ValTerra 0.6.10

What every control in the panel does. ValTerra is a plugin for Autodesk 3ds Max; this is a reference, not a tutorial.

Before anything: the credential and the area

The globe draws with a mapping credential of your own, and everything else on the first tab acts on a rectangle you draw with it.

Paste Cesium ion token or Google Maps key	The field at the top of the right-hand column, with Save beside it. The value stays on this machine. Two links underneath open the pages where each provider issues one.
The menu button left of the search bar	Your saved places. Save this location keeps where the camera is and how it looks, under a name you choose; choosing it later brings back the same shot. The pencil renames a place, the cross deletes it (press twice). Places and your recent searches are kept on this machine and are there after 3ds Max restarts.
Address or place, then Enter	The globe's own search bar. It also accepts coordinates pasted from any map, in decimal or in degrees, minutes and seconds. Find flies there and centres it in the view. Clicking into the empty bar lists your recent searches.
Select area	Draws the working rectangle: press it, then drag across the area on the globe, or click two opposite corners. It pulses until an area exists.
Clear	Removes the rectangle. Nothing already in your scene is touched.
The line above the import form	Reads "No area selected", or the size and area of what you drew, or the reason an import is refused. It is the whole feedback loop of this tab.

Import model

Brings the selected area into the scene as geometry.

Import as	What the rectangle becomes: a textured 3D model from imagery, the schematic city, road splines, terrain relief from open elevation data, or the combinations of those three. Only the first uses imagery; the others read OpenStreetMap and elevation and ignore every imagery setting below. Terrain relief, the schematic city and roads stand on the same ground as the textured model of the same place.
What the schematic city contains	As much as the map holds for that block. Building volumes with the heights OpenStreetMap knows, with their courtyards cut out of them; buildings mapped in parts come in as parts, including a storey that starts above the ground, and a part that gives no height of its own is as tall as the building it belongs to; twelve roof shapes (gabled, hipped, half-hipped, pyramidal, skillion, gambrel, mansard, saltbox, round, dome, onion, flat) with their height, orientation and direction, on any outline -- an L, a U or a block around a yard is roofed by stepping in from every eave at once; the colours the map gives, or a stand-in colour for a named material such as brick, concrete, glass or slate; the ground as coloured patches of park, water, grass, forest, sand, residential and industrial land, car parks, and squares and pedestrian precincts; rivers, canals and streams drawn as lines, at their own width; power lines hung between their pylons; pavements, paths, steps and cycleways at their own width; the surface a street or square is made of -- asphalt, cobblestone, paving stones, gravel, grass -- as its colour; railway and tram track as two rails at the real gauge; street trees and whole rows of them as proxies, using the girth and the species where the map gives them; walls, fences and hedges; bridge decks; and street lamps, benches, fountains, memorials, masts, chimneys and towers. Streets are splines that carry their real width, so they render as solid strips and stay curves for layout work. The ground is a single layer under the whole selection, cut around every street and path, so the street floor stays clean from any distance. Windows and doors are not generated.
The geometry you get	Editable Poly objects made of polygons, not of triangles: a wall is one quad, a flat roof one polygon, and the diagonal edges a mesh would carry are gone. What is curved -- a dome, a barrel or onion roof, a round facade, a tree crown, a round post -- comes as its own object and shades smoothly; everything flat shades flat, with no gradient across it. Everything unnamed is merged into one object per colour.

Buildings drawn in overlapping parts	A palace mapped wing by wing has its parts drawn over each other. The import builds them as one building: a wall standing inside another volume, and a roof under a taller one, are left out rather than drawn crossing what is in front of them.
Names in the scene	Anything the map names arrives under that name -- a palace, a park, a bridge, a tower -- and carries its own tags as object properties: the name, the address, the operator, a listing reference, a wikidata id, a date. Everything unnamed is merged into one mesh per colour, which is what keeps a whole district light enough to work with. Small named things such as plaques and benches stay merged too.
Layers in the scene	Everything the schematic import makes is filed in one layer, OSM, inside the plugin's own ValTerra layer. One eye on OSM hides the whole schematic city, and freezing or unloading it works the same way; the layers inside it -- OSM MODEL, OSM ROADS, OSM PATHS, OSM GROUND, OSM TREES, OSM RAILS, OSM STREET, OSM WALLS and OSM FACADE -- stay there to hide or freeze a part of it, such as the trees. The photorealistic model has its own layer, PHOTOREAL MODEL, and the terrain relief has TERRAIN, both beside OSM, so each can be hidden on its own. If the scene already has a layer of your own called OSM, it is left as it is and the group is named ValTerra OSM instead. A scene saved with the OSM layers outside the group has them moved in the next time the schematic is imported.
What is assumed, and where it is said	Where the map is silent, the import fills the gap with one stated number and counts every time it did: 3.2 m per building level, an 8 m house when there is neither height nor levels, a quarter of the wall height for a ridged roof and a third for a pointed one, 3.0 m per traffic lane, a width per road class, a 9 m tree with a crown half as wide as it is tall, a 2 m wall and a 1.5 m fence, 1.8 m for a pavement, 4.5 m for a street lamp, 10 m between the trees of a row. When the import finishes, the line above the form names each assumption and how many objects needed it, biggest first. A roof that needs a direction (gabled, saltbox) cannot be aimed round a corner: on an outline that is not a rectangle it is built hipped and reported under that name. A roof that cannot be built at all is left flat with its height kept in the wall, so the building's total height is still the one the map gives. Nothing tagged as a tunnel is built on the surface, the ground is cut to the rectangle you drew, and the streets run a little past it so the network does not stop dead on the edge.
OpenStreetMap import area	Building volumes, road splines, both, or terrain with both: Lite imports up to 4 km2 at a time, and a license or the trial imports any size. A rectangle over 4 km2 is downloaded in parts of up to 4 km2 each, one after another, and joined into one model, every building and street once and whole where two parts meet. For such a rectangle the line above the import form gives an estimate: how many parts, and for a dense city centre the download size, the time to download and build, and the memory 3ds Max takes on; a suburb or open country needs less. Over 50 km2, or an estimated 1 GB of download, Import first asks whether to go ahead, and names OpenStreetMap's fair-use guideline: overpass-api.de, the public server ValTerra asks, wants each user to stay within about 1 GB of downloads a day. Before a big build the status line says how much is coming and roughly how long it takes. While it builds, the panel and 3ds Max stay usable, and the viewports catch up when it is done. Cancel import, beside the progress bar on every tab, or Esc in the panel outside the globe stops the download or the build at any point: parts already downloaded are kept, and anything the import had built is taken away, so that Undo afterwards does not bring it back. In Lite a rectangle over 4 km2 is refused before anything downloads: the line above the import form gives its size, and Import stays grey. Terrain relief on its own is not held to that limit. Repeating an import over the same rectangle within 7 days reads the OpenStreetMap part from a copy kept on this machine, which keeps the 40 most recent, or every part of a bigger import.
Detail	Target geometric error for the fetched model: Maximum, High (4 m), Medium (8 m), Low (16 m), Very low (32 m). Smaller is finer and heavier.
Texture size	Scales textures before packing: Full, Half, Quarter.
Atlas sheet	Pixel size of each packed sheet: 4096 by default, 8192 or 16384. Larger sheets mean fewer bitmaps and fewer material slots, and they show at full size in viewports only once Texture Maps is raised to match (see Viewing the model in 3ds Max).
Texture files	JPEG keeps the brightness detail of the imagery, which is where facade detail lives. PNG also keeps the finest colour detail, at about five times the disk space and much slower writes.

Renderer	Which material family the import is built with. Three entries only: V-Ray, Corona, and Physical Material, which any renderer can use.
Shading	Standard lights the model with your scene. Self-illuminated emits the texture as it was photographed, ignoring scene lights.
Cull below ground	Discards geometry more than this many metres below the estimated ground, which removes the skirts photogrammetry leaves under overpasses. Zero switches the culling off.
Smoothing	Auto-smooth angle in degrees, 45 by default; zero leaves the mesh faceted.
Trim to selection	Cuts the mesh exactly on the rectangle, splitting the triangles that cross it, so the edge is straight and a neighbouring import can meet it. Off, whole tiles are kept and the edges run past the rectangle.
Leave out areas already in the scene	Available while Trim to selection is on. Ground that photorealistic models already in the scene cover is left out, so an overlapping import meets them along a straight line instead of adding the same buildings twice. Only models still in the scene count: delete an earlier import, or some of its pieces, and that ground can be imported again. Off, the whole rectangle is imported.
Even out chart exposure	An extra pass that evens brightness between texture charts. Off by default; it lengthens the import.
Name / Output folder	What the capture and its files are called, and where they are written. Each capture gets a folder of its own: importing the same area or the same name again adds _2, _3 and so on, so earlier captures keep their sheets. The grey line underneath reports free space on that drive.
Import	Starts the job for the selected area. Before the first imagery import it shows one page naming what will be fetched and on whose account; that page returns only when the credential kind or the text itself changes. While an import runs, a Cancel import button appears beside the progress bar under the tabs, on every tab; Esc in the panel outside the globe does the same. Cancel stops the import at any stage within a moment and takes away what it had written to the folder and brought into the scene; the next Import starts from the beginning with the settings in the panel.
Open last capture folder	Opens the newest finished capture in Explorer and copies its path.
Fix materials in scene	Rebuilds the materials of captures already in the scene from their atlas sheets on disk, using the Renderer and Shading above, so an earlier capture matches a fresh import. Only the atlas-sheet materials and the plain grey on capture objects are rebuilt; every other material stays as it is. Nothing is fetched again.
Make texture names unique	Gives the atlas sheets of captures in the scene file names no other capture uses, so the scene keeps its own textures on any computer and when its files are collected into one folder. Sheets named atlas_00.jpg, atlas_01.jpg and so on, and sheets whose file name a different picture in the scene also has, are copied beside themselves under a new name: a short code made from the file, then the old name, such as Burnaby_site_3f9a2c_atlas_00.jpg. In front goes the folder's name in Latin letters, digits, '.', '-' and '_' (other characters become '_'). It is left out when none of it can be written that way, or when the path has no room for it. The scene's bitmaps are pointed at the copies; the original files stay as they are. The status line counts the copies and says what to do about any sheet it could not copy; while it copies, the button reads Stop copying. Save the scene afterwards. New imports get names of their own from the start.

Viewing the model in 3ds Max

Viewport settings that show the imported model at its best.

Visual style	Default Shading for lit work. Flat Color shows the photograph as captured, without viewport lighting. Facets draws every triangle flat and is meant for checking geometry.
Texture Maps	Viewport Configuration > Display Performance > Texture Maps. Viewports show textures no larger than this, while renders use the full sheet, so set it to at least the Atlas sheet size. After a change, 3ds Max reloads textures for a while.

Orbiting a large capture	Clear the selection before you orbit a very large capture: Never Degrade Selected keeps selected objects at full detail while the view moves.
Framing hero shots	Frame hero shots from city-block distance and above, with the imported city filling the view. Save close views for foregrounds you model yourself, and let the city stand behind them.

Photo studio: the camera

Where the shot is framed, on the globe, before anything is built in the scene.

Latitude / Longitude / Altitude above ground	Where the camera is, in degrees and in metres above the ground at that point. They are written back as you fly.
Heading / Tilt	Which way it looks and how far down. Typing a value turns the live camera and stops it following a target.
Drone / Sensor / Focal length	Pick an aircraft and the sensor width and lens of that model are filled in. The angle of view beside them is computed, not typed.
Fly the camera	Six direction buttons, awake only once you are in the camera. Camera speed scales the globe's own mouse wheel and its W A S D flying, not those six buttons.
Cameras	Shots you saved. Select one or several: Go to returns the globe to it, Import to Max scene builds a real camera for every selected row.

Photo studio: light and sky

Date, time, and time zone	The moment being lit. The grey line beneath resolves the zone for that place and date, and says when it had to guess.
Volumetric	Aerial haze on the globe, and the number beside the slider is the value the slider holds. It travels: building a ValTerra sun carries it into the render as Corona's own sky volume.
Create Daylight System	Builds Autodesk's own Daylight system at this place and moment, with a CoronaSun in its slot when Corona is the active renderer. A grey line appears under it when the system in the scene was built for a different renderer: pressing the button replaces that system with a new one, so anything set on its sunlight is not carried over.
Create ValTerra Sun	Builds ValTerra's own sun instead: true longitude, the real UTC offset including the quarter-hour ones, and the exact minute -- all editable in the Modify panel and all keyable. The sun, the compass and the moon are one object, and clicking any part of it opens the same rollouts. A new sun arrives with the day already saved: sunrise, both golden hours, solar noon, sunset and the blue hour. With the sun type on Automatic it brings the sun and the sky of the renderer in force: CoronaSun with CoronaSky under Corona, VRaySun with VRaySky under V-Ray, Physical Sun & Sky under Arnold and ART, and an IES Sun with Physical Sun & Sky under Scanline. Change the renderer and the sun and sky change with it; switch back and the sky you had returns with your settings. The sky goes into an empty environment slot or replaces one ValTerra made; a map of your own stays where it is. Where the scene has no exposure control, a physical sky comes with a Physical Camera Exposure Control at EV 15, a sunny day.
Clouds / Stars / Moon	Switch those parts of the sky on the sun already in the scene. They need a ValTerra sun and they need Corona to be the active renderer; otherwise they are greyed and the line above says so.
Check / Freeze for handover / Test	Check recomputes the sun and compares it with the scene, changing nothing. Freeze turns it into ordinary keyframes for a render farm or a machine that has never had ValTerra. Test builds a throwaway sun, puts it through everything and deletes it again.

Photo studio: capture

Resolution	The height asked of a saved shot. The globe is never upscaled past what the live view holds, so a very large number is a ceiling rather than a promise.
Take photo / 360 panorama	Saves the frame, or the six faces of a sphere from where the camera stands. Both wait for the detail to finish streaming before the shutter fires, so a dense city honestly takes longer.

Shoot the day (light series)	One frame at each of the day's moments. Three of the six are deliberately offset -- ten minutes after sunrise, ten before sunset, fifteen before the blue hour ends -- because a sun at zero elevation lights nothing. The same button stops the run.
Sky masks	Saves the frame with the sky separated, for compositing.

Camera match

A photograph taken by a drone becomes a camera standing where the drone stood.

Import drone photos	Reads the metadata of each JPEG and builds a Physical Camera from it. The first photo also sets the scene's render output to that photo's pixel size. Each camera stands at the height the photo records, measured against the same ground as the imported model, and faces the way the drone's camera pointed. The camera's Object Properties, User Defined tab, lists where its height and heading came from.
Refine each camera against its photo	Ticked to begin with. With the photorealistic model already in the scene, each camera is then matched against its own photograph and stood where the photograph says, which is closer than metadata can be: on photographs with surveyed poses the heading lands a tenth of a degree out and the height a little over a tenth of a metre. It takes about fifteen seconds a photo, and the bar and the Cancel button beside the box run while it works. With no model imported yet it does nothing and the cameras stand as their metadata puts them.
What the status line says afterwards	One line for the batch, and a line of its own for any photo worth a second look. A camera placed by its photograph says how far it turned and how far it rose; a photograph the model could not be found in keeps its metadata pose and says so. Ctrl+Z once puts a camera back where its metadata had it.
Photo behind viewport	Switch it on and a viewport looking through a drone camera shows that camera's own photograph behind it, so the match can be judged by eye; the render frame takes the photo's pixel size. Look through another drone camera and its photo follows; any other view keeps its usual background.
Pixel-perfect refine	Opens a window where you lock points in the photo to points in the scene. Locked pairs are listed, and the solve moves the camera to satisfy them.
Put the metadata pose back	Stands the drone camera (selected, or the one the viewport looks through) where its metadata had it, from the pose written on the camera when it was refined. For a camera refined in an earlier session, where undo can no longer reach it.

Across the whole panel

Section headers	Every group folds away by the checkbox in its title.
The pin, top right	Keeps the window above 3ds Max and remembers the choice. It applies to the floating window only.
Progress bar and status line	Under the tabs, shared by all three. Nearly everything the panel has to say is said on that line.
Update strip	Hidden unless a newer release exists. It names the version you have and the one available, and can install it. Check for updates when the panel opens turns the request off before it leaves the machine.
Version line and the lamp beside it	The version being run, and a walk through the panel over the real controls, in the order they are used.

Removing it

Close 3ds Max first. Nothing below touches your scenes.

Before you start	If the license is going to another computer, press Deactivate this machine first. A scene holding a ValTerra sun needs the plugin to open; Freeze for handover turns that sun into ordinary keyframes.
The plugin folder	Delete C:\ProgramData\Autodesk\ApplicationPlugins\ValTerra. An install made for one user only is in the same place under %LOCALAPPDATA% instead.

Toolbar button	In the user folder of each version it was used in, under ENU, delete the files whose names start with ValTerra in usericons and in usermacros.
Your captures and settings	They stay in %LOCALAPPDATA%\Autodesk\3dsMax\ValTerra until you delete that folder yourself: captures, saved cameras, the credential you pasted, and the OpenStreetMap copies kept for repeat imports.

What each tier includes

	Trial	Lite	Licensed
How long	30 days from the first time the panel opens	Free, forever	A key, one machine
Imagery import area	No cap	0.25 km2 per import	No cap
OpenStreetMap import area	No cap	4 km2 per import	No cap
Detail	Everything	Medium (8 m) and coarser	Everything
Texture size	Everything	Half and below	Everything
Atlas sheet	Everything	4096 px	Everything
Capture height	Everything	HD 1080	Everything
ValTerra Sun	Yes	Autodesk's Daylight system instead; a ValTerra sun already in a scene keeps working	Yes
Schematic city, terrain, camera match	Full	Full	Full
Watermark	None	None	None

License

One key, one machine	An order for several seats issues one key per seat. Paste a key into the field in the right-hand column and press Activate (during a trial the field is folded to an Enter a license key link under the credentials): this computer registers once, and the key is checked here from then on.
What is sent, once	The key, a fingerprint of this machine, and the name it is listed under, which you can edit before pressing the button. After that ValTerra does not need the internet to keep working.
Where to see it	Once the key is active, the License section at the foot of the Info tab says which license this is and until when updates are included, and holds Deactivate this machine and Enter a new key. While there is something to do about the license -- a trial, a key to enter -- it stays at the top of the right-hand column instead.
Moving it	Deactivate this machine frees the key first and removes it here second, so a dropped connection cannot strand it. Paste the same key on the new machine.
If the key is already in use	The panel names the machine holding it and when it was activated, in your own local time, and offers Release and activate here.
When a trial ends	ValTerra becomes Lite. Nothing already made is touched, and blocked options grey out with an explanation rather than disappearing.

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