New Features in GeoCue 7.0 Products
August 06, 2010

Important Note: This guide provides information only about changes from GeoCue 6.1 to 7.0. Please see the appropriate user guide for full information regarding the use of GeoCue products.

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Getting Help

This guide contains information about using features new to Version 7.0 of the GeoCue product family.

We are sure that you will experience different problems with GeoCue that range from installation issues to defects that made it through our testing undetected. We hope that you will immediately contact us with any problems or questions and have the patience to work with us through a successful GeoCue deployment.

Please contact us via phone or email for assistance with or comments about GeoCue products.

email:

Support@geocue.com

Phone:

01-256-461-8289

Just ask for GeoCue help and you will get connected with someone who can assist you. There is usually someone in the office between the hours of 0600 and 1800 CDT, USA on weekdays. Weekends are sort of hit or miss.

Fax (always on):

01-256-461-8249

Contents

1 Introduction

GeoCue 7.0 is the major GeoCue feature upgrade release for 2010. GeoCue has now been in heavy day-to-day production (in commercial release) for about 6 years. Many of the new features that have appeared in GeoCue are a direct result of the feedback that we received from our user base of GeoCue customers.

GeoCue Version 7.0 and the associated CuePacs contain a number of new features. The highlights of these new features are described in the following sections.

Note: GeoCue Server is available in three versions. Sections that apply only to a specific version will be denoted as follows:

- GeoCue Workstation (W)
- GeoCue Professional (P)
- GeoCue Departmental (formerly Enterprise) (D)

The following is a summary of new features:

1.1 *GeoCue Server/Client:*

- New Checklist State Engine and User Interface – True state vectoring added. This is the most significant change in GeoCue 7.0
- Extensive additions to "Named Queues" (Named Configurations, new intra-entity stepping, image stepping, Annotations, Checklist step firing, etc.)
- Project Navigator - Allows you to establish Parent-Child relationships between projects and navigate between them via the Map View
- Radius Zones – Display radius bands around entities in the Map View for rapid error assessment
- Miscellaneous GUI improvements in the client – (e.g. Current Working Set entity is now highlighted in Entity Manager, font options for Measure are now on the GeoAnalysis option dialog, etc.)
- New Entity Information (primarily a table of entity vertices) on the Map View right click menu
- Bidirectional Google Earth® drive for the Map View (the Map View will now track movement in the Google Earth window)
- (D) Command Dispatch System Cluster Processing mode renamed to "Cloud" mode
- (D) New Machine Priority for the Command Dispatch System allows you to set the order in which machines in your clouds are used.
- User Manager is now a web-based interface
- License Manager is now web-based and can be run from any workstation (no need to access the GeoCue Server machine)

1.2 *Environment Builder (included with GeoCue Server)*

- Checklist definitions are now "Edit in Place"
- Attribute tables can now be imported from ESRI® Shape file DBF tables
- New Entity creation properties

1.3 *GeoCue Project Portal*

- Project Navigator allows switching between projects via the Map View

1.4 *LIDAR 1 CuePac*

- Transform LIDAR Strip coordinates on Import
- New color by elevation methods for LIDAR orthos
- New global intensity stretch for LIDAR orthos
- TerraSlave report files are now attached to entities
- Support for creation of specified LAS version – 1.1, 1.2 or 1.3
- Generate Trajectories from SBET allows setting of trajectory group based on SBET file
- Optional auto-compute of base elevation for LIDAR stereo pairs
- Edit in TerraScan can now pick which installed version of MicroStation to run

1.5 *Raster Tools CuePac*

- Image Tiler (cookie cutter) can now reproject to a different coordinate system – this is a major new feature that is very useful for multiple format delivery of ortho products
- Image Tiler now supports resampling to a different GSD
- Manage Photoshop editing sessions using the new annotation system including regenerating image overviews and tiff packets

1.6 *DEM CuePac*

- Import/Export of Intergraph DTM format

1.7 *DMC PPS CuePac (available from Intergraph)*

- Incremental addition of flight lines
- Support for new RMK-D models
- LUT Group folders may be copied across projects

1.8 *OrthoPro CuePac (New, available from Intergraph)*

(D) Completely new CuePac for integration of Intergraph's OrthoPro into GeoCue (available from Intergraph)

1.9 *Railway Feature Extraction CuePac (RFX CuePac)*

All new CuePac for release 7.0. This is used in support of collecting and managing features for Positive Train Control projects.

1.10 *GeoCue Federator (new product for GeoCue 7.0)*

- User Manager - "Federates" users across multiple GeoCue Departmental Servers
- License Manager - "Federates" licenses across multiple GeoCue Departmental Servers allowing license pooling.

NOTE: Purchasers of GeoCue Federator will receive an update in the Fall of 2010 for the Federated version of GeoCue Dashboard

2 GeoCue Server and GeoCue Client

This section contains the highlights of new features in the core GeoCue products; GeoCue Server and GeoCue Client.

2.1 *Checklist State Logic*

Prior to version 7.0, the GeoCue Checklist was a linear flow. Backward movement required the user to rerun a step simply based on knowledge of the process. GeoCue 7.0 contains a completely new checklist "vectoring" system that allows the next step of processing to be selecting based on the results of the current step.

With this new logic, the concept of "Optional" (round checklist icon) and "Mandatory" (square checklist icon) steps are contained within the step logic itself and thus the iconic representation of Mandatory and Optional are no longer needed (they can still be presented in the checklist Graphical User Interface (GUI) but they have no associated action).

Note that Checklists are created and/or modified via the Checklist tab of Environment Builder. See the "Environment Builder User Guide" for details.

2.1.1 Hybrid Step Icons

The checklist processing icons are now hybrid, with the top half of the icon representing the associated step's most recent transition status and the lower half of the icon representing the next most recent transition state. This allows you to determine if a step has previously been run and the outcome of that previous run. For example, consider the checklist of Figure 2-1. The associated entity is in the Working Set and ready to execute. This is indicated by the green title bar above the checklist (it would be red if the entity were not in the Working Set). The only step that can be executed is "Assign Macro." This is indicated by the white checklist background (or alternatively, orange if the step were currently *selected*.) The top of the Assign Macro icon is red. This means that this step was previously executed and it failed. Note that the bottom of the icon is green. This means that the step was also executed at least one time prior to the failed run. This previous run was successful (as indicated by the green color). Note the column in the checklist labeled "Count." This column lists the total number of times this step was run against the current entity. In our example, the count is 2. Finally, the most recent step that was previously executed has the step number underlined; in our example, Assign Macro (note that this changed to a lightning bolt symbol in the released product).

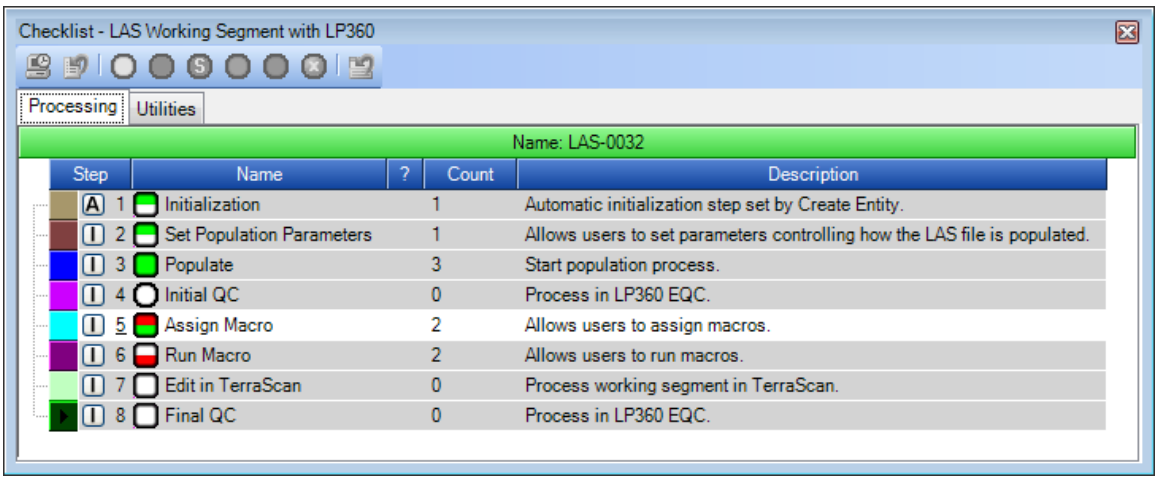


Figure 2-1: Hybrid Checklist Icons

2.1.2 Selecting Steps

When executing steps in a checklist, the available steps (those that can be executed) appear with a white background whereas those that cannot have a grey background (the associated entity must be in the Working Set for any steps to be enabled). The *selected* next step will be the highlighted step (the step highlighted in orange). In the example of Figure 2-2, Populate was the most recently run step (as indicated by the step action icon, a lightning bolt, in the checklist symbol). Note that the three steps, Initialization, Set Population Parameters and Populate have all been successfully run, one time each (as indicated by the count column). The next steps that can be executed are Initial QC, Assign Macro and Edit in TerraScan. The *selected* step is Initial QC.

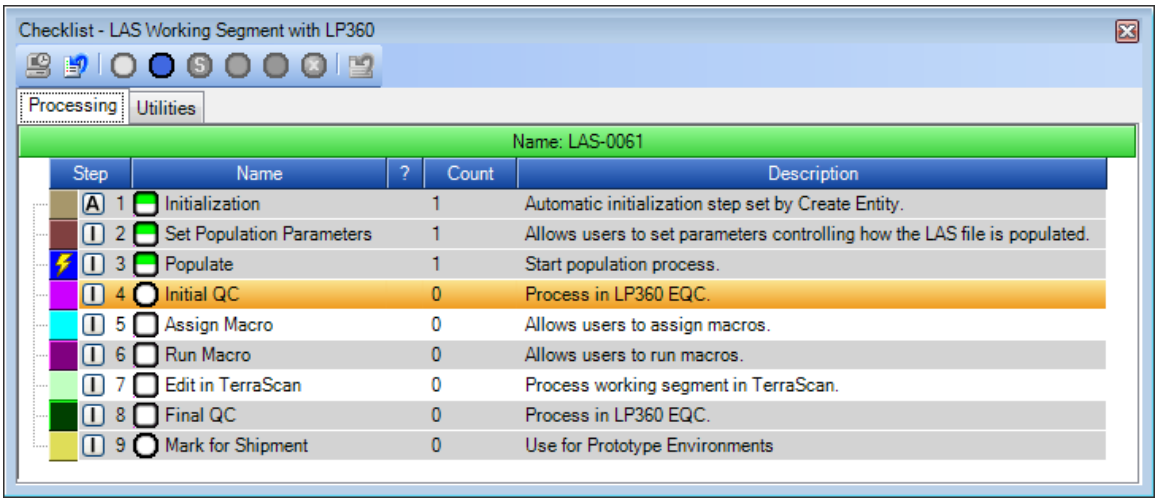


Figure 2-2: State Transition Logic

At this point, the user can execute the *selected* step by pressing the In Progress button (Blue) or can select one of the other two steps.

2.1.3 Predecessor Requirements

Each step in a checklist can list *predecessor* steps. A predecessor step is a step that must be successfully completed before the current step can be enabled for execution. A step can have more than one predecessor requirement. Note that predecessor means prior to the current step. It does not necessarily mean prior in the checklist sequence. For example, Step 4 in a checklist could have Step 8 as a predecessor requirement (this would be unusual in that good checklist designs should always have the user moving down the list).

2.1.4 Dynamic State Logic

Unlike previous versions of GeoCue, the logic of the Checklist can change depending on the current step and the outcome of the execution of a step. For example, suppose the user selects and executes the Assign Macro step of Figure 2-2. All users will see the checklist for this entity as shown in Figure 2-3. Note that the Assign Macro step is In Progress as indicated by the blue upper half of the status icon.

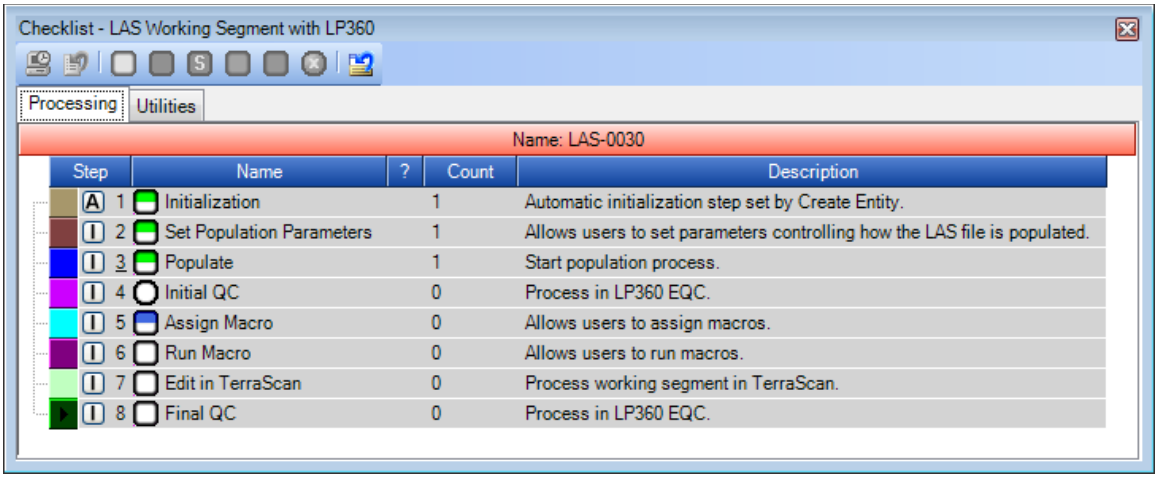


Figure 2-3: The Assign Macro step while it is In Progress

Assuming the Assign Macro step successfully completes and the entity is returned to the Working Set, the checklist changes to the state shown in Figure 2-4. Note that the only available next step is Run Macro and that this is the *Selected* step.

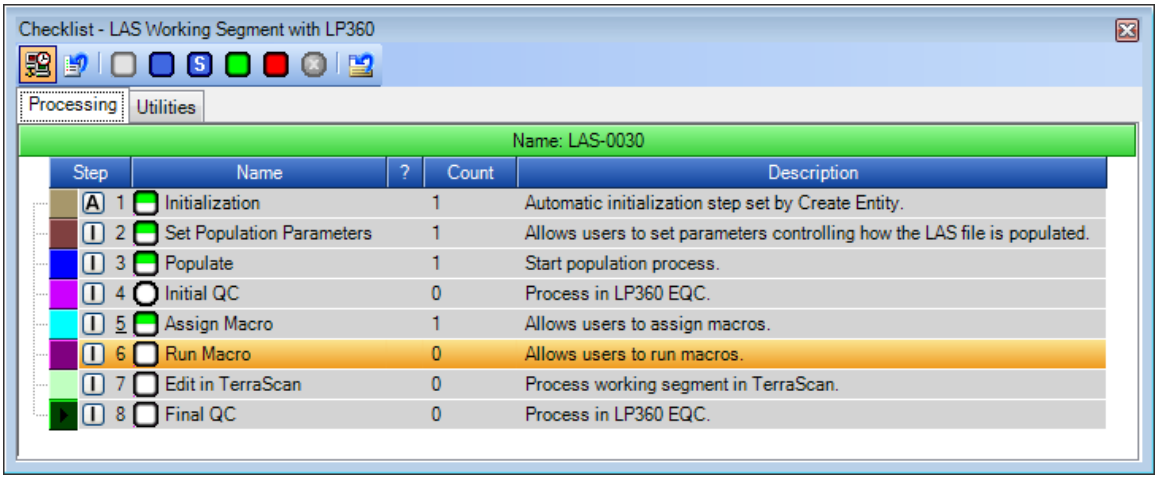


Figure 2-4: Checklist immediately following the successful completion of Assign Macro

2.1.5 Interactively Failing a Step

Interactive steps can be set to display an exit status dialog. A step that displays this dialog can enable the user to declare a Failure. An example is depicted in Figure 2-5. Note that the step that has just been executed is "Edit in TerraScan" as indicated in the title bar of the dialog. Here we are declaring a failure. When a failure is declared, GeoCue requires that a Checklist Step History Note be entered. Notice that even if you are declaring a failure, you can still set Estimate to Complete values. In our example, we are estimating that the associated tile is 10% complete. The transaction is completed by pressing the Fail button.

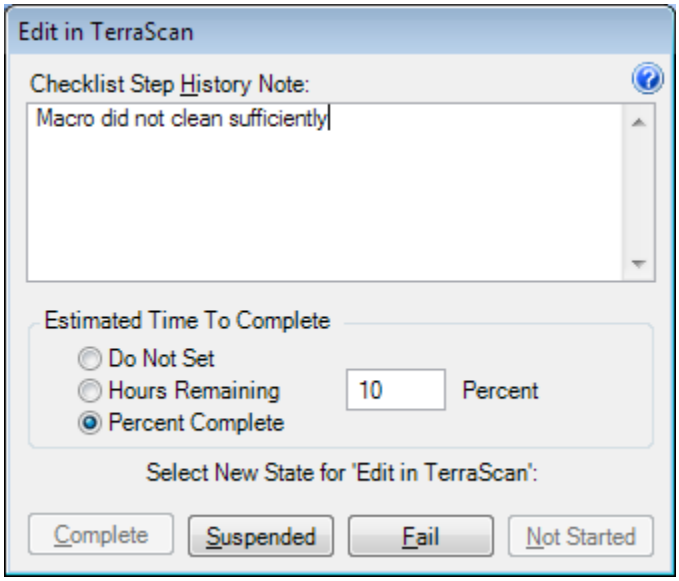


Figure 2-5: Step Exit Status dialog

2.1.6 Back Stepping in a Checklist

The logic of a checklist can be programmed to direct the next step(s) anywhere in the checklist, including previous steps. This most often occurs at an interactive step such as Editing or QC. As an example, consider the checklist state after failing the Edit in TerraScan step (Figure 2-6). We see that Edit in TerraScan was the most recently executed step (as indicated by the step action symbol, the lightning bolt, shown in the step icon of step 7)). The next possible transitions are Assign Macro or a repeat of Edit in TerraScan.

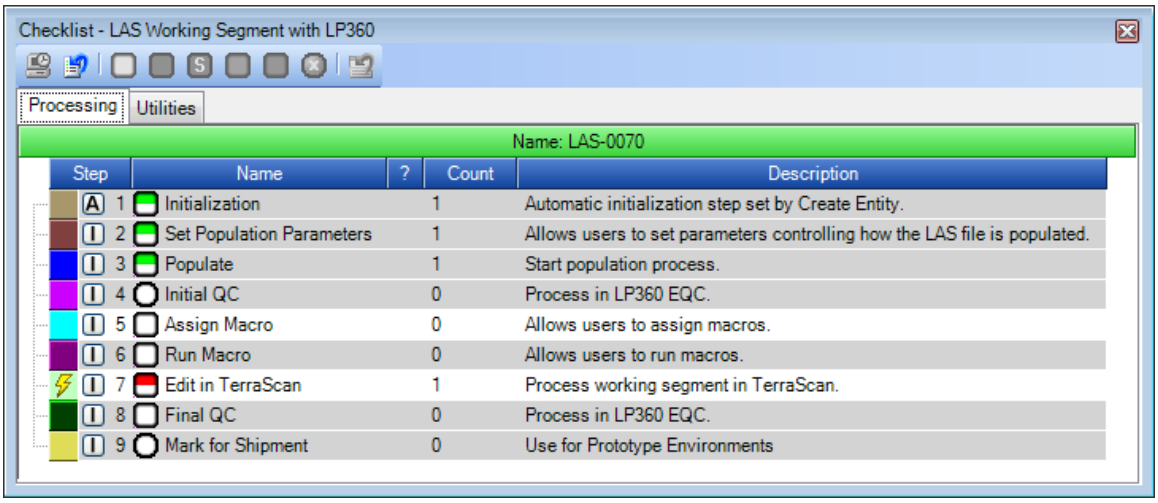


Figure 2-6: Possible steps after failing "Edit in TerraScan"

2.1.7 Overriding Step Logic

There are occasions when it is necessary to override the logic of the checklist sequence. For example, in the state of Figure 2-6, the Edit in TerraScan step has just been failed. This particular checklist has been programmed to allow the user to run either Assign Macro or repeat Edit in TerraScan. However, the user may decide that they need to repopulate the workings segments (perhaps a filter was not correctly applied during import). The programmer of a checklist can set a step to accept a manual override of the state logic sequence. This is activated by the user via the Override Step Logic button on the Checklist tool bar. In the example of Figure 2-7, pressing the Override Step Logic button (outlined in red) has caused the additional steps 2, 3 and 4 to enable.

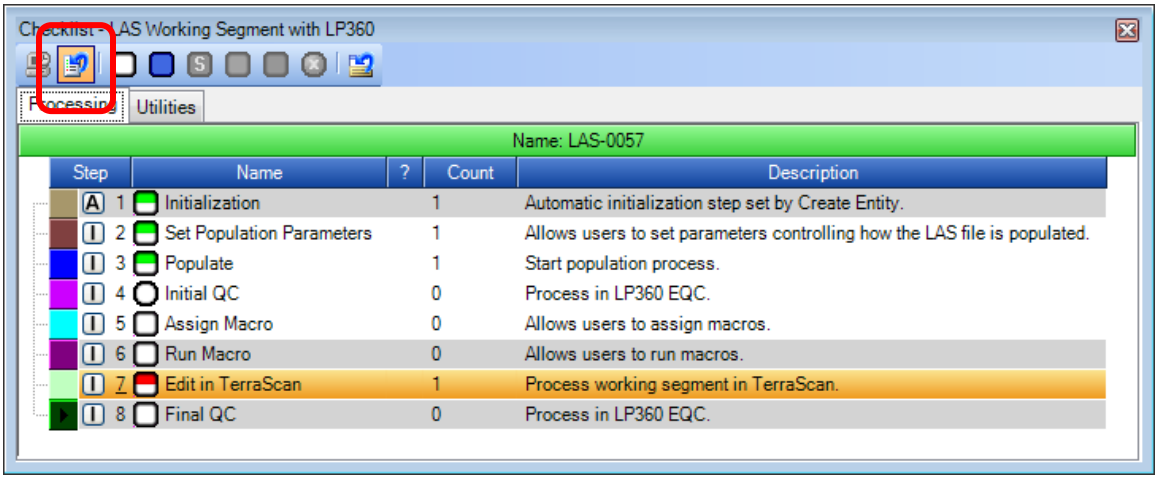


Figure 2-7: Override Step Logic

Note that the Override logic cannot enable a checklist whose predecessor step(s) have not been successfully completed.

2.2 *Named Queues*

Named Queues are used for organizing and navigating entities in GeoCue. A typical example would be using a queue to resolve issues in a collection of ortho photos. Queues allow you to logically move through a collection, control the GeoCue Map View display during navigation and perform *annotations* of the entities being navigated.

It should be noted that the Working Set of GeoCue is a Queue and that most of the functions described in the following sections can be applied to the Working Set.

2.2.1 Accessing and Using a Named Queue

A Named Queue (from here forward, simply a queue) is created from the Queue Manager tool that appears on the Working Set and Named Queue toolbars. Up to 4 Named Queue tools bars can be displayed in GeoCue. To add or remove a Named Queue toolbar, right click in the tool bar docking section of the Map View and activate, deactivate the desired Queue tool bar (Figure 2-8).

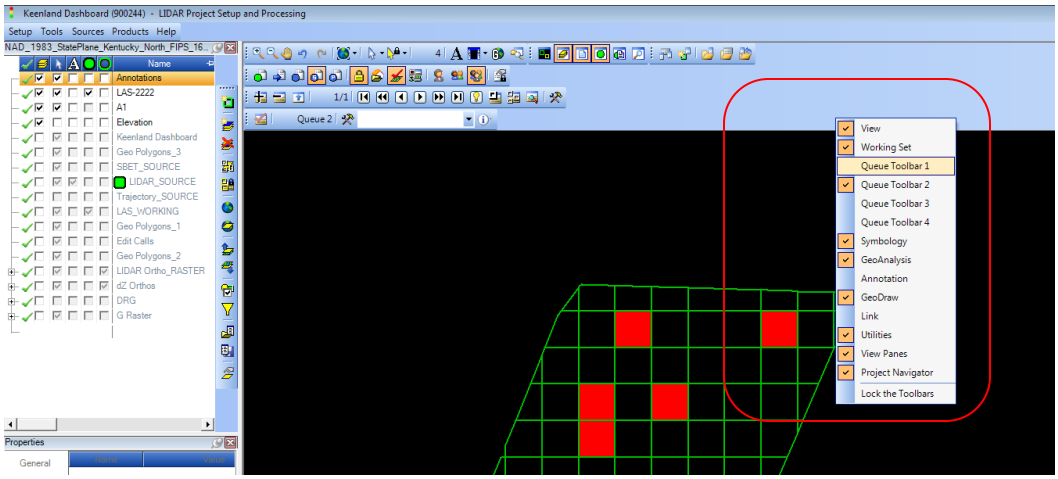


Figure 2-8: Displaying a Named Queue tool bar

To access an existing queue, simply select the queue from the drop-down list in the toolbar.

It should be noted that adding and removing entities from a queue does not affect the existence of the entity; that is, removing an entity from a queue does not *delete* the entity (This is a different operation than the Delete button on the Working Set which *does* permanently and irrevocably delete entities).

> Note – Queues hold heterogeneous collections of entities. Thus points, polylines, polygons and images can be freely mixed in the same queue. If the queue is in "intra-entity" mode (discussed below), it will automatically configure for the current entity.

2.2.1.1 The Toolbar Tools

Figure 2-9 is a Named Queue toolbar with all tools displayed. A Named Queue toolbar can be configured to display a subset of tools specific to the task at hand. Hovering the mouse pointer over a tool will display a tool tip describing its name/function. The function of each (moving from left to right) is described in Table 2-1.

Figure 2-9: Named Queue Toolbar

Table 2-1: The Named Queue Tools

Tool	Description
Move Toolbar (4 vertical dots at extreme left of the toolbar)	Move the toolbar. Left click and hold in this area to redock the toolbar. You can also float the toolbar anywhere on your monitor (even outside the GeoCue mainframe)
Active Queue	The Active Queue displays entities outlined in green in the Map View. Check to enable this display and uncheck to enable standard entity color display. Note that Entity Manager interacts with the Active Queue. Thus if you are using Entity Manager to sort queue items, ensure the desired queue is Active.
Add to Queue	Adds entities *Selected* in the Map View to this queue
Remove from Queue	Removes entities *Selected* in the Map View from this queue
Clear Queue	Removes all entities from the queue
n/m (j/k)	n is the current entity of the total m entities in the queue (this is information only, not a tool). Note that when in intra-entity mode, the position of the index within the entity itself is displayed in parenthesis (j/k). Thus if the entity is a line, j is the current vertex of k vertices. Points will always display as 1/1.
Intra-Entity Mode	If activated, the forward and reverse buttons move the queue along the vertices/distance of polygons and line strings or to the next King's Move position for images. Depending on the queue configuration, the queue will stop at the last vertex or advance to the first vertex of the next entity.
Kings-Move scale	Used to set the scale for intra-entity moves in images.
Enable Step Actions	You can configure the queue to fire a checklist step action against the current entity when you step <u>to</u> the entity and/or step <u>away</u> from the entity. When depressed, this toggle button enables the firing of the checklist actions. Note that when it is initially pressed to enable, the Step To action immediately fires against the current entity. When it is pressed to disable (or you change the number of entities in the queue), it immediately fires the Step Away action.
First	Moves to the first entity in a queue if not in Intra-Entity mode. Moves to the first vertex or king's move position if in Intra-Entity mode

Tool	Description
Auto-Play Backward	Automatically backup up the queue at the rate set in the queue configuration (intra-entity reverse if in intra-entity mode). This button converts to a Stop button when play mode is active.
Previous	Backs up one entity (or vertex or king move if in intra-entity mode)
Next	Advances one entity (or vertex or king move if in intra-entity mode)
Auto-Play Backward	Automatically advances the queue at the rate set in the queue configuration (intra-entity if in intra-entity mode). This button converts to a Stop button when play mode is active.
Last	Moves to the last entity in a queue if not in Intra-Entity mode. Moves to the last vertex or king's move position if in Intra-Entity mode.
Create Annotation	Creates an annotation and links the annotation to the current entity. Multiple annotations can be linked to the same entity.
Flash	Causes the current entity to flash in the Map View (obviously this will not be seen if the current entity is not within the current display region of the Map View)
Select Current Queue Entity	*Selects* the current queue entity
Select Queue Entities	*Selects* all queue entities
Add Current Queue Entity to the Working Set	Adds the current queue entity to the working set.
Add entire queue to the working set	Adds all entities in the queue to the Working Set
Fit Queue	Fits the Map View to the Minimum Bounding Rectangle of all entities in the queue
Queue Manager	Invokes Queue Manager to the Configuration tab
Queue Name and Type	The Queue name appears in the drop-down portion of the dialog. The symbol to the left of the name indicates the Publish status of the queue. A multi-workstation symbol indicates that the queue is Published whereas a single workstation icon indicates that the queue is not Published.

Tool	Description
System Info	Queues are often used in GeoCue as problem indicators. If so, we typically post a System Message to each queue element. This icon will display the associated message.

2.2.1.2 Intra-Entity Mode - Vectors

The Intra-Entity mode button toggles the queue between navigating from entity to entity to navigating within an entity. Note that if this button does not display on your named queue toolbar, the queue has not been enabled for intra-entity mode. You can enable and disable this feature from the queue configuration tab in Queue Manager (discussed below).

When Intra-Entity mode is activated, the queue advances or reverses from node to node. A node can be a vertex or a specified distance, depending on the settings in the queue configuration.

Thus if the current entity is a polyline and the configuration is set to *vertex* mode, the queue will advance/reverse from vertex to vertex along the polyline. Depending on the configuration settings for the queue, the queue will either stop when it reaches the end of the entity or advance/reverse to the next entity.

Toggling the Intra-Entity button switches the queue mode between Intra and Inter entity.

Note that since a point comprises a single vertex, the forward/reverse buttons will do nothing if the End of Entity mode is set to stop or move to the next point if the End of Entity mode is set to Move to next entity.

Vector intra-entity mode can be very useful for the meticulous inspection of images that are traversed by polylines such as seam lines in orthophoto production.

Note – You can use the Intra-Entity mode with a GeoAnalysis polyline to create "Snail Trail" inspectors. Simple draw a GeoAnalysis polyline that indicates the search path. Set the configuration of a Queue Configuration to the distance to be moved on each increment (for example, 25 meters), the Navigation mode to "Window Center" and the desired playback timing. Place the polyline in the queue and autoplay.

2.2.1.3 Intra-Entity Mode – Images (King's Move)

When the current entity is an image and intra-entity mode is enabled, the queue advances and reverses based on a scale setting. This scale is set and reset via the King's Move tool on the Queue Toolbar (note that this tool is not displayed until Intra-Entity mode is enabled). When you press the King's Move button, GeoCue superimposes a virtual grid over the image, the size of each grid determined by the magnification and Map View window size at the time you press the King's Move tool. When you navigate in Intra-entity move, GeoCue advances or reversed in King's Move (horizontal) fashion through this virtual grid. You can specify a percentage overlap in the Queue Configuration parameters.

King's Move can be combined with other queue tools to create a sophisticated image inspection system. Useful combinations include:

- Auto Play – Sit back and observer a large queue of images automatically advance through the display (note – pressing any keyboard button will stop auto-play)
- Auto Load/Unload images – this mode will allow you to turn on only the image that is the current entity in the display. This is very useful for inspecting collections of overlapping images.

2.2.2 Creating and Configuring Named Queues

To create a new queue, select the Queue Manager tool from the Queue toolbar (Figure 2-10). Note that if you activate Queue Manager from the toolbar of a Queue that is actively displaying a queue name (or from the Working Set Queue), Queue Manager will go directly to the Modify Queue Configuration tab. You can revert to the main Queue Manager dialog by canceling this dialog. The Queue Manager tool is also on the main display toolbar of GeoCue.

Figure 2-10: Queue Manager tool

2.2.3 Queue Manager

Queue Manager is used to create and configure queues. The Queues tab is used to create new queues (Figure 2-11).

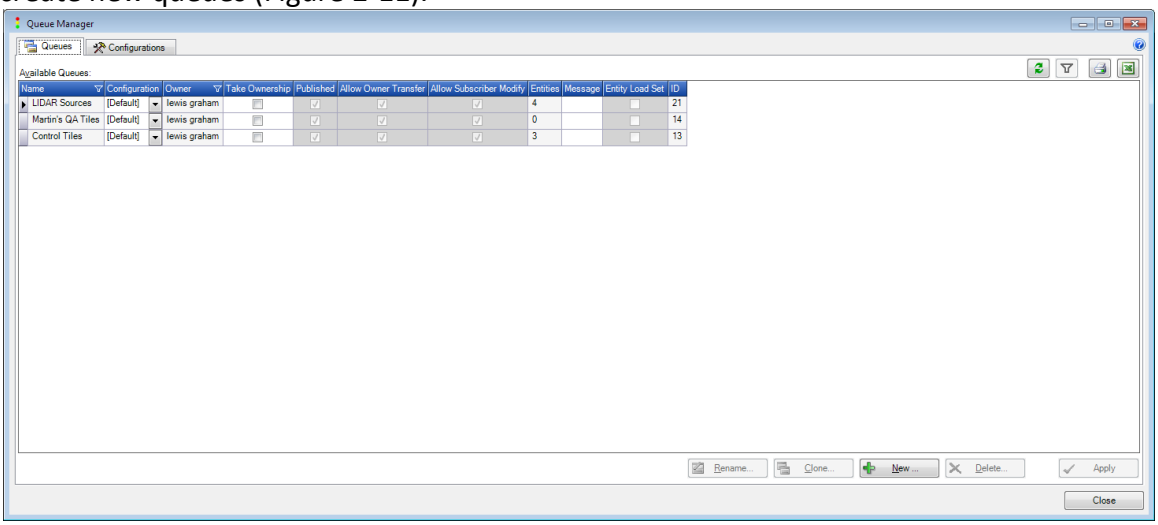


Figure 2-11: Queues tab of Queue Manager

Create a new queue by pressing the New button. You can *clone* an existing queue by selecting the queue you wish to clone and then pressing the Clone button. Note that Queues are also renamed and deleted from this tab.

You can also modify the properties of an existing queue by editing the applicable row(s). Note that you must be the "owner" of a Queue to effect changes in its configuration. If you are not the owner (and the Allow Owner Transfer check is true), click Take Ownership and press Apply. You will now be able to modify the Queue.

2.2.3.1 Creating a New Queue

When you press the New or Clone button, you will be presented the dialog of Figure 2-12. Type a name for your new queue (spaces are permitted and the name is not case sensitive). Duplicate queue names are not allowed.

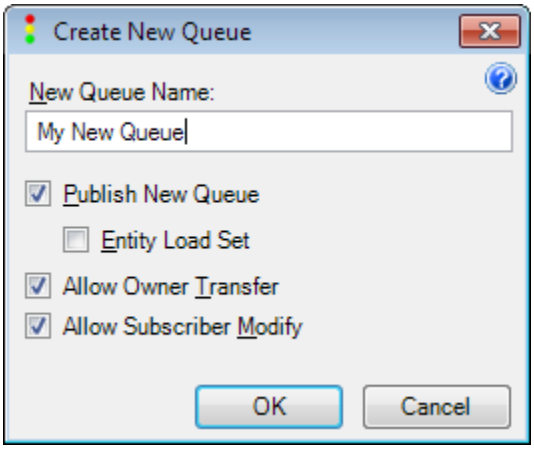


Figure 2-12: The New Queue dialog

The options on the New Queue dialog are described in Table 2-2.

Table 2-2: New Queue options

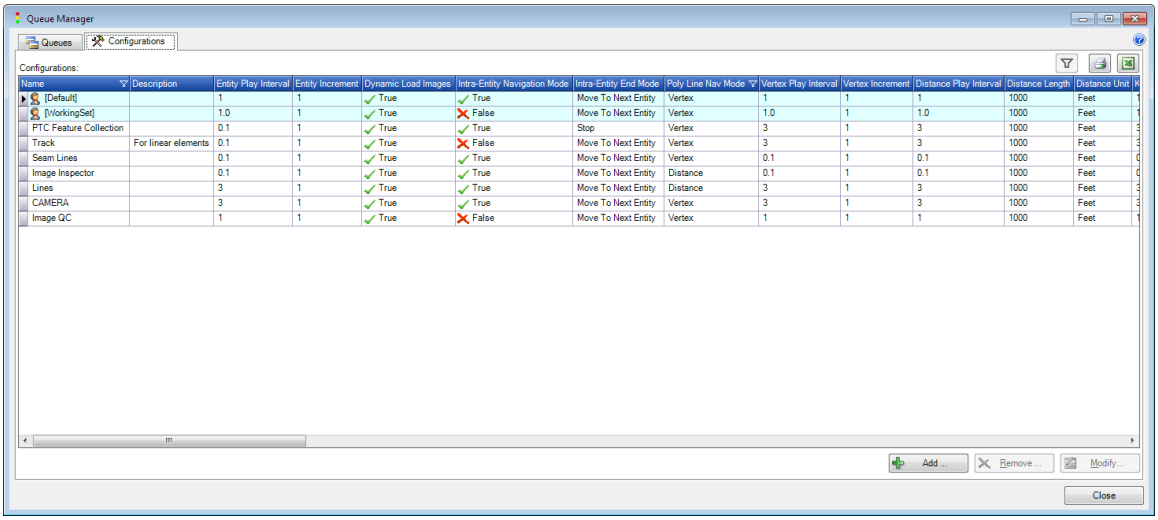
Option	Description
New Queue Name	Alphanumeric name for this queue. Spaces are allowed. The name is not case sensitive. The Queue Name must be unique
Publish New Queue	This allows other GeoCue Clients to access this queue. It also causes the queue to persist between GeoCue Client sessions. You will normally want your queues to be published (otherwise they will be deleted when you exit the project or the GeoCue Client)
Entity Load Set	This is only enabled for Published Queues. It forces the GeoCue Server to keep the Entities in this queue loaded in server memory. It is typically used to ensure rapid access to a set of entities in very large projects.
Allow Owner Transfer	You must be the owner of a queue in order to modify its configuration. This option allows anyone to take ownership of the queue.
Allow Subscriber Modify	This option allows non-owners of the queue to modify the queue content.

Clicking **OK** creates the new queue.

2.2.3.2 Named Configurations

The behavior of a queue is determined by the Configuration assigned to the queue. Configurations are assigned from a Configuration Library. Existing Configurations are assigned to Queues via the drop down "Configuration" setting on the Queues tab of Queue Manager (Figure 2-10).

New Configurations can be defined and added to the Configuration Library via the Configuration tab of Queue Manager (Figure 2-13). A New configuration is created by pressing the New button. An existing configuration can be cloned by selecting a single row and pressing the Clone button. An existing configuration can be modified by selecting the desired row and pressing modify. You can also quickly select a row for modification by double-clicking the desired row.



Name	Description	Entity Play Interval	Entity Increment	Dynamic Load Images	Intra-Entity Navigation Mode	Intra-Entity End Mode	Poly Line Nav Mode	Vertex Play Interval	Vertex Increment	Distance Play Interval	Distance Length	Distance Unit
[Default]		1	1	True	True	Move To Next Entity	Vertex	1	1	1	1000	Feet
[WorkingSet]		1.0	1	True	False	Move To Next Entity	Vertex	1.0	1	1.0	1000	Feet
PTC Feature Collection		0.1	1	True	True	Stop	Vertex	3	1	3	1000	Feet
Track	For linear elements	0.1	1	True	False	Move To Next Entity	Vertex	3	1	3	1000	Feet
Seam Lines		0.1	1	True	True	Move To Next Entity	Vertex	0.1	1	0.1	1000	Feet
Image Inspector		0.1	1	True	True	Move To Next Entity	Distance	0.1	1	0.1	1000	Feet
Lines		3	1	True	True	Move To Next Entity	Distance	3	1	3	1000	Feet
CAMERA		3	1	True	True	Move To Next Entity	Vertex	3	1	3	1000	Feet
Image QC		1	1	True	False	Move To Next Entity	Vertex	1	1	1	1000	Feet

Figure 2-13: Configuration tab of Queue Manager

2.2.3.3 Modifying Queue Behaviors

Queue behavior is modified by either assigning a new configuration to the queue or by modifying its existing configuration. The Modify Queue Configuration dialog is accessed as explained in the previous section or by selecting the Queue Manager tool on a Named Queue or the Working Set. The configuration is set via 4 tabs on this dialog.

2.2.3.3.1 General

The General tab is shown in Figure 2-14. The actions of each setting are described in Table 2-3.

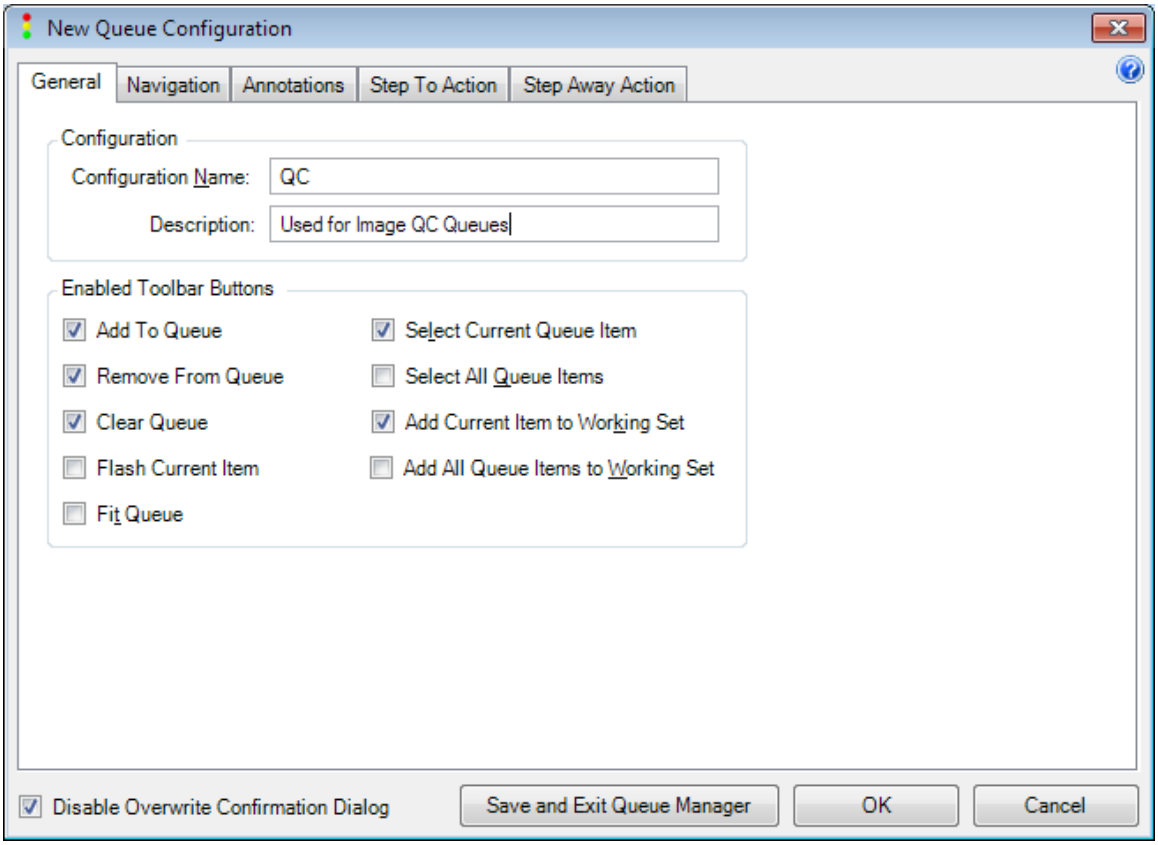


Figure 2-14: The General tab

Table 2-3: General Settings

Option	Description
Name	The name of this configuration. This can be set only when a new or clone queue is being created. The name can be any alphanumeric string. Spaces are permitted. The name is not case sensitive.
Description	An optional description of the queue (e.g. "Loads and Unloads images for Image QC")
Enabled Toolbar Buttons	When checked, causes this toolbar button to be included on the Queue Toolbar.

Option	Description
Disable Confirmation Dialog	Normally a confirmation dialog is displayed each time you modify a configuration. This can be annoying if you are making a lot of adjustments. Check this box to disable presentation of the confirmation.
Save and Exit Queue Manager	Pressing this button saves any configuration changes and completely exits Queue Manager
OK	Saves configuration changes and exits back to the main Queue Manager dialog
Cancel	Discards changes made during this session and exits back to the main Queue Manager dialog.

2.2.3.3.2 Navigation

The Navigation tab is shown in Figure 2-15. The actions of each setting are described in Table 2-4.

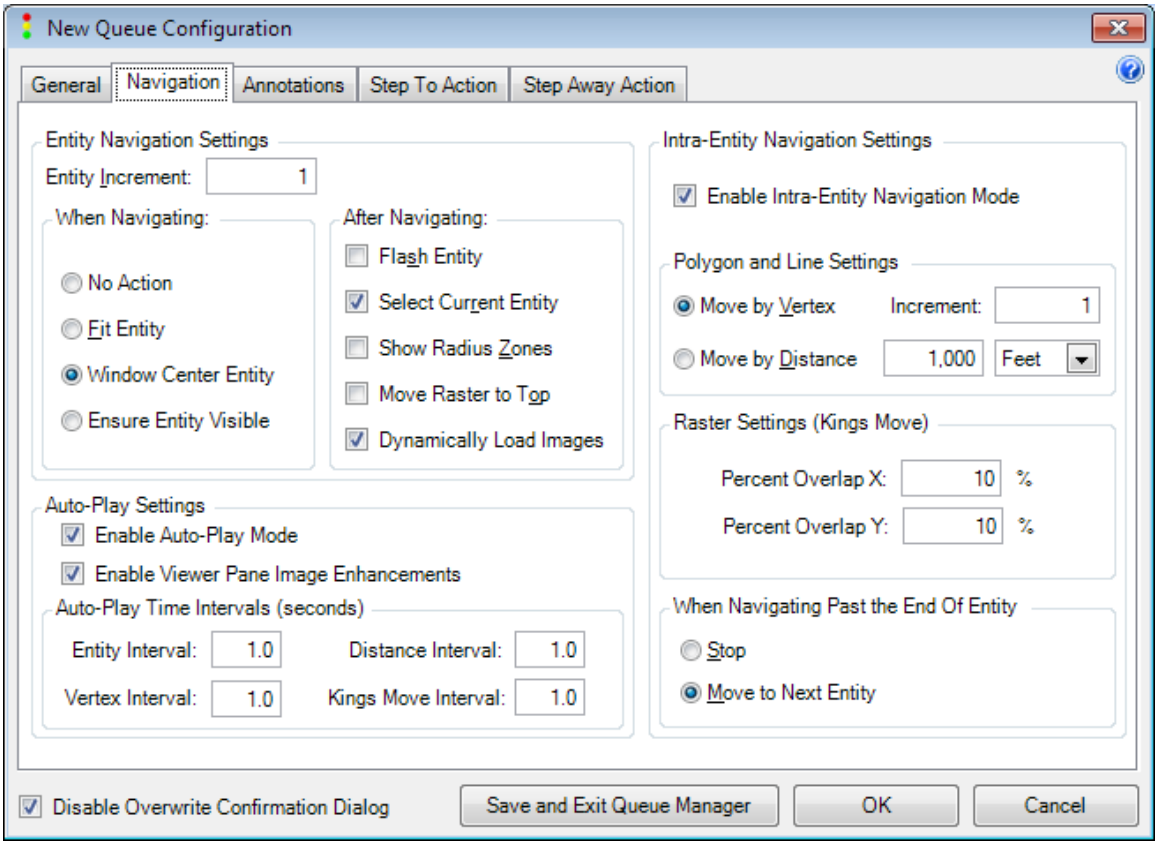


Figure 2-15: The Navigation tab

Table 2-4: Navigation Settings

Group	Setting	Description
	Entity Increment	The number of entities to advance or reverse when the forward/reverse mode buttons are pressed. Also applies to Auto-Play
When Navigating	No Action	Take no action when moving from entity to entity (typically the default action you would like for the Working Set)
When Navigating	Fit Entity	Fit the current entity when it becomes the current entity in the queue
When Navigating	Window Center Entity	Center the Map View on this entity (most common navigation mode)
When Navigating	Ensure Entity Visible	Modify the display only if the entity is not visible in the Map View
After Navigating	Flash Entity	Flash the entity (note that this can significantly slow navigating since the flash lasts for about ½ second)
After Navigating	Select Current Entity	*Select* the current entity. This is very useful if you would like to see the checklist or properties of the current entity. It is also very useful when your next action may be to add the current entity to the Working Set and execute a function. Having the entity *selected* means that its checklist will continue to display after you set a checklist state In Progress.
After Navigating	Show Radius Zones	Displays radius zones around the current entity.
After Navigating	Move Raster to Top	If the current entity is a raster, it will be moved to the top of the raster layer in which it resides. This is very useful for image inspection (but also consider the dynamic load options)
After Navigating	Dynamically Load Images	If a Raster becomes the current entity in the queue and it is Unloaded, it will be loaded. It will be immediately unloaded when it is moved out of the current entity location.
Auto-Play Settings	Enable Auto-Play Mode	Shows the Auto-Play buttons on the Queue Toolbar

Group	Setting	Description
Auto-Play Settings	Enable Viewer Pane Image Enhancements	If you have the entity viewer pane enabled and a raster viewer installed, the Raster View will apply image enhancements when the image is displayed. This is useful when Auto-Playing photo centers in a Mobile Mapping project.
Auto-Play Time Interval	Entity Interval	Length of time to display an entity prior to moving to the next entity
Auto-Play Time Interval	Distance Interval	Time between moves in Intra-entity mode, distance movement mode (applies to polylines and polygons)
Auto-Play Time Interval	Vertex Interval	Time between moves in Intra-entity mode, vertex movement mode (applies to polylines and polygons)
Auto-Play Time Interval	King's Move Interval	Time between image king's move shifts when in intra-entity mode.
Intra-Entity	Enable Intra-Entity Navigation Mode	Displays the Intra-Entity mode toggle on the Queue Toolbar
Intra-Entity: Polygon and Line Settings	Move by Vertex	Setting this option causes the polyline, polygon intra-entity movement to advance by the number of vertices set in the Increment box.
Intra-Entity: Polygon and Line Settings	Move by Distance	Setting this option causes the polyline, polygon intra-entity movement to advance by the distance set in the distance box.
Intra-Entity: Raster Settings	King's Move Percent Overlap	King's Move is performed on images by a dynamic scale setting created and modified by a tool on the Queue Toolbar. These settings specify how much overlap should be applied when shifting the display location.
Intra-Entity: End of Entity	When Navigating Past the End Of Entity	Specifies the behavior when the end of the current entity is reached while in Intra-Entity navigation mode. You will usually want this set to Move to Next Entity.

2.2.3.3.3 Annotations

An entity Annotation system is integrated into the Named Queue system of GeoCue. The Annotation tab is shown in Figure 2-16. The actions of each setting are described in Table 2-5. The use of the Annotation system is described in a separate section.

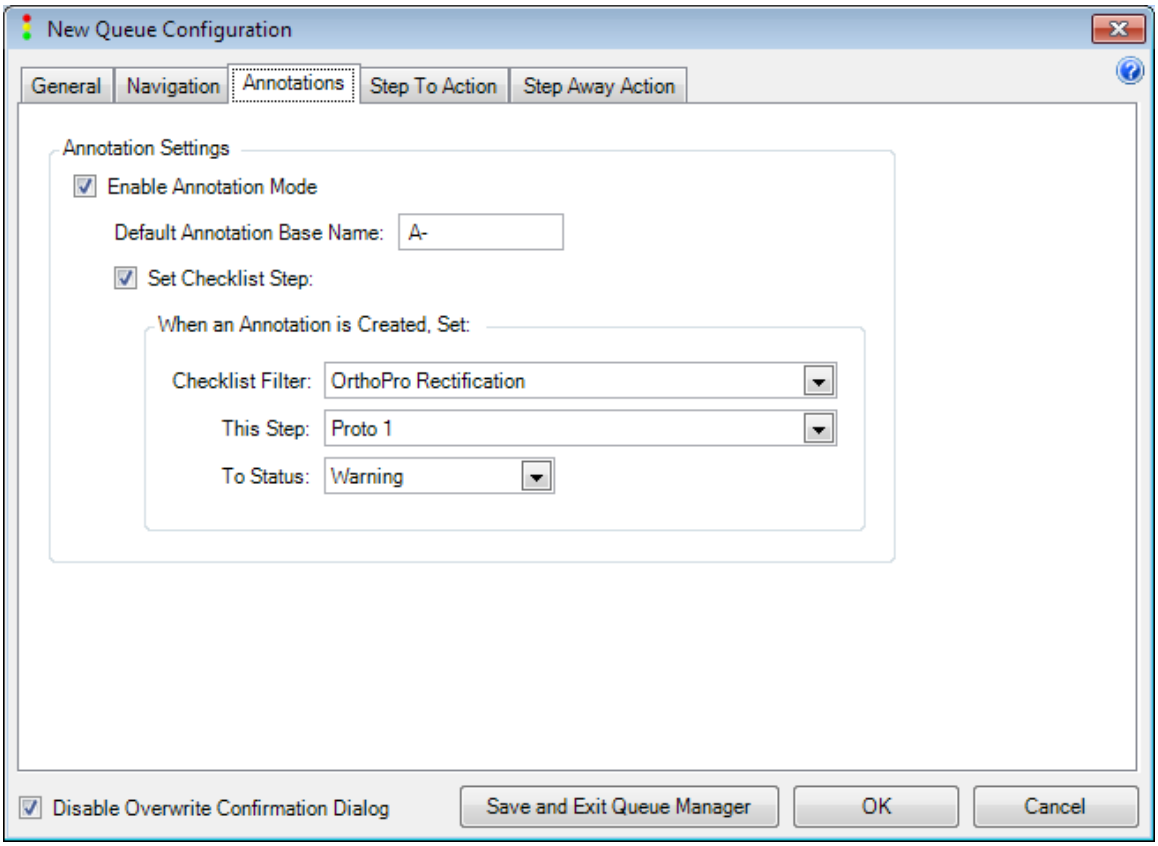


Figure 2-16: The Annotation tab

Table 2-5: Annotation Settings

Setting	Description
Enable Annotation Mode	Causes the Annotation tool to be displayed on the Queue toolbar
Default Annotation Base Name	An alphanumeric string that will be displayed in the Annotation dialog in the Name box. The Annotation dialog will automatically append a unique integer to this base name, alleviating the user from naming the annotation.

Setting	Description
Set Checklist Step	This option allows you to specify a checklist step action that is to be applied to the *current* entity if an Annotation is created.
Checklist Filter	Used to select a GeoCue Checklist
This Step	The Checklist step that you want to transition if an Annotation is created.
To Status	The state you would like the checklist step set to if an Annotation is placed

In the example of Figure 2-16, if an Annotation is placed, the Checklist Step "QC Ortho" of the current entity will be toggled to Warning. Note that if the current entity does not have a QC Ortho checklist step, no action will be performed.

The typical use of the checklist action is to flag a QC step as a Warning or Failure if an Annotation is placed on that entity. This function being built into the Named Queue mechanism automates the recording of problems.

2.2.3.3.4 Step To Action/Step Away Action

The Name Queue system can fire a checklist step action against an entity when that entity is shifted in to the current entity (Step To Action) and a different action when the entity is shifted out of the Current entity position (Step Away Action). The Step Action tabs are shown in Figure 2-17. The actions of each setting are described in Table 2-6.

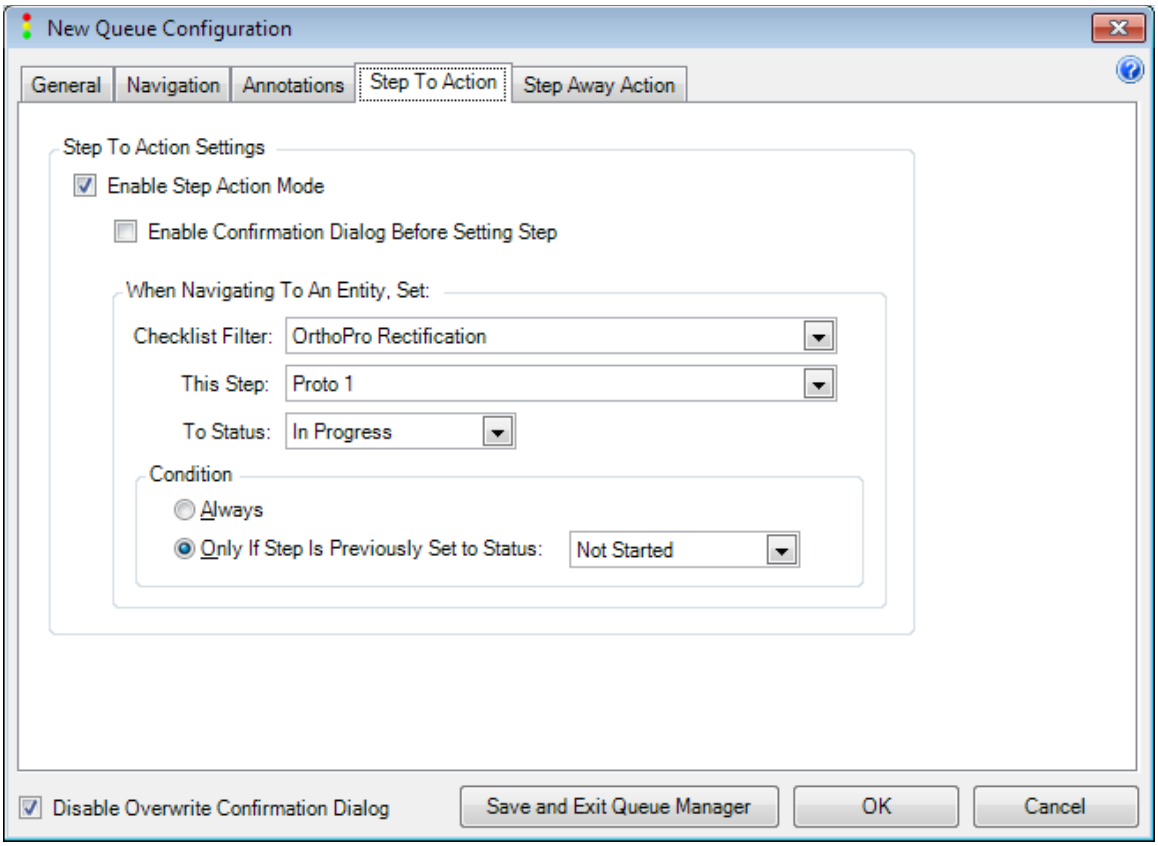


Figure 2-17: The Step Action tab

Table 2-6: Step Action Settings

Setting	Description
Enable Step Action Mode	Turns on the Step Action mode
Enable Confirmation Dialog before setting step	A confirmation dialog will be displayed prior to the checklist step being set
Checklist Filter	Allows selection of a specific Checklist
This Step	The step to set
To Status	The state to set on the selected Checklist Step

Setting	Description
Condition	Always – Always set the step to the requested value Only if Step is Previously Ste to Status … - This will toggle the state only if its current state is the value set in the drop-down. This is typically used in conjunction with the Annotation checklist setting. For example, if an annotation set a QC step to Warning, you would not want this function to set it to Success.

Note that firing of the step actions is controlled by the Enable Step Actions toggle tool, , on the Queue toolbar. Note that when this tool is not activated, no step actions will fire. When this tool is first pressed (toggled on), the Step To action fires on the current entity. When the tool is again disabled, the Step Away action fires against the current entity. This design allows you to set up the queue and navigate to your desired location without firing checklist steps. When you are positioned on the desired entity, the enabling action fires the initial Step To action. This allows you to control the checklist step firing without the need to perform convoluted operation such as stepping off and on an entity. It also allows you to correctly fire steps against a single entity.

2.2.4 Annotations

In GeoCue, an Annotation is a geospatial entity (point, polyline, polygon) with an associated note. Additionally, the annotation generally *links* to one or more entities. Annotations are typically used to denote a problem (although this is certainly not a requirement). For example, annotating a problem such as a distorted bridge deck would involve:

1. A polygon circumscribing the problem
2. A *link* from the annotation polygon to the ortho product containing the defect
3. An associated set of attributes that describe the problem

GeoCue has had an annotation system since its initial release. This system is accessed via the Annotation Toolbar. We are in the process of replacing the original system with a new set of functions. We have partially released this system with GeoCue 7.0. We will eventually deprecate the old annotations with the new queue oriented system. The primary reason for this change is that we have discovered via user feedback that while the creation of annotations tends to be generic (e.g. draw a polygon around a problem and write a note), the resolution of the associated problem is very specific. For this

reason, the resolution system in the standard annotation system has proven to be fairly inflexible.

Every environment in GeoCue now contains new layer definitions for placing the annotation entities. These are:

- Point_ANNOTATION
- Polygon_ANNOTATION
- Line_ANNOTATION

The creator of a workflow defines Annotation entities for the workflow. Version 7.0 of GeoCue includes two example annotations types. These annotations are:

- OrthoProblem_Annotation (polygon)
- SeamProblem_Annotation (polygon)

You can easily add additional annotation types via Environment Builder.

2.2.4.1 Configuring Annotations

The configuration of annotations is performed using the Annotation and, optionally, Step Action tabs of the Queue Manager – Configuration dialog. These configurations were described in the configuration section of Named Queues. Checking the Enable Annotation option adds the Annotation tool to the named queue toolbar.

There are two checklist actions that can be used with annotations. Both of these actions apply to the *current* queue entity. For example, if you are reviewing a queue of orthos, the checklist actions will be applied to the current ortho.

The first is configured on the Annotation tab. This option will cause a checklist event to automatically fire if you create an annotation. Note that regardless of where you physically place the annotation, the checklist event applies to the *current* entity. This feature is designed to be used to fire a QC step on the entity, indicating that a problem has been recorded against this entity. This allows you to find all of the problem entities using symbology or Entity Manager. It also enables problem tracking in GeoCue Dashboard. As an example see Figure 2-18. Here we have configured an Ortho Inspector Queue to transition the Ortho QC step to Warning if an annotation is placed. Note that if no annotations are placed while an Ortho is the current entity, the checklist is not changed by this setting.

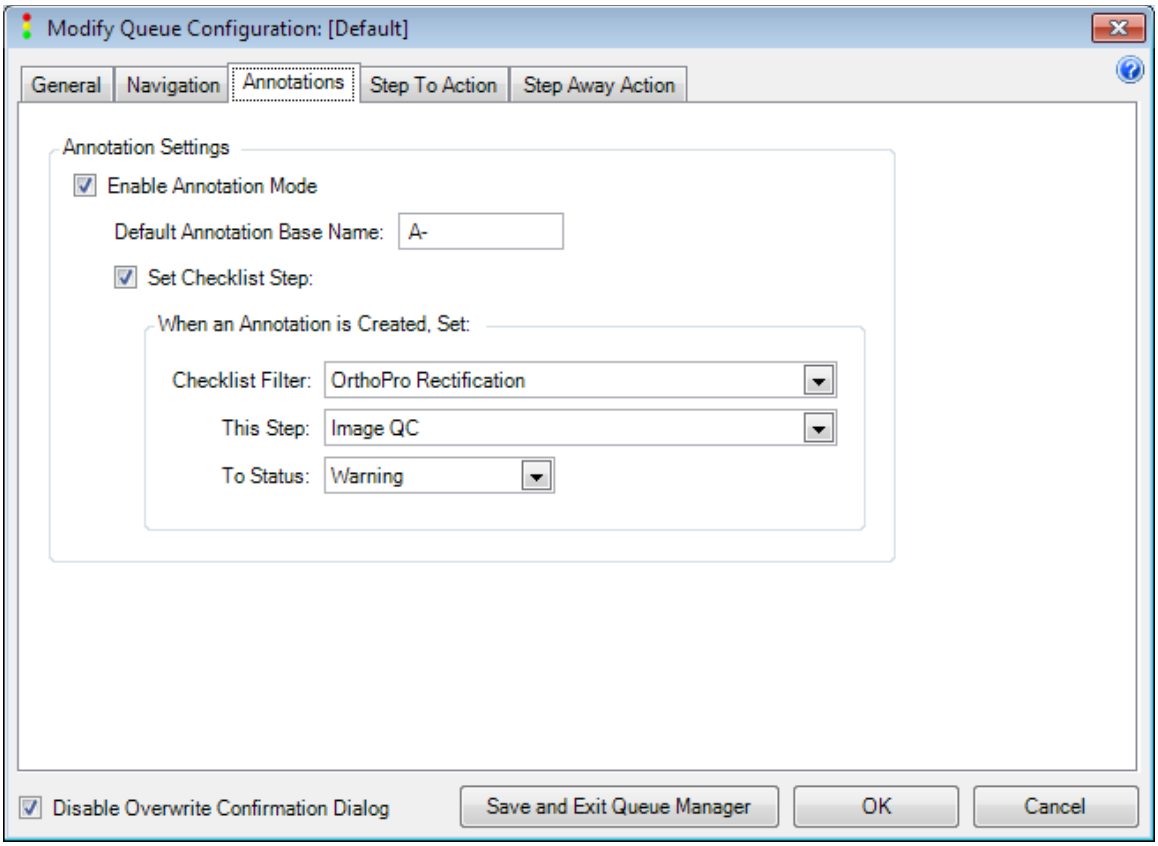


Figure 2-18: The Checklist Step Action fires when an annotation is placed

If you inspect an entity and an annotation is not placed, the checklist will remain undisturbed. However, you typically would like an indication that the QC operation has been successfully completed. To address this need, a second checklist action is configured on the Step Away Action tab of the Queue Manager -> Configuration dialog. This action also fires against the *current* entity. It will fire a single time, as the entity is moved out of the Current location (e.g. if you step off of this entity). It can be used in a multitude of ways but it was designed to indicate a successful QC of the current item if an annotation was not placed. This is accomplished by examining the QC step. If an annotation was not placed, this step will be set to, for example, Not Started (or In Progress if you use the Move To action). By conditionally firing the step (set to Complete only if previously set to In Progress), the QC step is automatically set as you move past entities. The configuration for our Ortho inspector is depicted in Figure 2-19.

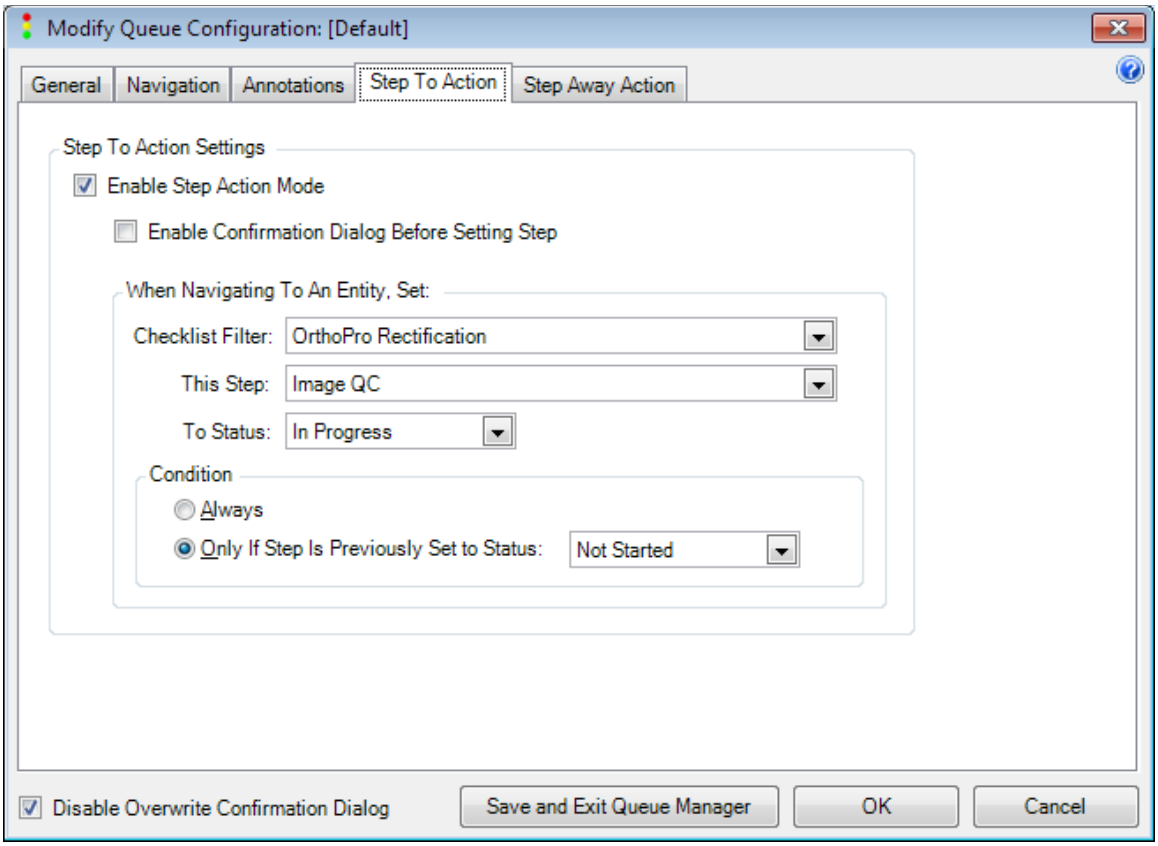


Figure 2-19: The Step To checklist action

Finally, we need to set the Checklist to In Progress when we move on to the entity. This is used to indicate that QC has started on the current entity. This setting is accomplished via the Step To Action depicted in Figure 2-20.

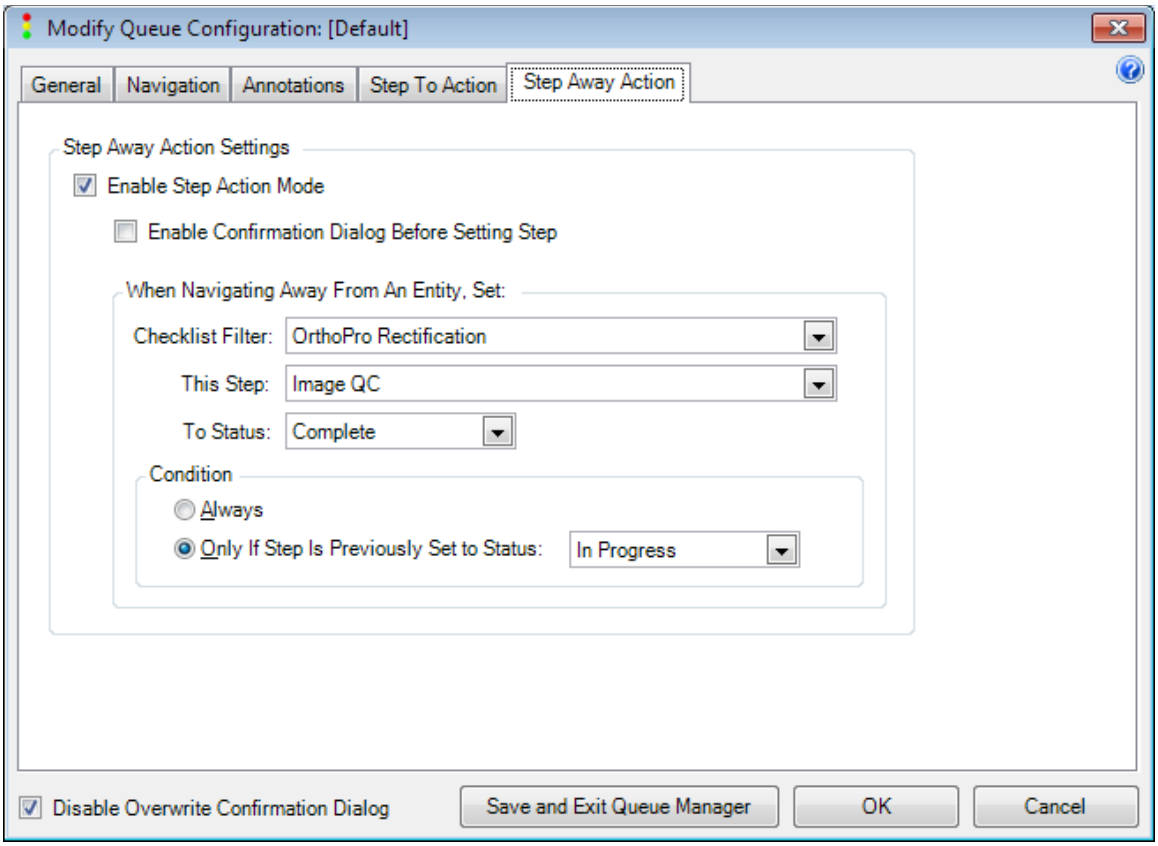


Figure 2-20: The Step Away checklist action

Combined with Auto-Play, these checklist actions can make for a very fast yet extremely well organized QC workflow. For example, in reviewing orthos, you can place 100's of orthos in a Queue, set the king's move intra-entity stepping mode and auto-play the entities. If a problem is seen, press a key to stop auto-play and place an annotation. When the queue has been traversed, all orthos for which an annotation was not placed will have a Success QC state. All orthos with annotations will have their QC state set to Warning (or whatever transition you select).

2.2.4.2 Placing Annotations

New Annotations are created while navigating a queue. When a problem (we use Problem as an example but annotations can, of course, be used for any notational purpose) is detected, press the Annotation button on the Queue toolbar (see the tool outlined in red in Figure 2-21).

Figure 2-21: The Annotation tool

This will cause the Create Annotation dialog of Figure 2-22 to display. These fields are filled out as indicated in Table 2-7. Simply fill out the fields and draw/place the annotation.

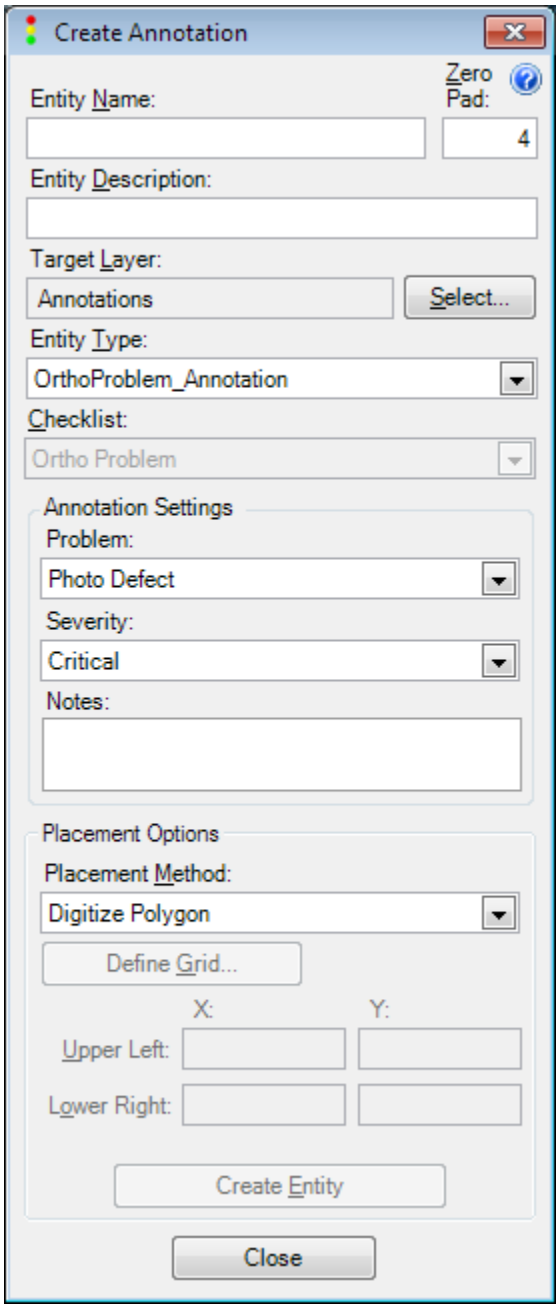


Figure 2-22: The Place Annotation dialog

Table 2-7: Annotation Fields

Setting	Description
Entity Name	Type in a name for the annotation. This can be any alphanumeric string. Note that you can use Environment Builder to require a unique name.
Zero Pad	Not used for Annotations
Entity Description	Optional alphanumeric description string. This is typically not used with Annotations since there are other fields for the problem description
Target Layer	Select an annotation layer that is appropriate to the type of annotation being created (point, line, polygon). If you have not created an annotation layer for the project, you will be led through the normal GeoCue Create Layer process. Once you have created the first annotation, this setting is "remembered" for subsequent placements.
Entity Type	Select the entity type that is associated with this problem from the drop-down list of entity types. Note that you can add your own types using Environment Builder.
Checklist	Your annotations may have an associated checklist. This is typically used in advanced problem resolution. For example, the GeoCue Raster Tools CuePac includes tools to allow ortho QC annotations to load the offending ortho into Photoshop and fix up GeoTIFF packets and overviews upon exit.
Problem	Select the specific problem type from the drop-sown list. You can add to this list using the Attribute tab of Environment Builder
Severity	Optional – Set the severity of the problem. This is notational only - GeoCue does not use this field.
Notes	This is a location for free-form notes regarding the problem. You can enter any text string in this field.
Placement Method	This is the standard GeoCue Entity placement type. You can use any type associated with the particular entity (e.g. point, line, polygon). The most typical method is Place Point for point annotations or Draw Polygon for polygonal annotations.

As an example, we drew an annotation over an image using the above described techniques. This is depicted in Figure 2-23. Note that the Ortho QC step on the associated ortho automatically toggled to Warning.

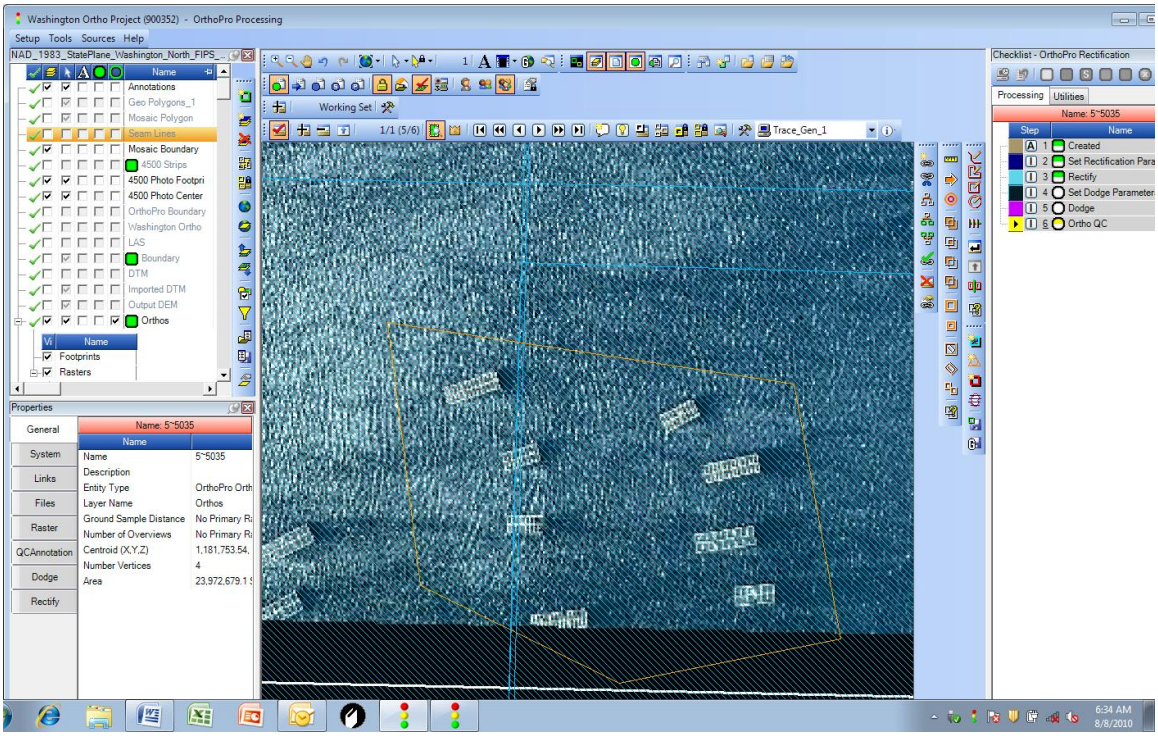


Figure 2-23: An annotation (orange polygon) with the annotated image selected

You can easily find the associations between annotations and the entities to which they were applied by using the GeoCue Linking tools to trace the links.

2.3 *Project Navigator*

Project Navigator is a new set of tools in GeoCue to manage hierarchical projects. You can establish parent-child relationships between projects and use the Map View to navigate between them. For example, you might have a hierarchy of a rail Network comprises Divisions and Divisions comprise Subdivisions. Thus the Network could form the top level project, Divisions would be children of the Network and finally, Subdivisions would form children of their parent Division. Figure 2-24 depicts a simple project being used for navigation. Here we simply added a graphic of the United States and inserted four rail projects. Navigation is accomplished by simply selecting the desired Child project and pressing the Open Child Project tool.

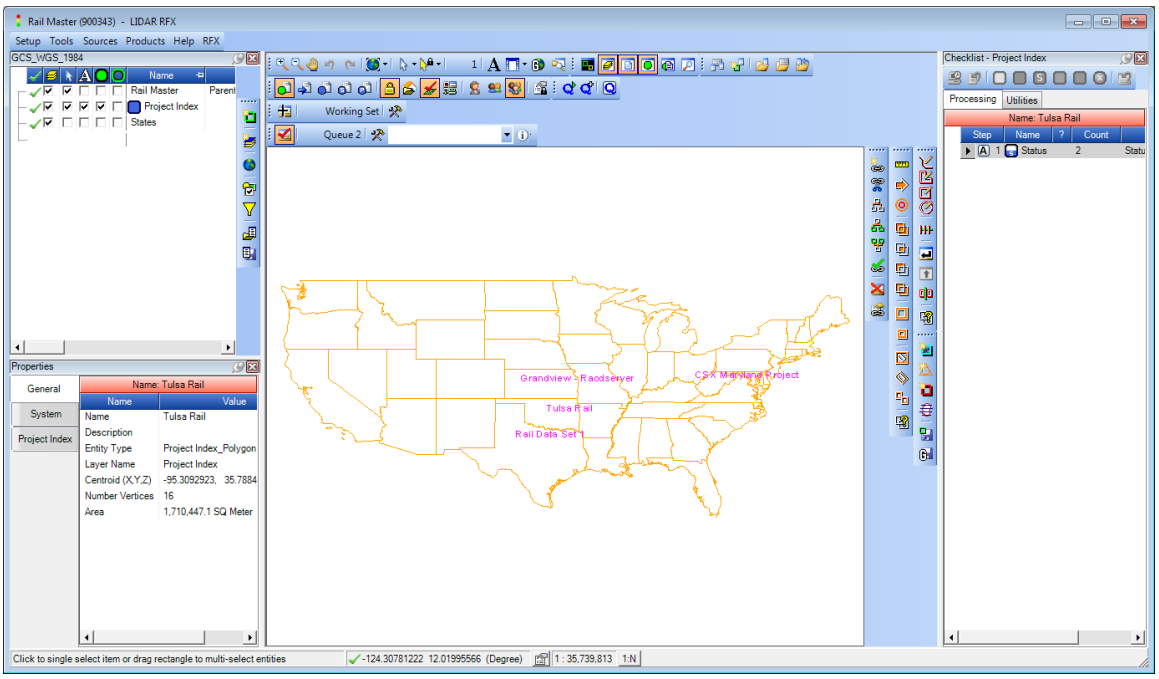


Figure 2-24: A parent Project used for project navigation

The projects that participate in Navigator hierarchies are in all respects standard GeoCue projects.

Note that there is no restriction on the number of parents or children a project can have (although navigation is more direct with single parent relationships).

2.3.1 Project Navigator Toolbar

A new Project Navigator toolbar has been added to GeoCue. Display this toolbar by right clicking in the toolbar area of the Map View and checking Project Navigator (Figure 2-25).

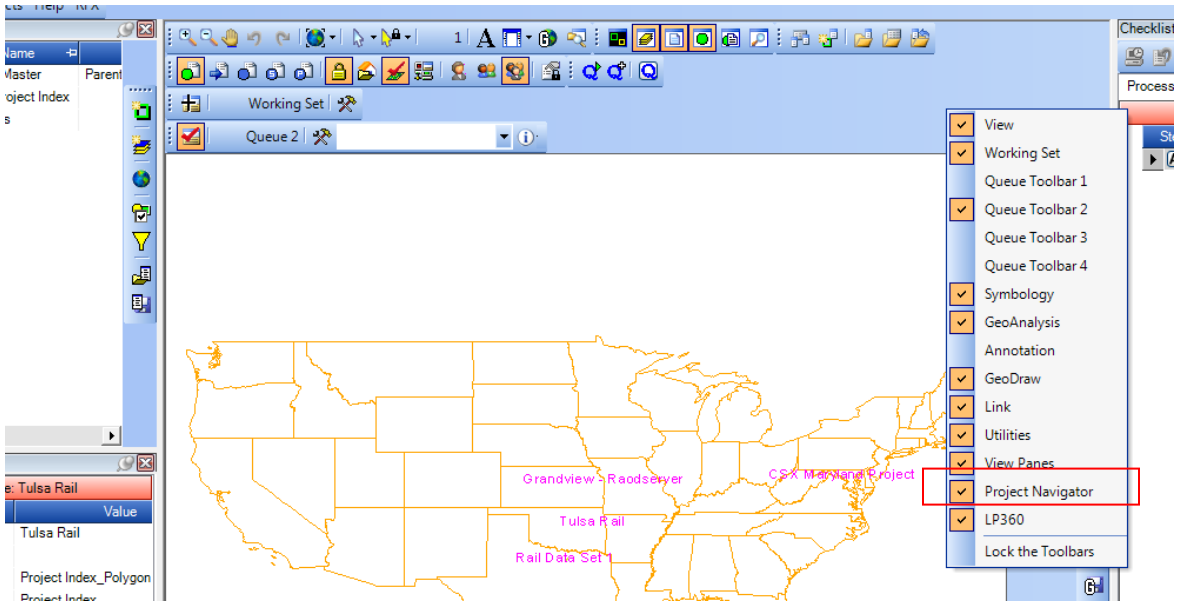


Figure 2-25: Adding the Project Navigator toolbar

The toolbar is depicted in Figure 2-26.

Figure 2-26: The Project Navigator toolbar

The function of each tool (moving from left to right along the toolbar) is described in Table 2-8.

Table 2-8: Project Navigator Toolbar tools

Tool	Icon	Description
Docking		Left click and drag in this area to undock the toolbar
Mange Child Project		Displays a dialog that allows you to change Parent-Child relationships

Create Project Index Boundary		Tool for specifying the shape that will be published to Parent projects to represent the graphic index of this Child project
Open Child Project		If a single graphic index of a Child Project is *selected* in the Map view, this tool will cause the current project to close and the selected Child project to open
Open Parent Project		If this project has a single parent, causes this project to close and the parent project to open. If this project has more than one parent, displays a selector dialog from which you can select the desired parent.
Open Prior Project		Opens the most recently navigated project prior to this project. This is most useful for moving back and forth between a child project and a parent project.

2.3.2 Creating Navigator Relationships

You can specify a parent project when you create a new project or at anytime thereafter. Hierarchies are dynamic and thus they can be modified anytime you desire.

You will notice that the Create Project dialog (Figure 2-27) now contains a section where you can select Parent Projects. Simply select all of the parents (for most cases, this will be a single parent) when creating the project.

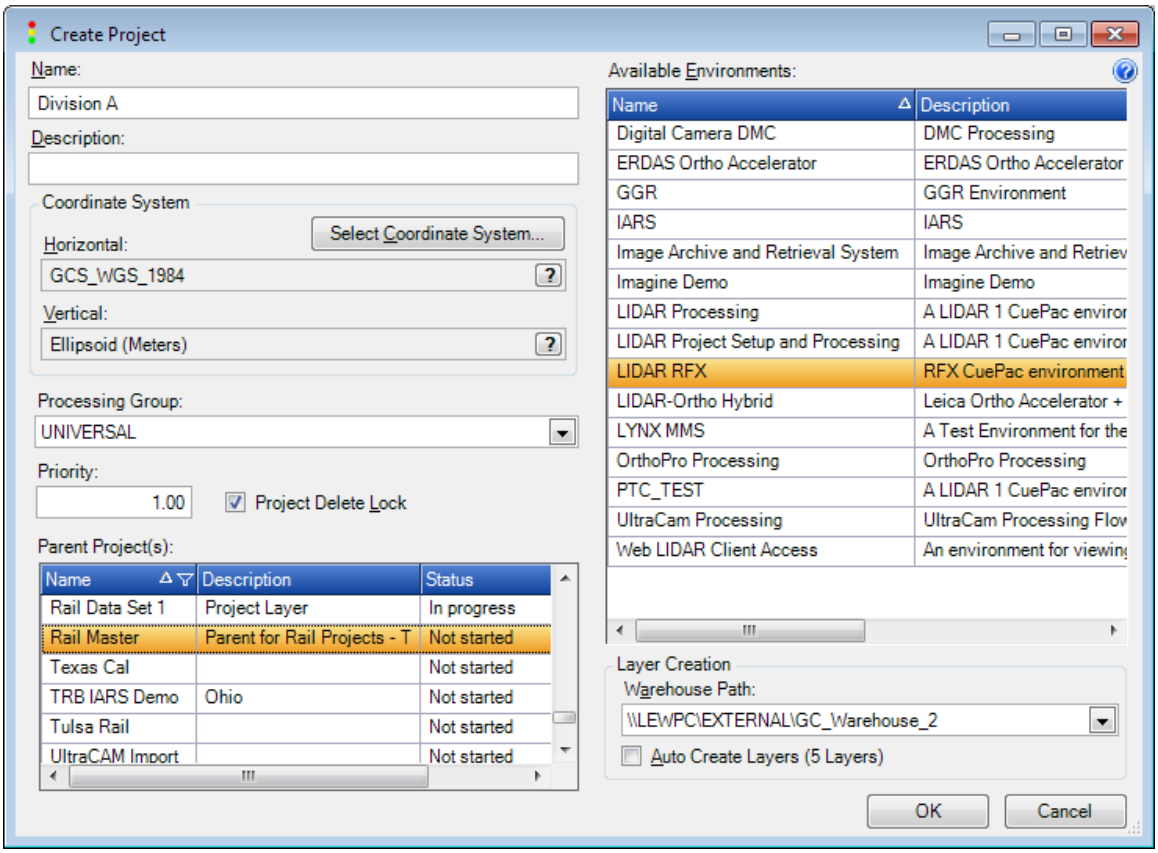


Figure 2-27: Create Project dialog with Parent Project selection

You can create and modify navigator relationships at any time using Project Utilities. Note the new Child Project(s) tab depicted in Figure 2-28. Select the Parent in the upper section of the dialog and add/remove Child projects using the lower section. Be sure to press the Apply button when your selections are complete.

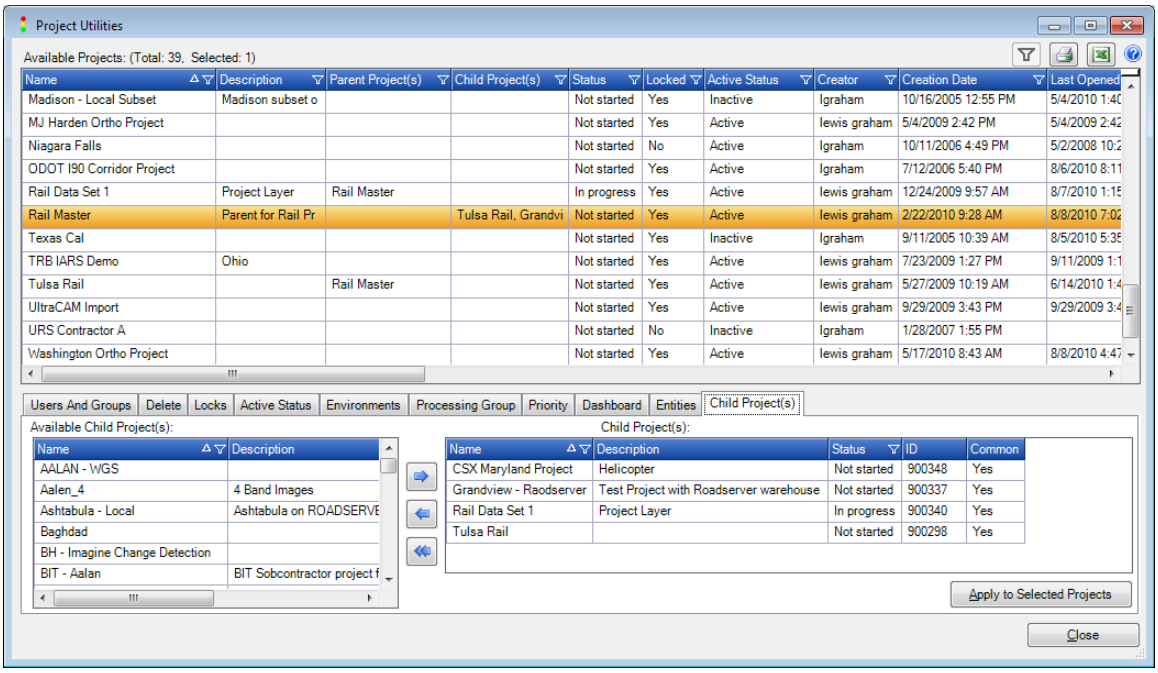


Figure 2-28: Editing Parent-Child relationships in Project Utilities

Finally, you can add or remove Child Projects from the currently opened project by selecting the Project Navigator tool, Manage Child Projects. This displays the dialog of Figure 2-29. Simply add or remove Child projects from the list at the right of the dialog. Note that after you modify the relationships, you can accelerate publishing of the graphic indices by pressing the ***Refresh Graphics*** button at the upper right of the dialog.

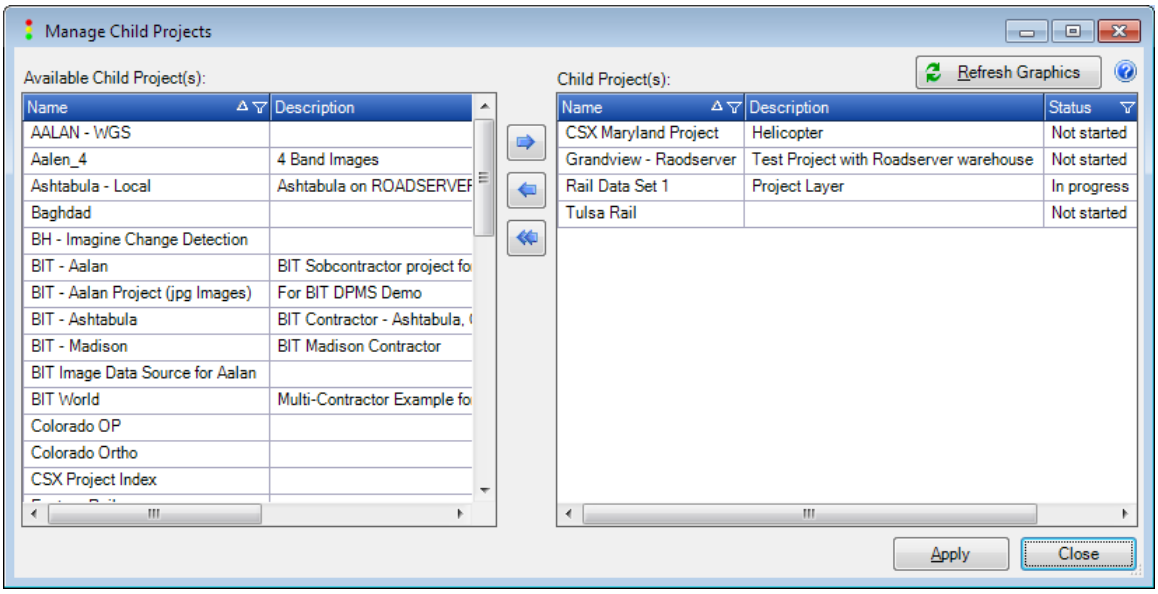


Figure 2-29: The manage Child Projects dialog accessed from the Project Navigator Toolbar

2.3.3 Navigating Projects

Once you have established Parent – Child relationships between projects, you can immediately begin graphically navigating.

GeoCue will automatically create a layer called Project Index in the parent project. This layer will contain entities of type Project Index Boundary for each child project. If you do not explicitly create a Project Index Boundary for a child project (see next section) GeoCue will create one for you based on the Minimum Bounding Rectangle of the child. These indices are a correctly positioned graphic that represents the location and extent of the Child projects within the Parent Project (GeoCue automatically manages any necessary coordinate system conversions).

Navigate to a Child project simply by selecting its Project Index Boundary in the Parent Project and press the Open Child Project tool on the Project Navigator toolbar. If you inadvertently select more than one child project, you will be presented the message of Figure 2-30.

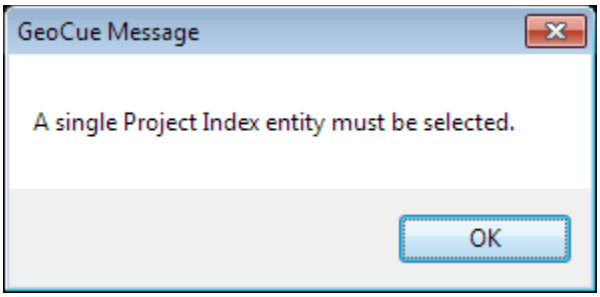


Figure 2-30: Multi-Select Project error message

When you press the Open Child Project tool, GeoCue will close the current project and open the selected child.

To navigate to the Parent project when in a child project, press the Open Parent tool on the navigator toolbar. If the current project has a single parent, the current project is closed and the parent project opened. If the current project has more than one parent, a selector dialog () is displayed. Select the desired parent from the list of available parents and press OK.

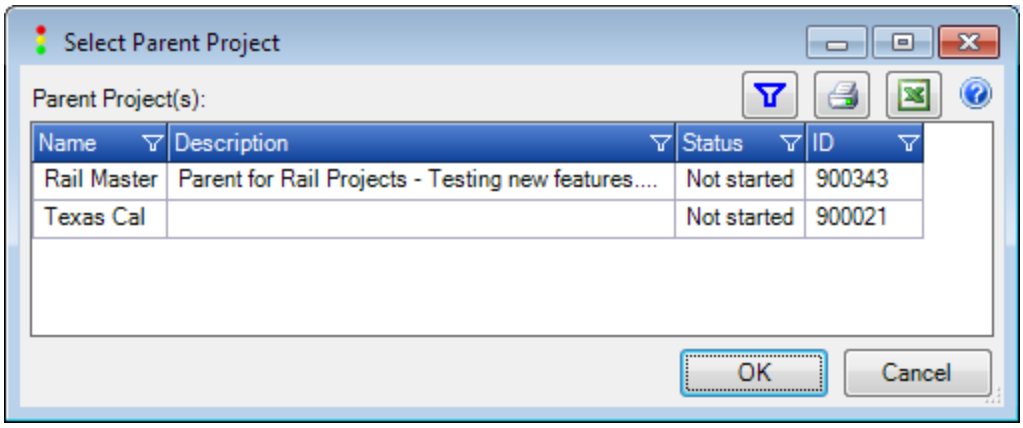


Figure 2-31: Resolving a Parent ambiguity

2.3.4 Creating a Project Index

A Project Index is a graphic that represents the *footprint* that you would like to display for a Child project when it is inserted in a Parent project. If you do not explicitly create a project index, GeoCue will use the Minimum Bounding Rectangle (MBR) of the project.

To create a custom Project Index, open the Child project for which you wish to create the index and press the Create Project Index Boundary tool on the Project Navigator toolbar. This will invoke the dialog of Figure 2-32. Note that the Project Index Boundary name is only used as the name of the entity that you create in this project. The name published to the Parent project is always the Project Name.

Fill in the requisite fields of the dialog and thus use any entity creation method in GeoCue that produces a single entity. This graphic will now be the index used in the parent project.

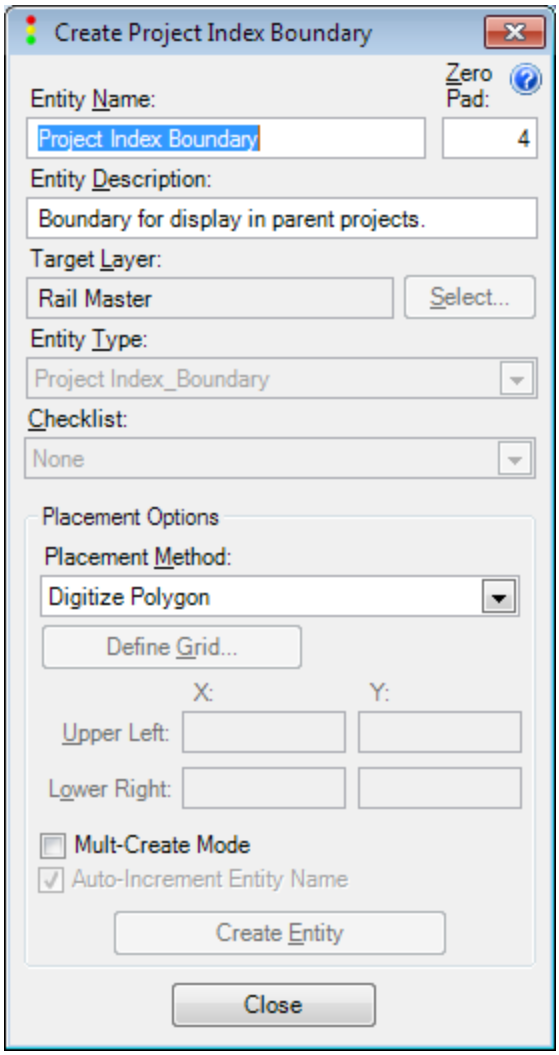


Figure 2-32: Create Project Index Boundary dialog

Note that if you want to replace a custom Project Index Boundary with a new graphic, you must first *delete* the existing boundary. Note that the Project Index Boundary entity is always placed on the Project Layer. If you delete a Project Index Boundary and do not create a new boundary, it will be replaced in the parent project(s) by the MBR of the project.

2.3.5 Project Status

A Project Index Boundary contains a checklist entitled Project Index with the single step, Status.

The Status step of the Project Index is set from the Project Utilities dialog (Figure 2-33). This status is propagated automatically to the reflected project indices in the Parent Project(s).

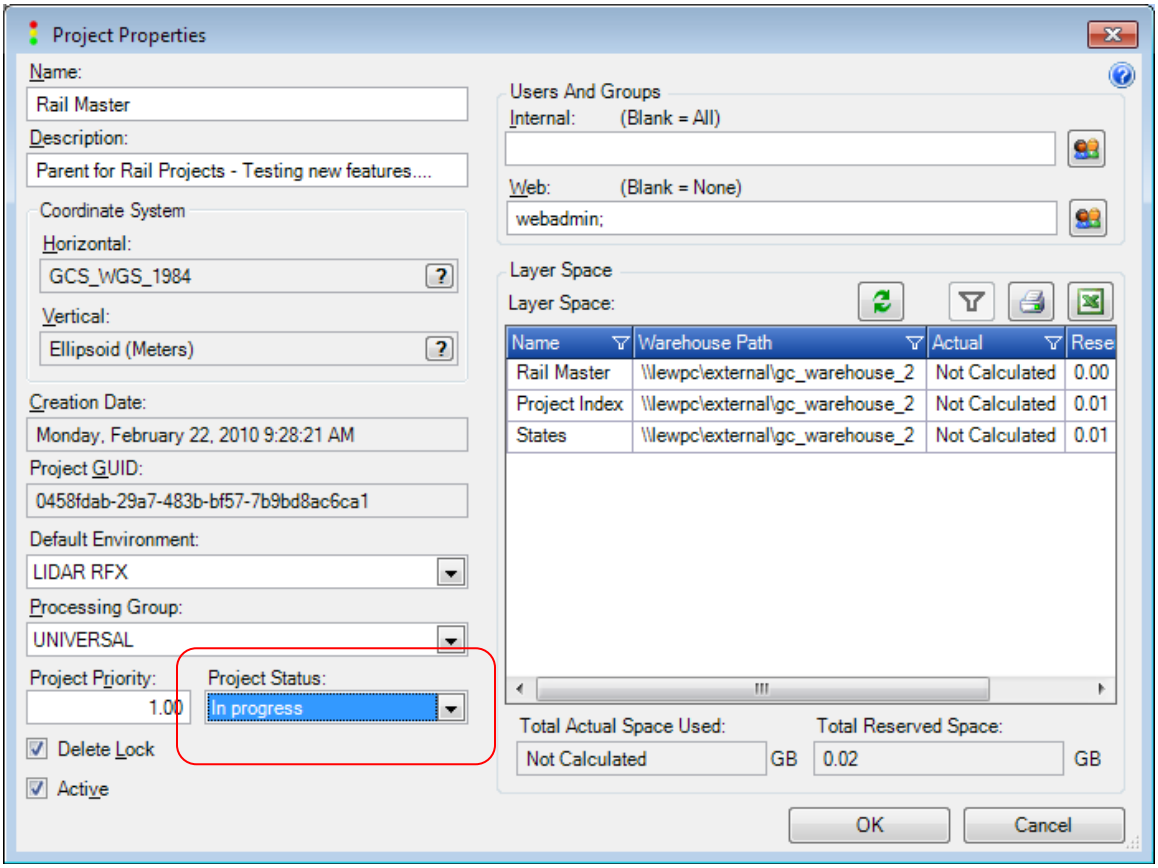


Figure 2-33: Setting the Project Status

3 Environment Builder

A number of changes have been made in Environment Builder for release 7.0, primarily in support of managing the new checklist system.

Checklists are collections of Checklist Steps that are associated with Entities. Effective with GeoCue 7.0, you can modify most aspects of Checklists.

You can also construct entirely new checklists and add those checklists into System supplied environments. Thus, for example, if you need three Process in TerraScan steps that you want to label "Classify Ground", "Classify Vegetation" and "Set Model Keypoints" you can accomplish this by building a new checklist and associating that checklist with LAS Working Segments.

3.1 *Modifying a System Defined Checklist*

First select the desired checklist in the top table (*Checklists)* on the Checklists tab of Environment Builder. This will display the associated checklist steps in the second table, *Assigned Checklist Steps* (Figure 3-1).

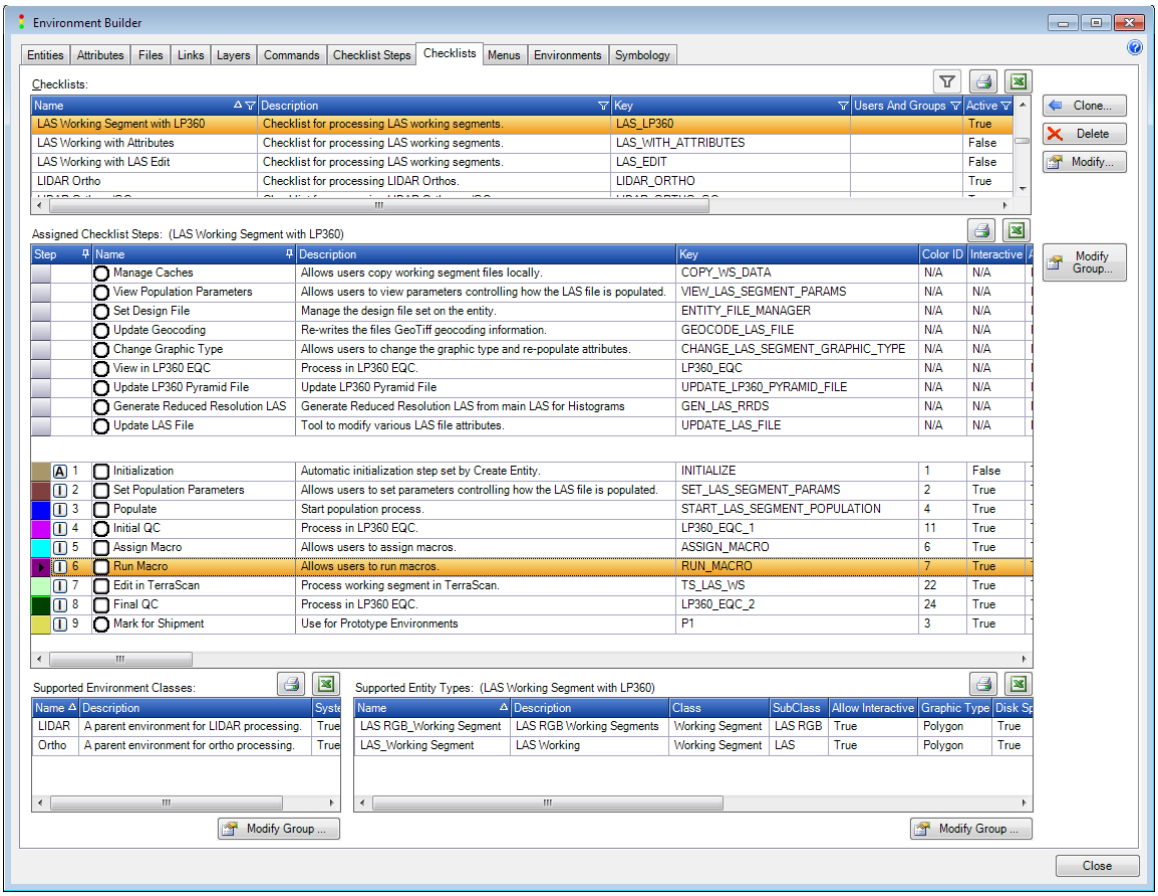


Figure 3-1: The Checklist tab of Environment Builder

You can modify most parameters of a system-defined checklist by pressing the **Modify Group** button to the right of the *Checklists* table: This will display the Modify Assigned Checklist Steps dialog (Figure 3-2).

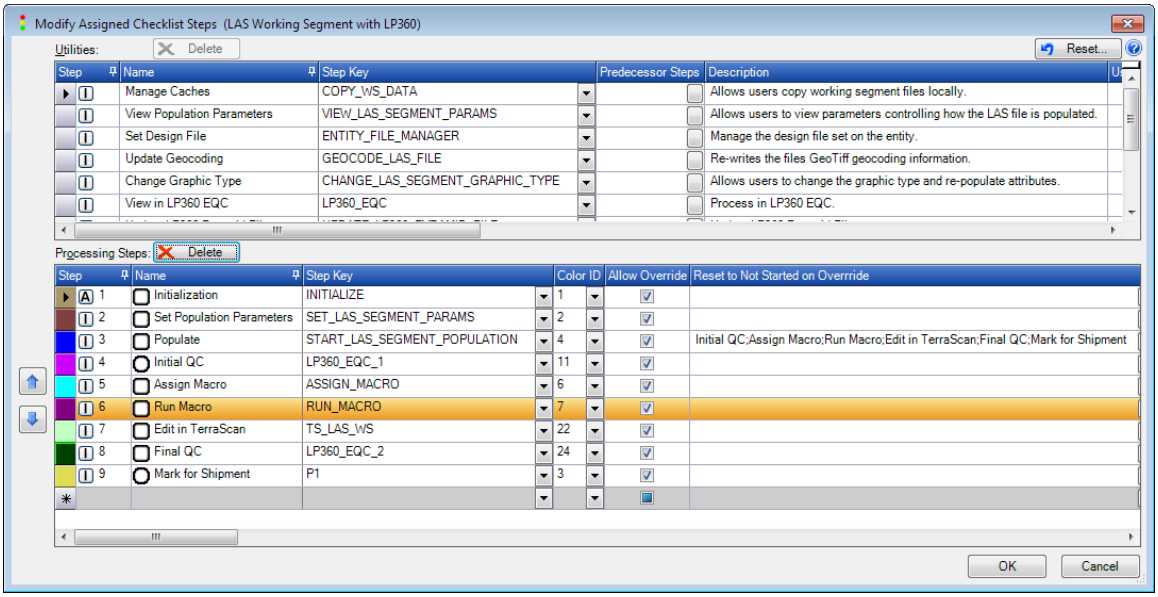


Figure 3-2: Modify Assigned Checklist Steps

The Modify dialog allows you to "edit in place." After performing modifications, press **OK** to apply.

The columns (moving left to right) and their functions are listed in Table 3-1.

Table 3-1: Modifying Checklist Functions

Column	Function	Notes
Step - Color	The step color that is displayed by GeoCue Symbology	Read only – Set via the Color ID column
Step - Symbol	"A" represents an Automatic (Batch) step whereas "I" is interactive (fired by the user).	Read Only
Name	Square represents a Mandatory step. Round represents an Optional step.	You can rename the step by editing in the name field. This overrides the name specified in the Checklist Step area of Environment Builder.
Step Key	Step Key	This is the unique GeoCue key assigned when you create a step. This is where you actually select the step that will be executed. Thus this is the first field that must be edited when building a new checklist or adding a step

Column	Function	Notes
Color ID	Override the Checklist Step default color	Pick the desired color from the drop-down.
Allow Override	Allow the user to enter this step, provided its Predecessor conditions are met, by using the Override Step Sequence button on the Checklist Toolbar	Generally used to do out-of-sequence processing when things go awry. An example might be the need to repopulate working segments in a LIDAR flow. The step will **not** enable if ***predecessor*** conditions are not set.
Reset to Not Started on Override	You can specify one or more steps in the Checklist. These steps will be set back to their Not Started status if this step is executed via the Override Step Sequence button on the checklist toolbar.	This function allows you to ensure, in your state logic, that the user does not become confused when stepping back in a checklist. An example would be setting Populate to Not Started if Set Population Parameters is run via an override after Populate had already been successfully run.
Reentry Allowed	This flag specifies (if checked) that this step can be executed again (if it is the target another step).	This function is used for "fire once" scenarios. For example, you might group three steps and allow the user to execute them in any order. You can use this function to prevent the user from running the same step twice, even if its predecessor condition is valid.
Predecessor Steps	One or more steps that must be in the COMPLETE state before this step can be executed.	***This is the most fundamental of the Checklist transition rules. It cannot be overridden by any checklist action.***
COMPLETE Targets	These are the steps that will potentially be enabled when this step transitions to Complete.	Steps will not enable if their **predecessor** condition is not met or they have already been transitioned to complete and their Allow Reentry flag is not set.
Select Step	This is the step that will be selected from the list of COMPLETE Targets after the associated step completes.	If the Select Target cannot be executed (due to predecessor requirements or the Reentry flag), no step[will be Selected.

Column	Function	Notes
ERROR Targets	These are the steps that will enable if the executable associated with this step crashes.	
FAIL Targets	These are the steps that will enable if the user declares a Failure. This is usually initiated via the Fail option of the Checklist Step Completion dialog.	
WARNING Targets	These are the steps that will be enabled if the executable (or exist dialog) associated with this step declares a Warning.	
INTENTIONALLY SKIPPED Targets	These are the steps that will enable if the user sets the state of the current step to Intentionally Skipped.	
Interactive	Checking this box allows the user to interactively execute this step	The step must be an interactive step as defined in the Step Library
Optional	Checking this box causes the Step icon to display as round (optional) rather than square (required)	Note that this is for appearances only. It has no programming affect on the step.
Intentional Skip Required	This option forces the user to press the Intentional Skip button on the checklist processing toolbar if they want to move past this step without executing.	This effectively sets up an optional checklist step that records an audit trail even if someone does not run the step. It is useful when you need the user to deliberately think about **not** applying an operation.
Auto Run Next Step	If this step successfully completes, the COMPLETE Target will automatically move to the In Progress state.	The associated executable of the target step must be an External command. All predecessor conditions must be met.

Column	Function	Notes
Same Machine	Used in conjunction with Auto Run Next Step and the Command Dispatch System. If enabled, the auto run step will be queued to run on the same machine as this step.	This is used in application where (for performance reasons) step n writes data to a local resource. For maximum performance, step n+1 needs to run on the same machine.
Description	Free form text that displays in the description field of the Checklist in GeoCue Client	
Users and Groups	Allows you to set permissions on a per step basis.	
System	If true, prevents many fields from being edited	
DPMS Enabled, Name and Key, Set complete on DPMS Import	If set, this step can be used in a GeoCue Distributed Project Management System status environment.	
Effort Type	Interactive or System. Determines which category GeoCue uses for Earned Value Management time tracking	Read only – set in the Checklist Step editor
Auto Budgeted Effort Enabled	Causes GeoCue to automatically compute Budgeted Effort for the entity associated with this checklist when the entity is created.	
Auto Budgeted Effort Type	Absolute = the Auto Budgeted Effort Value is assigned to the step Computed = the Auto Budgeted Effort is computed based on the size of the associated entity	The actual values are computed and assigned when an entity with this checklist assigned is created.

Column	Function	Notes
Auto Budgeted Effort Value	Either an absolute value or a multiplier as determined by the Auto Budgeted Effort Type field	
Auto Budgeted Effort Units	Specifies the units of the Auto Budgeted Effort Value when using Multiplier mode.	GeoCue automatically converts the Auto Budgeted Effort Value to the correct value based on the units specified in this field and the units of the Layer on which the associated entity is being created.

When a checklist is being evaluated by the GeoCue State Engine, the order of priority is as follows:

1. Predecessor – If a step's predecessor step(s) is not Complete, the step cannot be executed under any circumstances (i.e. it cannot be overridden)
2. If the Override Step Logic button is pressed on the checklist processing toolbar in GeoCue Client, the Predecessor step(s) is/are Complete and the Allow Override option has been checked in the Checklist configuration, the step will enable. Note that this will override the Allow Reentry flag