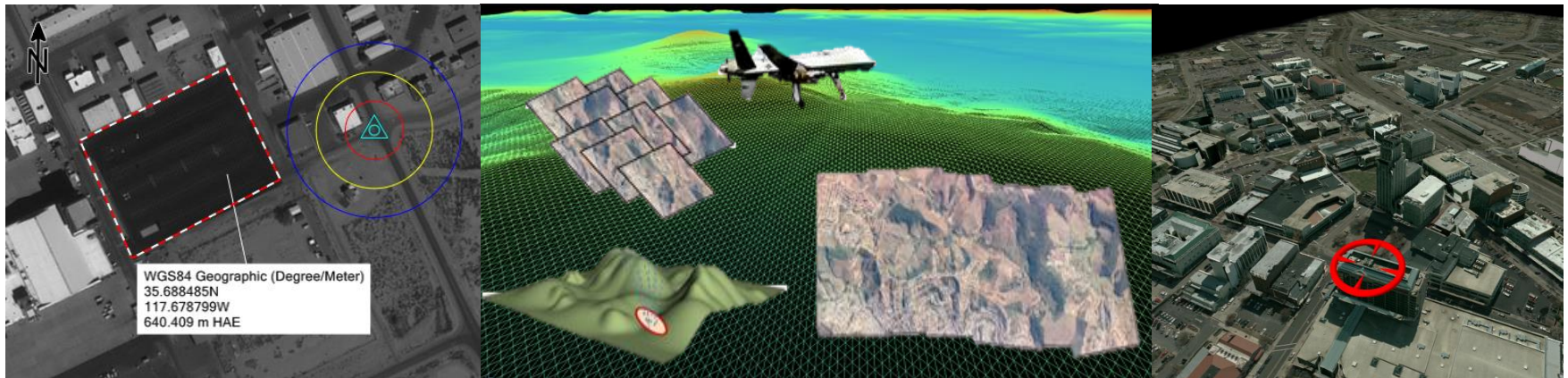


# Introduction to IApioneer v3.0.3

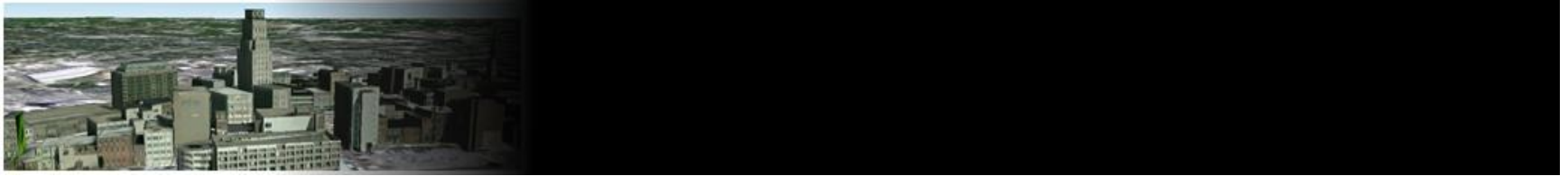
“Know the Earth – measure the way™”



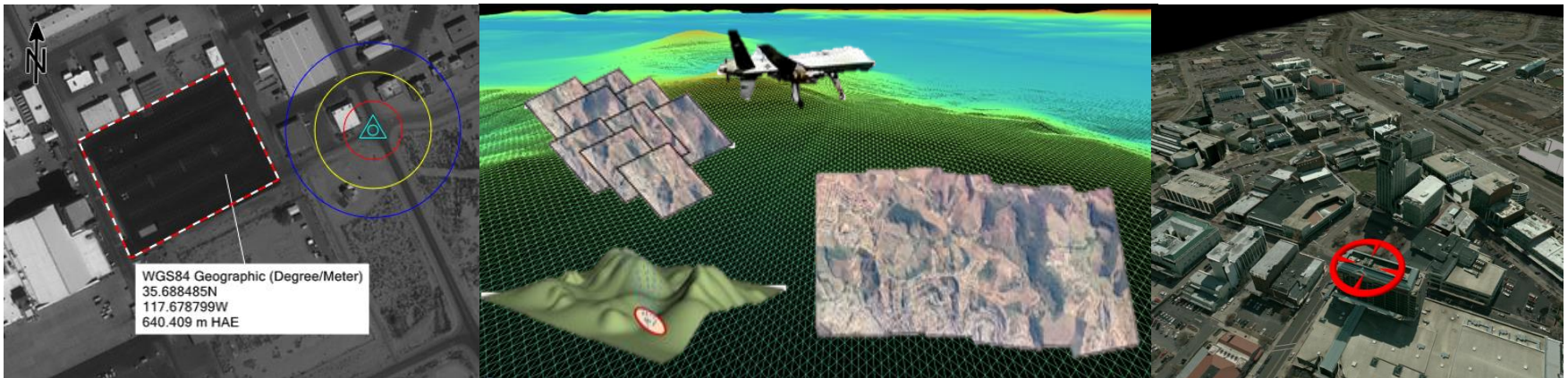




Session 1	Session 2
Module 1: Application Configuration & Data Management	Hands on Demo
Module 2: IApioneer	Q & A
Module 3: 3D Modeling	
Lunch Break	



# Module 1: Application Configuration & Data Management





# Mouse Control (Pan Mode)

## Mouse buttons:

- Left:
  - Click is the primary button for all actions.
  - Click and Dragging:
    - In the viewer will enable selection box mode.
    - A selected object, will allow for moving of the selected object.
- Mouse wheel:
  - Roll will zoom in and out.
  - Click will reposition the image to the center of the viewer for the point of the click.
  - Click and Dragging will grab the image and allow for it to move with the cursor.
- Right click:
  - Will display the context menus.
  - Will end the active drawing mode.





# Mouse Control (Roam Mode)

## Mouse buttons:

- Left:
  - Click is the primary button for all actions.
  - Click and Dragging:
    - In the viewer will enable the selection box mode.
    - A selected object, will allow for moving of the selected object.
- Mouse wheel:
  - Roll will zoom in and out.
  - Click will cause the image to move smoothly away from the cursor for the duration of the click.
  - Click and Dragging will cause the image to move smoothly away from the cursor for the duration of the hold.
- Right click:
  - Will display the context menus.
  - Will end the active drawing mode.

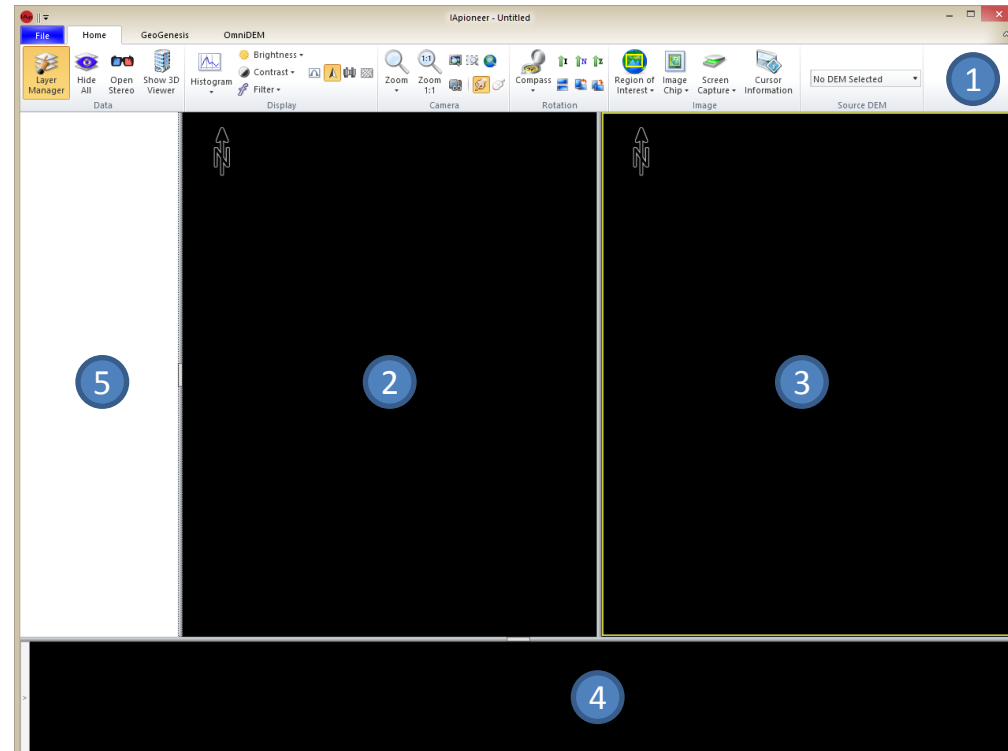


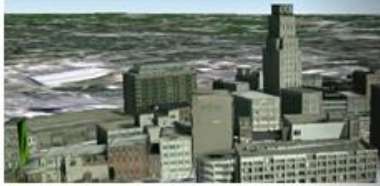


# Main Application

## Elements of the User Interface:

1. The Ribbon
2. Left Viewer
3. Right Viewer
4. Image Gallery
5. Layer Manager





# Elements of the User Interface (UI)

## Components of the UI:

1. The Ribbon – The tabs of the Ribbon organize capabilities by module, allowing the user to interact with the data in a logical manner. The *Home* tab contains all of the camera and image viewing tools, including; zoom, rotation, brightness, contrast, and histogram adjustments. Each of these is applied to the active viewer only. In addition to the *Home* tab, each licensed processing module may add one or more tabs to the Ribbon.
2. Left Viewer – One of the two primary viewers used to interact with the data. Images can be sent to the Left Viewer from the Image Gallery. Data layers (vectors, tie points, and annotations) can be displayed from the Layer Manager.
3. Right Viewer – One of the two primary viewers used to interact with the data. Images can be sent to the Right Viewer from the Image Gallery. Data layers (vectors, tie points, and annotations) can be displayed from the Layer Manager.
4. Image Gallery – Thumbnails of the raster data loaded in the current session are displayed here. Images can be added to the Left or Right Viewers by right-clicking on the thumbnail in the Image Gallery and selecting “*Send to Left Viewer*” or “*Send to Right Viewer*”.
5. Layer Manager – Vector, tie point, and annotation layers loaded in the current session are listed here. Each has a checkbox to indicate whether or not it is displayed in the viewers, and a radio button to select the actively editable layer.





# Application Configuration

This section will illustrate how to setup your production environment for product generation. You will be exposed to various tools to assist you in simplifying your workflows. This will also allow for a user or organization to modify and define a Common Operational Picture (COP) for a product.



# Backstage

Data loading and system parameters are accessed through the Backstage.

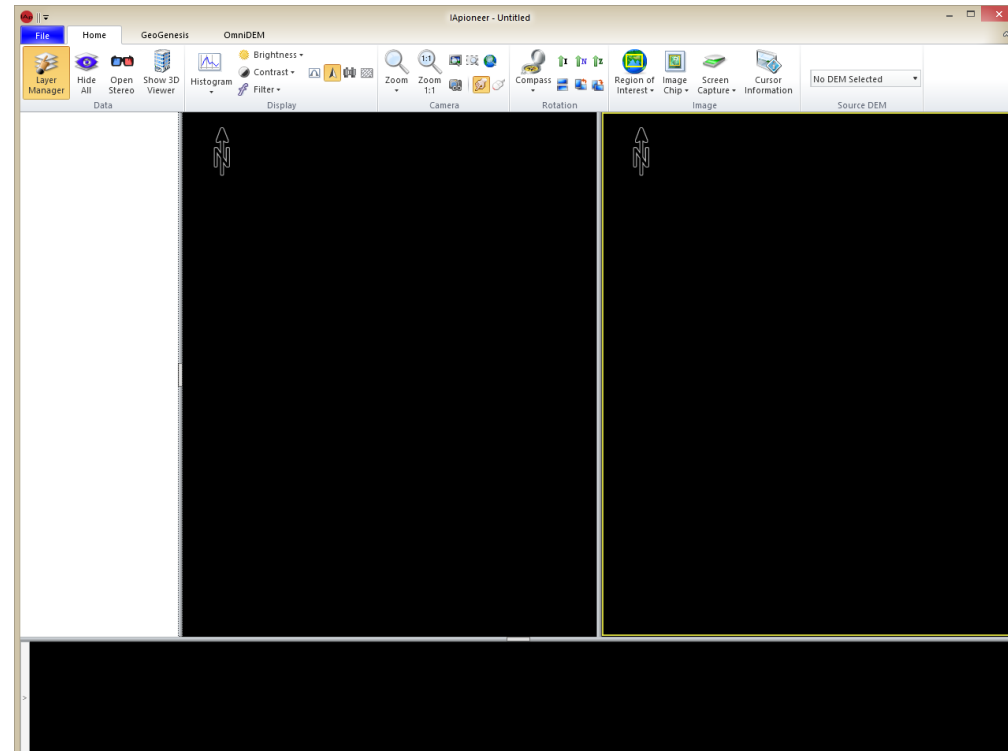
Capabilities within the backstage:

- Image management (Add and Remove)
- DEM management (Add, and Remove)
- Vector management (Add, Remove, and Save)
- Tie Point management (Add, Remove, and Save)
- Annotation management (Add, Remove, and Save)
- Session management (Save, Save As, Open, and Close)



# Navigating to the Backstage

Left click the “File” tab to navigate to the backstage.

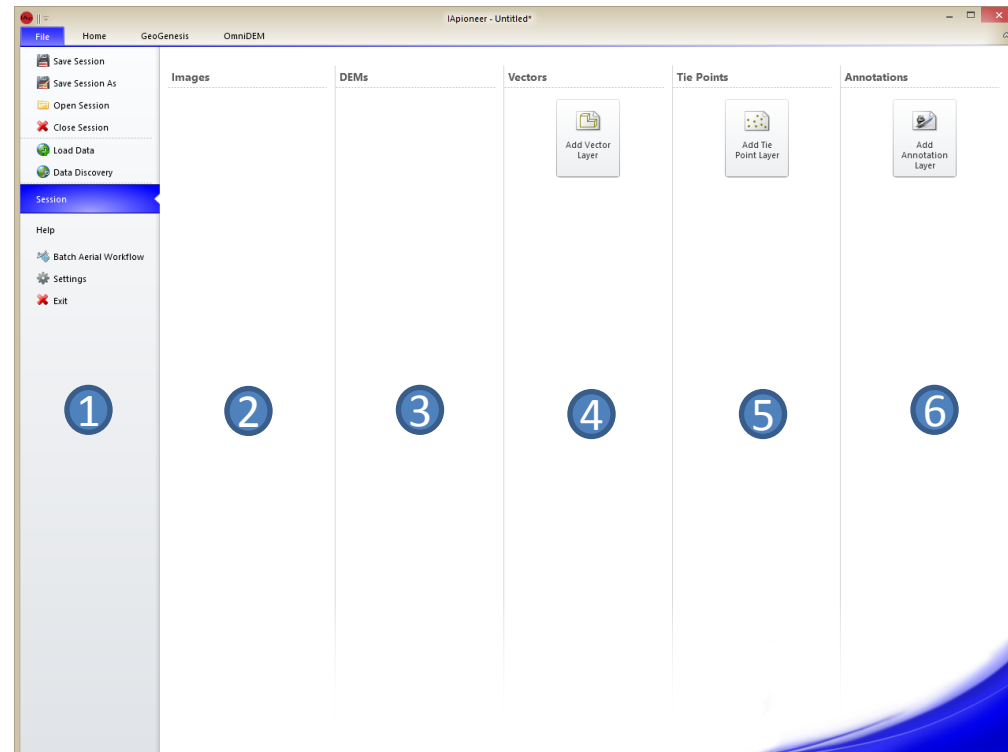




# Backstage - Overview

Elements of the backstage:

1. Commands
2. Images
3. DEMs
4. Vectors
5. Tie Points
6. Annotations

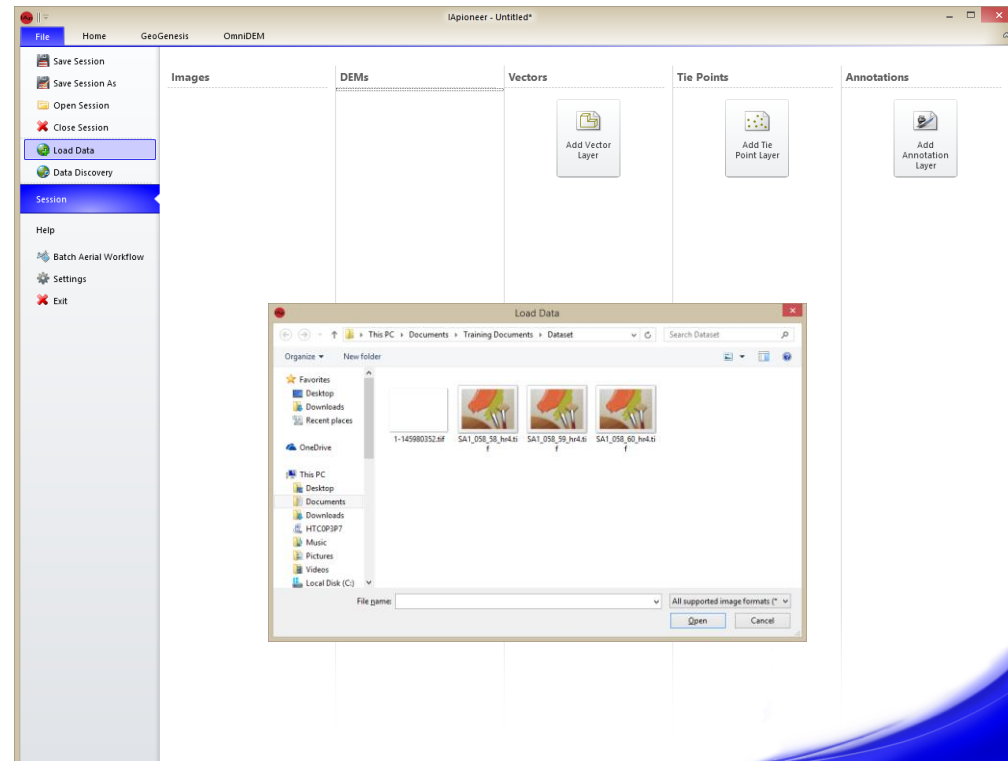




# Loading data into your session from the backstage

The application supports a number of different types of data, including: satellite imagery, aerial imagery (scanned film and digital images), orthographic images, DEMs, 2D and 3D vectors, tie points and annotations.

1. Left click the [Load Data] button.
2. Left click any supported data file(s).
3. Left click the [Open] button to load the selected data.





## Loading data continued

Things to watch for when data is loaded into the session for the first time:

- A pyramid (R-Set) warning icon will be overlaid on the image icon for all raster images without pyramids. You will have minimal functionality for those images, until the pyramid for that image is generated. A Pyramid will be generated automatically, for optimal viewing quality, for raster images without pyramids. The pyramid warning icon overlaid on the image icon will disappear, once the pyramid is generated. Large images may take some time to load, especially large vector sets. Please be patient, the images will appear in the Session shortly.
- A Spatial Referencing System (SRS) warning icon will be overlaid on the image icon for all raster images that the SRS have not been configured. You will have to configure the sensor model to ensure the correct alignment of the images. The sensor model warning icon will disappear, once the sensor model has been configured.



# Digital Elevation Model (DEM)

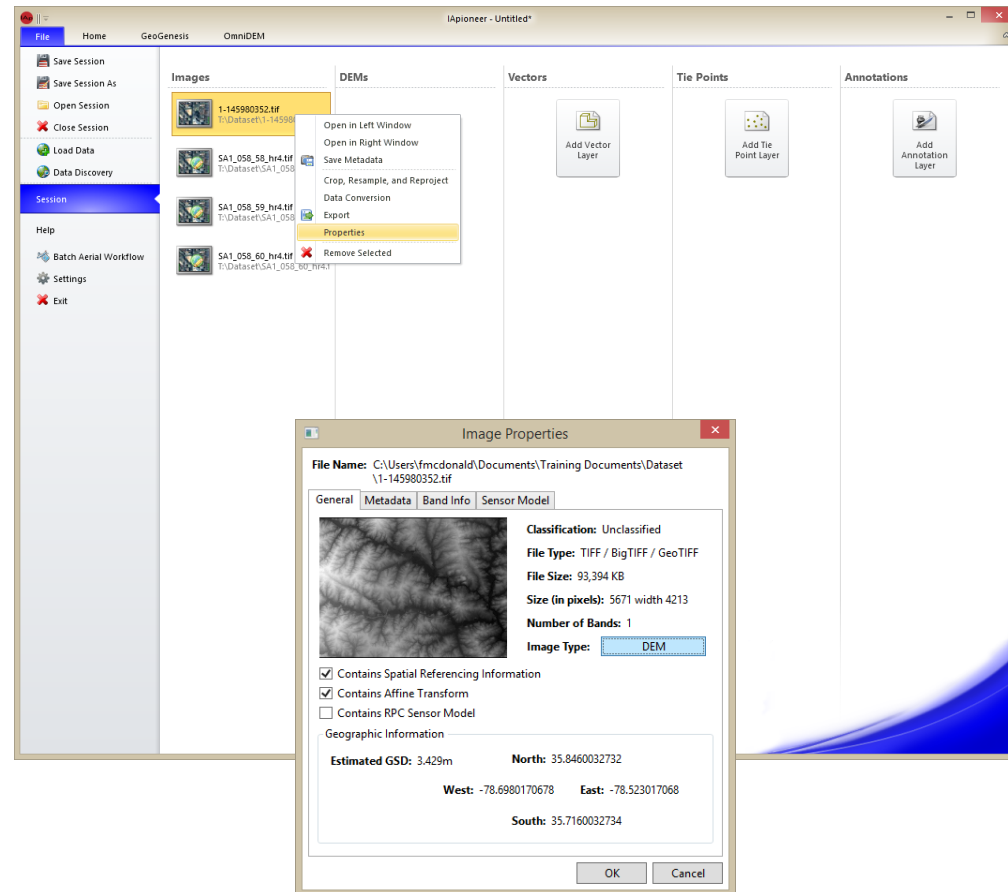
Wait a minute!

I thought I selected a DEM when I loaded the images. Why is it not showing in the DEMs section?

In this case we have selected a TIFF DEM. However, there is a simple fix for this. We need to let IAPioneer know that this raster file is a DEM.

Identify a raster image as a DEM:

1. Left click the image that you want to identify as a DEM.
  2. Right click the selected image from step 1.
  3. Left click the [Properties] menu item from the popup menu.
  4. Left click the [Image] button causing the text to toggle between "Image" and "DEM". Make sure it is in the DEM state.
  5. Left click the [OK] button to commit the change.
- \* The selected image should have moved from the Images group to the DEMs group.

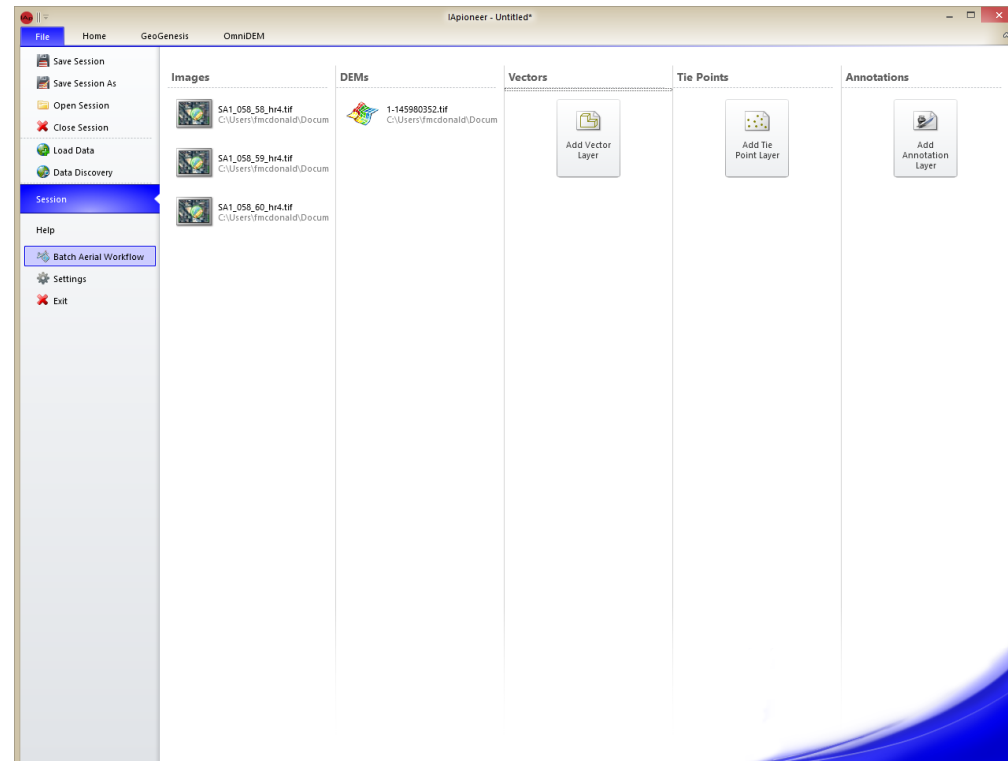




# Batch Aerial Workflow

Aerial imagery is often acquired in large batches, either from a set of flight lines or from some other pre-specified flight path. Batch Aerial workflow will eliminate the manual editing of each individual sensor model. You will be required to provide the Interior Orientation (IO), projection, and Exterior Orientation (EO) to complete the workflow.

Left click the [Batch Aerial Workflow] button to start the process.







# Batch Aerial Workflow – Interior Orientation Setup

The initial screen in the workflow is collecting the Interior Orientation.

Figure 1 is an example of the IO for the Raleigh demo data. Figure 2 is the initial screen that allows you to input the information from Figure 1.

Left click the [Next] button to proceed to the projection & Exterior Orientation screen.

```
File Edit Format View Help
Focal Length (mm): 120
Principle Point (mm): 0, 0
Distortion Parameter: None
Pixel Size (um): 12um
Sensor Size (Pixel): 7680 x 13824
Chip Size (mm): 92.16 x 165.888
```

Figure 1

The screenshot shows the 'Batch Aerial Workflow' window with the following settings:

- Focal Parameters (mm):** Focal Length: 120, Focal Offset: X: 0, Y: 0
- Radial Distortion:**  Radial Distortion (unchecked)
- Distortion Parameters:** K0: 0, K1: 0, K2: 0, K3: 0, K4: 0, P0: 0, P1: 0, P2: 0, P3: 0
- Sensor Affine:**  Standard (selected),  Edge,  Corner,  Edge and Corner
- Standard Affine Parameters:** Top Middle (X: 0, Y: 0), Right Middle (X: 0, Y: 0), Bottom Middle (X: 0, Y: 0), Left Middle (X: 0, Y: 0)
- Digital:**  Digital (selected), Chip Size: Width: 92.16, Height: 165.888, Y Scale Factor: 1
- Buttons:** Load Camera, < Back, Next >, Cancel

Figure 2



# Batch Aerial Workflow – Projection & Exterior Orientation

Setting the projection:

1. Left click the [Change] button.
2. Define the Spatial Referencing:
  - Projection: **State Plane**
  - Datum: **NAD83**
  - Linear Unit: **U.S. Foot**
  - Angular Unit: **Degree**
  - State Plane: **North Carolina (3200)**
3. Left click the [OK] button on the Spatial Referencing Dialog.
4. Select the appropriate file format for the EO file:
  - File Format: **“ImageID X Y Z Omega Phi Kappa”**
5. Left click the [...] button.
6. Left click the EO Zone file and then left click the [Open] button.
7. Left click the [Next] button to proceed to the data pairing form.

Image ID	X	Y	Z	Omega	Phi	Kappa
SA1_057_65_hi	2101030.4203			2299	0.047968	-89.595446
SA1_057_64_hi	2101036.11474			2222	0.096302	-89.581582
SA1_057_63_hi	2101040.92136			6997	0.144067	-89.602906
SA1_057_62_hi	2101043.54834			7868	0.088669	-89.712385
SA1_058_58_hi	2105986.40446			1302	-0.038576	88.902034
SA1_058_59_hi	2106007.08296			1683	-0.084058	89.021471
SA1_058_60_hi	2106023.57572			3021	-0.099333	89.22478
SA1_058_61_hi	2106026.78046			9146	-0.218939	89.823599



# Batch Aerial Workflow – Data Pairing

Data pairing is the process of taking all of the values from the earlier steps and configuring the sensor models for each image.

The Image Id is used to identify the image loaded into the project and pairs them automatically.

You can still change the image pair:

1. Left click the new image name within the image name dropdown.
2. Left click the [Next] button to process the batch and update the sensors for all of the paired images.

A screenshot of a software dialog box titled "Batch Aerial Workflow". The dialog has a "Data Pairing" section with the instruction "Match the data ID to the image name." Below this, there is a list of six rows, each containing an "ID" and an "Image Name" dropdown menu. The IDs are SA1057\_63\_hr4, SA1057\_62\_hr4, SA1058\_58\_hr4, SA1058\_59\_hr4, SA1058\_60\_hr4, and SA1058\_61\_hr4. The Image Name dropdowns are set to "None", "None", "SA1\_058\_58\_hr4.tif", "SA1\_058\_59\_hr4.tif", "SA1\_058\_60\_hr4.tif", and "None" respectively. At the bottom of the dialog, there are three buttons: "< Back", "Next >", and "Cancel".

ID	Image Name
SA1057_63_hr4	None
SA1057_62_hr4	None
SA1058_58_hr4	SA1_058_58_hr4.tif
SA1058_59_hr4	SA1_058_59_hr4.tif
SA1058_60_hr4	SA1_058_60_hr4.tif
SA1058_61_hr4	None

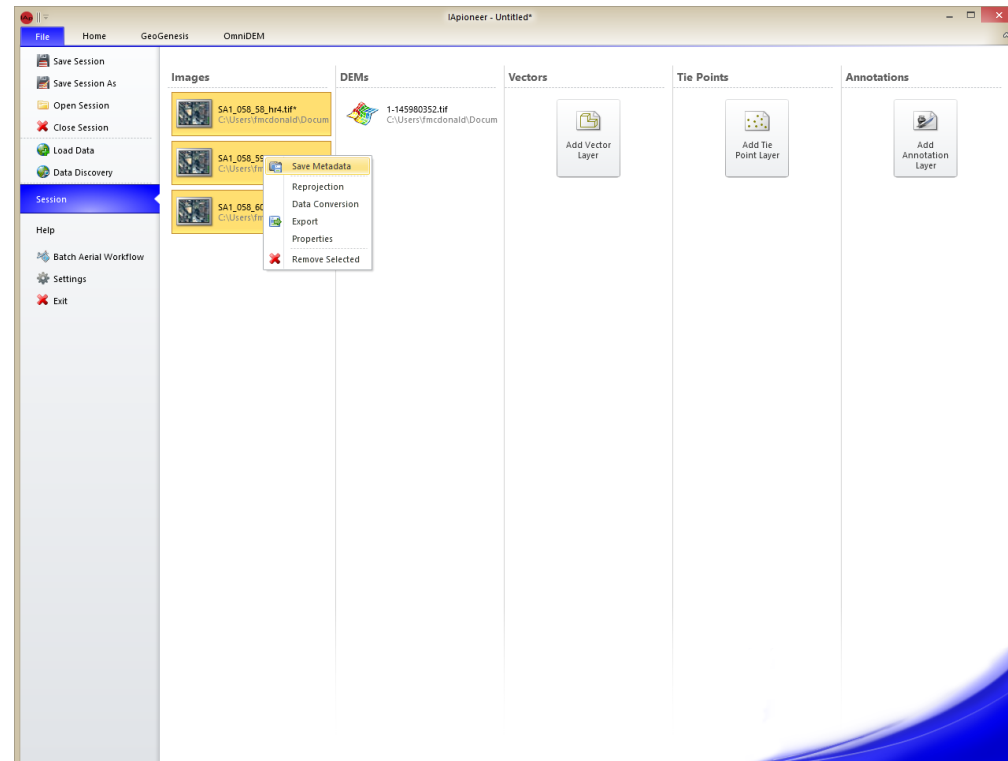


# Saving Imagery Metadata

You will need to save the changes to the images metadata or you will be required to reconfigure the SRS system when the image is loaded.

Saving the imagery metadata:

1. Left click the first image in the “Images” group.
2. Hold down the shift key.
3. Left click the last image in the “Images” group.
4. Right click on one of the selected image in the “Images” group.
5. Left click the [Save Metadata] menu item.





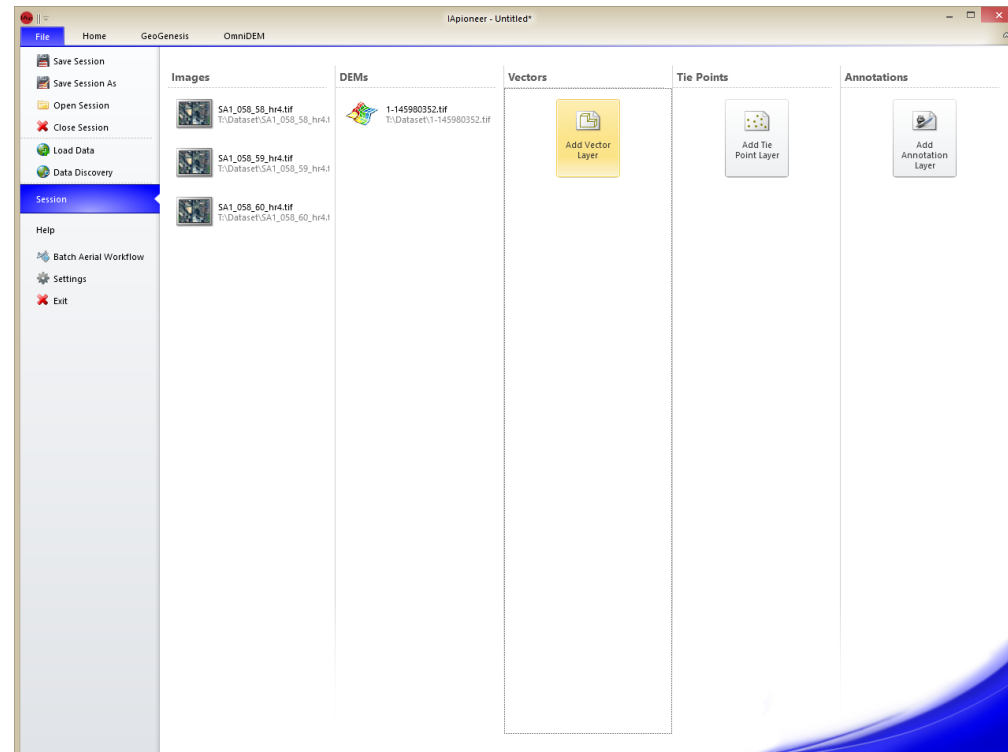
# Vectors

The Vectors header, in the Backstage, is the managing tool for all vector layers. Vector layers are individual documents within 3D FeatureXtract that stores your layer geometry.

Creating a new vector:

- Left click the [Add Vector Layer] button.

The new vector layer should display with the name of “Unnamed Feature Set #”.





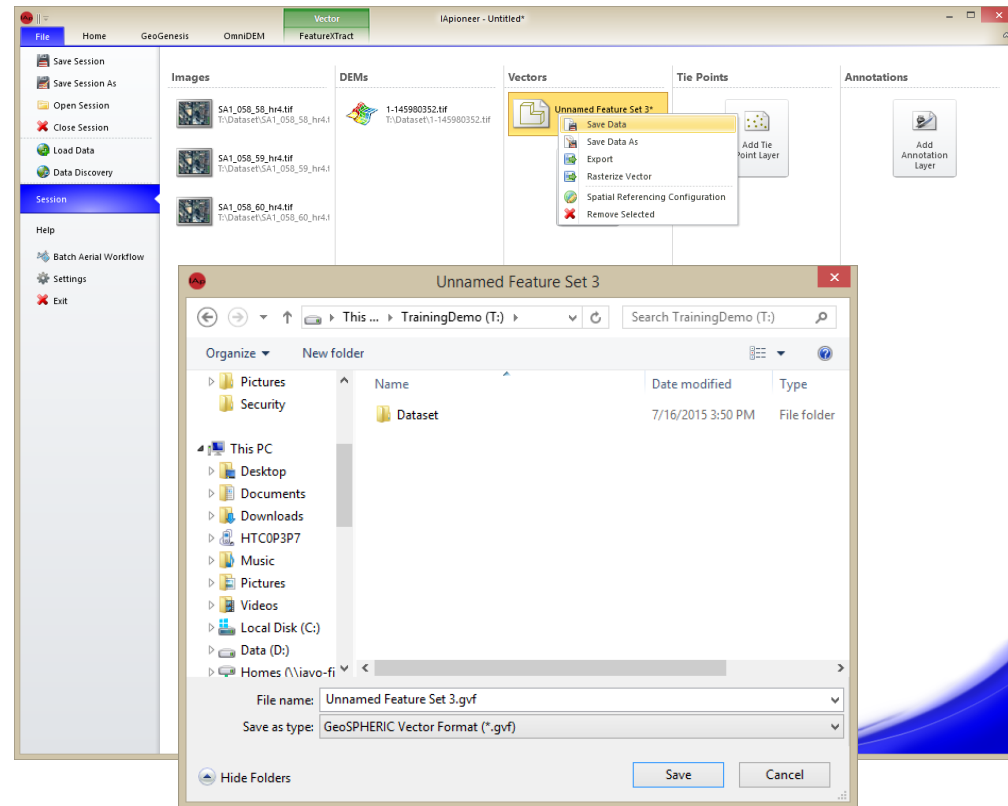
# Vector - Saving

Lets make sure that we don't lose the new vector file and provide it a more defined name.

Saving a new vector layer:

1. Left click the “Unnamed Feature Set 2\*” file to select it.
2. Right click the “Unnamed Feature Set 2\*” to display the popup menu.
3. Left click the [Save Data] menu item.
4. Type “Raleigh” as the new File Name.
5. Left click the [Save] button.

The “Unnamed Feature Set 2” should have updated to Raleigh.gvf when you return to the backstage.





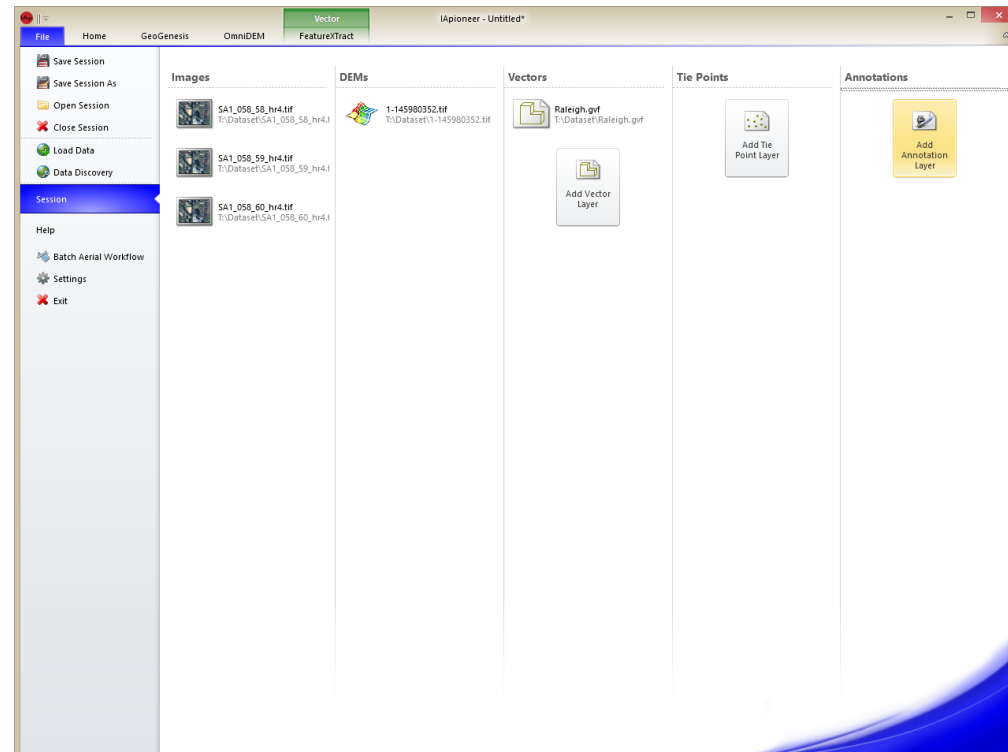
# Annotations

The Annotations header, in the Backstage, is the managing tool for all annotation layers. Annotation layers are individual documents within IApioneer.

Creating a new Annotation:

- Left click the [Add Annotation Layer] button.

The new annotation layer should display with the name of “Unnamed Annotation Document #”.





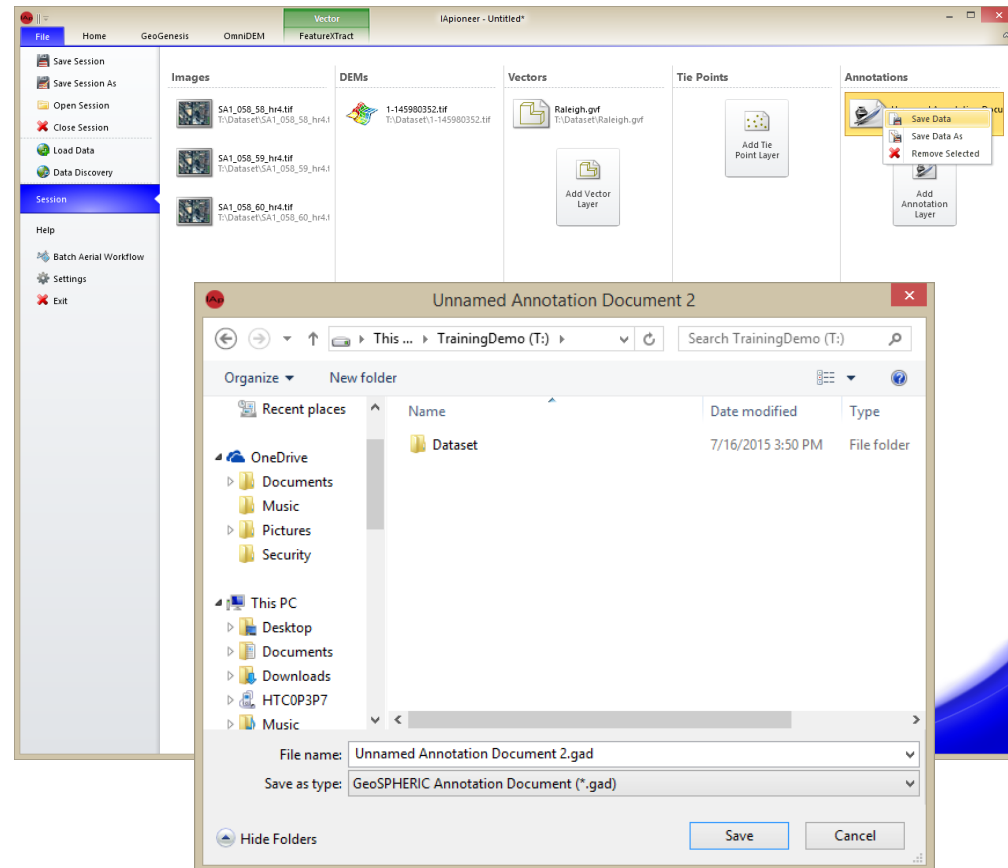
# Annotation - Saving

Lets make sure that you don't lose the new annotation file and provide it a more defined name.

Saving a new annotation layer:

1. Left click the "Unnamed Annotation Document 2\*" file to select it.
2. Right click the "Unnamed Annotation Document 2 \*" to display the popup menu.
3. Left click the [Save Data] menu item.
4. Type "Raleigh" as the new File Name.
5. Left click the [Save] button.

The "Unnamed Annotation Document 2 " should have been updated to Raleigh.gad when you return to the backstage.







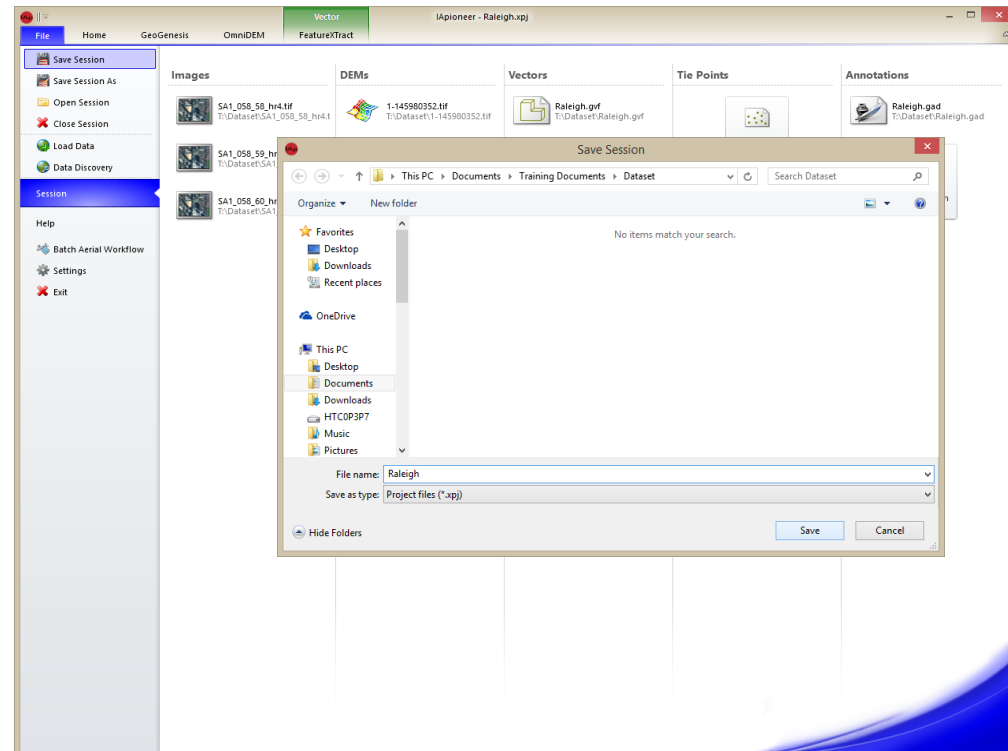
# Session - Saving

The data loaded in the application is managed by a Session. Currently, the application supports a single session workspace. The Session files will reduce your preprocessing time drastically. A session will take only a few clicks to load all of the data associated within that current workspace. You will be back up and running in no time.

## Saving a session:

1. Left click the [Save Session] button.
2. The “Save Data” dialog should display identifying that we have unsaved data in the session.
3. Left click the [Yes] button to save all files.
4. The “Save Session” dialog should display. Type “Raleigh” as the File Name.
5. Left click the [Save] button.

\*The title bar of the application should display IApioneer - Raleigh.xpj.

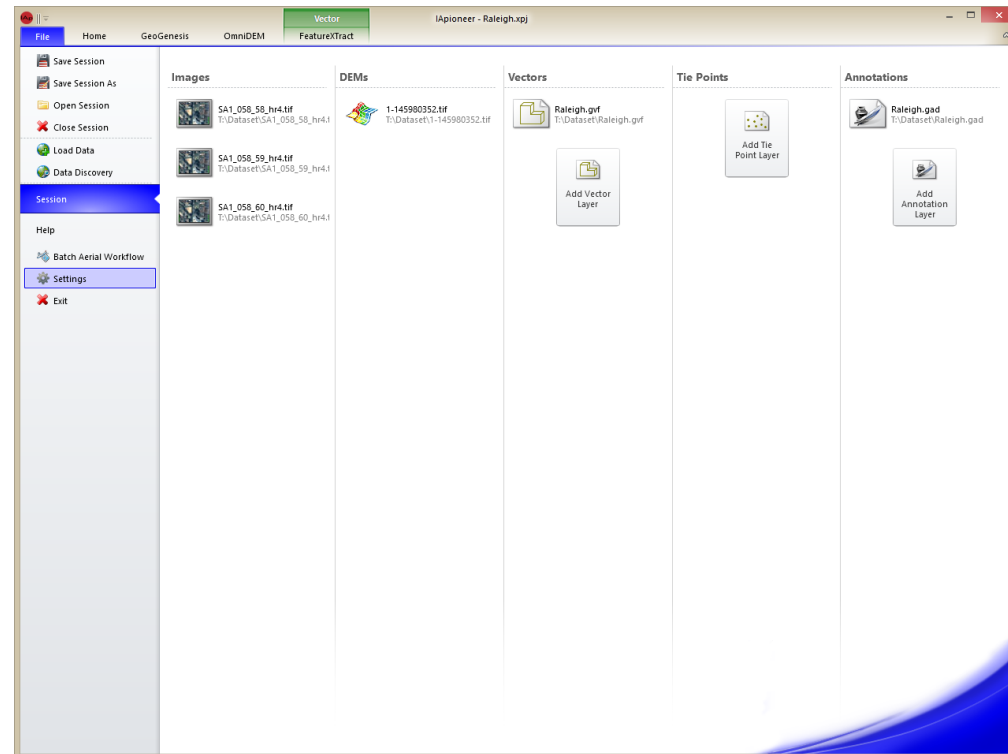




# Settings

The application was built to be customizable. This will allow for a user or organization to modify and define a Common Operational Picture (COP) for a product. The COP ensures that all products are consistent with look and content.

Left click the [Settings] button.





# Settings – Geolocation Formats

The Geolocation Formats properties provides you with the ability to configure how map information is displayed and entered. The Display format properties controls how map coordinates are displayed. The Input Format properties provides the template for a user-derived information.

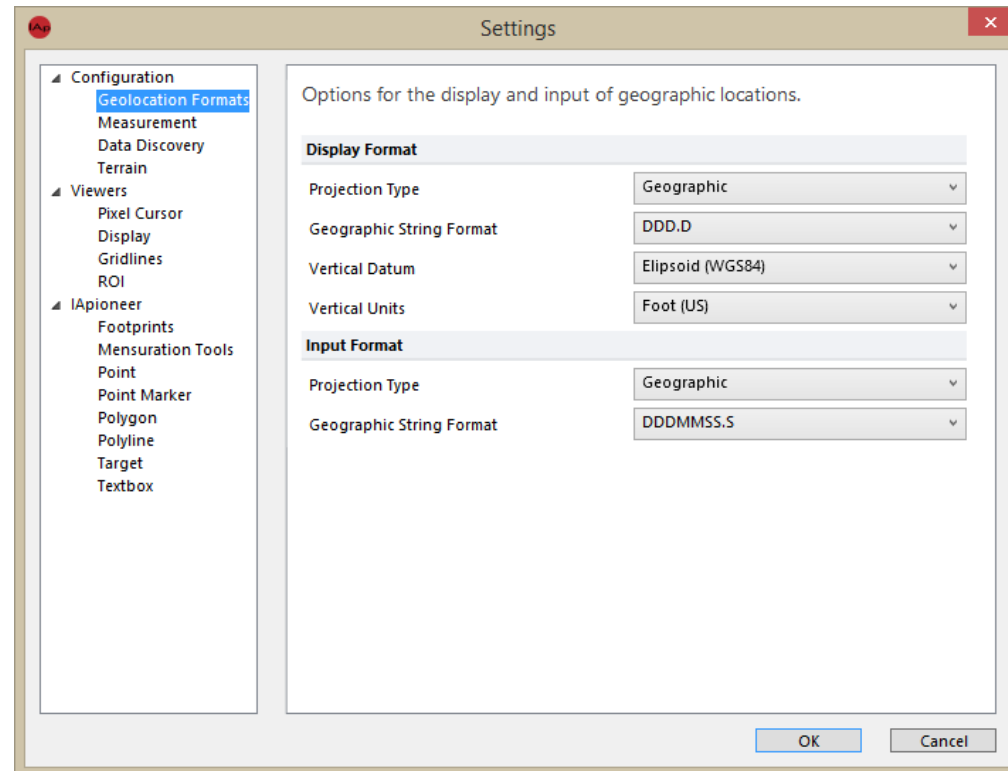
Modifying the Geolocation Formats:

Display Format:

- Projection Type: **Geographic**
- Geographic String Format: **DDD.D**
- Vertical Datum: **Ellipsoid (WGS84)**
- Vertical Units: **Foot (US)**

Input Format:

- Projection Type: **Geographic**
- Geographic String Format: **DDMMSS.S**



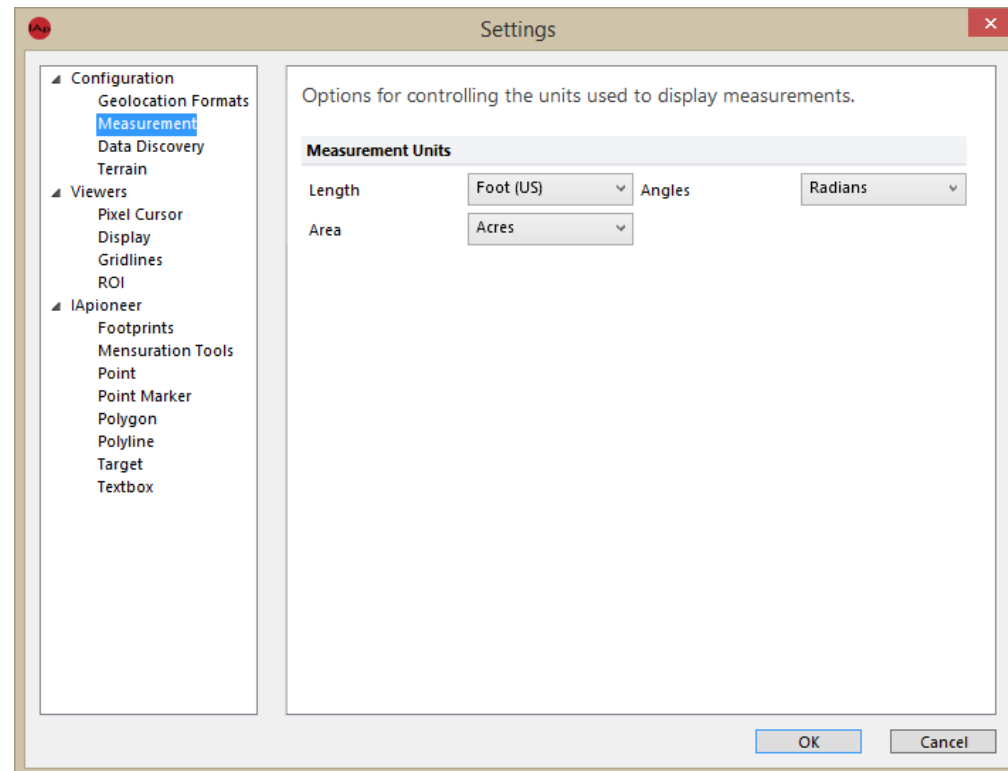


# Settings – Measurement

The Measurement properties provides you with the ability to configure how all measurements are displayed throughout the application. The measurement units can be specified for Length, Area, and Angles.

Modifying the Measurement:

- Length: **Foot (US)**
- Angles: **Radians**
- Area: **Acres**



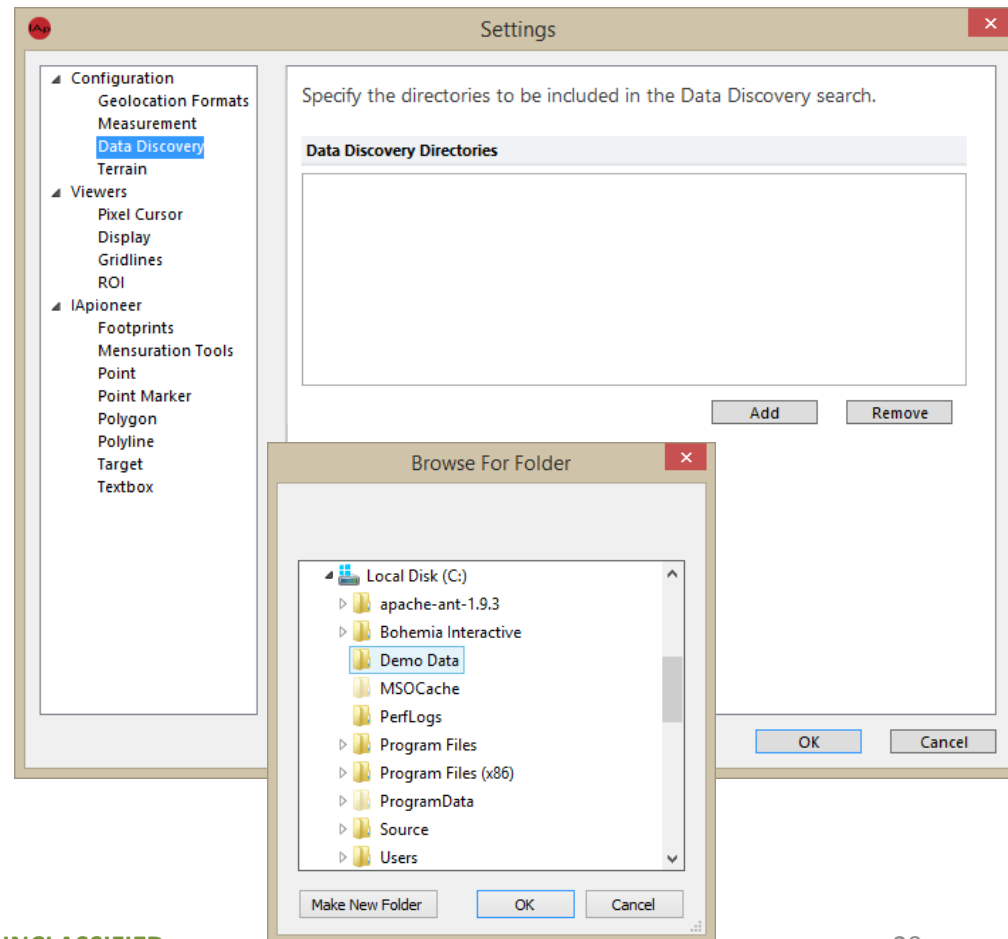


# Settings – Data Discovery

The Data Discovery property is where you specify the local and remote directories to use for the Data Discovery search routines. Add or remove directories from this dialog

Adding a directory:

1. Left click the [Add] button.
2. Select the local “Demo Data” root directory.
3. Left click the [OK] button in the “Browse For Folder” dialog.

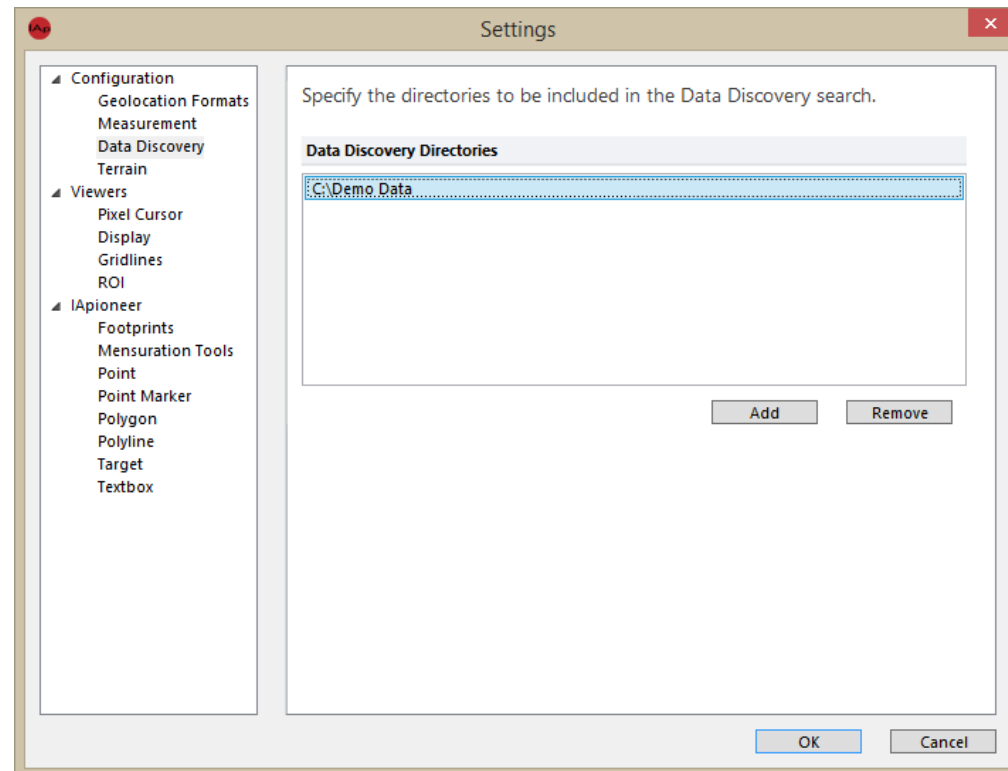




# Settings – Data Discovery continued

Removing a directory:

1. Left click the local “Demo Data”.
2. Left click the [Remove] button.



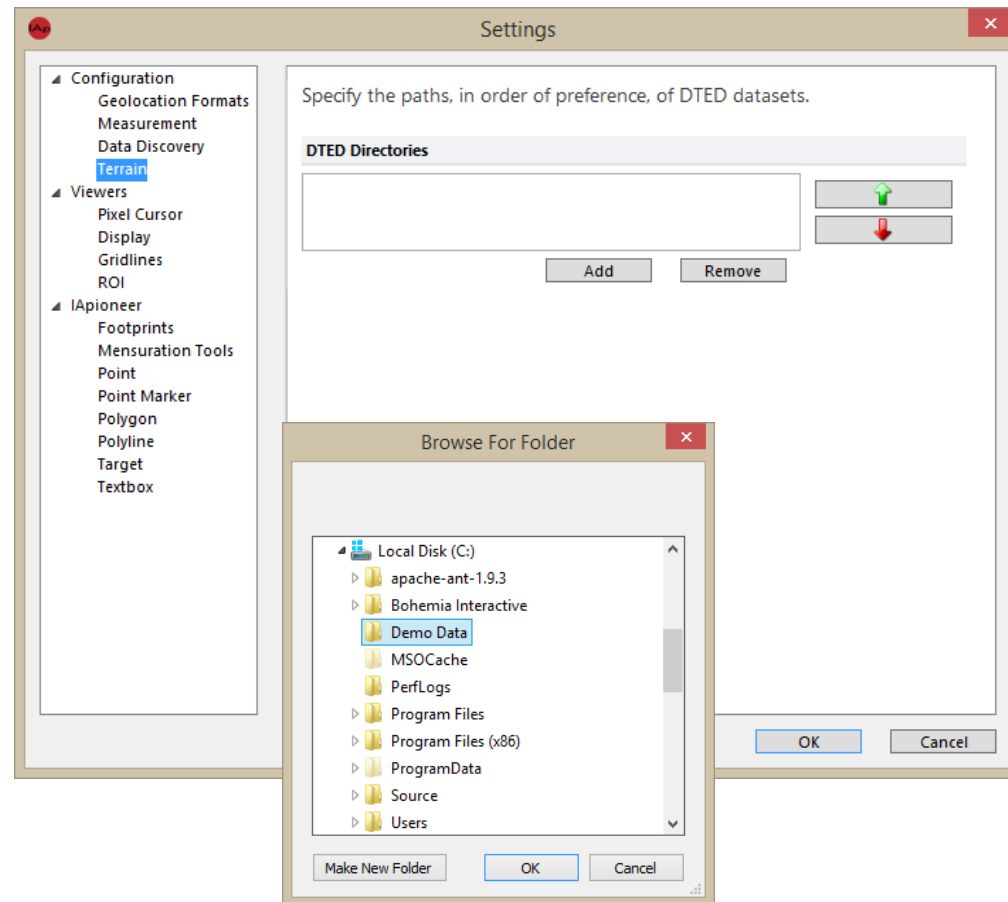


# Settings – Terrain

The Terrain property is where you can configure the application to look for DTED files to use as DEM sources. You can specify the locations for DTED0, DTED1, DTED2 DEM file. Use the up and down arrow to set the priority for the elevation files.

Adding a directory:

1. Left click the [Add] button.
2. Select the local “Demo Data” root directory.
3. Left click the [OK] button in the “Browse For Folder” dialog.

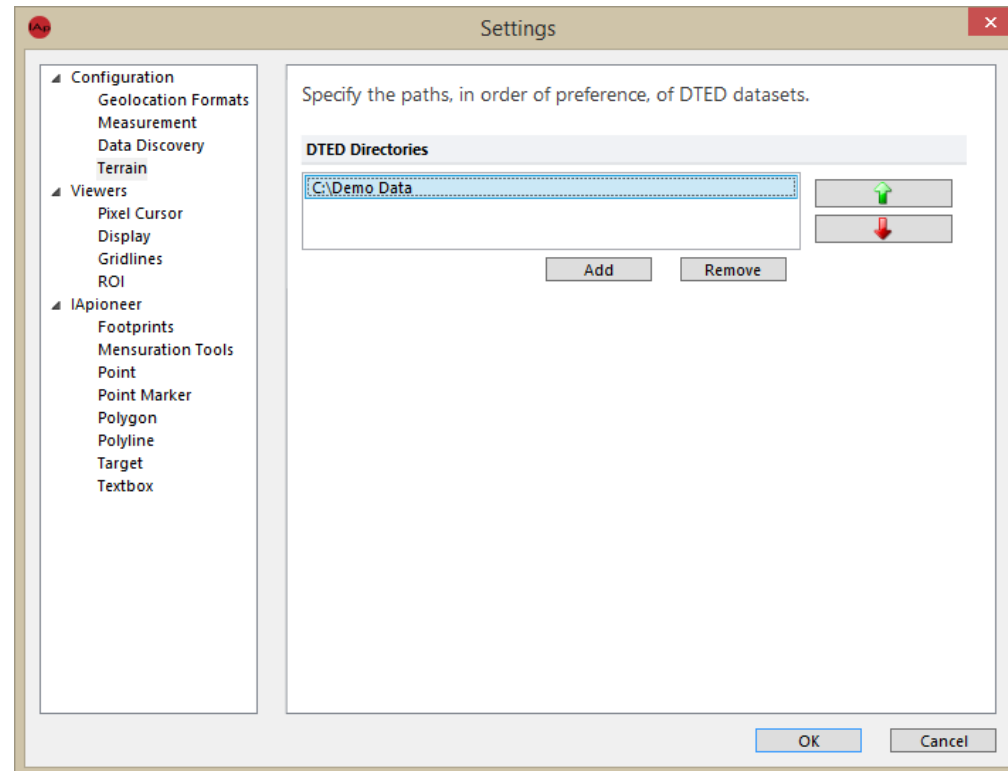




# Settings – Terrain continued

## Removing a directory:

1. Left click the local “Demo Data”.
2. Left click the [Remove] button.







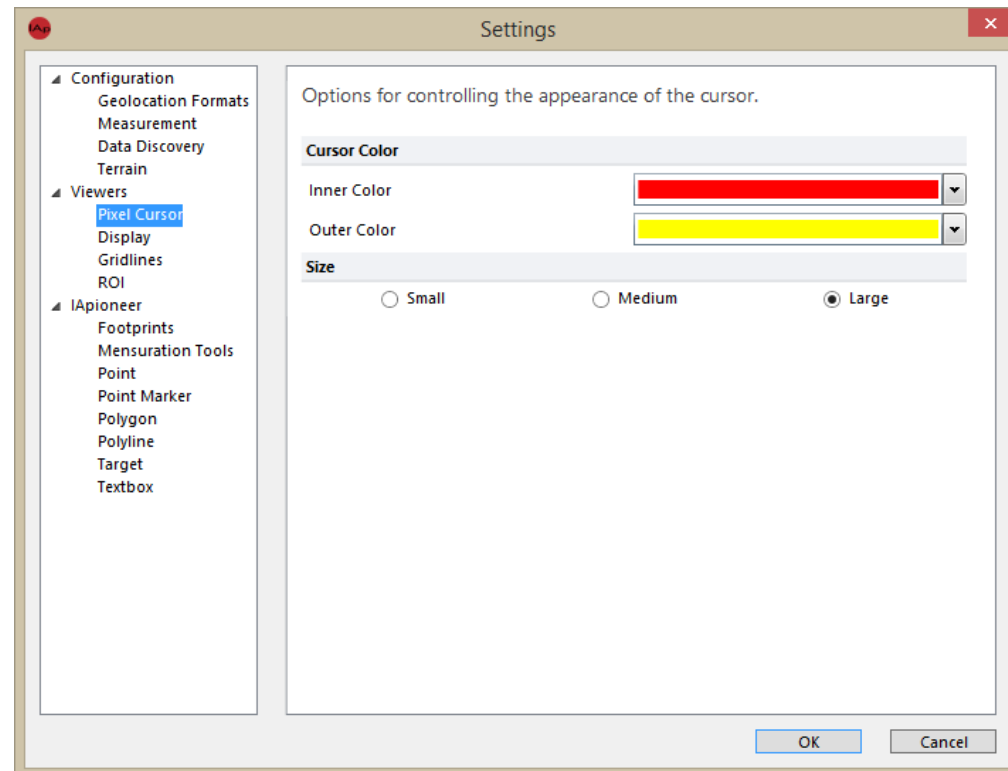
# Settings – Pixel Cursor

The Pixel Cursor properties provides you with the ability to configure the look of the cursor. The cursor has an Inner Color and an Outer Color, as well as a Size (Small, Medium, or Large).

Modifying the cursor:

- Inner Color: **Red**
- Outer Color: **Yellow**
- Size: **Large**

\* For best visibility of the cursor, set the inner color and outer color to be highly contrasting.



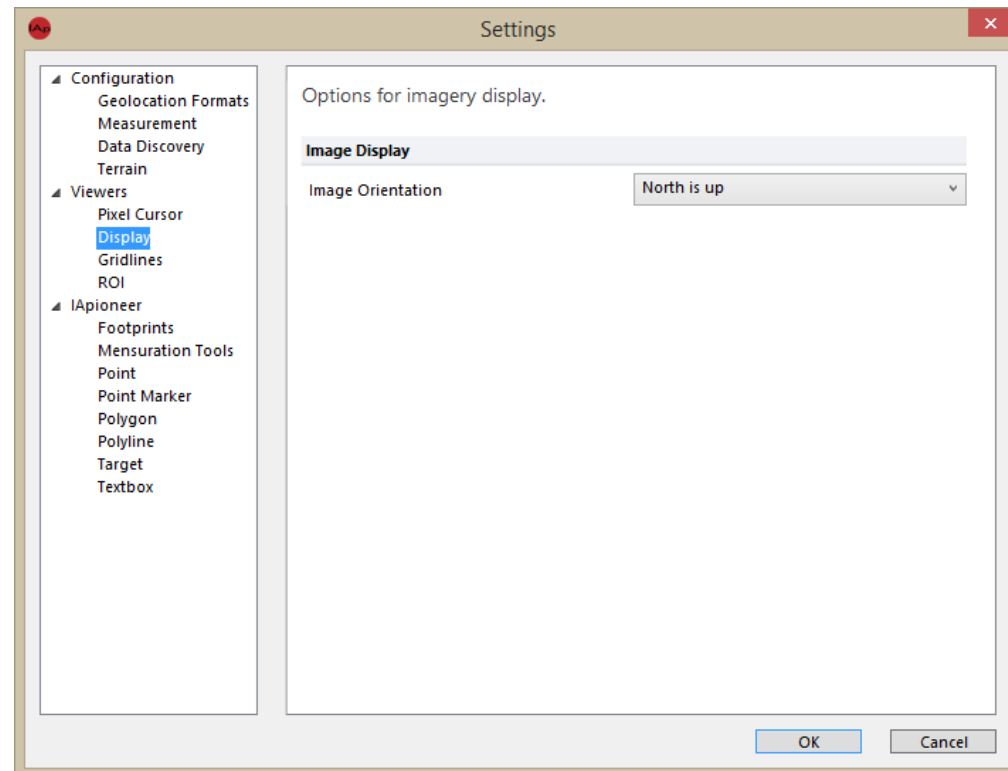


# Settings – Display

The Display properties provides you with the ability to configure the default image orientation for the viewers.

## Image Display:

- **Image is Up** orients the image such that the columns of the image are aligned with the columns of the viewer.
- **North is Up** orients the image in the viewer so that the direction to North, as determined by the spatial reference system, is aligned with the columns of the viewer.
- **Z is Up** orients the image so that vertical changes in elevation, such as the vertical lines of tall buildings, are aligned with the viewer.





# Settings – Gridlines

The Gridlines properties provides you with the ability to configure the default appearance of the geospatial grid overlay.

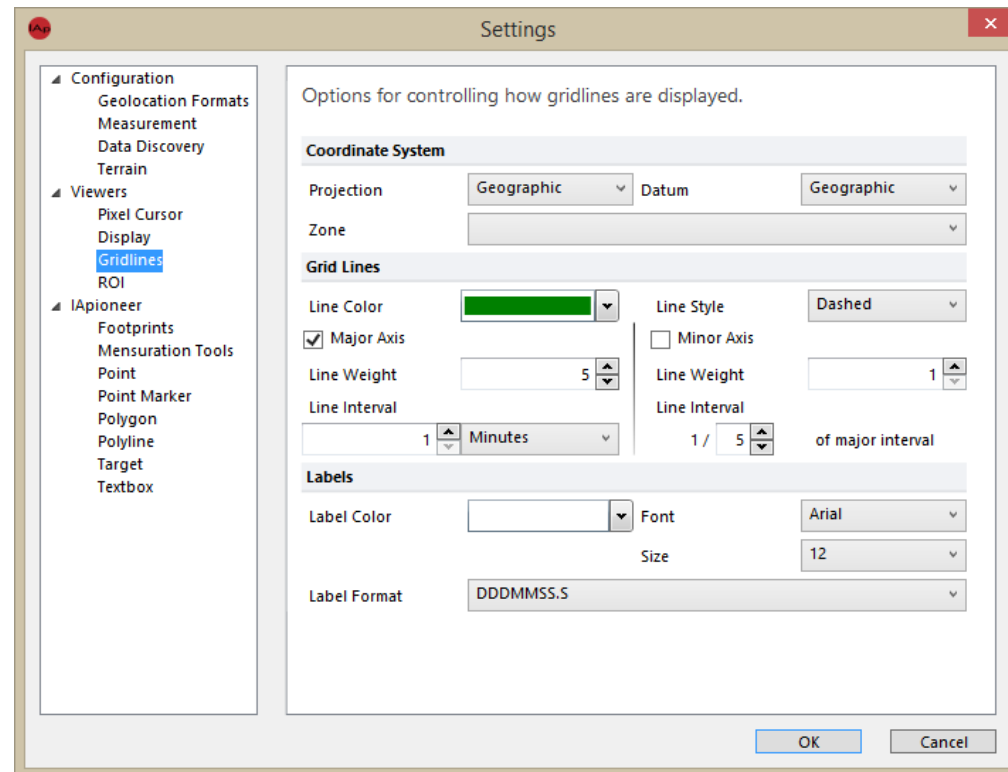
## Modifying Gridlines:

### Grid Lines:

- Line Color: **Green**
- Line Style: **Dashed**
- Major Line Weight: **5**

### Labels:

- Label Color: **White**
- Font: **Arial**
- Size: **12**
- Label Format: **DDMMSS.S**



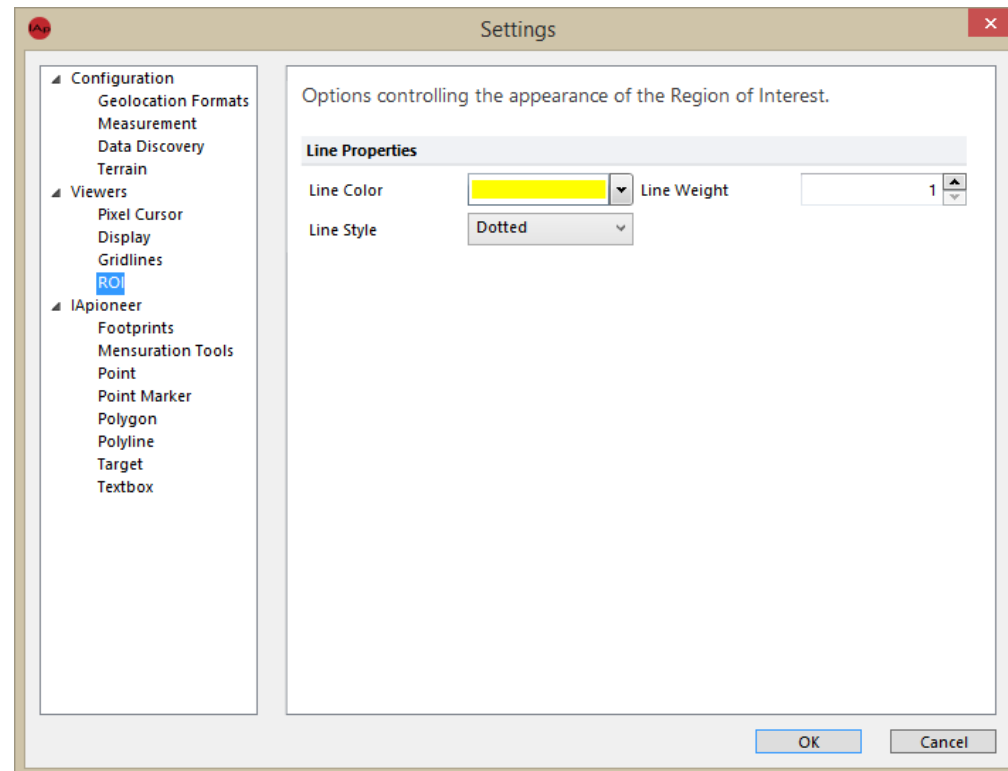


# Settings – Region of Interest (ROI)

The ROI properties provides you with the ability to configure the default appearance of the region of interest.

## Modifying the ROI:

- Line Color: **Yellow**
- Line Weight: **1**
- Line Style: **Dotted**





# Settings – Footprints

The Footprints properties provides you with the ability to configure how DPPDB footprints are displayed in the viewer. You can specify the *Line Color*, *Line Style*, and *Line Weight* for both the *Controlled Footprint* and the *Uncontrolled Footprint* of a DPPDB segment.

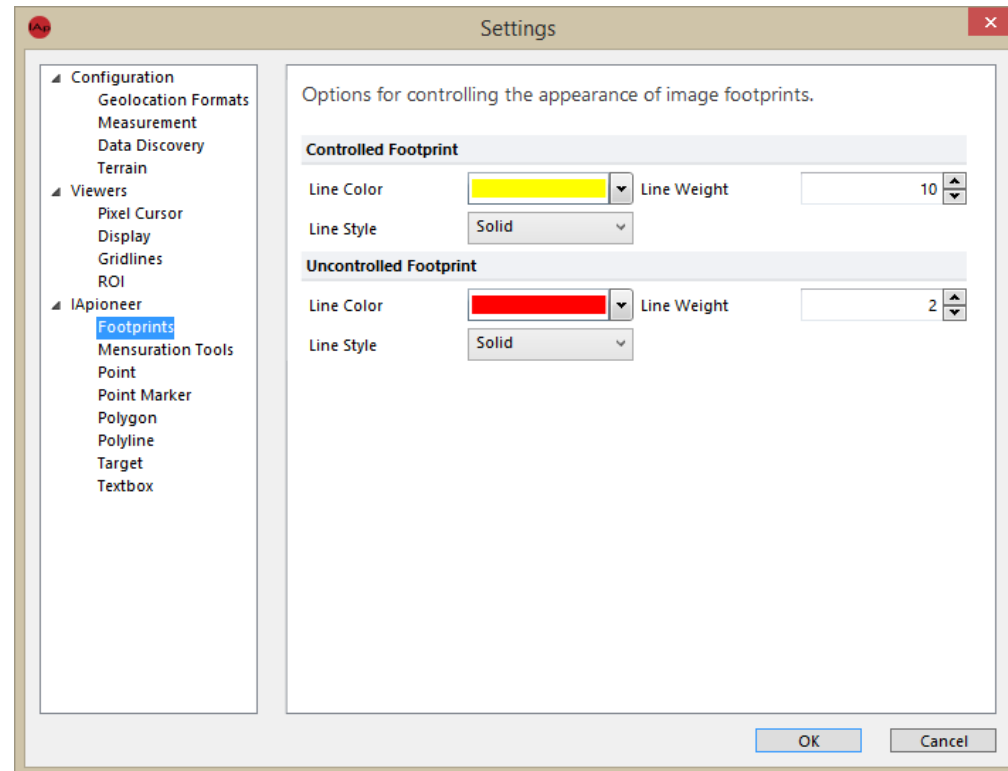
## Modifying the Footprints:

### Controlled Footprint:

- Line Color: **Yellow**
- Line Weight: **10**
- Line Style: **Solid**

### Uncontrolled Footprint:

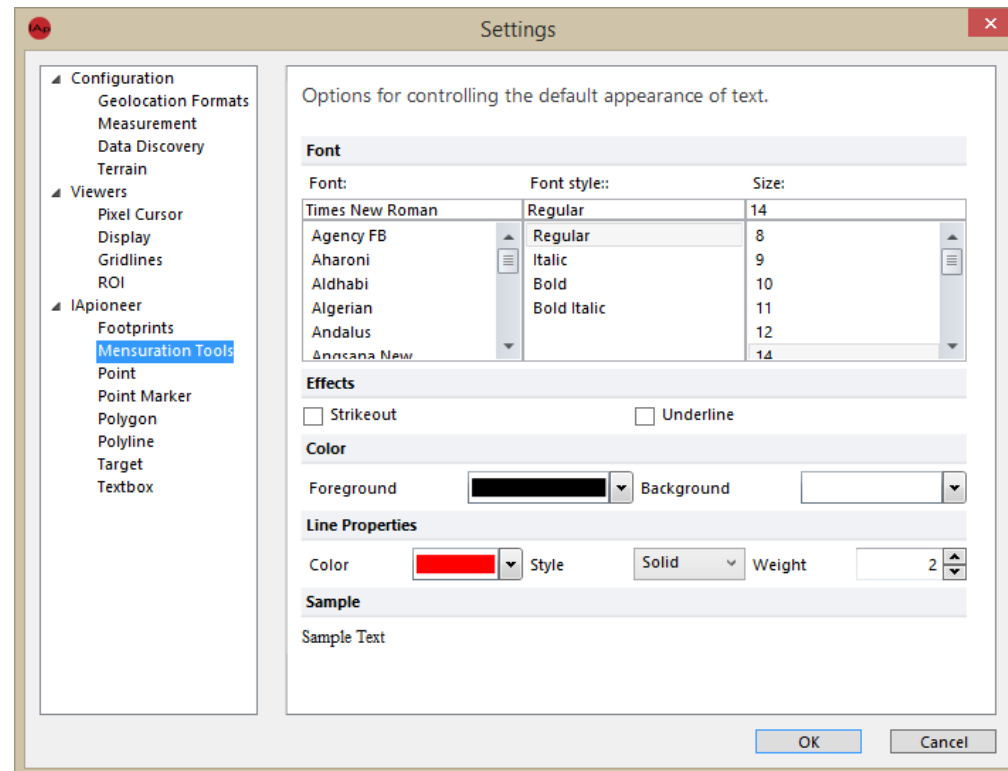
- Line Color: **Red**
- Line Weight: **2**
- Line Style: **Solid**





# Settings – Mensuration Tools

The Mensuration Tools properties provides you with the ability to configure how mensuration annotations appear. You can specify the default look and feel of the mensuration tools by specifying the *Font* parameters and *Effects*, as well as the *Foreground* and *Background* colors for the text. You can also specify the *Line Properties* of the mensuration vector components.



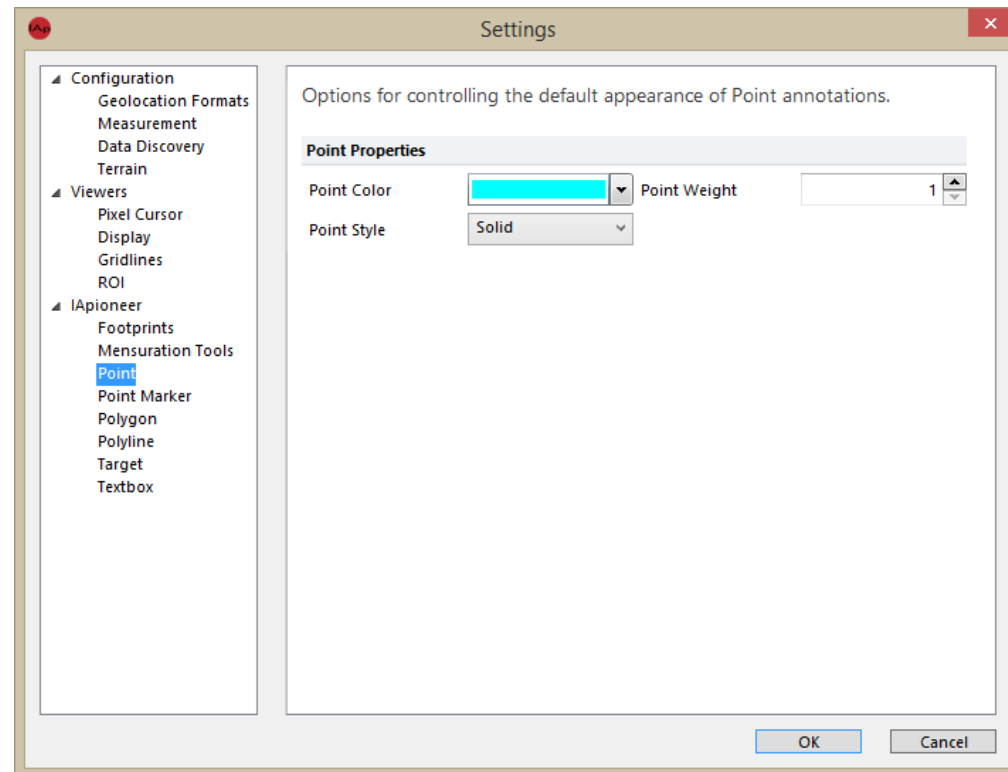


# Settings – Point

The Point settings properties provides you with the ability to configure how point annotations appear. You can specify the default *Color*, *Weight*, and *Style* for the Point annotation.

## Modifying the Point:

- Point Color: **Aqua**
- Point Weight: **1**
- Point Style: **Solid**

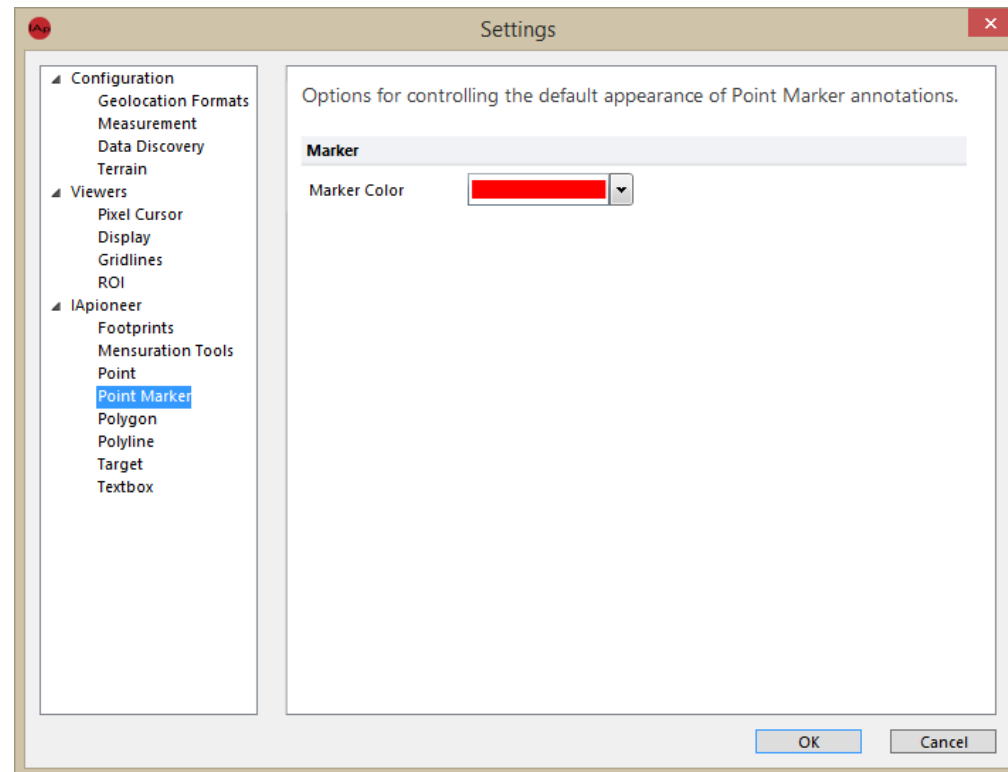




The Point Marker settings control how the point vector appears for the point marker annotation. The textbox portion of the annotation object is controlled via the Textbox settings.

Modifying the Point Marker:

- Marker Color: **Red**







# Settings – Polygon

The Polygon properties provides you with the ability to configure how polygon annotations appear. You can specify the default look and feel of the polygon annotations by specifying the *Line Properties* of the vector components. You can also specify whether the *Show Endpoint Direction* and *Show Centroid*. The *Fill Color* can also be specified here.

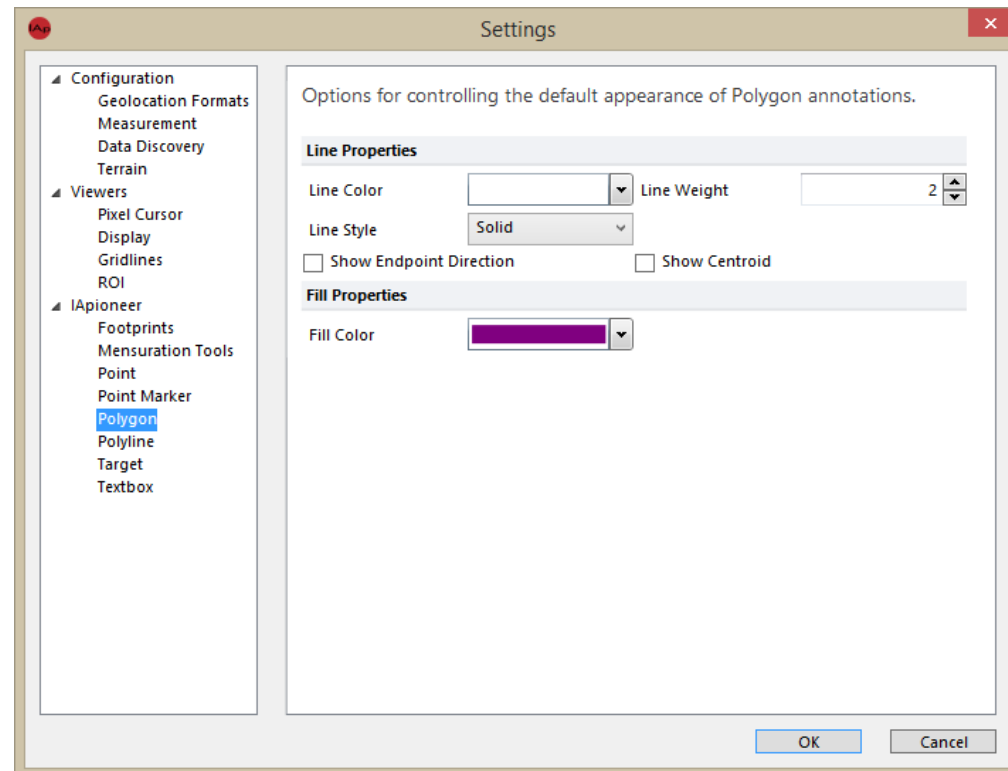
## Modifying the Polygon:

### Line Properties:

- Line Color: **White**
- Line Weight: **2**
- Line Style: **Solid**
- Show Endpoint Direction: **Unchecked**
- Show Centroid: **Unchecked**

### Fill Properties:

- Fill Color: **Purple**



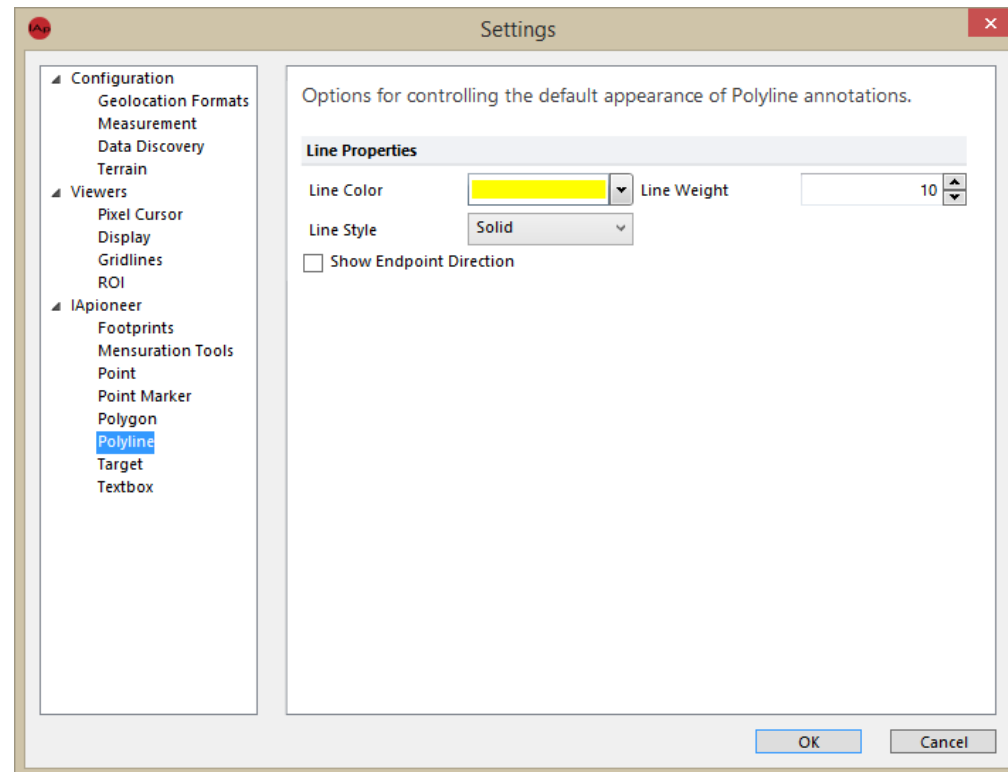


# Settings – Polyline

The Polyline properties provides you with the ability to configure how polygon annotations appear. You can specify the default look and feel of the polygon annotations by specifying the *Line Properties* of the vector components. You can also specify whether to *Show Endpoint Direction*.

Modifying the Polyline:

- Line Color: **Yellow**
- Line Weight: **10**
- Line Style: **Solid**
- Show Endpoint Direction: **Unchecked**



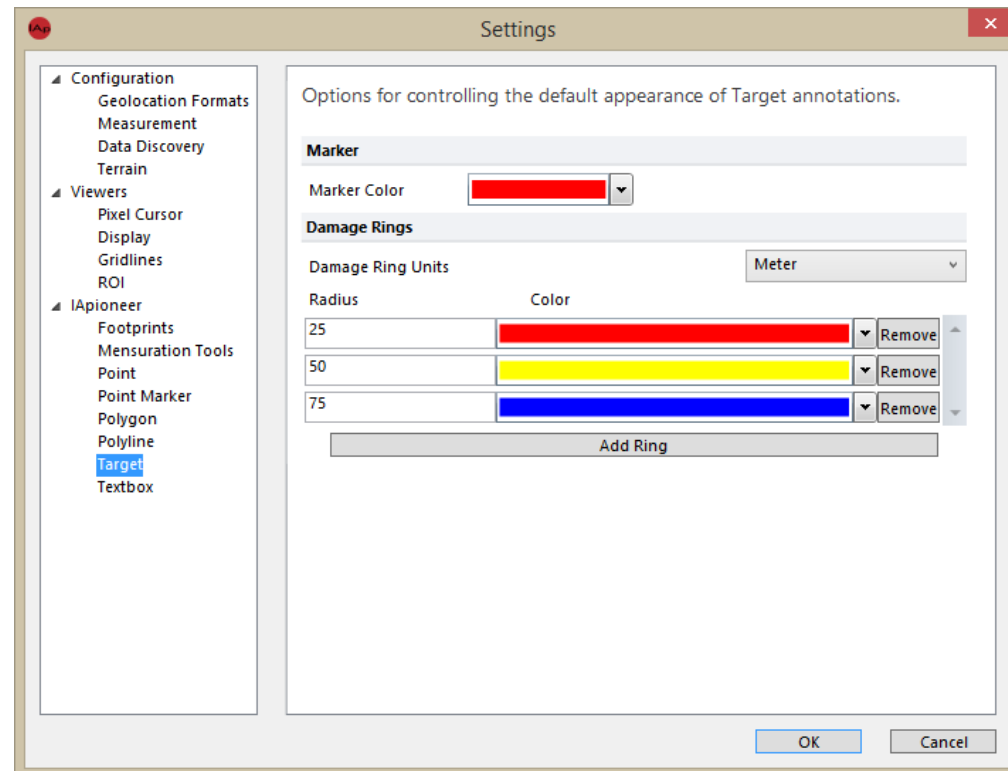


# Settings - Target

The Target properties provides you with the ability to configure how target circle annotations are initially constructed. You can specify the Marker Color for the annotation object delineating the center of the target annotation. Here, you can also specify parameters for the default rings, including the *Damage Ring Units*, and the initial *Radius* and *Colors* for the ring annotations.

## Modifying the Target:

- Marker Color: **Red**
- Damage Ring Units: **Meter**





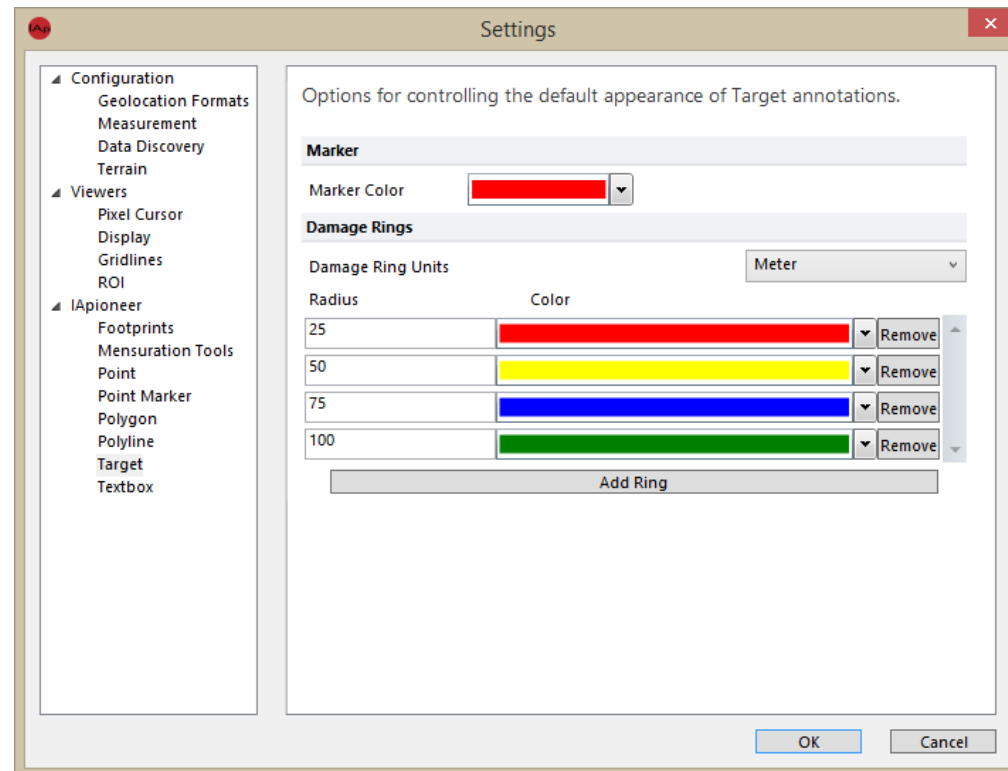
# Settings – Target continued

Adding a damage ring:

1. Left click the [Add Ring] button.
2. Define ring parameters:
  - Radius: **100**
  - Color: **Green**

Removing a damage ring:

- Left click the [Remove] button to the corresponding ring you would like to remove.





# Settings – Textbox

The Textbox properties provides you with the ability to configure the *Font*, *Effects*, and *Color* parameters for both standalone textbox annotations, as well as textboxes that appear as a component in complex annotations (e.g., point markers, target rings). The *Line Properties* are used for both the textbox border, as well as any necessary callout lines for complex annotations.

Modifying a Textbox:

Font Properties:

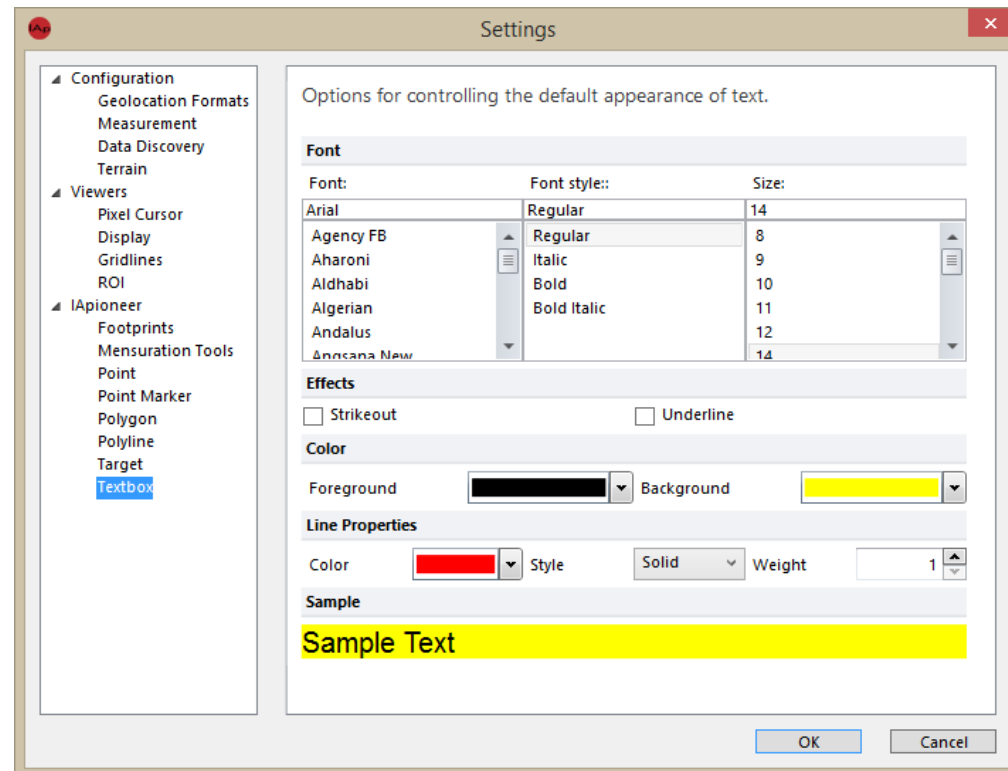
- Font: **Arial**
- Font Style: **Regular**
- Size: **14**

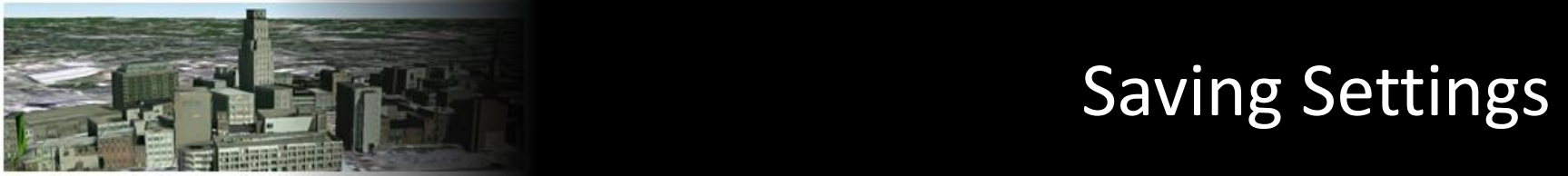
Color Properties:

- Foreground: **Black**
- Background: **Yellow**

Line Properties:

- Color: **Red**
- Style: **Solid**
- Weight: **1**

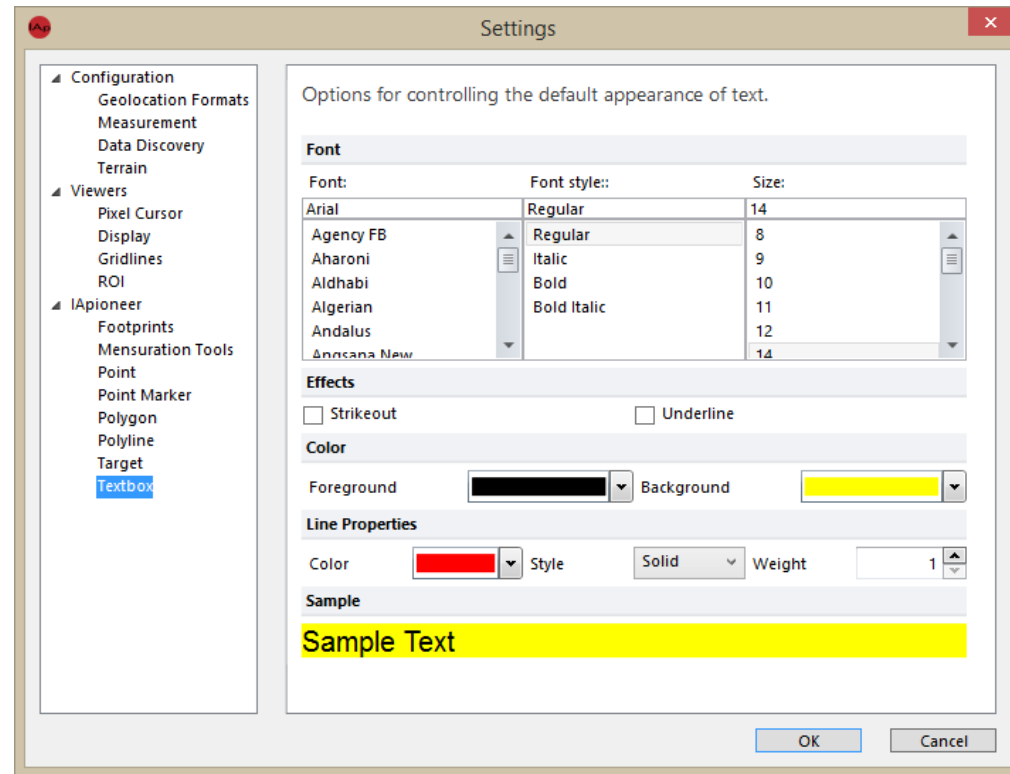




All changes made to the settings are saved on a per-user basis, allowing all users on the same system to customize the look and feel of the software.

**Saving Settings:**

- Left click the [OK] button to save the changes. This will also close the dialog and take you back to the Main application.



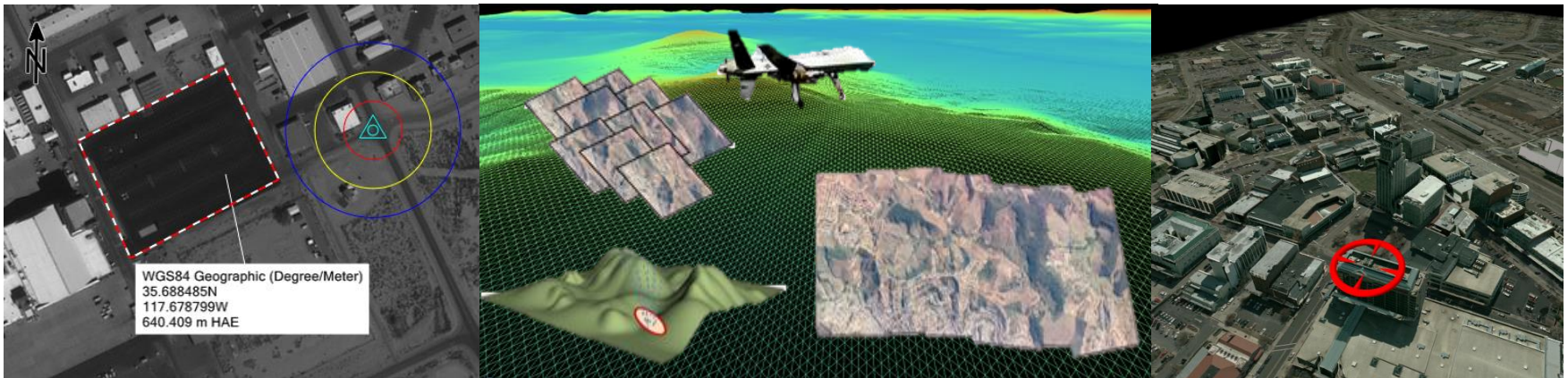


# Questions?





# Module 2: IApioneer





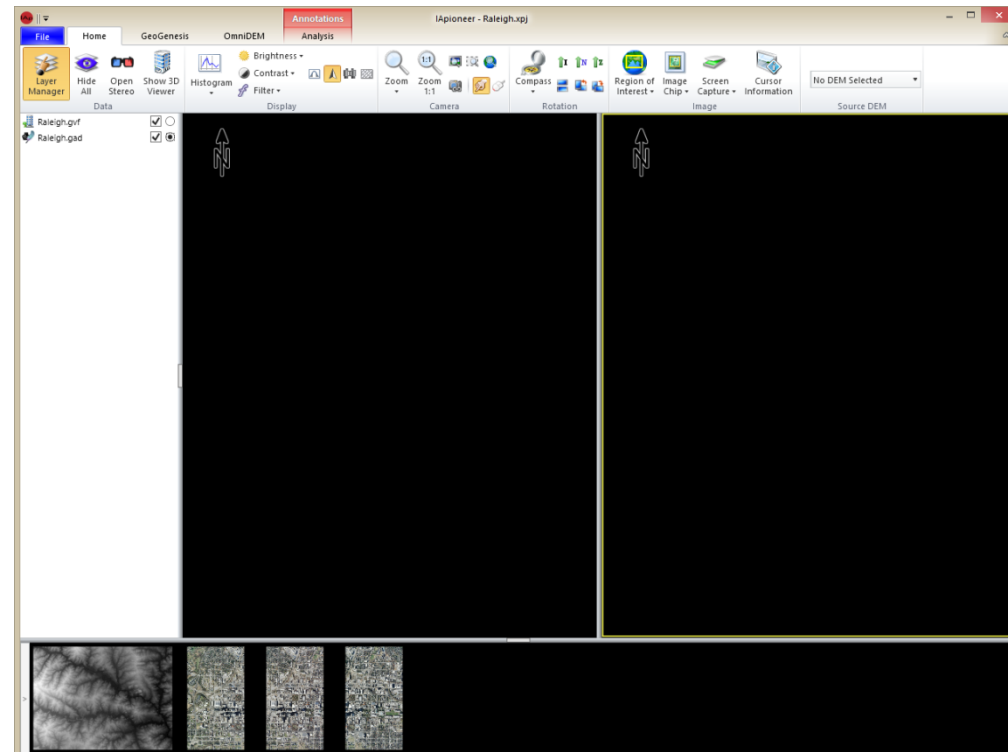


# Analysis

You must select an annotation layer (.gad) to utilize the Analysis functionality within IApioneer.

## Selecting the Annotation Layer:

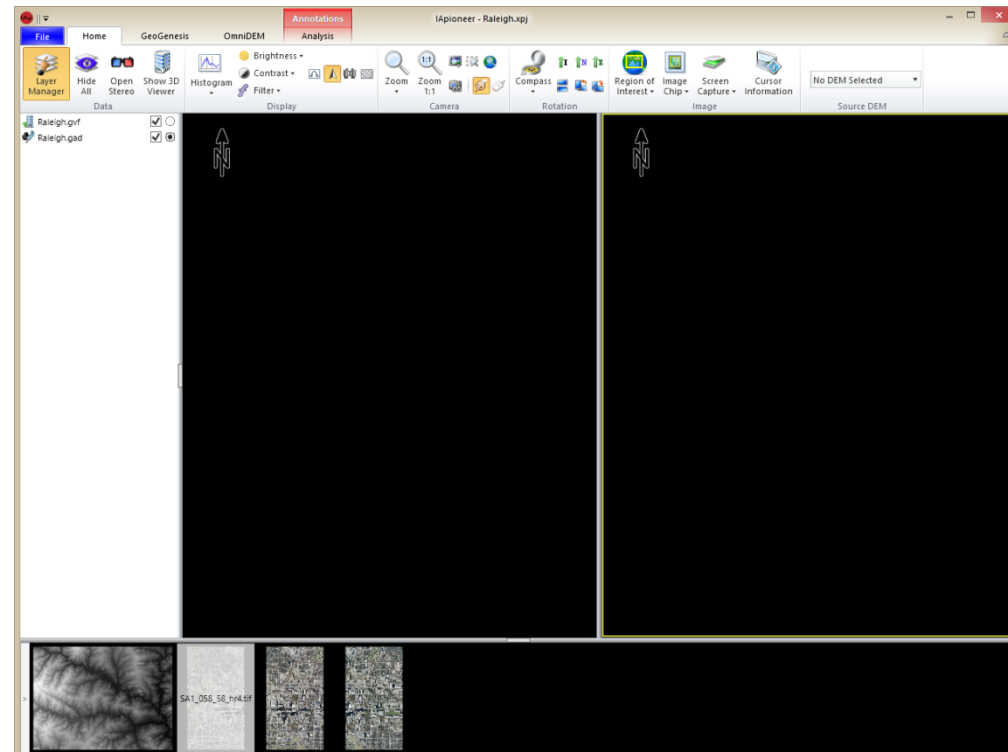
1. Left click the [Layer Manager] button to see all layers within the current session.
2. Left click the option button, to the right of the annotation layer, that you would like to edit.
3. The “Analysis” Tab will display exposing the functionality to edit the active layer.





Displaying an image into a viewer:

1. Mouse over an image, in the Image Gallery, to see the image name.
2. Right click image "SA1\_058\_58\_hr4.tif".
3. Left click the [Send to Left Viewer] menu item.



A 3D perspective view of a city with various buildings and terrain, rendered in a dark, somewhat muted color palette.

# Maximizing Your Workspace

## Hiding the layer Manager:

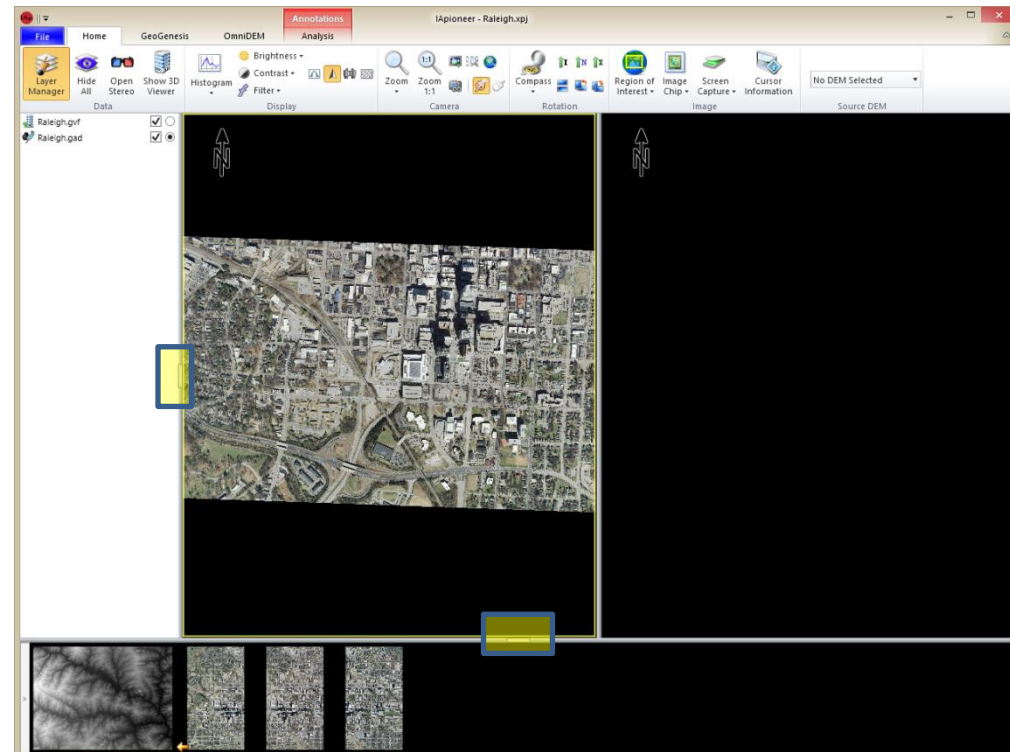
- Left click the [Layer Manager] button.

## Hiding the image gallery:

- Left click the spacer between viewers and image gallery.

## Hiding the right viewer:

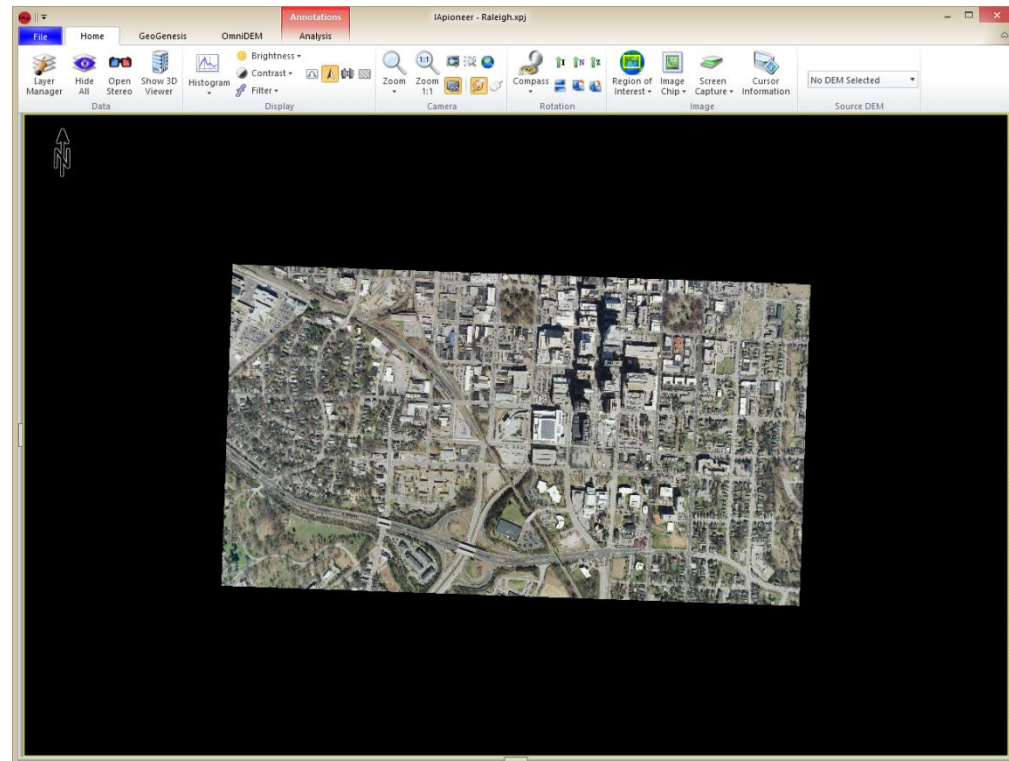
1. Mouse over the vertical bar between the left and right viewer. The cursor should turn into a left and right arrow.
2. Left click and hold the vertical bar between the left and right viewer.
3. Drag the mouse to the right portion of the right viewer.
4. Release the left mouse button.





# Accessing Analysis Capabilities

Left click the “Analysis” tab to access the Analysis capabilities from within IApioneer.

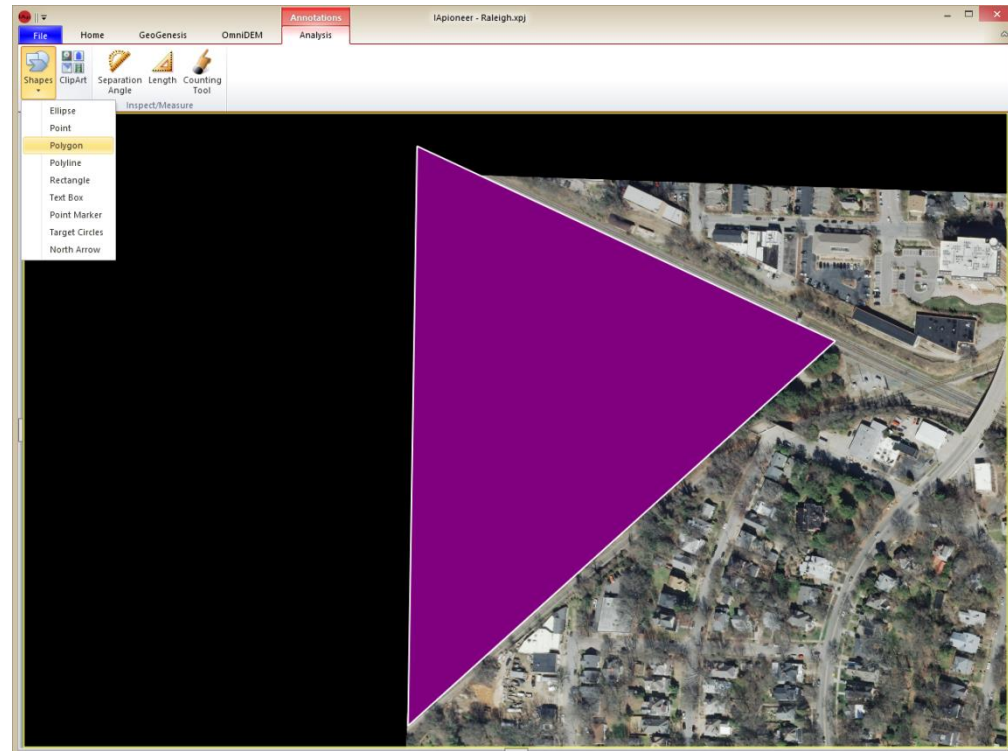




# Drawing a Polygon

Drawing a polygon:

1. Left click the [Shapes] button.
2. Left click the [Polygon] menu item to activate the Polygon tool.
3. Left click the starting point in the image to start drawing.
4. Move the mouse to your second location and left click to pin.
5. Move the mouse to the third location and left click to pin.
6. Right click in the viewer to stop drawing.

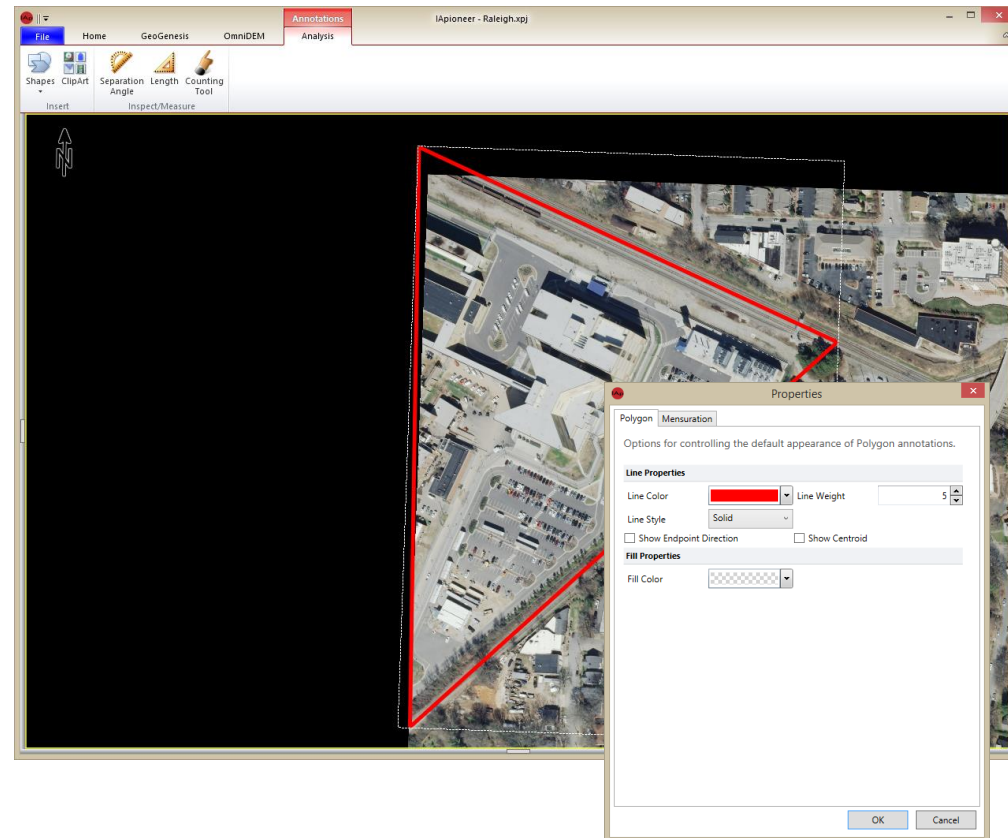




# Modifying a Polygon

## Modifying a polygon:

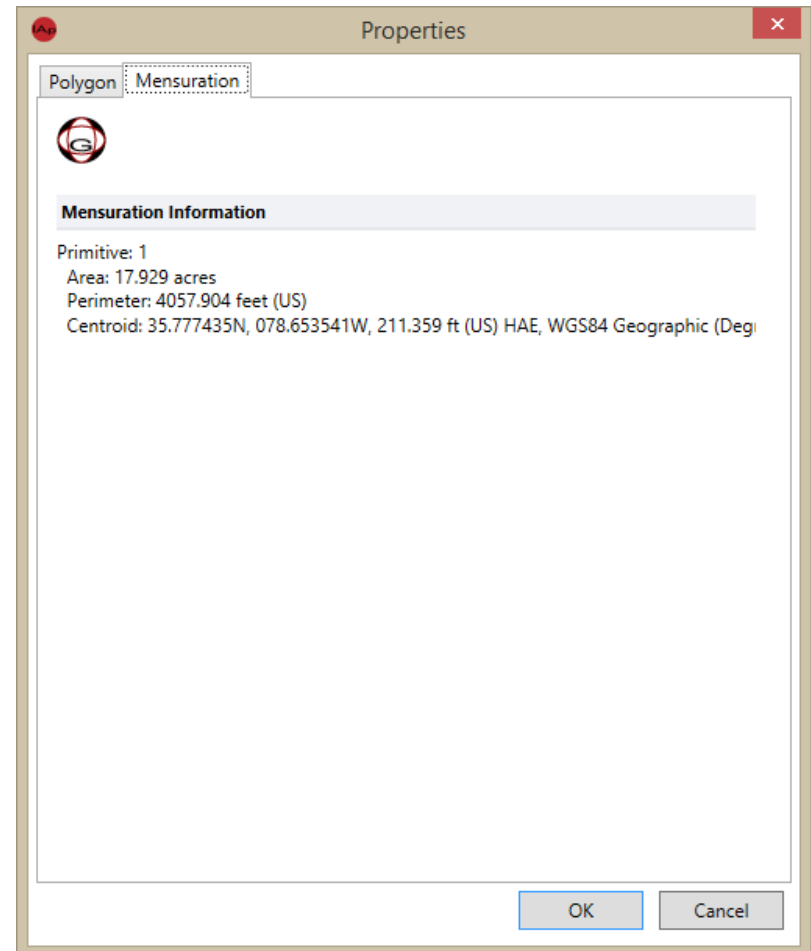
1. Left click the previously drawn polygon to select it.
2. Right click in the selected polygon.
3. Left click the [Properties] menu item.
4. Set the line properties to:
  - Line color: **Red**
  - Line Weight: **5**
  - Line Style: **Solid**
5. Set the fill properties to:
  - Fill Color: **Transparent**
6. Left click the [OK] button.





# Mensuration Information of a Polygon

1. Left click the polygon to select it.
2. Right click in the selected polygon.
3. Left click the [Properties] menu item.
4. Left click the “Mensuration” tab.
5. Left click the [OK] button.

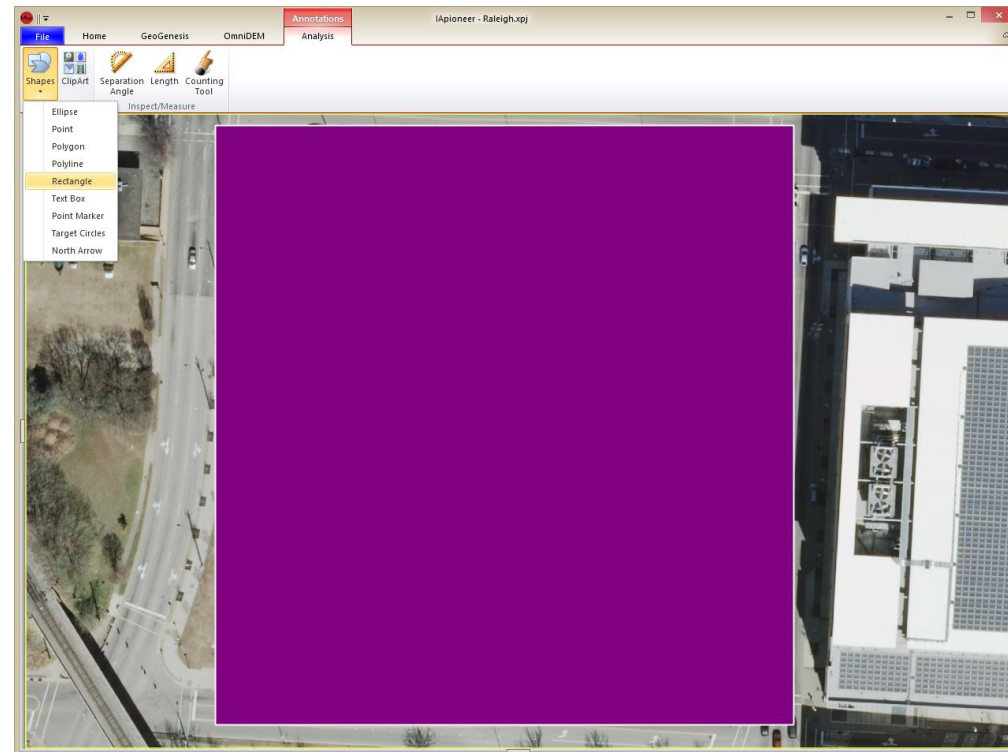




# Drawing a Rectangle

Drawing a rectangle:

1. Left click the [Shapes] button.
2. Left click the [Rectangle] menu item.
3. Left click and hold, at the first point, in the image to start drawing.
4. Drag the mouse to your second location.
5. Release the left mouse button.



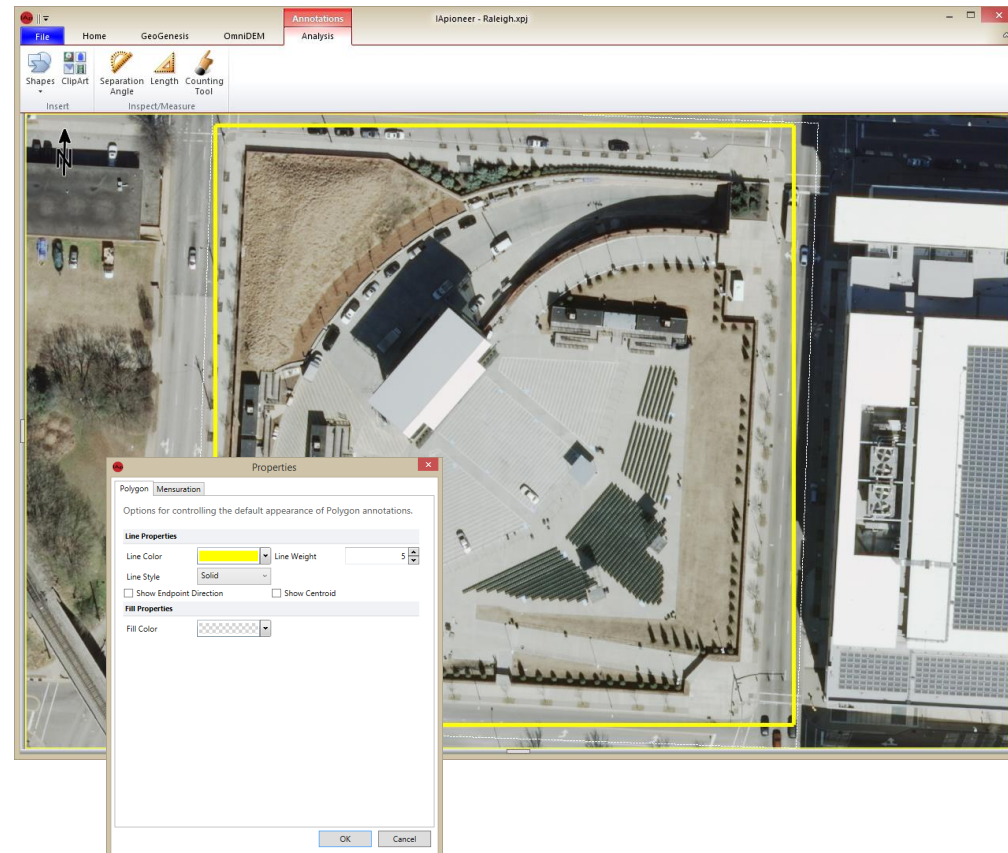




# Modifying a Rectangle

Modifying a rectangle:

1. Left click the previously drawn polygon to select it.
2. Right click in the selected polygon.
3. Left click the [Properties] menu item.
4. Set the line properties to:
  - Line color: **Yellow**
  - Line Weight: **5**
  - Line Style: **Solid**
5. Set the fill properties to:
  - Fill Color: **Transparent**
6. Left click the [OK] button.





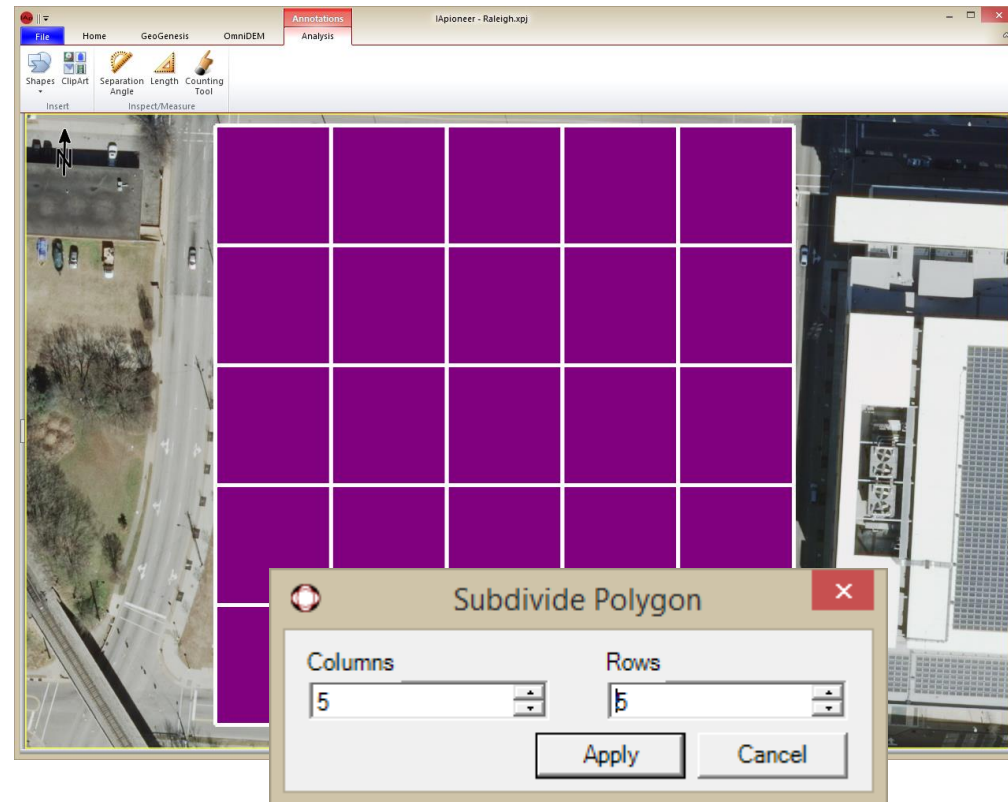
# Subdivide

IApioneer has the ability to subdivide a convex quadrilateral into a number of regularly sampled rows and columns.

To subdivide a quadrilateral:

1. Create a new convex four-sided polygon.
2. Left click inside the polygon to select it.
3. Right click the selected polygon.
4. Left click the [Subdivide] menu item.
5. Use the up-down arrows to adjust the number of rows and columns.
6. Left click the [Apply] button to finalize the subdivision.

\* This is a great way to regularly sample a grid, including the centroids for every sub-region.

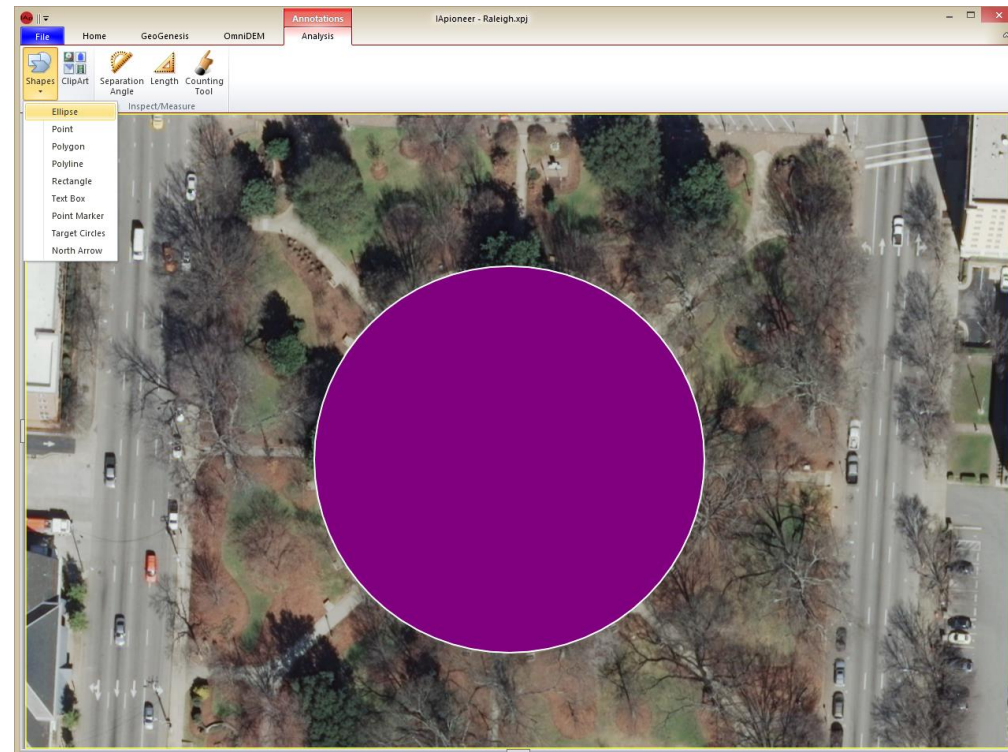




# Drawing an Ellipse

## Drawing an Ellipse:

1. Left click the [Shapes] button.
2. Left click the [Ellipse] menu item.
3. Left click and hold , at the first point, in the image to start drawing.
4. Drag the mouse to your second location.
5. Release the left mouse button.

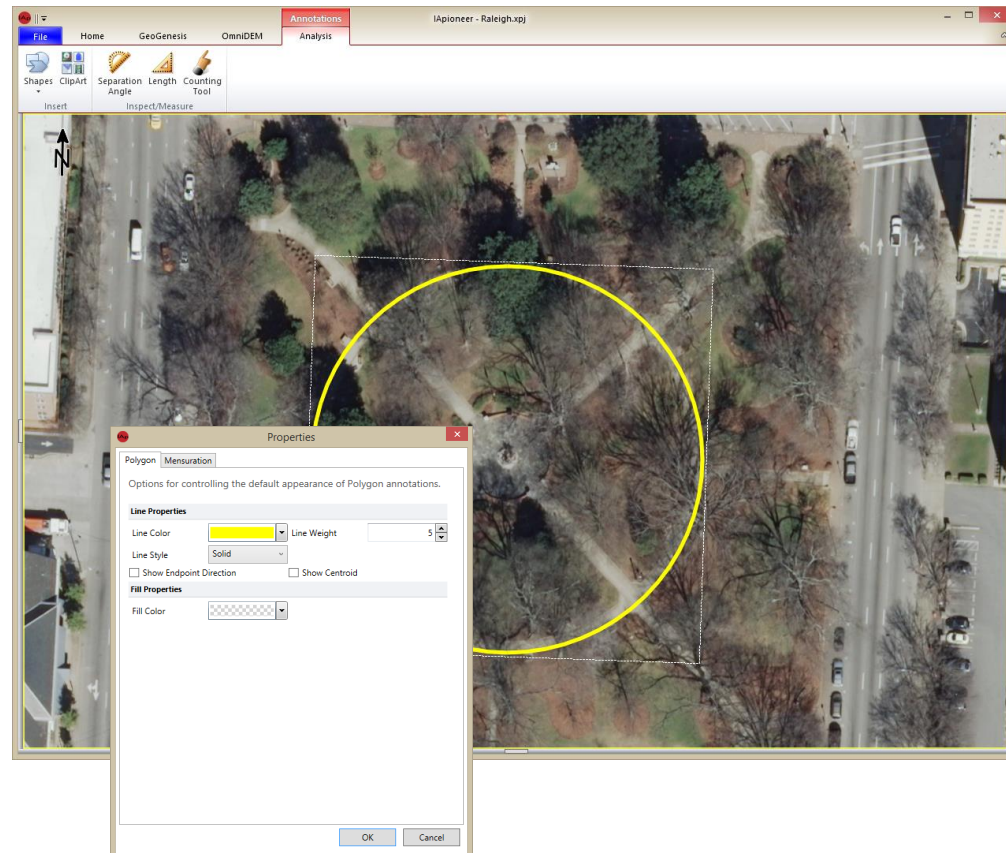




# Modifying an Ellipse

Modifying an ellipse:

1. Left click the previously drawn ellipse to select it.
2. Right click in the selected ellipse.
3. Left click the [Properties] menu item.
4. Set the line properties to:
  - Line color: **Yellow**
  - Line Weight: **5**
  - Line Style: **Solid**
5. Set the fill properties to:
  - Fill Color: **Transparent**
6. Left click the [OK] button.

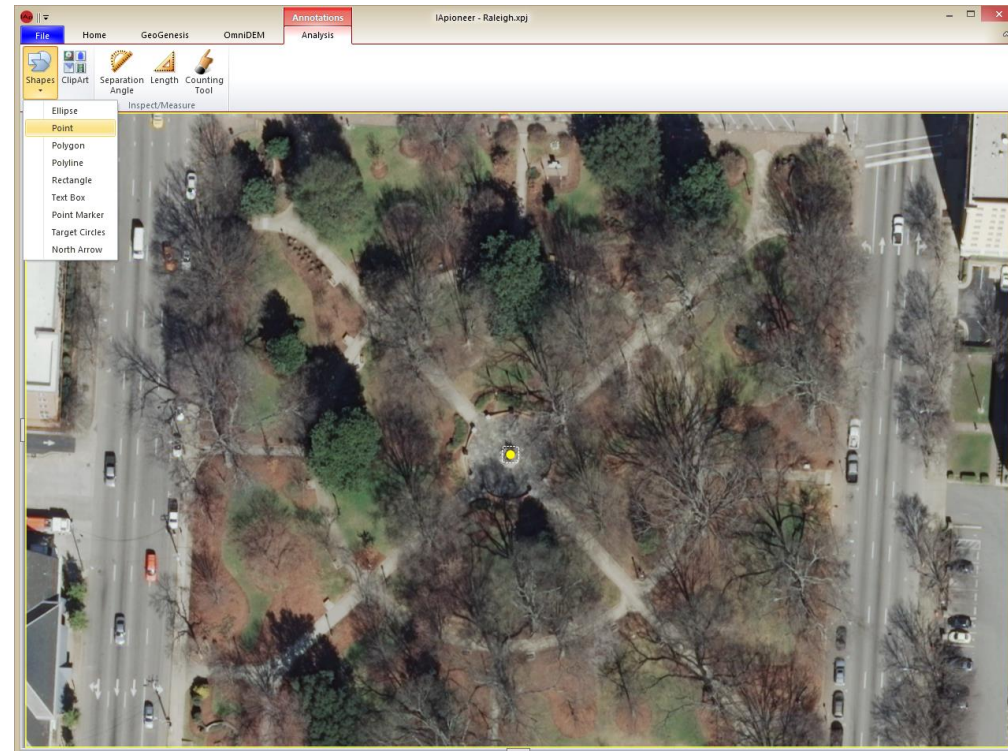




# Drawing a Point

## Drawing a Point:

1. Left click the [Shapes] button.
2. Left click the [Point] button.
3. Left click in the image.

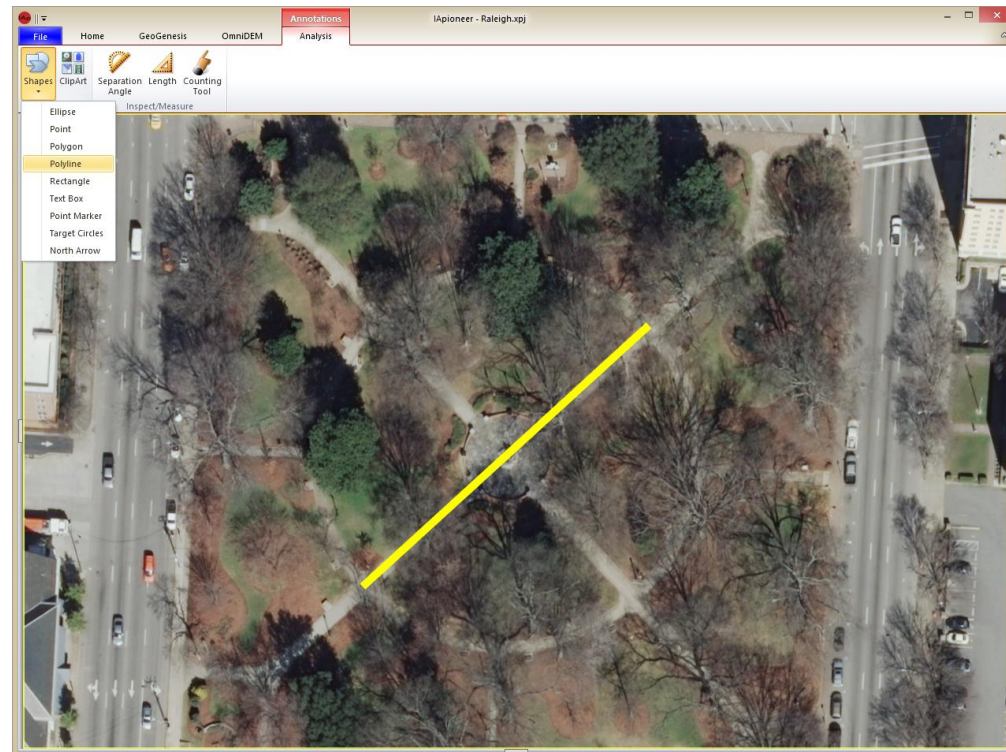




# Drawing a Line

## Drawing a line:

1. Left click the [Shapes] button.
2. Left click the [Polyline] menu item.
3. Left click where you would like the line to start.
4. Move the mouse to the next location and left click to pin.
5. Repeat step 4 as many times as you need to detail the line.
6. Right click in the image to stop drawing.



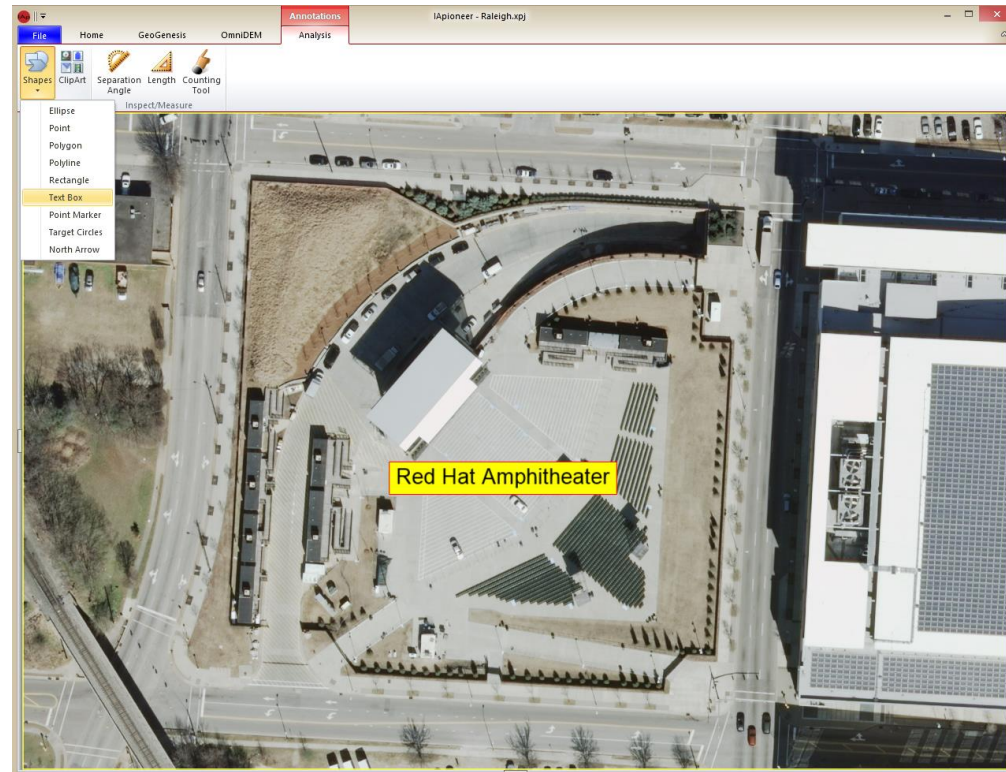


# Adding a Text Box

## Adding a text box:

1. Left click the [Shapes] button.
2. Left click the [Text Box] button.
3. Left click in the viewer where you would like to place the text box.
4. Type “Red Hat Amphitheater” into the text box.
5. Left click outside of the textbox to update textbox and end editing of the text.

Note: The textbox does not grow or shrink with the text being entered. The textbox will size to text, once you end the editing of the text.



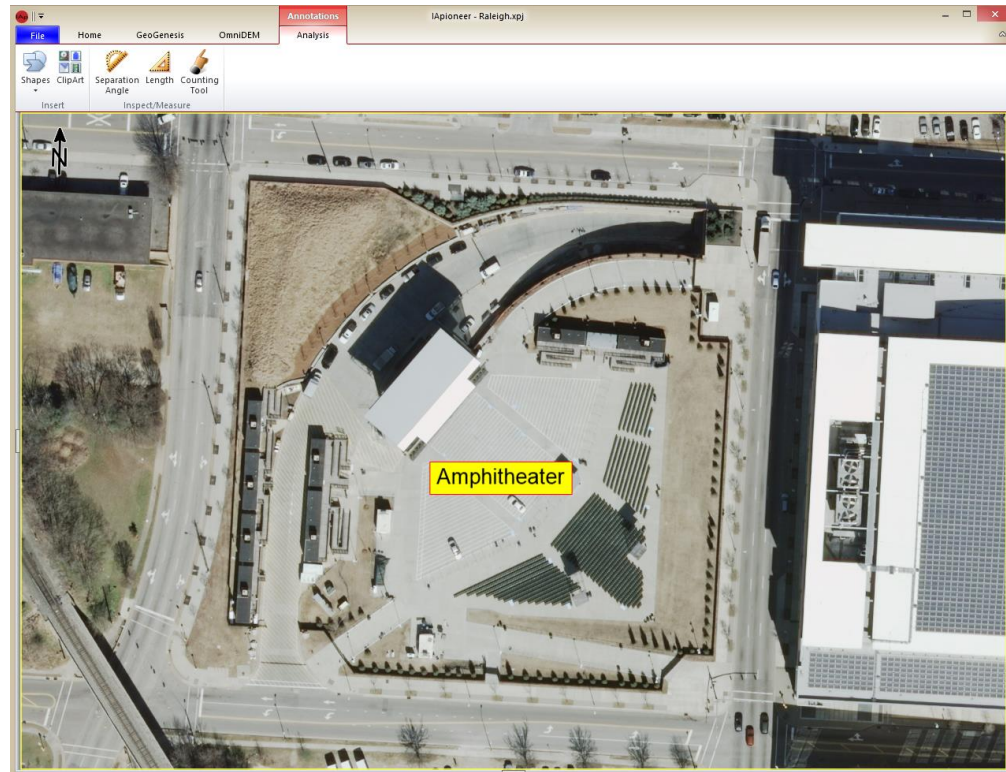


# Modifying a Text Box

## Modifying a text box:

1. Left double click the textbox.
2. Type “Amphitheater” into the text box.
3. Left click outside of the textbox to update textbox and end editing of the text.

Note: The textbox does not grow or shrink with the text being entered. The textbox will size to text, once you end the editing of the text.



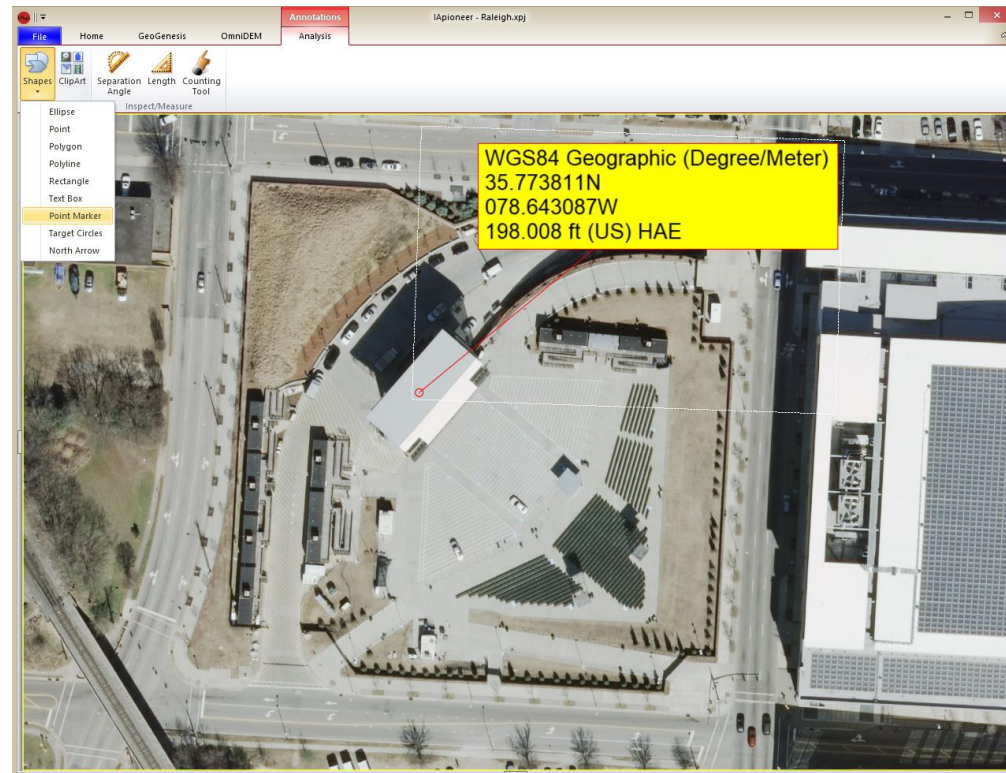




# Adding a Point Marker

## Adding a Point Marker:

1. Left click the [Shapes] button.
2. Left click the [Point Marker] menu item.
3. Left click object within the viewer.

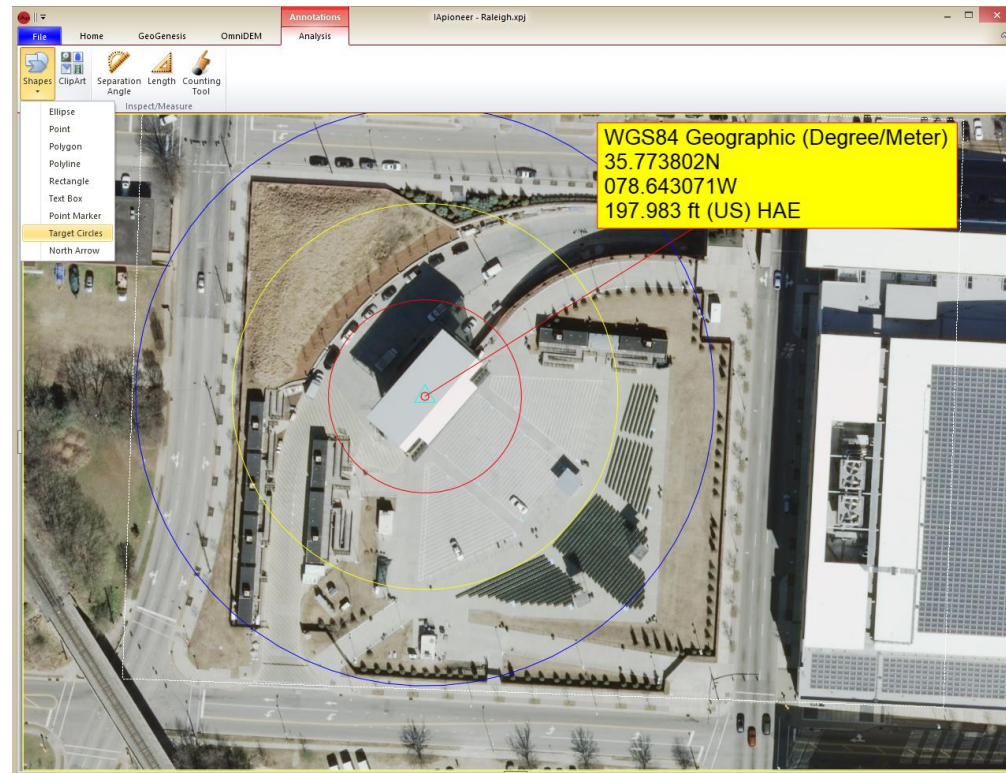




# Adding a Targeting Circle

## Adding a Targeting Circle:

1. Left click the [Shapes] button.
2. Left click the [Target Circles] menu item.
3. Left click the target.

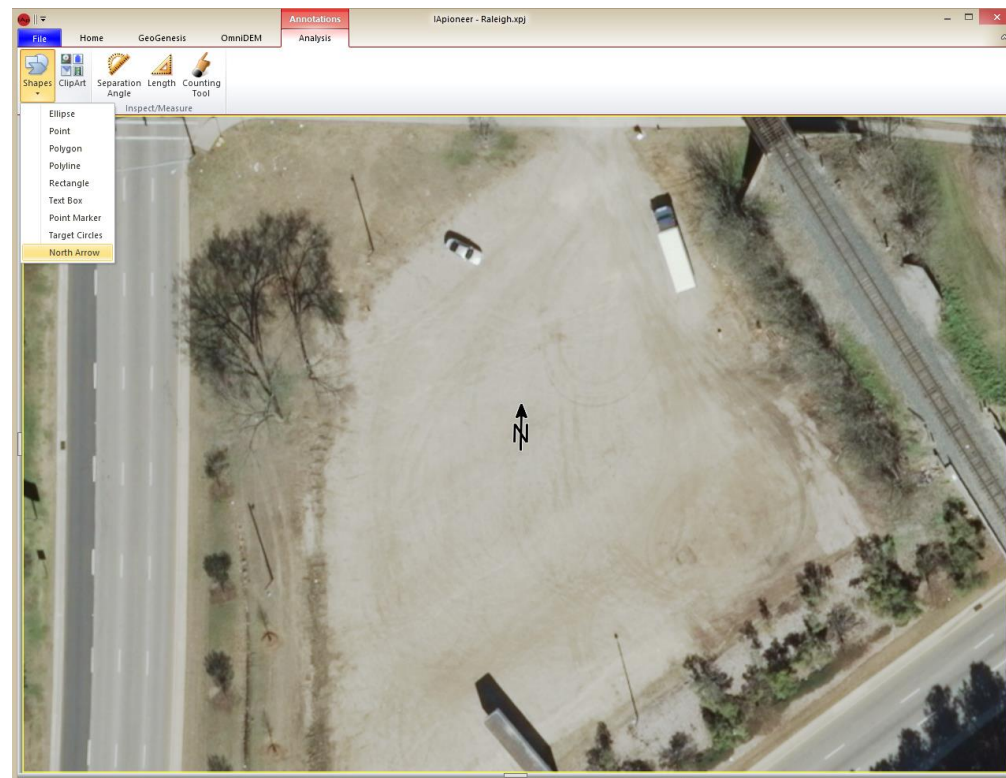




# Adding a North Arrow

## Adding a North Arrow:

1. Left click the [Shapes] button.
2. Left click the [North Arrow] menu item.
3. Left click in the image.



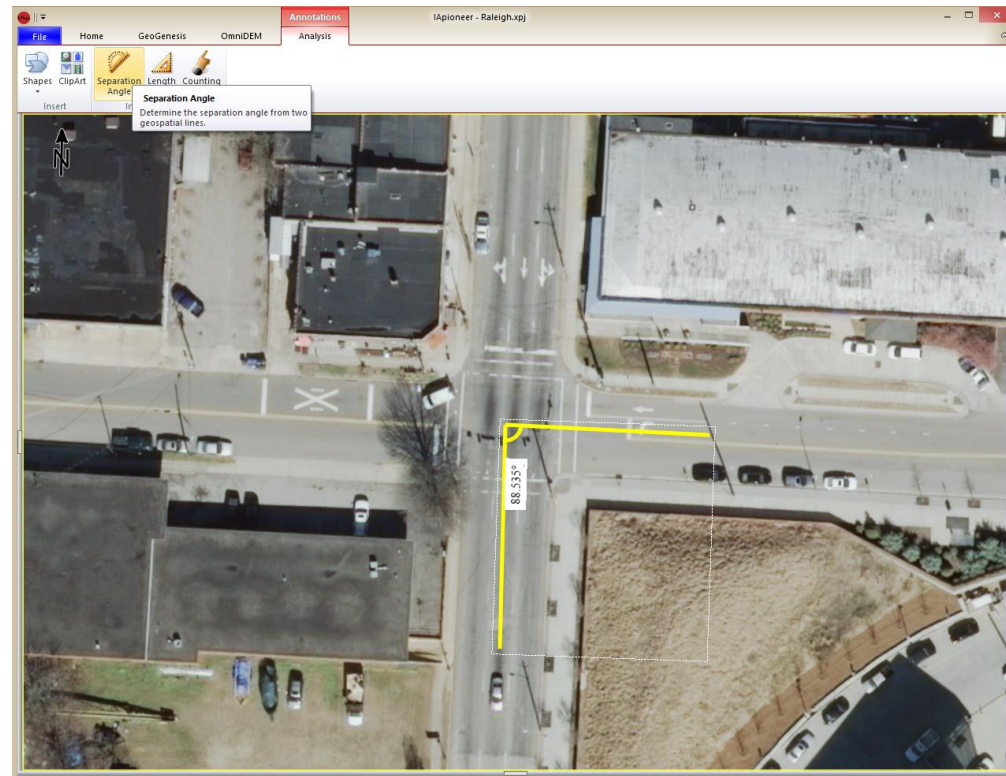


# Separation Angle

Determine the separation angle from two geospatial lines.

1. Left click the [Separation Angle] button.
2. Left click in the viewer to pin the first point.
3. Move the mouse to the pivot point and left click to pin it.
4. Move the mouse to the third point and left click to pin it.

This will produce the separation angle displaying the degrees of separation.



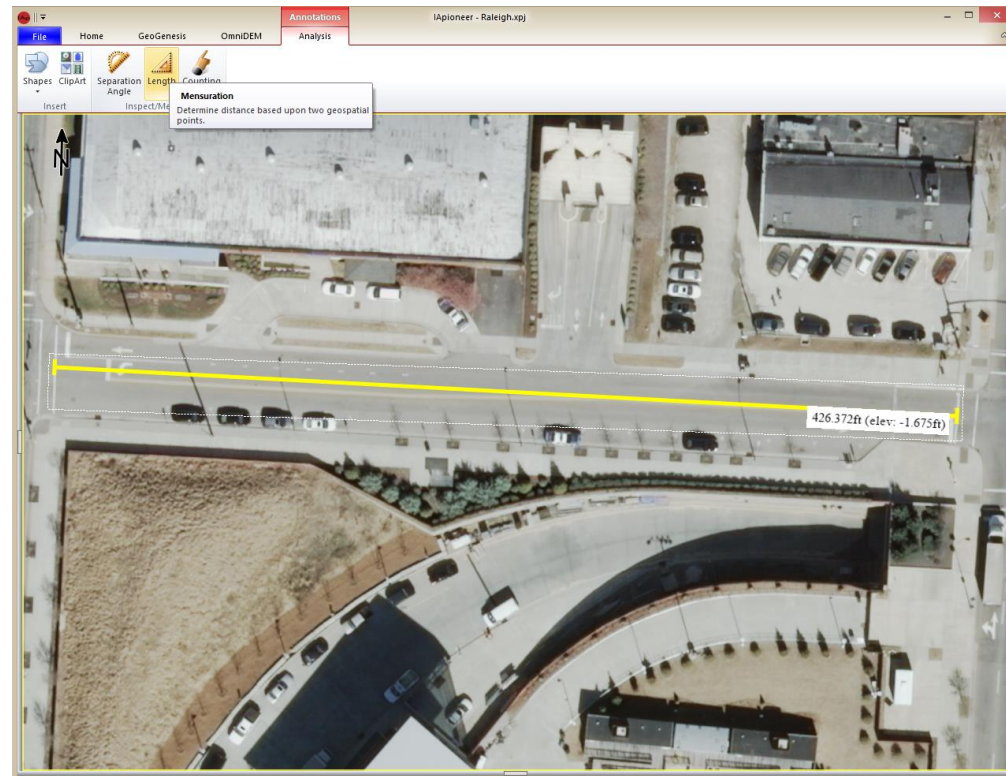


# Length

Determine distance based upon two geospatial points.

1. Left click the [Length] button.
2. Left click the start of the object that you want to measure.
3. Move the mouse and left click the end of the object.

The line will be drawn with identifying distance displayed.

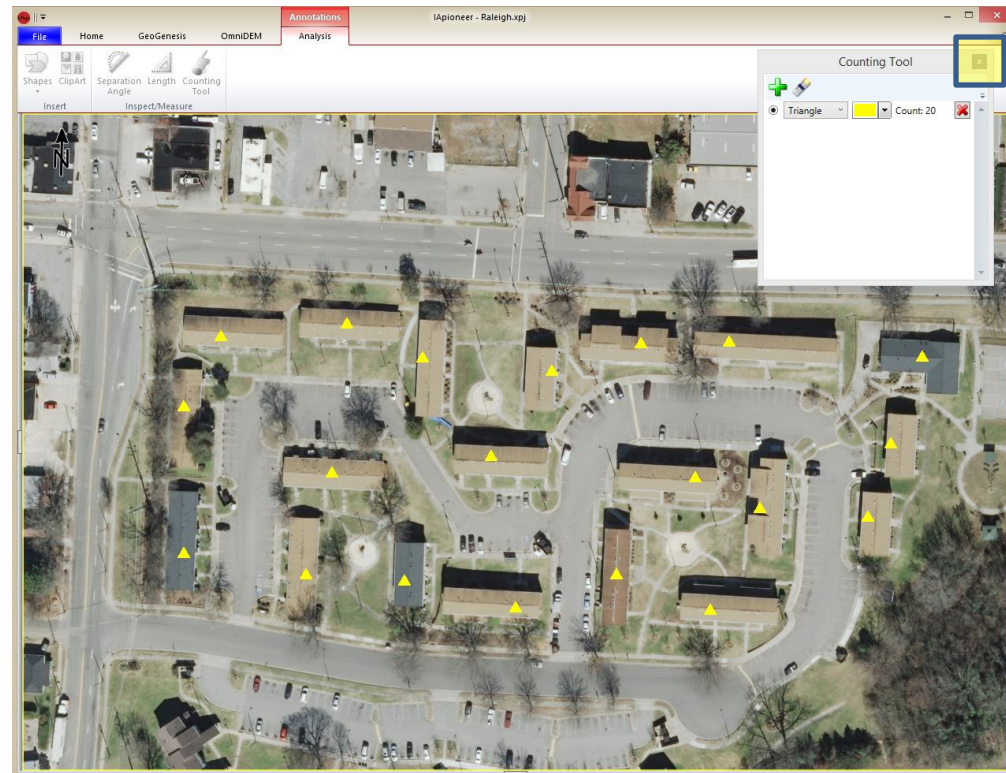




# Counting Tool

Assists in the counting of various features within the image.

1. Left click the counting tool.
2. Left click the green plus sign in the Counting tool dialog.
3. Left click on the object that you would like to count.
4. Repeat step 3 until all objects are accounted for.
5. Counting tool will tally up the number of objects you have clicked.
6. Left click the [X], in the upper right corner of the counting tool dialog, to close the counting tool.





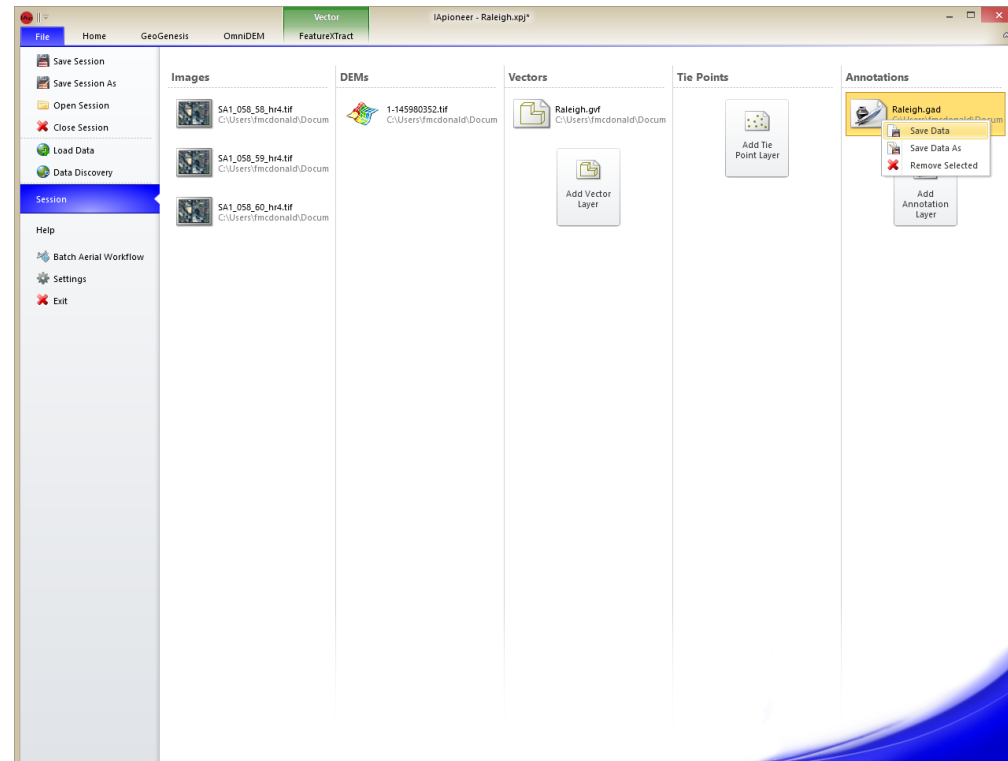
# Saving Annotations

Lets make sure that you don't lose your work.

Saving an annotation layer:

1. Left click the "File" tab to get to the backstage.
2. Left click the "Raleigh.gad\*" file to select it.
3. Right click the selected "Raleigh.gad\*" file to display the context menu.
4. Left click the [Save Data] menu item.

An asterisk should display on any files that have changes pending. The asterisk will disappear when the file is saved.





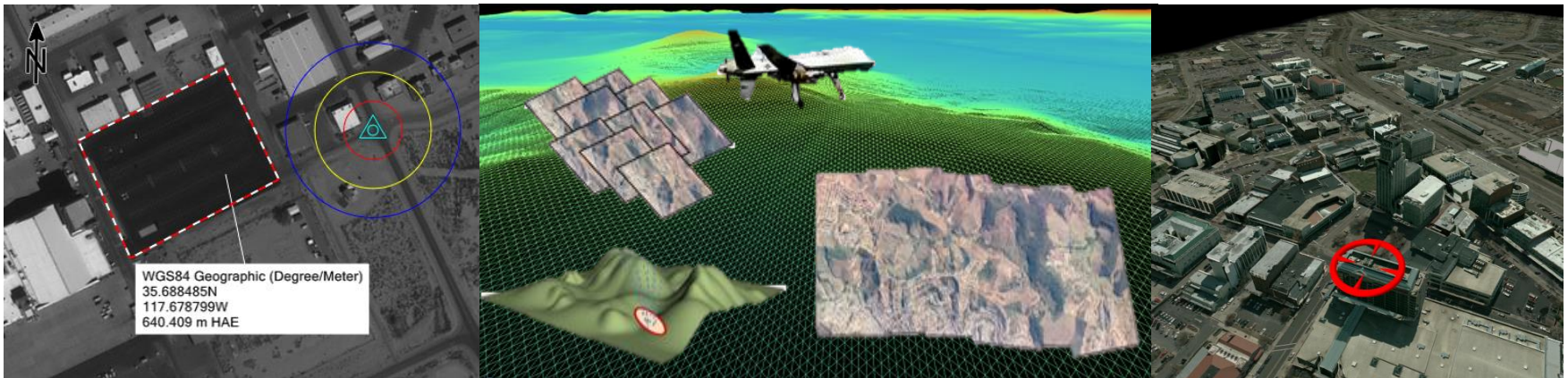
# Questions?







# Module 3: 3D Modeling





# Keyboard Controls

While not in active drawing mode

Key(s)	Behavior
CTRL	Activate the last used creation state.
CTRL+Z	Undo or reverse the actions.
CTRL+Y	Redo the actions.

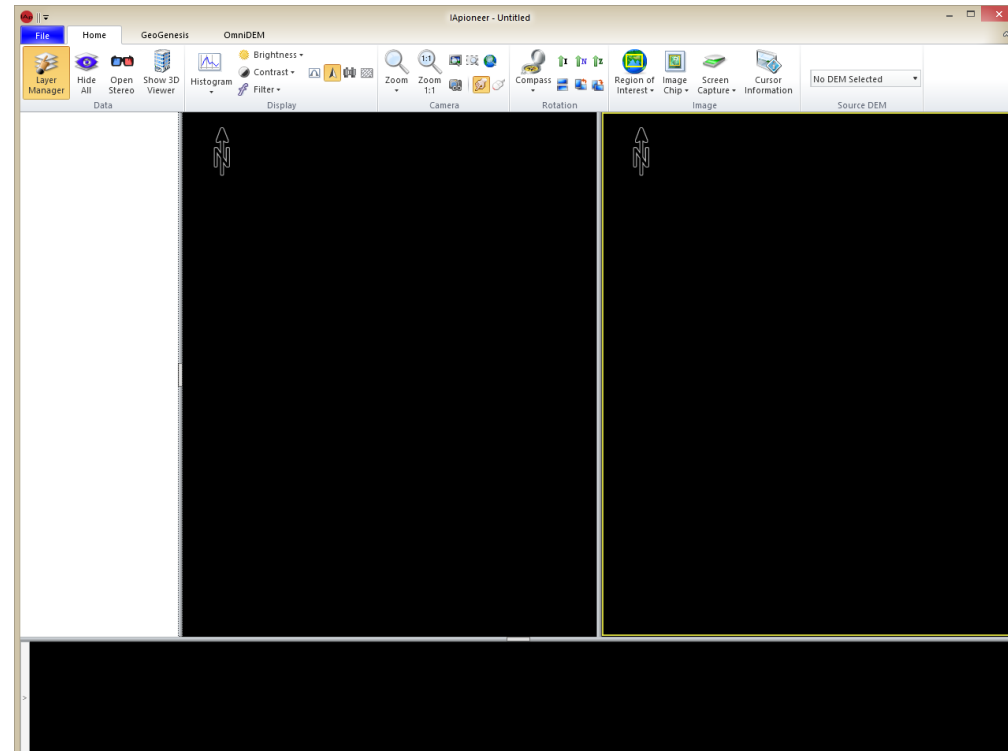
While in active drawing mode

Key(s)	Behavior
ESC	Cancel the current drawing without creating an object.
Backspace	Removes the last vertex placed in an object.
Shift	Initiate snapping when close to another object.



# Navigating to the backstage

Left click the “File” tab to navigate to the backstage.

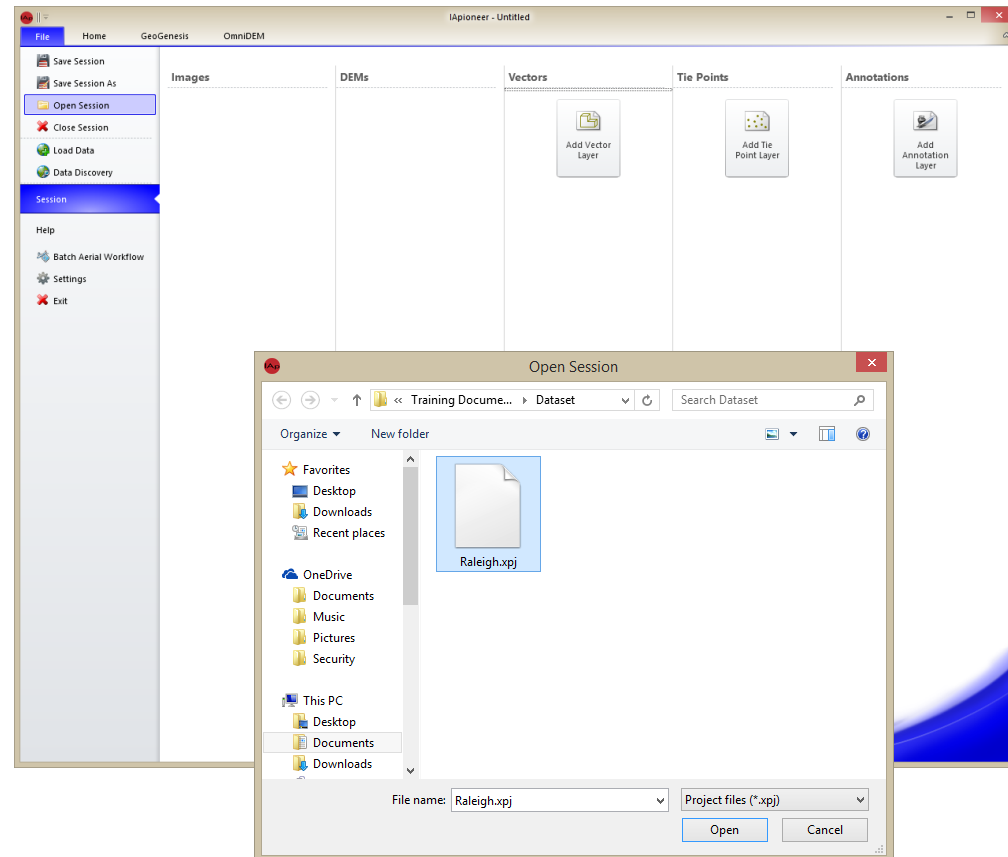


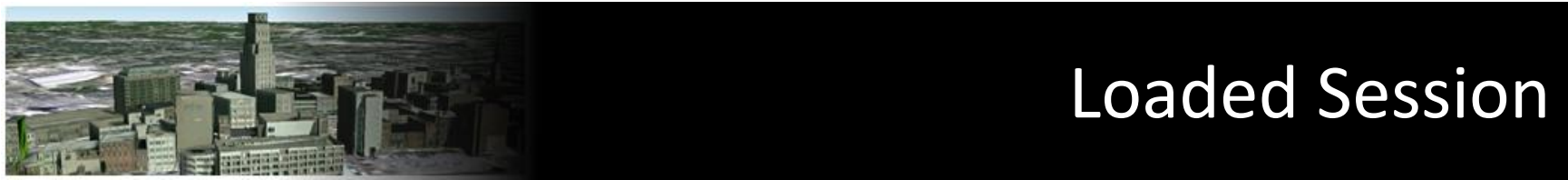


# Loading a Session

## Open Session:

1. Left click the [Open Session] button.
2. Left click the “Raleigh.xpj” file.
3. Left click the [Open] button.





The screenshot shows the IAVO software interface with the title bar 'Iapioneer - Raleigh.xpj\*'. The 'Vector' tab is active, and the 'FeatureXtract' sub-tab is selected. The interface is divided into several panes:

- File Menu:** Includes options like 'Save Session', 'Open Session', 'Close Session', 'Load Data', 'Data Discovery', 'Session', 'Help', 'Batch Aerial Workflow', 'Settings', and 'Exit'.
- Images Pane:** Contains three image files: 'SA1\_058\_58\_hr4.tif', 'SA1\_058\_59\_hr4.tif', and 'SA1\_058\_60\_hr4.tif', all located at 'C:\Users\fmcdonald\Docum'.
- DEMs Pane:** Contains one DEM file: '1-145980352.tif' at 'C:\Users\fmcdonald\Docum'.
- Vectors Pane:** Contains one vector file: 'Raleigh.grf' at 'C:\Users\fmcdonald\Docum'. Below it is an 'Add Vector Layer' button.
- Tie Points Pane:** Contains an 'Add Tie Point Layer' button.
- Annotations Pane:** Contains one annotation file: 'Raleigh.gad' at 'C:\Users\fmcdonald\Docum'. Below it is an 'Add Annotation Layer' button.



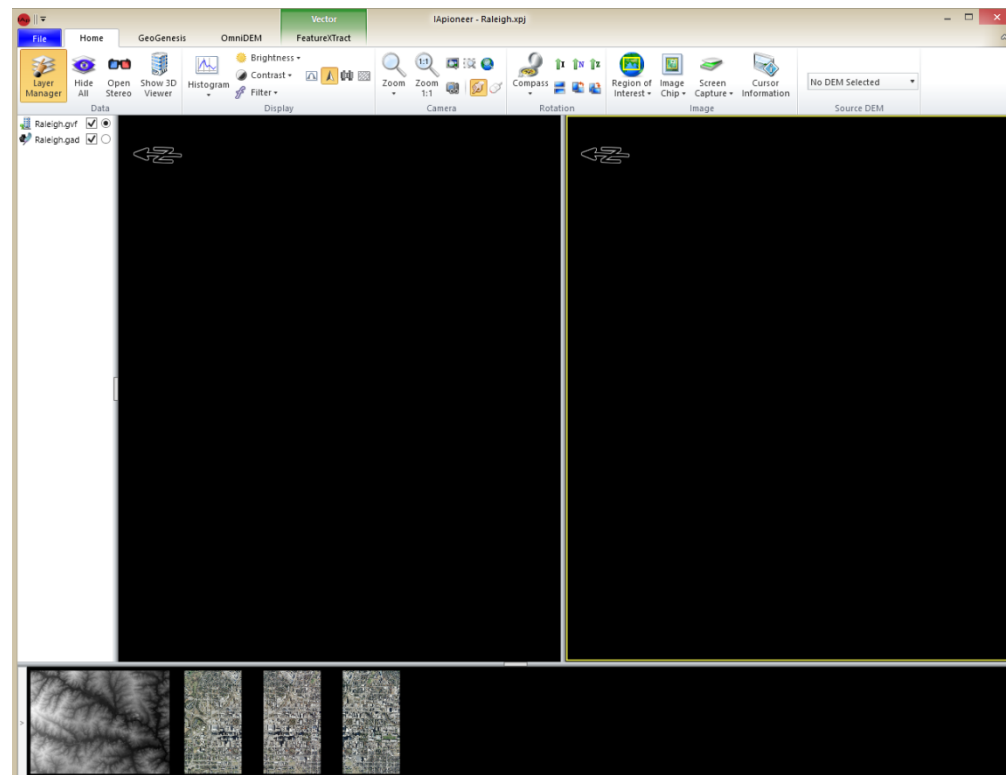
# Vector

You must select a vector layer (.gvf) to utilize the FeatureXtract functionality within IApioneer.

## Selecting the Vector Layer:

1. Left click the “Home” tab.
2. Left click the [Layer Manager] button to see all layers within the current session.
3. Select the option button to the right of the vector layer (.gvf) that you would like to edit.

The “Vector” Tab should display exposing the functionality to edit the active layer.



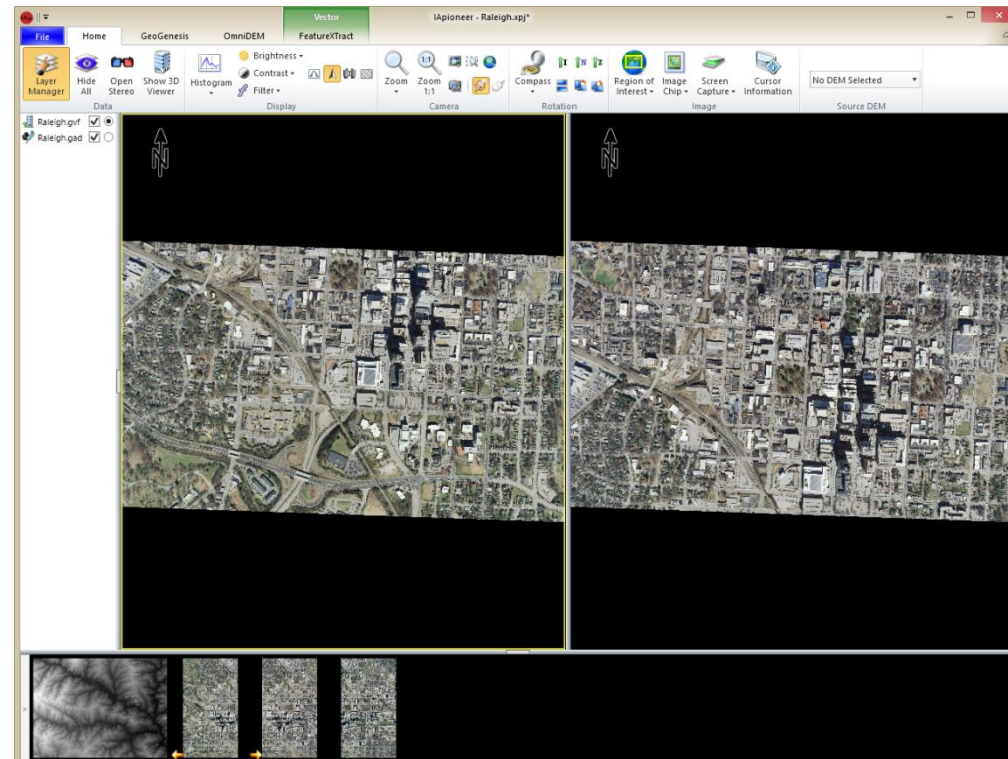


# Displaying an image in the viewer

Displaying an image into a viewer:

1. Mouse over an image, in the Image Gallery, to see the image name.
2. Right click image "SA1\_058\_58\_hr4.tif".
3. Select the [Send to Left Viewer] menu item.
4. Right click image "SA1\_058\_59\_hr4.tif".
5. Select the [Send to Right Viewer] menu item.

Note: notice the arrow to the left of the image in the image gallery. The arrow icon indicates which viewer the image is being displayed.





# Maximizing Your Workspace

## Hiding the Annotation Layer:

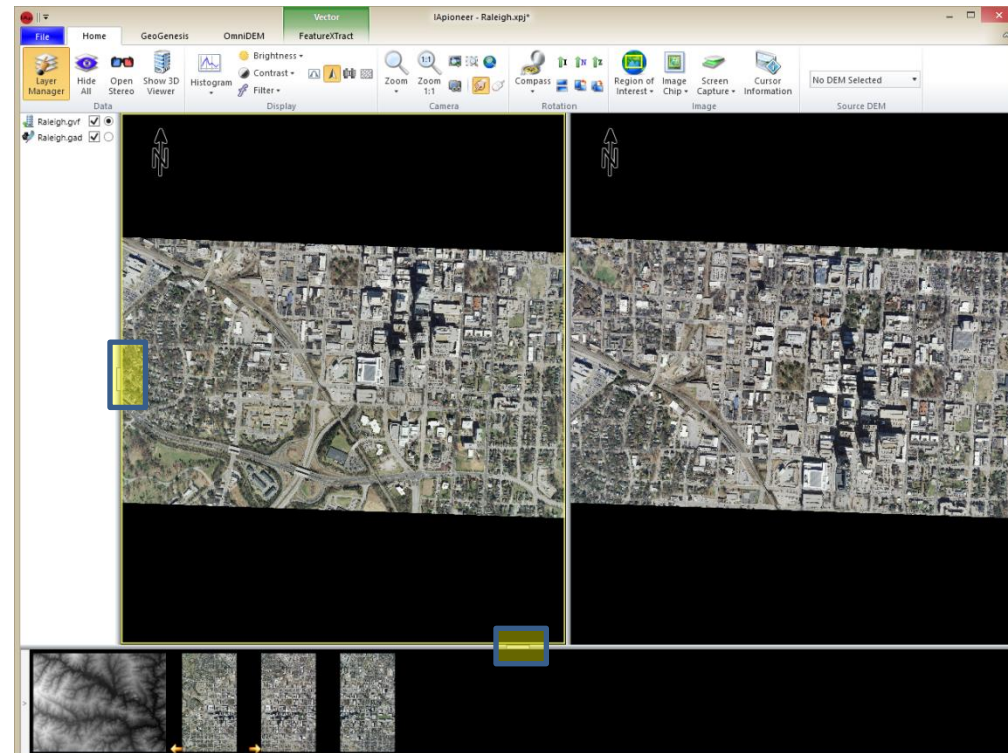
- Left click the checkbox to the right of the “Raleigh.gad”.

## Hiding the layer Manager:

- Left click the [Layer Manager] button.

## Hiding the image gallery:

- Left click the spacer between viewers and image gallery.





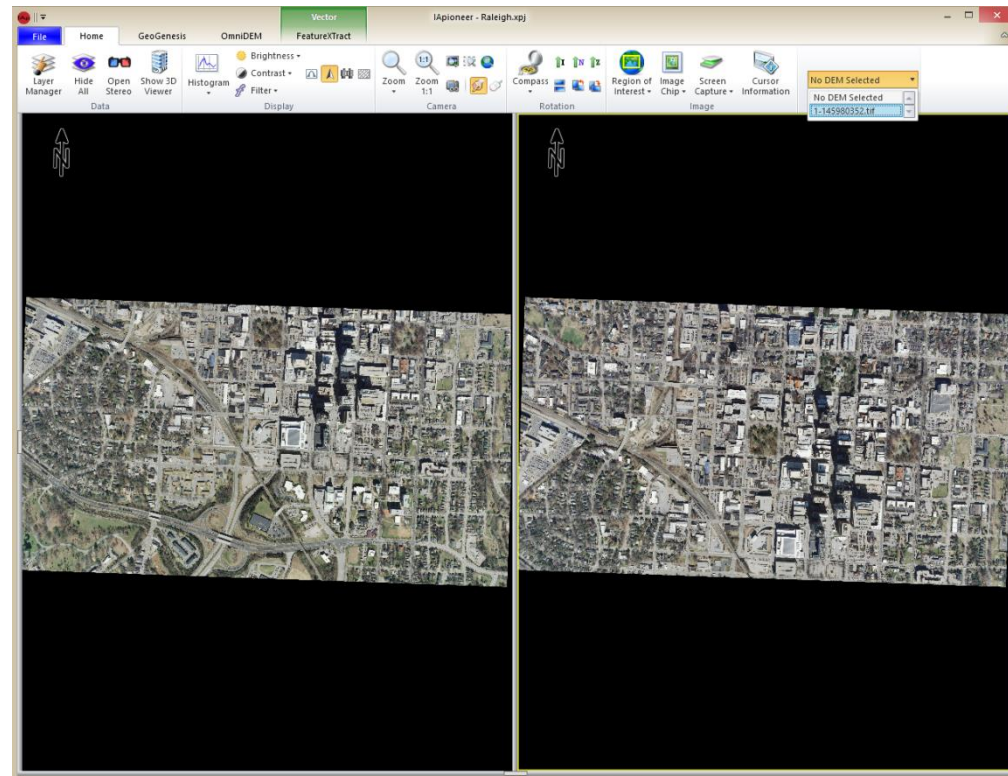


# Double check your source DEM

If you have a DEM use it. However, a DEM is not required for modeling within FeatureXtract.

Selecting a Source DEM:

1. Left click the “Home” tab.
2. Left click the source DEM dropdown.
3. Select the available DEM.



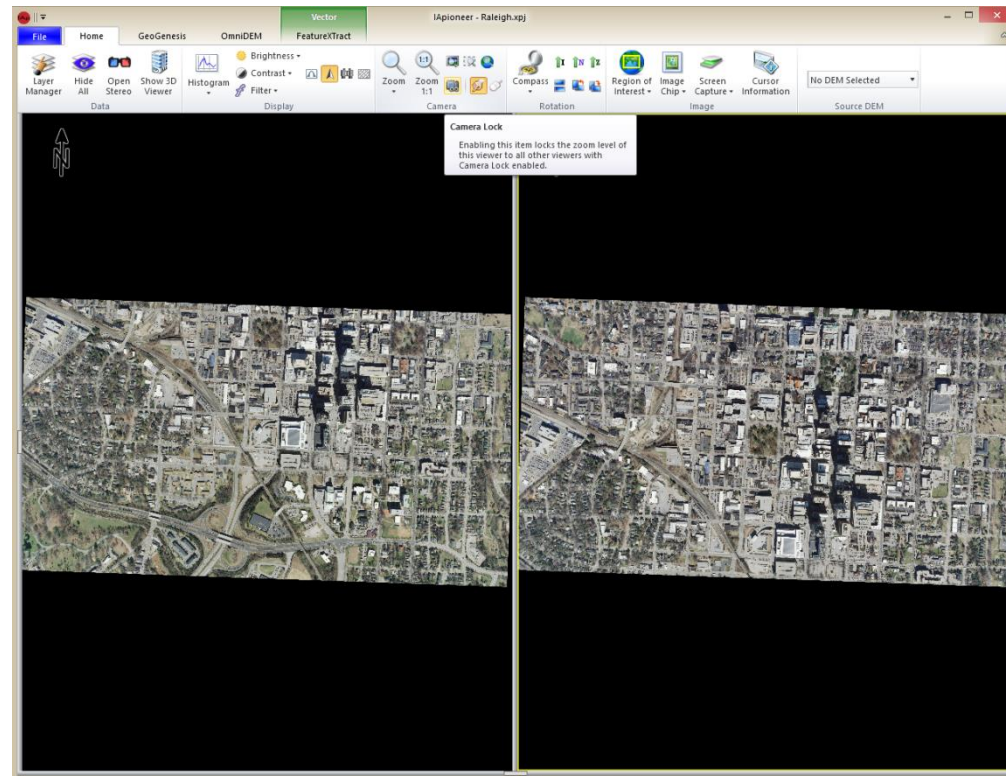


# Camera Locking

Camera locking is used to geographically link the viewers so that movement (pan and zoom) in one corresponds to movement in the other.

Locking the cameras:

- Left click the [Camera Lock] button.





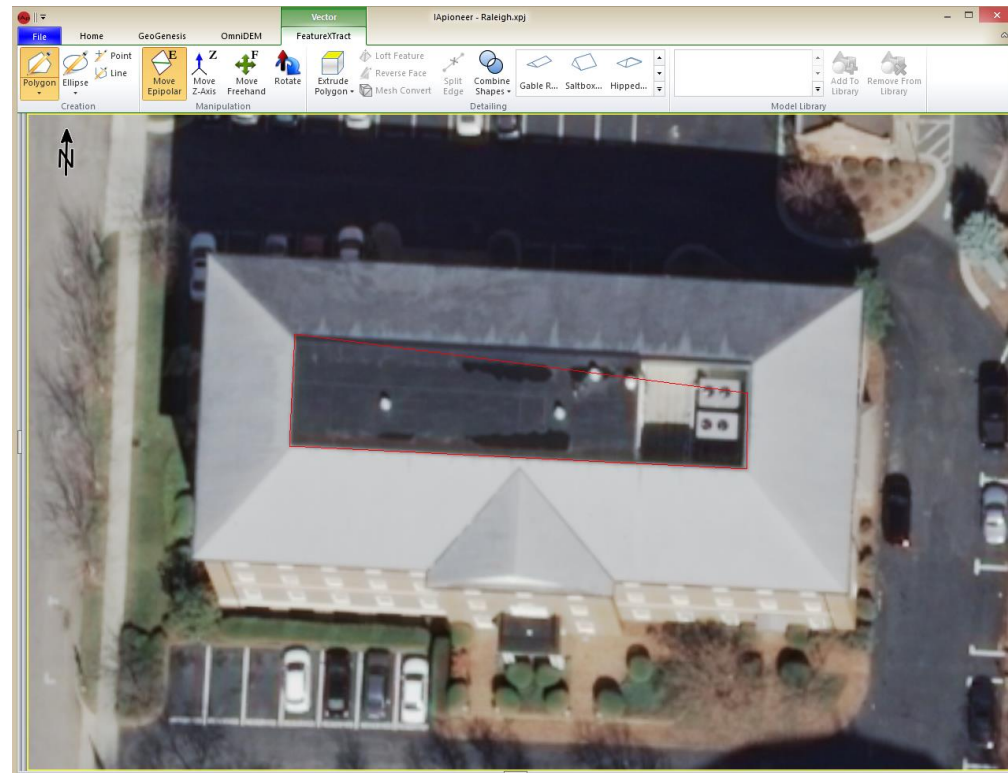
# Shape Creation (Draw Polygon Tool)

The draw polygon tool allows you to create a more complex polygon. Every point that defines that polygon will need to be pinned.

Create a polygon with the Draw Polygon tool:

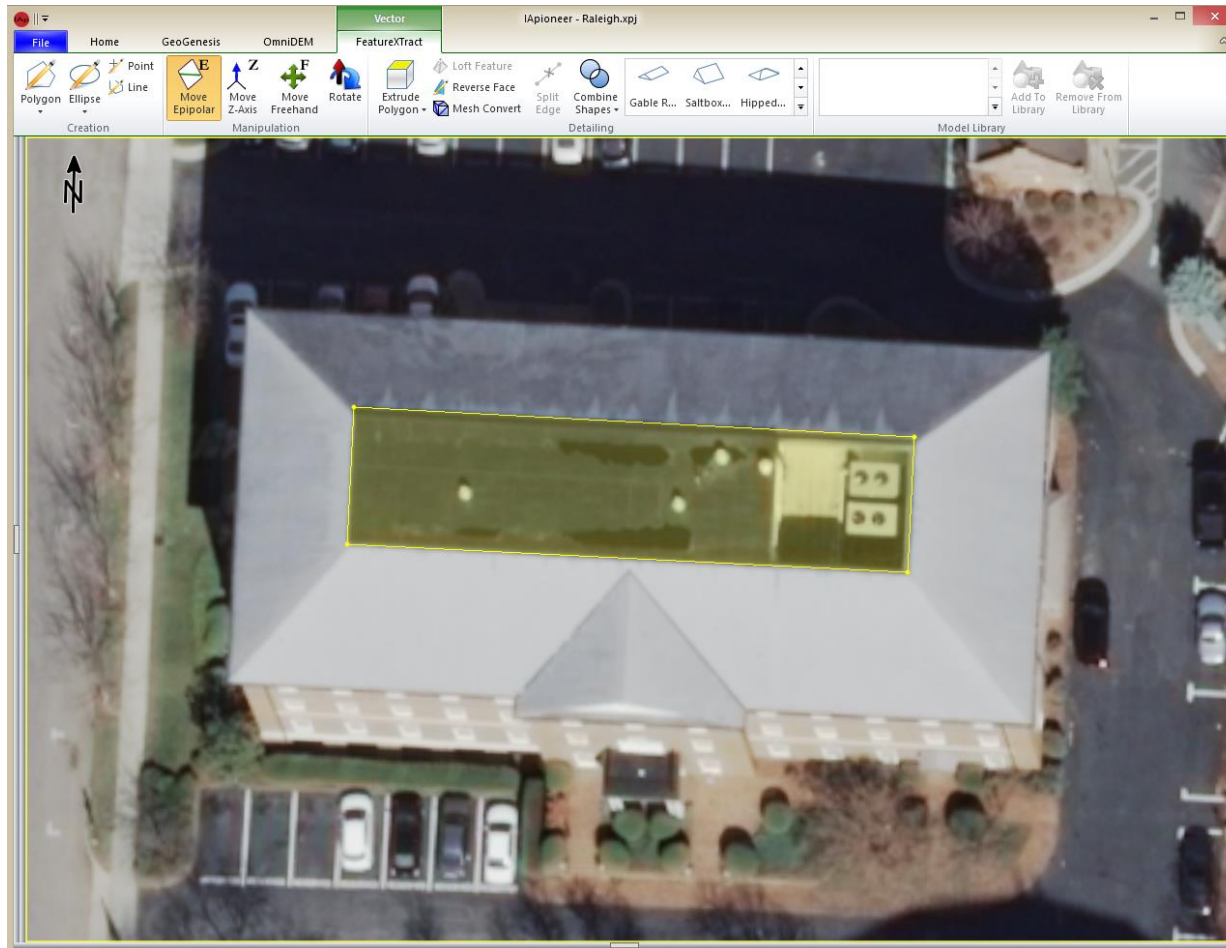
1. Left click the [Polygon] dropdown button.
2. Left click [Draw Polygon] to enable.
3. Left click in the upper-left corner of the polygon.
4. Left click in the lower-left corner of the polygon.
5. Left click in the lower-right corner of the polygon.
6. Left click in the upper-right corner of the polygon.
7. Right click in viewer to end drawing mode.

Note: notice the shape icon above the polygon dropdown button indicating the current drawing mode.





# Shape Creation Results (Draw Polygon Tool)





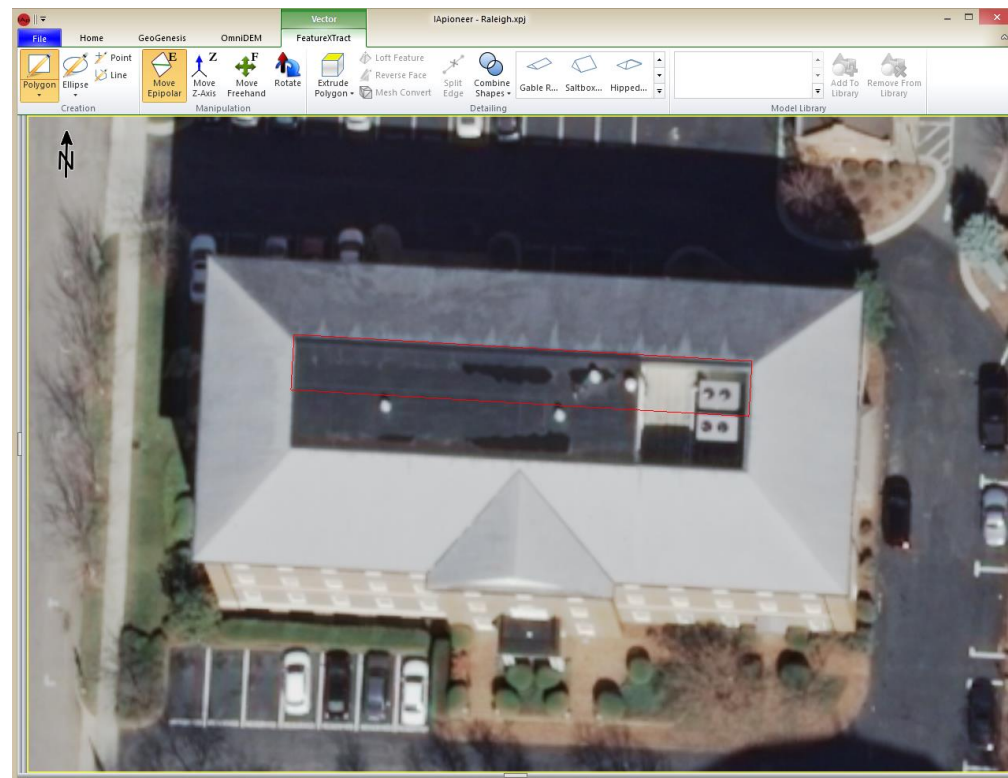
# Shape Creation (Draw Box Tool)

The draw box tool is used to create a rectilinear polygon. Every polygon edge meets at a right angle.

Create a polygon with the Draw Box tool:

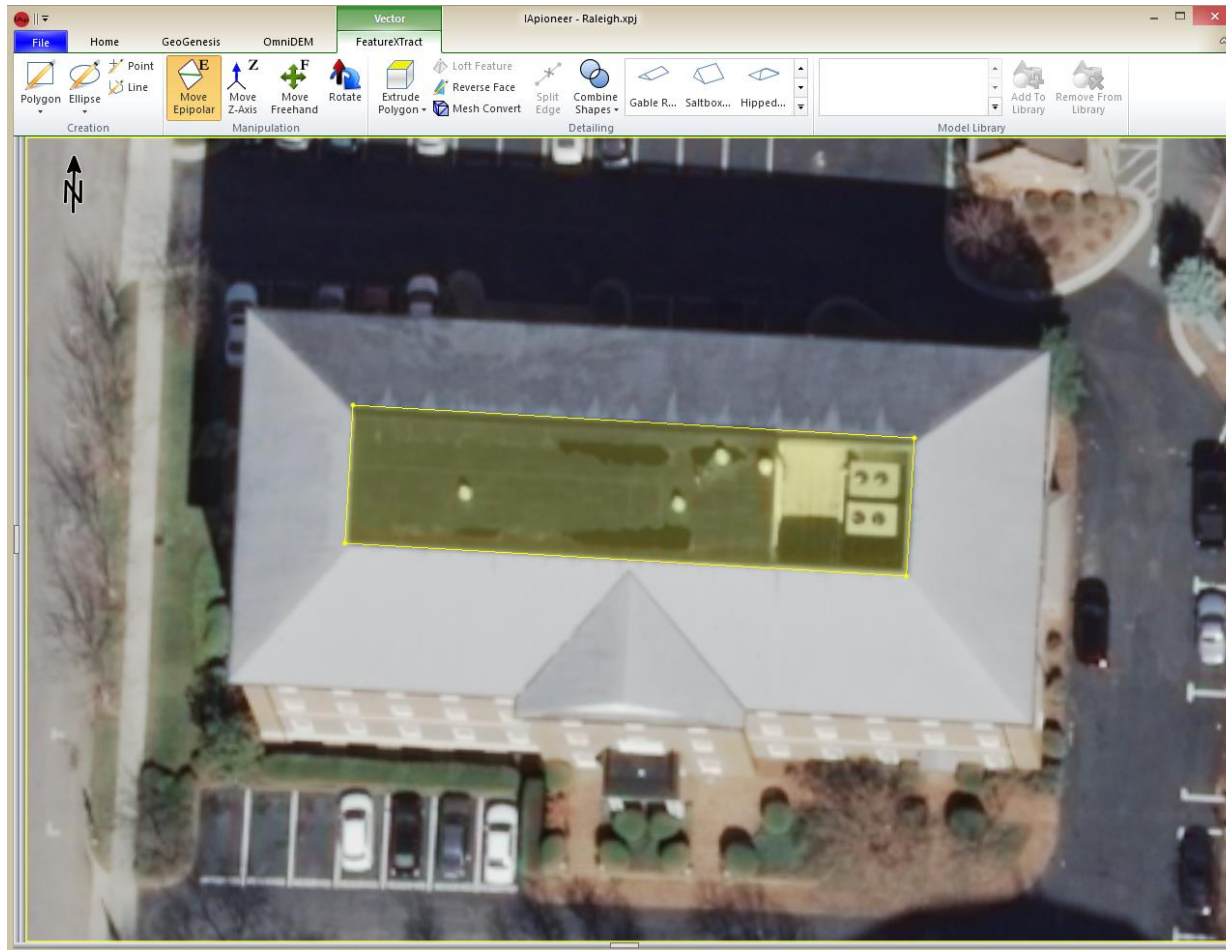
1. Left click the [Polygon] dropdown button.
2. Left click [Draw Box] to enable.
3. Left click in the upper-left corner of the polygon.
4. Left click in the upper-right corner of the polygon.
5. Left click in the lower-right corner of the polygon.
6. Right click in the viewer to end drawing mode.

Note: notice the shape icon above the polygon dropdown button indicating the current drawing mode.





# Shape Creation Results (Draw Box Tool)





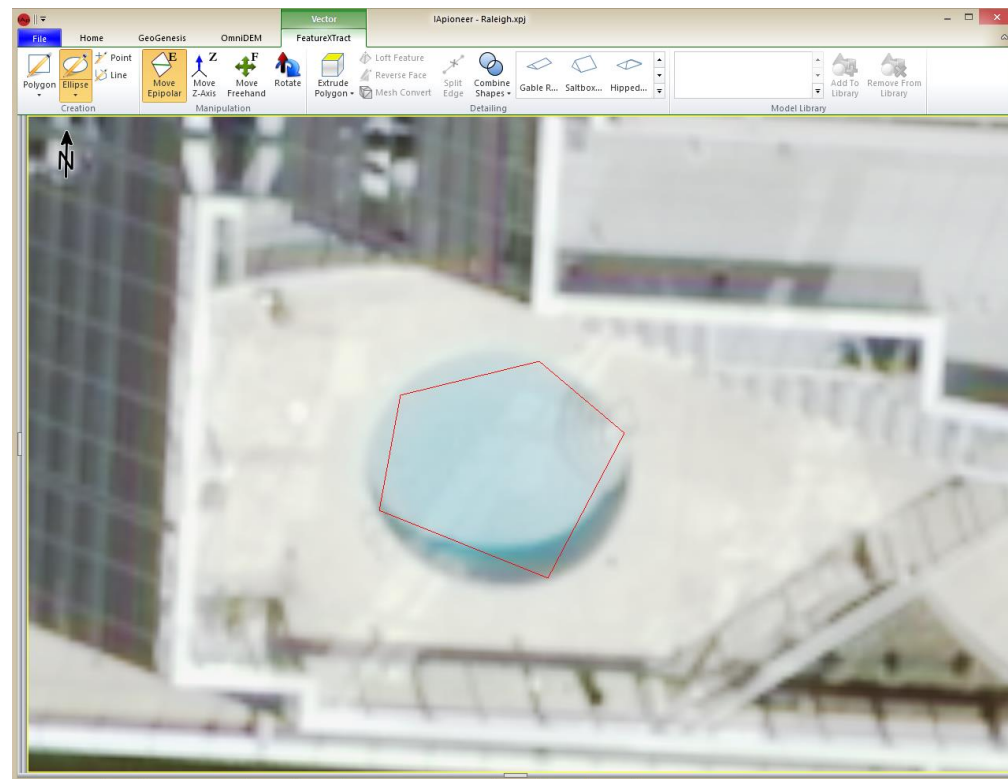
# Shape Creation (Draw Ellipse Tool)

The draw ellipse tool is used to create an Ellipse. Five points are required to construct an ellipse.

Create an Ellipse with the Draw Ellipse tool:

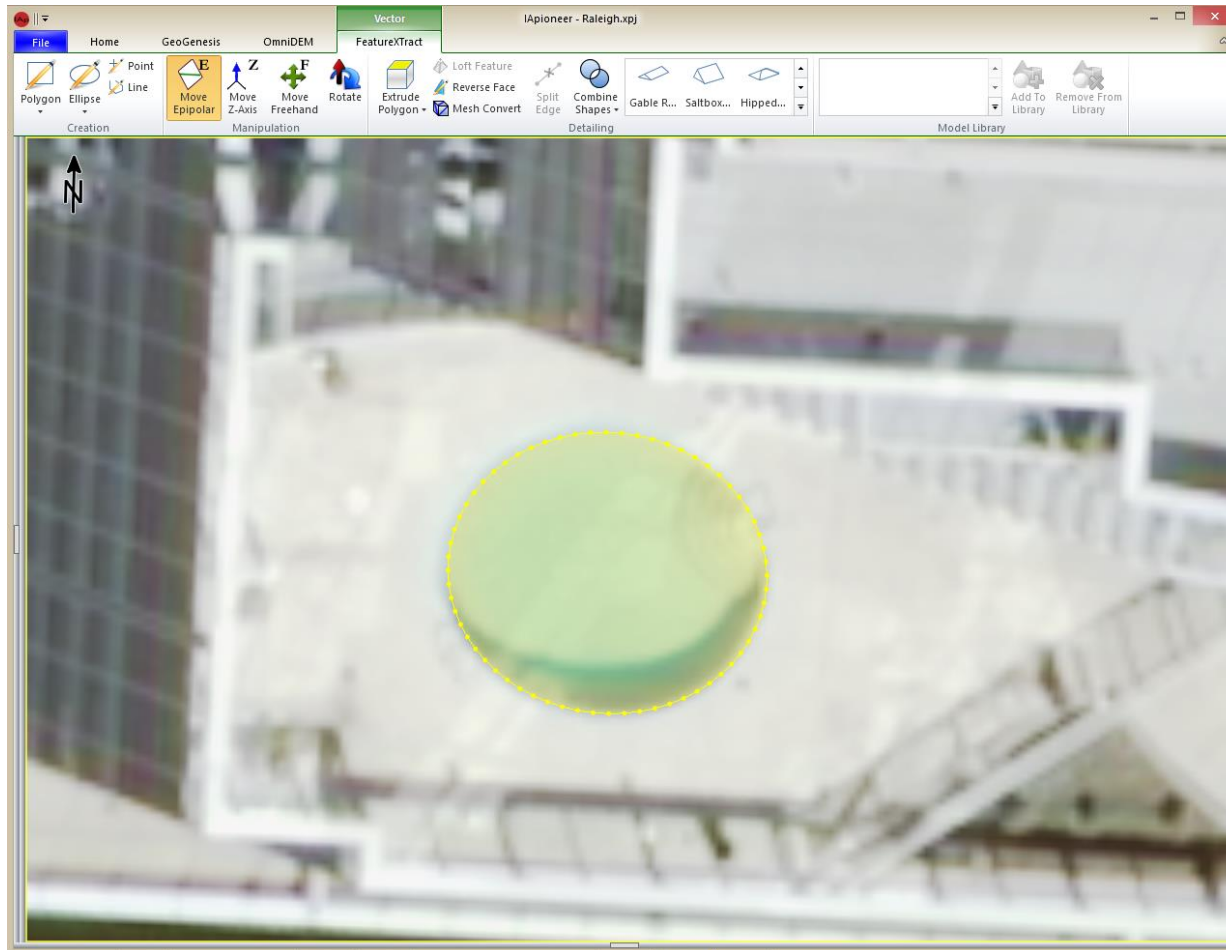
1. Left click the [Ellipse] dropdown button.
2. Left click [Draw Ellipse] to enable.
3. Left click on the perimeter of the ellipse.
4. Repeat step 3 four times.

Note: notice the shape icon above the Ellipse dropdown button indicating the current drawing mode.

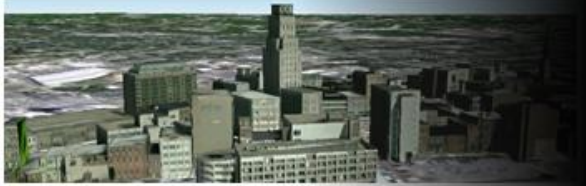




# Shape Creation Results (Draw Ellipse Tool)







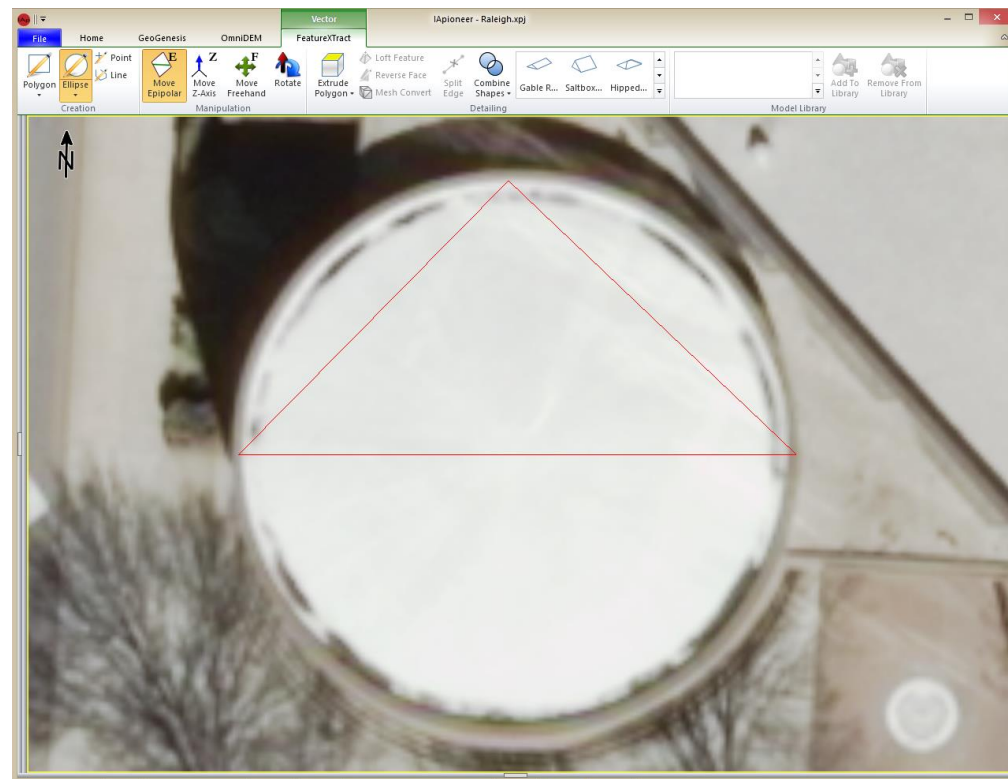
# Shape Creation (Draw Circle Tool)

The draw circle tool is used to create a circle. Three points are required to construct a circle.

Create a Circle with the Draw Circle tool:

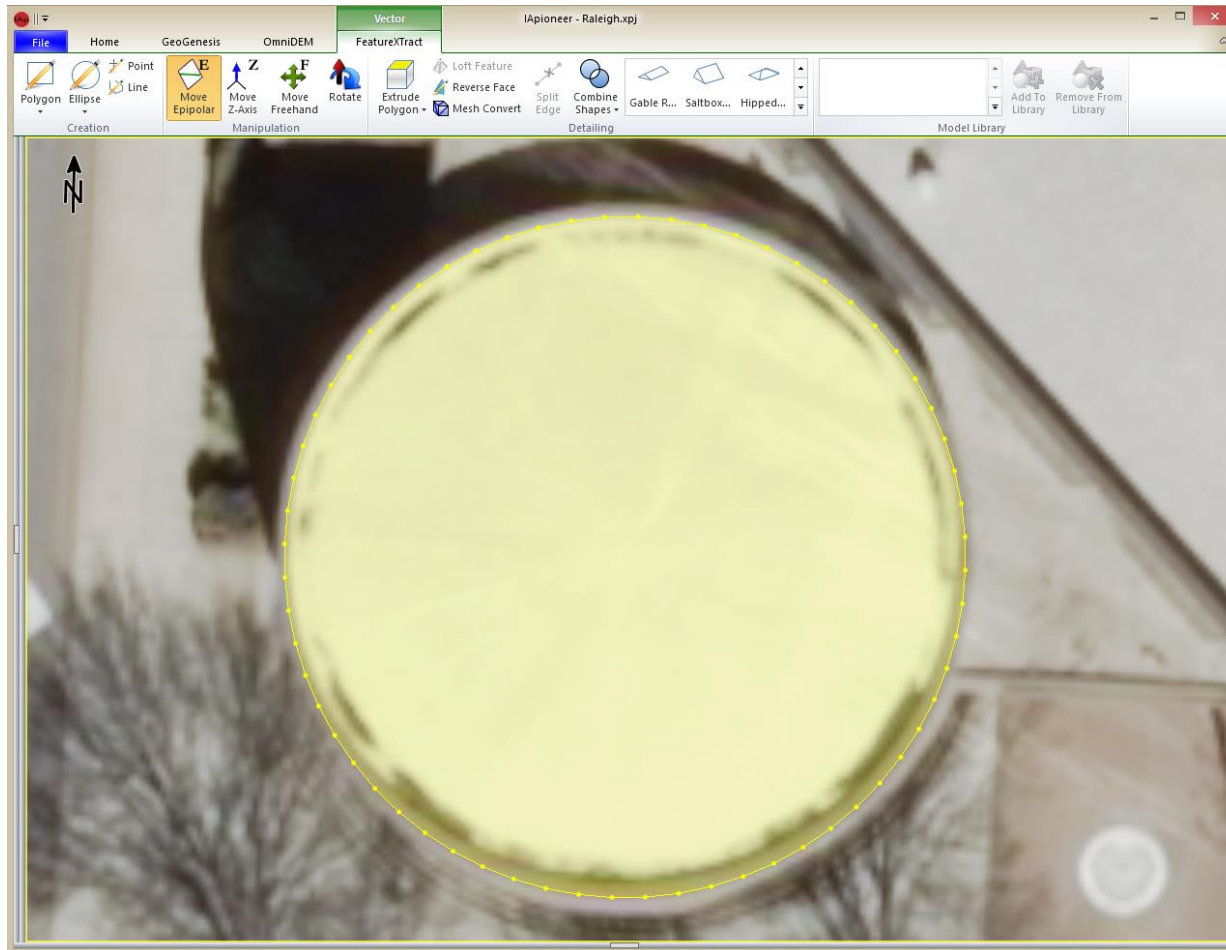
1. Left click the [Ellipse] dropdown button.
2. Left click [Draw Circle] to enable.
3. Left click on the perimeter of the ellipse.
4. Repeat step 3 two times.

Note: notice the shape icon above the Ellipse dropdown button indicating the current drawing mode.





# Shape Creation Results (Draw Circle Tool)



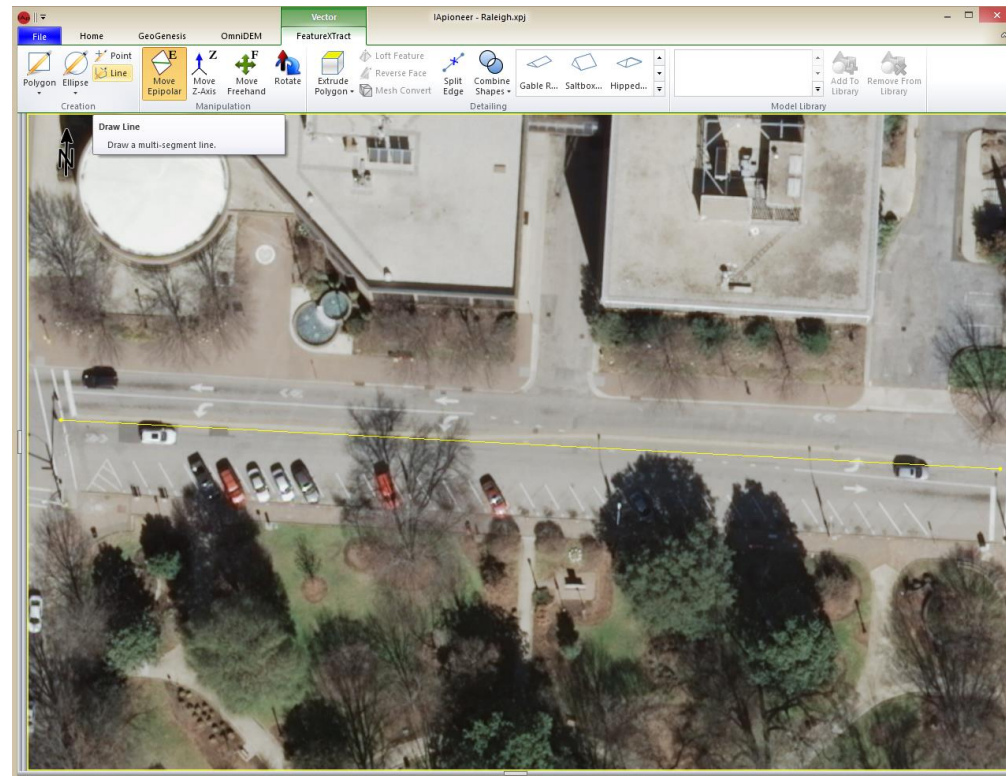


# Shape Creation (Line Tool)

The line tool is used to create a multi-segment line.

Create a Line with the Line tool:

1. Left click the [Line] button.
2. Left click the start of the line.
3. Left click the end of the line.
4. Right click to end drawing mode.



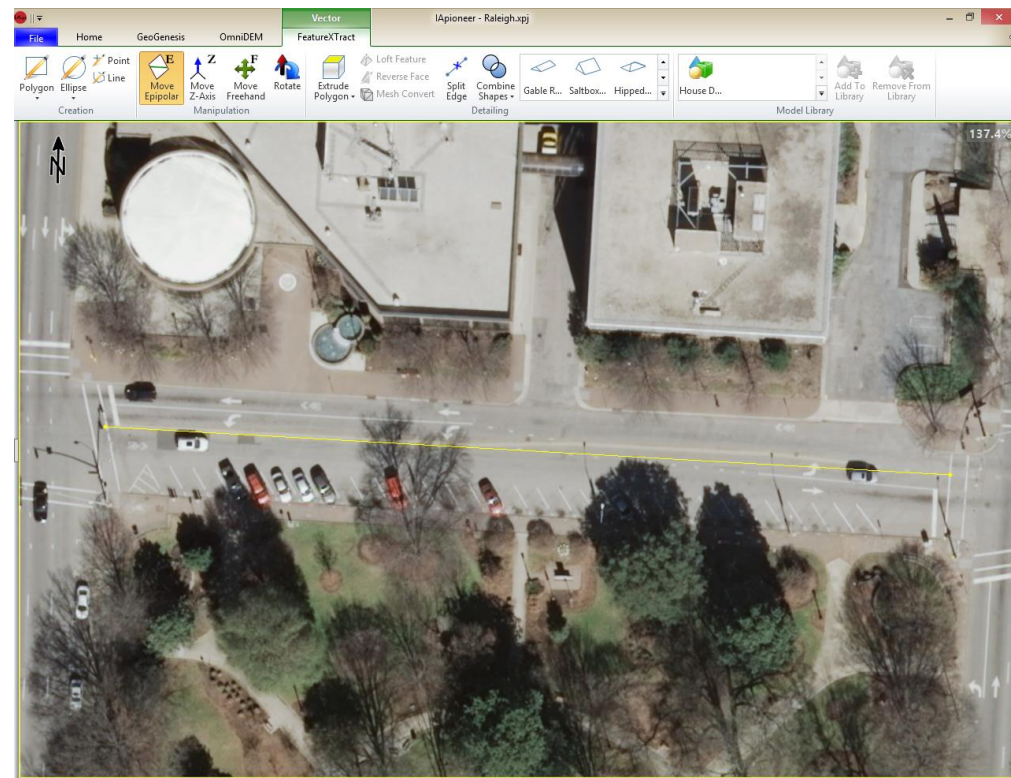


# Split Edge Tool

Splits the currently selected edge by adding a vertex at the midpoint of the edge.

Split line:

1. Left click the line segment that you would like to split.
2. Left click the [Split Edge] button.

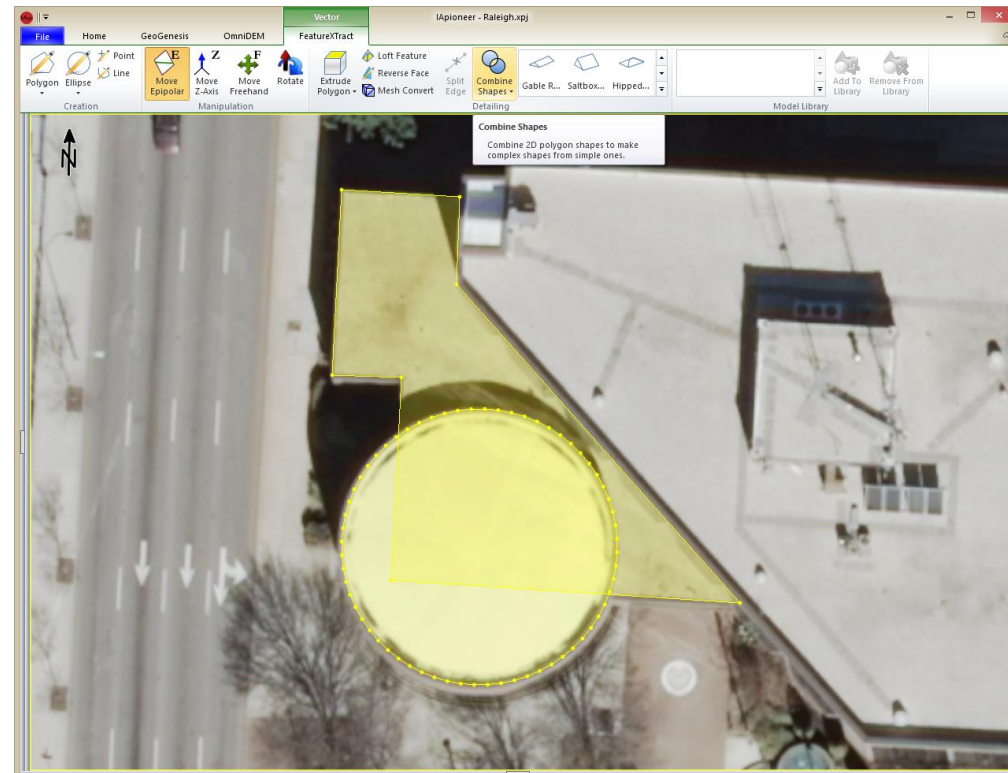




# Combining Shapes (Union)

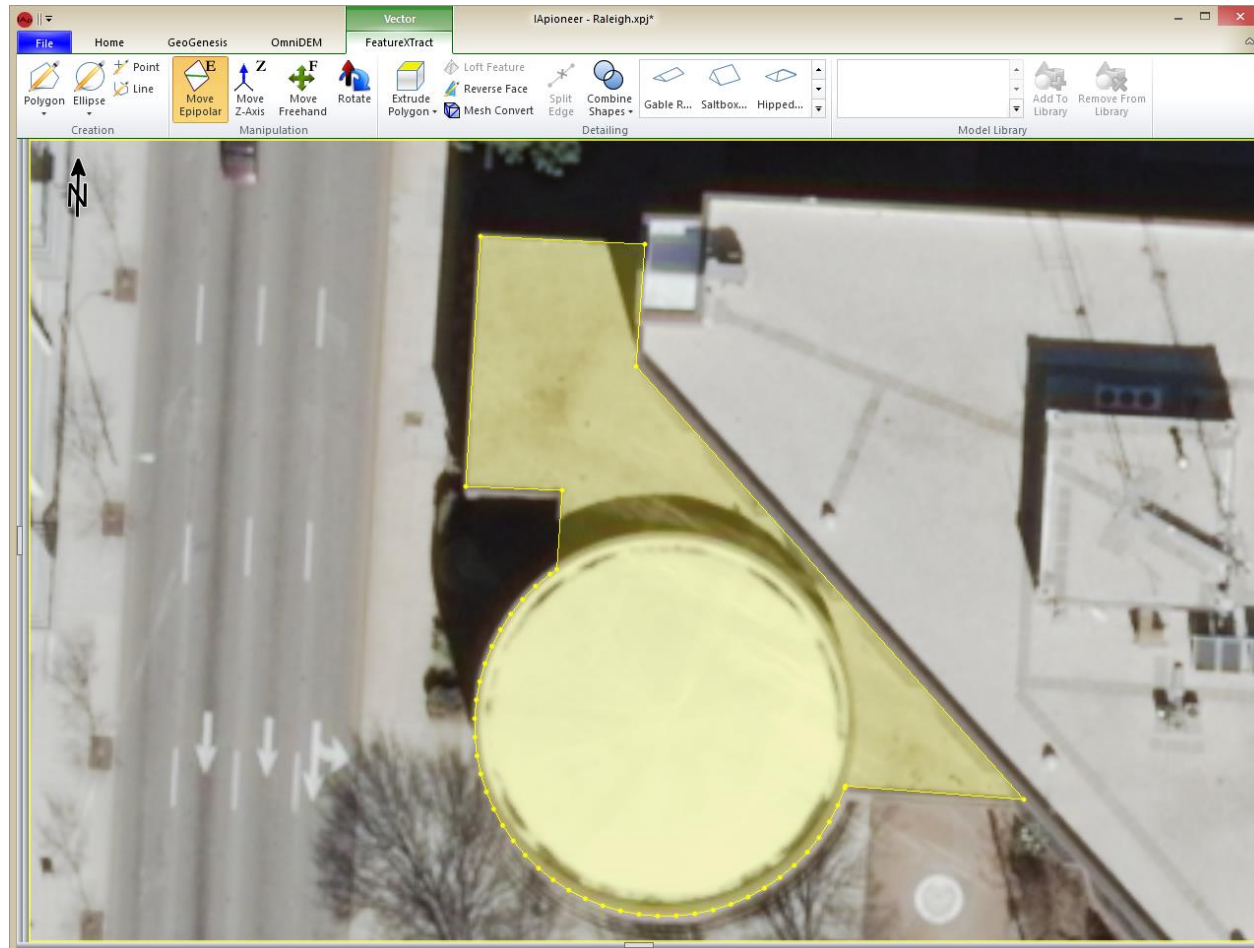
Union shapes:

1. Left click inside the boundaries of the first shape you would like to combine.
2. Hold the down shift key and left click the second shape you would like to join.
3. Left click the [Combined Shapes] button.
4. Left click the [Union] button.





# Combining Shapes Results (Union)



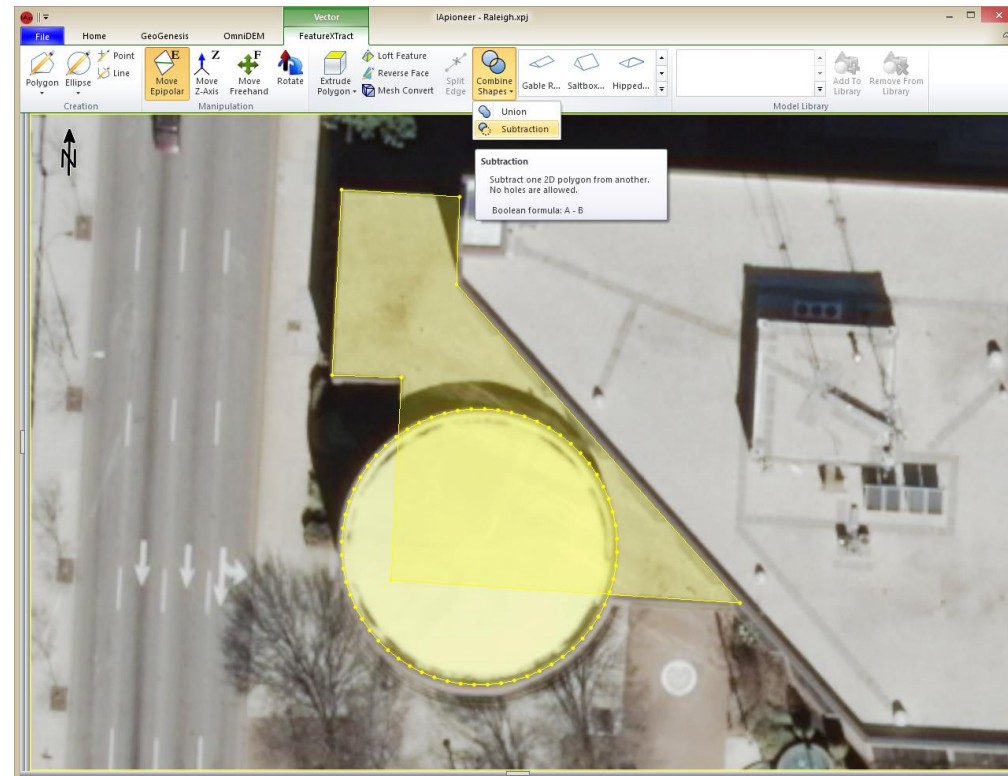


# Combining Shapes (Subtraction)

Ordering is Key! The polygon is the shape we want to alter and keep. The circle is going to be used to cut into the polygon.

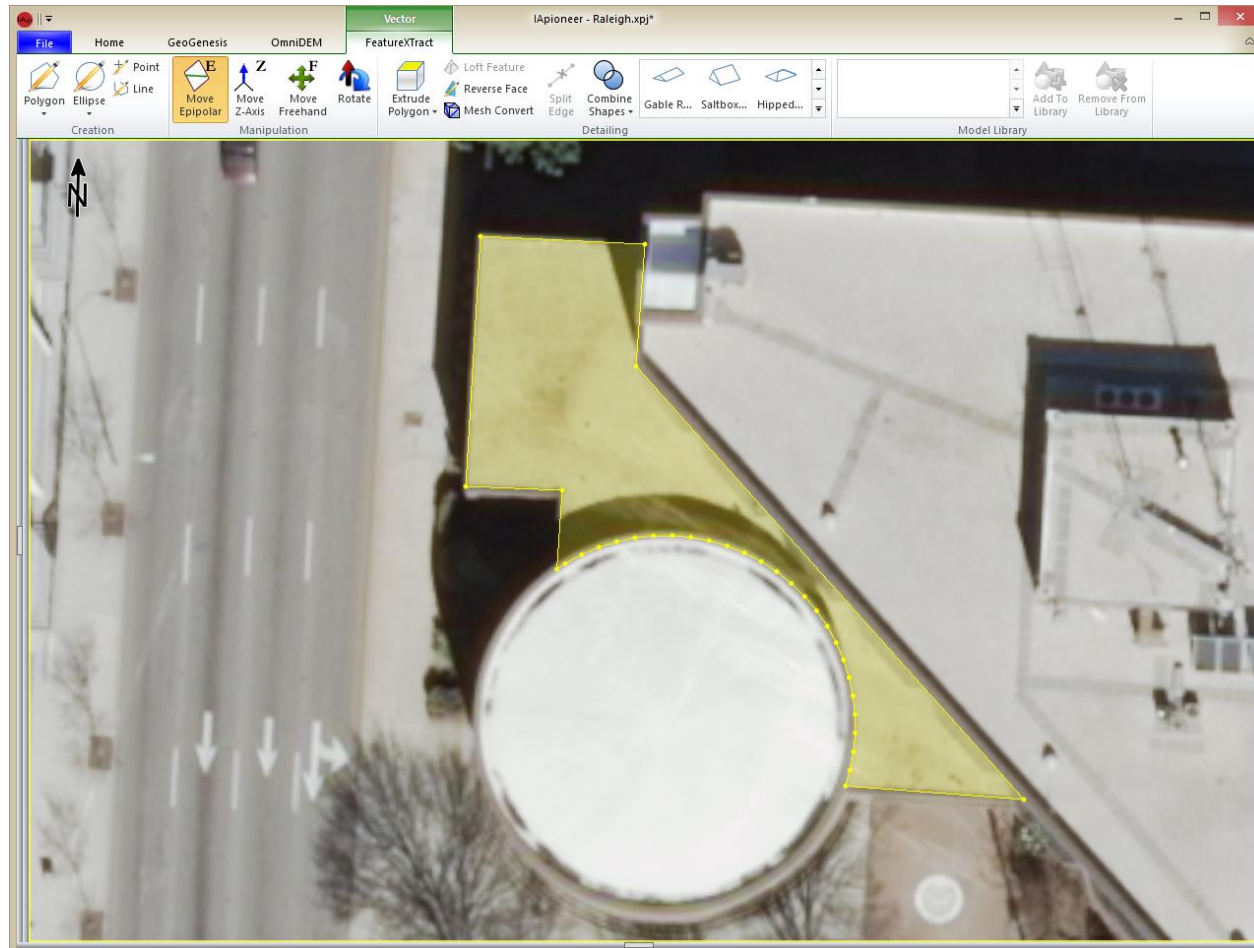
Subtracting shapes:

1. Left click inside the boundaries of the polygon.
2. Hold down the shift key and left click the circle then release the shift key.
3. Left click the [Combined Shapes] button.
4. Left click the [Subtract] button.





# Combining Shapes Results (Subtraction)





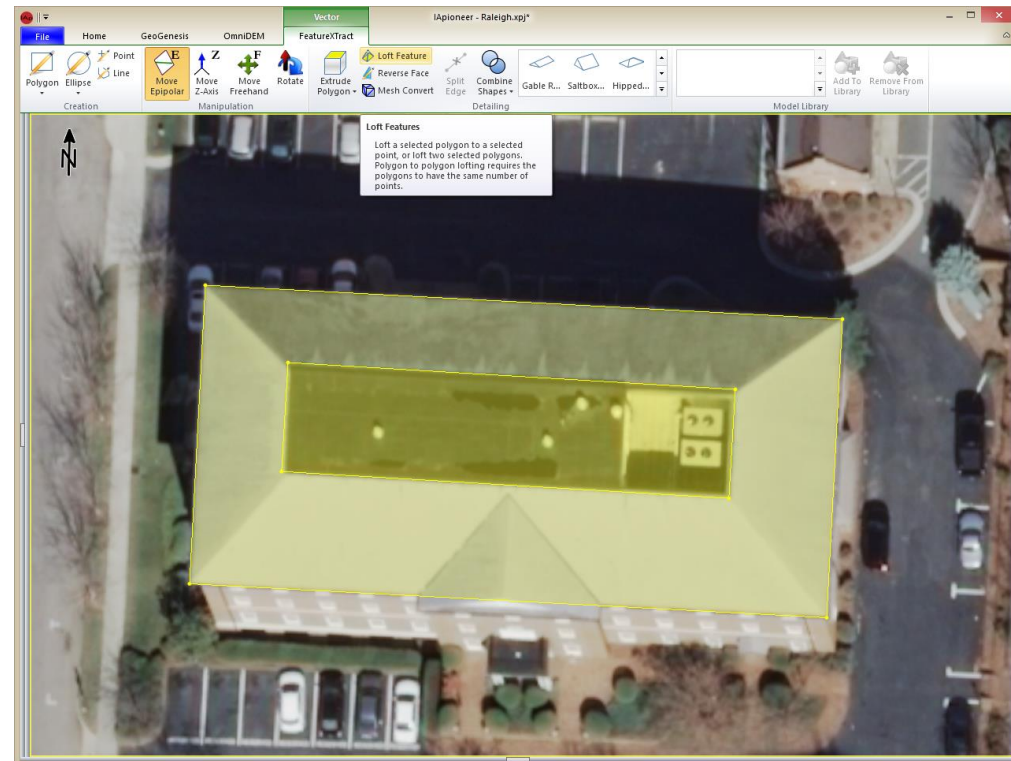


# Loft Feature

Loft a selected polygon to a selected point, or loft two selected polygons. Polygon to polygon requires the same number of points.

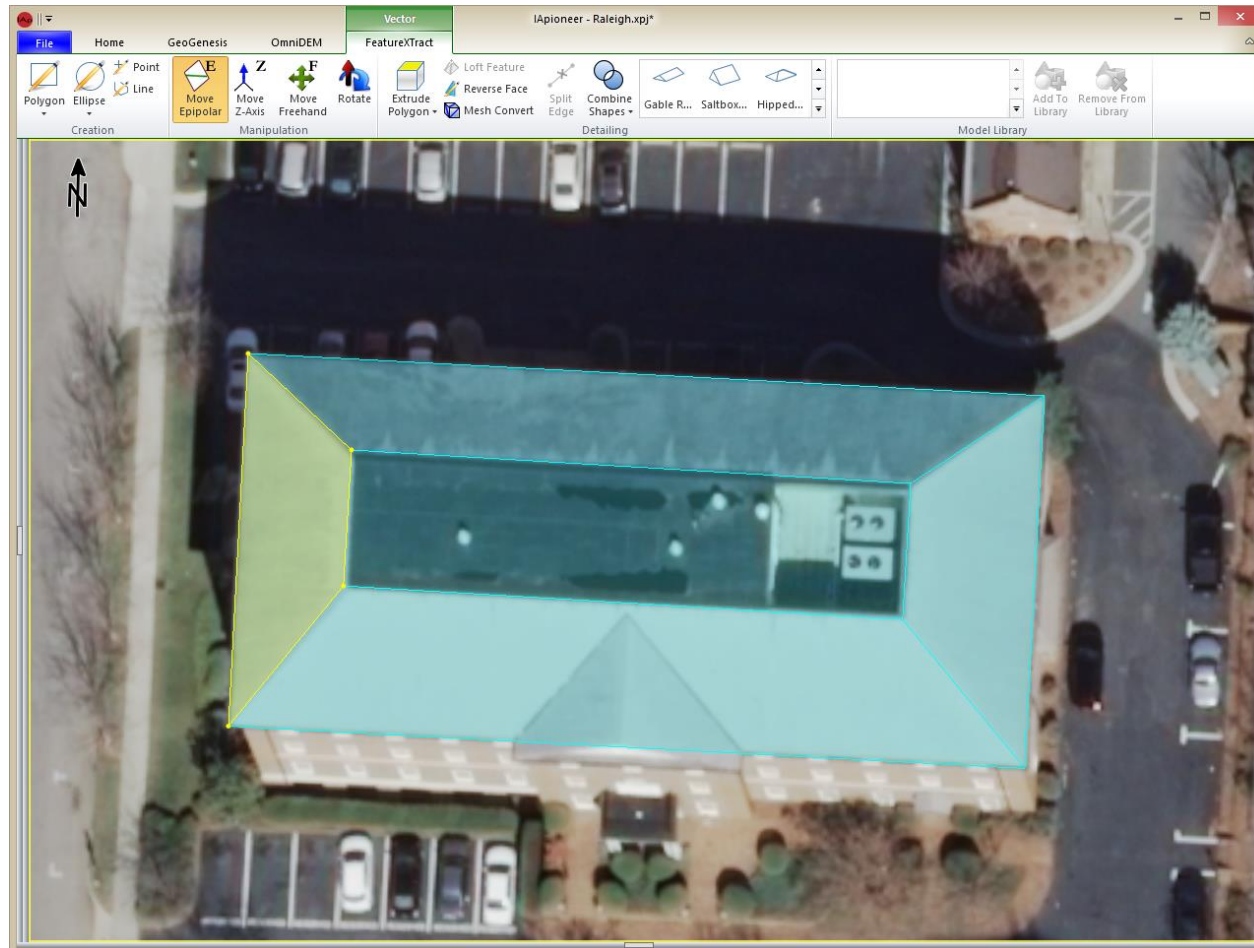
Polygon to Polygon:

1. Select both polygons with the selection box.
2. Left click the [Loft Feature] button.





# Loft Results

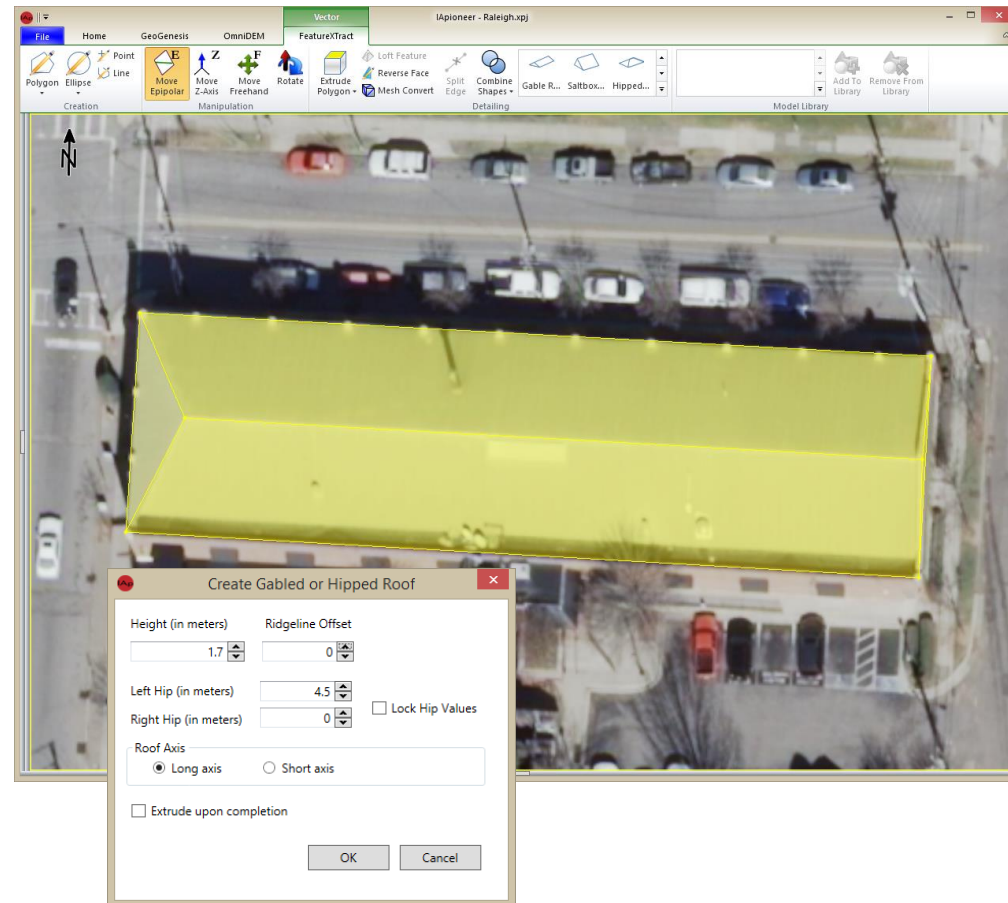




# Hipped Roof

Creating a hipped roof:

1. Create a polygon outlining the roof.
2. Left click the polygon to select it.
3. Left click the [Hipped Roof] button.
4. Provide the Hipped roof parameters:
  - Height: **1.7**
  - Ridgeline Offset: **0**
  - Lock Hip Values: **Unchecked**
  - Left Hip: **4.5**
  - Right Hip: **0**
  - Roof Axis: **Long Axis**
5. Left click the [OK] button to create the roof.

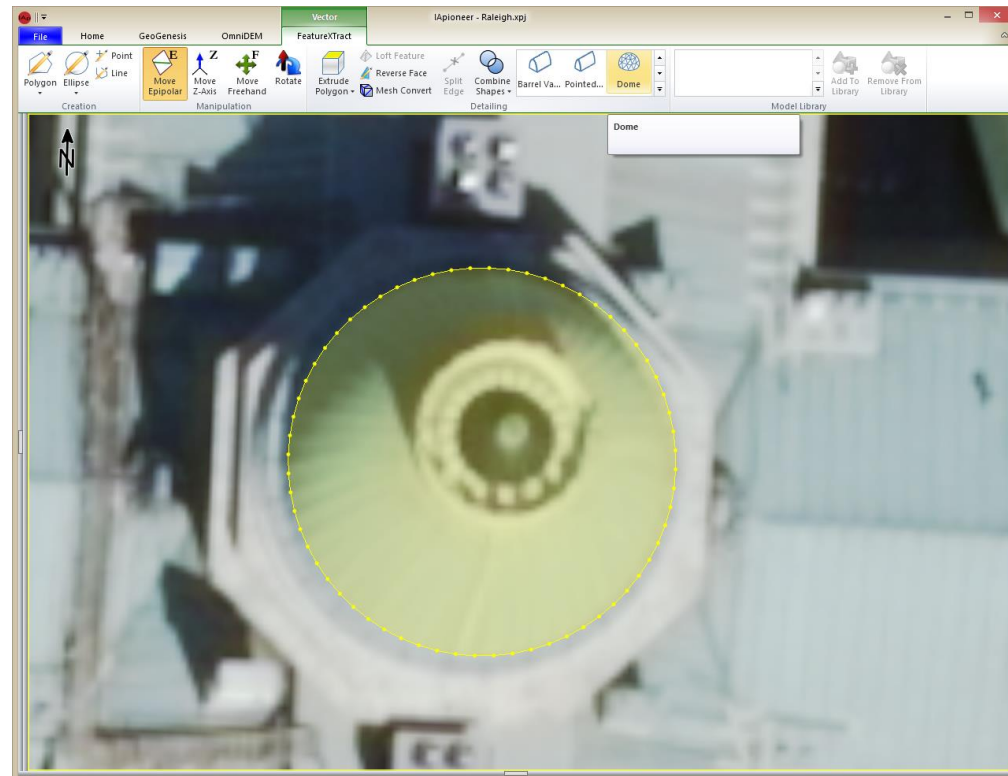




# Domed Roof

## Domed Roof

1. Left click the [Ellipse] dropdown button.
2. Left click [Draw Circle].
3. Left click a point on the image circle object boundaries.
4. Left click another point on the image circle object boundaries.
5. Left click another point on the image circle object boundaries.
6. Left click within the circle boundaries to select the circle.
7. Left click the [Dome] button from within the roof window.

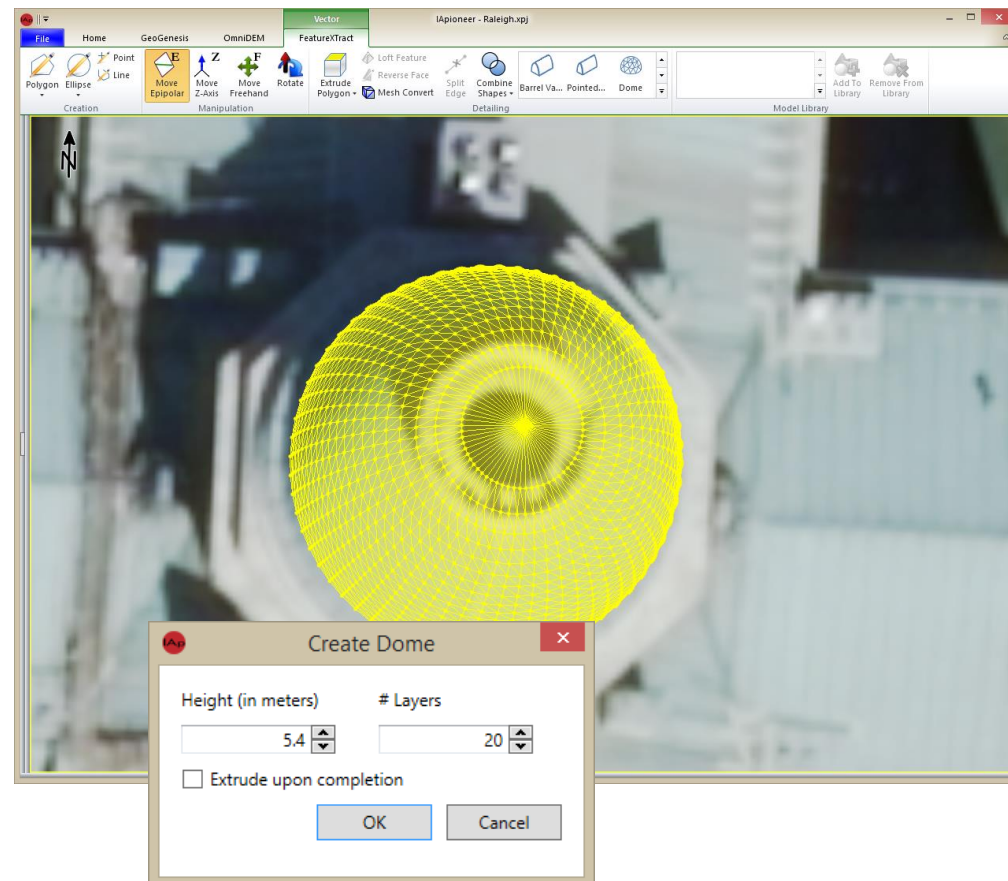




# Domed Roof Continued

## Create Dome:

1. Input the height **5.4**.
2. Input the number of layers **20**.
3. Left click the [OK] button.





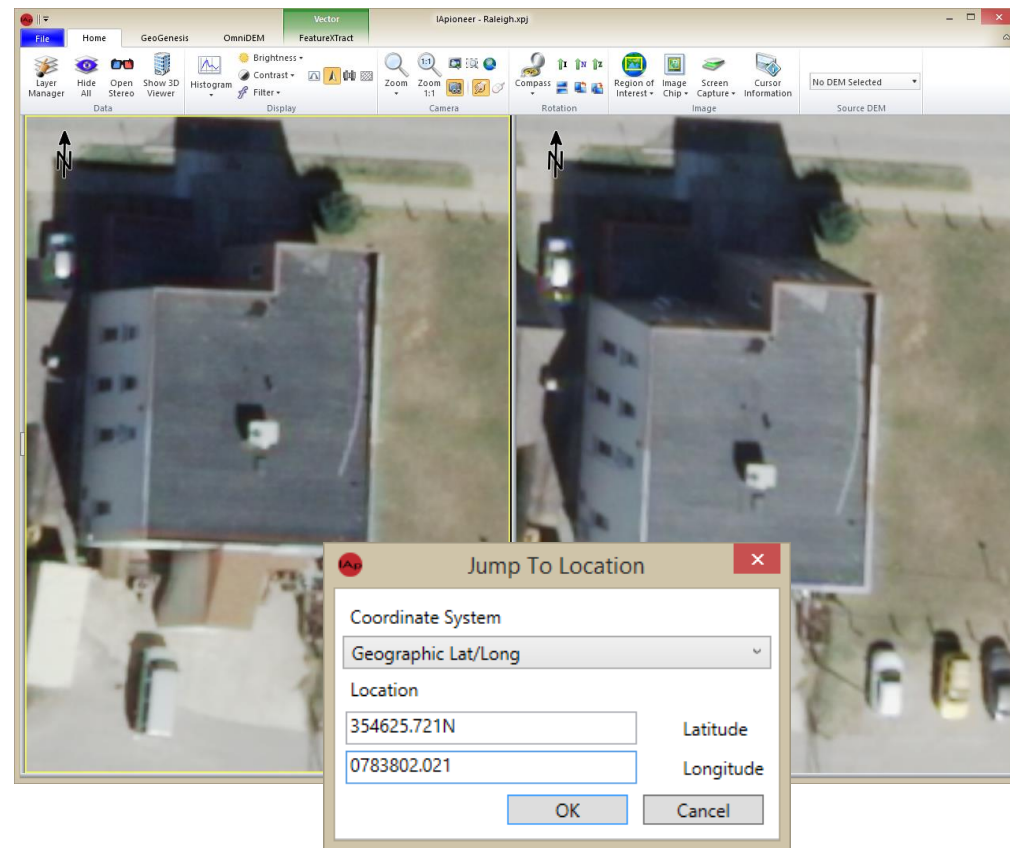
# Jumping to Location

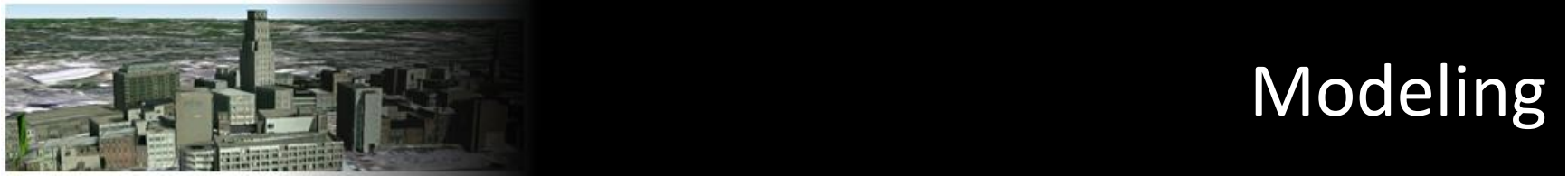
This tool will reposition the camera to a point within the viewer. Use this tool if you know the coordinates of the object that you are going to model.

Jump to Location:

1. Left click the [Jump to Location] button.
2. Left click the coordinate system and select **“Geographical Lat/Long”**.
3. Enter the latitude **“354625.721N”**.
4. Enter the longitude **“0783802.021W”**.
5. Left click the [OK] button.
6. Forward Mouse wheel to zoom to the object.

Note: make sure the input format of the Lat/Long matches the format of your coordinates.



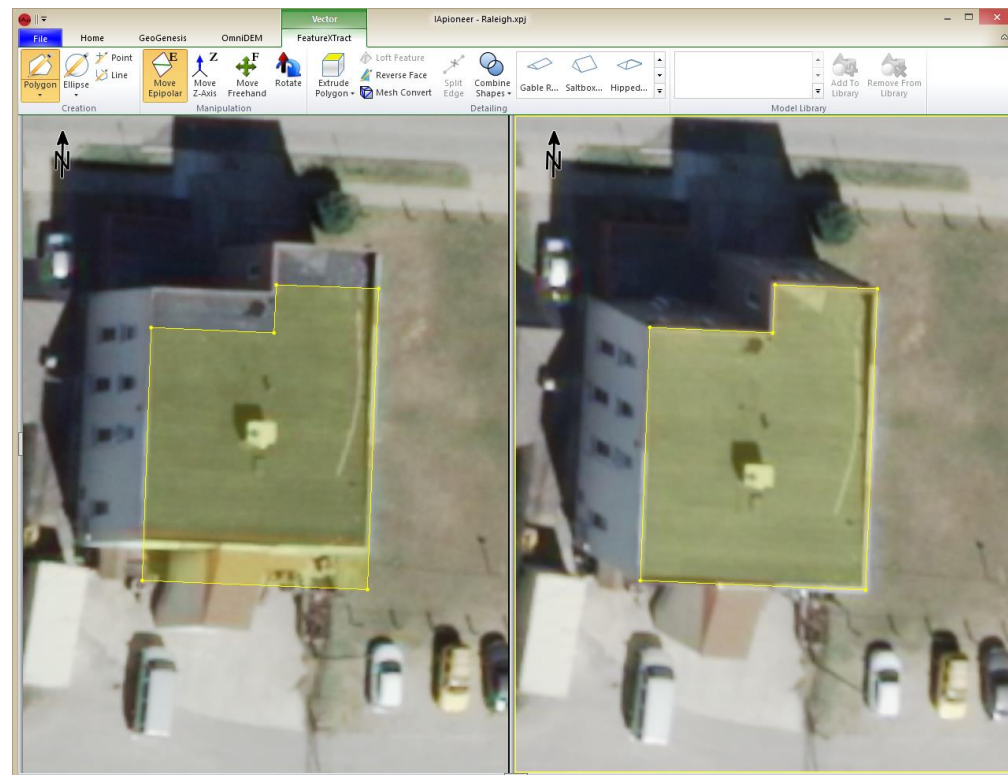


You can model in the left or right viewer. The right viewer was used for this example.

### Simple Modeling:

1. Left click the “FeatureXtract” tab.
2. Left click the [Polygon shape] button to activate the polygon tool.
3. Left click the corner of the object.
4. Repeat step 3 five times to completely outline the object.
5. Right click in the viewer to complete the polygon and end exit drawing mode.

Note: The polygon in the left viewer is not aligned to the house. This indicates that the elevation is not correct and will need to be manipulated.



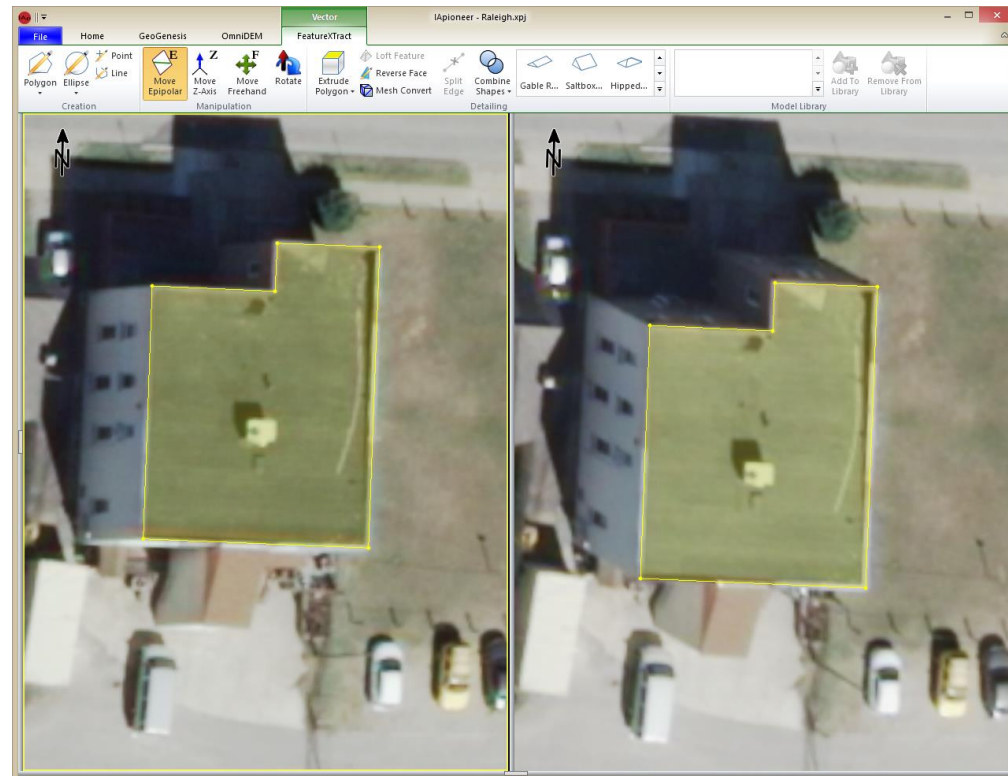


# Manipulation of an object

Move Epipolar is moving the selected feature along the epipolar line defined by the camera sensor models.

## Moving Epipolar:

1. Left click the [Move Epipolar] button.
2. Left click and hold within the boundaries of the polygon that you would like to manipulate.
3. Drag the polygon to where it is aligned with the building in the image.
4. Release the left mouse button when you are satisfied with the placement of the polygon.
5. Now the two polygons are aligned to the building within the image.





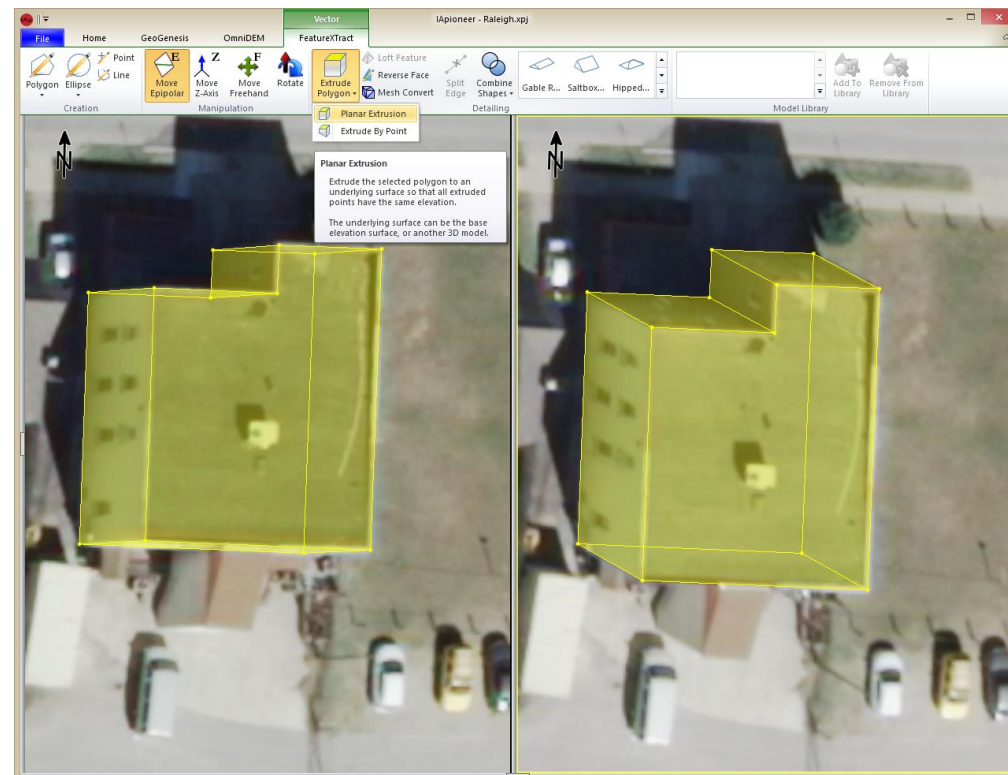


# Object from 2D to 3D

Now that we have a 2D shape of the top of the building. We can transform the 2D object to a 3D object with the Extrude feature.

## Extrude Polygon:

1. Left click within the polygon that you want to extrude.
2. Left click the [Extrude Polygon] button.
3. Left click the [Planar Extrusion] button.



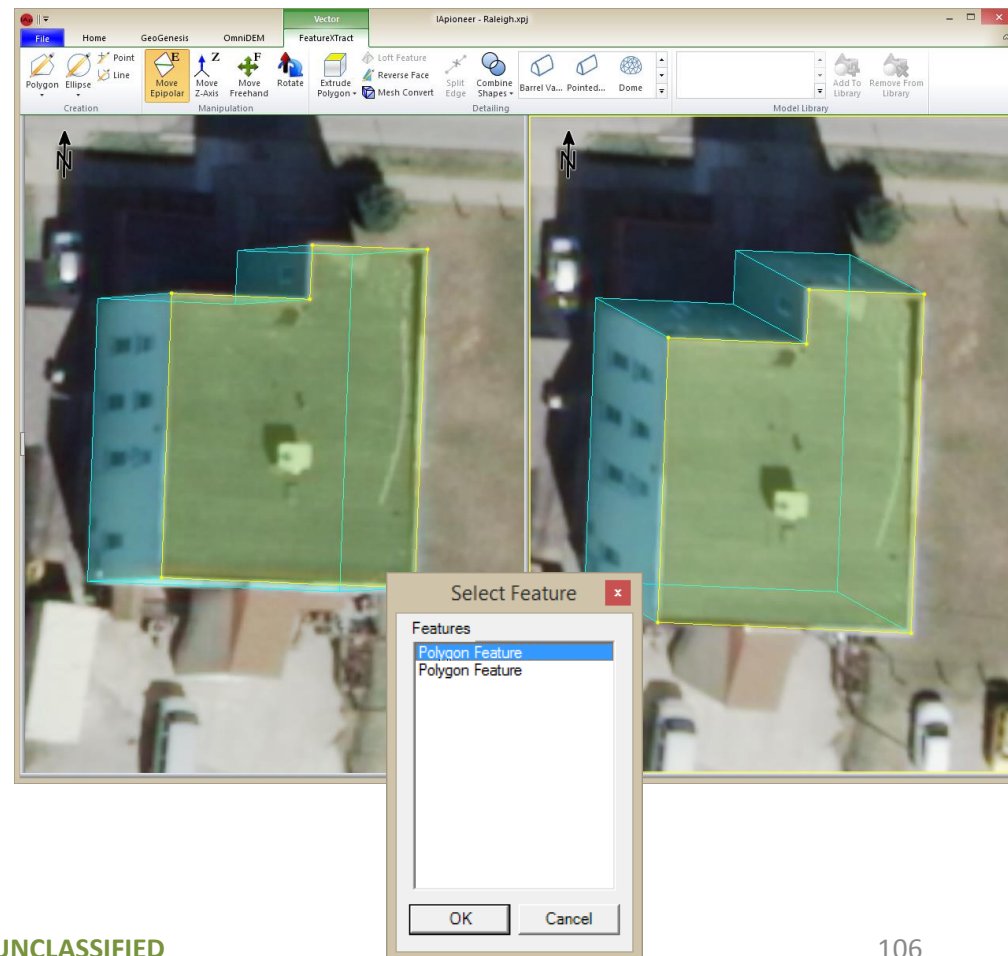


# Selecting a face of a 3D object.

## Selecting a face:

1. Left click inside the boundaries of the polygons.
2. Left click the first “Polygon Feature” displayed in the “Select Feature” dialog.
3. Left click the [OK] button.

Note: left clicking the “Polygon Feature” will select the polygon face within the selected viewer.





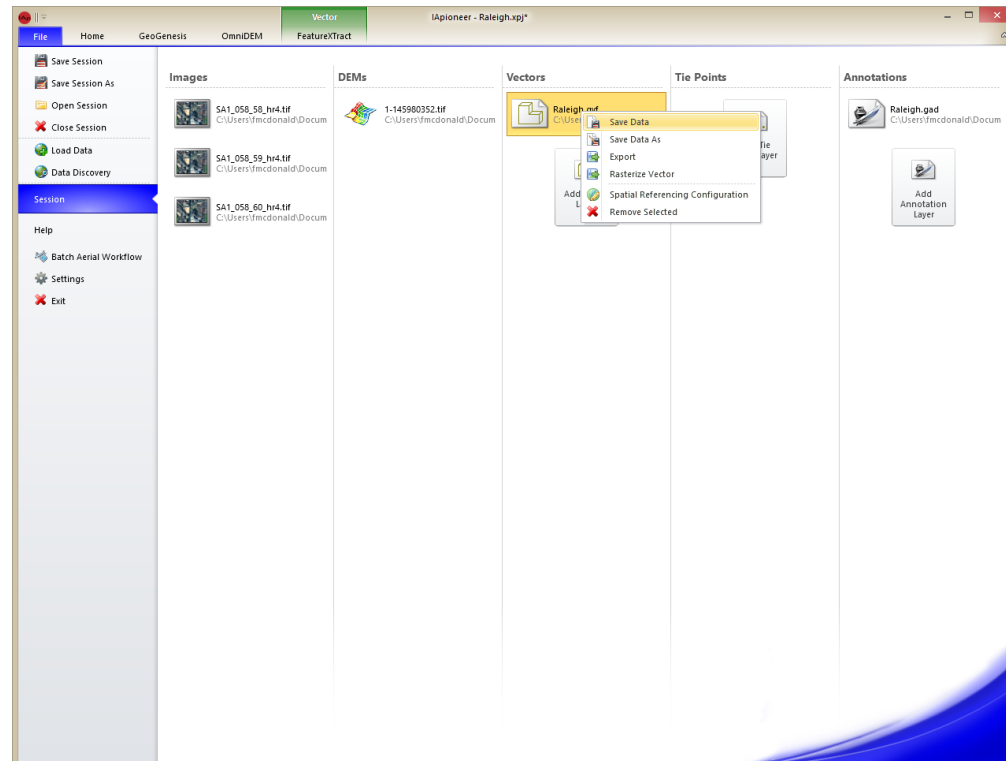
# Saving Vectors

Lets make sure that you don't lose your work.

## Saving a vector layer:

1. Left click the "File" tab to get to the backstage.
2. Left click the "Raleigh.gvf\*" file to select it.
3. Right click the selected "Raleigh.gvf\*" file to display the context menu.
4. Left click the [Save Data] menu item.

An asterisk should display on any files that have changes pending. The asterisk will disappear when the file is saved.

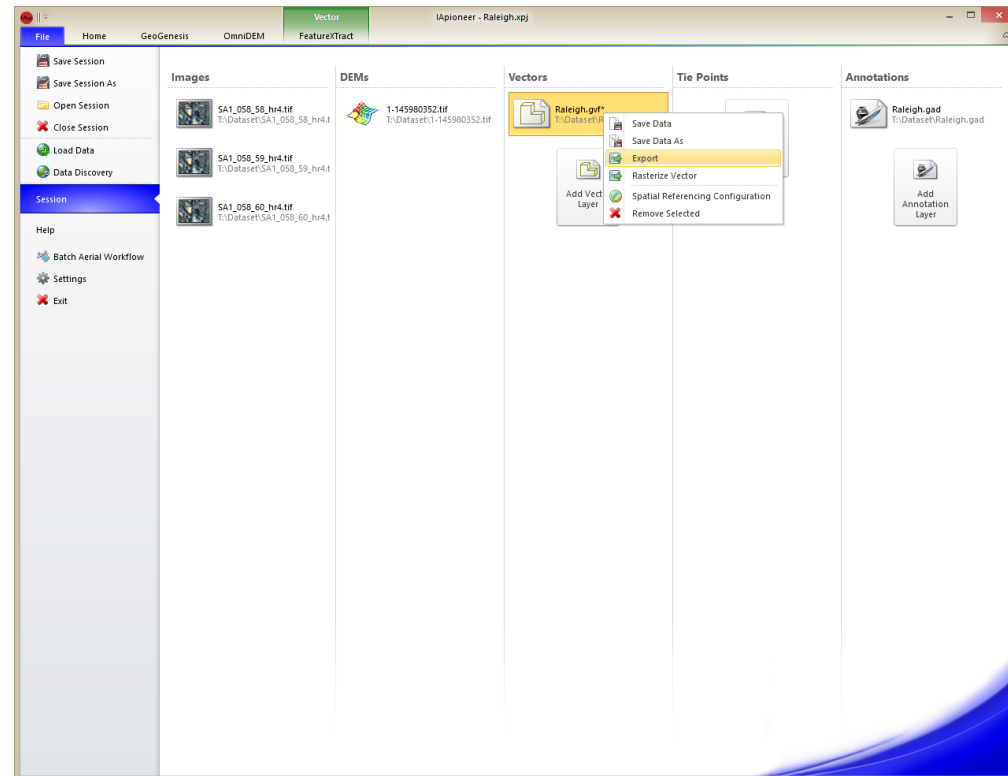




# Exporting Vectors

You have the ability to export vectors to other formats.

1. Left click the “File” tab.
2. Left click the Vector (.gvf) that you would like to export.
3. Right click the selected vector file from step 2.
4. Left click the [Export] menu item.

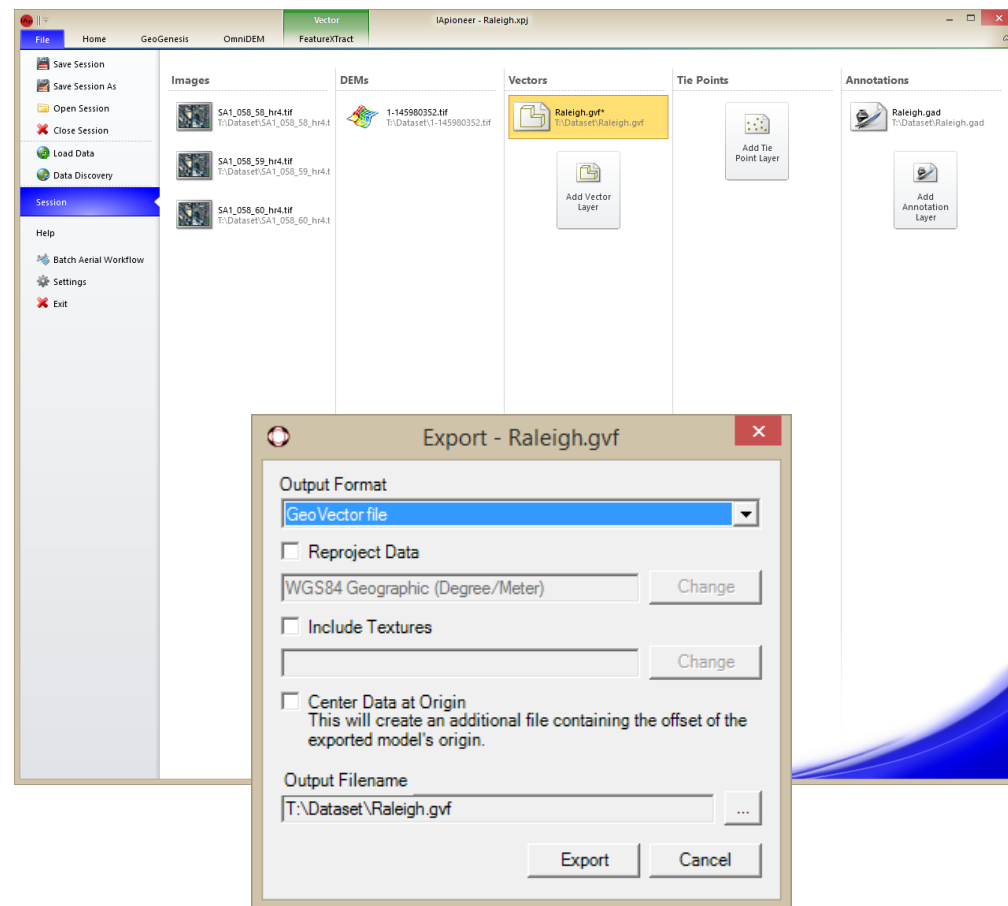




# Exporting Vectors - Continued

Select the output format.

1. Select the desired Output Format.
2. Left click the [...] button.
3. Provide the name of the file.
4. Left click the [Export] button.





# Questions?

