



IApioneer v3.0.3 Training Manual

Powered by the GeoSPHERIC™ v3.0.3 Common Code Foundation

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System Requirements

Minimum

- Windows XP SP2, Vista, 7, 8, and 10
- 4 GB RAM
- Core 2 Duo Processor
- 7200 RPM hard drive
- 250MB of Free Disk space
- OpenGL 2.1 supported graphics card*
- Two-Button Mouse

Recommended

- Windows 7, 8, or 10
- 4 GB RAM
- Core i5 processor
- 7200 RPM hard drives
- 1GB of free disk space
- NVIDIA graphics card
- Two-button Mouse with a scroll wheel

*The GPU acceleration for some processes is not supported on all graphic architectures.

How to Contact Us

If you have technical issues about the application, please visit our [Support](#) link. If your question is not answered from the [support](#) page, please contact our support team via email or phone. Before you contact us, you will need to complete a trouble ticket.

Trouble Ticket:

- Company name
- Primary contact number
- Email address
- Product name and version
- Computer O/S version
- Error message, if any
- Steps necessary to re-create the issue

IAVO Research and Scientific

1. Via Email
Support@iavo-rs.com
2. Via phone
Hours of Operation: 9:00 am – 5:00 pm Eastern time, Monday - Friday

*An example of a completed trouble Ticket is in appendix A.

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Part I User Interface

This section will identify the components of the User Interface. Getting yourself familiar with the User Interface (UI) is the key to completing the workflows effectively.

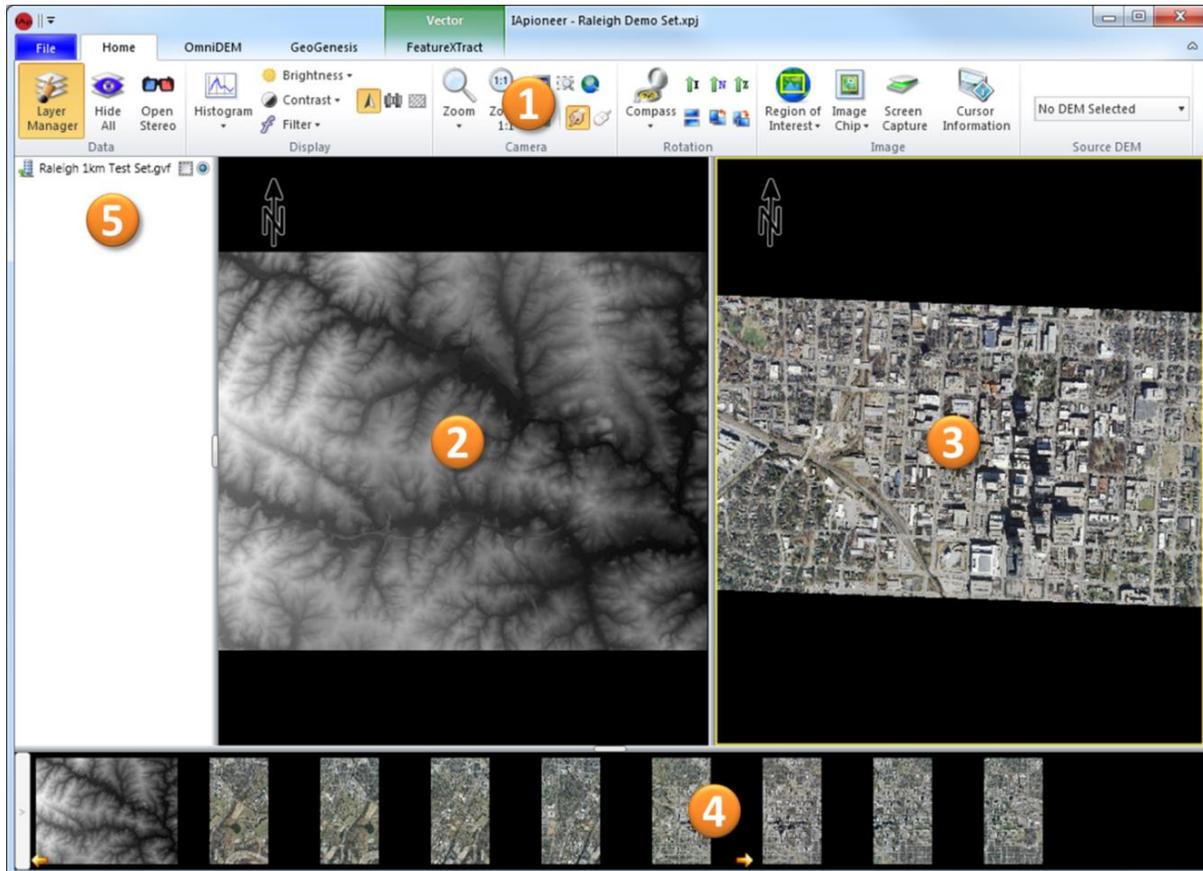


Figure 1. Components of the UI.

1 Elements of the User Interface

1. **The Ribbon** – The ribbon is a command bar that organizes the features of the application into a series of tabs at the top of the application window. The ribbon UI increases discoverability of features and functions, enable quicker learning of the application, and makes users feel more in control of their experience with the application.
2. **Left Viewer** – the primary viewers used to interact with the data. Images can be sent to the Viewers from the Image Gallery. Data layers (vectors, tie points, and annotations) can be displayed from the Layer Manager.
3. **Right Viewer** – the primary viewers used to interact with the data. Images can be sent to the Viewers from the Image Gallery. Data layers (vectors, tie points, and annotations) can be displayed from the Layer Manager.

4. Image Gallery – The image gallery controls the visibility of images within the viewers. Thumbnails of the loaded images are displayed here for visual identification of the data within the session.
5. Layer Manager – Controls the enabling/disabling edit mode and displaying of the vector, tie point, and annotation layers loaded in the viewers. Each layer has a checkbox to indicate whether it is displayed in the viewers, and a radio button to select the actively editable layer.

2 The Backstage

The backstage provides you with the capabilities to manage a session, load data, and define system parameters (**Error! Reference source not found.**), which can be brought up by clicking on the *File* tab in the Ribbon.

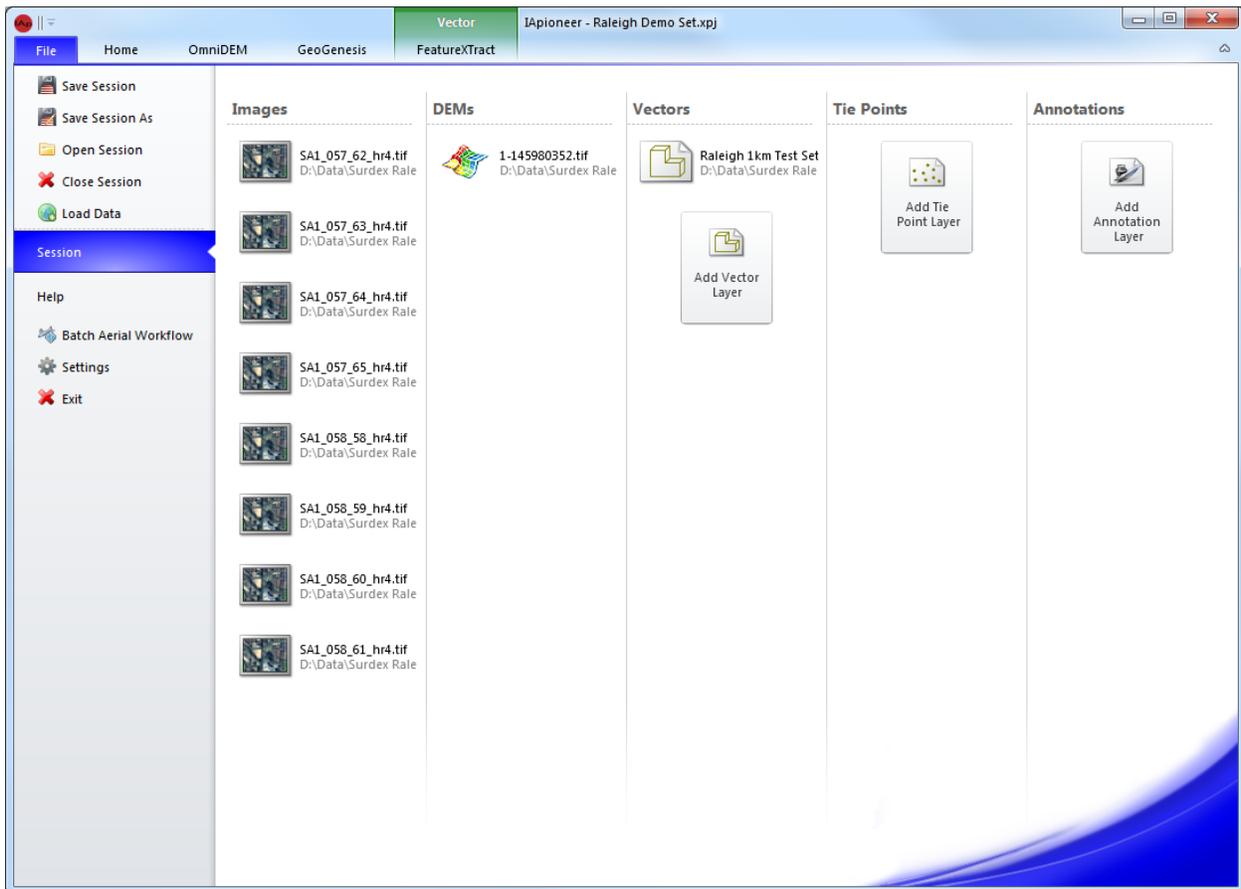


Figure 2. The Backstage.

Part II Administration

3 Application Configuration & Data Management

This section will illustrate how to setup your environment for production of a product. You will be exposed to various tools to assist you in simplifying your workflows. The tools have been designed to be an independently managed workflow for many different scenarios.

3.1 The Backstage

The backstage is an environment for you to perform various operations that will aid in the setup of a project. The backstage allows you to manage the current session of the application. From the backstage you will have access to the following option:

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

3.2 Default Settings

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

3.2.1 Controlling the Environment

This function requires the privileges of an administrator. You will be required to run the application as an administrator to get to the control section of the settings. Click on the [Settings] button from within the Backstage, to change the default settings for a variety of display and measurement operations within the UI. The Setting dialog (figure 3) allows you to specify how the UI displays certain types of information and if the user can modify them, including: measurement units, cursor information, display colors, fonts, and other graphics.

There are two levels of locking:

1. Group Level
2. Property Level

Group level will lock all of the properties in that group with one click. Property level will control one property at a time.

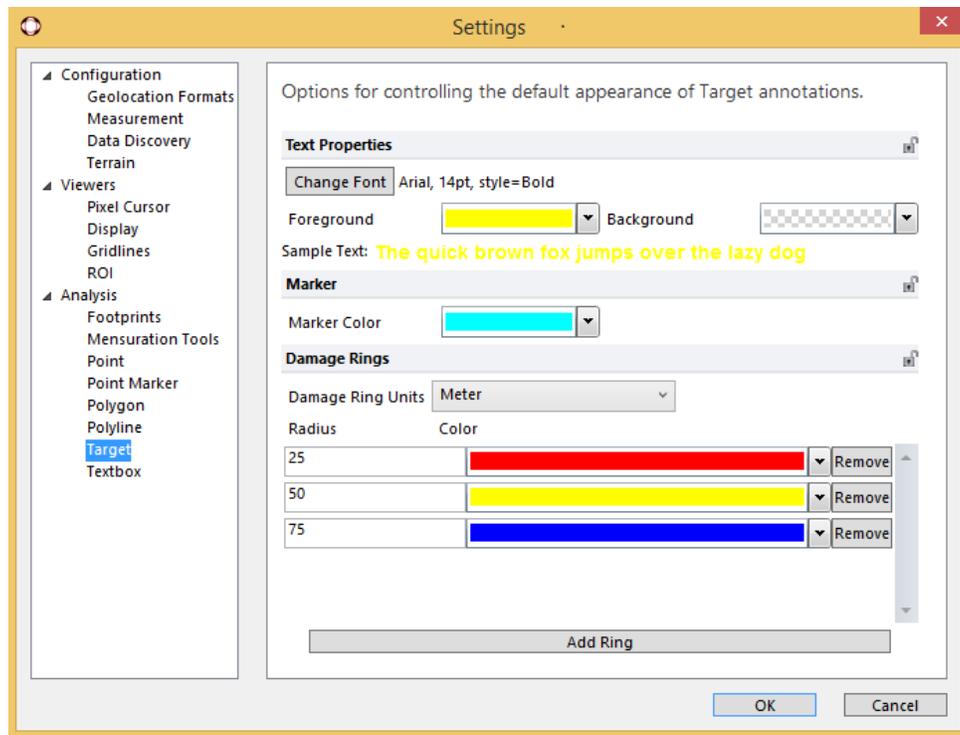


Figure 3 Settings dialog

To change a setting, click on the setting type within the left tree and edit the parameters from within the right-hand side of the dialog.

To lock a setting, click on the lock that corresponds to the property that you would like to disable changing. This will lock the property for you as well and define the default for all users. To unlock a setting, click on the lock that corresponds to the property that you would like to enable changing. The lock indicator will toggle between a closed and open lock. The lock will indicate the current state of the property.

3.2.2 Changing the defaults

Click on the [Settings] button from within the Backstage, to change the default settings for a variety of display and measurement operations within the UI. The Setting dialog (figure 3) allows you to specify how the UI displays certain types of information and if the user can modify them, including: measurement units, cursor information, display colors, fonts, and other graphics. If the property is grayed out, it was disabled by the administrator and is not allowing you to change the corresponding value.

Changes made to the preferences are saved on a per-user basis, allowing all users of a system to configure the look and feel of the software as they see fit.

3.3 Image and Digital Elevation Model (DEM)

The application supports a number of different types of data, including: satellite imagery, aerial imagery (scanned film and digital images), orthographic, images and DEMs.

3.3.1 Adding

The application provides two ways for you to load data into the session. The choice is up to the user as to which option they prefer. From the Backstage, this will only create a reference pointer to the actual data and ingest the metadata associated with the file. An image or DEM icon will be added to the Images section or DEM section of the Backstage, as the data is being ingested.

A pyramid 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 sensor model warning icon will be overlaid on the image icon for all raster images that 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 sensory model is configured.

3.3.1.1 Adding data into the session via load data option

To load data, navigate to the Backstage and select [Load Data]. The open dialog will display and allow you to navigate to where your data is located. Once you have navigated to the directory, select the single image or multiple images that you wish to load into the session.

3.3.1.2 Adding data into the session via Data Discovery option

You can use the Data Discovery option to crawl your local and remote storage for data that meet your specified search criteria. First, you must specify the root data repositories that you wish to crawl. You specify the directory in the settings, under the configuration -> Data Discovery section. You will click the add button and proceed to navigate to the root folder. Click [OK], if you would like to add the directory. This is a cascade down approach and will only look in the children of the root you have selected.

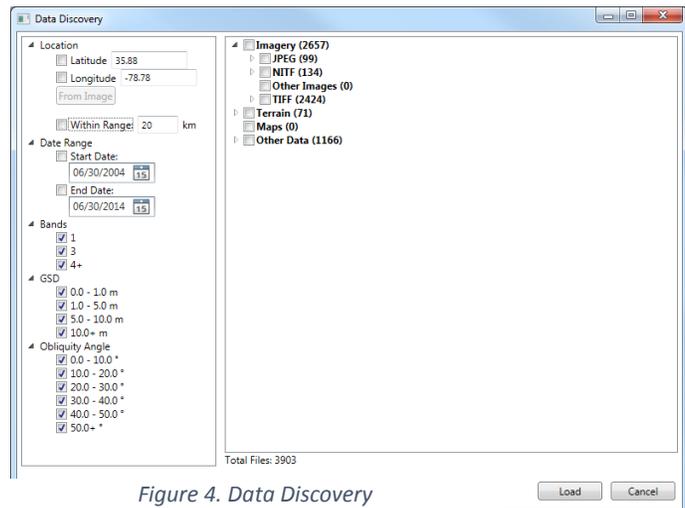


Figure 4. Data Discovery

Note: This may take anywhere from a few seconds to few minutes, depending on how many files are in the repository.

Second, select [Data Discovery] to launch the Data Discovery dialog (Figure 4). From here you can search by location, date, number of bands, sampling resolution, and obliquity angle. The results are categorized by type of data, and then by subtype. Finally, check the checkbox next to the item that you would like to load into the current session. You can select a group of items or a single item. Once all of the data has been identified, press [Load] to ingest the selected data into the current session.

3.3.2 Band Information

You have the capability to manage the way the bands are displayed in the application. If you load a panchromatic image (1 Band), usually displayed as a grey scaled image, all of the bands will be set to support the only band that is present and you can't modify them. When you load a multispectral image, you will gain the ability to rearrange the three bands (Red, Green, and Blue).

Rearranging the three bands:

1. Right click on the image and click the [Properties] menu item.
2. Click the "Band Info" tab.
3. Assign the band number that you would like to associate with the corresponding color.
4. Click [OK] to process your information.

3.3.3 Sensor Model

Most geospatial raster data have inherent metadata, which incorporates both the Spatial Referencing System (SRS) that the data was acquired in, as well as the sensor model defining the projective nature of the image data. The SRS consists of a Projection and a Datum. Any image loaded without embedded sensor model information will default to unitary orthographic sensor model.

The application supports three sensor model formats:

- Frame camera (scanned film and digital back)
- Rational Polynomial Coefficient (RPC)
- Orthographic

Updating the Sensor Model:

1. Right click on the images and click the [Properties] menu item.
2. Click the "Sensor Model" tab.
3. Select the desired "Sensor Type".
4. Click the [Change] button to modify the SRS.
5. Assign the desired parameters in the Spatial Referencing dialog.
6. Click the [OK] button to apply you SRS and return to the Sensor Model dialog.
7. Complete the respective information within the requesting sensor type.
8. Click the [OK] button to apply the sensor model and SRS to the image and close the dialog.

3.3.4 Crop, Resample, and Reproject

Crop is the primary mechanism for exporting raster data. This capability will allow for the creation of a sub-image from the original image. The bounds of the chipping process can be set to pixel values, Geospatial Coordinates, or from Other Data. Resample box will allow you to specify the GSD of the output image. You can only change the output SRS for Orthographic sensor models.

Crop, Resample, and Reproject

Crop by choosing any of the options below

To crop by click-dragging:

1. Right click on the image and click the [Crop, Resample, and Reproject] menu item.

2. Check the “Crop by image coordinates” check box.
3. Click and hold in the upper left most portion of the image chip that you would like to create.
4. Drag the mouse to the lower right most portion of the image chip that you would like to create.
5. Release the mouse.

To crop by image coordinates:

1. Right click on the image and click [Crop, Resample, and Reproject] menu item.
2. Check the “Crop by image coordinates” check box.
3. Enter the Upper left X and Y value.
4. Enter the Lower left X and Y value.

To crop by Geospatial Coordinate:

1. Right click on the image and click [Crop, Resample, and Reproject] menu item.
2. Check the “Crop by image coordinates” check box.
3. Click [Use Geospatial Coordinates].
4. Enter the Upper left X and Y value.
5. Enter the Lower left X and Y value.
6. Click the [OK] button.

To crop by Other Data:

1. Right click on the image and click [Crop, Resample, and Reproject].
2. Double check that the Crop by image coordinates check box is checked.
3. Click [From Other Data].
4. Select the filename from the current project that you would like to reference.
5. Specify the Buffer (Pixels), if any.
6. Click the [OK] button.

Reproject:

1. Check the “Reproject” check box.
2. Click the [Change] button.
3. Specify the “Spatial Referencing” parameters.
4. Click the [OK] button.

Resample:

1. Check the “Resample” check box.
2. Enter the “Resolution” value.
3. Select the “Linear Units”.

To process image chip:

1. Select an “Interpolation”.
2. Click the [Browse] button.
3. Select the directory where you would like the chip to reside.
4. Click the [Save] button.

5. Select the file format that you would like to create.
6. Click the [OK] button.

3.3.5 Data Conversion

Image and DEM data can be converted from one data type to another. You are allow to process a single image or DEM or multiple images or DEMs at a time.

To convert a single image:

1. Click the image that you would like to convert.
2. Right click to display menu options.
3. Select the [Data Conversion] menu item.
4. Select the “Data Type” that you would like to convert to.
5. Select the “File Format” that you would like to be created.
6. Click the [...] (Ellipsis) button to specify the “Output Path”.
7. Select the directory where you would like the converted image to reside.
8. Click the [Save] button.
9. Click the [OK] button

To convert multiple images:

1. Select the images that you would like to convert.
2. Right click to display menu options.
3. Select [Data Conversion] menu item.
4. Select the “Data Type” that you would like to convert to.
5. Select the “File Format” that you would like to be created.
6. Click the [...] (Ellipsis) button to specify the “Output Path”.
7. Select the directory where you would like the converted image to reside.
8. Click the [Save] button.
9. Click the [OK] button.

*A suffix of “_dc” will be added to the name of the file.

3.3.6 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.

1. Select the [Batch Aerial Workflow] button.
2. Provide the IO parameters of the camera.
3. Click the [Next] button.
4. Provide the EO parameters of the camera.
5. Click the [Next] button.
6. Match the data ID to the image name within the project.
7. Click the [Next] button.

3.3.7 Export

You are also provided with the capability to export the data to other supported products.

Export a single file:

1. Click the image that you would like to export.
2. Right click the selected image to display the menu options.
3. Click the [Export] menu item.
4. Select the “File Format” that you would like to export to.
5. Click the [...] (Ellipsis) button to specify the “Output File”.
6. Select the directory where you would like the converted image to reside.
7. Click the [Save] button.
8. Click the [OK] button.

Export multiple files:

1. Select the images that you would like to export.
2. Right click a selected image to display the menu options.
3. Click the [Export] menu item.
4. Select the “File Format” that you would like to export to.
5. Specify the “Suffix”.
6. Click the [...] (Ellipsis) button to specify the “Output Path”.
7. Select the directory where you would like the converted image to reside.
8. Click the [Save] button.
9. Click the [OK] button.

3.3.8 Removing

You have the ability to remove the image from the session. This does not delete the image from your computer.

Removing a single file:

1. Click the image that you would like to remove.
2. Right click the image to display the menu options.
3. Click the [Remove Selected] menu item.

Removing multiple files:

1. Select the images that you would like to remove.
2. Right click one of the selected image to display the menu options.
3. Click the [Remove Selected] menu item.

*There is no warning that allows you to confirm or deny the action to remove.

3.4 Vectors

Vectors' heading, in the Backstage, is the managing tool for all vector layers. Vector layers are individual documents within 3D FeatureXtract.

3.4.1 Adding

This section will guide you through the process of creating a vector layer.

1. Click the [Add Vector Layer] button.

3.4.2 Spatial Referencing Configuration

This section will guide you through the process of defining the SRS for a vector layer.

1. Click the vector layer that you would like to update the SRS.
2. Right click the selected vector layer.
3. Click the [Spatial Referencing Configuration] menu item.
4. Define the spatial reference.
5. Click the [OK] button.

3.4.3 Rasterize Vector

This section will guide you through the process of rasterization. This option can only be performed on a single image.

1. Click the vector layer that you would like to update the SRS.
2. Right click the selected vector layer.
3. Click the [Rasterize Vector] menu item.
4. Provide the output parameters.
5. Click the [Browse] button.
6. Provide the file location and name.
7. Click the [Save] button.
8. Click the [Generate] button.

3.4.4 Export

You are also provided with the capability to export the vector data to other supported products. You will have options to Reproject Data, include textures, and center data at origin. These options are available for the output format that can support them. The option to add these features will disabled if the output format does not support them.

1. Click the vector layer that you would like to export.
2. Right click the selected vector layer.
3. Click the [Export] menu item.
4. Select the "Output Format".
5. Click the [...] button.
6. Provide the directory and filename.
7. Click the [Save] button.
8. Click the [Export] button.

3.4.5 Save Data

The changes made within the vector layer are not automatically saved. You will see an asterisk (*) for any vector file that has been changed and waiting to be saved.

To save a single vector file that has changed:

1. Click the vector layer that you would like to save.
2. Right click the selected vector layer.
3. Click the [Save Data] menu item.

To save multiple vector files that has changed:

1. Select the vector layers that you would like to save.
2. Right click a selected vector layer.
3. Click the [Save Data] menu item.

*You will need to specify the location and name for all “Unnamed Feature Set”.

3.4.6 Save Data As

This section will guide you on the process of preserving a vector file and eliminate potential loss of data. This is very simple copy of the file.

To save a single vector file that has changed:

1. Click the vector layer that you would like to copy.
2. Right click the selected vector layer.
3. Click the [Save Data As] menu item.
4. Provide the location and filename.
5. Click the [Save] button.

To save multiple vector files that has changed:

1. Select the vector layers that you would like to copy.
2. Right click a selected vector layer.
3. Click the [Save Data As] menu item.
4. Provide the location and filename.
5. Click the [Save] button.

3.4.7 Removing

You have the ability to remove the vector layer from the session. This does not delete the vector layer from your computer.

Removing a single file

1. Click the vector layer that you would like to remove.
2. Right click the vector layer to display the menu options.
3. Click the [Remove Selected] menu item.

Removing multiple files

1. Select the vector layers that you would like to remove.
2. Right click one of the selected vector layer to display the menu options.
3. Click the [Remove Selected] menu item.

*There is no warning that allows you to confirm or deny the action to remove.

3.5 Tie Points

Tie Points, in the Backstage, is the managing tool for all Tie Point layers. Tie Point layers are individual documents within GeoGenesis. The pair of points will link the images together to create a mosaic.

3.5.1 Adding

This section will guide you through the process of creating a tie point layer.

1. Click the [Add Tie Point Layer] button.

3.5.2 Export

You are also provided with the capability to export the tie point data to other supported products.

1. Click the tie point layer that you would like to export.
2. Right click the selected tie point layer.
3. Click the [Export] menu item.
4. Provide the directory and filename.
5. Click the [Save] button.

3.5.3 Save Data

The changes made within the tie point layer are not automatically saved. You will see an asterisk (*) for any vector file that has been changed and waiting to be saved.

To save a single tie point file that has changed:

1. Click the tie point layer that you would like to save.
2. Right click the selected tie point layer.
3. Click the [Save Data] menu item.

To save multiple tie point files that has changed:

1. Select the tie point layers that you would like to save.
2. Right click a selected tie point layer.
3. Click the [Save Data] menu item.

*You will need to specify the location and name for all "Unnamed Tie Point Set".

3.5.4 Save Data As

This section will guide you on the process of preserving a tie point file and eliminate potential loss of data. This is very simple copy of the file.

To save a single tie point file that has changed:

1. Click the tie point layer that you would like to copy.
2. Right click the selected tie point layer.
3. Click the [Save Data As] menu item.
4. Provide the location and filename.
5. Click the [Save] button.

To save multiple tie point files that has changed:

1. Select the tie point layers that you would like to copy.
2. Right click a selected tie point layer.
3. Click the [Save Data As] menu item.
4. Provide the location and filename.
5. Click the [Save] button.

3.5.5 Removing

You have the ability to remove a tie point layer from the session. This does not delete the tie point layer from your computer.

Removing a single tie point file

1. Click the tie point layer that you would like to remove.
2. Right click the tie point layer to display the menu options.
3. Click the [Remove Selected] menu item.

Removing multiple tie point files

1. Select the tie point layers that you would like to remove.
2. Right click one of the selected tie point layers to display the menu options.
3. Click the [Remove Selected] menu item.

*There is no warning that allows you to confirm or deny the action to remove.

3.6 Annotations

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

3.6.1 Adding

This section will guide you through the process of creating an annotation layer.

1. Click the [Add Annotation Layer] button.

3.6.2 Save Data

The changes made within the annotation layer are not automatically saved. You will see an asterisk (*) for any annotation file that has been changed and waiting to be saved.

To save a single annotation file that has changed:

1. Click the annotation layer that you would like to save.
2. Right click the selected annotation layer.
3. Click the [Save Data] menu item.

To save multiple annotation files that has changed:

1. Select the annotation layers that you would like to save.
2. Right click a selected annotation layer.
3. Click the [Save Data] menu item.

*You will need to specify the location and name for all “Unnamed Annotation Document”.

3.6.3 Save Data As

This section will guide you on the process of preserving an annotation file and eliminate potential loss of data. This is very simple copy of the annotation file.

To save a single annotation file that has changed:

1. Click the annotation layer that you would like to copy.
2. Right click the selected annotation layer.
3. Click the [Save Data As] menu item.
4. Provide the location and filename.
5. Click the [Save] button.

To save multiple annotation files that has changed:

1. Select the annotation layers that you would like to copy.
2. Right click a selected annotation layer.
3. Click the [Save Data As] menu item.
4. Provide the location and filename.
5. Click the [Save] button.

3.6.4 Removing

You have the ability to remove an annotation layer from the session. This does not delete the annotation layer from your computer.

Removing a single annotation file

1. Click the annotation layer that you would like to remove.
2. Right click the annotation layer to display the menu options.
3. Click the [Remove Selected] menu item.

Removing multiple annotation files

1. Select the annotation layers that you would like to remove.
2. Right click one of the selected annotation layers to display the menu options.
3. Click the [Remove Selected] menu item.

*There is no warning that allows you to confirm or deny the action to remove.

3.7 Session Managing

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

3.7.1 Save Session

You will need to save the session, after you have loaded all of the data in the Backstage.

Saving the session:

1. Click the [Save Session] button.
2. Provide the location and filename.
3. Click the [Save] button.

*The session will prompt to save data of any files that have changed and not yet saved. Clicking the [No] or [Cancel] button will not save the session.

3.7.2 Save Session As

This section will guide you on the process of preserving a session file. This is very simple copy of the session file.

1. Click the [Save Session As] button.
2. Provide the location and filename.
3. Click the [Save] button.

*The session will prompt to save data of any files that have changed and not yet saved. Clicking the [No] or [Cancel] button will not save the session.

3.7.3 Open Session

Use open session, when you would like to restore the workspace to a saved state.

1. Click the [Open Session] button.
2. Navigate to the project file that you would like to open.
3. Select the project file.
4. Click the [Open] button.

*You will be prompted to save the current state of the application before opening a new project. Clicking the [No] button will discard the unsaved data and proceed to open session.

3.7.4 Close Session

Use close session, when you would like to clear the Backstage and start fresh. This will remove the session and all files associated with it. However, it will not delete the session project or data files associated with it.

1. Click the [Close Session] button.

*You will be prompted to save the current state of the application before closing the project. Clicking [No] will discard the unsaved data and proceed to open session.

Part III Visualization Tools

The visualization tools are centralized to the Home tab of the application.

4 Data

The data group allows you to quickly load data within the Backstage without having to go to the backstage, displaying and hiding of the layer manager, hide all layers within the layer manager, show images in stereo, and open a 3D Viewer.

4.1 Add layer

Add layer button allows you to quickly load data within the session without having to navigate to the Backstage.

4.1.1 Add Vector Layer

1. Click the [Add Layer] button.
2. Click the [Add Vector Layer] button.

4.1.2 Add Tie Point Layer

1. Click the [Add Layer] button.
2. Click the [Add Vector Layer] button.

4.1.3 Add Annotation Layer

1. Click the [Add Layer] button.
2. Click the [Add Vector Layer] button.

4.2 Layer Manager

The layer manager allows you to set the visibility of any data layer. To edit the data layer from within the modules you will need to activate it, which is accomplished in the layer manager. Each data layer in the layer manager contains the following items:

- Icon defining the type of data layer.
- File name of the data layer
- Check box indicating the visibility
- Radio box indicating the active layer (editing layer)

4.2.1 Showing and hiding the layer manager

The layer manager button behaves in toggle manor. If the layer manage is displayed clicking the [layer manager] button will hide and vice versa.

4.2.2 Showing and hiding the data layer in the viewer

The layer manager allows you to toggle the visibility of the data layers. A check box that is checked, indicates that the data layer is visible in the viewers. A check box that is unchecked, indicates that the data layer is not visible in the viewers.

4.2.3 Active data layer (editing mode)

Select the radio box, in the layer manager, that you would like to edit the data of that layer. This will set the layer as active and allow for you modify the layer data.

4.3 Hide All

The hide all button will turn all of the data layers off with one click.

4.4 Open Stereo

The application provides you with the ability to view photos in 3D. To use this function you will open a Stereo viewer.

Displaying Stereo:

1. Click the [Open Stereo] button.
2. Select the left and right image.
3. Click the [Open] button.

4.5 Show 3D Viewer

The 3D Viewer is a great way to visualize the active vector layer during both the geometry creation and the geometry editing processes. Turn your 3D viewer on and let the modeling begin.

Showing 3D viewer:

1. Click the [Show 3D Viewer] button.
2. Select the vector layer, from the layer manager, that you would like to view.

5 Display

The display group contains a number of tools useful for adjusting how the selected image is displayed within a viewer, as well as contextual overlays that can provide a better overview for exploitation.

5.1 Histogram

You can affect a color transformation on individual channels, or all channels simultaneously, of the image in the active viewer. Output values from the color transform are scaled between 0 (black) and 1 (white).

Adjusting the Histogram:

1. Make sure the image that you would like to transform is in the active viewer (yellow border around viewer).
2. Click the [Histogram] button.
3. Click the [Adjust Histogram] menu item.
4. Select the "Presets".
5. Select the "Channel".
6. Adjust the ends to new value.
7. Click the [OK] button.

5.2 Brightness

Use the brightness option to adjust the overall brightness of the image in the active viewer. You are provided with a gallery of preset choices, as well as a manual slider option.

Adjusting the brightness using preset choices:

1. Select the viewer that you would like to brightened.
2. Click the [Brightness] button.
3. Select the desired brightness.

Adjusting the brightness using the slider option

1. Select the viewer that you would like to brightened.
2. Click the [Brightness] button.
3. Mouse over the [Adjust Brightness] menu item.
4. Click and hold the vertical bar slider.
5. Slide it left or right to the desired brightness.
6. Release the mouse.

5.3 Contrast

Use the Contrast option to adjust the overall contrast of the image in the active viewer. You are provided with a gallery of preset choices, as well as a manual slider option.

Adjusting the contrast using preset choices:

1. Select the viewer that you would like to contrast.
2. Click the [Contrast] button.
3. Select the desired contrast.

Adjusting the contrast using the slider option

1. Select the viewer that you would like to contrast.
2. Click the [Contrast] button.
3. Mouse over the [Adjust Contrast] menu item.
4. Click and hold the vertical slider.
5. Slide it left or right to the desired contrast.
6. Release the mouse.

5.4 Filter

Filters provide you the options to sharpen, smooth and haze reduction of an image. These filters are applied to the displayed data in the active viewer.

Adjusting the filter using preset choices:

1. Select the viewer that you would like to filter.
2. Click the [Filter] button.
3. Select the filter that you would like to apply.

5.5 Dynamic Range Adjustment

You can get the enhancement you need by stretching based only on the pixel values within the display and not using all the pixels in the raster dataset. This option is useful when you have zoomed into an area where the color range is not as diverse as the entire image.

Turning on the dynamic Range:

1. Click the viewer that you would like DRA applied.
2. Click the [DRA] button.

*This is a toggle button. The button is on, if the background is showing orange. When pressed will turn it off and vice versa.

5.6 Image Overview

An image overview is a thumbnail of the entire image, with the current view location highlighted in a bounding box.

Displaying the Image overview:

1. Click the viewer that you would like to see the overview.
2. Click the [Image Overview] button.

*This is a toggle button. The button is on, if the background is showing an orange. When pressed will turn it off and vice versa.

5.7 North Arrow

A map symbol that shows the direction of north on in the viewer, thereby showing how the image and overlays are oriented.

Displaying the North Arrow:

1. Click the viewer that you would like to see the overview.
2. Click the [North Arrow] button.

*This is a toggle button. The button is on, if the background is showing an orange. When pressed will turn it off and vice versa.

5.8 Grid Lines

A series of horizontal and perpendicular lines that divide a map into squares to form a grid by means of which any point may be located by a system of rectangular coordinates.

Displaying the Grid Lines:

1. Click the viewer that you would like to see the grid lines.
2. Click the [Grid Lines] button.

*This is a toggle button. The button is on, if the background is showing an orange. When pressed will turn it off and vice versa.

5.9 Zoom Ratio

Display the zoom ratio in the upper right hand corner of the viewer.

Displaying the Zoom Ratio:

1. Click the viewer that you would like to see the zoom ratio.
2. Click the [Zoom Ratio] button.

*This is a toggle button. The button is on, if the background is showing an orange. When pressed will turn it off and vice versa.

6 Camera

This group contains tools for manipulating the position of the camera.

6.1 Zoom

Use the Zoom option to adjust the scale of the image in the active viewer. You are provided with a gallery of preset choices.

Adjusting the Zoom using preset choices:

1. Select the viewer that you would like to adjust the zoom.
2. Click the [Zoom] button.
3. Select a preset zoom.

6.2 Zoom 1:1

Use the Zoom 1:1 option to adjust the scale of the image in the active viewer to 100%.

Zoom to 100%

1. Select the viewer that you would like to adjust the zoom.
2. Click the [Zoom 1:1] button.

6.3 View Extents

Use the view extents when you would like to zoom so that the entire set of data is in view.

1. Select the viewer that you would like to adjust the zoom.
2. Click the [View Extents] button.

6.4 Zoom to Box

Use the zoom to box when you would like to zoom to a predefined area of the data set. This will zoom to the extent of the rectangle bounds area that you justify with a rectangular box.

1. Click the [Zoom to Box] button.
2. Click and hold in the uppermost region of the area you would like to zoom to.
3. Drag the mouse to lowermost region of the area you would like to zoom to.
4. Release the left mouse.

6.5 Jump to Location

The jump to location allows for to center the active viewer on a specific geospatial or pixel location. For geospatial coordinates, the coordinate templates for string input are controlled by the Display Format in the settings.

1. Select the viewer that you would like to reposition the camera.
2. Click the [Jump to Location] button.
3. Select the "Coordinate System" dropdown option.
4. Input the location parameters.
5. Click the [OK] button.

6.6 Camera Lock

The camera lock allows you to link your viewers so that movement (pan and zoom) in one corresponds to movement in the other.

Camera lock left and right viewer

- Click the [Camera Lock] button.

Camera lock external viewer

1. Click the [Camera Lock] button in the main application.
2. Click the [Camera Lock] button in the external viewer.

6.7 Pan Mode

This is the default behavior of the camera movement.

With a mouse wheel

Center the data at a point:

1. Click in the viewer that you would like to pan.
2. Click the [Pan Mode] button.
3. Move the mouse over the point that you would like to center in the viewer.
4. Click the mouse wheel.

Moving the data set to a point:

1. Click in the viewer that you would like to pan.
2. Click the [Pan Mode] button.
3. Click and hold the mouse wheel within the viewer.
4. Drag the mouse in any direction.
5. Release the mouse wheel.

Without a mouse wheel

Center the data at a point:

1. Click in the viewer that you would like to pan.
2. Click the [Pan Mode] button.
3. Move the mouse over the point that you would like to center in the viewer.
4. Click the left and right mouse button together.

Moving the data set to a point:

1. Click in the viewer that you would like to pan.
2. Click the [Pan Mode] button.
3. Click and hold the left and right mouse button within the viewer.
4. Drag the mouse in any direction.
5. Release the left and right mouse button

6.8 Roam Mode

While in roam mode, you will be able to center the camera on a position within the data set. This will cause the data set to smoothly move away from the cursor, toward the center of the viewer. The further away from the center of the viewer, the faster the data set will move.

With a mouse wheel

Moving the data set to a point:

1. Click in the viewer that you would like to roam.

2. Click the [Roam Mode] button.
3. Move the cursor away from the center of the viewer.
4. Click and hold the mouse wheel within the viewer.
5. Release the mouse wheel.

Without a mouse wheel

Moving the data set to a point:

1. Click in the viewer that you would like to roam.
2. Click the [Roam Mode] button.
3. Move the cursor away from the center of the viewer.
4. Click and hold the left and right mouse button within the viewer.
5. Release the left and right mouse button.

7 Rotation

This group contains tools that will allow you to rotate the data sets in the active viewer.

7.1 Compass

The compass tool allows free rotation of the active viewer.

Using the slider

1. Click in the viewer that you would like to rotate.
2. Click the [Compass] button.
3. Click and hold the vertical slide bar.
4. Drag the bar left or right.
5. Release the mouse.

7.2 Image Up

Image up orients the image such that the columns of the image are aligned with the columns of the viewer.

1. Click in the viewer that you would like to rotate.
2. Click the [Image up] button.

7.3 Image North

Image north orients the image in the viewer so that the direction to North, as determined by the SRS, is aligned with the columns of the viewer.

1. Click in the viewer that you would like to rotate.
2. Click the [North up] button.

7.4 Z Up

Z Up orients the image in the viewer so that vertical changes in elevation, such as the vertical lines of tall buildings, are aligned with the columns of the viewer.

1. Click in the viewer that you would like to rotate.
2. Click the [Z up] button.

7.5 Rotate 180

Rotates the current viewer 180 degrees from its current position

1. Click in the viewer that you would like to rotate.
2. Click the [Rotate 180] button.

7.6 Left 90

Rotates the current viewer 90 degrees counterclockwise from its current position

1. Click in the viewer that you would like to rotate.
2. Click the [Left 90] button.

7.7 Right 90

Rotates the current viewer 90 degrees clockwise from its current position

1. Click in the viewer that you would like to rotate.
2. Click the [Right 90] button.

8 Image

The image group provides you with the tools to gather information about the image, justify the region of interest, and create images.

8.1 Region of Interest

This allows you to justify boundaries within the image that is of some importance.

Set ROI

1. Click the [Region of Interest] button.
2. Click the [Set Region of Interest] menu item.
3. Click and hold in the uppermost region of the area you would like to identify.
4. Drag the mouse to lowermost region of the area you would like to identify.
5. Release the left mouse.

Clear ROI

1. Select the viewer that you would like to remove the ROI.
2. Click the [Region of Interest] button.
3. Click the [Clear Region of Interest] menu item.

8.2 Image Chip

Chipping is the primary mechanism for exporting raster data. This capability will allow for the creation of a sub-image from the original image. The bounds of the chipping process can be set to pixel values, Geospatial Coordinates, or from Other Data. Resample box will allow you to specify the GSD of the output image. You can only change the output SRS for Orthographic sensor models.

8.2.1 Chip from ROI

ROI chipping will crop out the ROI from the active viewer. This will provide the crop dialog with the boundaries of the ROI from the active viewer.

1. Click the viewer that you would like to chip.
2. Click the [Region of Interest] button.
3. Click the [Set Region of Interest] menu item.
4. Click and hold in the uppermost region of the area you would like to identify.
5. Drag the mouse to lowermost region of the area you would like to identify.
6. Release the left mouse.
7. Click the [Image Chip] button.
8. Click the [Chip from Roi] menu item.
9. Select an interpolation (optional).
10. Select the file format that you would like to create.
11. Select the directory where you would like the chip reside.
12. Click the [Save] button.
13. Click the [OK] button.

8.2.2 Full screen Chip

Full screen chipping will crop out the active viewer viewing perspective. This will provide the crop dialog with the boundaries of the active viewer relative to the image.

14. Click the viewer that you would like to chip.
15. Click the [Image Chip] button.
16. Click the [Full Screen Chip] menu item.
17. Select an interpolation (optional).
18. Select the file format that you would like to create.
19. Select the directory where you would like the chip reside.
20. Click the [Save] button.
21. Click the [OK] button.

8.3 Screen Capture

You can export the active viewer visible information to a flat format image file or directly into another application.

8.3.1 Save Screen to File

This option is utilized when you would like to export your content to image file.

1. Click in the viewer that you would like to capture.
2. Click the [Screen Capture] button.
3. Click the [Save screen to file] menu item.
4. Provide the location and filename
5. Click the [Save] button.

8.3.2 Save Screen to PowerPoint

This option is utilized when you would like to export your content to another application.

1. Click in the viewer that you would like to capture.
2. Click the [Screen Capture] button.
3. Click the [Save screen to PowerPoint] menu item.

*The application is required on your local machine.

8.3.3 Copy Screen to Clipboard

This option is utilized when you would like to paste your content in another application.

1. Click in the viewer that you would like to capture.
2. Click the [Screen Capture] button.
3. Click the [Copy screen to Clipboard] menu item.

8.3.4 Copy ROI to Clipboard

This option is utilized when you would like to paste your content in another application.

1. Click the viewer that you would like to capture.
2. Click the [Region of Interest] button.
3. Click the [Set Region of Interest] menu item.
4. Click and hold in the uppermost region of the area you would like to identify.
5. Drag the mouse to lowermost region of the area you would like to identify.
6. Release the left mouse.
7. Click the [Screen Capture] button.
8. Click the [Copy ROI to Clipboard] menu item.

8.4 Cursor Information

This tool will provide you pixel location as well as geolocation information about the image.

1. Click the [Cursor Information] button.
2. Move mouse over image to gather information.

9 Source DEM

The source DEM allows the user the ability to specify the DEM used for viewer-related processing. The drop down tool allows the users to select the base DEM from the DEMs loaded in the backstage. Alternatively, if no DEM is selected, the default low-resolution DEM included with the software is the base DEM.

1. Click the [DEM] dropdown button.
2. Select one of the available DEM.

Part IV OmniDEM

Provides you the capability to create high-resolution DEMs from imagery and fuse multiple overlapping DEMs. You have the ability to efficiently extract accurate elevation models from stereoscopic imagery as well as full editing capabilities to refine existing DEMs.

10 Miscellaneous

10.1 DEM Fusion

This tool allows you to combine DEMs into a DEM.

1. Click the [DEM Fusion] button.
2. Select the Available DEMs.
3. Click the [>>] button to move to the DEM Priority.
4. Define the post spacing.
5. Define the Null Value.
6. Click the [Browse] button.
7. Provide the location and filename.
8. Click the [Save] button.
9. Click the [OK] button.

10.2 DEM to Vector

This tool allows you to convert a DEM to a regularly sampled set of 3D points.

1. Click the [DEM to Vector] button.
2. Select a DEM.
3. Define the post spacing.
4. Click the [Browse] button.
5. Provide a location and filename.
6. Click the [Save] button.
7. Click the [OK] button.

10.3 Epipolar Rectification

This tool allows you to transform an image pair onto a common image plane, suitable for stereo viewing or area correction.

1. Click the [Epipolar Rectification] button.
2. Select a "Left Image".
3. Select a "Right Image".
4. Select an "Interpolation Method".
5. Click the [Browse] button for the "Left Output File".
6. Provide a location and filename.
7. Click the [Browse] button for the "Right Output File".
8. Provide a location and filename.
9. Click the [Save] button.
10. Click the [OK] button.

10.4 Area Correlation

This tool allows you to find matching points between a pair of images, and use those points to generate an elevation model.

1. Click the [Area Correlation] button.
2. Select a "Primary Image".

3. Select a “Secondary Image”.
4. Define the post spacing.
5. Define the Confidence.
6. Select an output format.
7. Click the [Browse] button.
8. Provide a location and filename.
9. Click the [Save] button.
10. Click the [OK] button.

10.5 Vector Interpolation

The vector interpolation tool allows you to convert an irregularly sampled 3D elevation set into a regularly sampled DEM product.

1. Select the [Vector Interpolation] button.
2. Select “Vector Input”.
3. Define the post spacing.
4. Define the “Interpolation Method”.
5. Define the “Output Type”.
6. Click the [Browse] button.
7. Provide a location and filename.
8. Click the [Save] button.
9. Click the [OK] button.

Part V GeoGenesis

GeoGenesis provides you an easy-to-use imagery processing and photogrammetric workstation, giving you complete control over your data. You can rapidly orthorectify UAV/aerial and satellite imagery and bundle adjustment of multiple images. There are capabilities to help create orthomosaic and remove any visible seams.

11 Image Correction

This group provides you the capabilities to modify an image.

11.1 Image Update

The image update tool allows you to specify the control and tie points of an image.

Controlling images

1. Click the [Image Update] button.
2. Hold the CTRL key, click on the image in the left viewer.
3. Hold the CTRL key, click on the image in the right viewer.
4. Release the CTRL key.
5. Right click in the right viewer.

11.2 Bundle Adjustment

This tool will align the images to the control point supplied from the image update.

1. Click the [Bundle Adjustment] button.
2. Select the "Control Points".
3. Provide the "Convergence Criteria".
4. Provide "Standard Deviation for Triangulation".
5. Select the "Imagery" that you would like adjusted.
6. Check "Save Detailed Results to File" (Optional).
7. Click the [Browse] button (If step 6 was checked).
8. Provide a location and filename.
9. Click the [OK] button.

11.3 Data Warping

This tool provides the capability to warp non-rigidly map raster and vector data to reference imagery.

1. Click the [Data Warping] button.
2. Select the "Tie Point Set".
3. Select the "Control Image".
4. Select the "Data to Warp".
5. Click the [Browse] button.
6. Provide a location and filename.
7. Click the [OK] button.

12 Miscellaneous

12.1 Automatic Tie Point Extraction

This tool will provide you with the ability to automatically create tie points within an image set with just a few clicks.

1. Click the [Automatic Tie Point Extraction] button.
2. Select "Input Imagery".
3. Click the [Browse] button.
4. Provide a location and filename.
5. Click the [OK] button.

12.2 Resection

This tool will provide you the ability to compute the sensor model parameters for the imagery using ground control points.

1. Click the [Resection] button.
2. Select the "Control Points".
3. Select the "Images Used".
4. Check the "Save Detailed Results to File" (Optional).
5. Click the [Browse] button (If step 4 was checked).
6. Provide a location and filename.
7. Provide a "Convergence Value (pix)".
8. Provide the "Maximum Iterations".
9. Click the [OK] button.

12.3 Grayscale Conversion

The grayscale conversion tool will allow you to convert a multi-band image to a single band image.

1. Click the [Grayscale Conversion] button.
2. Select the “Color Image”.
3. Adjust the “Band Math” sliders to the desired grayscale.
4. Click the [Browse] button.
5. Provide a location and filename.
6. Click the [OK] button.

12.4 Pan Sharpening

This tool will allow you to merge a high-resolution panchromatic image with a low-resolution multiband image to produce a high-resolution multi-band image.

1. Click the [Pan Sharpening] button.
2. Select a “Panchromatic Image”.
3. Select a “RGB Image”.
4. Click the [Browse] button.
5. Provide a location and filename.
6. Click the [Add] button.
7. Click the [OK] button.

12.5 Orthorectification

This tool will allow you to generate orthophotos.

Orthorectification for a single file

1. Click the [Orthorectification] button.
2. Select the “Imagery”.
3. Select the “DEM Based”.
4. Provide a “Resolution”.
5. Select an “Interpolation”.
6. Click the [Browse] button beside “Output Filename”.
7. Provide location and filename.
8. Click the [Save] button.
9. Click the [OK] button.

Orthorectification for a multiple files

1. Click the [Orthorectification] button.
2. Select the “Imagery”.
3. Select the “DEM Based”.
4. Provide a “Resolution”.
5. Select an “Interpolation”.
6. Click the [Browse] button beside “Output Folder”.
7. Provide a location.
8. Click the [OK] button.

9. Provide a "Suffix".
10. Click the [OK] button.

12.6 Mosaicking

This tool will allow you to combine multiple orthophotos into a single large-format ortho product.

1. Click the [Mosaicking] button.
2. Select an "Ortho Images".
3. Select a "Method".
4. Select an "Intensity Correction".
5. Select a "Post Spacing".
6. Click the [Browse] button.
7. Provide location and filename.
8. Click the [OK] button.

12.7 Band Stacking

This tool will allow you to combine multiple single-band images into one multi-band image.

1. Click the [Band Stacking] button.
2. Select an "Available DEMs".
3. Select a "DEM Priority".
4. Click the [Browse] button.
5. Provide a location and filename.
6. Click the [OK] button.

13 Tie Points

A tie point is a point in a digital image or aerial photograph that represents the same location in an adjacent image or aerial photograph. The tie point pairs are used to create the link between images and create mosaics.

13.1 Tie Points

This group will allow you to navigate between tie points within a tie point layer.

13.1.1 Tie Point Manger

This tool will provide a popup that will provide you the capability to navigate through the tie points pair.

1. Select the tie point file in the "Layer manager".
2. Click the "Tie Points Selection" tab.
3. Click the [Tie Point Manager] button.
4. Select the "Tie Point".

13.1.2 Previous Tie Point

This tool is a backward sequential cycle of the tie points in a tie point layer.

1. Select the tie point file in the "Layer manager".
2. Click the "Tie Points Selection" tab.
3. Click the [Previous Tie Point] button.

*This will only have an action if you are not at the beginning of the list.

13.1.3 Next Tie Point

This tool is a forward sequential cycle of the tie points in a tie point layer.

1. Select the tie point file in the “Layer manager”.
2. Click the “Tie Points Selection” tab.
3. Click the [Next Tie Point] button.

*This will only have an action if you are not at the end of the list.

13.1.4 Tie Point selection

This tool provides you the ability to jump to a tie point defined within the given active tie point layer of the active viewer.

1. Select the tie point file in the “Layer manager”.
2. Click the “Tie Points Selection” tab.
3. Click the dropdown button.
4. Select a tie point from within the list.

Part VI FeatureXTract

FeatureXtract will provide you the capability to quickly extract 3D buildings, roads, and other features from overlapping aerial and satellite imagery. Automatic texture mapping of extracted building from your source imagery.

14 Creation

The creation group provides all of the 2D tools used to create features from areal imagery.

14.1 Polygon

This tool will allow you to create any shape with at least three straight side and angles.

14.1.1 Draw Polygon

This tool provides you with the ability to free-hand a polygon of varying size.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Click the [Polygon] button.
4. Click the [Draw Polygon] button.
5. Click within the image.
6. Move the mouse in the image.
7. Click within the image.
8. Move the mouse in the image
9. Click within the image.
10. Right click to complete and end the polygon.

14.1.2 Draw Box

This tool provides you with the ability to draw a box, where all of the sides are parallel and perpendicular to the first drawn segment.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Click the [Polygon] button.
4. Click the [Draw Box] button.
5. Click within the image.
6. Move the mouse in the image.
7. Click within the image.
8. Move the mouse in the image.
9. Click within the image.
10. Right click to complete and end the box.

14.2 Ellipse

This tool will allow you to create a regular oval or circular shape.

14.2.1 Draw Ellipse

This tool provides you with the ability to draw an oval shape. The ellipse requires 5 points anywhere on its perimeter.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Click the [Ellipse] button.
4. Click the [Draw Ellipse] button.
5. Click within the image.
6. Move the mouse in the image.
7. Click within the image.
8. Move the mouse in the image.
9. Click within the image.
10. Move the mouse in the image.
11. Click within the image.
12. Move the mouse in the image.
13. Click within the image.

14.2.2 Draw Circle

This tool provides you with the ability to draw a circle shape. The circle requires 3 points anywhere on its perimeter.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Click the [Ellipse] button.
4. Click the [Draw Circle] button.
5. Click within the image.

6. Move the mouse in the image.
7. Click within the image.
8. Move the mouse in the image.
9. Click within the image.

14.3 Point

This tool provides you with the ability to draw a point.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Click the [Point] button.
4. Click within the image.

14.4 Line

This tool provides you with the ability to draw a line.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Click the [Line] button.
4. Click within the image.
5. Move the mouse in the image.
6. Click within the image.
7. Right click to complete and end the line.

15 Manipulation

This group provides you with the ability to manipulate objects.

15.1 Move Epipolar

This tool allows you to move an object along the epipolar line defined by the relationship between the sensor models of the images in the Left and Right Viewers.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Click the [Move Epipolar] button.
4. Click and hold within the object.
5. Drag the mouse in the image.
6. Release the mouse.

15.2 Move Z-Axis

This tool allows you to move an object along the Z-Axis, as defined by the data’s SRS.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Click the [Move Z-Axis] button.
4. Click and hold within the object.
5. Drag the mouse in the image.

6. Release the mouse.

15.3 Move Freehand

This tool allows you to move an object along the X-Y plane, keeping the z value constant, as defined by the data's SRS.

1. Select the vector layer, within the "Layer Manager", that you would like to edit.
2. Select the "Vector FeatureXTract" tab.
3. Click the [Move Freehand] button.
4. Click and hold within the object.
5. Drag the mouse in the image.
6. Release the mouse.

15.4 Rotate

This tool allows you to rotate an object around the z-axis.

1. Select the vector layer, within the "Layer Manager", that you would like to edit.
2. Select the "Vector FeatureXTract" tab.
3. Click the [Rotate] button.
4. Click and hold an object.
5. Drag the mouse in the image.
6. Release the mouse.

16 Detailing

This group contains tools to add 3D details to existing geometries. These tools are single-use operations that act on a selected object or group of objects.

16.1 Extrude Polygon

Extrude polygon extrudes the selected polygon(s) to the underlying elevation source (3D model, user-specified DEM, DTED, or embedded DEM). These tools will quickly create a 3D object from a 2D object.

16.1.1 Planar Extrusion

All points of the polygon are extruded to the same elevation.

1. Select the vector layer, within the "Layer Manager", that you would like to edit.
2. Select the "Vector FeatureXTract" tab.
3. Click inside of the object to select it.
4. Click the [Extrude Polygon] button.
5. Click the [Planar Extrusion] menu item.

16.1.2 Extrude by Point

Each point is extruded separately.

1. Select the vector layer, within the "Layer Manager", that you would like to edit.
2. Select the "Vector FeatureXTract" tab.
3. Click inside of the object to select it.

4. Click the [Extrude Polygon] button.
5. Click the [Extrude by Point] menu item.

16.2 Loft Feature

This tool provides you the ability to loft a selected polygon to a point, or another polygon of the same topology (number of sides).

Loft polygon to a point:

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Place a point within the image.
4. Place a circle around the point.
5. Select both the circle and the point.
6. Click the [Loft Feature] button.

16.3 Reverse Face

This tool provides you the ability to flip the faces of an object.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Select the face of the object you would like to flip.
4. Click the [Reverse Face] button.

16.4 Mesh Convert

This tool provides you with the ability to convert a mesh to a polygon or a polygon to a mesh.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Select the Mesh or polygon object.
4. Click the [Mesh Convert] button.

16.5 Split Edge

This tool provides you the ability to add a vertex in the center of the line segment.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Select the edge that you would like to split.
4. Click the [Split Edge] button.

16.6 Combined Shapes

The combined shapes tool provides you the ability to create complex shapes by adding or subtracting simple shapes from each other.

16.6.1 Union

This tool combines any number of 2D shapes into a single 2D shape.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.

2. Select the “Vector FeatureXTract” tab.
3. Draw a circle.
4. Draw a circle that overlaps the previous circle slightly.
5. Select both circles.
6. Click the [Combine Shapes] button.
7. Click the [Union] button.

16.6.2 Subtraction

This tool subtracts one shape from another.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Draw the object that you would like to keep.
4. Draw the object that you would like to subtract from the previous object.
5. Select the object from step 3.
6. Hold the CTRL key and select the object from step 4.
7. Click the [Combine Shapes] button.
8. Click the [Subtraction] button.

16.7 Templates

This gallery contains a set of parameterized structures, each based on an underlying feature type. Currently, the gallery contains predefined roofs and walls.

Roof:

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Draw a polygon.
4. Select the polygon.
5. Select the [Gable Roof] button.
6. Provide a “Height”.
7. Provide a “Ridgeline Offset”.
8. Provide a “Left Hip”.
9. Provide a “Right Hip”.
10. Provide a “Roof Axis”.
11. Click the [OK] button.

Wall:

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Draw a Line.
4. Select the Line.
5. Select the [Wall] button.
6. Provide a “Height”.
7. Provide a “Width”.
8. Provide the “Side to Build Off”.

9. Click the [OK] button.

17 Modeling Library

This will provide you with a quick utility to generate a standard model, which can be inserted as an object.

17.1 Template Models

Models that have been saved to the library will show up for insertion into you modeling project.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Select a “Model Template” from the library.
4. Click in the image where you would like to insert the object.

17.2 Add to Library

This tool will provide you with the ability to insert templates to your model library.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Draw a polygon.
4. Select the polygon.
5. Click the [Mesh Convert] button.
6. Select the polygon.
7. Click the [Add To Library] button.
8. Provide a “Title”.
9. Provide a “Description”.
10. Click the [OK] button.

17.3 Remove from Library

This tool will provide you with the ability to remove templates from your model library.

1. Select the vector layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Vector FeatureXTract” tab.
3. Select a “Model Template” from the library.
4. Click the [Remove From Library] button.

Part VII Analysis

Will provide you the capability to quickly ingest, analyze, and annotate aerial and satellite imagery via an easy to use interface.

18 Insert

This group provides you with the tools to insert shapes into the annotation layer.

18.1 Polygon

This tool will allow you to create any shape with at least three straight side and angles.

18.1.1 Polygon

This tool provides you with the ability to free-hand a polygon of varying size.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Polygon] button.
4. Click the [Polygon] button.
5. Click within the image.
6. Move the mouse in the image.
7. Click within the image.
8. Move the mouse in the image.
9. Click within the image.
10. Right click to complete and end the polygon

18.1.2 Rectangle

This tool provides you with the ability to draw a box, where all of the sides are parallel and perpendicular to the first drawn segment.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Polygon] button.
4. Click the [Rectangle] button.
5. Click and hold within the image.
6. Move the mouse in the image.
7. Release the mouse.

18.2 Ellipse

This tool provides you with the ability to draw an oval shape.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Ellipse] button.
4. Click and hold within the image.
5. Move the mouse in the image.
6. Release the mouse.

18.3 Point

This tool provides you with the ability to draw a point.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Point] button.
4. Click within the image.

18.4 Line

This tool provides you with the ability to draw a line.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Line] button.
4. Click within the image.
5. Move the mouse in the image.
6. Click within the image.
7. Right click to complete and end the line.

18.5 Text Box

This tool provides you with the ability to type text within the image.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Text Box] button.
4. Click within the image.
5. Provide some text.
6. Click outside of the textbox.

18.6 Point Marker

This tool provides you with the ability to mark a point with geolocation information.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Point Marker] button.
4. Click point within the image.

18.7 Targeting Circle

This tool provides you with the ability to mark a target point with geolocation information.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Target Circle] button.
4. Click within the image.

18.8 North Arrow

This tool provides you with the ability to mark a north arrow to provide the orientation of the image with respect to the viewer.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [North Arrow] button.
4. Click within the image.

18.9 ClipArt

This tool provides you with the ability to insert the Warfighting symbols from the MIL-STD-2525B graphics objects.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [ClipArt] button.
4. Select the “Warfighting Symbols” category.
5. Click and hold the clipart.
6. Drag the selected clipart into the viewer.
7. Release the mouse.

19 Inspect/Measure

This group provides you with the tools for linear and angular measurement.

19.1 Separation Angle

This tool provides you the ability to measure an angle in the image.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Separation Angle] button.
4. Click within the image.
5. Move the mouse in the image.
6. Click within the image.
7. Move the mouse in the image.
8. Click within the image.

19.2 Length

This tool provides you the ability to measure a length in the image.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Length] button.
4. Click within the image.
5. Move the mouse in the image.
6. Click within the image.

19.3 Counting Tool

This tool provides you the ability to mark and count a group of objects within an image.

1. Select the annotation layer, within the “Layer Manager”, that you would like to edit.
2. Select the “Annotations Analysis” tab.
3. Click the [Counting Tool] button.
4. Click the [Plus] button.
5. Click in the image.
6. Click in the image.
7. Click in the image.

8. Close the Counting tool.

Appendices

Appendix A – Trouble Ticket Example

Company name: IAVO

Primary contact number: X1234-092-W20934

Email address: Help@IAVO-rs.com

Product name and version: IAPioneer v1.4

Computer O/S version: Windows 8.1 Pro

Error message, if any

NullReferenceException was unhandled, an unhandled exception of type System.NullReferenceException occurred in GeoSpheric.

Steps necessary to re-create the issue

1. Clicked File tab
2. Clicked Batch Aerial Workflow
3. Set Focal length to 1.0, Focal Offset X to 1.0, and Focal Offset Y to 1.0
4. Selected the Digital Option
5. Set Chip Size Width = 1.0, Height = 1.0, Y Scale Factor =1.0
6. Clicked Next
7. Error occurs

Appendix B – Button Reference

	Add Annotation Layer
	Add Annotation layer
	Add Count marker
	Add Layer
	Add Tie Point Layer
	Add Tie point Layer
	Add to Library
	Add Vector Layer
	Add Vector layer
	Area Correlation
	Automatic Tie Point Extraction
	Band Stacking
	Batch Aerial Workflow
	Brightness
	Bundle Adjustment
	Camera Lock
	Circle
	ClipArt
	Close Session
	Compass
	Contrast
	Counting Tool
	Cursor Information
	Data Discovery
	Data Warping

UNCLASSIFIED

	DEM Fusion
	DEM to Vector
	Draw Box/Rectangle
	Draw Polygon
	Dynamic Range Adjustment
	Ellipse
	Epipolar Rectification
	Exit
	Extrude By Point
	Filter
	Grayscale Conversion
	Grid Lines
	Hide All
	Histogram
	Image Chip
	Image Overview
	Image Up
	Image Update
	Jump to Location
	Layer Manager
	Left 90
	Length
	Line
	Load Data
	Loft Feature

UNCLASSIFIED

UNCLASSIFIED

	Mesh Convert
	Mosaicking
	Move Epipolar
	Move Freehand
	Move Z-Axis
	Next Tie Point
	North Arrow
	North Arrow
	North Up
	Open Session
	Open Stereo
	Orthorectification
	Pan Mode
	Pan Sharpening
	Planar Extrusion
	Point
	Point Marker
	Previous Tie Point
	Region of Interest
	Remove Count marker
	Remove From Library
	Resection
	Reverse Face
	Right 90
	Roam Mode

UNCLASSIFIED

UNCLASSIFIED

	Rotate
	Rotate 180
	Save Session
	Save Session As
	Screen Capture
	Separation Angle
	Settings
	Show 3D Viewer
	Split Edge
	Subtraction
	Swap Left/Right
	Targeting Circle
	Text Box
	Tie Point Manager
	Union
	Vector Interpolation
	View Extents
	Z Up
	Zoom
	Zoom 1:1
	Zoom Ratio
	Zoom to Box

UNCLASSIFIED

Appendix C – Notification Icons

	Raster image with no pyramid.
	Raster file with no configured SRS.

Appendix D – Roofs & Walls

	Barrel Vault
	Dome
	Gable Roof
	Gambrel Roof
	Hipped Roof
	Mansard Roof
	Parapet Roof
	Pointed Vault
	Saltbox Roof
	Wall

Appendix E – Keyboard Shortcuts

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 an object.

Glossary

A

Active Layer – a layer in the layer manager that is marked with the circle filled in.

Affine – allowing for the preserving parallel relationships

Annotation – a note of explanation or comment added to an image.

Automatic Texturing – is the automatic process of extracting and applying them to the models.

B

Backstage – the area in the application out of view of the audience, used to manage data and projects.

Brightness – is an attribute of visual perception in which a source appears to be radiating or reflecting light

C

Camera Lock – is a mechanism that groups all of the camera for each viewer and allows for the zooming and repositioning a camera to prorogate to all viewers.

Chip from ROI – taking a piece of an image within the upper-left and lower-right defined coordinates.

Color Curves

Color Transformations

Creation Group

Crop – cut an image from with a defined region.

Cursor Information – is a geographical and pixel information with respect to the placement of the mouse within a viewer.

D

Data Discovery – is the process of looking for data that meets the defined parameters.

Data Layer Manager – the section from within the application that allows editing of data.

DEM – is digital elevation model.

E

Epipolar Line

Exterior Orientation – the locations of the object points' images or the film or an electronic imaging device.

Extrude Polygon

F

Feature Extraction

Fiducials

G

Geolocation Formats

H

I

Image Chipping – refer to crop

Image Up

Interior Orientation – is the internal geometry of a camera or sensor as it existed at the time of data capture

J

K

L

Layer Manager

Left Viewer

Length

Load Data

M

MIL-STD-2525B – the military standard for Common Warfighting Symbology

N

O

Ortho

Orthographic

P

Pyramids

Q

R

Raster Data – is digital aerial photographs, imagery from satellites, digital pictures, or even scanned maps.

Region of Interest – is a selected subset of samples within a dataset identified for a particular purpose.

Reproject – is changing the projection (or coordinate system) of spatial data with another projection.

Resample - is the processing of reducing or increasing the number of pixels in an image.

Reverse Face – the process of switching the normal of a face.

RPC – Rational Polynomial Coefficient

S

Sensor Model

Session – a period devoted to a particular activity.

Spatial Reference Systems – a specific map projection, as well as transformation between different SRS.

SRS – Spatial Reference System

T

Textbox - an on-screen rectangle frame into which you type text.

U

V

Vectors

W

X

Y

Z

Acronyms

DEM	Digital Elevation Model
DTED	Digital Terrain Elevation Database
EGM96	Earth Gravitational Model 1996
EO	External Orientation
GSD	Ground Sample Distance
IO	Internal Orientation
KML	Keyhole Markup Language
KMZ	Keyhole Markup Zip
ROI	Region of Interest
SRS	Spatial Reference System
UI	User Interface
WGS84	World Geodetic System 1984