Viva3D® Pro release 1.03

Features overview

**Unique features**

- Real-time GPU/GPGPU rendered 3D scene creation & presentation with in-scene dynamic data & streaming
- Virtual-reality style scene editing dramatically boosts productivity
- GPU-based software provides enormous performance scalability across mobile, embedded and desktop platforms: Viva3D engine is fully platform independent
- Renders complex scenes on low-cost devices, including sub $70- UHD set-top boxes
- Fully interactive 3D environment with live-data updating of in-scene objects
- AI driven gesture & speech controlled content creation & presentation
- Supports all standard displays and projectors, both 2D and 3D holographic
- Direct 2D+Z and Autostereoscopic multi-view output for all sub-pixel formats
- 3D scenes support live data input, i.e. 3D content can show live data feeds, text, live video, time and date, transport schedules, prices, etc.
- Comprehensive easy-to-use automated scene creation facilities
- Extensive range of materials with extendable vertex, pixel, and geometry shaders
- Real-time conversion of SBS-LR (glasses) 3D movies to autostereoscopic multiview

**2D & 3D TrueType™ Unicode fonts with texturing, bump-mapping & live-data linking with Arabic (right-left+ligands), Chinese, Hebrew, Japanese and Korean scripts**

**Fastest available GPU-driven animation using mesh skinning and morphing**

- Programmable particle effects, billboards, spot and unidirectional lighting, environment mapping, fast depth buffer PCF shadows, and other special effects
- Rendering of 2K-8K video directly to textures for 3D scene video playback

**Mesh formats supported:** FBX (.fbx), 3D Studio (.3ds), Bliz Basic B3D (.b3d), Cartography Shop 4 (.csm), COLLADA (.dae, .xml), Delgine (.dmf), DirectX (.x), Wavefront (.obj), Milkshape (.ms3d), My3D (.my3d), OCT (.oct), OGRE Meshes (.mesh), Pulsar LMTools (.lmts), Quake 3 levels (.bsp), Quake models (.md2/.md3)

**Image formats:** Portable Network Graphics (.png), JPEG File Interchange Format (.jpg), Windows Bitmap (.bmp), Adobe Photoshop (.psd), Truevision Targa (.tga), ZSoft Paintbrush (.pcx)

**Flexible 2D and 3D GUI with animated buttons, list and edit boxes**

**Physics engine support, with efficient collision detection, gravity & response system**

**External sensor & device I/O, including real-time stereo camera input, IR & LIDAR**

**Voice & gesture recognition for content creation and presentation control, animated human models can interact using voice recognition supported by AI**

**Extensive features for 3D digital signage** content management, scheduling, playback & reporting with 24x7 channel presentation on an unlimited number of independent channels with regional groups and content. High fault tolerance.

- ODBC database connection and filtering to support data I/O and language or code translation. Maxum™ Network server software available to rebroadcast datagrams.
- Datagram reception, transmission and filtering to support data I/O and translation across local or global networks using standard socket protocols at low bandwidth.
- Audience Metrics support providing viewer driven actions and data reporting
- Detailed status and error reporting via FTP, email and SMS messaging
- Designed for 24x7 operation with kernel-level operating system management
- Drivers for OpenGL/ES 2.4, DX9-11 and Vulkan
Scene rendering facilities

- Dynamic rendering with shininess, specular, diffuse, and ambient settings
- Dynamic shadows using scene depth rendering and PCF smoothing
- Reflective surfaces using environment map or simulation textures
- Flexible particle systems to produce rain, snow, smoke, fire and logo confetti effects
- SkyBoxes and SkyDomes with rotation; 32K pixel panoramic image support
- Fog with distance controlled attenuation and tinting
- Volume light to create spatial glow effects
- Video rendering to any surface, including SkyDomes, at up to 4K resolution
- Real world data-driven ocean and atmospheric simulations
- MIP-mapped detail-level terrains with up to 2M x 2M pixels per tile resolution
- Bump, Parallax and Sphere mapping
- Transparent surfaces with mix-controlled reflection
- Manual or automatically controlled model sectioning & sub-mesh transformation

Scene management

- 3D scenes are created by manually placing objects into a Virtual Reality style world space. Once placed, objects are modified by selecting the required materials and attributes. In this manner, complex scenes and animations can be created and modified very rapidly.
- For interactive content, users have a wide range of controls, from a standard user-interface, to gesture control and speed. This includes in-scene touch-activated information display, 3D buttons, and exploded views controlled using a slider or hand gesture.
- 3D scene objects can be spatially linked so that they track a parent object’s movements. In this manner they can be easily linked to form more complex objects. Animations applied to the parent object act on all linked objects, simplifying animation control.
- A wide range of stock animations can be applied to objects, including rotation, step-rotation, fly straight, fly circle, ellipse, path, fly waypoints, face camera, proximity activation, etc. An unlimited number of cameras can be set-up, which can be activated at set times or events, and animated to fly paths, with programmable look-at targets, and tracking modes.

Scene and model editing

- Users can paint models very easily just by dragging texture files onto the part of the model required, or clicking that part and selecting a color, texture file, and shader type. Multiple selections of sub-meshes can be made, and then a color or texture file assigned. The whole process if entirely visual, we could say it was 3D WYSIWYG!
- Once painted, models can be positioned with the mouse and spun into position in seconds. Models can also be instantly duplicated and animated with custom or standardized animations.
- Environmental reflections, glass effect, transparency and shaders can be simply selected for each model or each individual material and its associated sub-mesh. There are no limits to the number of materials per model, that is apart from available memory!
- Each sub-mesh or a model can be dragged and rotated as required by the user using the mouse or touch gestures. Multiple sub-meshes can be selected for rotation to facilitate animation of any part of the model as required, and a single slider control allows models to be expanded (or exploded) as required. Models can also be set to automatically expand as the camera approaches.
Support for an unlimited number of materials/sub-meshes per model, each with its own settings. Each material can use any of the available renderers, including Phong and Gouraud, with transparency, bump mapping, environmental reflection and live video to texture, plus database data, text and image rendering to texture.

Advanced per-pixel lighting supports a mix of up to 32 lights and radiosity channels, with PCR shadows.

Models and their sub-meshes can be translated and rotated as required, and animated to support events such as door fly-throughs.

3D models can be linked to local data tables that are populated from incoming data. Data can control object mesh selection, position, 3D TrueType text content, and many other attributes.

Database text can also be translated internally to select 3D models and textures, allowing simplified remote control of 3D in-scene elements, useful for creating auto-updating content.

3D text linked to external data is fully supported.

A library of 3D models allows scenes to be created rapidly. Additional models can be imported into scenes as required up to 1GB each. Models can be rendered in real-time fully shaded, or in wireframe mode. Textures can be dropped directly onto model surfaces or browsed.

Render features
- Per-pixel lighting with depth-map PCF shadowing, radiosity & bump maps
- Up to 32 lights and radiosity sources supported, with light colour and effects
- Per material anti-aliasing with 5 levels
- Per material filtering (bilinear, trilinear, anisotropic) for improved quality
- MIP maps for improved image quality at all scales, including on real-time video streams
- Fog enabling per material with height and distance attenuation
- Alpha blending and multi-texture mixing to effect & environmental reflection textures
- Gouraud, phong and depth map rendering
- Fast ray traced environment reflection simulation, with soft shadows from multiple lights
- Reflective surface (floor)(environment or simulated) with parallax maps for water surface
- Sphere map, simulated and true environment reflection.
- Glass environmental reflection and refraction with optional bump map
- Transparency via texture color key: supports video keying
- Transparency via texture alpha
- Material lighting controls : specular, diffuse, emissive, ambient, shininess
- Volumetric lighting with efficient vertex based shader, and color start and end selection
- Wireframe rendering per sub-mesh or entire model
- Backface/Frontface culling
- Texture matrices for 2D rotations
- Vertex geometry shader for fast mesh animation of large numbers of models
- Vertex heightmap shader supporting massive terrain models stored on the GPU. This avoid the need to regenerate large mesh models on the CPU, increasing load speed, and in addition allow real-time terrain height variation, useful in a number of modelling scenarios.
- Video rendering, either live stream or recorded, direct to texture at up to 4K resolution. Advanced coding techniques allow the efficient processing of massive video frames to texture in real-time, allowing 4K content to be streamed to textures at up to 120 FPS on mobile.
- Stereo camera live feed or video rendering to depth-extruded mesh in 3D scene, enabling external world to be captured in 3D environment and realistically represented.
Model/Character animation
- Anatomically correct human characters animated in the GPU allow real-time animation through standardized key frames, text scripts, or direct voice control, allowing director-to-actor control. Real-time rendering of realistic human models is now possible even on mobile devices.
- Skeletal animation: Limb meshes are manipulated via animated joints, skinned and morphed in real-time in the GPU. Animated objects may also be linked to clothing or other objects. Models can be imported in following formats:- FBX, DirectX, My3D and Blitz.
- Flexible animation: Meshes can be linearly interpolated from one frame to the next. 98% of animation is directly managed by the GPU, allowing realistic animations on low-cost devices. Facial animation is managed via standardised rigging that can be synchronised to text files or live data streams supporting lip-syncing. Models can also directly follow voice commands.
- Simulation and 3D mimic data displays
  As a data-driven real-time 3D system that is 24x7 reliable, Viva Pro makes possible advanced 3D mimic displays for industry and science, maritime and aerospace applications. We would be pleased to collaborate with any enquiries in these fields.
- Advanced Digital Signage for large global networks
  Viva3D Pro offers a complete solution for global 3D-empowered TV, from server software to ensure each channel is always running, to automated reporting and content updating. Please contact us for details.
- 3D Visualization without glasses
  Viva3D Pro instantly outputs to VR googles, autostereoscopic multiview, 2D+Z and LightField monitors, and even the latest holographics displays. It supports most known autostereoscopic monitors and all of the WowVX and Dimenco formats.
- Infinite expandability
  Viva3D Pro has been carefully designed with a modular structure allowing the most efficient processing using not only the latest 3D rendering processors of today, but future innovations yet to come. We are confident that we are ready to rapidly expand the capability of the program to support advanced A.I., image and speech recognition to make creating content and interacting within 3D worlds a real pleasure.

Summary
Viva3D Pro provides a fast, flexible and efficient solution for rapidly creating realistic & complex data-driven 3D content for a wide range of applications from education, to advertising, industry and science. It is available for desktop, mobile & embedded 24x7 applications.

Content can be created as much as 80% faster compared to existing tools, and with a much reduced learning curve; for more details visit our ViewPoint3D channel on YouTube.

Viva3D offers many novel features, including zero render time, remote-data control of in-scene models making, for example, automated weather maps a possibility, auto-updating 3D text & models, stereo camera/video input with automatic depth map creation, automatic conversion of LR stereo movies (SBS glasses formats) to 3D scene, object & face recognition, and direct output to autostereoscopic and holographic displays.

Its unique VR-style scene editor makes creating content fast and enjoyable, allowing users to create exciting 3D content dramatically faster than any other application. With VR googles users can enter the 3D scene to create content using data-gloves to modify objects, and speech for object control and confirmation.

Viva3D Pro has been developed entirely within the company using standards-based C++ coding, enabling easy expansion of features to meet future needs. Please contact us for further details.