



software

Technical Specifications: tOG VR



tOG VR

software



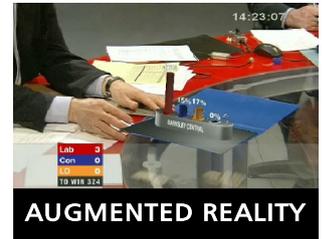
BILLBOARDING



ENCODED HEADS



FULL FREEDOM



AUGMENTED REALITY



tOG VR: Real-time 3d virtual reality sets from RT Software

Virtual reality sets are increasingly being used to enhance the audience experience and decrease production costs. The challenge though is to achieve realism: a virtual reality set needs to be convincing to the audience. This means that the VR solution needs to be powerful enough to manage the most complex design with no detrimental effects to the video; with no glitches as the camera and real objects move, or as the director cuts between cameras. It also needs to be easy to use for both the graphics designer and the production operators - from the initial 3d set design tools to the interaction with real-time 3d graphics live on-air.

tOG VR is RT Software's Virtual and Augmented Reality product family. RT Software has over 10 years experience of providing both 2d and 3d VR systems to the Broadcast Industry. We have taken a traditionally complex and confusing technology and, with the assistance of innovative tools and user friendly interfaces, created an accessible and easy to use product. tOG VR covers everything from lens calibration to graphic placement, simple 'pseudo' VR through to total 8 axis freedom of movement. We integrate to a wide range of systems including instrumented heads, tracked cameras and cranes.

KEY FEATURES

- Easy to use step-by-step calibration and alignment tools
- Support for 2.5D PTZ heads, Full 3d VR such as FreeD and Blue-i
- Support for tracked cameras (straight or curved)
- Support for cranes
- Multi camera for mixed VR, Pseudo or static cameras
- Onboard, high quality software chroma (any colour) or matte keyer (Blue or Green)
- 2 Channel video in with audio pass through
- Mpeg streamed video sources with audio
- Pseudo, billboarded VR with no need for expensive camera tracking technologies.
- Integrated Blue Box
- Full scene effects like Depth of Field and motion blur
- Built in per pixel, phong based lighting models
- Integrated CgFx shader framework for soft shadows, mirrors, reflections, refractions etc
- In built geometric primitives or import via FBX for 3rd party tools like Max and Maya
- Multi camera control from tOG3dPLayout or 3rd party customization.
- Presenter feedback
- Pre-visualization with full instrumented logging and playback.
- Support for external hardware keys
- Sports integration.



TOOLS FOR GREAT VR DELIVERY

Building VR sets should be easy, and the right tools to enhance them should be readily available. tOG VR delivers this with a range of tools that ensure great VR sets design every time.



Easy Set Design or Import

Create sets using tOG VR's inbuilt primitives or import complete sets using the tOG FBX importer. This will bring in geometry, textures, materials, lights, cameras, animations and hierarchy. Pre-build light maps within 3rd party software and import these to add or enhance the dynamic lighting.

Mix VR and non-VR Graphics

Mix VR and non VR graphics using static scene cameras at the same time as virtual ones, enabling the same system to render foreground graphics like text and tickers as well as the 3d VR set.

Pseudo-VR

Key talent into a virtual set and 'fly' the virtual camera around. Since the talent exists on a camera aligned surface and is fully keyed, this gives the effect of the person being in the set. Treat the keyed video as an object and fade it, move it, stretch it, warp it or even add CgFx such as edge detect and outline glows. This is known as 'Pseudo' VR and is a cost effective alternative to instrumented VR.

VR SOLUTION SYSTEMS

VR solutions need to integrate with the wider broadcast system. tOG VR is In operation all over the world by leading broadcasters, successfully integrated to the best in tracking technology.



Multi camera integration

Control any number of cameras from a single tOG Playout interface, benefiting from auto generated or custom interfaces to control your set. Streams may be a mixture of VR, pseudo VR or static locked off. Alternatively, use the tOG 3rd party comms modules to create custom interfaces to drive the VR graphics.

Keyer integration

tOG VR offers a range of keying options. A built in software chroma or matte keyer gives stunning results and options for multi layered foreground and background keying. Alternatively, use the output fill and key with external keyers such as Crystal Vision and Ultimatte.

Video inputs integration

tOG VR supports 2 channels of video in, enabling, for example, one channel as a studio feed and the other for in scene texturing such as virtual video screens. Since we also pass the audio through you don't need ancillary audio delays. As well as video in, we support multiple mpeg streaming from disk or even across the web complete with audio.



TOOLS TO HELP CONTROL & PREVIEW

To make the difference between a set looking fake or looking real, the presenters, camera man and director need to be able to visualize and control the VR set. tOG VR has a number of highly effective tools that help achieve this.



Custom VR Control

tOG VR includes a custom interface that can control all graphics in the VR set. This is ideal for gallery control. In addition, the presenter can cue graphic stacks at their own pace using a radio mouse. Alternatively tOG VR's support for the Wii controller provides fully customisable multi input control.

Reverse Feed Rendering

To assist the presenter a simple, but very effective tool is to install off screen displays with tOG VR reverse feed rendering, so when a presenter moves left - the screen moves left.

Projected Shader Version

Project a green or blue screen shader

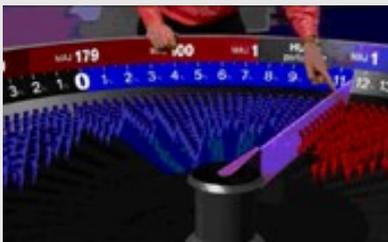
version of the graphic onto the VR cyce so the presenter can actually see what they are pointing at. You can distort the projected image so that it lines up with the graphic even though it is projected onto a flat surface.

Pre-Visualisation

Provide on set visualisation for directors and producers, and at the same time log all VR instrumented data to disk for use in Post production - greatly reducing post production costs.

TOOLS FOR MAKING VR LOOK REALISTIC

A common perception in VR is that sets often look 'plastic' and unrealistic. With the tools available in tOG VR this is no longer true. With a mixture of great graphics and controlled areas tOG VR delivers the most realistic VR on the market.



Real-time Depth of Field

We have real time Depth of Field as standard on all VR systems . This is synchronised with the actual camera zoom control to create a realistic effect.

Per Pixel Lighting

Per-pixel lighting is part of tOG 3d's standard lighting model. Simply turn it on to create perfectly lit sets.

Shader Framework

Because VR is built into our standard render engine it benefits from our CgFx shader framework. This means you can use real time soft shadows, mirrors, bump maps, reflections, refractions, caustics ,glows and more - you can even do things like edge detect and edge glow

- all to great effect.

Custom Shader Support

Use Mental Mill to create custom shaders such as frosted glass to really bring sets to life.

Create Sets in Preferred Applications

Our well established support for .fbx means designers can use preferred design tools such as 3dstudioMax, Maya, Cinema 4D or the like. This makes it achievable to sub contract design work.



TOOLS TO HELP ACHIEVE PERFECT VR

There are a number of problems that need to be solved when commissioning a VR system including lens distortion, CCD offset, nodal shift, barrel distortion and model frame of reference. tOG VR includes a set of easy to use tools to solve these problems.

Lens Calibration

Compensate for all lens distortion using the tOG VR complete lens calibration procedure, including correcting barrel distortion. With tOG VR, lens calibration is a procedure that needs to be done just once for each lens / camera body combination, and loading a previously created lens files into tOG when swapping lens or cameras is a trivial procedure. Swapping camera bodies simply requires a CCD offset correction.

Quick model orientation is especially important when using a 2.5D PTZ head since it allows repositioning of a camera in less than 5 minutes. For full 3D this is part of the commissioning procedure and need only be done once. Accuracy is also important especially when using Augmented Reality where a virtual object has to line up with a real one.

Blue Box Working Area

Use the tOG VR configurable Blue Box module to set the working area of the VR set, automatically masking out the rest of the area. This tool is ideal for making a small area appear like a large complete studio.

Model Positioning in 3D Space

tOG VR includes a procedure that very quickly and easily positions a VR model in 3D space, with easy to follow on screen instructions.

TRACKING TECHNOLOGY INTEGRATION

An integral part of a VR set is the tracking technology used—from encoded ptz heads to cranes, hoists and tracks. tOG VR integrates with tracking solutions from the leading suppliers in

Tracking system integration

tOG VR integrates to a wide variety of 3rd party tracking technologies including Vinten, Radamec, Blue-i and FreeD, and bespoke systems for cameras on linear or curved tracks, cranes, hoists and wall mounts. Custom retrofitting to existing hardware may also be possible.

used. It can give up to 8 axis of movement (pan, tilt, roll, zoom, focus,x,y,z). This can even allow 'hands held' camera operation.



Encoded Ptz Head VR— tOG VR 2.5D is restricted to Pan, Tilt, Zoom and Focus instrumented heads (PTZ). In this mode users are restricted to keeping the position and roll of the camera fixed.

Full Freedom of Movement VR — tOG VR 3D incorporates additional axis of movement depending on the technology



HARDWARE SPECIFICATION

tOG-3D Edit is a software solution operating on industry standard IT hardware and operating systems, with leading video graphics cards.



Workstations

RT Software only qualifies hardware that is proven to meet the exacting demands of live broadcast for reliability, durability and performance.

Desktop/side and rack mount systems are offered from:

- Hewlett Packard.
- Dell.
- Super Micro.

Laptops are offered from:

- Hewlett Packard.
- Dell.

Graphics Sub-System

tOG solutions harness the power of Quadro GPUs made by nVidia, the world leader in visual computing technology.

Video Sub-System

To ensure the quality of tOG rendered graphics are maintained all the way to video output, tOG solutions use the highest quality video input and output cards from DVS and nVidia.

More Information

- See <http://www.rtsw.co.uk/hardware> for a complete hardware specification
- See <http://www.rtsw.co.uk/products> for more information on our other technologies

About RT Software

-  **Provides real-time 3D graphics solutions** for all on air requirements including VR studios, sports, news, elections, entertainment and academia.
-  **Founded in 2004** and privately funded, its award winning founders had spent many years working for the Computer Graphics department at the BBC.
-  **Based in London** in the United Kingdom. The company operates globally through a network of trained value added resellers.

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-  **Through one of our local resellers**
Our resellers are tOG-3D trained to provide you with local support. Please see the partners page on our web site.