

Forum8 are set to release VR-Design Studio Version 11!

See below for the latest features and functions of this award winning 3D VR Interactive Simulation Software.

VR-Cloud® Support by Default

Aimed at giving users the ability to publish their VR data on the internet, to perform coordinated design discussion, or even remote interactive conferencing, VR-Cloud's server features will be available to both the VR-Design Studio Advanced and Ultimate versions by default. Users can now leverage on this change to perform more effective project presentation through remote TV conferences, or simply attract more audiences who lack a powerful computer.



▲ Figure 1 VR-Cloud®

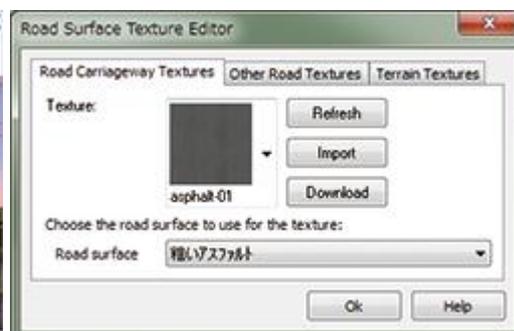
Improved User Interface

We will be replacing the menus and toolbars with a new ribbon menu design. This change will help users locate the commands needed more intuitively, increasing work efficiency.

VR-Design Studio's new menu layout will consist of the following ribbons: File, Home, Edit, View, Server, and Plug-in. All functions are directly placed under its corresponding ribbon category. With easy-to-understand graphical icons, the complicated interface pre-version 11 will become much smoother to use.



▲ Figure 2 Main window ribbon menu



▲ Figure 3 Texture Settings window

Another minor but useful change is the ability to load textures in the texture folder that have been modified without first restarting VR-Design Studio. Furthermore, the ability to specify textures is now integrated into one single window, with the following features also incorporated:

- Texture list update

- Importing of additional files
- Accessing and downloading from Road DB

Oculus Rift DK2 Support

Oculus Rift is an enclosed 3D head-mounted display developed and marketed by Oculus VR. It is one of the first and few headsets available that provide users with a wide field of view (up to 110 degrees). Through the use of the Oculus Rift, it will provide the users with a higher sense of immersion and realism.



▲ Figure 4
Example of Oculus Rift video



▲ Figure 5
Oculus Rift DK2

To achieve stereoscopic display, the images need to be outputted and rendered individually for each eye, with considerations of parallax. Furthermore, in order to make the small lens displaying a seemingly wide area, the videos are deliberately distorted. The embedded accelerometer allows user to synchronize their head movements with the video they are seeing, which is great for navigation or driving in VR.

Head Mounted Displays grant users an unparalleled sense of spatial and depth perception, providing a true immersive experience within a VR simulation.

OpenStreetMap Support

OpenStreetMap (OSM) is a world-wide collaborative project to create free world maps. Anyone may join and edit these data to further refine its precision. OSM is currently a popular alternative among various companies over paid options such as Google Maps.

This data format is characterized by its composition made mainly of nodes and roads, which is open and flexible. Elements such as roads, tunnels, bridges, and buildings can all be properly shown.

The new OSM plug-in will allow importing of OSM data to shorten the time for creating 3D virtual spaces.

Users can now import the OSM files, which will be converted into VR-Design Studio data. Roads, lanes, tunnels, and bridges are currently supported. The roads are complete with further information such as their names, types and lane widths. Each of these elements are converted for further customization. In the future, we plan to support buildings as well.



▲ Figure 6 OpenStreetMap data conversion example

Curve Calculation Function

In previous versions of VR-Design Studio, roads are usually defined by first pasting ortho aerial photographs, then drawing the curves by entering turning points.

In VR-Design Studio 11, however, road curves can be defined even more easily by our new Curve Calculation Function. By importing information via GPS tracking, or a few simple clicks of the mouse, the road centreline, horizontal / vertical curves will be automatically generated as opposed to manual inputs in pre-ver.11 software.

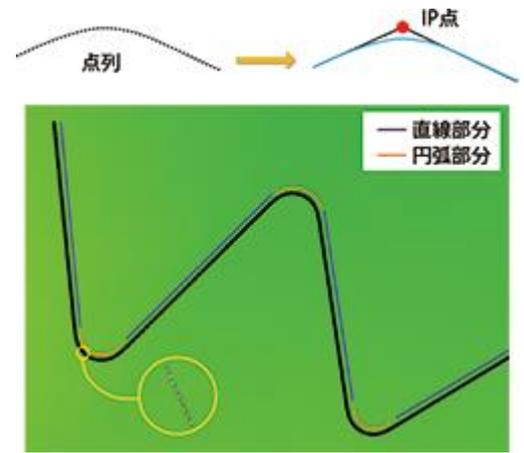
Horizontal Curve Calculation

Horizontal curves mostly consist of straight lines, arcs, and transition curves and are calculated using these elements.

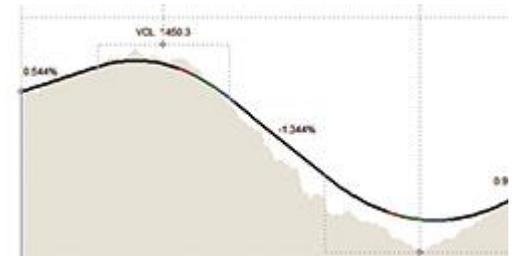
This new function will first search for the straight lines and arcs before progressing any further. Once found, it will move on to calculate the transition curves that link together the straight lines and circles, or circles and circles (a.k.a. clothoid curves), and connect and combine everything together.

Vertical Curve Calculation

The vertical curve calculation is also done under similar logic to its horizontal equivalent. First it searches for straight lines and arcs, then calculates the turning points, and finally adjusts the VCL so it matches the point sets according to the road.



▲ Figure 7 Horizontal curve created from point sets.



▲ Figure 8 Vertical curve created by points sets.

Extended 3DS Export Support

When exporting files into 3DS files, further information such as the objects' coordinates and many landscape settings can also be added into the exported XML files. The extended information in the exported 3DS models and XML files allow a quicker and more convenient import of VR-Design Studio data into other software as well. Furthermore, exporting of objects such as road signs, backgrounds, and power poles have been added.

SfM (Structure from Motion) Plug-in

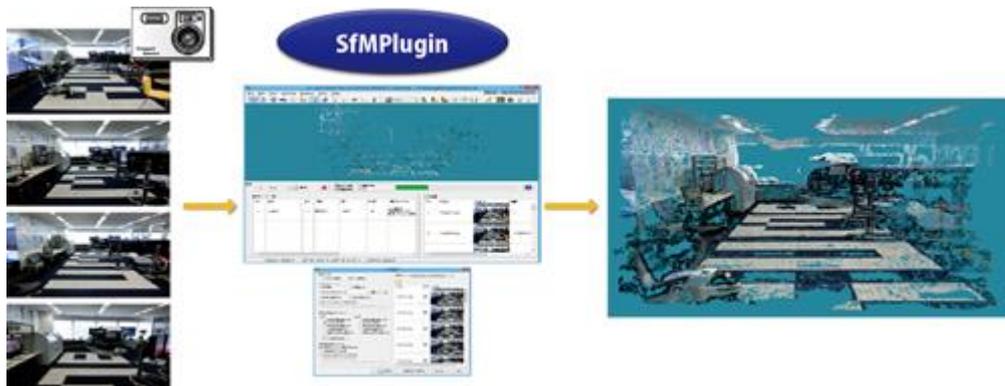
SfM(Structure from Motion) is the name of a technique of generating point-cloud data from a series of photographs through a regular digital camera, which makes 3D data modelling much more accessible. The SfM plug-in allows photographs to be loaded into VR-Design Studio and analyzed to generate models.

Using the SfMPlugin mainly involves the following steps:

1. Photographing the target location to obtain 3-dimensional coordinates
2. Specify the analysis parameters and perform SfM analysis
3. Adjust and refine the point cloud data

When performing the analysis the user must specify the distortion characteristics of the camera used. No other files are needed to analyze the photos. The generated point-cloud data can be used in VR-Design Studio immediately for simulation. Users can also set the position, orientation, and scale of the data to a desired location or shape.

This plug-in may be useful in recording and recreating road structures and objects by car-mounted cameras. Or alternatively, using a UAV drone to fly around and over large building complexes.



■Figure 9 SfMPlugin

Bicycle Simulation

Bicycle dynamics are now a default feature of VR-Design Studio. The previous bicycle riding function was internally defined as a mere model of a pedestrian, and hence would stop immediately once the user stopped pedalling.

The new simulation dynamics now incorporate factors such as inertia, friction, momentum, and aerodynamics. The bicycle will now continue moving even if the user has stopped pedalling and the speed will react differently according to slopes and terrain elevation. Further parameters such as friction, pedal torque, and centre of gravity can all be defined to make the most realistic simulation.



▲Figure 10 Adjustable Parameters for Bicycles

It will also become possible to build cycling scenarios within a bicycle simulation and it is now possible to change bicycle models, routes, and starting positions. Similar to driving, bicycle routes can also be assigned as a flight-path, and will automatically be 'snapped' onto the terrain. Bicycles are controlled by keyboards or game controllers.

The Log Export Plug-in will also be compatible with bicycles. Information such as position, tilt, and speed are exported and may be used for research.

Flovel's cycleStreet bicycles introduced in earlier version that can be linked with VR-Design Studio through a plug-in.

Improved Rendering Engine

The visualization of shadows has now been improved in version 11. The coding is now more optimized allowing higher speed rendering while maintaining quality. Other than shadow simulations, the improved shadows greatly increase the sense of presence and spatial perception necessary for driving simulation and overall realism. The shadow's sharpness, contrast, and blur can also be adjusted for cloudy conditions.

The visualization of ripples in lake water has also been improved, with dynamic calculation of texture and reflectivity for more realistic water graphics.

A new sky-dome model is now available in addition to the previous method of applying existing sky textures. This allows more liberty and intuition in controlling the colour and sunlight of skies, through the simply progression of time. In future versions, we will focus on expanding the cloud models.

The overall rendering engine has also been updated to allow more 'customizability'. With the rendering process now consolidated, customization of every single rendering process is now possible. In future or via the SDK currently, it will be possible to add pre- and post- processing of all rendering steps. This will make it easier for developing features that are compatible with techniques such as fisheye lens effects, ambient occlusion, and edge blending.

VR-Design Studio Ver.10 No Shadows



VR-Design Studio Ver.11 Sunny and Bright



VR-Design Studio Ver.11 Cloudy and Dark



▲ Figure 11 VR-Design Studio Ver.10 Comparison between Ver.10 with no Shadows, and Ver. 11 showing different Light and Shadow Settings. Ver.11 allows the changing of shadow intensity according to the various weather and time conditions.



▲ Figure 12 Water Ripples



▲ Figure 13 Improved Skyboxes

A Message from FORUM 8

FORUM8 is the leading Japanese producer of state-of-the-art 3D Engineering software.

It's premier product in the west, VR-Design Studio (formerly known as UC-win/Road), is at the forefront of Interactive 3D VR Simulation & Modeling technology. Established in 1987, this award-winning company has offices and partners on every continent and is a member of the ITE and an associate of the TRB visualization group.

VR-Design Studio is the ideal solution for urban and transport planning and design projects, either on its own or adding value to 3rd party 3D design or 2D micro-simulation software and other data sources such as point-clouds and photo-logs. It is also used extensively for the interactive visualisation of rail, road and pedestrian-based situations and environments, as well as emergency and security planning / training scenarios. Due to the high visual quality of the software and its high level of interactivity, VR-Design Studio powers many different Drive Simulators in use throughout the world. From desk top units to multi-million dollar hexapod systems.

FORUM8 Western Office

The Leadenhall Building, Level 30, 122 Leadenhall Street, London, EC3V 4AB, UK
+44 (0)203 753 5391 patrick@forum8.com www.forum8.com @forum8_world Skype: Patrick.hafferty

