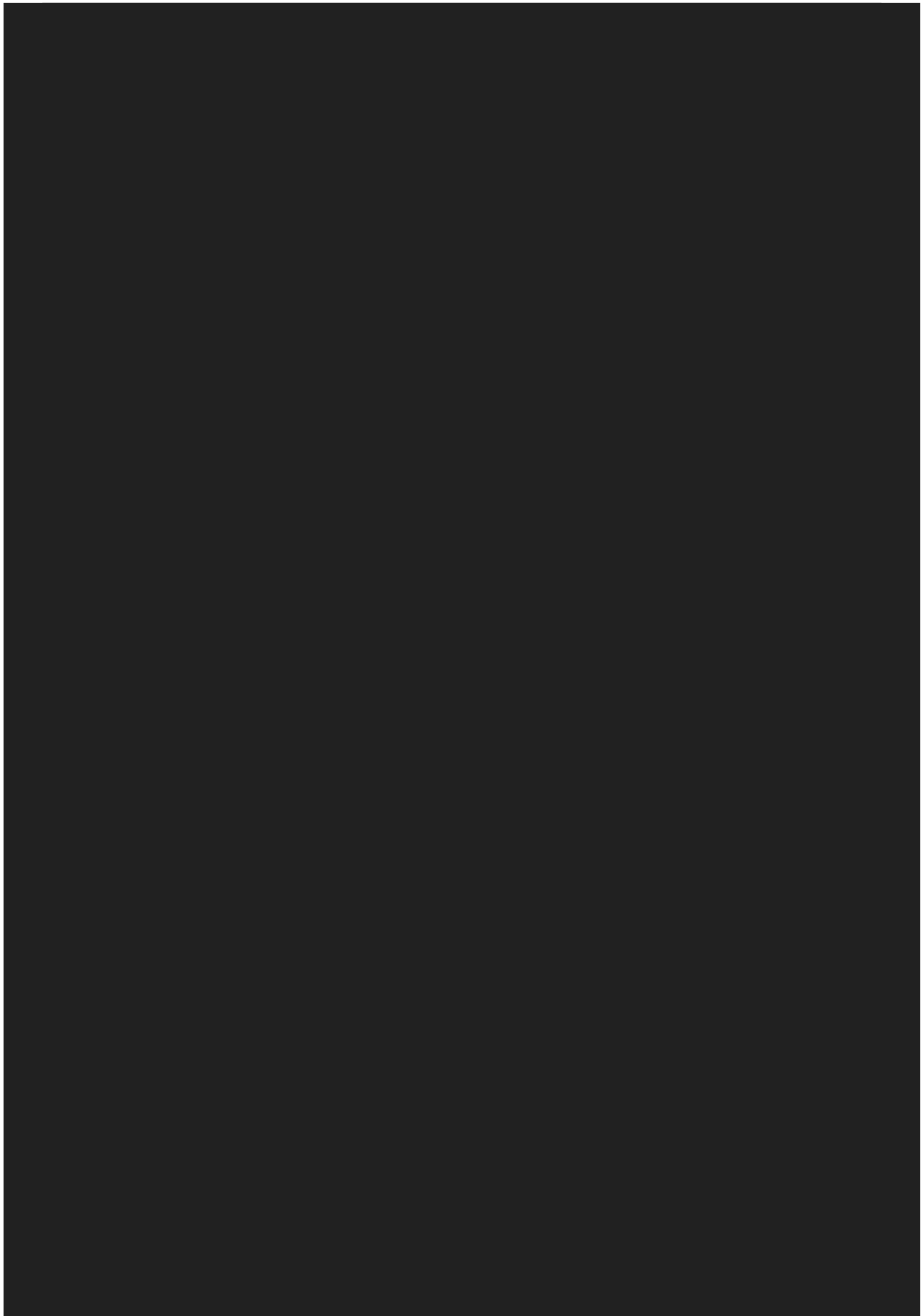
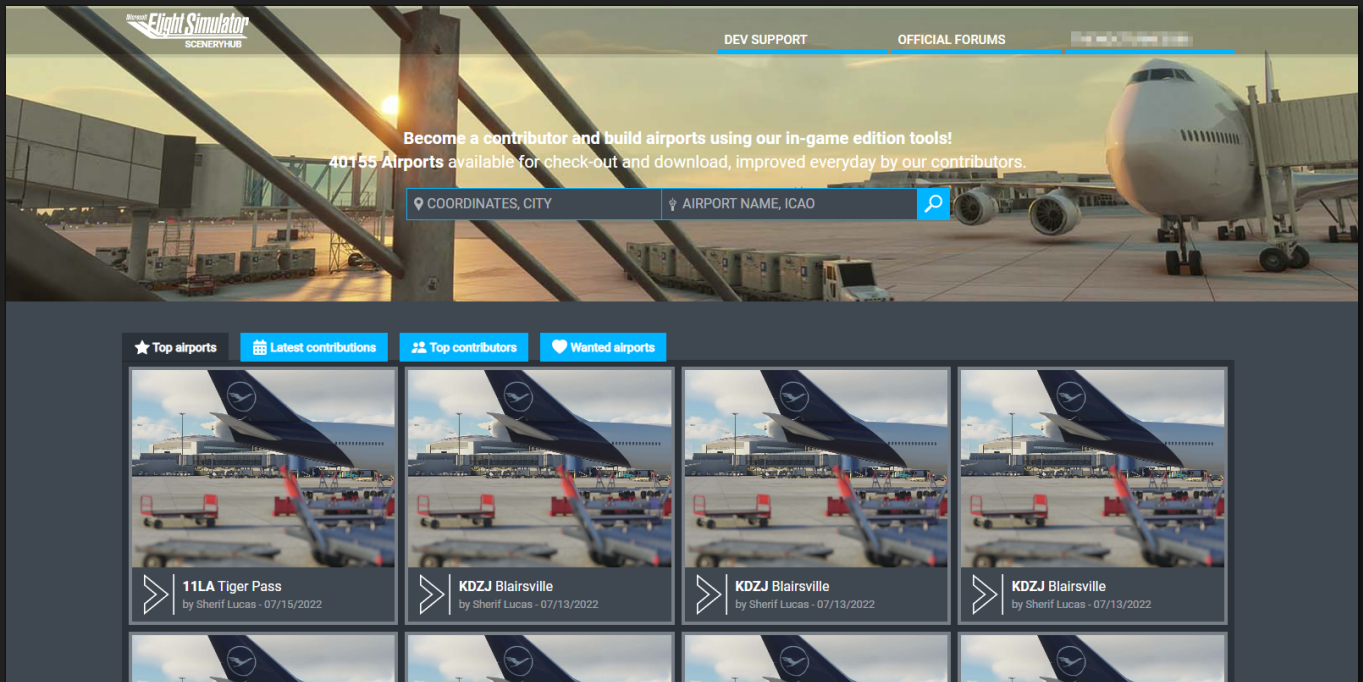




WORLDHUB SDK
DOCUMENTATION



World Hub



World Hub was conceived as a way for the Microsoft Flight Simulator community to edit their favorite airports to better match the accuracy of their real world counterparts. With World Hub you can access almost any airport in the world, download the base files for that airport, and alter the placement of runways, taxiways, parking spots, and other objects to create a more accurate representation of the real airport. Each World Hub submission is carefully reviewed by a team of moderators, and if approved, will later be published and made available in Microsoft Flight Simulator.

You can get access to the World Hub here:

- [Microsoft Flight Simulator World Hub](#)

From the World Hub landing page you can search for an airport using either the coordinates, the city name, the airport name, or the ICAO code . You may also browse the available airports and see what's been edited recently, etc..

To help you create your airports and upload them to the World Hub, we have prepared a short tutorial which is split into the following sections:

- [Downloading The Airport Files](#)
- [Setting Up](#)
- [Airport Perimeter](#)
- [Runways](#)
- [Taxiways](#)
- [Taxiway Parking And Jetways](#)
- [Additional Elements](#)
- [Uploading](#)

Airport Information

Before you start, it's important to ensure that you have as much information as possible about the airport(s) which you want to work on. The following links can all help you to find the required details for the airport(s) that you want to edit:

USA Only:

- [AirNave.com - Airports](#)

The rest of the world:

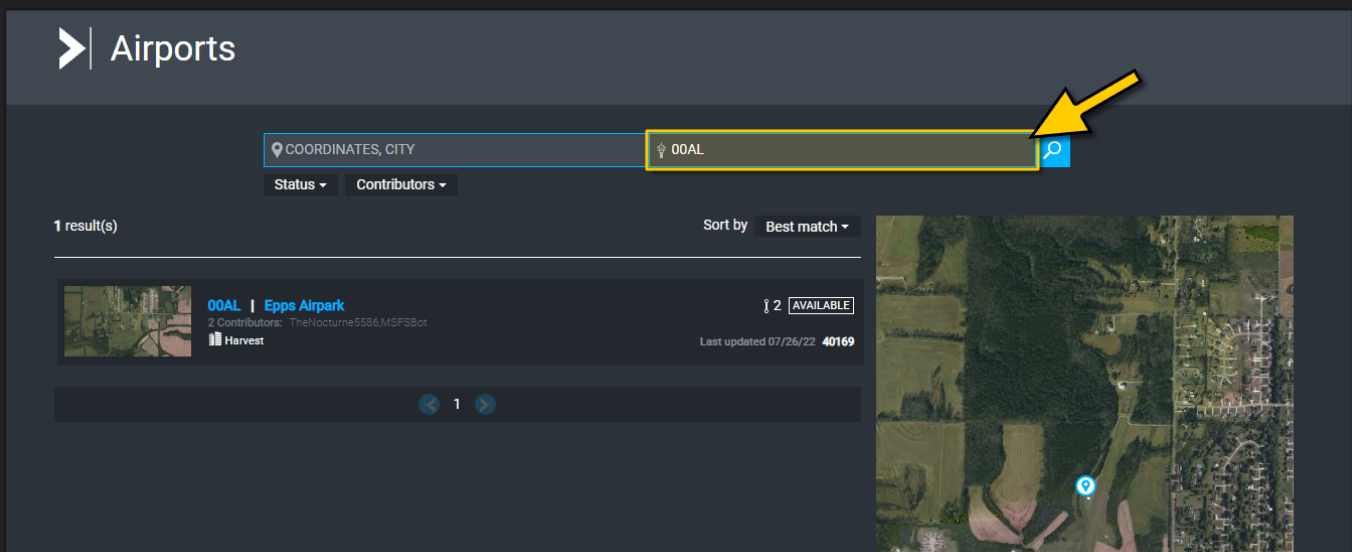
- [World Airport Codes](#)
- [ICAO - Airport Map](#)
- [SkyVector](#)
- [AC-U-Kwik](#)
- [Airport Nav Finder](#)

DOWNLOADING THE AIRPORT FILES

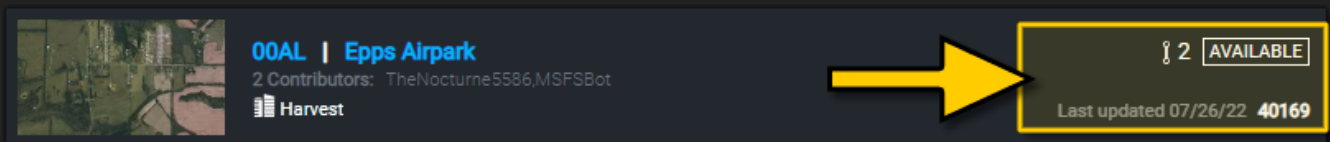
For this World Hub tutorial we'll be editing the following airport:

- Epps Airfield in Alabama (the ICAO is 00AL)

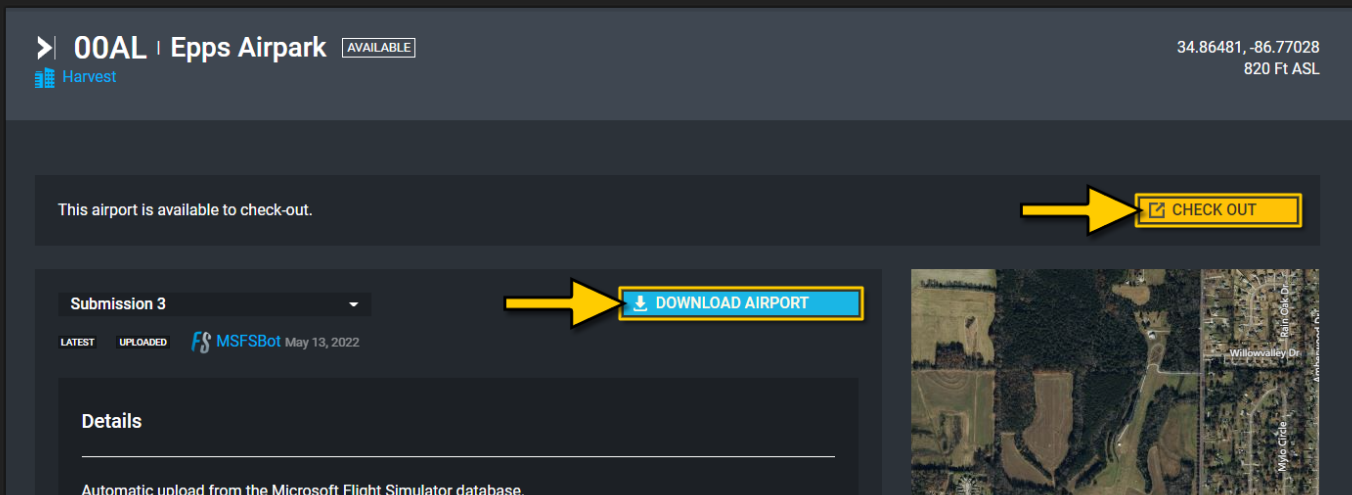
To get the files you need, you will need to log into the World Hub, and then at the top of the main page, type the ICAO in the appropriate field then click on the search button:



Before downloading the airport, you should check and see if it is *available* or not. Only one user at a time can work on any given airport, and as such, if someone has checked the airport out then it will no be available for anyone else to edit. To check the availability, simply look at top right corner of the airport card:



In this section you can see the city where the airport is based, whether the airport is available or not (if it is unavailable, it means that someone else is currently editing it), and how many times it has been updated. If the airport is available, then you can click on the card and you'll be taken to an overview page:

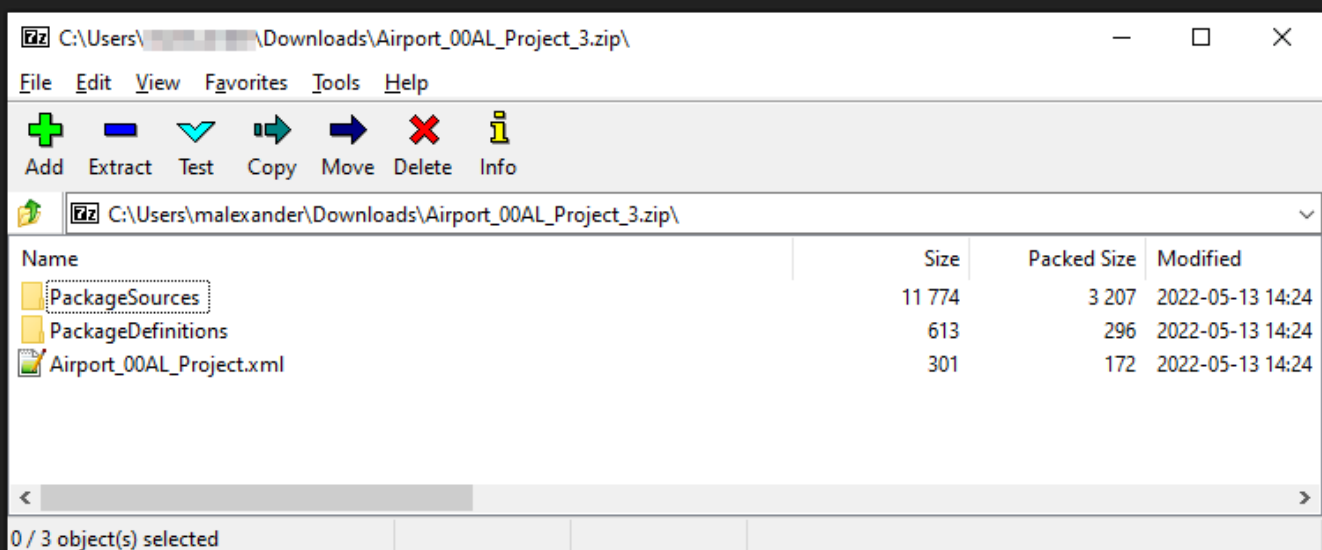


Here you have to do two things:

- Click the **Check Out** button to lock the file and check it out to you (making it unavailable for others to check out)
- Click the **Download Airport** button to get the airport files

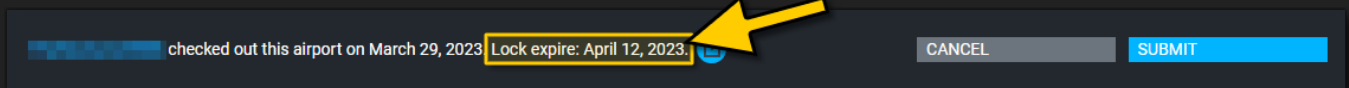
*NOTE: You can download the airport files at any time, regardless of whether you check it out or not. However, you will only be able to submit edits if the file was locked/checked out to you using the **Check Out** button.*

The airport files will be downloaded as a ZIP file, and once you have it, you will need to unzip the contents to a safe location:



Once you have unzipped the contents, you can then continue on to edit the airport inside Microsoft Flight Simulator.

IMPORTANT! Checked out files are on a time limit. If you do not submit the edited files before this time limit is up, the files will be made available to all users again. The page for the airport will show the time you have available, as shown in the image below.

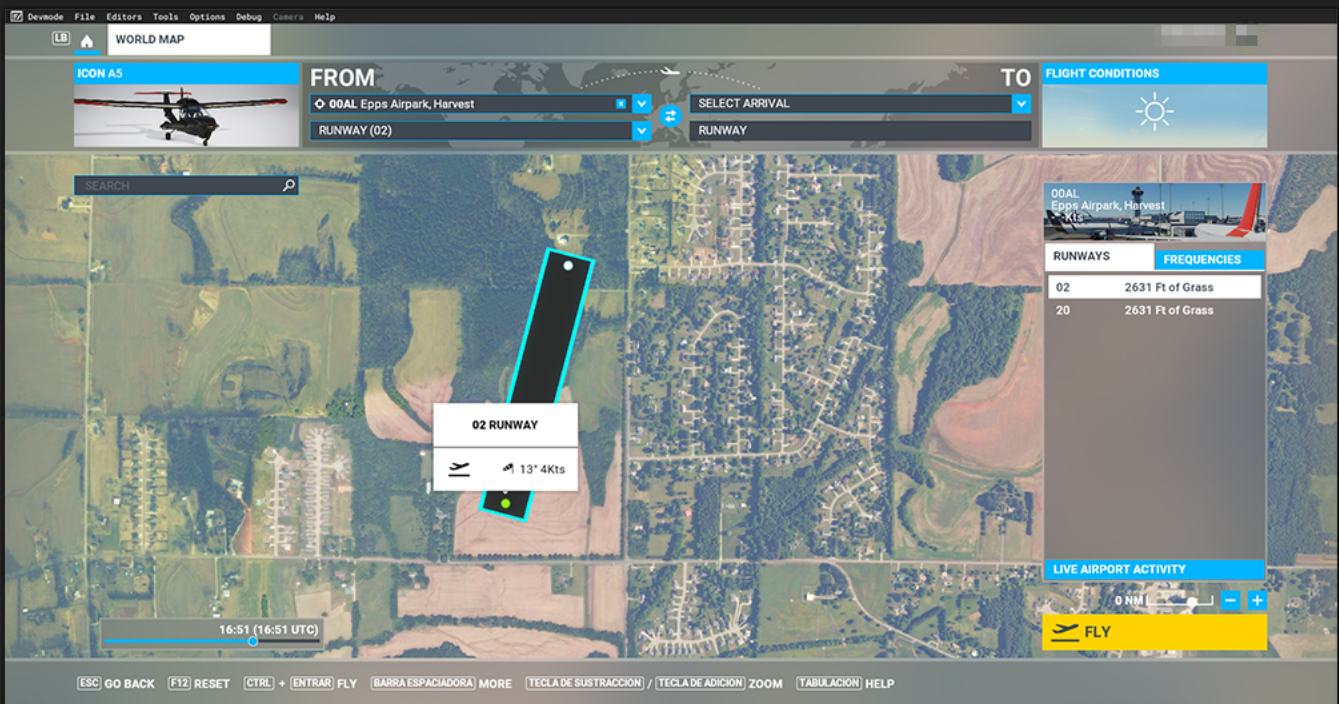


Note too that at any time you can cancel the Check Out and make the airport available to others for editing. You will not be able to upload any files for the airport until it has been checked out again.

SETTING UP

Once you have your project files for the airport that you want to edit, you need to open them in Microsoft Flight Simulator, so we'll explain that process here (note that in general, you'll be following these same steps for every project that you want to edit).

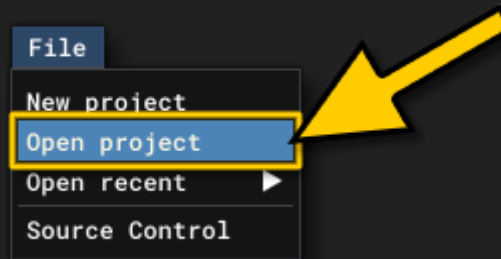
To start with you need to begin Microsoft Flight Simulator and then find the airport you want to edit from the main map, before starting a flight from it. As mentioned on the page about the [World Hub](#), we'll be starting from Epps Airfield in Alabama (the ICAO is OOAL), so you should go there from the world map:



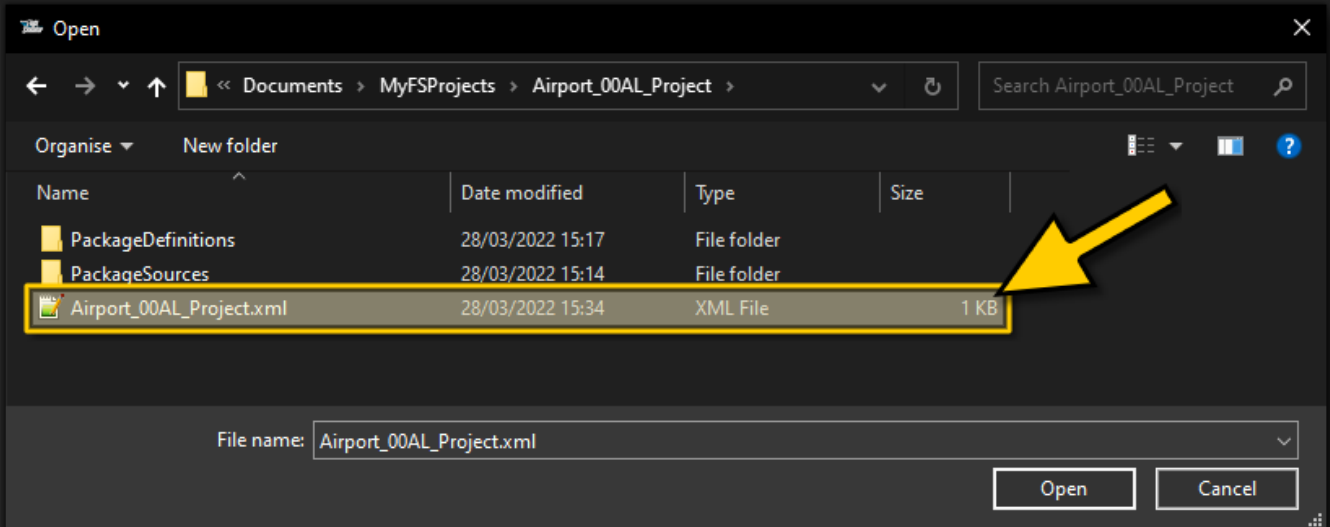
NOTE: You should have also enabled [DevMode] before starting your flight.

The Project Editor

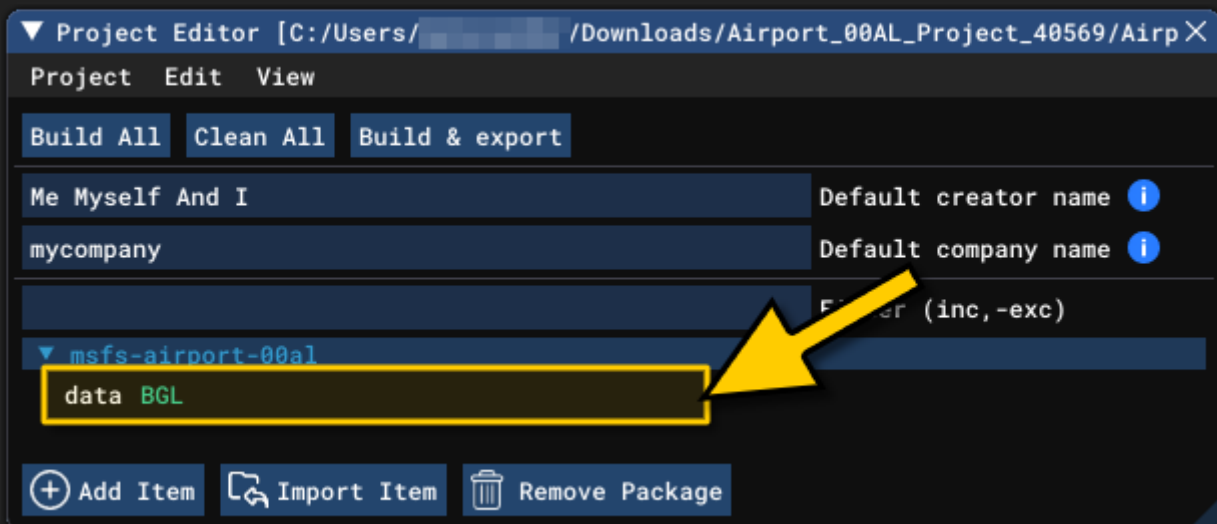
Once you have started the flight, you will need to load the project that you previously downloaded an unzipped to a safe location. This is done from the File menu, by selecting the Open Project option:



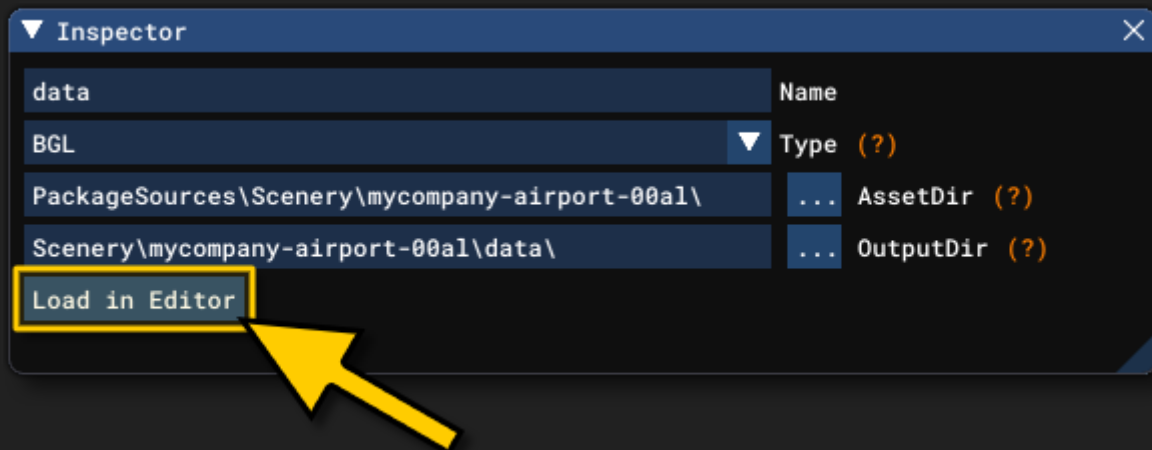
This will open a file explorer where you should browse to the XML file for the project:



The project will then be opened in The Project Editor, and you can see the package listed in the main window. You should click on the package to expand it, and you'll see the different asset groups that are contained within it. For our airport there is only one, which is the main **BGL** package for scenery:



At this point we would click on the **BGL** and then open The Inspector window. We can then load the BGL into The Scenery Editor by clicking on the **Load In Editor** button:



Cameras

When you load the BGL from the Inspector, it will open up The Scenery Editor (in World Hub mode), which is where you will be able to edit the selected airport. However, before we look at the editor itself it's worth taking a moment to discuss the different cameras that you can use when editing your project. The different cameras can be selected from the Camera menu at the top:



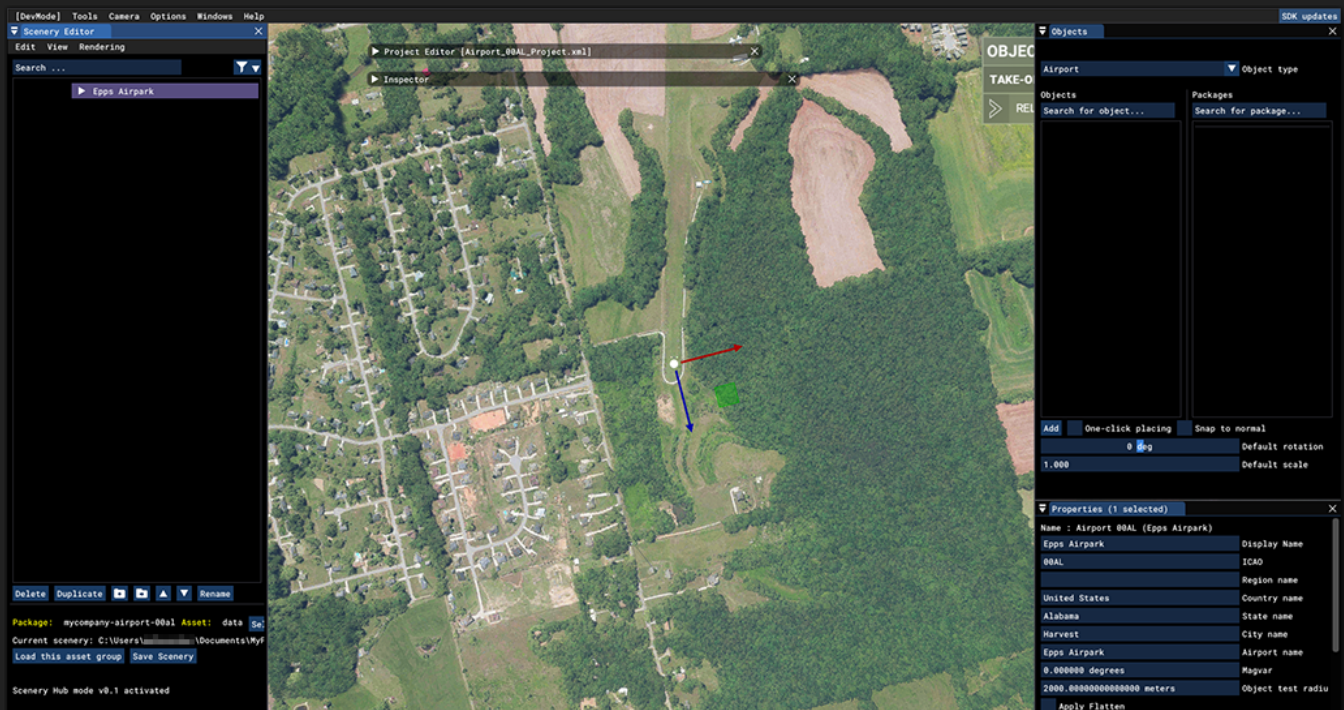
The two most important cameras for us to use when editing an airport are the Developer Camera and the Top Down Camera. The developer camera is similar to the "drone" camera in the simulation and gives you a way to freely fly around a scene and see how it looks from all angles. However, for most of the time you'll be editing the airport, you'll want to use the Top Down Camera. This fixes the camera into an *orthographic plan* view, or "top down" view, which makes editing things like runways, taxiways, aprons, etc.... a lot easier.

All the cameras (along with their controls) are explained in detail on the following page of the SDK documentation:

- Cameras
- Camera Controls

The Scenery Editor: World Hub Mode

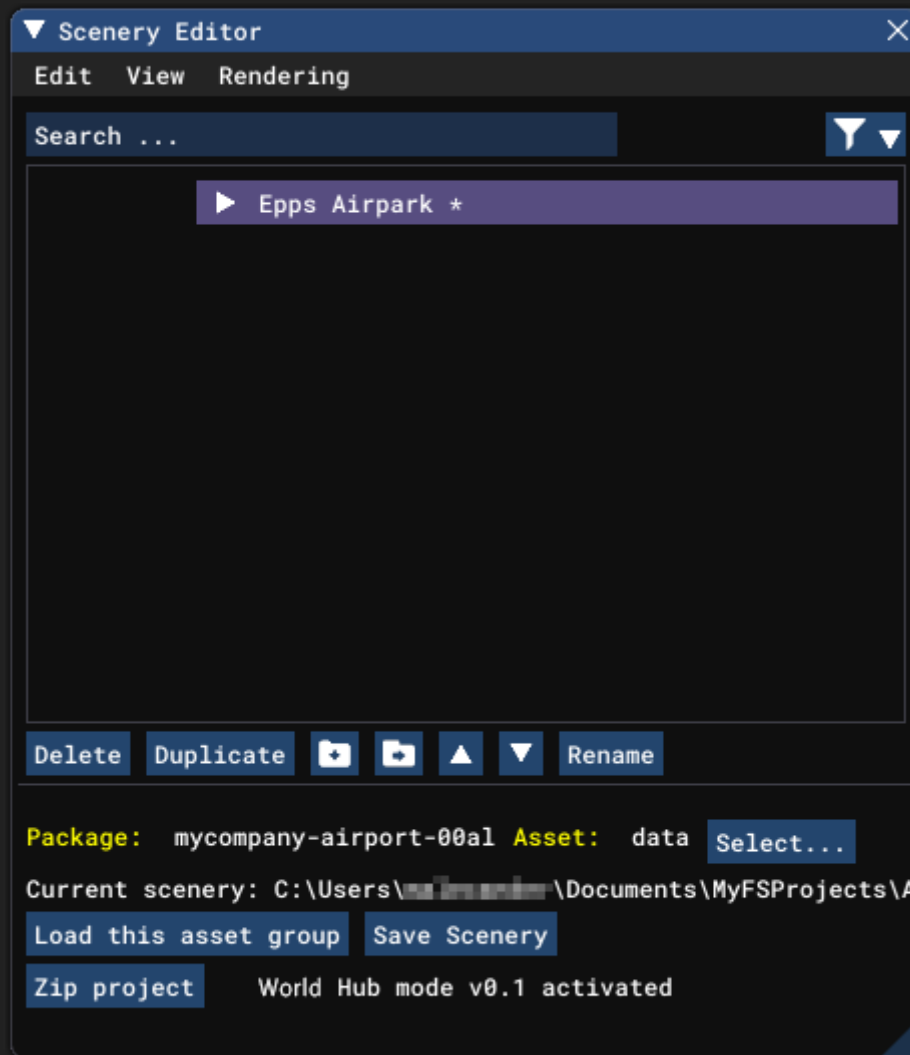
Loading the project will open [The Scenery Editor](#), which will be in World Hub **Mode**. Essentially this means that you will be using a "lightweight" version of the editor which is used to create and edit packages from the World Hub. This "lightweight" version of the tool simply contains a sub-set of tools from the "full" version which are designed to be used to create airport assets that are not package dependent, and as such *any user* can download them and use them in Microsoft Flight Simulator, regardless of the version they have or the other packages/add-ons that they have installed.



You can find all the information on the different options, windows and menus related to this tool from the link below, however we'll quickly go over the main component here and you can use the link for reference later should you need further details.

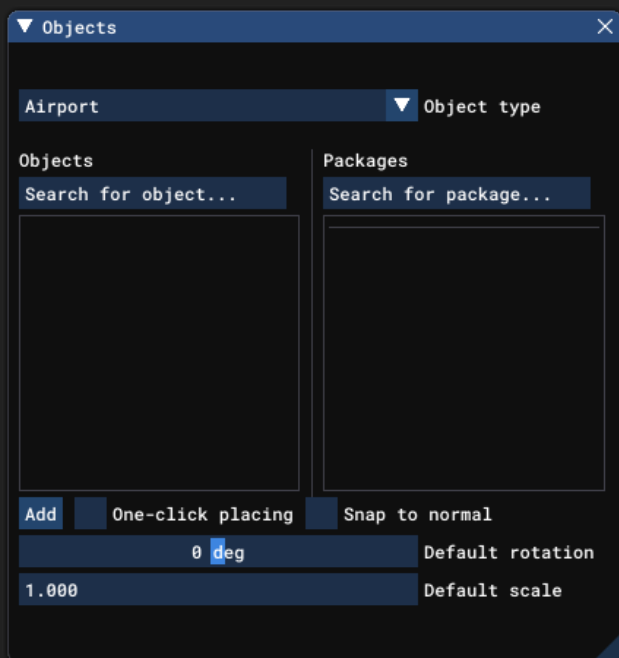
- [The Scenery Editor](#)

The main window that will open is the Scenery Editor itself which will look something like this:



This will contain the list of elements that have been added to the airport you are editing and the menus at the top can be used to open other windows and tools that will help you when adding/editing elements.

The other two windows that will open are the [Objects](#) window and the [Properties](#) window:



NOTE: Other windows may open when you open a project in the Scenery Editor when in World Hub mode, like the Material Editor. These can be closed and you generally only need the three windows mentioned above (Editor, Objects and Properties) to be open.

The Objects window is where you'll be selecting the objects that you want to place into the scene, and the Properties window is where you'll edit the different properties and attributes associated with each of the placed objects. You can find a list of objects that can be placed from the link below, and on each object page you can find the different properties that they have. We'll be covering the most important ones over the course of this tutorial, however.

- [World Hub Objects](#)

It is worth noting that the various windows can be docked in multiple different ways around the screen. This means that you can set things up to suit your workflow, which doesn't necessarily have to be the same as that shown in this tutorial. For more information, please see here:

- [Developer Mode Window Control](#)

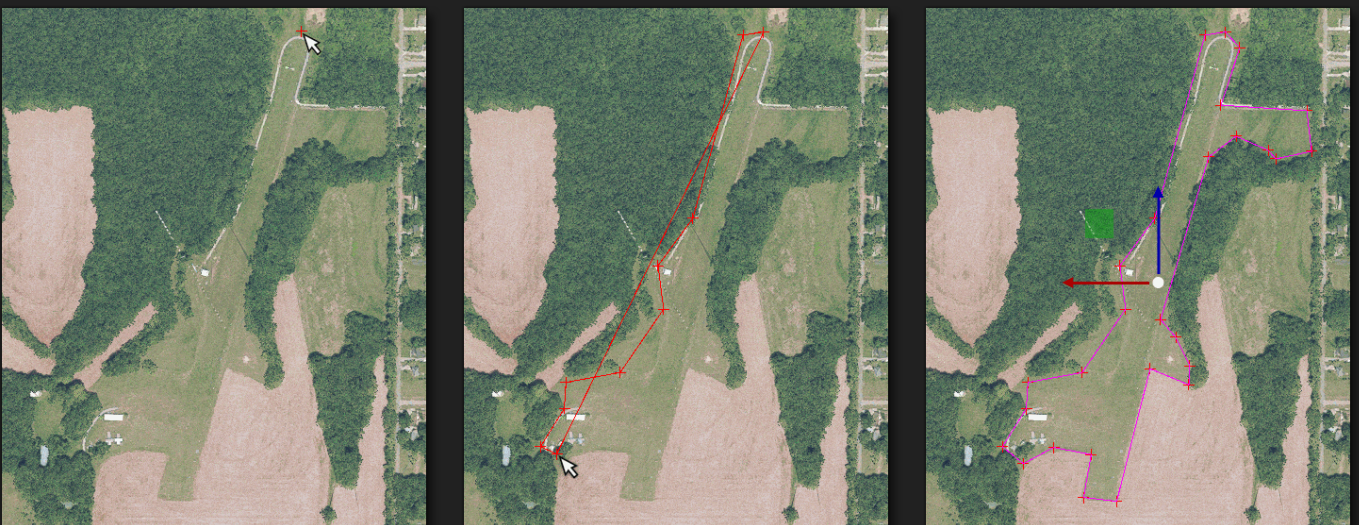
AIRPORT PERIMETER

The first thing we're going to do with our airport is to add a [polygon](#) object to delimit the area that the airport occupies. By default, the [airport object](#) sets up a circular area which is considered as the radius within which the airport has influence - the [Object Test Radius](#) - but this only affects where you can place airport objects and has no other effect. So, we need to create a delimiting area that will also setup a few other properties for us using one or more polygons.

Before continuing, ensure that you are using the Top Down Camera as that will make creating the polygon easier.

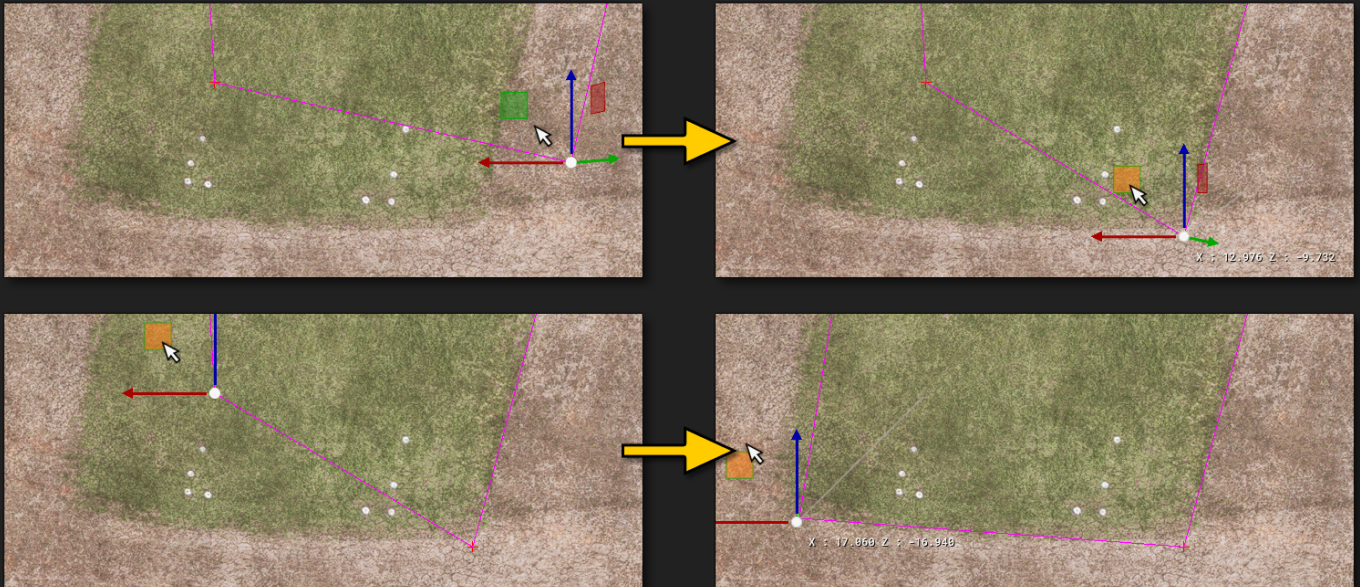
Adding the Polygon

We'll add a polygon object to the scene now. For that you need to go to the Objects window, then select the Polygon object type, and click the [Add](#) button. This will add the object to the scene, but before you can do anything with it, you need to add *at least* three points to the scene to define the polygon shape. To do this, hold down [Ctrl](#) and click the left mouse button on the scene, as shown in the image below:

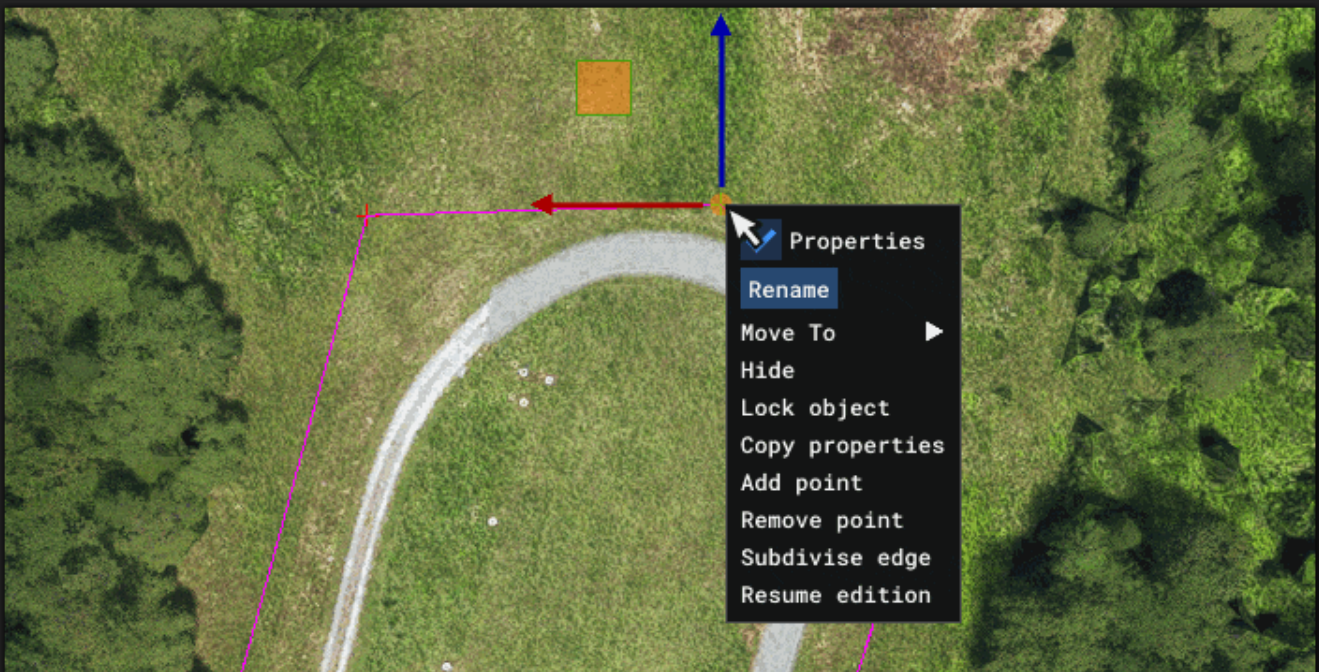


When you have added the last point, simply press the [Enter](#) key and the polygon will be finalised. Once you have placed the initial perimeter, you can zoom in and edit the position of individual points to make them fit

better. This is done by simply clicking on a point and then using the Gizmo to change its position:

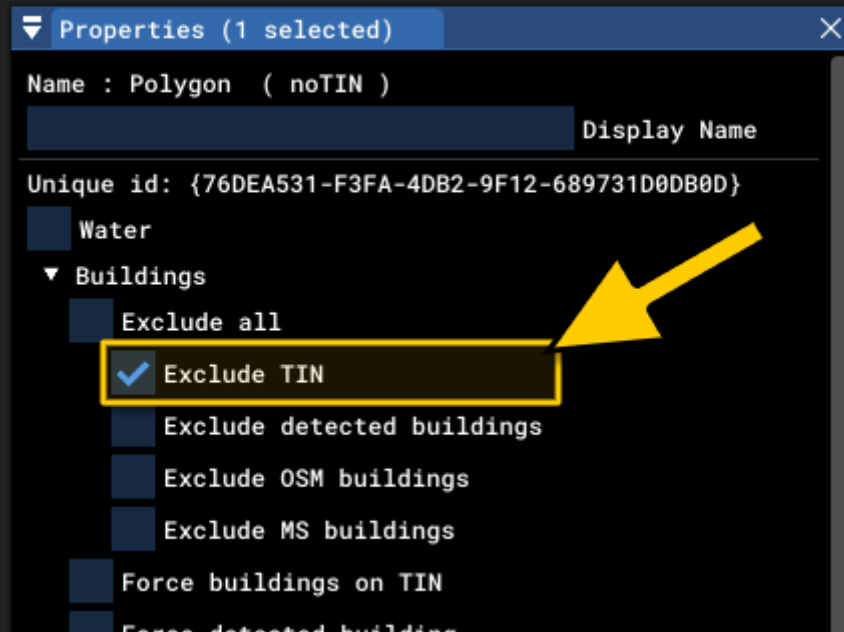


It is also worth noting that you have a number of additional options available to you by right clicking on either a point or a line:

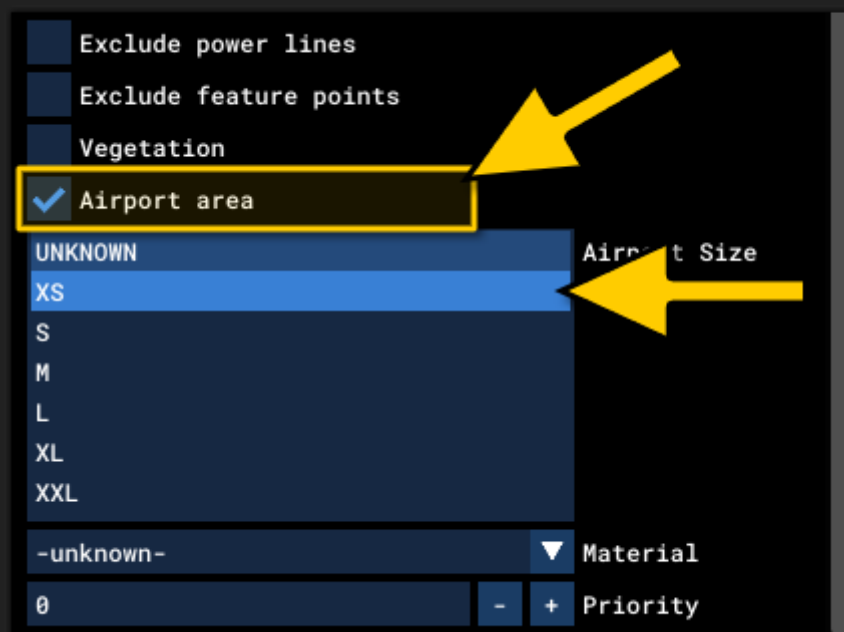


Polygon Properties

With the airport area delineated using the polygon, you can now go ahead and modify its properties. There are multiple options available here, but for now we just want to check the Exclude TIN option under the [Exclude All](#) section:



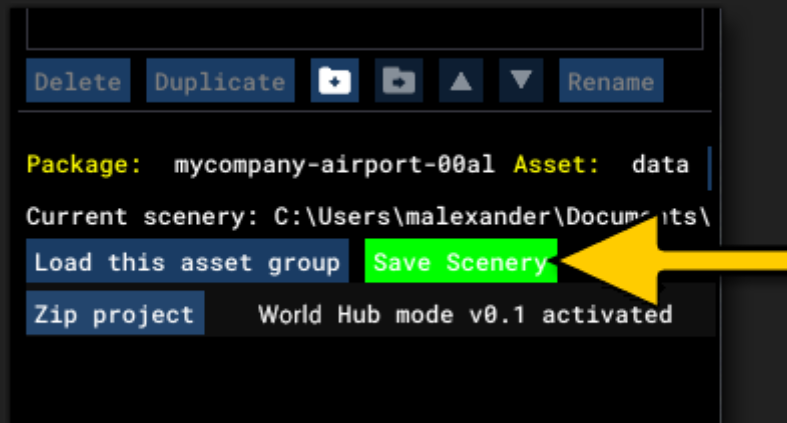
The next thing we need to do is check the [Airport Area](#) box - to flag the polygon as delimiting an airport area - and then set the size of the airport. In this case we'll be choosing the option the XS (extra small) option:



At the moment we don't need to set any further properties on this polygon.

Saving Your Work

At this point you should save what you've done, and we recommend that after every change - assuming you are happy with it - you save the project to prevent any data-loss if there are unforeseen issues. Saving is simply a case of clicking the **Save Scenery** button in the Scenery Editor, which will briefly flash green while the save is in progress:

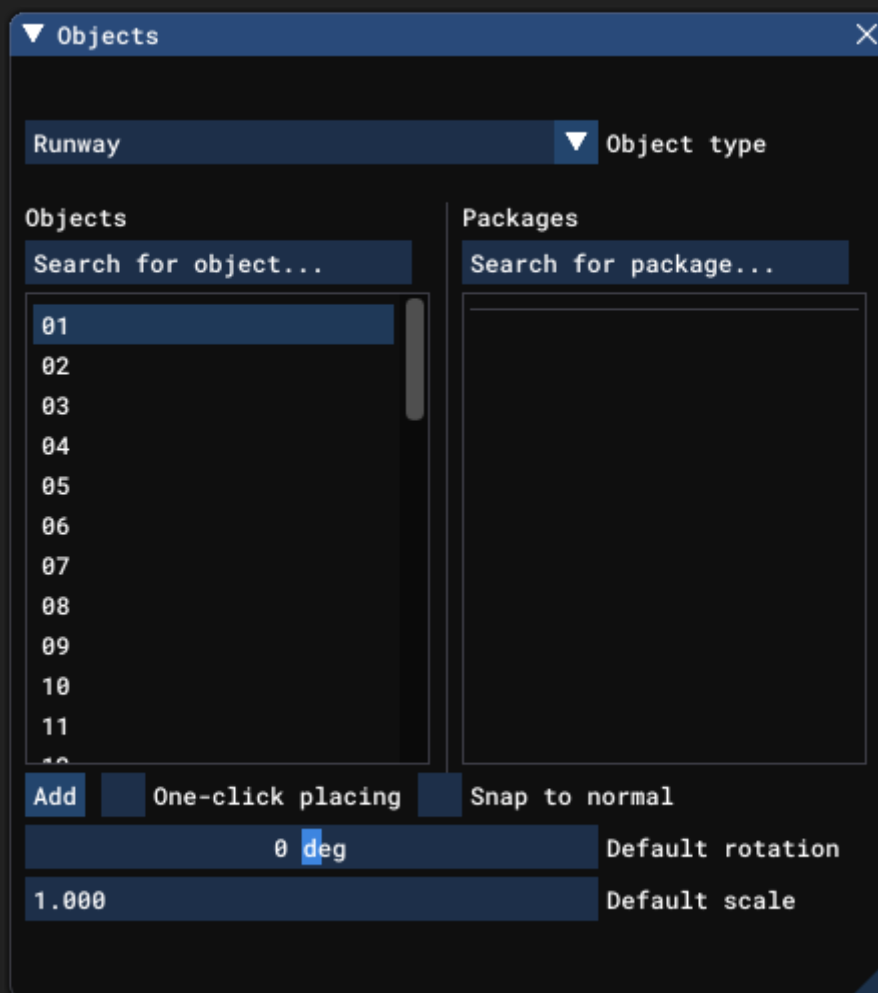


RUNWAYS

At this point in the tutorial it's time to add the [Runway](#) objects to our airport. In general you'll always want to add these before almost anything else so that you can then later adapt taxiways and aprons to them correctly.

Adding The Runway

To add a runway, move the camera over the approximate position (still in top down mode) and then in the [Objects](#) window, select the Runway object type.



There are a number of different objects listed here, and each one simply corresponds to a runway designator. If you know it then you can select the value that is appropriate right now, but if not it doesn't matter just yet as

we'll be editing the runway properties later. Once you are ready, click on the **Add** button to add the runway to the scene:



The Runway Properties

The editor will try and add the runway at the correct heading for the position and airport, however it will be the default length and width, and it will not have any of the required markings or other details. That means that it's up to you to provide this information. You can get the required details from a number of different sources, some of which are listed in the section on [Airport Information](#). For this airport we've gone to the [AirNav website](#) to find information on the runway:

Runway Information

Runway 1/19

Dimensions: 2100 x 90 ft. / 640 x 27 m

Surface: turf

RUNWAY 1 **RUNWAY 19**

Traffic pattern: left

left

With these details, you can go into the object Properties window for the runway and set the initial values for length, width, surface material and number:

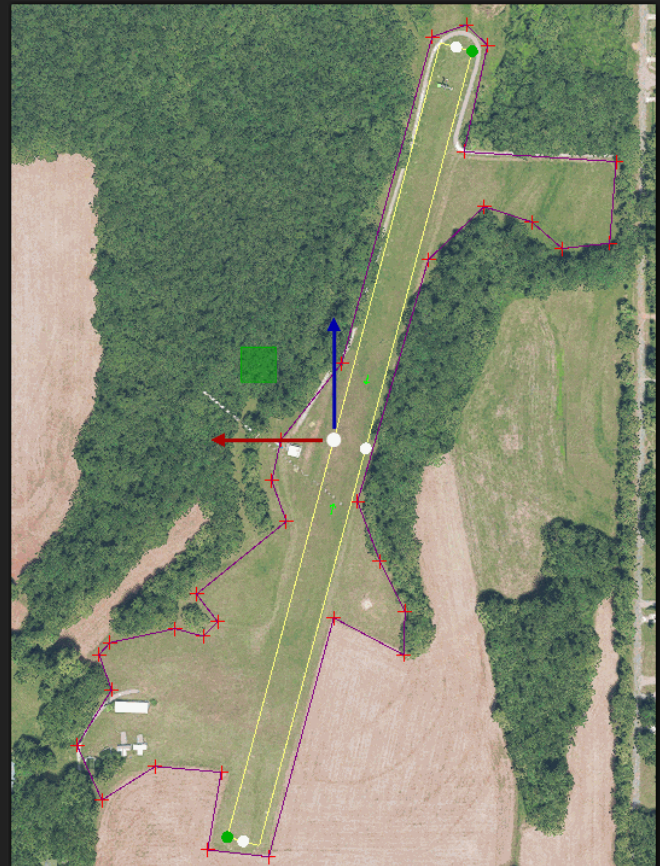
The screenshot shows a dark-themed 'Properties' window for a runway object. It is divided into two main sections: 'Configuration' and 'Materials'. Several fields are highlighted with yellow boxes, indicating the values to be set.

Property	Value
Heading	15.000000 degrees
Length	640.000000 meters
Width	27.000000 meters
Pattern altitude	304.799988 meters
Number	01
Primary design	NONE
Secondary design	NONE
Primary pattern	LEFT
Secondary pattern	LEFT
Surface	GRASS

Additional settings in the 'Materials' section include 'Transparent' (unchecked) and 'Ground merging' (checked).

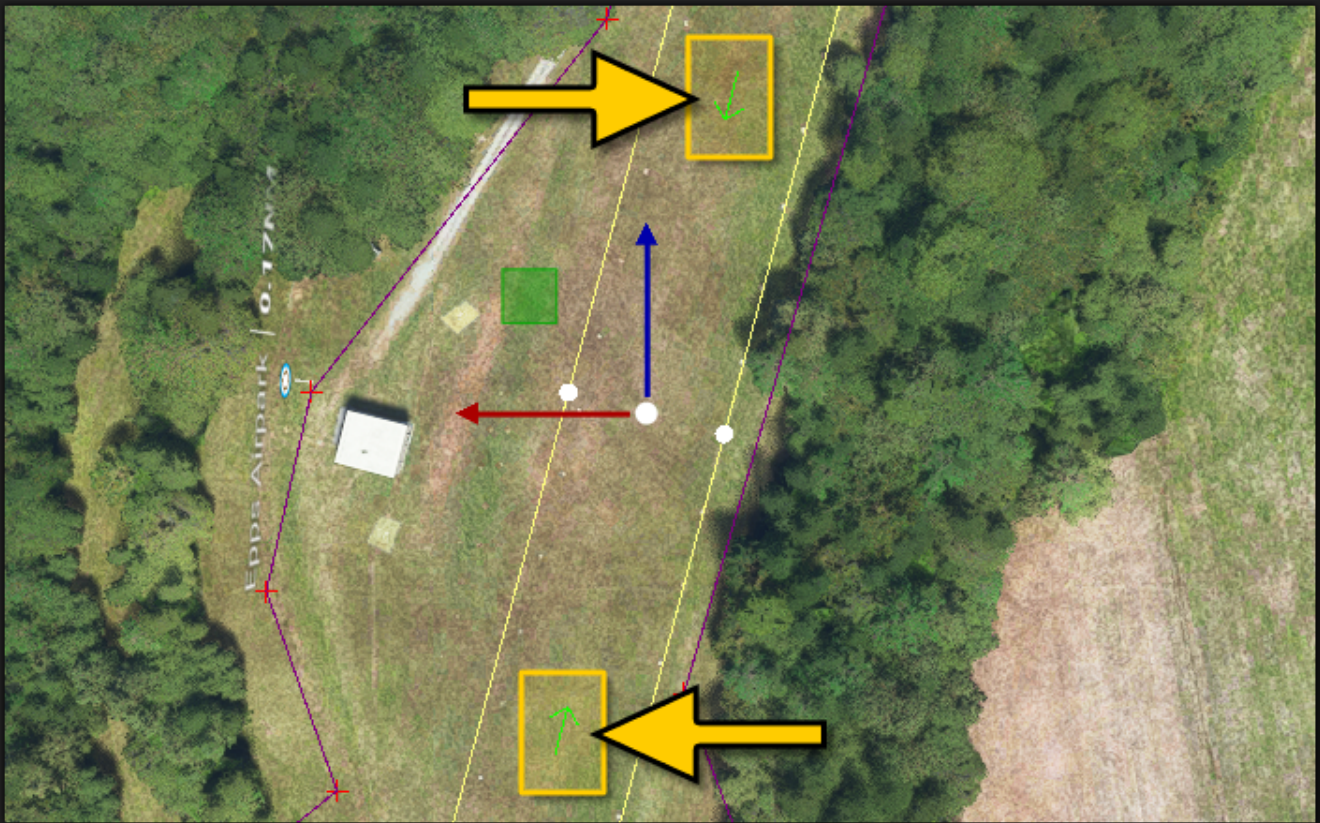
Once you have these details filled in, you can go back into the scenery editor and check and see how the runway looks. In general, you'll probably have to tweak some of the supplied values, as the position may not be exactly correct, or the aerial view shows the runway slightly longer/wider, etc... A little bit of creative licence is permitted here to make what you add fit in with the existing scenery, but try not to take too many liberties!

Edition at this time in the process is usually best achieved using the [Gizmo](#) tool and changing the positions and sizes by hand:

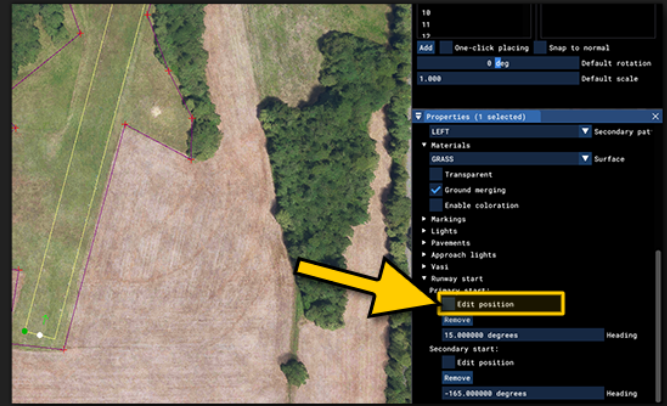
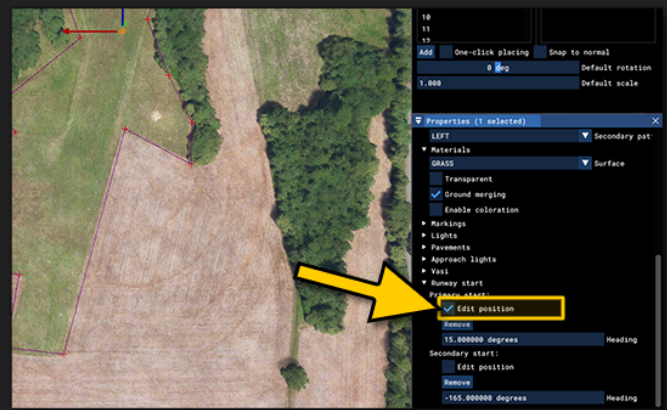
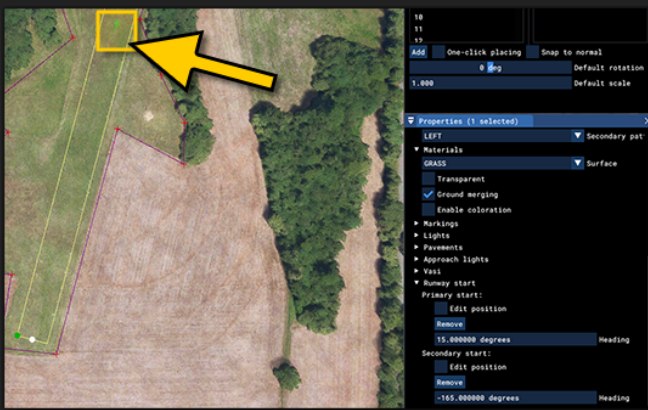


Runway Start Points

By default the runway start points - which are the points on the runway where the aircraft will be positioned to start a flight - are incorrect and will need editing too. These are shown by two green arrows on the runway overlay:



To edit these, you need to go to the last set of properties labelled Runway Start and expand the options. You would then check the box marked Edit Position. This will place a [Gizmo](#) in the scene at the position of the start point which can then be used manually position it where you require, nearer the ends of the runway. You should do this for *both* start points, assuming that both ends of the runway are usable.

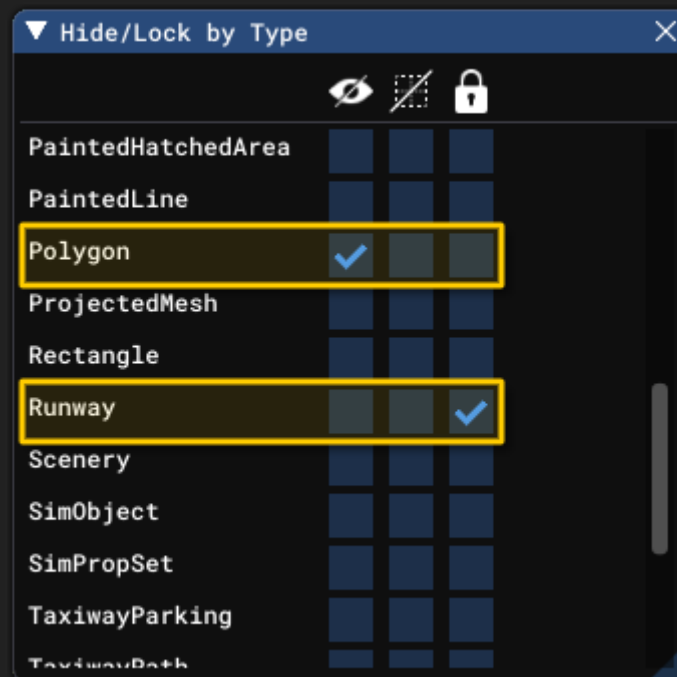


That's really all you have to do for the runway in this tutorial airport, but it's worth checking all the options available to you for the [Runway](#) object and taking time to ensure that it's set up correctly.

TAXIWAYS

The next stage of editing our tutorial airport involves setting up the taxiways and aircraft parking spots. Taxiways are comprised of two different objects: [TaxiwayPoints](#) and [TaxiwayPaths](#). You place the taxiway *points* throughout the airport, and then they are connected by taxiway *paths* to create a complete taxiway network. Then, after you create the paths, you'll add in the parking spots.

Before going any further, we should probably disable editing for the polygon and runway objects that we have already placed. This will make placing the taxiway simpler as we won't need to worry about accidentally selecting an object that is "under" the taxiway, and it also reduces the visual noise. For that you should open the [Hide/Lock By Type](#) window, and then click on the "hide" icon for the polygon and the "lock" icon for the runway:

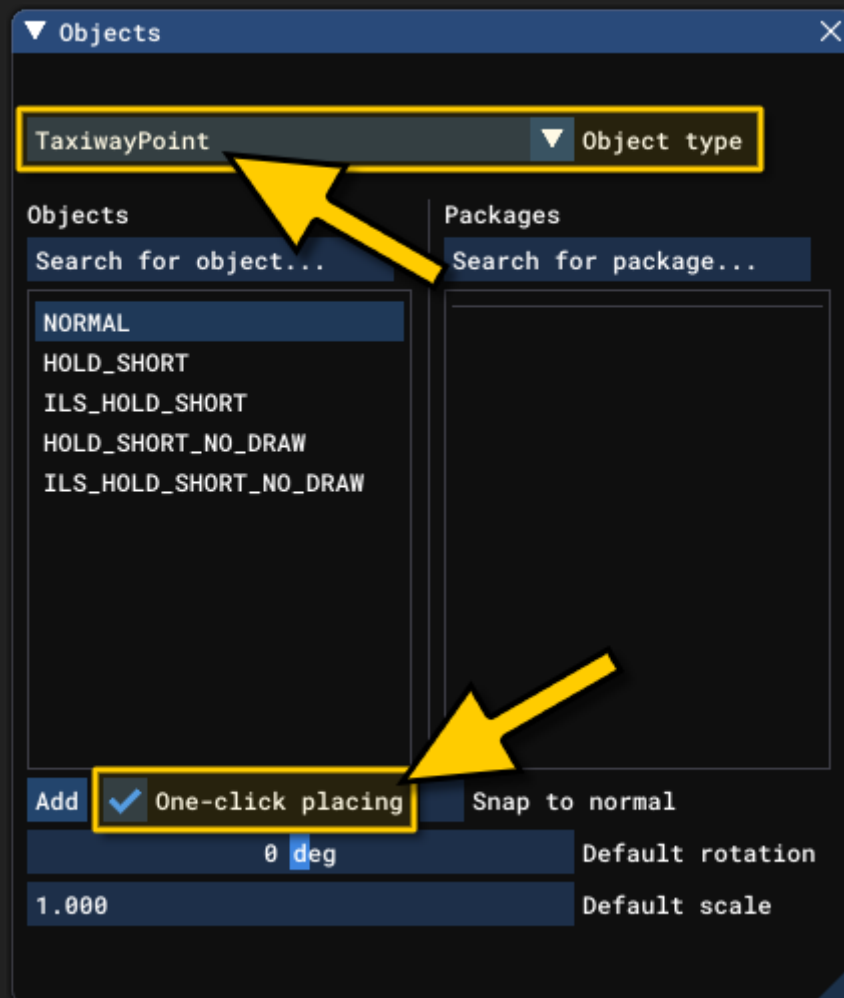


We could just hide everything, but we need to be able to see the Runway area to properly place the taxiway path, so we simply lock it to prevent edition. This permits us to still see the bounding box for positioning things without having to worry about accidentally editing it. Note that this window is very helpful throughout the entire edition process and we recommend that you keep it docked along with the other windows so you can quickly

enable/disable the edition and visibility of objects, as it makes editing specific things much simpler.

Runway Taxiway

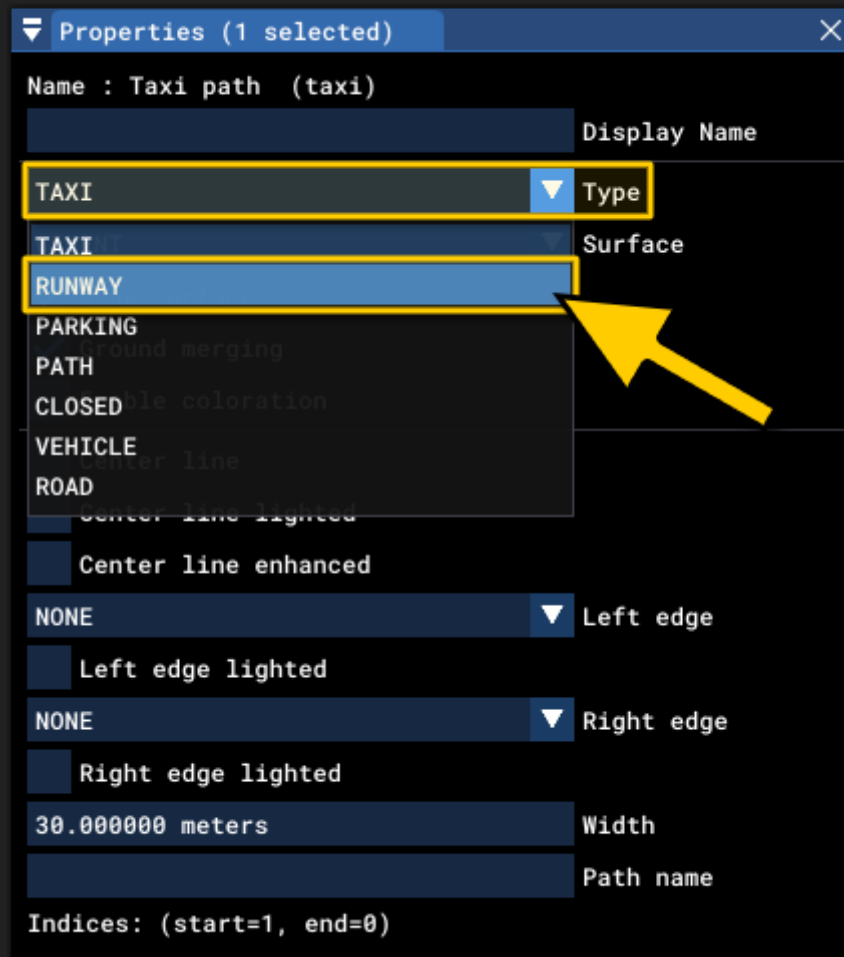
We first need to add the taxiway that follows the runway. In general, this should always be the first taxiway you create as all others will branch off from this. So to create this path, you need to first select the [TaxiwayPoint](#) object and activate the One-Click Placing option:



You can now click on the scene and place the points you need. In our tutorial airport, we need to add 3 points to start with, one for the start of the path, one for the position on the runway where other taxiways will be joined, and then one at the end of the runway:



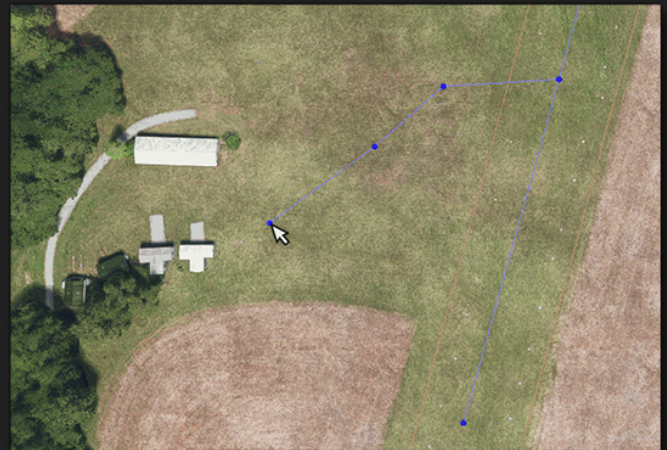
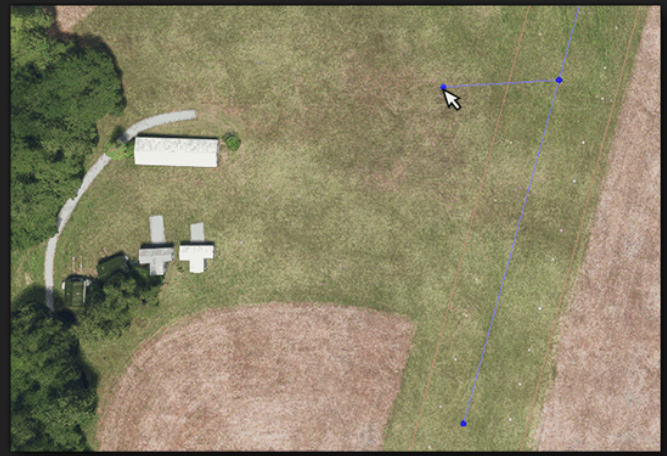
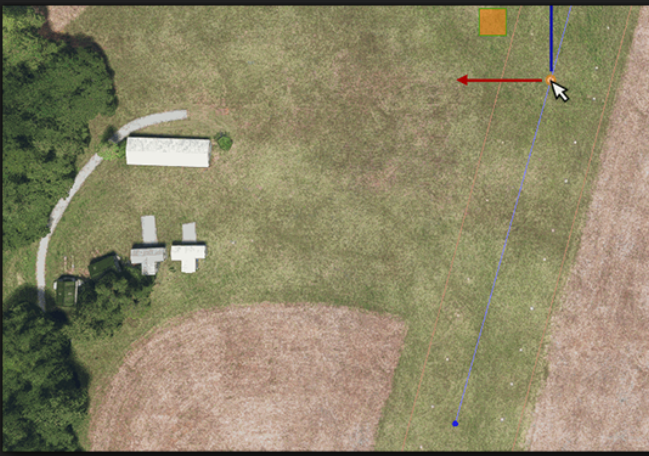
Once you've add the final point, you should disable One-Click Placing so you don't accidentally create any further points. The scenery editor will now show the points that you've added, and you'll notice that there are also [TaxiwayPath](#) objects. These are added automatically by the Scenery Editor and will now need to be edited, since by default they will created as generic taxiways which have a material added to them. So, in the [The Scenery Contents List](#) select the first TaxiwayPath object, then in the Properties window, set the Taxiway Type to Runway:



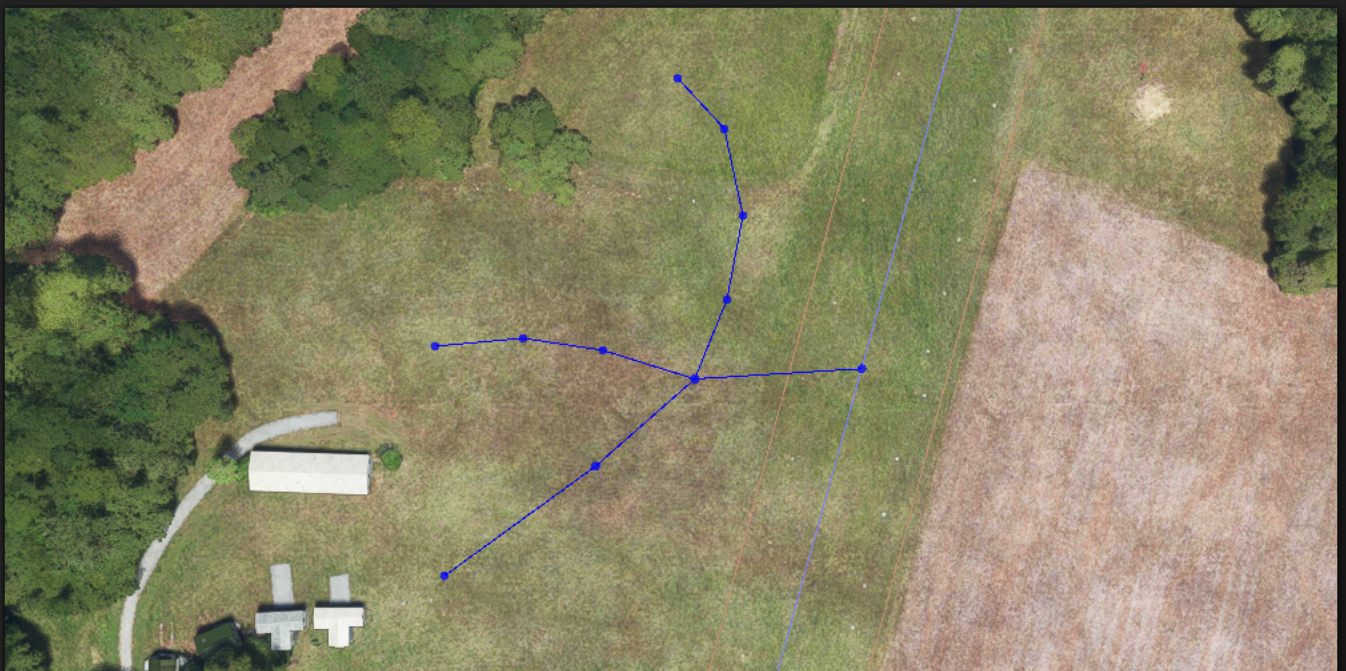
Runway paths have no material by default since you would almost always want to maintain the original Runway Material.

Connecting Taxiways

We can now add further subsidiary taxiways that connect to the runway taxiway from the areas where the aircraft can be parked. To start with, select the "middle" taxiway point that we added as a connection node. Once selected, you can enable One-Click Placing again for the taxiway point object, and then add a couple of points that go off towards where we want the aircraft to park:

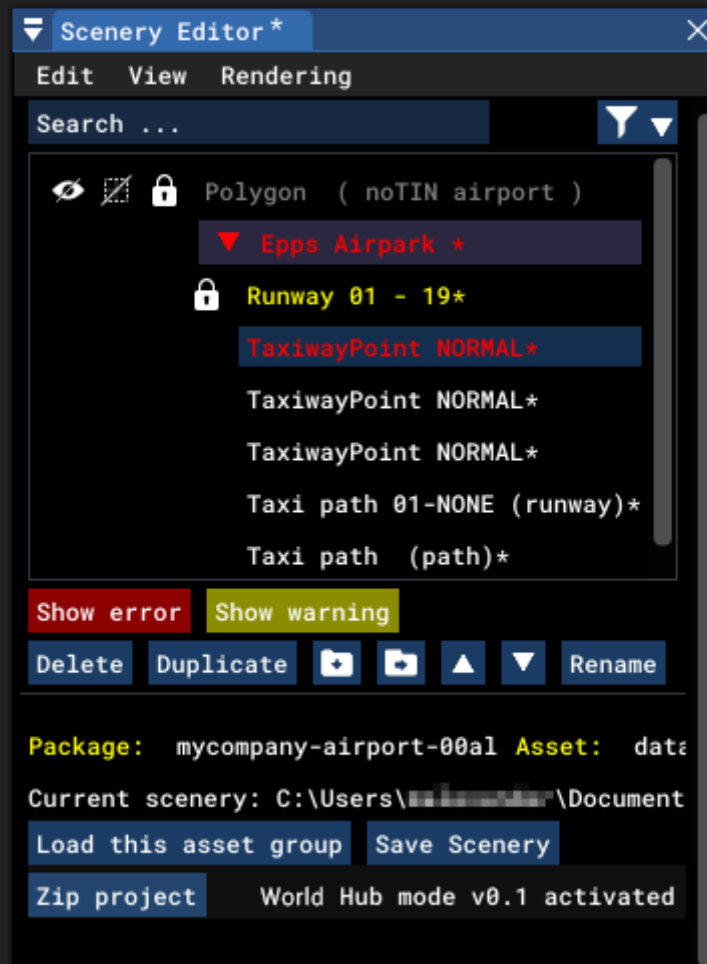


At this point, you should select the different TaxiwayPath objects and ensure that their Type is set to Path. Once you have done that you need to repeat this process two more times so we have three connecting taxiways that look something like this:



Errors And Warnings

At this point, it's more than likely that you'll have at least one warning in the Scenery Editor, although you may also have errors, depending on how you've connected things up. In the editor, a warning will mean that you can save the airport, but it may be mis-configured, while an error will mean you *can't* save the scenery until the errors have been resolved. The image below shows how both types of issue will be shown in the Scenery Editor:



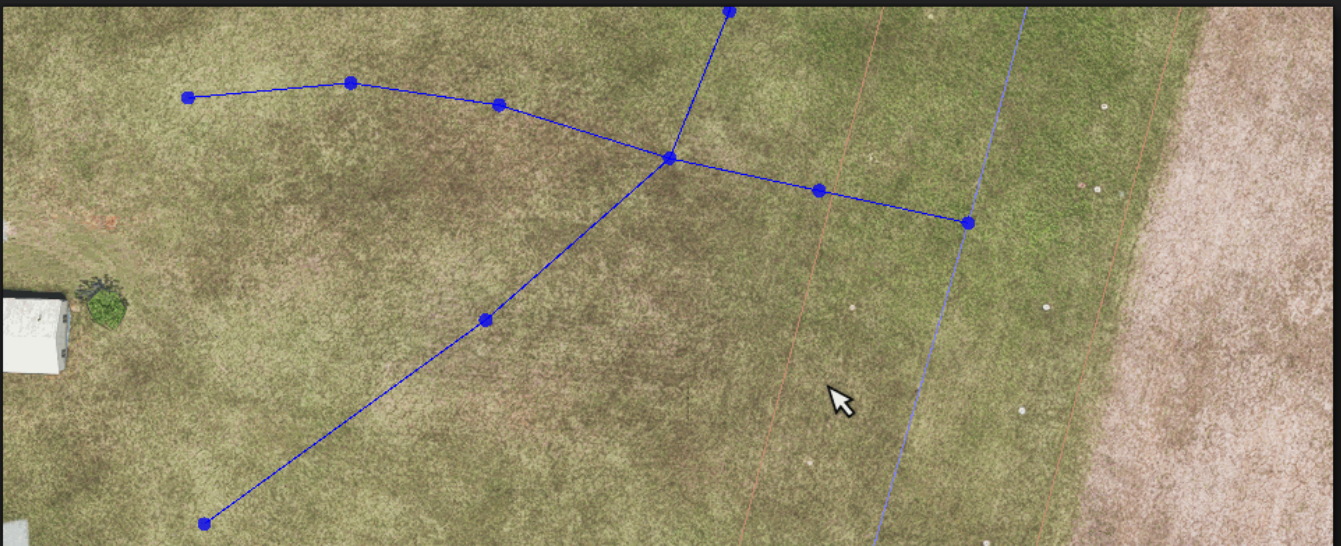
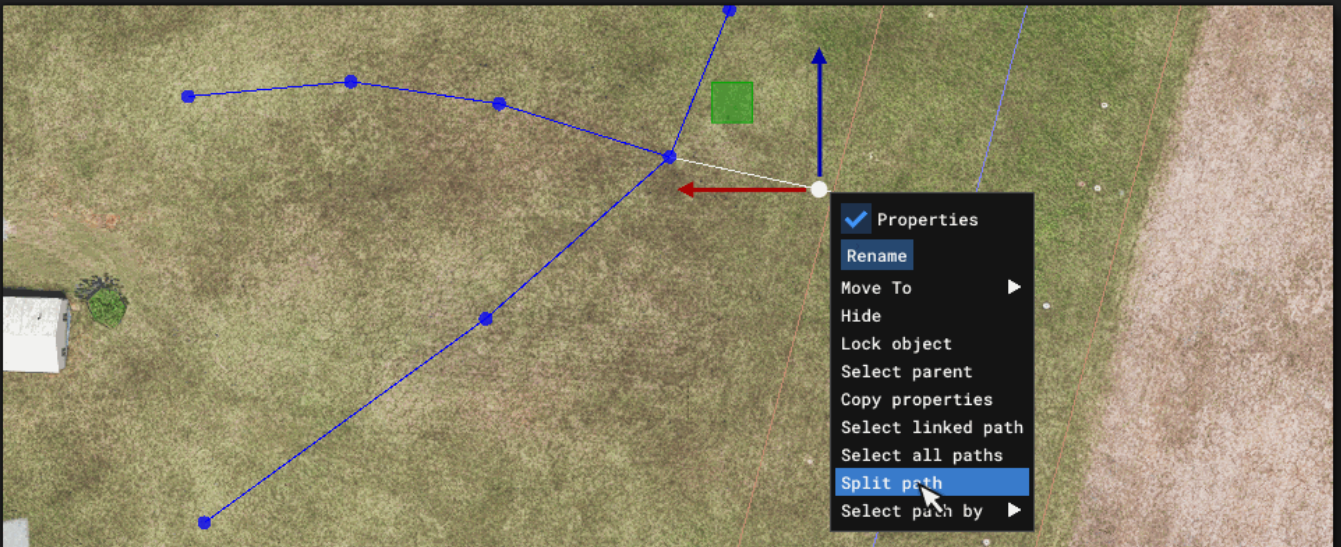
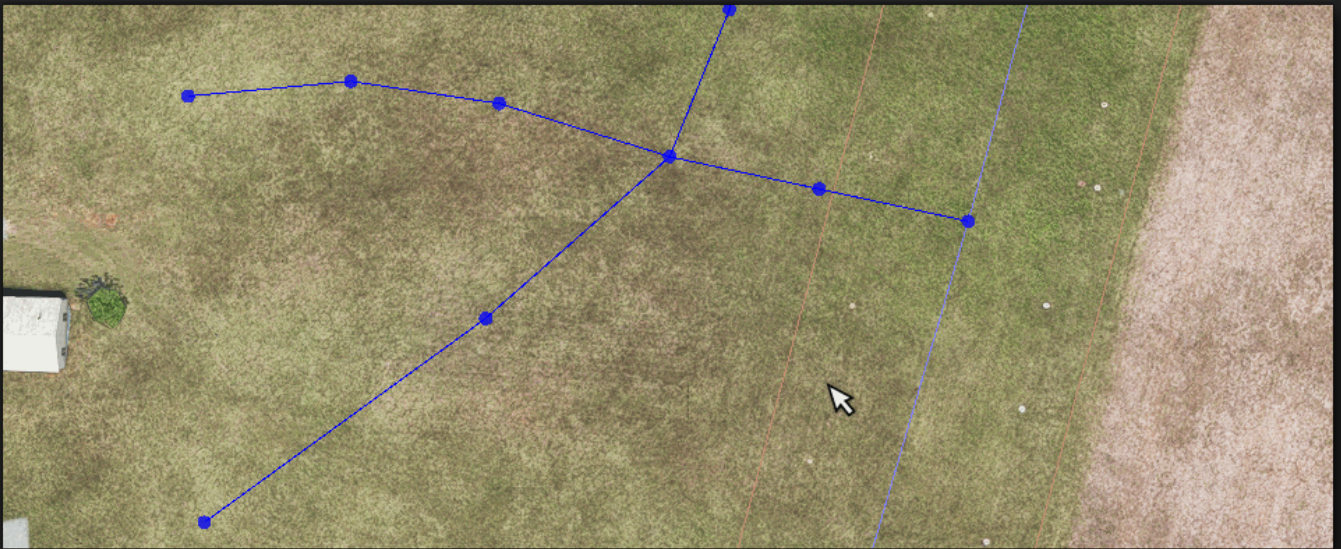
The error shown here is a stray Taxiway Point that we can simply delete (you can double-click on the point object in the list to be taken to it in the scene and see what the exact issue is) and the warning is related to the Runway object. If you mouse over the runway object in the list, you will get a message that tells you what the issue is:



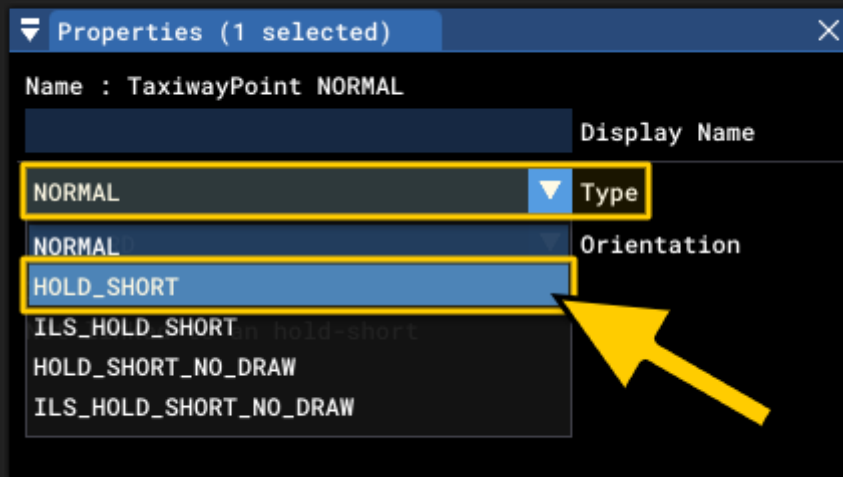
In this case, the warning is that there is no taxiway hold short close enough to the runway to be usable, so we'll add that in now.

Setting A Hold Short

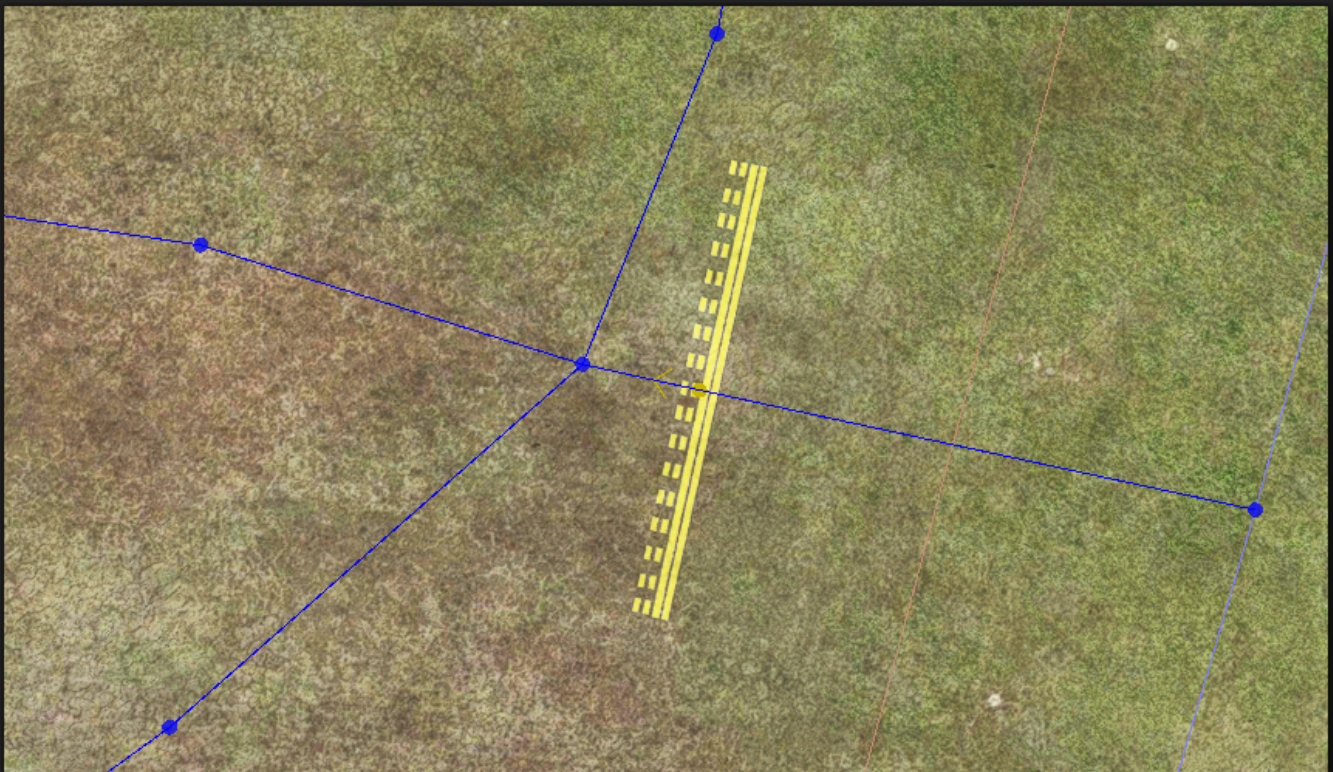
Since we have a taxiway point leading onto a runway, we need to set a point to be the hold short position for aircraft (this is the point where aircraft should stop before crossing or entering a runway). For this we need to add another point into the path between the one on the runway, and the one that splits into different connecting taxiways. This is easily done by first selecting the path, then right clicking and selecting Split Path to create an extra point on it:



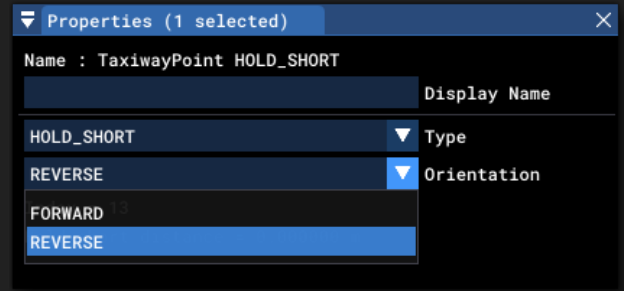
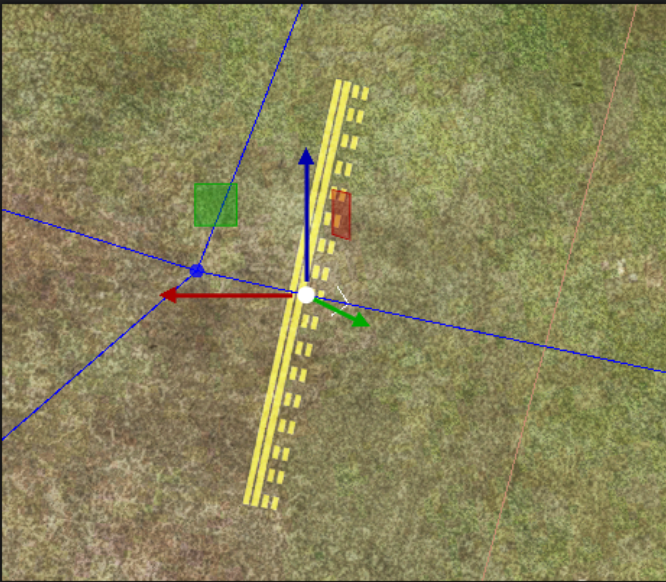
If you click on this point, you can then go to the properties and change the type to be HOLD_SHORT:



You will then be shown in the scene the painted lines associated with the hold short, and an arrow showing the facing direction when stopped. We don't actually *want* these painted lines for this airport, but they make an excellent visual indicator for the hold short position and orientation:



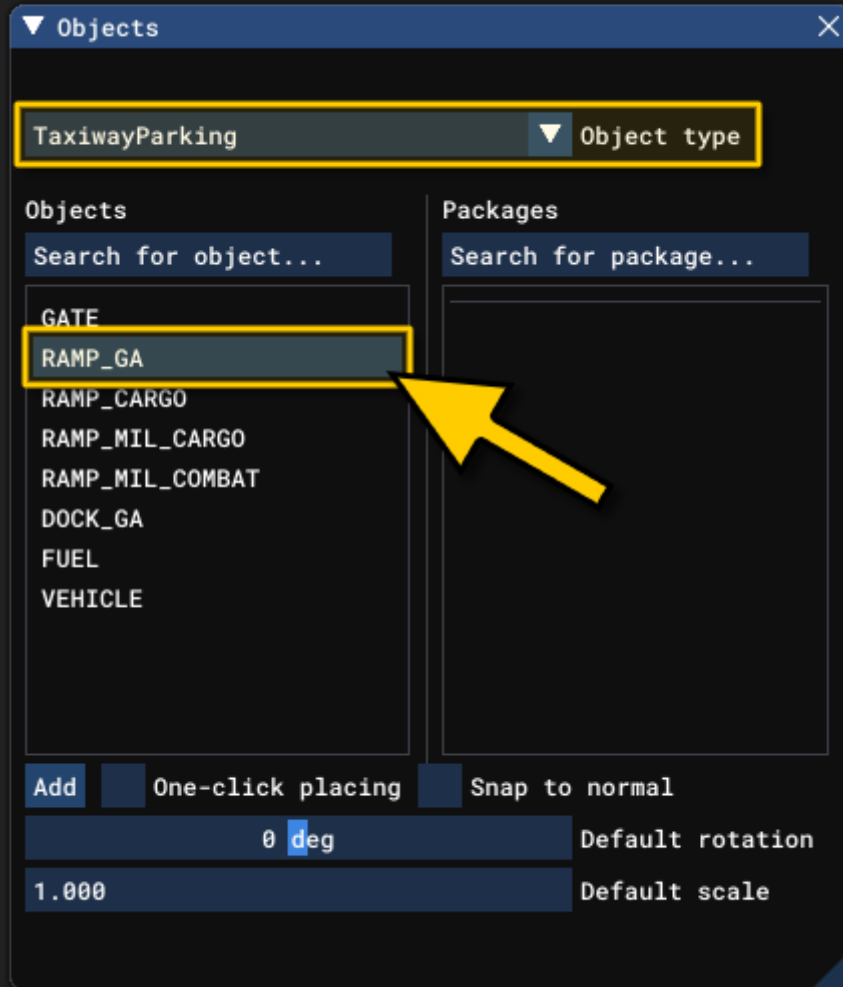
In our example you can see that the hold short is orientate wrongly, and should be facing the *runway*. This is easily solved by going back to the properties and changing the Orientation to be Reverse.



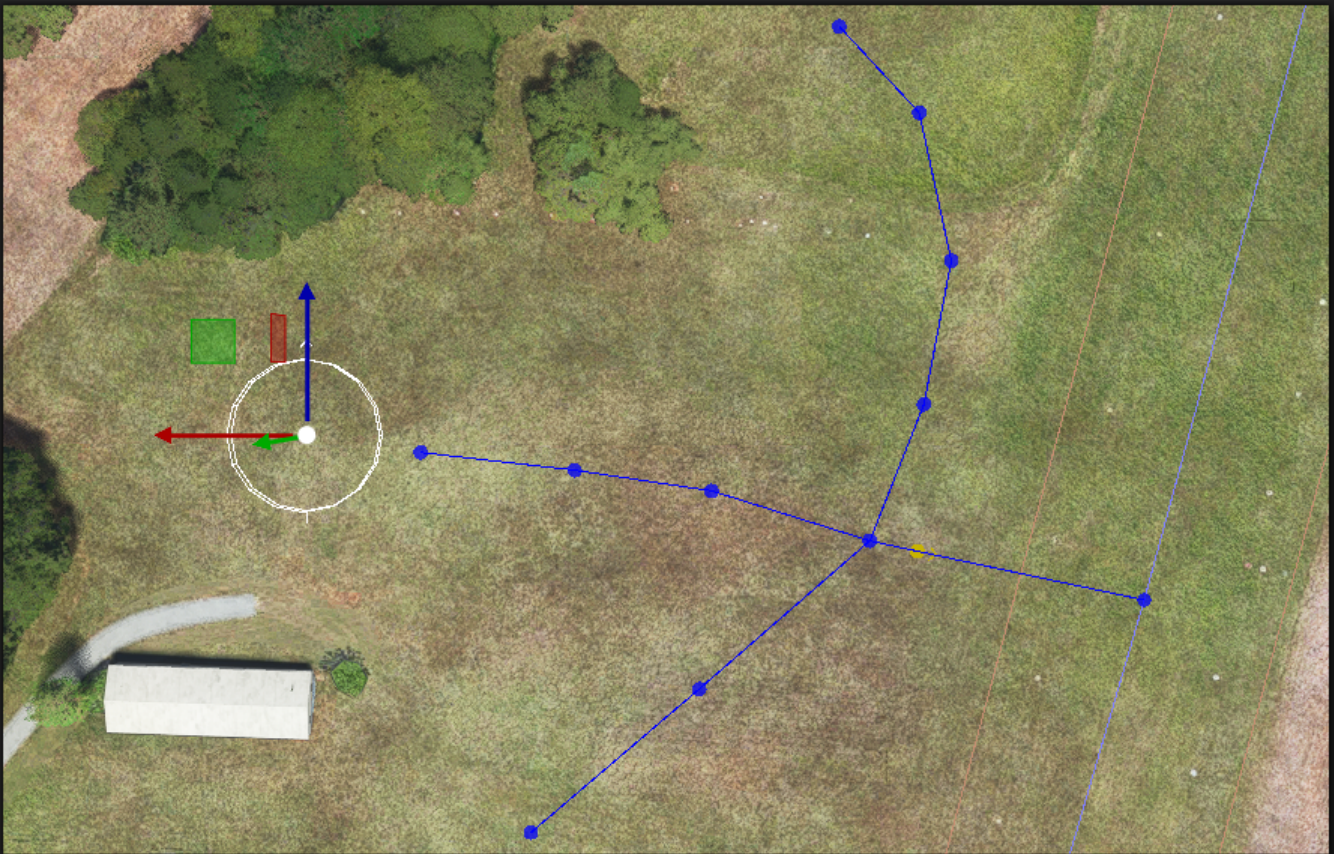
You can also take this time to move the hold short taxiway point using the [Gizmo](#) and make sure it is positioned appropriately. When ready, you should go back to the Properties for this point and set it to be the HOLD_SHORT_NO_DRAW type, which will keep the point as a hold short position, but remove the painted lines associated with it.

TAXIWAYPARKING AND JETWAYS

With our taxiways added, we need to add in some parking spots for the aircraft now. For this we'll use the [TaxiwayParking](#) object, and we'll be using the RAMP_GA type to start with:

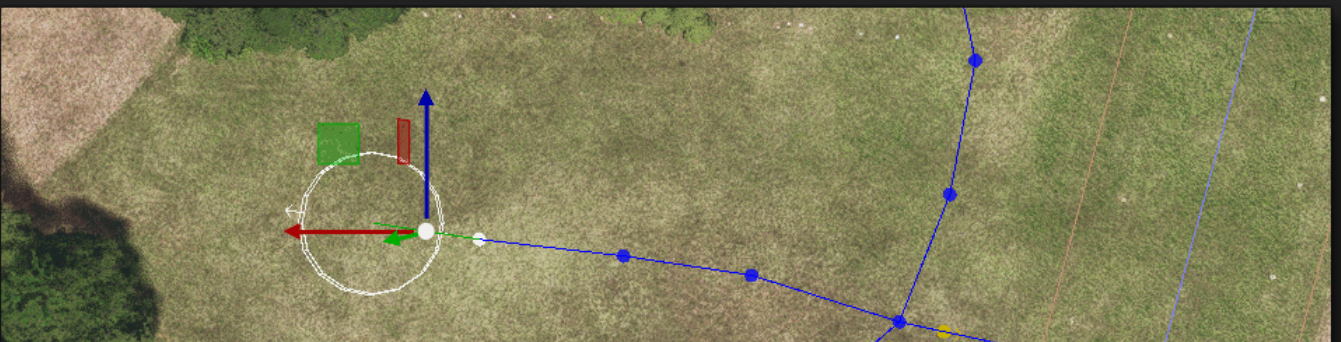
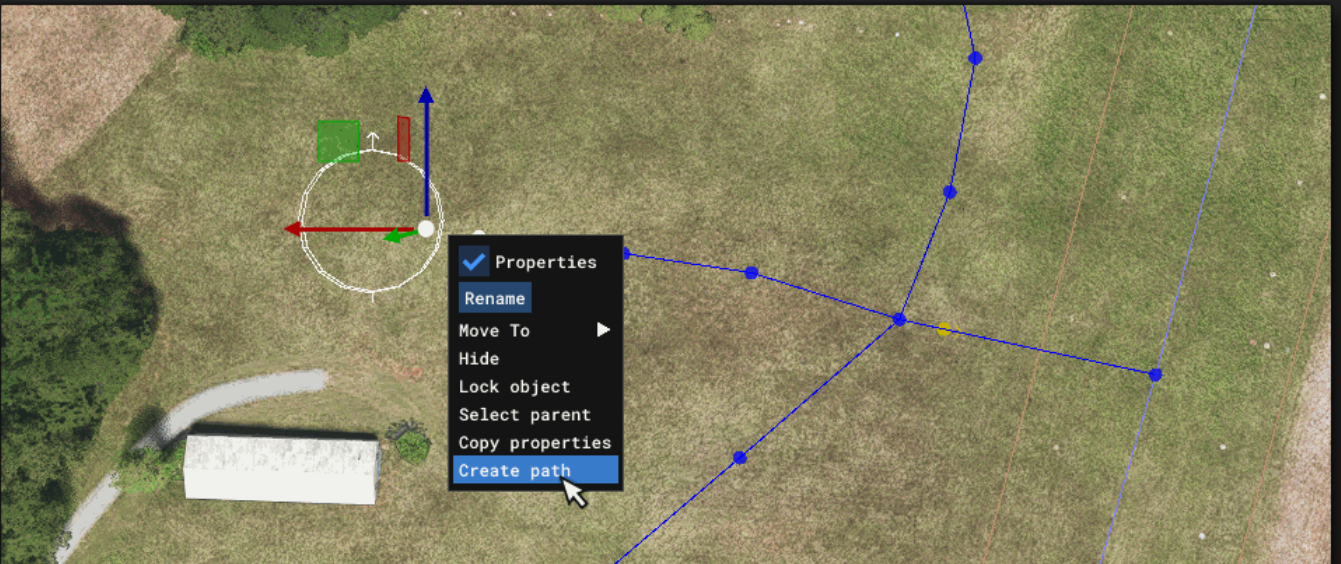
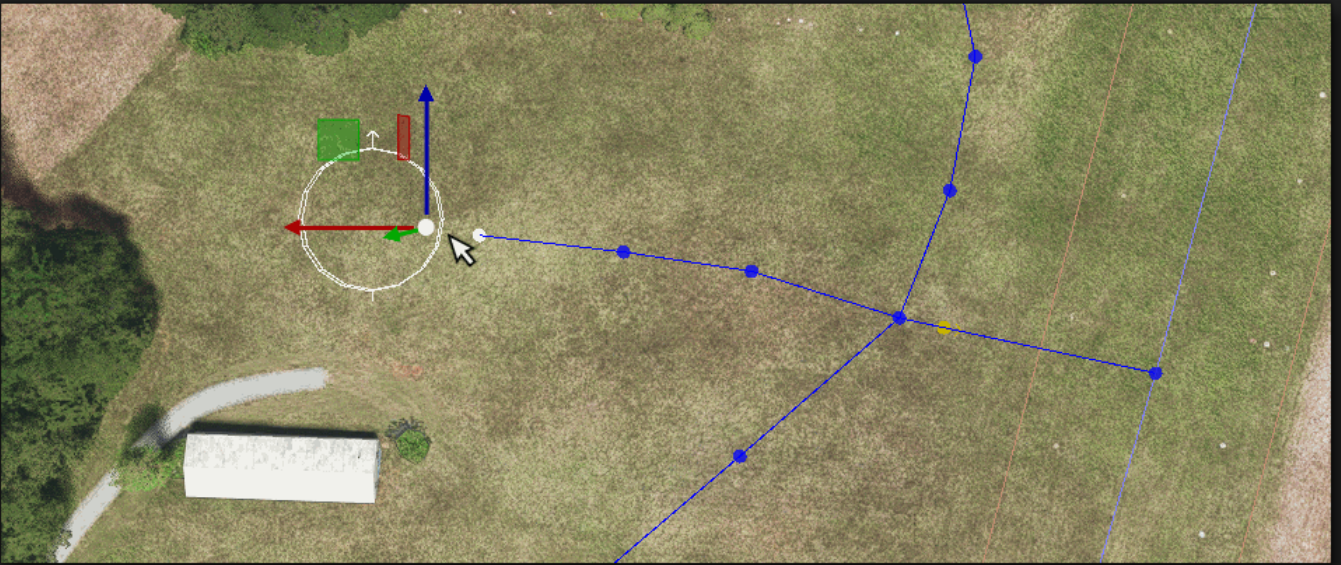
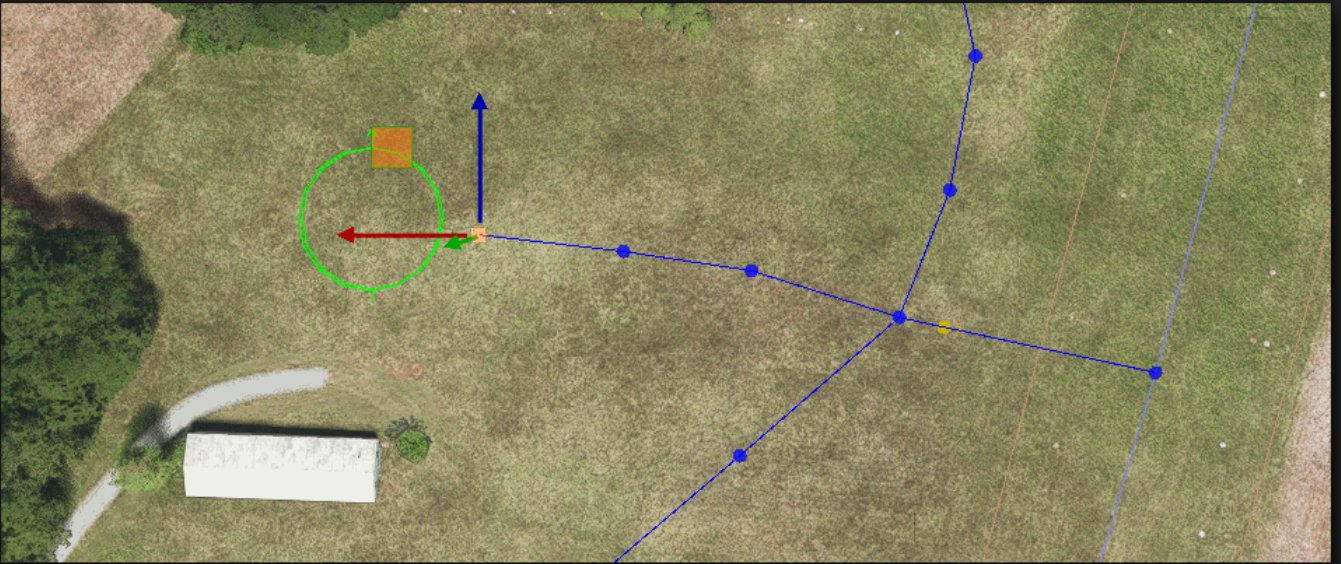


Place one of these in the scene right now beside the middle taxiway path:



Connecting The Parking

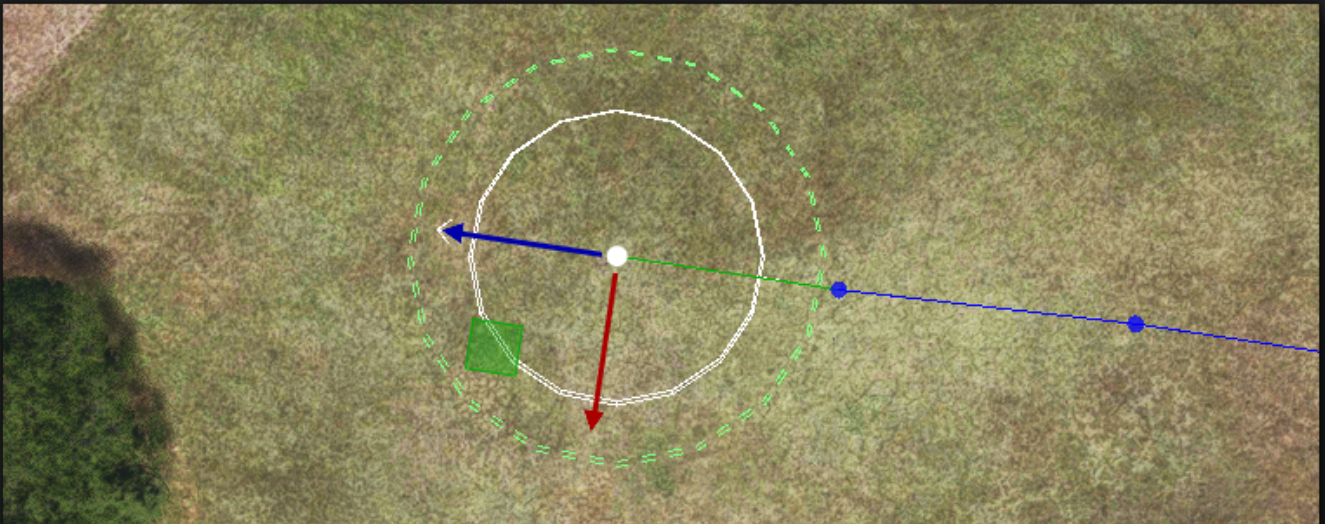
The first thing we need to do is connect the parking object to the taxiway. For that you need to click on the parking object to select it, then hold **Ctrl** and click on the last point of the taxiway path that you want to attach it to. We then right click and select Create Path:



When it has been connected, there will be a new [TaxiwayPath](#) object of the type Parking (it will be coloured dark green so you can visually check that it's correct). The parking spot orientation will also change to match the direction of travel along the taxiway path, which you can see by the direction of the arrow coming from the parking spot.

Setting Up The Parking

The parking space has been connected and oriented correctly, which means you can now set up it's size and other properties. For this you want to first go to [The Scenery Editor](#) and in the [Rendering](#) menu select the option [Show Parking Spaces](#). This will show the area around the parking space that will be reserved for additional airport vehicles using a dashed line:



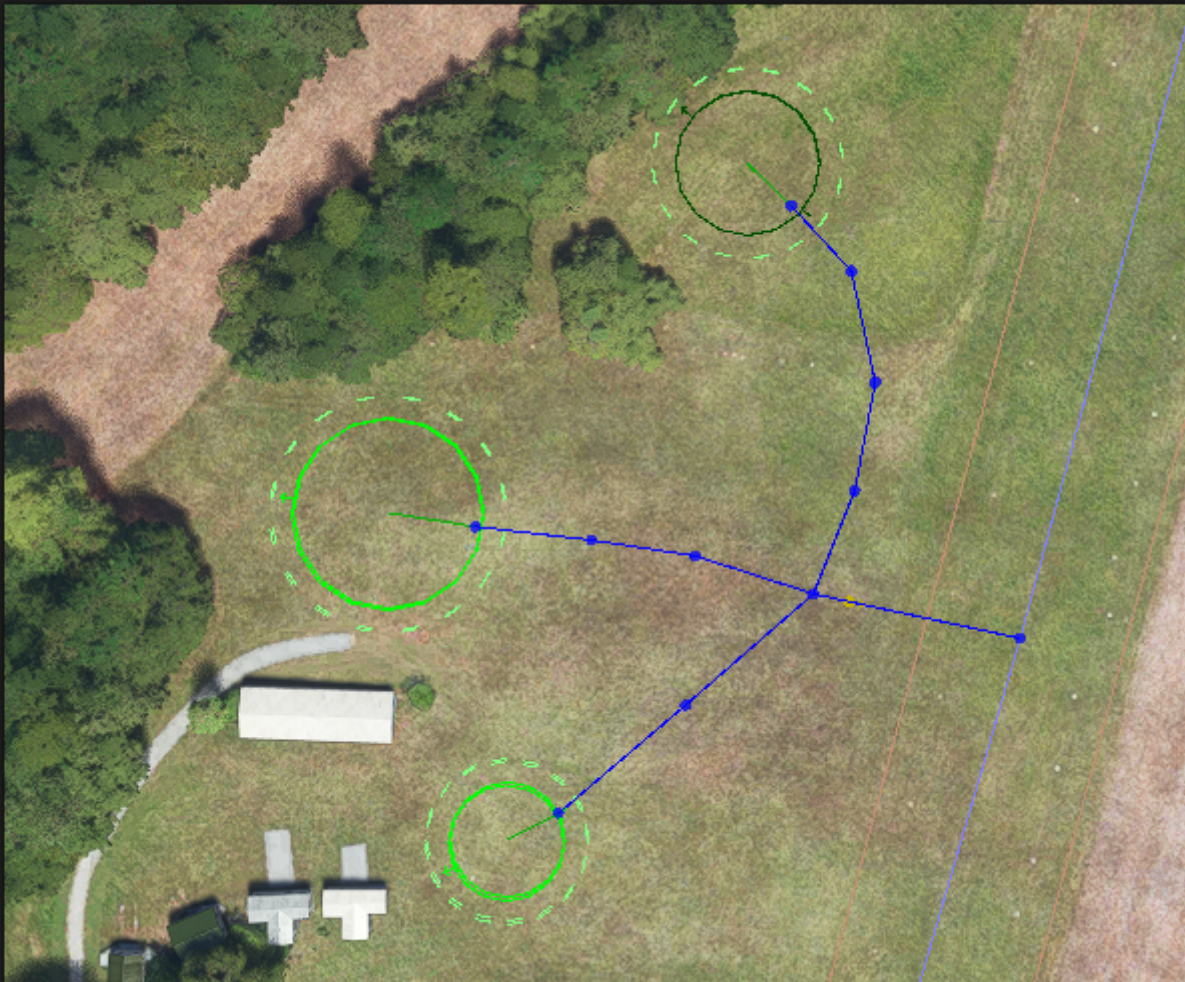
With that done, you can then set the size of the parking space. You can do this precisely using the Radius parameter in the properties window, or alternatively, you can use the [Gizmo](#) - set to Scale - and visually adjust the size of the parking space. For our tutorial we want the radius to be around 20m:



Once the size is set, you also need to give the parking spot a number. Each parking spot must have a unique designation number, and in this case we'll set it to 1.

Further Parking Spots

You can now go ahead and add two more parking spots, following the same procedures outlined above, one for each of the connecting taxiway paths. These parking spots should have a smaller radius of about 15m. When you've finished doing that we want to set the top parking spot to be of the type Fuel, so that it can be used for refueling aircraft. When finished, the scene should look like this:

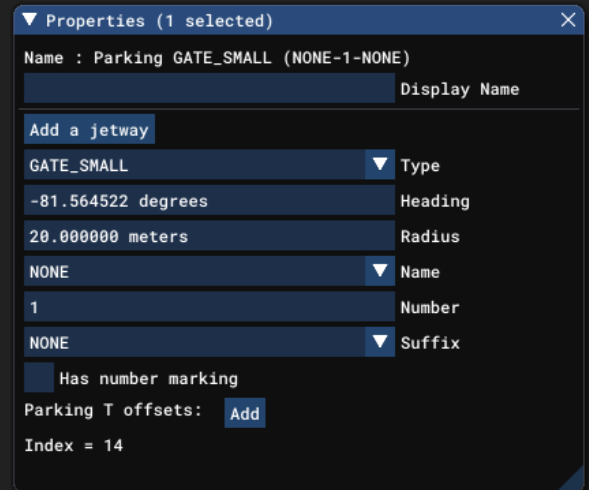
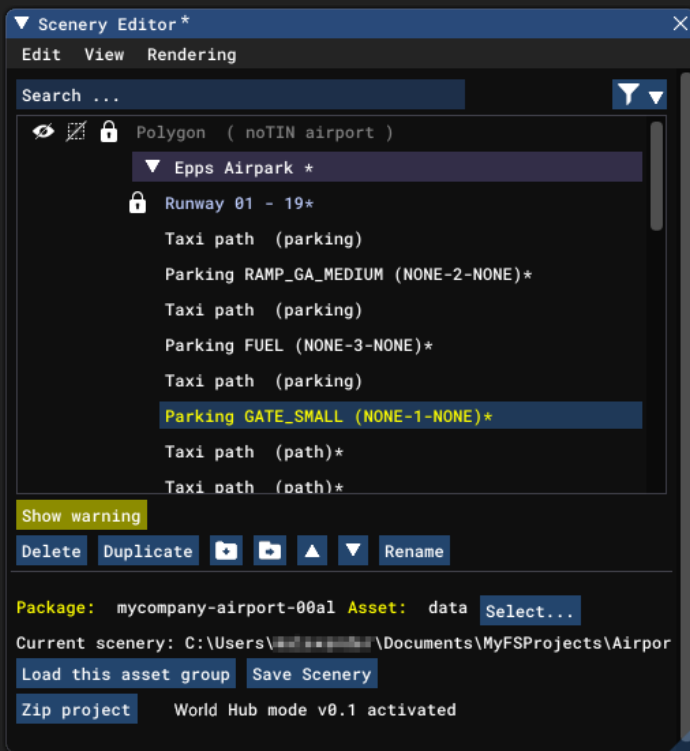


Adding A Jetway

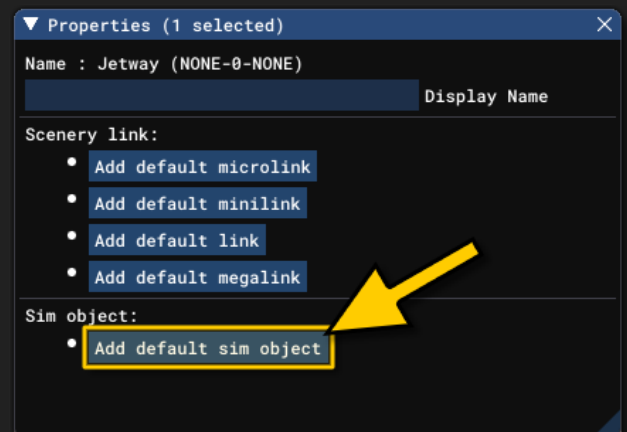
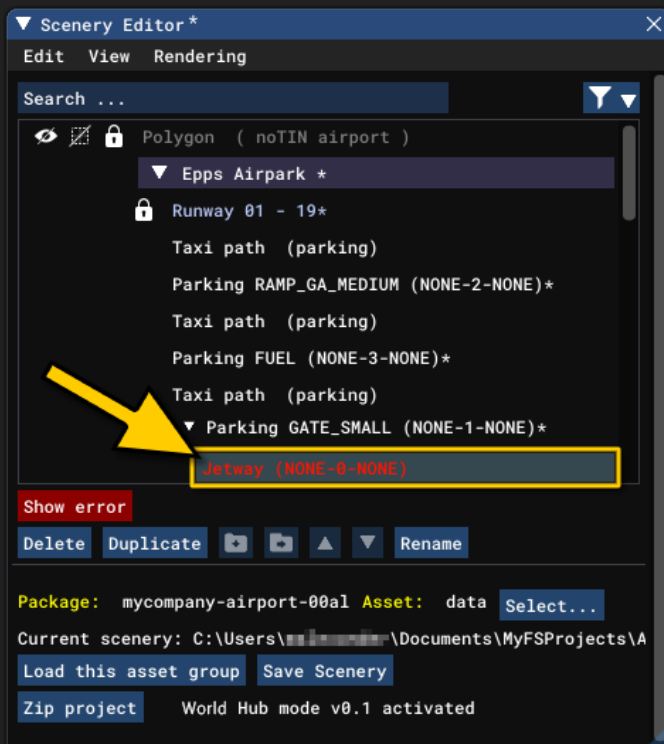
The airport we are editing is pretty much finished at this point, but for the sake of the tutorial, we're going to continue to keep adding elements to demonstrate how each of them is created and works in the scene. We'll start with adding in a jetway - which is obviously not appropriate at all for this airport, and when you are creating your own airports, you should avoid "improvising" like this.

NOTE: For this part, you might prefer to set the camera to the Developer Camera rather than the Top Down Camera, as it makes working with 3D objects easier.

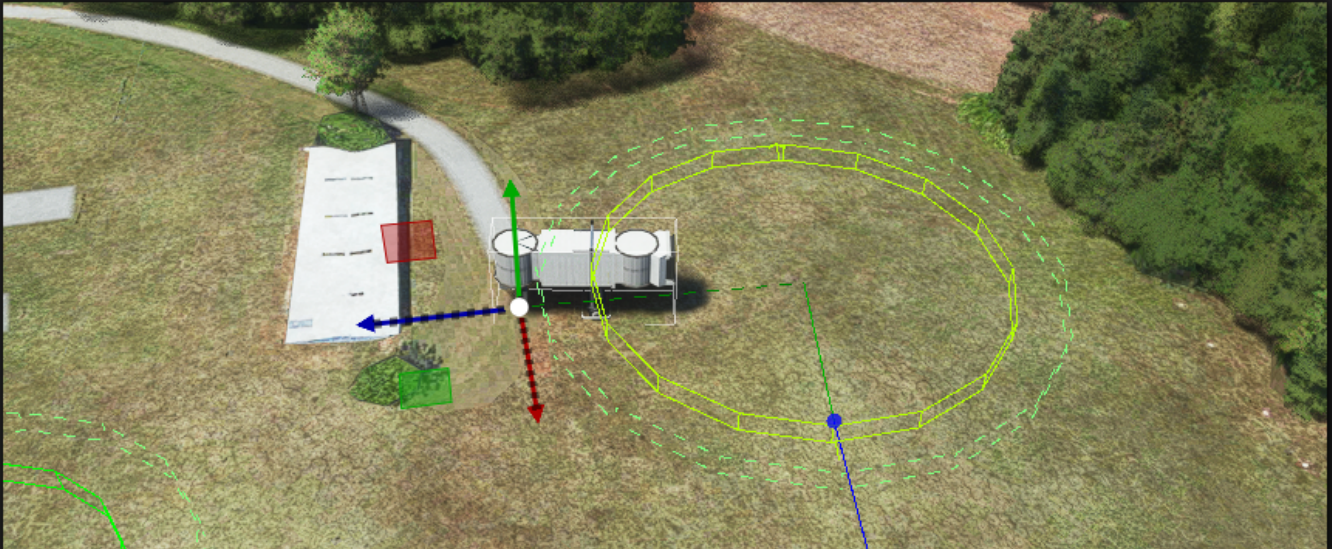
We'll add the jetway to the larger parking spot that we made, and so you will need to change the type of the TaxiwayParking object to be Gate Small or Gate_Medium. This will trigger a warning in the Scenery Editor, as these gate types require a Jetway which we haven't added yet, and you'll also have an extra option to add the jetway in the object properties:



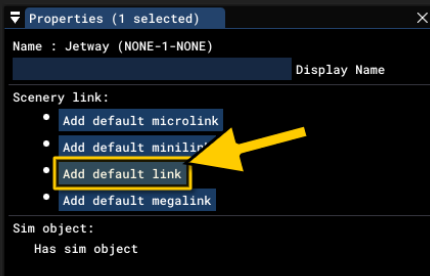
You should now click the **Add A Jetway** button, which will add a Jetway Object to the parking spot. Note that this does NOT add the jetway itself, as that requires a SimObject, it only adds the Jetway object which is essentially a *container* for the jetway SimObject components. To add the jetway SimObject, you need to select the Jetway Object in the Scenery Editor and then in the properties click on the **Add Default Sim Object** button:



This will add the a JetWay SimObject to the parking space, which can then be rotated and positioned as required using the [Gizmo](#) tool:



You can also add a Jetway Link scenery object to link the jetway to any buildings using the Jetway container buttons, and edit the position and placement using the [Gizmo](#) tool, as shown in the image below:



Obviously in this example it's not very realistic, but for the sake of this tutorial we'll leave this parking spot as it is.

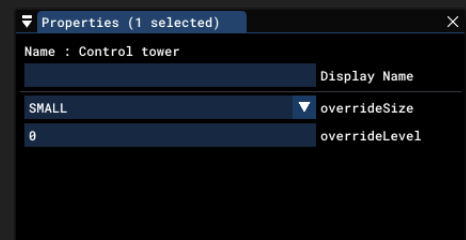
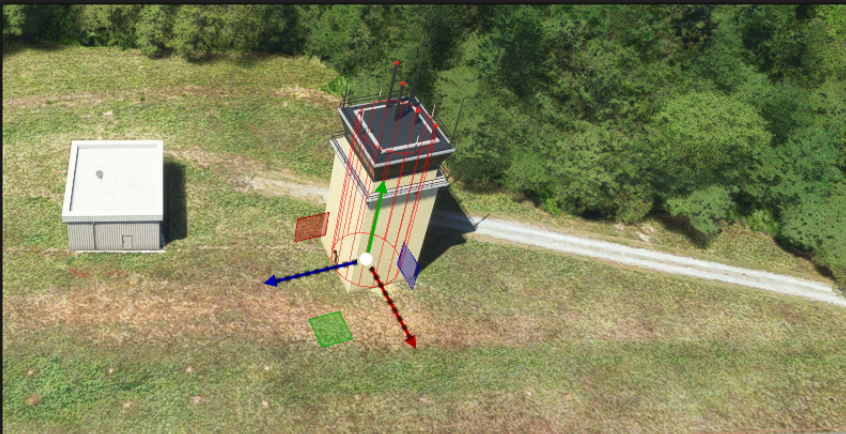
ADDITIONAL ELEMENTS

Since this airport is being used simply as a tutorial and will not be submitted to the [World Hub](#), we can go ahead and add a few other elements to it in order to show you how things work. All these elements can be used in any airport, although - as we've mentioned previously - you should strive to keep the airports you edit as realistic and accurate as possible.

Control Towers

Control towers are procedurally generated for you by the Microsoft Flight Simulator engine based on the Properties that you give. For this tutorial airport we'll add a small control tower, so select the [Control Tower](#) object and click the **Add** button to add one to your scene:

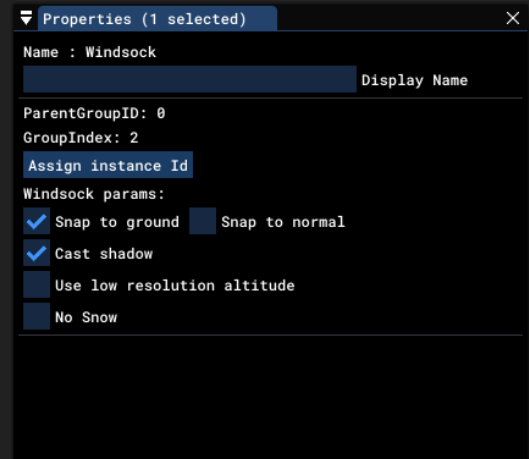
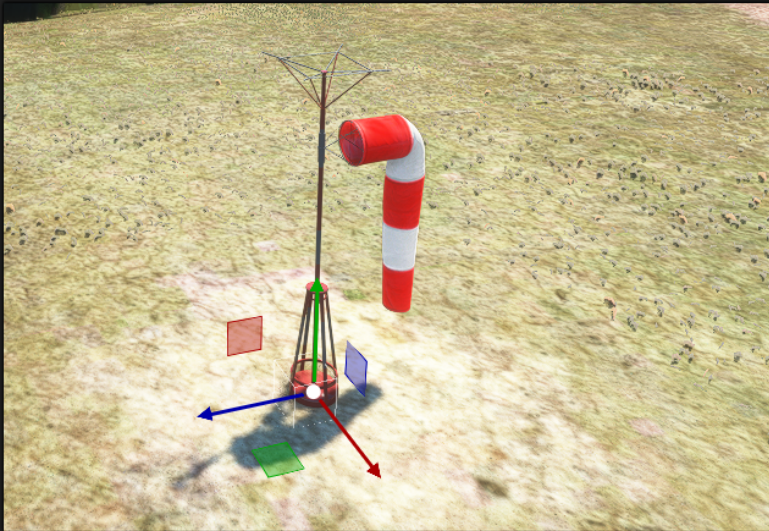
NOTE: For this object, you might prefer to set the camera to the Developer Camera rather than the Top Down Camera, as it makes working with 3D objects easier.



As with other objects, you can use the [Gizmo](#) tool to modify the placement of the object, and - if required - you can modify the height of the control tower (within limits based on the size) using the `OverrideLevel` parameter.

Windsocks

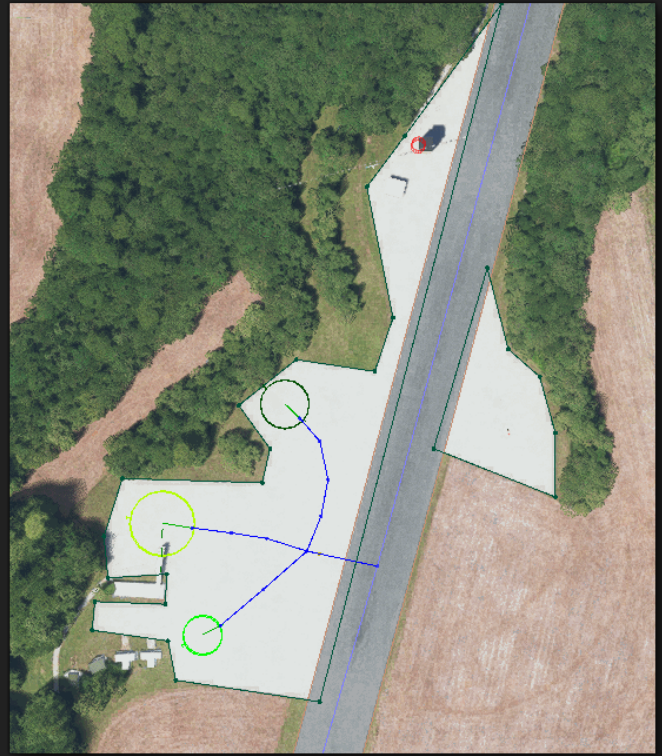
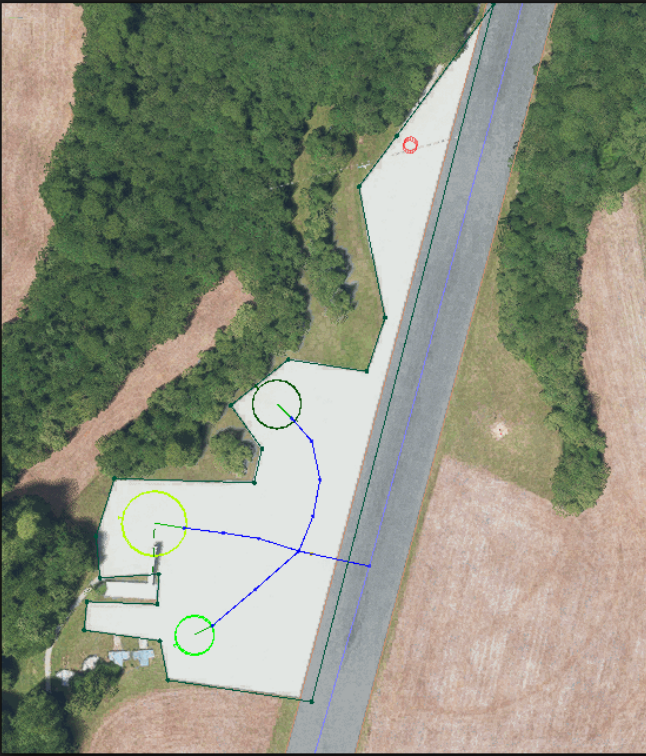
Another simple but common SimObject that you'll want to place in your airport is the [Windsock](#). Like the control tower, you simply select this object from the list and click **Add** to add it to the scene and then using the [Gizmo](#) tool you would position it and set it's size. You can add one or more of these now to the tutorial airport:



Aprons

We'll add some [Apron](#) objects to our tutorial airport now. These are added in almost the exact same way as you would add a [Polygon](#), and are mainly used for landscaping and changing the terrain around the airport to use different materials. When you select the Apron object, you have three options: Default, Disk and Square. We'll be using the default option so select that then click the **Add** button. As with Polygons, you then need to go around the airport area and hold down **Ctrl** then Click to place the points that will delimit the apron, and then press **Enter** when finished:

NOTE: For this part of the tutorial we have set the [Runway](#) material to be CEMENT so that it is more visually coherent with the aprons we're adding. However, as mentioned previously, this is only for the tutorial and you should always strive to keep your edits as close to reality as possible.



Once you've placed the aprons, you can then change their surface material, change how the surface texture is applied, use them to exclude vegetation and colour them.

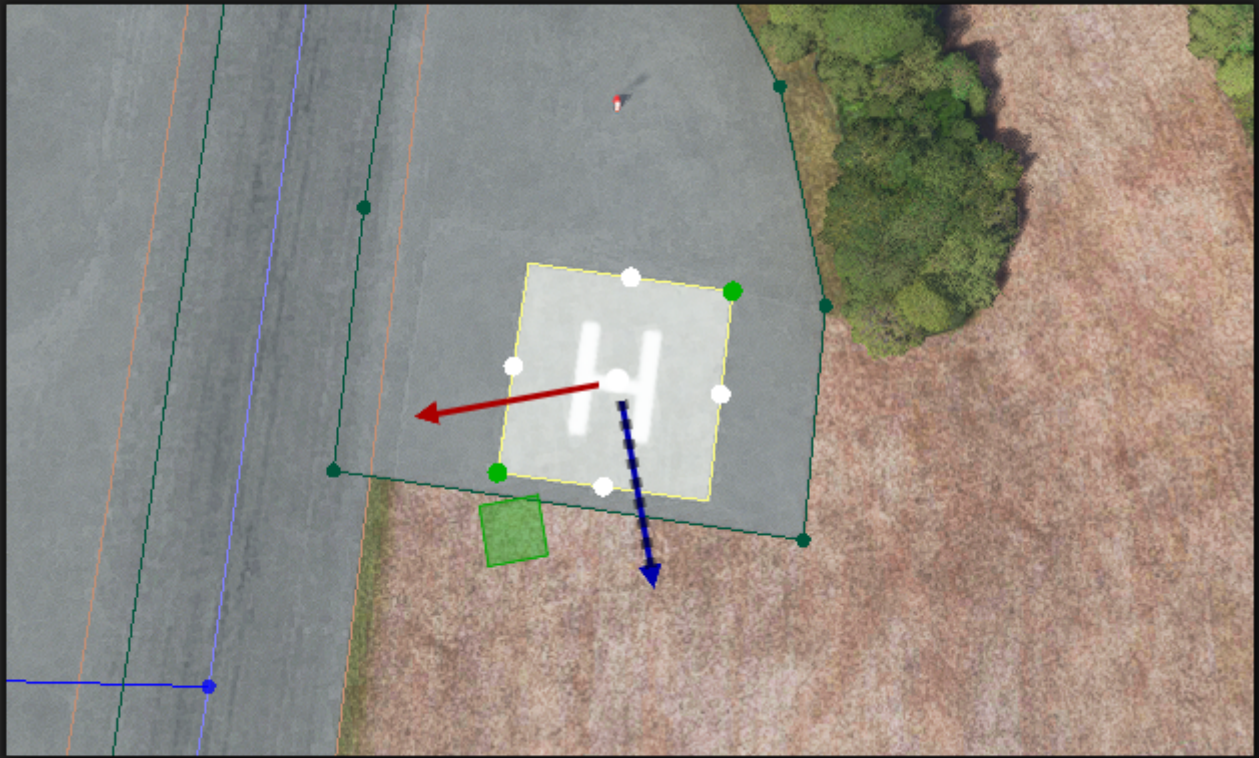
Car Parking

Many airports will have areas specifically for carparking, and the aerial of the airport may show lines or spaces dedicated for this purpose. So these areas look better, you can flag them as carparks using the [Carparking](#) object. Again, this works the same as the [Polygon](#) object where you add it to the scene, then hold **Ctrl** and click to place points and press **Enter** to finalise:

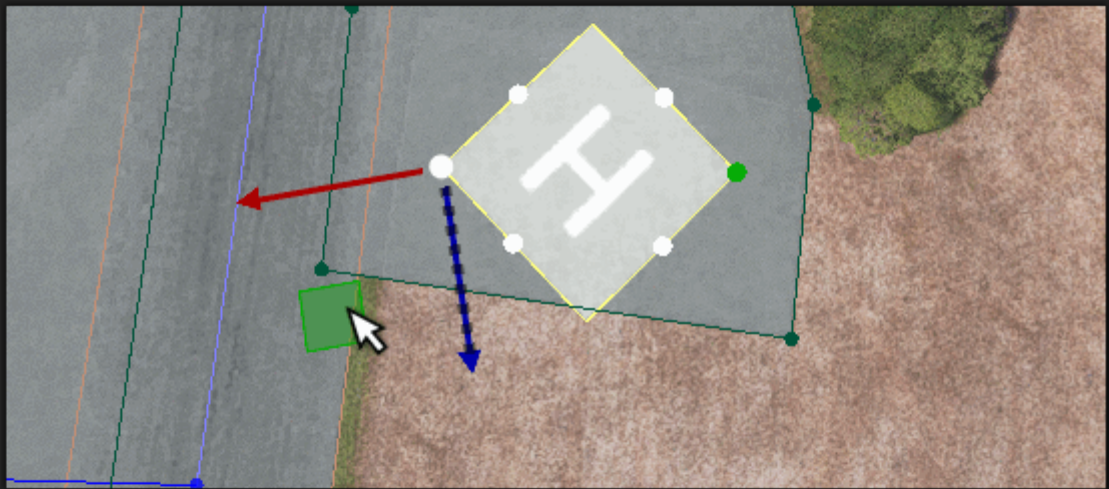
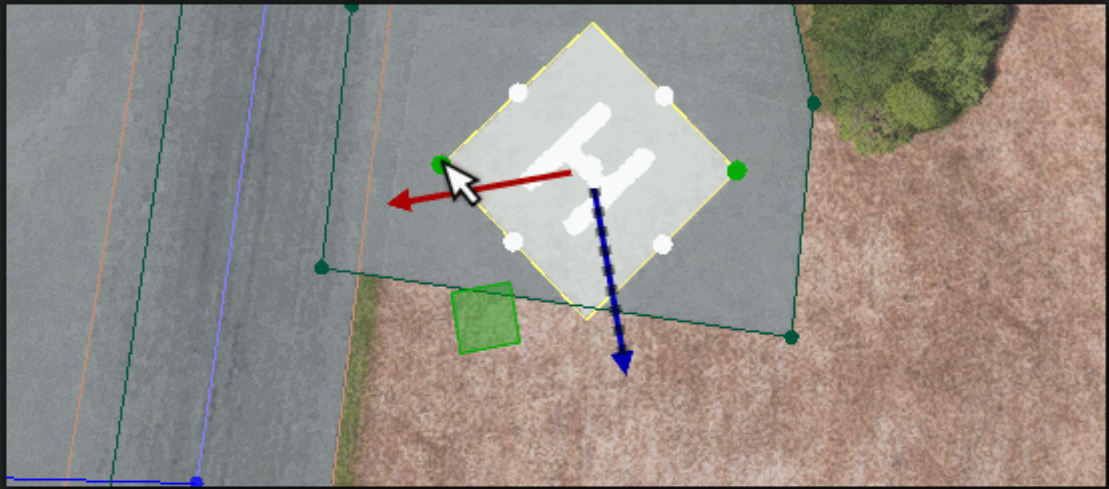


Helipads

The final thing we'll add to our tutorial airport is a [Helipad](#) object. When you select this object type you will have a few options, but for this tutorial we'll be using the SQUARE type. We have added an apron to the side of the runway where the windsock is, so we'll just scroll over to that part and add it there:



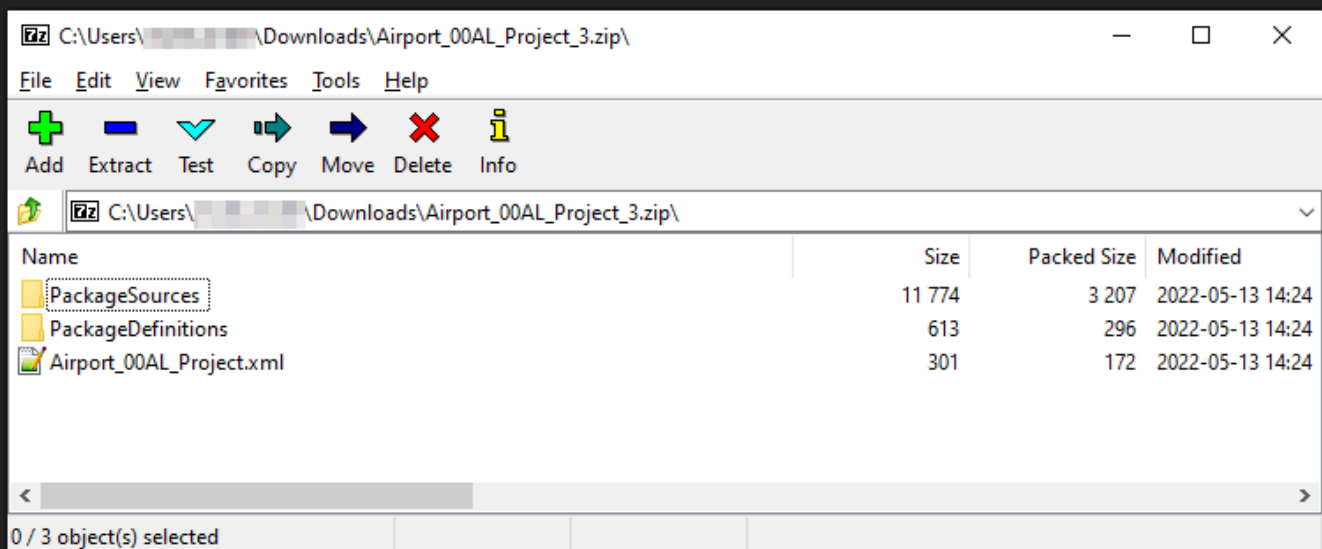
As with other objects, you can use the [Gizmo](#) tool to set the position, and, if you need to change its angle of orientation, you can select one of the green corner points and then use the Gizmo to change the angle:



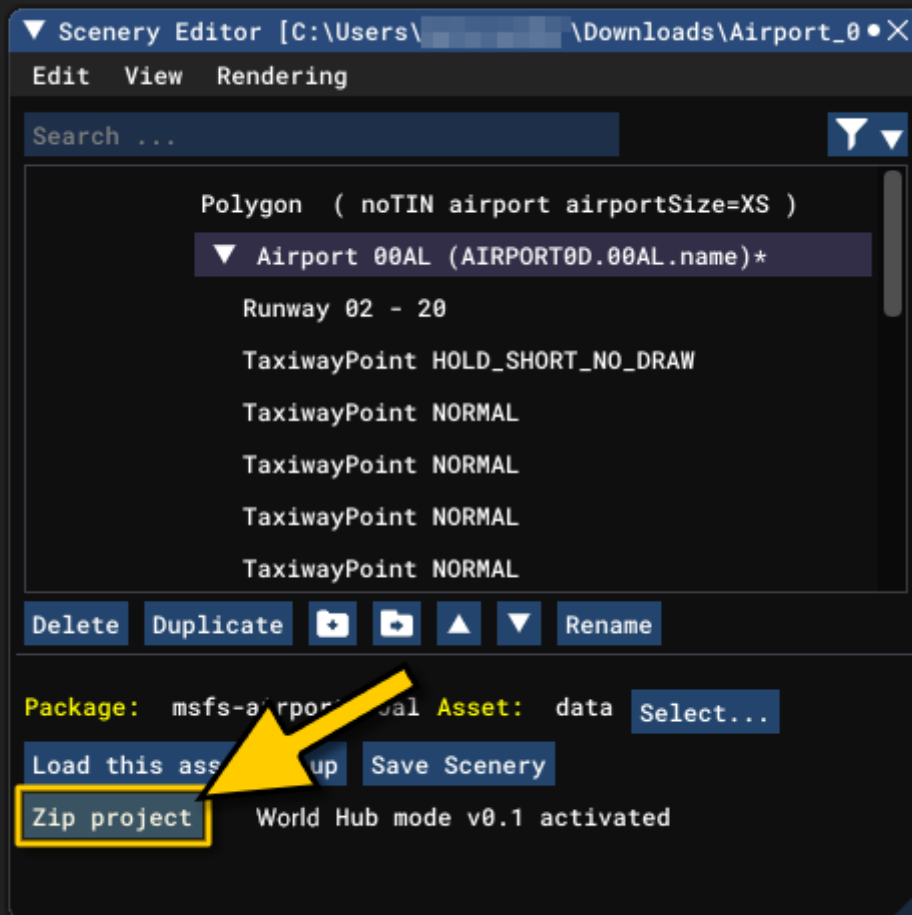
UPLOADING

Once you have finished editing an airport, you will upload it to the World Hub so that it can be reviewed and later published (once approved). To do this, you must first create a ZIP file with the contents of the airport folder. This *must* include the following:

- The PackageSources folder
- The PackageDefinitions folder
- The airport project XML file



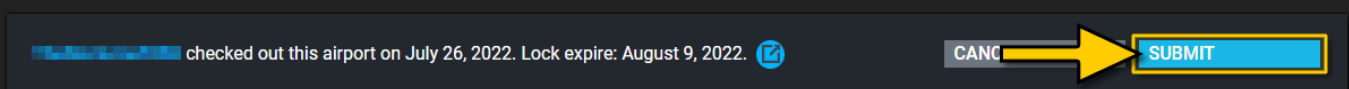
The recommended and simplest way to do this is to click the **Zip Project** button that can be found at the bottom of the Scenery Editor, which will automatically generate the ZIP file for you with all the appropriate files and folders:



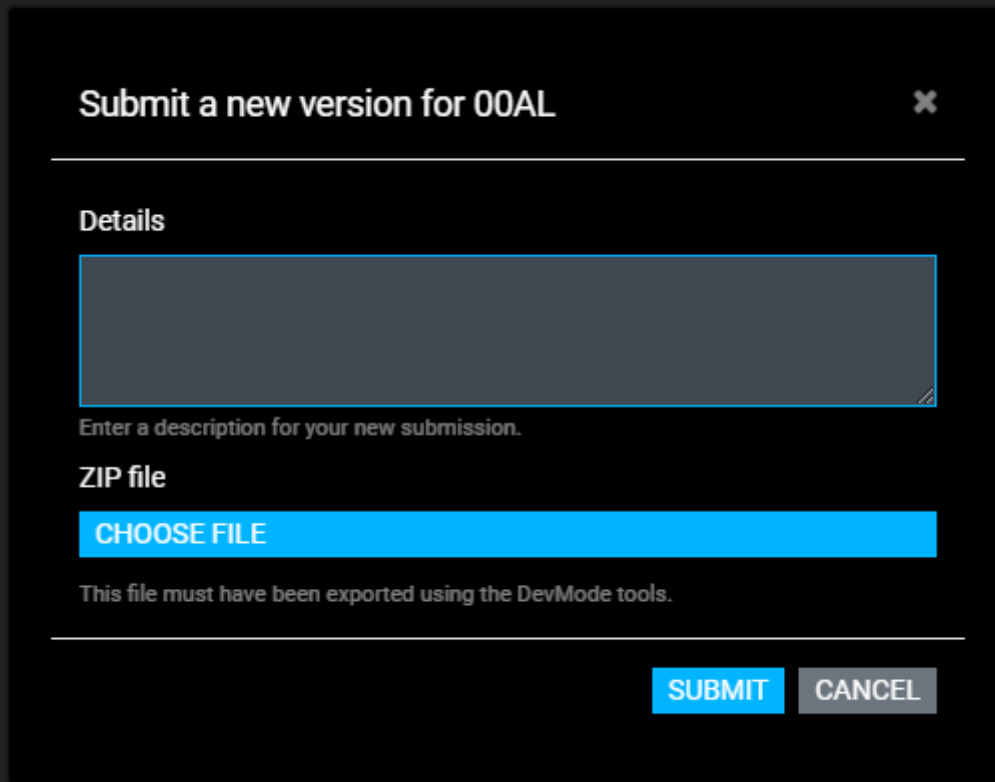
Note that creating the ZIP file outside the editor may result in other folders created while testing being included. The upload process will attempt to strip out anything that is not required by the World Hub, but this is not guaranteed to be successful and may cause the package to be rejected. It should also be noted that external ZIP tools may not create a ZIP file of a type that the World Hub upload process can accept. As such you should *always* use the built in **Zip Project** option.

Uploading The ZIP

When you have created the ZIP file, return to the page for the airport on the World Hub and click on the **Submit** button:



Clicking this button, will open the following window:



Submit a new version for 00AL

Details

Enter a description for your new submission.

ZIP file

CHOOSE FILE

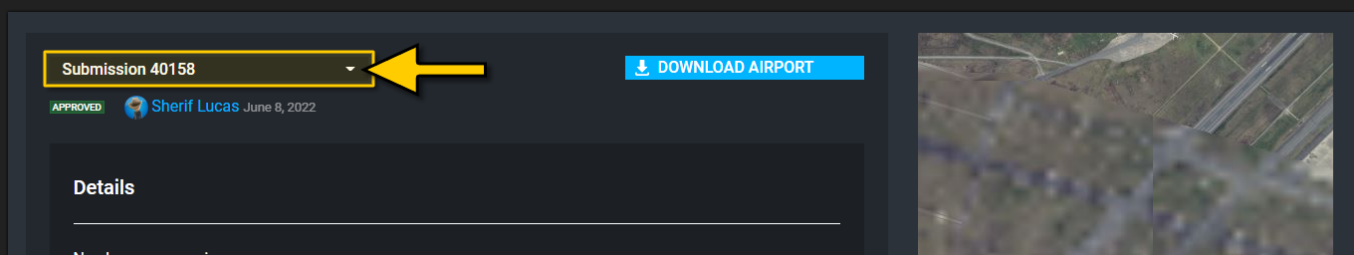
This file must have been exported using the DevMode tools.

SUBMIT CANCEL

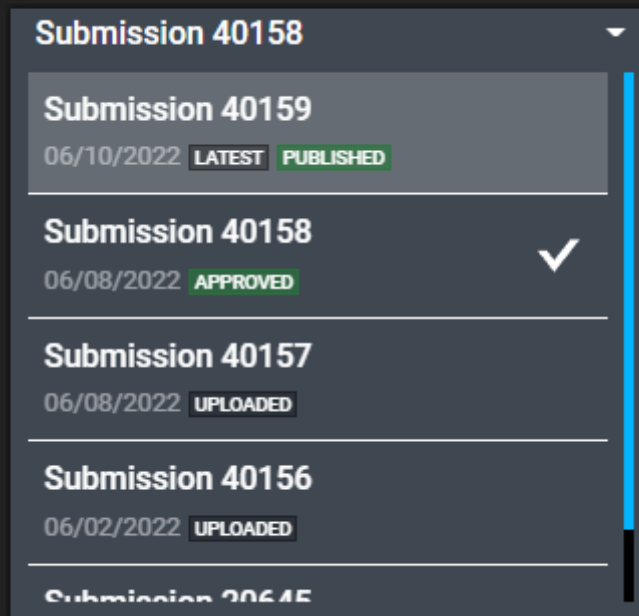
In this window you should give a short summary of the changes you have made in the Details section, then click on the **Choose File** button and browse to the ZIP with the airport files. Once you have selected the ZIP file you can click on the **Submit** button to upload it to the World Hub.

The Submission Process

After completing the upload process, your files will then be placed in the submission queue for moderation. You can see what state the submission is in from the airport page itself, by clicking on the Submission drop down menu in the top left corner of the airport information section:



Clicking on this you will see something like the following:



- Any files that have been uploaded, but are not public, will be shown as Uploaded.
- Files that have been uploaded and approved by the moderation team will be shown as Approved. In the future, people will download this version if they wish to make additional edits.
- Files that have been included in Microsoft Flight Simulator as part of the world will be marked as Published.

THE SCENERY EDITOR

The Scenery Editor is where you can edit all the various aspects of the Microsoft Flight Simulator physical world, from landscapes, to POI s, to airports, and more. This section of the SDK documentation outlines the different parts of the scenery editor, and also explains how each of them can be used to create and edit great add-ons for the simulation.

NOTE: In general, the Scenery Editor will only ever be used in the simulation, so you should not attempt to open or use this editor on any of the main menu screens. Instead, you should start a flight and only open the editor when you are in the sim.

While this page provides an overview of the Scenery Editor sections, but you can find more detailed information about how to use the editor from the following page:

- [Using The Scenery Editor](#)

The most important part of using the scenery editor is the placing of objects within the scene, and there are many different types of objects available, each with their own properties and settings. You can find in-depth explanations of all these objects from the following page:

- [Objects](#)

Overview

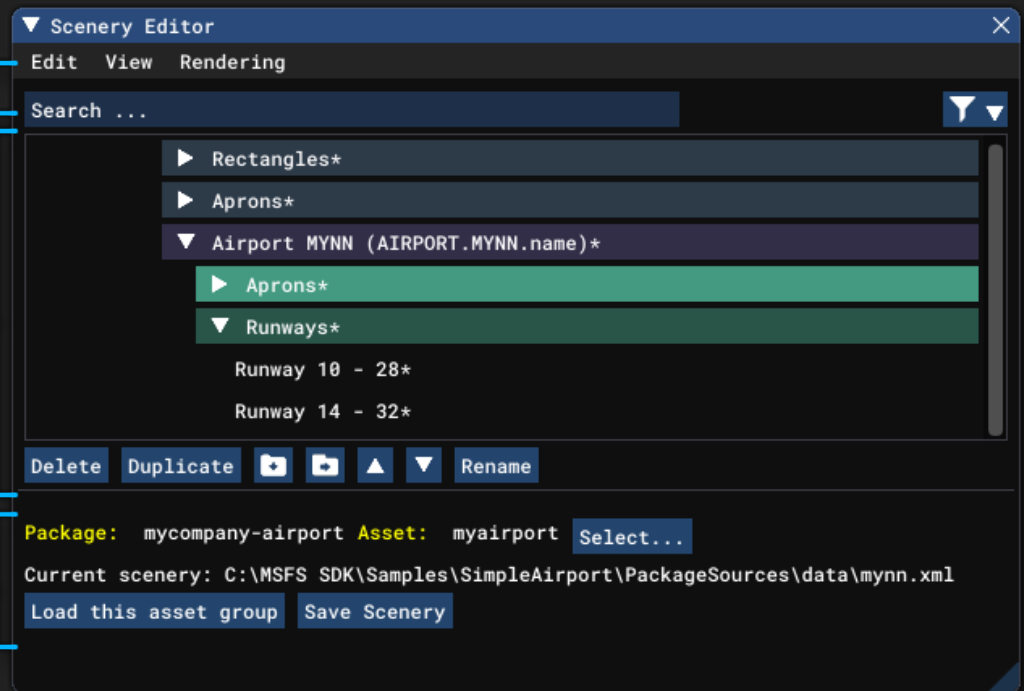
The Scenery Editor can be opened directly from the Tools menu, or - and this is the more common method for opening it - it'll be opened from Project Editor when you create or edit a package (as explained below). The editor itself looks like this:

Menu Items

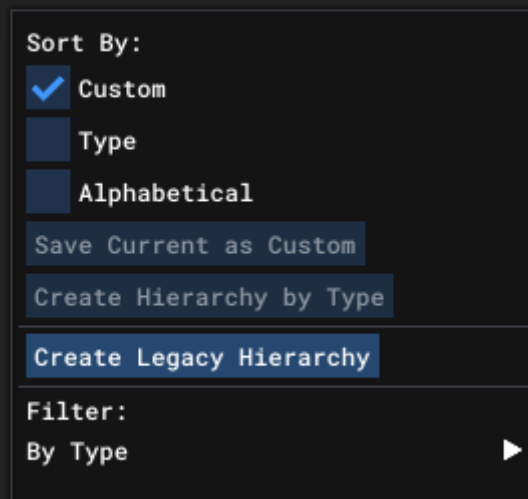
Search

Content List

Package Details

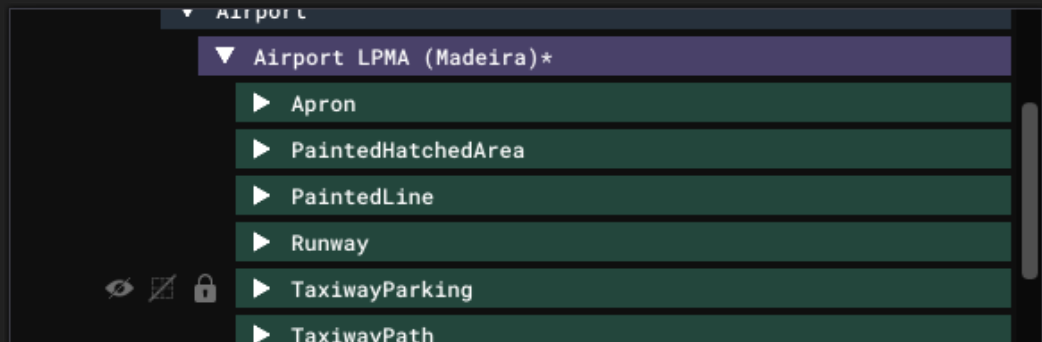


- Menu Items: This part of the edit gives you access to the different editor menus, which are explained on the following pages.
 - [The Edit Menu](#)
 - [The View Menu](#)
 - [The Rendering Menu](#)
- Search: This input field can be used to filter the Content List based on the input term, or - if you prefix the filter text with "-" - you can omit items with the input keyword from the list. Finally, you have the additional Filter options button which will open the following window:



Here you can choose the "Sort By" option, which permits you to choose one of the following three options:

- Custom - Elements are not sorted automatically, but will be stored in the order that you put them in. You can change the order of the different elements using the ▲ and ▼ buttons under the Content List section.
- Type - Elements will be sorted by type, so "like" elements will be grouped together. This option can be saved as a custom option so you can reorder individual elements after sorting by clicking the **Save Current As Custom** button. You can also use the **Create Hierarchy** button to create a "type hierarchy" for one or more airports within the same package. This will delete all current airport groups then create individual groups for each element type present in the airport(s). Note that this cannot be undone!



Note that you have one other button that can be used to create a custom hierarchy: **Create Legacy Hierarchy**. This will go through the entire list of scenery objects and restructure the groups such that there is only *one* group for each object type at the top level of the hierarchy. This option is provided as a convenience for those people that are used to (or prefer) the old way the Scenery Editor grouping system worked. As with the **Create Hierarchy** button, this cannot be undone.

- Alphabetical - Elements will be sorted by name in alphabetical order from A - Z. This option can be saved as a custom option by clicking the **Save Current As Custom** button so you can reorder individual elements after sorting.

Note that these sorting orders only apply to airports. Finally, you can use the Filter: By Type option at the bottom of the pop-up to view only those objects of a specific type or types.

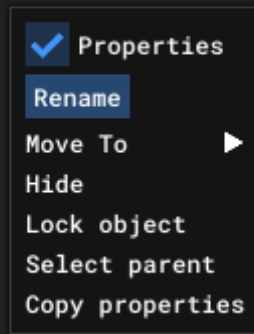
- Content List: This section lists all the different object elements and groups within the package. The section on [The Scenery Contents List](#), below, has more information.
- Package Details: Here you can see details about the current package and asset being edited. Since a single package can contain multiple assets, you can change the one being edited from here by clicking on the **Select...** button, and you can load a different asset group using the **Load This Asset Group** button. Finally you can save the current progress for the asset using the **Save Scenery** button.

The Scenery Contents List

As you go about adding elements to your scene, the Scenery Editor content list will slowly fill up as it lists each of the object elements and their type:



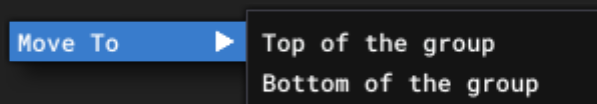
By default, each object type will have its own "container" and within that the different elements for that type. For example, the SimObject type could have animals, aircraft, windsocks, etc... as elements within it, depending on the Container Title that you set. You can expand each object type by clicking the arrow icon beside the type name, then select an element from within by clicking on it again. You can also go to the element by double-clicking it, which will move the developer camera to focus on the element. Once an element is selected, you can then right-click anywhere in the editor to open up a menu of options for that element. At its most basic this menu looks like this:



- **Properties**: If unchecked, this will open the object element Properties window (explained in more detail on the page about [Objects](#)).
- **Rename**: This button will bring up a dialog that permits you to rename the element.

NOTE: This will not change the actual names of the items, but only their display names as shown in the list.




- **Ungroup Items**: This option will *only* be available when you have right-clicked on a group. Selecting this option will remove *all* elements from the group and place them at the same level in the hierarchy within the Content List. For more information about groups see the [Scenery Groups](#) section, below.
- **Move To**: This can be used to move the selected element(s) to the top or the bottom of the current group.



Note that if the selected element(s) is outside of any groups, then it will be moved to the top/bottom of the content list itself.

- **Hide**: This will hide the element in the simulation, making it invisible and also locking it from editing. This is the same as using the "hide" button in the Content List (explained below).

- Lock Object: This locks the element gizmo for translation/rotation/scale, but still permits other properties for the element to be edited.
- Select Parent: This option will select the group folder for the element(s) within the hierarchy. Note that *this option will only be present for those objects that are within a group* (including groups within groups).
- Copy Properties: This option will copy the selected element properties to the clipboard. If there are properties copied like this, then the menu will also show a Paste Properties option. This can be used to copy the property details between elements of the same type. For more information on the properties of each object element, [please see here](#).

Beside each object type and element in the content list there are three "buttons". The first  is for hiding the element (or elements if clicked on an object type or group) from view in the simulation. The second  is for hiding the edition tool overlay for the selected object in the simulation (note that this will also temporarily lock the object so it can't be edited). Finally, the third  is for locking an element (or elements), meaning they will still be visible within the simulation, but you will be unable to edit them in any way. Note that hiding an element will also lock it from editing.

To select an element, simply click on it using the left mouse button, or you can also use **Ctrl** + Click to select multiple *individual* elements, or click an element then **Shift** + Click to select *consecutive* elements in this list. Many element options can be used on multiple elements at once, like grouping, or hiding, etc...

At the bottom of the content list you also have a number of buttons that can be used to perform actions on one or more selected elements in the list:

Delete Duplicate     Rename

The buttons relating to scenery groups (see below for more details) may be greyed out depending on the currently selected element, but the ones that are always available are:


- **Delete**: Clicking this will delete the currently selected element(s), including groups.
- **Duplicate**: Clicking this will duplicate the currently selected element(s), including groups.
- **Rename**: Clicking this will rename the currently selected element(s), including groups. Note that if this is used on multiple elements, then each element will be given the *same* name, but also have an identifying number appended to it in brackets.

Note that the Scenery Editor Content List will also highlight any errors and warnings that should be resolved before creating your scenery package. See here for more information:

- [Warnings And Errors](#)

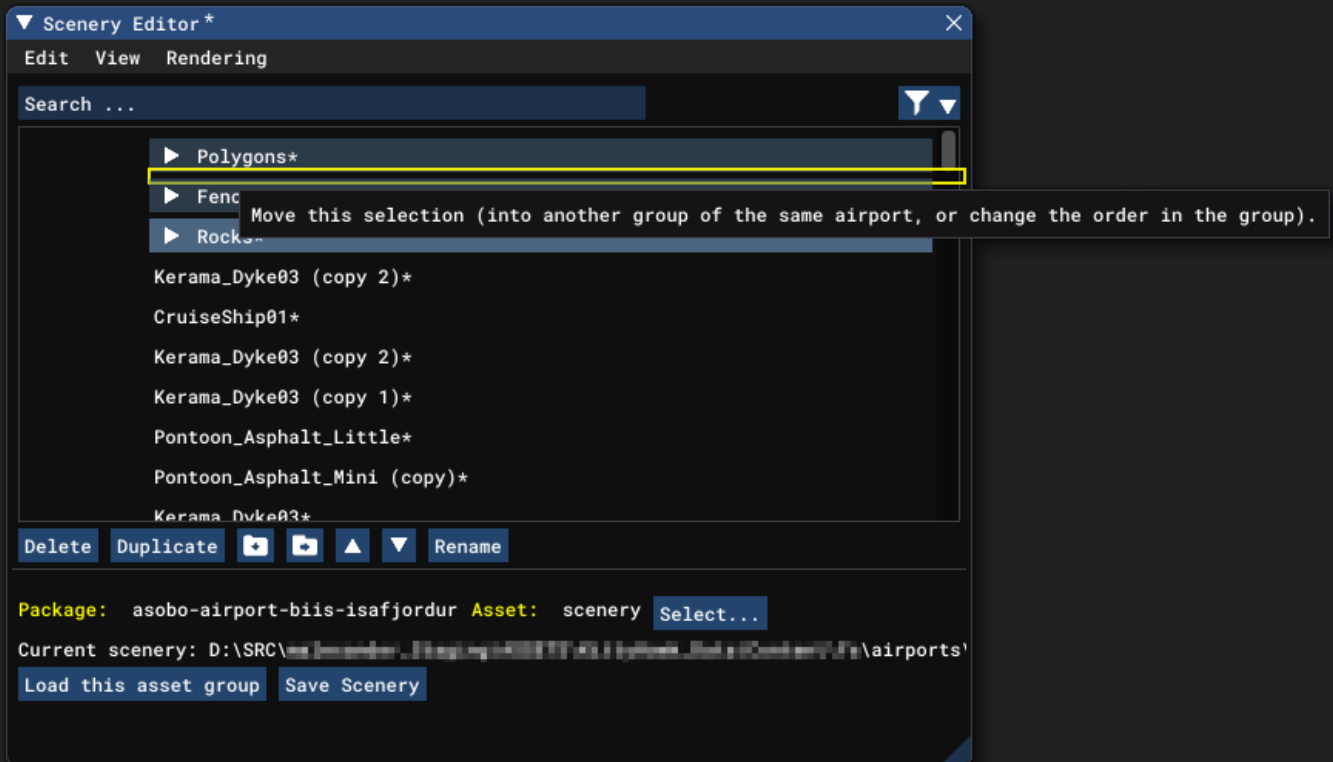
Scenery Groups

The Scenery Editor content list permits you to create and edit groups, so that you can move and place assets within them and so keep your scene hierarchy organised to suit your own workflow.

To create a group you simply press the Create A New Group button . This will add a group to the contents list which you can then rename from the Right Mouse Button menu or by selecting it and then editing the name in the . Created groups can be nested - so you can place a group within a group within a group, and so on.

Elements and groups, once created in the contents list, can be easily moved up or down in the list, either by selecting them and then using the move

up button ▲ or the move down button ▼, or by clicking and dragging them up or down.




You can use this system for multiple selected elements and/or groups too (selected using **Ctrl** + Click and/or **Shift** + Click), although you cannot move groups or elements from an airport group *out* of the airport group, nor can you move elements from outside of an airport group *into* an airport group. Note that If you have a selection of multiple elements, then click one, this will *de-select* all the other elements. Therefore you must use the **Alt** key when moving, for example:

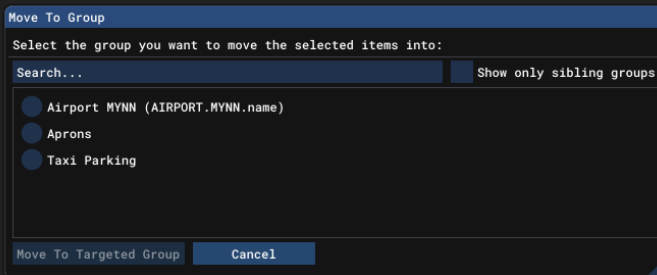
- Use **Ctrl** + Click to select three different elements.
- Hold down **Alt**.
- Click on one element and drag it to the new position.
- All elements will be moved along with the one you clicked.

Please note the following caveats when creating or moving groups:

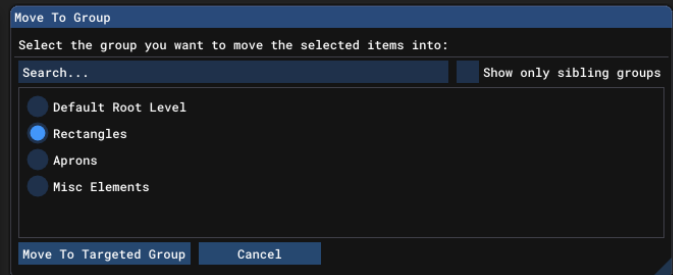
- When you add an airport, it will automatically be assigned it's own group.
- [Airport](#) groups can be moved and placed within other groups, *except* within another Airport group.

- Objects add to the scene that are *specifically* for airports - for example [Runways](#), Jetways, [TaxiwayParking](#) - cannot be moved outside the airport group they were created in, but can be placed in groups created within an airport group.
- Objects added to the scene that are *not* specifically for airports - for example [Polygons](#), Rectangles, LandmarkLocation - cannot be moved into an airport group, or into a group within an airport group.

Finally you have the Move Selection To Another Group button . Selecting this will open the following window (the contents of the window will change depending on the groups in the group list and whether the selected elements/groups are airport specific or not):



Airport Groups

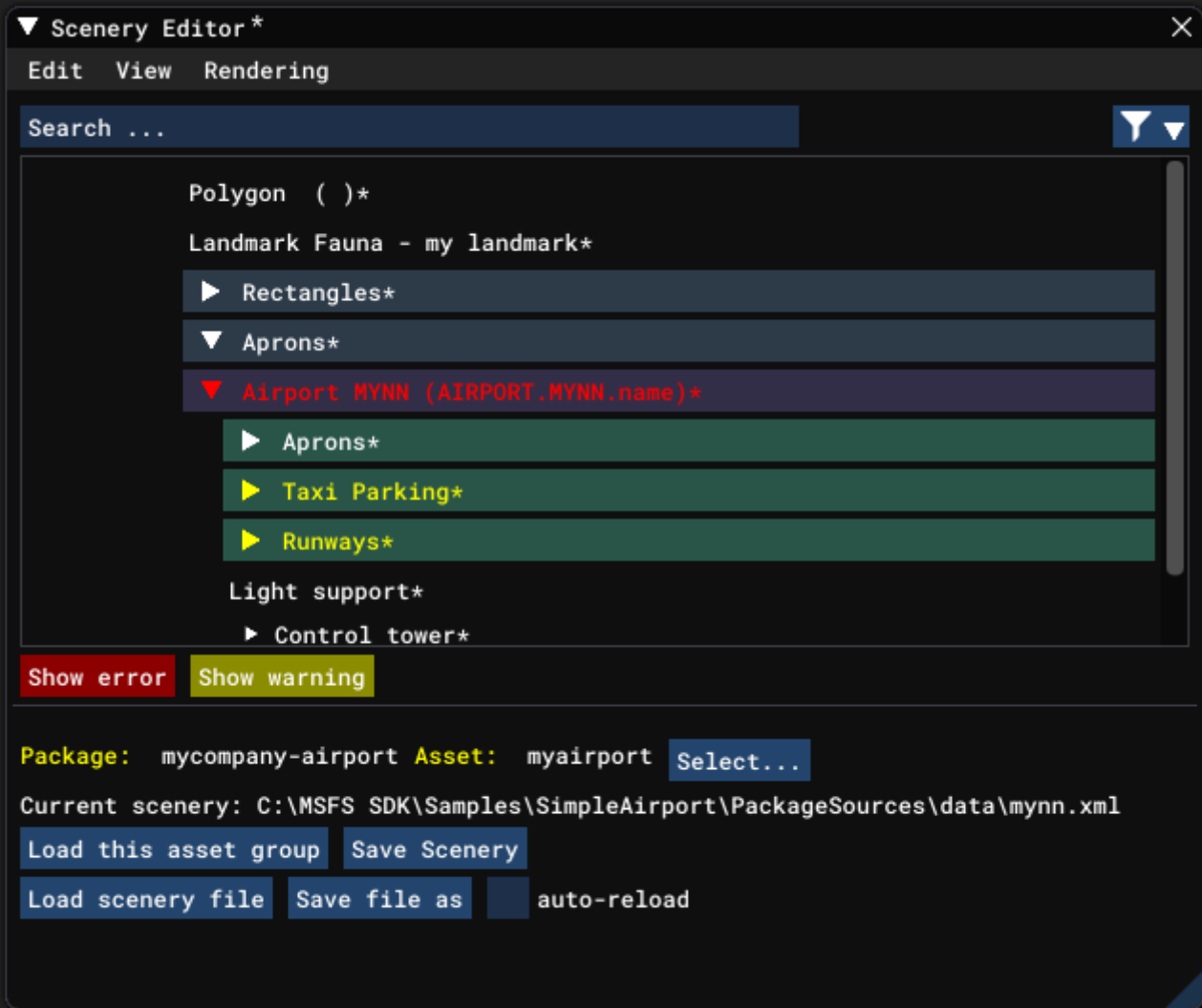


All Other Groups

For airports (and groups within airports), you can only move to other groups within the airport itself, or move to the top level airport group. For all other elements, you can move to any other group, *except* airport groups. When you have multiple groups, you can use the Search option at the top of the window, and you can also filter the groups to show only siblings (and parents) of the selected element(s) by checking the Show Only Sibling Groups option.

Warnings And Errors

The Scenery Editor will do it's best to show any issues that you may have with the objects that have been placed in the current scene being edited:



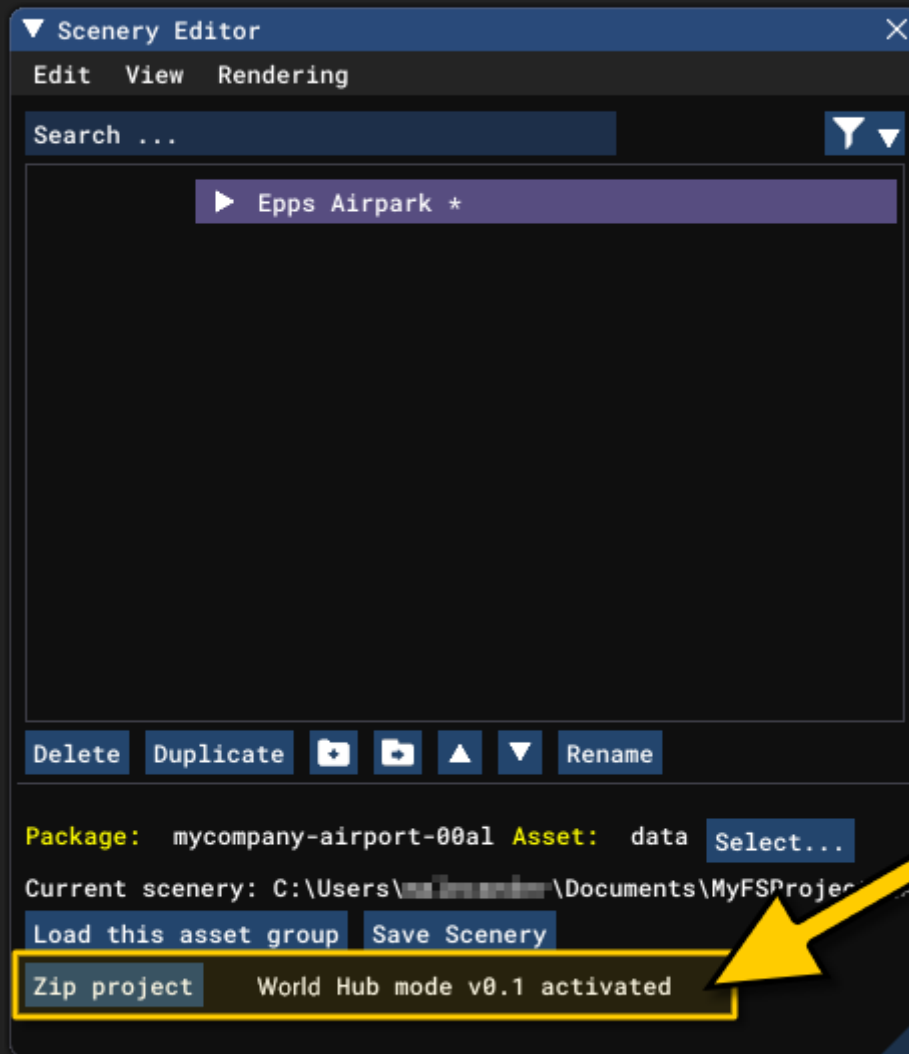
Warnings will be highlighted in yellow and errors will be highlighted in red, and there will also be buttons shown at the base of the Content List. Clicking either the **Show error** or **Show warning** button will take you to the first object element that is causing the problem. If there is more than one object generating an issue then subsequent clicks of the buttons will cycle through them. Note that a warning does *not* mean that the scene cannot be built as a package, but an error does. So, before trying to build any packages all errors must be fixed.

World Hub Mode

The Scenery Editor is - by default - a fully featured and powerful tool that can be used to create scenery features and airport packages. However when used to edit [World Hub](#) projects, it will instead be limited and work as a "lightweight" editor, where some features will be limited. This has been done to ensure consistency within the simulation between airports that

have been made by many different people, and it prevents any issues that may arise because of package dependencies etc...

World Hub Mode will be activated automatically for the Scenery Editor when you load a World Hub BGL file, and will be shown by the fact you have an extra `ZipProject` button and some text showing the version of the editor being used:



World Hub Objects

When using World Hub mode you will be limited to the following objects only (and some of their options may also be limited compared to the normal Scenery Editor - these changes will be flagged on the appropriate object page):

- [Airport Objects](#)
- [Apron Objects](#)
- [CarParking Objects](#)

- [ControlTower Objects](#)
- [Helipad Objects](#)
- [LightRow Objects](#)
- [LightSupport Objects](#)
- [PaintedHatchedArea Objects](#)
- [PaintedLine Objects](#)
- [Polygon Objects](#)
- [Runway Objects](#)
- [TaxiwayParking Objects](#)
- [TaxiwayPath Objects](#)
- [TaxiwayPoint Objects](#)
- [Taxiway Sign Objects](#)
- [Windsock Objects](#)

For more information on the World Hub and a full tutorial for creating and uploading an airport, please see here:

- > [World Hub](#)

USING THE SCENERY EDITOR

This page illustrates how to use the Scenery Editor. For a more general overview of the editor functions please see the following page:

- [The Scenery Editor](#)

For information about the available objects that can be placed in a scene please see here:

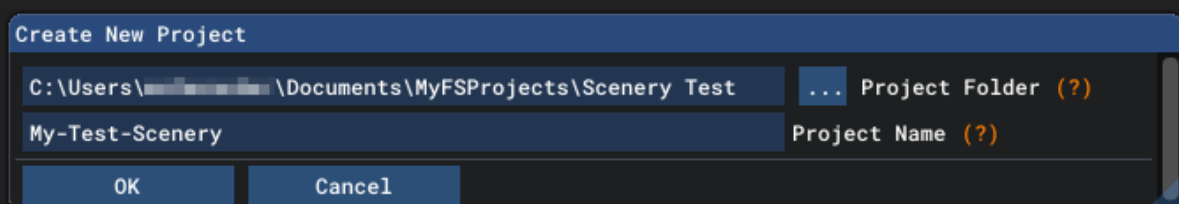
- [Objects](#)

Getting Started

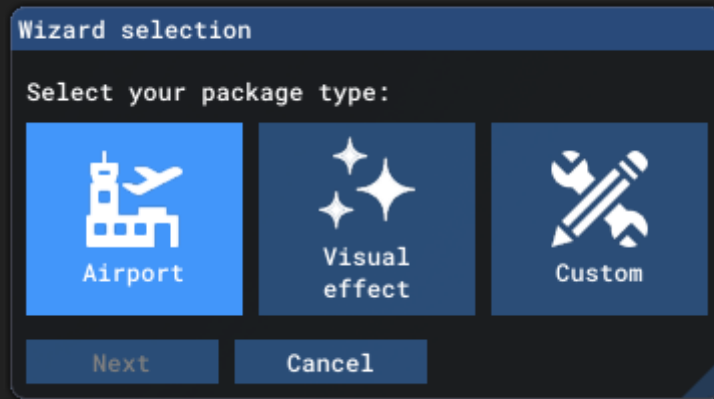
In this section we'll outline the general workflow for creating a new scenery package from scratch. Note that the procedure here is *not* meant to be used if you are creating airports, for that you should see the page [Creating Or Replacing An Airport](#). Also note that if you are wanting to download and edit an airport from the World Hub, then you should follow the procedure outlined on the [Setting Up World Hub](#) page.

IMPORTANT! When creating scenery, the user aircraft must be located near or within the zone being edited otherwise you may find that placed assets won't be displayed.

- To start with, you'll need to open the Project Editor from the DevMode Tools menu.
- In the Project Editor, select New Project from the Project menu.
- Give the project an appropriate name and a location to save it to:

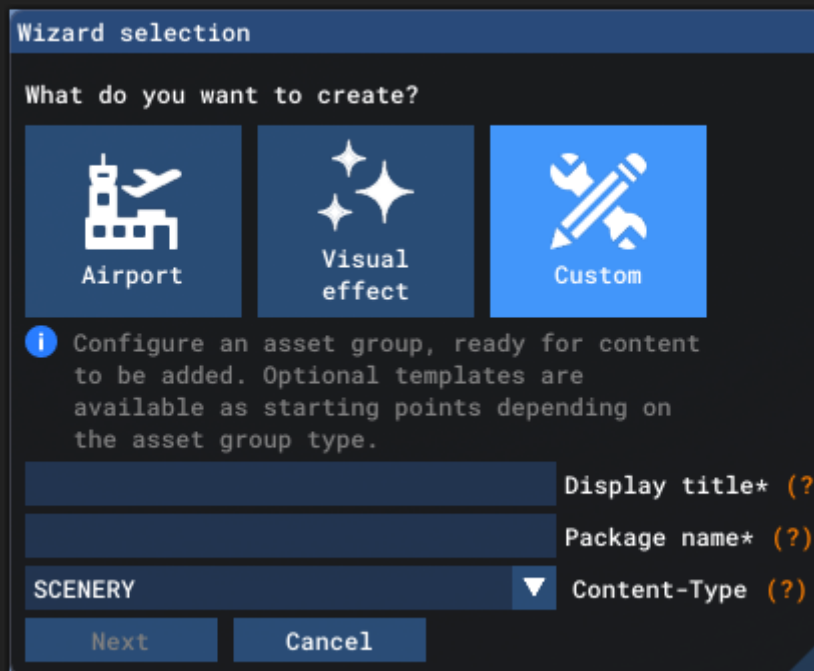


- Click the **OK** button to open the Package Creation wizard where you will be asked to choose a package type to add:

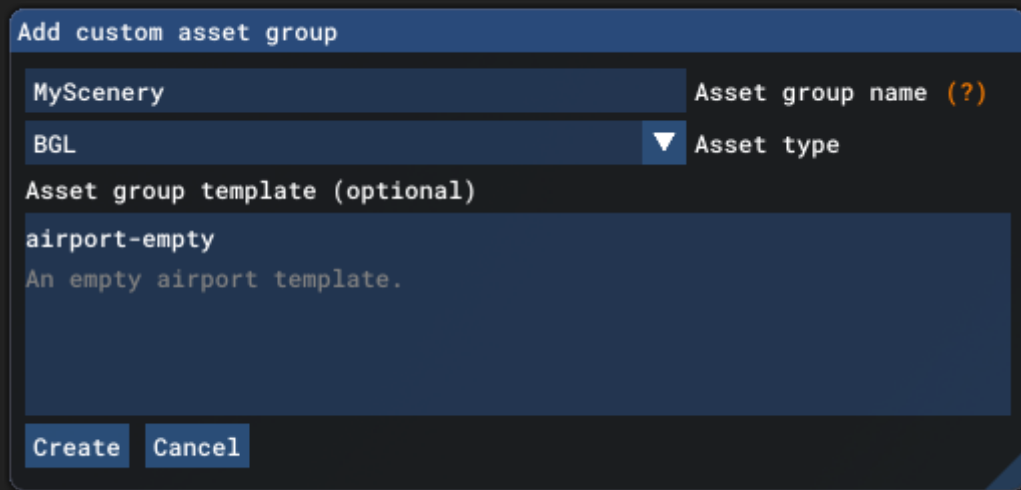


In this case you want to click on the **Custom** button.

- The package wizard will expand to present you with options to give the package a Name, a Content-Type, and the Display Name (this is what will be displayed in the content manager and also on ther Marketplace if the package is published). The important thing to note here is that the content-type should be SCENERY:

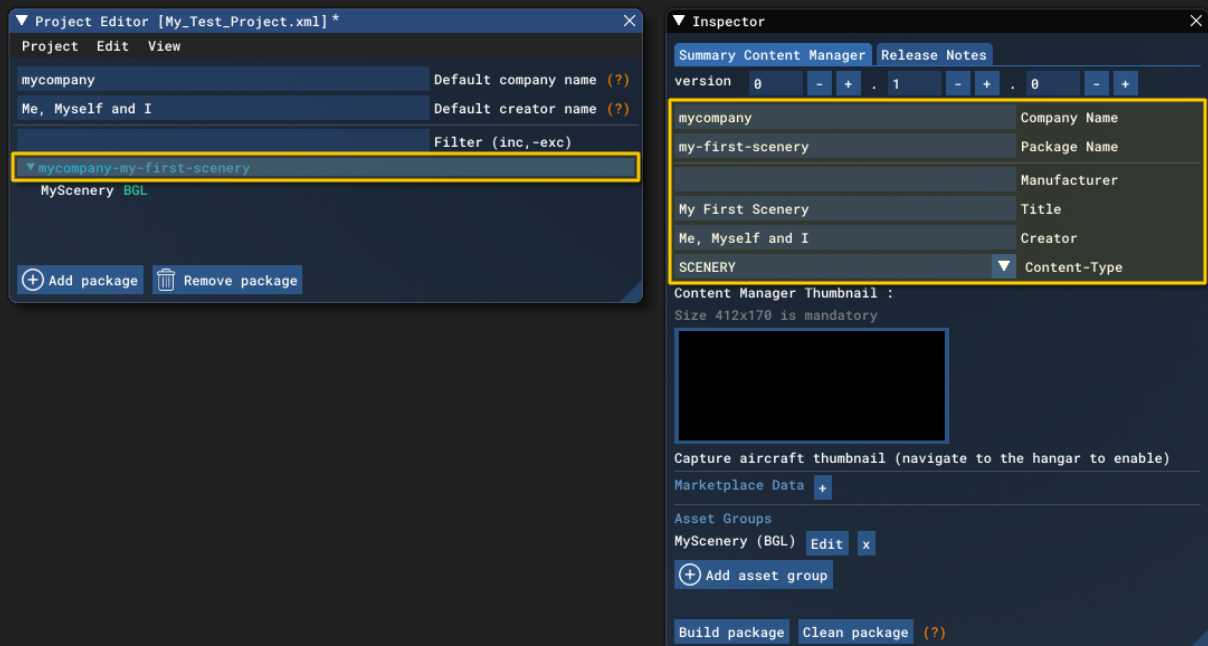


- When you click the **Next** button, you will be shown a new window asking you define an asset group. All packages need at least one type of asset to store the required data for the add-on, and in this case it's going to be the BGL asset type:



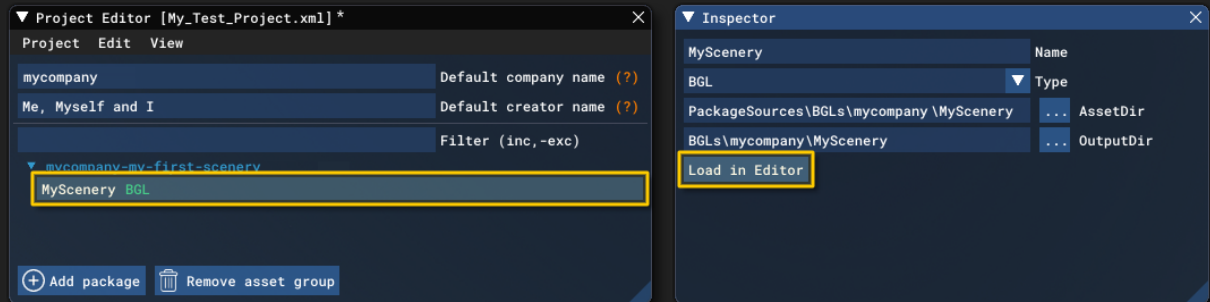
Note that you should not select the airport-empty template! That would only be used for creating an airport package, which we're not doing, we're making a *generic* scenery package.

- Click the **Create** button
- In the Project Editor, click on the new package you've just created you'll see in the Inspector window that it's all been set up correctly, and you may edit any of the values here if required:



- Next, you want to select the asset group that you added to the package. This will change the contents of the Inspector window to show the Asset Directory and the Output Directory. The asset directory is where the base project files will be stored and is relative to the main project XML. The output directory is the directory within the "Package" directory where the package will compile the asset groups. Once you have checked that these paths are correct (they

should have been auto-created for you, but you may want to change them, although it's not recommended), you can click the **Load In Editor** button:



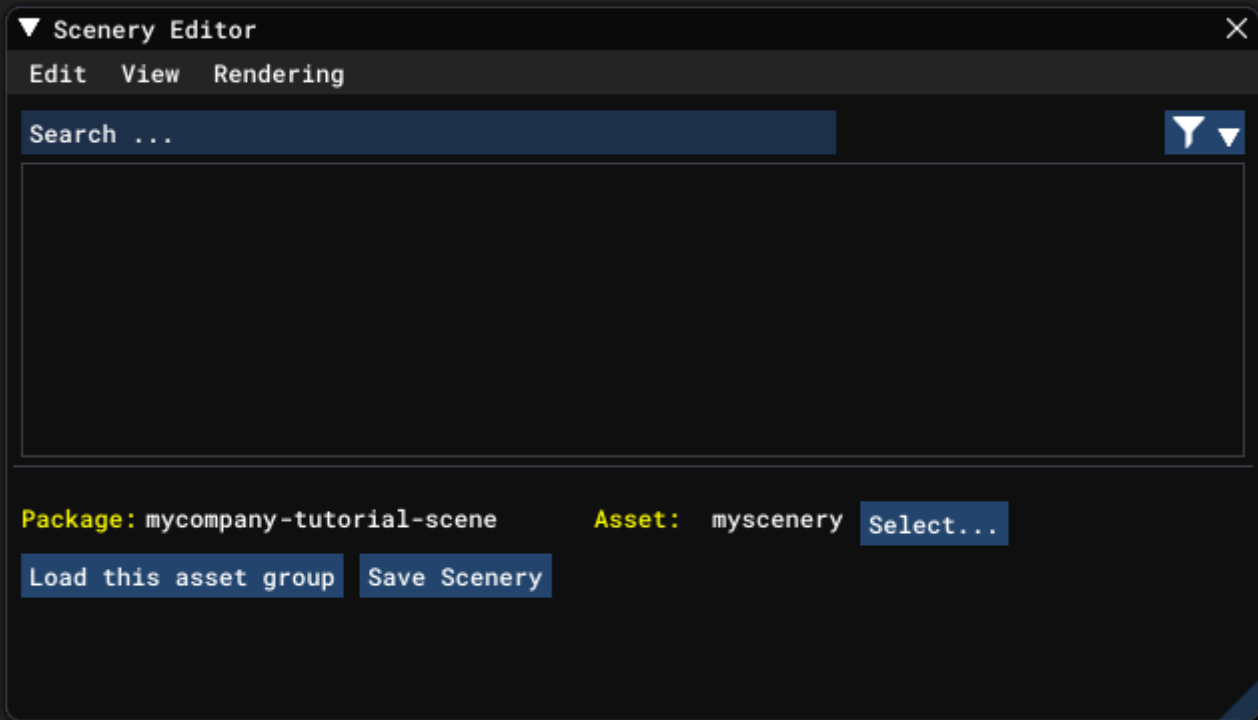
- The scenery editor will open and you can begin adding elements, however we recommend that you first save the project before continuing (from the Project Editor Project menu).

NOTE: At this point you would probably want to navigate to the place in the world where you want to add the new scenery, which can be done using the Teleport Window from the Tools DevMode menu.

If you are loading a previously created add-on package, then you would simply select Open from the Project Editor menu to open the package, then select the BGL asset group that you want to edit and select the **Load In Editor** option from the inspector.

NOTE: When loading a previously created package, you can double-click on any of the elements in the scenery editor content list and be transported to the location of the element.

When you have loaded the BGL, the camera will switch to the Developer Camera and the Scenery Editor will open, presenting you with the following window:



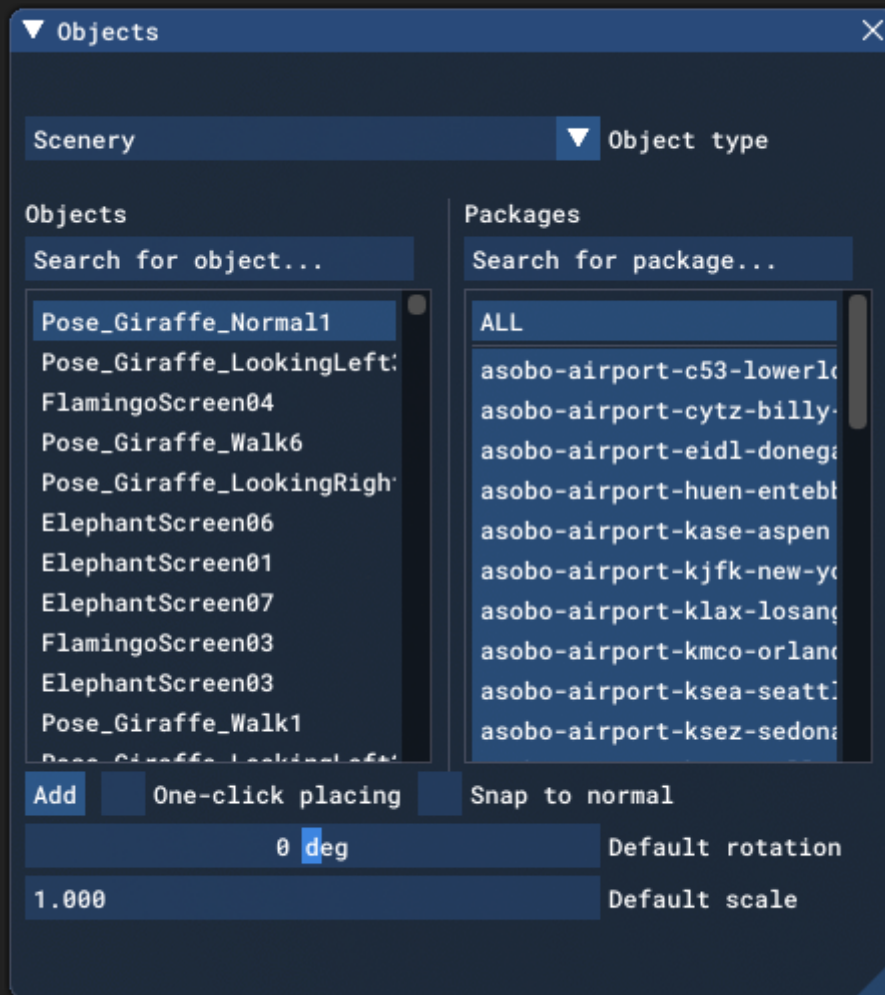
If the camera does not switch automatically to the developer camera you can enable it manually from the Camera menu. The Developer Camera is moved around the world using the mouse and keyboard controls listed below:

- To rotate: hold the **Alt** key, left click and drag the mouse.
- To move: hold the **Alt** key, middle click and drag the mouse.
- To zoom in/out: use the mouse wheel or hold the **Alt** key, right click and drag the mouse.

You can find a full list of the controls available from the Camera Controls page.

Adding An Element To The Scene

To add anything to a scene you will need to use the Objects window. This is opened from [The View Menu](#) in the Scenery Editor, although it may open automatically when you load a package into the editor:



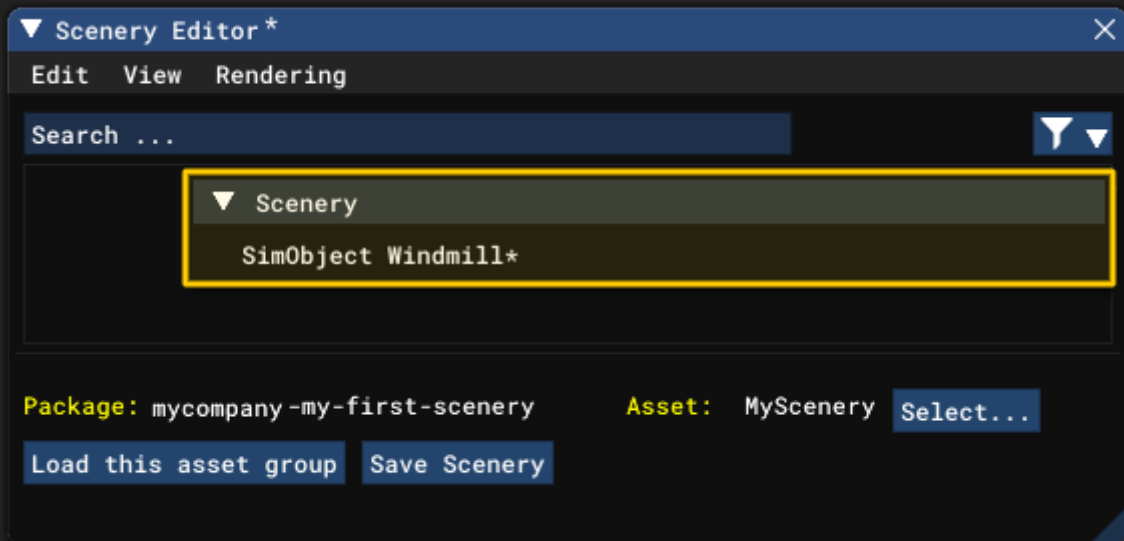
To add an item from this window to a scene, you would do the following:

- Select the type of object to add from the *Object Type* menu at the top.
- Select one of the objects of the given type from the Objects list, on the left. Note that the list will show objects for the packages that are installed, when appropriate (not all objects are associated with packages). These packages are shown on the right, and you can click on any package - or use **CTRL** and/or **SHIFT** and click to select multiple packages - to see only the objects associated with the selected package(s).
- Click the **Add** button to add it to the scene.

As an example, let's add a Windmill somewhere in the world. For this, simply navigate to an area using the Developer Camera then in the Objects window select the Object Type SimObject. Then type "windmill" into the filter to find and select the Windmill object, then click **Add**:

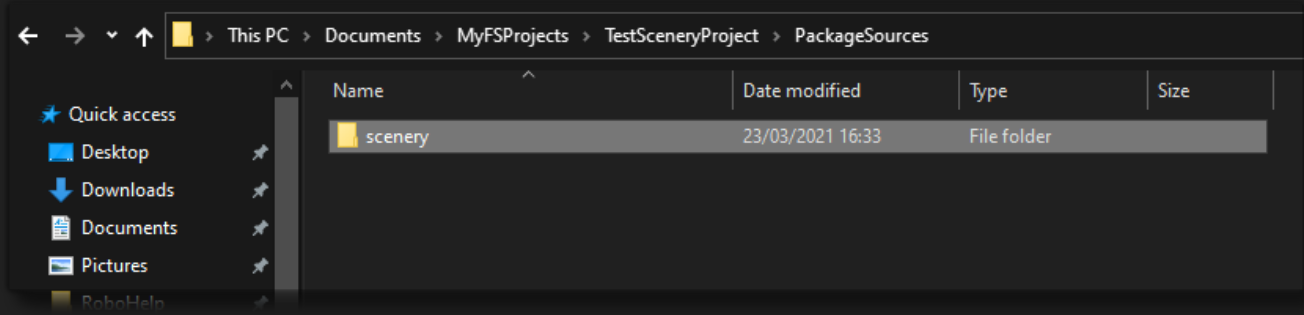


The Windmill object will be added to the scene and will also now be listed in the scenery editor:

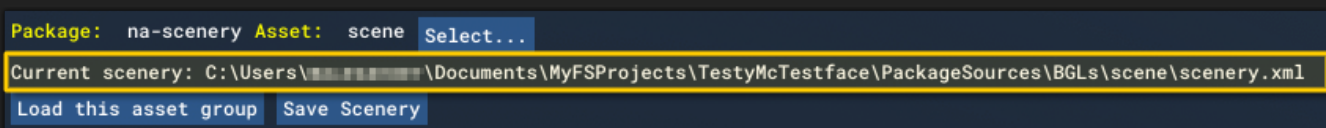


Notice that the object is listed with a star beside it (*), indicating that it hasn't been saved as part of the package yet. To resolve this you can click the **Save Scenery** button at any time, and it's recommended that you do this regularly to prevent any data loss in case of issues or mistakes! Clicking this will open a file window where you can save the file. You'll want to save the file in the same scenery folder you created for the Asset Directory, as

explained further up on this page (under the root directory for the package), eg:



You can name the scenery file anything you want, but in general it would be something like "scene" or "scenery". The "Current Scenery" path in the Scenery Editor will update to show the saved file path:



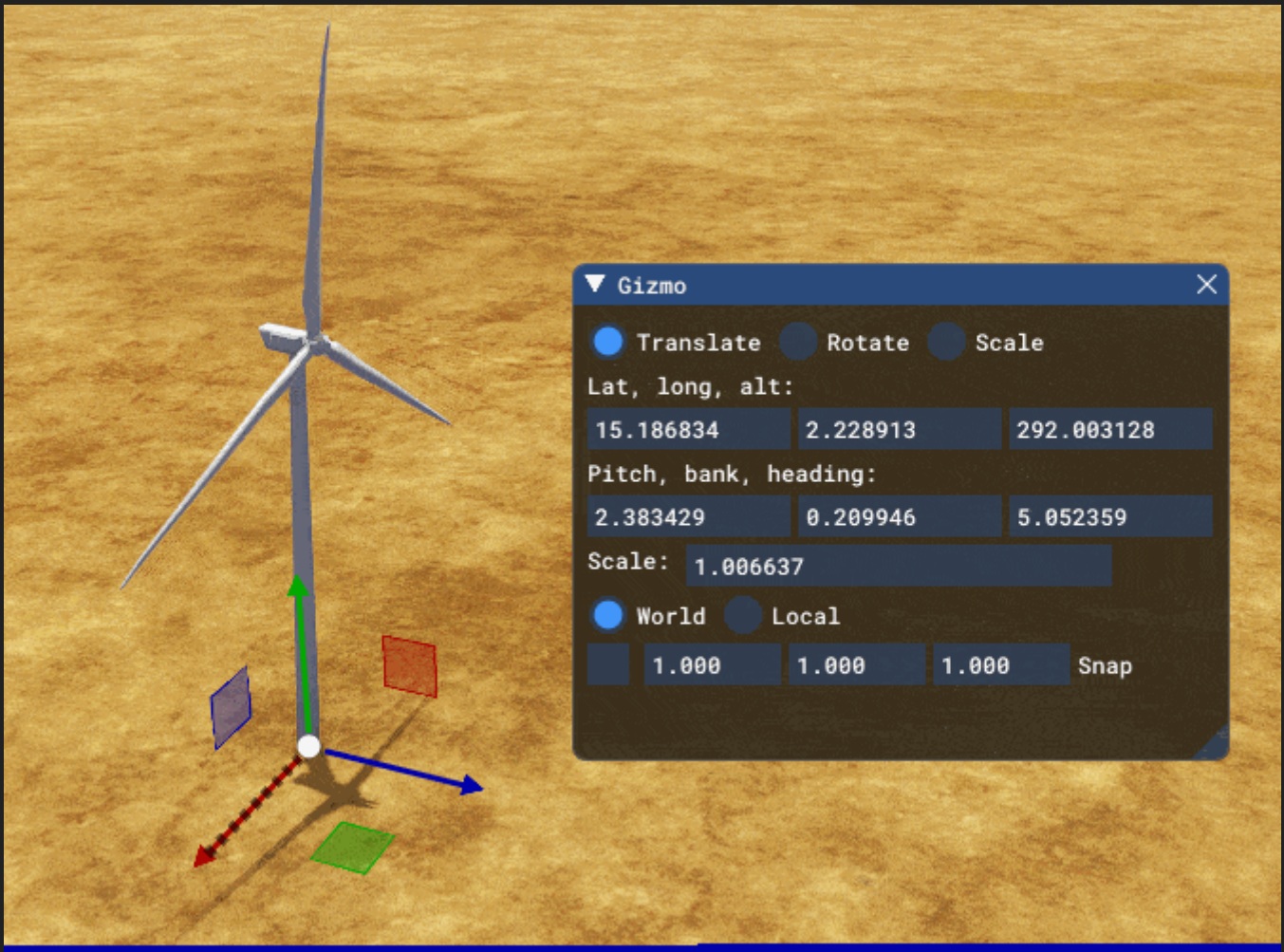
*NOTE: After the initial save you can use the keyboard shortcut of **Ctrl** + **'S'** to do a quick save of the current scene in the same file.*

ModelLibs

You may also use the ModelLib asset group in a scenery project to add custom models that can then be used in the scene. It is important to note that when doing this, the package should be built using the **Build Package** button in the Inspector before any objects that it creates can be used in the Scenery Editor. This should be done *before* opening the Scenery Editor otherwise the new objects may not be available and you will have to close and re-open the Scenery Editor to access the new objects. Also note that if the contents of the ModelLib package sources change (ie: you add a new set of source files to the asset group), you will also need to close the Scenery Editor, rebuild the package, and then open the editor again to have access to those objects.

Positioning Scenery Elements

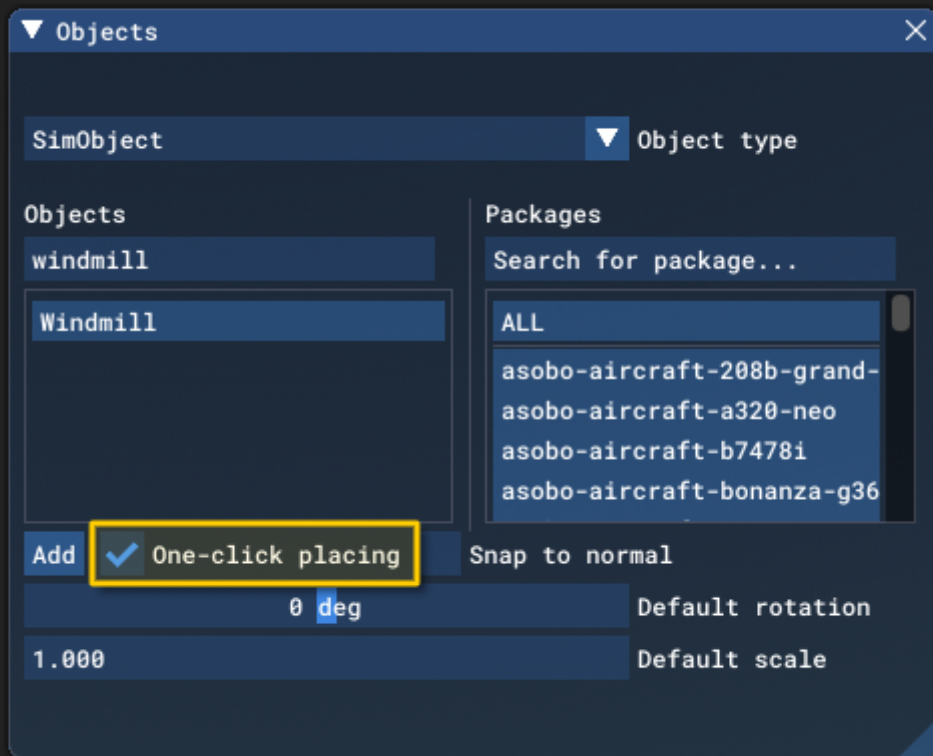
Once the object has been initially added you can then fine-tune its position, size and rotation using the different gizmos that are available. You can open the gizmos window from [The View Menu](#) in the Scenery Editor:



- Translate: This permits you to move the object on the X/Y/Z axis.
- Rotate: This gizmo lets you rotate the axis around the X/Y/Z axis.
- Scale: This permits you to scale the object on the X/Y axis.

You can also fine-tune the position more precisely using the input fields in the Gizmo window. For more information on this, please see the [Gizmo](#) section of [The View Menu](#) page.

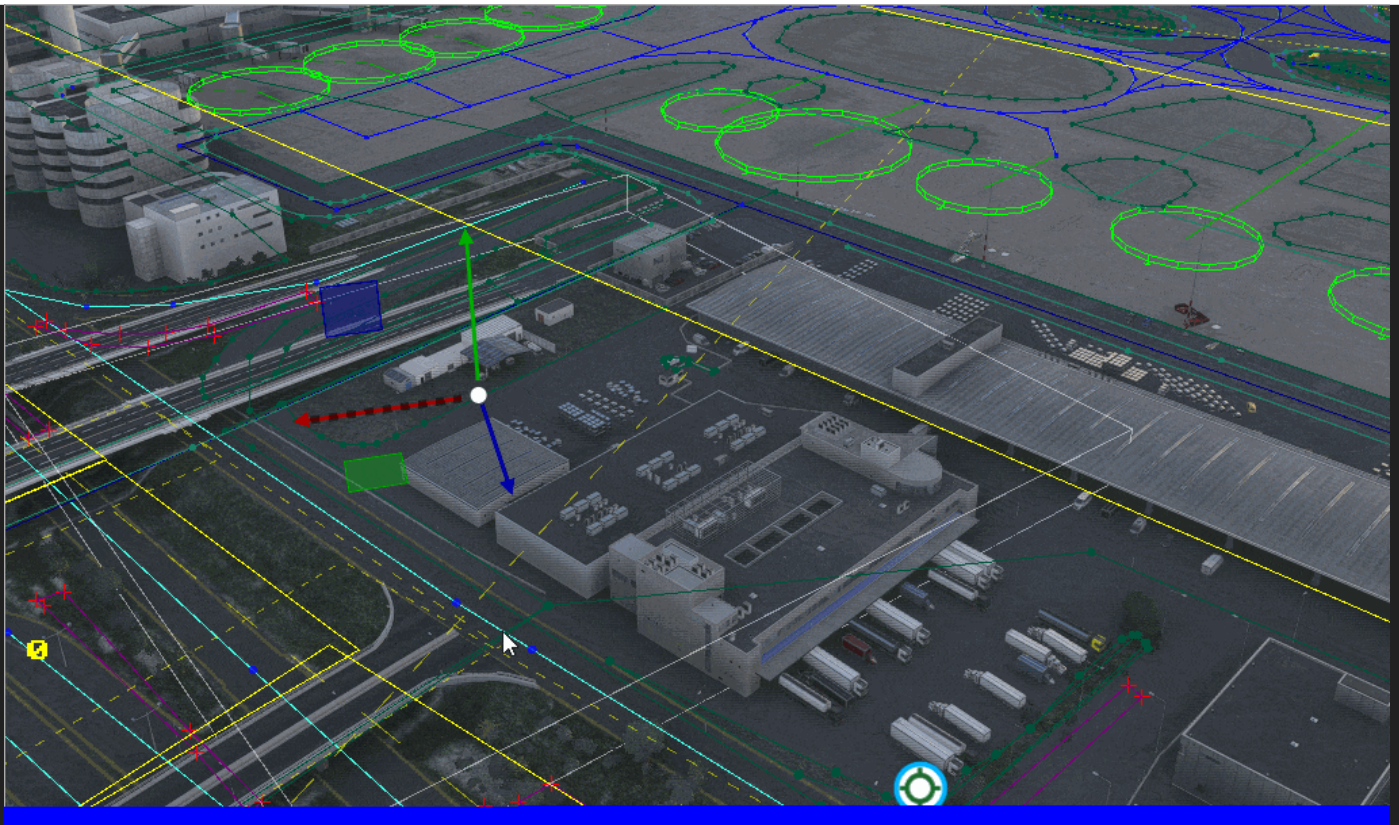
Finally, the Objects window also has an option at the bottom for One-click placing:



When enabled, this mode allows you to place the same object several times on the ground at the mouse position by left-clicking the mouse. If you click and hold the mouse, you can then hold down the the **Ctrl** key and move the mouse to change the rotation and/or hold the **Shift** key to change the scale.

Selecting Elements

Once an element has been placed in the simulation there are multiple ways it can be selected again to be edited. The most basic of these is to simply click on it with the left-mouse button in the world, which will select it automatically. If there are multiple overlapping objects, then repeatedly clicking the same position will cycle through them so you can select the one you want:



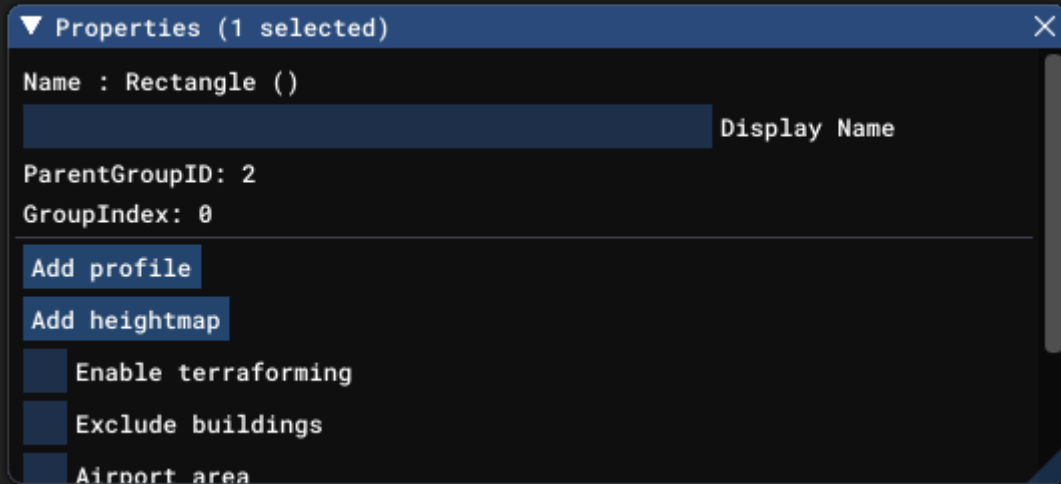
When you want to select multiple elements in a scene, you can hold down **Shift**, then click the left mouse button and drag to create a window around the elements. When you release the mouse button, there will be a single [Gizmo](#) in the middle of the selection and any changes made using the gizmo (or in the gizmo window) will affect all of the selected elements. To select multiple *individual* elements, you can hold down **Ctrl** and then click the elements you want within the simulation, and they can then be moved/scaled/rotated as if they were a single element too.

Finally, you can select a single element from the , which will select it in the simulation for editing, and you can double-click the element to move the developer camera to it. You can also use **Ctrl** + Click to select multiple individual elements, or click an element then **Shift** + Click to select consecutive elements in this list.

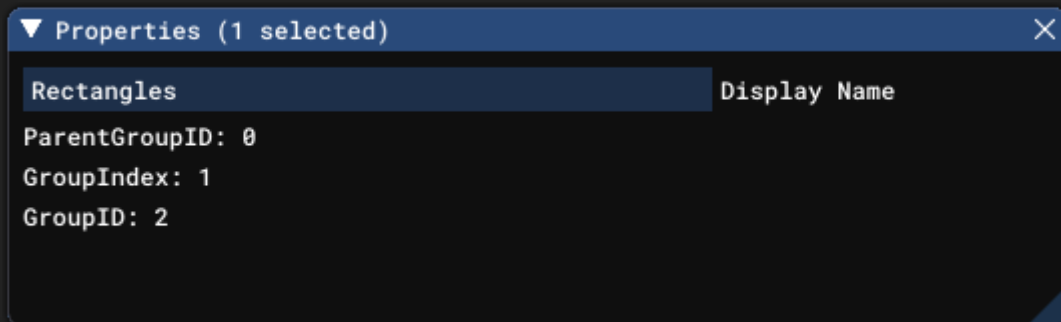
Properties

Every object element - and group element - that you add to a scene has its own specific properties and it's important that you are aware of them, since many objects will require you to add information to the object properties for them to be valid. To open the properties window for any

object or group element either use [The View Menu](#) option for [Properties](#), or right click on the object in the Scenery Editor window and check the Properties box. For objects, a window similar to the following window will open (the exact contents will depend on the object):



Note that the exact contents of this window will change depending on the type of object element that is currently selected. The properties for each of the different objects are explained from the [Objects](#) page. For a selected group, the following will be displayed (see [Scenery Groups](#) for more information):



Keyboard Shortcuts

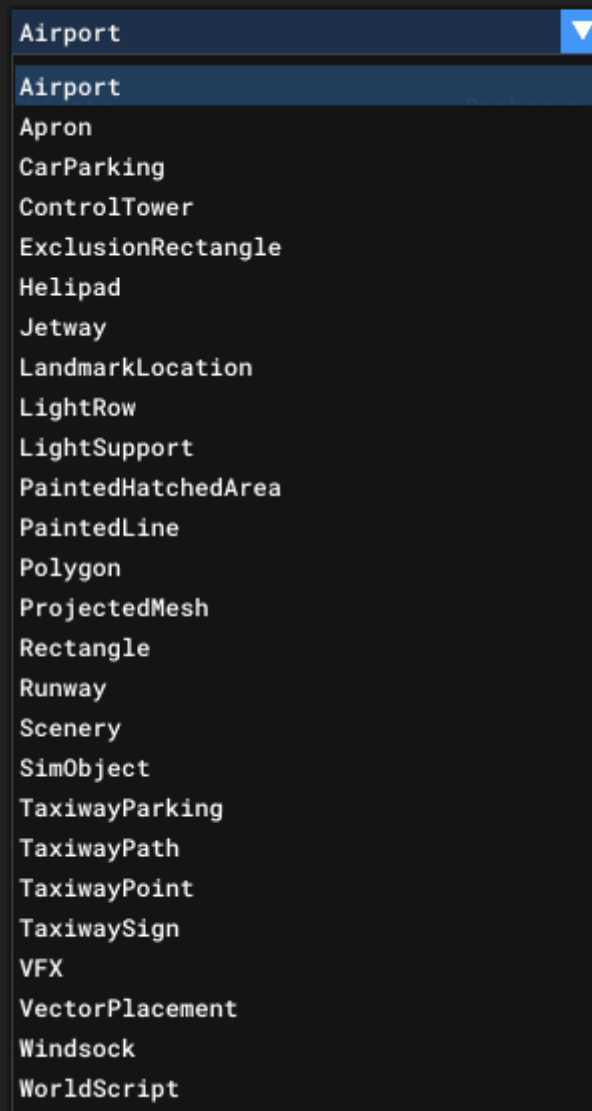
There are a number of keyboard shortcuts that can be used when working with the Scenery Editor, which we've listed below for your convenience:

- **Ctrl** + **G**: Create a new group.

- **Ctrl** + **Shift** + **G**: Ungroup. Note that this removes items from the group but doesn't delete the group.
- **Arrow Up** and **Arrow Down**: Move an object up/down in the hierarchy group hierarchy.
- **Ctrl** + **R**: Rename the selected object.
- **Ctrl** + **H**: Hide the selected objects.
- **Ctrl** + **Shift** + **H**: Hide the edition lines of the selected objects.
- **Ctrl** + **L**: Lock the selected object.
- **Ctrl** + **F**: Focus the camera on the first selected object.
- **Shift** + **A**: Add an [Apron Object](#).
- **Shift** + **L**: Add a [PaintedLine Object](#).
- **Shift** + **M**: Add a [TaxiwayParking Object](#).
- **Shift** + **P**: Add a [TaxiwayPoint Object](#).
- **Shift** + **R**: Add a [Runway Object](#).
- **Alt** + **H**: Hide all objects.
- **Alt** + **Shift** + **H**: Hide all the edition lines.
- **F2**: Show/Hide the "Hide-Lock by type" sub-window.

OBJECTS

This section outlines all the different object type available for use within [The Scenery Editor](#), as well as the parameters specific to them. These objects are selected from the [Objects](#) window, and many have different elements within each type (for example, there are many different elements for the Scenery object type, but only one element of the Polygon object type).



Due to the complexity of some of these object types, each one has been given its own dedicated page in the documentation which explains how it should be used and the different it can have:

- [CarParking](#)
- [Polygon](#)
- [Airport](#)

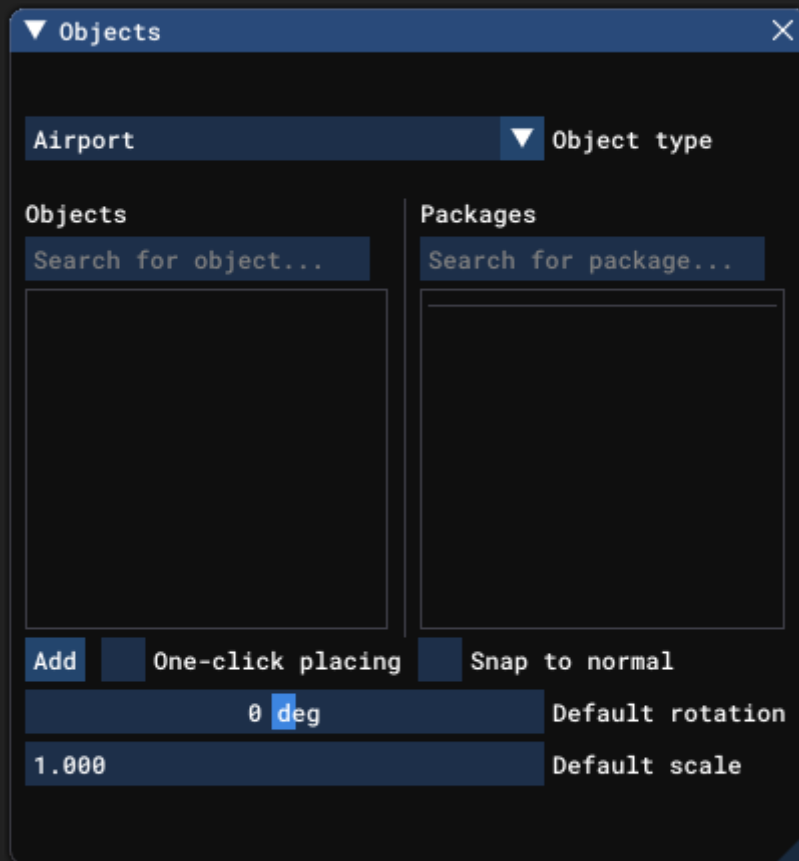
- [Runway](#)
- [Helipad](#)
- [TaxiwayPoint](#)
- [TaxiwayParking](#)
- [TaxiwayPath](#)
- [TaxiwaySign](#)
- [Apron](#)
- [PaintedLine](#)
- [PaintedHatchedArea](#)
- [LightRow](#)
- [LightSupport](#)
- [ControlTower](#)
- [Windsock](#)

AIRPORT OBJECTS

An Airport object is an object element used to add an airport area to the world. Adding this object will permit you to define certain meta-data for the Airport and then add airport-specific object elements from the Scenery Editor. These object elements are:

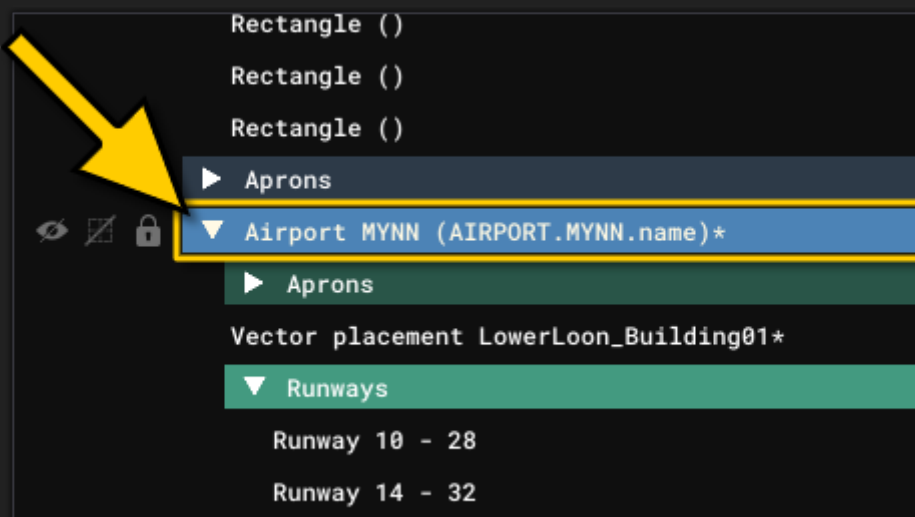
- [Runway](#)
- [Helipad](#)
- [CarParking Objects](#)
- [TaxiwayPoint](#)
- [TaxiwayParking](#)
- [TaxiwayPath](#)
- [TaxiwaySign](#)
- [Apron](#)
- [Polygon Objects](#)
- [PaintedLine](#)
- [PaintedHatchedArea](#)
- [LightRow](#)
- [LightSupport](#)
- [ControlTower Objects](#)
- [Windsock Objects](#)

When you select this object type the [Objects](#) window will not show any different object elements as there is only one type of airport and it's meta-data is defined through the [Properties](#):



When you click the **Add** button, the Airport object will be added to the scene and can be positioned using the [Gizmo](#). The position of this airport object will be used to define the airport reference point which is used for placing in-sim markers but otherwise has little bearing on the contents of the airport.

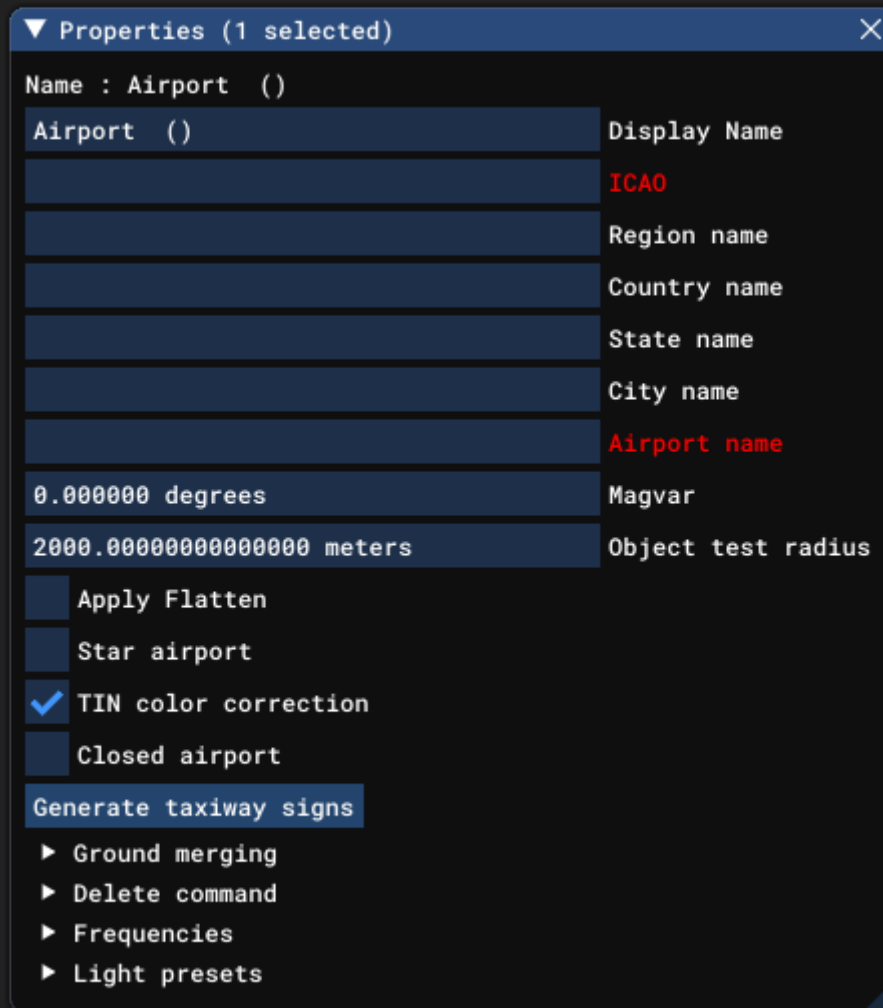
Note that when you add an Airport object to scene for the first time, it will be created in [The Scenery Contents List](#) of the Scenery Editor as a unique group rather than as a single object listing. This is because airports, while themselves an object, are also a type of "container" for other object types that can *only* be placed within an airport:



Any further airports you add to the package will be listed as an individual named group, and each named airport group will contain all the sub-groups and object elements that are created for it. For more information see the section on [Scenery Groups](#).

Properties

The Properties window for an Airport looks like this:



- Name

This is the name of the element as defined from its type. The name will be appended with additional information in brackets depending on the rest of the options in the Properties window (for example, the ICAO code or the Airport Name).

- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

- ICAO

This is the ICAO code for the Airport being defined. This value is obligatory and you will get an error in the Scenery Editor if it's not supplied. Note that after entering the ICAO into the input field, *you need to press the `Enter` key to confirm it.*

- Region Name

This is the name of the region the airport is in. Generally the region would be one of the following:

- Japan
- Asia (China, India, Sri Lanka, Philippines, Taiwan, etc...)
- North America (Canada, USA)
- Latin America (Argentina, Cuba, Venezuela, Brazil, etc...)
- Middle East (UAE, Israel, Saudi Arabia, Iran, etc...)
- Europe (France, Spain, Germany, United Kingdom, etc...)
- Africa (Tunisia, Chad, Kenya, Madagascar, etc...)

- Country Name

This is the name of the country the airport is in.

- State Name

This is the name of the state the airport is in.

- City Name

This is the name of the city that the airport is either in or nearest to.

- Airport Name

This is the name of the airport itself and will be displayed to the user. This value is obligatory and you will get an error in the Scenery Editor if it is not supplied.

- Magvar

This is the magnetic variation for the airport position. This is the angle difference between the *magnetic* north and *true* north. A negative value here means it's to the east and positive value is to the west, and the value is measured in degrees between -360.0° and 360.0° .

- Object Test Radius

This is the radius around the airport reference point in which you are permitted to place any of the listed airport objects. In the world, this can be seen rendered as a dark blue circle.

- Apply Flatten

Checking this option will auto-generate terraforming rectangles within the bounds of the airport test radius to flatten the terrain. These rectangles are internally defined and not rendered in the world as objects, although their effects will be visible on the terrain.

- Star Airport

Checking this will make the airport a "star" airport on the world map, highlighting it to users.

- TIN Colour Correction

This option is enabled by default on all new airports and applies colour correction to certain airport features - mainly runways and aprons - to eliminate unnatural TIN colours bleeding into them.:



- Closed Airport

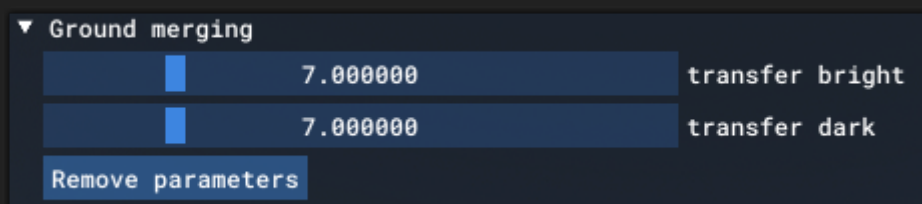
When checked, this will stop the airport from being accessible or interactive in any interface such as the world map, the instruments or the ATC system. Essential meaning the airport is only going to be rendered and nothing else.

- Generate Taxiway Signs

Clicking the Generate Taxiway Signs button will add auto-generated [Taxiway Sign Objects](#) to the airport based on the [TaxiwayPath Objects](#) that have been added. This button requires at least one taxiway path to exist in the airport.

Ground Merging

When you expand the Ground Merging section, initially you'll be presented with a single button: **Setup Transfer Parameters**. Clicking this will expand the Properties window to show the following:



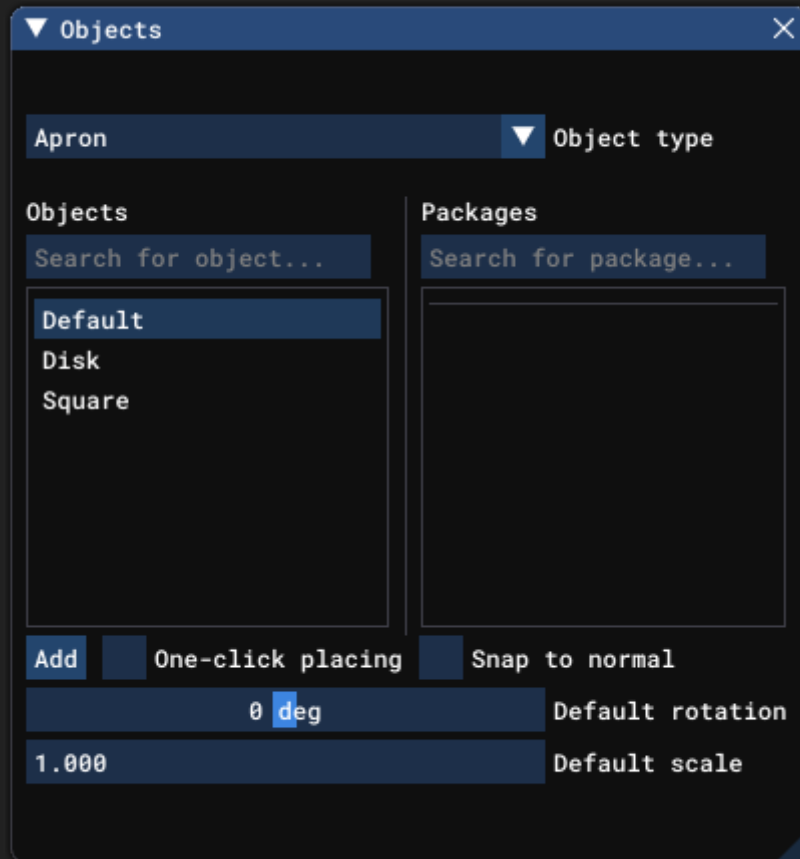
Basically, these sliders define how much aerial map detail will remain visible by changing the transparency of the lighter (*transfer bright*) and darker (*transfer dark*) areas of the element individually.

NOTE: This option is only valid for [Apron Objects](#) in the airport.

You can disable this option by clicking the **Remove Parameters** option which will remove the bright/dark parameters from all applicable ground elements.

APRON OBJECTS

A Apron object is an object element that is used to add arbitrary sized paved areas to [Airport Objects](#). When you select this object type the [Objects](#) window will show the following basic apron types:



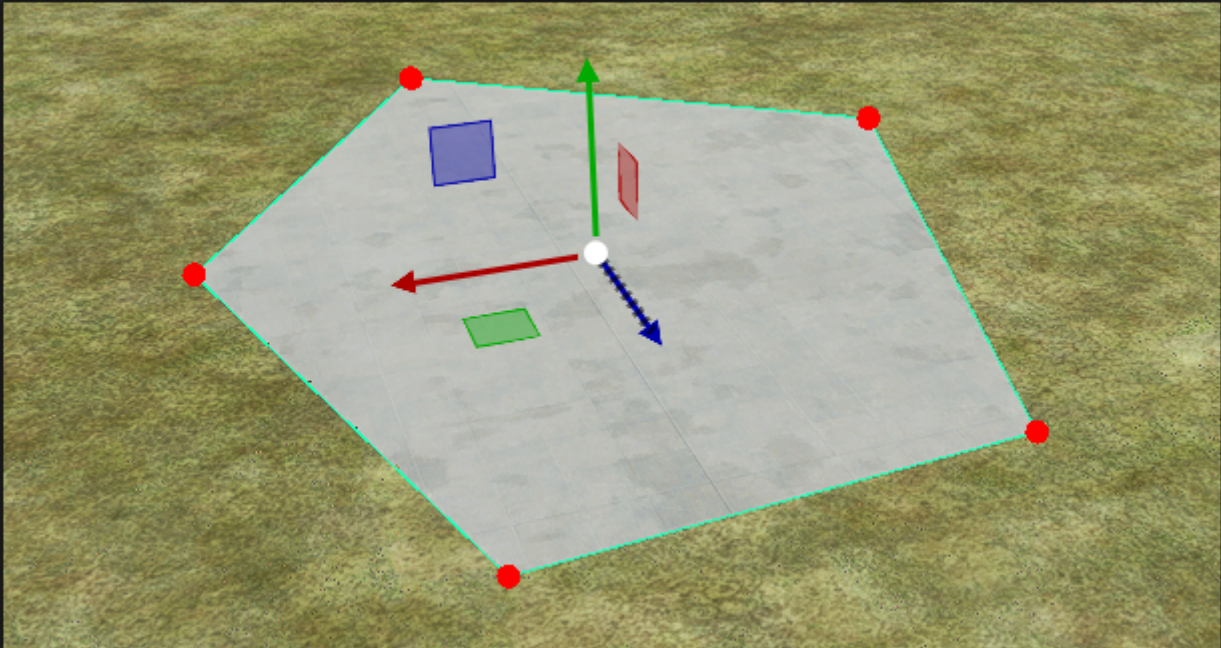
Apron object elements are simply arbitrary areas that you can add into the world - generally with a surface material - that define the parts of an airport where aircraft are parked, unloaded or loaded, refilled, or boarded, among other things.

IMPORTANT! Apron objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.

Default Aprons

When you select the Default Apron object and click **Add**, the cursor will have a red dot attached to it, and if you then hold down **Ctrl** and use the

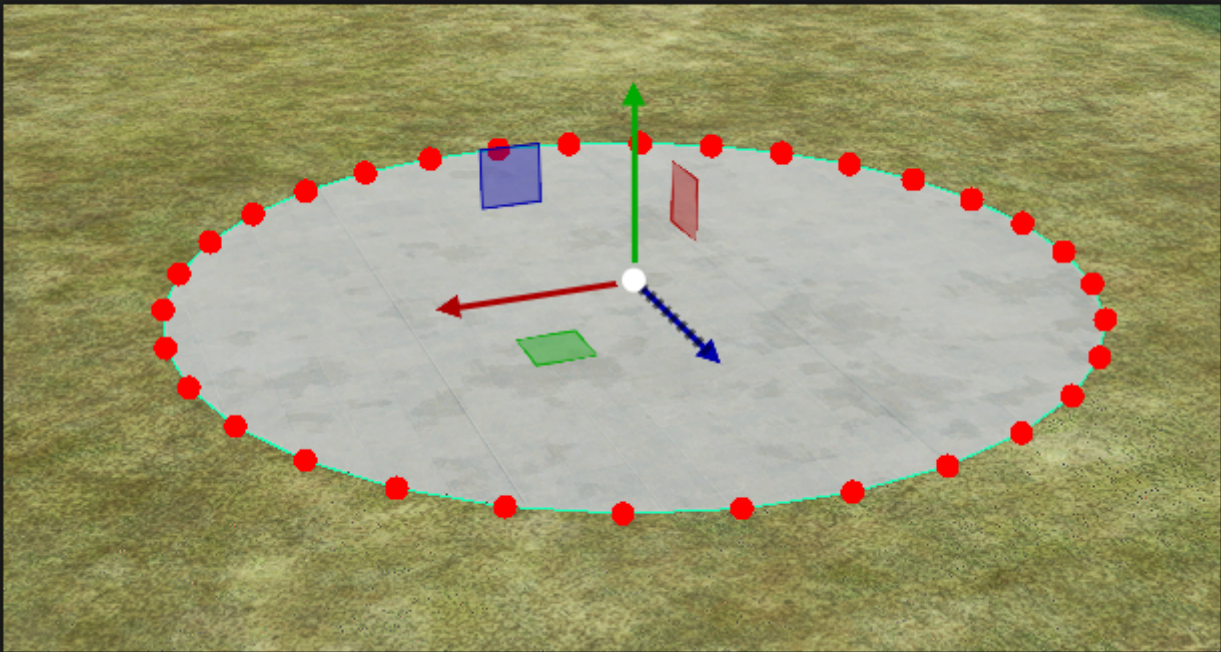
Left Mouse Button you can start to place points on the world to outline the shape. When you are happy with the area you have delineated, you can press **Enter** to "fix" the shape, which will now look like this in the world:



The polygon will have a [Gizmo](#) in its center and this can be used to change the position/rotation/scale of the apron. Note that the apron polygon can be convex or concave, so you can define just about any area, although the edges of the apron area should never cross, as this will lead to errors when rendering.

Disk Aprons

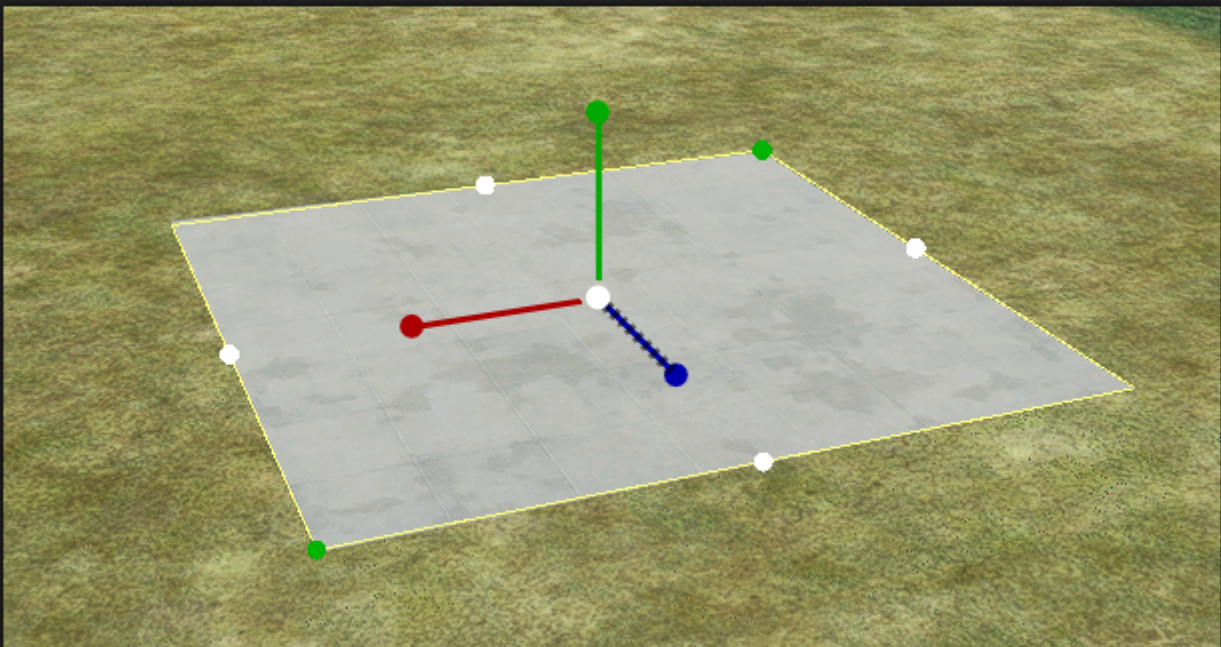
When you select the Disk Apron object and click **Add**, a disk apron will be added. This apron is defined using 32 individual points to create an approximately circular area which will look like this in the world:



The disk apron will have a [Gizmo](#) in its center and this can be used to change the position/rotation/scale of the whole apron area.

Square Aprons

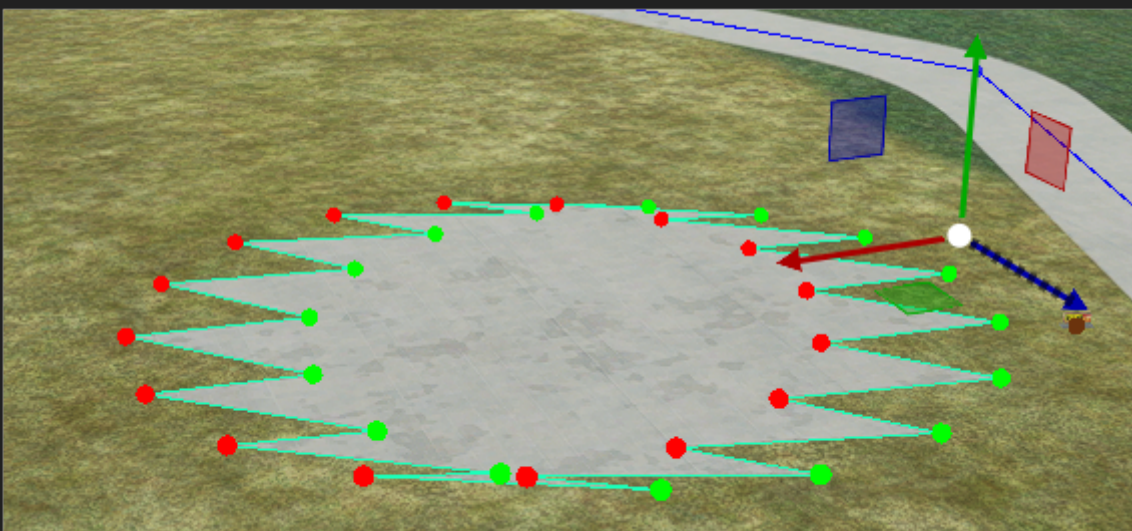
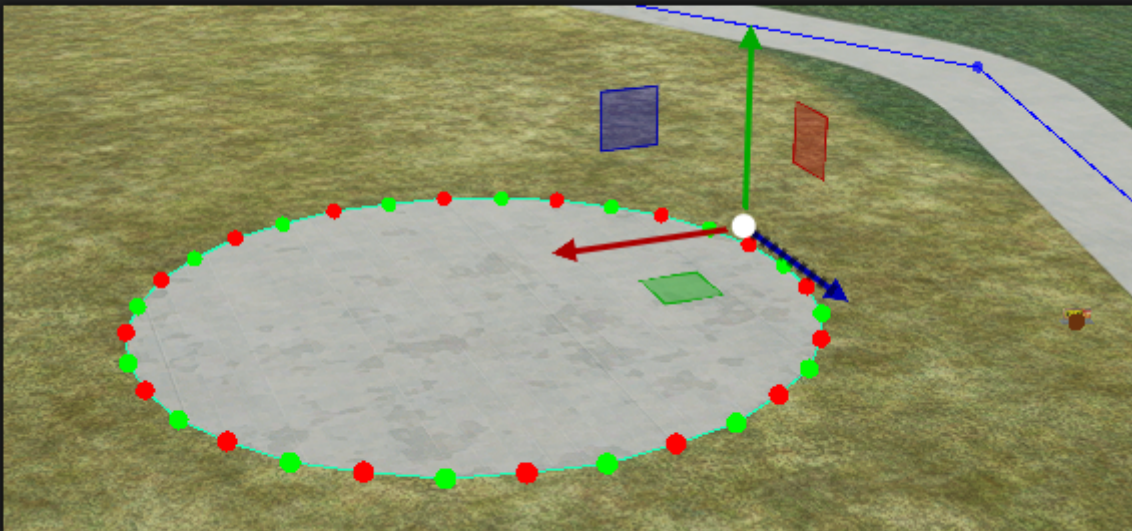
When you select the Square Apron object and click [Add](#), a square apron will be created in the world, looking like this:



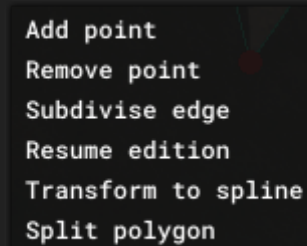
Editing Aprons

If you want to change the area that the apron covers after you have created it, you can edit the different points that make up the apron. The actual way this works will depend on the apron type.

For the Default and Disk aprons, you can click the Left Mouse Button on any point to set the gizmo to that point, and this point can then be translated to a new position using the gizmo or by inputting new values in the gizmo window. You can also select various points together by using **Ctrl** + Left Click on individual points, or by using **Shift** + Left Click + Drag to select multiple points. Selected points will turn green and these points can then be edited together, as illustrated in the images below:

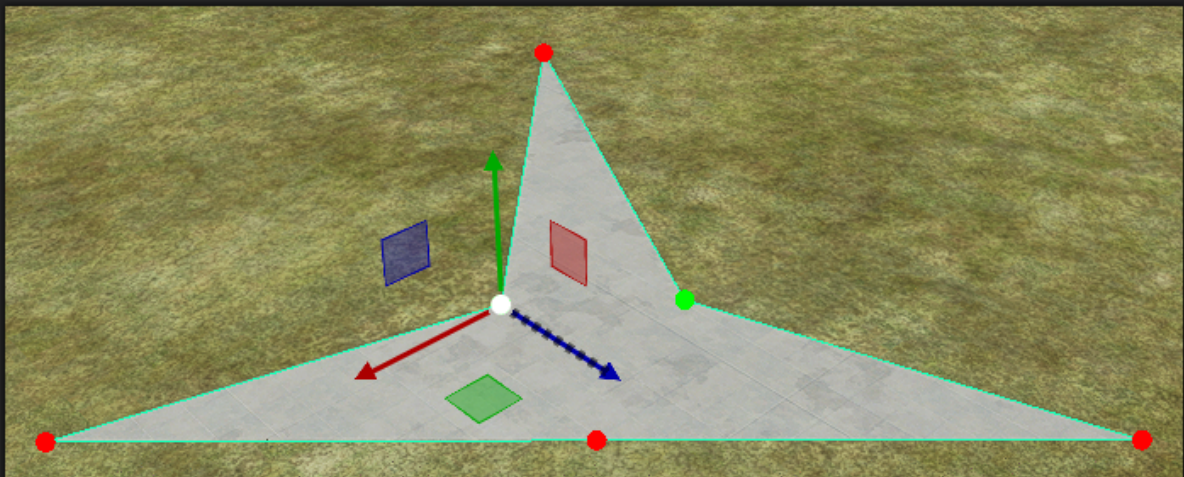


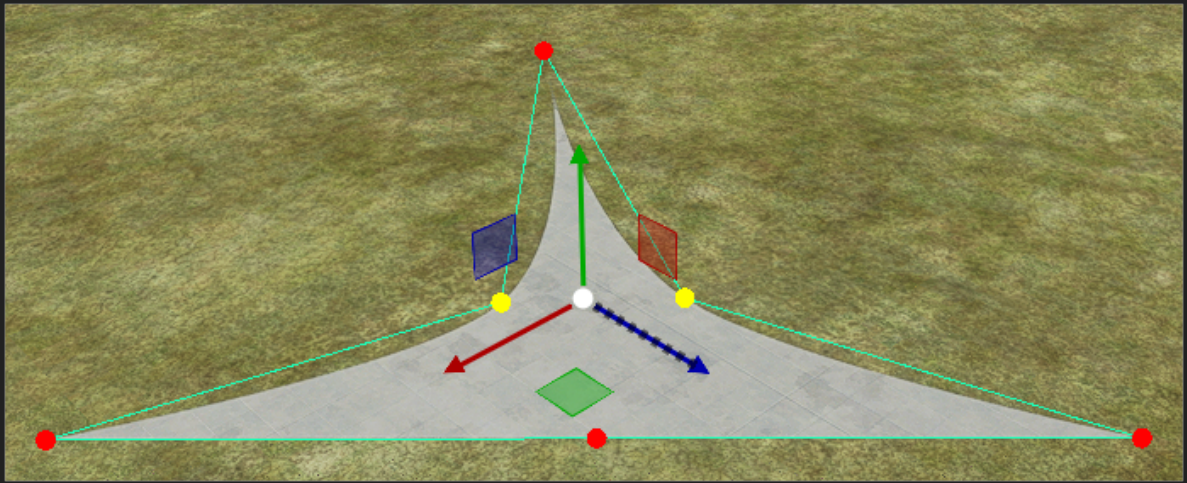
Editing the Default and Disk aprons will also give you access to extra options when you click the Right Mouse Button:



This menu has the following options:

- **Add Point:** Clicking the RMB on a point or on the edge of the Disk or Default apron and using this option will add a new point to the apron polygon, which can then be edited as normal.
- **Remove Point:** Selecting one or more points on the Default or Disk apron and selecting this will remove the point(s) from the apron.
- **Subdivide Edge:** Clicking the RMB on the edge of the Default or Disk apron and selecting this option will add a new point on the clicked edge, halfway between the points at either end.
- **Resume Edition:** Selecting this option will enable you to continue defining the apron shape, using **Ctrl** + Click to add new points, and using **Enter** to finalise the edition.
- **Transform To Spline:** When you select one or more points and choose this option from the RMB menu, the selected points will turn from red to yellow, and the material used to render the apron will be rendered using spline curves between the points, as shown in the images below:

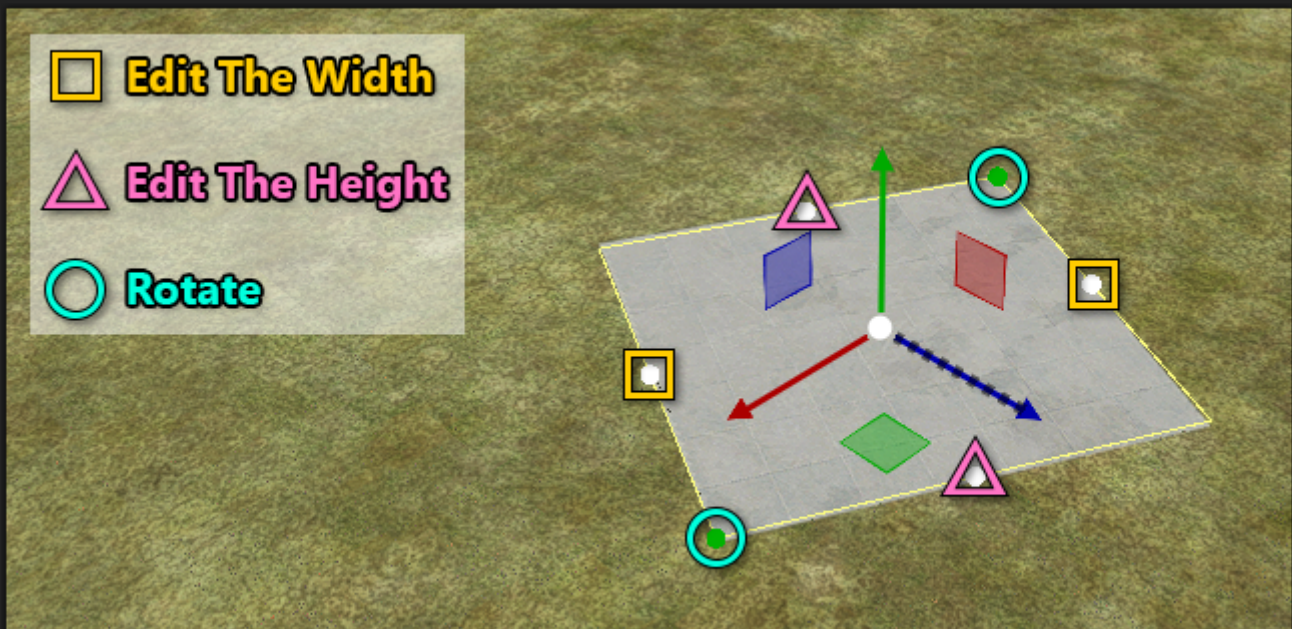




If you do not wish to have spline rendering for a point, the RMB menu will have a Remove Spline option when clicked on it.

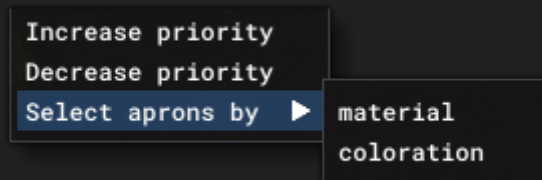
- Split Polygon: This option will only be available when you have selected two or more points that are *not adjacent*. Selecting this option will then split the Apron object into two separate Default polygon aprons that can be edited independently.

The Square polygon edition is different to the other two element types as it is done using "handles" that are shown in the simulation UI:



You can select any of the "handles" shown in the image then use the Translate [Gizmo](#) to edit them, or input values directly into the gizmo window.

Finally, there are a couple of extra RMB menu options that can be used regardless of the apron element type:



These options are:

- **Increase Priority:** With this option you can increase the apron priority, where higher priority aprons will render over lower priority aprons. See the section on Priority in the Properties section below for more details.
- **Decrease Priority:** This lowers the priority value for an apron so that it will render under any aprons with a higher priority. See the section on Priority in the Properties section below for more details.
- **Select Aprons By:** This option permits you to select ALL aprons in the airport that meet the specified criteria, either based on their Material or based on their Colouration values. Note that if selecting by colouration, only aprons with the *exact same color settings* will be selected. This option permits you to mass-edit certain properties for all aprons that meet the criteria.

Note that if you wish to remove the apron object from the world, you can select it and then press the **Delete** key.

Properties

The Properties window for an Apron object looks like this:



- Name

This is the name of the element as defined by its object type properties.

- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

- Draw Surface

This option can be un-checked to disable drawing the surface material assigned to the apron object. It is checked by default.

- Surface

This button shows you the material that has been selected for the apron object surface. To change the material, simply click the button to open The Material Editor, then drag a material onto the button. The button will change to show the name of the chosen material and it will be applied to the Apron in the world.

IMPORTANT! When being rendered, apron elements are baked into the terrain textures. This helps reduce the polycount and permits the element to be terraformed. However, it also means that the texture quality won't be any greater than the resolution of the terrain textures themselves. In general, this resolution is around 4cm/pixel at the equator, with the best/highest resolution terrain textures reserved for higher LODs so we have a better quality for airports. For users, they will experience the best resolution possible setting the "Terrain level of detail" option to its maximum value.

- Local UV

When this option is checked, the surface material will be applied to the local coordinates of the apron. This means that moving the apron will also move the surface material, keeping it aligned with the position of the apron. Un-checking this means that moving the apron will not change the position of the surface material. By default this option is checked.

- Edit UV

When this option is checked, you can use the [Gizmo](#) tool to change the different texture UV properties:

- Texture tiling with the scale gizmo
- Texture X/Y offset with the translate gizmo
- Texture rotation with the rotate gizmo

- Stretch UV

When checked, the surface material will be stretched to fit within the bounds of the apron area, such that changing the apron scale

will also change the scale of the material being applied. Also note that when checked the Texture Tiling option will not be available. Un-checking this option means that the material will not be stretched when you change the size of the apron object. By default this option is un-checked.

- Flip UV

This option permits you to flip the UV coordinates for the texture that the applied material is using.

- Texture Tiling

This option permits you to change the tiling scale for the applied material texture. Note this option will not be visible if the Stretch UV option is checked.

- Texture Offset U

This option permits you to offset the texture alignment along the U axis.

- Texture Offset V

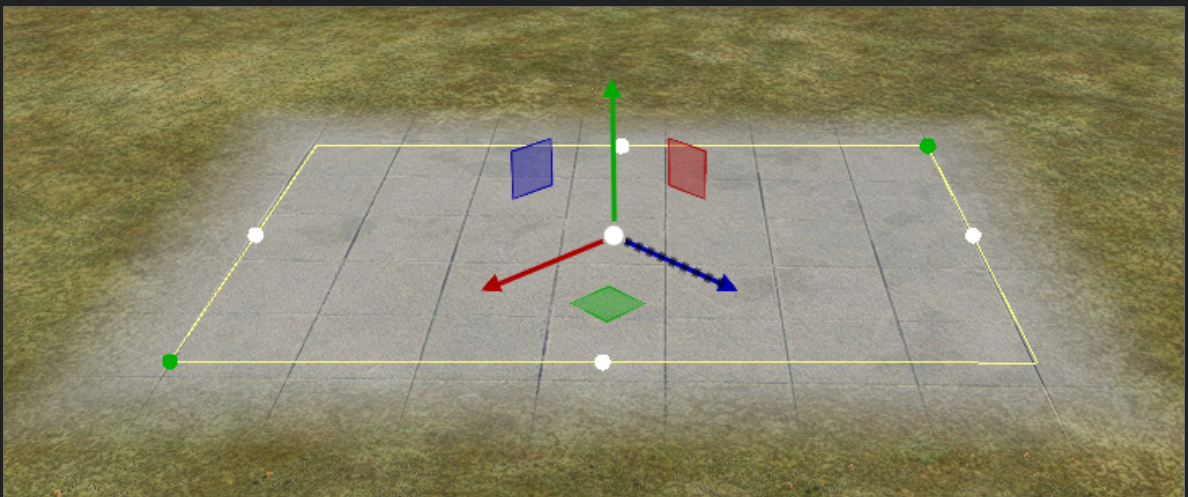
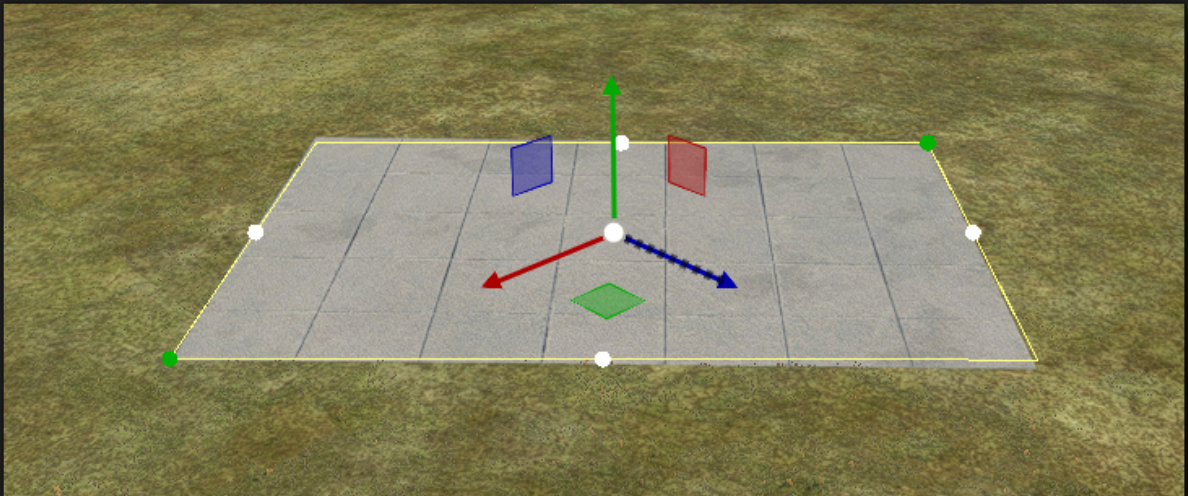
This option permits you to offset the texture alignment along the V axis.

- Texture Rotation

This option permits you to rotate the surface material texture within the apron area, changing it's orientation without changing the orientation of the apron itself. Note that this value will be reset if you rotate the apron itself - or any points used to define the apron - and the rotation of the texture will be set to the new apron rotation. As such it is recommended that you first perform any transforms on the apron object *then* change the rotation of the texture.

- Falloff

This value can be used to "feather" the edges of the apron, removing the hard edge where the apron ends and the terrain begins. The images below show the difference between a default falloff of 0m and falloff value of 10m:

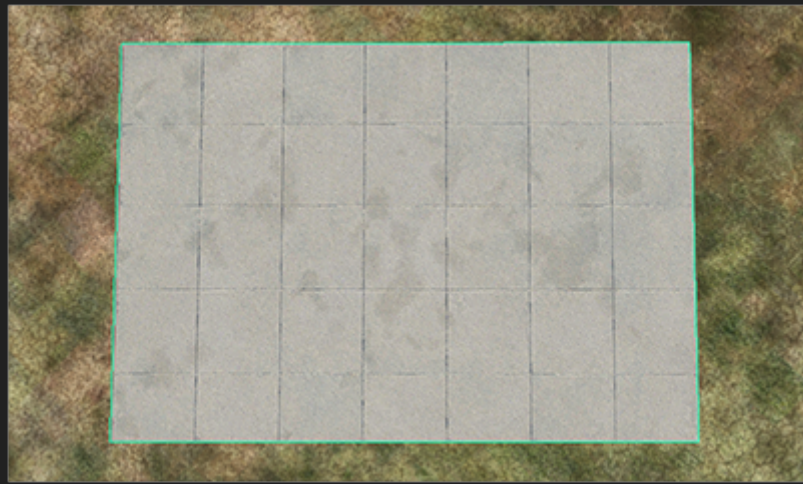


- Opacity

This option can be used to make the apron surface texture more or less transparent.

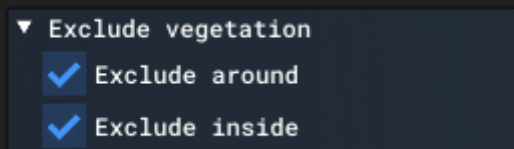
- Ground Merging

When checked, this option will merge the terrain textures with the material texture that is used for the apron.



- Exclude Vegetation

If you click on the Exclude Vegetation option, you will be presented with the following two check-boxes:



- Exclude Around: When checked, this option will remove any vegetation that is near the edge of the taxiway path object.
- Exclude Inside: When checked, this option will remove any vegetation that is within the bounds of the taxiway path object.

Both these options are checked by default.

- Force Draw Above Runways

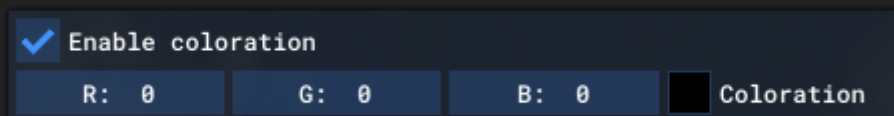
Checking this option will mean that the apron will always be rendered above any runway object elements, regardless of the priority.

- Priority

This option sets the render priority for the apron. The default render priority is 0, which for most cases is fine. However, if you have overlapping aprons and want one to render over another one, then you will need to change this value clicking the **+** or **-** buttons to raise or lower the priority value. Higher priority values will render *over* lower priorities, for example, a polygon with priority 1 will render over one with priority 0, which in turn will render over one with priority -1. Note that the engine cannot guarantee the render order for aprons with the *same* priority, so if you need something to always render over or under something else, you need to set this value.

- Enable Colouration

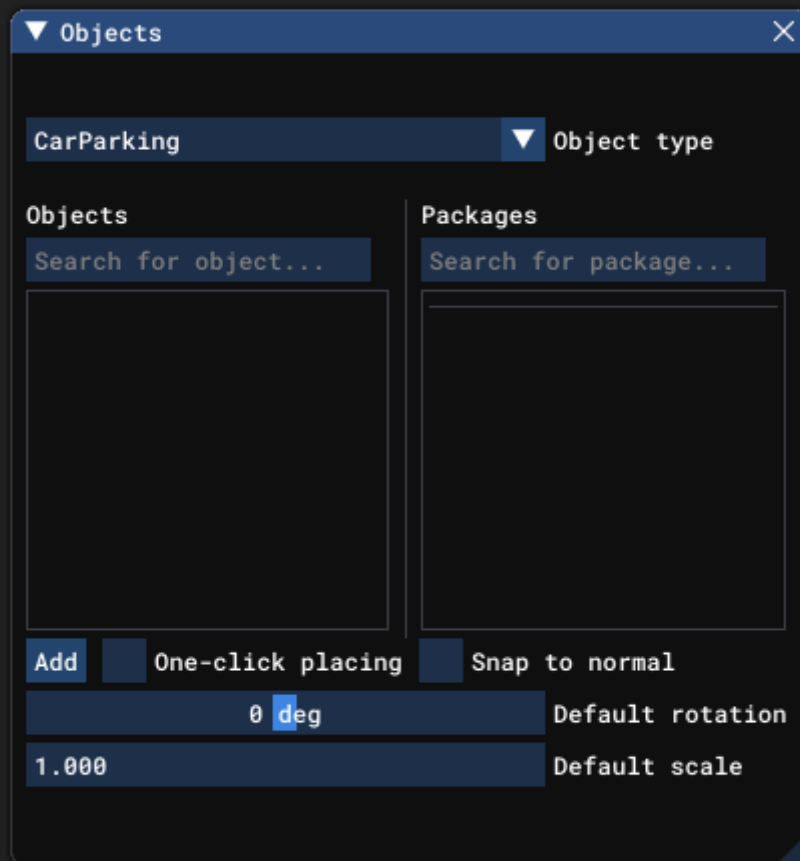
Checking this will open a further set of options that permit you to edit the RGB values for the materials being used to texture the apron, using the color picker or by editing the value fields directly.



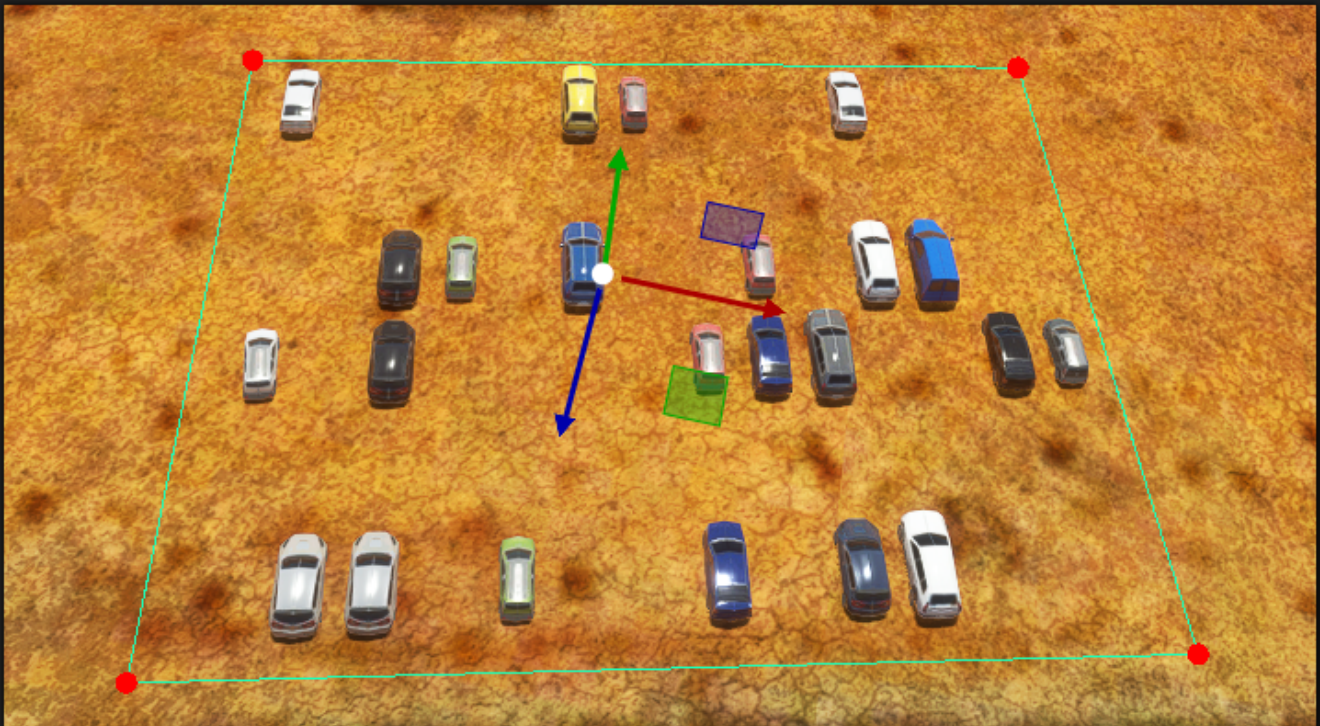
In this way you can change the color of the materials to better suit the environment and area that the apron has been placed in. Setting all the values to 0 will disable the colouration.

CARPARKING OBJECTS

A CarParking object is an object element used to define an N sided area (minimum 3 sides) that you can create to add parked cars to a scene. When you select this object type the [Objects](#) window will not show any different object elements as currently there is only one type of CarParking object and what it does is defined through its Properties:



When you select a carpark object and click **Add**, the cursor will have a red cross-hair attached to it, and if you then hold down **Ctrl** and use the Left Mouse Button you can start to place points on the world to outline the shape. When you are happy with the area you have delineated, you can press **Enter** to "fix" the shape, which will now look like this in the world:



The carparking polygon will have a [Gizmo](#) in its center and this can be used to change the position/rotation/scale of the area. Note that these carparking polygons can be convex or concave, so you can define just about any area, although the edges of the polygonal area should never cross, as this will lead to errors when rendering. If you wish to remove the carparking object from the world, you can select it and then press the **Delete** key. While editing the carparking polygon you will see the cars spawned in the area you are defining, and they will be aligned along the angle of the *longest* edge of the area.

If you want to change the area that the carparking polygon covers after you have created it, you can click the Left Mouse Button on any point to set the gizmo to that point. This point can then be translated to a new position using the gizmo or by inputting new values in the gizmo window, updating the area of the carparking as you do.

Carparking objects also have specific commands available from the Right Mouse Button menu:

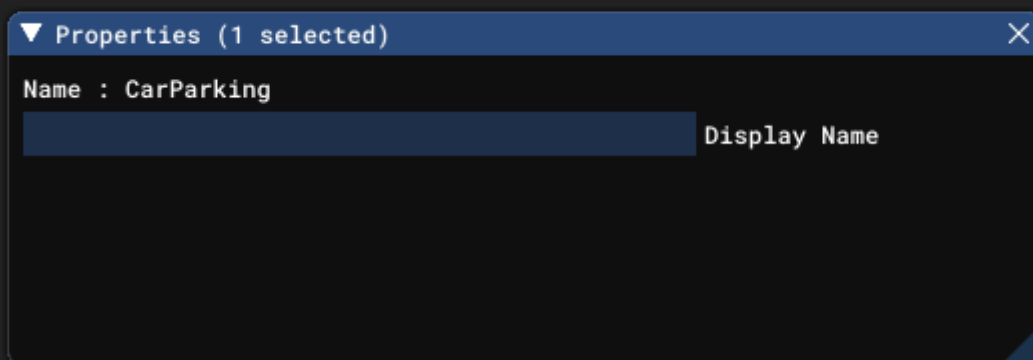
```
Add point
Remove point
Subdivide edge
Resume edition
```

The first options are general for all objects and are explained in the section on [The Scenery Contents List](#), so we'll concentrate here on the options unique to the carparking object:

- **Add Point:** When you right click on an edge of the carparking polygon and select this option, a new point will be added to the edge at the position that was clicked.
- **Remove Point:** Right clicking and selecting this option on any point of the carparking polygon will remove that point.
- **Subdivise Edge:** When you right click on an edge of the carparking polygon and select this option, a new point will be added to the center point of the edge.
- **Resume Edition:** Selecting this option will put you back into the edition mode, the same as when you first added the carparking polygon object to the scene. There will be a red cross-hair and you can add points to the carparking polygon using **Ctrl** + Left Mouse Button, and then finalise using **Enter**.

Properties

Polygon objects have the following [Properties](#) which can be edited:

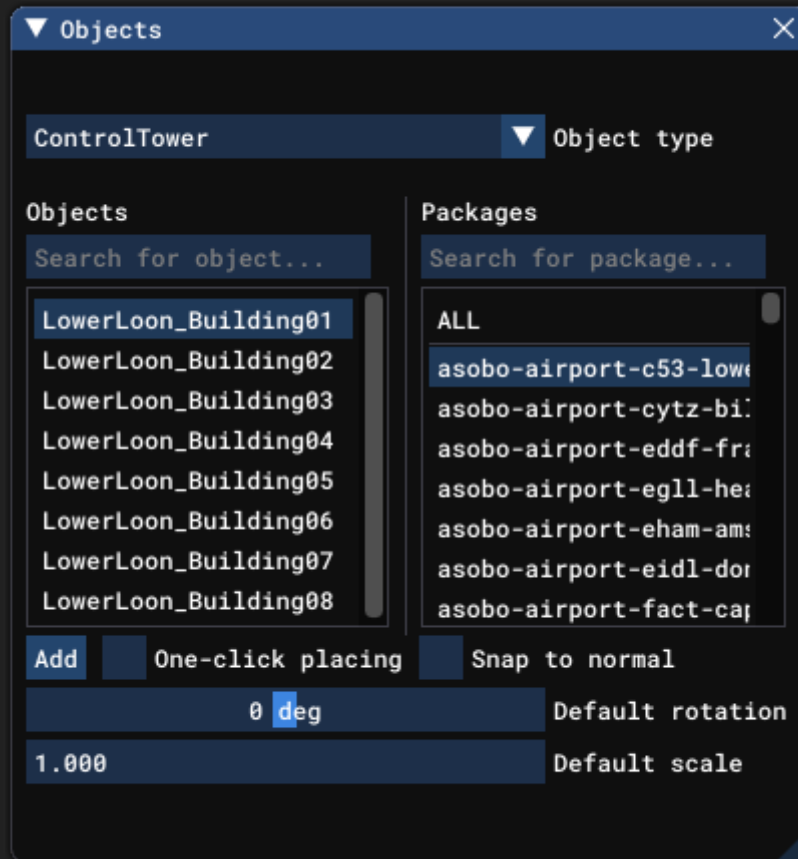


- **Name**

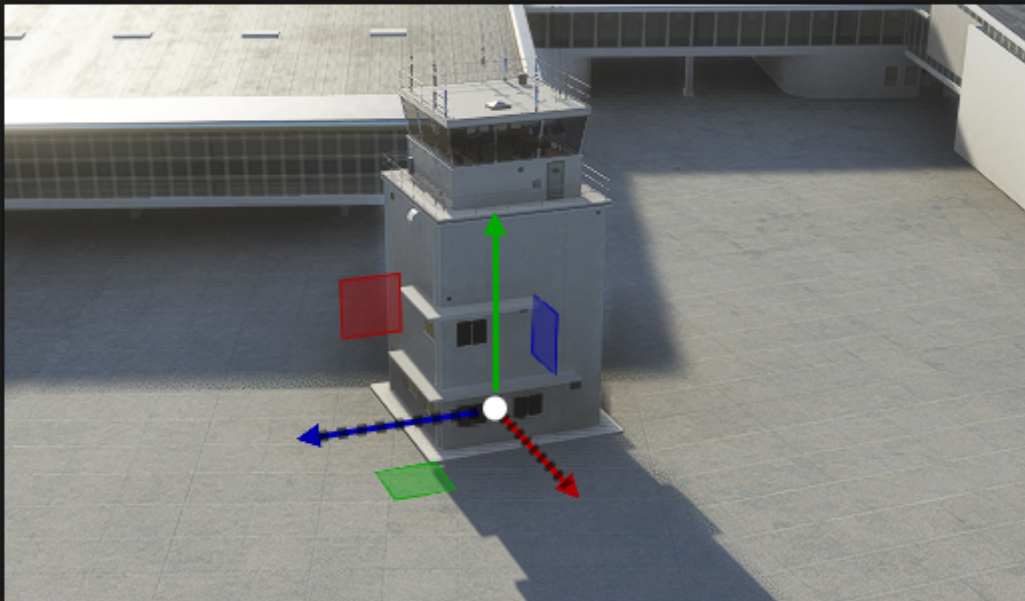
This is the name of the element as defined from its properties, and will be shown in the Content List of the Scenery editor.

CONTROLTOWER OBJECTS

A ControlTower object is an object element used to add an ATC tower to an airport. When you select this object type you will be presented with a list of different scenery object elements listed in the [Objects](#) window:

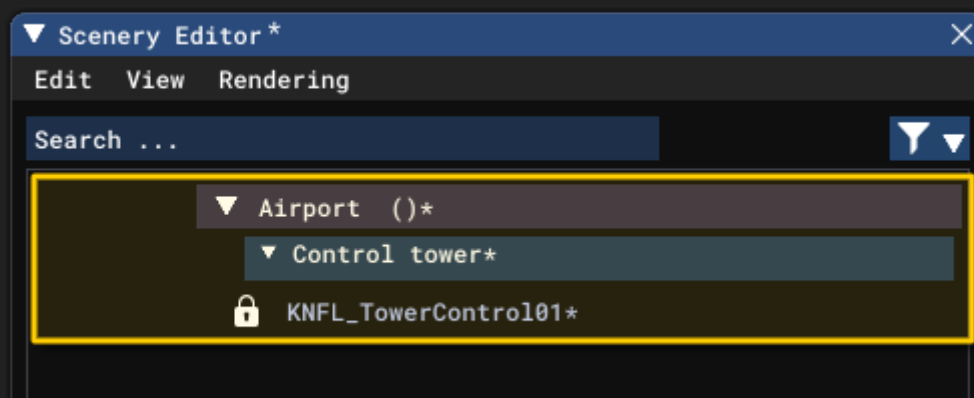


Since towers are considered scenery objects *all* scenery objects will be shown in the list, but you can use the *filter* at the top of the Objects window to narrow down the search to the objects that you want. Once you have found the tower that you want to add to the airport, click the **Add** button, and then use the Translate [Gizmo](#) to position the tower where you want, or you can enable **One-Click Placing** and simply click in the world to place it. You may also use the Rotation [Gizmo](#) to change the angle the element is shown at, as well as the Scale [Gizmo](#) to change its size.



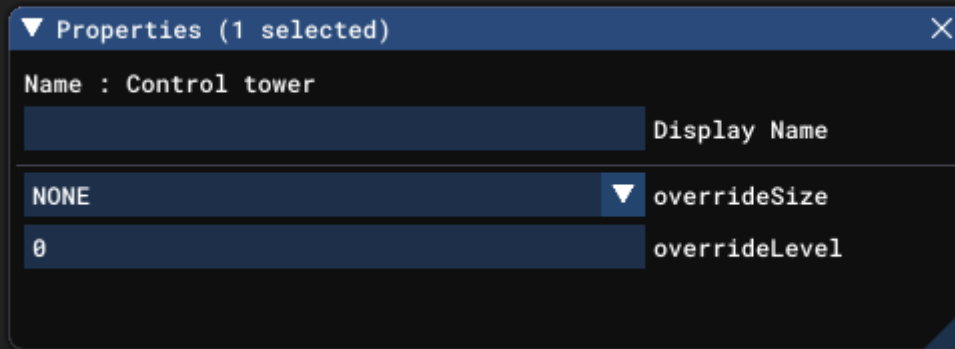
IMPORTANT! Tower objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.

Once you place a ControlTower in an airport, the Scenery Editor will show a ControlTower group with a single child that is the tower that was just placed. Both the group and the Tower object have properties that can be set, explained below.



ControlTower (Group) Properties

ControlTower groups have the following [Properties](#) which can be edited:



- Name

This is the name of the object group.

- Display Name

This is the name of the element group as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

- Override Size

The size of the tower object will be based on the mesh the object uses, but will be modified based on the size of the airport that it belongs to. Using this option you can override this and change the size to something other than the default.

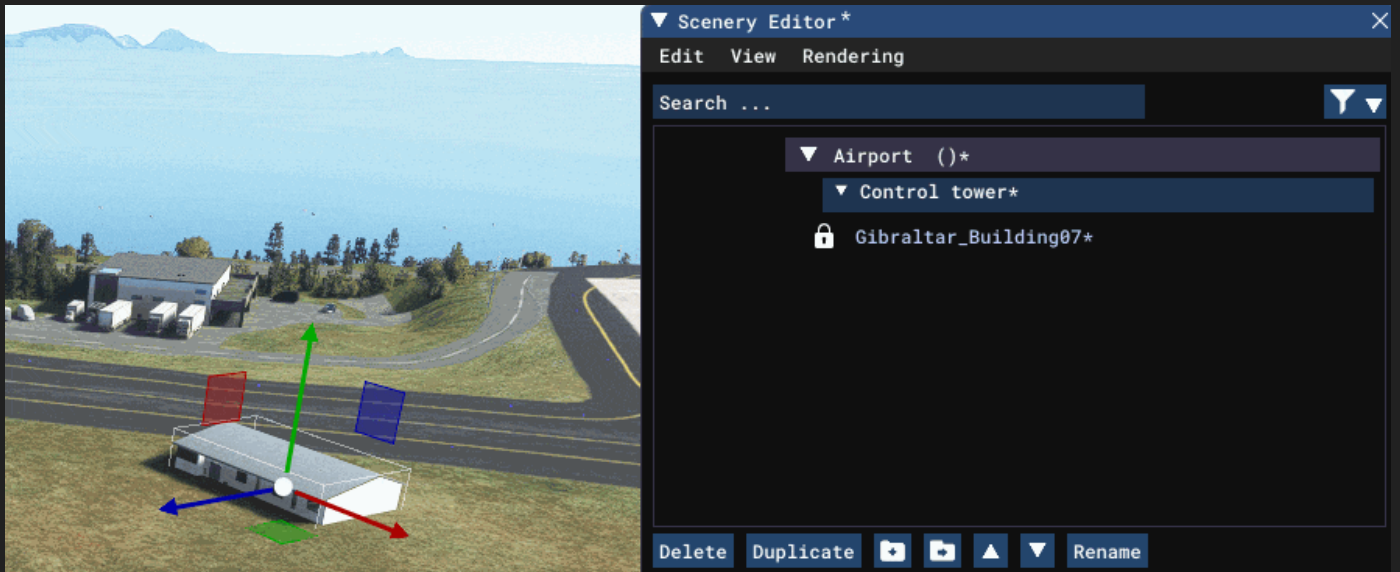
- Override Level

The height of the tower object will be based on the mesh the object uses, but will be modified based on the size of the airport that it belongs to. Using this option you can override this and change the height to something other than the default.

Procedural ControlTowers

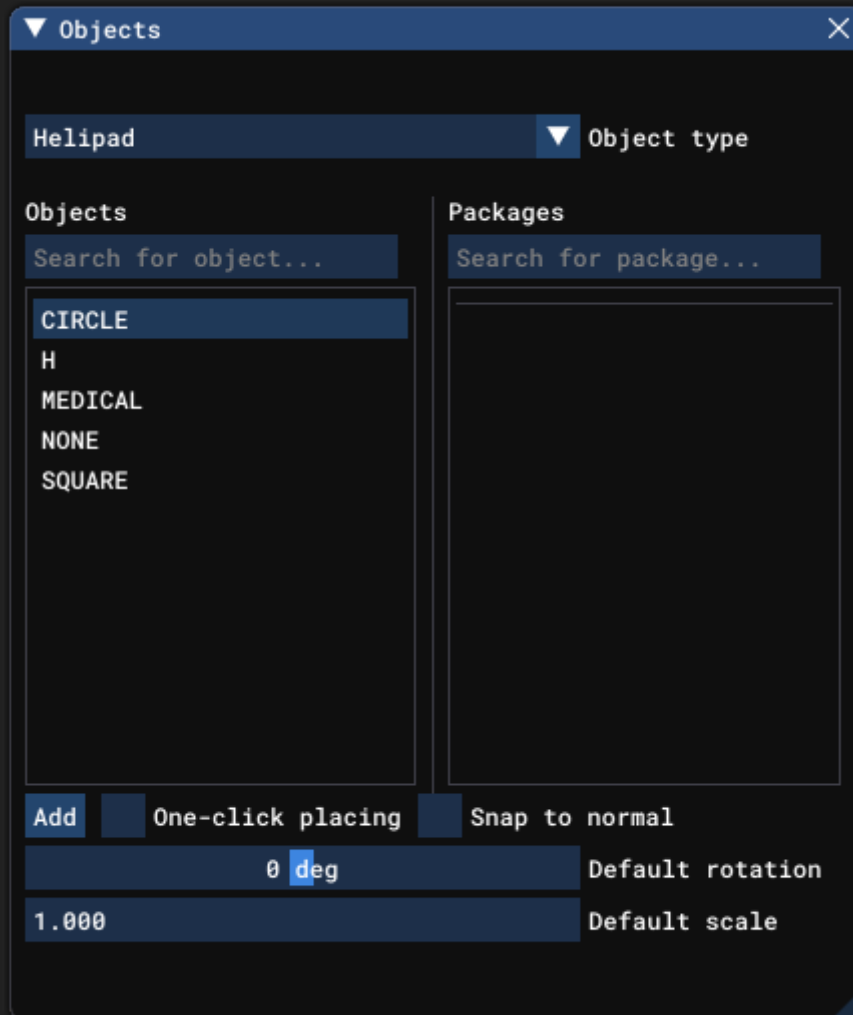
When you create the ControlTower group, you need to pick an object from the Objects list and that will be added to the scene as the Control Tower.

However, it may be that you don't have an appropriate object, or that you don't want to model one yourself and create a new object just for this airport. In these cases, you can *delete* the object from the scenery editor ControlTower group and *just* leave the group. When you do that, the ControlTower group will tell the simulation to generate a "generic" control tower model procedurally, for example:



HELIPAD OBJECTS

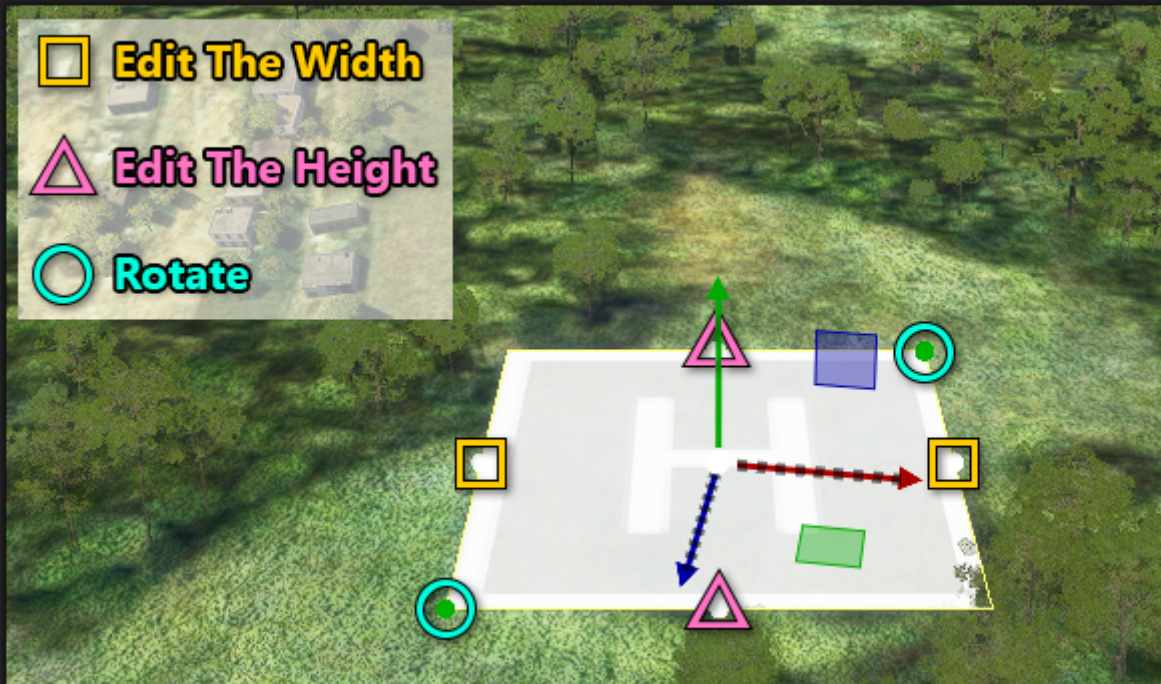
A Helipad object is an object element that is used to add a helipad (helicopter landing pad) to an airport in the world. When you select this object type you will be presented with a list of different helipad object elements listed in the [Objects](#) window:



When you click the [Add](#) button, the Helipad object will be added to the scene and can be positioned using the [Gizmo](#). Once positioned, the helipad can be edited.

IMPORTANT! Helipad objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.

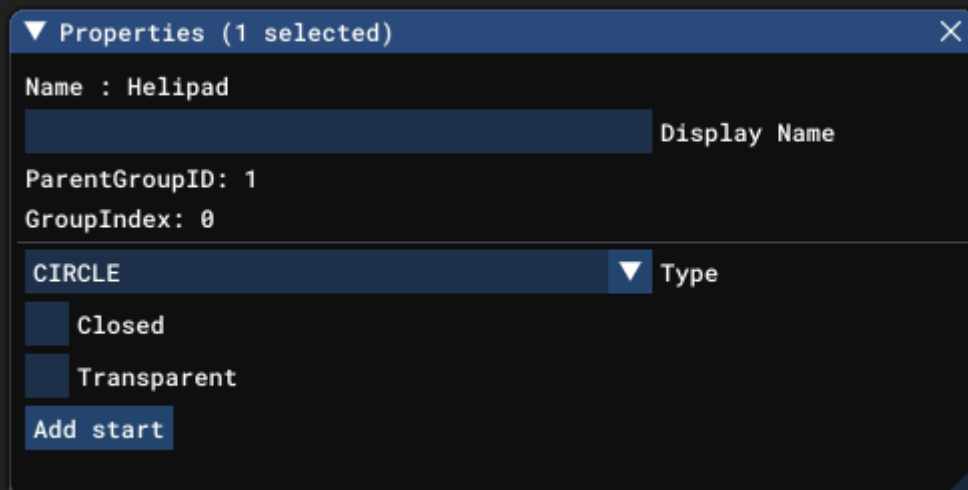
After adding the helipad object to the scene, its position, orientation and scale can be edited directly using the [Gizmo](#) in its center. You'll notice too that there are various points shown on the helipad area in the world view. Each of these points can also be clicked on, which will move the gizmo to that point and enable you to edit the following properties:



Once you are happy with the placement of the helipad, you can then go on to edit its Properties. Note that if you wish to remove the helipad, you can select it and press `Delete` on the keyboard.

Properties

The Properties window for a Helipad looks like this:



- Name

This is the name of the element as defined by its object type.

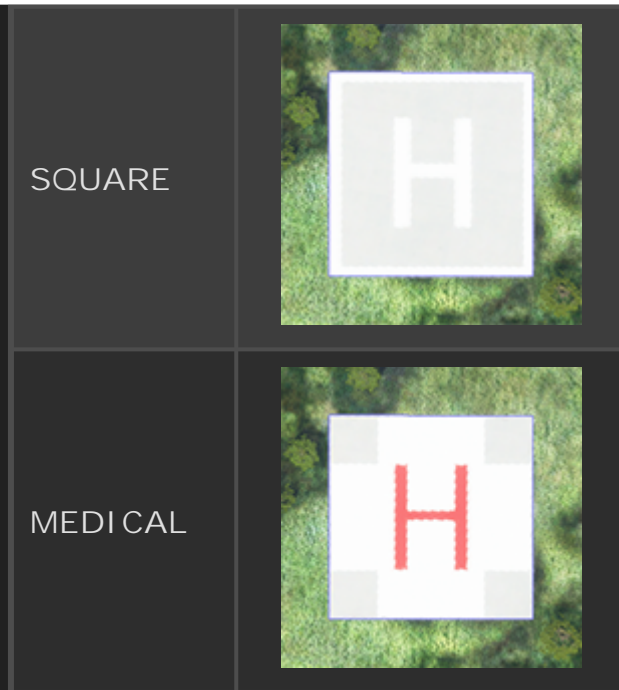
- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

- Type

This can be used to change the type of helipad object element. The different types are illustrated in the table below:

Type	Illustration
NONE	
CIRCLE	
H	



- Closed

When this is checked, the helipad will be flagged as "closed" and a cross drawn over it, eg:



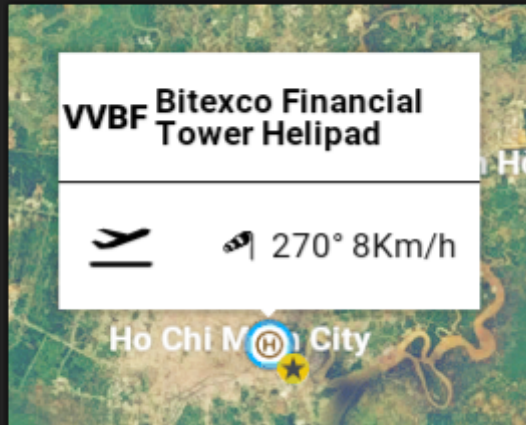
- Transparent

When this is checked, the surface material will be made transparent and only the markings will be rendered, eg:



- **Add Start**

This button enables you to designate the helipad being added as a start point (or destination) for a flight with a helicopter, which will add a new type of departure point to the world map:

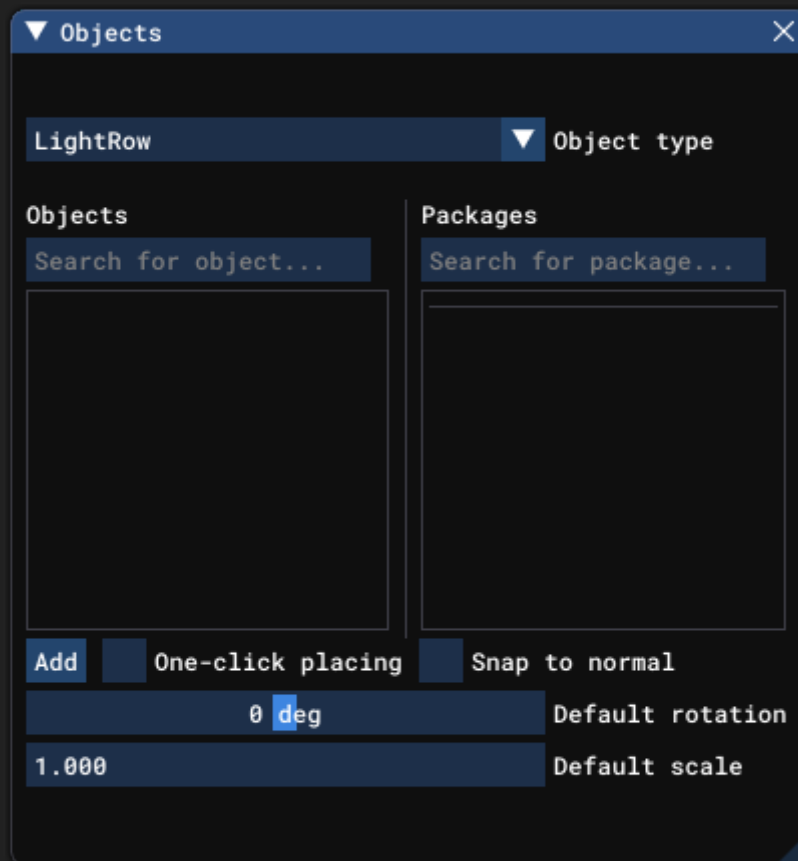


When you click this button the Properties window will expand to show the following additional parameters:

- **Edit Position**: This will permit you to use the Gizmo to visually position the starting point for a helicopter when a flight is initiated.
- **Remove Start**: This will simply remove the Start information, returning the helipad to being a purely visual feature that cannot be used for departing or landing.
- **Heading**: This is the initial heading for the helicopter (the "facing" direction) when a flight is initiated. 0° corresponds to True North.

LIGHT ROW OBJECTS

A Light Row object is an object element that is used to add rows of lights within an airport. When you select this object type the [Objects](#) window will not show any different object elements as currently there is only one type of light row and what it does is defined through its :



Light row object elements are a visual effect that can be used to better mark out areas and paths in your airport using lights. To add one to your airport, click the **Add** button, or select One-Click Placing. Either of those options will add a red dot to the mouse cursor in the world view and you can then use **Ctrl** + Left Mouse Click to place points in the world, creating a "path" for the lights. When you have added the points you require to create the path, you can then hit the **Enter** key to finalise the light row. Note that if you wish to remove the light row object from the world, you can select it and then press the **Delete** key.

IMPORTANT! Light Row objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.

Once placed in the world, the whole row can be moved using the Translate [Gizmo](#) or it can be rotated using the Rotate gizmo. It is also possible to click on any specific point along the row and then use the translate gizmo to move that point - the light row will update accordingly. You can also select various points together by using **Ctrl** + Left Click on individual points, or by using **Shift** + Left Click + Drag to select multiple points. Selected points will turn green and these points can then be edited together, as illustrated in the image below (mouse over the image to see the edition):



When editing Light Row objects, you will have the following additional options for the Right Mouse Button menu:

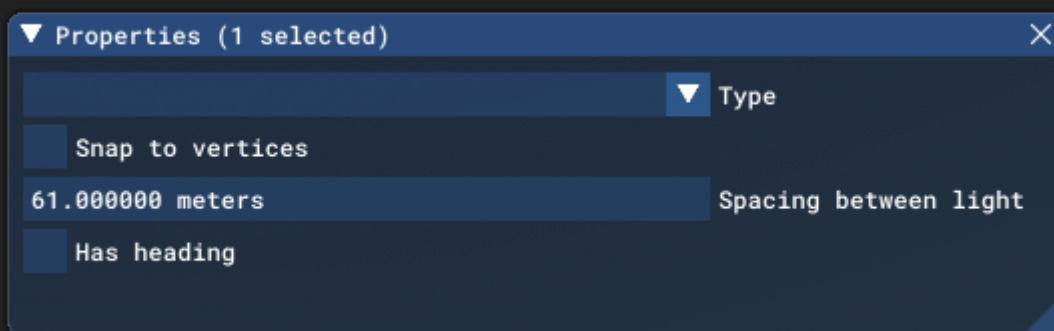
Add point
Remove point
Subdivide edge
Resume edition

- Add Point: Clicking the RMB on a point or on the light row path itself and using this option will add a new point to the light path, which can then be edited as normal.

- Remove Point: Selecting one or more points on the light path and choosing this will remove the point(s) from the light row.
- Subdivide Edge: Clicking the RMB on the path of the light row and selecting this option will add a new point on the path, halfway between the existing points at either end of the selected edge.
- Resume Edition: Selecting this option will enable you to continue defining the light row path, using **Ctrl** + Click to add new points, and using **Enter** to finalise the edition.

Properties

The Properties window for a Light Row object looks like this:



- Type

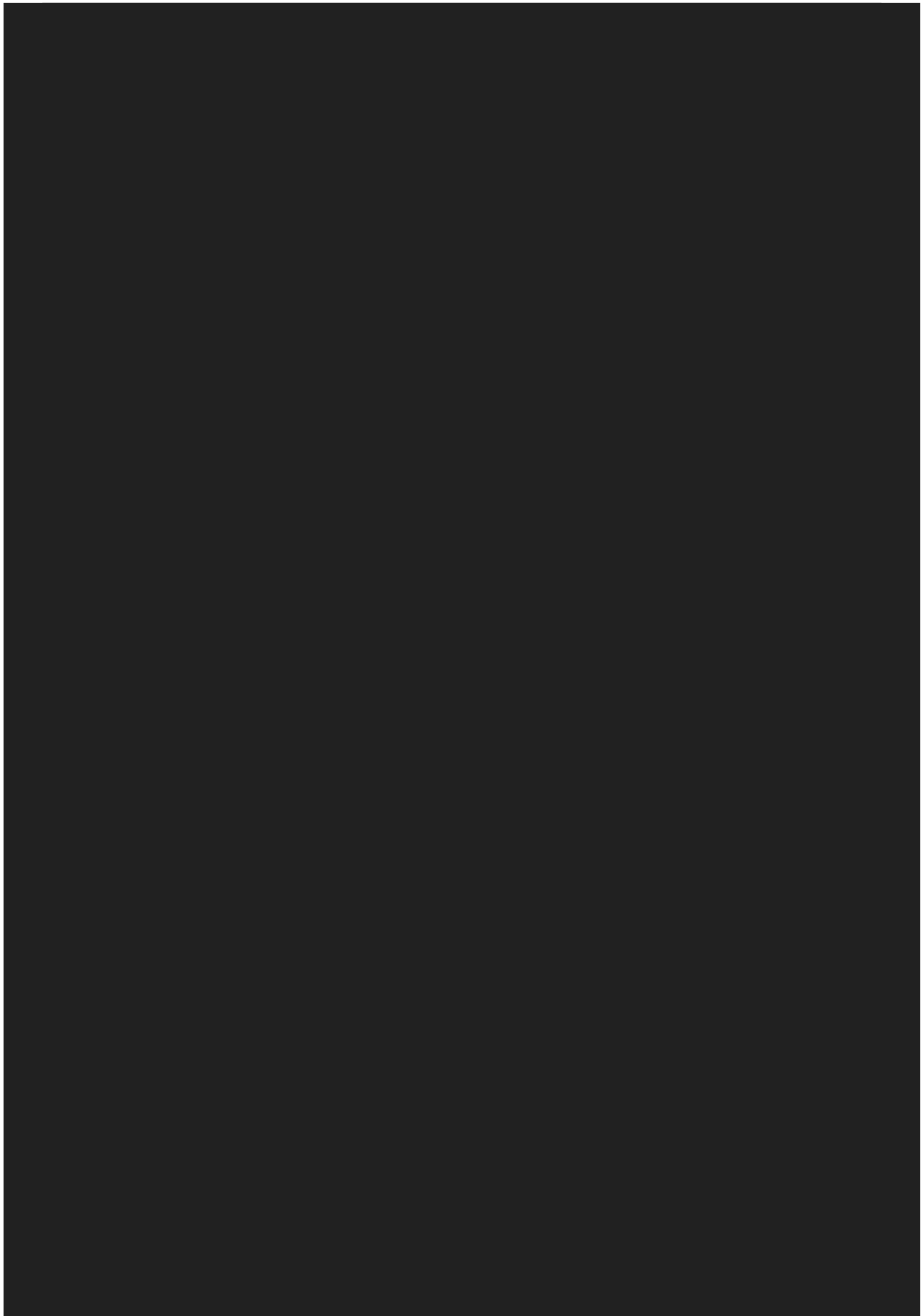
This is the preset type that should be used to create the light row. Presets are defined *per airport* from the section of [Airport Objects](#).

- Snap To Vertices

When this option is checked, the lights will only be placed on the vertices (points) of the path that generates the light row. Enabling this will also remove the Spacing Between Lights option.

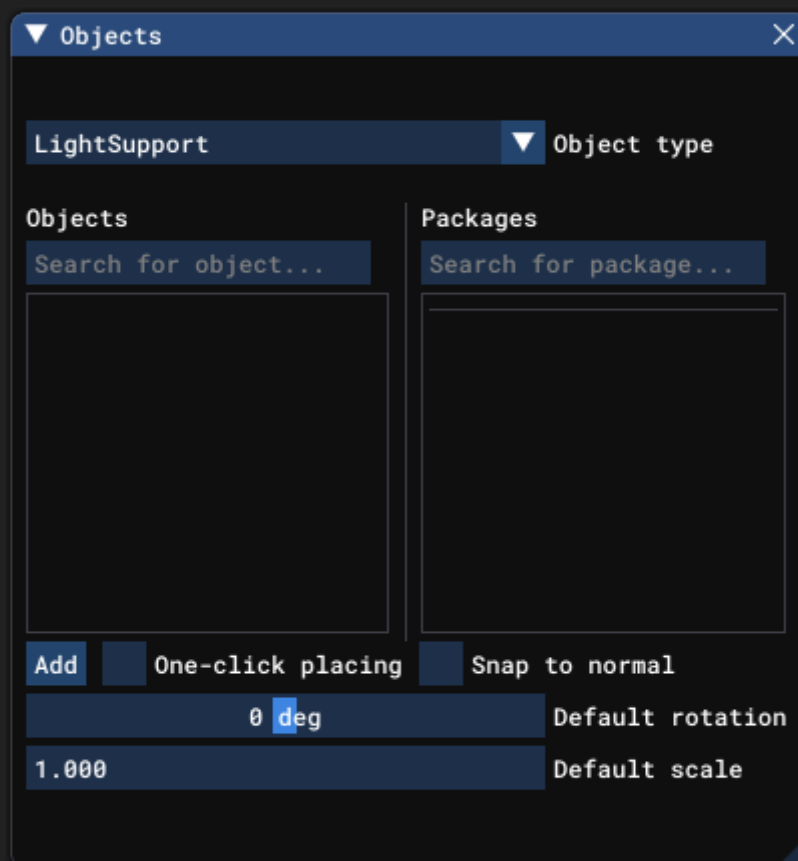
- Spacing Between Lights

This option sets the spacing between each light along the row. The spacing is in meters, and the option will only be visible if the Snap To Vertices option is disabled.

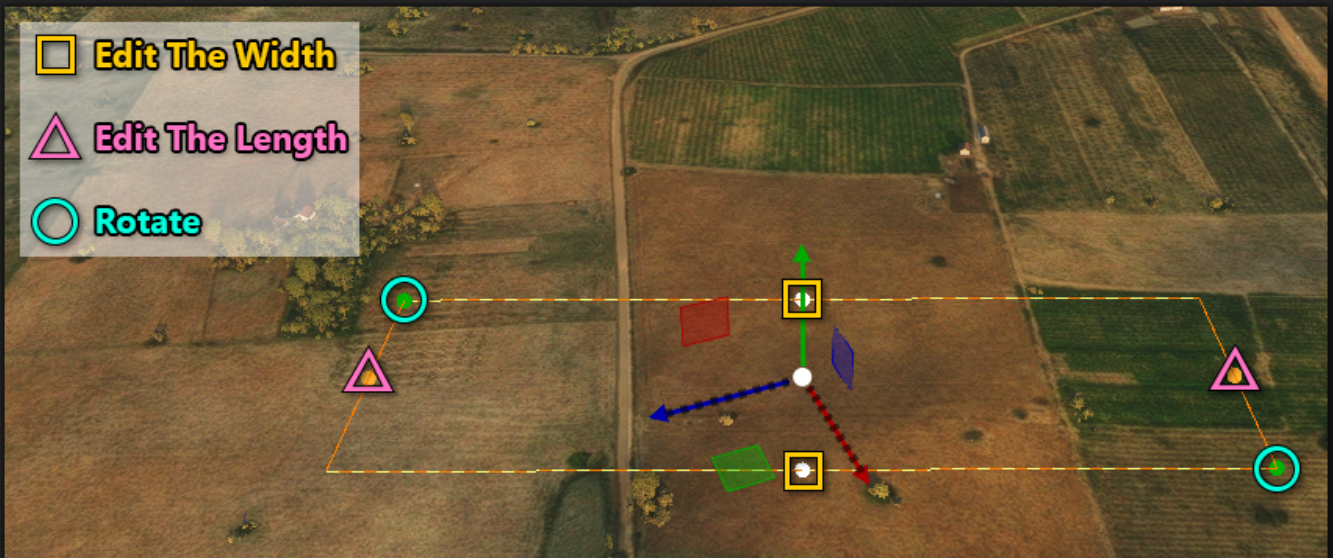


LIGHT SUPPORT OBJECTS

A Light Support object is an object element that is used to "support" lights within an airport. Basically it's a rectangular area that is used to change the altitude of any lights that are part of the airport and fall within the area the support object covers. This includes [LightRow Objects](#), any lights added as part of [Runway Objects](#), etc... When you select this object type the [Objects](#) window will not show any different object elements as currently there is only one type of Light Support and what it does is defined through its :



When you select a Light Support object and click **Add**, a rectangular area will be added to the scene and you can edit its size (length / width) using the [Gizmo](#) in its center or setting the values in the Gizmo window. The gizmo can also be used to change the scale and rotation of the support rectangle. You'll notice that there are various points shown on the rectangle area in the world. Each of these points can also be clicked on, which will move the gizmo to that point and enable you to edit the following properties:



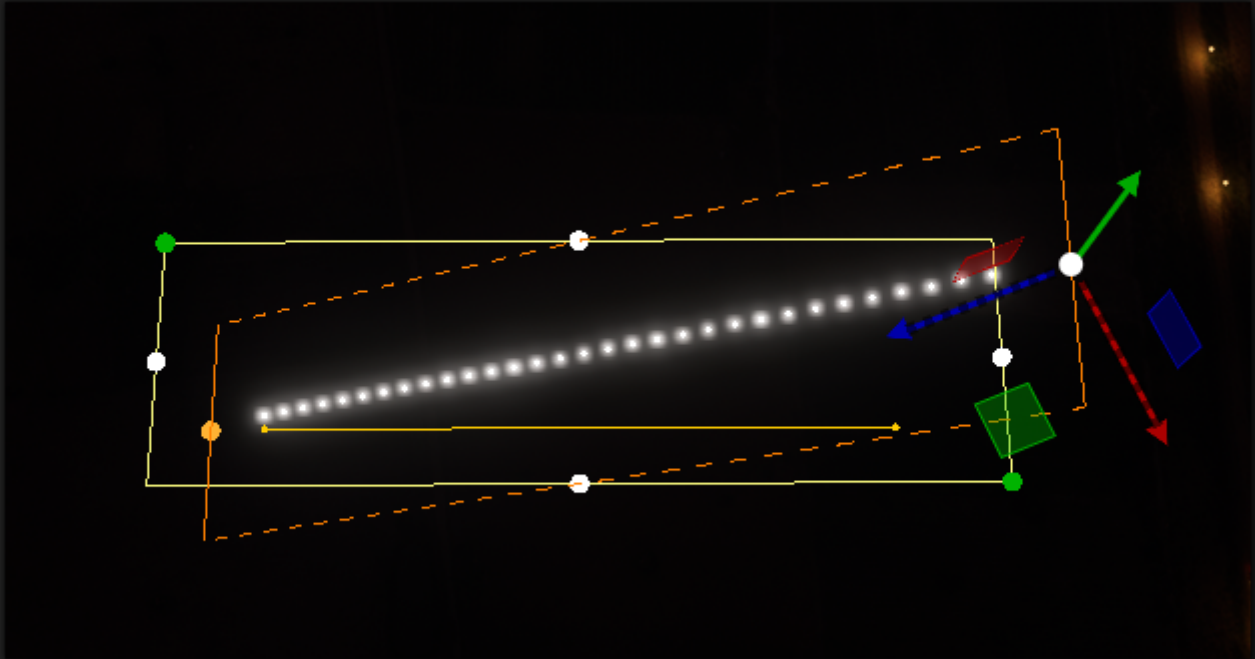
Once you are happy with the placement of the rectangle, you can then go on to edit its Properties. It's important to note that unlike other objects with similar controls, the support rectangle will also move on the vertical axis and has an altitude. The altitude will affect how any lights within the support rectangle are displayed, since that is the purpose of the object - to "support" lights at an altitude other than that with which they were created. The image below shows a Light Row Object that has been half placed within the area of a Light Support rectangle, and the rectangle has been placed at an altitude higher than the row of lights:



If you wish to remove the light support object after it's been created, you can select it and press `Delete` on the keyboard.

IMPORTANT! Light Support objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.

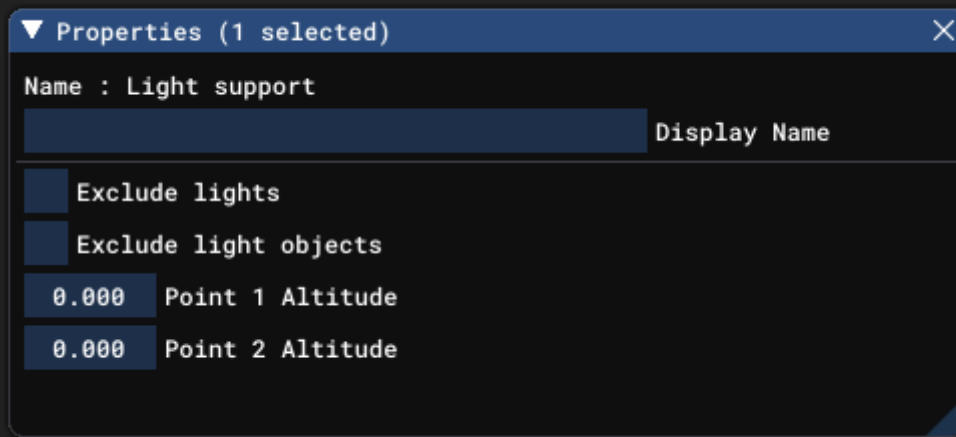
When working with the light support object, you're not just limited to setting a single baseline altitude for the lights, you can also set a sloped gradient along the length of the rectangular area. This is done by modifying the Point 1 Altitude and Point 2 Altitude values in the Properties. When you edit either of the end points, these changes will be reflected in the world:



As you can see in the image above, the base rectangle is still shown, as is the light row path, however the lights themselves now follow the slope set by the altitude values for the points at either end of the object, and the Light Support rectangle has an extra set of "handles" along the slope indicator. These can be clicked on and dragged up or down within the world to visually set the altitude of the ends of the area.

Properties

The Properties window for a Light Support object looks like this:



- Name

This is the name of the element as defined from its properties.

- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

- Exclude Lights

When this is checked, light support rectangles will act like ExclusionRectangle Objects and exclude all lights in the rectangular area it covers (this includes any objects/meshes associated with the light).

- Exclude Light Objects

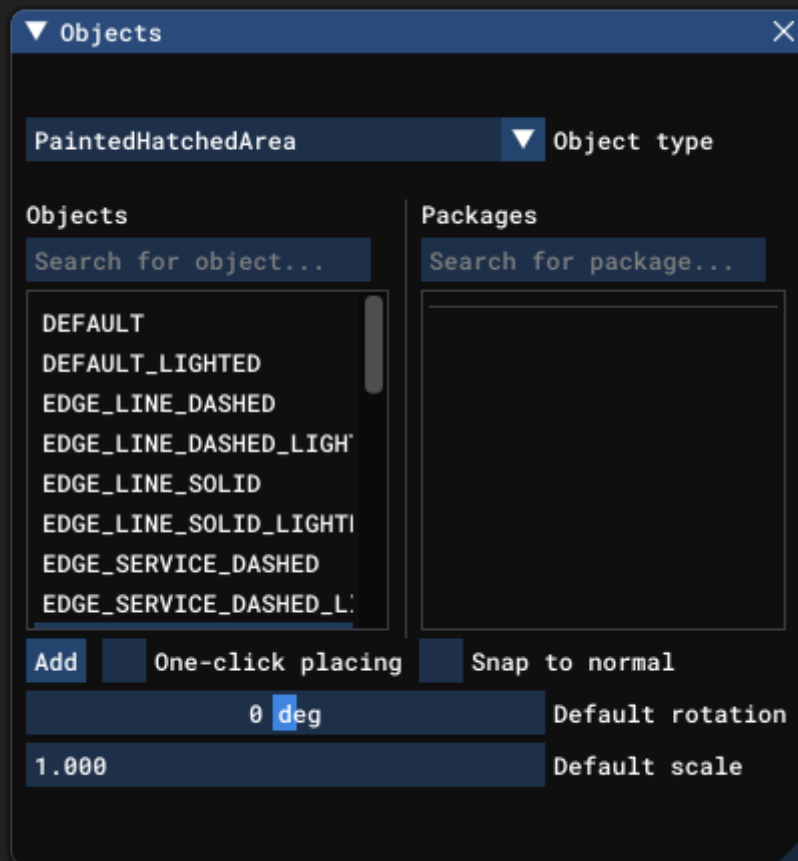
When this is checked, light support rectangles will act like ExclusionRectangle Objects and exclude all light *objects* in the rectangular area it covers. The light itself will remain, but any visible objects/meshes will be removed from the area.

- Point 1 Altitude / Point 2 Altitude

These values can be changed to alter the start and end altitudes of the light support object and so create a slope or modify the height of the support for the lights.

PAINTED HATCHED AREA OBJECTS

A Painted Hatched Area object is an object element that is used to add arbitrary sized, transparent, polygonal areas that are cross-hatched with painted lines within an airport. When you select this object type the [Objects](#) window will show the following basic painted hatched area types:



Painted hatched area object elements are a purely visual effect that can be used to better mark out areas and sections in your airport. To add one to your airport, click the **Add** button, or select One-Click Placing. Either of those options will add a red dot to the mouse cursor in the world view and you can then use **Ctrl** + Left Mouse Click to place points in the world, delineating a "path" around the edge of the painted area. When you have added the points you require to create the area (there must be a minimum of 3 points placed for it to be considered valid), you can then hit the **Enter** key to finalise the painted hatched area path. Note that if you wish to remove the painted area object from the world, you can select it and then press the **Delete** key.

IMPORTANT! Painted Hatched Area objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also

note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.

Once placed in the world, the whole line can be moved using the Translate [Gizmo](#) or it can be rotated using the Rotate gizmo. It is also possible to click on any specific point along the path and then use the translate gizmo to move that point - the painted line will update accordingly. You can also select various points together by using **Ctrl** + Left Click on individual points, or by using **Shift** + Left Click + Drag to select multiple points. Selected points will turn green and these points can then be edited together, as illustrated in the image below (mouse over the image to see the edition):



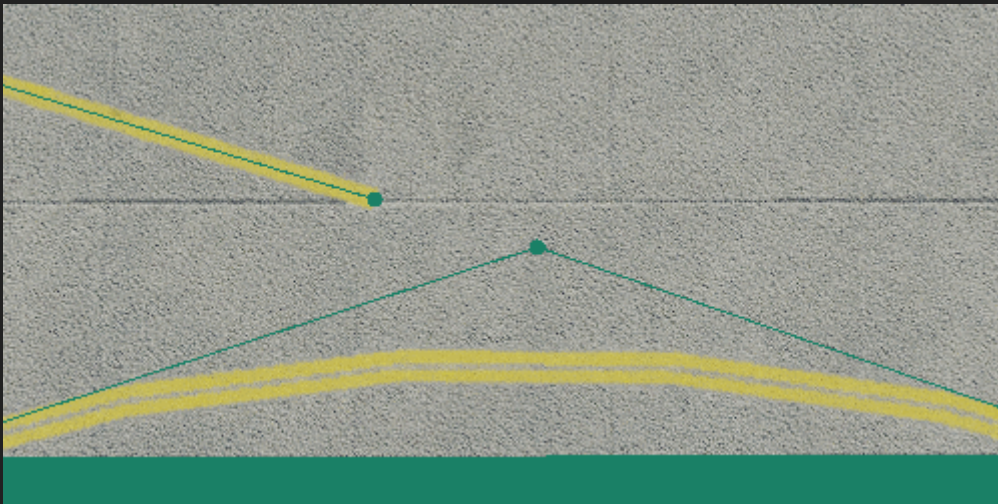
When editing Painted Hatched Area objects, you will have the following additional options for the Right Mouse Button menu:

```
Add point
Remove point
Subdivide edge
Resume edition
```

- **Add Point:** Clicking the RMB on a point or on the edge of the painted area and using this option will add a new point to the area polygon, which can then be edited as normal.
- **Remove Point:** Selecting one or more points on the area polygon and choosing this will remove the point(s) from the painted line.

- **Subdivide Edge:** Clicking the RMB on the edge of the painted hatched area and selecting this option will add a new point on the edge, halfway between the existing points at either end of the selected edge.
- **Resume Edition:** Selecting this option will enable you to continue defining the painted hatched area polygon, using **Ctrl** + Click to add new points, and using **Enter** to finalise the edition.

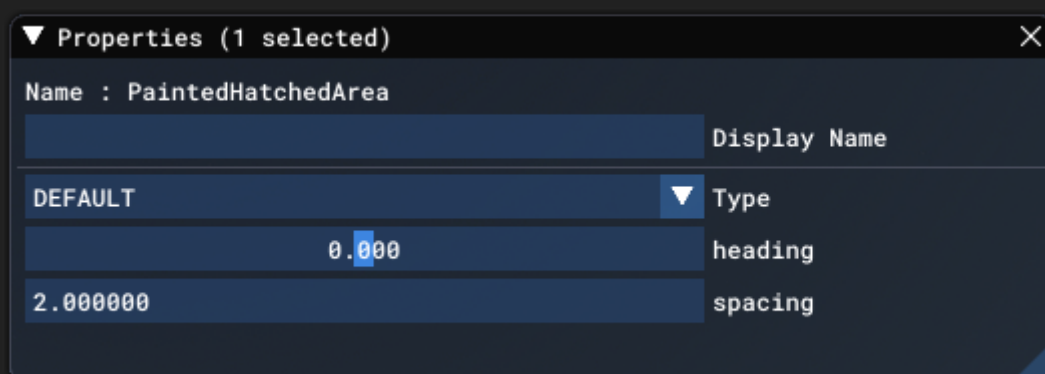
Finally, it's worth noting that, by default, when you have multiple painted line objects and want them to connect, moving the end of one painted line object near a path point for another, will cause them to automatically join, as shown in the image below:



Note that this will depend on the type of painted line being used, as well as the True Angle setting.

Properties

The Properties window for a Painted Hatched Area object looks like this:



- Name

This is the name of the element as defined by its object type properties.


- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

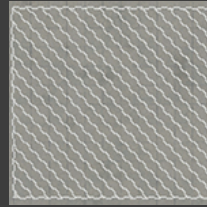
- Type

This is where you can select the type of painted hatched area being created. The options here are the same as those available when you select one of the elements from the Options window:

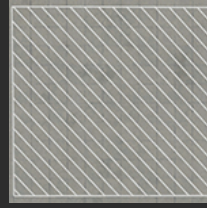
NOTE: The "LIGHTED" versions of the different Painted Hatched Area lines are the same as the "normal" versions, only they will have lights added to them.

Type	Illustration
DEFAULT	
EDGE_LINE_DASHED	
EDGE_LINE_SOLID	

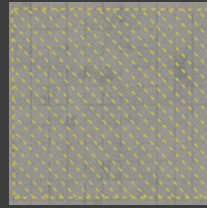
EDGE_SERVICE_DASHED



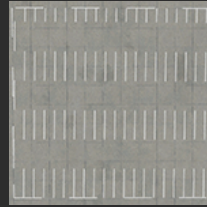
EDGE_SERVICE_SOLID



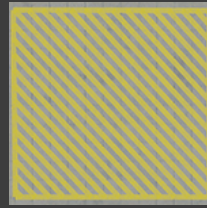
HOLD_SHORT_TAXIWAY



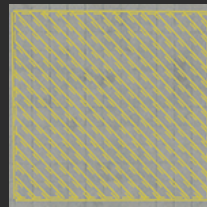
SERVICE_DASHED



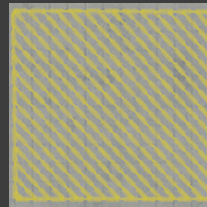
WIDE_YELLOW



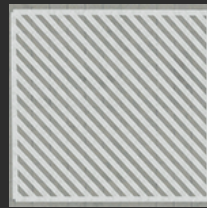
NON_MOVEMENT

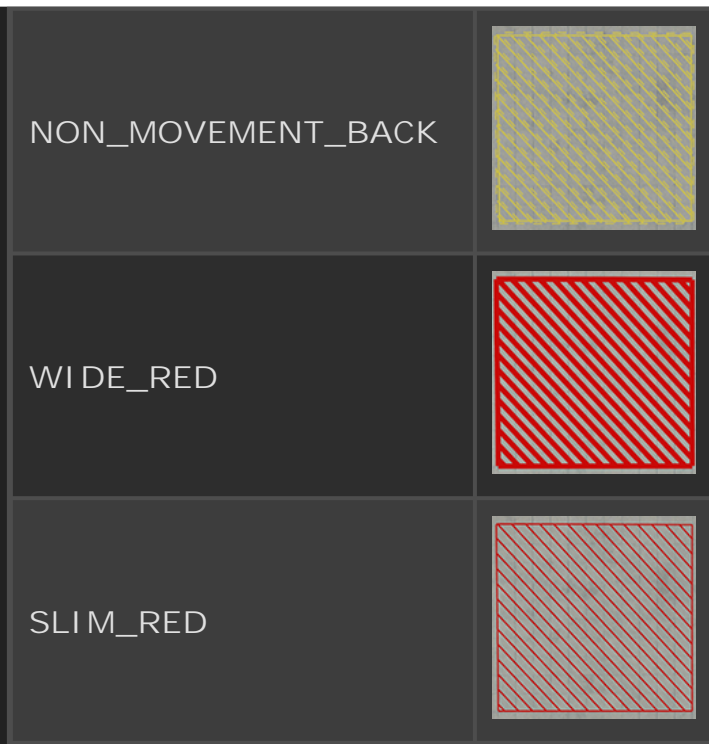


ENHANCED_CENTER



WIDE_WHITE



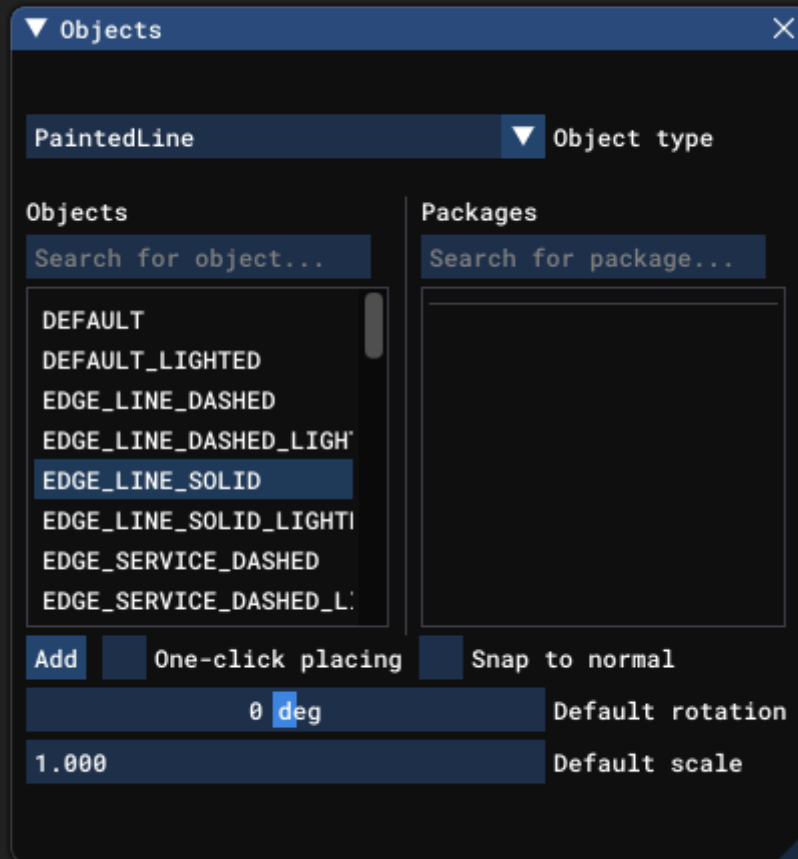


- Heading

This setting can be used to change the orientation of the lines within the painted hatched area. The value can be between -90°

PAINTED LINE OBJECTS

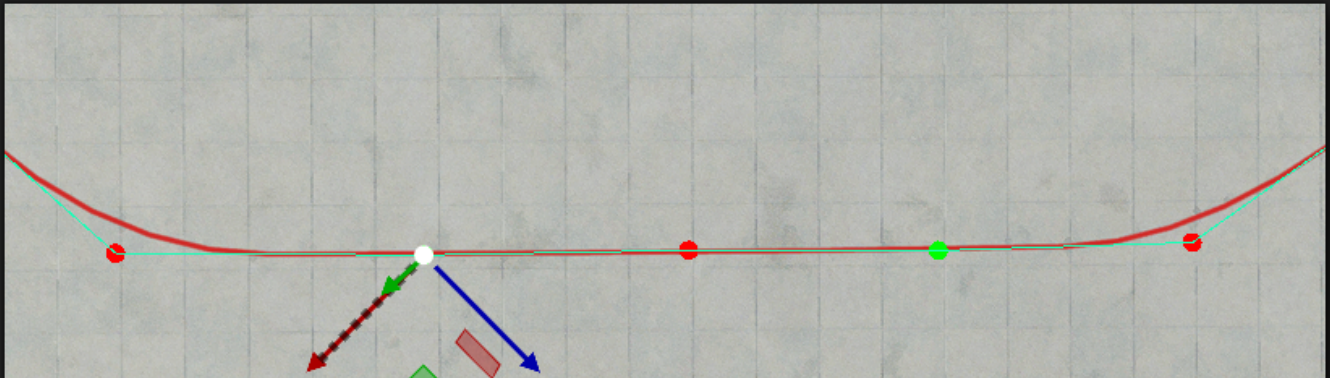
A Painted Line object is an object element that is used to add arbitrary length lines to areas within an airport. When you select this object type the [Objects](#) window will show the following basic painted line types:



Painted line object elements are a purely visual effect that can be used to better mark out areas and paths in your airport. To add one to your airport, click the **Add** button, or select One-Click Placing. Either of those options will add a red dot to the mouse cursor in the world view and you can then use **Ctrl** + Left Mouse Click to place points in the world, creating a "path" for the painted line. When you have added the points you require to create the path, you can then hit the **Enter** key to finalise the painted line path. Note that if you wish to remove the painted line object from the world, you can select it and then press the **Delete** key.

IMPORTANT! Painted Line objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.

Once placed in the world, the whole line can be moved using the Translate [Gizmo](#) or it can be rotated using the Rotate gizmo. It is also possible to click on any specific point along the path and then use the translate gizmo to move that point - the painted line will update accordingly. You can also select various points together by using **Ctrl** + Left Click on individual points, or by using **Shift** + Left Click + Drag to select multiple points. Selected points will turn green and these points can then be edited together, as illustrated in the image below (mouse over the image to see the edition):



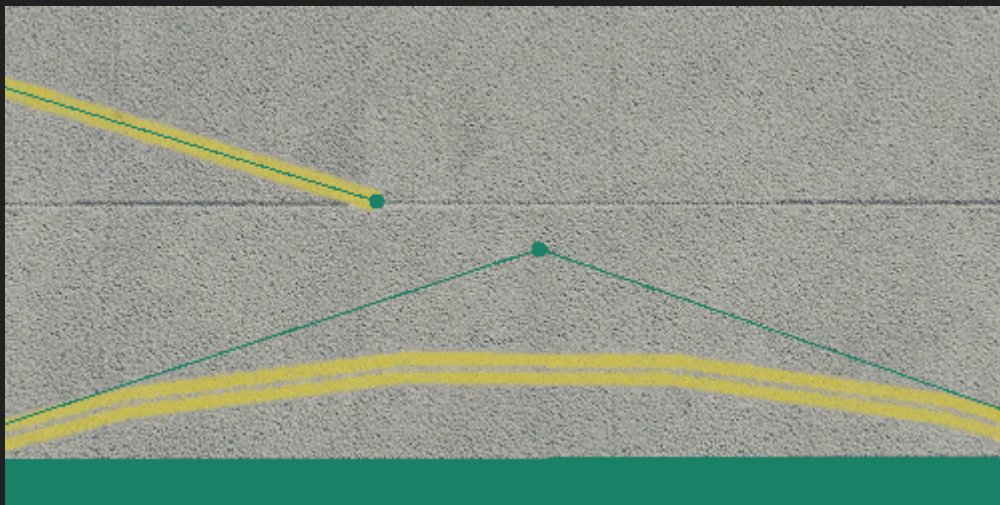
When editing Painted Line objects, you will have the following additional options for the Right Mouse Button menu:

```
Add point
Remove point
Subdivide edge
Resume edition
Select all with the same type
```

- **Add Point:** Clicking the RMB on a point or on the painted line itself and using this option will add a new point to the line path, which can then be edited as normal.
- **Remove Point:** Selecting one or more points on the line path and choosing this will remove the point(s) from the painted line.
- **Subdivide Edge:** Clicking the RMB on the path of the painted line and selecting this option will add a new point on the path, halfway between the existing points at either end of the selected edge.
- **Resume Edition:** Selecting this option will enable you to continue defining the painted line path shape, using **Ctrl** + Click to add new points, and using **Enter** to finalise the edition.

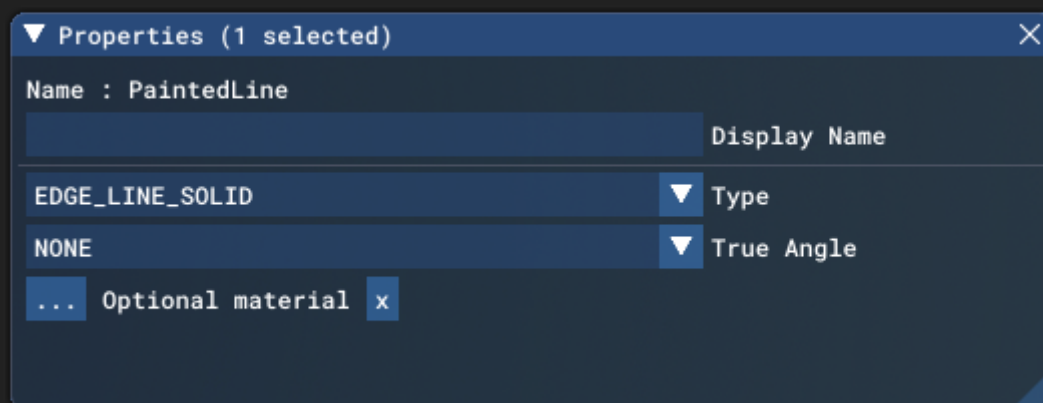
- **Select All With The Same Type:** Choosing this option will select every painted line object element in the current airport that shares the same type value. This permits you to mass-edit certain properties.

Finally, it's worth noting that, by default, when you have multiple painted line objects and want them to connect, moving the end of one painted line object near a path point for another, will cause them to automatically join, as shown in the image below (note that this will depend on the type of painted line being used, as well as the True Angle setting):



Properties

The Properties window for a Painted Line object looks like this:



- **Name**

This is the name of the element as defined by its object type properties.



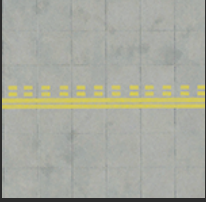
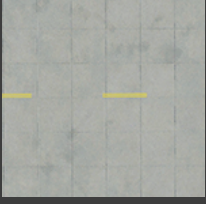
- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

- Type

This is where you can select the type of painted line being created. The options here are the same as those available when you select one of the elements from the Options window:

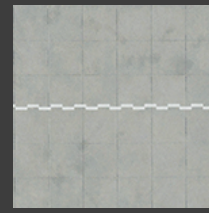
NOTE: The "LIGHTED" versions of the different Painted Lines are the same as the "normal" versions, only they will have lights added to them.

Type	Illustration
DEFAULT	
HOLD_SHORT_FORWARD	
HOLD_SHORT_BACKWARD	
EDGE_LINE_DASHED	

EDGE_LINE_SOLID



EDGE_SERVICE_DASHED



EDGE_SERVICE_SOLID



HOLD_SHORT_TAXIWAY



ILS_HOLD_SHORT



SERVICE_DASHED



WIDE_YELLOW



NON_MOVEMENT



ENHANCED_CENTER



WIDE_WHITE



NON_MOVEMENT_BACK



EDGE_SOLID_ORTHO



EDGE_SOLID_ORTHO_BACK



WIDE_RED



SLIM_RED



HOLD_SHORT_FORWARD_MARKED

NOTE: The markings for this type are auto-generated based on the proximity to a runway and a taxiway path.



HOLD_SHORT_BACKWARD_MARKED

NOTE: The markings for this type are auto-generated based on the proximity to a runway and a taxiway path.



- True Angle

This setting controls how the painted line will conform to the path that you define for it. By default, the line will be painted using spline curves between points, unless the angle between points is either very close to 90° - in which case it will "snap" to a right angle - or a very acute angle - in which case the line will conform exactly to the path. However you can force the line to conform to the path you created under different circumstance using the options here, which are:

- NONE - The line will be painted using spline curves and/or right angles or acute angles.
- BEGIN - The line starting at the first point on the path will conform exactly to the path, and not automatically join with other painted lines.
- END - The line ending at the last point on the path will conform exactly to the path, and not automatically join with other painted lines.
- BOTH_ENDS - The lines starting and ending on the first and last points of the path will conform exactly to the path, and not automatically join with other painted lines.
- ALL_POINTS - The painted line will conform exactly to the path along all points of the path.

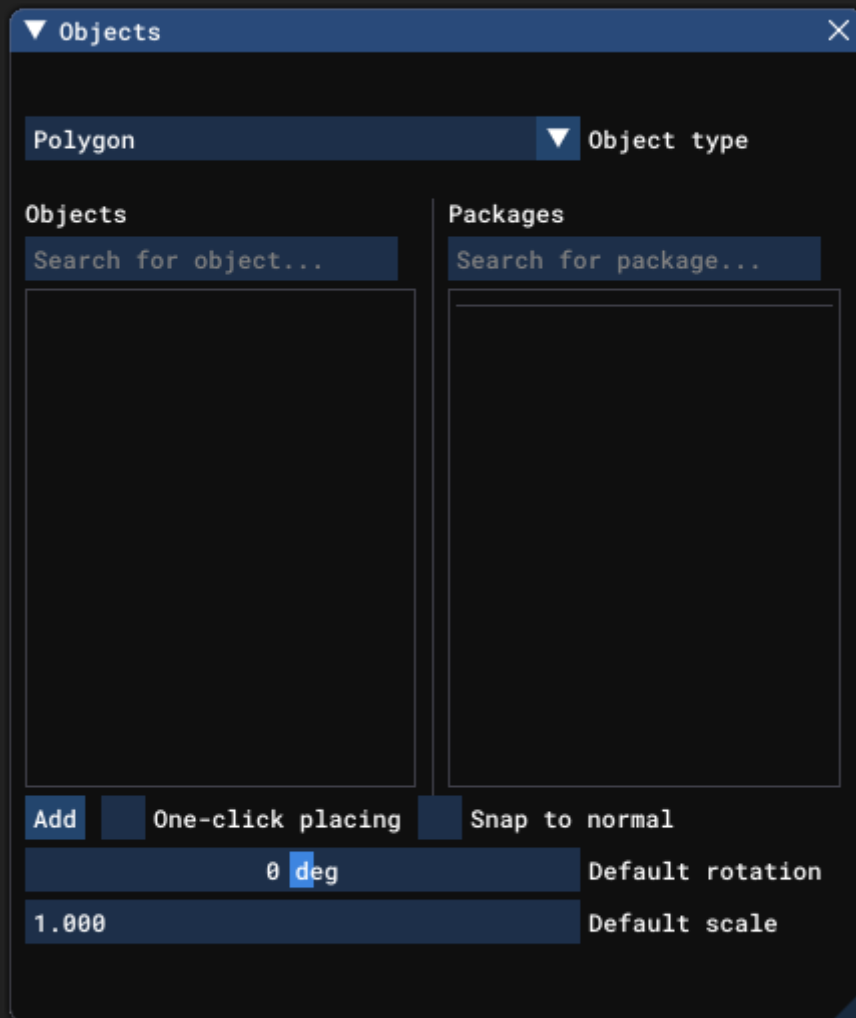
NOTE: Some painted lines will always conform to the path true angle, for example HOLD_SHORT_FORWARD/BACKWARD.

POLYGON OBJECTS

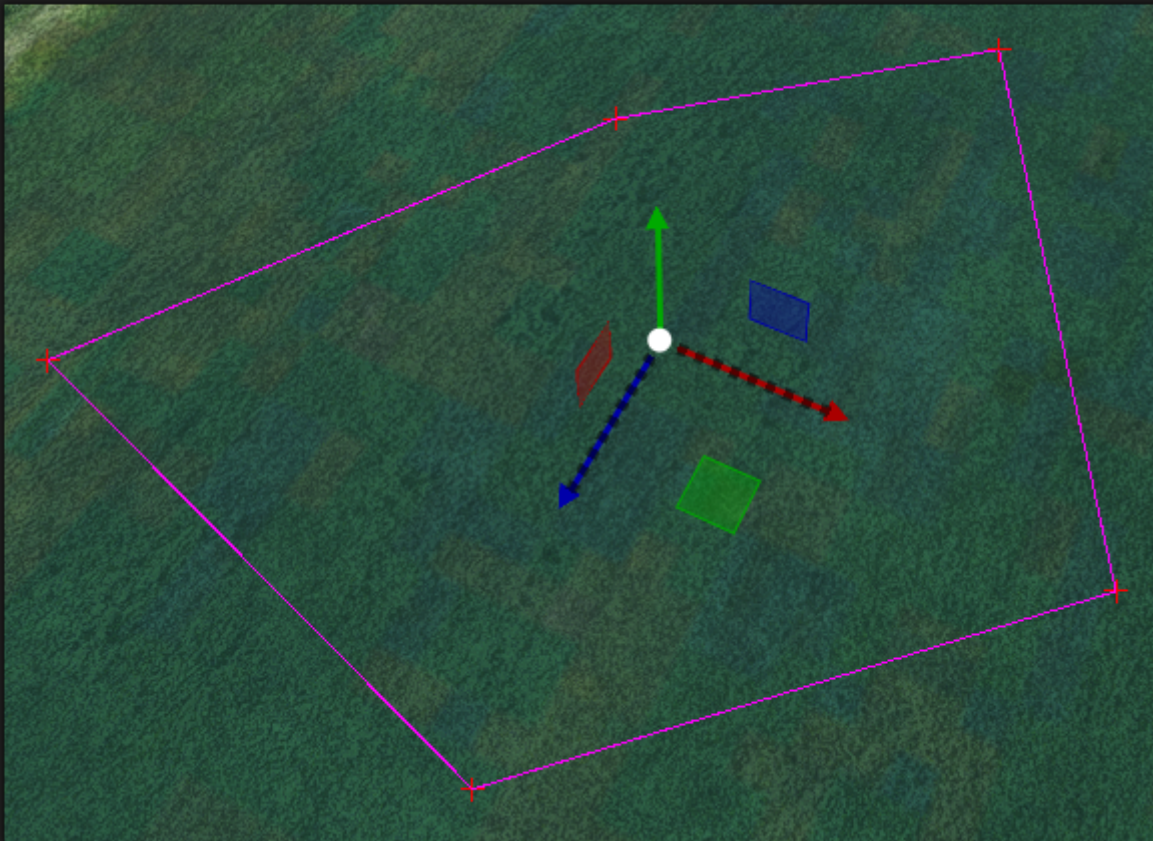
A Polygon object is an object element used to define an N sided area (minimum 3 sides) that you can create to define an arbitrary area in the scene to manipulate in some way. The properties that you assign to the polygon will allow you to:

- flatten the terrain
- exclude auto-generated buildings
- force or exclude vegetation
- change vegetation type
- specify airport zones (changes the type of auto-generated buildings)
- apply a material to the ground
- add or remove water

When you select this object type the [Objects](#) window will not show any different object elements as currently there is only one type of polygon and what it does is defined through its Properties:



When you select a polygon object and click **Add**, the cursor will have a red cross-hair attached to it, and if you then hold down **Ctrl** and use the Left Mouse Button you can start to place points on the world to outline the shape. When you are happy with the area you have delineated, you can press **Enter** to "fix" the shape, which will now look like this in the world:



The polygon will have a [Gizmo](#) in its center and this can be used to change the position/rotation/scale of the polygon. Note that polygons can be convex or concave, so you can define just about any area, although the edges of the polygonal area should never cross, as this will lead to errors when rendering or performing the actions required of the polygon. If you wish to remove the polygon object from the world, you can select it and then press the `Delete` key.

If you want to change the area that the polygon covers after you have created it, you can click the Left Mouse Button on any point to set the gizmo to that point. This point can then be translated to a new position using the gizmo or by inputting new values in the gizmo window, updating the area of the polygon as you do.

Polygon objects also have specific commands available from the Right Mouse Button menu:

```
Add point
Remove point
Subdivide edge
Resume edition
```

The first options are general for all objects and are explained in the section on [The Scenery Contents List](#), so we'll concentrate here on the options unique to the polygon object:

- **Add Point:** When you right click on an edge of the polygon and select this option, a new point will be added to the edge at the position that was clicked.
- **Remove Point:** Right clicking and selecting this option on any point of the polygon will remove that point.
- **Subdivise Edge:** When you right click on an edge of the polygon and select this option, a new point will be added to the center point of the edge.
- **Resume Edition:** Selecting this option will put you back into the edition mode, the same as when you first added the polygon object to the scene. There will be a red cross-hair and you can add points to the polygon using **Ctrl** + Left Mouse Button, and then finalise using **Enter**.

*IMPORTANT! If you load a previously created scenery project into DevMode, it is possible that you will be asked if you want to convert terraforming to the "new" system. This is a permanent change and cannot be undone, so if you are happy with the way your terraforming looks, you should select **Cancel**. For more information, please see here: [Old Terraforming Method](#)*

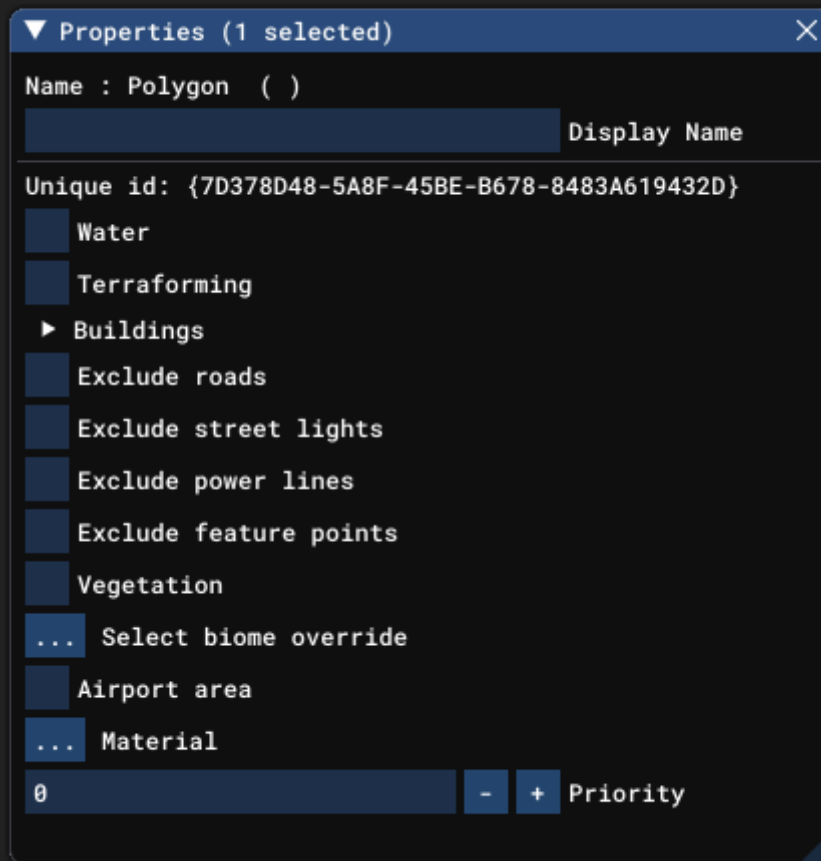
AskToConvertTerraformers

The source file contains rectangles and polygons that use the old terraforming method. Would you like to convert them to use the more precise new system? Be sure to check terraformers after the conversion.

Convert terraformers **Cancel**

Properties

Polygon objects have the following [Properties](#) which can be edited:



- Name

This is the name of the element as defined from its properties. For example if you have selected the Airport Area option, the name would become "Polygon (Airport Texture)".

- Display Name

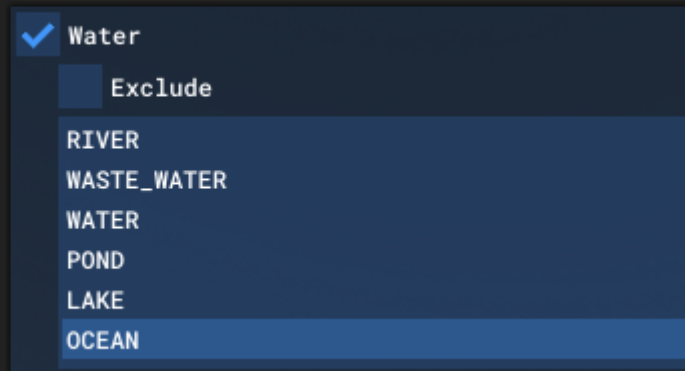
This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

- Unique ID

This shows the GUID -formatted Instance ID unique to the specific instance of the polygon object placed within the simulation.

- Water

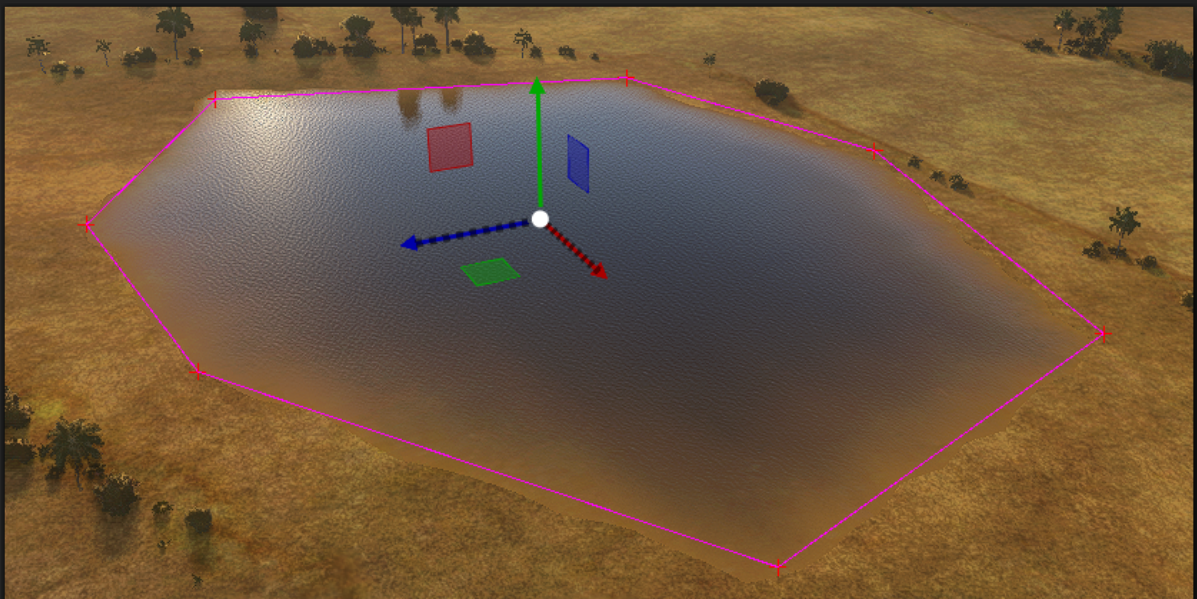
Selecting this option tells the simulation that the polygon is defining an area of water. When checked, a number of new options will be visible in the properties:



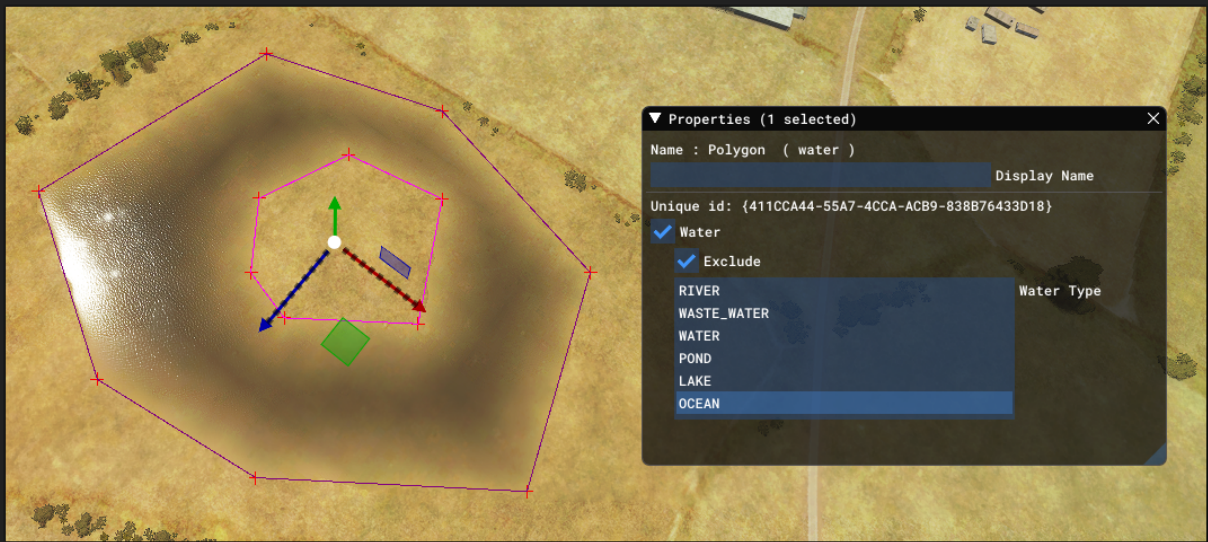
Here you can choose the type of water that is to be rendered within the polygon, or you can choose the Exclude option to remove any water from within the area.

NOTE: when Exclude is ticked, the water polygon excludes only the type of water that is selected. In the example below, the bigger polygon is OCEAN, so the A-shaped exclusion polygon only works if it is also of type OCEAN.

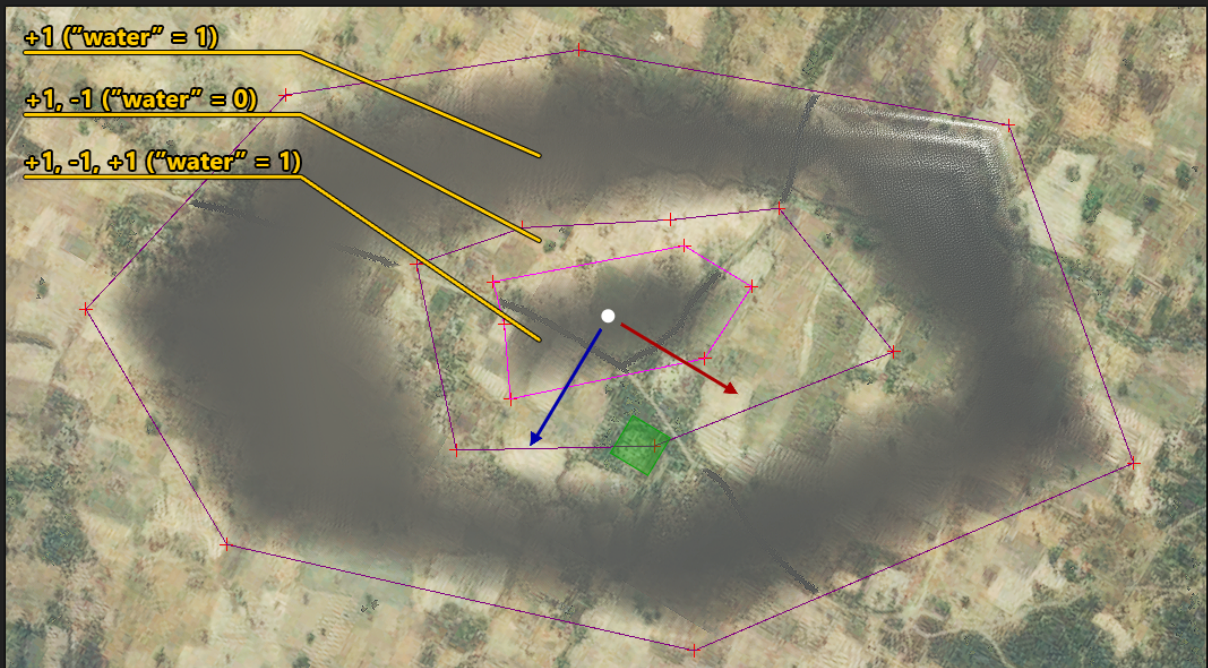
The image below shows a water polygon in a scene:



If you wish to exclude part of this polygon, for example to create an island, you can create a new polygon object, set it to water - ensuring that the *type* is the same as the base polygon, so if the main polygon is *Ocean* the exclude polygon must be *Ocean* too - and then select Exclude:



You can see in the image above that the edges of the water are "feathered" with the land to create a smooth transition. This is because water polygons create a distance field on the *water*-side of the polygon boundary to create the shoreline. Also note that water polygons will work additively when multiple overlapping polygons are used together. A single water polygon increments the internal "water" value by 1, while a water polygon with Exclude decrements the internal "water" value by 1. The distance field will be applied based on this value, so an internal "water" value greater than 0 will mean that water is rendered while a value of 0 or less will mean that water is not rendered.



IMPORTANT! Polygons of the same water type do not merge! If you have overlapping polygons of the same type they will cancel each other out and create what appears to be an exclusion area, only without the correct distance field feathering. So, avoid

overlapping polygons unless you are creating an exclusion area or they are different types.

- Buildings

The buildings section can be expanded to show the following options:

- Exclude All

Selecting this option will convert the polygon into an *exclusion* polygon which will exclude TIN data, buildings, OSM buildings and MS (Microsoft) buildings. Note that each of these options can be toggled on/off individually using the additional option underneath so you can choose to only exclude OSM buildings, or exclude only TIN data and MS buildings, etc... The list below explains what each of these items is:

- TIN: The TIN data is data streamed from Bing Maps, which may include buildings as well as other things.
- Detected Buildings: These are buildings created algorithmically from the aerial image data.
- OSM Buildings: These are buildings created from the data supplied by [Open Street Maps](#).
- MS Buildings: These are buildings generated from open-source data for North America that comes from Microsoft.

NOTE: These data-sets can overlap, so you may see different buildings in the same locations if you exclude one or the other of OSM or Detected buildings, and so will need to exclude both kinds to clear the area.

- Force Buildings On Tin

This can be used when you have excluded TIN data, but want to still have TIN generated buildings present.

- Force Detected Buildings

This option can be used to force the rendering of detected buildings for an area.

- Exclude Roads

Enabling this option will exclude any roads and traffic that have been generated within the bounds of the polygon. Note that traffic will generally instantly stop spawning but roads may still be visible or require some time to update correctly while being previewed in the scenery editor.

- Exclude Street Lights

Enabling this option will exclude any streetlights that have been generated within the bounds of the polygon.

- Exclude Power Lines

Enabling this option will exclude any power lines that have been generated within the bounds of the polygon.

- Exclude Feature Points

Enabling this option will have the polygon exclude feature points. Feature points are generated from OSM - for example, windmill, wind turbine, com masts, etc... - and these will be excluded within the polygon, along with any lights that are associated with them.

- Vegetation

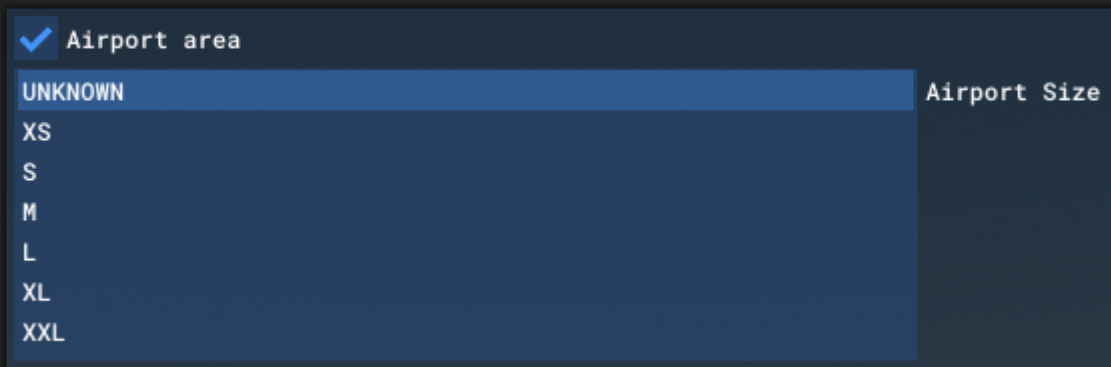
When this option is enabled, the polygon will be filled with vegetation. By default, the vegetation used will be in accordance with the biome for the zone that you are creating scenery for, but you can use the biome override option to change this to anything supported by the game, even custom vegetation. Enabling this will

also show additional sliders to control how the vegetation is rendered.



- **Vegetation Scale:** This sets the scale of the vegetation within the polygon.
 - **Vegetation Density:** This sets the density of vegetation within the polygon.
 - **Falloff Distance:** This sets the distance around the polygon in which the vegetation will be "feathered" between the edge and the surrounding terrain. This is shown in the scene as a dashed line.
 - **Brightness:** This setting is for changing the brightness of the vegetation color.
- **Airport Area**

This option tells the simulation that the area is part of an airport. Selecting this option will affect how some of the buildings within the polygon are rendered in the world, and also open a further option to set the approximate size of the airport:



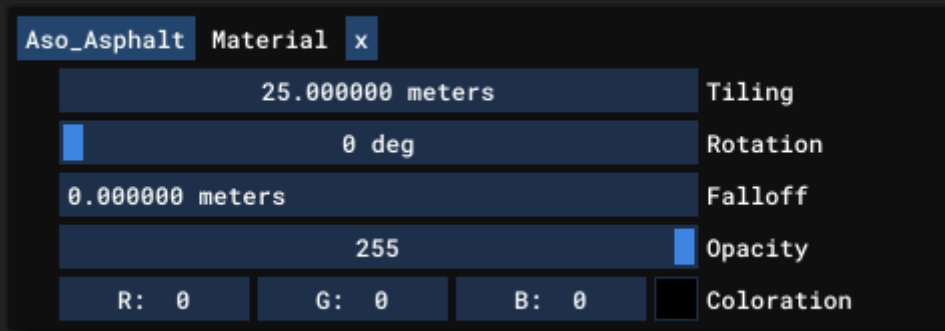
This option will affect the size and type of buildings that may be auto-generated in the area as well as certain airport models like ATC Towers.

- Material

This section permits you to define the type of surface material that will be used by the area in the polygon. Clicking the **...** button will open The Material Editor where you will see a list of the available materials. You would then select the one you want from this list, click on it then drag it onto the **...** button to apply it to the polygon. The button name will then change to name of the material that you have just applied. To return to the default material, click the **x** button. Note that this option will have no effect if the polygon is set to Vegetation.

IMPORTANT! When being rendered, polygon elements are baked into the terrain textures. This helps reduce the polycount and permits the element to be terraformed. However, it also means that the texture quality won't be any greater than the resolution of the terrain textures themselves. In general, this resolution is around 4cm/pixel at the equator, with the best/highest resolution terrain textures reserved for higher LODs so we have a better quality for airports. For users, they will experience the best resolution possible setting the "Terrain level of detail" option to its maximum value.

Adding a material to the polygon will expand the options to show the following:



- Tiling: This sets the tiling scale for the texture used by the material.
- Rotation: This sets the angle at which the material texture will be rendered.
- Falloff: This sets the distance around the polygon in which the material will be "feathered" to smooth the transition between the polygon material and the terrain.
- Opacity: This setting is for changing the transparency of the material.
- Coloration: This permits you to add a colored "tint" to the material. Setting the RGB values to (0, 0, 0) will remove all tinting.

Note that if you have enabled the option then no material will be shown for the polygon until that option is disabled again.

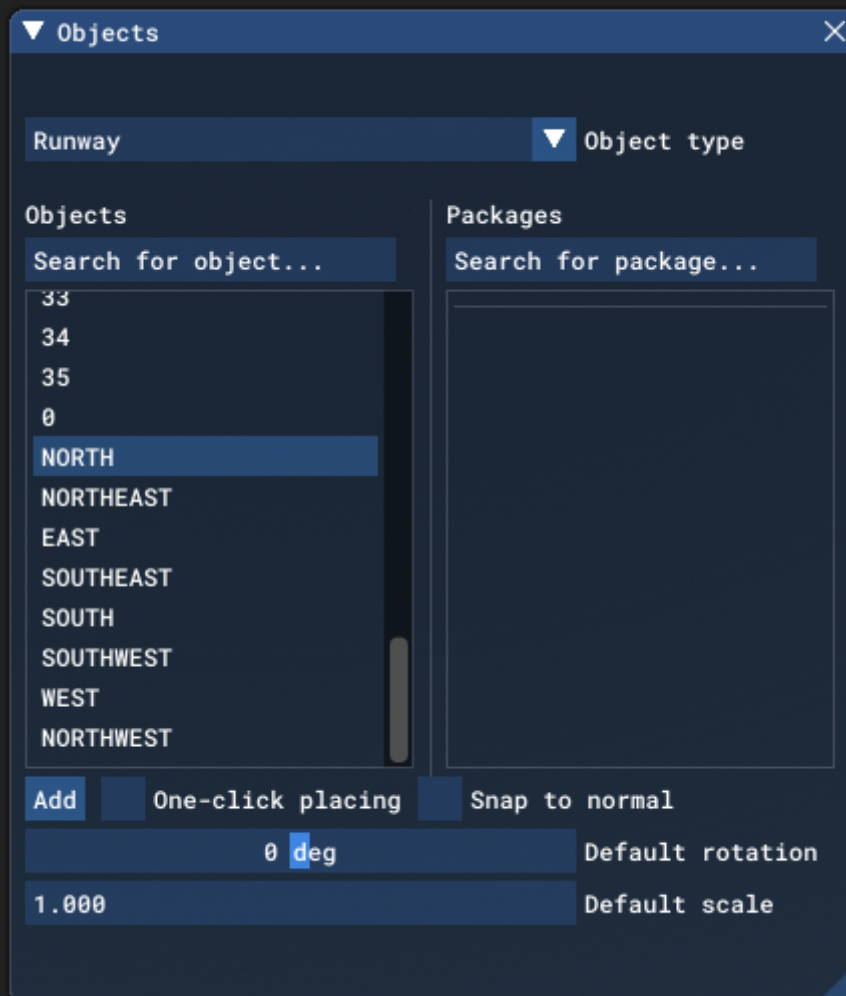
- Priority

This option sets the render priority for the polygon. The default render priority is 0, which for most cases is fine. However, if you have overlapping polygons and want one to render over another one, then you will need to change this value clicking the or buttons to raise or lower the priority value. Higher priority values will render *over* lower priorities, for example, a polygon with priority 1 will render over one with priority 0, which in turn will render over one with priority -1. Note that the engine cannot guarantee the render order for polygons with the *same* priority, so if you need something to always render over or under something else, you need to set this value. Note that if the polygon is flagged as

terraforming then the priority value will be rendered in the world view to make debugging easier.

RUNWAY OBJECTS

An Runway object is an object element used to add a runway to [Airport Objects](#). When you select this object type the [Objects](#) window will show a list of numbers and titles that can be used to add a runway object to the airport with the selected value/string:

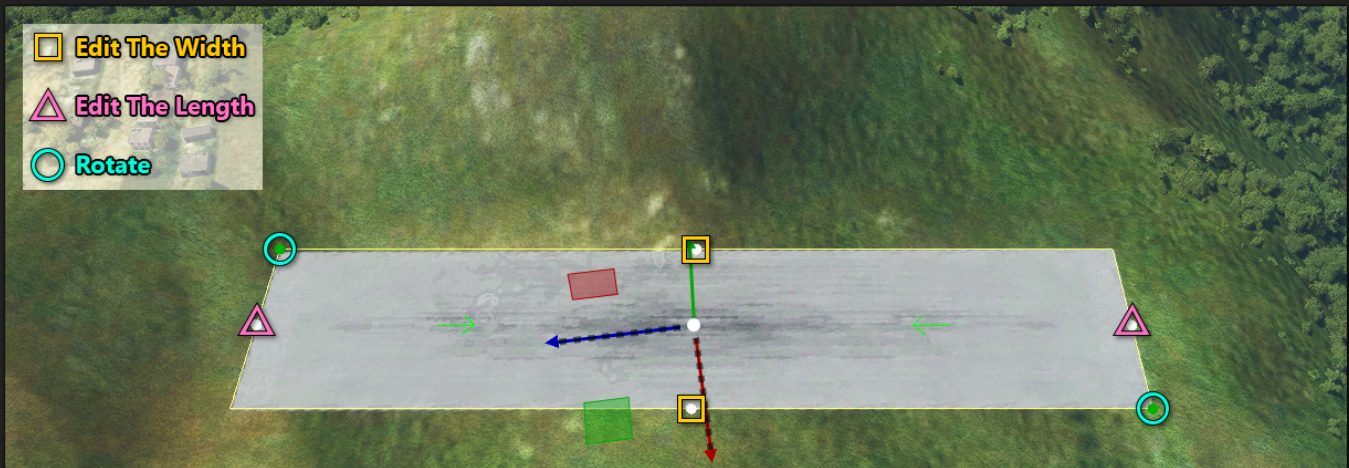


When you click the **Add** button, the Runway object will be added to the scene and can be positioned using the [Gizmo](#). Once positioned, the runway can be edited.

IMPORTANT! Runway objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.

After adding the Runway object to the scene, its position, orientation and scale can be edited directly using the [Gizmo](#) in its center. You'll notice that there are various points shown on the runway area in the world view. Each

of these points can also be clicked on, which will move the gizmo to that point and enable you to edit the following properties:



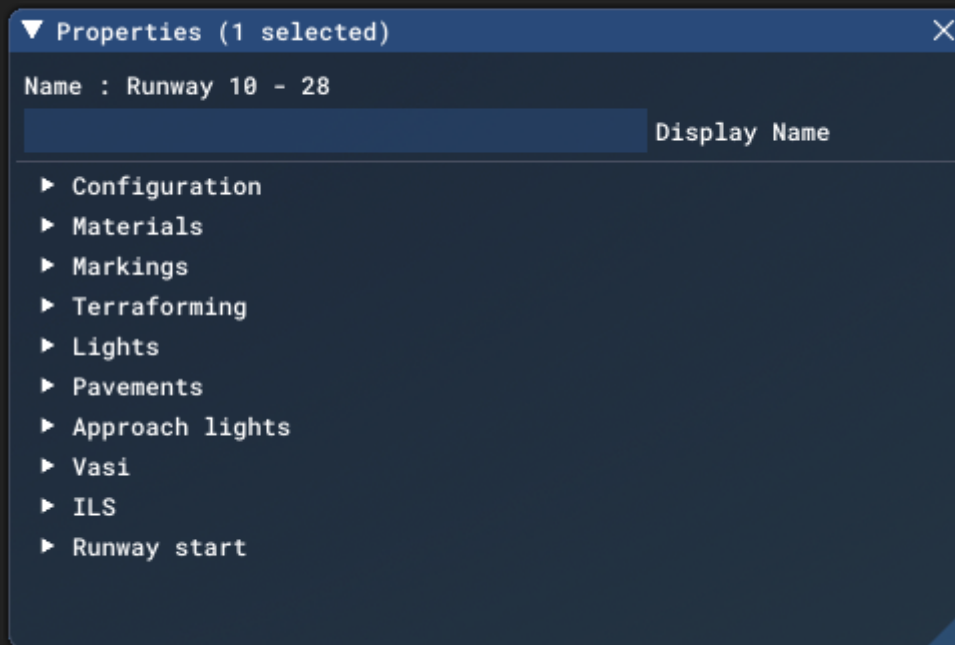
Once you are happy with the placement of the runway, you can then go on to edit its Properties. Note that if you wish to remove the runway, you can select it and press `Delete` on the keyboard.

Note that runways will terraform the land that they are placed on so that they are on an even, flat surface. This behaviour can be edited using the Terraforming tools (as explained in the section below).

IMPORTANT! Certain objects have a Priority value (like polygons and aprons) which defines the order in which they are rendered. Lower priority objects will be rendered under higher priority objects. Runways do not have a Priority option but do have a priority value, which is 10 so they will generally render over everything else. Keep this in mind when setting priorities for other objects.

Properties

The Properties window for a Runway looks like this:



- Name

This is the name of the element as defined from its type. The name will be appended with additional information depending on the rest of the options in the Properties window.

- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

The rest of the contents of the Properties window are explained in the subsections below.

Configuration



This section is related to the basic configuration of the runway. The available options are:

- Heading

This value sets the direction (heading) of the runway, in degrees. It will be automatically updated if you edit the runway using the Gizmo directly in the scene.

- Length

This value sets the length of the runway, in meters. It will be automatically updated if you edit the runway using the Gizmo directly in the scene.

- Width

This value sets the width of the runway, in meters. It will be automatically updated if you edit the runway using the Gizmo directly in the scene.

- **Pattern Altitude**

This value (also called the "circuit height") sets the altitude for aircraft to maintain a "holding pattern" for the runway, and is only relevant to AI air traffic. The value given is in meters and is offset from the actual runway altitude. For example, for a runway with an altitude of 2000m above sea level and a pattern altitude of 1500m, the aircraft would be flying at 3500m above sea level.

- **Exclude Vegetation Around The Runway**

When checked, this will remove any vegetation from the scene in an extensive area around the entire runway area. When unchecked, vegetation can be right up to the edge of the runway (although not on the runway itself).

- **Number**

This sets the runway number and can be a value from 1 to 36, or the words EAST, NORTH, NORTHEAST, NORTHWEST, SOUTH, SOUTHEAST, SOUTHWEST, or WEST.

- **Primary Designator**

This is the primary designator of the runway being added. Can be any of the following values: L, R, C, A, B or Water.

- **Secondary Designator**

This is the secondary designator of the runway being added. Can be any of the following values: L, R, C, A, B or Water.

- **No Primary Landing**

When checked, the primary landing area of the runway will be disabled, meaning aircraft cannot land on that end. When enabled, aircraft can land on the primary end.

- No Primary Takeoff

When checked, aircraft will not be permitted to take off from the primary end of the runway. Unchecking this will permit takeoffs.

- Primary Pattern

The side for traffic patterns taking off from the primary end of the runway. Can be either LEFT or RIGHT.

- No Secondary Landing

When checked, the secondary landing area of the runway will be disabled, meaning aircraft cannot land on that end. When enabled, aircraft can land on the secondary end.

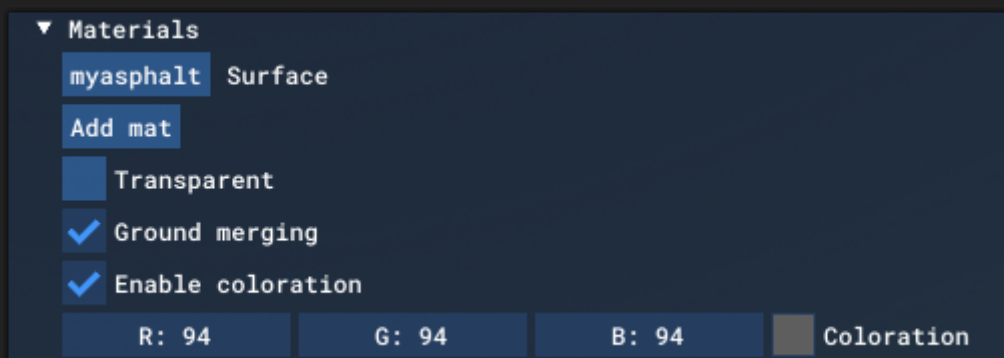
- No Secondary Takeoff

When checked, aircraft will not be permitted to take off from the secondary end of the runway. Unchecking this will permit takeoffs.

- Secondary Pattern

The side for traffic patterns taking off from the secondary end of the runway. Can be either LEFT or RIGHT.

Materials



This section permits you to change the way a runway object will be rendered by applying one or more materials to it. You can select the Surface material to use by clicking the **<MATERIAL>** button to open The Material Editor, and then from there you can drag a material onto the button to apply it to the runway. Once applied, the button will change and show the name of the applied material.

IMPORTANT! When being rendered, runway elements are baked into the terrain textures. This helps reduce the polycount and permits the element to be terraformed. However, it also means that the texture quality won't be any greater than the resolution of the terrain textures themselves. In general, this resolution is around 4cm/pixel at the equator, with the best/highest resolution terrain textures reserved for higher LODs so we have a better quality for airports. For users, they will experience the best resolution possible setting the "Terrain level of detail" option to its maximum value.

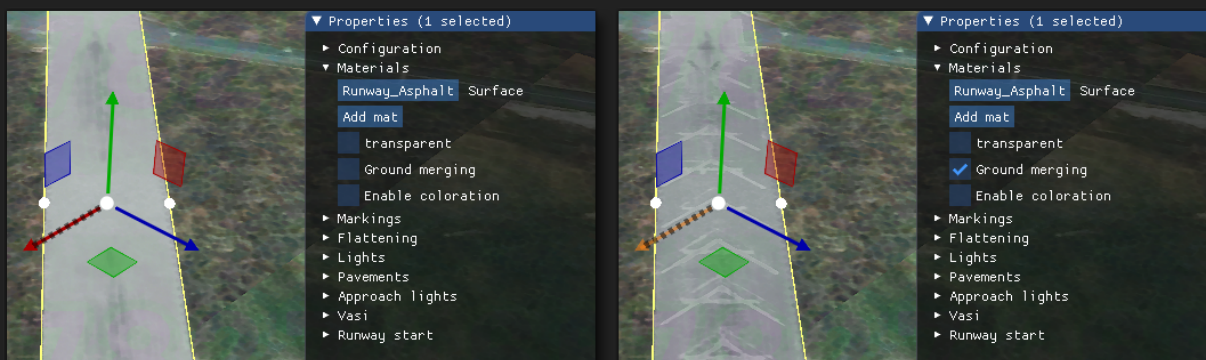
The following options will be applied to the surface material, as well as any further materials you use (as explained below):

- **Transparent**

Checking this will make the runway materials transparent so they won't be rendered in the scene, although the runway will still be valid and usable. Also note that even when a runway is flagged as transparent, its Markings will still be rendered.

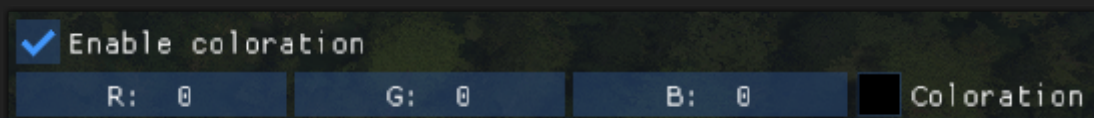
- **Ground Merging**

When checked, this option will merge the terrain textures with the materials that are used for the runway.



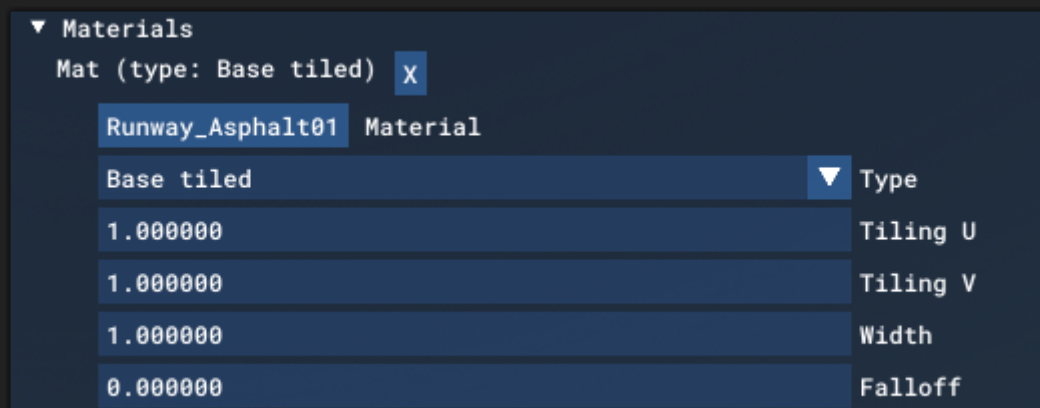
- Enable Colouration

Checking this will open a further set of options that permit you to edit the RGB values for the materials being used to texture the runway, using the color picker or by editing the value fields directly.



In this way you can change the color of the materials to better suit the environment and area that the runway has been placed in. Setting all the values to 0 will disable the colouration.

If you require more control over the visuals of the runway, you can click the **Add Mat** button instead of setting the Surface material. This button permits you to add multiple materials to the runway, and have each one behave in a different way, and it also gives you more control over how the material will be applied and rendered. Clicking this will present you with the following options:



As before you have the **<MATERIAL>** button which can be used to open The Material Editor, and you can drag materials onto the button to apply them to the runway object. However, now you are not limited to a single material and add multiple materials as different types using the **Add Mat** button multiple times. Each material you add will have the following options:

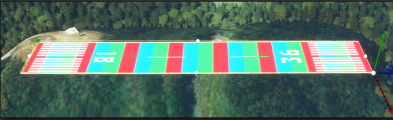
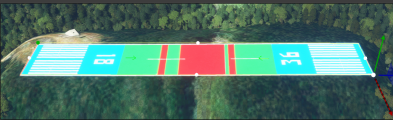

- Type

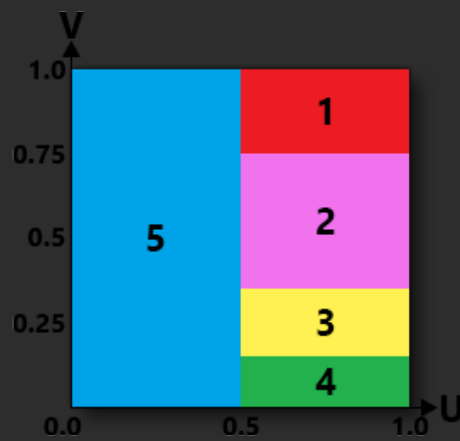
To help create unique, detailed and realistic runways you can add up to 7 different material types, each one adding a different visual "layer" to the final rendered runway. The table below explains each

of these types and uses a special test texture to better illustrate how they work.




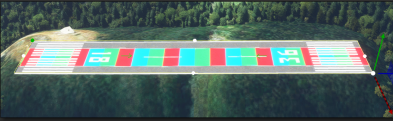
Test Texture

Type	Description	Illustration
Base Tiled	This is the base surface material tiled along the length and width of the runway. Tiling will be based on the Tiling U/V values set.	
Base And Tire Marks	This creates a base surface material stretched from both ends of the runway towards the middle. It is expected that the texture used for the material has tire marks included on it.	
Base And End Cap	This is a legacy format and requires the material texture to be laid out in a particular way (as shown in the image below). The texture will then be used in the way shown on the image to the right.	



The sections of the texture are as follows:

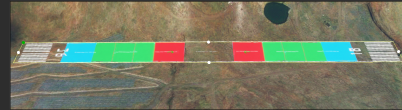
- 1) Blast Pad - This section is tiled with v0.75 to v1.0 in the texture and will flip the texture back and forth in 150ft sections. This area is clear of any tire marks
- 2) Clear To Tires - This section goes from v0.75 to v0.35 in the texture. Goes from clear at the end to the middle of the black tire marks. There is no tiling here.
- 3) Black Tires - This section goes from v0.35 to v0.15 in the texture. The texture should have black tire touch down marks, and it will be repeated 8 times.
- 4) Black Tires To Center - This section goes from v0.15 to v0.0 in the texture. And is meant for adding black tire touch down marks to

	<p>the center of runway. There will be no tiling performed using this part of the texture.</p> <ul style="list-style-type: none"> 5) Center - This section takes half the texture width (u0.0 to u0.5), and when applied to the runway it will repeat an even number of times. When it repeats the texture will be "flipped" so that this section start and ends with <code>V==1.0</code>. 	
Border	<p>This type is for adding a specific border texture to the runway and behaves essentially the same as the Based Tiled type, only it expects a texture that is transparent in the middle so it can be overlaid on the base surface.</p>	
Center	<p>This type is for adding a specific center texture to the runway and behaves essentially the same as the Based Tiled type, only it expects a texture that is transparent along the edges so it can be overlaid on the base surface.</p>	
Patch	<p>This type is used to add imperfections to the runway like patches or damaged sections.</p>	

IMPORTANT! This type is currently not available and will be added in a future update.

Tire
Gum

This mode splits the texture in 3 parts and applies them in different proportions to the start and end of the runway to simulate tire marks on the ground.



- Tiling U

This sets the the texture to tile across the U axis (the runway *width*). By default this is set to 1.0 but you can change the value to alter the number of times the texture will be tiled.

- Tiling V

This sets the the texture to tile across the V axis (the runway *length*). By default this is set to 1.0 but you can change the value to alter the number of times the texture will be tiled. Note that this may behave differently depending on the Type of surface material being added.

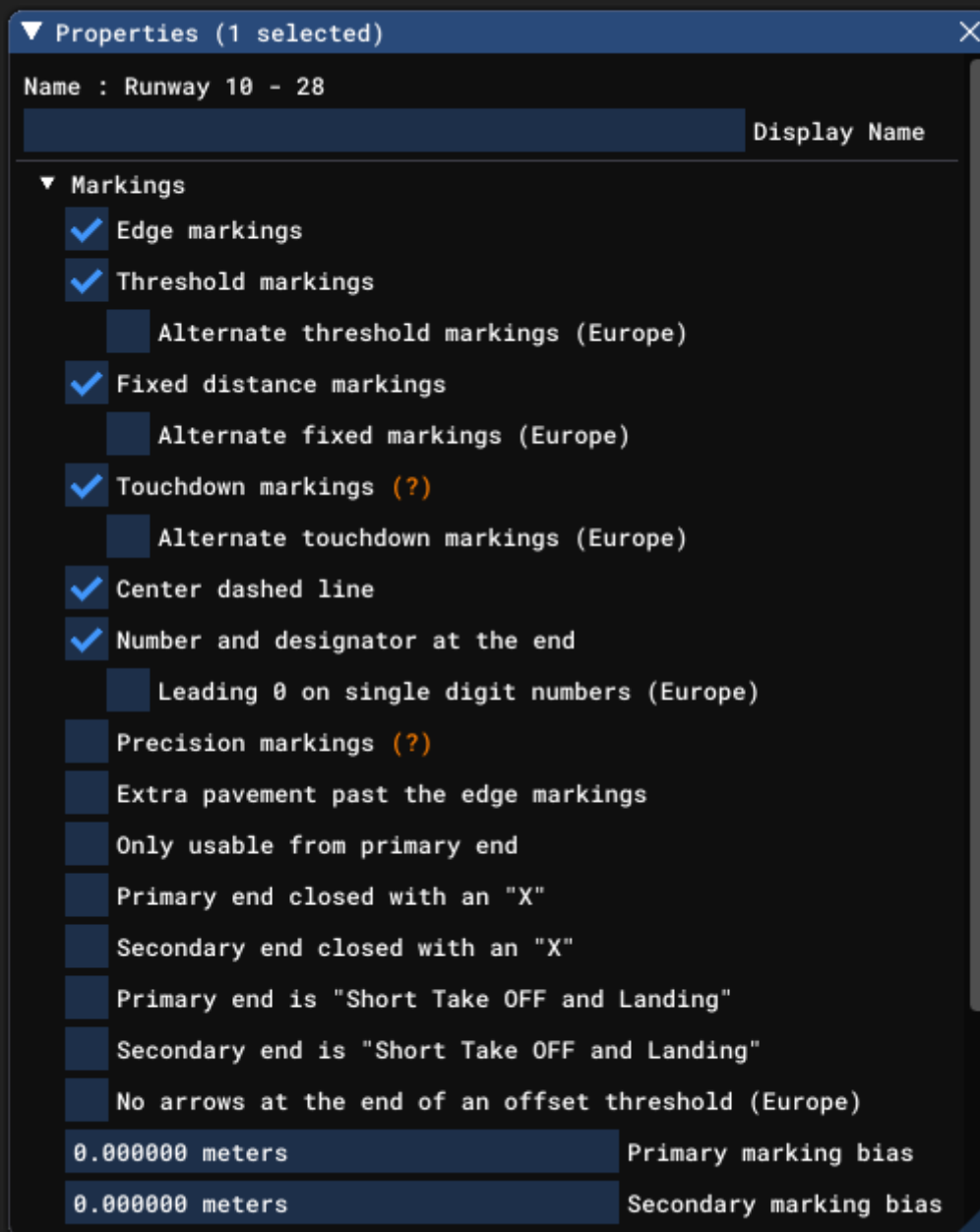
- Width

Sets the width of the material texture in relation to the width of the runway. A value of 1.0 means the texture will be applied to fit the width of the runway, while a value larger than 1 will mean the texture will be stretched outside the bounds of the runway width. A value less than 1 will have the texture applied to a space smaller than the width of the runway.

- Falloff

The falloff value is used to add "feathering" to the outer edges of the material after it is applied to the runway, creating a smoother transition between the runway material and the surrounding terrain or other objects.

Markings

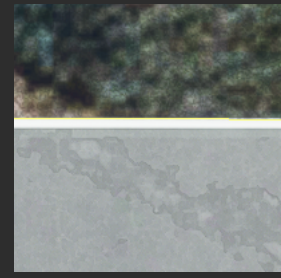


The next section in the Runway properties is for the runway markings. The table below shows each of the options:

Markings / Alternate Markings

Illustration

Edge Markings



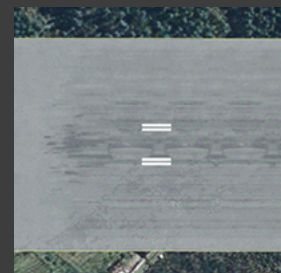
Threshold Markings / Alternate Threshold Markings
(Mouse over the image to see the alternate version)



Fixed Distance Markings / Alternate Fixed Markings
(Mouse over the image to see the alternate version)



Touchdown Markings /Alternate Touchdown
Markings
(Mouse over the image to see the alternate version)



Center Dashed Line



Number and Designator At End /Leading 0 On
Single Digit Numbers

(Mouse over the image to see the version with the leading
0)



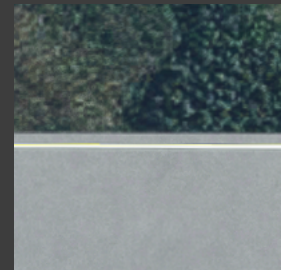
Precision Markings / Alternate Precision Markings

(Mouse over the image to see the alternate version)

When this is selected, it will also activate the yellow light at the end of the runway. These lights will follow the FAA reglementation for their length.



Extra Pavement Past The Edge Markings



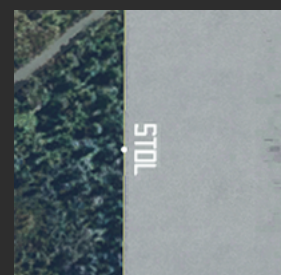
Only Usable From Primary End

No Image Required. This simply removes any markings (number, designator, etc...) from the secondary end.

Primary End Closed With An "X" / Secondary End Closed With An "X"



Primary End Is "Short Takeoff and Landing" / Secondary End Is "Short Takeoff and Landing"



No Arrows At The End Of The Offset Threshold

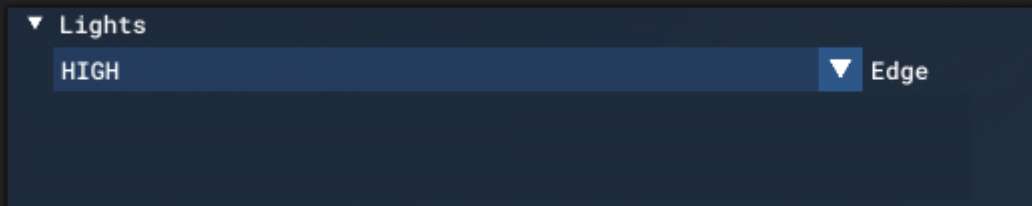
(When checked, removes the arrows from the threshold pavement. Mouse over the image to see the difference)

NOTE: This option requires a pavement threshold to have been set in the Pavement options (explained below).



Underneath the different markings, you also have two values to set the Primary Marking Bias and Secondary Marking Bias. These values are in meters and are used to offset the primary or the secondary markings from their end of the runway.

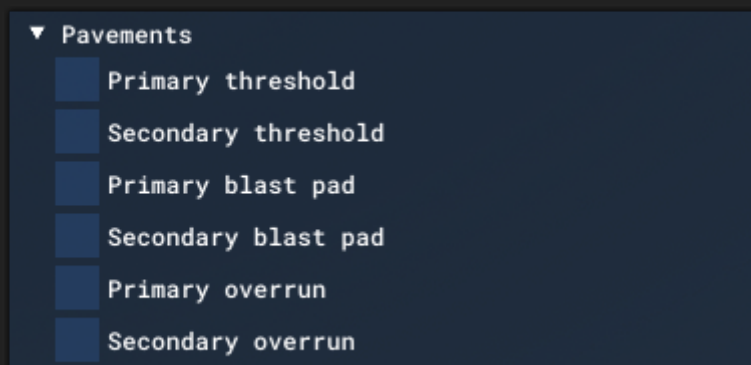
Lights






This section permits you to add basic runway lights to the object. Here you can set the Edge lights, choosing between the following three brightness levels (or NONE for no lights):

- LOW
- MEDIUM
- HIGH

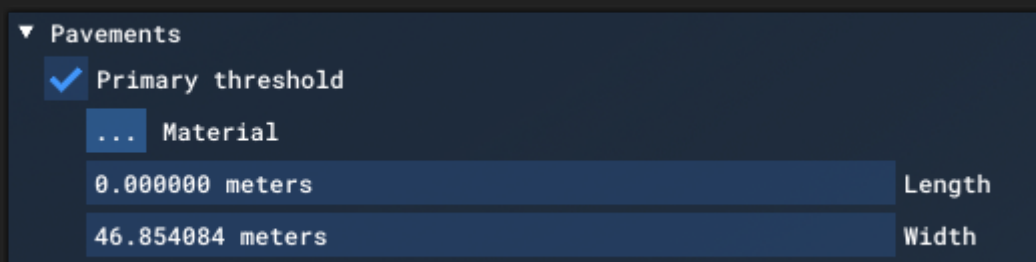
Pavements



This set of options permits you to add additional pavement elements to the ends of the runway object. The available options are:

Pavements	Illustration
<p>Primary Threshold / Secondary Threshold</p> <p>Note that this will be added as part of the established runway length, and will not extend the runway.</p>	
<p>Primary Blast Pad / Secondary Blast Pad</p> <p>This will be added as an extension to the runway.</p>	
<p>Primary Overrun / Secondary Overrun</p> <p>This will be added as an extension to the runway.</p>	

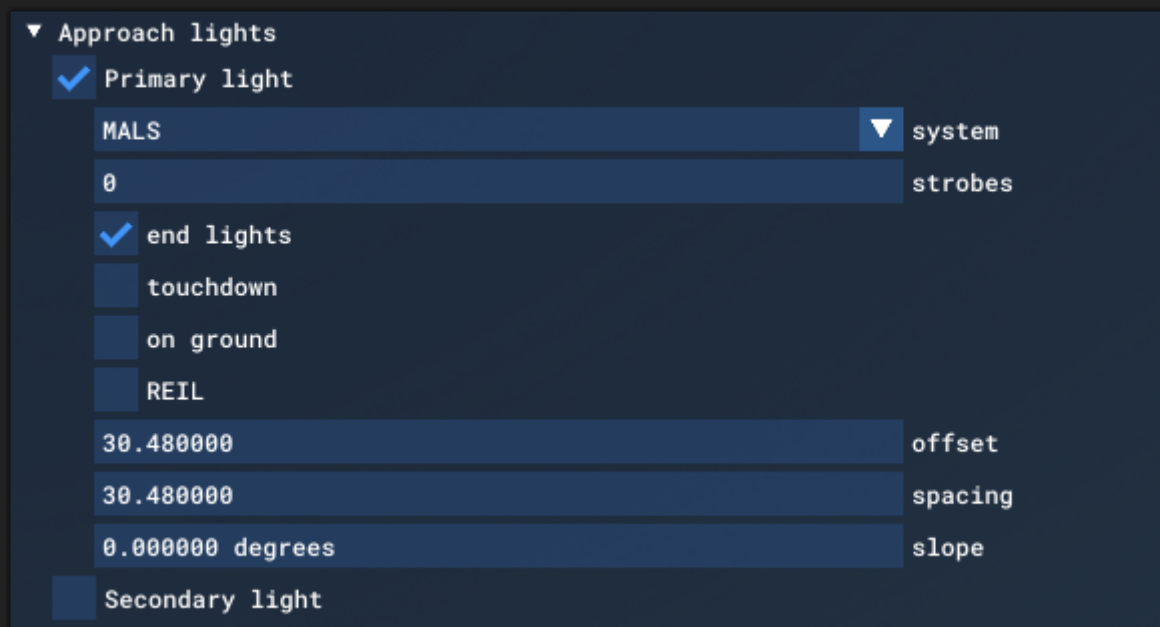
Each one of these options has the following settings:



- Material: Clicking the ... button will open The Material Editor where you can choose an appropriate material to use for the selected option. You apply the material by dragging it from the editor and dropping it onto the button. This will then change to show the name of the chosen material and the runway visuals will update to apply it in the world.
- Length: This sets the length (in meters) of the selected option.
- Width: This sets the width (in meters) of the selected option.

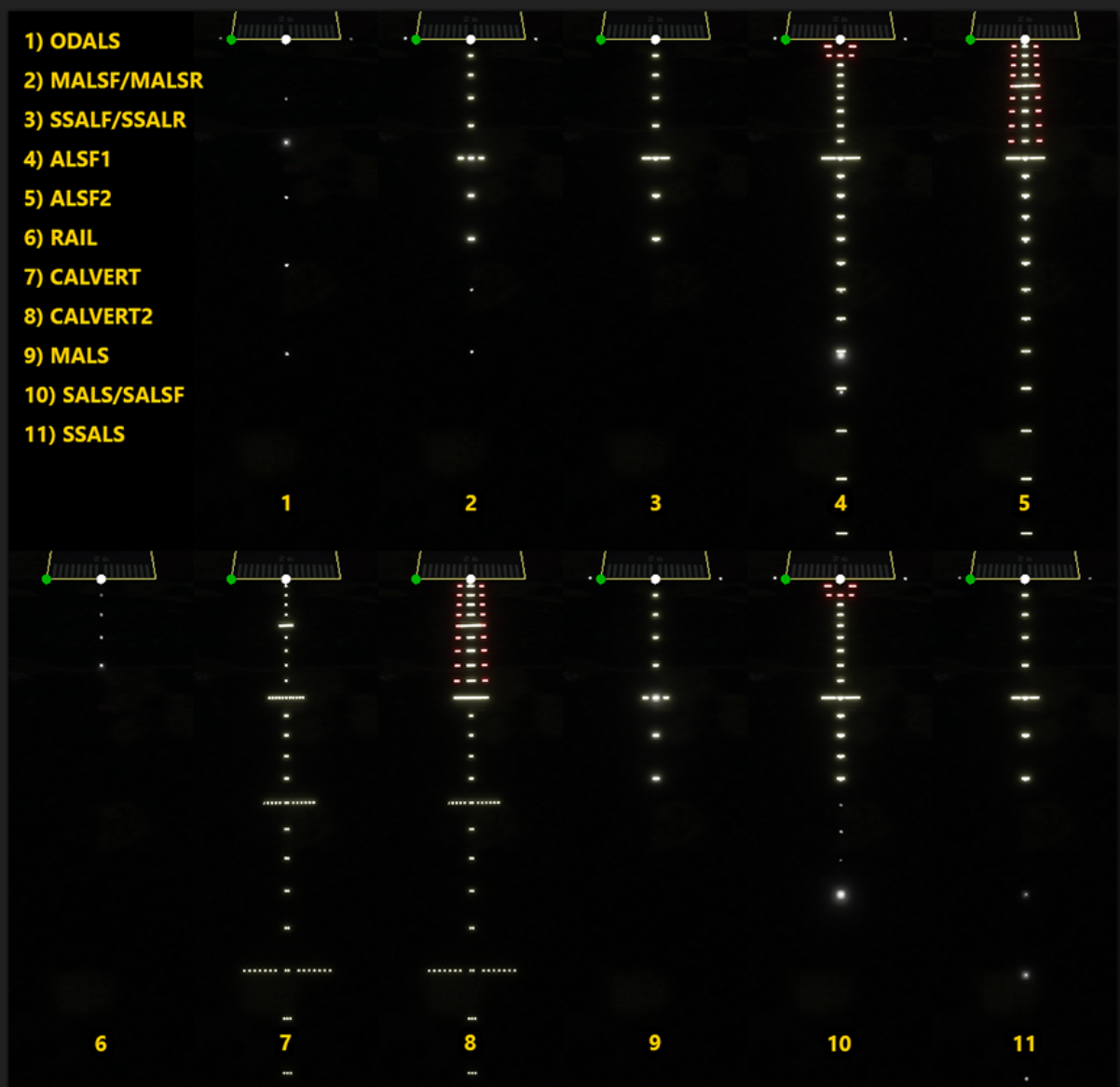
Approach Lights

Approach lights can be added to a runway using the Primary Lights Or Secondary Lights options for the primary and secondary end of the runway object. Enabling either of these will show you the following options:



- System

The lighting systems available are shown in the following image:



Note that the differences between the two system shown for each of the images 2, 3 and 10 is that the "F" version has strobes, while the other does not, but they are otherwise visually identical.

- Strobes

This option sets the number of lead-in strobes for the runway approach lights. This value can be between 0 and 20 and would normally be set to 5 or more.

- End Lights

Enabling this option will add a row of bright green lights to the end of the runway, marking the runway threshold.



- Touchdown

Enabling this option will add a double row of lights to the runway itself.



- On Ground

Enabling this option will place all the lights on the ground so that they follow the terrain. In general this is not ideal as it may mean that features on the terrain will block the lights.

- REIL

Enabling this will add two blinking lights to the corners of the runway threshold. These lights are very high intensity and visible from far away, useful to see where the runway is from a distance.

- Offset

This is the offset from the threshold of the runway, in meters. Changing this value will move the lights closer or farther away from the threshold edge.

- Spacing

This is the spacing, in meters, between the approach lights. Changing this will change how far apart one light is from the other along the length of the light row(s).

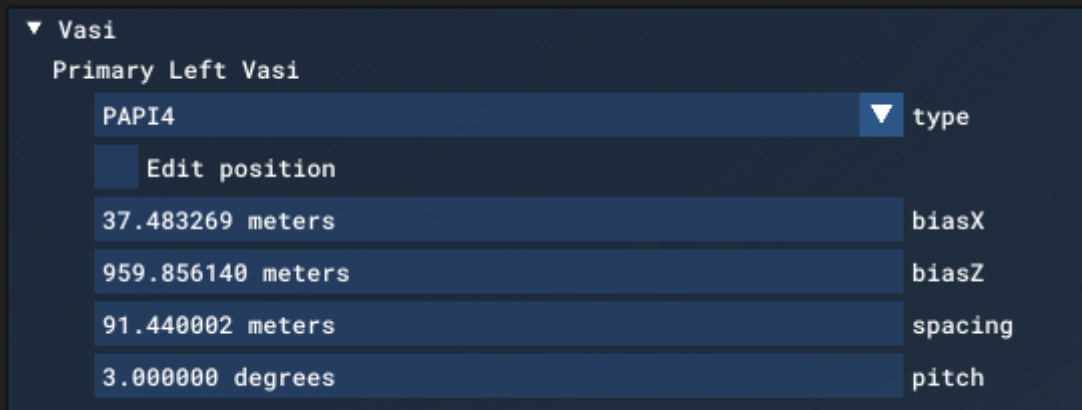
- Slope

This value is the slope angle, in degrees. Changing this will change the orientation of the entire row of lights, permitting them to be made more visible when the terrain is irregular around the threshold area.

VASI



These options are for setting up different VASI systems for the Primary and Secondary ends of the runway, and can be configured for the Right or Left sides. Changing the type of any of the options will expand view to show further settings:



- Type

The type of VASI lighting that should be used. One of the following:



- Edit Position

When this option is enabled, the [Gizmo](#) moves to the VASI lights themselves and you can manually position them (only the translate gizmo can be used). Note that the position of the lights will be clamped to within certain bounds depending on the side and whether it is the primary or secondary runway being edited.

- BiasX

This can be used to set the X-axis bias, in meters. Essentially this is the distance from the runway threshold, where 0 is on the

threshold. Which threshold is used will depend on whether you are setting the value for the Primary or Secondary runway.

- BiasZ

This can be used to set the Z-axis bias, in meters. Essentially this is the distance from the runway center, where 0 is on the center and greater values will move it towards the edge (which edge will depend on the side of the runway you are setting the value for).

- Spacing

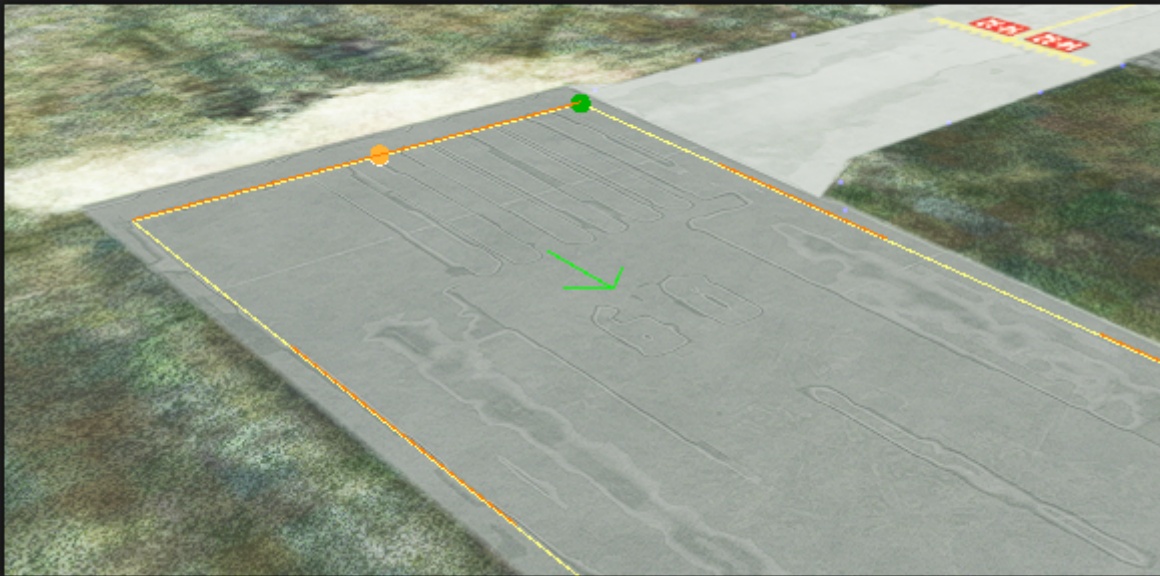
The value used here will set the spacing between the lights when there are multiple rows of VASI lights in the chosen type. Distance is in meters. Note that this is only applicable to the following systems: VASI21, VASI31, VASI22, VASI32, VASI23, VASI33, and TVASI.

- Pitch

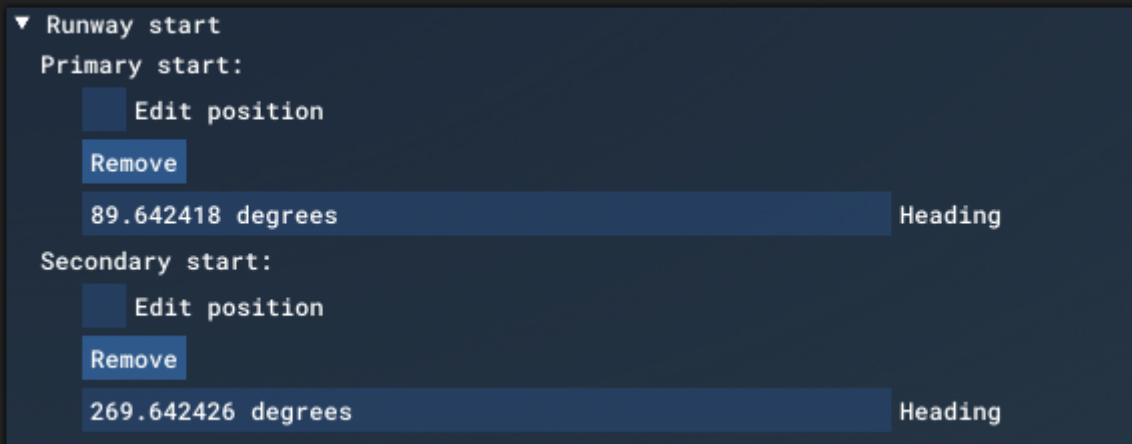
This value sets the VASI pitch, in degrees. The default value should be 3° but it can be changed to other values depending on the requirements of the airport/runway. Changes in this value will cause the VASI lighting to change color/pattern based on the approach slope of the aircraft.

Runway Start

The start position for an aircraft on the runway will be shown as a green arrow pointing in the direction that the any aircraft starting there will face:



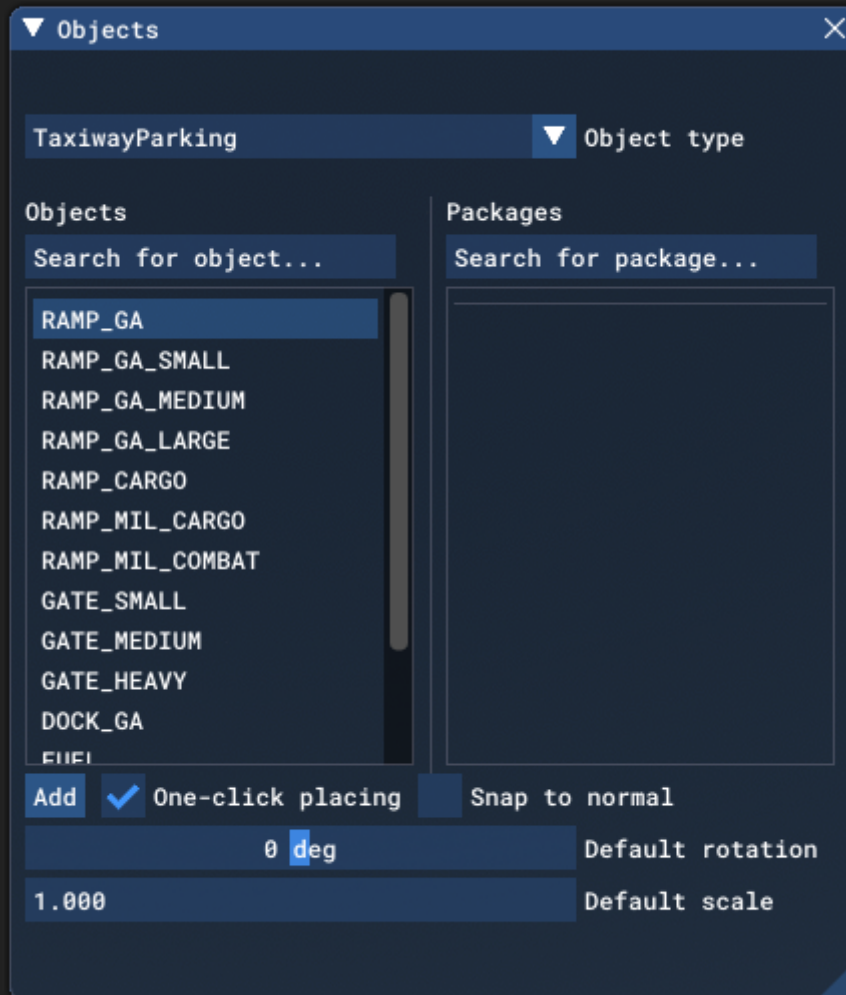
The actual position and heading for this start position can be set from the Runway Start options:



Here you can set the heading for the start position (relative to true North), or you can remove it using the button, so that it will not be available as a start position for flights from the airport that has the runway. You can also edit the actual position by checking the Edit Position checkbox. This will set the Scenery Editor gizmo into "translate" mode and link it with the start position arrow in the editor. You can then use the gizmo controls to edit the position.

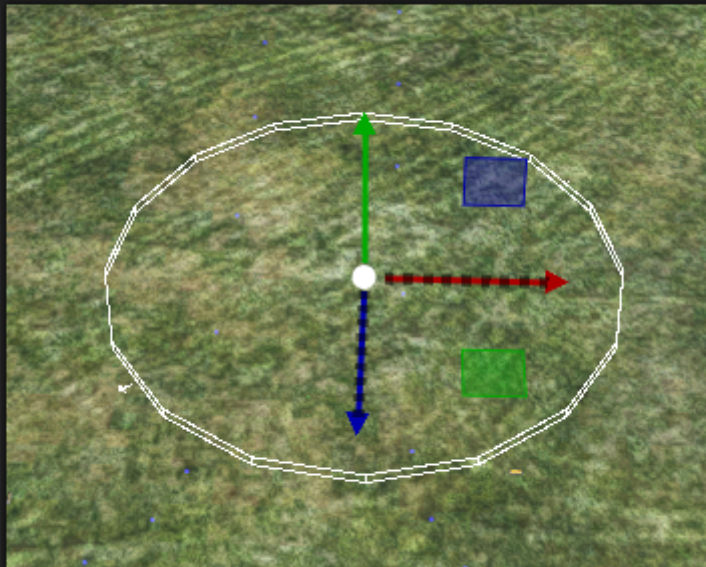
TAXIWAY PARKING OBJECTS

A Taxiway Parking object is an object element that is used to add an aircraft or ground vehicle parking area to an airport in the world. When you select this object type you will be presented with a list of different object elements listed in the [Objects](#) window:



When you click the **Add** button, the Taxiway Parking object will be added to the scene and can be positioned using the [Gizmo](#). Once positioned, the taxiway parking can be edited.

IMPORTANT! Taxiway Parking objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.



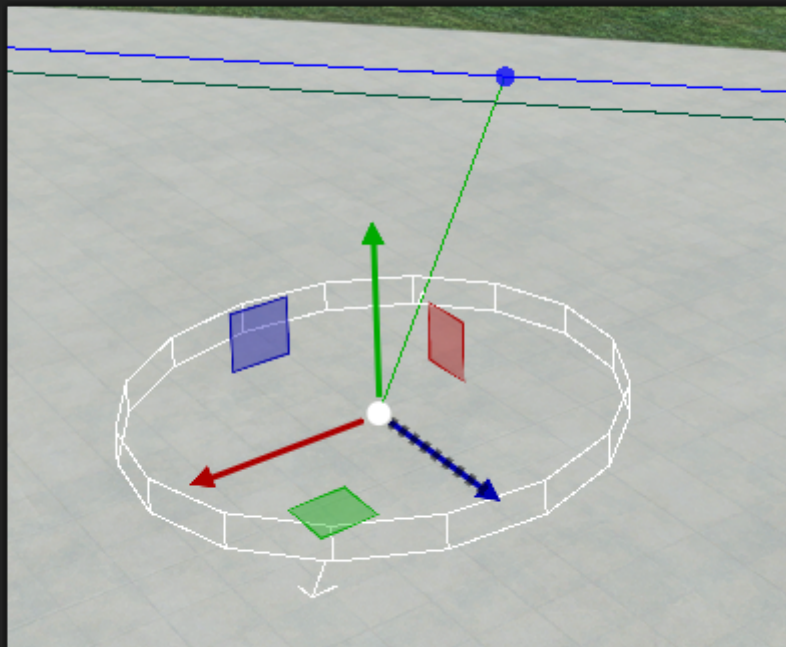
When placed in the world, it will be displayed as a circular area, and you can use the [Gizmo](#) to not only place the parking spot, but to rotate it - you can see a small arrow indicating the orientation - as well as change the scale of the object. When the parking spot is for aircraft, the scale will affect the size of the aircraft that can use the parking spot.

Connecting A Taxiway Path

Once you have placed the taxiway parking spot in the world, it will generally need to be connected to [TaxiwayPoint Objects](#) using [TaxiwayPath Objects](#). To do this you must first select the taxiway parking object in the world, then use **Ctrl** and left mouse button to select the taxiway point that you want it to connect to. You can then do one of the following things to add a path between the two:

- Select the Taxiway Path Object in the Objects window and click **Add**.
- Use the Right Mouse Button and select the Create Path option.

This will then add a Taxiway Path object between the point and the parking, which will look like this in the world:

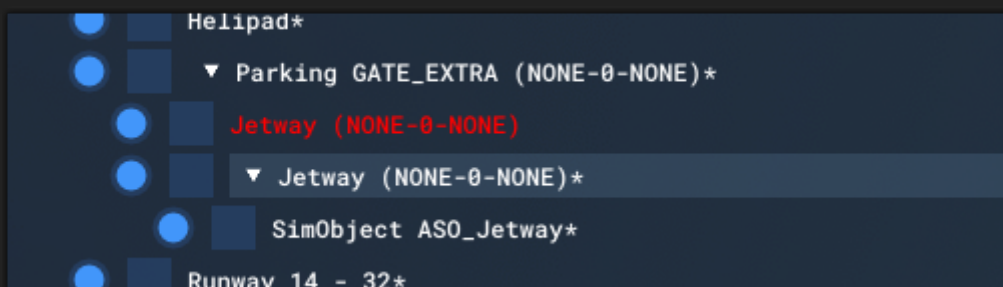


NOTE: Taxiway Paths added to link Parking Spots with Taxiway Points will not have a surface texture and should be placed over [Apron Objects](#) if you require a texture.

When you connect the point to the parking, the parking spot heading will be rotated to be parallel to the path. Also note that you can connect more than one Taxiway Path point to a Parking spot if required (although you wouldn't normally), and you can remove the path by selecting it and using the **Delete** key on the keyboard.

Jetways

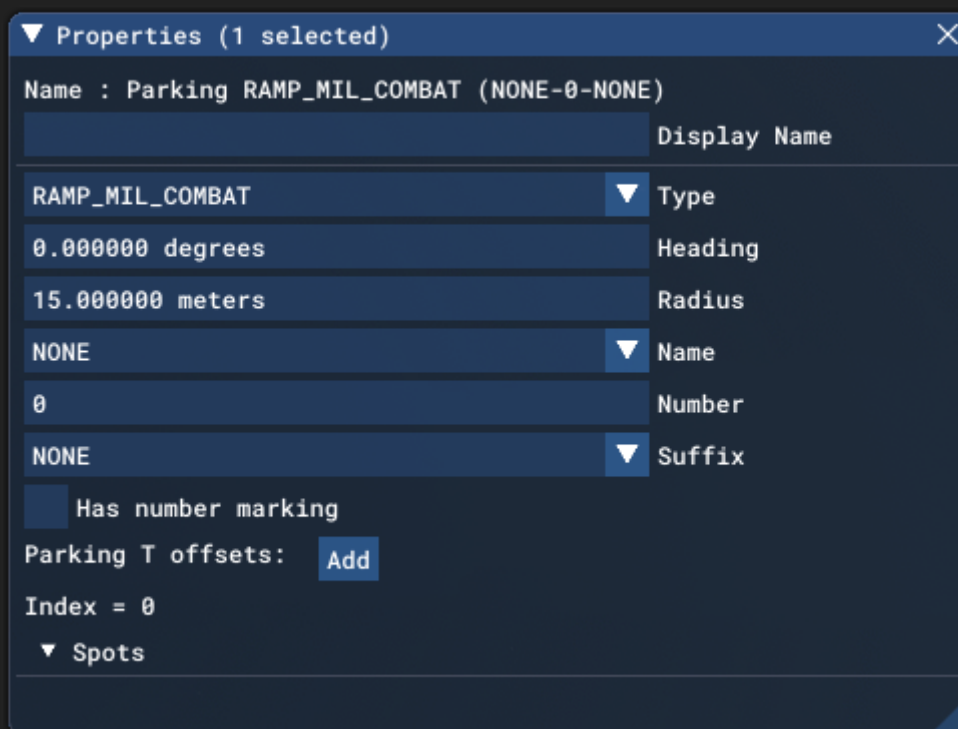
Depending on the [Type](#) of parking that you add, you may get an error shown in [The Scenery Editor](#) telling you that you need to add a Jetway:



Specifically, this error will occur when you have set the parking as being any of the GATE_ types. Gates require a jetway to connect any parked aircraft with the airport terminal, and as such you will need to add a Jetway to this kind of parking spot.

Properties

The Properties window for a Taxiway Parking looks like this:



- Name

This is the name of the element as defined by its object type properties.

- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

- Type

This can be used to change the type of taxiway point that is being edited. You can choose one of the following types, which will be drawn with the corresponding colour in the scene:

- NONE

- DOCK_GA (green)
- FUEL (dark green)
- GATE_HEAVY (yellow)
- GATE_MEDIUM (yellow)
- GATE_SMALL (yellow)
- RAMP_CARGO (green)
- RAMP_GA (green)
- RAMP_GA_LARGE (green)
- RAMP_GA_MEDIUM (green)
- RAMP_GA_SMALL (green)
- RAMP_MIL_CARGO (green)
- RAMP_MIL_COMBAT (green)
- VEHICLE (dark blue)
- RAMP_GA_EXTRA (green)
- GATE_EXTRA (yellow)

Note that when the FUEL type is selected, there will be an additional option:

- Has 3d Mesh: This checkbox is so you can decide if you want the parking space to generate a fuel mesh or not.

- Heading

The parking spot heading (oriented from the North) from -360.0° to 360.0° . This is shown in the world by a little arrow on the edge of the bounding circle. Note that this can be edited using the [Rotation Gizmo](#).

- Radius

The parking spot radius, in meters. This will determine the size and type of aircraft that can park there (where applicable). Note that this can be edited using the [Scale Gizmo](#).

- Name

The parking spot name. Can be any one of the following values:

- NONE
- PARKING
- N_PARKING
- NE_PARKING
- E_PARKING
- SE_PARKING
- S_PARKING
- SW_PARKING
- W_PARKING
- NW_PARKING
- GATE
- DOCK
- GATE_A - GATE_Z

- Number

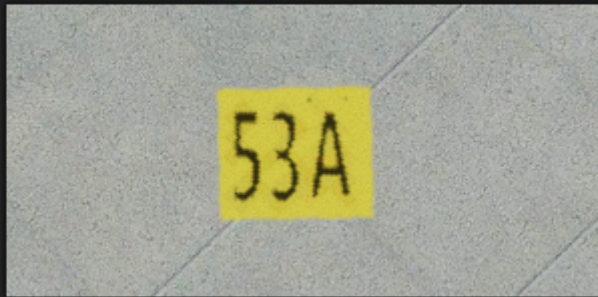
Defines the number of the taxiway parking (goes with the given name), from 0 to 3999.

- Suffix

Here you can select the suffix to be added to the taxiway parking name and number. Either NONE or a value between GATE_A and GATE_Z.

- Number Marking

When enabled, this will display number markings for the taxiway parking spot, as shown in the image below:



This will also enable additional options that can be edited to position the number if required:

<input checked="" type="checkbox"/>	Has number marking
<input type="checkbox"/>	Edit number position
<input type="text" value="0.000000 meters"/>	Number Bias X
<input type="text" value="0.000000 meters"/>	Number Bias Z
<input type="text" value="0.000000 degrees"/>	Number Heading

Checking the Edit Number Position will permit you to edit the following properties:

- Number Bias X

This is for offsetting the position of the parking spot number along the X axis. Values are in meters.

- Number Bias Z

This is for offsetting the position of the parking spot number along the Z axis. Values are in meters.

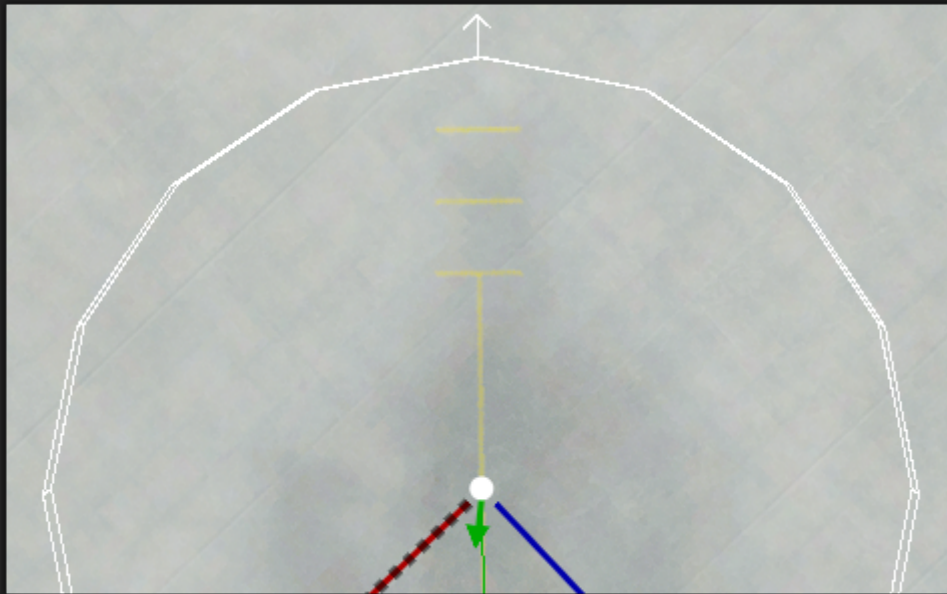
- Number Heading

This is for changing the angle that the parking spot number is orientated, in degrees.

- Parking T Offsets

This option permits you to change the "T" position - or add more "T" positions - to the parking spot. These are approximately where the nose wheel for an aircraft should sit when parked, and you may want to have various of them if the parking can accept multiple different sizes or types of aircraft. If you click the **Add** button you will be shown a new input field where you can set the offset, which is in meters and calculated from the center point of the parking

spot. You can add up to 4 different values, and the last one will always be connected to the center spot and the taxiway path. The image below shows a parking spot with 3 different T Offsets:



You can remove the last T offset value added using the [Remove](#) button, and repeatedly pressing it will remove the offsets in sequence.

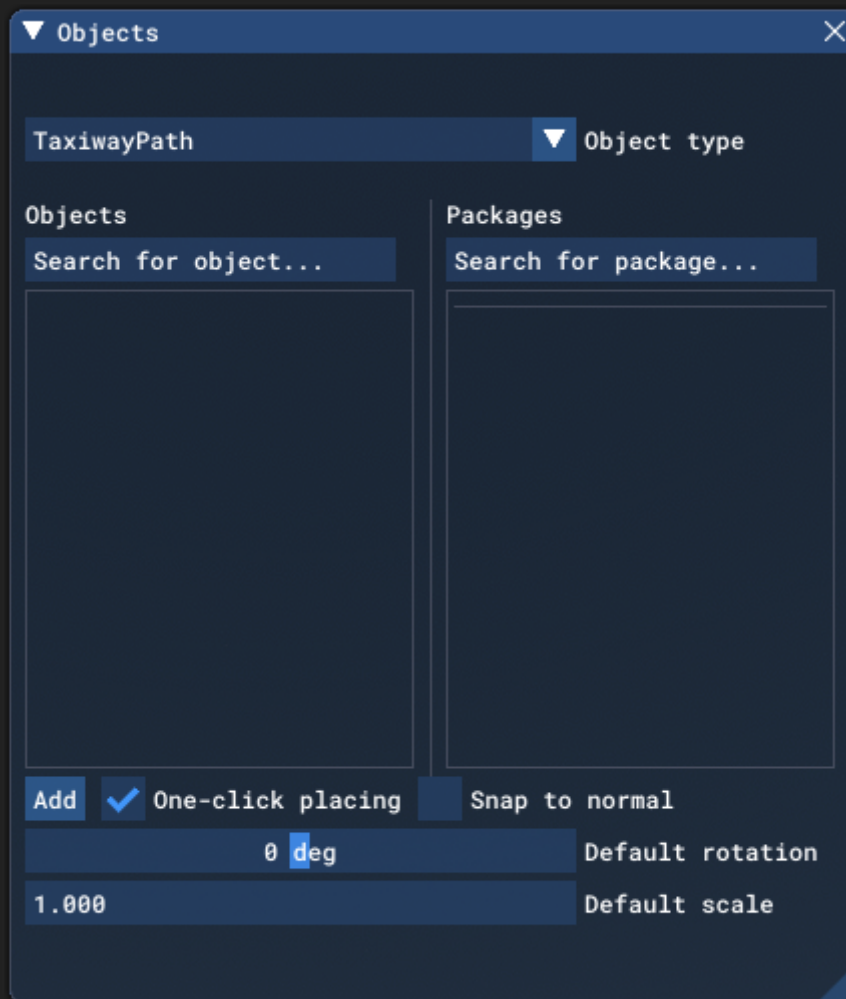
NOTE: This is a purely visual effect and will have no influence on where an aircraft using the spot will actually park.

- Index

This is the identifier index assigned to this taxiway parking inside of an airport.

TAXIWAY PATH OBJECTS

A Taxiway Path object is an object element that is used to connect [Taxiway Points](#) and [Taxiway Parking](#) within an airport as well as to create different paths for things like ground vehicles. When you select this object type the [Objects](#) window will not show any object elements as the type of path created will depend on the properties and the use it is put to:



In general, Taxiway Path objects will be added automatically when you add [TaxiwayPoint Objects](#) into the scene, and simply clicking the **Add** button with no taxiway point selected will not do anything. Taxiway path objects can also be used with [TaxiwayParking Objects](#) and with [Taxiway Sign Objects](#). Please see those pages of the documentation for more information on how they are created and used in a scene.

IMPORTANT! Taxiway Path objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note

that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.

Properties

The Properties window for a Taxiway Path looks like this:



- Name

This is the name of the element as defined by its object type properties.

- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for

identifying elements when you have a lot of items in the content list.

- Type

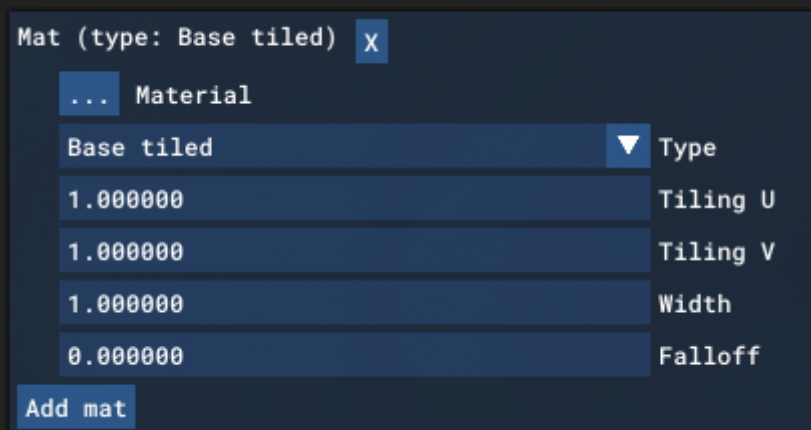
This sets the type of path that is being created. You can select from the following options:

- Taxi - This is a general taxiway path showing a surface and (optional) markings. These will be drawn in green/blue in the scene.
- Runway - This one would be used on a runway center line for traffic to taxi on a runway. Note that any assigned marking will not be shown with this path type. These will be drawn in light blue in the scene.
- Parking - This path type is used to connect the taxi network to [TaxiwayParking Objects](#). This, like the Path type, does not show any surface material, so will show whatever is "under" it (ie: [Apron Objects](#)). These will be drawn in dark green in the scene, but only when connected to TaxiwayParking object.
- Path - This is a basic path that has no surface material of its own showing, so will show whatever is "under" it (ie: Apron Objects). Note that assigned markings will still be shown even though the surface is not. These will be drawn in blue in the scene.
- Closed - This flags the path as being closed and may show extra markings on the surface. These will be drawn in red in the scene.
- Vehicle - This path type is specifically for airport support vehicles, and aircraft won't use them. Vehicles will use them if they are available and link correctly, but note that vehicles will *also* use other path types if a vehicle path is not available. If you have assigned any markings to this path type, they will be different to the rest of the types, showing that the path is purely for vehicles. These will be drawn in dark blue in the scene.

- Road - This marks the path as an external road for general ground traffic. This path type will have different markings to the other path types to signify it is a road. These will be drawn in cyan in the scene.

Material

This Material button shows the current material being used for the surface of the taxiway path. You can change this at any time by clicking on it to open The Material Editor, and then dragging a new material onto the button (which will then change to the name of the new material being used). Beneath this you also have the **Add Mat** button. This is used when you want to "layer" materials on the taxiway - as you can add multiple materials using this button - or use specific tiling options for a material. When you click this the Material option will change to the following:



IMPORTANT! If you are editing a World Hub airport, you will only be able to apply one of the predefined materials shown in a drop-down list.

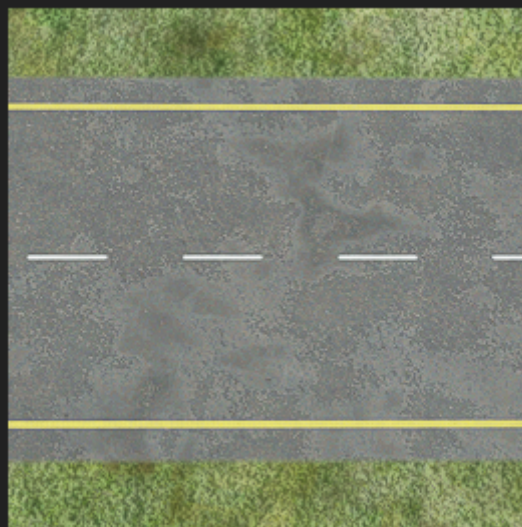
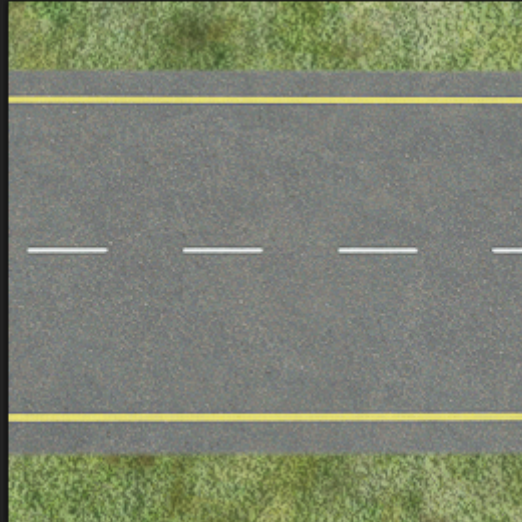
As before, you can add a material by dragging it onto the **...** button, and then you can set the various different options:

- Draw Surface

Un-checking this will make the path materials transparent so they won't be rendered in the scene, although the path will still be valid and usable. Also note that even when a path is flagged as transparent, its Markings will still be rendered.

- Ground Merging

When checked, this option will merge the terrain textures with the materials that are used for the path. Mouse over the image below to see the difference:



- Enable Colouration

Checking this will open a further set of options that permit you to edit the RGB values for the materials being used to texture the path, using the color picker (opened by clicking on the color swatch) or by editing the value fields directly.



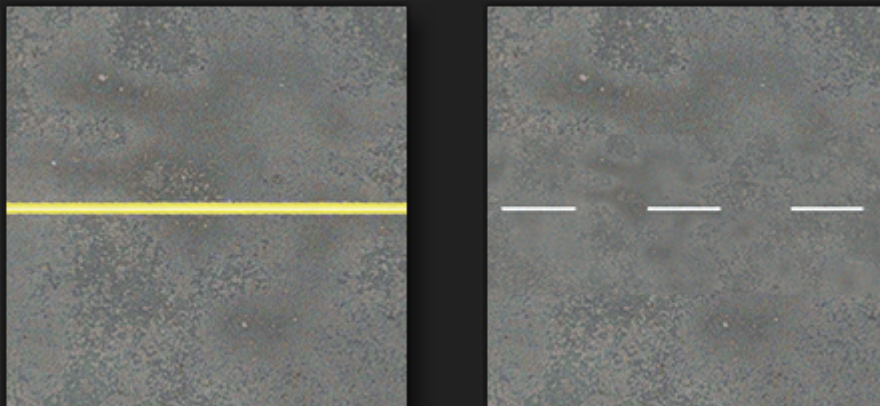
In this way you can change the color of the materials to better suit the environment and area that the path has been placed in. Setting all the values to 0 will disable the colouration.

Markings

The following options are related to the different markings available to you when editing Taxiway Paths.

- Center Line

This will add a center line to the path (only visible for Taxi, Path, Closed, Vehicle and Road types of path). The line will be different depending on the type of path it is:

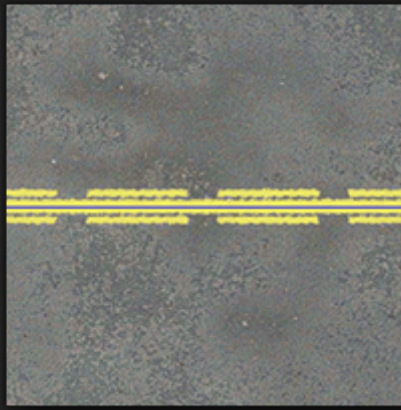


- Center Line Lighted

Selecting this will add lights along the center line of the taxiway path object. Note that this option will do nothing for Runway, Path or Road type paths, which will never have lights.

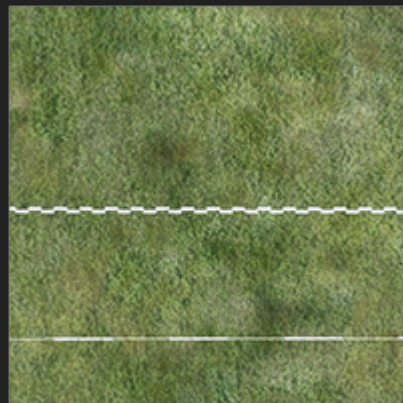
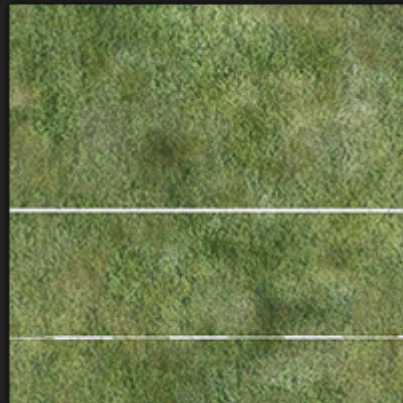
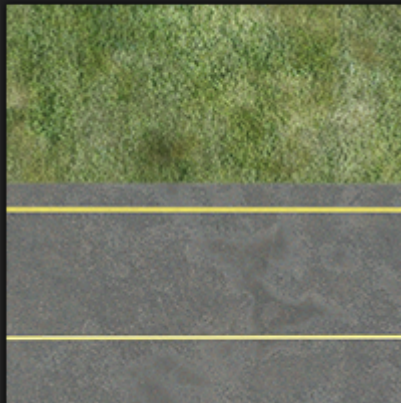
- Center Line Enhanced

This option will show an "enhanced" center line. The option will only have any effect when used on a Taxi, Path or Closed type paths:



- Left Edge

This will add a line to the left-hand edge of the path. The line can be either SOLID or DASHED, and will be applied to all path types except Runway and Path. Mouse over the image below to see the difference between solid and dashed edge lines:



- Left Edge Lighted

When checked, lights will be added along the left edge of the pathway. This option will do nothing for Runway, Path or Road type paths, which will never have lights.

- Right Edge

This will add a line to the left-hand edge of the path. The line can be either SOLID or DASHED, and will be applied to all path types except Runway and Path (see the image for the Left Edge for examples)

- Right Edge Lighted

When checked, lights will be added along the right edge of the pathway. This option will do nothing for Runway, Path or Road type paths, which will never have lights.

Miscellaneous

The final properties available for Taxiway Path objects are:

- Width

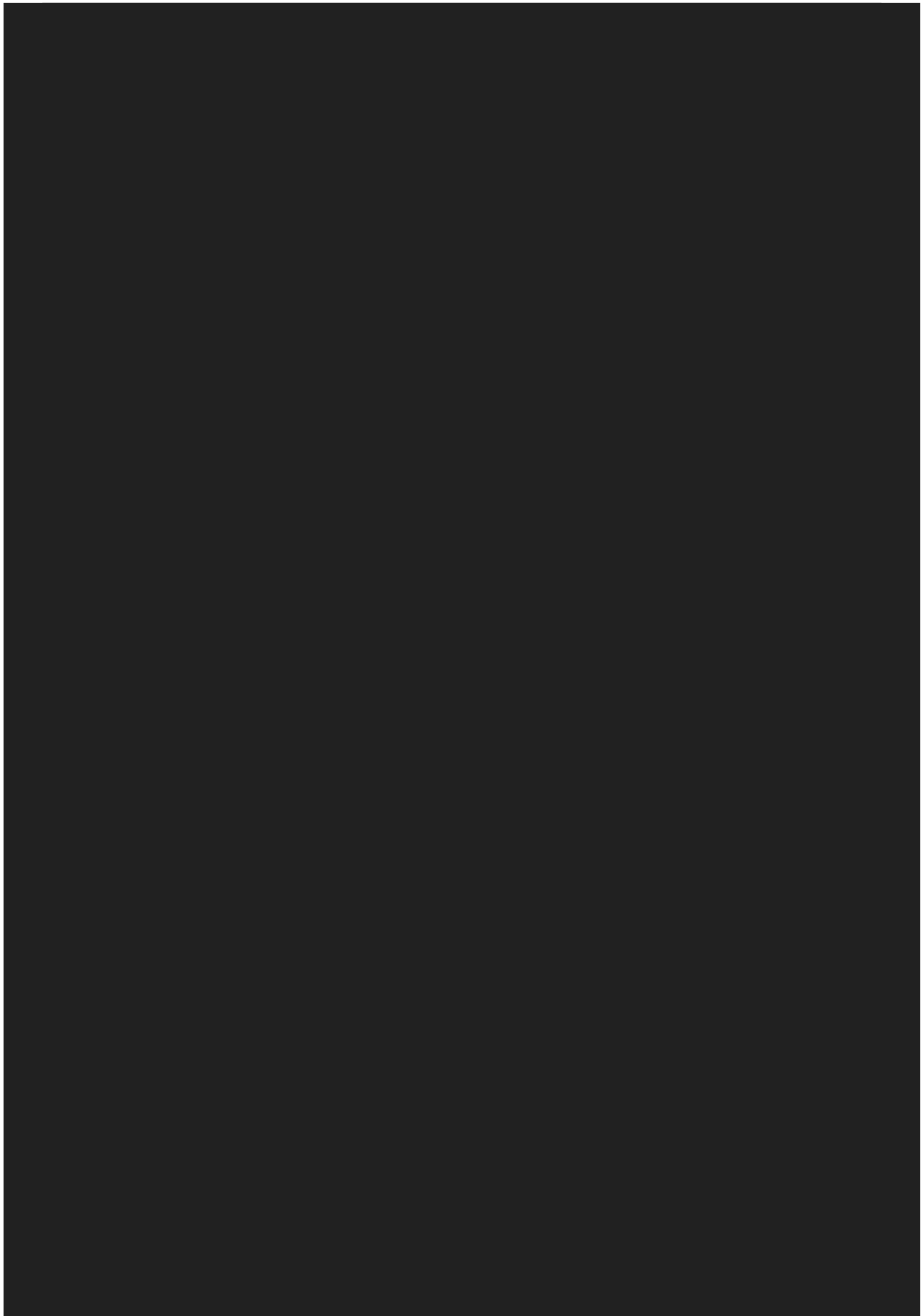
This defines the width of the taxiway path, in meters. The default is 30m.

- Name

This is a common name for the taxiway path.

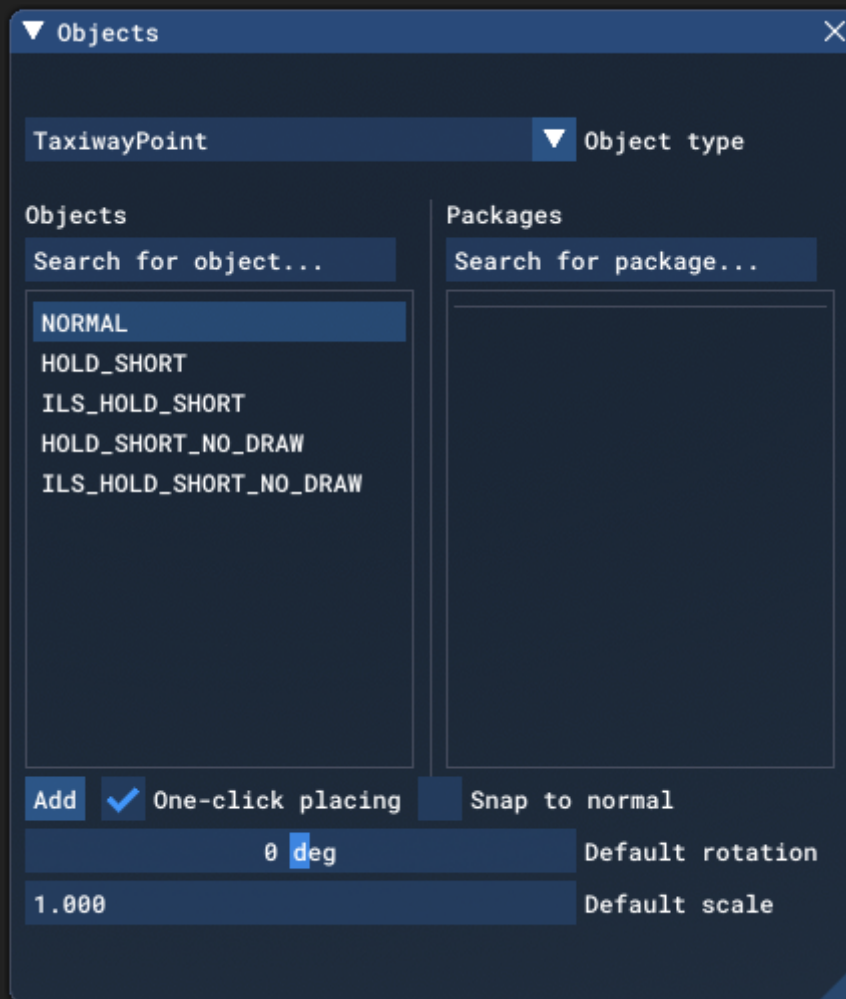
- Indices

This shows the indices of [TaxiwayPoint Objects](#) at either end of the taxiway path.



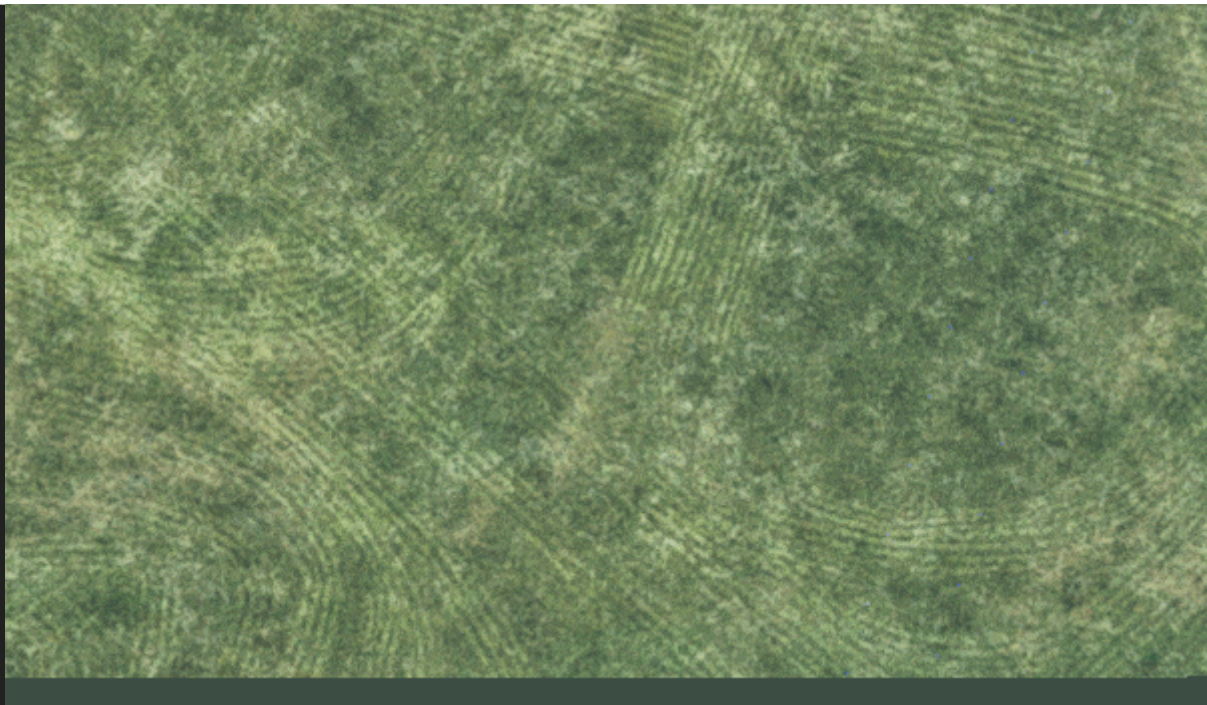
TAXIWAY POINT OBJECTS

A Taxiway Point object is an object element that is used to add a taxiway point to an airport in the world. These points form the "nodes" that are then connected together to make taxiway paths throughout the airport. When you select this object type you will be presented with a list of different object elements listed in the [Objects](#) window:



Adding Points

Adding taxiway points is achieved in two different ways depending on what you want to achieve. The first, and easiest, method is to enable the **One-Click Placing** option in the Objects window then start to place the points by clicking the Left Mouse Button in the world:



Adding the Taxiway Point objects in this way will also generate [TaxiwayPath Objects](#) between the points in the sequence.

NOTE: By default all taxiway path objects added in this and the other steps shown here will be created as TAXI types.

To end the current set of continuous points, simply disable **One-Click Placing**, click anywhere in the world, and then enable it again. The next time you click in the world a new path will be generated between the points. If you make a mistake you can use **Ctrl** + "**Z**" to undo the placement, but you will need to do it twice! The *first* undo will undo the taxiway path, the *second* will undo the placement of the point. So, essentially, when using this method to add points you're actually performing two actions for every click of the mouse: adding a point, and adding a path between the new point and the previous one.

The second way to add points is to use the **Add** button in the Objects window. Using this will *not* add any Taxiway Path objects, but instead simply add the Taxiway Point object into the world at the center of the view. When using this method you would add a point, then move the camera, then add another point, etc... To link the points with a Taxiway Path Object, you would click on the first point, then hold **Ctrl** and click on the second point (or hold **Shift**, then click and drag to select the points) and then do one of the following:

- Select a Taxiway Path object in the Objects window and click the **Add** button

- Right-click in the world view and select the Create Path option in the menu

Both of those will add a Taxiway Path Object between the two selected points.

The final method to create Taxiway Points and Path objects is to use the **Add** button in the Objects window - as before - to create the *first* point, but once you add the first point, you can place your mouse at the position you want the next point and use the Right Mouse Button menu option Create Path. This will add a new taxiway point at the mouse position, and also create a taxiway path between the new point and the previous.

IMPORTANT! Taxiway point objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then the paths they connect will not be rendered.

Removing Points

Once you have a Taxiway Point in the world, you can click on it at any time and then use the Translate [Gizmo](#) to change it's position, and you can delete the point by selecting it and using the **Delete** key on the keyboard. Note that if you delete a point that is between two other points - and they are all attached by Taxiway Paths - deleting the point will *also delete the paths between them*.

Merging Points

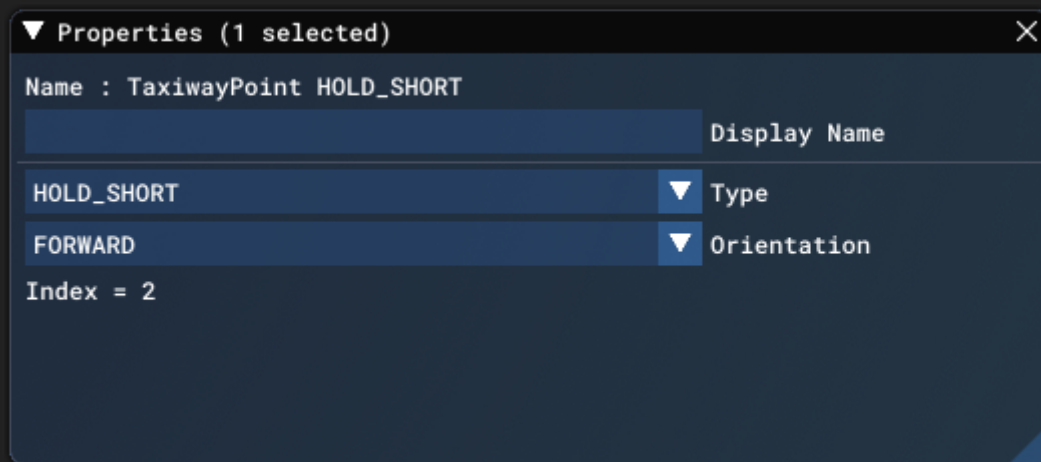
When you have selected two or more taxiway points, you can click the Right Mouse Button to bring up the menu and then select the Merge Points option. This will behave differently depending on whether you have selected an *odd* or *even* number of points. An odd number will remove the middle points and merge the path between the two outer points, while an even number will remove the middle points as well as one of the end points, merging the path between a previous point and the last selected point.

Aligning Points

If you have selected three or more taxiway points, then you can click the Right Mouse Button and select the Align option. What this will do is move all the points between the first and the last so that they are all aligned in a straight line.

Properties

The Properties window for a Taxiway Point looks like this:



- Name

This is the name of the element as defined by its object type properties.

- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

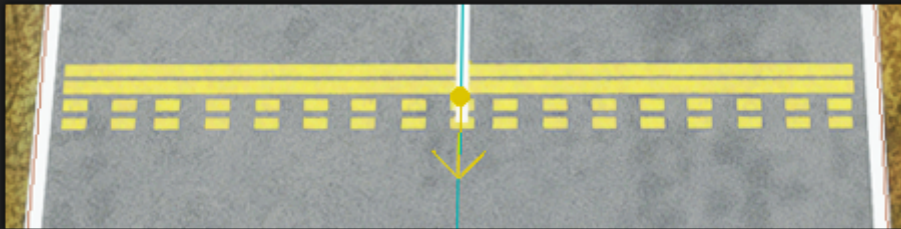
- Type

This can be used to change the type of taxiway point that is being edited. You can choose one of the following types:

NOTE: The NO_DRAW options will set the point to be of the specified type, but will not render any path surface for the point, useful for when the taxiway is on gravel or grass.

- NORMAL
- HOLD_SHORT
- ILS_HOLD_SHORT
- HOLD_SHORT_NO_DRAW
- ILS_HOLD_SHORT_NO_DRAW

It's worth noting that normal points will be drawn in blue, while hold short points will be drawn in yellow and have a small arrow to indicate the direction:



- Orientation

This can be used to set the direction of taxiway point that is being edited. You can choose one of the following types:

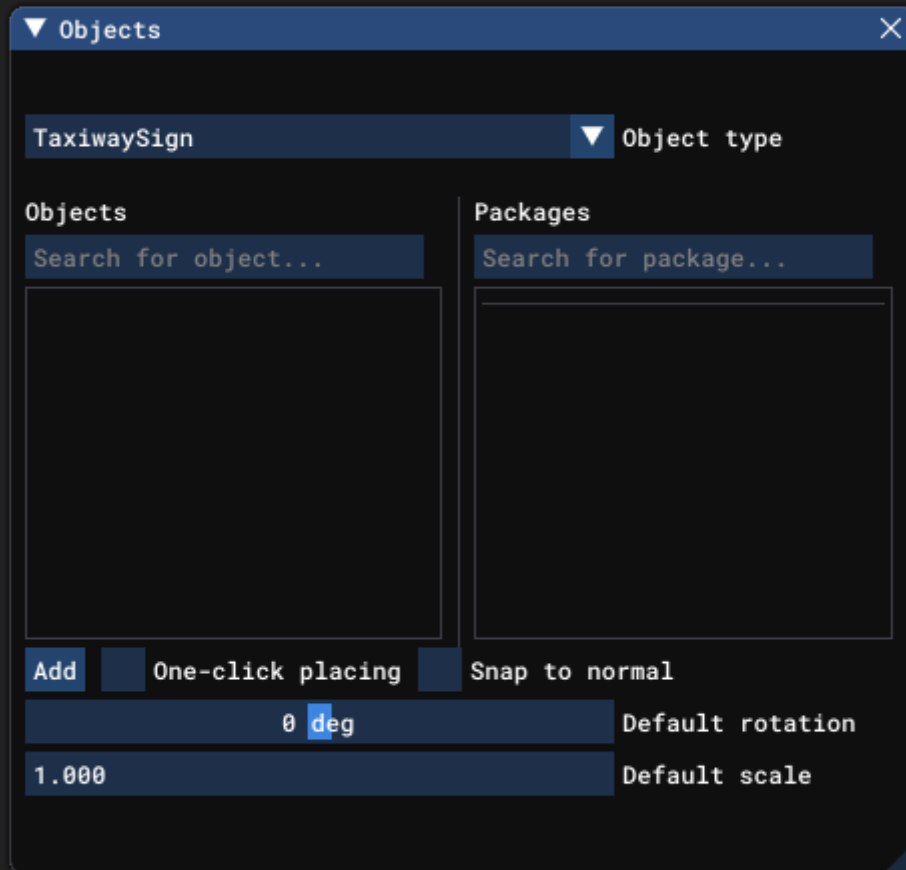
- FORWARD
- REVERSE

- Index

This is the identifier index assigned to this taxiway point inside of an airport.

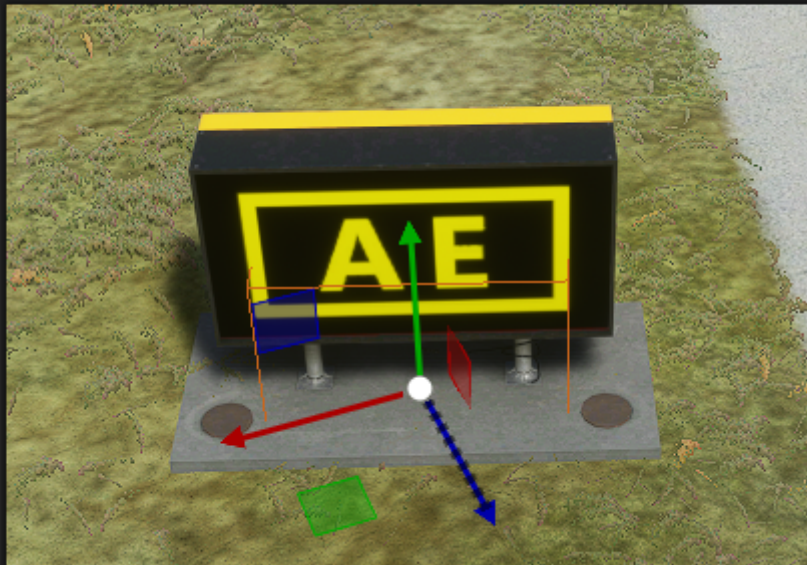
TAXIWAY SIGN OBJECTS

A Taxiway Sign object is an object element that is used to add signposts to [TaxiwayPath Objects](#). When you select this object type the [Objects](#) window will not show any object elements as the type of sign created will depend on the properties:



When you click the **Add** button, the Taxiway Sign object will be added to the scene and can be edited in the world using the [Gizmo](#). Once positioned, the taxiway sign can be edited from the properties window.

IMPORTANT! Taxiway Sign objects require one or more [Airport Objects](#) to be present in the scene, and must be added to an airport group in [The Scenery Editor](#). If no airport is present then they cannot be used. Also note that if they are placed too far away (ie: outside the airport [Object Test Radius](#)) then they will not be rendered.

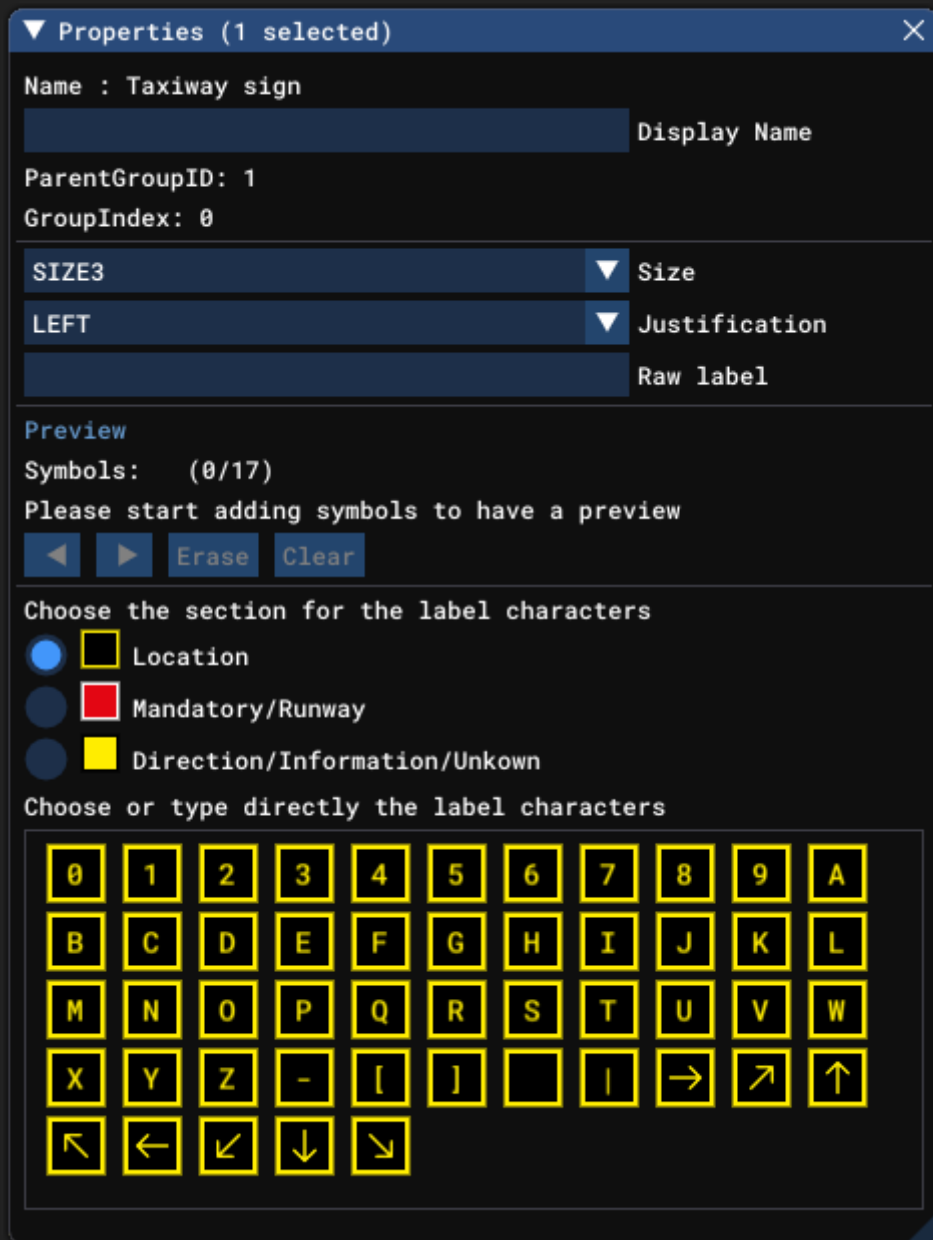


When placed in the world, the sign will be displayed along with a wireframe box - which is always the "size 3" option so you can get an idea of scale for the sign - and you can use the [Gizmo](#) to not only place the taxiway sign, but to rotate it. Note that if the airport that the sign belongs to is not configured correctly, then only the wireframe will be shown and there will be an error message shown in the [The Scenery Contents List](#).

Once the sign has been added and positioned, you can then define the text that it is to display. This is done by either editing the Raw Label section of the properties directly, or by using the visual controls in the Properties Editor. The actual contents of these sections are explained in full below. Note that there is a limit to the amount of information that single sign can hold, but it will depend on the actual characters and symbols that you use.

Properties

The Properties window for a Taxiway Sign looks like this:



- Name

This is the name of the element as defined by its object type properties.

- Display Name

This is the name of the element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

- Size

This is the physical size scalar used for the sign. This will simply scale the model used for the sign up or down depending on the selected value, where 1 is the smallest and 5 is the largest. The default size is 3.

- Justification

This option lets you pick the side of the taxiway path that the sign is going to be placed on. When you change this the sign information will be flipped so it can be read either by vehicles coming from the left or from the right.

- Raw Label

This is a text input box that will show the complete "label" text for the sign. If you add information to the sign using the [Add New Section](#) button, then this will be filled out automatically for you. However, if you know what you're doing you can directly input the sign details here too. The actual contents of the raw label is a string comprised of at least one sign-type symbol (a lower case letter) and one or more characters to define the sign contents.

IMPORTANT! The maximum permitted number of symbols for a single sign is 17, and this limit does not include the sign-type identifier. For example `L[G]d[F\]` would be 7 symbols as the `L` and `d` are not included in the character count.

A simple example would be "`1[G]`" which creates a location sign for taxi "Golf". The sign-type symbols are as follows:

Sign-type Identifier	Description	Colours
<code>1</code>	Location	Yellow text on black
<code>d</code>	Direction	Black text on yellow
<code>m</code>	Mandatory	White text on red

i	Information	Black text on Yellow
r	Runway	White text on red
u	Unknown	Black text on Yellow

The following characters describe the content of the sign. The characters can be any upper case letter (A-Z), any numerical digit (0-9), or any one of the following special characters:

Character	Symbol Description
_ or space	Space
-	Dash
>	Right Arrow
<	Left Arrow
^	Up Arrow
v	Down Arrow
' (apostrophe)	Up-right arrow
` (backwards apostrophe)	Up-left arrow
/	Back-left arrow
\	Back-right arrow
[Left border
]	Right border
	Vertical Line

Here are a couple of examples:

- 1[GE] - This sign indicates to the pilot that they are on taxiway "golf-echo"



- `1[G]d[F\]m[11R-29L]` - This sign will tell a pilot that they are located on taxiway Golf at the intersection with runway 11R/29L and that taxiway Foxtrot is back and to their right



Note the use of brackets in these examples. Brackets create the black outline around the letter on many of the signs, and if you omit the brackets the letter will have no "box" around it. You can also use brackets on direction and runway signs to increase the spacing at either end of the segment.

IMPORTANT! A sign with incorrect label formatting will not be rendered!

- Preview

This section will show a preview of the graphics that will be used to generate the Taxiway Sign in the scene. The preview can be created using either the Raw Label or by using the visual editor below the preview:

Choose the section for the label characters

Location

Mandatory/Runway

Direction/Information/Unkown

Choose or type directly the label characters

0	1	2	3	4	5	6	7	8	9	A
B	C	D	E	F	G	H	I	J	K	L
M	N	O	P	Q	R	S	T	U	V	W
X	Y	Z	-	[]			→	↗	↑
↖	←	↙	↓	↘						

This visual editor permits you to input the characters that make up the sign, as well as select the category for each section of the sign using the Location, Mandatory/Runway and Direction/Information/Unknown options at the top. Note that to create boxes you can use the square bracket buttons [].

IMPORTANT! When you use the visual editor, the Raw Label may show the "wrong" text descriptor (but visually the sign will look correct). For example, You may want to designate a Runway and expect the Raw Label to use "r" but it uses "m" instead. This is because visually the Mandatory and Runway options are identical and so only one identifying character is required, in this case "m" (and it will be "d" for Direction, Information, and Unknown sections).

When using the visual editor, the Preview will fill in:

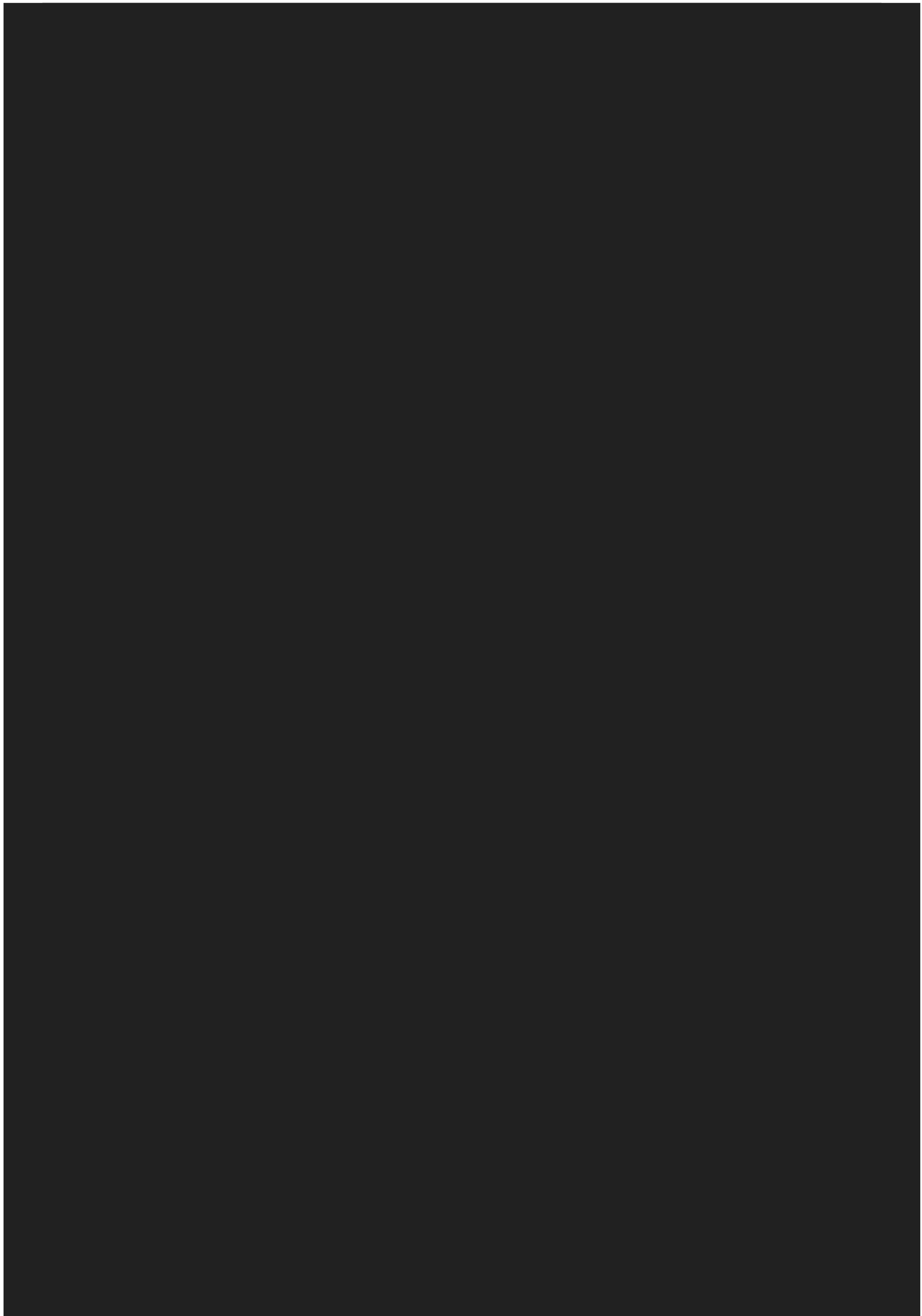
Preview

Symbols: [G][F\][11R-29L] (16/17)

G	F ↘	11R - 29L
---	-----	-----------

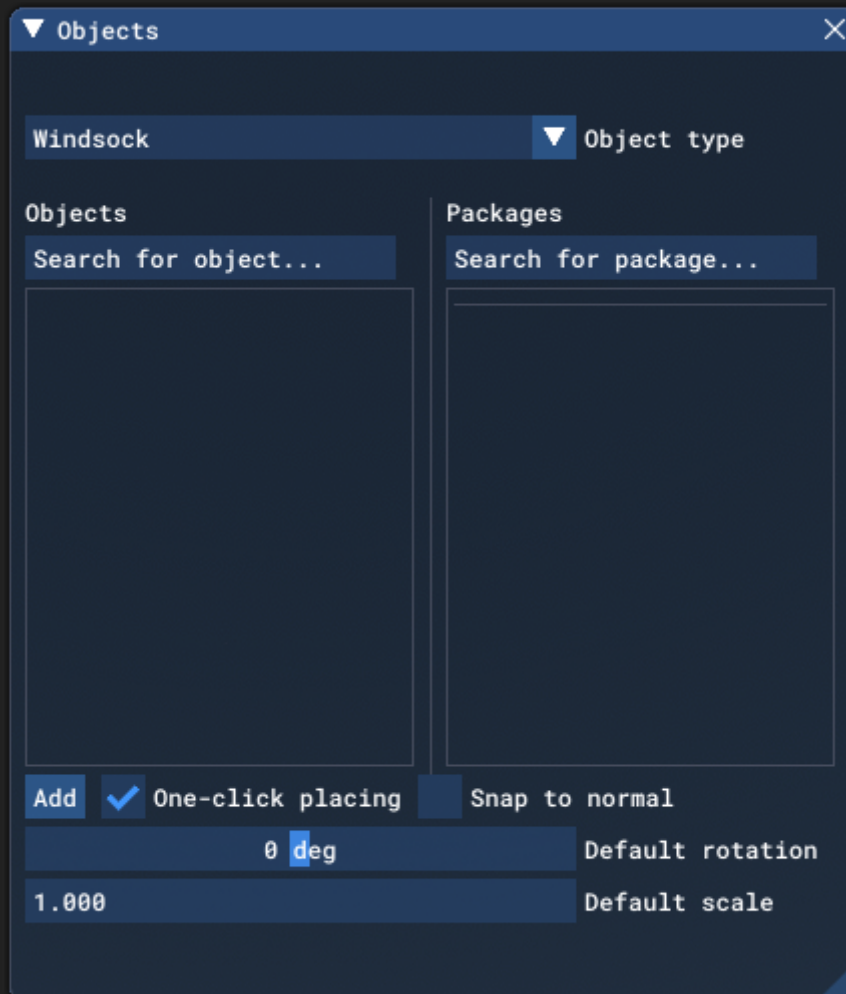
◀ ▶ Erase Clear

When you have any characters in the visual editor, you can click anywhere to place the cursor there, or use the arrow keys ◀ ▶ to move the cursor around. You can also delete a character at the cursor position using the Erase button, or clear the entire input using the Clear button.



WINDSOCK OBJECTS

A Windsock object is an object element that is *usually* used to add windsock SimObjects to [Airports](#), but can also be placed in the world outside of airports (for example on top of buildings, etc...). When you select this object type the [Objects](#) window will not show any different object elements as there is only one type of windsock by default and its behaviour is defined through the [Properties](#):

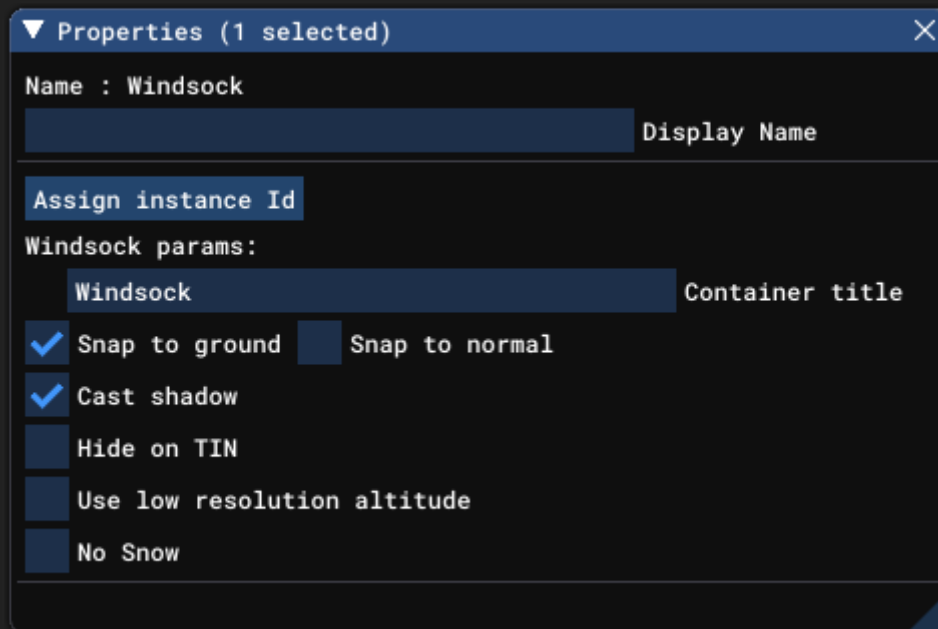


To place a Windsock object element in the scene you can click the **Add** button, and then use the Translate [Gizmo](#) to position the object where you want, or you can enable **One-Click Placing** and simply click in the world to place it. You may also use the Rotation [Gizmo](#) to change the angle the element is shown at, as well as the Scale [Gizmo](#) to change its size.

NOTE: While windsocks are generally created for airports, they do not require an airport object to be placed in the world to use them, and when added to the world, they will be added to the Scenery group.

Properties

Windsock objects have the following [Properties](#) which can be edited:



- Name

This is the name of the windsock element as defined from its file.

- Display Name

This is the name of the windsock element as it will be displayed in the [The Scenery Contents List](#). This can be edited and is helpful for identifying elements when you have a lot of items in the content list.

- Assign Instance ID

Clicking this button will create a GUID -formatted Instance ID unique to the instance of the windsock object element placed within the simulation. This is distinct to the GUID value (explained below), as the GUID will be shared by all elements of the same object, while the instance ID will be unique to each instance of that object. This can be useful for many things like when creating mission scripts (for example).

- Snap To Ground

This option is enabled by default, and will "snap" the windsock object element to the ground so that - regardless of the terrain height - the element will always be at ground level, even when moving it. Enabling this means that the altitude [Gizmo](#) does nothing, while disabling this will permit you to change the altitude. When this is disabled, you will have a new option present in the Properties window:

- Offset To Ground

This value is the altitude from the ground for the object, and editing it will raise or lower the element (and changing the altitude using the Translate Gizmo will also change this value automatically).

- Snap To Normal

When enabled, the windsock object element will change orientation based on the terrain surface normal underneath the center-point of the element. When disabled, it will maintain the default orientation regardless of the terrain underneath (or the orientation which is set using the Rotation [Gizmo](#), and note that when enabled the Rotation Gizmo will only affect the horizontal axis around the center of the element). This option is disabled by default.

- Cast Shadow

This option will enable or disable the ability for the windsock model to cast a shadow on the terrain. This option is enabled by default.

- Use Low Resolution Altitude

This option, when checked, will force the simulation to use a lower resolution altitude calculation when calculating the placement of the object in relation to the camera. In general this option only needs to be checked when the object is placed on a slope and you can see it "bounce" up or down in altitude as the camera gets closer/farther

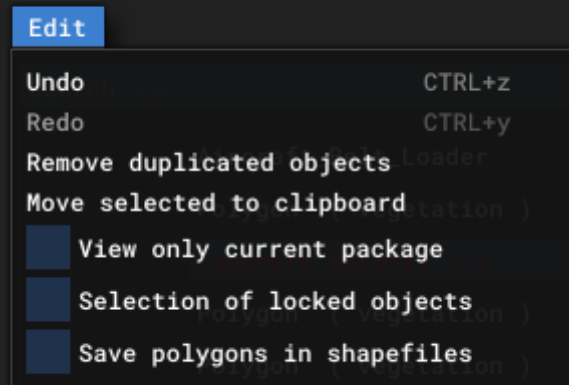
from it. Enabling this option should stop this changing visual altitude.

- No Snow

This option will enable or disable snow on the windsock, where appropriate. This option is disabled by default.

Menus

THE EDIT MENU



This menu is where you can use certain tools for editing the in the Scenery Editor, as well as set some options. Each item in the menu is explained below.

- Undo/Redo

Clicking either of these options will undo or redo the editor states by one state position. For example, if you perform 3 actions in the Scenery Editor then select Undo 3 times, you will take the editor back to the state it was in when you opened it, before making any changes. Clicking Redo 3 times would then take you back to last state it was in after making changes.

You can perform these actions using the following keyboard shortcuts

- **Ctrl** + "**Z**": Undo
- **Ctrl** + "**Y**": Redo

You can also open the [Undo History](#) window from [The View Menu](#) to see all of the stored undo/redo states and then skip directly to the one you want to be at.

- Remove Duplicated Objects

This option is specifically for [Taxiway Parking](#) and Scenery object types, and will remove any object elements of the given type that share the same position within the world.

- Move Selected To Clipboard

This option will copy the selected object element(s) to the clipboard, and a new option will be present in this menu to paste them at the current position. In this way you can copy/paste objects within the scene.

- View Only Current Package

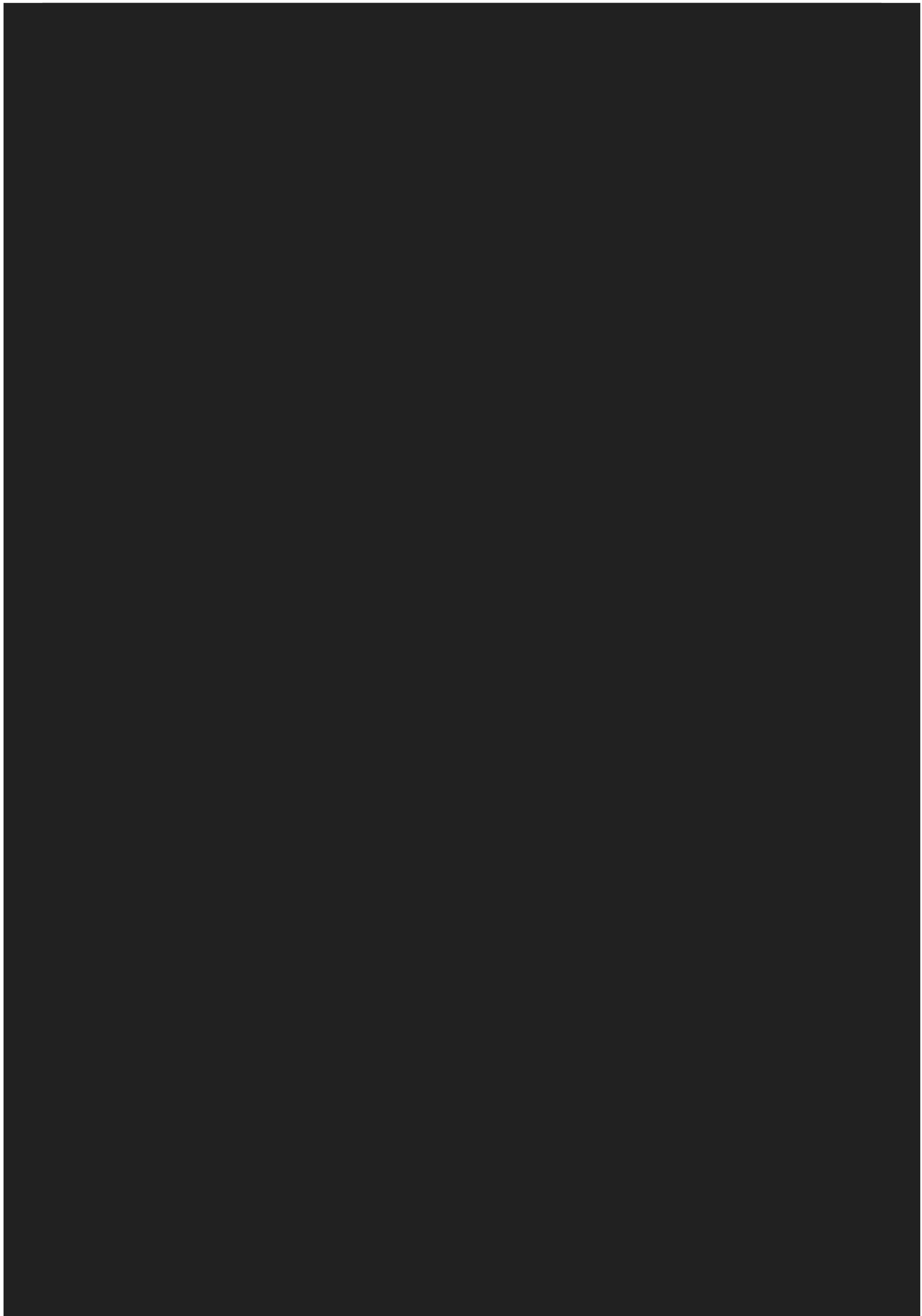
Checking this means that only objects in the currently selected package will be shown in the simulation.

- Selection Of Locked Objects

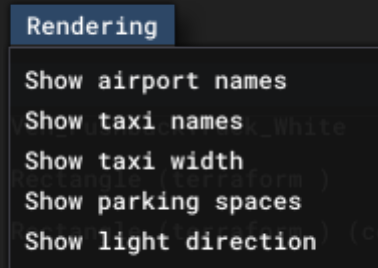
When this option is checked, you will be able to select object elements that have been "locked" in [The Scenery Contents List](#) by clicking on them or by using the multi-select (**Shift** + Left Mouse Button + Drag).

- Save Polygons In Shape Files

When you select this option, clicking the **Save Scenery** button will not only save any edits to the project, it will also open a file explorer for you to select a location to save all the polygon objects as shape (*.shp) files. Before saving you should have created a new asset group (of the BGL type) in the Project Editor, and the files should be saved to this folder in PackageSources. These files can then be edited in an external editor and imported again as part of the scenery project by selecting the asset group in the project editor then using the **Load This Asset Group** button from the Scenery Editor.



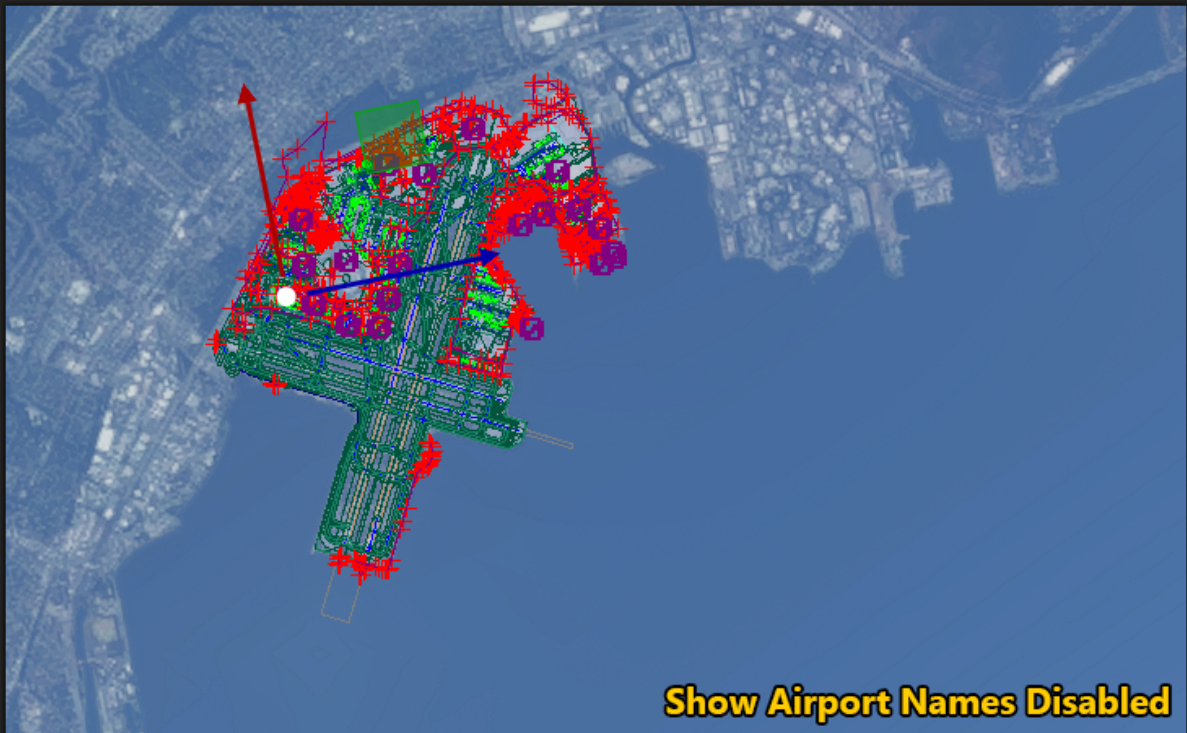
THE RENDERING MENU



This menu permits you to enable/disable some extra rendering details within the simulation. The options available are:

- Show Airport Names

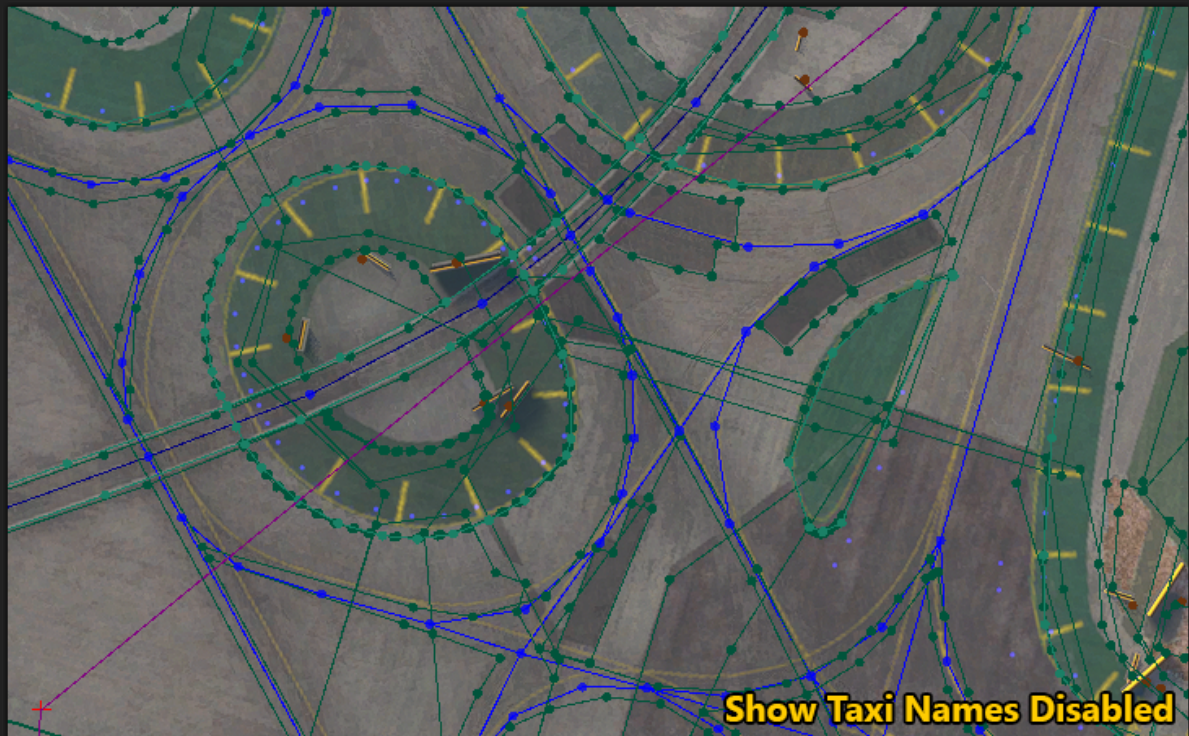
When enabled, this will show the name of the airport and also show the area that the airport covers (as a blue polygon edge).

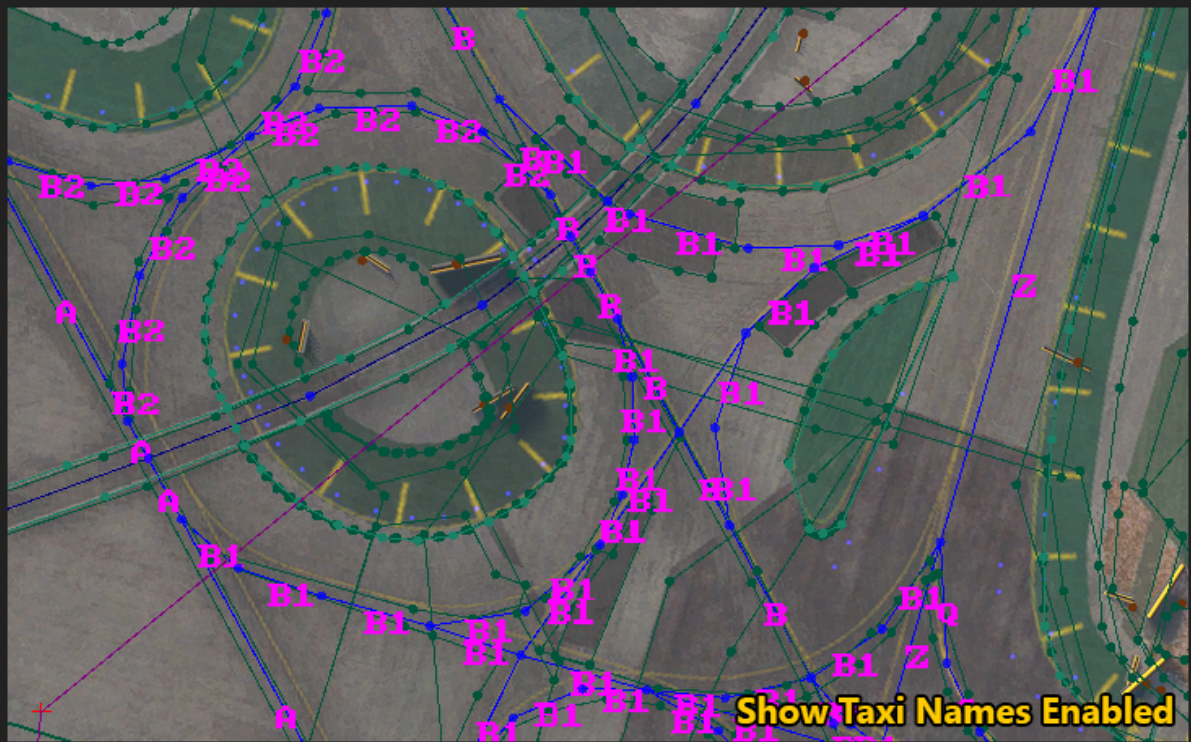




- Show Taxi Names

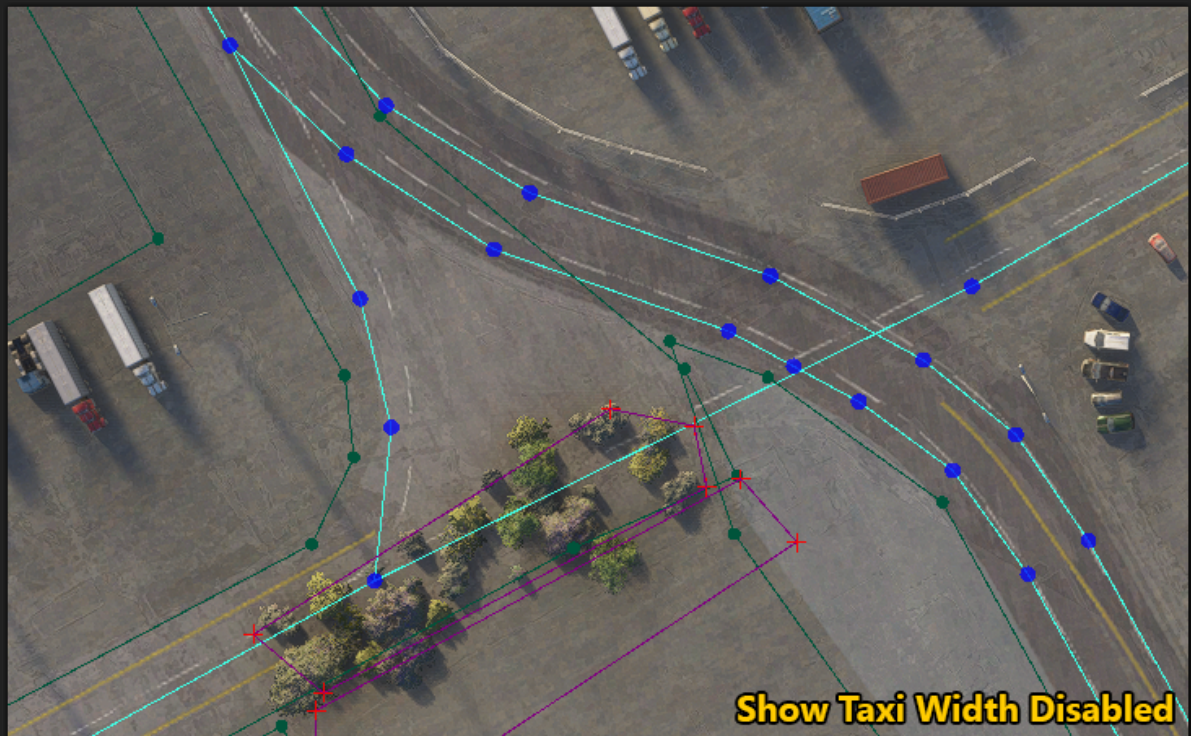
This option will show the names of the different taxiways when enabled, as shown in the images below.

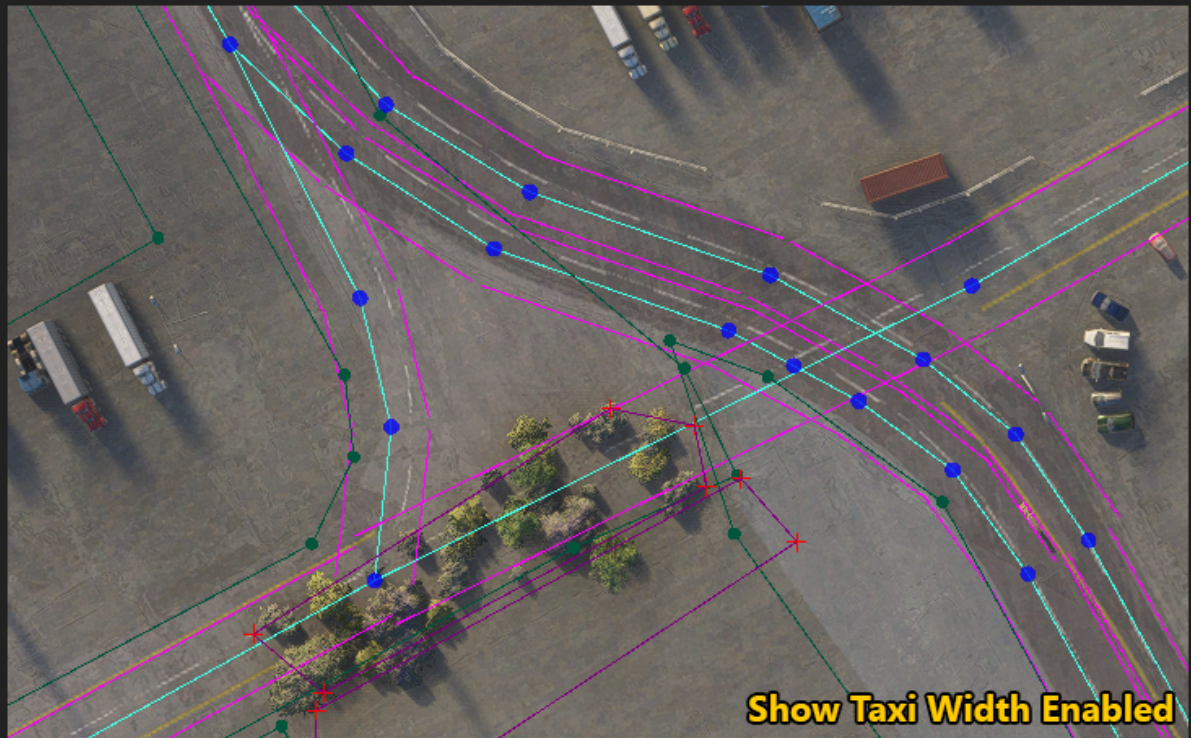




- Show Taxi Width

By default, taxiways are drawn as a single path of lines connected by points. Enabling this option will also render the width of the taxiway, as shown in the images below.





- Show Parking Spaces

Parking spaces are shown by default in the simulation, but when you enable this option, an extra circle will be drawn around the parking space that indicates where additional items can spawn (for example, ground vehicles).



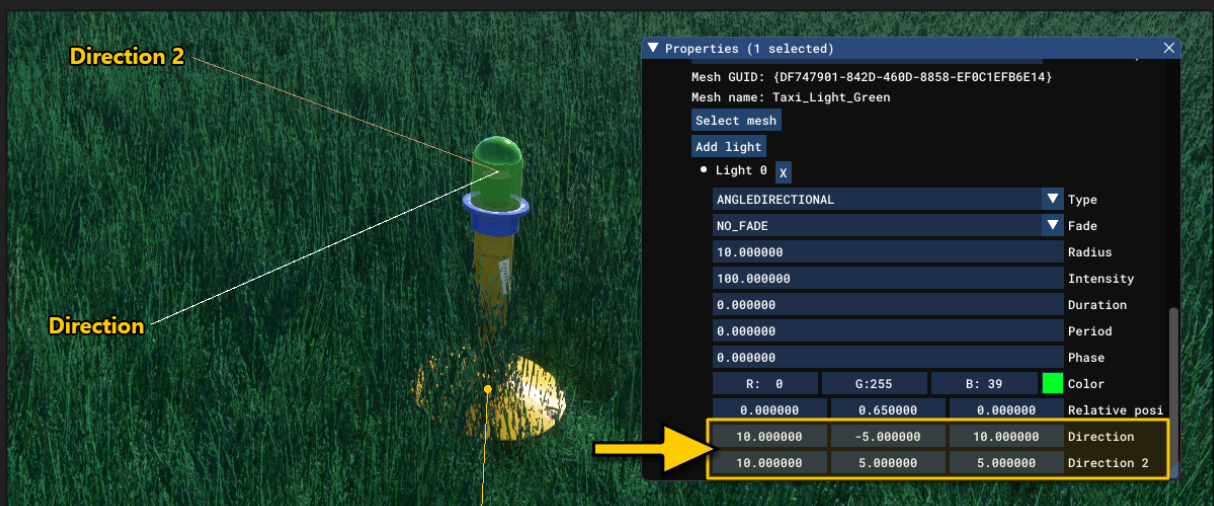


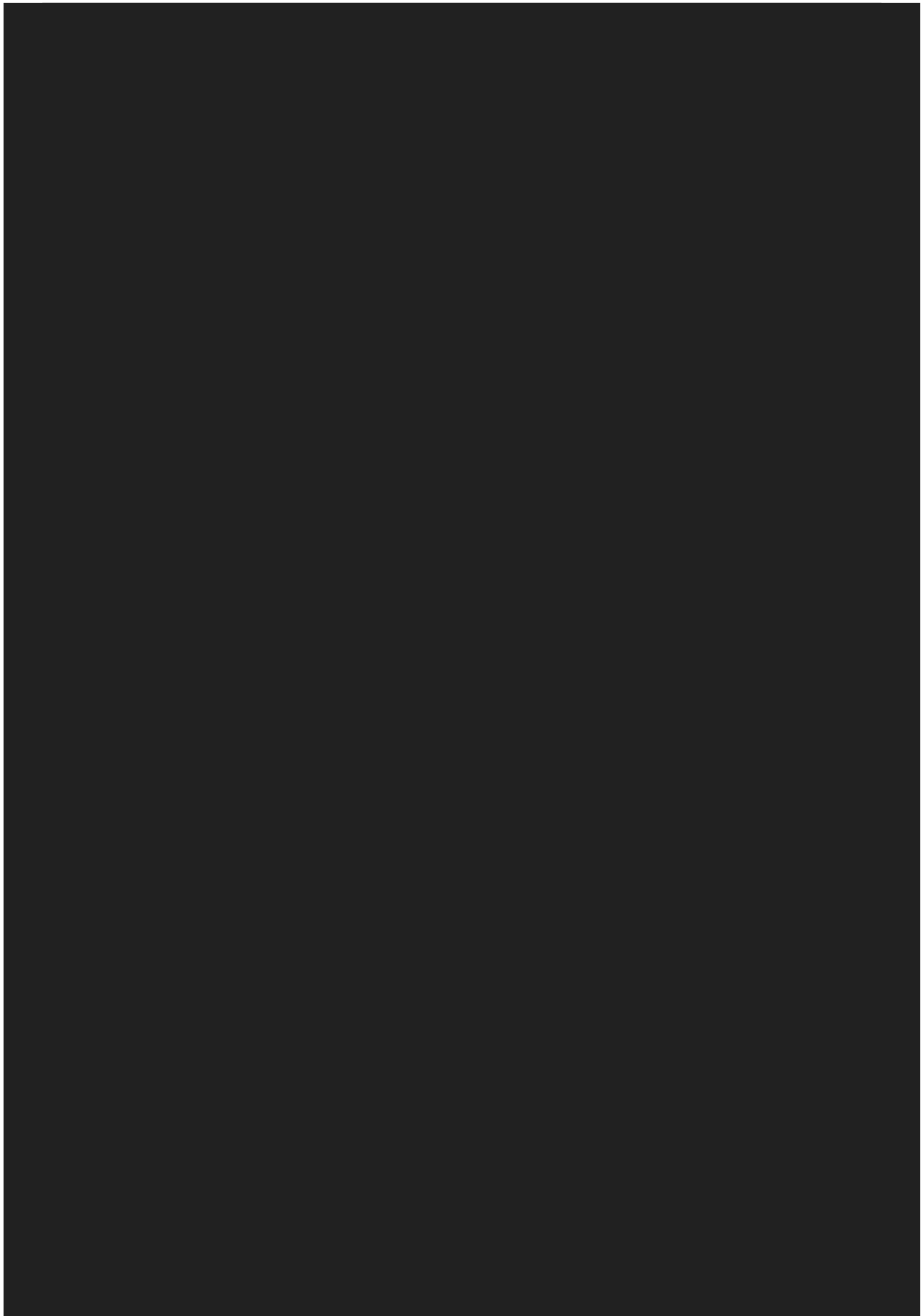
- Show Light Direction

When creating it can be difficult to get a "feel" for the different directions required, especially when working with Angled Directional or Fresnel lights, for example. Enabling this option will help with this, as it will render - on the first light of the [LightRow Object](#) using the preset - two lines:

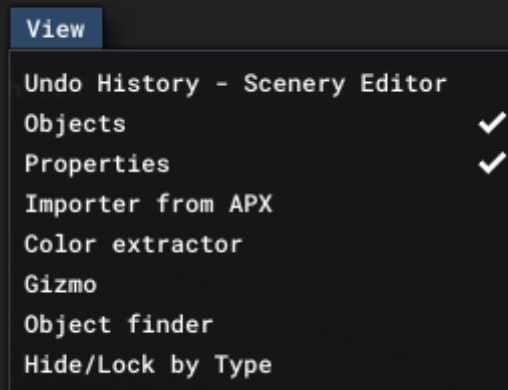
- a white line which represents the preset Direction parameter
- an orange line which represents the preset Direction2 parameter

As you edit the values for Direction and Direction2, these lines will show the vector formed by the light position and the direction x/y/z position.



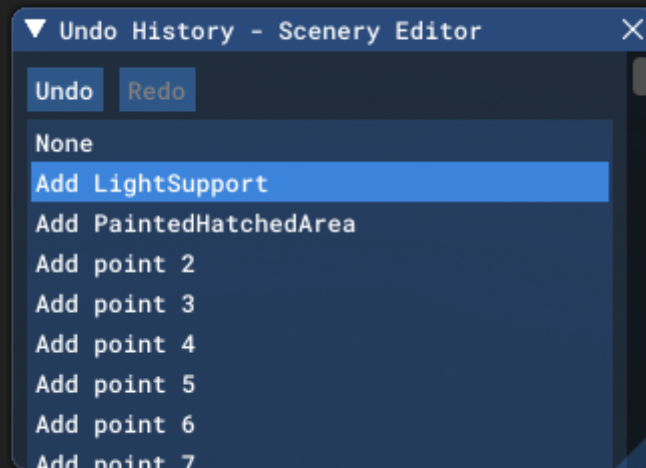


THE VIEW MENU



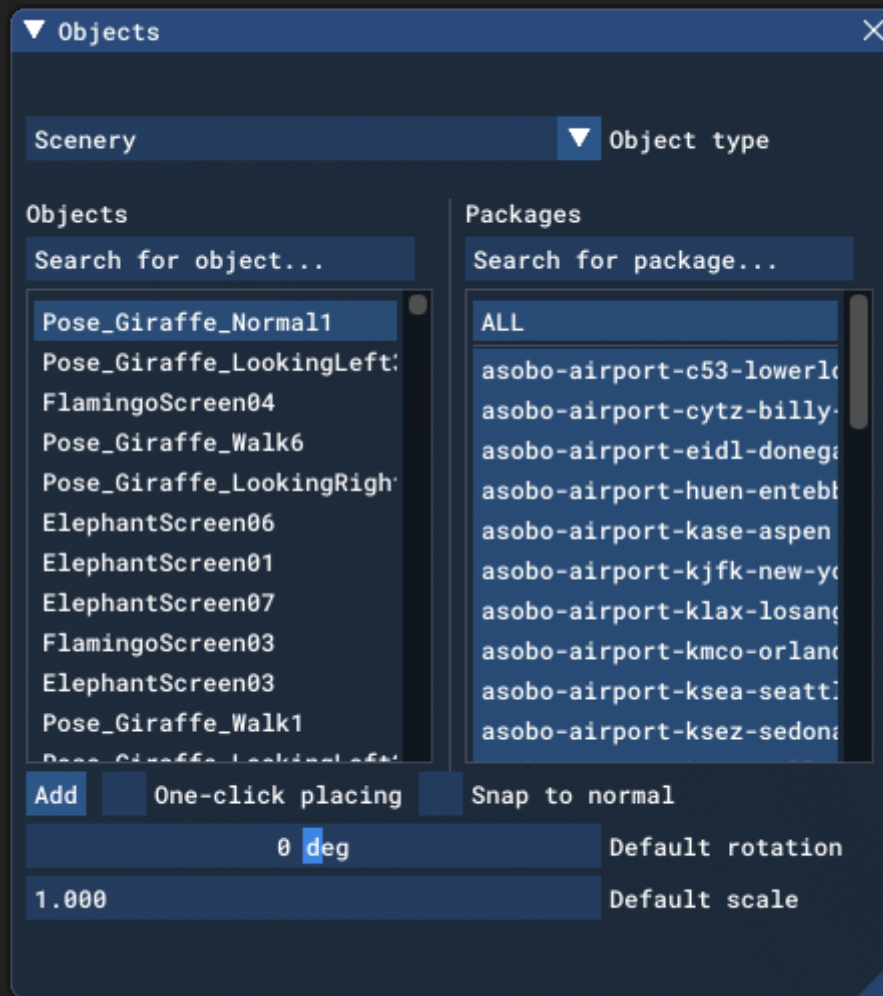
This menu is where you can open the different Scenery Editor views (windows). Each item in the menu is explained below.

- Undo History



[The Scenery Editor](#) supports undo/redo functionality which can be accessed through this window, or alternatively using the keyboard shortcuts **Ctrl** + "**Z**" for undo, and **Ctrl** + "**Y**" for redo. From this window, however, you can select any item from the list and "reset" the editor to that state without having to go through each of the steps before or after. If you want to step through the state list, you can use the aforementioned shortcuts, or use the **Undo** and **Redo** buttons at the top.

- Objects



The Objects window is where you can browse, select and add the different "objects" that are available to use in [The Scenery Editor](#).

NOTE: When we talk about "objects" we are referring to anything that can be used a scenery editor element, and this includes non-physical things like polygons, exclusion rectangles and waypoints.

At the top of the window you have a drop-down menu where you can select the Object Type that you want to add. There are a lot of different types, and each one is explained in full from the [Objects](#) page.

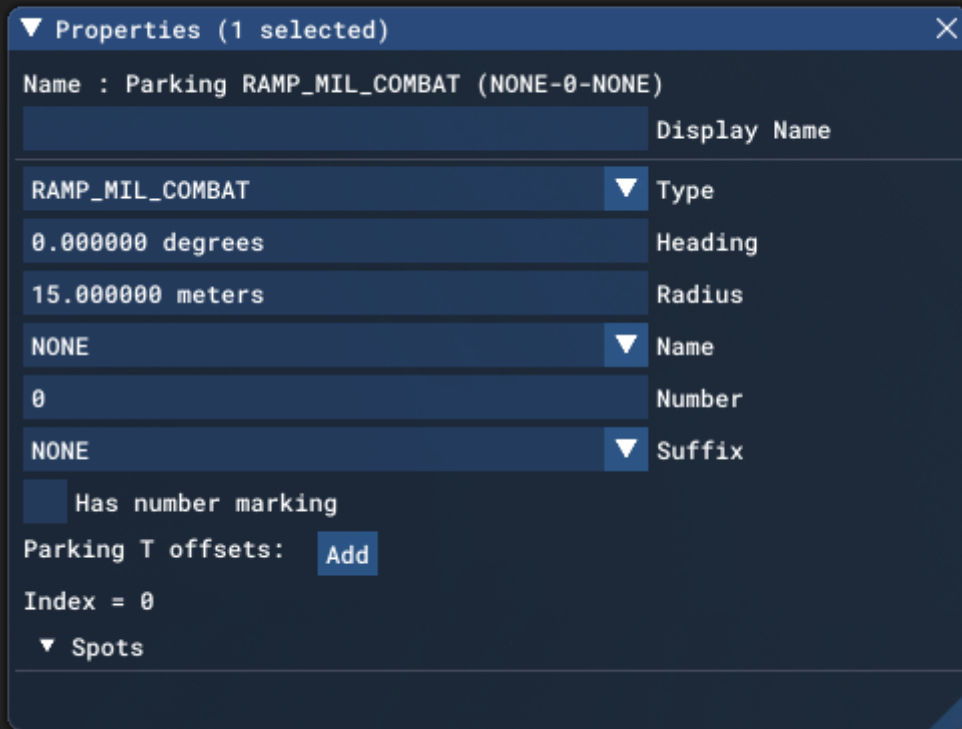
Once you've selected the type, on the left of the window you may be presented with a list of Objects within that type that can be placed in the scene (not all types have objects to choose from though). The right of the window will show all the Packages that the have objects of the selected type. You can use the Search For Object input field to add filters to use for the list of objects, and

you can use the Search For Package input field to add filters to the list of packages. Note that you (if available) you can select the All option from the package list to show the appropriate object from all installed packages. Note that for both search filters, the filter keyword can be used to show *only* those elements that contain the word, or *exclude* elements that contain the keyword. Exclusion is achieved by prefixing the keyword with "-", for example "-runway" would exclude elements with the word "runway" in their name.

To add the object to the scene, you would select the object you want from the left hand list (if available, as some objects - like polygons - don't have anything to choose) then click the **Add** button which will place the object instance in the scene at the center point where the camera is positioned. If you have enabled the option One-click Placing, then simply clicking in the scene will directly place the object element at the mouse position. You also have a Snap To Normal option that - when enabled - will snap placed elements to the terrain surface normal.

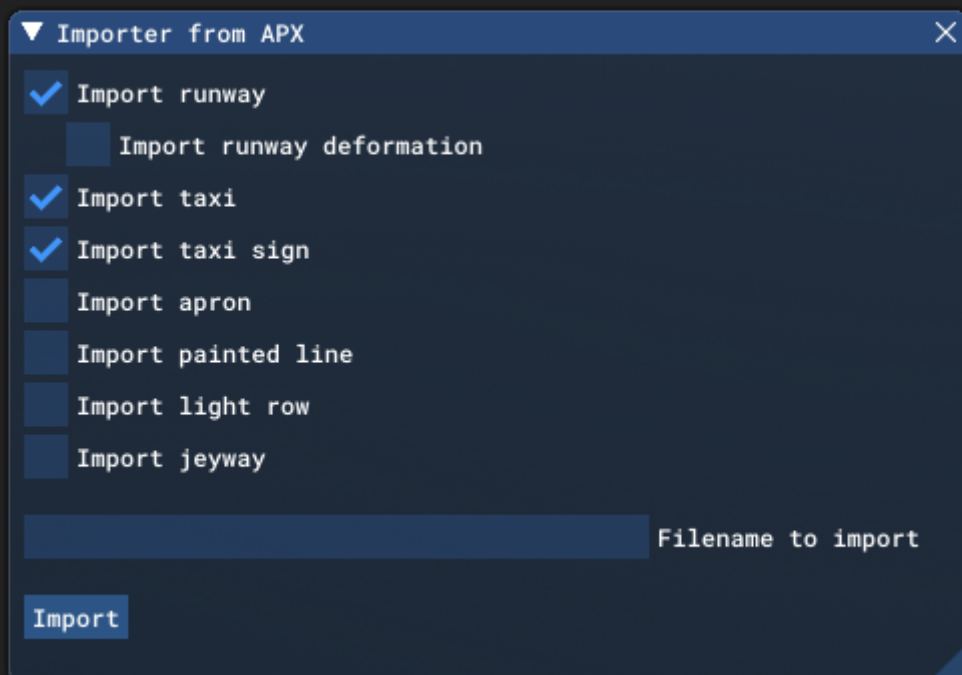
Finally, you can edit the default rotation and scale for the elements as they are added. Changing these settings will influence how *all* subsequent object elements will look when added to the scene.

- Properties



This window shows any element specific properties for the currently selected object element. The actual contents of this window will change depending on the selected Object Type, and are listed along with the type information on the [Objects](#) page.

- Importer From APX



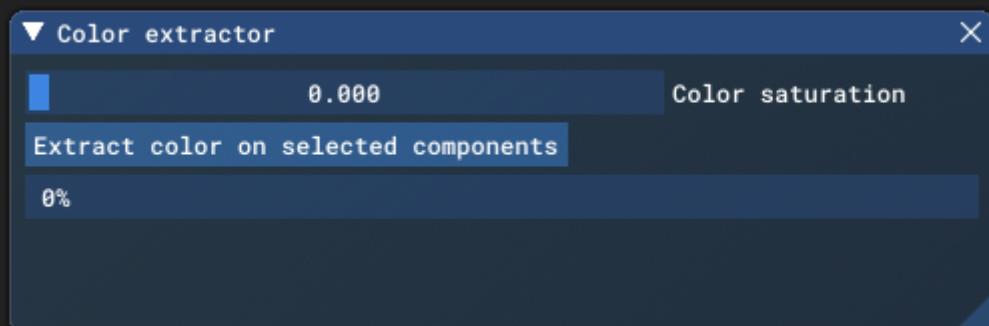
This window permits you to import some of the elements from one airport into the current one being edited. Before you can use this

window, you must have created an airport object element in the scene (see [Airport Objects](#) for more information). The available options in this window are:

- **Import Runway:** When checked the runways from the given file will be imported to the airport.
- **Import Taxi:** When checked the taxiways from the given file will be imported to the airport.
- **Import Taxi Sign:** When checked the taxiway signs from the given file will be imported to the airport.
- **Import Apron:** When checked the aprons from the given file will be imported to the airport.
- **Import Painted Lines:** When checked the painted lines from the given file will be imported to the airport.
- **Import Light Row:** When checked the light rows from the given file will be imported to the airport.
- **Import Jetway:** When checked the jetways from the given file will be imported to the airport.

After making your selections, you then add the path to the file you want to import the object elements from to the **Filename To Import** field. When finished click the **Import** button to import the elements.

- **Color Extractor**



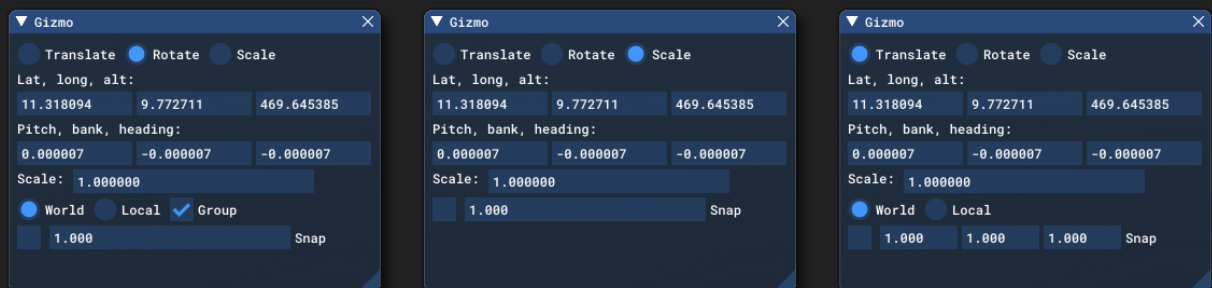
The purpose of this window is to permit you to retrieve the ground color and apply it to [aprons](#), [taxiway paths](#), and [runways](#). This tool can be used in two different ways:

- Select an object (or objects) in the scene that you want to apply it to then click the **Extract Colour On Selected Components** button
- Select the [Airport](#) group in [The Scenery Contents List](#) then in this window click the **Extract Whole Airports Colour** button.

After a few seconds, the simulation will reload and the colors will have been applied to the selected object(s), or to all applicable objects within the airport. The actual colour that is applied will be an average of the sum of the colours that are detected underneath the applicable objects - this is calculated by sampling the colour of each ground pixel found under the object(s) and then getting the average over all pixels.

IMPORTANT! This tool is currently under development and may not work correctly 100% of the time, and it may also cause stability issues with Microsoft Flight Simulator. As such, use at your own risk.

- Gizmo

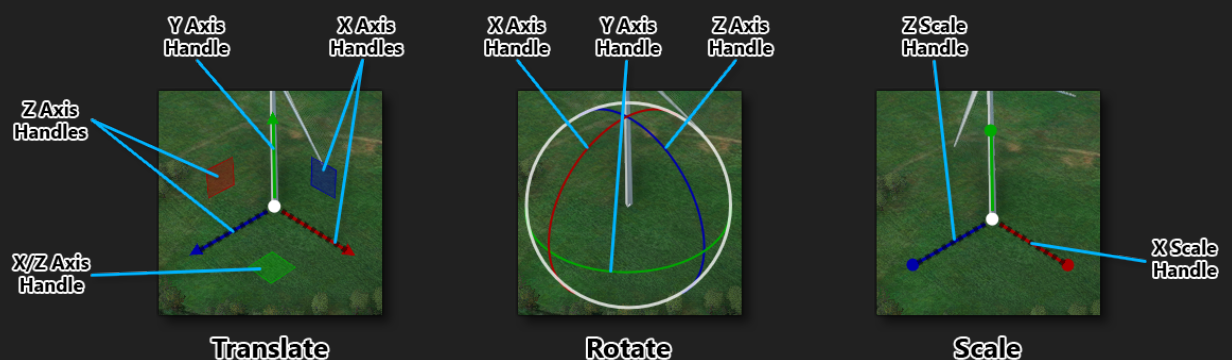


The Gizmo window permits you to change the properties of the translate/rotate/scale gizmos using the following input fields and buttons:

- Translate/Rotate/Scale: Select which kind of gizmo you want to use to apply changes to the object element.
- Lat/Long/Alt: Set the position using latitude and/or altitude for the object element. These values will automatically change when manipulating the gizmo handles on the element(s) in the simulation, but you can also input values here manually. Note that the altitude value may not be editable if the Snap To Ground option is checked in the element [Properties](#).

- Pitch/Bank/Heading: These are used to set the rotation of the object element along the X/Y/Z axis. These values will automatically change when manipulating the gizmo handles on the element(s) in the simulation, but you can also input values here manually.
- Scale: Set the size scale as a multiplier. For example, a value of 0.5 is half the base size, while a value of 2 would be double the size.
- World/Local: Selecting this will change the Gizmo UI to be based on the world location/angle or on the local location/angle.
- Group: This option is only available to the Rotate Gizmo and changes how grouped elements will be rotated. If this is checked, then 2 or more elements being rotated together will rotate around the common axis of the gizmo (the center-point between all elements), while un-checking this will cause all elements to rotate around their *own* center-points.
- Snap: This option permits you to enable/disable value snapping, as well as set the snap amount. For example, when scaling, if you enable this option and set the value to 2, then the gizmo handles will only permit you to increment or decrement the object element in steps of 2.

As mentioned in the list above, each of the gizmos has different "handles" so you can adjust the placement/rotation/scale in the actual simulation:



To use the different handles, simply click and hold the left mouse button on them and then drag. If you have selected multiple object elements, then the gizmo will be placed in the approximate

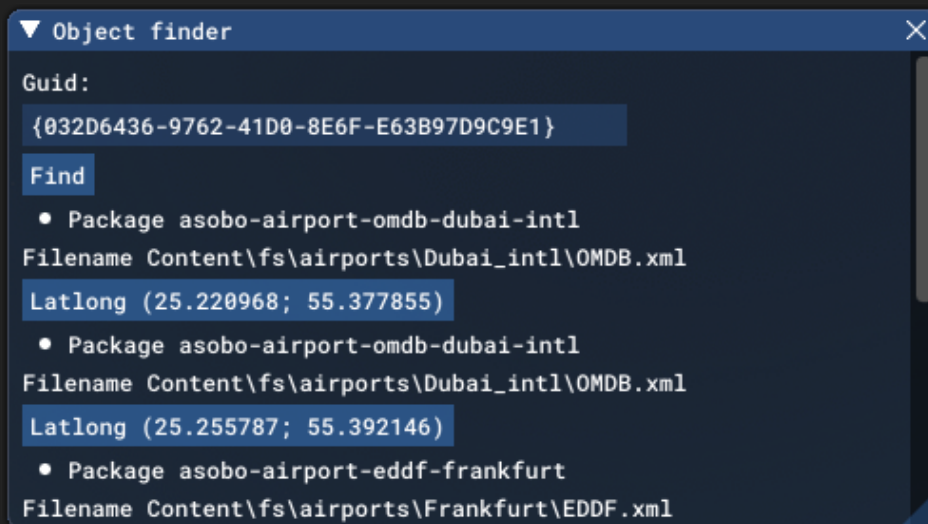
center of all of them and manipulating the gizmo with the mouse will move/rotate/scale all the selected elements together as one.

Finally, the following shortcuts are available when using the Gizmo:

- When using the Translate gizmo, holding down **Ctrl** + **Shift** then clicking and dragging the gizmo will duplicate the currently selected object(s).
- If you position the mouse over the center point of the Gizmo and click the middle mouse button, you can swap between the different Gizmo types (translate, rotate, scale).
- If you hold down the **Shift** key while using any of the Gizmo controls the controls will react with more precision.

IMPORTANT! If the object currently selected is locked in the Scenery Editor - or has the "Hide Edition Lines" option checked - then the values in the gizmo will NOT be editable, and the gizmo "handles" will not be visible in the simulation.

- Object Finder






This window can be used to check the GUID of an object element and see if all the references to it in the packages that make up the project. You supply the GUID to check (with no {}, eg: CA557D51-3E1B-4A35-B1D2-F01E90FB32A2), and then click the **Find** button. Depending on the size of the project and the number of packages it contains, this can take several seconds to complete.

Once the search has been completed, a list of all the packages that reference the given GUID will be shown, and each one will be accompanied by a [LatLong](#) button which you can click to be taken to the location of the object element in question.

- Hide/Lock By Type



This window controls how the information in the [The Scenery Contents List](#) is displayed. To start with, along the very top of the window, you have the "block check" options which are a series of options that can be applied to entire "blocks" of items. Below that you have a table where you can toggle on or off the following options for one or more specific groups of scenery objects:

-  Hide: Hide all of the selected object type(s) in the simulation.
-  Hide Edition Markers: Hide the edition tool overlay for the selected object(s) in the simulation (this will also temporarily lock the object so it can't be edited).
-  Lock: Lock the selected object(s) so they cannot be edited in any way.

