

CLIENTS

ABC

Beyond C

CBC

CBS

Centropolis

C.O.R.E. Digital Pictures

Command Post

Digital Domain

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Ludens

Mainframe Entertainment

Namco

Nintendo

Rhythm and Hues

Satelight

SEGA Enterprises

Sony Computer Entertainment

Sony Pictures Entertainment

Square Co. Ltd.

VisionArt Design & Animation

Weta Digital Ltd.

PROJECTS

Hollowman

Chicken Run

X-Men

Lord of the Rings

The Grinch

Red Planet

Battlefield Earth

Mission Impossible 2

Fight Club

Supernova

The Patriot

Frequency

Oh Brother Where Art Thou

The Beach

Sleepy Hollow

Jason X

Castaway

Gulliver's Travels

Nutty Professor II: The Klumps



TAKE CONTROL...VEX VEX is about having complete control over the look of your creation at any point in the process: be it modeling, compositing or rendering. It's a multipurpose language that supports every stage of the production pipeline.

VEX is about shaders. Easy to create shaders that can be used with either Houdini's native renderer (Vmantra) or RenderMan®. Go with VMantra to get real ray-traced displacements...at a speed that will amaze. Add Cinema Graphics' Shade Tree® for an artist-friendly GUI.

VEX is about simplifying the creative process. Because VEX is integrated throughout Houdini you can reuse your displacement shader as an efficient geometry deformation tool. Likewise the VEX code you wrote for generating a procedural texture can be easily reused in the image compositor.

VEX is also about empowering artists. Master this one simple shader language and you can create custom Houdini tools...without having to turn to the programmers or a Developer's Kit. *Reality Reinvented once more.*



Image courtesy Rhythm & Hues Studios
© 2000 New Line Cinema



Image courtesy Sony Pictures Entertainment
© 2000 Columbia TriStar



Image courtesy CFC
© 2000 DreamWorks/Aardman/Pathe

CONTACT US

For more information about Side Effects Software and Houdini: sidefx.com

For sales or demonstration information: info@sidefx.com



**SIDE EFFECTS
SOFTWARE**

```

void
UT_MatrixResultant::DixonTP3(UT_Matrix &coeff, const UT_Matrix &A,
                             const UT_Matrix &B, const UT_Matrix &C) const
{
    int     udeg = A.getNCH() - A.getNCL();
    int     vdeg = A.getNRH() - A.getNCL();
    int     f, g, h, k;
    int     r, rp, rpp, s, sp, spp; // r, r', r'', s, s', s''
    int     ridx, cidx;             // Index into coeff array.
    float   coeffaccum;
    float   *As, *Aasp, *Aspp, *Bs, *Bsp, *Bsp, *Cs, *Csp, *Cspp;
    float   Apq, Ars, Atu, Bpq, Brs, Btu, Cpq, Crs, Ctu;

    coeff.init(1, 2*udeg*vdeg, 1, 2*udeg*vdeg);

    if (udeg <= MAX_CACHE_DEG && vdeg <= MAX_CACHE_DEG)
    {
        // Use caching...

```



UN

REAL

```

    utCaches[Eudeg][Evdeg]->findResultant(coeff, A, B, C);
    return;
}
for (f = 0; f <= 2*udeg - 1; f++)
{
    for (g = 0; g <= vdeg-1; g++)
    {
        for (h = 0; h <= udeg-1; h++)
        {
            for (k = 0; k <= 2*vdeg - 1; k++)
            {
                // Find coefficient of x^f y^g a^h b^k:
                // Offset into array:
                ridx = k * udeg + h + 1;
                cidx = f * vdeg + g + 1;

                coeffaccum = 0.0;
                for (s = 0; s <= UTmin(k, vdeg); s++)

```

3D ANIMATION TOOLS

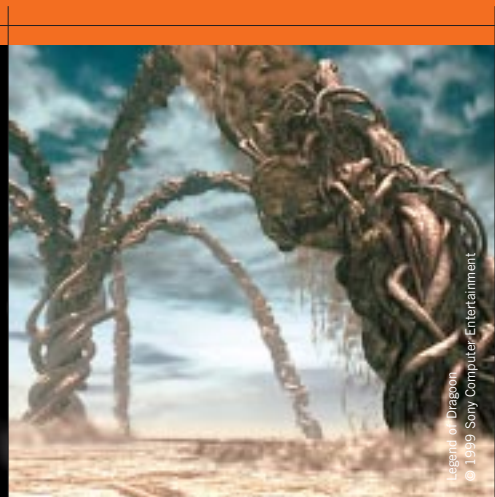
Houdini™

REINVENT REALITY

REINVENT REALITY



Image courtesy Realise Studio
© 2000 WCRS



Legend of the Dragon
© 1999 Sony Computer Entertainment



Image courtesy Digital Domain
© 2000 20th Century Fox



ART IS ALL Artists will create. Rodin, equipped with nothing but PlayDoh would still have inspired. David Fincher without a camera would find ways to express his ideas. Create, express, inspire: it's what artists do. The tools — they influence the final outcome of the art, but they are not the art itself. The best tools allow the artist to forget about the method and concentrate on the expression.

Houdini is a tool. A tool allowing you to inspire, create and express...limitlessly. It puts the control in your hands and enables you to realize a unique self-expression. Not canned effects, not another

walk-cycle like every other. Something *Un Real*. Organs and muscles that dissolve before your eyes, a crowded stadium filled with hundreds of characters with unique actions and attributes.

With its newly redesigned UI, Houdini 4.0 works the way you think...so that the tool becomes imperceptible. *And the artist can reinvent reality.*

INNOVATE Side Effects Software is a company built on innovation: the procedural paradigm, a non-linear workflow combining modeling and animation, a built-in scripting language, procedural particles, motion compositing and layering, a fully integrated pipeline, an interface for choreographing, NURBS surface pasting, VEX, a port to Linux...an impressive list of firsts. Our innovations are user-driven. Take our port to Linux for example — we did that for our users, many of whom like the power and flexibility of Unix. We also did it because we like the idea of community mindshare. We did it because, like you, we innovate. Today, we're still the only high-end 3D graphics package running on Linux. *Innovation lets you stand apart.*

HOUDINI 4.0



THE ULTIMATE IN ANIMATION AND EFFECTS

Houdini 4.0 is the ultimate animation and effects solution that streamlines modeling, animation, compositing, lighting, texturing, motion editing, shader writing and rendering.

VISUAL PROCEDURAL NETWORKS

Houdini's unique and award-winning Visual Procedural Network technology facilitates quick learning, rapid experimentation, and the ultimate in production flexibility.

FULLY NON-LINEAR WORKFLOW

Houdini's revolutionary approach to animation gives artists freedom to create and innovate. A fully non-linear architecture lets artists work the way they think.

NEW USER INTERFACE

A powerful new customizable interface has been designed to handle the most sophisticated production environments with efficiency.

REAL-TIME INTERACTIVE

Houdini is a high-performance, real-time, interactive animation engine. A number of innovations in the area of live channel manipulation and time slicing make Houdini the premier tool for performance animation, motion capture, and motion control work.

OPEN AND CUSTOMIZABLE

Openness and customizability are the underlying tenets of the Side Effects Softwares philosophy:

- virtually every operation and every parameter is open and animatable

- artists can customize everything from the interface through to the operators and the output drivers
- developers have direct access to the powerful libraries from which Houdini was constructed

VECTOR EXPRESSION LANGUAGE (VEX)

- a powerful yet easy-to-use programming language that bridges content creation with shader writing
- allows artists to create custom surface operators (SOPs), particle operators (POPs), compositing operators (COPs), and rendering shaders without C or C++
- extensive VEX documentation with examples

SUPERIOR MODELING TOOLS

A superior collection of NURBS, Bézier, and polygonal surface and solid modeling operations – surfacing: skin, rail, revolve, sweep, join, stitch, free-form and circular fillet, round, bridge, extrude, polyloft, cap; fitting: polyspline, polypatch, resample, fit; cutting: carve, curve and surface intersection, trim, untrim, clip, hole; projection: project, profile, ray, creep; xform/ instancing: align, transform, copy, stamp, trail, sort; deformation: magnet, lattice, twist, fractal, clay, curveclay, basis, point, primitive, skeleton, blend, difference, facet, revolve; dynamics: spring, particle; refinement: subdivide, polyreduce, viewport LOD, smooth/divide, refine, unrefine; hierarchical splines (h-splines): paste, unpaste; conversion: convert, trace

TRADITIONAL MODELING TOOLS

Houdini's procedural modeling tools offer more power and flexibility than traditional modeling tools. For those who prefer traditional modeling techniques, Houdini also offers many of its powerful modeling operations through a traditional modeling interface.

CHOPS: MOTION AND AUDIO EDITING

Choreography through motion layering and manipulation is taken to the next level through Houdini's Channel Operators (CHOPs). This award-winning technology provides animators with a superior way to manage sampled data:

- non-destructive motion editing suitable for motion capture, motion-on-motion compositing, lip sync, facial animation, motion management for large projects, real-time gesture capture, audio editing, and audio synthesis
- a multi-target variable-weight IK system specifically designed for motion captured characters

MATERIAL AND TEXTURE EDITING

- complete material attributes including refraction, reflection, transparency, and emissive properties
- shader types include Blinn, Lambert, Phong, Cook, Normal, Constant, Shadow, and TwoTone (cartoon)
- 2D /3D procedural texture operators include bump, erode, wave, and noise
- 3D solid textures such as wood, marble, and agate
- numerous texture-mapping operators including polar, cylindrical, spherical, orthographic, and cubic
- interactive texture positioning for rapid stamping

ADVANCED CHARACTER ANIMATION TOOLS

- powerful capture and deform tools with joint control and direct capturing of NURBS surfaces; multiple weights per point; independent rest and capture positions
- skeleton-building interface for rapid character creation
- 3D inverse, forward, and follow-curve kinematics on multi-bone chains with angular constraints
- fully accessible and animatable bone parameters, including bone length and rest position
- integrated audio scrubbing with text voice track
- ability to edit capture weights interactively

ADVANCED VISUAL EFFECTS

Houdini's award-winning procedural particle operators (POPs) bring new power to the world of visual effects.

- full control over particle attribute and collision information
- sub-frame controllable event and time based behaviors
- flocking support with inter-particle and following forces
- per-particle up-vector (for instanced geometry)
- birth from geometry (points, edges, trimmed surfaces, volumes) or from other particle streams
- multiple collision objects, attractors and forces (such as fan, wind, drag, turbulence, gravity, and friction)
- momentum-preserving, fully-animatable particle emitters
- integrated with Rigid Body Dynamics engine

HOUDINI SCRIPTING LANGUAGE

- powerful scripting in the Houdini textport
- extensive math expression library (including spline curve/surface evaluation functions); custom functions
- scripts can be triggered by selecting objects

MANTRA PHOTOREALISTIC RENDERER

- soft spotlights, slide projector, ray-traced reflections (or reflection map), atmosphere; customizable lens flare
- hard or soft shadows through textured or translucent objects; phantom and depth shadows
- camera options include motion blur, depth of field, video fields, orthographic, perspective, panoramic, and dither
- programmable shaders and displacement with VEX
- integrated distributed rendering support

INTEGRATED RENDERMAN SUPPORT

- output to RenderMan with an extensive set of camera, lighting, shadow, image, and surface features
- RenderMan shaders animated from within Houdini
- NURBS curves and patches, polygons, quadrics
- complete motion blur of deforming surfaces

ADDITIONAL TOOLS

- ships with a variety of additional stand-alone tools such as ipaint (2D paint program), greduce (interactive polygon reduction tool), isplay (flipbook viewer), spy (visual file browser), and several geometry format converters

GEOMETRY FORMATS

- input: IGES, DXF, Wavefront, Inventor, PostScript, Adobe fonts, Lightwave, SDL
- output: DXF, Wavefront, Inventor, VRML

COMPOSITING / 2D IMAGE TOOLS

Houdini 4.0 provides a 2D environment that interacts "live" with the 3D components:

- matte key, color correct, combine, crop, replicate, time distort, image filter, field separator, channel swap
- image caching and scanline compositing to save RAM
- image color reduction with color map or best-fit
- read/write PRISMS, Cineon, TIFF, SGI, Wavefront, Targa, Alias, Abekas, Accom, and JPEG formats
- QuickTime and MovieMaker support

SUPPORTED PLATFORMS

- Windows NT (Intel): version 4.0 with SP3 or later
- Windows 2000 (Intel)
- SGI Irix: version 6.2 or later
- Linux (Intel): tested with Red Hat 6.0

OPTION: HOUDINI DEVELOPER'S KIT

- create custom expression functions, scripting commands, objects, SOPs, COPs, TOPs, POPs, CHOPs, materials, output drivers, and even stand-alone applications using Houdini's powerful class library with no intermediate API
- online hypertext documentation with sample C++ code