Contents of the CD-ROM

The CD-ROM contains the distribution of Wild Magic version 3.4. The release notes, license agreement, and source code are located in the directory tree:

```
GeometricTools/WildMagic3p4ReleaseNotes.pdf
GeometricTools/WildMagic3License.pdf
GeometricTools/WildMagic3/Foundation
GeometricTools/WildMagic3/Renderers
GeometricTools/WildMagic3/Applications
GeometricTools/WildMagic3/SampleGraphics
GeometricTools/WildMagic3/SampleImagics
GeometricTools/WildMagic3/SampleMiscellaneous
GeometricTools/WildMagic3/SamplePhysics
GeometricTools/WildMagic3/SampleShaders
GeometricTools/WildMagic3/Tools
```

The data sets and various items of interest are in other directories. The official Web site for the Wild Magic engine is `www.geometrictools.com`, and will include engine updates, a history of file changes and bug fixes, known problems, and addition materials relevant to the engine.

Source Directory

Approximation. Fitting of point sets with Gaussian distributions, lines, planes, quadratic curves, quadric surfaces, and polynomials.

Collision. Support for collision detection. Collision groups, collision records, bounding volume trees.

Containment. Containment of point sets by boxes, capsules, cylinders, ellipsoids, lozenges, spheres. Containment by minimum volume boxes and spheres. Convex hull construction.

Controllers. Various animation controllers. Keyframe animation, morphing, skin and bones, point and particle systems, inverse kinematics.

Curves. Abstract curve class to compute position, derivatives, tangents, speed, arc length, reparameterization by arc length, subdivision algorithms, curvature, torsion, normals, binormals. Includes polynomial curves, Bézier curves, B-spline curves, NURBS curves, cubic spline curves, tension-bias-continuity curves. Also includes support for curve tessellation and rendering.

Detail. Level of detail. Discrete, continuous, billboards.

Distance. Distance calculators for pairs of objects.

Effects. The special effects system for lighting and materials, texturing, vertex colors. High-level effects include bump maps, light and dark maps, environment maps, gloss maps, planar reflection, planar projected shadows, projected textures.

ImageAnalysis. Basic routines for 2D and 3D image analysis and processing. Includes support for level curve extraction from 2D images and level surface extraction from 3D images.

Interpolation. Interpolation of data. Akima, bilinear, bicubic, B-spline, piecewise quadratic, spherical interpolation, thin plate splines, trilinear, tricubic, vector field interpolation. Scattered data interpolation uses Delaunay triangulation and tetrahedralization.

Intersection. Intersection calculators for pairs of objects, including support for static and dynamic queries

and support for test-intersection and find-intersection queries.

MATH. Basic support for points, vectors, matrices, quaternions, and polynomials. Also provides fast function evaluation for a few trigonometric functions. Includes the source code for a large number of objects that are used in the engine.

MESHES. Various implementations of vertex-edge-triangle tables for use in graphics and imaging applications.

NUMERICS. Root finding via bisection, eigensolver for symmetric matrices, integration, linear system solving, minimization without derivative calculations, sovling systems of ordinary differential equations, polynomial root finding.

OBJECT SYSTEM. The object-oriented infrastructure for the engine, including run-time type information, smart pointers, unique naming and identification, and streaming.

PHYSICS. Source code to support physics. Deformable surface meshes. Volume interpolation for free-form deformation. Numerical solver for Linear Complementarity Problems (LCP). Support for the physics of particle systems. Mass-spring systems. Computation of mass and inertia for rigid, convex polyhedral bodies. Fast overlap detection for intervals (1D), axis-aligned rectangles (2D), and axis-aligned boxes (3D) that allow for fast intersection testing using time coherence.

RATIONALARITHMETIC. Exact integer and rational arithmetic functions. Supports exact conversion from floating point types to rational numbers.

SCENEGRAPH. Scene graph management. Tree structures, internal nodes, leaf nodes, point and particle primitives, line primitives, triangle primitives, bounding volumes, transformations, and global render state including alpha blending, dithering, fog, lighting, materials, shading, texturing, wireframe, and depth buffering.

SHADERS. The base level support for vertex and pixel shaders.

SHARED ARRAYS. Support for instancing of arrays for the purposes of sharing the data among objects. Support for caching of arrays in VRAM.

SORTING. Sorting for rendering purposes, including binary space partitioning (BSP) trees and portals.

SURFACES. Abstract surface class to compute position, derivatives, tangents, normals, principal curvatures and directions. Derived classes for parametric surfaces, including B-splines and NURBS, and for implicit surfaces, including quadrics. Also includes support for surface tessellation and rendering.

SYSTEM. Encapsulation of operating system specific needs (Windows, Linux, Macintosh, Unix).

TERRAIN. Terrain with or without continuous level of detail.

TESSELLATION. Delaunay triangulation and tetrahedralization.

Renderers Directory

The graphics engine has an abstract API for the rendering system. The renderers for specific platforms are implemented to use this API. The engine supports OpenGL and DirectX.

Applications Directory

The application layer is an abstract API that supports console applications or window applications for either

two- or three-dimensional graphics. Each platform of interest provides some platform-specific code.

Sample Directories

A repository of sample applications for graphics, physics, image processing, and shader programming.

Tools Directory

Supporting tools for the engine are located here

3DSToWm3. An importer for Discreet's 3DS file format.

BitmapFontCreator. Create bitmaps for the GLX OpenGL renderer.

Bmp24ToWmif. A converter from Microsoft Windows BMP files to Wild Magic WMIF image files.

CgToWm3. A compiler that generates Wild Magic source code from shader programs written with nVidia's Cg programming language.

GenerateProjects. Automatically generate projects for Visual Studio 6, 7.0, and 7.1, and for Xcode 1.5.

LwoToWm3. An importer for Lightwave's LWO file format.

Max4ToWm3. An exporter for Discreet's 3D Studio Max version 4.

Max6ToWm3. An exporter for Discreet's 3D Studio Max version 6.

Max7ToWm3. An exporter for Discreet's 3D Studio Max version 7.

Maya6ToWm3. An exporter for Alias Wavefront's Maya version 6.

MfcSampleVC6. A sample Microsoft Foundation Class project for Visual Studio 6.

MfcSampleVC71. A sample Microsoft Foundation Class project for Visual Studio 7.1.

OpenGLExtensions. Generate the extension wrapper code for the OpenGL renderers on all platforms.

ScenePrinter. Write a scene graph to an ASCII text file.

SceneTree. A Microsoft Windows tree control for scene graph browsing.

SimpleViewer. A simple scene graph viewer.

WmifToBmp24. A converter from Wild Magic WMIF image files to Microsoft Windows BMP files.