

12d DIMENSIONS:

- BIM & Digital Engineering

Project Summary

Over the past few years, the SMEC Perth office has grown their business more than eight-fold, and it's easy to see how when you examine the innovations that they are using to engage their clients. A key component of SMEC's technical service delivery is Digital Engineering, which is fundamental to how they create value for clients and their projects.

For example, with the help of Revizto - "a cloud-based visual collaboration software for architects, engineers and contractors to communicate their design within the project team in a navigable 3D environment" (source: Wikipedia) - SMEC regularly sends 12d Model IFCs to Virtual Reality (VR) headsets for their clients to experience designs in ways they've never encountered before!

For more information

To find out more about how you can create better designs faster with the 12d Model solution for civil engineering design, visit www.12d.com.



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Practical Virtual Reality



The Challenge

Using 12d Model alone, the SMEC team already knew they could present clients with a TIN, which would look good and have the relevant information...but you can't walk around on a TIN! Enter VR.

After determining that VR would be beneficial to their processes, the SMEC team set out to test various methods of delivery as they needed to find the most effective workflow to ensure they were not losing any intelligence on the way into the model.

Some potential solutions required gaming software experience (which can become costly) and others involved reading in and out of a variety of third-party packages.

The Solution

Reading 12d Model IFCs into Revizto (via a third-party package) has been the best solution for the SMEC team at this stage, but they continue to refine their processes as they go, ensuring they're always at the cutting edge of available technology.

To support the federated model process, SMEC utilised an additional function in Revizto to push the IFCs into the HTC VIVE plugin for VR. Attributes in 12d Model could then be seen visually in the digital platform within the Revizto environment - *i.e.* they could see the attributes on a screen as they're walking around the model!

SMEC's Team Leader - Design & Drafting, Roads & Highways (Perth), Allan Walker said, "Once time has been spent writing 12d Model attributes and meshes, it's an easy process to export to that environment. We engage this process for public consultation, virtual site walks, and general correspondence. It's been a huge asset at times when clients have looked at a design solution in 3D and don't really understand the complete concept. With the VR headset, they are easily submersed into the environment - measuring physical distances, checking how big an object would be in the project, *etc.*"

One detailed design project SMEC had been working on involved 4.5GB IFC outputs, which created

a 4GB Revizto file that took just half an hour to upload into the cloud. In fact, the whole turnaround for the federated process can be as quick as 15 minutes for smaller models!

Including the process of draping on a 3D CAD file from the landscape architect, the SMEC team finds that it generally takes just half a day to put everything into the environment and output the IFC – this time saving is extremely beneficial.

SMEC is currently working with Main Roads Western Australia and the Public Transport Authority on a project for which the local city council was unsure about the placements of trees, or of how removing existing trees would impact on the streetscape. The SMEC team worked with a landscape architect and created a series of proposed tree locations using 12d Model's **BIM trimesh object apply**, then submersed these into the model itself, so that with VR goggles, they could physically see new trees replacing old trees and create the most appealing environment for the situation. This enabled the clients to determine what would be the finished product.

The Result

The feedback SMEC has received from clients on these technological innovations has been outstanding. They've been able to resolve queries through digital discussions and virtual site walks so that

clients can see solutions before committing, meaning they were happy and able to close off RFIs in a timely fashion.

VR really helps people perceive solutions, especially those who benefit from a visual representation.

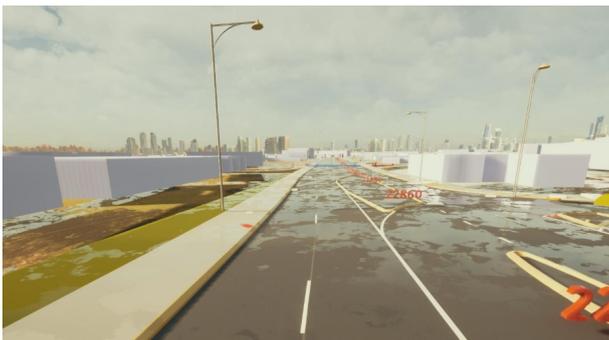
Another advantage is when designs change based on new information and feedback, it's already set up and can run in the background - revisions are really simple once it's all loaded in.

The duration of the process is dependent on internet speed – hefty IFCs can slow down some systems - but it's a time saver nonetheless when compared with previous processes.

SMEC has been working on this method for several years – they've conducted rigorous testing to create the best possible format for client engagement. And the more projects they're working on, the more they utilise it.

The integration of Digital Engineering as best practice has contributed greatly to the growth of the Perth office over the past few years. Other SMEC offices are also using VR and they encourage their clients to come in for a live demo.

12d Solutions can't wait to see what SMEC comes up with next!



[Most images from 12d Model, with thanks to SMEC.]



Roads and Highways

12d Model's design option is the smarter solution for the design, modification and maintenance of Road and Highway projects.

Enjoy advanced 3D tools to design local and major roads, intersections, roundabouts, highways, interchanges and much more.



Ports and Dredging

12d Model is the solution for port infrastructure and dredging, easily managing the very large datasets and complex volume calculations often required by these projects.

A complete range of flexible and customisable volume calculation tools allow teams to extract and present the information quickly and easily.



Land Development

12d Model is the most versatile solution for the creation of sustainable land development projects, including residential, commercial and industrial developments, recreational areas, landfills, and agriculture projects.

Easily manage all aspects of your land development project from earthwork quantities, road design utilities and drainage design.



Airport Infrastructure

12d Model provides a solution for the design, construction and analysis of new airports, as well as the upgrade and maintenance of existing runways and airport infrastructure.

Easily manage large airport infrastructure projects and share data across multi-disciplinary teams.



Rail

12d Track has been specifically designed for the survey, design and construction of light, heavy and high speed rail projects.

Extensive railway tools in 12d Track allow the rail designer to quickly and easily design their projects. These options are built on the existing 3D modelling and design tools available in 12d Model.



Mining Infrastructure

12d Model's powerful set of exploration, site investigation, survey and analysis tools are crucial for the initial design, construction and ongoing operation of mining projects.

Comprehensive tools for the survey, design and construction of access roads, railways, earthworks and services allow for the coordinated design and management of mining infrastructure from within 12d Model.



Drainage, Sewer and Utilities

12d Model provides comprehensive tools for the design, analysis and optimisation of stormwater and sewer projects using rational, dynamic (hydrograph) and 2d drainage methods.

Powerful clash detection management allows for efficient 3D modelling of service networks such as gas, electricity, telecommunications and water prior to construction.



Surveying

12d Model is a complete surveying package providing the tools to manage all facets of surveyed data including LIDAR, topographical, as-built, conformance, traversing, geodetics, data mapping, labelling and much more.

The 12d Field option runs on a ruggedized tablet and gives the user access to full 12d Model functionality, allowing you to take the entire project into the field with the most comprehensive pick-up and set-out tools.



Oil and Gas

12d Model assists with the design, construction and mapping of oil and gas pipelines, original site exploration and the wide range of infrastructure required for oil and gas projects.

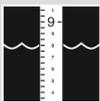
Accurate 3D modelling and the ability to share data between users allow teams to quickly and easily coordinate designs.



Construction

12d Model is the ultimate software for construction with powerful set-out options, direct interfaces to machine control and detailed conformance reporting and auditing.

Manage 3D data and control volumes, quantities and progress claims with 12d Model. Set-out your project and undertake conformance and as-built surveys live on-site using 12d Field.



Rivers, Dams and Hydrology

12d Model handles very large datasets and interfaces with a wide range of analysis packages, making it perfect for flood studies and the management of rivers and dams.

12d has partnered with industry leading analysis software, allowing users to apply 2D drainage analysis from within 12d Model.



Environmental

12d Model's ability to handle very large datasets combined with flexible and comprehensive 3D analysis and modeling tools make it perfect for a wide variety of environmental projects.

Existing workflows can adopt 12d Model easily as it allows users to directly interface with GIS systems and most software packages and file formats.

Why Choose 12d?

- **Powerful data processing & intelligent functionality.**
- **Modular, easy to update & completely customisable.**
- **Seamless integration with major industry software and hardware.**
- **Used in over 55 countries worldwide.**
- **Friendly support & training from industry experts.**

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