



Orbiter Base Maker Manual

*A basic guide to the general operation of
Orbiter Base Maker (OBM)*

OBM Version 2.0.3

February 21, 2013

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Preface

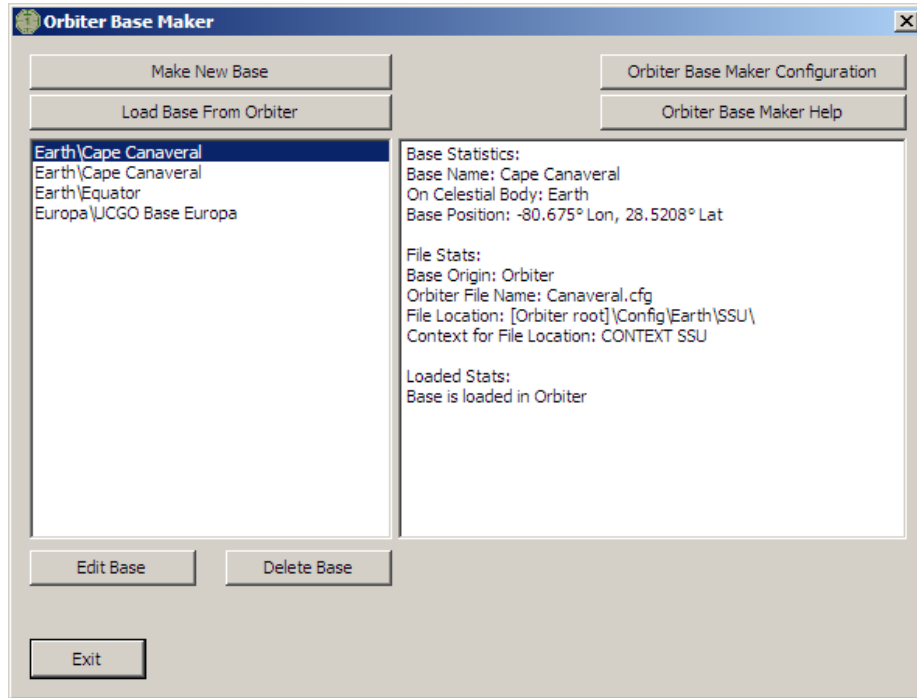
Orbiter Base Maker, or “OBM,” is an ongoing project that strives to provide a user-friendly interface for creating and adding bases for the “Orbiter 2010” space simulator. I originally started the project as a tool for downloading satellite maps, and processing those maps into tile textures for Orbiter bases. Development quickly got out of hand, and before I knew it I was rendering, rotating and stretching runways on top my own map GUI. From there, it was just a matter of saving points on a map into a base file, and viola - a new base is created!

Windows, Buttons, and Boxes - the GUI explained

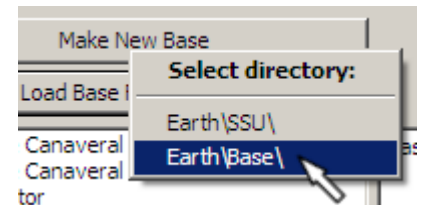
This section goes over the different windows that appear inside OBM, and gives a brief overview of the functions inside each one.

Main Menu

This is the first window to appear when OBM is started.



- **Make New Base** – Click this button to add a new base to the base list. It opens the “Make New Base” window.
- **Load Base From Orbiter** – This button will first bring up a menu for you to select the celestial body from which to import the base. Then it lists the base “.CFG” files for that body. If the celestial body has more than one “base directory” in its configuration, a menu will ask you to select from which directory as well.
- **Edit Base** – After highlighting a base in the base list, click this button to open the “Edit Base” window which will allow you to edit the tiles and objects of that base. Double-clicking on a base in the list will also open this window.
- **Delete Base** – After highlighting a base in the base list, click this button to delete it.
- **Orbiter Base Maker Configuration** – This button opens up the “Configuration” window that changes the configuration of OBM.
- **Orbiter Base Maker Help** – This button opens the OBM user manual, which is a .PDF file.
- **Exit** – Exits OBM.
- **“Base Statistics” Window** – This window displays statistics on the highlighted base, such as its location, the celestial body it’s located on, and whether or not it is loaded into Orbiter. *Note: The base origin can be “User Created” or “Orbiter.”*



Make New Base

This window is created by the main menu's "Create New Base" button. It allows one to set the name and position of a new base. Clicking the "OK" button will exit this window, and the new base will appear in the base list of the main menu.

- **Select Planet or Moon** – This menu list allows you to select the planet or moon where the base will be stationed.
- **Base Name** – Type in the name of the base here.
- **Base Position** – If you know that Longitude and Latitude of the base you want to create, you can type them in here. If you don't know, click on the "Find on map" button.
- **Find on map** – Click this button to open up a map to select the location of the base you want to create.
- **OK** – Once you are finished setting the name and position, click this button to add it to the base list in the main menu.
- **Cancel** – Click this button if you want to exit this window without adding a new base.
- **Select .CFG File Location** – This menu will appear if the selected planet or moon has more than one base directory listed in its configuration file.

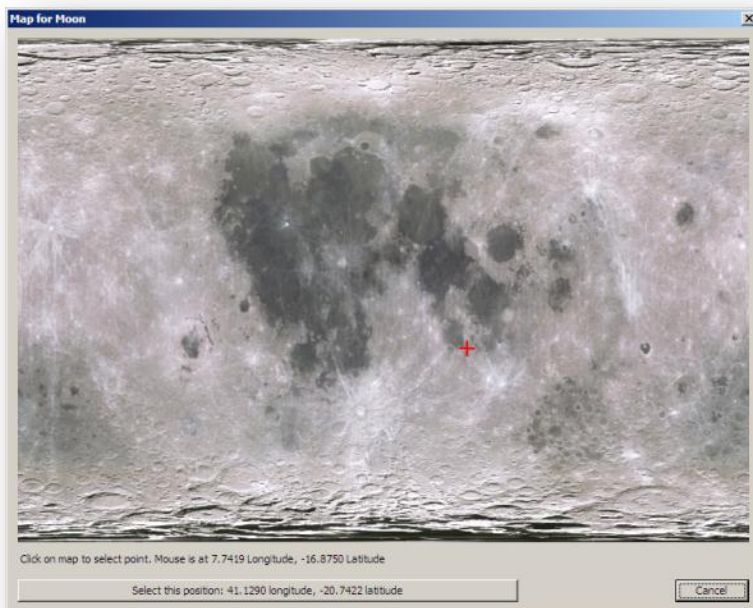
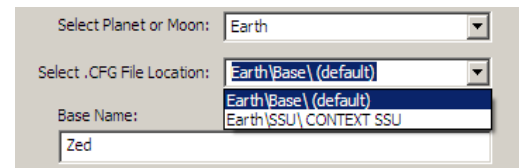
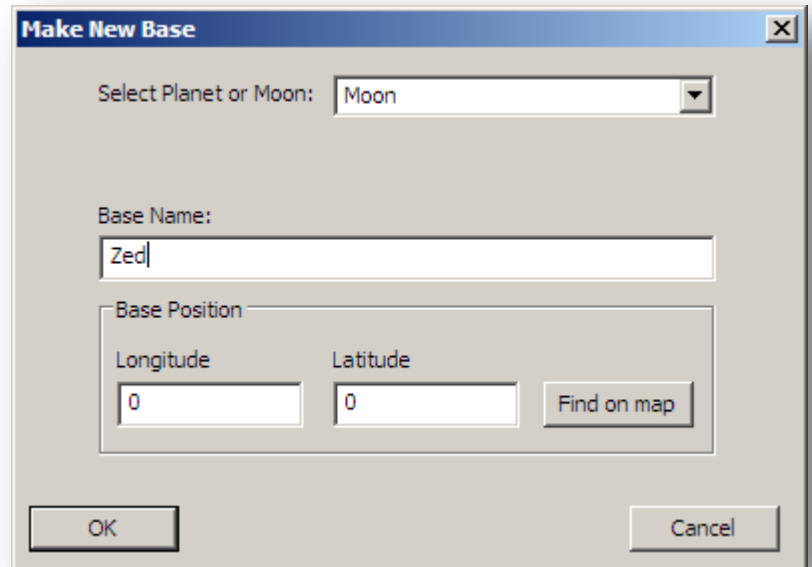
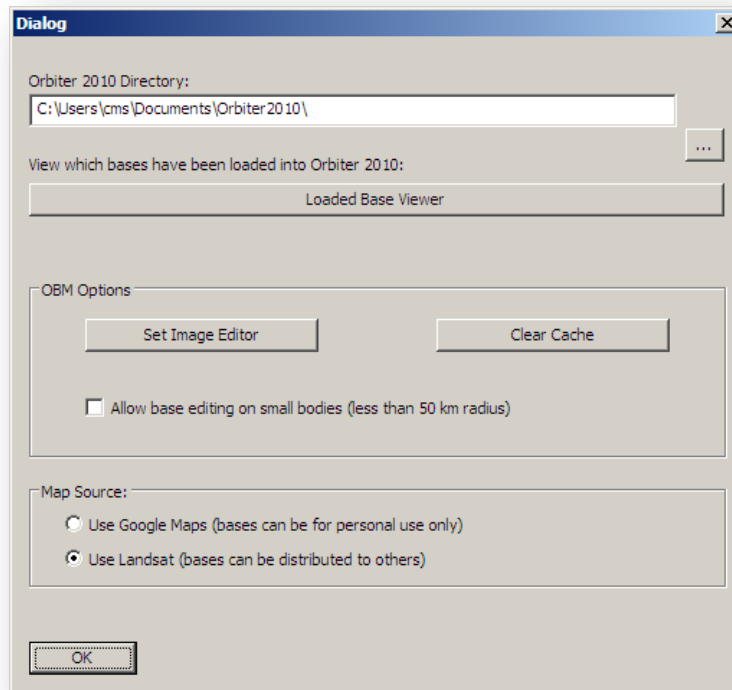


Figure 1 "Find on map" view for the Moon.

Configuration

This window is created by the main menu's "Configuration" button. It changes various configuration options of OBM.



- **Orbiter 2010 Directory** – This is the path to the directory where "Orbiter 2010" resides on this computer. Click on the "..." button to open a directory explorer window that will allow you to find and select the path.
- **Loaded Base Viewer** – This button opens the "Loaded Bases" window, which allows one to see and unload the bases OBM has loaded into orbiter.
- **Set Image Editor** – This button allows you to select the ".exe" file of an image editor for editing tile pictures. If none is selected, OBM will call the system's image editor.
- **Clear Cache** – This clears the cache files OBM creates for drawing.
- **Allow base editing on small bodies** – Because smaller bodies don't always align their drawn surface with the collision surface (where the vessels appear when landed), OBM won't include small bodies by default. Selecting this option allows one to add bases to small bodies.
- **Clear Cache** – This button clears the cache files that OBM created from downloading tile files.
- **Map Source** – This option selects where OBM will download image tiles for Earth. Google tiles can't be distributed to other people.

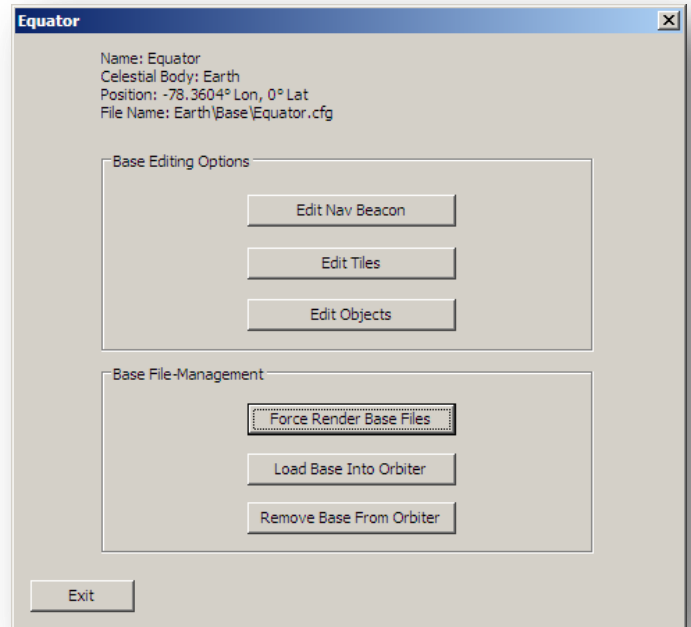
Things to Know:

- *Because tiles often have transparent portions, OBM uses the PNG file format. Make sure your image editor supports transparencies in order to take full advantage of OBM. If you don't have an image editor (besides MS Paint – which doesn't seem to support transparency) here are a couple good image editors that are free: [Paint.NET](#), [Gimp](#)*

Edit Base

This window allows you to select multiple options for base editing. You can open other windows to edit aspects of how the base looks in Orbiter. You can also render the base files, load this base into Orbiter, and remove this base from Orbiter.

- **Edit Nav Beacon** – This button opens the “Edit Navigation Beacon” window that allows one to add and edit the ID and frequency of a navigation beacon.
- **Edit Tiles** – This button opens the “Tile List Editor” window, which will allow you to add and remove surface tiles to the base.
- **Edit Objects** – This button opens the “Edit Objects” window, which will allow you to add, place and remove different objects such as runways, landing pads, and buildings.
- **Force Render Base Files** – This button forces OBM to render the tiles. This is useful if you’ve edited the tile images in an image editor, and you want OBM to use those changes.
- **Load Files Into Orbiter** – This button loads the base you created into the Orbiter installation that is set in the “Configuration” window. Once that is done, the base will be present the next time you start Orbiter. This button won’t be displayed if the current base settings are already loaded into Orbiter.
- **Remove Files From Orbiter** – This button removes your base from Orbiter. This button won’t be displayed if the base isn’t already loaded into Orbiter.



Things to know:

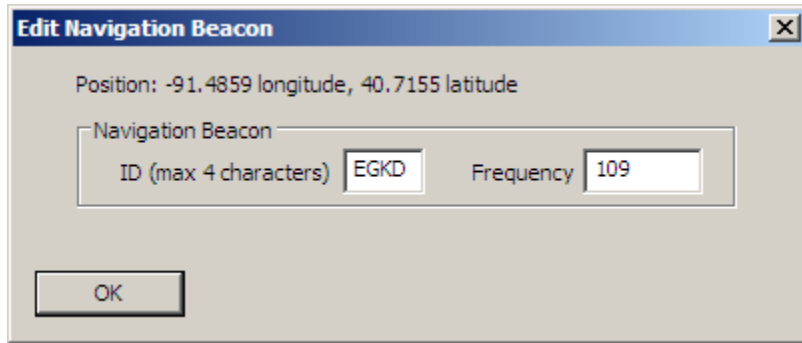
- *OBM will automatically generate scenario files! If you have at least one landing pad, OBM will make a scenario with a Delta Glider on the first landing pad. If you have at least one runway, OBM will make a scenario with a Delta Glider at the end of the first runway (conveniently facing in the direction of the runway of course). If you have no runways or landing pads, a scenario will be generated with a Delta Glider at the center of the base.*

Additionally, if the base was imported or created in a directory that has a “CONTEXT” associated with it, it will add that context to the scenario’s environment list.



Edit Nav Beacon

This window allows one to edit a navigation beacon for the base. For simplicity, this will only edit a few parameters of one navigation beacon (Orbiter supports multiple navigation beacons). If a navigation beacon(s) already exists for a base, this will load in the first beacon and display its information. If no beacon exists, it will create one and set the location to that of the base. Then it will set the ID to the first four letters of the base name, and the frequency to a random frequency between 108 and 139. Currently no option exists in OBM to change the beacon's location, but one can edit the ID and frequency with this window.



Things to know:

- If you would like to edit other parameters of the nav beacon, you can edit them in the base's .txt file. These files should be in your "[Documents]\Orbiter Base Maker" folder (make sure OBM isn't running when you edit it, or it may over-write your changes). The format of this file is similar to Orbiter, with a few variables added that are used by OBM (these variables begin with the prefix "OBM_...", please to mess with those). The nav beacons are located between the following lines:

BEGIN_NAVBEACON ; this starts the nav beacon list

<NAV list>

END_NAVBEACON ; this ends the nav beacon list

The format of the nav beacons is as follows:

Note: the nav beacon lines cannot begin with spaces or tabs.

<type> <id> <lng> <lat> <freq> [<range>]

where

<type> transmitter type. currently supported: VOR

<id> identifier code (up to 4 letters)

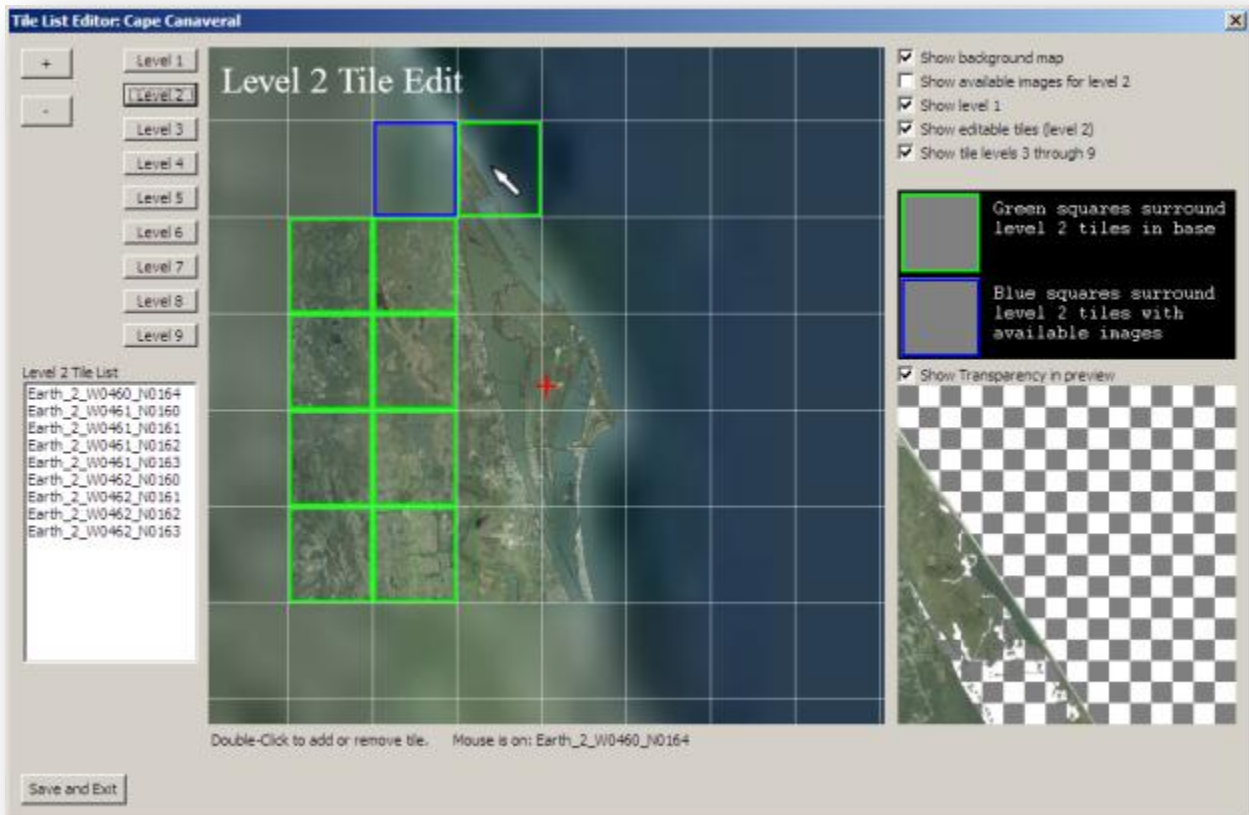
<lng> <lat> transmitter position (equatorial coordinates) [deg]

<freq> transmitter frequency [MHz]

<range> transmitter range [m] (default: 500 km)

Tile List Editor

This window is opened by the “Edit Base” window. It allows you to add and remove tiles from a base, and provides options for loading image files into tiles. Tiles are images Orbiter places on the Earth (or other body) to give the area the tile covers more detail. If you’ve ever noticed that the area around Cape Canaveral looks more detailed than other parts of the Earth, this is because of tiles.



In order for OBM to add a tile to a base, an image has to be available for that tile. OBM can get images for tiles in 2 ways:

1. Importing it from an image file.
2. Downloading it (Earth only). **Note that OBM can only download tiles in levels 1 through 4.** OBM will also not download images if it is zoomed out further than a level’s default zoom value.

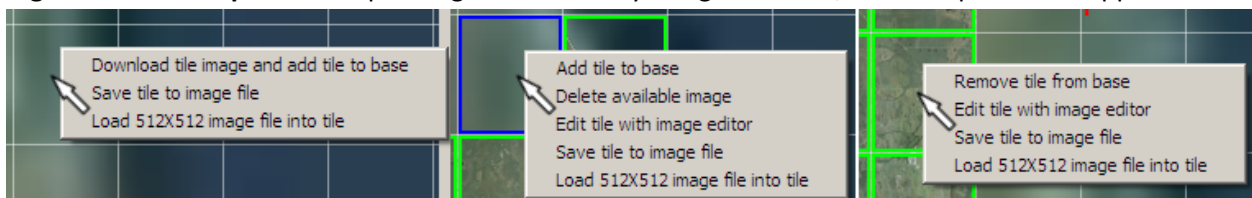
Once an image for a tile has been added to OBM, it will be in one of two states:

1. In the base list (it will be surrounded by a green square).
2. In OBM’s image cache as an “available image” (it will be surrounded by a blue square).

- – and + buttons zoom out and in.
- **Level 1-9** – Click these buttons to select which tile “level” you want to work with.

- **Show background map** – This checkbox toggles the display of the background map. This map is rendered from Orbiter’s “.tex” files, so it should be close to what is shown in game. Because of this, OBM needs to know which folder you’ve installed Orbiter (this is set in the “Configuration” window). Note that OBM only uses the default “.tex” file in the “Textures” folder. It won’t use any higher resolution “.tex” file from the “Textures2” folder.
- **Show available images for level X** – This checkbox toggles the showing of “available images” inside the tile editor (images for tiles that are in OBM’s image cache, but not in the base list). Note that these tiles won’t appear in a base until they are added, so leaving this checked may lead to confusion.
- **“Show level 1” or “Show levels 1 through X”** –This checkbox toggles showing tiles in levels that are below the current level being worked with. It can be useful for finding holes you want to cover.
- **Show editable level X** – This checkbox toggles showing tiles in the current level being worked with. It can be useful for finding holes you want to cover.
- **“Show levels X through 9” or “Show level 9”** –This checkbox toggles showing tiles in levels that are above the current level being worked with. It can be useful for finding holes you want to cover.
- **Show Transparency in preview** – Click this button to toggle the transparency display in the lower right “preview window.”

Right-click menu options – Depending on which tile you right-click on, a list of options will appear.



- **Download tile image and add tile to base** – (Earth only) downloads the tile and adds it to the base’s tile list.
- **Add tile to base** – (Only for tiles with available image) adds the tile to the base’s tile list.
- **Remove tile from base** – (Only for tiles in the base’s tile list) removes tile from base’s tile list.
- **Delete available image** – (Only for tiles with available image that are not in a base’s list) removes the image from OBM’s image cache.
- **Edit tile with image editor** – This will open the tile in an image editor. Note that if you change the tile, you may have to “Force Render Base Files” and re-add your base for the changes to appear (this is done in the “Edit Base” window).
- **Save tile to image file** – This allows you to save your own image file of the tile’s image. If an “available image” for the tile is in OBM’s cache, it will copy this file. If there is no available image, OBM will create the file from the background map (Orbiter’s “.tex” file for the planet or moon).
- **Load 512X512 image file into tile** – This allows you to take an image file (perhaps one you edited after you performed a “Save tile to image file”), and add it to the tile. It is recommended you use an image that has a width and height of 512 pixels.

Multi-select options – OBM now allows you to select multiple tiles, and perform some options on them.

Using multi-select

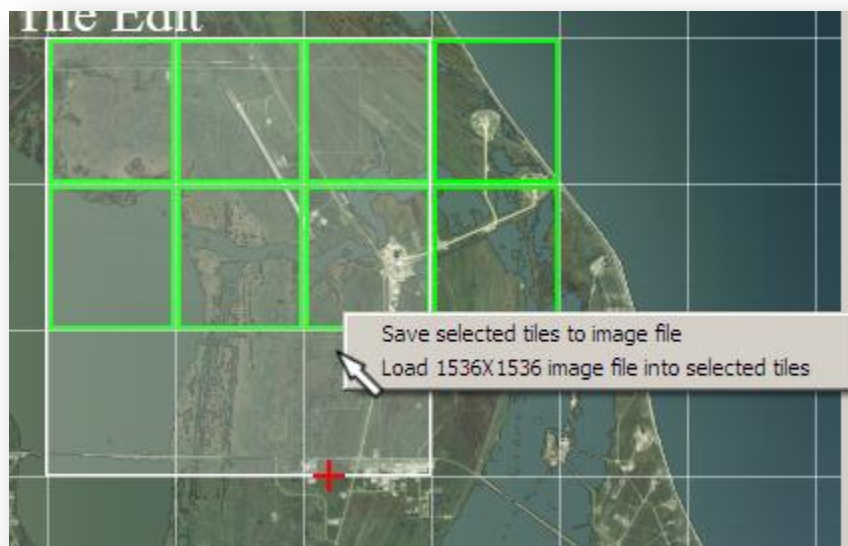


Left-mouse button click and hold

Drag mouse over desired tiles

Release mouse button

Once your tiles are selected, you can right-click in the selected area to get these “right-click” options:



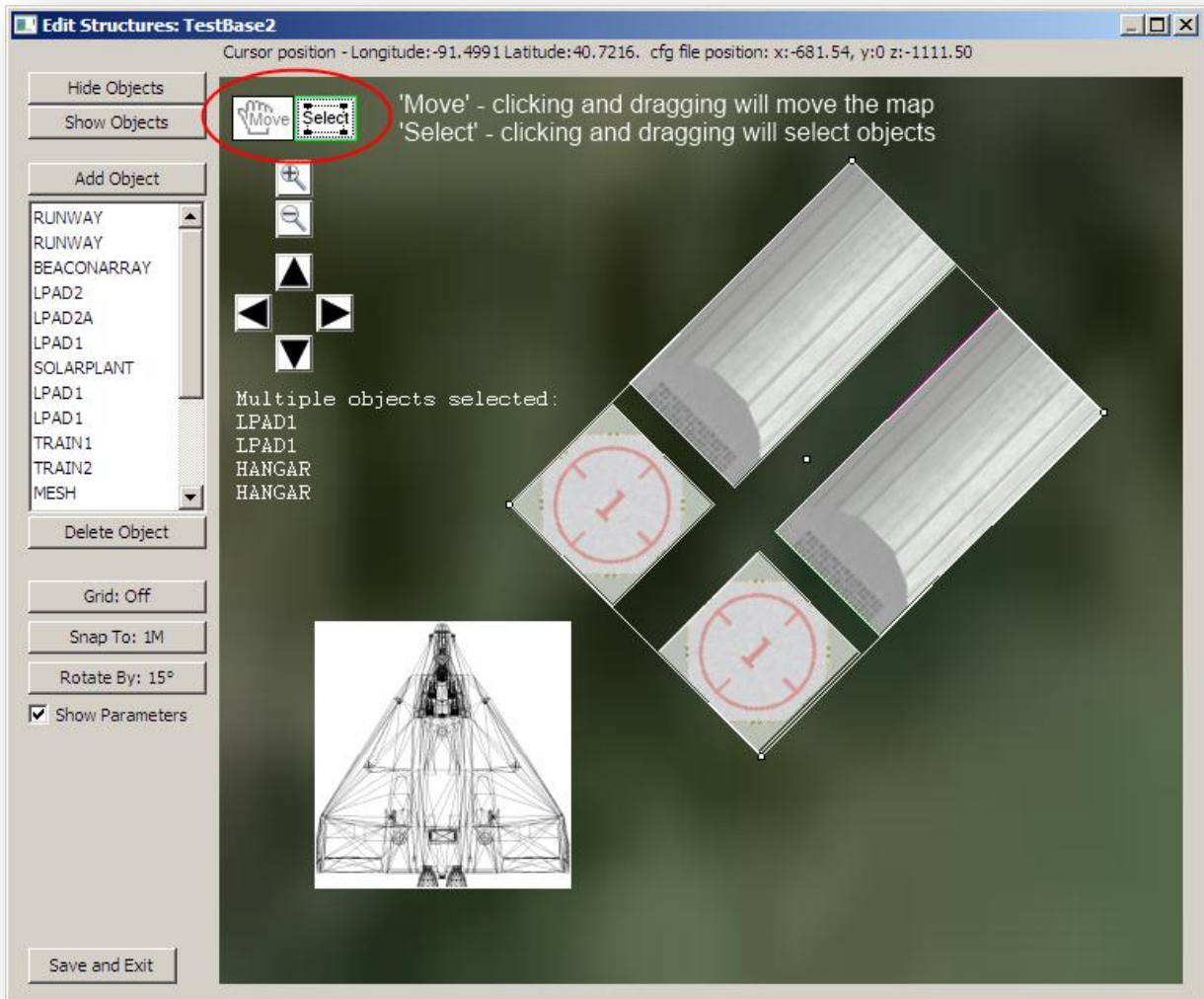
- **Save selected tiles to image file** – This allows you to save all the tiles into one “PNG” image file. Useful for editing. All the base tiles at the current edit level, and the base tiles below that level, are rendered into this file. If tiles have transparency, this will be included. If no image is available for any tile in the list, OBM will put the background map image in that tile’s location.
- **Load “Width”X”Height” image file into selected tiles** - This is useful for importing the image exported by the “Save selected tiles to image file” option above (after you edit it of course). Note that the resolution of the imported image has to match the resolution of the imported tile area.

Things to know:

- *Double clicking on a tile in the “tile selection window” will add it to the base. If the tile is not downloaded (which will be indicated by the “preview window”), Orbiter will download it. **Version 2.0.3 only supports downloading Earth tiles, and only from “Level 1” to “Level 4.”***
- *If you download too many tiles, the server providing the images will get angry at you and will stop providing them for a period of time. You may have to wait up to a day to download more.*
- *The “Mouse is on:” text below the “tile selection window” shows the name of a tile as it would be displayed in the “tile list.” This is also the name of the .dds file Orbiter uses for the tile texture file.*

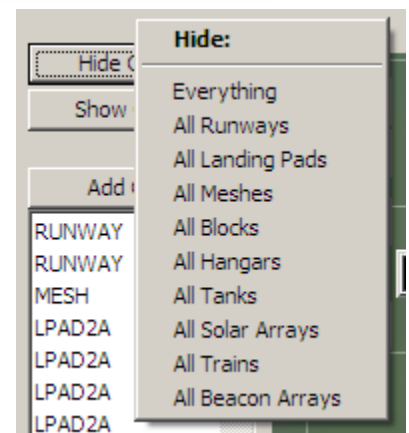
Edit Objects

This is where the bulk of the editing is performed. This window allows you to add, place, move, and remove different objects on a base, such as runways, landing pads and buildings.

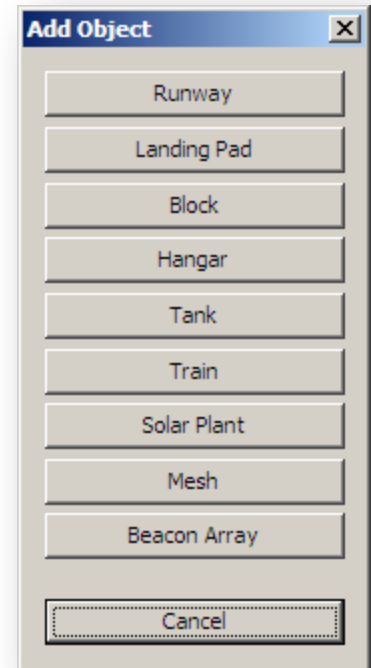


- **Hide Objects** – Sometimes objects can overlap (or just be distracting). So it is sometimes useful just to hide them from view. This button brings up a menu of objects to hide. One can also hide individual objects by “right-clicking” on them and selecting the “Hide Object” option.
- **Show Objects** – This button works the opposite way of the “Hide Objects” button. It brings up a list of objects to show.

Things to know: The “Hide Objects” action only works on objects in the base’s object list when it was pressed. In other words, if you hide “All Landing Pads” then add a new landing pad; the new landing pad will still be visible.



- **Add Object** – Clicking this button opens the window shown to the right. Select the type of object you want to add, and another window will appear that will allow you to edit some parameters of that object (giving a runway lights for example). Once you are happy with that, click the “Ok” button, and you will be able to place the object on the map using your mouse.
- **Delete Object** – Clicking this button will delete the object that is highlighted in the “object list.”
- **Grid** – OBM can draw a grid on the map with different grid sizes. Clicking the button displays a menu list for you to choose which size to draw (or none at all). Version 1.1.2 gives the options of 1, 10, 100, and 1000 meters.
- **Snap To** – Sometimes accurately placing objects next to each other can be a hassle. The “Snap To” feature causes OBM to move and size objects by a minimal discrete amount. For instance if “Snap To” is set to 10 meters, you can only move objects by 10 meters at a time. Sizing with “Snap To” is set to 10 meters means you can only size objects to some multiple of 10 meters.
- **Rotate By** – This button works similar to the “Snap To” button, only it deals with rotation instead of placement and sizing. With “Snap To” set to 15 degrees, you can only rotate objects by multiples of 15 degrees.
- **Show Parameters** – This checkbox toggles the displaying of the highlighted objects parameters. If one object is selected, it displays what OBM will actually write to the base’s “.cfg” file for the object. If more than one object is selected, it will list the type of objects that are selected.



Things to know:

- *You can zoom in and out with the mouse wheel.*
- *Clicking on an object on the map, or in the ‘object list,’ will select it for editing.*
- *Holding ‘ctrl’ while clicking an object on the map will toggle its selection status without affecting the status of other objects. I.e. you can use it to add or remove individual objects for selection.*
- *The arrow keys will move a selected object up, down, left, or right.*
- *Double clicking an object in the ‘object list’ will open the ‘Parameter Window’ for that object.*
- *Ctrl-C will copy a highlighted object; Ctrl-V will paste it.*
- *Ctrl-Z will ‘undo’ a change; Ctrl-Y will ‘redo’.*
- *Ctrl-A will select all objects.*
- *The ‘Delete’ key will delete the highlighted object(s).*
- *The ‘Esc’ key will clear the selection.*
- *Double-clicking on an object on the map will bring up its ‘Parameter Window.’*
- *Right-clicking on an object brings up options for opening its ‘Parameter Window,’ hiding the object, or opening a window where one can directly edit its .cfg file text.*
- *Objects with radio frequencies (runways and landing pads) are internally managed by OBM. Each new object will have its own unique frequencies, even if it was created by a “copy and paste” action.*
- *The ‘Edit Structures’ window is resizable. You can click on the lower right corner to resize it, or click the ‘maximize’ button on the top right.*
- *It’s possible to copy and paste between bases.*

Selected Objects on Map

When an object is selected on the map, it will appear highlighted and you will be able to move, stretch and rotate it. There are three basic types of objects: rectangular objects, end-point objects, and multi-selection.

Rectangular Object

Rectangular objects are objects like blocks, hangars and landing pads.

Look for the white square “points” that are displayed on a highlighted object (shown in Figure 2).

Clicking and dragging on these different points will manipulate the object in different ways. The “Move Point” will move the entire object. The “Stretch Point” will stretch the objects width and height, allowing you to make it thinner or wider. The “Rotate Point” will allow you to rotate the object.

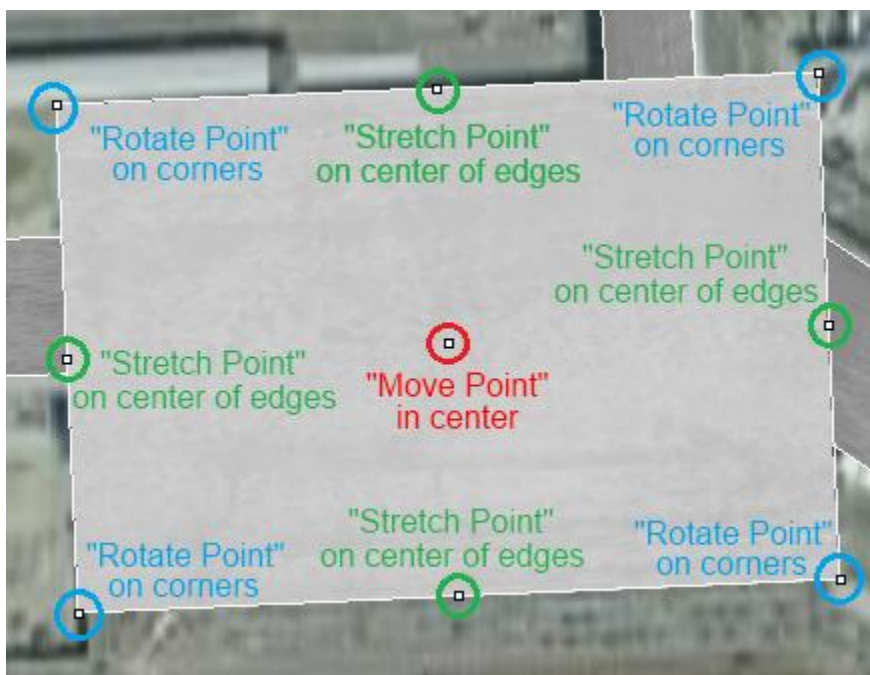


Figure 2 - Selected "Rectangle" Object

Things to know

- *Not all rectangular objects can have their width and height stretch independently. Landing pads have a fixed aspect ratio (they always have to be square), so altering the width also alters the height.*

End-point Object

End-point objects are runways and trains. These objects are described by two end points (runways also have width). As such, you can manipulate these objects by moving each end point independently.

Look for the white square “points” that are displayed on a highlighted object (shown in Figure 3). **Clicking and dragging on these different points will manipulate the object in different ways.** The “Move Point” will move the entire object. The “Stretch Point” will stretch the objects width, allowing you to make it thinner or wider. The “Move End Point” will allow you to place where that end-point is located.



Figure 3 – Selected “End-point” Object

Things to know

- *Trains have no width, so they have no “Stretch Points.”*

Multi-selection

Selecting more than one object creates a 'multi-selection.' This can be accomplished by either clicking the 'select' button on the map, and clicking and dragging over objects, or by holding the 'ctrl' key down while clicking on objects.

Multi-selection works in a similar manner as individual objects, except there is no 'resize' option. The 'Move Point' is at the center of the selection, and the 'rotate points' are at the corners.

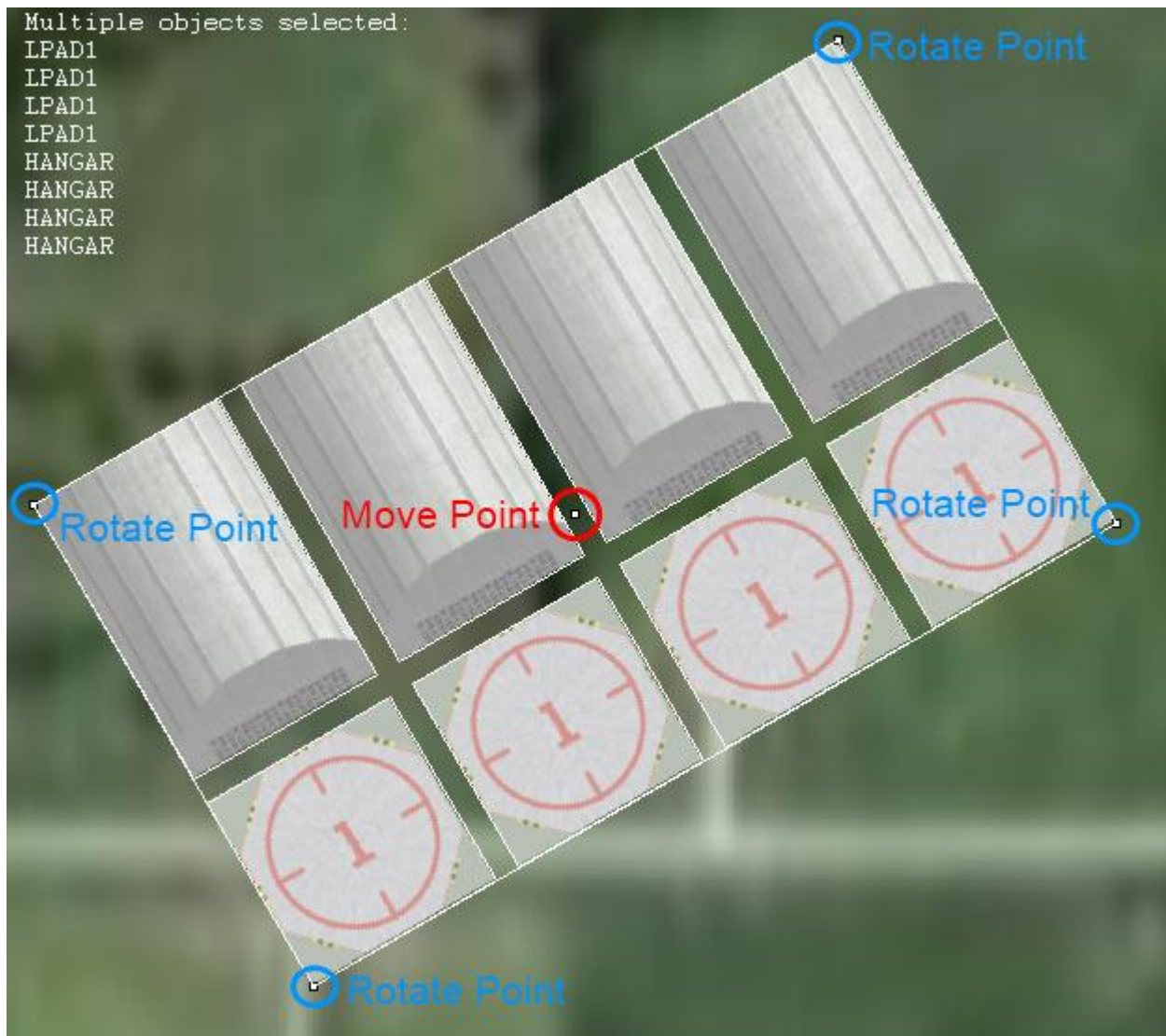


Figure 4 – Multi-selection

Parameter Window

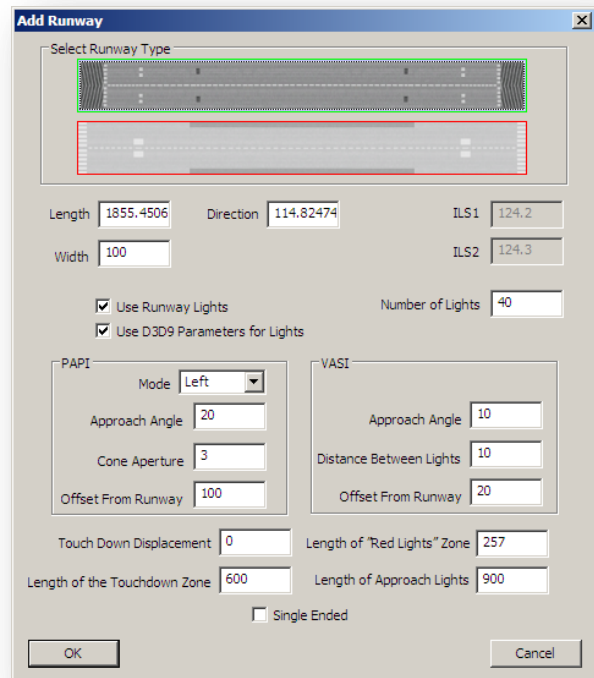
Whenever you add a new object, or double click an object on a map, a “parameters window” will appear, allowing you to change different aspects of the object. This section will describe these windows.

Runway and Trains

These parameter windows are for the “End Point objects” You can adjust their length and their direction in these windows.

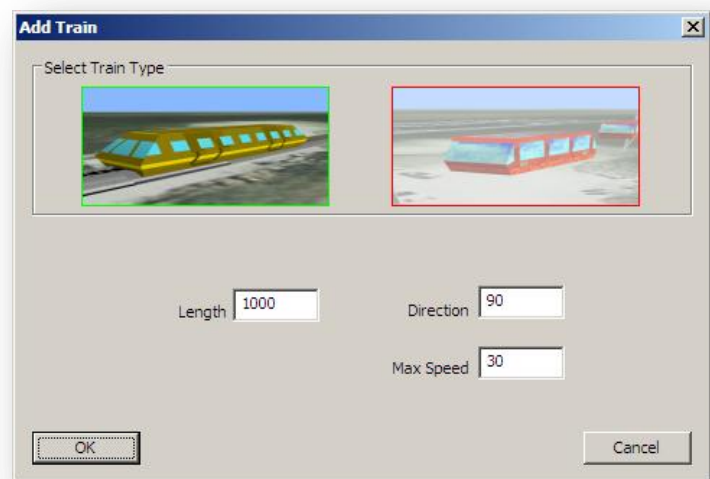
Runway

- **Select Runway Type** sets which of the two provided runway texture configurations to use. Click on the image of the desired type to set it.
- **Width** sets the width of the runway.
- **ILS1 and ILS2** are managed by OBM, and can't currently be set by the user.
- **Use Runway Lights** sets if the runway has lights.
- **Number of Lights** sets the number of runway lights.
- **Use D3D9 Parameters for Lights** allows one to use the new runway-lights parameters used in the D3D9 graphics client.
- **PAPI and VASI** list parameters available for their operation.



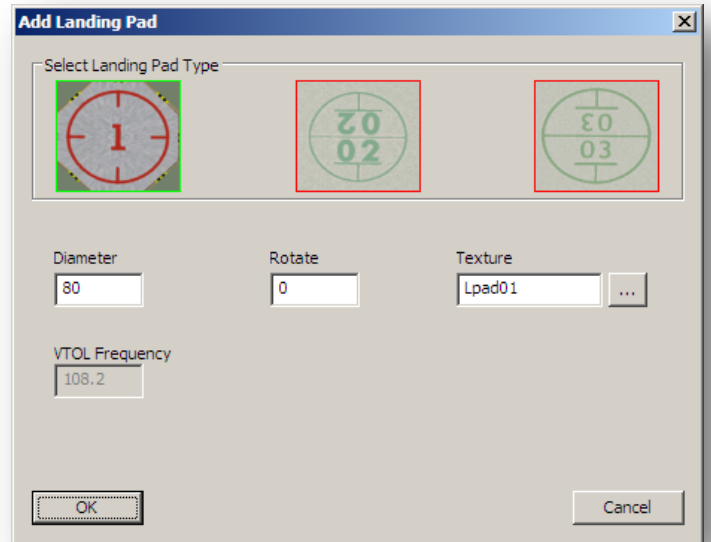
Train

- **Select Train Type** sets which type of train will be displayed in Orbiter. There are two types: monorail, and gondola.
- **Max Speed** sets the max speed the train will travel in Orbiter.



Landing Pads

- **Select Landing Pad Type** sets which type of landing pad to use out of a choice of 3. Choose by clicking on the image.
- **Diameter** sets the diameter of the pad in meters.
- **Rotate** sets how the pad is rotated in Orbiter.
- **Texture** sets the texture that is displayed on the pad in Orbiter.
- **VTOL Frequency** is managed by OBM, and can't currently be set by the user.



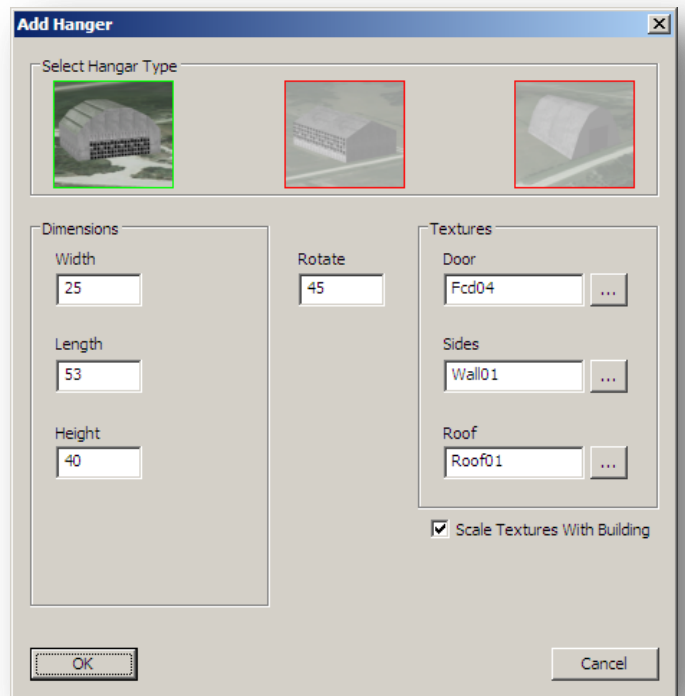
Blocks, Hangars and Tanks

These parameter windows can adjust length, width, height, rotation, and the texture to use on each object.

Note: The parameters window for "blocks" and "tanks" is nearly the same as the hangar, except without the "select hangar type" option. "Tanks" also only have 1 side texture to choose.

Hangar

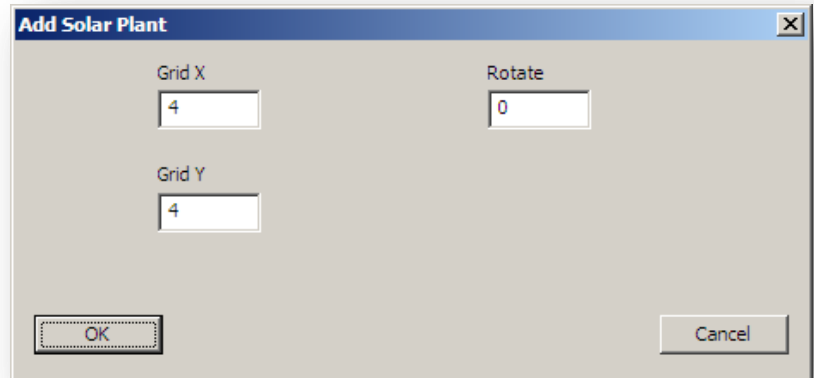
- **Select Hangar Type** sets between 3 types of hangars. Choose by clicking the image.
- **Scale Textures With Building**, when selected, will adjust the UV scale parameter of the textures to match the width and height of the building. This prevents textures from becoming too stretched or compressed when adjusting the size of buildings.



Solar Plants

Solar plants are a grid of solar panels. This parameters window allows you to select the size of the grid and its rotation.

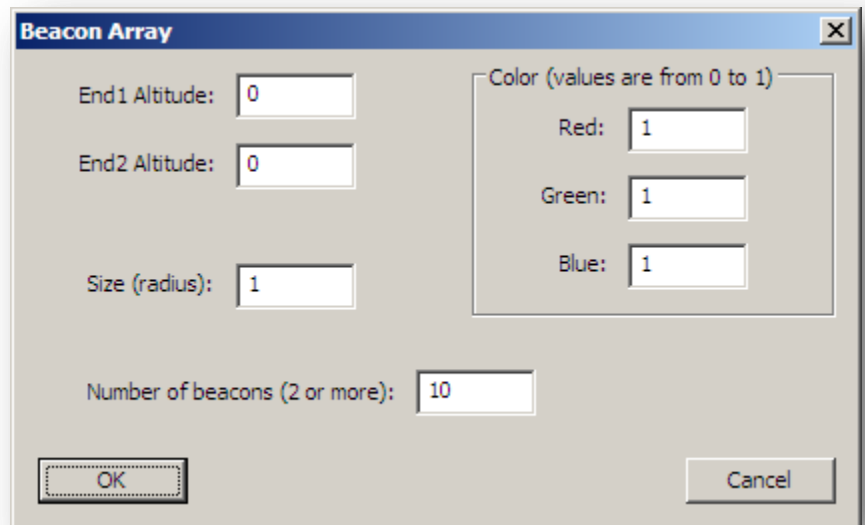
- **Grid X** sets the number of panels in the “x” direction.
- **Grid Y** sets the number of panels in the “y” direction.



Beacon Arrays

Beacon arrays are rows of lights. They are often used to illuminate taxiways.

- **End1/End2 Altitude** – In case you’re interested in making a vertical array, you can set the altitude of the end points of the array in these boxes.
- **Size** sets the radius size of the lights.
- **Number of beacons** sets the number of lights in the array. Orbiter requires this number be equal or greater than 2.
- **Color** – set the color of the light by adjusting how much red, green, or blue is in the light. Values range from 0 to 1.



Mesh

The mesh parameters window is probably the most complex one of them all. To use it, you first need to know the mesh file you want to use. Then you select this file by clicking the “...” button (to the right of the “File: ProjectAlpha_ISS” edit box in the image below). If you don’t know which mesh file you want to use, feel free to try and add one and see what it looks like in Orbiter.

After you select a mesh file, OBM will parse that file to find its dimensions. These will be shown under the “Mesh properties” list.

In this parameters window the width, length, height, and rotate options perform like in the other parameters windows.

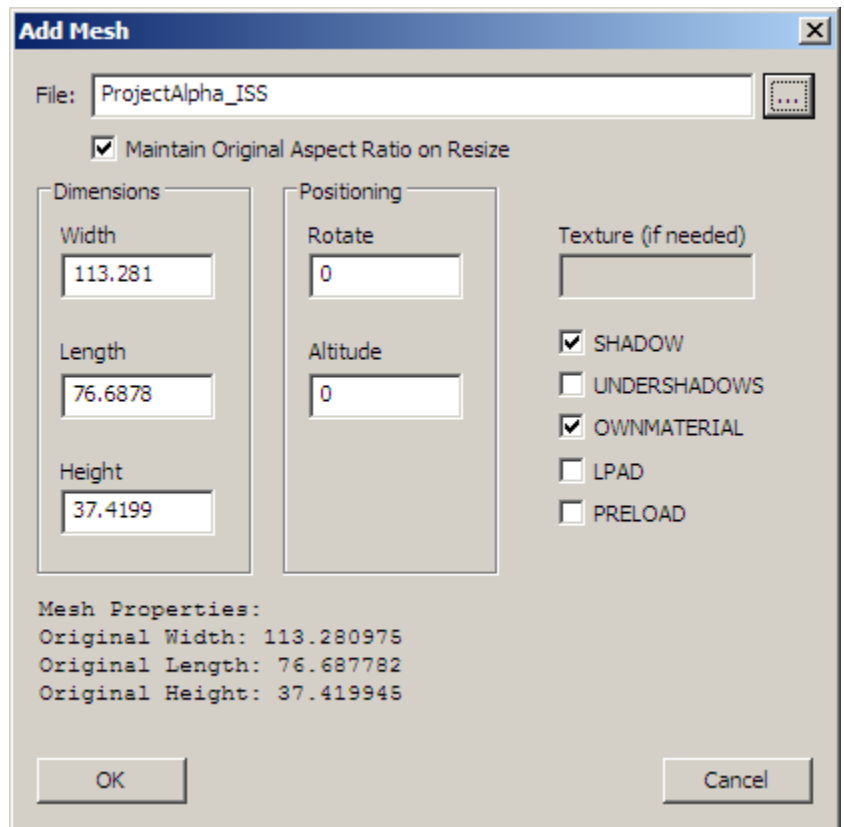
- **Maintain Original Aspect Ratio on Resize** sets if OBM will maintain the aspect ratio of the mesh file if you decide to stretch it in the editor. This is useful for things like a spaceship mesh. It may not be desirable for a taxi-way mesh.
- **Altitude** sets how high off the ground the bottom point of the mesh will sit.

Following description from “OrbiterConfig.pdf”:

- **SHADOW** - Render the shadow cast on the ground by the object.
- **UNDERSHADOWS** - Object can be covered by shadows cast on the ground by other objects (e.g. roads, landing pads, etc.). Default: object not covered by ground shadows.
- **OWNMATERIAL** - Use materials and textures defined in the mesh file. This overrides the TEX entry.
- **LPAD** - Object is a landing pad.
- **PRELOAD** - Mesh should be loaded at program start. This can reduce disk activity during the simulation but increases main memory usage. De-fault: Load only when used.

Things to know:

- *If OBM detects the mesh has its own textures, it will auto-select the “OWNMATERIAL” option.*
- *If OBM detects the mesh has a near 0 height (like a taxiway), it will auto-select the “UNDERSHADOWS” option.*
- *If OBM detects the mesh has a height greater than 0, it will auto-select the “SHADOW” option.*



Loaded Bases

This window is opened by the “Configuration” window. It allows you to see a list of bases that OBM has loaded into your installation of Orbiter. After you highlight a base in the “Loaded Bases” list, the “Base Files” list displays the files OBM has loaded into orbiter. Note that a “Loaded Base” is a base that OBM has copied into Orbiter. If you import a base from Orbiter, it will not be in this list until you load it back into Orbiter from OBM.

- **Orbiter 2010 Path** - If you have multiple Orbiter installations on your computer, and you installed bases from OBM into different installations, this drop down box allows you to select the appropriate one.
- **Remove Base From Orbiter** – After highlighting a base in the “Loaded Bases” list, click this button to remove the base from Orbiter. As of Version 1.1.3, OBM lists the base .CFG file path and name, instead of the base’s name.
- **OK** – Click to exit.

