



Re-Creating Natural Environments
Using
Real-time 3D Engines

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 **Real Vision Consultancy FZE.**
Creating a Virtual version of a Real Location



Above :Original Location

Below: Virtual replica fully navigable in real-time.



Background of the Company:

Real Vision Consultancy, based in Dubai UAE, via the creative use of technology, provides solutions and ideas for Culture and Heritage awareness, Tourism & Real Estate and educational experiences for the public.

With a core team based in Dubai, and with recruitment of dedicated professionals worldwide on a project basis via the internet, Real Vision Consultancy creates new concepts and pioneering work in the area of Virtual Reality, Augmented Reality and Stereoscopic 3D visualization.

Some of the end results of projects are made available to the public free of cost via the online repository of the company at www.realvisionhomes.com and www.realvision.ae

While the company itself does not monetize most of these ideas, they are made available freely, and form the seeds for many business ventures for individuals and companies who access this online knowledge base.

Sponsorship forms the key source of revenue whenever Real Vision is contracted to undertake a project.

It is the company's belief that by making knowledge available for free, opportunity presents itself eventually.

Expertise:

Stereoscopic 3D visualization –

The core members of the team have over 15 collective years of experience in Stereoscopic 3D production of video, CG 3D (computer generated stereoscopic content) and most importantly, in-depth knowledge of Immersive Environments.

The company has been honorary advisors to many of the pioneering Auto-Stereoscopic companies such as New-sight and Philips 3D Solutions.

The team has been deeply involved with these companies as beta testers for software and hardware, while some of the ideas presented have made their way as features and plugins to software such as Scala for 3D signage using New-sight 3D plasma screens.

A deep understanding of “experiential” marketing by using state of the art technology, allows the company to exist within this niche market.

The Project: - Virtual Nature Trekking Experience



We intend to use a state-of-the-art 3D Gaming Engine to re-create an actual location, which is a Nature Trail, to bring the “experience” of what this real world location is really like, to people who may not be aware of its existence and also possibly to induce them to visit the real place after experiencing it virtually.

The Experience will have to be very realistic, and typically not have a “video game feel” if we want the project to succeed in leaving a sense of being there in the minds of the audiences.

The first phase of this project is already underway and comprises shooting a stereoscopic 3D film of the location, and creating a Virtual Experience room complete with surround sound and polarized 3D glasses, along with such sensory effects as Ambient light washers, Fog effects and surround Sound.

These effects can be triggered in sync with video being played back to complete the multi-sensory experience for the audience.

Linear Film versus Interactive 3D:

Real Vision has the expertise to film the location in 3D and is already developing the end-user experience as stated here, but that is not ground breaking enough!

Real time, Stop-And-Look-Around, interactivity is the way forward for a truly immersive experience. This emotes a feeling of belonging and immersion in the viewer.

This is the very reason we are exploring 3d game engines, to completely re-create with high detail, the actual Nature Trail and all that it has to offer.

Audiences experiencing the Nature Trail will be completely immersed in the environment with 3D glasses, surround sound and the ability to get up close to flora and fauna, and insects that are present on the nature trail.



Above: Highly Realistic animated Tortoise / Turtle in CryEngine2 ®™ 3D game engine.

Choosing an Advanced Gaming Engine – CryEngine2 ®™

We looked at the most advanced options available in a real-time simulation solution and realized that Gaming Engines are far ahead in quality and technology than existing dedicated simulation software, for re-creating Nature with the ease of use and some even offer realistic pre-fabricated “assets” for such a complex outdoor environment as a Nature Trail. The choices narrowed down to:

Engine Comparison

Quest 3D:

This is a dedicated Virtual Reality visual authoring environment that is specifically used for authoring high end multi-sensory experiences for visualization in the fields of real-Estate, Oil and gas, Simulations, and Town planning. The learning curve is a bit high for new comers, but the feature list and possibilities are numerous. It has complete integration with high end software such as 3Dsmax for creating virtual assets and has built in Physics capability as well as accommodation for stereoscopic out-put and Virtual Reality hardware input for control of user experiences, such as head trackers, VR wands etc.

Licensing: One time price of US\$ 10,000/- for very high end version with royalty-free executables and video output. End product is free of any recurring royalties and license fees.

Disadvantage: Not yet as realistic for nature specific output as compared to CryEngine2. No built in pre-fab assets for nature. However any existing third party detailed models such as foliage from software like XFrog and landscaping models etc can be imported.

Unity3D Engine:

The Unity3D engine offers the best of both worlds and is rightfully in the middle with Quest3D on one side and CryEngine2 on the other.

Unity3D is a breakthrough engine in the sense that it has a very easy to use instant visual feedback authoring environment in “Sandbox” format. It has similar features to Cryengine2, although visual fidelity is definitely not comparable to the superior Cryengine2 output.

Licensing: One time price of US\$ 1500 only. This is a huge advantage over other licensing schemes, and makes this ideal for visualization markets, where output is typically used for presentation purposes to clients and not commercially sold as games are.

Advantages: The biggest advantage that Unity3D has over any existing real-time 3D engine is the ability to be cross platform ready. Once a project is produced, it can be delivered for the PC platform, the MAC as well as the I-phone.

One other novel and arguably the biggest advantage it has is the ability to run from within a web-browser! This opens up visualization possibility and collaboration a world wide possibility.

- Side note: Imagine hosting the Nature Trail online and having people visiting and interacting with each other directly from a webpage with excellent eye candy visuals that easily rival other online worlds such as Second Life.

CryEngine2:

Our ultimate choice for this specific project is CryEngine2. It is as though the software and engine was tailor made for the project. CryEngine2 excels in rendering ultra realistic outdoor environments with atmosphere, ultra responsive physics and environment (natural) effects.

The “wet” settings need to be seen in Stereoscopic 3D to be believed! The vegetation shows water drops dripping down the leaves and rocks as it would in real life when it is wet and raining.

Licensing is available directly from the owners and makers, CryTek GmbH.

Advantages: 90% of what would be needed for a Nature trekking project is already built into the Engine as “assets”. You can find realistic rocks, vegetation and a few animals and insects. The easy to use visual authoring environment, called “SandBox 2” is state of the art and gives instant real time feedback while editing.

The best available engine for an outdoor project, and well suited to the Nature Trekking project described here. The only possible competitor would be Unreal2 Engine, which is known for its indoor environments.

Disclaimer: The opinions about products and solutions are the Authors only, and do not necessarily reflect the true capability and intent of the software solutions.

Nature Trekking Project: An in-depth look



The Nature Trail Experience:

This nature trail is a real world location that has a blend of natural surroundings and assisted by man-made structures such as a path for walking with fences on the edges of the cliff for safety. There are also a few watchtowers to look down a valley and a few rest benches along the way.

Some beautiful insects such as butterflies, chameleons and other smaller animals and birds can be seen freely wandering around. There are some rare flowers being grown as part of an eco-conservation project.

Part of the nature trail overlooks a Dam that is being used for water conservation and for “greening” the valley that the trail is located on.

Ongoing eco-friendly work such as Hydro seeding to prevent soil erosion can be witnessed while reaching the nature trail.

We have re-created this entire valley and nature trail, based on acquiring a height map of the location from the free USGS worldwide database. This will allow for an accurate (to within 10 meters) resolution of the area.

The purpose of this project is to “bring” or transport this nature trail experience to people at an “experience room” where they can wear 3D glasses, and move around in the virtual environment with a game-controller while experiencing complete 3d visuals as well as Surround sound. They can thus learn about eco-friendly initiatives and for other later projects, learn about the Culture and Heritage of a place and / or its History and past lives.

A voice over commentary triggered by Proximity triggers in the Game will have a Documentary like feel to the project.

We believe to the best of our knowledge that such an experience using the CryEngine2 has **never been** attempted or done before, and this will be truly a first.



Above: Replica of the real Watch tower on the nature trail overlooking the valley below.

Objectives and Enhancements:

- Use and promote the project and capability of Real Time 3d Engines, in particular, 3D Gaming engines, such as the CryEngine2, by making the finished project available free of cost to the public as a “Mod” that can be played by purchasing the retail version of the original Crysis.
- Educate other companies and professionals involved in visualization, to the potential of using Gaming engines and in particular CryEngine2 and upcoming CryEngine3.
- Run the complete 3D simulation in native Stereoscopic 3D. Stereoscopic 3D is the technical term for the same experience as seen in the current wave of 3D films that is sweeping Hollywood. By allowing the audiences to wear lightweight 3d glasses and viewing the real-time environment on large screens, with full surround sound, an unprecedented feeling of immersion is created.

RealVision **already has** this capability of using the CryEngine2 to output stereoscopic 3D visuals.

- Add new innovations to what is possible with the 3d Gaming Engines. One example under study is to get professional programmers to add customizations to send out DMX codes to control devices such as fog machines, Wind Fans, Strobe lights and Ambient LED wall washers. This will allow synced strobe to “flash” whenever the Lightning effect is activated in the game or fog machine to send fog burst when users are walking into a foggy area etc.

And other more advanced but as of now, classified innovations.

Sample Screen shots of The Project:



Above: Waterfalls look realistic as seen by the main road leading to the Nature Trail.



Wet Roads during the rains lead to the Dam and the Lake in the Valley.

The Author:

This project has been conceptualized and will be created by Clyde DeSouza. Clyde has an overall knowledge of immersive visualization in the fields of stereoscopic 3D usage for industries such as Real Estate, Tourism, Heritage architecture documentation, Oil and Gas visualization solutions and Virtual reality hardware for “Caves” and Power-walls.

He also has excellent creative and capable knowledge of VR authoring software from solution providers such as Bit Management GmbH, Eon, Quest 3d, Autodesk, WorldViz and real-time 3D engines, including OpenScene Graph. Augmented Reality authoring is an area of active research for him.

For more background information visit his profile at <http://www.linkedin.com/in/clydesouza>

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