A new way to construct a 'real' road network in 3D VR

Forum8's premier software product UC-win/Road (*which is now known as VR-Design Studio in the West*) was, as its name suggests, initially developed to enable transport engineers to produce interactive road networks in a 3D VR space.

Although it is extremely quick and easy to produce a hypothetical highway system, as you would expect it was always rather more complex to develop a real road network. However this problem has now been solved in the latest version of VR-Design Studio.

Version 11 includes a feature called Road Alignment Calculation (RAC). This feature allows users to automatically create a road by generating the horizontal or vertical curve that best fits all the available turning points.

These turning points can either be imported via a CSV file containing GPS trajectory information, or they can be manually inserted by following the aerial photograph of the road in question and adding mouse clicks as and when necessary.

In previous versions of VR-Design Studio, roads were usually defined by first pasting ortho aerial photographs over the appropriate Digital Terrain Model, then drawing the curves manually by entering turning points.

In Version 11, however, road curves can be defined far quicker and 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 are automatically generated, as opposed to manual inputs in pre-ver.11 software.

Horizontal Curve Calculation: These curves mostly consist of straight lines, arcs, and transition curves and are calculated using these elements. This new software function first searches 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 vertical curve line (VCL) so it matches the point sets according to the road.

In addition to this new Curve calculation function Version 11 also offers users a number of additional features to assist in the rapid production of interactive 3D VR environments.

Open Street Map Support: A world-wide collaborative project to create free world maps. Anyone may join and edit the data to further refine its precision via the OSM web site:
https://www.openstreetmap.org/#map=5/51.481/-0.088
OSM is proving to be a popular alternative to the alternative expensive options such as Google Earth. This open and flexible data format is characterized by its composition being made mainly of nodes

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and roads. Elements such as roads, tunnels, bridges, and buildings can all be displayed correctly. The new OSM plug-in allows importing of OSM data to shorten the time for creating interactive 3D VR environments. Version 11 users can now import the OSM files, which will be directly converted into VR-Design Studio data. Roads, lanes, tunnels, and bridges are currently supported. The roads are complete with information such as their names, types and lane widths. Each of these elements is capable of being converted for further customization if and when required.

S f M Plug-in: Structure from Motion is the name of a technique for generating point-cloud data from a series of photographs taken by a regular digital camera, thereby making 3D city modelling much less difficult and hence more accessible to the user.

Improved Rendering Engine: The visualization of shadows has now been improved allowing higher speed rendering while maintaining quality. The visualization of ripples in lake water has also been improved along with a new sky-dome model.

Extended 3DS Export: The coordinates of objects and many landscape settings can now be added into the exported XML files.

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