbars must be reset. See “Reset the Toolbars After a DAT/EM Software Update” on page 2-2.



Step 3) Select **Close**, and verify that the **DAT/EM Capture Tools**, **DAT/EM Capture Editing Tools**, and **DAT/EM Capture Drawing Tools** toolbars are displayed. They may be either docked with the other ArcMap toolbars, or they may be displayed alone. To move them, drag and drop.

The DAT/EM toolbars may be displayed either undocked or docked with the other ArcMap toolbars. To move them, drag and drop.



ArcGIS for Desktop 10.x toolbars are shown. Toolbars are slightly different for ArcGIS 9.x versions. Toolbars are subject to change with software updates.



Add Current Z to an ArcMap Toolbar (Optional)

If desired, add the ArcMap Z display to an ArcMap toolbar. Perform the following step:

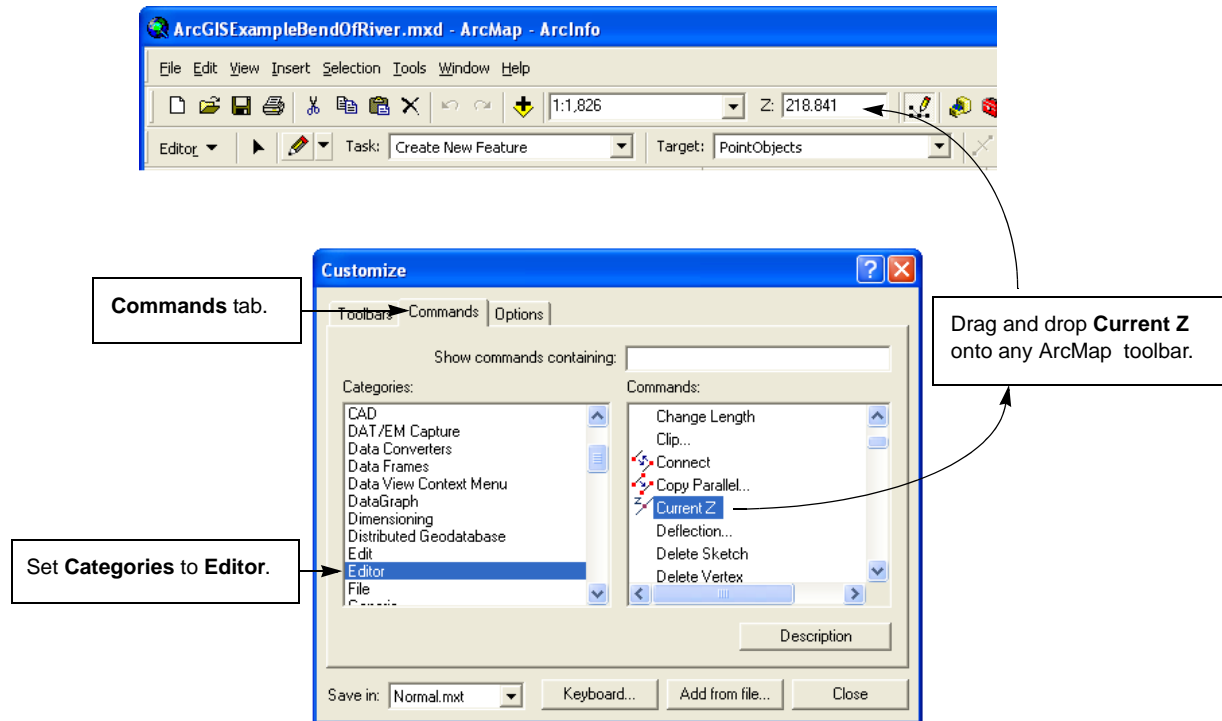
Step 1) Activate the Customize dialog:

- **ArcMap 9.x:** Select **Customize** from the **Tools** pull-down menu in ArcMap.
- **ArcMap 10.x:** Select **Customize Mode** from the **Customize** pull-down menu in ArcMap.

Step 2) Select the **Commands** tab.

Step 3) Set **Categories** to **Editor**. Click and drag **Current Z** from the **Commands** list and drop it onto any position on any toolbar.

For example, drag **Current Z** and drop it next to the ArcMap zoom display:



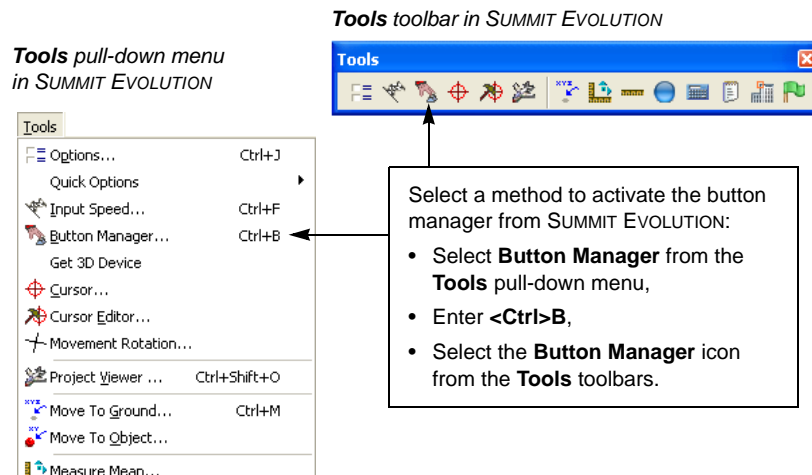
Set Digitizer Buttons to ArcMap-Specific Functions

The *SUMMIT EVOLUTION Operation Manual* gives general instructions on how to use the button manager. The **Pick**, **DAT/EM Undo**, **Cancel**, and several feature drawing functions are available for the ArcMap interface.

- **Pick** selects or digitizes points.
- **DAT/EM Undo** behaves like ArcGIS **Undo** when no sketch is active; it undoes the most recent action. When a sketch is active, **DAT/EM Undo** behaves differently than ArcMap **Undo**; **DAT/EM Undo** removes the most recently digitized vertex without ending the sketch. **DAT/EM Undo** may be used repeatedly to remove each vertex in turn. If **DAT/EM Undo** removes the first vertex of the sketch, the next digitized vertex starts a new sketch.
- **Cancel** finishes a sketch.
- **Tentative** moves the SUMMIT EVOLUTION cursor to a snapped-to point. The move is in XYZ with 3D snap on. The move is in XY with 2D snap on. The stereoplottor does not move if the **Tentative** button is used when snap is off.
- **3d line**, **3d line stream**, **3d arc**, and **3d square** activate DAT/EM digitizing modes.
- The same text strings that are used for the DAT/EM KEYPAD may be set on a **User CAD** button.

To set 3D Mouse buttons, perform the following steps:

- Step 1)** In the SUMMIT EVOLUTION window, select **Button Manager** from the **Tools** toolbar, enter <Ctrl>B, or select **Button Manager** from the **Tools** pull-down menu.

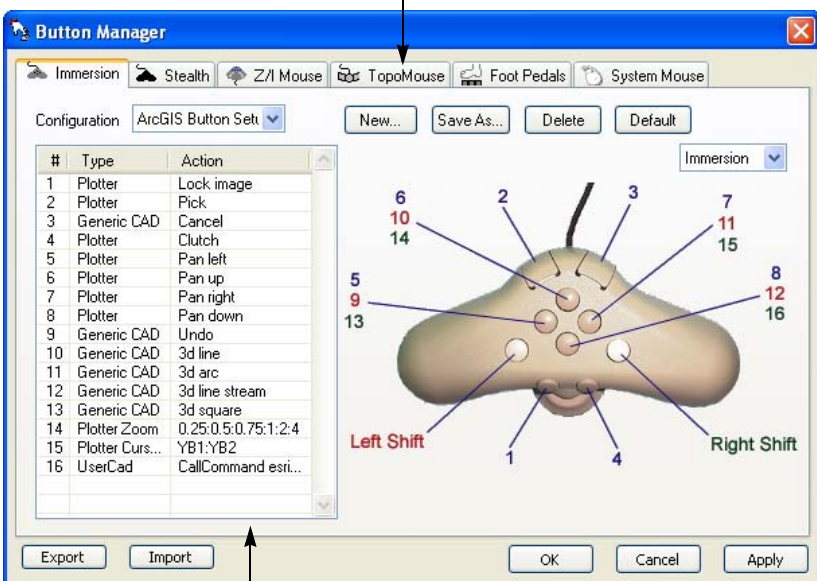


- Step 2)** The DAT/EM BUTTON MANAGER appears. Make any desired changes to the button settings.
- If AutoCAD or MicroStation are used on the same workstation with ArcGIS for Desktop, keep separate button configurations for each CAD system. Individual users may wish to have separate button configuration files as well. If necessary, select **New** to create a new configuration.
 - Set a button to **Type=Plotter** and **Action=Pick**.
 - Set a button to **Type=Generic CAD** and **Action=Undo**.
 - Set a button to **Type=Generic CAD** and **Action=Cancel**.
 - Set a button to **Type=Generic CAD** and **Action=Tentative**. (This moves the SUMMIT EVOLUTION cursor to the snapped-to location when 2D or 3D snap is on.)
 - Set four buttons to **Type=Generic CAD** and **Action=3d line, 3d line stream, 3d arc, and 3d square**. These functions activate DAT/EM digitizing modes. Suggested 3D Mouse buttons are the left shift buttons 9, 10, 11, 12, or the right shift buttons 13, 14, 15, 16. If used often, a button may also be set to **Type=User CAD** and **Action=draw trace** or **CallCommnad CaptureArcInfo.MultiTraceTool**.
 - All of the **Type=Plotter** functions work with every interface. Set any that are useful to you for running SUMMIT EVOLUTION.
 - If desired, a button may be set to **Type=Plotter** and **Action=System Mouse Toggle**. This toggles the SUMMIT EVOLUTION 3D Mouse from stereoplottor control mode to a mode that emulates the system mouse. When in system mouse mode, button 2 behaves like a left system mouse button, and button 3 behaves like a right system mouse button.
 - Any of the command strings used for the DAT/EM KEYPAD may also be set to a **Type=User CAD** button. For example, if you set **Type=User CAD** and **Action=StartEditingTarget LargeBuildings:Shed draw square**, then that button will start the editing session (if necessary), set the target layer to the "Shed" subtype of the "LargeBuildings" feature class, and start the squared ground coordinate collection mode. See *Appendix A* and *Appendix B* for a list of DAT/EM keywords and command IDs to use with the DAT/EM KEYPAD and cursor buttons.

The SUMMIT EVOLUTION BUTTON MANAGER can support a series of keyword sets on a single **Type=User CAD** button. Separate each keyword set with a semi-colon character (;). Do not add a space before or after the semi-colon (;). Each time the button is pressed, the next keyword set is activated, cycling back to the first set after the last set is used.

- **Example 1:** To scroll through DAT/EM drawing modes, set **Type=User CAD** and **Action=draw Stream;draw PointToPoint;draw arc;draw square;draw trace;**
- **Example2:** To scroll through DAT/EM snapping options, set **Type=User CAD** and **Action=Snap2d;Snap3d;SnapOff;**

Choose the tab(s) for the type of digitizing device(s) controlling SUMMIT EVOLUTION.



For each button number, select a function **Type** and an **Action**.

- For ArcGIS, all of the **Type=Plotter** actions can be used.
- For ArcGIS, active **Type=Generic CAD** actions are **Action=Cancel, Undo, Tentative, 3d line, 3d line stream, 3d square, and 3d arc** (but not **arc 3d!**).
- **Type=User CAD** may be used to set any of the command strings that are used with the DAT/EM KEYPAD for ArcGIS. See *Appendix A* and *Appendix B* for a list of keywords and command IDs.

Step 3) When finished, select **OK** to activate the changes.

What to do When an ArcGIS Upgrade or Service Pack is Available

ArcGIS for Desktop version upgrades and service packs are occasionally available from Esri. Be aware that your existing DAT/EM software may have been compiled before this upgrade became available, and it is possible that it is not compatible. You may or may not need a new version of DAT/EM software. In general:

- It may or may not be necessary to reinstall DAT/EM software after an ArcGIS for Desktop *service pack*. Install the service pack and try running ArcMap. If the DAT/EM toolbars are not present and the SUMMIT EVOLUTION cursor does not control the ArcMap cursor, then reinstall the DAT/EM software.
- The DAT/EM software must be reinstalled after an ArcGIS *version upgrade*, such as from 9.2 to 9.3.

Please follow this procedure for ArcGIS version upgrades, such as from 9.2 to 9.3.1:

- Step 1)** Contact DAT/EM Support to ask whether your version of DAT/EM software is compatible with the ArcGIS upgrade. An update of the DAT/EM software may be necessary.
- Step 2)** Install the ArcGIS upgrade or service pack only when you know you have a compatible version of DAT/EM software.
- Step 3)** Reinstall a compatible version of the DAT/EM software.

Chapter 3. Storing Z in ArcGIS Files

Among the most important advantages of using SUMMIT EVOLUTION as a digitizer for ArcMap is the ability to easily produce, store, and edit an elevation (Z) component for digitized objects.

The Z capability means that new shapefiles and personal geodatabase feature classes must be configured to store Z.

Note: Existing 2D shapefiles and personal geodatabase feature classes may be converted to 3D using the instructions in “Elevate Layers” on page 6-72.

Note: DAT/EM installs example shapefiles and an example personal geodatabase in **\Program Files\Datem Software\ArcGIS\Samples**. You are welcome to use these examples for training or to see how the Z is set up and used.

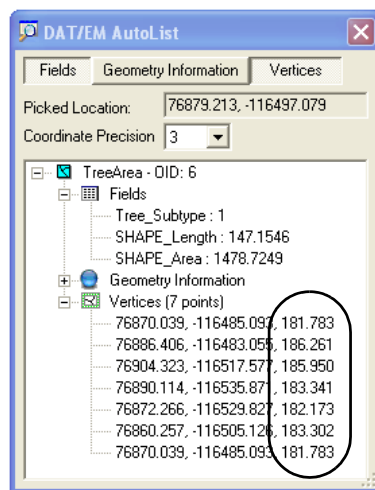
Instructions to configure elevation components appear in:

- “How to Define Z in a Shapefile” below.
- “How to Define Z in a Personal Geodatabase Feature Class” on page 3-10

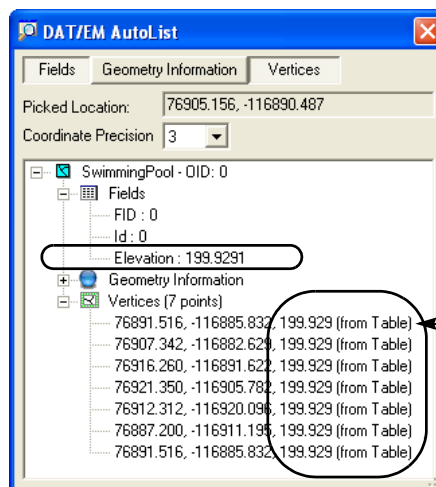
How to Define Z in a Shapefile

There are two methods to define Z in a shapefile. You must decide which method is best for your project.

- **Vertex Method:** The first method is to define Z vertex components. Z is attached to every vertex in every object within the shapefile. See “Shapefile Z, Vertex Method (Z on Every Vertex) (Version 9.x)” on page 3-2.
- **Field Method:** The second method is to define an elevation field. The field attaches only one Z value to each object within the shapefile. Individual vertices remain XY only. When digitizing, the Z field is set to the stereoplotter’s elevation at the time the first vertex is digitized. See “Shapefile Z, Field Method (One Z per Object) (Version 9.x)” on page 3-5 for instructions.



Autolist shows an object from a shapefile that uses the **Vertex Method**.

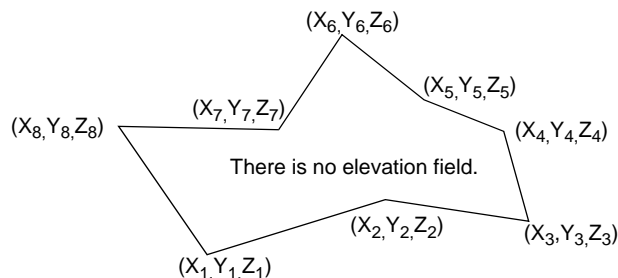


Autolist shows “(from Table)” if the vertex is XY only and an elevation field is found.

Autolist shows an object from a shapefile that uses the **Field Method**.

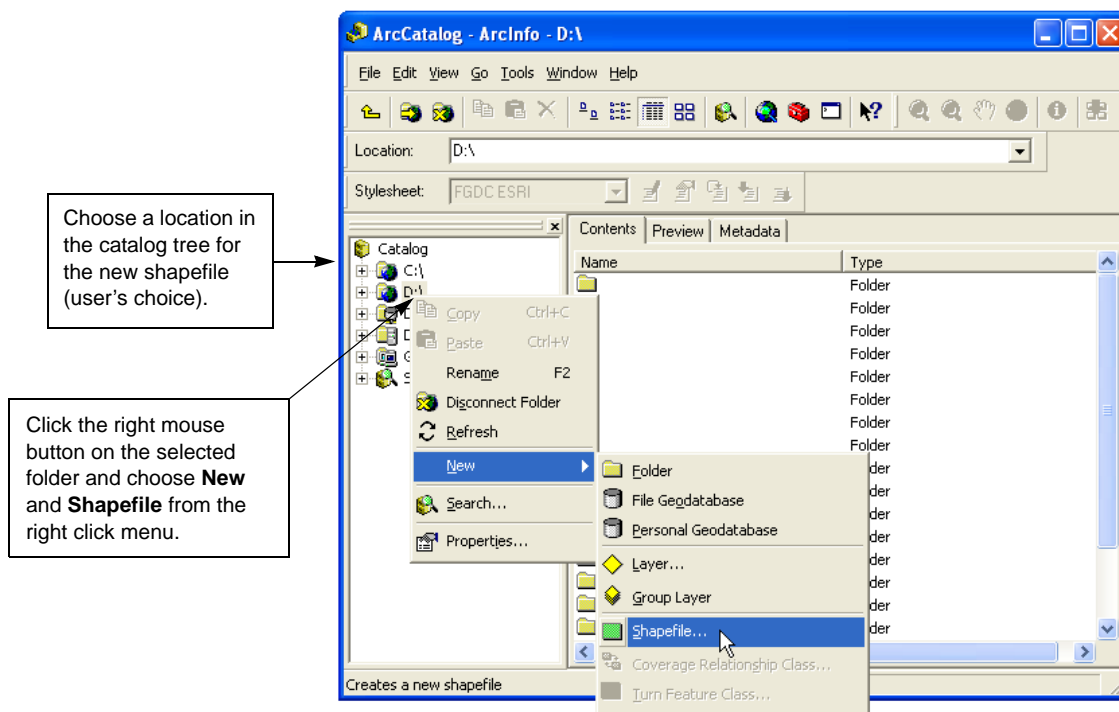
Shapefile Z, Vertex Method (Z on Every Vertex) (Version 9.x)

A shapefile may be defined so that it attaches a Z coordinate component to every vertex in an object. An elevation field is not used.



To define a shapefile with a Z component, perform the following steps:

Step 1) In ArcCatalog, define a new Shapefile with a Z component:



Step 2) Configure the new shapefile. Be sure to check **Coordinates will contain Z values...**:

The **Feature Type** is your choice. Please note:

- If this shapefile will be used with **Load Control** (page 6-80), set it to **POINT**;
- If this shapefile will be used with **Capture Contour** (page 6-14), set it to **POLYLINE**.

Use **Edit** to set the **Spatial Reference** to match the coordinate system used in the SUMMIT EVOLUTION project. More information about coordinate systems and custom coordinate systems can be found in the ArcCatalog Help.

Note: The coordinate system is the only component on this dialog box that can be changed later!

These two settings are your choice.

IMPORTANT!

Check on **Coordinates will contain Z values. Used to store 3D data.**

Note: The settings for M and Z values CANNOT be changed later! They must be selected correctly now.

Enter a **Name** for the shapefile.

Create New Shapefile

Name:

Feature Type: Polygon

Spatial Reference

Description:

Projected Coordinate System:
Name: NAD_1983_StatePlane_Alaska_4_FIPS_5004

Geographic Coordinate System:
Name: GCS_North_American_1983

Vertical Coordinate System:
Name: NAD_1983

☐ Show Details

☐ Coordinates will contain M values. Used to store route data.

☒ Coordinates will contain Z values. Used to store 3D data.

Step 3) Select **OK** only when you're sure the settings are correct. The **Spatial Reference** (coordinate system) is the only setting on this dialog that can be modified after the dialog is closed.

Step 4) Fields may be added to the shapefile *before it is added to the ArcMap environment and before it contains data*. Fields are necessary in shapefiles that are used for **Load Control Points** (page 6-80). A field may optionally be used for **Capture Contour** (page 6-14) to differentiate between contour types. Fields may also be necessary for individual project specifications.

To add fields, right click on the shapefile in ArcCatalog and select **Properties**. Select the **Fields** tab and add fields the **Field Name** column. For each new field, set its **Data Type** and any other information requested in **Field Properties** for that data type. More information about fields may be found in the ArcGIS Help.

a.) (Optional) To use both intermediate and index contours in **Capture Contour** (page 6-14), define a field as follows:

Right click on the polyline shapefile in ArcCatalog. Select **Properties**.

Select the **Fields** tab.

For Capture Contour only!
The Geometry type must have been set to **Polyline** in Step 2.

Add a text or short integer field. Here it is called **ContourTyp**. The name may be different if desired; there is a 10-character limit. The field is used to indicate whether the contour is an index contour or an intermediate contour.

Set the **Data Type** to your choice of:

- **Text** to use descriptive words such as "Index" and "Intermediate."
- **Short Integer** to use integer codes such as **0** for index contours and **1** for intermediate contours.

For more information, see "Capture Contour" on page 6-14.

Shapefile Properties

Field Name	Data Type
FID	Object ID
Shape	Geometry
Id	Long Integer
ContourTyp	Short Integer

Click any field to see its properties.

Field Properties

Precision: 0

Import...

To add a new field, type the name into an empty row in the Field Name column, click in the Data Type column to choose the data type, then edit the Field Properties.

OK Cancel Apply

b.) Fields required for **Load Control Points** (page 6-80) are as follows:

Right click on the point shapefile in ArcCatalog. Select **Properties**.

Select the **Fields** tab.

For DAT/EM Load Control only!
The Geometry type must have been set to **Point** in Step 2.

Add two text fields. Here they are called **PointType** and **PointID**. The names may be different if desired; there is a 10-character limit. One field represents the point type, such as horizontal-vertical or horizontal-only control points. The other field represents the name of the control point.

Set the **Data Type** to **Text**. Use the default text length of 50.

For more information, see "Load Control Points" on page 6-80.

Field Name	Data Type
FID	Object ID
Shape	Geometry
Id	Long Integer
PointType	Text
PointID	Text

Click any field to see its properties.

Field Properties

Length: 50

Import...

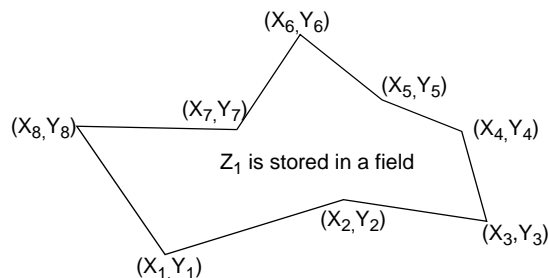
To add a new field, type the name into an empty row in the Field Name column, click in the Data Type column to choose the data type, then edit the Field Properties.

OK Cancel Apply

Step 5) Drag the new shapefile into ArcMap when needed. For more information on shapefile procedures, see the ArcGIS Help.

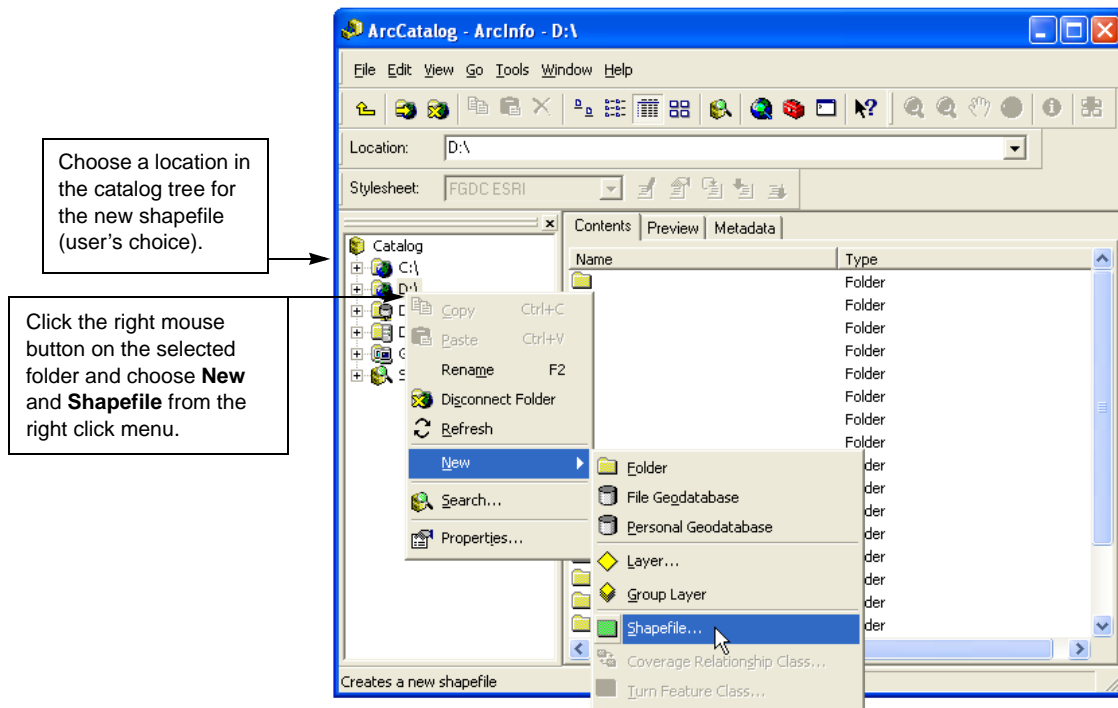
Shapefile Z, Field Method (One Z per Object) (Version 9.x)

An elevation field may be defined in a shapefile. Then when a feature is digitized, it obtains one Z value in its elevation field. This Z value is taken from the stereoplottor cursor's Z position at the time the first vertex is digitized. If the cursor Z changes during that object's digitizing process, subsequent Zs are ignored.

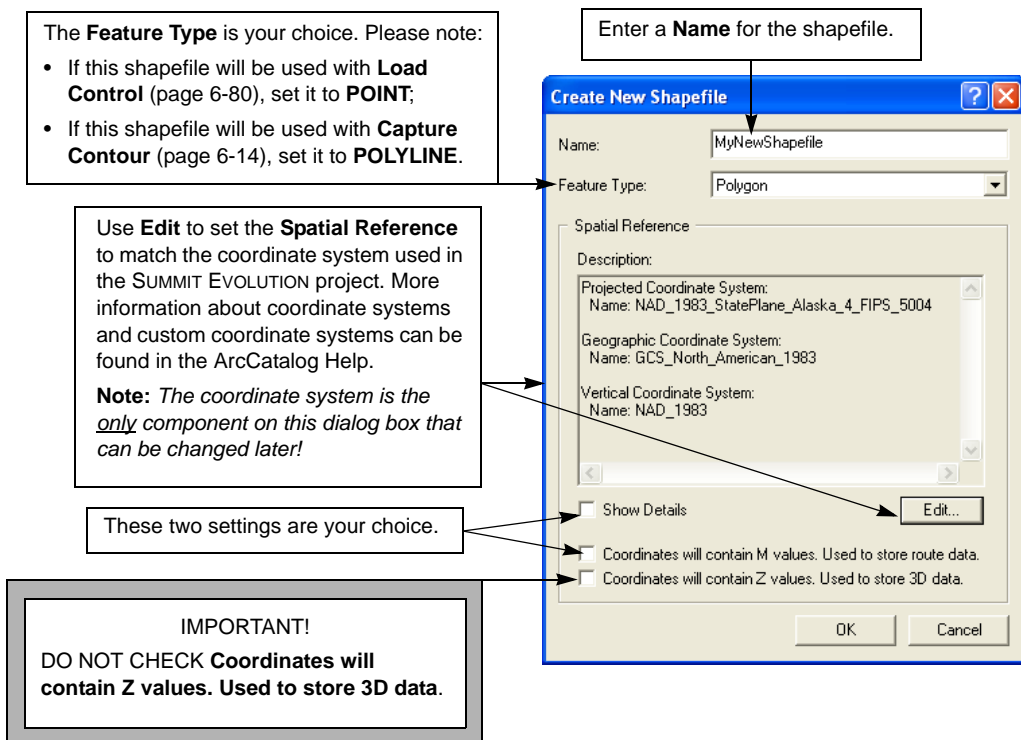


To define a shapefile that contains an elevation field, perform the following steps:

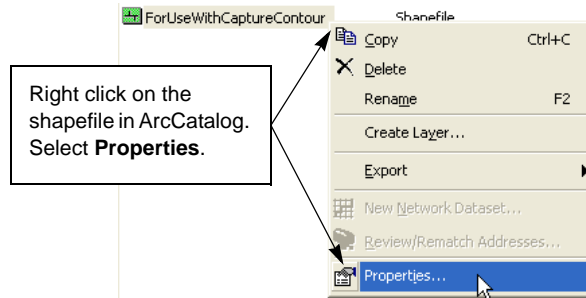
Step 1) In ArcCatalog, define a new Shapefile:



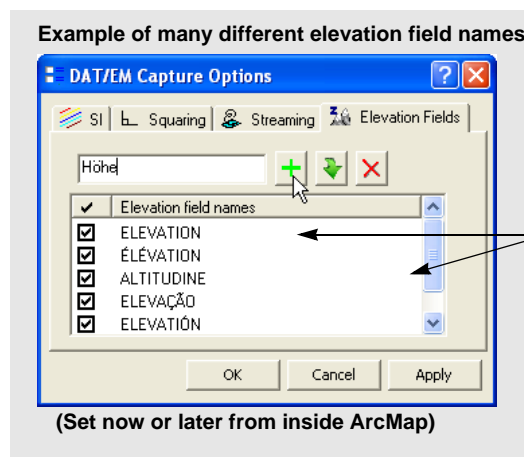
Step 2) Configure the new shapefile. Do not check **Coordinates will contain Z values...**:



- Step 3)** Select **OK** only when you're sure the settings are correct. The **Spatial Reference** (coordinate system) is the setting on this dialog that can be modified after the dialog is closed. **DO NOT DRAG THE SHAPEFILE INTO ARCMAP YET!**
- Step 4)** Fields may be added to the shapefile *before it is added to the ArcMap environment and before it contains data*. Right click on the shapefile in ArcCatalog and select **Properties**.



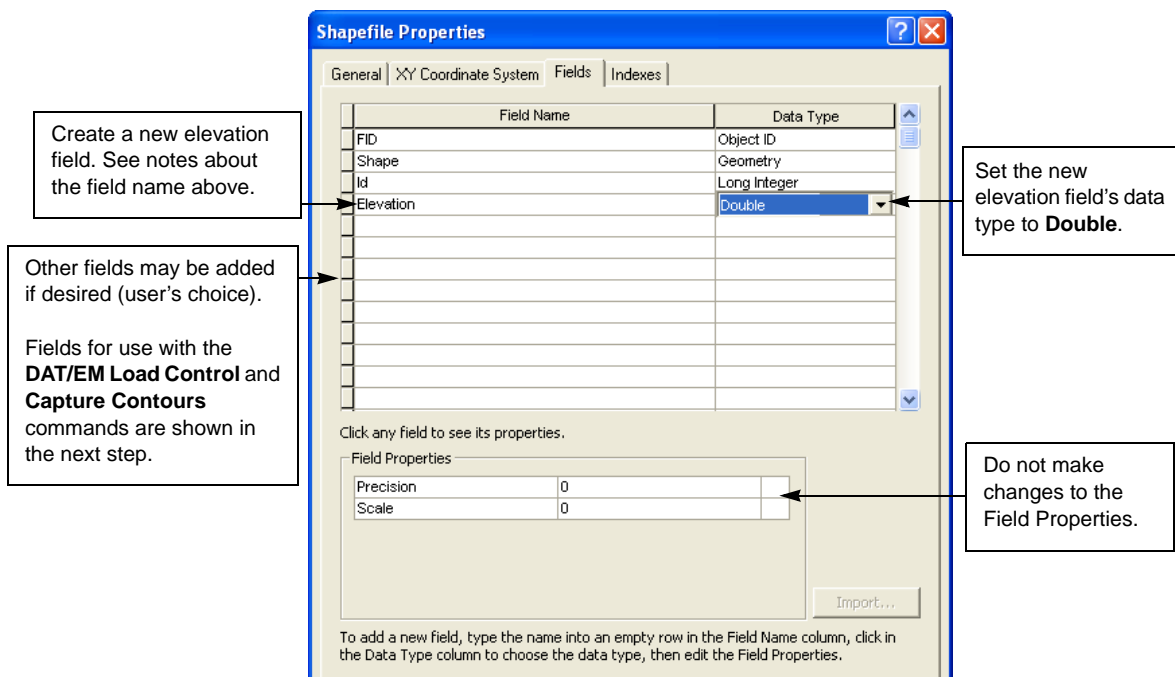
- Step 5)** Click the cursor in the first empty **Field Name** field. Enter any name for the elevation field. Note:
- A field name called **ELEVATION** (either upper or lower case characters) is treated as the default elevation field name. This field name always appears in the **Elevation Fields** tab on the DAT/EM Capture Options dialog. If you add “elevation” to the shapefile, make sure “ELEVATION” is checked on in the DAT/EM Capture Options dialog.
 - If you use a field name other than “elevation,” it must be added and checked on in the **Elevation Fields** tab on the DAT/EM Capture Options dialog. This may be done at any time before the shapefile is used as a target for digitizing.



The elevation field you add to the shapefile must also be set in the **Elevation Fields** list on the DAT/EM Capture Options dialog. The DAT/EM software can then place the Z value into the proper field as objects are digitized.

- “Elevation” (upper or lower case) always appears in the list; however, it must be checked on in order to use it.
- Any other field name may be used to store Z. In order for Z to be placed in the correct field, add the same field name to the **Elevation Fields** list on the DAT/EM Capture Options dialog. This may be done later when ArcMap is open, but before the shapefile is used as a target for digitizing.
- The elevation field name is not case sensitive. **AITiTuDiNe** would be matched to both **altitudine** and **ALTITUDINE**.

Step 6) Click on the **Data Type** field to the right of the new elevation field. Set it to **Double**.



Step 7) If other fields are necessary, define them now. Remember, fields may be added to the shapefile *before it is added to the ArcMap environment and before it contains data.*

The **Fields** tab should still be open, but if it is not, right click on the shapefile in ArcCatalog and select **Properties**. Select the **Fields** tab and add fields in the **Field Name** column. For each new field, set its **Data Type** and any other information requested in **Field Properties** for that data type. More information about fields may be found in the ArcGIS Help.

Fields are necessary in shapefiles that are used for **Load Control Points** (page 6-80). A field may optionally be used for **Capture Contour** (page 6-14) to differentiate between index and intermediate contours. Configure these fields as follows:

(Optional) For Capture Contour only!

This field is optional. If it exists, **Capture Contour** will be able to assign different field values to index and intermediate contours.

The Geometry type must have been set to **Polyline** in Step 2.

Add a text or short integer field. Here it is called **ContourTyp**. The name may be different if desired; there is a 10-character limit.

Set the **Data Type** to your choice of:

- **Text** to use descriptive words such as "Index" and "Intermediate."
- **Short Integer** to use integer codes such as **0** for index contours and **1** for intermediate contours.

For more information, see "Capture Contour" on page 6-14.

For DAT/EM Load Control only!

This field is required in order to use **Load Control**.

The Geometry type must have been set to **Point** in Step 2.

Add two text fields. Here they are called **PointType** and **PointID**. The names may be different if desired; there is a 10-character limit. One field represents the point type, such as horizontal-vertical or horizontal-only control points. The other field represents the name of the control point.

Set the **Data Type** to **Text**. Use the default text length of 50.

For more information, see "Load Control Points" on page 6-80.

The image shows two screenshots of the 'Shapefile Properties' dialog box, specifically the 'Fields' tab. The top screenshot shows a table with the following fields: FID (Object ID), Shape (Geometry), Id (Long Integer), Elevation (Double), and ContourTyp (Short Integer). The bottom screenshot shows a similar table with additional fields: PointType (Text) and PointID (Text). The 'Field Properties' section at the bottom of the bottom screenshot shows the 'Length' set to 50.

Field Name	Data Type
FID	Object ID
Shape	Geometry
Id	Long Integer
Elevation	Double
ContourTyp	Short Integer

Field Name	Data Type
FID	Object ID
Shape	Geometry
Id	Long Integer
Elevation	Double
PointType	Text
PointID	Text

Field Properties

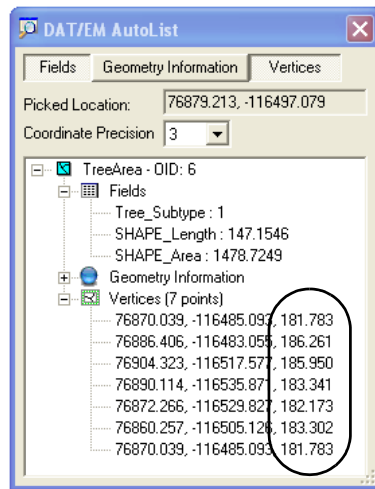
Length: 50

Step 8) Drag the new shapefile into ArcMap when needed. For more information on shapefile procedures, see ArcGIS Help.

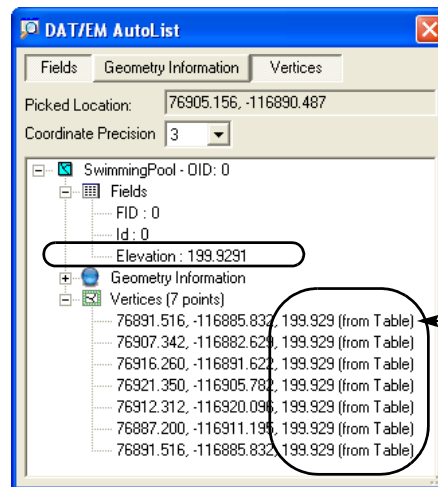
How to Define Z in a Personal Geodatabase Feature Class

There are two methods to define Z in a personal geodatabase feature class. You must decide which method is best for your project.

- **Vertex Method:** The first method is to define Z vertex components. Z is attached to every vertex in every object within the feature class. See “Feature Class Z, Vertex Method (Z on Every Vertex) (Recommended)” on page 3-11 for instructions.
- **Field Method:** The second method is to define an elevation field. The field attaches only one Z value to each object within the feature class. Individual vertices remain XY only. When digitizing, the Z field is set to the stereoplotter’s elevation at the time the first vertex is digitized. See “Feature Class Z, Field Method (One Z per Object)” on page 3-16 for instructions.



Autolist shows an object from a shapefile that uses the **Vertex Method**.



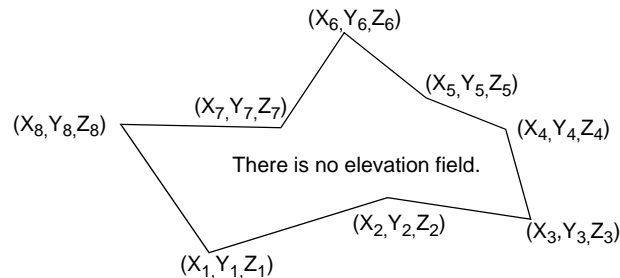
Autolist shows an object from a shapefile that uses the **Field Method**.

Autolist shows “(from Table)” if the vertex is XY only and an elevation field is found.

Note: Existing 2D shapefiles and personal geodatabase feature classes may be converted to 3D using the instructions in “Elevate Layers” on page 6-72.

Feature Class Z, Vertex Method (Z on Every Vertex) (Recommended)

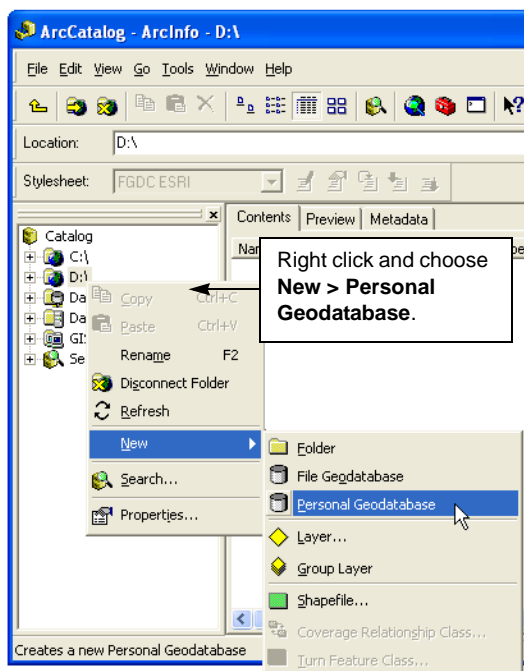
A personal geodatabase feature class may be defined so that it attaches a Z coordinate component to every vertex in an object. An elevation field is not used.



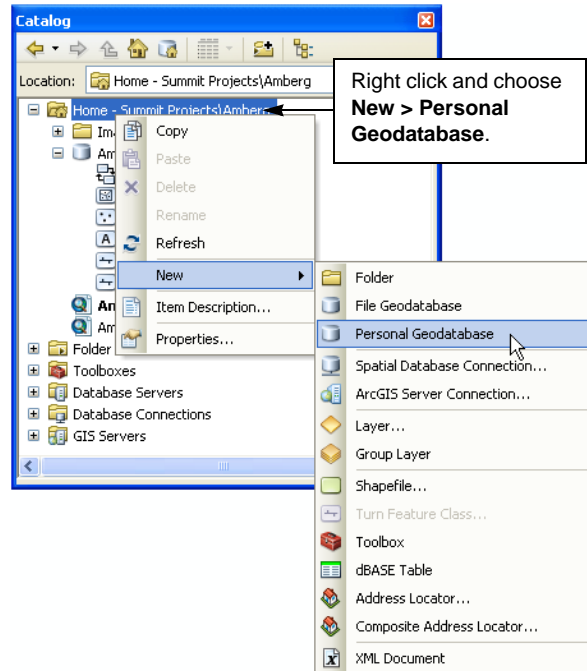
To define a new feature class that has a Z component, perform the following steps:

- Step 1)** In ArcCatalog (9.x) or the Catalog window (10.x), either use an existing personal geodatabase or define a New Personal Geodatabase:
- To use an existing personal geodatabase, be sure it is not open for editing by ArcMap at this time.
 - To make a new personal geodatabase, right click on the desired folder location and choose **New** and **Personal Geodatabase**. Give the personal geodatabase a name, then select it in the catalog tree.

ArcCatalog in ArcGIS 9.x versions

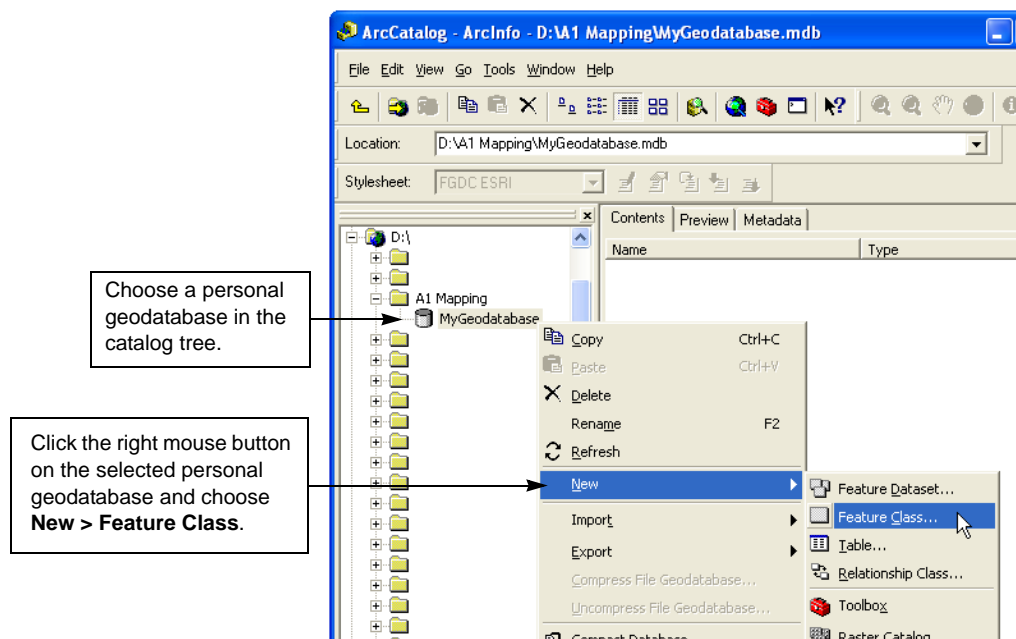


Catalog window in ArcGIS for Desktop 10.x

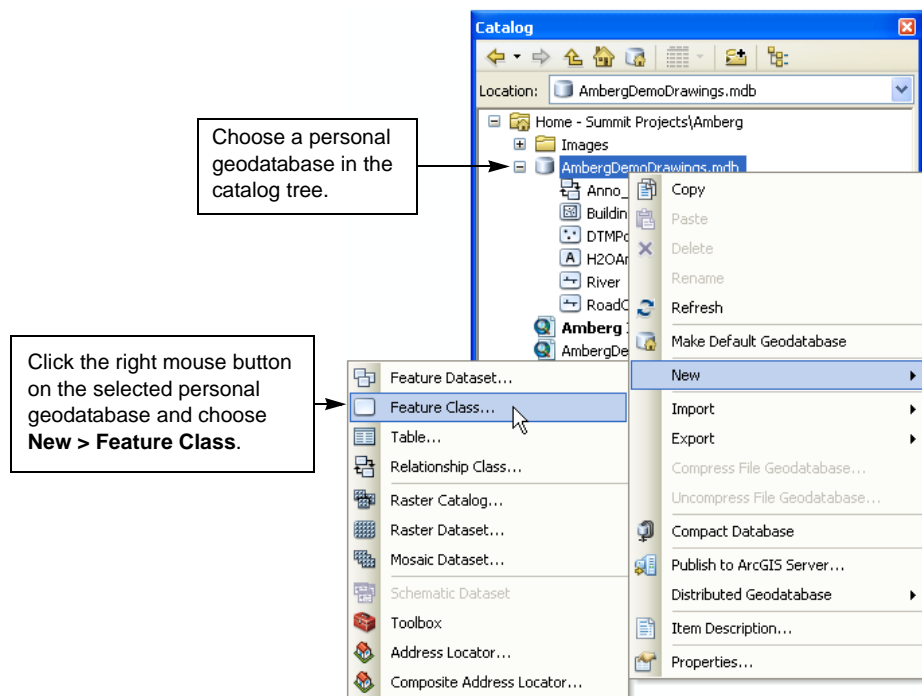


Step 2) Right click on the personal geodatabase in the catalog tree. Choose **New** and **Feature Class**.

ArcCatalog in ArcGIS 9.x versions



Catalog window in ArcGIS for Desktop 10.x



Step 3) Check **Contains Z values...** on and make other settings as follows:

ArcGIS 9.x and 10.x versions

Give the feature class a **Name** (user's choice).
Set an **Alias** if desired.

Choose a **Geometry Type**. Polygon, Line, Point, and Multipoint may be used with DAT/EM tools and commands. *Multipatch and Dimension may not be used.*

- If this feature class will be used with **Load Control** (page 6-80), set it to **Point Features**.
- If this feature class will be used with **Capture Contour** (page 6-14), set it to **Line Features**.

The **M** setting is the user's choice.

IMPORTANT!

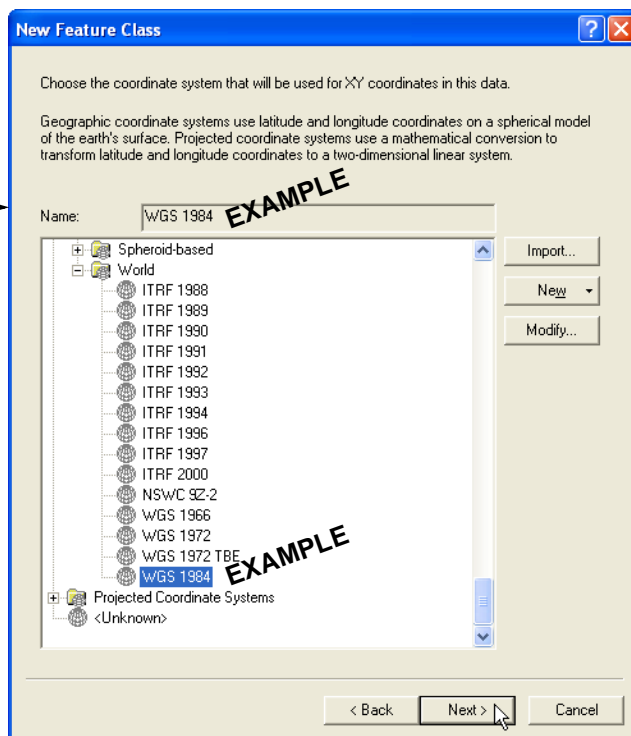
Check on **Coordinates will contain Z values. Used to store 3D data.**

Note: The settings for M and Z values CANNOT be changed later! They must be selected correctly now.

Step 4) Choose a coordinate system to match the one used in the SUMMIT EVOLUTION project file.

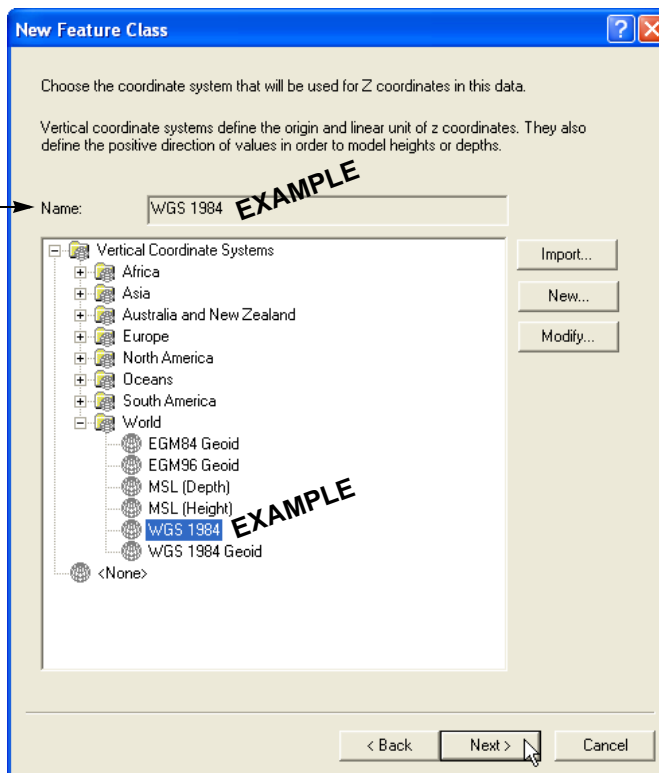
Set the same coordinate system that is used by the SUMMIT EVOLUTION project file.

ArcGIS 9.x and 10.x versions



Step 5) Set a Z coordinate system if needed for the particular project.

Set a Z coordinate system if it is needed for the project.



Step 6) Either accept the defaults for the **XY Tolerance** and **Z Tolerance** or set them as required by the project.

Either accept the defaults for the **XY Tolerance** and **Z Tolerance** or set them as required by the project.

Hint: Know about the coordinate range and resolution needs for the project! If you uncheck **Accept default resolution...**, you will be able to see the range and resolution settings. This is the only time you will be able to edit these settings.

- If the project has negative coordinates with six or more digits before the decimal, you may need to shift the range.
- If the project uses a latitude-longitude coordinate system, the ranges may need to be no greater than -180 to 180 in X and -90 to 90 in Y. Be sure to allow for enough resolution for ground units that are measured in fractions of degrees.

Step 7) Fields may be added to the feature class now or any time before it is added to the ArcMap environment and before it contains data. Fields are necessary in feature classes that are used for **Load Control Points** (page 6-80). A field may optionally be used for **Capture Contour** (page 6-14) to differentiate between contour types. Fields may also be necessary for individual project specifications.

- a.) (Optional) If this feature class is to be used with **Capture Contour** (page 6-14), and you wish to differentiate between index and intermediate contours, then add a contour type field. Alternatively, this field may be added later while following the instructions for the command.

(Optional) For Capture Contour only!

This field is optional. If it exists, **Capture Contour** will be able to assign different field values to index and intermediate contours.

The Geometry type must have been set to **Line Features** in Step 3.

Add a text or short integer field. Here it is called **ContourTyp**. The name may be different if desired; there is a 10-character limit. The field is used to indicate whether the contour is an index contour or an intermediate contour.

Set the **Data Type** to your choice of:

- **Text** to use descriptive words such as "Index" and "Intermediate."
- **Short Integer** to use integer codes such as **0** for index contours and **1** for intermediate contours.

For more information, see "Capture Contour" on page 6-14.

- b.) If this feature class will be used with the **DAT/EM Load Control** command (page 6-80), the point type and point identification fields may be added now, if desired. Alternatively, these fields may be added later while following the instructions for the command.

For DAT/EM Load Control only!

The Geometry type must have been set to **Point Features** in Step 3. Add two new fields:

- **Point Type Field:** Make a new field to hold the point type code. Enter a **Field Name** that has up to 10 characters. In this example, the **Field Name** is called "**PointType**." Set the **Data Type** to either **Text** or a number type such as **Short Integer**. If **Text** is selected, accept the default text length of 50.
- **Point Name (Identification) Field:** Make another new field to hold the names of the points. Enter a **Field Name** that has up to 10 characters. In this example, the **Field Name** is called "**PointID**." Set the **Data Type** to **Text**. Accept the default text length of 50.

For more information, see "Load Control Points" on page 6-80.

Field Name	Data Type
OBJECTID	Object ID
SHAPE	Geometry
PointType	Text
PointID	Text

Click any field to see its properties.

Field Properties	
Alias	
Allow NULL values	Yes
Default Value	
Length	50

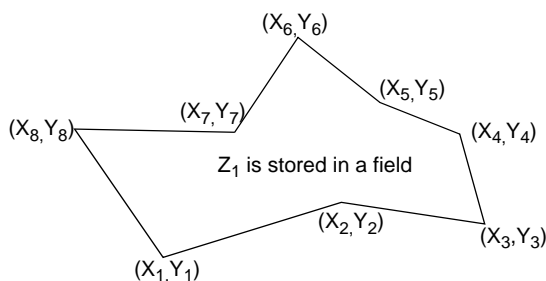
Import...

Step 8) Review all settings that have been made for the new feature class. Most of the settings may not be changed once the dialog box has been closed. Select **OK** when you're sure everything is correct.

Step 9) Drag the feature class into the ArcMap Table of Contents (TOC) when needed.

Feature Class Z, Field Method (One Z per Object)

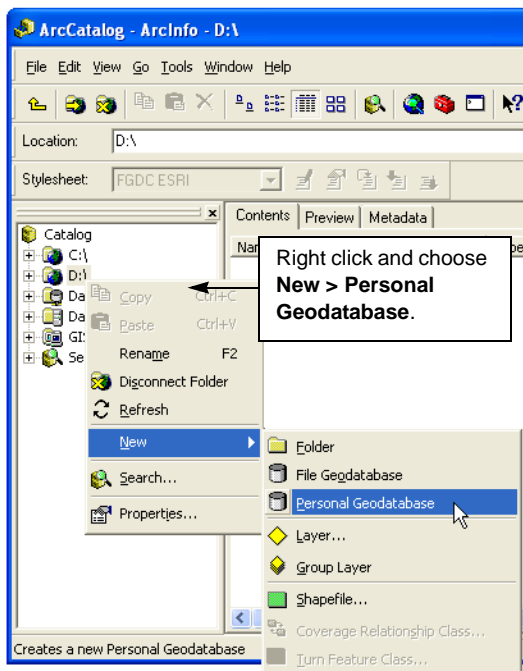
An elevation field may be defined in a personal geodatabase feature class. Then when an object is digitized, it obtains one Z value in its elevation field. This Z value is taken from the stereoplottor cursor's Z position at the time the first vertex is digitized. If the cursor Z changes during that object's digitizing process, subsequent Zs are ignored.



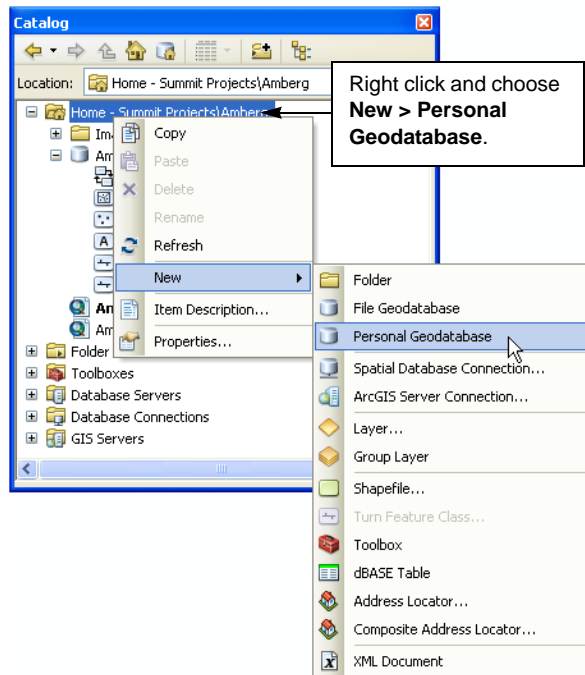
To define a personal geodatabase feature class that contains an elevation field, perform the following steps:

- Step 1)** In ArcCatalog, either use an existing personal geodatabase or define a New Personal Geodatabase:
- To use an existing personal geodatabase, be sure it is not in use by ArcMap at this time; close ArcMap if necessary. You can't add a feature class to a personal geodatabase that is open in another application.
 - To make a new personal geodatabase, choose a location in the catalog tree, right click on the location and choose **New** and **Personal Geodatabase**. Enter a name, then select it in the catalog tree.

ArcCatalog in ArcGIS 9.x versions

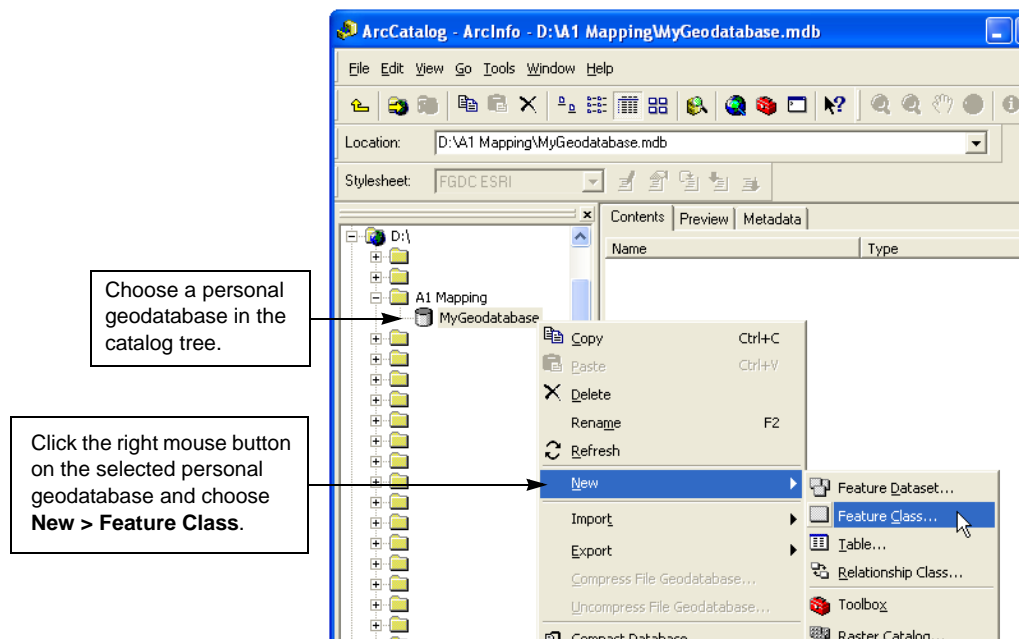


Catalog window in ArcGIS for Desktop 10.x

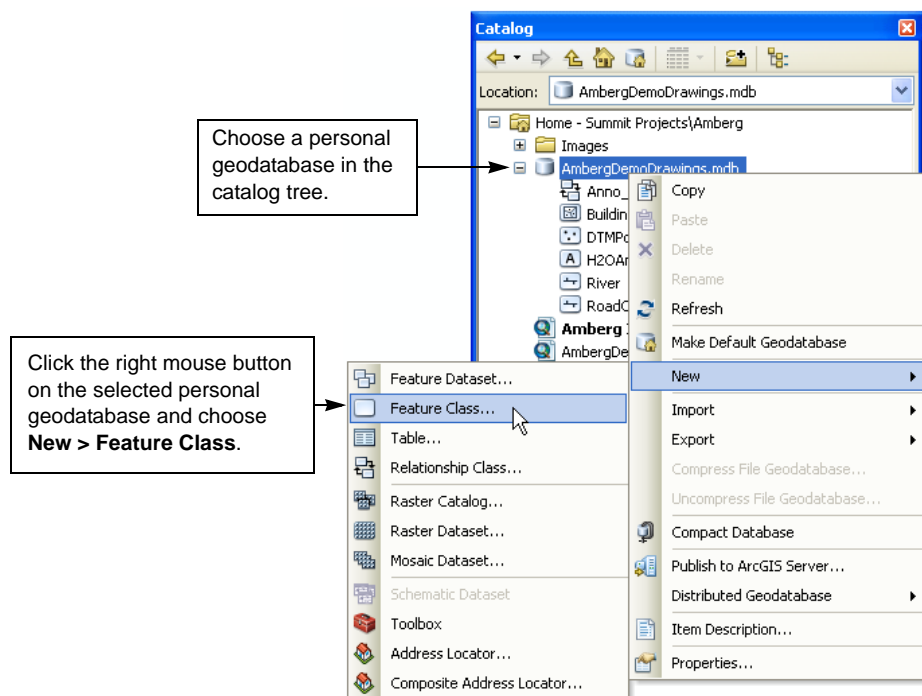


Step 2) Right click on the personal geodatabase in the catalog tree. Choose **New** and **Feature Class**.

ArcCatalog in ArcGIS 9.x versions

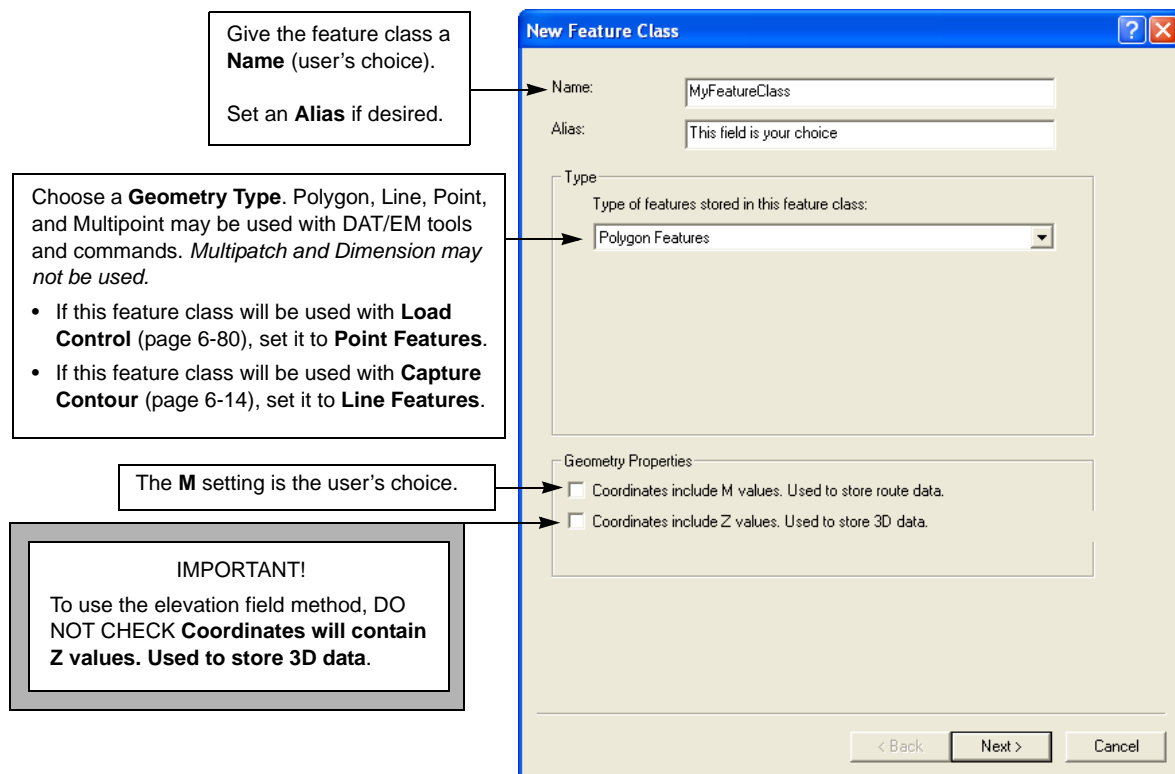


Catalog window in ArcGIS for Desktop 10.x

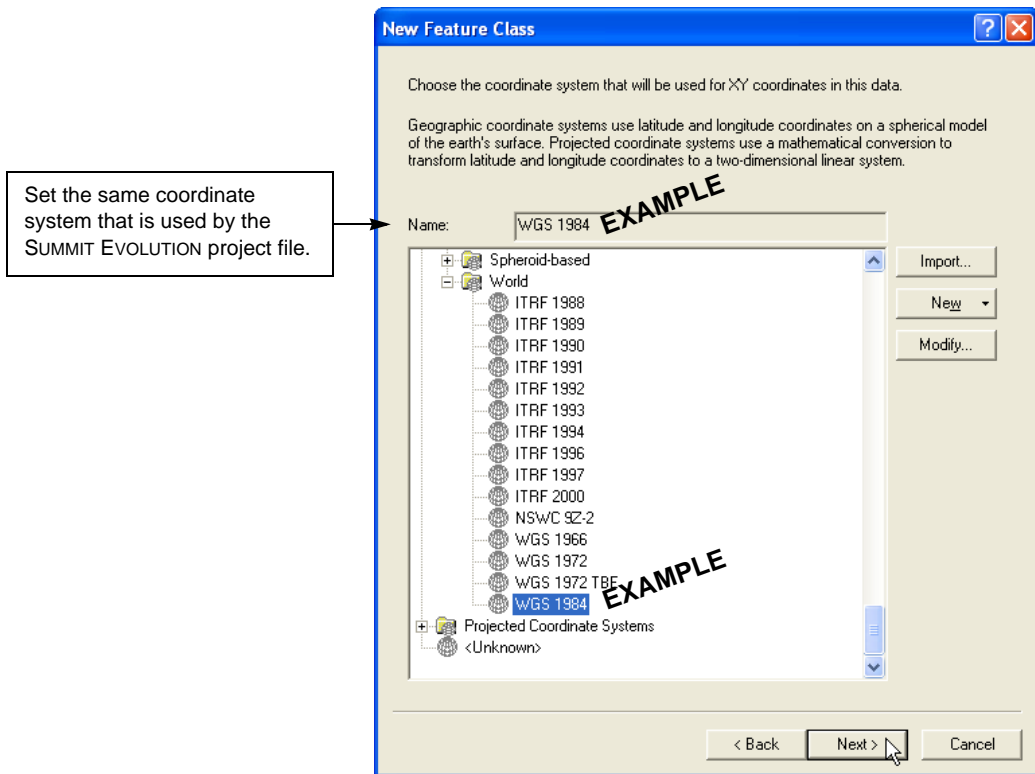


Step 3) To use the elevation field method, do not check **Contains Z values...** Make settings as follows:

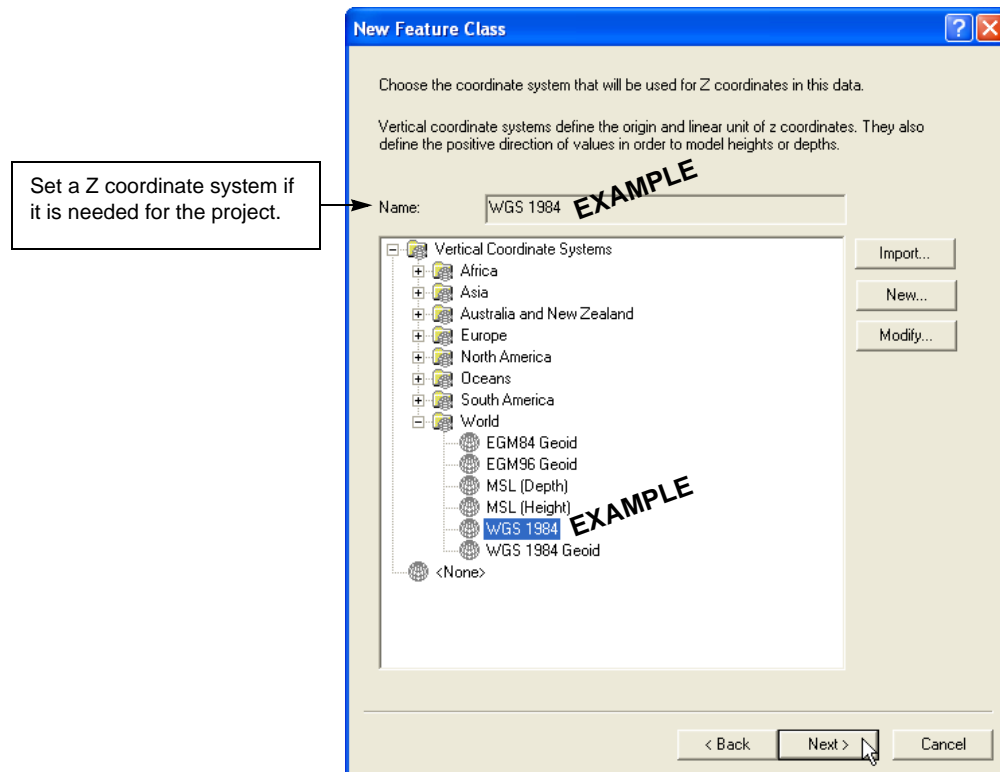
ArcGIS 9.x and 10.x versions



Step 4) Choose a coordinate system to match the one used in the SUMMIT EVOLUTION project file.



Step 5) Set a Z coordinate system if needed for the particular project.



Step 6) Either accept the defaults for the **XY Tolerance** and **Z Tolerance** or set them as required by the project.

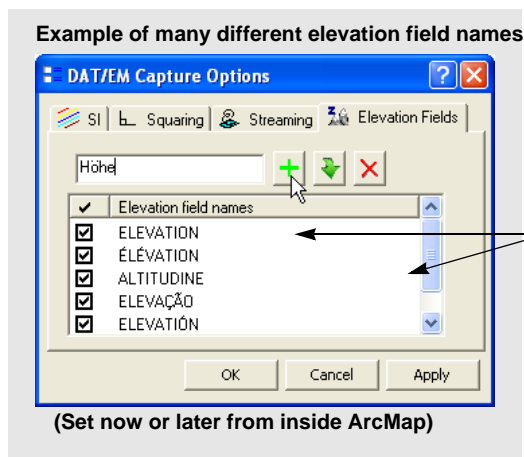
Either accept the defaults for the **XY Tolerance** and **Z Tolerance** or set them as required by the project.

Hint: Know about the coordinate range and resolution needs for the project! If you uncheck **Accept default resolution...**, you will be able to see the range and resolution settings. This is the only time you will be able to edit these settings.

- If the project has negative coordinates with six or more digits before the decimal, you may need to shift the range.
- If the project uses a latitude-longitude coordinate system, the ranges may need to be no greater than -180 to 180 in X and -90 to 90 in Y. Be sure to allow for enough resolution for ground units that are measured in fractions of degrees.

Step 7) Click the cursor in the first empty **Field Name** field. Enter any name for the elevation field. Note:

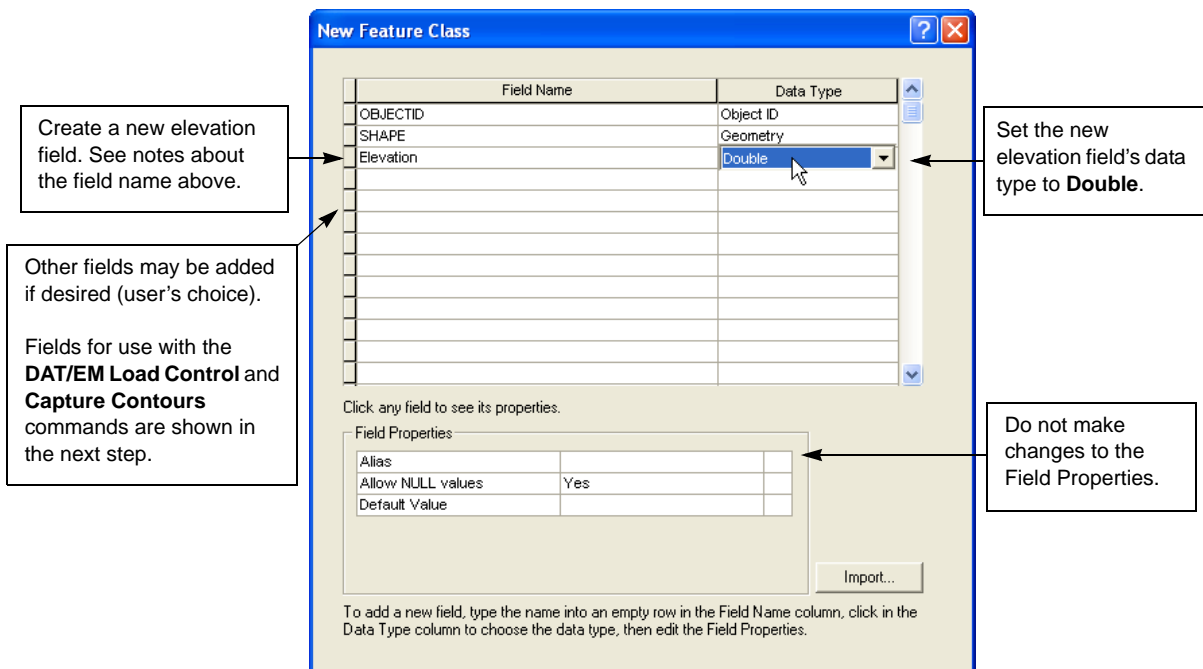
- A field name called **ELEVATION** (either upper or lower case characters) is treated as the default elevation field name. This field name always appears in the **Elevation Fields** tab on the DAT/EM Capture Options dialog. If you add “elevation” to the feature class, make sure “ELEVATION” is checked on in the DAT/EM Capture Options dialog.
- If you use a field name other than “elevation,” it must be added and checked on in the **Elevation Fields** tab on the DAT/EM Capture Options dialog. This may be done at any time before vector objects are added to the feature class.



The elevation field you add to the feature class must also be set in the **Elevation Fields** list on the DAT/EM Capture Options dialog. The DAT/EM software can then place the Z value into the proper field as objects are digitized.

- “**Elevation**” (upper or lower case) always appears in the list; however, it must be checked on in order to use it.
- Any other field name may be used to store Z. In order for Z to be placed in the correct field, add the same field name to the **Elevation Fields** list on the DAT/EM Capture Options dialog. This may be done later when ArcMap is open, but before the feature class is used as a target for digitizing.
- The elevation field name is not case sensitive. **AltItuDine** would be matched to both **altitude** and **ALTITUDE**.

Step 8) Click on the **Data Type** field to the right of the new elevation field. Set it to **Double**.



Step 9) If other fields are necessary, define them now. Remember, fields may be added to the feature class before it is added to the ArcMap environment and before it contains data.

Fields are necessary in feature classes that are used for **Load Control Points** (page 6-80). A field may optionally be used for **Capture Contour** (page 6-14) to differentiate between contour types. Fields may also be necessary for individual project specifications.

- a.) (Optional) If this feature class is to be used with **Capture Contour** (page 6-14), and you wish to differentiate between index and intermediate contours, then add a contour type field. Alternatively, this field may be added later while following the instructions for the command.

(Optional) For Capture Contour only!

This field is optional. If it exists, **Capture Contour** will be able to assign different field values to index and intermediate contours.

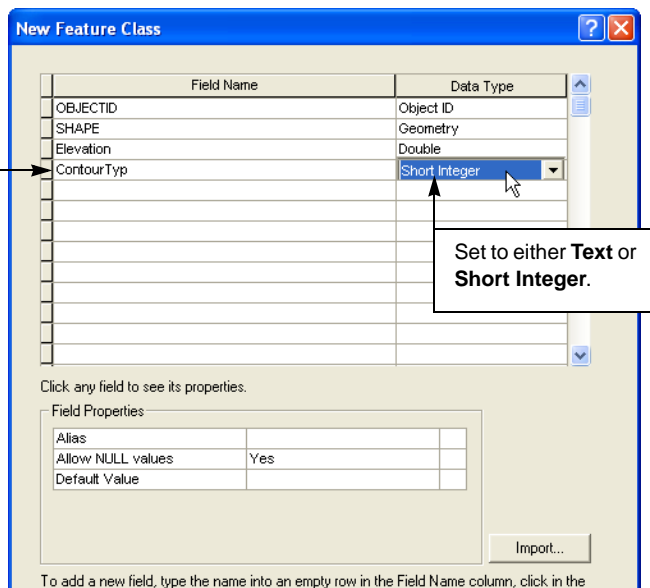
The Geometry type must have been set to **Line Features** in Step 3.

Add a text or short integer field. Here it is called **ContourTyp**. The name may be different if desired; there is a 10-character limit. The field is used to indicate whether the contour is an index contour or an intermediate contour.

Set the **Data Type** to your choice of:

- **Text** to use descriptive words such as "Index" and "Intermediate."
- **Short Integer** to use integer codes such as **0** for index contours and **1** for intermediate contours.

For more information, see "Capture Contour" on page 6-14.



- b.) If this feature class will be used with the **DAT/EM Load Control** command (page 6-80), the point type and point identification fields may be added now, if desired. Alternatively, these fields may be added later while following the instructions for the command.

For DAT/EM Load Control only!

The Geometry type must have been set to **Point Features** in Step 3. Add two new fields:

- **Point Type Field:** Make a new field to hold the point type code. Enter a **Field Name** that has up to 10 characters. In this example, the **Field Name** is called "PointType." Set the **Data Type** to either **Text** or a number type such as **Short Integer**. If **Text** is selected, accept the default text length of 50.
- **Point Name (Identification) Field:** Make another new field to hold the names of the points. Enter a **Field Name** that has up to 10 characters. In this example, the **Field Name** is called "PointID." Set the **Data Type** to **Text**. Accept the default text length of 50.

For more information, see "Load Control Points" on page 6-80.

Field Name	Data Type
OBJECTID	Object ID
SHAPE	Geometry
Elevation	Double
PointType	Text
PointID	Text

Click any field to see its properties.

Field Properties	
Alias	
Allow NULL values	Yes
Default Value	
Length	50

Import...

To add a new field, type the name into an empty row in the Field Name column, click in the Data Type column to choose the data type, then edit the Field Properties.

Step 10) Review all settings that have been made for the new feature class. Most of the settings may not be changed once the dialog box has been closed. Select **OK** only when you're sure everything is correct.

Step 11) Drag the feature class into the ArcMap Table of Contents (TOC) when needed.

Chapter 4. Vector Super/Imposition

SUPER/IMPOSITION is a very useful tool to show vectors superimposed over the SUMMIT EVOLUTION images. The following data types and information can be superimposed:

General type	Specific types and information
Shapefiles	<ul style="list-style-type: none"> • Point (recommended) • Polyline (recommended) • Polygon (recommended) • Multipoint • <i>Not Multipatch!</i>
Personal geodatabase feature classes	<ul style="list-style-type: none"> • Polygon (recommended) • Line (recommended) • Point (recommended) • Multipoint • Annotation <p>Annotation will display at the elevation of SUMMIT EVOLUTION at time SUPER/IMPOSITION was last updated. Annotation will not display to exact current size or placement shown in ArcMap, because DAT/EM cannot obtain this information from ArcMap.</p> <ul style="list-style-type: none"> • <i>Not Multipatch!</i> • <i>Not Dimension!</i>
Labels and Annotation	Labels and annotation will display at the first elevation found in the object. They will not display to exact current size or placement shown in ArcMap, because DAT/EM cannot obtain this information from ArcMap. Labels that automatically turn off in ArcMap due to scale or other placement conditions may continue to display in SUPER/IMPOSITION, because DAT/EM cannot detect when ArcMap prevents the display.
Rubber band	A rubber band shows the position of the last selection when necessary, such as during line drawing. Rubber banding must be on in SUMMIT EVOLUTION's Options > SI tab.
Snap rubber band and Snap ring	<p>A stereo rubber band shows the position of the 2D or 3D snap compared to the cursor position. A snap mode (page 6-102) must be on in order to see this. Show Snap must be on in DAT/EM Capture Options in ArcMap.</p> <p>The snap ring shows the snapping tolerance as a circle at the cursor (see page 6-102). Show Snap Ring must be on in DAT/EM Capture Options in ArcMap.</p>

SUPER/IMPOSITION Settings within SUMMIT EVOLUTION

Choose settings in both SUMMIT EVOLUTION and ArcMap for the best possible viewing convenience and refresh speed. The following are the settings that can be made from the SUMMIT EVOLUTION application:

- Step 1)** In SUMMIT EVOLUTION, either select the **Options** icon, select **Options** from the **Tools** pull-down menu, or enter <Ctrl>J. To learn more about any setting, click the “?” icon, then click on the item in the dialog box to activate context-sensitive help.
- Step 2)** Select the **SI** tab. Make SUPER/IMPOSITION settings as desired. The following are a few important settings to consider:
- Set **Clip Scope** so that the image around the SUMMIT EVOLUTION cursor is always free of the SUPER/IMPOSITION display. The exact setting is the user’s choice.
 - Set **Thickness** and **Opacity** as desired. **Thickness** affects the width of vectors and **Opacity** affects the intensity of polygon fill colors in the SUPER/IMPOSITION display.
 - If any of the shapefiles or feature classes are 2D, the **2D - object elevations at cursor** must be turned on in order to see them in the main view in SUPER/IMPOSITION. If this is not checked, the user might think SUPER/IMPOSITION is not working, when in fact everything in “displayed” completely outside the view at Z=0.
 - If all the shapefiles and feature classes are 3D, do not check **2D - object elevations at cursor**. Superimposed vectors will be displayed in stereo at the correct object elevations.

Choose object types to display and set their thickness and opacity.

If any of the shapefiles or feature classes are 2D, check on **2D - object elevations at cursor**.

Set **Clip Scope** so that SUPER/IMPOSITION does not obstruct the images around the cursor. Examples:

Clip Scope off

Clip Scope=20

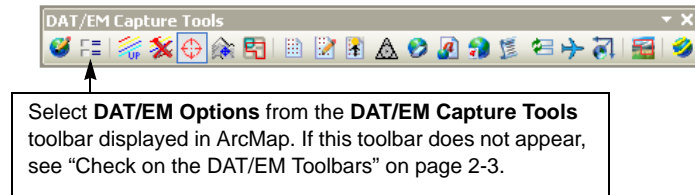
Clip Scope=40

Note that the Close Up View (if on) does not display superimposed fill patterns. The area around the cursor is always visible in this view. To turn on the Close Up View, select **Close Up Stereo View** from the **View** pull-down menu in SUMMIT EVOLUTION.

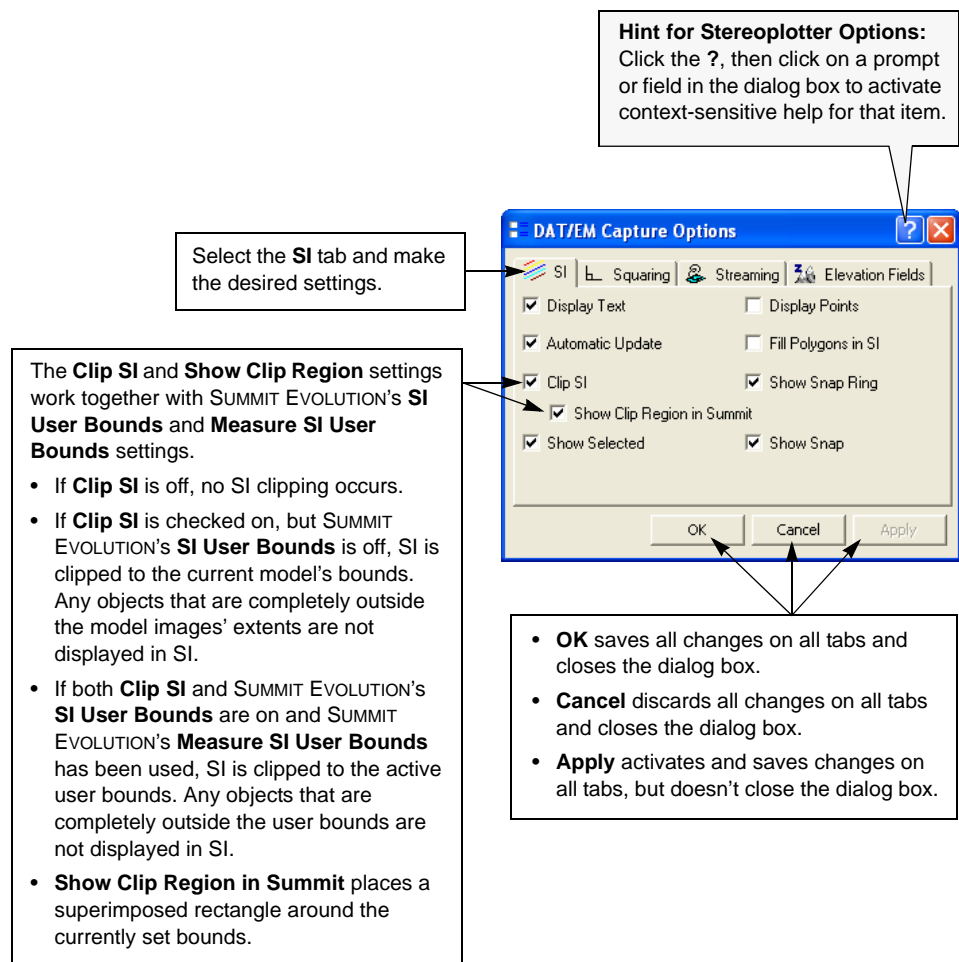
SUPER/IMPOSITION Settings within ArcMap

Choose settings in both SUMMIT EVOLUTION and ArcMap for the best possible viewing convenience and refresh speed. The following are the settings that can be made from the DAT/EM tools in ArcMap. Perform the following steps in ArcMap:

Step 1) Select the **DAT/EM Options** icon from the **DAT/EM Capture Tools** toolbar:



Step 2) The DAT/EM Systems Options dialog appears. Select the **SI** tab and make settings. Be familiar with the **Clip SI** and **Show Snap** settings; for very large ArcGIS files with many features, turning off **Clip SI** and **Show Snap** can greatly speed up the SI refresh rate.



SUPER/IMPOSITION Troubleshooting

The following are the most common SUPER/IMPOSITION problems and what you can do to solve them:

Problem	Try This
Nothing displays in SUPER/IMPOSITION.	<p>These are the three most common reasons:</p> <ol style="list-style-type: none"> 1. The shapefiles or feature classes are 2D. Check on 2D - objects elevations at cursor in SUMMIT EVOLUTION's Options > SI tab. 2. The data sources are not shapefiles (ver. 9.x) or personal geodatabase feature classes, or they are multipatches. See the table on page 4-1 for a list of types that are compatible with SUPER/IMPOSITION. 3. The layers are not on in SUMMIT EVOLUTION's SI Layer Manager. Choose Layer Manager from SUMMIT EVOLUTION's SI pull-down menu. Make sure either "All Layers" is on or specific layers are checked. 4. The specific object types are not checked on. Review settings on the SUMMIT EVOLUTION > Options > SI tab (objects, points, and text). In ArcMap, review settings on the DAT/EM Capture Options > SI tab (text and points).
The superimposed vectors are in mono at the cursor elevation.	For 3D shapefiles and feature classes, <i>turn off</i> 2D - objects elevations at cursor in SUMMIT EVOLUTION's Options > SI tab.
Labels and annotation are the wrong size and position.	Unfortunately, DAT/EM cannot obtain the current label and annotation sizes and positions from ArcMap. You will not be able to fix this. If it becomes too distracting, set SUMMIT EVOLUTION > Options > SI tab > Text OFF .
Superimposed vectors refresh either too often (too slow!) or not often enough (too messy!).	<p>Select the DAT/EM Options icon from the DAT/EM Capture Tools toolbar in ArcMap. Choose a setting for Automatic Update. The view will update more often when this setting is on.</p> <p>Every superimposition update takes processing time. DAT/EM tries to update often enough to make the view look neat, but not so often that you must wait.</p> <p>You may force an update at any time. Use SI Update from the Keypad, a button, or from the toolbars in both SUMMIT EVOLUTION and ArcMap.</p>
Refresh time is very slow.	<p>The more data there is to display, the longer the refresh takes. If many elevation points – a DTM or DEM – have been added to the map file, they may cause SUPER/IMPOSITION to be slow. Turn off the display of any objects that are not needed. There are several places they could be turned off: In the ArcMap Table of Contents, on the Options > SI tab in SUMMIT EVOLUTION, or on the DAT/EM Capture Options > SI tab in ArcMap.</p> <p>There are also some performance settings that can be made in SUMMIT EVOLUTION. And, of course, all of this is dependent on the capabilities of the computer hardware. Contact DAT/EM Support if you have further concerns.</p>

Chapter 5. Startup Procedures

This following procedure shows how to start SUMMIT EVOLUTION with DAT/EM CAPTURE for ArcGIS. Use this chapter in place of *Chapter 9* (“Step-by-Step Project Procedure”) in the *Summit Evolution Operation Manual*.


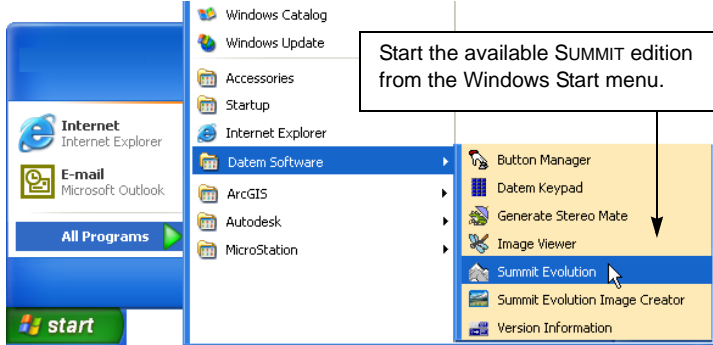
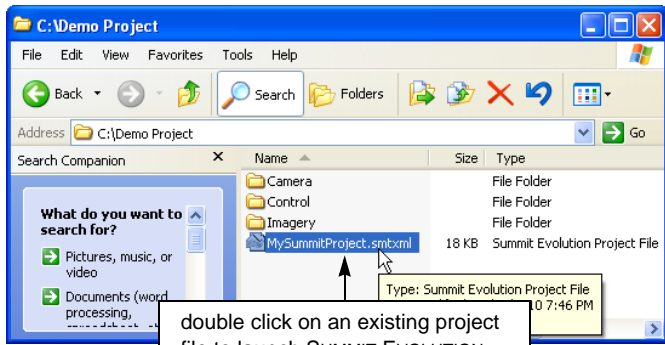
- Step 1)** Turn on power to all system components. Hardware and software installation should be complete according to the instructions in the *Summit Evolution Operation Manual*. The user should be familiar with the input devices for SUMMIT EVOLUTION.
- Step 2)** Log on to any user account that has Power User or higher permission status. See “User Permissions” in *Appendix A* of the *Summit Evolution Operation Manual* for more information about read-write permissions.
- Step 3)** If a DAT/EM KEYPAD™ is installed, the blue grid-like DAT/EM KEYPAD™ icon appears in the notification area of the Windows taskbar. Make sure the correct keypad file is open and ready for use. For instructions, please see the *DAT/EM KEYPAD Operation Manual*.



Windows XP shown. The same icon appears in Windows 7.

A blue grid icon in the notification area means the DAT/EM KEYPAD software is active. To open a different configuration file or for other information about the DAT/EM KEYPAD, see the *DAT/EM Keypad Operation Manual*.

- Step 4)** Start the SUMMIT EVOLUTION stereoplottter software. Use one of the following methods:

SUMMIT EVOLUTION Start Method	What this looks like
Double click the Summit Professional or Feature Collection icon on the Windows desktop.	 <p>Double click the Summit Professional or Feature Collection icon on the desktop.</p>
a.) Select the Windows Start button. b.) Select Programs . c.) Select DAT/EM Software . d.) Select the available edition of Summit .	 <p>Start the available SUMMIT edition from the Windows Start menu.</p>
Double click the system mouse on the name of an existing .smtprj or .smtxml file shown in the Windows Explorer or a Windows “My Computer” window. (Older .smtprj format projects will be made into an additional .smtxml file.)	 <p>double click on an existing project file to launch SUMMIT EVOLUTION.</p>

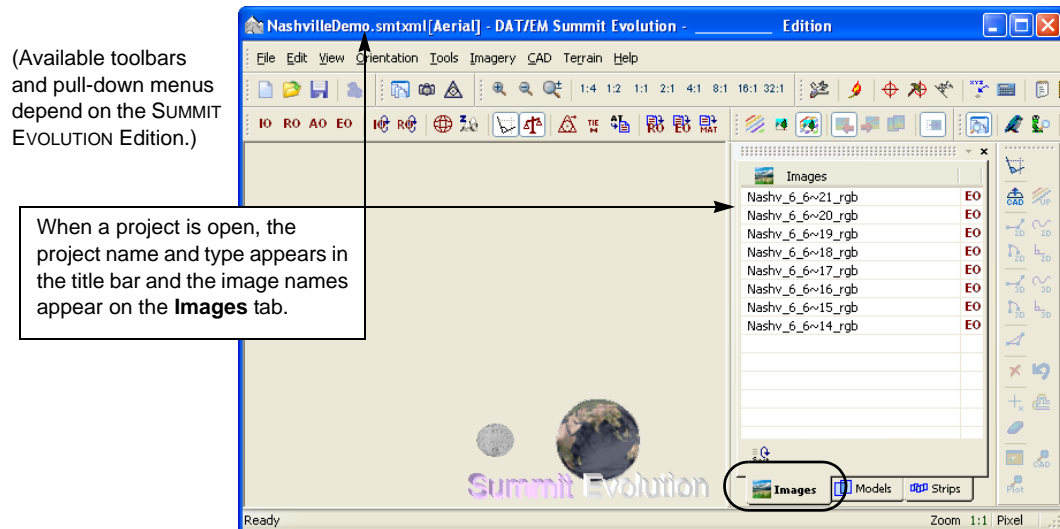
Step 5) (Professional Edition only) For a **new project**, prepare the following:

- Two or more images for stereo projects, or at least one image for an orthophoto feature collection project.
- One or more camera definition files (not used for ADS40, orthophoto, satellite, or SAR projects).
- (Sometimes optional) One or more ground control files.
- (Optional) A DTM or LiDAR points file for use with Terrain Following.

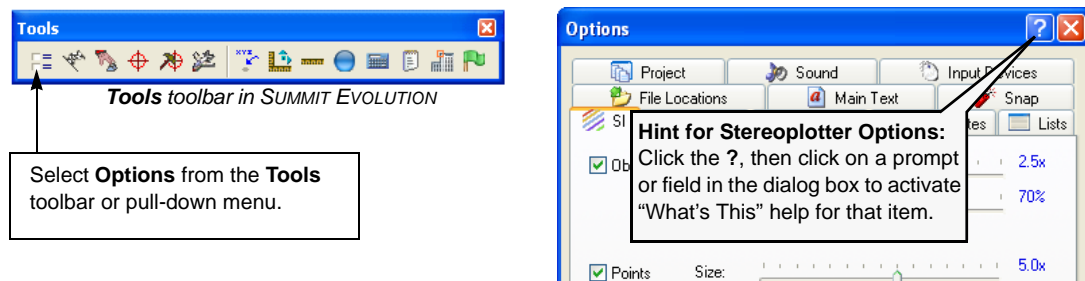
Step 6) If a project is not already open or to open a different project, choose one of the following methods:

- To open an existing project, select **Open Project** from the **File** toolbar or pull-down menu and select the project name.
- To edit a recently opened project, select the project name from the **File** pull-down menu.
- To create and open a new project, see the project creation chapters in the *Summit Evolution Professional Edition Operation Manual*.
- To import a Z/I, SocetSet, DiAP, Phorex, or SUMMIT PC project, see the project import chapter in the *Summit Evolution Operation Manual*. (Available formats depend on the SUMMIT EVOLUTION edition.)

The name of the open project appears in the title bar and the images appear on the **Images** tab:



Step 7) If desired, review the stereoplottter settings. Select **Options** from the **Tools** toolbar or pull-down menu. To learn more about any setting, click the “?” icon, then click on the item in the dialog box to activate online “What’s This?” help.



- Step 8)** For stereo projects, open two partially overlapping images. For orthophoto feature collection projects, open one image. Use one of the following methods:

Methods for Opening Images in SUMMIT EVOLUTION	
<p>Method 1. Stereo Projects: From the Images tab, click on the left image, then hold down the <Ctrl> key and click on the right image.</p> <p>Method 1. Orthophoto Projects: For orthophoto feature collection projects, click on one image name only.</p>	
<p>Method 2: If models have been defined, click on the model name from the Models tab. Both model images will open.</p> <p>Models are not used for orthophoto feature collection projects.</p>	
<p>Method 3: If strips have been defined, click on the model name from a strip on the Strips tab. Both model images will open.</p> <p>Strips are not used for orthophoto feature collection projects.</p>	


Orientation may be done for one model at a time or for all the models in the project before starting the CAD software.

- Step 9) SUMMIT EVOLUTION PROFESSIONAL EDITION:** Perform or import a complete orientation. Ground coordinates – or object coordinates for a close range project – must be established as a result of any method of orientation. Note that for imported projects, orthophoto, ADS40, satellite, and SAR projects, orientation is established in the project setup.

SUMMIT EVOLUTION FEATURE COLLECTION EDITION: For projects that require importing an exterior orientation, first complete an interior orientation (if necessary for the camera type). Then import the exterior orientation file. All other projects types should already have a complete orientation.

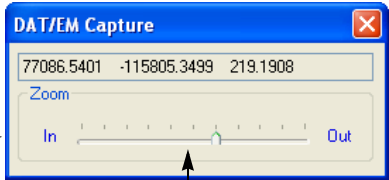
- Step 10)** Start ArcMap from the ArcView, ArcEditor, or ArcInfo modules of ArcGIS. Open a map file. The communication between ArcMap and SUMMIT EVOLUTION starts automatically, and the **DAT/EM Capture** toolbars appear. (If the toolbars do not appear, see “Check on the DAT/EM Toolbars” on page 2-3.)
- Step 11)** Select the **DAT/EM Capture Coordinates** icon to activate the DAT/EM 3D coordinate display.
- Step 12)** Set **Zoom** as desired at any time.

Select the **DAT/EM Capture Coordinates** icon to activate the coordinate display.




As SUMMIT EVOLUTION pans or zooms, it forces ArcMap to display a similar view. **Zoom** allows the ArcMap view to be slightly zoomed in or out compared to the SUMMIT EVOLUTION view:

- A setting near the middle of the slider sets the ArcMap view zoom to be about the same as the SUMMIT EVOLUTION Image View.
- A setting near **Out** on the left sets the ArcMap view zoom to be slightly zoomed out compared to the Image View.
- A setting near **In** on the right sets the ArcMap view zoom to be slightly more zoomed in than the Image View.



Set **Zoom** as desired at any time.

- Step 13)** Choose a DAT/EM Cursor setting. The DAT/EM Cursor must be on for SUMMIT EVOLUTION workstations that use the system mouse as the 3D input device. If there is a dedicated 3D input device in addition to the system mouse, the DAT/EM Cursor may be toggled at any time. See “DAT/EM Cursor” on page 6-25 for more information.

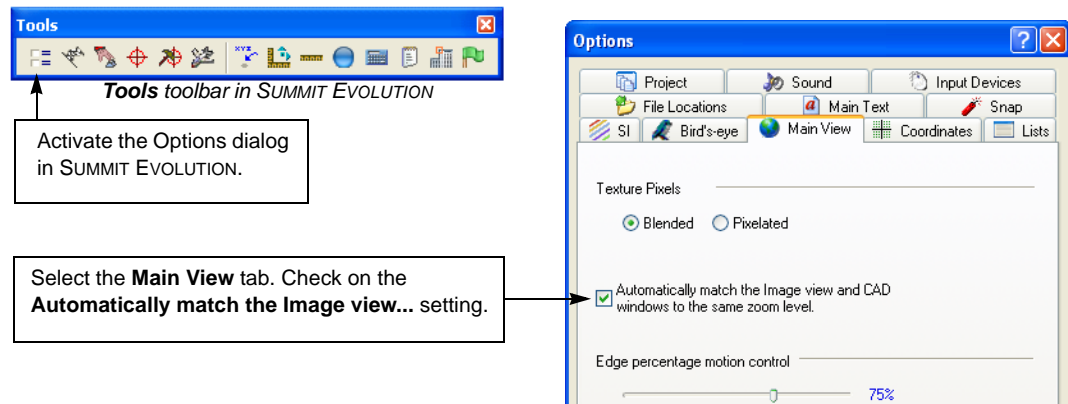


Select the **Use DAT/EM Cursor** icon to activate the DAT/EM cursor in ArcMap.

- If the DAT/EM cursor is on, there are two independent cursor indicators: one to show SUMMIT EVOLUTION's position, and one for the system mouse.
- If the DAT/EM cursor is off, there is a single cursor indicator in ArcMap. The system mouse and SUMMIT EVOLUTION take turns controlling this cursor.

- Step 14)** For the first stereo (not orthophoto) project after a new SUMMIT EVOLUTION hardware installation, verify that the hardware's pseudo/stereo setting is correct. Verify rising elevation appearance for stereo projects. View an object that has a distinct rise in elevation, such as a building or the top of a hill. If it looks like a depression, verify that the Z Box or Z Screen switch is set correctly to **CE** or **Crystal Eyes**. More information about the **pseudo/stereo** setting can be found in the *Summit Evolution Operation Manual*.

Step 15) Check on **Always match image view...** on the **Image View** tab in the SUMMIT EVOLUTION Options dialog:



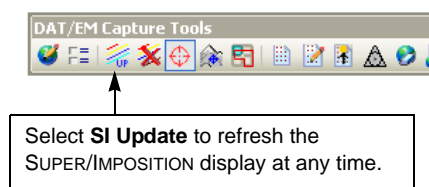
Step 16) In SUMMIT EVOLUTION, adjust the image appearance or activate histogram equalization if necessary to make details visible on the image view. The image appearance may be adjusted again at any time.



Step 17) (Optional) Activate any DTM or LIDAR file that will be used for **Terrain Following**. See the *Summit Evolution Operation Manual* for more information on Terrain Following.

Step 18) Make SUPER/IMPOSITION settings. Detailed settings can be seen in *Chapter 4*. In summary:

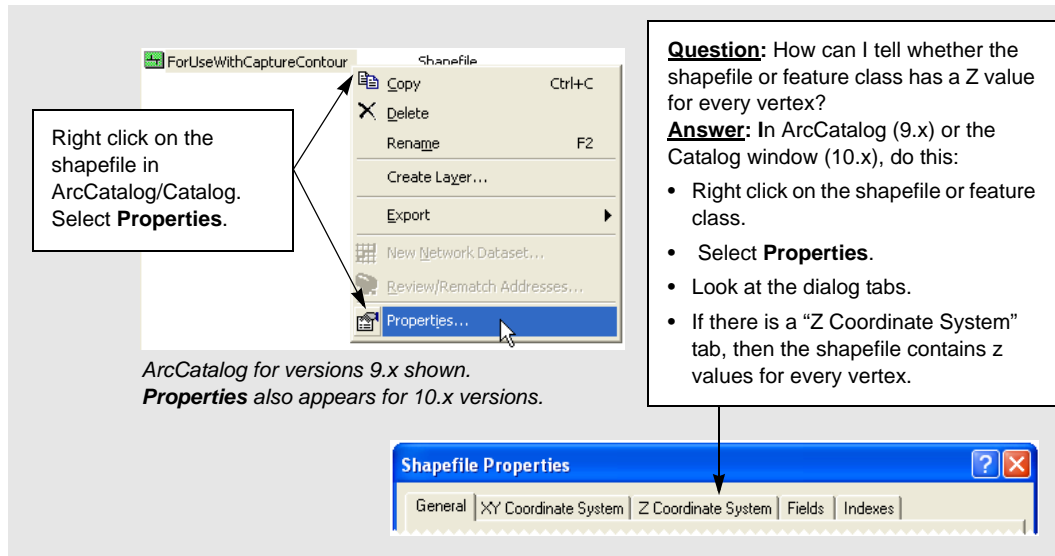
- If the shapefiles and/or feature classes are new and empty, use SUMMIT EVOLUTION to digitize at least one feature into the ArcMap file.
- Make settings from the **SI** tab on the **Stereoplotter Options** box in SUMMIT EVOLUTION.
- Make settings from the **SI** tab on the **DAT/EM Options** dialog in ArcMap.
- Most SUPER/IMPOSITION refreshes are automatic. To force a refresh at any time, click the **SI Update** icon on the **DAT/EM Capture Tools** toolbar, from SUMMIT EVOLUTION, or from the DAT/EM KEYPAD.



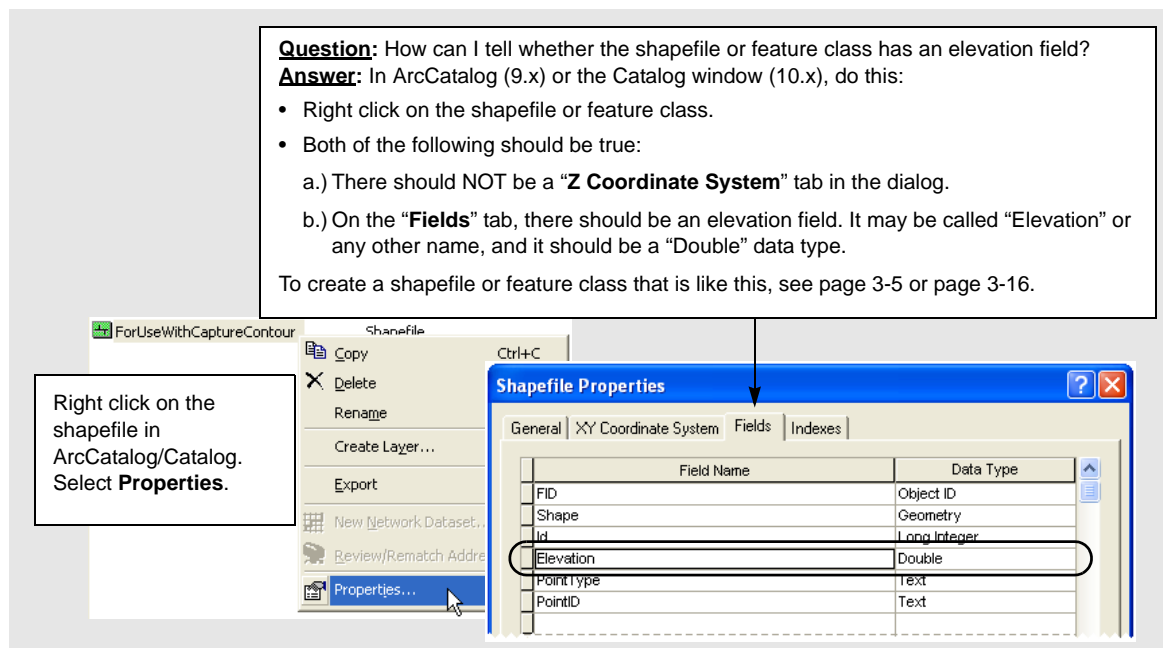
Step 19) Prepare at least one shapefile or personal geodatabase feature class and add it to the Table of Contents in ArcMap.

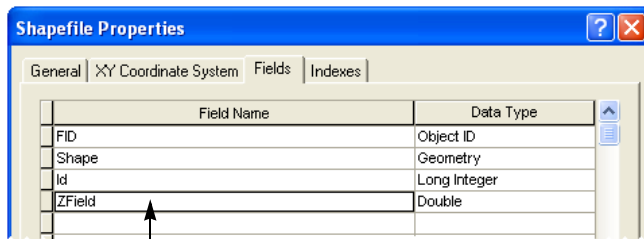
- Instructions to make new shapefiles and personal geodatabase feature classes with the correct Z settings appear in *Chapter 3*.
- If using existing shapefiles or personal geodatabase feature classes, or if you don't know how the shapefile or feature class was created, verify that the elevation will be stored correctly and determine the elevation method:

- a.) If the shapefile or personal geodatabase feature class has a Z value for every vertex (see *Chapter 3*), then you don't need to do anything in this step. Go on to the next step.



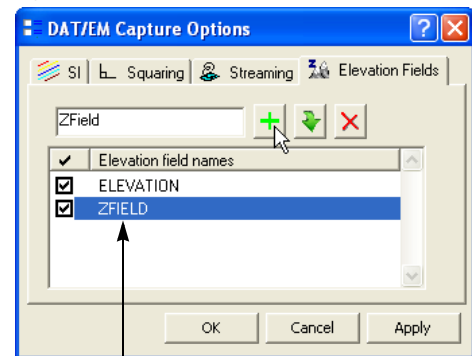
- b.) If the shapefile or personal geodatabase feature class has an elevation field, make sure the field name is checked on in the DAT/EM Capture Options dialog. Select **DAT/EM Options** from the **DAT/EM Capture Tools** toolbar in ArcMap. From the **Elevation Fields** tab, either check on an existing matching field name or add the field name. See the graphics below to determine whether the feature class has an elevation field and how to see the field name.





The field names can be seen by right clicking on the shapefile or personal geodatabase feature class in ArcCatalog (9.x) or the Catalog window (10.x). Select **Properties** from the menu. Select the **Fields** tab.

Hint: Another method is to right click on the shapefile or personal geodatabase feature class in the ArcMap Table of Contents. Select **Properties** and select the **Fields** tab.



Perform the following:

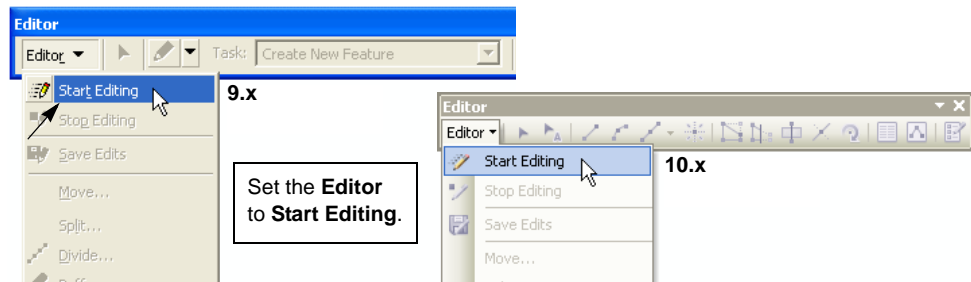
- Follow the directions above to check the exact name of the field that will store Z in the shapefile or personal geodatabase feature class. In this example, the field is called **ZField**.
- Select **DAT/EM Options** from a DAT/EM toolbar in ArcMap.
- From the **Elevation Fields** tab, either check on an existing matching field name, or add the field name.
- Note that different shapefiles or feature classes may use different elevation field names. Do not check off or delete a field name unless you know it is not used in any of the current shapefiles or feature classes.

Step 20) Set the ArcMap snap tolerance and ArcMap snapping environment settings to be used with the DAT/EM 2D and 3D snap modes. Please see “Snap2D, Snap3D, SnapOff” on page 6-102 for complete instructions. Notes about snapping:

- **ArcGIS for Desktop 10.x versions and SUMMIT EVOLUTION LITE EDITION or any edition using a system mouse digitizer for SUMMIT EVOLUTION:** The Classic Snapping Environment must be used, because the DAT/EM cursor must be on for the system mouse digitizer, and the 10.x ArcMap Snapping toolbar options do not work with the DAT/EM cursor.
- **ArcGIS for Desktop 10.x versions and SUMMIT EVOLUTION PROFESSIONAL/FEATURE COLLECTION EDITIONS with digitizers other than the system mouse :** The Classic Snapping Environment is recommended. It must be used for 3D snaps. For 2D snaps, either the Classic or ArcMap **Snapping** toolbar snaps may be used; however, the **Snapping** toolbar snaps can only be used when the DAT/EM cursor is off.

Step 21) Make SUPER/IMPOSITION settings as desired. See *Chapter 4* for complete instructions.

Step 22) Start an editing session in ArcMap. Select **Editor>Start Editing** from the ArcMap **Editor** toolbar or use a DAT/EM KEYPAD or KEYPAD CONTROLLER key that includes the “StartEditing” keyword.

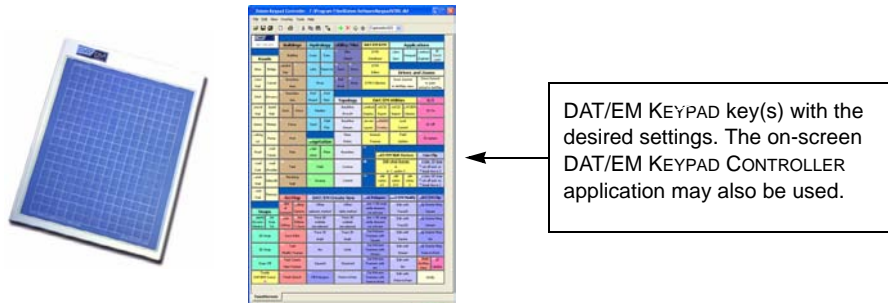


Step 23) Make necessary settings and start a DAT/EM drawing tool or command.

Note: ArcGIS tools and **Snapping** toolbar modes may optionally be used with SUMMIT EVOLUTION PROFESSIONAL or FEATURE COLLECTION EDITION as long as they have a dedicated 3D cursor device in addition to the system mouse. The DAT/EM Cursor (page 6-25) must be off in order to use ArcGIS tools and **Snapping** toolbar snaps.

Choose a method to make settings and/or start tools and commands:

- a.) **DAT/EM KEYPAD Method (recommended):** Press one or more DAT/EM KEYPAD or KEYPAD CONTROLLER keys that make the desired settings and/or activate tools and commands. See *Appendix A* and *Appendix B* for information on key settings.



- b.) **Cursor Button Method (recommended):** Press one or more cursor buttons that make the desired settings and/or activate tools and commands. A cursor button may be set using exactly the same keyword and command ID strings that are used by the DAT/EM KEYPAD. See “Set Digitizer Buttons to ArcMap-Specific Functions” on page 2-4, *Appendix A*, and *Appendix B*.

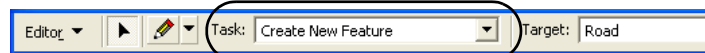


- c.) **Toolbar Method:** Use the system mouse to select from the menus and toolbars in ArcMap. For example, select **Start Editing** from the **Editor** menu, set the task, and set the desired **Target** (9.x) or feature class template (10.x), and start DAT/EM drawing tools and snap modes from the **DAT/EM Capture Drawing Tools** toolbar.

Introduction to DAT/EM drawing tools:

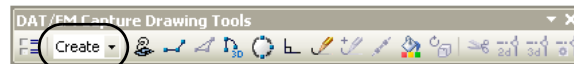
DAT/EM drawing tools may be used to draw new objects or to edit existing objects. DAT/EM drawing tools work when the DAT/EM cursor is on. They work in 3D coordinates. The choice between drawing and editing is made by setting a task before choosing a drawing tool. The task is located as follows:

- **Version 9.x, Create New Feature, Modify Feature, or Cut Polygon Features** under **Task** on the ArcMap **Editor** toolbar.



Task on the ArcMap **Editor** toolbar for 9.x versions.

- **Version 10.x, Create, Modify, or Cut** on the **DAT/EM Capture Drawing Tools** toolbar. These are the equivalent of the classic 9.x tasks shown above, except that they have been moved to a DAT/EM toolbar, and only three of the classic tasks are listed. These three are the only tasks that are needed for the DAT/EM drawing tools.



Task on the **DAT/EM Capture Drawing Tools** toolbar for 10.x versions.

In addition to setting the task, set a shapefile or feature class target (9.x) or feature class template (10.x) and activate a drawing tool from the **DAT/EM Capture Drawing Tools** toolbar.

When the task is set to **Modify**, the DAT/EM drawing tools may be used with the **Clip** (page 6-20) or **Clip segments** (page 6-21) tools either on or off.

The DAT/EM snap settings (page 6-102) may be used with the DAT/EM drawing tools. In ArcGIS for Desktop 10.x, use the Classic Snapping Environment (page 6-27).

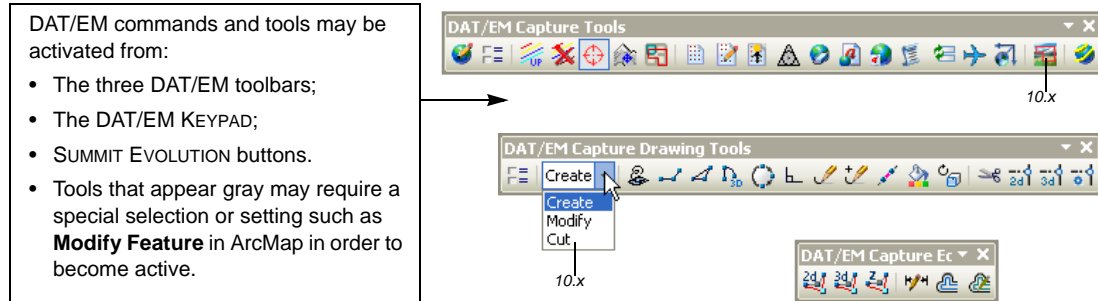
Information about each drawing tool can be found in "Draw Arc" on page 6-30, "Draw 2-Point or 3-Point Circle" on page 6-35, "Draw Point-to-Point Segments" on page 6-37, "Draw Squared Segments" on page 6-42, "Draw Streamed Vertices" on page 6-47, "Draw Trace Multiple Features" on page 6-52, and "Draw Trace Single Feature" on page 6-56.

Step 24) Draw or edit objects. Instructions for each DAT/EM drawing tool appear in *Chapter 6* and in the DAT/EM online Command Reference, **DAT/EMStereoCaptureForArcGIS.chm**.

Step 25) Archive the project and the files according to the standards in your company or organization. Choosing an archiving method is the responsibility of the user.

Chapter 6. DAT/EM Capture Tools and Commands

DAT/EM CAPTURE for ARCGIS has several tools and commands that automate drawing or other mapping processes. The DAT/EM tools are activated from the three DAT/EM toolbars: **DAT/EM Capture Tools**, **DAT/EM Capture Editing Tools**, and **DAT/EM Capture Drawing Tools**.

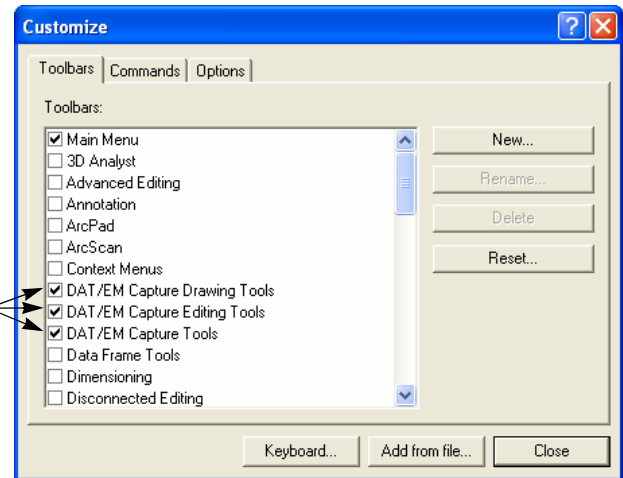


Be sure to reset the DAT/EM toolbars after each DAT/EM software update (see “Reset the Toolbars After a DAT/EM Software Update” on page 2-2 for complete instructions):

Note: After a software update, the toolbars must be reset. See “Reset the Toolbars After a DAT/EM Software

If the **DAT/EM** toolbars are not visible, perform the following:

- Choose **Customize** from ArcMap's **Tools** pull-down menu.
- Select the **Toolbars** tab.
- Check on **DAT/EM Capture Tools**, **DAT/EM Capture Editing Tools**, and **DAT/EM Capture Drawing Tools**.



Tabular List of DAT/EM Tools and Commands

The following is a summary of the DAT/EM CAPTURE for ArcGIS tools and commands:

DAT/EM Tool/Command	Brief Purpose	Purpose
Airfield3D (See the <i>Airfield3D Operation Manual</i>)	Start Airfield3D	Start Airfield3D utilities, which work together with SUMMIT EVOLUTION PROFESSIONAL EDITION. See the <i>Airfield3D Operation Manual</i> .
ASCII Export (page 6-7)	Export to ASCII file	To export data from layers in the ArcMap environment into an ASCII (text) file.
ASCII Import (page 6-10)	Import from an ASCII file	To import data from an ASCII (text) file into a shapefile or geodatabase feature class/template in the ArcMap environment

DAT/EM Tool/Command	Brief Purpose	Purpose
Autolist (page 6-13)	List object information	To show information about a selected object. It shows more details and is easier to activate than ArcMap's Properties and Attributes dialogs. It can also move the stereoplotter cursor to a selected vertex.
Capture Contour (page 6-14)	Contour generation	To generate elevation contours. In order to run this command, CAPTURE CONTOUR must be purchased and a current Inpho SCOP hardware lock must be attached to the computer.
Clear Layers (page 6-19)	Delete all objects from layer(s). No Undo!	To delete all objects on one or more layers. The layer itself remains defined in the mx d file, but all objects are deleted from it. But be careful! Undo is not possible.
Clip Polygon (page 6-20)	Clip interior rings in polygons.	Use with DAT/EM drawing tools to clip an interior ring in a polygon. Use with any DAT/EM drawing mode except trace , trace multiple , and draw circle .
Clip Segments Tool (page 6-21)	Cut one line into two pieces or trim off the end of a line.	Use for objects with line geometry. <ul style="list-style-type: none"> • Cut a section out of one line; results in two lines separated by a gap. • Or, cut off the end of a line.
Close Polyline Sketch (page 6-23)	Close the polyline sketch.	Close and end the polyline sketch. Add an ending segment that snaps the last vertex to the first vertex of the polyline.
DAT/EM Capture Coordinates (page 6-24)	3D coordinate display and view settings	To display the ground coordinates that SUMMIT EVOLUTION sends to ArcMap; to set view zoom preferences.
DAT/EM Cursor (page 6-25)	Toggle the DAT/EM cursor	The DAT/EM Cursor makes it possible to draw in ArcMap without moving the system mouse cursor. It is designed for use with DAT/EM Drawing tools. (If you would like to use the Esri drawing tools you will need to disable the DAT/EM Cursor.) The DAT/EM cursor also prevents the system mouse cursor from jumping back to the ArcMap view every time the stereoplotter moves.
DAT/EM Options (page 6-26)	DAT/EM tool settings	To make settings for DAT/EM tools such as SUPER/IMPOSITION, stream digitizing, and building squaring.
Display Classic Snapping Environment (page 6-27)	Display the Classic Snapping Environment window in 10.x	To display the Classic (9.x-like) Snapping Environment Window in ArcMap 10.x. Classic snapping must be used with the DAT/EM cursor and for all 3D snaps.

DAT/EM Tool/Command	Brief Purpose	Purpose
Draw Point and Measure Fields (page 6-28)	Digitize a point and set its rotation and/or size field	This DAT/EM 3D drawing tool is used to digitize a point and set its rotation and/or size fields. Either set a constant value or measure the field.
Draw Arc (page 6-30)	Digitize arcs	This DAT/EM 3D drawing tool is used to digitize a simulated arc. The arc is simulated by short segments. It can: <ul style="list-style-type: none"> • Create and modify lines • Create, modify, and cut polygons
Draw 2-Point or 3-Point Circle (page 6-35)	Digitize circles	This DAT/EM drawing tool is used to create a circle based on 2-point (center-edge) or 3-point (edge-edge-edge) digitizing. The circle is simulated by many short segments. It can: <ul style="list-style-type: none"> • Create a polygon • Create a closed (end snapped) polyline
Draw Point-to-Point Segments (page 6-37)	Digitize in point-to-point mode	This DAT/EM 3D drawing tool is used to digitize each individual vertex. It can: <ul style="list-style-type: none"> • Create points • Create and modify lines • Create, modify, and cut polygons
Draw Squared Segments (page 6-42)	Digitize buildings	This DAT/EM 3D drawing tool is used to add a new segment at 90° from the previous segment. This tool is useful for digitizing or editing man-made objects such as buildings. It can: <ul style="list-style-type: none"> • Create and modify lines • Create, modify, and cut polygons
Draw Streamed Vertices (page 6-47)	Digitize in stream mode without system mouse interference	This DAT/EM 3D drawing tool is used to add vertices in “stream mode” based on the path of the cursor as it moves. Stream mode is useful to digitize or edit the edges of natural features such as contours, coastlines, lakes, and areas of trees. It can: <ul style="list-style-type: none"> • Create and modify lines • Create, modify, and cut polygons
Draw Trace Single Feature (page 6-56)	Draw a shared edge along one existing object	This DAT/EM drawing tool is used to automatically draw a shared edge along an existing object. <ul style="list-style-type: none"> • It is used while digitizing or editing a line or polygon. • The shared edge may be traced in 2D or 3D.

DAT/EM Tool/Command	Brief Purpose	Purpose
Draw Trace Multiple Features (page 6-52)	Draw shared edges along multiple selected existing objects	This DAT/EM drawing tool is used to automatically draw shared edges along multiple selected existing objects. <ul style="list-style-type: none"> • It is used while digitizing or editing a line or polygon. • The shared edge may be traced in 2D or 3D.
Drive Summit Evolution (page 6-61)	Move the stereoplottter to picked point	To move the SUMMIT EVOLUTION stereoplottter cursor to a location selected with the system mouse in the ArcMap graphics view.
DTM Collection (page 6-62)	Digitize DTM points	To digitize new DTM points inside polygon boundaries.
DTM Distributor (page 6-65)	Distribute DTM points	To combine two or more DTM point sets into a single set; to redistribute DTM points at a new grid interval and/or angle; to output DTM points into a layer and/or file.
DTM Editor (page 6-70)	Edit DTM points	To redigitize, shift, or reset the coordinates of point features. Used mostly to adjust DTM points.
Elevate Layers (page 6-72)	Convert 2D shapefiles and feature classes to 3D, or replace existing elevations.	Two purposes: <ol style="list-style-type: none"> 1. To input 2D shapefiles/feature classes and output copies that are 3D shapefiles/feature classes. 2. To replace existing elevations in 3D shapefiles/feature classes. New object elevations are based on one or more DTM point files.
Field Update (page 6-76)	Edit field values;	To edit field values in existing features; more convenient than the ArcMap Attributes dialog.
Fill Polygons (page 6-79)	Copy a polygon ring to a new layer.	To make a new polygon by copying the vertices of another polygon's exterior or interior ring. The new polygon appears to "fill" the selected ring. The new polygon is drawn on the active target layer. The new polygon is always a single exterior ring.
Load Control Points (page 6-80)	Place points at control point coordinates	To automatically place points at control point coordinates. Control point coordinates are found either in the current SUMMIT EVOLUTION model or in a control point file.
Load and Distribute DTM Points. <i>See</i> DTM Distributor.		

DAT/EM Tool/Command	Brief Purpose	Purpose
Offset - Selection Method (page 6-85)	Single 3D offset	To create a 3D offset of a line object by selecting the offset location with the stereoplotter.
Offset - Table Method (page 6-86)	Multiple 3D offsets	To create offsets of a selected object based on a table of offset specifications.
Select Images on Image Server (page 6-88)	Create a SUMMIT EVOLUTION project from an ArcGIS for Server dataset (10.x)	To select images from a raster dataset in ArcGIS for Server and automatically create a SUMMIT EVOLUTION project from them. This command works for ArcGIS for Desktop 10 and higher.
Select Summit Models Area (page 6-93)	Draw area in ArcMap, list SUMMIT EVOLUTION models in the area	To draw an area in the ArcMap view and automatically find the SUMMIT EVOLUTION models that are in that area. The goal is to drag and drop the models from the list into multiple viewports in SUMMIT EVOLUTION.
Shift Features (page 6-94)	Shift (move) features.	To move one or more features in X, Y, and/or Z. Either digitize the new location with the stereoplotter or key in and apply offset values.
Shift Vertex in XY Only (page 6-97)	Edit vertex in XY	To edit the X and Y of an existing vertex in a polygon or polyline.
Shift Vertex in XYZ (page 6-98)	Edit vertex in XYZ	To edit the XYZ of an existing vertex in a polygon or polyline.
Shift Vertex in Z Only (page 6-99)	Edit vertex in Z	To edit the Z of an existing vertex in a polygon or polyline.
SI (Super/Imposition) Off (page 6-100)	SUPER/IMPOSITION off	To turn off the display of superimposed objects in the SUMMIT EVOLUTION Image View.
SI (Super/Imposition) Update (page 6-101)	Force refresh of SUPER/IMPOSITION	To refresh the display of superimposed objects in the SUMMIT EVOLUTION Image View; or, to turn on the superimposed display after it has been turned off with SI Off .
Snap to Objects (2D), Snap to Objects (3D), and SnapOff (page 6-102)	DAT/EM 2D snap, 3D snap, and snap off.	To enhance ArcMap's snapping as follows: <ul style="list-style-type: none"> • 2D snap: Snap to the object's XY, but use the stereoplotter's Z; • 3D snap: Snap to the XYZ of the object; • SnapOff: Turn all snapping off.

Alphabetical List of DAT/EM Tools and Commands

Instructions for the DAT/EM tools and commands appear below.

Airfield3D

Purpose: The **Airfield3D** command is an airfield obstruction identification tool that works together with SUMMIT EVOLUTION PROFESSIONAL EDITION. For complete instructions, please see the DAT/EM publication, *Airfield3D Operation Manual*.



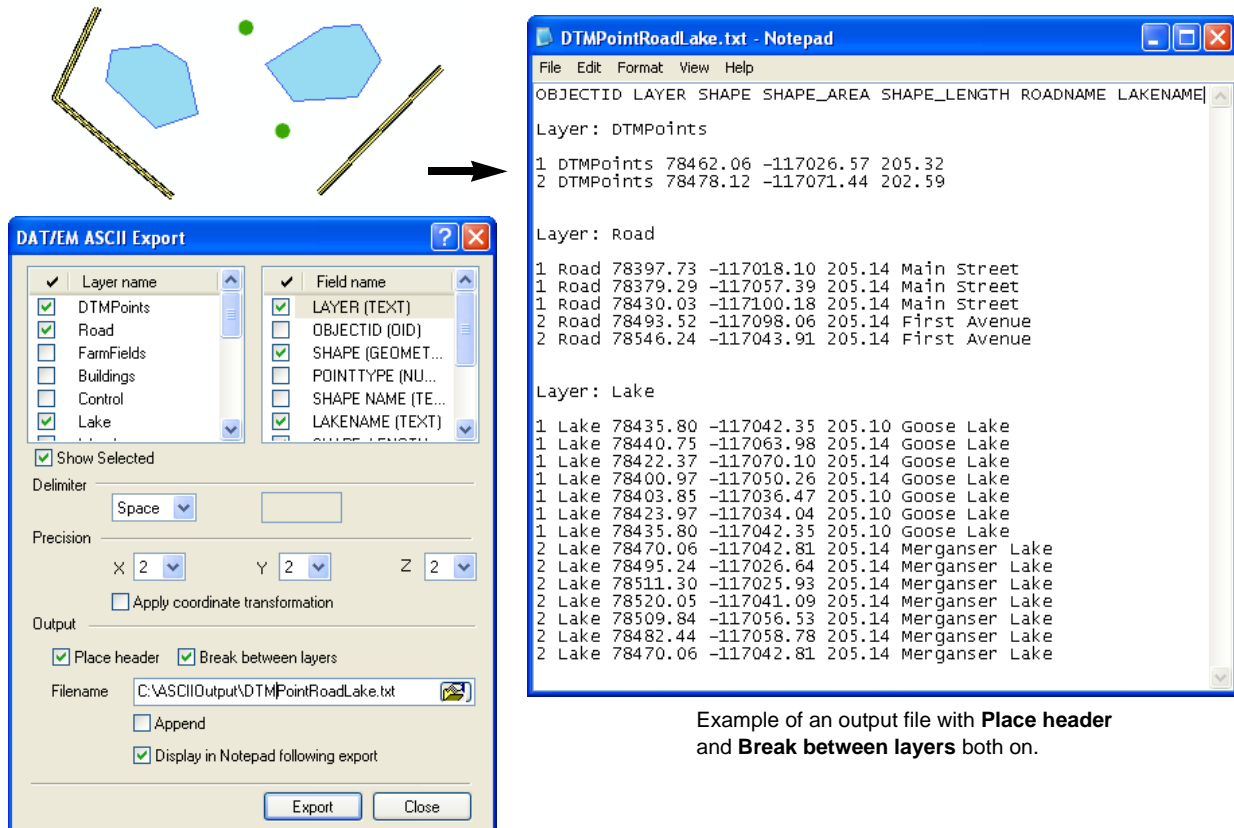
This is the **Airfield3D** option on the **DAT/EM Capture Tools** toolbar.

The **Airfield3D** command is used with SUMMIT EVOLUTION PROFESSIONAL EDITION. It is a tool to perform airfield obstruction identification according to the specifications set by the United States Federal Aviation Administration publication: *General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection And Geographic Information System (GIS) Standards*, (www.faa.gov, 2009), Advisory Circular (AC) 150/5300-18B.

For complete instructions, please see the DAT/EM publication, *Airfield3D Operation Manual*.

ASCII Export

Purpose: To export data from layers in the ArcMap environment into an ASCII (text) file.



DAT/EM ASCII Export

Layer name: ☒ DTMPPoints, ☒ Road, ☐ FarmFields, ☐ Buildings, ☐ Control, ☒ Lake

Field name: ☒ LAYER (TEXT), ☐ OBJECTID (OID), ☒ SHAPE (GEOMET...), ☐ POINTTYPE (NU...), ☐ SHAPE NAME (TE...), ☒ LAKENAME (TEXT)

☒ Show Selected

Delimiter: Space

Precision: X 2, Y 2, Z 2

☐ Apply coordinate transformation

Output: ☒ Place header, ☒ Break between layers

Filename: C:\ASCIIOutput\DTMPointRoadLake.txt

☐ Append

☒ Display in Notepad following export

DTMPointRoadLake.txt - Notepad

```
File Edit Format View Help
OBJECTID LAYER SHAPE SHAPE_AREA SHAPE_LENGTH ROADNAME LAKENAME
Layer: DTMPPoints
1 DTMPPoints 78462.06 -117026.57 205.32
2 DTMPPoints 78478.12 -117071.44 202.59
Layer: Road
1 Road 78397.73 -117018.10 205.14 Main Street
1 Road 78379.29 -117057.39 205.14 Main Street
1 Road 78430.03 -117100.18 205.14 Main Street
2 Road 78493.52 -117098.06 205.14 First Avenue
2 Road 78546.24 -117043.91 205.14 First Avenue
Layer: Lake
1 Lake 78435.80 -117042.35 205.10 Goose Lake
1 Lake 78440.75 -117063.98 205.14 Goose Lake
1 Lake 78422.37 -117070.10 205.14 Goose Lake
1 Lake 78400.97 -117050.26 205.14 Goose Lake
1 Lake 78403.85 -117036.47 205.10 Goose Lake
1 Lake 78423.97 -117034.04 205.10 Goose Lake
1 Lake 78435.80 -117042.35 205.10 Goose Lake
2 Lake 78470.06 -117042.81 205.14 Merganser Lake
2 Lake 78495.24 -117026.64 205.14 Merganser Lake
2 Lake 78511.30 -117025.93 205.14 Merganser Lake
2 Lake 78520.05 -117041.09 205.14 Merganser Lake
2 Lake 78509.84 -117056.53 205.14 Merganser Lake
2 Lake 78482.44 -117058.78 205.14 Merganser Lake
2 Lake 78470.06 -117042.81 205.14 Merganser Lake
```

Example of an output file with **Place header** and **Break between layers** both on.

The **ASCII Export** command writes data from layers in the ArcMap environment into an ASCII (Text) file. To use **ASCII Export**, perform the following steps:

Step 1) Select the **ASCII Export** icon from the **DAT/EM Capture Tools** toolbar.



Step 2) Check on each layer and field to export. Every field found within all of the checked layers is listed.

Hint: Multiple lines may be selected. Highlight one line, then: **<Shift>click** to select a block of lines, **<Ctrl>click** to select multiple individual lines, **<Ctrl>A** to select all. Checking or unchecking one selected line's box affects all selected lines.

Check on each field to export. Every field found within all the checked layers is listed. It is possible that not every layer contains every field.

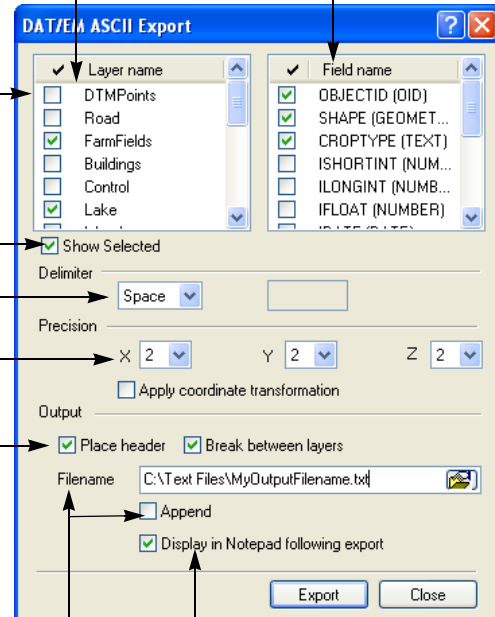
Check on each layer to export.

To select and highlight all objects on the checked layers, check on **Show Selected**. Note that if there are many objects in the layers, this option may be very slow.

Choose a **Delimiter** that is to separate the fields in the ASCII file. If the desired option is not offered, select **Other** and enter the delimiter character(s).

For the **Precision** fields, select the number of decimal places to write out for each coordinate component.

- Check **Place header** to place a line at the top of the output file that lists the selected **Field names** in order. If **Break between layers** is also on, it also places a layer name header at the start of each layer list.
- Check **Break between layers** places two blank lines between layers in the output file. If **Place header** is also on, a layer name header will also appear after the two blank lines.



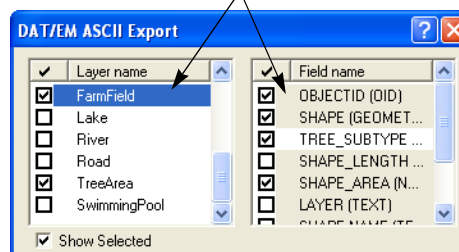
If desired, check on **Display in Notepad following export** to activate the new file in the Windows Notepad text editor.

Enter or browse for an output **Filename**. If the file already exists, choose whether to add to it or replace it:

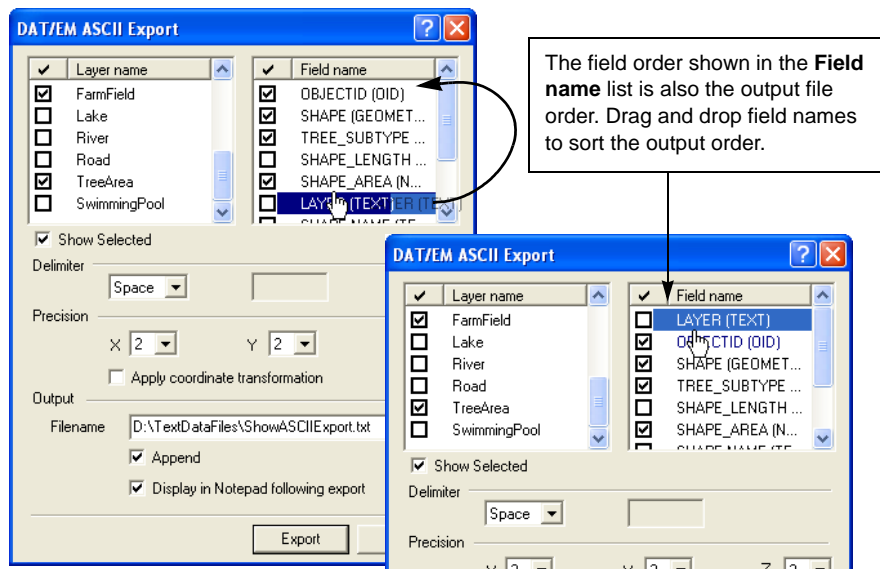
- Check on **Append** to add to the end of the existing file.
- If **Append** is not checked, any existing file of that name will be overwritten.

Step 3) It is possible that not every layer contains every field; to see a particular layer's fields, highlight the layer on the **Layer name** list to see its fields highlighted on the **Field name** list:

Highlight a line in the **Layer name** list to see its fields highlighted on the **Field name** list.



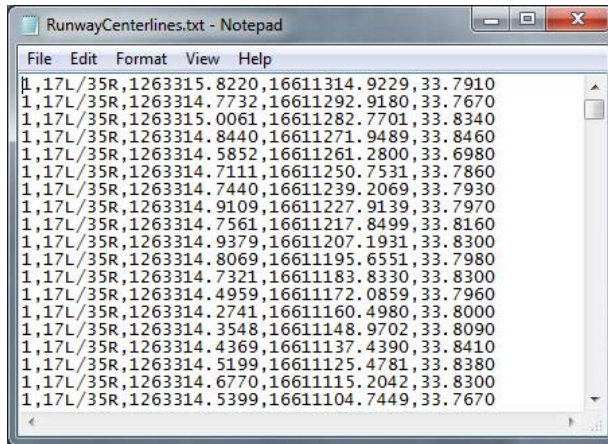
Step 4) To sort the output order, drag and drop field names into the desired order in the **Field name** list:



Step 5) Select the **Export** button to run the command, create or append to the output file, and possibly open the new file in Windows Notepad.

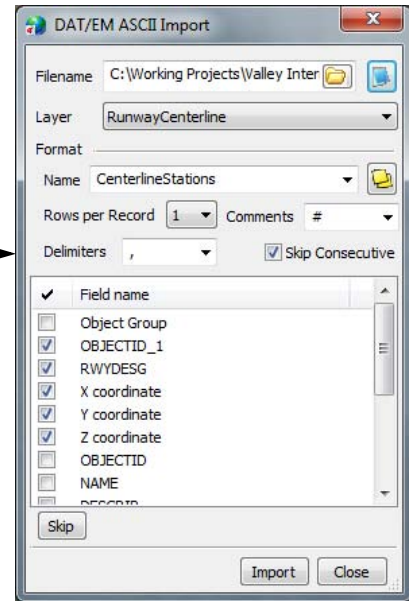
ASCII Import

Purpose: To import data from an ASCII (text) file into a shapefile or geodatabase feature class/template in the ArcMap environment.

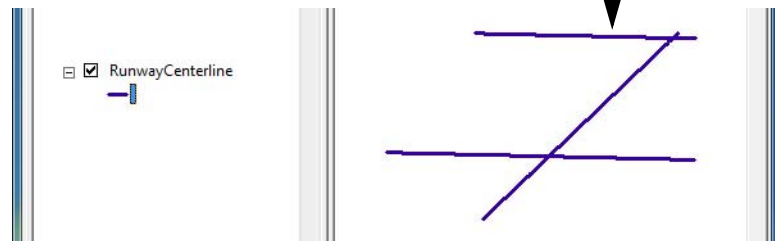


ASCII (text) file input

ASCII Import Command



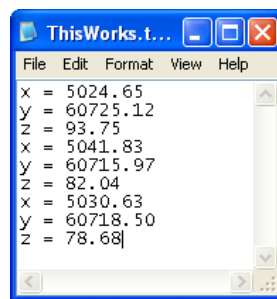
Import objects



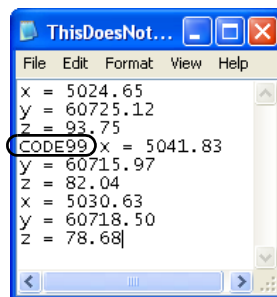
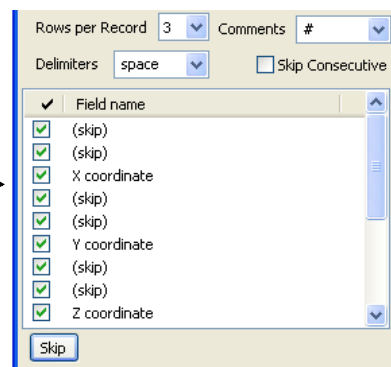
The **ASCII Export** command imports coordinates and other data from an ASCII (text) file into layers in the ArcMap environment. To use **ASCII Import**, perform the following steps:

Step 1) Prepare the ASCII (text) file:

- At the very least, the file should contain X and Y coordinates for at least one object. An elevation Z coordinate is recommended, especially if the target layer has a Z coordinate defined. Z will be set to 0 (zero) if the target has a Z coordinate and Z is not checked on or does not exist in the file format.
- Coordinates should be expressed in the destination coordinate system; **ASCII Import** does not offer coordinate translation.
- The file should contain object(s) for a single target layer (shapefile or personal geodatabase feature class template) only. If the file contains objects for multiple target layers, split the input file using a text editor. For example, if a file contains an airfield runway centerline (polyline geometry) and the two runway endpoints (point geometry), split the file into a file that contains the centerline only and another file that contains the endpoints only.
- The file may contain field settings in addition to coordinates.
- Know the order of data presented in the file. There is a **Notepad** button on the **ASCII Import** dialog; this is used to visually check the file's contents, if needed.
- Each line or set of lines should contain the same components in the same order. For example:



Good File. In this file, there are three lines per record. Each three-line record has the same components.



Bad File. This extra "CODE99" text is found in one record, but not in the others. This file will not import correctly, because each three-line record does not have the same components.

Step 2) Select the **ASCII Import** icon from the **DAT/EM Capture Tools** toolbar.

Select **ASCII Import** from the **DAT/EM Capture Tools** toolbar.

Step 3) Browse for the text file and make settings. Drag and drop checked fields into the order they appear in the input file.

Choose a format name:

- Formats are saved by target layer name (now set in **Layer**). To use a previously saved format for this layer – if any exist – select it from the **Name** pop-down list.
- To save the current dialog settings as a new format for this layer, enter a new **Name**. The name will be saved at run time, that is, the **Import** button must be used in order to save the **Name** format.
- If you don't need to save the settings or use a previously saved format, you may skip this setting and use the default, **(unsaved)**.

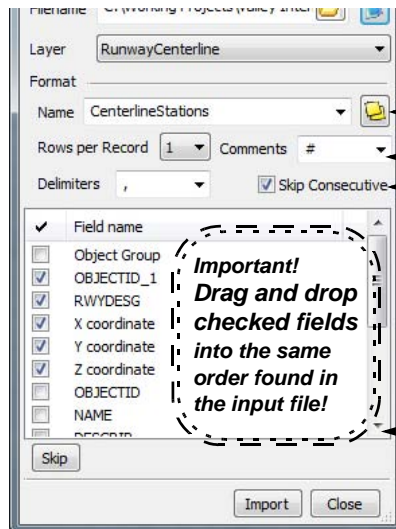
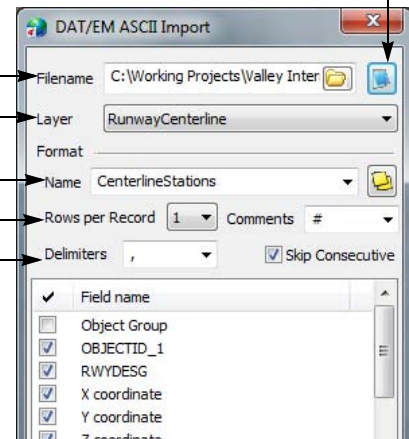
Browse for the file.

Select one layer to receive the new object(s).

The **Notepad** button may be used to open and view the file in Windows Notepad. This is a good way to check the format, as long as the file isn't too big to load into memory using Notepad.

Set **Rows per Record** to the number of rows (lines) per record in the input file. One record contains one (x,y) or (x,y,z) coordinate.

Set **Delimiters** to the separator between fields in the file.



The **Manage Formats** button activates a dialog where you can delete old formats or save new ones. This shows existing formats for the set **Layer** only.

Set **Comments** to any comment character that appears at the start of a line that should be ignored. If there aren't any comments, leave it set to the default value, #.

Check on **Skip Consecutive (delimiters)** if there are repeated delimiters, such as two spaces or two commas between field values.

Components defined in the **Layer** are listed. Perform the following:

- Check on the components that exist in the input file.
- Drag and drop the list items into the order they appear in the input file. For example, if Y appears before X in the file, drag "Y coordinate" and drop it above "X coordinate". The order of checked items matters, but it does not matter where unchecked items appear.
- For any extra fields in the input file that should be ignored, click on the next usable field in the format list to highlight it. Select the **Skip** button to add a "(skip)" placeholder above the highlighted line. This tells the command to read a field and ignore it. An example appears above in Step 1 on page 6-11. If "(skip)" is added in the wrong place by accident, drag and drop it into the correct place. If "(skip)" is added, but not wanted, simply uncheck it.

Step 4) Select the **Import** button to run the command.

Autolist

Purpose: To easily show detailed information about an existing object's fields, geometry, and vertices. To move the SUMMIT EVOLUTION cursor to a selected vertex.

The **Autolist** command shows information about a selected object. It was designed to show more details and to be easier to activate than ArcMap's Properties and Attributes dialogs. To use **Autolist**, perform the following steps:

Step 1) Select the **List Feature Information** icon from the **DAT/EM Capture Tools** toolbar.

Step 2) Use the **Autolist** "magnifying glass" cursor to select an existing object in the ArcMap view.

Select **List Feature Information** from the **DAT/EM Capture Tools** toolbar.

Select an object.

The buttons at the top of the dialog have two functions:

- Quickly expand or contract the details under that heading in the list.
- Set the default display for the next time the dialog appears.

Either use the buttons at the top of the dialog or click the + or - icons to expand or contract the details.

For polygons, exterior and interior rings are shown in separate lists.

If **"(From Table)"** is shown after the Z coordinate, then the object is in a shapefile or feature class that has an elevation field. In this case, the vertices are really XY only, with the field's elevation shown for convenience.

If **"(no elevation)"** is shown in the Z position, there is neither an elevation field nor a Z vertex component in the shapefile or feature class definition. The shapefile or feature class is 2D.

Single click on a vertex to highlight it in both the superimposition view and in the ArcMap view.

Double click on a vertex to move the SUMMIT EVOLUTION cursor to that coordinate.

For objects that have more than 100 vertices, only the first 50 and last 50 are shown.

DAT/EM Autolist dialog box details:

- Buttons: Fields, Geometry Information, Vertices, Rings
- Picked Location: 78626.210, -116447.719
- Coordinate Precision: 3
- Object: Lake - OID: 24
- Fields:
 - LakeName : Lilly Lake
 - SHAPE_Length : 147.2923
 - SHAPE_Area : 228.6442
- Geometry Information:
 - Area: 228.64
 - Center of Gravity: 78638.253, -116450.282
 - # Exterior Rings: 1
 - # Interior Rings: 2
 - Bounding Envelope:
 - Minimum Z: 180.86
 - Maximum Z: 180.86
- Vertices:
 - Exterior Ring 0 - 11 points
 - 78650.823, -116443.691, 180.861
 - 78651.768, -116448.487, 180.861
 - 78646.658, -116453.667, 180.861
 - 78643.533, -116455.713, 180.861
 - 78635.415, -116458.064, 180.861
 - 78628.100, -116457.888, 180.861
 - 78624.068, -116453.548, 180.861
 - 78624.728, -116448.154, 180.861
 - 78629.966, -116446.477, 180.861
 - 78641.502, -116443.148, 180.861
 - 78650.823, -116443.691, 180.861
 - Interior Ring 0 - 6 points
 - 78642.384, -116446.139, 180.861
 - 78641.374, -116448.449, 180.861
 - 78643.552, -116450.516, 180.861
 - 78646.533, -116450.058, 180.861
 - 78645.782, -116446.009, 180.861
 - 78642.384, -116446.139, 180.861
 - Interior Ring 1 - 143 points, 100 shown
 - 78637.522, -116449.841, 180.861

Step 3) Use the buttons at the top of the dialog for two purposes:

- To quickly expand or contract the details under that heading in the list;
- To set the default display for the next time the dialog appears. If a button is highlighted (light gray), the details for that item will appear expanded the next time the dialog appears.

Step 4) Use the "Vertices" list as a visualization and "move to" tool as follows:

- Single click on a vertex to highlight it with a yellow dot in ArcMap and SUMMIT EVOLUTION.
- Double click on a vertex to move the SUMMIT EVOLUTION cursor to that coordinate,

Capture Contour

Purpose: To generate elevation contours. In order to run this command, the CAPTURE CONTOUR package must be purchased and a current Inpho GmbH SCOP hardware lock must be attached to the computer.



DAT/EM's CAPTURE CONTOUR + INPHO's SCOP = Contour generation within ArcGIS

Contour interpolation with DAT/EM CAPTURE for ARCGIS can be accomplished using the SCOP library software by INPHO GmbH. Contact DAT/EM to purchase the CAPTURE CONTOUR package. Specific information about INPHO products may be viewed on www.inpho.de.

The **Capture Contour** command sends input to Inpho GmbH's SCOP contour generation package. Contour generation runs, then the contours are either written to a file or imported directly back into layers in the ArcMap environment. In order to run this command, the CAPTURE CONTOUR package must be purchased and a current SCOP hardware lock must be attached to the computer.

To use **Capture Contour**, perform the following steps:

- Step 1)** (Optional) If desired, use the **Load and Distribute DTM Points** command to combine multiple overlapping DTM sets into one distribution. See "DTM Distributor" on page 6-65.
- Step 2)** Prepare input. There must be existing XYZ data from either of the following sources:
 - a.) Densely distributed, accurate 3D (XYZ or DTM) point objects in layers that are currently listed in the ArcMap Table of Contents.
 - b.) INPHO **.dem** mass points file generated by INPHO's MATCH-T software.

There may also be 2D or 3D morphological objects such as,

- c.) (Optional) 2D or 3D boundary area polygons, 2D or 3D exclusion area polygons, 3D formline polylines, and 3D spot height points.
- Step 3)** Prepare a layer for the generated contours. Use the instructions in "How to Define Z in a Shapefile" on page 3-1 or "How to Define Z in a Personal Geodatabase Feature Class" on page 3-10. To differentiate between index contours and intermediate contours, create an additional field for the contour type.

Step 4) If you wish to differentiate between index contours and intermediate contours, then add a contour type field to the shapefile or feature class. This may have already been done using the instructions in page 3-4, page 3-15, page 3-21, or page 3-21.

Right click on the layer in ArcCatalog. Select **Properties**.

Add a text or short integer field. Here it is called **ContourType**. The name may be different if desired; there is a 10-character limit. The field is used to indicate whether the contour is an index contour or an intermediate contour.

Set the **Data Type** to your choice of:

- **Text** to use descriptive words such as "Index" and "Intermediate."
- **Short Integer** to use integer codes such as **0** for index contours and **1** for intermediate contours.

Set to either **Text** or **Short Integer**.

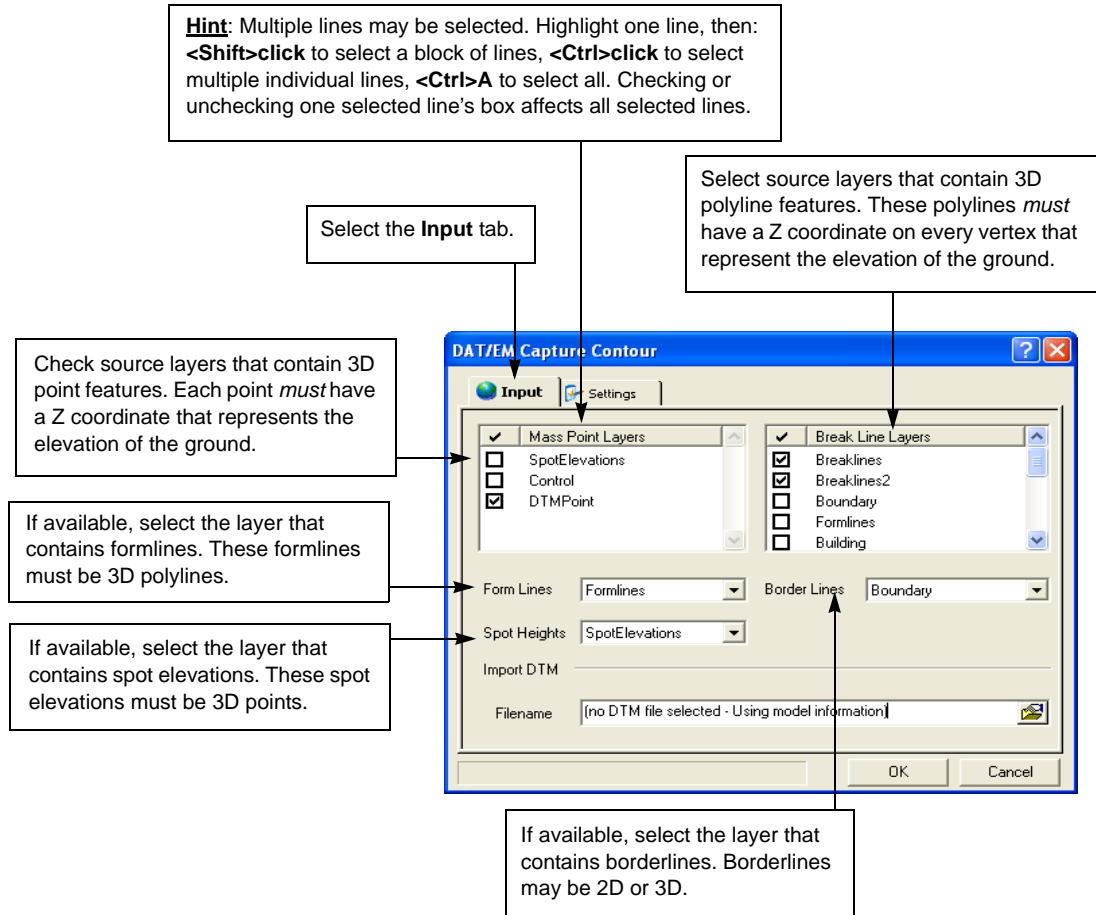
Field Name	Data Type
FID	Object ID
Shape	Geometry
Id	Long Integer
ContourType	Short Integer

Step 5) Select **Capture Contour** from the **DAT/EM Capture Tools** toolbar or from the **Tools** pull-down menu.

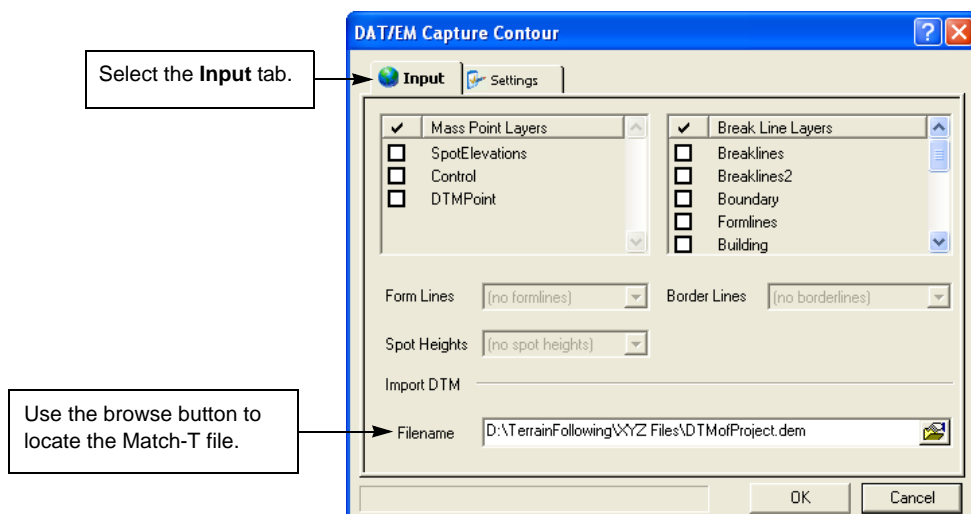
Select **Capture Contour** from the **DAT/EM Capture Tools** toolbar or from the **Tools** pull-down menu.

Step 6) Select the **Input** tab. Choose to use either layer input or file input:

a.) To use input from the ArcMap environment, choose settings from the upper part of the dialog:



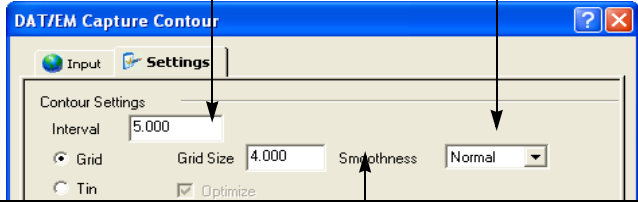
b.) Or, to use input from a MATCH-T results file, use the browse button to set the filename in the **Import DTM Filename** field. When a file is listed, the other fields on the **Input** tab are not available.



Step 7) Select the **Settings** tab and begin to make settings:

Select a **contour interval** for the resulting interpolated contours. The interval is in master units.

Select a **smoothness** setting for the resulting interpolated contours. The **smoothest** setting takes the longest to process.



Select a **Grid Size**.

- **If using a DTM grid digitized in MicroStation**, enter the estimated distance between the grid points in master units.
- **If using a MATCH-T-generated .DEM.XYZ file**, either enter the grid size or one half the grid size that was used when running MATCH-T. Recall from INPHO's MATCH-T documentation that the MATCH-T grid width is described as follows:
 “The Grid Width corresponds approximately to thirty pixels in the digital image... The grid width, gw, can be calculated using the following formula:

$$gw = 30 * pixel_size * scale\ factor$$
 pixel_size : pixel size of the digital image
 scale factor : image scale factor
 This is, however, only a rough recommendation and can be rounded off to give meaningful values. The unit for this parameter is a unit from the object's system of coordinates.” -- *match_help.html* dated Nov. 5, 1999

Step 8) Continue to make settings on the **Settings** tab:

Select the field that contains elevation.

- This may be “**Shape (Geometry)**” if there is one Z per vertex as described in “Shapefile Z, Vertex Method (Z on Every Vertex) (Version 9.x)” on page 3-2 and “Feature Class Z, Vertex Method (Z on Every Vertex) (Recommended)” on page 3-11.
- This may be an elevation field if there is one Z per feature as described in “Shapefile Z, Field Method (One Z per Object) (Version 9.x)” on page 3-5

Select a layer to be used for the new contours.

To use a field entry to differentiate between index contours and intermediate contours, perform the following:

- Check on **Index Contours**.
- Set the **Index Interval** (this should be an even multiple of the **Interval** above).
- Set the **Contour Type Field** from the list of compatible fields found in that layer.
- Set **Contour Value** and **Indexed Contour Value** to any character string you want to add to the **Contour Type Field** to differentiate between index and intermediate contours. (In ArcEditor and ArcInfo, these can be matched later to subtypes and displayed with different colors or line styles.)

(Optional) To write out the contours to a file in addition to placing them on a layer, enter or browse for an output **Filename**.

Step 9) If desired, review all the settings on both the **Input** and **Settings** tabs.

Step 10) Select **OK** to run the contour generation. The Inpho SCOP library activates automatically. Elevation contours appear in layers in the ArcMap environment and in a file, if specified.

Clear Layers

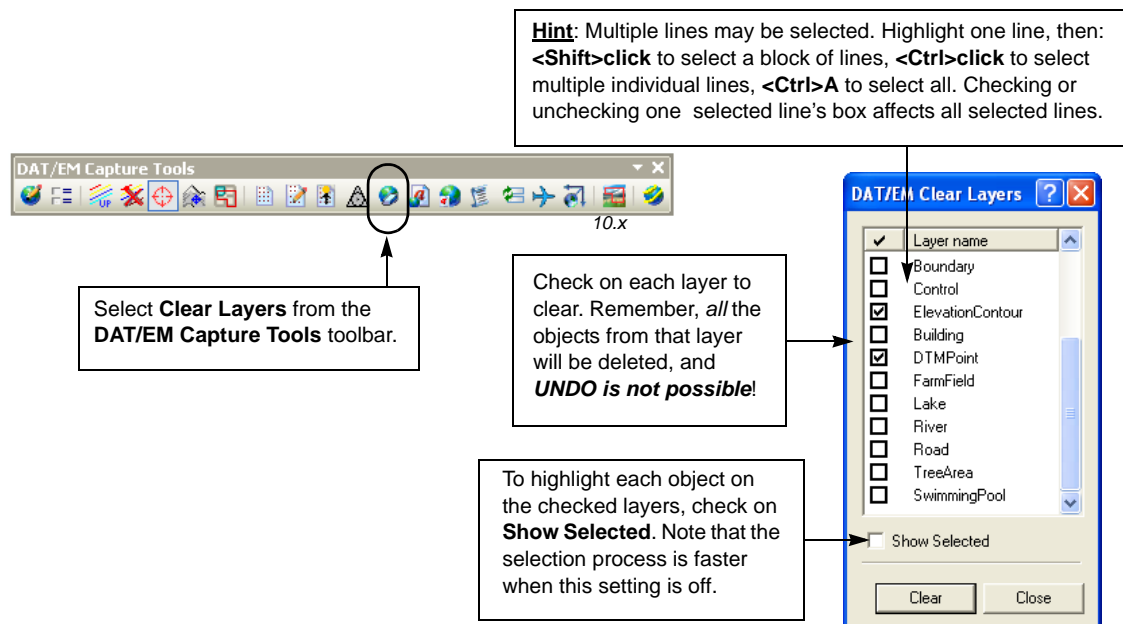
Purpose: To delete all objects on one or more layers. The layer itself remains defined in the **mx**d file, but all objects are deleted from it. But be careful! **Undo is not possible**.

The **Clear Layers** command deletes all objects on one or more layers. Note that objects can be deleted only if the ArcGIS package currently in use has permission to edit the object class type. For example, if an object is created with feature class subtypes in ArcEditor, it may not be deleted using **Clear Layers** in ArcView, because feature class subtypes are read-only in ArcView.

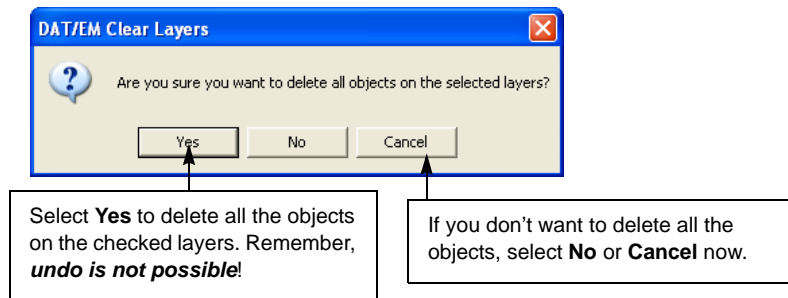
To use **clear layers**, perform the following steps:

Step 1) Select the **Clear Layers** icon from the **DAT/EM Capture Tools** toolbar:

Step 2) Choose a **Show Selected** setting and check on each layer to clean:



Step 3) Select the **Clear** button to delete the objects. A message appears to make sure the user is aware that all objects on the checked layers will be deleted. Select **Yes** to delete the objects.



If an object remains on the layer, be sure that the current ArcGIS package has permission to edit its class type. For example, classes with subtypes can be created with ArcEditor or ArcInfo, but subtypes are read-only in ArcView. If a class is read-only, the **clear layers** command will not delete objects drawn using that class.

Clip Polygon

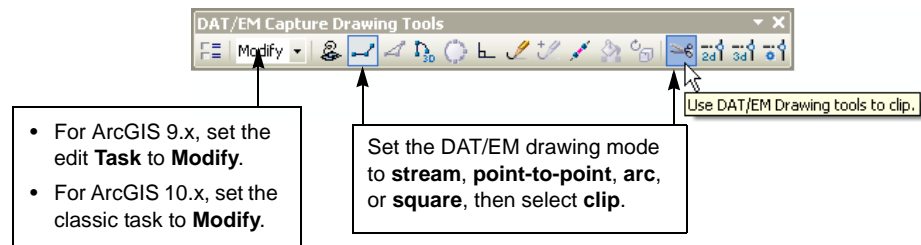
Purpose: Use with DAT/EM drawing modes to clip an interior ring in a polygon. Use with any DAT/EM drawing mode except **trace**, **trace multiple**, and **draw circle**.

The **Clip Polygon** command allows other DAT/EM drawing modes (streamed, point-to-point, arc, squared) to clip a hole (and interior ring) in an existing polygon. This tool is similar to ArcMap's **Editor>Clip** tool, except that it's faster to use, and its only option is to cut a hole in the polygon. The resulting object is a polygon with an interior ring.

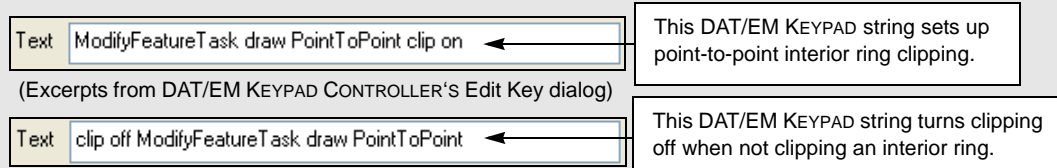
To use **Clip Polygon**, perform the following steps:

Step 1) Either use a DAT/EM KEYPAD key that sets up clipping or:

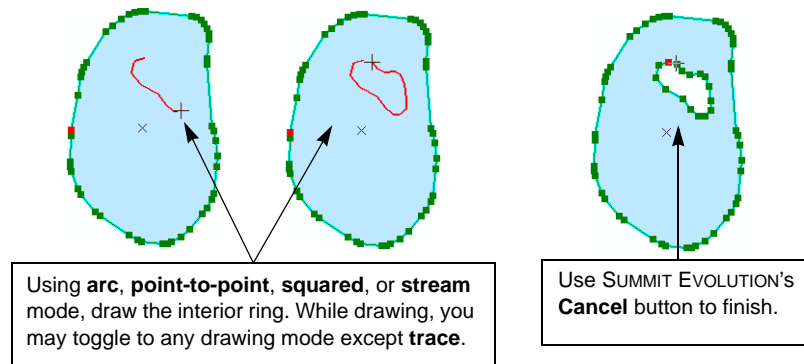
- Set the **Task** to **Modify Feature**.
- Activate any DAT/EM drawing mode except **trace**, **trace multiple**, and **draw circle**.
- Select (highlight) the **Use DAT/EM drawing tools to clip** icon on the **DAT/EM Capture Drawing Tools** toolbar:



Note: The DAT/EM KEYPAD should use the **clip on** and **clip off** keywords whenever the task is set to **Modify Feature**. Examples:



Step 2) Draw the interior ring inside the existing polygon. Use SUMMIT EVOLUTION's **Cancel** button to finish the interior ring.



Clip Segments Tool

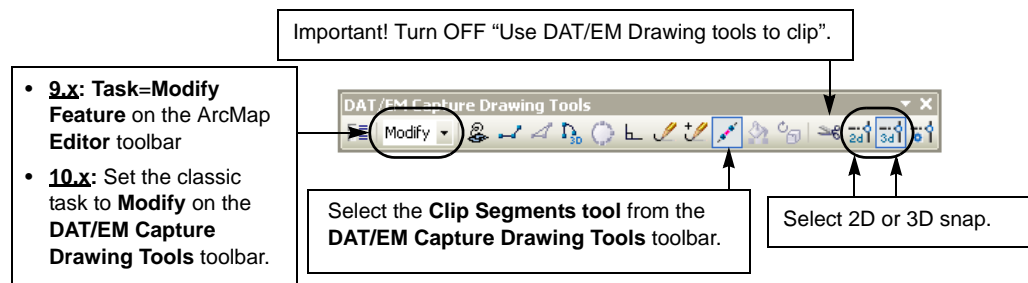
Purpose: Use to edit line-geometry objects. Clip segments out of the middle of a line or cut off the end of a line. DAT/EM 2D or 3D snap must be on with this tool.

The **Clip Segments tool** helps to edit line-geometry objects (lines). It clips segments out of the middle of the line, which results in two separate lines. It also clips segments off the end of a line to make the line shorter.

To use the **Clip Segments tool**, perform the following steps:

Step 1) Either use a DAT/EM KEYPAD key that sets up clipping or:

- Set **Task=Modify Feature** on the ArcMap **Editor** toolbar (9.x) or set the classic task to **Modify** on the **DAT/EM Capture Drawing Tools** toolbar (10.x).
- Set Clip off (it is off if “the scissors” icon is not highlighted).
- Turn on DAT/EM 2D or 3D snap. If 2D snapping is used, the “cut point” will be set to the stereoplotter’s current Z. If 3D snapping is used, the “cut point” will remain at the line’s original elevation at that vertex or segment. If desired, the snap mode may be changed between the first and second selection along the line.
- Select (highlight) the **Clip Segments tool** icon on the **DAT/EM Capture Drawing Tools** toolbar:



Note: The DAT/EM KEYPAD string for **Clip Segments** should first use the **clip off** keyword:

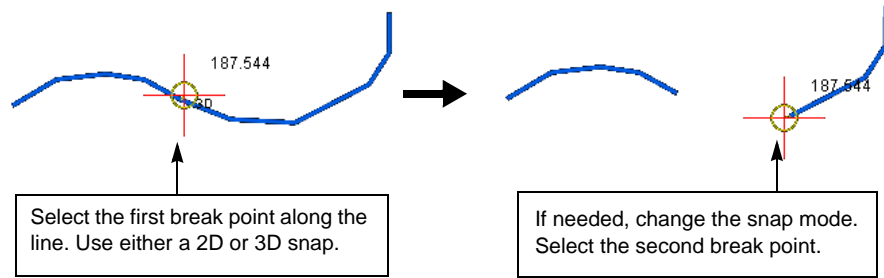
Text: clip off ModifyFeatureTask CallCommand CaptureArcInfo.ClipSegment Snap3D

This DAT/EM KEYPAD string sets up clip segments.

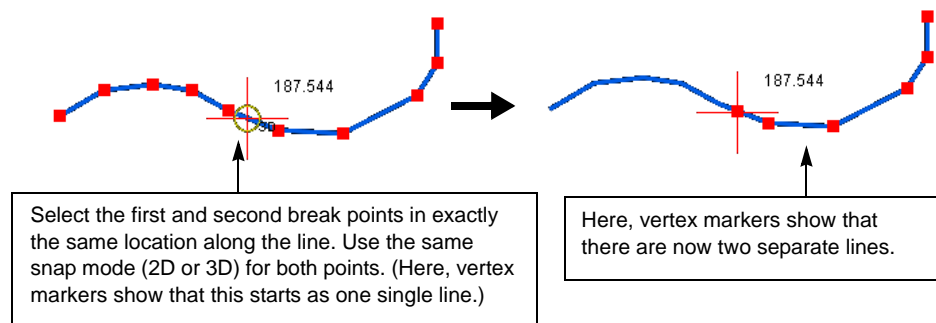
Step 2) Select the first breaking point along an object that has line geometry. (If a polygon is selected, this tool will behave as if Modify Feature and the point-to-point drawing tool were selected. It will not cause an error, but the prompts will not match the results.)

Note: Whenever a 2D snap is used, set the stereoplotter to the elevation desired for the breaking point. Check the results in superimposition to make sure the break point Z is correct.

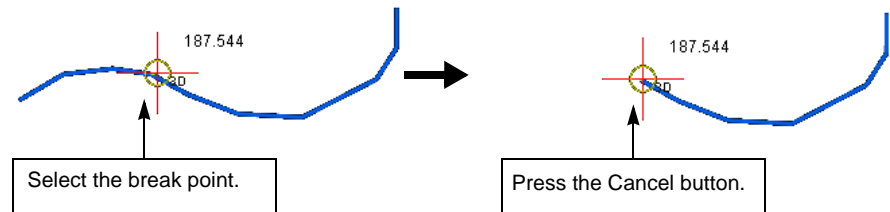
- a.) **To cut one line into two pieces separated by a gap:** Select the first break point; if needed, change the 2D/3D snap mode; select the second break point in a different location.



- b.) **To cut one line into two adjoining lines:** Select the first break point and the second break point in exactly the same location.



- c.) **To cut off the end of the line:** Select the break point and then press the Cancel button. The end that is closer to the break point will be trimmed.



Close Polyline Sketch

Purpose: Close and end a polyline sketch. Add a segment that snaps the last vertex to the first vertex of the polyline.

The **Close Polyline Sketch** tool help to quickly snap the last vertex of a polyline sketch to the first vertex.

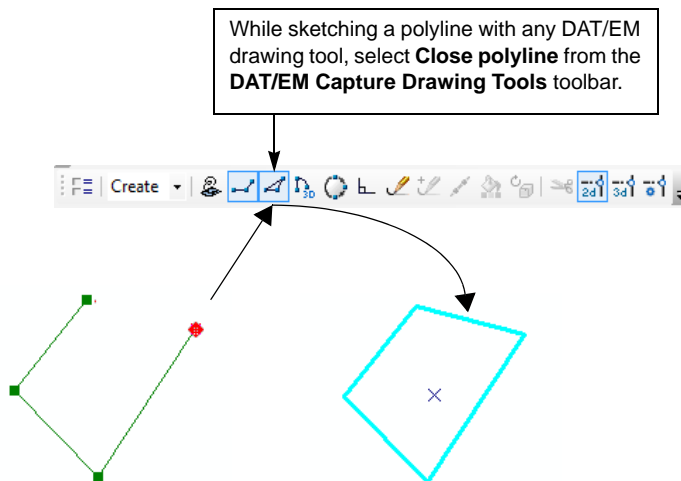
Use this tool with a polyline-geometry target/template.

To use the **Close Polyline Sketch**, perform the following steps:

- Step 1)** Use any polyline layer target/template and any DAT/EM drawing tool to sketch.
- Step 2)** Pause the sketch after drawing the second-to-last vertex. Select **Close Polyline** from the **DAT/EM Capture Drawing Tools** toolbar.

This function may be activated from a DAT/EM KEYPAD key or digitizer button set to:

```
CallCommand CaptureArcInfo.ClosePolyline
```



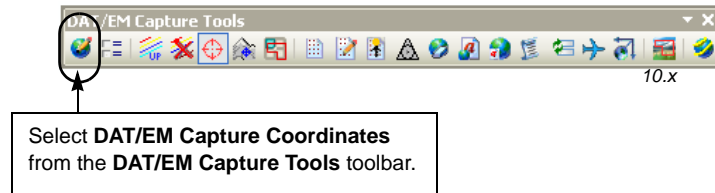
DAT/EM Capture Coordinates

Purpose: To display the ground coordinates that SUMMIT EVOLUTION sends to ArcMap; to set view zoom preferences.

The **DAT/EM Capture Coordinates** command activates a ground coordinate display window and some view preference settings.

To use **DAT/EM Capture Coordinates**, perform the following steps:

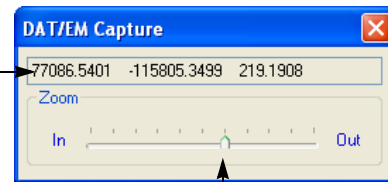
Step 1) Select the **DAT/EM Capture Coordinates** icon from the **DAT/EM Capture Tools** toolbar.



Step 2) Drag the coordinate display window to any desired display position.

Step 3) Set **Zoom** as desired at any time.

XYZ coordinates sent from SUMMIT EVOLUTION to ArcMap.



As SUMMIT EVOLUTION pans or zooms, it forces ArcMap to display a similar view. **Zoom** allows the ArcMap view to be zoomed in or out compared to the SUMMIT EVOLUTION view:

- A setting near the middle of the slider sets the ArcMap view zoom to be about the same as the SUMMIT EVOLUTION Image View.
- A setting near **Out** on the right sets the ArcMap view zoom to be zoomed out compared to the Image View.
- A setting near **In** on the left sets the ArcMap view zoom to be slightly more zoomed in than the Image View.

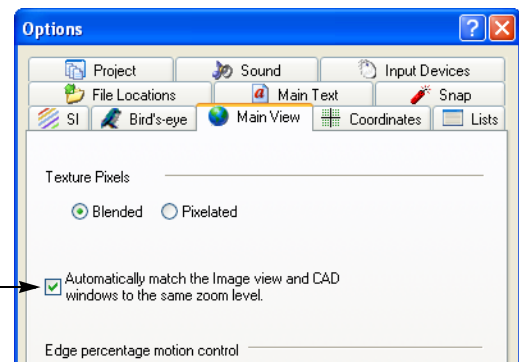
This setting works in conjunction with the **Always match image view...** setting on the **Image View** tab in the SUMMIT EVOLUTION Options dialog. This setting *must* be on to prevent ArcMap from crashing; if it is off, ArcMap may crash when the SUMMIT EVOLUTION cursor is allowed to leave the ArcMap view.



Tools toolbar in SUMMIT EVOLUTION

Activate the Options dialog in SUMMIT EVOLUTION.


Select the **Main View** tab. **Automatically match the Image view...** must be on at all times.



DAT/EM Cursor

Purpose: The DAT/EM Cursor makes it possible to draw in ArcMap without moving the system mouse cursor. It is designed for use with DAT/EM Drawing tools and DAT/EM snaps. The DAT/EM cursor also prevents the system mouse cursor from jumping back to the ArcMap view every time the stereoplotter moves.

The **DAT/EM Cursor** has the effect of separating the stereoplotter cursor from the system mouse cursor in ArcMap.

- If the DAT/EM cursor is on, there are two independent cursor indicators: one to show SUMMIT EVOLUTION's position , and another one for the system mouse. The system mouse cursor "remembers" where it was before the stereoplotter cursor moved.
- If the DAT/EM cursor is off, there is a single cursor indicator in ArcMap. The system mouse and SUMMIT EVOLUTION take turns controlling this single cursor. Every time the stereoplotter moves, the system mouse jumps to SUMMIT's location in the ArcMap view.
- The DAT/EM Cursor should be ON when using DAT/EM drawing tools and DAT/EM snaps.
- The DAT/EM Cursor should be OFF when using Esri drawing tools. It must also be off to optionally use Esri 10.x **Snapping** toolbar snaps (these are always 2D snaps).

To toggle the **DAT/EM Cursor**, perform the following steps:

Step 1) Use one of the following methods to toggle the DAT/EM Cursor:

- Select the DAT/EM cursor on the **DAT/EM Capture Tools** toolbar.



Select **Use DAT/EM Cursor** from the **DAT/EM Capture Tools** toolbar.

- Select a cursor button set to **Type=UserCAD**, **Action=ToggleDatumCursor**.



- Select a DAT/EM KEYPAD key that is set to **ToggleDatumCursor**.

DAT/EM Options

Purpose: To make settings for SUPER/IMPOSITION, stream digitizing, building squaring, and feature class elevation fields.

The **DAT/EM Options** command activates a dialog box that contains settings for tools such as SUPER/IMPOSITION, stream digitizing, and building squaring.

To use **DAT/EM Options**, perform the following steps:

Step 1) Select the **DAT/EM Options** icon from either the **DAT/EM Capture Tools** or the **DAT/EM Capture Drawing Tools** toolbar.



Select **DAT/EM Options** from the **DAT/EM Capture Tools** or the **DAT/EM Capture Drawing Tools** toolbar. If these toolbars do not appear, see "Check on the DAT/EM Toolbars" on page 2-3.

Step 2) The DAT/EM Systems Options dialog appears. Select tabs and make settings.

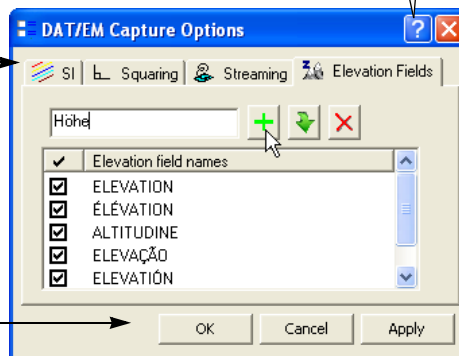
Hint for Stereoplotter Options:

Click the ?, then click on a prompt or field in the dialog box to activate context-sensitive help for that item.

Select tabs and make the desired settings.

Choose to save or cancel:

- Select **OK** to save all changes on all tabs and close the dialog box.
- Select **Cancel** to discard all changes on all tabs and close the dialog box.
- Select **Apply** to save changes that have been made on any of the tabs, but don't close the dialog box yet.

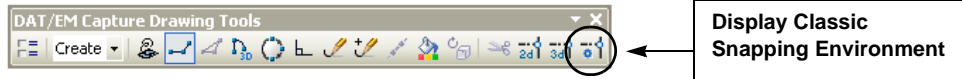


Display Classic Snapping Environment

Purpose: This command displays the Classic Snapping Environment Window.

There are special considerations for using snapping in ArcGIS 10.x. The ArcGIS Classic Snapping Environment must be used to snap with the DAT/EM cursor on and for all 3D snaps. The **Display Classic Snapping Environment** option on the **DAT/EM Capture Drawing Tools** toolbar displays the Classic Snapping Environment.

This command works in both ArcGIS 9.x and 10.x. It activates the same ArcGIS dialog in both 9.x and 10.x.



This option has the same effect as a DAT/EM KEYPAD or a digitizer button set to:

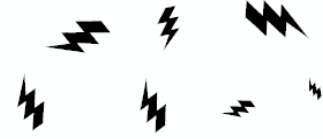
```
CallCommand esriEditor.SnappingCommand
```

Please see “Snap2D, Snap3D, SnapOff” on page 6-102 for complete snapping instructions.

Draw Point and Measure Fields

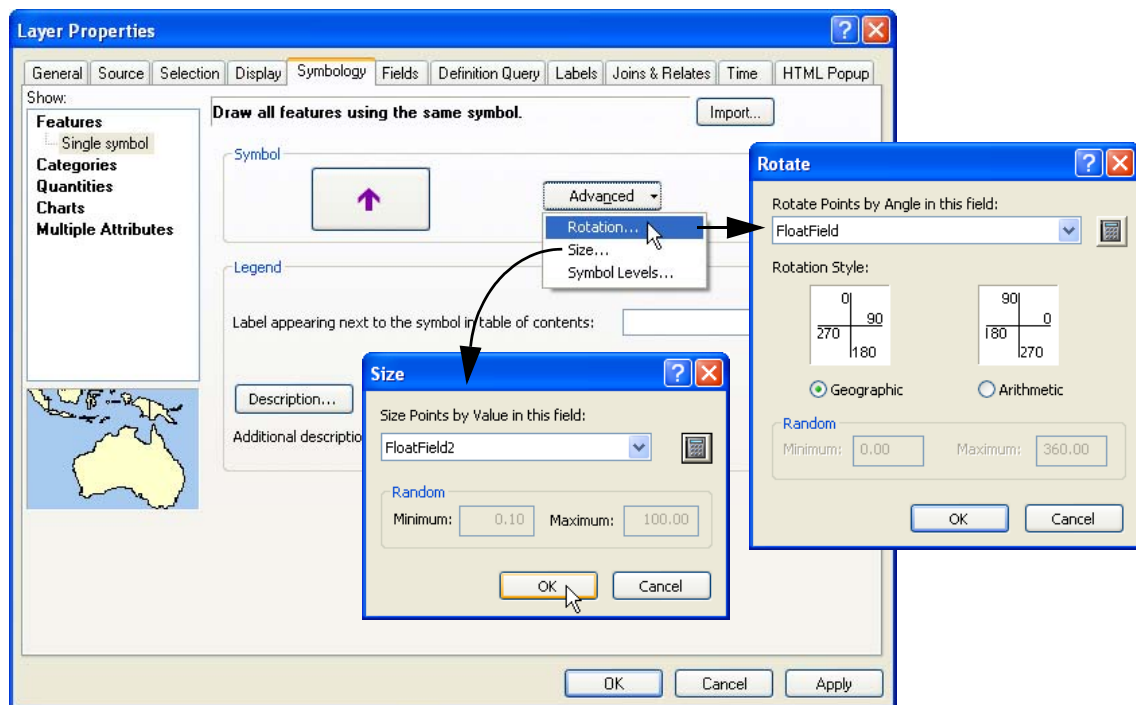
Purpose: This DAT/EM 3D drawing tool is used to digitize a point and set its rotation and size fields. Either set constant field values or measure the values.

Use this tool to draw a point-geometry object and set a float- or double-type fields to a rotation angle and size values. Digitize the point location first. If the active “measure” option is on, digitize the rotation angle and/or size value using the point location as a base.



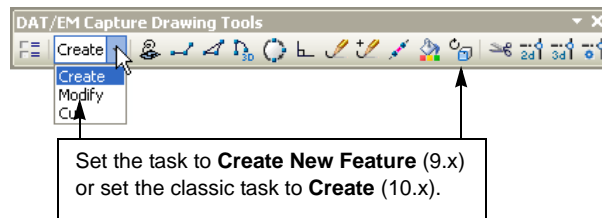
To use DAT/EM’s **Draw Point and Measure Fields** tool, perform the following steps:

- Step 1)** If an editing session is not already active, either press a **Start Editing** key on the DAT/EM KEYPAD or select **Start Editing** from the **Editor** pull-down menu on ArcMap’s **Editor** toolbar.
- Step 2)** Set the rotation and/or size fields for the layer. Right click on the point layer in the Table of Contents (TOC) and select **Properties** > **Symbology** tab:
 - a.) Select **Advanced** > **Rotation**. Set a float- or double-type field for the rotation angle value. Select your choice of **Arithmetic** or **Geographic** (Geographic rotates the same as the cursor direction, and is usually recommended).
 - b.) Select **Advanced** > **Size**. Set a float- or double-type field for the size value.



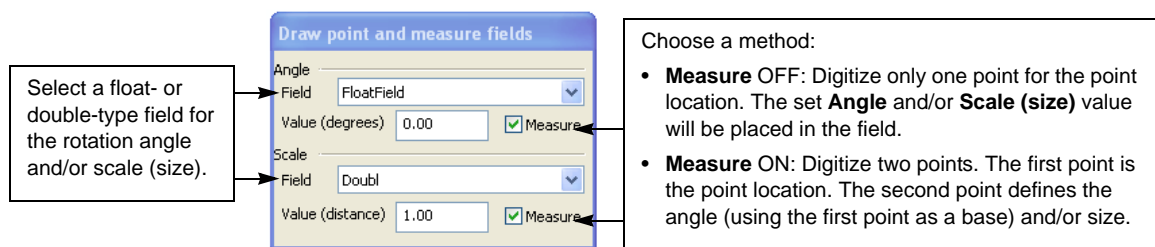
- Step 3)** Set the ArcMap 9.x target to a point-geometry shapefile or feature class, or select an ArcMap 10.x point-geometry feature class template as a target. This point-geometry target must have a rotation and/or size field that is defined as a “float” or “double” type.
- Step 4)** Set the **Task** to **Create New Feature** on the ArcMap **Editor** toolbar (9.x) or set **Create** on the **DAT/EM Capture Drawing Tools** toolbar (10.x).

Step 5) Select the **Draw point and measure fields** option from the **DAT/EM Drawing Tools** toolbar.



Step 6) Set **Angle>Field** and/or **Scale>Field** to the field name. If needed, select “(Not Set)” to deactivate the field.

Step 7) Either enter a constant value for the fields or check on **Measure** to measure the field.



Step 8) Digitize the point location.

- If **Measure** is off, the set value(s) will be placed in the field(s) and the point will rotate and/or size immediately. Do not digitize a second point for this object.
- If **Measure** is on for one or both fields, digitize a second point that defines the angle and/or scale (size). The value will be sent to the field, and will also populate value field in the dialog. If the setting has been made correctly in Step 2 above, the point will rotate and/or size in the ArcMap display.

Hint: To use the first measured angle and/or size for subsequent points, uncheck **Measure** for that field after finishing the first point.

Draw Arc

- Purpose:**
- 1) **With Create New Feature task:** Digitize a simulated arc to add to a new sketch.
 - 2) **With Modify Feature task:** Digitize a simulated arc to add to the sketch that edits an existing line or polygon.
 - 3) **With Cut Polygon Features task:** Digitize a simulated arc to add to the sketch that cuts the original polygon.

A simulated arc is a series of segments that approximate the shape of the true arc. True 3D arcs – arcs that vary in elevation from beginning to end – are not a valid geometry type in ArcGIS. Simulated arcs are used so that the elevation may change within the “arc” feature. Simulated arcs have the advantage that individual parts of the arc may be easily edited.

- When the task is **Create New Feature/classic Create**, **Draw arc** may be used to draw a new object.
- When the task is **Modify Feature/classic Modify**, **Draw arc** may be used to edit an existing object.
- When the task is **Cut Polygon Feature/classic Cut**, **Draw arc** may be used to cut one polygon into two polygons.
- The DAT/EM **Draw arc** mode may be toggled to any other DAT/EM drawing mode during the same sketch.

To use DAT/EM’s **Draw arc** mode, perform the following steps:

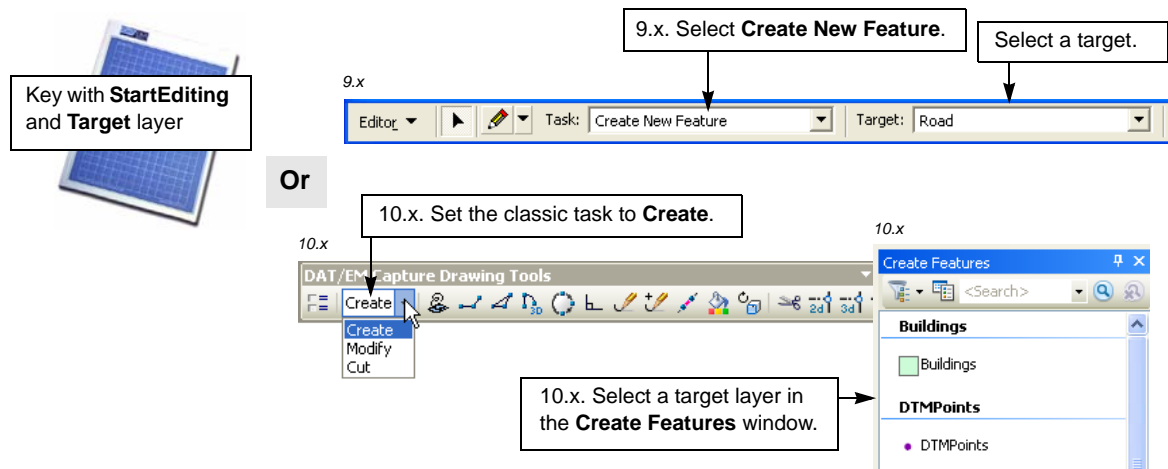
- Step 1)** If an editing session is not already active, either press a **Start Editing** key on the DAT/EM KEYPAD or select **Start Editing** from the **Editor** pull-down menu on ArcMap’s **Editor** toolbar.
- Step 2)** Make any necessary snap settings in ArcMap’s Snapping Environment window.
 - Snapping is required for the polygon’s layer when using the **Cut Polygon Features(9.x)/Cut(10.x)** task. Snapping is optional for **Create New Feature/Create** and **Modify Feature/Modify**.
 - More information about snapping may be found on page 6-102.

For ArcGIS 9.x and 10.x, use the (Classic) Snapping Environment

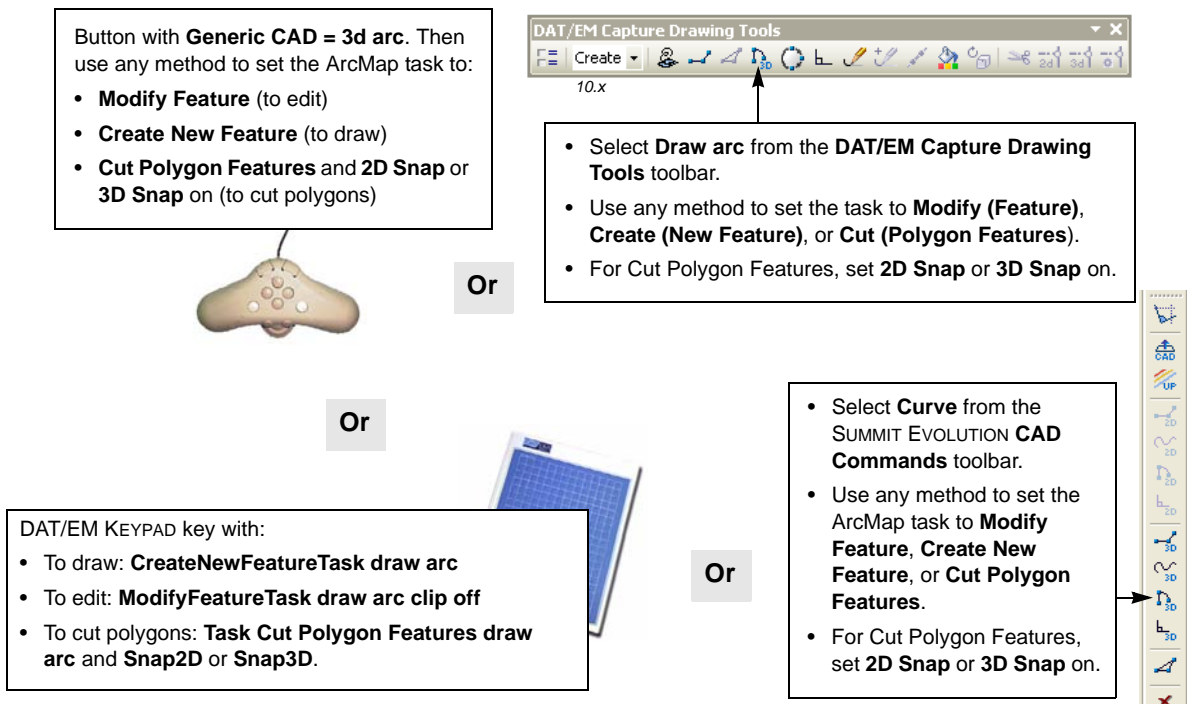
Make snap settings if necessary.

Snapping Environment			
Layer	Vertex	Edge	End
RoadCenterlines	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Buildings	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DTMPoints	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
River	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Step 3) For new objects only: Either choose a target layer from the DAT/EM KEYPAD or choose a target on the **Editor** toolbar in ArcMap.



Step 4) Choose a method to start the DAT/EM **Draw arc** mode and select the desired task:



Step 5) In arc mode, points may be digitized by either the stereoplottor or the system mouse; however, the stereoplottor must be used if accurate Z coordinates are required. Digitize the arc:

- To start a new sketch: Digitize the beginning of the arc, a point along the arc, and the end of the arc.
- To start to edit an existing object: Snap to an existing object in the current workspace. This first point is also the first endpoint of a new arc that will replace part of the original object. Note that the target layer and the layer of the object do not need to be the same; any new segments will be automatically matched to the original object's layer.

For **Cut Polygon Features(9.x)/Cut(10.x)** only, if multiple polygons are near the cursor and the wrong polygon is selected, select again in the same place to change to the next possible polygon. As long as the cursor does not move, repeated picks will continue to select the next possible polygon near the cursor.

- To continue digitizing: Digitize a point along the arc and the far end of the arc.
- To end: If editing an interior section of an object or cutting a polygon, snap back into the object at the end of the sketch. Press the **Cancel** button to finish.

See more details in the graphics and captions below.

Arc mode with

Task = Create New Feature (9.x)

or the classic task on the DAT/EM Capture Drawing Tools toolbar = Create (10.x):



1. If this arc starts the sketch, digitize the arc's first point.

If the sketch is already in process, the most recent point is used as the first point of the arc.



2. Digitize a point on the arc, preferably near the midpoint.



3. Digitize the arc's endpoint. Then choose to:

- draw another arc;
- toggle to point-to-point, square, stream, trace, or trace multiple digitizing modes;
- or, end the sketch.



Example of arc toggled to point-to-point mode.

Arc mode with

Task = *Cut Polygon Feature (9.x)*

or the classic task on the *DAT/EM Capture Drawing Tools* toolbar = *Cut (10.x)*:



1. Snap 2D or 3D must be on to begin and to finish. Snap to the original polygon where the cut line sketch is to begin.

- Note: If two or more polygons are near the cursor, pick again in the same place until the desired polygon is highlighted.

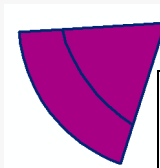


2. Digitize a point along the arc and the endpoint of the arc.

- Digitize one or more arcs.
- An arc endpoint may also be the ending snap point, if needed.
- If desired, turn off snapping while digitizing the sketch.
- If desired, toggle to other DAT/EM drawing modes and continue the sketch.



3. For the finishing point, 2D or 3D snap must be on. Snap to the original polygon and press SUMMIT EVOLUTION's **Cancel** button to finish the sketch.



One polygon has been cut into two separate, adjoining polygons.

Arc mode with**Task = *Modify Feature* (9.x)****or the classic task on the *DAT/EM Capture Drawing Tools* toolbar = *Modify* (10.x):**

1. 2D or 3D snap must be on. Snap to the existing object. The snap point is the first endpoint of the new arc.

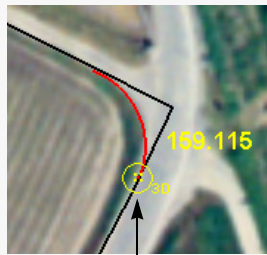
- For line/polyline objects only: To add to the end of an existing line, snap to the line's endpoint. To replace a section of the line that includes its endpoint, snap to the beginning of the section.



2. If desired, turn off snap mode while digitizing. Digitize a point on the arc, preferably near the midpoint.

3. Optional at this time:

- Digitize the arc endpoint and more arcs;
- Toggle to other DAT/EM drawing modes and continue digitizing.
- Snap to the original object *but do not Cancel*. Continue digitizing. (Unlimited snaps to the original object are allowed; the process does not finish until SUMMIT's **Cancel** button is used.



4. If replacing a midsection of the original object, 2D or 3D snap must be on in order to reconnect. Snap to the point where the end of the current arc rejoins the object.

- For polygon objects: A snap is required.
- For line/polyline objects only: If the current arc is to replace an end of the original line/polyline, digitize the end of the arc (don't snap).



5. Press the Summit Evolution's **Cancel** button to finish.

- If the last point was snapped to the original object, the section of the object between the first and last snaps is replaced.
- For line/polyline objects only: If the last point was not snapped to the original object, the end section of the line/polyline is replaced.

Step 6) (Optional) To remove vertices during the digitizing or editing process, use any of the following **Undo** options:

- The **Undo** icon on the **CAD Commands** toolbar in SUMMIT EVOLUTION;
- The **Undo Add Vertex** icon on ArcMap's **Standard** toolbar;
- Press a digitizer button that is set to **Generic CAD = Undo**. To set the digitizer buttons, start the Button Manager using the icon provided in the SUMMIT EVOLUTION window.
- Press a DAT/EM KEYPAD key that is set to **Undo**.

Step 7) To finish digitizing the feature or to finish the edit, press the SUMMIT EVOLUTION digitizer button that is set to **Generic CAD = Cancel**.

Draw 2-Point or 3-Point Circle

Purpose: To create a simulated circle based on center-edge (2-point) or edge-edge-edge (3-point) digitizing. The circle is simulated by many short segments. The result is either a new polygon or a closed (end snapped) polyline.

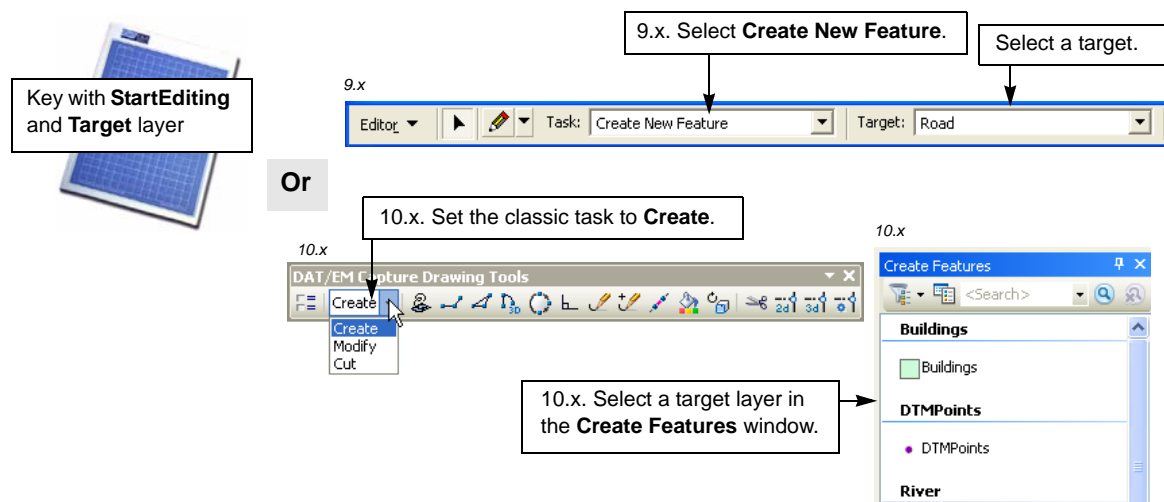
A simulated circle is a series of segments that approximate the shape of a true circle. Simulated circles are easier to edit than true circles.

With the DAT/EM **Draw circle** tool, the resulting segments are all at the same elevation — the elevation of the first digitized point — so that the line or polygon looks circular when viewed in the XY plane.

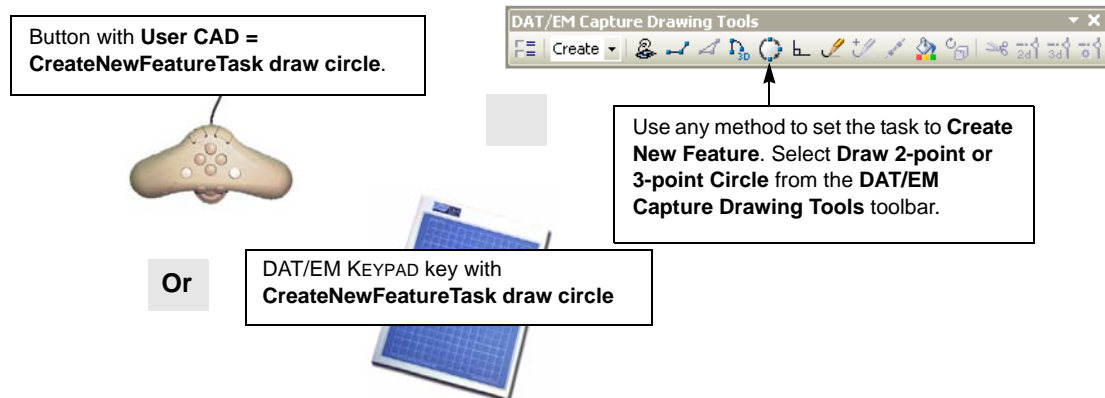
Unlike the other DAT/EM drawing tools, the **Draw circle** tool can only be used to draw new features with the **Create New Feature** task. The **Draw circle** tool may not be used to modify an existing feature.

To use DAT/EM's **Draw circle** tool, perform the following steps:

- Step 1)** If an editing session is not already active, either press a **Start Editing** key on the DAT/EM KEYPAD or select **Start Editing** from the **Editor** pull-down menu on ArcMap's **Editor** toolbar.
- Step 2)** Set the **Task** to **Create New Feature** and set a target layer.

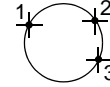
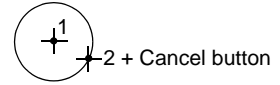


- Step 3)** Choose a method to start the DAT/EM **Draw circle** tool:



Step 4) The circle may be digitized by a center-edge (2-point) or edge-edge-edge (3-point) method:

- **For a 2-point circle:** Set the elevation of the circle. Digitize the circle's center and one point on the edge, then press the Cancel button.
- **For a 3-point circle:** Set the elevation of the circle. Digitize three different points along the edge of the circle.



Draw Point-to-Point Segments

- Purpose:**
- 1) **With Create New Feature task:** Digitize each vertex to add to a new sketch.
 - 2) **With Modify Feature task:** Digitize each new vertex to add to an existing line or polygon.
 - 3) **With Cut Polygon Features task:** Digitize each new vertex to add to the line sketch that cuts the original polygon.

Note the following about the DAT/EM **Draw point-to-point segments** tool:

- When the task is **Create New Feature/classic Create**, **Draw point-to-point segments** may be used to draw a new object.
- When the task is **Modify Feature/classic Modify**, **Draw point-to-point segments** may be used to edit an existing object.
- When the task is **Cut Polygon Features/Classic Cut**, **Draw point-to-point segments** may be used to cut one polygon into two polygons.
- With any of these tasks, the DAT/EM **Draw point-to-point segments** may be toggled to any other DAT/EM drawing mode during the same sketch.

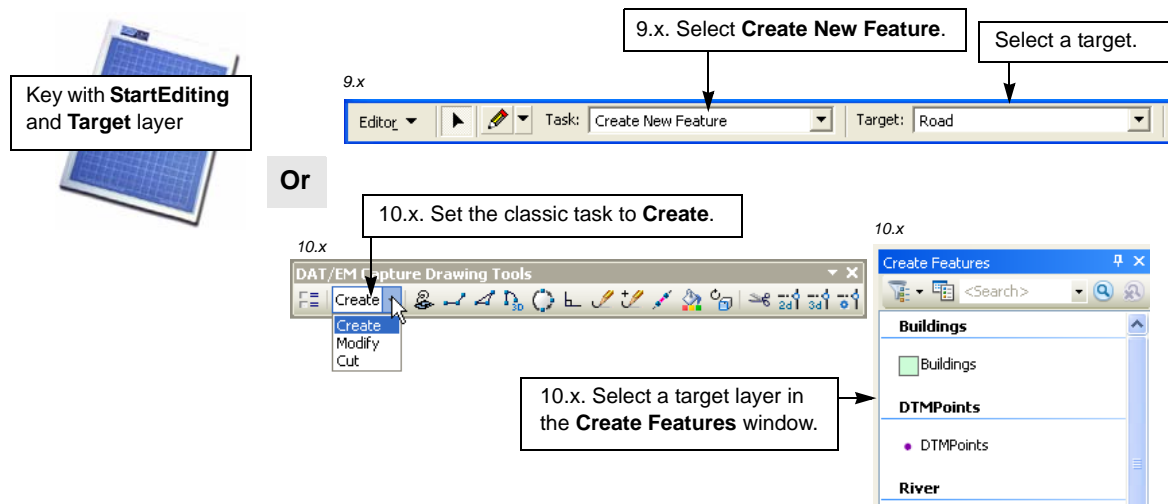
To use DAT/EM's **Draw point-to-point segments** mode, perform the following steps:

- Step 1)** If an editing session is not already active, either press a **Start Editing** key on the DAT/EM KEYPAD or select **Start Editing** from the **Editor** pull-down menu on ArcMap's **Editor** toolbar.
- Step 2)** Make any necessary snap settings in ArcMap's Snapping Environment window.
 - Snapping is required for the polygon's layer when using the **Cut Polygon Features(9.x)/Cut(10.x)** task. Snapping is optional for **Create New Feature/Create** and **Modify Feature/Modify**.
 - More information about snapping may be found on page 6-102.

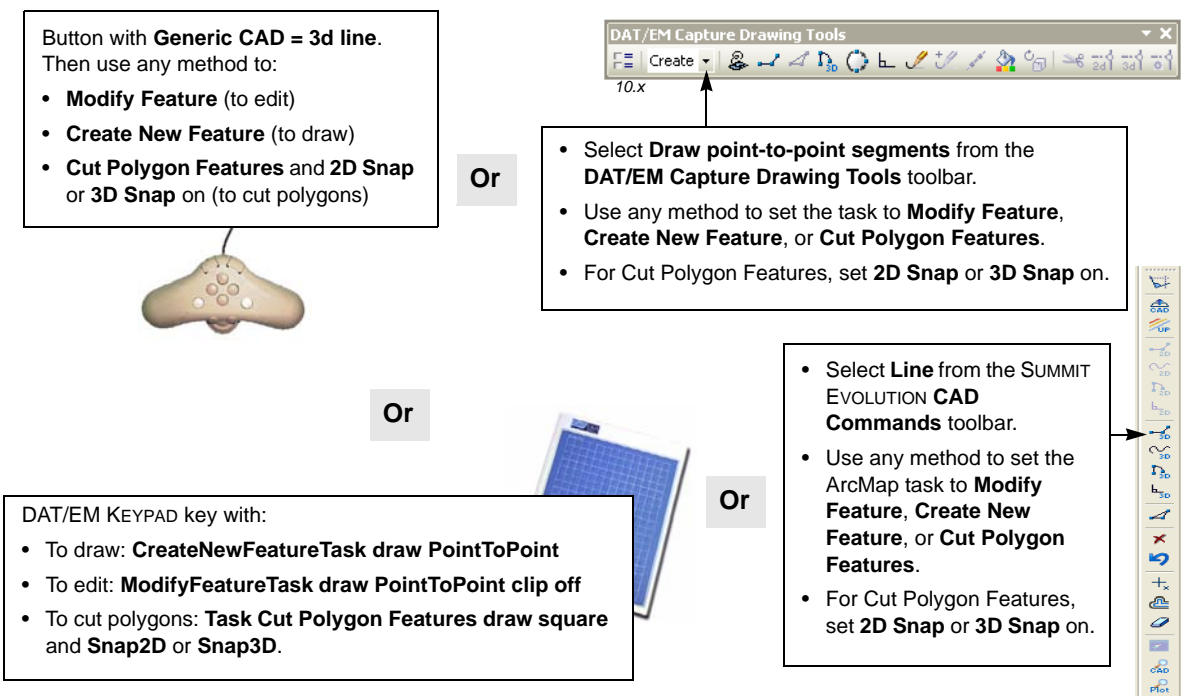
Make snap settings if necessary.

Snapping Environment			
Layer	Vertex	Edge	End
RoadCenterlines	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Buildings	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
DTMPoints	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
River	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Step 3) For new objects only: Either choose a target layer from the DAT/EM KEYPAD or choose a target on the **Editor** toolbar in ArcMap. The layer may have point, polyline, or polygon geometry. Note the following:



Step 4) Choose a method to start the point-to-point digitizing mode and select the desired task:



Step 5) In **Draw point-to-point segments** mode, vertices may be digitized by either the stereoplotter or the system mouse; however, the stereoplotter must be used if an accurate Z coordinate is required. Digitize the point-to-point vertices:

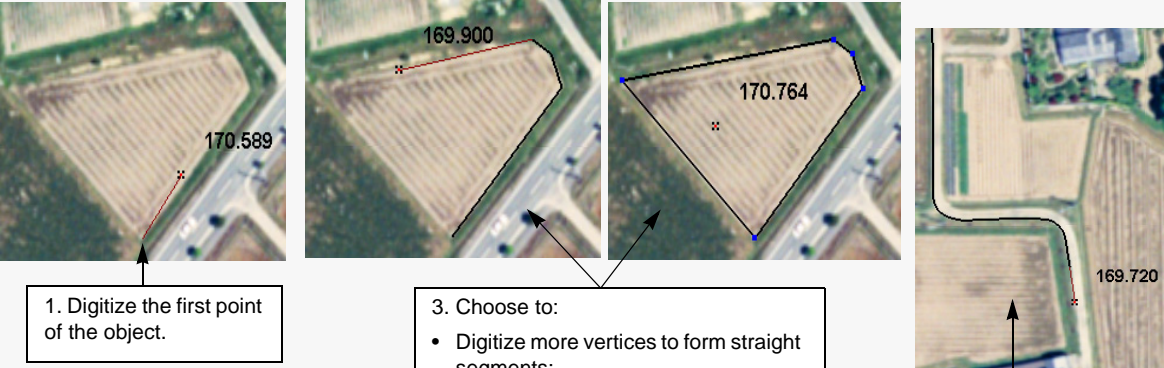
- To start a new sketch: Press the digitizing switch at each vertex of the polygon or polyline. If the target layer has point geometry type, it will place a single, complete point each time the digitizing switch is pressed.
- To start to edit an existing object: Snap to an existing object in the current workspace. This snap-in point is the first point of the new segment(s) that will replace part of the original object or cut the polygon apart.

For **Cut Polygon Features(9.x)/Cut(10.x)** only, if multiple polygons are near the cursor and the wrong polygon is selected, select again in the same place to change to the next possible polygon. As long as the cursor does not move, repeated picks will continue to select the next possible polygon near the cursor.

- To continue digitizing: Digitize as many vertices as desired into the new or edited object. Change to other DAT/EM digitizing modes at any time.
- To end: If editing an interior section of an object or cutting a polygon, snap back into the object at the end of the sketch. Press the **Cancel** button to finish.

See more details in the graphics and captions below.

Point-to-Point mode with Task = Create New Feature (9.x) or the classic task on the DAT/EM Capture Drawing Tools toolbar = Create (10.x):



1. Digitize the first point of the object.

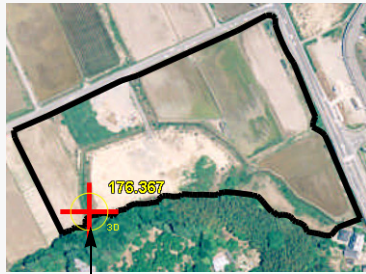
3. Choose to:

- Digitize more vertices to form straight segments;
- Toggle to arc, square, stream, trace, or trace multiple digitizing modes;
- Use SUMMIT EVOLUTION's **Cancel** button to end the sketch.

Example of point-to-point mode toggled to arc mode.

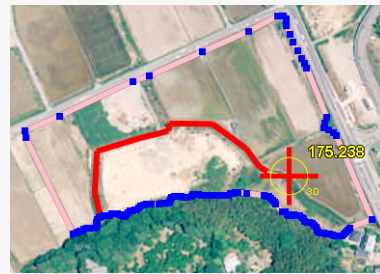
Point-to-Point mode with
Task = *Cut Polygon Features (9.x)*

or the classic task on the *DAT/EM Capture Drawing Tools* toolbar = *Cut (10.x)*:



1. Snap 2D or 3D must be on to begin and to finish. Snap to the original polygon where the cut line sketch is to begin.

- If two or more polygons are near the cursor, pick again in the same place until the desired polygon is highlighted.

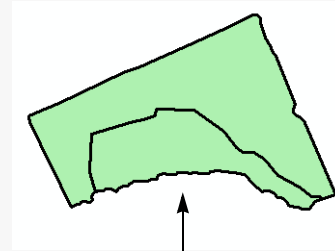


2. Options at this time:

- Digitize more vertices to form more segments;
- Toggle to other DAT/EM drawing modes and continue the sketch.
- If desired, turn off snapping while digitizing the new vertices.



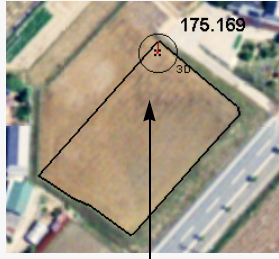
4. For the finishing point, 2D or 3D snap must be on. Snap to the original polygon and press SUMMIT EVOLUTION's **Cancel** button to finish the sketch.



One polygon has been split into two separate, adjoining polygons.

**Point-to-Point mode with
Task = *Modify Feature* (9.x)**

or the classic task on the *DAT/EM Capture Drawing Tools* toolbar = *Modify* (10.x):



1. 2D or 3D snap must be on. Snap to the existing object where the replacement is to begin.

- For line/polyline objects only: To add to the end of an existing line, snap to the line's endpoint. To replace a section of the line that includes its endpoint, snap to the beginning of the section.



2. If desired, turn off snapping while digitizing the new vertices.

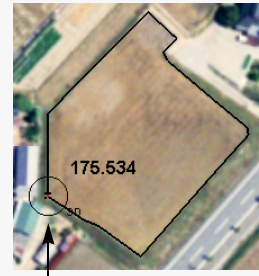
3. Optional at this time:

- Digitize more vertices to form straight segments;
- Toggle to other DAT/EM drawing modes and continue digitizing.
- Snap to the original object *but do not Cancel*. Continue digitizing. (Unlimited snaps to the original object are allowed; the process does not finish until SUMMIT's **Cancel** button is used.



4. If replacing a midsection of the original object, 2D or 3D snap must be on in order to reconnect. Snap to the point where the new section rejoins the object.

- For polygon objects: A snap is required.
- For line/polyline objects only: If replacing an end of the original line/polyline, finish digitizing the new end, but don't snap back into the original object.



5. Press the Summit Evolution's **Cancel** button to finish.

- If the last point was snapped to the original object, the section of the object between the first and last snaps is replaced.
- For line/polyline objects only: If the last point was not snapped to the original object, the end section of the line/polyline is replaced.

Step 6) (Optional) To remove vertices during the digitizing process, use any of the following **Undo** options:

- The **Undo** icon on the **CAD Commands** toolbar in SUMMIT EVOLUTION;
- The **Undo Add Vertex** icon on ArcMap's **Standard** toolbar;
- Press a digitizer button that is set to **Generic CAD = Undo**. To set the digitizer buttons, start the Button Manager using the icon provided in the SUMMIT EVOLUTION window.
- Press a DAT/EM KEYPAD key that is set to **Undo**.

Step 7) To finish digitizing the feature or to finish the edit, press the SUMMIT EVOLUTION digitizer button that is set to **Generic CAD = Cancel**.

Draw Squared Segments

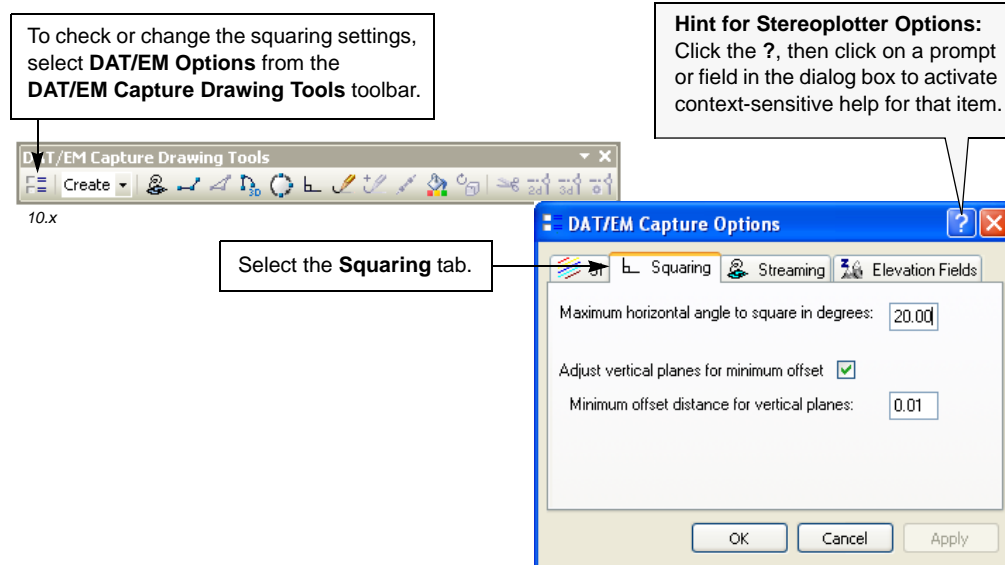
- Purpose:**
- 1) **With Create New Feature task:** Add new segments to a new sketch. Each new segment is digitized at 90° to the previous segment as long as the cursor position is within the set angle tolerances.
 - 2) **With Modify Feature task:** Add new segments to an existing line or polygon. Each new segment is digitized at 90° to the previous segment as long as the cursor position is within the set angle tolerances.
 - 3) **With Cut Polygon Features task:** Digitize a new segment at 90° to the previous segment; add this line “squared” segment to the line sketch that cuts the original polygon.

Note the following about DAT/EM’s **Draw squared segments** mode tool:

- When the task is **Create New Feature/classic Create**, **Draw squared segments** may be used to draw a new polyline or polygon object.
- When the task is **Modify Feature/classic Modify**, **Draw squared segments** may be used to edit an existing polyline or polygon object.
- When the task is **Cut Polygon Features/classic Cut**, **Draw squared segments** may be used to cut one polygon into two polygons.
- For any of these tasks, the DAT/EM **Draw squared segments** may be toggled to any other DAT/EM drawing mode during the same sketch.

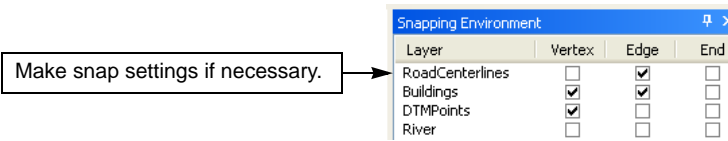
To use DAT/EM’s **Draw squared segments** mode, perform the following steps:

- Step 1)** (Optional) To check or change the squaring settings, select **DAT/EM Options** from the **DAT/EM Capture Drawing Tools** toolbar. Select the **Squaring** tab and make settings.

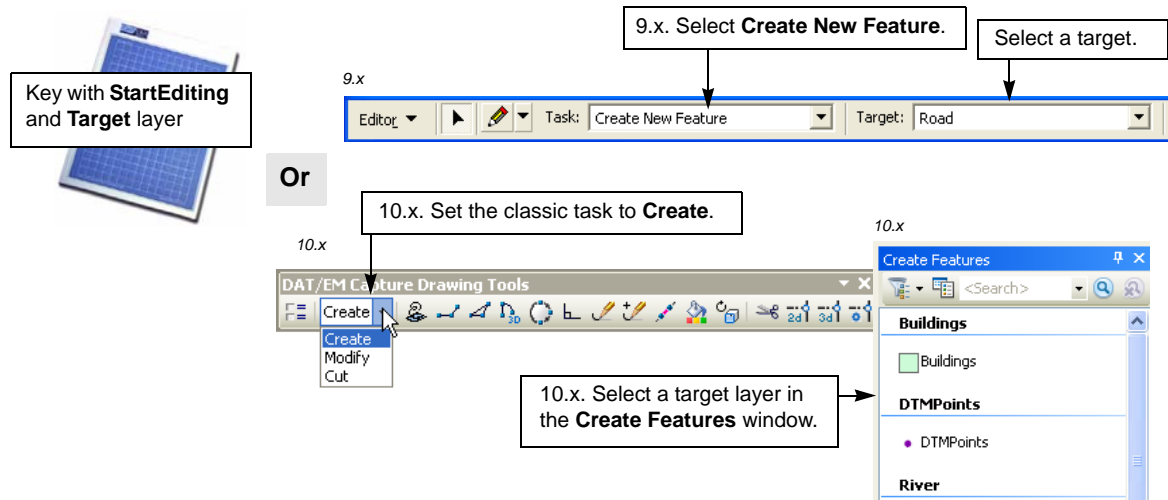


- Step 2)** If an editing session is not already active, either press a **Start Editing** key on the DAT/EM KEYPAD or select **Start Editing** from the **Editor** pull-down menu on ArcMap’s **Editor** toolbar.

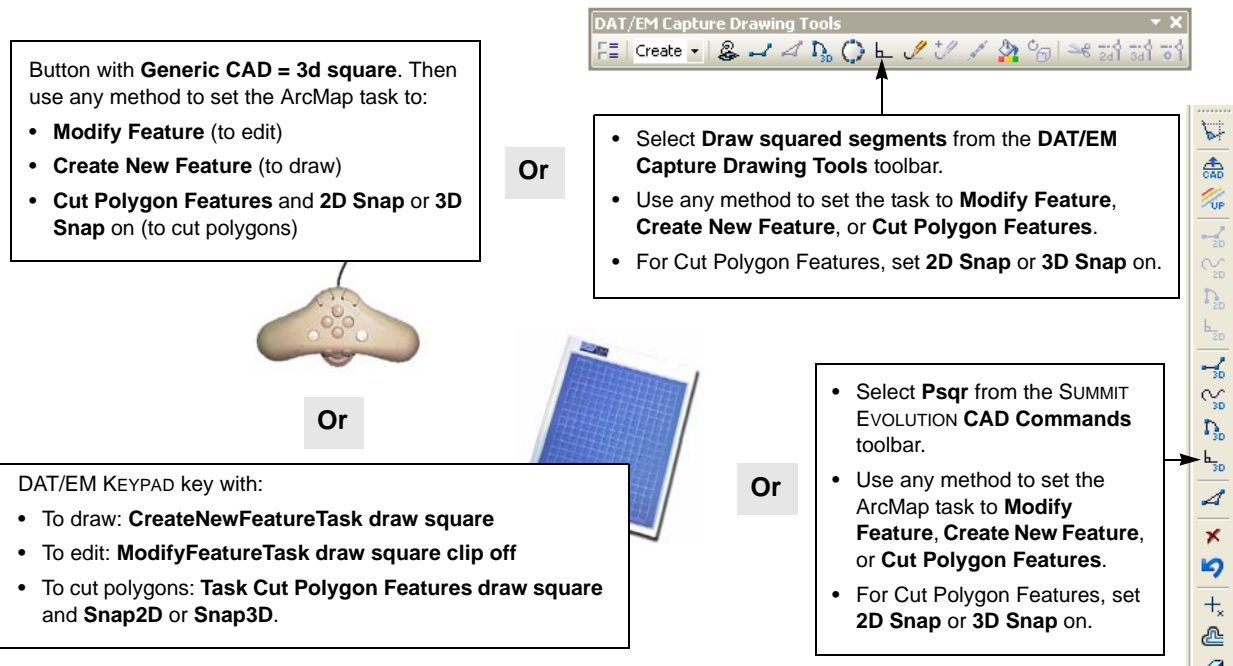
Step 3) Make any necessary snap settings in ArcMap's Snapping Environment window.



Step 4) If planning to use the **Create New Feature** task, choose a polyline or polygon target layer from the DAT/EM KEYPAD or choose a target on the **Editor** toolbar in ArcMap.



Step 5) Choose a method to start the squared digitizing mode and select the desired task:



Step 6) In **Draw squared segments** mode, vertices may be digitized by either the stereoplotter or the system mouse; however, the stereoplotter must be used if an accurate Z coordinate is required. Digitize the squared vertices:

- To start a new sketch: Press the digitizing switch at each vertex of the polygon or polyline (these are often building corners).

To start to edit an existing object: Snap to an existing object in the current workspace. This snap-in point is the first point of the new segment(s) that will replace part of the original object or cut the polygon apart. Note that the target layer and the layer of the object do not need to be the same; any new segments will be automatically matched to the original object's layer.

For **Cut Polygon Features(9.x)/Cut(10.x)** only, if multiple polygons are near the cursor and the wrong polygon is selected, select again in the same place to change to the next possible polygon. As long as the cursor does not move, repeated picks will continue to select the next possible polygon near the cursor.

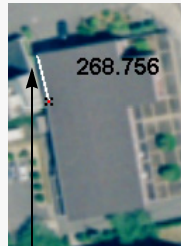
- To continue digitizing: Digitize as many vertices as desired into the new or edited object. Change DAT/EM digitizing modes at any time.
- To end: If editing an interior section of an object or cutting a polygon, snap back into the object at the end of the sketch. Press the **Cancel** button to finish.

See more details in the graphics and captions below:

Squared mode with

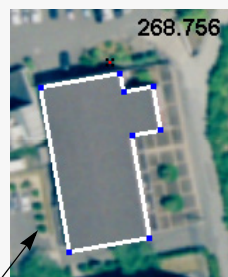
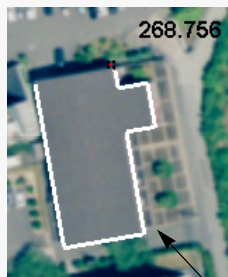
Task = Create New Feature (9.x)

or the classic task on the DAT/EM Capture Drawing Tools toolbar = Create (10.x):



1. Digitize the first point of the object.

Hint: Digitize the endpoints of the longest, most visible side of the object first. This helps set up the initial squaring angle.



3. Choose to:

- Digitize more vertices to form straight segments. In the case of a rectangular object, digitize only the first three corners (for polygon geometry only);
- Toggle to arc, square, stream, trace, or trace multiple digitizing modes;
- Use SUMMIT EVOLUTION's **Cancel** button to end the sketch.

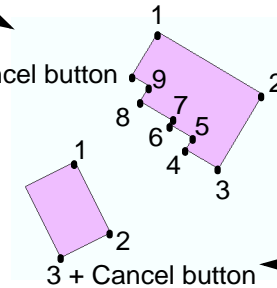


Example of squared mode toggled to arc mode.

Example of two buildings and the order that the vertices were digitized.



10 + Cancel button

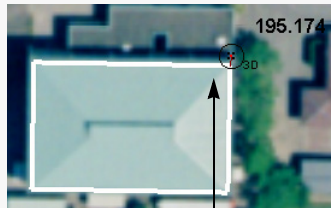


Notice that the rectangular building polygon may be finished after digitizing only three of the corners.

Squared mode with

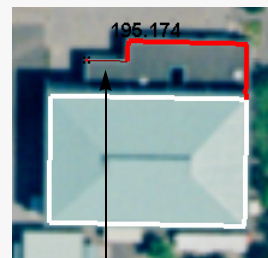
Task = **Modify Feature (9.x)**

or the classic task on the **DAT/EM Capture Drawing Tools** toolbar = **Modify (10.x)**:



1. 2D or 3D snap must be on. Snap to the existing object where the replacement is to begin. (In this example, a 3D snap is followed by a 2D snap to place a segment between the upper and lower roof levels.)

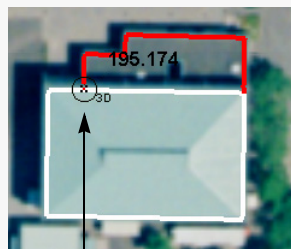
- For line/polyline objects only: To add to the end of an existing line, snap to the line's endpoint. To replace a section of the line that includes its endpoint, snap to the beginning of the section.



2. If desired, turn off snapping while digitizing the new vertices.

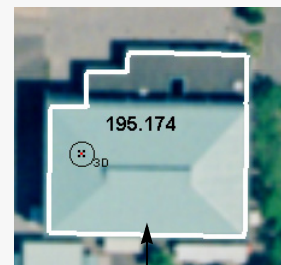
3. Optional at this time:

- Digitize more vertices to form straight segments;
- Toggle to other DAT/EM drawing modes and continue digitizing.
- Snap to the original object *but do not Cancel*. Continue digitizing. (Unlimited snaps to the original object are allowed; the process does not finish until SUMMIT's **Cancel** button is used.



4. If replacing a midsection of the original object, 2D or 3D snap must be on in order to reconnect. Snap to the point where the new section rejoins the object. (In this example, a 2D snap is followed by a 3D snap to place a segment between the lower and upper roof levels.)

- For polygon objects: A snap is required.
- For line/polyline objects only: If replacing an end of the original line/polyline, finish digitizing the new end, but don't snap back into the original object.



5. Press the Summit Evolution's **Cancel** button to finish.

- If the last point was snapped to the original object, the section of the object between the first and last snaps is replaced.
- For line/polyline objects only: If the last point was not snapped to the original object, the end section of the line/polyline is replaced.

**Squared mode with
Task = *Cut Polygon Features* (9.x)
or the classic task on the *DAT/EM Capture Drawing Tools* toolbar = *Cut* (10.x):**



1. Snap 2D or 3D must be on to begin and to finish. Snap to the original polygon where the cut line sketch is to begin.
 - If two or more polygons are near the cursor, pick again in the same place until the desired polygon is highlighted.



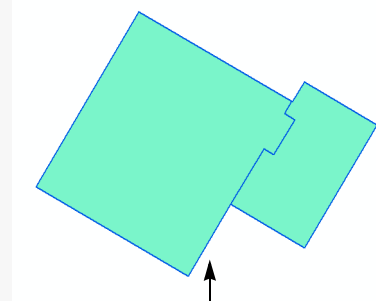
2. If desired, turn off snapping while digitizing the new vertices.

3. Options at this time:

- Digitize more vertices to form more squared segments;
- Toggle to other DAT/EM drawing modes and continue the sketch.



4. For the finishing point, 2D or 3D snap must be on. Snap to the original polygon and press SUMMIT EVOLUTION's **Cancel** button to finish the sketch.



One polygon has been split into two separate, adjoining polygons.

Step 7) (Optional) To remove vertices during digitizing, use any of the following **Undo** options:

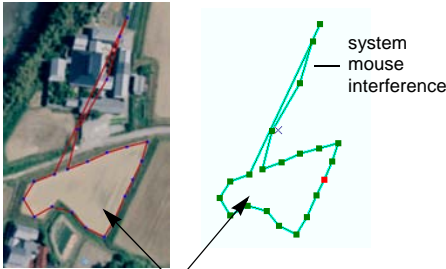
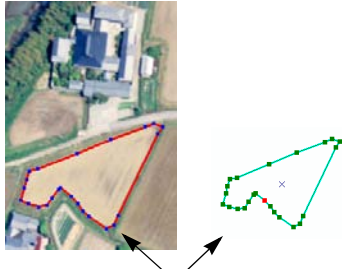
- The **Undo** icon on the **CAD Commands** toolbar in SUMMIT EVOLUTION.
- The **Undo Add Vertex** icon on ArcMap's **Standard** toolbar.
- Press a digitizer button that is set to **Generic CAD = Undo**. To set the digitizer buttons, start the Button Manager using the icon provided in the SUMMIT EVOLUTION window.
- Press a DAT/EM KEYPAD key that is set to **Undo**.

Step 8) To finish digitizing the feature or to finish the edit, press the SUMMIT EVOLUTION digitizer button that is set to **Generic CAD = Cancel**.

Draw Streamed Vertices

- Purpose:**
- 1) **With Create New Feature task:** Digitize streamed vertices to add to a new sketch.
 - 2) **With Modify Feature task:** Digitize streamed vertices to add to an existing line or polygon.
 - 3) **With Cut Polygon Features task:** Stream mode is deactivated for **Cut Polygon Features**.

There are several advantages to using DAT/EM's **Draw streamed vertices** drawing tool instead of ArcMap's "Streaming - F8 (key)" option:

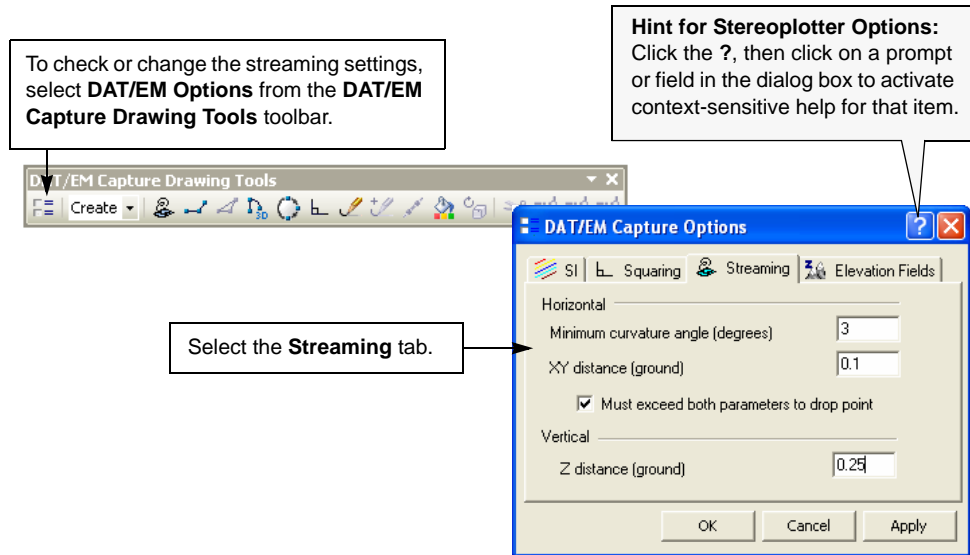
ArcMap Streaming	DAT/EM "Draw Streamed Vertices" tool
 <p>ArcMap's streaming can result in:</p> <ul style="list-style-type: none"> • All vertices a set distance apart; • Curves and corners cut off or too jagged; • "Zinger" where system mouse was accidentally bumped. • During digitizing, one Undo might take away several vertices, or even tens or hundreds, depending on the setting. • ArcMap streaming can't be set to digitize a vertex based on angle or elevation changes. 	 <p>DAT/EM's streaming results in:</p> <ul style="list-style-type: none"> • Option for more vertices around curves and corners than in a straight line; another option for evenly spaced vertices. • No system mouse interference; • During digitizing, one DAT/EM Undo removes just one vertex. • Points can be digitized based on angle, XY change, and/or elevation change.

Note the following about DAT/EM's **Draw streamed vertices** drawing tool:

- When the task is **Create New Feature/classic Create**, **Draw streamed vertices** may be used to draw a new object.
- When the task is **Modify Feature/classic Modify**, **Draw streamed vertices** may be used to edit an existing object.
- For any of these tasks, the DAT/EM **Draw streamed vertices** may be toggled to any other DAT/EM drawing mode during the same sketch.

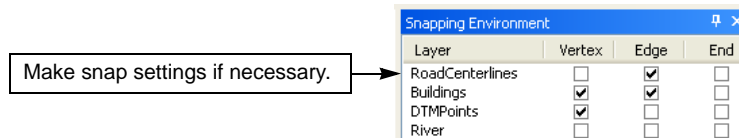
To use DAT/EM's **Draw streamed vertices** drawing tool, perform the following steps:

- Step 1)** (Optional) To check or change the streaming settings, select **DAT/EM Options** from the **DAT/EM Capture Drawing Tools** toolbar. Select the **Streaming** tab and make settings.

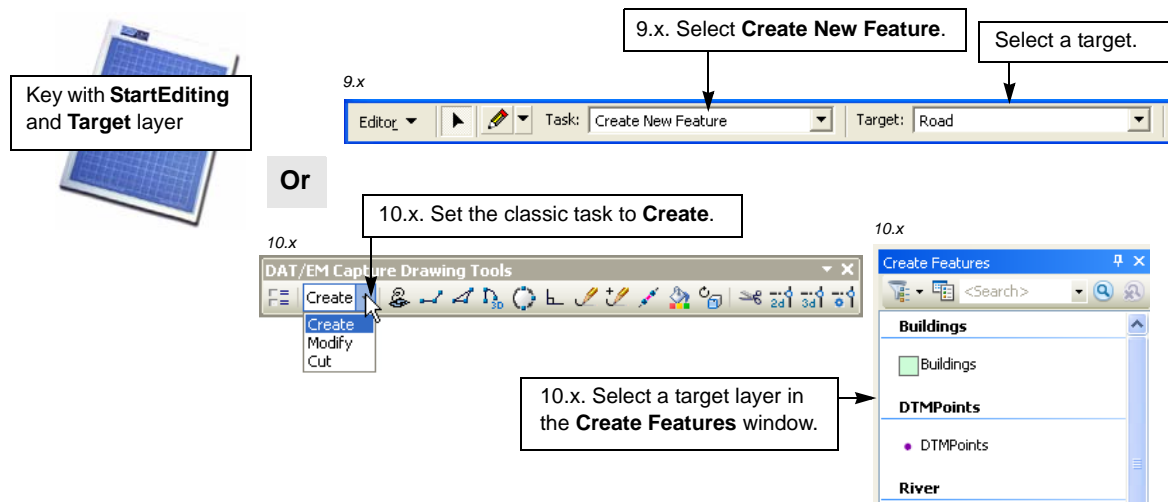


- Step 2)** If an editing session is not already active, either press a **Start Editing** key on the DAT/EM KEYPAD or select **Start Editing** from the **Editor** pull-down menu on ArcMap's **Editor** toolbar.

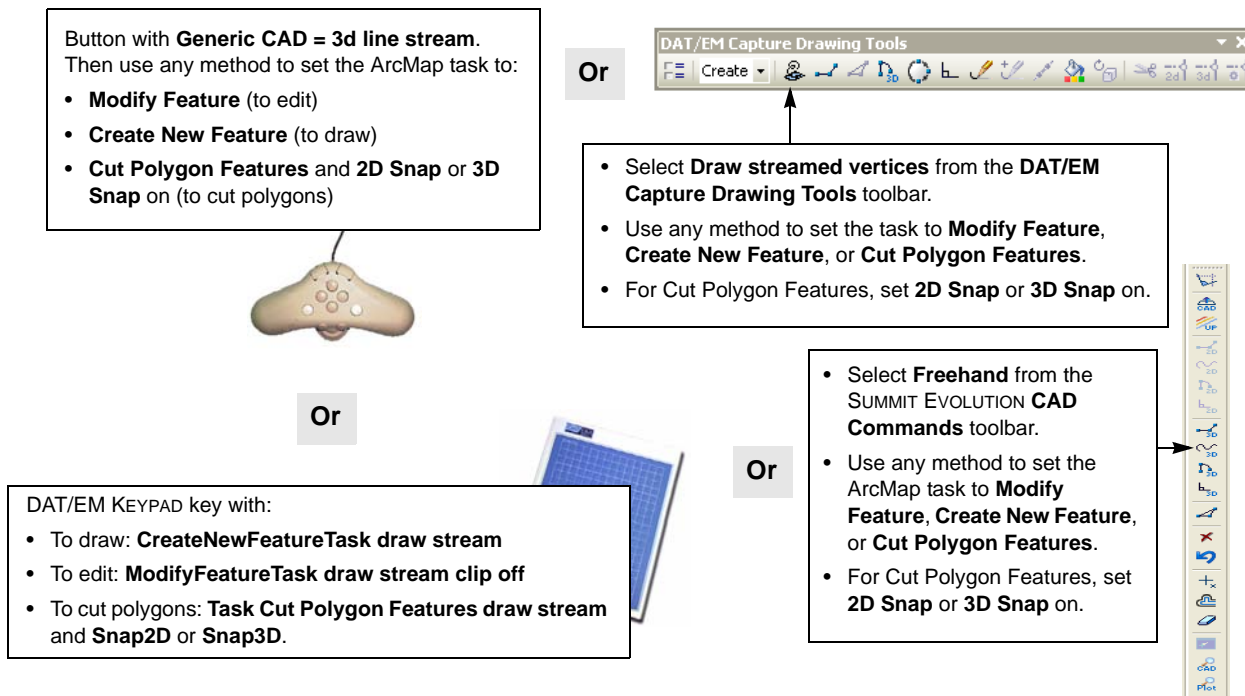
- Step 3)** Make any necessary snap settings in ArcMap's Snapping Environment window.



- Step 4)** For new objects only: Either choose a target layer from the DAT/EM KEYPAD or choose a target on the **Editor** toolbar in ArcMap.



Step 5) Choose a method to start the **Draw streamed vertices** mode and select the desired task:



Step 6) In streaming mode, vertices may be digitized by either the stereoplottor or the system mouse; however, the stereoplottor must be used if an accurate Z coordinate is required. Digitize the streamed vertices:

- To start a new sketch: Press the digitizing button once at the start of the feature. This sets a “pen down” status. Move the stereoplottor cursor carefully around the object. Vertices are automatically added to the sketch based on the streaming values set in Step 1.
- To start to edit an existing object: Snap to an existing object in the current workspace. This snap-in point is the first point of the new segments that will replace part of the original object.
- To continue digitizing: Add as many vertices as desired into the new or edited object. Change DAT/EM digitizing modes at any time.
- To end: If editing an interior section of an object or cutting a polygon, snap back into the object at the end of the sketch. Press the **Cancel** button to finish.

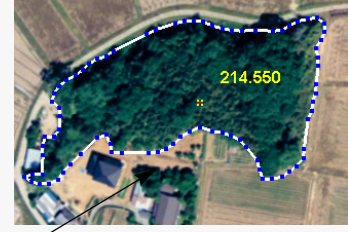
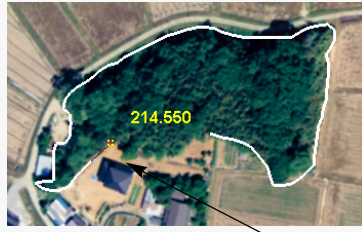
See more details in the graphics and captions below.

Streaming mode with
Task = *Create New Feature (9.x)*

or the classic task on the *DAT/EM Capture Drawing Tools* toolbar = *Create (10.x)*:



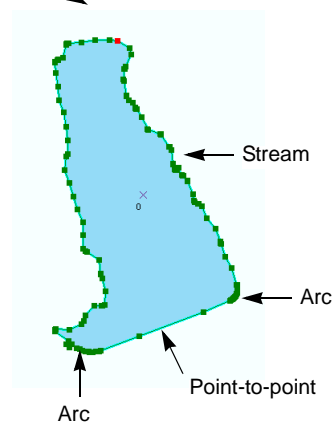
1. Digitize the first point of the object. This sets the "pen down" status. Move around the edge of the object.



2. Choose to:

- Digitize more vertices by moving around the edge of the object;
- Toggle to arc, point-to-point, square, trace, or trace multiple digitizing modes;
- Use SUMMIT EVOLUTION's **Cancel** button to end the sketch.

Example of streaming mode toggled to arc and point-to-point modes.



Streaming mode with**Task = *Modify Feature* (9.x)****or the classic task on the *DAT/EM Capture Drawing Tools* toolbar = *Modify* (10.x):**

1. 2D or 3D snap must be on. Snap to the existing object where the replacement is to begin. If necessary, digitize the first point of the new streaming area to activate "pen down" status.

- For line/polyline objects only: To add to the end of an existing line, snap to the line's endpoint. To replace a section of the line that includes its endpoint, snap to the beginning of the section.

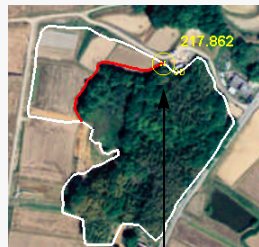


2. If desired, turn off snapping while digitizing the new vertices.

Move along the edge of the feature.

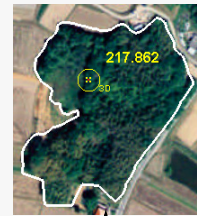
3. Optional at this time:

- Keep moving along the edge of the feature to automatically drop vertices along the path of the cursor;
- Toggle to other DAT/EM drawing modes and continue digitizing.
- Snap to the original object *but do not Cancel*. Continue digitizing. (Unlimited snaps to the original object are allowed; the process does not finish until SUMMIT's **Cancel** button is used.



4. If replacing a midsection of the original object, 2D or 3D snap must be on in order to reconnect. Snap to the point where the new section rejoins the object.

- For polygon objects: A snap is required.
- For line/polyline objects only: If replacing an end of the original line/polyline, finish digitizing the new end, but don't snap back into the original object.



5. Press Summit Evolution's **Cancel** button to finish.

- If the last point was snapped to the original object, the section of the object between the first and last snaps is replaced.
- For line/polyline objects only: If the last point was not snapped to the original object, the end section of the line/polyline is replaced.

Step 7) (Optional) To remove vertices during digitizing, use any of the following **Undo** options:

- The **Undo** icon on the **CAD Commands** toolbar in SUMMIT EVOLUTION.
- The **Undo Add Vertex** icon on ArcMap's **Standard** toolbar.
- Press a digitizer button that is set to **Generic CAD = Undo**. To set the digitizer buttons, start the Button Manager using the icon provided in the SUMMIT EVOLUTION window.
- Press a DAT/EM KEYPAD key that is set to **Undo**.

Step 8) To finish digitizing the feature or to finish the edit, press the SUMMIT EVOLUTION digitizer button that is set to **Generic CAD = Cancel**.

Draw Trace Multiple Features

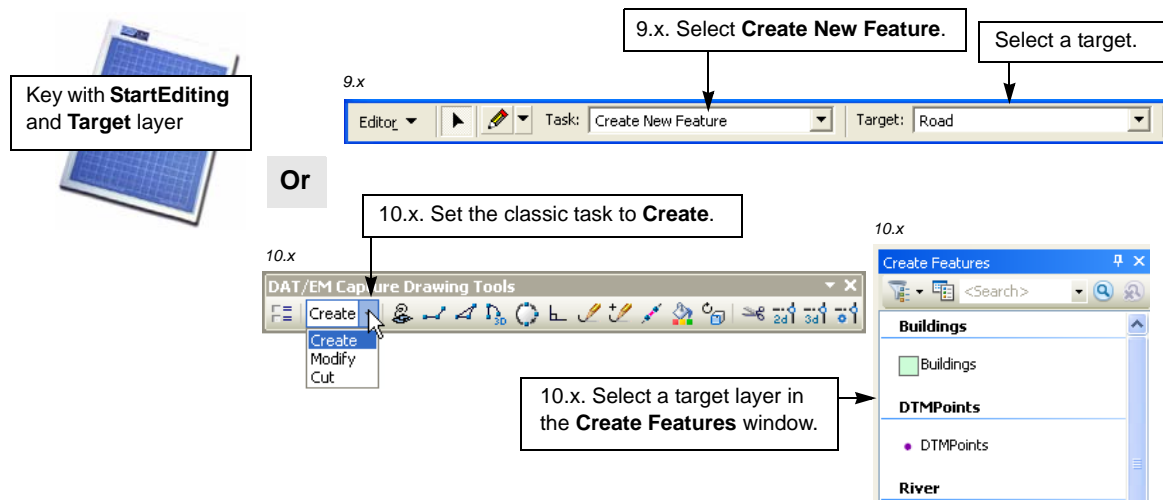
- Purpose:**
- 1) **With Create New Feature task:** Select and trace in 2D or 3D along a series of shared edges on multiple existing objects; add the vertices for the series of shared edges to a new sketch.
 - 2) **With Modify Feature task:** Select and trace in 2D or 3D along a series of shared edges on multiple existing objects; add the vertices for the series of shared edges to an in-process DAT/EM edit. In order to use **trace multiple** with **Modify Feature**, another DAT/EM drawing tool (arc, point-to-point, streamed, or squared) must have started the edit.

Note the following about DAT/EM's **trace multiple** tool:

- When the task is **Create New Feature/classic Create**, **trace multiple** may be used to select shared edges along a series of existing lines or polygons and add the vertices to a sketch.
- When the task is **Modify Feature/classic Modify**, and another DAT/EM drawing tool has started to edit an existing line or polygon, **trace multiple** may be used to select a shared edge along a series of other objects and add the vertices to the in-process DAT/EM edit.
- The series of existing objects that will be traced.
- The objects that **trace multiple** traces must be selected before drawing or editing begins, and they must be snapped (in either XY or XYZ) to each other. That is, where the trace of one object ends and the trace continues onto the next object, the two objects must share the same XY value.
- **Trace multiple** traces the edges of multiple selected objects. It could be used to trace just one selected object, but for one object, single **Trace** is faster. See "Draw Trace Single Feature" on page 6-56.

To use DAT/EM's **trace multiple** tool, perform the following steps:

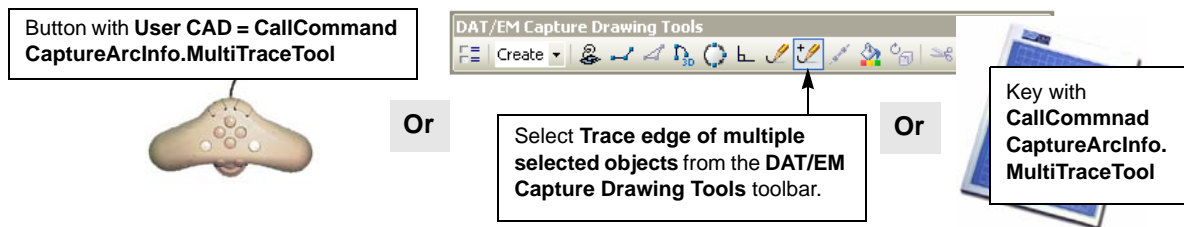
- Step 1)** If an editing session is not already active, either press a **Start Editing** key on the DAT/EM KEYPAD or select **Start Editing** from the **Editor** pull-down menu on ArcMap's **Editor** toolbar.
- Step 2)** Select the adjoining objects that will be traced. If there is an adjoining object that should not be considered for tracing, make sure it is *not* selected.
- Step 3)** For new objects only: Either choose a target layer from the DAT/EM KEYPAD or choose a target on the **Editor** toolbar in ArcMap.



Step 4) To sketch a new object with the Create New Feature task: **Trace multiple** mode may either be used to start a new sketch or it may be toggled on when another drawing mode is already active. Either start **trace multiple** mode with the **Create New Feature** task, or start a sketch using arc (page 6-35), point-to-point (page 6-37), square (page 6-42), stream (page 6-47), or single trace (page 6-56) and toggle to **trace multiple** mode when needed.

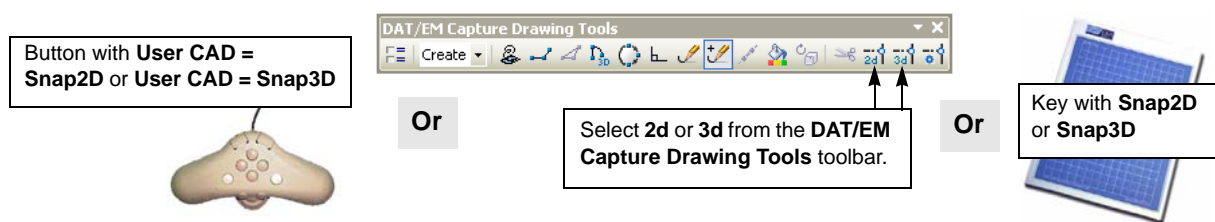
To edit an existing object with the Modify Feature task: **Trace multiple** mode may NOT start the edit, but it may be toggled during the edit. Start editing an object using arc (page 6-35), point-to-point (page 6-37), square (page 6-42), or stream (page 6-47) and the **Modify Feature** task. Once the DAT/EM edit is in process, toggle to **trace multiple** mode when needed.

Choose a method to start or toggle to the **trace multiple** digitizing mode:



Step 5) Set the desired snap mode, 2D or 3D. Note that unlike single **trace**, it doesn't matter whether snapping is on for the selected objects' layers in the ArcMap Snapping Environment window. 2D and 3D snaps are not used for an actual snap, but they do determine what elevations to apply to new vertices:

- If 2D snap is on, the new traced vertices take their XY values from the traced objects, but take the Z from the stereoplottor at the time of the last "end trace" selection on the last traced object.
- If 3D snap is on, the traced vertices take their XYZ values from the vertices in the traced objects.



Step 6) Prompts appear in SUMMIT EVOLUTION's main stereo view. Perform the following in order:

- a.) **Start Trace:** Select the "start trace" location on the first object to be traced. The nearest intersection with the nearest selected object is used.

Note: If the trace won't start where you picked, it could be because the object is not selected. All objects to trace must be selected before starting the trace.

- b.) **Trace the Path:** Move the cursor roughly along the selected objects, following the path you wish the trace to take. A dark line forms along the selected objects to show where the trace is currently set. If needed, back up along the path to remove or re-route parts of the trace.

Note: If the trace won't continue on to the next object, it could be because the selected objects are not snapped to each other in XY or XYZ at the vertex where the trace transitions from one element to the other.

- c.) **End Trace:** If 2D snap is set, set the cursor to the Z to be applied to the trace vertices. Select the “end trace” point. The drawing mode now switches back to point-to-point mode.

Step 7) Finish the task: Continue drawing in any drawing mode, start a new trace, end the sketch, or end the edit.

See more details in the graphics and captions below.

Trace Multiple mode with

Task = Create New Feature (9.x)

or the classic task on the *DAT/EM Capture Drawing Tools* toolbar = **Create (10.x)**:

1. Select all the objects to be traced.

2. If needed, start any other digitizing mode. Digitize vertices that come before the trace, if any.

3. Start **trace multiple** mode, set the 2D or 3D snap mode, and select the “start trace” point.

4. Use the cursor to trace the path along the objects. If 2D snap is on, set the desired Z. Select the “end trace” point.

5. **Point-to-Point** mode resets automatically. Continue digitizing in **point-to-point** mode, or toggle to any other DAT/EM digitizing mode at any time. Press the **Cancel** button when finished.

Trace Multiple mode with

Task = Modify Feature (9.x)

or the classic task on the *DAT/EM Capture Drawing Tools* toolbar = **Modify (10.x)**:

1. Select all the objects to be traced.

2. Set the 2D or 3D snap.

3. Start the edit with any other DAT/EM digitizing mode. Digitize vertices that come before the trace, if any.

2. Toggle to **trace multiple** mode.

- Select the “start trace” point.
- Use the cursor to trace the path along the objects.
- If 2D snap is on, set the desired Z.
- Select the “end trace” point.

3. After **trace multiple** is finished, **point-to-point** is set automatically:

- If desired, continue digitizing; toggle to any DAT/EM drawing mode.
- Snap back to the original object where the edit ends. Or, for line/polyline objects, choose whether to snap (replace midsection) or not to snap (replace end).

4. Press SUMMIT EVOLUTION's **Cancel** button to finish.

- If the last point was snapped to the original object, the section of the object between the first and last snaps is replaced.
- For line/polyline objects only: If the last point was not snapped to the original object, the end section of the line/polyline is replaced.

Step 8) (Optional) To remove individual vertices after **trace multiple** has added them, use any of the following **Undo** options. Note that SUPER/IMPOSITION and ArcMap may not be able to update after each undo, but when the object is finished, you will see that the undos were recorded correctly.

- The **Undo** icon on the **CAD Commands** toolbar in SUMMIT EVOLUTION.
- Press a digitizer button that is set to either **User CAD = Undo** or **Generic CAD = Undo**.
- Press a DAT/EM KEYPAD key that is set to **Undo**.

To finish digitizing, use the SUMMIT EVOLUTION button that is set to **Generic CAD = Cancel**.

Draw Trace Single Feature

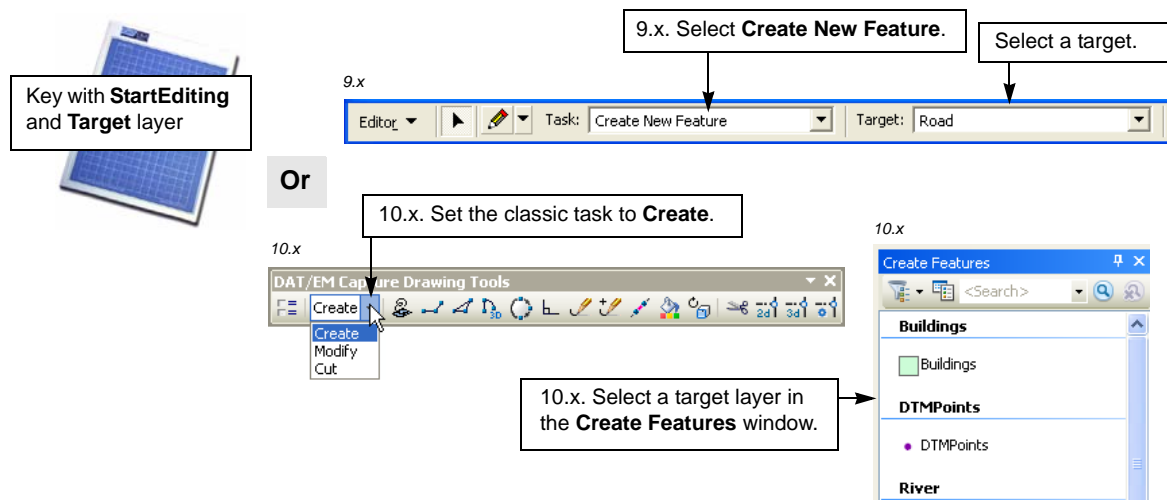
- Purpose:**
- 1) **With Create New Feature task:** Select the start and end of a shared edge on a single existing object; add the vertices for the shared edge to a new sketch. Trace the shared edge in 2D or 3D.
 - 2) **With Modify Feature task:** Select the start and end of a shared edge on a single existing object; add the vertices for the shared edge to an in-process DAT/EM edit. Trace the shared edge in 2D or 3D. In order to use **trace** with **Modify Feature**, another DAT/EM drawing tool (arc, point-to-point, streamed, or squared) must have started the edit.
 - 3) **With Cut Polygon Features task:** Helps to draw a Cut Polygon Features cutting edge sketch; however, the sketch must be started and ended by another drawing tool.

Note the following about DAT/EM's **trace** mode tool:

- When the task is **Create New Feature/classic Create**, **trace** may be used to select a shared edge along a single existing line or polygon and add the vertices to a new object.
- When the task is **Modify Feature/classic Modify**, and another DAT/EM drawing tool has started to edit an existing line or polygon, **trace** may be used to select a shared edge on another object and add the vertices to the in-process DAT/EM edit. (**Trace** may not be used to start the edit process, but it may be toggled on or off during the edit.)
- When the task is set to **Cut Polygon Features/classic Cut**, and another DAT/EM drawing tool has started to create the cutting edge sketch, **trace** may be used to select a shared edge on another object and add the vertices to the sketch. (**Trace** may not be used to start or end the sketch, but it may be used during the sketch.)
- **Trace** traces the edge of one object at a time. To trace the edges of multiple objects instead, please see "Draw Trace Multiple Features" on page 6-52.

To use DAT/EM's **trace** tool, perform the following steps:

- Step 1)** If an editing session is not already active, either press a **Start Editing** key on the DAT/EM KEYPAD or select **Start Editing** from the **Editor** pull-down menu on ArcMap's **Editor** toolbar.
- Step 2)** For new objects only: Either choose a target layer from the DAT/EM KEYPAD or choose a target on the **Editor** toolbar in ArcMap.

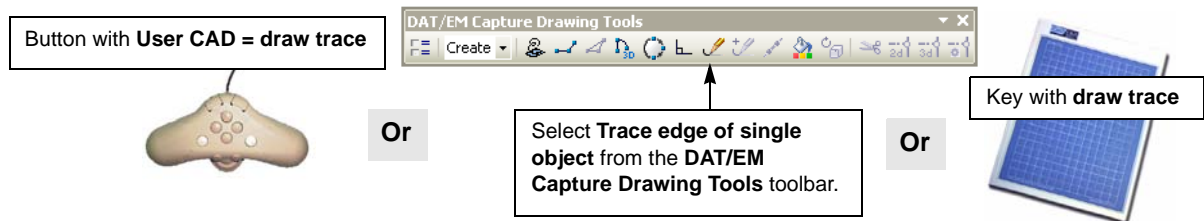


Step 3) To sketch a new object with the Create New Feature task: **Trace** mode may either be used to start a new sketch or it may be toggled on when another drawing mode is already active. Either start **trace** mode with the **Create New Feature** task, or start a sketch using another DAT/EM drawing mode and toggle to **trace** when needed.

To edit an existing object with the Modify Feature task: **Trace** mode may NOT start the edit, but it may be toggled during the edit. Start editing an object using another DAT/EM drawing mode and the **Modify Feature** task. Once the DAT/EM edit is in process, toggle to **trace** mode when needed.

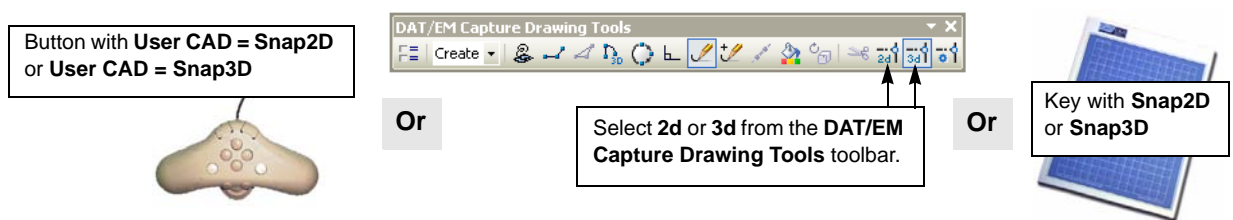
To use Trace during a Cut Polygon Features sketch: **Trace** mode may NOT start or end the sketch of the cutting edge for Cut Polygon Features, but it may be toggled during the sketch. Start the sketch using another DAT/EM drawing tool and the **Cut Polygon Features** task. Once the sketch is in process, toggle to **trace** mode when needed.

Choose a method to start or toggle to the **trace** digitizing mode:



Step 4) Set the desired snap mode, 2D or 3D, and check on the desired type(s) of snapping in the ArcMap Snapping Environment window. For more information about snapping, see page 6-102.

- If 2D snap is on, the new vertices take their XY values from the traced object, but take the Z from the stereoplotter at the time of the first 2D snap to the traced object.
- If 3D snap is on, the traced vertices take their XYZ values from the traced object.



Step 5) A prompt appears in SUMMIT EVOLUTION's main stereo view. If a 2D snap is to be used, set the stereoplotter to the elevation for the new vertices.

Step 6) Choose the situation(s) that describe your process:

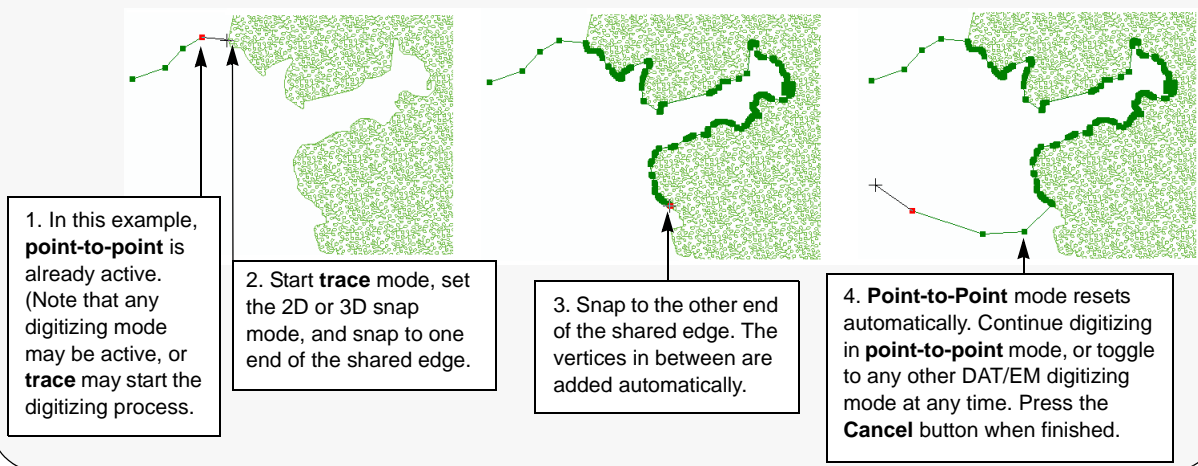
- To start a new sketch in **trace** mode: Follow the prompts on SUMMIT EVOLUTION's main view. Snap to an existing object at the beginning and end of the desired shared edge. Note that **point-to-point** mode is automatically set at the end of each **trace**. To perform another **trace**, **trace** mode must be reselected.
- To continue an in-process edit: **Modify Feature** task is set and another DAT/EM mode (arc, point-to-point, square, or stream) is actively editing an existing object in the current workspace. Toggle to **trace** mode. Follow the prompts on SUMMIT EVOLUTION's main view to digitize start and end points along an existing line or polygon. The traced object may be a separate object or a part of the object being edited. The traced vertices may end on the final snap-in point of the edit. Note that **point-to-point** mode is automatically set at the end of each **trace**. To perform another **trace**, **trace** mode must be reselected.
- To continue a Cut Polygon Features sketch: **Cut Polygon Features** task is set and another DAT/EM drawing tool (arc, point-to-point, square, or stream) has started the cutting edge sketch. Toggle to **trace** mode. Set the desired snap mode. Follow the prompts on SUMMIT EVOLUTION's main view to digitize start and end points along an existing polygon or interior ring. The series of vertices to trace must be completely contained *inside* the polygon to be cut! Note that **point-to-point** mode is automatically set at the end of each **trace**. Continue digitizing the sketch. Snap to the original polygon and Cancel to finish.
- To continue digitizing: **Point-to-point** mode is automatically set at the end of each **trace**. To perform another **trace**, **trace** mode must be reselected. Change DAT/EM digitizing modes at any time and add as many vertices as desired into the new sketch or edit.
- To end a new sketch: Press the SUMMIT EVOLUTION button that is set to **Cancel**.
- To end an edit: In **point-to-point** or another non-**trace** drawing mode, snap back to the object being edited at the end of the edited section. Press the SUMMIT EVOLUTION button that is set to **Cancel**.

See more details in the graphics and captions below.

Trace mode with

Task = **Create New Feature (9.x)**

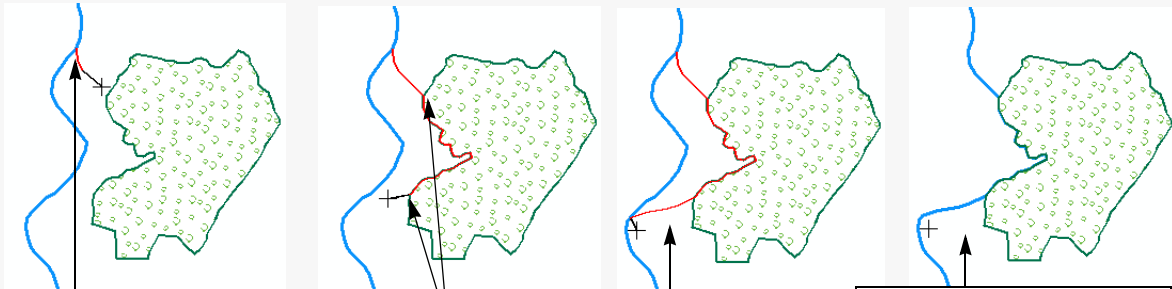
or the classic task on the **DAT/EM Capture Drawing Tools** toolbar = **Create (10.x)**:



Trace mode with

Task = **Modify Feature** (9.x)

or the classic task on the **DAT/EM Capture Drawing Tools** toolbar = **Modify** (10.x):

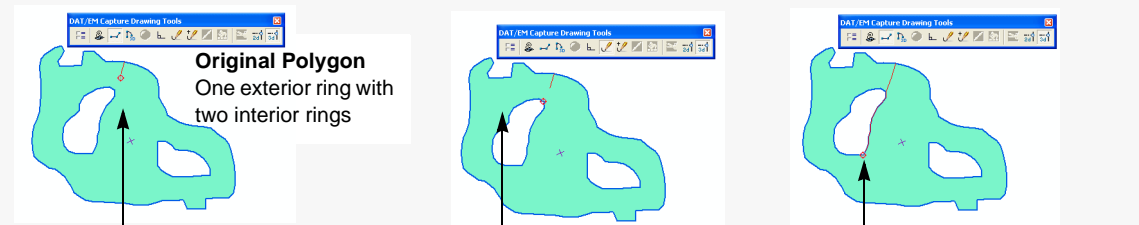


1. Another DAT/EM mode must start the edit. Here, **point-to-point** has started the edit by snapping to the object that needs changing.
2. Toggle to trace mode and select the two ends of the shared edge.
3. The **trace** is finished and **point-to-point** is automatically reset. Continue digitizing the DAT/EM edit.
 - Toggle to any DAT/EM mode at any time.
 - Snap back to the original object if necessary.
4. Press Summit Evolution's **Cancel** button to finish.
 - If the last point was snapped to the original object, the section of the object between the first and last snaps is replaced.
 - For line/polyline objects only: If the last point was not snapped to the original object, the end section of the line/polyline is replaced.

Trace mode with

Task = **Cut Polygon Features** (9.x)

or the classic task on the **DAT/EM Capture Drawing Tools** toolbar = **Cut** (10.x):



Original Polygon
One exterior ring with two interior rings

1. Another DAT/EM mode must start the cutting edge sketch. Here, **point-to-point** has started the sketch by snapping to the polygon's exterior ring.
2. Toggle to the **trace** tool. Set the desired snap mode. Select the two ends of the shared edge. Here, part of an interior ring is traced.
3. When **trace** is finished, **point-to-point** turns on automatically. Continue the sketch. Toggle to any DAT/EM drawing tool (except Trace Multiple) at any time.

Polygon A Result
One exterior ring

Polygon B Result
One exterior ring with one interior ring

4. While another DAT/EM drawing tool is active, snap back to the polygon edge. Press SUMMIT EVOLUTION's **Cancel** button to finish.

Step 7) (Optional) To remove individual vertices after **trace** has added them, use any of the following **Undo** options. Note that SUPER/IMPOSITION and the ArcMap view may not be able to update after each undo, but when the object is finished, you will see that the undos were recorded correctly.

- The **Undo** icon on the **CAD Commands** toolbar in SUMMIT EVOLUTION.
- Press a digitizer button that is set to either **User CAD = Undo** or **Generic CAD = Undo**. To set the digitizer buttons, start the Button Manager using the icon provided in the SUMMIT EVOLUTION window.
- Press a DAT/EM KEYPAD key that is set to **Undo**.

To finish digitizing, use the SUMMIT EVOLUTION button that is set to **Generic CAD = Cancel**.

Drive Summit Evolution

Purpose: To move the SUMMIT EVOLUTION stereoplottor cursor to a location selected with the system mouse in the ArcMap graphics view.

The **Drive Summit Evolution** tool moves the SUMMIT EVOLUTION stereoplottor cursor to a location selected with the system mouse in the ArcMap graphics view.

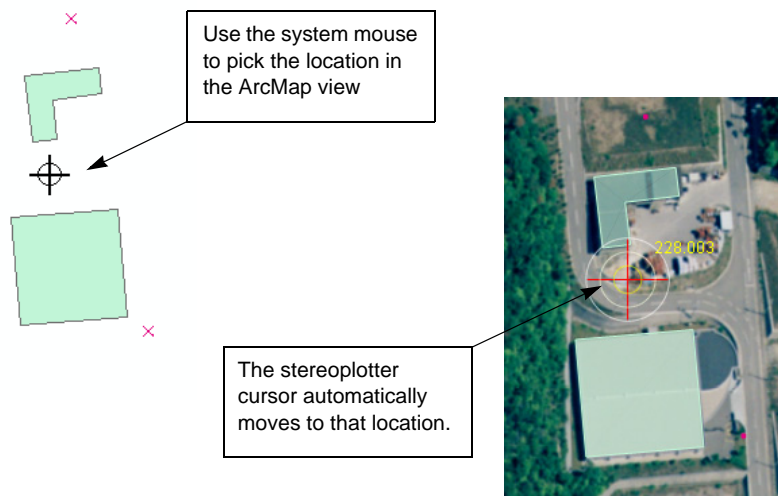
To use **Drive Summit Evolution**, perform the following steps:

Step 1) Select the **Drive Summit Evolution** icon from the **DAT/EM Capture Tools** toolbar.



Select **Drive Summit Evolution** from the **DAT/EM Capture Tools** toolbar.

Step 2) Use the system mouse to select a location in the ArcMap graphics view area. The SUMMIT EVOLUTION cursor immediately moves to that location.



Step 3) To cancel this cursor mode, simply select a different tool or command.

DTM Collection

Purpose: To digitize new DTM points inside polygon boundaries.

DTM Collection calculates grid distributions inside one or more polygons and then drives the stereoplottor to the points for digitizing.

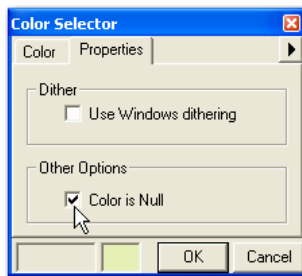
To use **DTM Collection**, perform the following steps:

Step 1) Prepare the following 3D shapefiles or personal geodatabase feature classes:

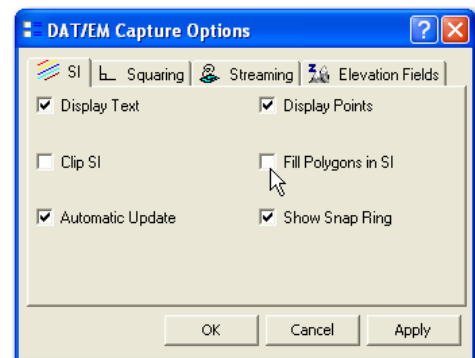
- A point-geometry layer for the DTM points;
- A point-geometry layer for the grid marker points (optional);
- A polygon-geometry layer for the bounding polygons.

Hint: To see the DTM and grid marker points more easily, turn off polygon fill in both the ArcMap and the SUMMIT EVOLUTION views.

- In the ArcMap Table of Contents, click on the color sample below the layer name; from the Symbol Selector dialog, pop out the **Fill Color** menu and choose **More Colors**; from the Color Selector dialog, choose the **Properties** tab, and check on **color is null**.
- Choose **DAT/EM Options** from the DAT/EM Capture Tools toolbar; select the **SI** tab; turn off **Fill Polygons in SI**.



Hint: In ArcMap, set the fill color to **Color is Null** for the polygon layer.



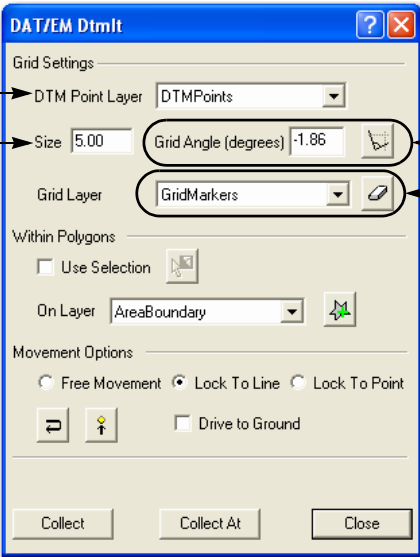
Hint: Select **DAT/EM Options**, select the **SI** tab, and turn off **Fill Polygons in SI**.

Step 2) Select the **DTM Collection** icon from the **DAT/EM Capture Tools** toolbar.



Select **DTM Collection** from the **DAT/EM Capture Tools** toolbar.

Step 3) Make settings in the **Grid Settings** area of the dialog box:



The screenshot shows the DAT/EM DtmIt dialog box with the following settings and annotations:

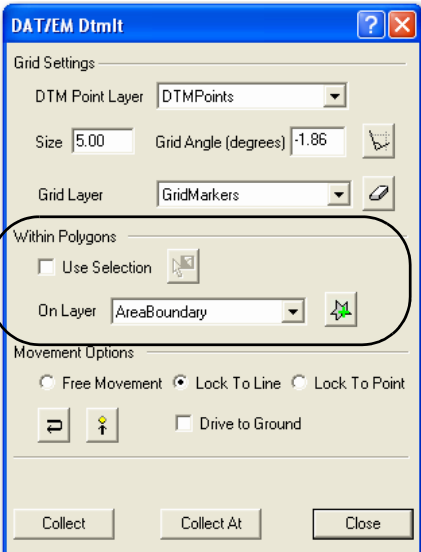
- DTM Point Layer:** Set to "DTMPoints". Annotation: "Set **DTM Point Layer** to the layer for the points to be digitized."
- Size:** Set to "5.00". Annotation: "Set **Size** to the distance between grid points."
- Grid Angle (degrees):** Set to "-1.86". Annotation: "Set **Grid Angle** to the angle of the rows of points. To use the current model's kappa angle, select the angle button."
- Grid Layer:** Set to "GridMarkers". Annotation: "Set **Grid Layer** to the layer for the grid markers, which are an optional visual aid to show the grid locations."
 - To prevent the placement of these points, choose **(do not show grid)** from the list.
 - To erase all previously existing objects on the layer, select the eraser button.

Other settings visible in the dialog box include:

- Within Polygons:**
 - ☐ Use Selection
 - On Layer:** AreaBoundary
- Movement Options:**
 - ☐ Free Movement
 - ☒ Lock To Line
 - ☐ Lock To Point
 - ☐ Drive to Ground

Buttons at the bottom: Collect, Collect At, Close.

Step 4) Make settings in the **Within Polygons** area of the dialog box:



The screenshot shows the DAT/EM DtmIt dialog box with the following settings and annotations:

- DTM Point Layer:** Set to "DTMPoints".
- Size:** Set to "5.00".
- Grid Angle (degrees):** Set to "-1.86".
- Grid Layer:** Set to "GridMarkers".
- Within Polygons:**
 - ☐ Use Selection
 - On Layer:** AreaBoundary

Buttons at the bottom: Collect, Collect At, Close.

Choose a **Within Polygons** setting:

- To select one or more polygons manually, check on **Use Selection**, click on the selection button, then select one or more polygons in ArcMap. Return to the dialog box when finished.
- To use all polygons on a certain layer, set that layer name in the **On Layer** field. (**Use Selection** must be off to use this option.)
- To draw one or more new polygons on the **On Layer** layer, select the polygon button, and draw the polygon in ArcMap. Return to the dialog box when finished.

Step 5) Make settings in the **Movement Options** area of the dialog box:

Choose **Movement Options** settings:

- **Free Movement** drives the stereoplotter cursor to the grid point, then allows the cursor to move away from the point in X, Y, and Z. The DTM point may be digitized anywhere.
- **Lock To Line** drives the stereoplotter cursor to the grid point, then allows the user to move the cursor in X,Y, and Z; however, the X and Y movement is restricted to the current grid row. The DTM point may be digitized anywhere along the grid row.
- **Lock To Point** drives the stereoplotter cursor to the grid point, and allows the cursor to move in Z only. The DTM points must be digitized on the designated grid.

Set a between-row movement direction:



- indicates that the cursor movement will reverse direction as it changes rows (left-right, then right-left). This requires a shortest cursor travel between rows.



- indicates that the cursor will start each row on the left side. This requires the longest cursor travel between rows, but ensures the point-to-point travel direction is always the same.

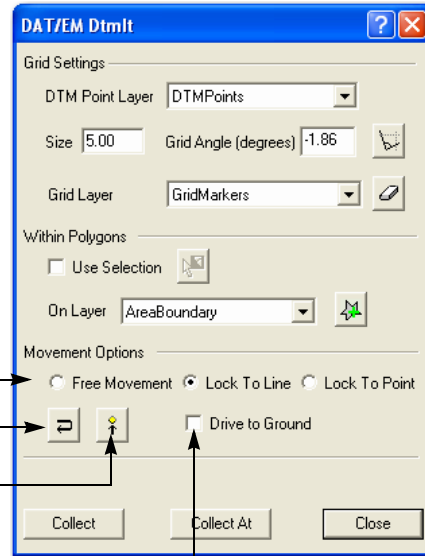
Choose a setting for **Indicate the DTM position in SI:**



- If the icon is light gray (on), then a temporary superimposed point marker appears to mark the current grid XY position. The Z of this point is set to the Z of the most recently digitized point.



- If the icon is dark gray (off), then no additional point marker is displayed at the current grid point position.



Select **Drive to Ground** to perform an automatic image match at each point. This behaves as if SUMMIT EVOLUTION's **Align** button had been selected immediately after each move to a grid point. The usefulness of this option depends on how easily automatic elevation matching is done on the current images. It is easy to toggle this option on and off if elevation matching fails in certain areas on the images.

Step 6) When the settings are finished, choose where to start point collection:

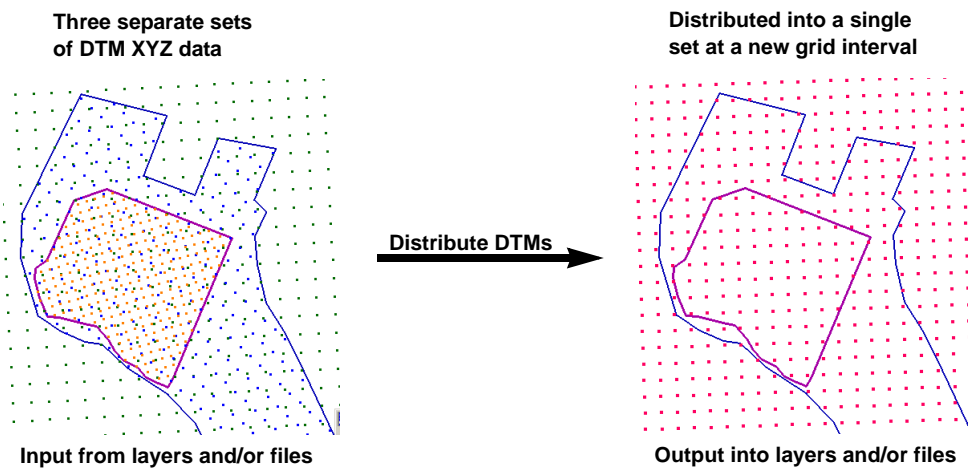
- Choose **Collect** to start digitizing points at the first point of the first polygon.
- Choose **Collect At** to choose the starting point. Choose a starting point with the stereoplotter. This is useful if part of the project has already been digitized or to skip a great number of points.

Step 7) For each DTM point, position the stereoplotter in XY (if allowed by the movement mode), position the stereoplotter in Z, and digitize.

DTM Distributor

Purpose: To combine two or more DTM point sets into a single set; to redistribute DTM points at a new grid interval and/or angle; to output DTM points into a layer and/or file.

The **DTM Distributor** command is used to combine overlapping sets of DTM points into one non-overlapping set at a new grid interval.

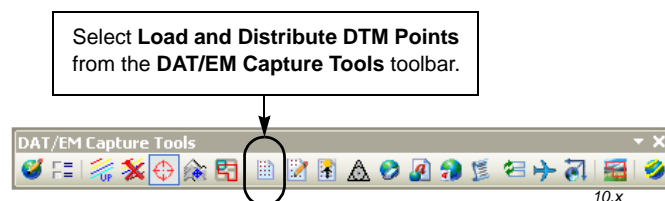


To use **Load and Distribute DTM Points**, perform the following steps:

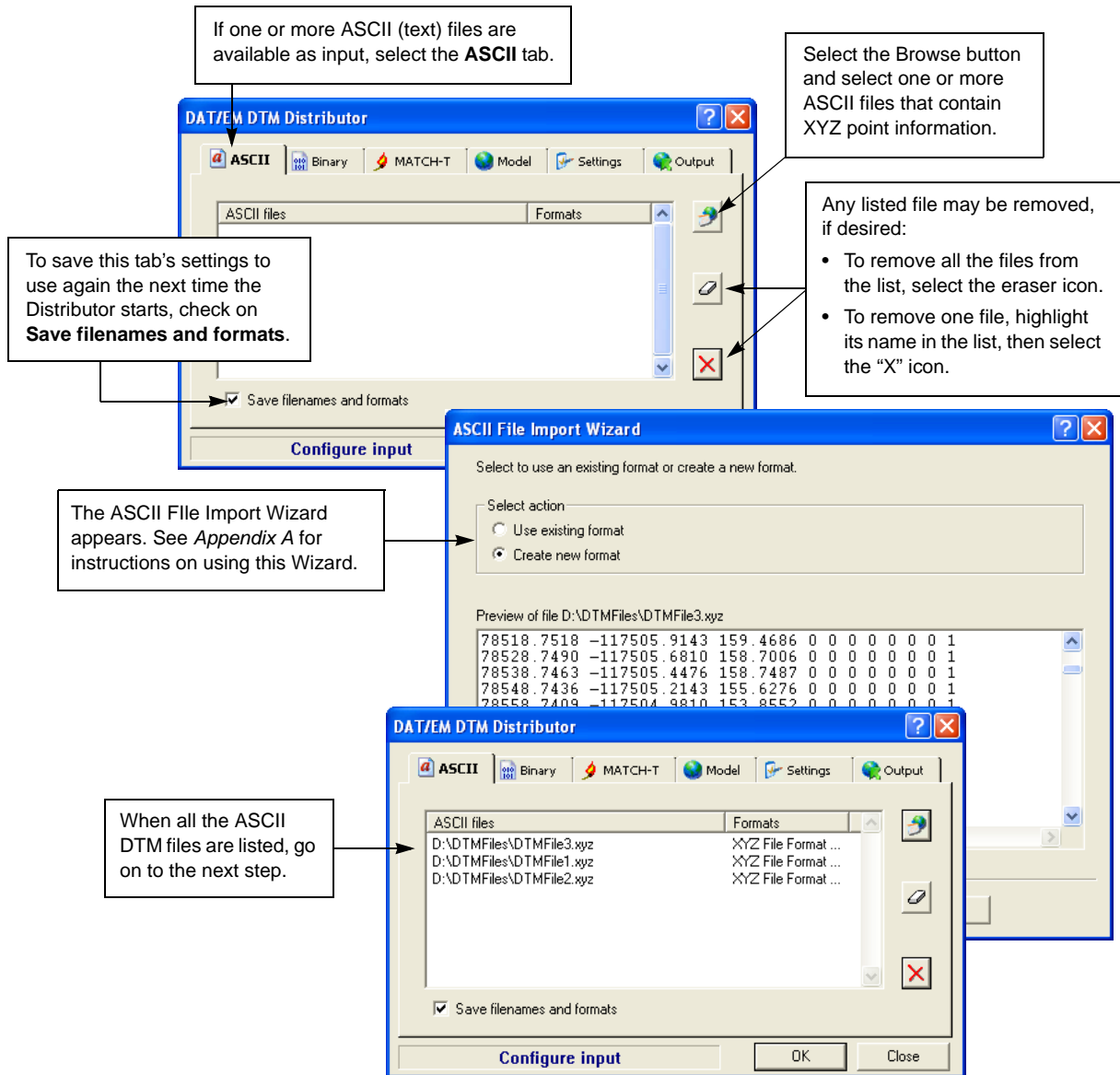
- Step 1)** Prepare one or more DTM point sets. Point sets may be XYZ data contained in any combination of the following formats:
- Point objects currently in ArcGIS layers;
 - ASCII (text) file of any format, as long as it has an XYZ coordinate on each line in the file;
 - Binary file produced by SUMMIT EVOLUTION's **Terrain Following** tool;
 - Inpho MATCH-T files.

Any combination of input types can be used. For example, objects in a point shapefile and a MATCH-T file may be used at the same time.

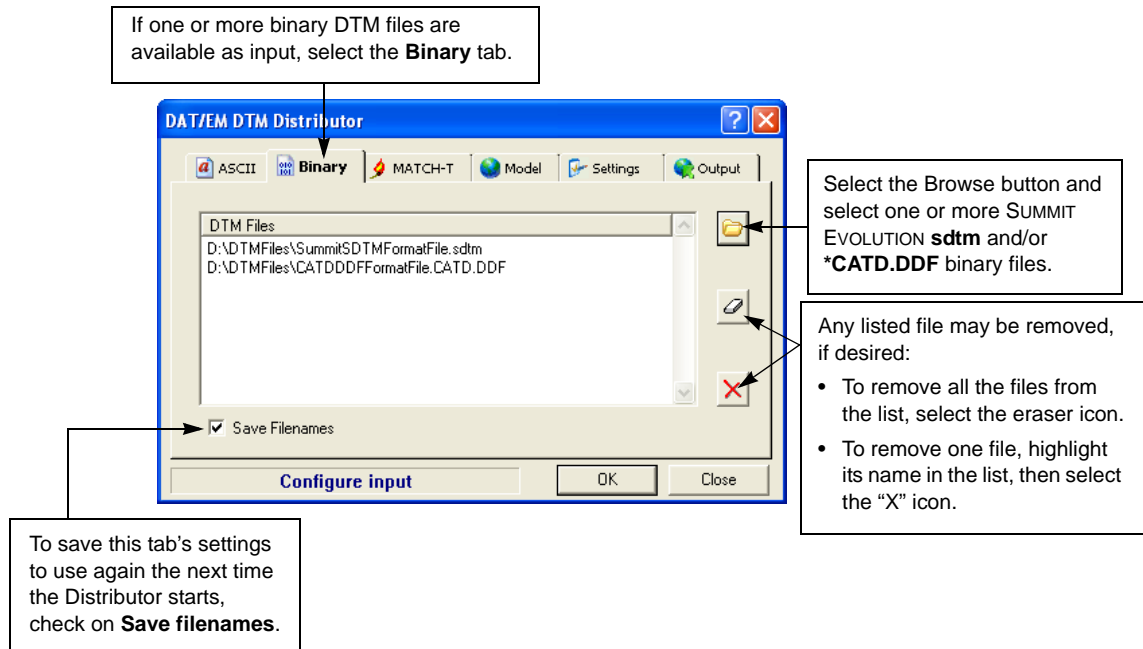
- Step 2)** Select the **Load and Distribute DTM Points** icon from the **DAT/EM Capture Tools** toolbar.



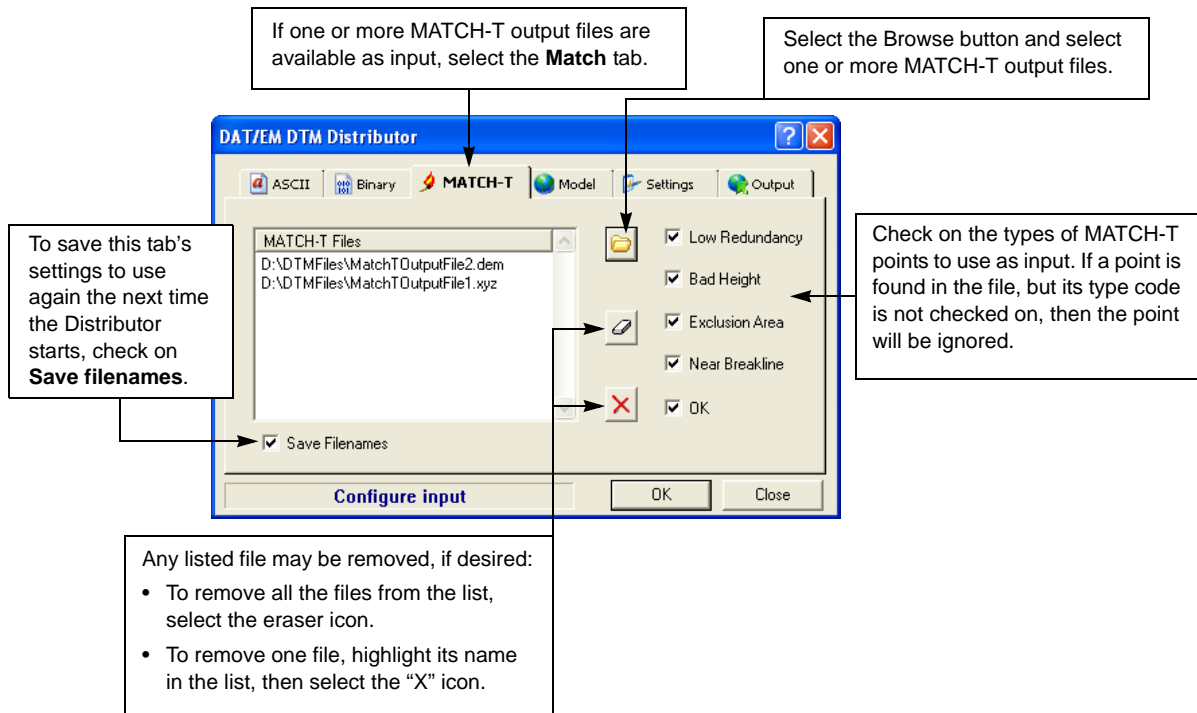
Step 3) If one or more ASCII (text) files are available as input, select the **ASCII** tab and use the Browse button to select each file. The File Import Wizard utility appears to help define the file's format. See *Appendix A* for instructions on using the File Import Wizard.



- Step 4)** If one or more binary files are available as input, select the **Binary** tab and use the Browse button to select each binary DTM file:



- Step 5)** If Inpho MATCH-T output files are available, select the **Match** tab and use the Browse button to select each MATCH-T **xyz**, **yxz**, **dtm**, and/or **dem** file.

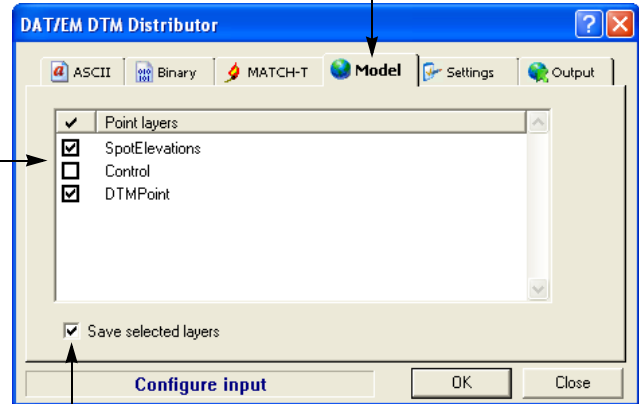


Step 6) Point layers that are defined in the currently open **mxd** file may be used as input. To use existing points as well as any input files, select the **Model** tab and check on the desired point feature layers:

Check on the point layers that are to be used as DTM point input.

- The layers listed are all the point shapefiles and point feature classes found in the **mxd** file's layer list.
- These layers may or may not contain actual XYZ data; if they are empty, they still appear on the list.
- To see where to define the point type in a shapefile, see Step 2 on page 3-3. In that dialog box, set **Feature Type** to **Point** (instead of **Polygon** as shown).
- To see where to define a point type in a personal geodatabase feature class, see Step 3 on page 3-13. In that dialog box, set **Geometry Type** to **Point** (instead of **Polygon** as shown).

To use point features as input, select the **Model** tab.



To save this tab's settings to use again the next time the Distributor starts, check on **Save selected layers**.

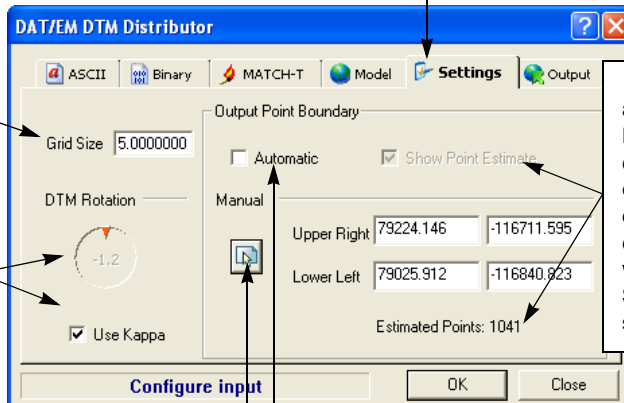
Step 7) Select the **Settings** tab and configure the output grid and coverage area:

Select the **Settings** tab.

Set **Grid Size** to the distance between points in the new DTM grid.

Choose a method to set the **DTM Rotation**:

- Use the angle dial to set a specific angle;
- Or, check on **Use Kappa** to set the DTM grid to the kappa angle of the current SUMMIT EVOLUTION model.



If both **Automatic** and **Show Point Estimate** are both checked on, a point estimate is displayed. The point estimate indicates whether the **Grid Size** and other settings are correct.

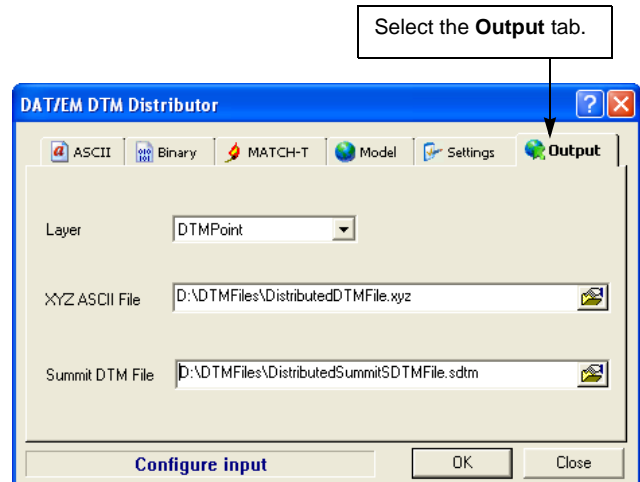
Points are calculated only inside the **Output Point Boundary**. Choose a method to set this boundary:

- Check on **Automatic** to calculate the bounds of all the input points that are specified on the **ASCII**, **Binary**, **Match**, and **Model** tabs;
- Or, measure a bounding rectangle in the current model:
 - a.) Click on the manual measurement button.
 - b.) Position the SUMMIT EVOLUTION cursor at any corner of the bounding rectangle and digitize. A yellow superimposed rectangle appears.
 - c.) Position the cursor at the opposite corner of the rectangle and digitize. The bounding coordinates appear in the display fields.
 - d.) View the point estimate that appears below the bounding coordinates. Make sure it is a reasonable number of points. If not, make sure the **Grid Size** and other settings are correct.

Step 8) Select the **Output** tab to set one or more output formats:

Select one or more of the following output formats for the newly calculated DTM grid:

- To place points in a shapefile or feature class, select a layer name from the **Layer** list. This list contains point type layers found defined in the currently open **mx**d file. (Note: To define a point type in a shapefile, see Step 2 on page 3-3 and set **Feature Type** to **Point**. To define a point type in a personal geodatabase feature class, see Step 3 on page 3-13 and set **Geometry Type** to **Point**.)
- To write the points out to an ASCII (text) file, set a file name in the **XYZ ASCII File** field.
- To write the points out to a Summit DTM file for use with SUMMIT EVOLUTION's **Terrain Following** tool, set a file name in the **Summit DTM File** field.



Step 9) If desired, select each tab again to verify that all necessary settings are correct.

Select **OK** to begin processing. If output to a layer was selected, points appear on the layer at the end of processing. If output files were selected, the files are created to contain the points.

DTM Editor

Purpose: To redigitize, shift, or reset the coordinates of point features. Used mostly to adjust DTM points.

The **DTM Editor** command processes point features and moves the points either by digitizing new locations or by a coordinate entry process.

To use the **DTM Editor**, perform the following steps:

- Step 1)** Select the **DTM Editor** icon from the **DAT/EM Capture Tools** toolbar.
- Step 2)** Select the layers that contain points to edit.
- Step 3)** To edit only those points found within polygons, select a polygon layer from the **Polygons** list. To draw new polygons around the points, select the polygon drawing button, digitize one or more polygons, and then return the cursor to the **DTM Editor** dialog.



Select **DTM Editor** from the **DAT/EM Capture Tools** toolbar.

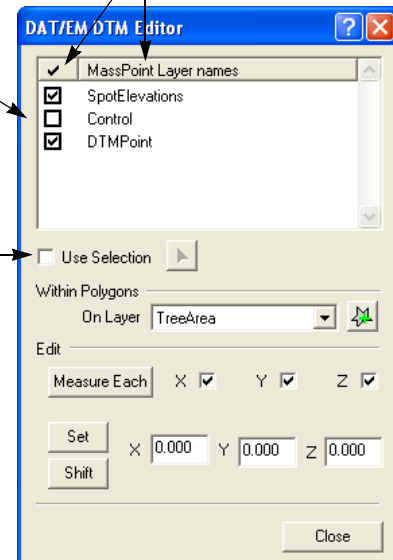


Hint: Multiple lines may be selected. Highlight one line, then: **<Shift>click** to select a block of lines, **<Ctrl>click** to select multiple individual lines, **<Ctrl>A** to select all. Checking or unchecking one selected line's box affects all selected lines.

Check on each point layer to include in the editing process.

Choose whether to select all points or only those points inside polygons:

- To use all points on the selected layers, set **On Layer** to **(none selected)**. The **Use Selection** box must be off.
- To use only those points that are within a selected polygon, check on **Use Selection** and click the  button. Select the polygon, then return the cursor to the DAT/EM DTM Editor dialog box.
- To use only those points that are within all polygons on a certain layer, choose a **Within Polygon** layer. All polygons that already exist on the layer are used. To add more polygons to the **Within Polygon** layer, select the  button, digitize one or more new polygons, then return the cursor to the DAT/EM DTM Editor dialog box.



Step 4) Choose a method to edit the points:

First check on the **X**, **Y**, and/or **Z** coordinate components. If a component is not checked, then it will not be edited. For example, if only **X** and **Z** are checked, then the X and Z coordinates change, but Y stays the same.

Choose a method to edit the point coordinates:

- To use the stereoplotter to drive to each point and digitize a new position, first check on the desired **X**, **Y**, and/or **Z** coordinate components, then select the **Measure Each** button. The SUMMIT EVOLUTION cursor moves to a point. Position the cursor and digitize. The points will not appear to move; *the view updates after all points have been digitized.*
- To change the checked coordinate components to a fixed value, first check on the desired **X**, **Y**, and/or **Z** coordinate components, then enter values in the **X**, **Y** and **Z** fields. Select the **Set** button to run the edit.
- To shift the checked coordinate components by an offset value, enter the values in the **X**, **Y** and **Z** fields. Select the **Shift** button to run the edit.

Example of Set:
A point is at (5,5,5). Check on only the **Z** coordinate component. Set the **Z** field to -1.0. Select **Set**. The point changes to (5,5,-1).

Example of Shift:
A point is at (5,5,5). Check on only the **Z** coordinate component. Set the **Z** field to -1.0. Select **Shift**. The point changes to (5,5,4).

Step 5) If necessary, repeat Step 2 through Step 4 to edit more points. Select **Close** when finished.

Elevate Layers

Purpose: To input 2D shapefiles or feature classes and output 3D shapefiles and feature classes. Or, to replace existing elevations in 3D shapefiles and feature classes. New elevations are based on one or more DTM point files or TIN layers.

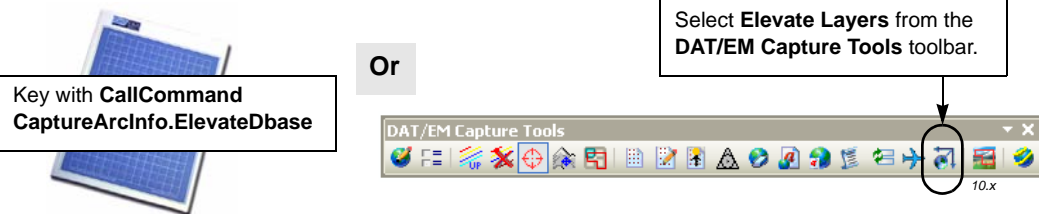
Elevate Layers was created to help convert existing 2D shapefiles and personal geodatabase feature classes to 3D. It can also be used to replace existing “bad” elevations, which is recommended only when the elevations in the DTM and/or TIN input are more accurate than the elevations in the original file. For each layer to process, **Elevate Layers** performs three main tasks:

1. It copies the feature class or shapefile.
2. In the copy, it checks for selected elevation field or Z vertex component. If it doesn't exist, it adds the field or Z component.
3. It populates the elevation field or Z components with elevations based on the input DTM file(s).

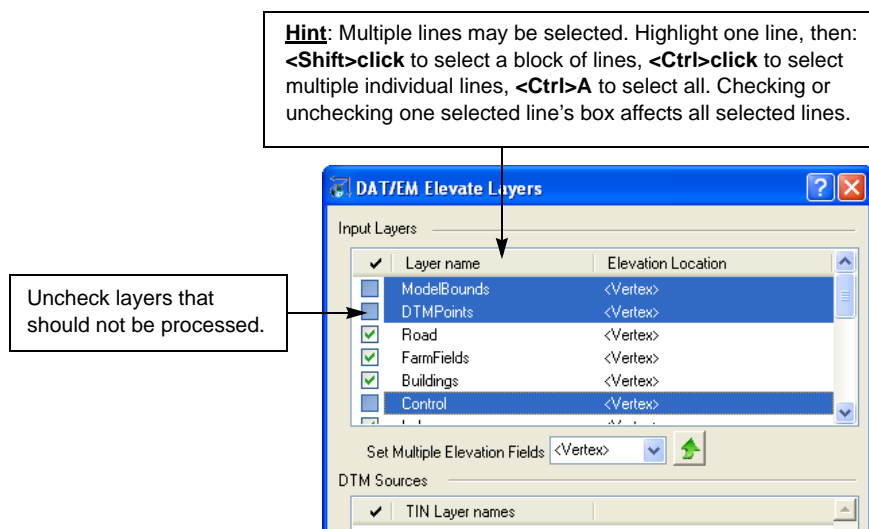
To use **Elevate Layers**, perform the following steps:

Step 1) Verify that the input layers appear in the ArcMap Table of Contents. These layers may be from shapefiles and/or personal geodatabase feature classes.

Step 2) Select **Elevate Layers** from the **DAT/EM Capture Tools** toolbar or the DAT/EM KEYPAD.



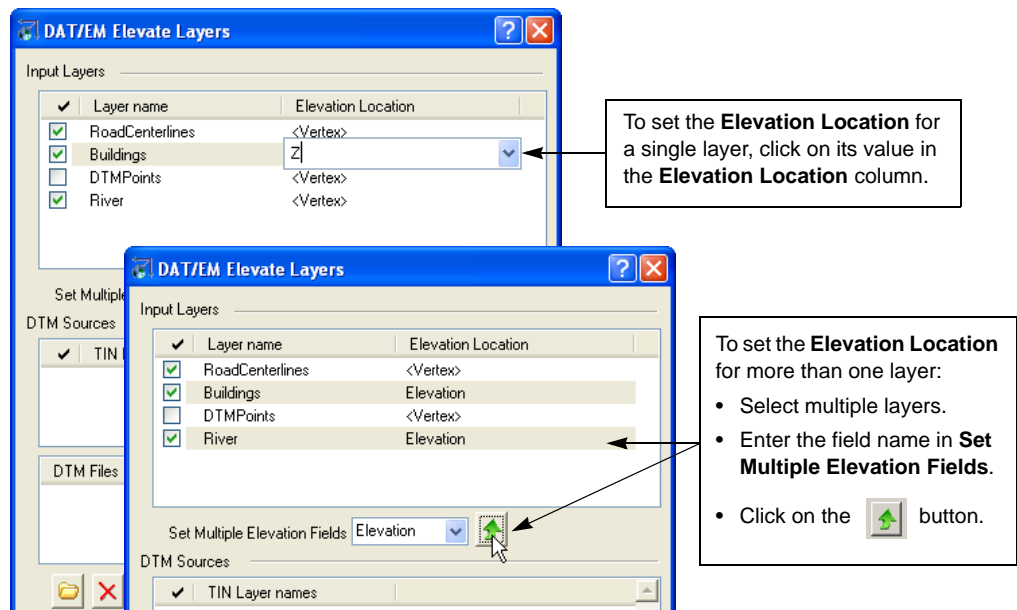
Step 3) The DAT/EM Elevate Layers dialog appears showing every layer that is currently listed in the Table of Contents. All layers are checked on by default. Uncheck any layers that should not be processed.



Step 4) Choose the method to add elevation for each checked layer:

- a.) Set **Elevation Location** to **<Vertex>** to add a Z component to all existing XY vertices of all objects in that layer. Existing Z vertex components will be replaced, except possibly outside the area of the DTM/TIN, depending on the settings.
- b.) Set **Elevation Location** to a field name to add the field to the layer. Using the field method, one Z is stored per object, and the object's vertices remain XY only. If this field exists already, its values will be replaced, except possibly outside the area of the DTM/TIN, depending on the settings.

To set one layer at a time, click in its individual setting in the **Elevation Location** column. To set more than one layer to the same field name, select multiple lines, set **Set Multiple Elevation Fields** to the field name, then click the up-arrow button.

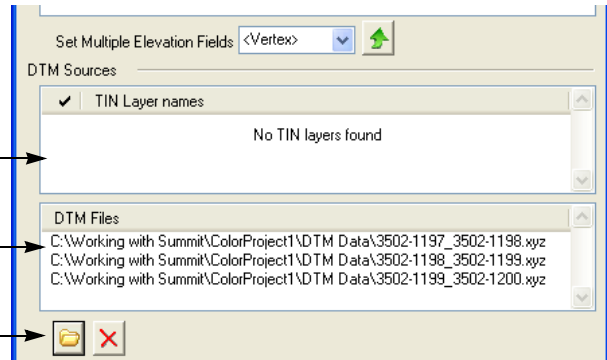


Step 5) Select one or more DTM files and/or TIN layers as Z input. These files should contain XYZ data expressed in the same coordinate system and covering the area of the objects in the layers to be processed. The elevations from these files are used to update elevation fields or vertices at the corresponding XY positions on the layer(s) checked. Note:

- If DTM/TIN files are not used, all elevations will be set to 0 (zero). This could be useful to convert a shapefile/feature class to 3D by adding a Z=0 vertex or field, which could be populated with actual Z values later. This would be done only when there is no DTM/TIN input available. **Hint:** Remember to turn on **Options > SI tab > 2D-object elevations at cursor** in SUMMIT EVOLUTION to view a Z=0 file.
- **Vertex method:** If a line or polygon is partially outside the DTM/TIN area, only those vertices covered by the DTM/TIN are set “on the ground.” Vertices that are outside the DTM are set to Z=0 if they are being converted from 2D to 3D for the first time; they retain their original Z value if they are already 3D.
- **Field method:** To set an elevation field (one Z per object), the elevation is interpolated from the DTM/TIN at the XY location of the object's center of gravity (not at the first vertex). If the center of gravity is outside the DTM area, 0 (zero) is assigned if it is being converted from 2D to 3D for the first time; it retains its original Z value if it is already 3D.

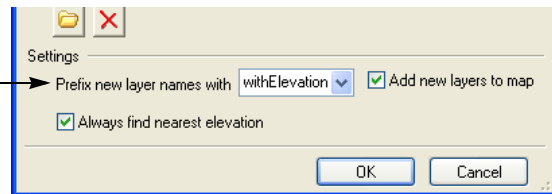
Define TIN and/or DTM files as elevation input:

- If there are any TIN Layers in the TOC, they will appear in the **TIN Layer names** list. Check on the layers to use as input.
- Browse for one or more DTM files that cover the area of the objects in the checked layers.

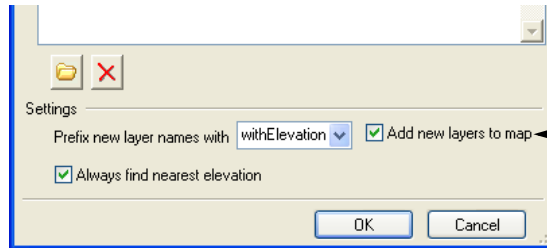


Step 6) Choose a layer name prefix. Either choose one of the existing prefixes, or enter a different prefix. This prefix makes the name of the new layer different from the original shapefile or feature class.

Choose a file name or feature class name prefix. This prefix makes the name different from the original shapefile or feature class.



Step 7) Choose a setting for **Add new layers to map**. If checked on, the new 3D layers will be added to the Table of Contents in the open map file. If it is not checked, the layers will be created and may be viewed in ArcCatalog, but they will not be added to the current Table of Contents.



Choose a setting for **Add new layers to map**:

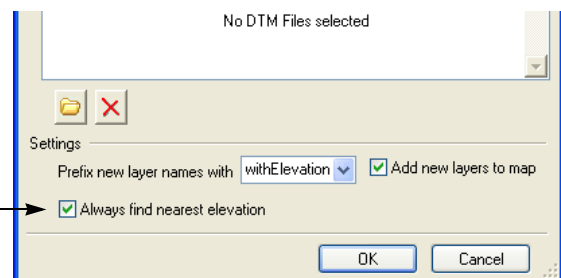
- Check on to add the new 3D layers to the Table of Contents.
- Uncheck to create the layers without adding them to the current Table of Contents.

Step 8) Choose a setting for **Always find nearest elevation**:

- If checked on, the elevation of the original object will not change. If the original object did not have an elevation value, it will be set to 0 (zero). A message will appear to show which layers extended outside the TIN/DTM area.
- If off, the TIN/DTM elevation closest to the object will be assigned, no matter how far away it is in (x,y).

Choose a setting for **Always find nearest elevation**:

- On: The elevation of the original object will not change. If the original object did not have an elevation value, it will be set to 0 (zero).
- Off: The TIN/DTM elevation closest to the object will be assigned, no matter how far away it is in (x,y).



Step 9) When all settings are correct, select **OK** to process. Note:

- Each shapefile is copied as a new file with the prefix added to its name. It is placed in the same folder that contains the original shapefile.
- Each feature class is copied as a new feature class with this prefix added to its name. It is placed in the same personal geodatabase that contains the original feature class.
- The new shapefiles and feature classes are automatically added to the map file only if **Add new layers to map** is checked. If they are not added automatically, they may be found using ArcCatalog (9.x) or the Catalog window (10.x).
- (9.x) If ArcCatalog is already running when **Elevate Layers** starts, one or more view refreshes may be required in ArcCatalog in order to see the new files.
- The original feature classes and shapefiles are not changed in any way. Removing them from the map file is the user's choice.

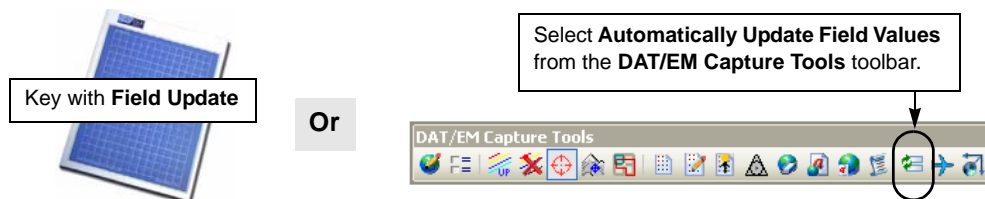
Field Update

Purpose: To edit field values in existing features.

The **Field Update** tool is designed to be more convenient than the ArcMap Attributes dialog for changing field values. It is useful to change more than one field at a time, and also to make the same changes to more than one feature. For fields defined as float or double data types, it also allows you to measure new values.

To use **Field Update**, perform the following steps:

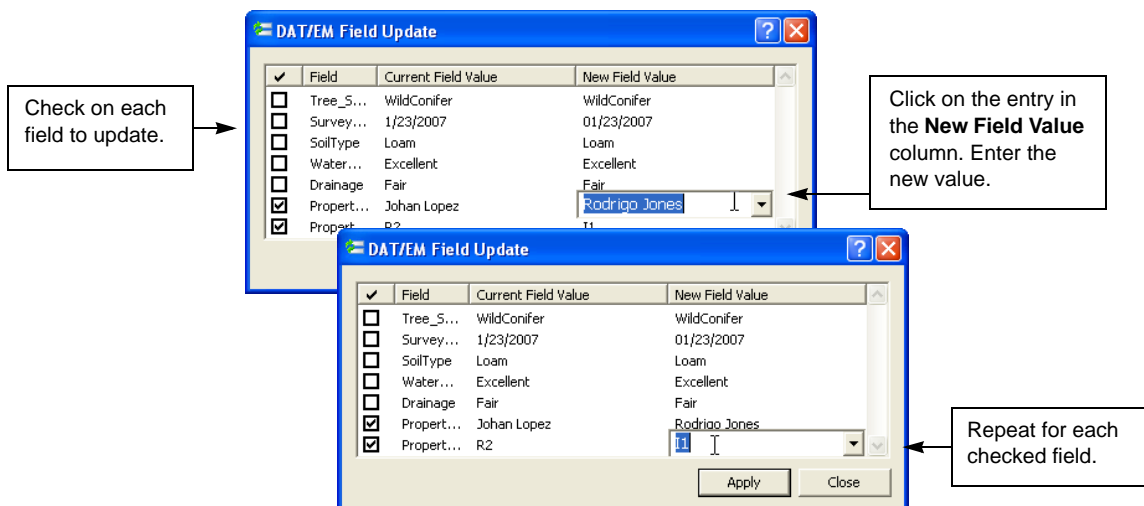
- Step 1)** An edit session must be active. Using ArcMap's **Edit Tool**, select (highlight) an existing feature in the current workspace.
- Step 2)** Select the **Automatically Update Field Values** icon from the **DAT/EM Capture Tools** toolbar or from the DAT/EM KEYPAD.



- Step 3)** In the left column of the DAT/EM Field Update dialog, check each field to update. Multiple fields may be checked and updated at one time.

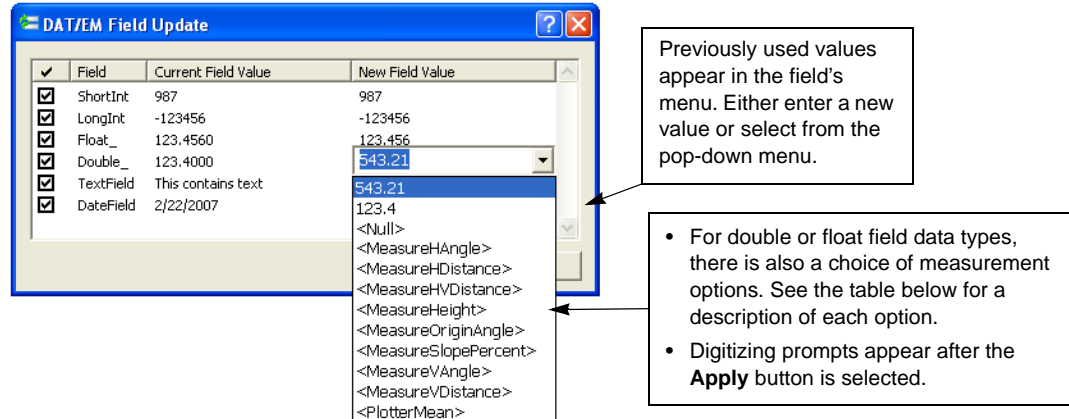
If “No editable fields found” appears, either there is no active selection, the selected feature does not contain editable fields, or the selected feature is not in the currently open workspace.

- Step 4)** Click on the current setting in the **New Field Value** column. Previously used values appear in the pop-down menu for fields of any data type. Either enter a new value or select from the pop-down menu. Repeat for each checked field.



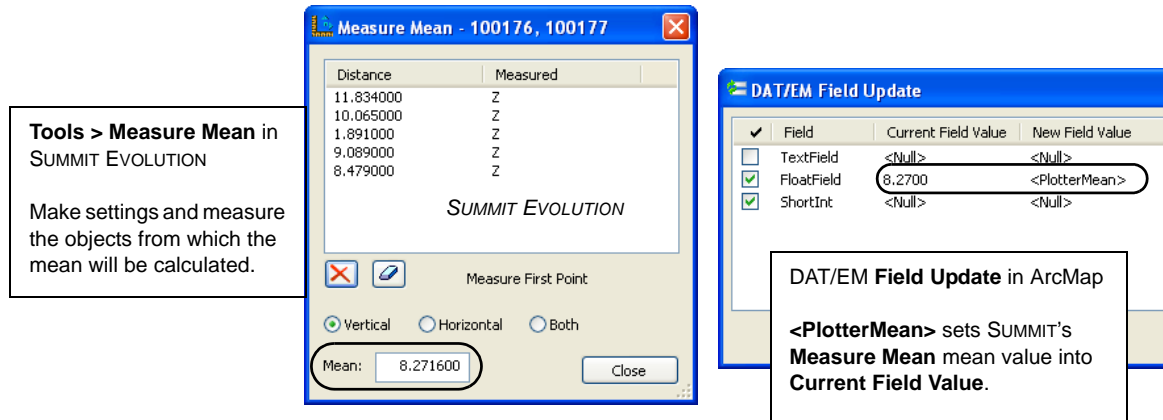
If “Your Entry is not a valid value for Field Name” is displayed, check that the new value conforms to the field's data type. For example, if the field is defined as text with up to 25 characters, then be sure to enter no more than 25 characters. Or, if the field is a short integer, then be sure that $-32769 < \text{Your Entry} < +32768$. For more information on data types and their ranges, see “ArcGIS data types table” in the ArcGIS Desktop Help.

For fields that are defined as double or float data types, there is also a choice of several measurement options. See the table below for a description of each option.



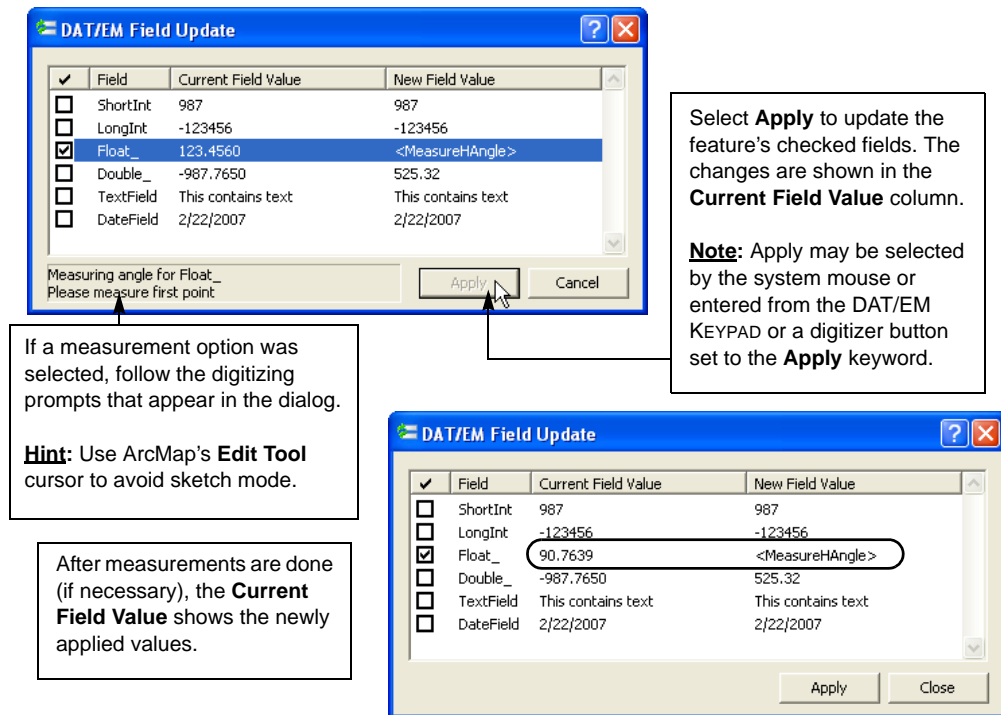
Option	Description
MeasureHAngle	“Horizontal” (angle in XY plane). Digitize three points using the using XY cursor controls. Z changes are ignored.
MeasureHDistance	“Horizontal” distance. Digitize two points to define a distance in the XY plane. Z changes are ignored.
MeasureHVDistance	“Horizontal-Vertical” distance. Digitize two points to define a distance in X, Y, and Z.
MeasureHeight	Digitize one point to define a height from the base of the object. The absolute value is used (negative signs are not used). For example, if the base of a tree is at Z=100, and MeasureHeight is digitized at stereoplotter Z=125, the field will be set to $ (100-125) =25$.
MeasureOriginAngle	Like MeasureHAngle, except that you digitize two points in the XY plane, and (0,0,0) is used as the common point to define the angle.
MeasureSlopePercent	Percent grade. Digitize a point at the bottom of the slope and a point at the top of the slope. The field is set to the value calculated by: $\% \text{ grade} = [(Z \text{ change}) \div (XY \text{ change})] * 100$
MeasureVAngle	“Vertical” (angle in XZ plane). Digitize three points using the X and Z cursor controls. Y changes are ignored.
MeasureVDistance	“Vertical” distance. Digitize two points to define a distance along the Z axis. XY changes are ignored.
PlotterMean	PlotterMean works together with SUMMIT EVOLUTION’s Tools > Measure Mean tool to place the current mean value into the field. It is rounded to two decimal places.

- Step 5)** If any field is set to **<PlotterMean>**, start SUMMIT EVOLUTION's **Tools > Measure Mean** tool. Make settings and measure the objects from which the mean will be calculated. The measurements should be done and the mean established before using **Apply** in the DAT/EM Field Update dialog.



- Step 6)** When each checked field in the **New Field Value** column is ready, select **Apply**. **Note:** The DAT/EM KEYPAD or a digitizer button can use the **Apply** keyword to activate the **Apply** button in this dialog. See *Appendix A* for more information.

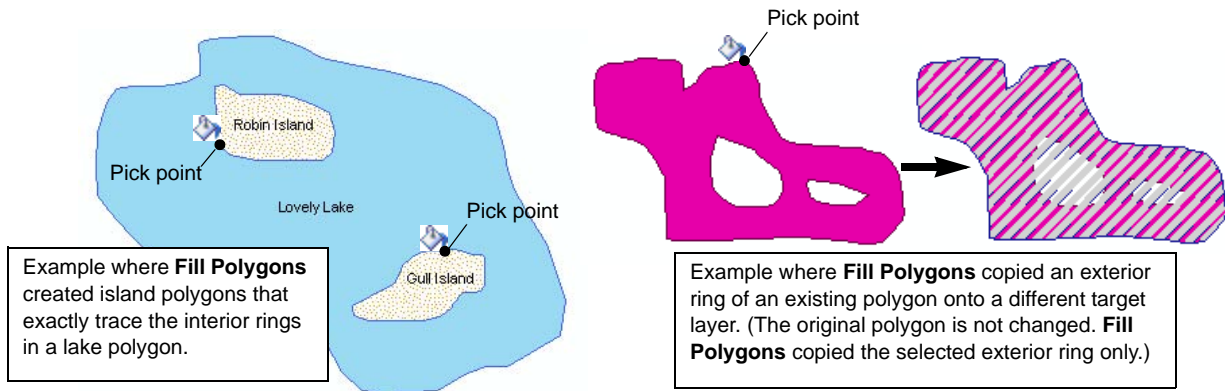
If a measurement option was used, follow the digitizing prompts that appear in the dialog. The feature's checked fields are updated and the changes are shown in **Current Field Value**.



- Step 7)** To use the command again, select the next feature. Choose an editing method for each feature:
- To apply the same field values to another feature from the same shapefile or feature class, simply select **Apply** again. The **New Field Value** column is retained so that it may be used multiple times.
 - To apply different field values, or if the selection is from a different shapefile or feature class, repeat Step 3 through Step 6.
 - If **<PlotterMean>** is being used, measure the new plotter mean each time before using **Apply**.

Fill Polygons

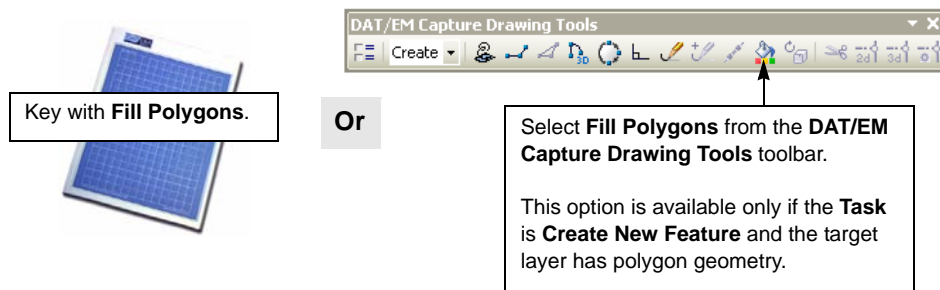
Purpose: To make a new polygon by copying the vertices of another polygon's exterior or interior ring. The new polygon appears to "fill" the selected ring. The new polygon is drawn on the active target layer. The new polygon is always a single exterior ring.



The **Fill Polygons** command can be used to "fill" an interior ring with a new polygon or to copy the exterior ring of a polygon onto the target layer.

To use **Fill Polygons**, perform the following steps:

- Step 1)** An edit session must be active. If necessary, either press a **Start Editing** key on the DAT/EM KEYPAD or select **Start Editing** from the **Editor** pull-down menu on ArcMap's **Editor** toolbar.
- Step 2)** Set the **Task** to **Create New Feature** (9.x) or set the classic task to **Create** on the **DAT/EM Capture Drawing Tools** toolbar.
- Step 3)** Set a polygon **Target** layer on ArcMap's **Editor** toolbar (9.x) or in the **Create Features** window (10.x) or set a polygon target layer using the DAT/EM KEYPAD.
- Step 4)** Select the **Fill Polygons** icon from the **DAT/EM Capture Drawing Tools** toolbar or select it from the DAT/EM KEYPAD.



- Step 5)** Use the stereoplottor or the system mouse to pick very close to the exterior or interior polygon ring that you wish to use as a shared edge. (Snapping is not necessary for this tool. Please pick very close to the ring. For best results, position the cursor just inside the polygon you wish to fill.)

Be aware that the selected polygon ring is not changed in any way. The new polygon appears to "fill" the old ring. It is easy to see all polygons after an interior ring is selected. If an exterior ring is selected and the target layer has a solid color, the new polygon may visually obscure the old polygon; however, the old polygon is still there underneath the new polygon.

Load Control Points

Purpose: To automatically place points at the control point coordinates. Control point coordinates are found either in the current SUMMIT EVOLUTION model or in a control point file.



The **Load Control Points** command places point objects at the control points coordinates. Control points are found either in the current SUMMIT EVOLUTION model or in any control point file.

To use **Load Control Points**, perform the following steps:

- Step 1)** Prepare a layer to contain the control points. This may be done with a simple point shapefile or feature class, but it is better to add point identification and point type fields so that points can be individually identified. For example, a horizontal-vertical control point called “20001” should be identified separately from a horizontal-only point called “H309.”
- Create a shapefile or personal geodatabase feature class that stores Z elevation and has POINT geometry. To start, follow the instructions in “How to Define Z in a Shapefile” on page 3-1 or “How to Define Z in a Personal Geodatabase Feature Class” on page 3-10.
 - If using a shapefile, add two fields for the control type and control point name. Note that this may have already been done using the instructions for setting up a shapefile on page 3-5 or page 3-8:

Right click on the point shapefile in ArcCatalog (9.x) or the Catalog window (10.x). Select **Properties**.

Select the **Fields** tab.

Add two text fields. Here they are called **PointType** and **PointID**. The names may be different if desired; there is a 10-character limit. One field represents the point type, such as horizontal-vertical or horizontal-only control points. The other field represents the name of the control point.

Set the **Data Type** to **Text**. Use the default text length of 50.

Field Name	Data Type
FID	Object ID
Shape	Geometry
Id	Long Integer
PointType	Text
PointID	Text

Click any field to see its properties.

Field Properties

Length 50

- c.) If using a feature class in a personal geodatabase, add two fields to the feature class for the control type and control point name. Note that this may have already been done using the instructions for setting up a feature class on page 3-16 or page 3-22:

Right click on the feature class in ArcCatalog.
Select **Properties**.

Add two fields as follows:

- **Point Type Field:** Make a new field to hold the point type code, which separates the different types of control points, such as horizontal-vertical or horizontal-only. Enter a **Field Name** that has up to 10 characters. In this example, the **Field Name** is called "PointType." Set the **Data Type** to either **Text** or a number type such as **Short Integer**. The type must be **Short Integer** or **Long Integer** in order to set up subtypes later with ArcEditor or ArcInfo (see more instructions below). If **Text** is selected, accept the default text length of 50.
- **Point Name (Identification) Field:** Make another new field to hold the names of the points. Enter a **Field Name** that has up to 10 characters. In this example, the **Field Name** is called "PointID." Set the **Data Type** to **Text**. Accept the default text length of 50.

Remember the new field names, because they will be used later in the Load Control dialog box.

Feature Class Properties

General | XY Coordinate System | Z Coordinate System | Tolerance | Resolution
Domain | Fields | Indexes | Subtypes | Relationships | Representations

Field Name	Data Type
OBJECTID	Object ID
SHAPE	Geometry
PointType	Short Integer
PointID	Text

Click any field to see its properties.

Field Properties

Alias	PointID
Allow NULL values	Yes
Default Value	
Length	50

Import...

To add a new field, type the name into an empty row in the Field Name column, click in the Data Type column to choose the data type, then edit the Field Properties.

OK Cancel Apply

- d.) If using ArcEditor or ArcInfo (not ArcView), it is possible to define subtypes so that each control type can be represented by a different symbol. First add and apply the point type and point identification fields as shown above. You may need to close the Properties dialog and reopen it. Then select the **Subtypes** tab and define the types of control points:

Right click on the feature class in ArcCatalog.
Select **Properties**.

(Note: This graphic shows some fields light gray; in ArcEditor and ArcInfo, all fields are active.) Make the following settings:

- Set **Subtype Field** to the field name of the control point type. Here, it is called **PointType**, but you may have used a different field name.
- Set an integer code, starting with 0, for each type of control point that may be found in the control file. Enter a **Description** for each type. Here, **0** is set to **Horizontal**, **1** is set to **Horizontal-Vertical**, and so on. It is not necessary to use these words. For example, **0** could be set to **XY**, and **1** could be set to **XYZ**, if desired.
- Remember the codes and matching descriptions. You will enter them later in the DAT/EM Load Control dialog box.

Feature Class Properties

General | XY Coordinate System | Z Coordinate System | Tolerance | Resolution
Domain | Fields | Indexes | Subtypes | Relationships | Representations

Subtype Field:

Default Subtype:

Subtypes:

Code	Description
0	Horizontal
1	Horizontal-Vertical
2	Vertical
3	Pass Point
4	Check Point

Default Values and Domains:


Field Name	Default Value	Domain
PointID		

Use Defaults Domains...

OK Cancel Apply


Step 2) Select **Load Control Points** from the **DAT/EM Capture Tools** toolbar or the DAT/EM KEYPAD:

Step 3) Choose a control point source and check on the points to be used:



Key with **CallCommand**
CaptureArcInfo.LoadCtrl

Or

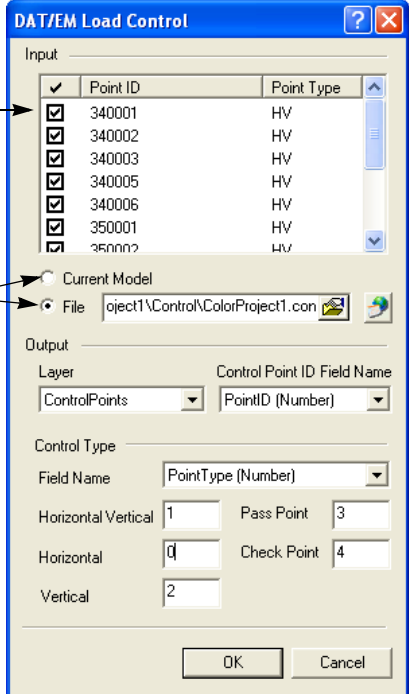


Select **Load Control Points** from the **DAT/EM Capture Tools** toolbar.

When the control points appear in the list, check on the points to be used. If a point is not checked, it will be ignored.

Choose a control point source:

- To use only those points that are active in the current SUMMIT EVOLUTION model's orientation, select **Current Model**.
- To use points selected from a SUMMIT EVOLUTION format control file, choose the browse button and select the file.
- To use points selected from any other format of control file, choose the Wizard button and see *Appendix A* for instructions on how to use the file import Wizard.



The dialog box shows the following configuration:

Point ID	Point Type
340001	HV
340002	HV
340003	HV
340005	HV
340006	HV
350001	HV
350002	HV

Input: ☒ Current Model ☐ File (object1\Control\ColorProject1.con)

Output: Layer: ControlPoints, Control Point ID Field Name: PointID (Number)

Control Type: Field Name: PointType (Number)

Horizontal Vertical: 1, Pass Point: 3

Horizontal: 0, Check Point: 4

Vertical: 2

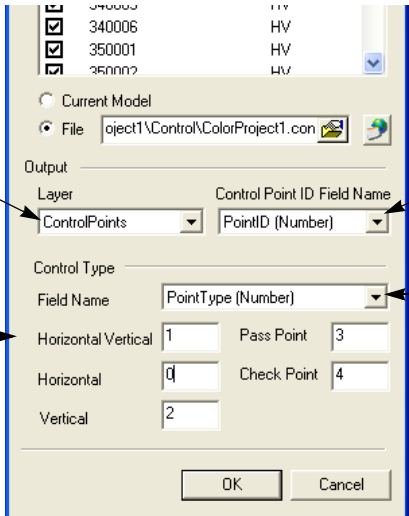
Buttons: OK, Cancel

Step 4) Choose the output layer, specify the point identification and type fields, and set labels for each type of control point:

Choose a layer for the control point objects.

Set **Control Point ID Field Name** to the point identification field. This field should have been added to the layer in Step 1.

Enter text labels for each type of control point. Here, labels such as 0, 1, 2, 3, and 4 are used as an example of an integer field. Text values such as **HV** and **H** might be used for a text field. Any labels may be used as long as they are the same type as the field definition.



The dialog box shows the following configuration:

Point ID	Point Type
340001	HV
340002	HV
340003	HV
340005	HV
340006	HV
350001	HV
350002	HV

Input: ☐ Current Model ☒ File (object1\Control\ColorProject1.con)

Output: Layer: ControlPoints, Control Point ID Field Name: PointID (Number)

Control Type: Field Name: PointType (Number)

Horizontal Vertical: 1, Pass Point: 3

Horizontal: 0, Check Point: 4

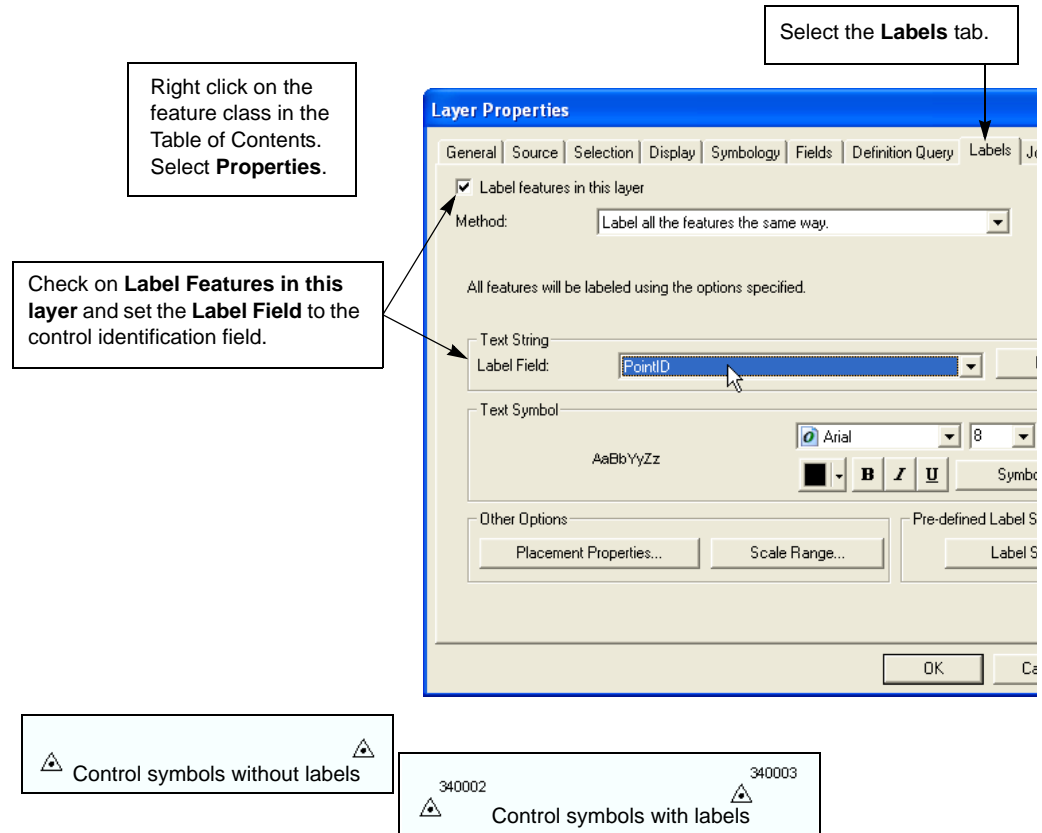
Vertical: 2

Buttons: OK, Cancel

Set **Control Type Field Name** to the point type field. This field should have been added to the layer in Step 1.

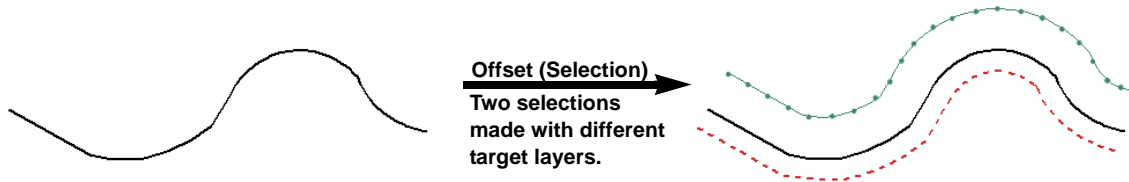
Step 5) Select **OK** to run the command.

- Step 6)** (Optional) If desired, use the point identification field to label the control symbols. See the ArcGIS Help for information about labeling. Briefly, labeling consists of the following: Right click on the control point layer in the Table of Contents. Select **Properties**. Select the **Labels** tab. Check on **Label Features in this layer** and set **Text String Label Field** to the control identification field.



Offset - Selection Method

Purpose: To create a 3D offset of a line object by selecting the offset location with the stereoplotter.

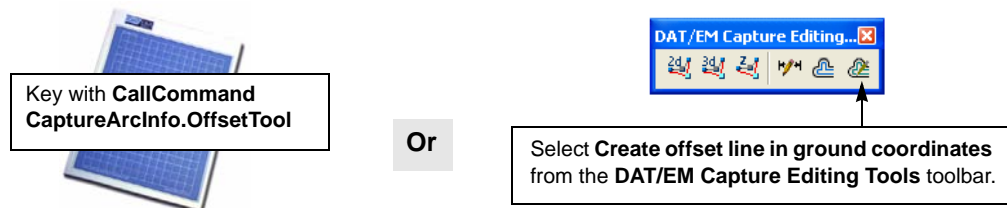


The **Offset - Selection Method** command allows you select an object, then use the stereoplotter to pick one or more 3D offset locations. Each offset is placed on the currently set target layer.

To add multiple offsets at one time based on a table of offset specifications, see “Offset - Table Method” on page 6-86 instead.

To use **Offset - Selection Method**, perform the following steps:

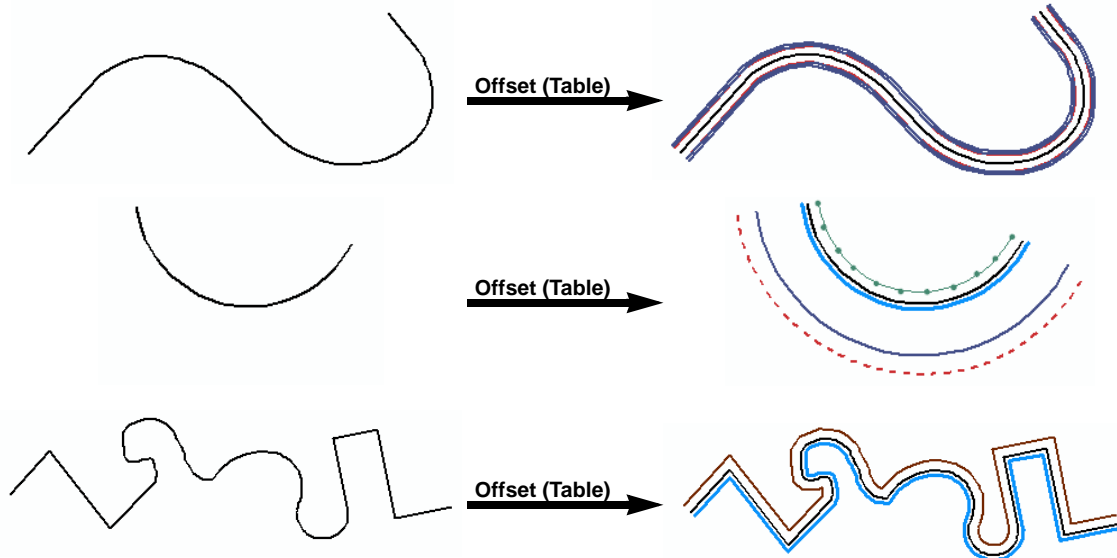
- Step 1)** An edit session must be active. Using ArcMap’s **Edit Tool** or **Select Features** tool, select (highlight) an existing line/polyline feature in the current workspace.
- Step 2)** Select the **Create offset line in ground coordinates** icon from the **DAT/EM Capture Drawing Tools** toolbar or select it from the DAT/EM KEYPAD.



- Step 3)** Set the **Target** layer on ArcMap’s **Editor** toolbar or set a target layer using the DAT/EM KEYPAD. The target layer must have line (feature class) or polyline (shapefile) geometry.
- Step 4)** Carefully position the stereoplotter cursor at the X, Y, and Z offset distance away from the selected object. Digitize. This position will become a point on the new offset line, and its perpendicular and vertical offset distances will be used to create the remainder of the offset line.
- Step 5)** If desired, repeat Step 3 and Step 4 to create more offsets of the same selected object.

Offset - Table Method

Purpose: To create one or more 3D offsets of a selected object based on a table of offset specifications.



The **Offset - Table Method** command allows you to set up a table of any number of offset distances and layers. It creates 3D offsets of the selected object. This command could be used to add road edges and curb and gutter lines to a digitized road edge or centerline.

To add only one offset at a time using the stereoplottor to select the offset location, see “Offset - Selection Method” on page 6-85 instead.

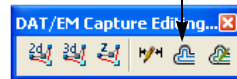
To use **Offset - Table Method**, perform the following steps:

- Step 1)** An edit session must be active. Using ArcMap’s **Edit Tool** or **Select Features** tool, select (highlight) an existing line/polyline feature in the current workspace.
- Step 2)** Select the **Create one or more offset curves** icon from the **DAT/EM Capture Editing Tools** toolbar or select it from the DAT/EM KEYPAD.

Key with **CallCommand**
CaptureArcInfo.CurveOffset

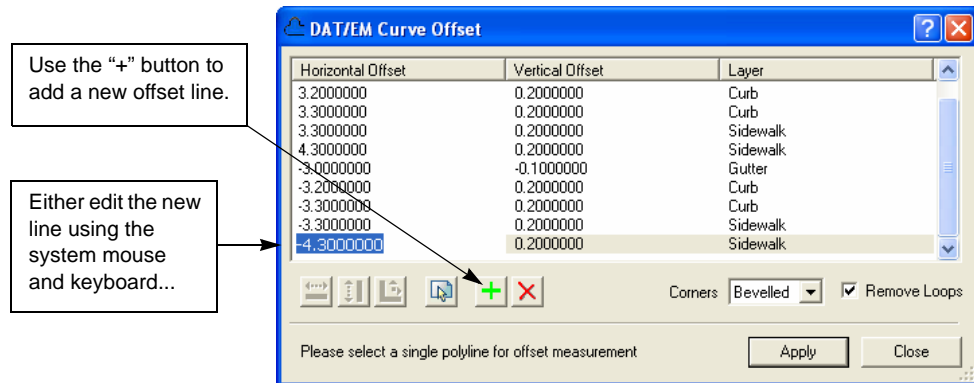
Or

Select **Create one or more offset curves** from the **DAT/EM Capture Editing Tools** toolbar.



Step 3) The DAT/EM Curve Offset table dialog appears. To add an offset definition to the table, click “+” to add a line to the table. Highlight the line and choose a method to set the definition:

- a.) Edit each field in the row using the mouse and keyboard.
- b.) Or, use one of the stereoplotter measurement choices. If an object isn’t already selected, use the selection tool button and select the object to offset. Then choose the horizontal, vertical, or horizontal-vertical measurement buttons and select the offset location with the stereoplotter cursor.



...or, use one of the stereoplotter measurement choices.

- If an object isn't already selected, use the selection tool button and select the object to offset.
- Then choose the horizontal, vertical, or horizontal-vertical measurement buttons and select the offset location with the stereoplotter cursor.

Step 4) Select **Apply** to add the table’s offsets to the selected object.

Note: The DAT/EM KEYPAD or a digitizer button can use the **Apply** keyword to activate the **Apply** button in this dialog. See *Appendix A* for more information.

Step 5) If desired, apply offsets to other objects. Use the offset tool button to select one object at a time, then select **Apply**. (Do not select multiple objects; only the first selected will be offset.)

Select Images on Image Server


Purpose: To select images from a stereo raster dataset in ArcGIS for Server and automatically create a SUMMIT EVOLUTION project from them. This command works for ArcGIS for Desktop 10 and higher.

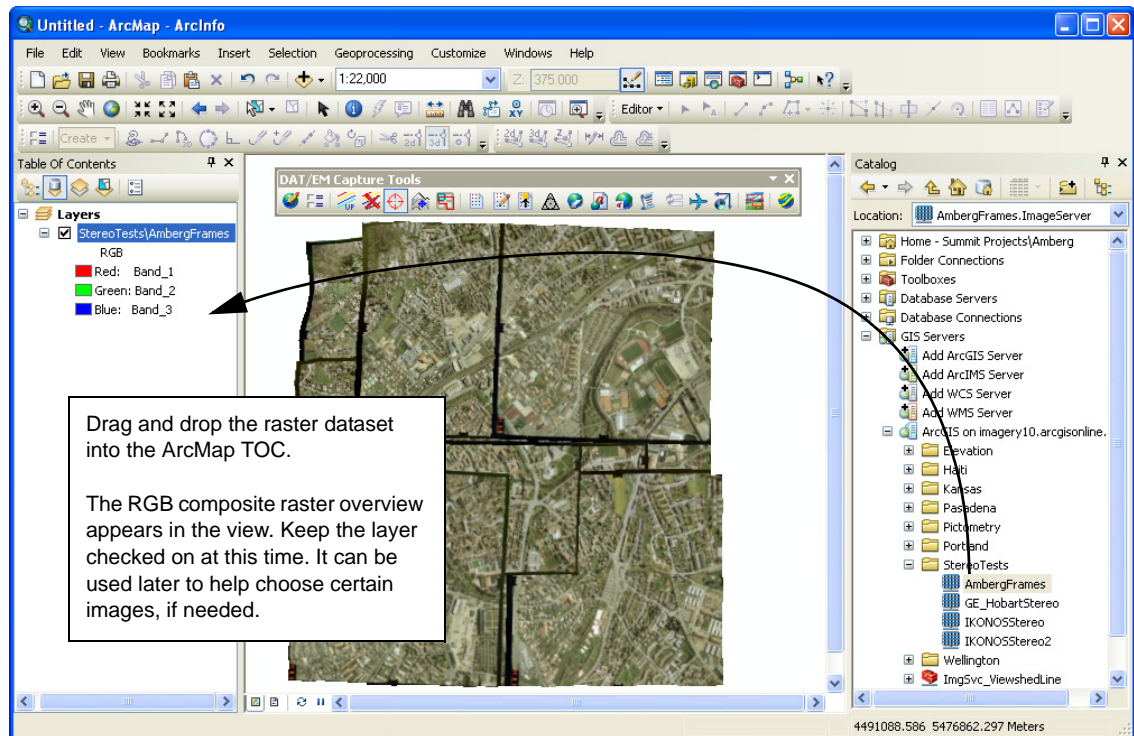
The **Select Images on Image Server** command helps choose and download images and other files from ArcGIS for Server (formerly called Esri Image Server). It builds a SUMMIT EVOLUTION project file from the selected files.

Be aware that this process downloads entire images. The images must be completely downloaded before using them with SUMMIT EVOLUTION. Please plan enough time for the download process, which uses an ftp download for images located through the internet.

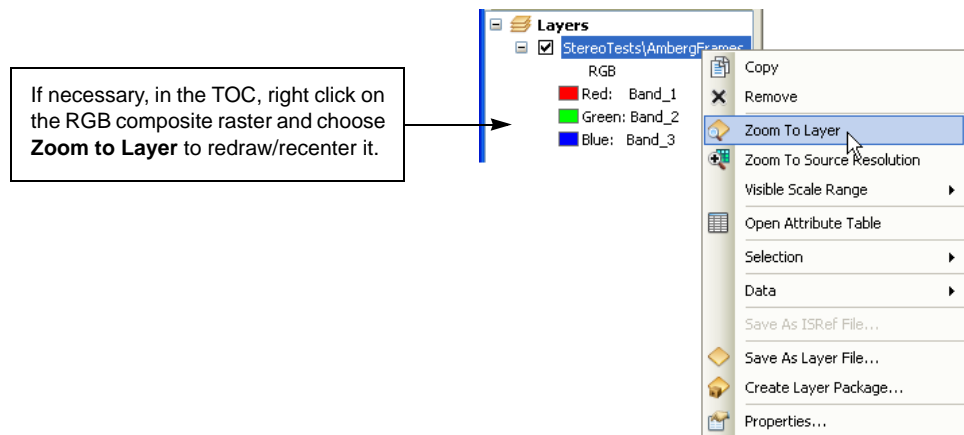
To use **Select Images on Image Server**, perform the following steps:

Step 1) In ArcMap, perform the following steps:

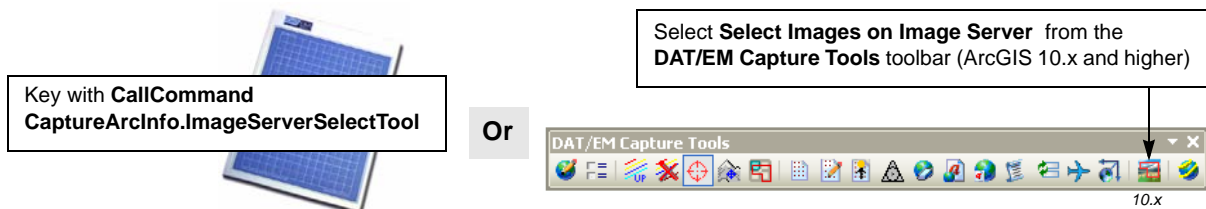
- a.) Open a new, blank map in ArcMap. (SUMMIT EVOLUTION does not need to be running at this time.)
- b.) Open the Catalog window. Select **Windows>Catalog** or select **Catalog Window** from the **Standard** toolbar.
- c.) Select GIS Servers and connect to the server where the desired stereo raster dataset is located. Browse to the desired raster dataset.  *Esri ArcGIS raster dataset icon*
- d.) Drag and drop the stereo raster dataset into the ArcMap Table of Contents (TOC). The RGB composite raster for the project will appear in the ArcMap data view. It shows an mosaic-like overview of the images available in the dataset. These are *not* the actual TIF images that will eventually be used by SUMMIT EVOLUTION.
- e.) Save the new map file with the RGB composite raster included in it.



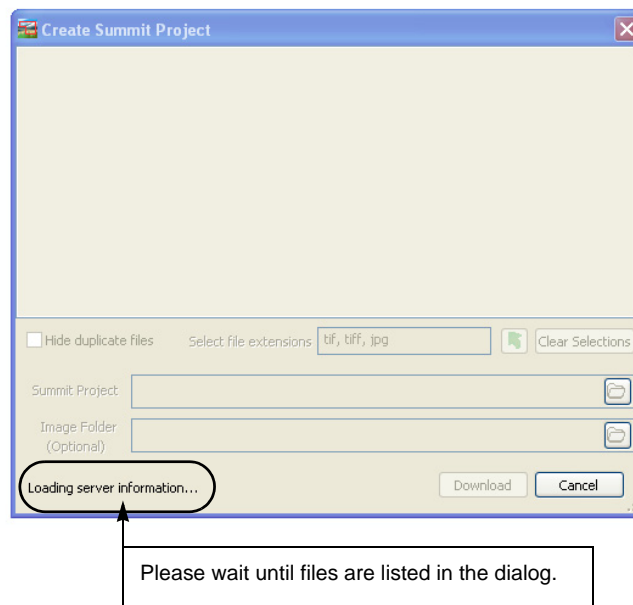
- f.) If the composite is not visible or to redraw or recenter it at any time, right click on the layer in the TOC and select **Zoom to Layer**.



- Step 2)** Select the **Select Images on Image Server** icon from the **DAT/EM Capture Tools** toolbar or select it from the DAT/EM KEYPAD.



The Create Summit Project dialog appears. It may report, “Loading Server Information” for a long time while it accesses the server; please wait. When it is finished, it lists all the files in the project grouped into catalog trees for each image. It automatically checks on the image types that match the current **Select file extensions** setting.



Step 3) Check or uncheck image names to include only those photogrammetric images you need for SUMMIT EVOLUTION stereo models. Please note:

- Files are checked on if they match the **Select file extensions** list, but checked files are *not* guaranteed to be the photogrammetric images needed for a SUMMIT EVOLUTION project. There could be any number of “extra” checked TIF or JPG files. It is your responsibility to adjust the checked items to include the photogrammetric images only.
- A large file size usually indicates that an image file is correct. Photogrammetric imagery is usually very high resolution, and therefore has a very large file size.
- Compatible image formats at this time (July 2011) are TIFF, TIF, JPG, JP2, ECW. AFR may be supported; please contact DAT/EM Support if you have this format.

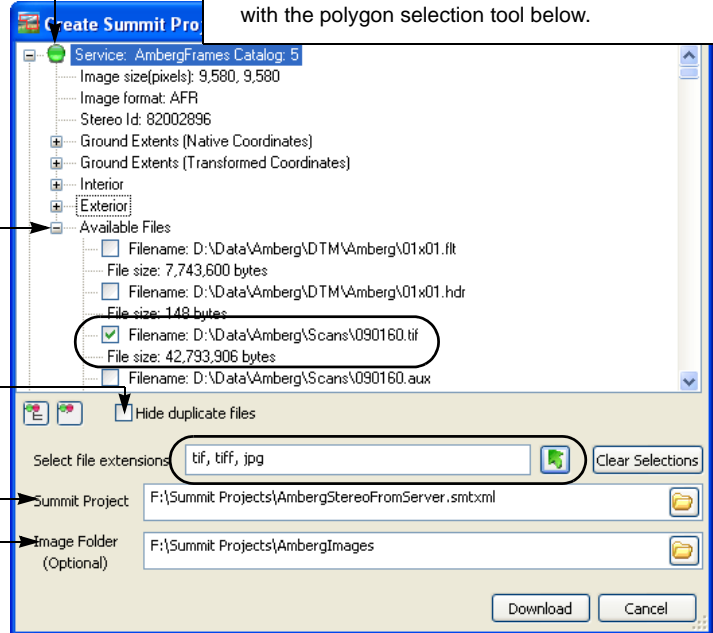
Initially, all files are checked if they match the extensions currently listed in **Select file extensions**. Choose a method to refine the list of checked items:

- Check/uncheck images files manually,
- Change **Select file extensions** and use the green arrow button to refresh the checked items,
- Use **Clear Selections** and proceed to make manual selections,
- Use the drawing tool to define an area on the overview and automatically find the files in that area. See instructions below.

- If desired, choose **Hide duplicate files** if duplicate files are a problem in the list.
- If desired, use the expand and collapse buttons to adjust the display.

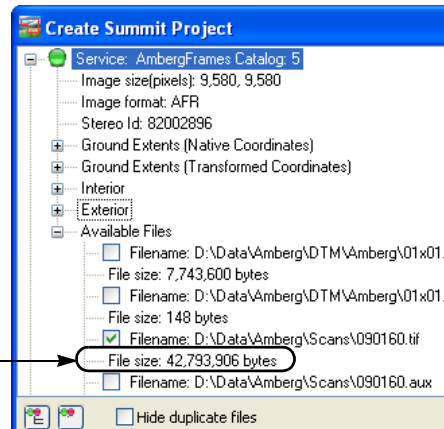
- Enter a new SUMMIT EVOLUTION project path and name.
- If desired, enter a path for the image files. If this is left blank, the images are placed in the same location as the **Summit Project**.

- A green dot** means that any checked files in this catalog tree will be downloaded.
- A red dot** means that files in this catalog tree will not be downloaded, even if they are checked.
- Click directly on a red or green dot to toggle it.
- More information on red and green dots appears with the polygon selection tool below.



Note the large file size of this image. This indicates it is a photogrammetric image. Hints:

- There could be any number of images included with the file set, but usually only one will be the photogrammetric image that you need.
- Small images might be “extras” that should be unchecked.
- Watch out for duplicate photogrammetric images appearing in the same file set. If both are checked, the download time will double, and there will be no benefit. If this is a problem, check the **Hide duplicate files** checkbox.



- (Optional) If desired, use the polygon selection tool to help find the images in a part of the project. Use this tool if you want to download some, but not all, of the images.

If the RGB composite raster is not completely displayed, right click on its layer in the TOC and select **Zoom to Layer**.

The ArcMap system mouse cursor indicates the polygon selection tool. Use it to draw a polygon over the RGB composite raster in the ArcMap view. As soon as the first polygon point is digitized, temporary image boundary lines will appear over the RGB composite raster. These indicate the extents of the images from all listed catalog trees in the Create Summit Project dialog. As you draw the polygon, either cross or completely enclose the boundaries of the images you need.

Right click to end and close the polygon.

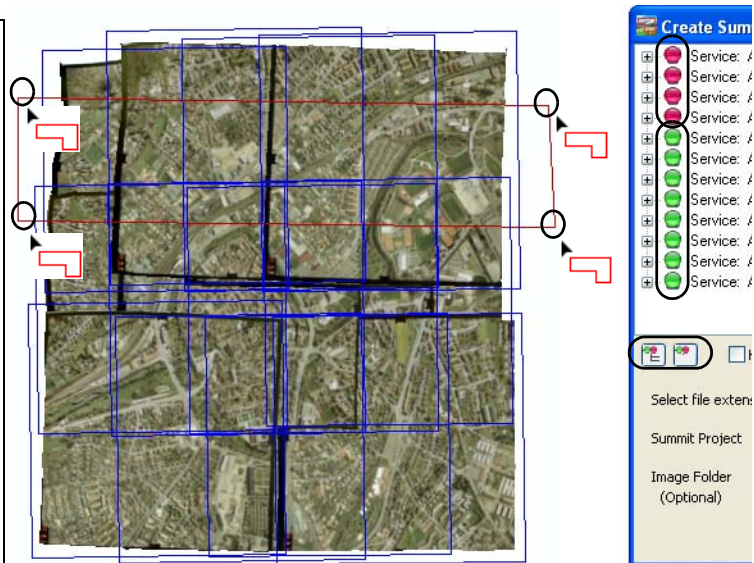
The catalog trees that contain images crossing and/or inside the polygon will be shown with a green dot (active); areas outside will be shown with a red dot (deactivated, even if files are checked on). Click directly on a red or green dot to toggle it, if desired.

Use these green and red dots to help decide whether to check or uncheck images under the particular catalog trees. Only those checked images under a green dot will be downloaded; if they have a red dot – even if they are checked – they will not be downloaded.

(Optional) Use the polygon selection tool to draw a polygon through or around the images of interest.

- When the first point is digitized, boundary lines appear for the individual image areas.
- Draw the polygon to either cross or enclose the boundaries.
- Right click to end and close the polygon.
- Crossed or enclosed boundary areas will be indicated with a green dot in the Create Summit Project catalog list. Outside areas will have a red dot.

Note: The polygon tool does not check or uncheck images. Red-dotted catalogs may still contain checked images, but they will appear gray/inactive and will not be downloaded.



Step 4) Perform a final review:

- Review the checked/green dot files and other settings.
- Make sure there is enough disk space on the destination **Summit Project** or **Image Folder** drive to hold all of the checked images.
- Be aware of the total of all the file sizes and how long they are likely to take to download. They must be completely downloaded before using them in SUMMIT EVOLUTION.

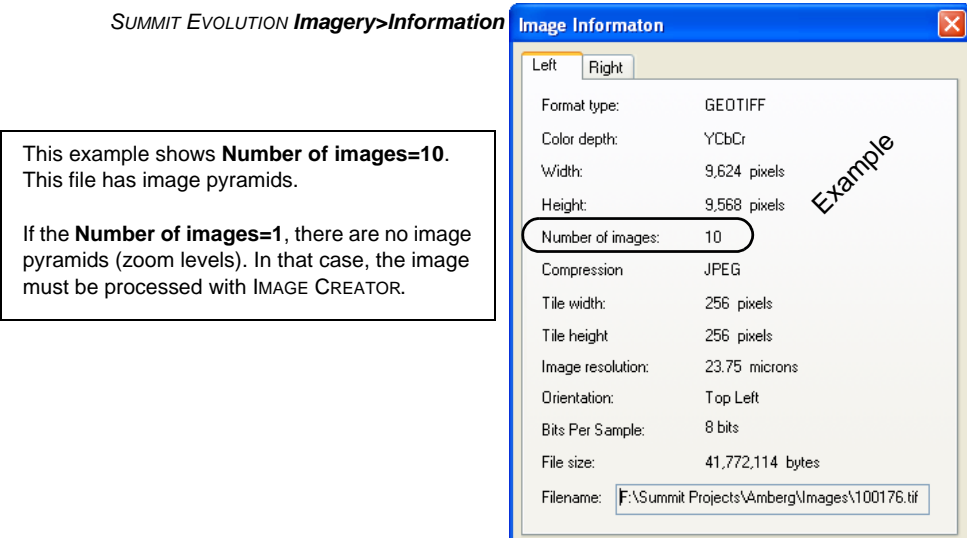
- Step 5)** Select the **Download** button. Please wait the time required for all of the files to download. The time required depends on the total size of all the checked files, the upload speed of the server, and the download speed of the client. If the server is on a local area network, the time will be much faster than if it is using the internet.
- Step 6)** Open the new **.smtxml** file in SUMMIT EVOLUTION. **Note:** This type of SUMMIT EVOLUTION project does not have a camera file, because it has an imported interior orientation (IO), which may not be remeasured.
- Step 7)** Determine whether or not the images have zoom levels (image pyramids). Open an image or a model in SUMMIT EVOLUTION.

Symptoms of missing zoom levels include: SUMMIT EVOLUTION cannot zoom in to the sub-pixel level; there is no embedded bird's-eye view displayed when that view is set on; PROJECT VIEWER WITH ORTHOPHOTO AND MOSAIC cannot load images for the project.

Select the “i” icon on SUMMIT EVOLUTION’s **Imaging** toolbar or select **Imagery>Information**. If it reports **Number of Images>1**, the file probably has image pyramids; in this case, skip to the next step. If it reports **Number of Images=1**, the images only have a 1X level, and they must be processed by SUMMIT EVOLUTION’s IMAGE CREATOR to make the zoom levels. Please see instructions for IMAGE CREATOR in the *Summit Evolution Operation Manual*.

- **Hint:** If the original image name is **.tif**, select either **TIF**, **PYR**, or **New TIF and PYR** as the IMAGE CREATOR output. If new **.tif** files are made, substitute them into the original **.tif** location. This ensures that the file paths listed in the SUMMIT EVOLUTION **.smtxml** file will still be valid, but the new files will be referenced.

If the IMAGE CREATOR output files have a different extension than the original files (for example, original JPG files are output as new TIFs), the files must be exchanged using the Edit Project dialog in SUMMIT EVOLUTION. In the SUMMIT EVOLUTION Project Edit dialog, highlight each file and use the **Modify** button to change the file name.



- Step 8)** At this time, the SUMMIT EVOLUTION project is ready to use. If desired, uncheck the RGB raster overview in the ArcMap TOC; it may be displayed or turned off – or even removed from the TOC – at any time. Create models and strips if needed (see the *Summit Evolution Operation Manual* for instructions).

Select Summit Models Area

Purpose: To draw an area in the ArcMap view and automatically find the SUMMIT EVOLUTION models that are in that area. The goal is to drag and drop the models from the list into multiple viewports in SUMMIT EVOLUTION.

The **Select Summit Models Area** command helps to choose which models to open in multiple viewports in SUMMIT EVOLUTION. It allows you to draw (freehand) a polygon in the ArcMap view, from which it makes a list of Summit Evolution models that are in that area. The list is used to open models in multiple viewports in SUMMIT EVOLUTION.

To use **Select Summit Models Area**, perform the following steps:

- Step 1)** SUMMIT EVOLUTION must be open with a project that matches the current ArcMap data frame view. If multiple viewports are not already open in SUMMIT EVOLUTION, use **View>Viewports** to open your choice of multiple viewports.
- Step 2)** Select the **Select Summit Models Area** icon from the **DAT/EM Capture Tools** toolbar or select it from the DAT/EM KEYPAD.

Key with **CallCommand**
CaptureArcInfo.SelectPlotterModelArea

Or

Select **Select Summit Models Area**
from the **DAT/EM Capture Tools** toolbar.

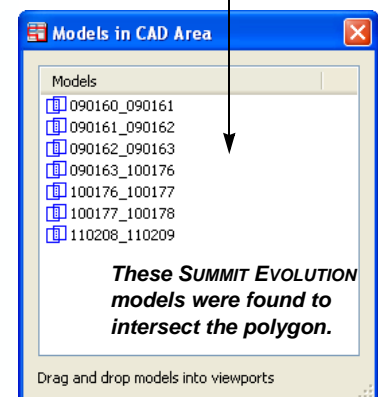


- Step 3)** If necessary, use SUMMIT EVOLUTION to adjust the zoom of the ArcMap view to display the area of interest. It may be necessary to zoom out very far in the currently open model.
- Step 4)** Use the system mouse to draw a freehand polygon around the area of interest in the ArcMap view. Right click to finish the polygon. (This is a temporary polygon, not a permanent object.)
- Step 5)** A model list appears. Drag and drop models from the list into viewports in SUMMIT EVOLUTION.



- Activate the **Select Summit Models Area** cursor.
- Use the system mouse to draw the polygon. Right click to finish.

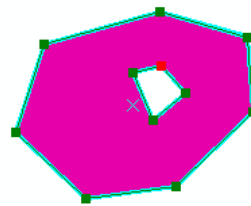
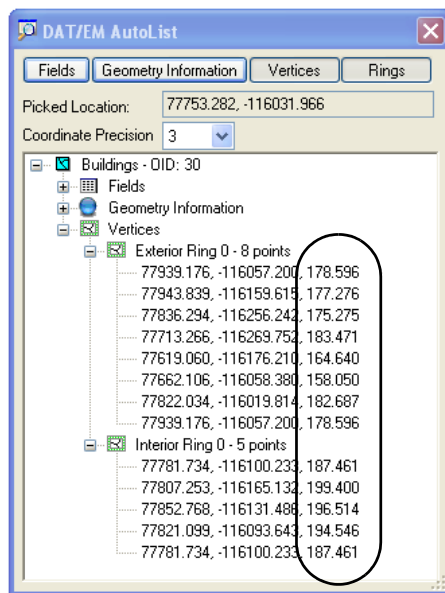
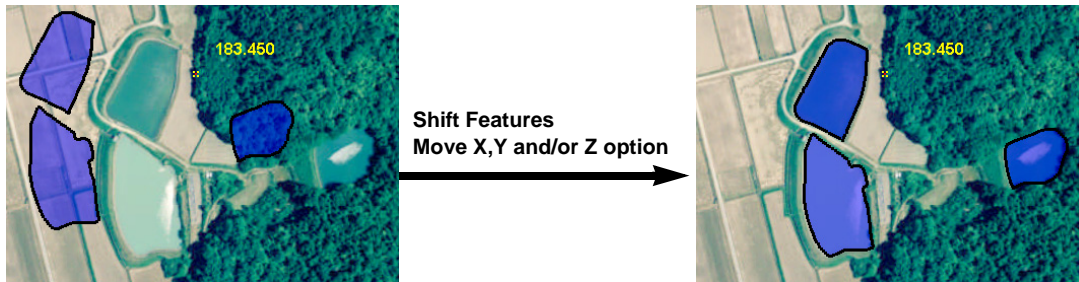
Drag and drop models
from the resulting list
into multiple viewports
in SUMMIT EVOLUTION.



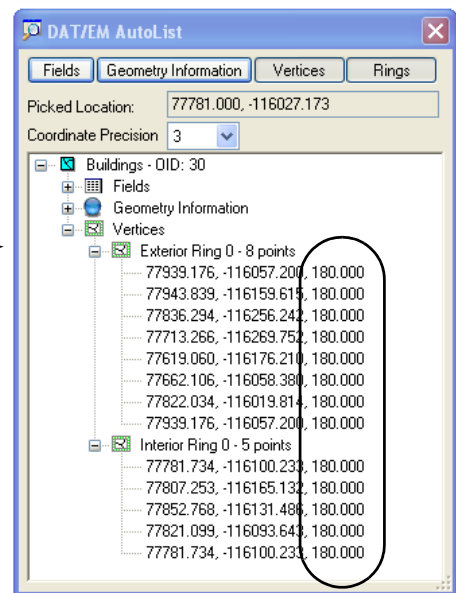
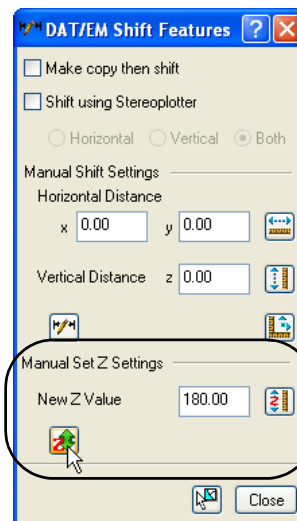
Shift Features

Purpose: **Shift Features** can work on the selected object or a copy of the object. It has two purposes:

- Options to shift (move) one or more features in X, Y, and/or Z.
- An option to set all the Z values in an object to the same elevation value, effectively flattening the object.



Shift Features
Set Z "flatten" option

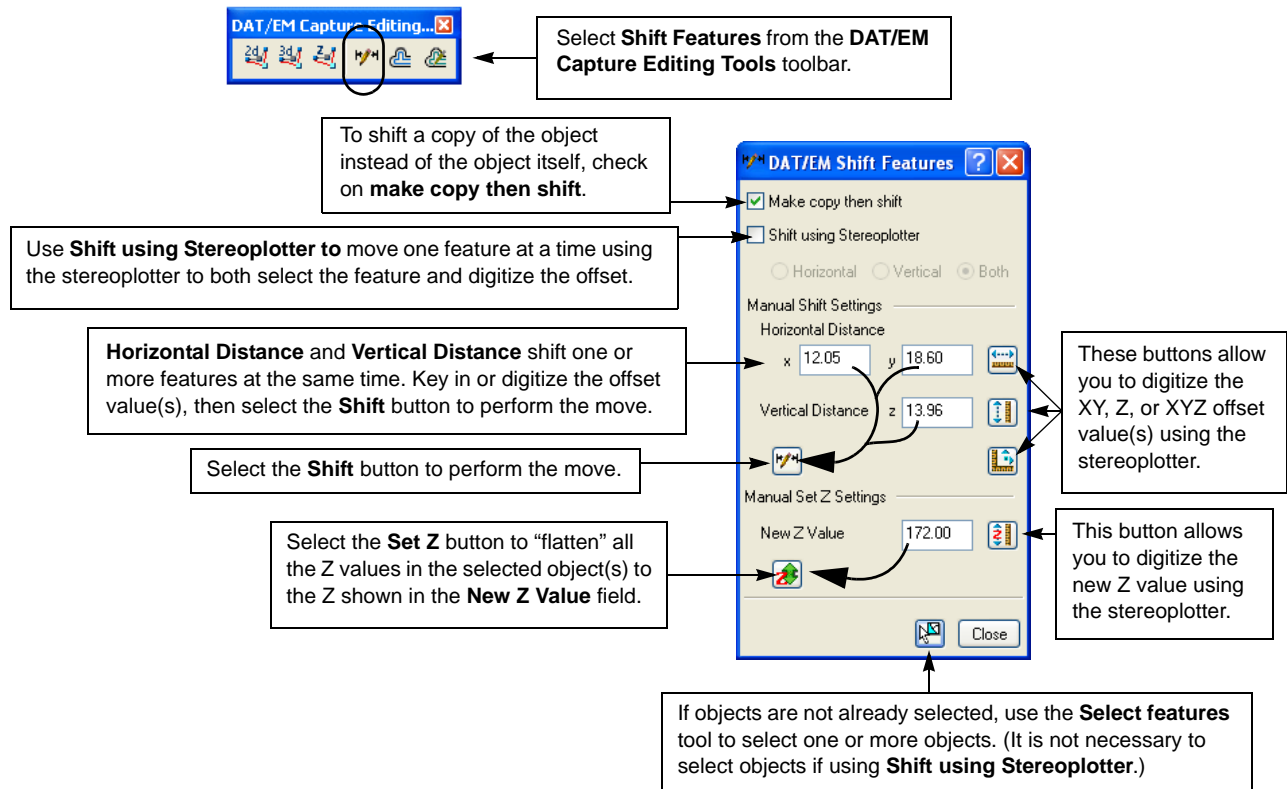


The **Shift Features** tool is a 3D alternative to ArcMap's drag and drop function, which moves feature(s) in 2D only.









To use **Shift Features**, perform the following steps:

- Step 1)** If an editing session is not already active, select **Start Editing** from ArcMap's **Editor** menu or from the DAT/EM KEYPAD.

- Step 2)** If desired, select one or more objects now. Note that object selection may also be done when the DAT/EM Shift Features dialog is open. Note also that if **Shift using Stereoplotter** will be used, it is not necessary to select objects in advance.
- Step 3)** Select the **Shift Features** icon from the **DAT/EM Capture Editing Tools** toolbar.



- Step 4)** Choose a **Make copy then shift** setting. When on, changes are made to a copy of the object, while the original object remains unchanged. When off, changes apply directly to the selected object.
- Step 5)** Select the shift method:
- Select **Shift using Stereoplotter** to use the stereoplotter cursor to select and move one feature at a time.
 - Use the **Manual Shift Settings** area to specify offset values, select one or more features, and then apply the offsets to the selected feature(s). To use this method, **Shift using Stereoplotter** must be off (not checked).
 - Use **Manual Set Z Settings - New Z Value** to set an elevation and "flatten" all vertices in the object to the same Z value. For polygons, this applies to both exterior and interior ring vertices. (This is especially useful for "flattening" lake polygons that have been accidentally digitized with varying Z values.)
- Step 6)** Make settings in the dialog box. For information on each setting, select the "?" button and select the dialog box item to see context-sensitive help.
- For **Shift using Stereoplotter**, select **Horizontal**, **Vertical**, or **Both**. Using the stereoplotter cursor, digitize a start point directly on the feature you wish to move. This point both selects the feature and sets the origin for the move. Move the stereoplotter to the new feature location and digitize. Repeat to shift more features. When finished, select **Cancel** to stop the stereoplotter selection mode.

- b.) For **Manual Settings**, either key in new offset values or use the    buttons to digitize them using the stereoplotter. If features are not already selected, use the  button to select one or more features. Use the **Shift**  button to apply the shift values.
- c.) For **Manual Set Z Settings - New Z Value**, either key in a **New Z Value** or use the  button to measure the elevation using the stereoplotter. If features are not already selected, use the  button to select one or more objects. Use the **Set Z**  button to apply the **New Z Value** to every vertex in the object(s).

Step 7) When finished, select **Close** to exit the dialog.

At any time, you may use the ArcMap **Undo** button to undo the last shift without having to close the DAT/EM Shift Features dialog.

Shift Vertex in XY Only

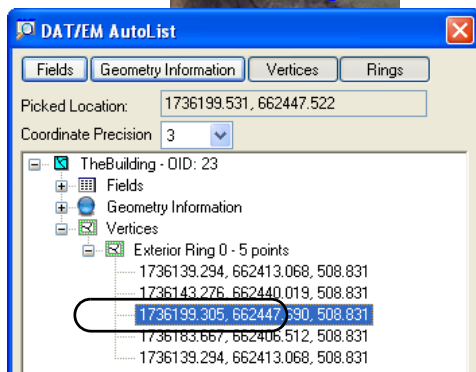
Shift Vertex in XY Only

Purpose: **Shift Vertex in XY Only** edits the X and Y of an existing vertex in a polygon or polyline.

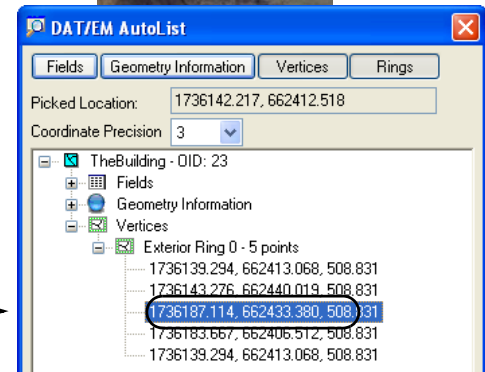


One corner of this roof is at the correct elevation, but it is not at the correct XY.

Use **Shift Vertex in XY Only** to move the vertex to the correct XY.

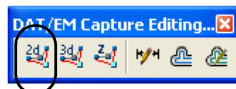


Shift Vertex in XY Only



To use **Shift Vertex in XY Only**, perform the following steps:

- Step 1)** If an editing session is not already active, select **Start Editing** from ArcMap's **Editor** menu or from the DAT/EM KEYPAD.
- Step 1)** Set ArcMap's **Task** to **Modify Feature**.
- Step 2)** Select the **Shift vertex in XY only (keep Z)** from the **DAT/EM Capture Editing Tools** toolbar.



Select **Shift vertex in XY only (keep Z)** from the **DAT/EM Capture Editing Tools** toolbar.

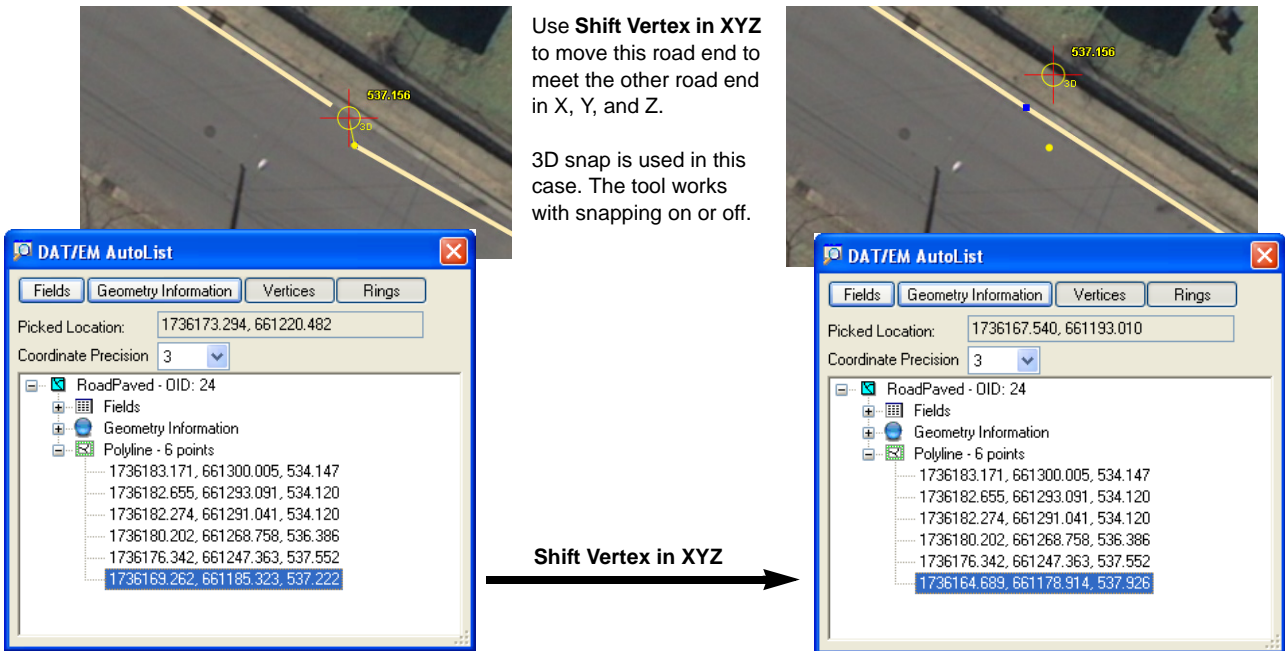
- Step 3)** Using the stereoplottor cursor, pick on the vertex to be edited. The object will highlight, and a rubber band line will appear from the vertex to the cursor location. Hints:

- The pick does not depend on snapping. Snapping layers and snapping modes may be off.
- The ArcMap snapping tolerance is used as a pick radius. To set the snap radius in ArcGIS 9.x, select **ArcMap Editor toolbar > Editor > Options > General tab > Snapping tolerance**. To set it in ArcGIS 10.x, select **ArcMap Editor toolbar > Editor > Snapping > Options**. Remember that while DAT/EM CAPTURE is loaded, the "Pixels" setting really means "SUMMIT EVOLUTION ground units". The setting must be set to "Pixels", not "Map units".
- For best results picking a polygon vertex, position the stereoplottor cursor *inside* the polygon and near the vertex.

- Step 4)** Move the cursor to the new XY location and pick again. (Snapping may be on or off. It does not matter where the stereoplottor cursor is located in Z.)

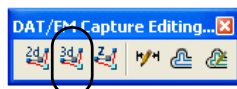
Shift Vertex in XYZ

Purpose: **Shift Vertex in XYZ** edits the full 3D coordinate of an existing vertex in a polygon or polyline.



To use **Shift Vertex in XYZ**, perform the following steps:

- Step 1)** If an editing session is not already active, select **Start Editing** from ArcMap's **Editor** menu or from the DAT/EM KEYPAD.
- Step 1)** Set ArcMap's **Task** to **Modify Feature** (9.x) or the classic task to **Modify** on the **DAT/EM Capture Drawing Tools** toolbar (10.x).
- Step 2)** Select the **Shift vertex in XYZ** from the **DAT/EM Capture Editing Tools** toolbar.



Select **Shift vertex in XYZ** from the **DAT/EM Capture Editing Tools** toolbar.

- Step 3)** Using the stereoplotted cursor, pick on the vertex to be edited. The object will highlight, and a rubber band line will appear from the vertex to the cursor location. Hints:
 - The pick does not depend on snapping. Snapping layers and snapping modes may be off.
 - The ArcMap snapping tolerance is used as a pick radius. To set the snap radius in ArcGIS 9.x, select **ArcMap Editor toolbar > Editor > Options > General tab > Snapping tolerance**. To set it in ArcGIS 10.x, select **ArcMap Editor toolbar > Editor > Snapping > Options**. Remember that while DAT/EM CAPTURE is loaded, the "Pixels" setting really means "SUMMIT EVOLUTION ground units". The setting must be set to "Pixels", not "Map units".
 - For best results picking a polygon vertex, position the stereoplotted cursor *inside* the polygon and near the vertex.
- Step 4)** Move the cursor to the new XYZ location and pick again. (Snapping may be on or off.)

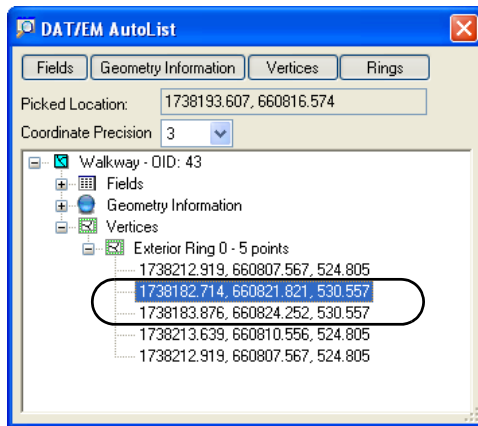
Shift Vertex in Z Only

Purpose: **Shift Vertex in Z Only** edits the elevation of an existing vertex in a polygon or polyline.

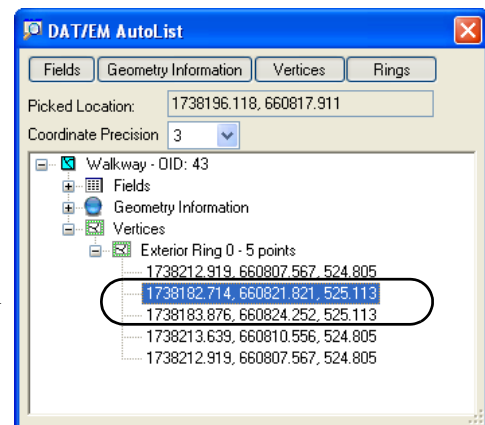


This concrete walk was accidentally 3D snapped to the elevation of the building roof. It should have been 2D snapped.

Use **Shift Vertex in Z Only** to move each point to the ground Z without changing its XY.

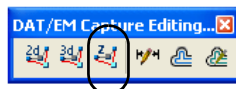


Shift Vertex in Z Only
(Run two times to edit two vertices)



To use **Shift Vertex in Z Only**, perform the following steps:

- Step 1)** If an editing session is not already active, select **Start Editing** from ArcMap's **Editor** menu or from the DAT/EM KEYPAD.
- Step 1)** Set ArcMap's **Task** to **Modify Feature**.
- Step 2)** Select the **Shift vertex in Z only** from the **DAT/EM Capture Editing Tools** toolbar.



Select **Shift vertex in Z only** from the **DAT/EM Capture Editing Tools** toolbar.

- Step 3)** Using the stereoplottor cursor, pick on the vertex to be edited. The object will highlight, and a rubber band line will appear from the vertex to the cursor location. Hints:

- The pick does not depend on snapping. Snapping layers and snapping modes may be off.
- The ArcMap snapping tolerance is used as a pick radius. To set the snap radius in ArcGIS 9.x, select **ArcMap Editor toolbar > Editor > Options > General tab > Snapping tolerance**. To set it in ArcGIS 10.x, select **ArcMap Editor toolbar > Editor > Snapping > Options**. Remember that while DAT/EM CAPTURE is loaded, the "Pixels" setting really means "SUMMIT EVOLUTION ground units". The setting must be set to "Pixels"; do not set "Map units".
- For best results picking a polygon vertex, position the stereoplottor cursor *inside* the polygon and near the vertex.

- Step 4)** Move the cursor to the new Z location and pick again. (Snapping may be on or off. It does not matter where the stereoplottor cursor is located in XY.)

SI (Super/Imposition) Off

Purpose: To turn off the display of superimposed objects in the SUMMIT EVOLUTION Image View.

The **SI Off** command turns off the display of superimposed objects in the SUMMIT EVOLUTION Image view.

To use **SI Off**, perform the following steps:

- Step 1)** Select the **SI Off** icon from the **DAT/EM Capture Tools** toolbar.
- Step 2)** At any time, turn the display back on using the **SI Update** icon from the **DAT/EM Capture Tools** toolbar.

Select **SI Off** from the **DAT/EM Capture Tools** toolbar.



Note that other SUPER/IMPOSITION options may be set using **DAT/EM Options**.

SI (Super/Imposition) Update

Purpose: To refresh the display of superimposed objects in the SUMMIT EVOLUTION Image View; or, to turn on the superimposed display after it has been turned off with **SI Off**.

The **SI Update** command forces a refresh, or redraw, of the superimposed objects in the SUMMIT EVOLUTION Image view. The objects in ArcMap are read immediately and refreshed in SUPER/IMPOSITION. Note that some objects, such as arced segments, are not completely committed to ArcMap's database during, or even just after, they are drawn; SUPER/IMPOSITION reads the most current information possible and displays it, but sometimes it is not possible to obtain the complete object.

If necessary, the **SI Update** command turns on the SUPER/IMPOSITION display. See page 6-100 for information on the **SI Off** command.

For example, if an object is deleted in ArcMap, it still appears superimposed over the SUMMIT EVOLUTION Image View. Use **SI Update** to force a view refresh and make the object disappear from the SUPER/IMPOSITION display.

To use **SI Update**, perform the following steps:

- Step 1)** Choose a method to activate the command:
 - a.) Select a DAT/EM KEYPAD key that is set to **SI Update**.
 - b.) Select the **SI Update** icon from the **DAT/EM Capture Tools** toolbar.
- Step 2)** Be aware that complete information about some objects is not available to SUPER/IMPOSITION. This is an ArcMap limitation. For example, multi-part polygons may not be completely committed and "cleaned up" in the database until the **mx**d file is closed. The multi-part polygon may display correctly in SUPER/IMPOSITION only when the file is re-opened in ArcMap.

Select **SI Update** from the **DAT/EM Capture Tools** toolbar.



Note that other SUPER/IMPOSITION options may be set using **DAT/EM Options**.

Snap2D, Snap3D, SnapOff

Purpose: These “DAT/EM Snaps” work with the DAT/EM Cursor on and enhance ArcMap’s snapping as follows: **Snap2D** snaps to the object’s XY, but uses the stereoplottter’s Z; **Snap3D** snaps to the XYZ of the object; **SnapOff** turns snapping off.

When using ArcMap’s snapping by itself – without help from DAT/EM – it always performs a 2D snap. That is, it snaps to the XY of the snapped-to object, but retains ArcMap’s current Z setting. With the DAT/EM snapping modes, snaps can be 2D, 3D, or off. DAT/EM snapping modes work with the DAT/EM cursor.

- When **Snap2D** is on, ArcMap snaps to the object’s XY, but retains the stereoplottter’s current Z.
- When **Snap3D** is on, ArcMap snaps to the full XYZ of the snapped-to object.
- When **SnapOff** is used, snapping is turned off for every layer, even if they are checked on in the Snapping Environment Window.

DAT/EM 2D and 3D snapping modes require the ArcMap (Classic) Snapping Environment to be active in both ArcMap 9.x and 10.x. DAT/EM snapping modes help with ArcMap snapping; they do not perform the snap itself. ArcMap performs the snap operation, and the DAT/EM snap mode determines the Z of the snap.

In the SUMMIT EVOLUTION stereo view, the current snapping mode is visible by looking at the stereo “snap-to” line that extends from the cursor to the snapped-to object. As long as the cursor is at a different elevation than the snapped object, the following can be seen:

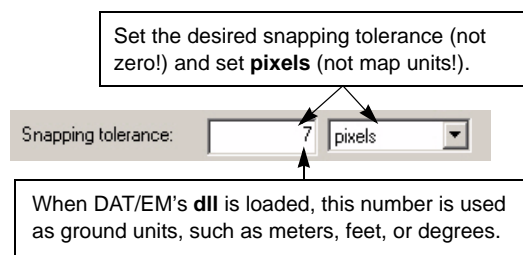
- For a 2D snap, the “snap-to” line starts and ends at the elevation of the cursor, showing an obvious elevation difference at the snapped-to object.
- For 3D snaps, the “snap-to” line starts at the elevation of the cursor, but ends at the snapped-to object’s elevation.

To use DAT/EM snapping, perform the following steps:

Step 1) (Preparation) Set the snapping tolerance:

- **ArcMap 9.x:** Select **Options** from the **Editor** pull-down menu on ArcMap’s **Editor** toolbar. The setting is on the **General** tab. DAT/EM KEYPAD key for this dialog: **CallCommand esriEditor.PropertiesCommand**.
- **ArcMap 10.x:** Select **Snapping>Options** from the **Editor** pull-down menu on ArcMap’s **Editor** toolbar. The setting is in the Classic Snapping Options dialog. DAT/EM Support has not been able to find an ArcMap command ID that launches this dialog, which means that it can’t be launched from the DAT/EM KEYPAD (as of August 2011).

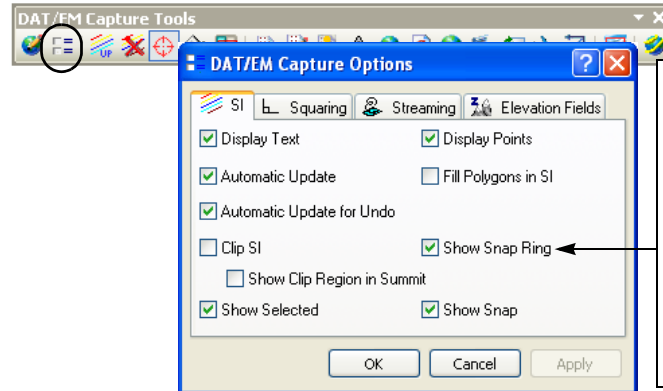
Set the **Snapping tolerance** to the desired number of *ground units*, and set the units field to **pixels**. *The units field must be set to pixels, but the number is really ground units when DAT/EM software is registered!* Suggested setting: 1 to 7 for projects in meters or feet, or 0.0001 for projects in latitude-longitude degrees.



DO NOT set **map units** and DO NOT set to **0** (zero).

Hint: The snap ring in the SUMMIT EVOLUTION view does not automatically update its size when a new ArcMap snap tolerance is set. There is a reason for this: ArcMap does not report the setting change, and it would be slow for DAT/EM to check it very often. To refresh it, turn off **Snap Ring** in **DAT/EM Capture Options**, update SI while the snap ring is off, and then turn **Snap Ring** back on. See the next step.

- Step 2)** (Preparation) Choose a snap ring setting from DAT/EM Options. This setting affects the cursor appearance in the superimposed display. “On” is recommended.



Choose a **Show Snap Ring** setting. For more information and examples, click the “?” on the dialog, then click on the setting.

Recommended: ON

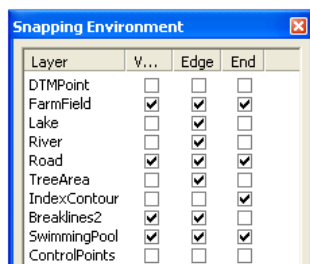
To refresh after a new snap ring size setting, turn off, **OK**, start **Options** again, turn on, **OK**. (**Apply** cannot be activated for this setting. This is not a mistake in the software. Please start **Options** two times.)

- Step 3)** (Preparation) If an editing session is not already active, select **Start Editing** from the **Editor** pull-down menu on ArcMap’s **Editor** toolbar or from the DAT/EM KEYPAD.
- Step 4)** (Preparation) Display the Snapping Environment window and make settings for the desired vertex, edge, and end snaps.
- **ArcGIS 9.x:** Select **Snapping** from the **Editor** pull-down menu on ArcMap’s **Editor** toolbar or select **Display Classic Snapping Environment Window** from the **DAT/EM Capture Drawing Tools** toolbar.
 - **ArcGIS 10.x:** Select **Display Classic Snapping Environment Window** from the **DAT/EM Capture Drawing Tools** toolbar. This is the same as selecting **Snapping > Snapping Window** from the **Editor** pull-down menu on ArcMap’s **Editor** toolbar. This activates the Classic Snapping Environment. Note that the Classic Snapping Environment must be used when the DAT/EM Cursor is on, and it must be used in order to have 3D snaps. The newer snaps offered on the ArcMap **Snapping** toolbar can only be used for 2D snaps and with the DAT/EM cursor off. SUMMIT EVOLUTION LITE EDITION users must always use the Classic Snapping Environment, because LITE must always keep the DAT/EM Cursor on.



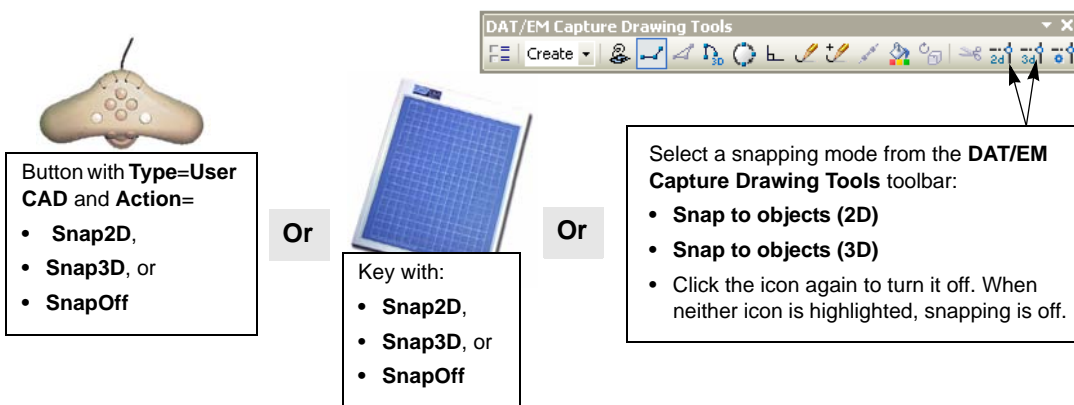
Select **Classic Snapping Environment** from the **DAT/EM Capture Drawing Tools** toolbar.

- For both 9.x and 10.x versions, the command to activate the Classic Snapping Environment from the DAT/EM KEYPAD is **CallCommand esriEditor.SnappingCommand** (*Appendix B*).



From ArcMap's **Snapping Environment** window, check on the desired snapping settings and drag layers into the correct snapping priority positions. For more information on ArcMap snapping, see the ArcGIS Desktop Help.

- Step 5)** Choose a DAT/EM snap mode (these require the DAT/EM Cursor to be on. For ArcMap 10.x, the Classic Snapping Environment must be used with DAT/EM snaps.):
- For a 2D snap, highlight **Snap to objects (2D)** from the **DAT/EM Capture Drawing Tools** toolbar, a DAT/EM KEYPAD key that includes **Snap2D**, or a cursor button set to **Type=User CAD** and **Snap2D**.
 - For a 3D snap, highlight **Snap to objects (3D)** from the **DAT/EM Capture Drawing Tools** toolbar, from a DAT/EM KEYPAD key that includes **Snap3D**, or from a cursor button set to **Type=User CAD** and **Snap3D**.
 - To turn snapping off, choose **SnapOff** on the DAT/EM KEYPAD or select a cursor key set to **Type=User CAD** and **Action=SnapOff**. Or, click the active toolbar snap icon again so that both icons are not highlighted (dark gray).



- Step 6)** Perform the drawing or editing operation that uses the active snapping mode.

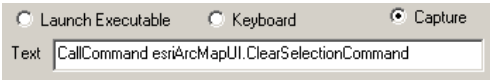
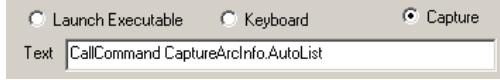
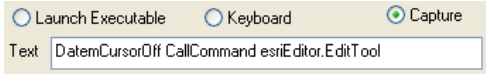
Appendix A. Keyword List for DAT/EM CAPTURE™ for ArcGIS®

The DAT/EM KEYPAD™ and digitizer buttons can send command keywords to ArcMap®. DAT/EM CAPTURE for ArcGIS must be installed in order to use the DAT/EM KEYPAD or special digitizer buttons with ArcMap.

Instructions to use command keywords with the DAT/EM KEYPAD appear in page 2-26. A list of Command IDs to use with the **CallCommand** keyword appears in *Appendix B*.

The following is a list of the command keywords.

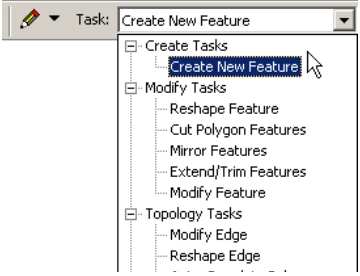

DAT/EM Keywords as of August 2011 (Sheet 1 of 3)

Keyword	Description
Airfield	This keyword starts the AIRFIELD3D command to display the "Airfield3D - Field Update" dialog and generate the surfaces in SUMMIT EVOLUTION's superimposition display.
Apply	This keyword selects the Apply button on the active DAT/EM CAPTURE dialog box, such as the Field Update dialog box. (It does not work on ArcMap or other brand dialogs.)
CallCommand <complete command name> Command names (Command IDs) can be from DAT/EM CAPTURE FOR ARCGIS, ArcMap, or any third-party application for ArcMap. <u>Important!</u> See <i>Appendix B</i> for a list of DAT/EM CAPTURE for ArcGIS command IDs.	This calls the named command ID. This can be used to call any DAT/EM, ArcMap, or third-party application command. For example, the following key calls the ArcMap "unselect the currently selected features in all layers" command:  The following key would start DAT/EM's Autolist command: 
Clip On Clip Off	Turns on and off the Clip setting that allows the drawing modes to clip interior rings in existing polygons.
CreateNewFeatureTask	Same as Task Create New Feature . Sets the task to Create New Feature in the Task field on ArcMap's Editor toolbar.
DatemCursorOff DatemCursorOn	Turn the DAT/EM cursor off or on. <u>Suggestion:</u> Place DatemCursorOff before CallCommand esriEditor.EditTool . That is, turn off the DAT/EM cursor before starting the ArcMap Edit Tool. The ArcMap Edit Tool is a system mouse state, and is not compatible with the DAT/EM cursor.  <u>See also:</u> ToggleDatemCursor below.
DeleteObject	Deletes the selected object if possible.
Draw Arc	Starts the DAT/EM Draw Arc mode.
Draw Circle	Starts the DAT/EM Draw 2-Point or 3-Point Circle tool.
Draw PointToPoint	Starts the DAT/EM Draw Point-to-point Segments mode.

DAT/EM Keywords as of August 2011 (Continued) (Sheet 2 of 3)

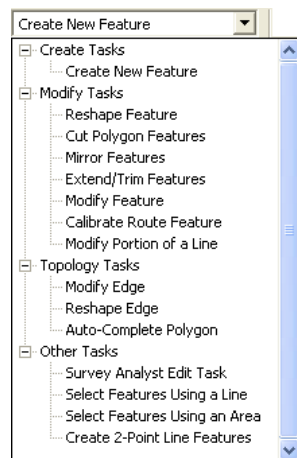
Keyword	Description
Draw Square	Starts the DAT/EM Draw Squared Segments mode.
Draw Stream	Starts the Draw Streamed Vertices mode.
Draw Trace	Starts the DAT/EM Trace edge of existing feature mode.
FillPolygons	Starts the Fill Polygons tool.
FinishSketch	Same as hitting <F2> to end the sketch.
ModifyFeatureTask	Same as Task Modify Feature . Sets the task to Modify Feature in the Task field on ArcMap's Editor toolbar.
RefreshView	Refreshes the ArcMap view.
SaveEdits	Same as selecting Save Edits from the Editor pull-down menu on the Editor toolbar.
ShiftVertex2D	Activates the DAT/EM Shift vertex in XY only tool.
ShiftVertex3D	Activates the DAT/EM Shift vertex in XYZ tool.
ShiftVertexZ	Activates the DAT/EM Shift vertex in Z tool.
SI Off	Turns off SUPER/IMPOSITION in the SUMMIT EVOLUTION image view.
SI On	Turns on SUPER/IMPOSITION in the SUMMIT EVOLUTION image view.
SI Update	Updates SUPER/IMPOSITION in the SUMMIT EVOLUTION image view.
Snap2d	Sets the snap mode to 2D. ArcMap snaps to the XY of the snapped-to object.
Snap3d	Sets the snap mode to 3D. ArcMap snaps to the XYZ of the snapped-to object.
SnapOff	Turns off snapping.
StartEditing	Same as selecting Start Editing from the Editor pull-down menu on the Editor toolbar.
StartEditingTarget <target name> StartEditingTarget <target name>:<subtype>	Finds and opens the target layer's workspace and sets the target layer. <u>Example:</u> StartededitingTarget Trees:MixedForest draw stream
StopEditingAndSave	Same as selecting Stop Editing from the Editor pull-down menu on the Editor toolbar and selecting Yes to the Save prompt.
StopEditingNoSave	Same as selecting Stop Editing from the Editor pull-down menu on the Editor toolbar and selecting No to the Save prompt.
Target <target name> Target <target name>:<subtype>	Same as setting a different layer in the Target field on the Editor toolbar. Sets the target layer without attempting to change the workspace. Editing must start in ArcMap and the target layer must exist in the current workspace in order for this keyword to work.

DAT/EM Keywords as of August 2011 (Continued) (Sheet 3 of 3)

Keyword	Description
Task <task name> Task names are found on the ArcMap Editor toolbar ^a : 	Set the task in the Task field on ArcMap's Editor toolbar. Task names and spaces must appear exactly as they are on the ArcMap Editor toolbar, with one exception: The characters are not case dependent. For example, the following two Datem Keypad Controller text lines work the same: <div style="border: 1px solid gray; padding: 2px; margin: 5px;">Text Task Create 2-Point Line Features</div> <div style="border: 1px solid gray; padding: 2px; margin: 5px;">Text Task cReAtE 2-poiNT LINE features</div>
ToggleDatemCursor 	Toggles the DAT/EM cursor. <u>See also:</u> DatemCursorOff and DatemCursorOn above.
Undo	Calls Undo in ArcMap.
ZoomPlotter	Zooms the SUMMIT EVOLUTION view to match the ArcMap view.

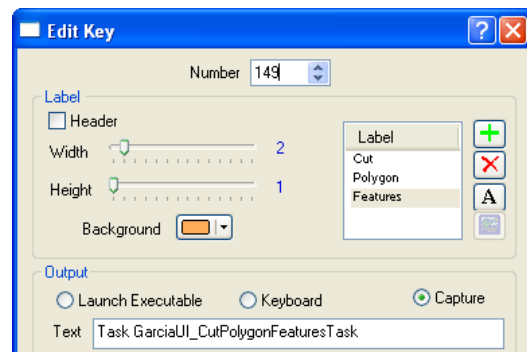
- a. *Task <task name>* will not work where <task name> is from a non-English version of ArcGIS. An alternate method that will work for all languages (including English) is to replace <task name> with the unique ArcGIS task name:

Task Create New Feature	=> Task GarciaUI_CreateNewFeatureTask
Task Reshape Feature	=> Task GarciaUI_MirrorFeaturesTask
Task Cut Polygon Features	=> Task GarciaUI_CutPolygonFeaturesTask
Task Mirror Features	=> Task GarciaUI_MirrorFeaturesTask
Task Extend/Trim Features	=> Task GarciaUI_ExtendTrimFeaturesTask
Task Modify Feature	=> Task GarciaUI_ModifyFeatureTask
Task Calibrate Route Feature	=> Task RouteEditorUI_CalibrateRouteFeatureTask
Task Modify Portion of Line	=> Task RouteEditorUI_ModifyPortionOfLineTask
Task Modify Edge	=> Task TitusUI_ModifyEdgeTask
Task Reshape Edge	=> Task TitusUI_ReshapeEdgeTask
Task Auto Complete Polygon	=> Task TitusUI_AutoCompletePolygonTask
Task Select Features Using a Line	=> Task GarciaUI_SelectFeaturesUsingLineTask
Task Select Features Using an Area	=> Task GarciaUI_SelectFeaturesUsingPolygonTask



English-version ArcMap Task menu

The order of the items on the English menu is the same as the order on the non-English menus.



Example DAT/EM KEYPAD CONTROLLER text string

Appendix B. DAT/EM Command IDs for use with ArcGIS®

The **CallCommand** keyword allows the DAT/EM KEYPAD™ and SUMMIT EVOLUTION digitizer buttons to activate commands in Esri's ArcMap®. The commands are called by their exact command IDs (Identifiers). DAT/EM CAPTURE™ for ArcGIS must be installed in order to use the DAT/EM KEYPAD with ArcMap.

The **CallCommand** keyword can call command IDs from any of the following applications:

- DAT/EM CAPTURE for ArcGIS

(Part of the Edit Key dialog)

The screenshot shows a dialog box with three radio buttons: 'Launch Executable', 'Keyboard', and 'Capture'. The 'Capture' button is selected. Below the buttons is a text field containing the text 'CallCommand CaptureArcInfo.AutoList'.

Example of calling a DAT/EM command

- ArcMap. A list of ArcMap command IDs can be found in the “ArcGIS Developer Help” file, **ArcGISDevHelpVC.chm** (9.x) and at the following link for 10.x:

http://help.arcgis.com/en/sdk/10.0/arcobjects_net/conceptualhelp/index.html#/00010000029s000000

Search for “ArcMap IDs” in that file to see a list of ArcMap command names.

(Part of the Edit Key dialog)

The screenshot shows a dialog box with three radio buttons: 'Launch Executable', 'Keyboard', and 'Capture'. The 'Capture' button is selected. Below the buttons is a text field containing the text 'CallCommand esriArcMapUI.ClearSelectionCommand'.

Example of calling an ArcMap command

- Any third-party application for ArcGIS. The command IDs must be obtained from the software developer.

The following is a list of the DAT/EM CAPTURE command IDs.

DAT/EM CAPTURE Command IDs as of August 2011 (Sheet 1 of 3)

DAT/EM Command ID to use with CallCommand	Result in ArcMap
CaptureArcInfo.ArcTool	DAT/EM Arc Ground Coordinate Collection digitizing mode.
CaptureArcInfo.AsciiExport	Starts the ASCII Export command.
CaptureArcInfo.AutoList	Starts the AutoList command.
CaptureArcInfo.CleanLayers	Starts the Clear Layers command. Note that the command ID is spelled <i>CleanLayers</i> , not <i>ClearLayers</i> .
CaptureArcInfo.ClipSegment	Activates the line segments clipping tool.
CaptureArcInfo.ClosePolyline	Close and finish a polyline sketch.
CaptureArcInfo.Contour	Starts the Capture Contour command.
CaptureArcInfo.CurveOffset	Starts the Offset - Table Method command.

DAT/EM CAPTURE Command IDs as of August 2011 (Continued) (Sheet 2 of 3)

DAT/EM Command ID to use with CallCommand	Result in ArcMap
CaptureArcInfo.DrawClip	Sets the Clip Polygon mode on. Suggestion: DAT/EM recommends using the Clip On and Clip Off keywords instead of this command ID. The keywords are more useful, because the command ID cannot turn the mode off.
CaptureArcInfo.DTMDistributor	Starts the Load and Distribute DTM Points command.
CaptureArcInfo.DtmEditor	Starts the DTM Editor command.
CaptureArcInfo.DtmIt	Starts the DTM Collection command.
CaptureArcInfo.ElevateDbase	Starts the Elevate Layers command.
CaptureArcInfo.FeatureShift	Starts the Shift Features command.
CaptureArcInfo.FieldUpdate	Starts the Field Update command.
CaptureArcInfo.ImageServerSelectTool	(ArcGIS 10.x) Starts the Select Images on Image Server tool.
CaptureArcInfo.ImportAscii	Starts the ASCII Import command.
CaptureArcInfo.LoadCntrl	Starts the Load Control Points command.
CaptureArcInfo.MoveToCmd	Runs Drive Summit Evolution to set the SUMMIT EVOLUTION cursor location to a point picked in ArcMap.
CaptureArcInfo.MultiTraceTool	DAT/EM Trace edge of multiple existing features digitizing mode.
CaptureArcInfo.OffsetTool	Starts the Offset - Selection Method tool.
CaptureArcInfo.Options	Activates the DAT/EM Options dialog.
CaptureArcInfo.PointToPointTool	DAT/EM Point-to-Point Ground Coordinate Collection digitizing mode.
CaptureArcInfo.SelectPlotterModelArea	Activates the Summit Models Area Tool .
CaptureArcInfo.SetRotationPoint	Activates the Summit Models Area Tool .
CaptureArcInfo.ShowDatumCursor	Toggles the DAT/EM Cursor .
CaptureArcInfo.ShowDlg	Shows the DAT/EM Capture Coordinates display.
CaptureArcInfo.SiOffCmd	Runs SI Off to turn off the SUPER/IMPOSITION display.
CaptureArcInfo.SiUpdateCmd	Runs SI Update to refresh the SUPER/IMPOSITION display.
CaptureArcInfo.Snap2d	Turns on the 2D snapping mode (default 2D ArcMap snapping).
CaptureArcInfo.Snap3d	Turns on the 3D snapping mode (forces snapping to be 3D).
CaptureArcInfo.SquaringTool	DAT/EM Squared Ground Coordinate Collection digitizing mode.
CaptureArcInfo.StreamTool	DAT/EM Streaming Ground Coordinate Collection digitizing mode.
CaptureArcInfo.TraceTool	DAT/EM Trace edge of one existing feature digitizing mode.

DAT/EM CAPTURE Command IDs as of August 2011 (Continued) (Sheet 3 of 3)

DAT/EM Command ID to use with CallCommand	Result in ArcMap
CaptureArcInfo.VertexShift2D	Activates the DAT/EM Shift vertex in XY only tool.
CaptureArcInfo.VertexShift3D	Activates the DAT/EM Shift vertex in XYZ tool.
CaptureArcInfo.VertexShiftZ	Activates the DAT/EM Shift vertex in Z tool.

Appendix C. DAT/EM Technical Support

For questions concerning this product, contact DAT/EM's Support Department. You may be asked to purchase a software support agreement before support services are received.

DAT/EM Systems International
8240 Sandlewood Place, Suite 101
Anchorage, Alaska 99507
USA
Phone: (907) 522-3681
Fax: (907) 522-3688
E-mail: support@datem.com

General information is available on DAT/EM's website at www.datem.com.

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