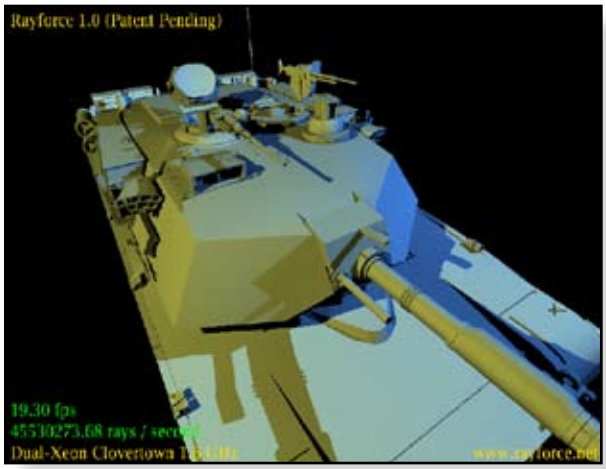
SURVICE ENGINEERING COMPANY

Rayforce™

Patent-Pending High-Performance Raytracing Engine

Real-Time Raytracing with Rayforce™

Computer graphics have been relegated to OpenGL or DirectX accelerated cards, which provide good visual feedback. However, the quality of these traditional means of real-time computer imaging pales in comparison to rendered (or raytraced) images which are used in the movie industry to generate photorealistic scenes. The difference is associated with the computationally intensive process associated with raytracing…which traces light paths, reflections, translucencies, etc. for every pixel in a computer-generated scene. Traditionally, therefore, the trade has been between quality and real time imaging. Rayforce™ represents a highly-optimized architecture which brings real-time rendering using raytracing to desktop computing.



Real-time Rendering using Rayforce™

Exceptional Performance through Non-Traditional Means

Current rendering engines use traditional and straightforward means of raytracing. Binary Space Partitioning (BSP) and Kd-tree acceleration structures are used in conjunction with Möller-Trumbore triangle intersection methods to achieve acceptable levels of performance. Rayforce™ implements an alternative approach which produces exceptional performance. Rayforce™ characteristics/capabilities include:

- Total count of primitives have no direct impact on performance.
- Efficient exploitation of the coherency and locality of rays.
- Ability to accommodate local alterations of the geometry without loss of raytracing performance or need to reconstruct the entire space partition.

Performance Benchmarks	
Sample Geometry	138,436 facets
Light Sources	3
Resolution	800 x 600
System	Dual Opteron
Processor	Dual Core
Rays Per Second	24-45 Million
Frames Per Second	13-24

Paradigm Shift in Computer Graphics

With the advent of multi-processor and multi-core desktop systems, high-quality rendered images that used to take minutes or hours can now be generated in real-time, at frame rates suitable for interactive viewing. Rayforce™ leverages the latest in desktop hardware with highly-optimized software to provide next-generation performance…today.

Roots in U.S. Department of Defense

Rayforce™ was developed to support the needs within the U.S. DoD for accurate high-speed imagery required for a variety of simulation purposes, which is a core business of the SURVICE Engineering Company. We are now bringing this cutting-edge technology to the commercial sector.

About the Author

Rayforce™ was developed by Alexis Naveros in association with SURVICE Engineering. Alexis leads several of our Internal Research and Development (IR&D) projects, working on a variety of high-performance computing problems. In addition to Rayforce™, Mr. Naveros is also working on Apollo™ - a modern and highly-optimized Computational Fluid Dynamics (CFD) code to support a variety of physics-based simulations to include fire and thermodynamics associated with heat transfer.

Contact Information

For more information on Rayforce™ visit the Rayforce™ website at:

www.Rayforce.net

or send inquiries to: rayforce@survice.com