



Services rendered

The power of the average PC means that 3D imaging is within all our capabilities. And with packages costing as little as £100, it won't break the bank either. Jason Whittaker takes a look at the programs available and the images and animations they can help you create

In recent years, there has been a revolution in PC-based 3D design and animation. Once the preserve of high-end hardware such as that provided by Silicon Graphics, humble Wintel machines had to make do with low-end software applications that struggled to create a realistic spinning logo, hovering teacup or flying toaster.

Now, with the average notebook packing more punch than the super-computer of yesteryear, the ability to create stunning graphics and animation is within the reach of more PC users than ever before.

Hardware increases alone would not be sufficient to get excited about the

prospect of creating 3D, but last year also saw quite a few price drops in the 3D software market – in some cases up to 74 percent – and a number of professional-level 3D applications are now available as free learning versions.

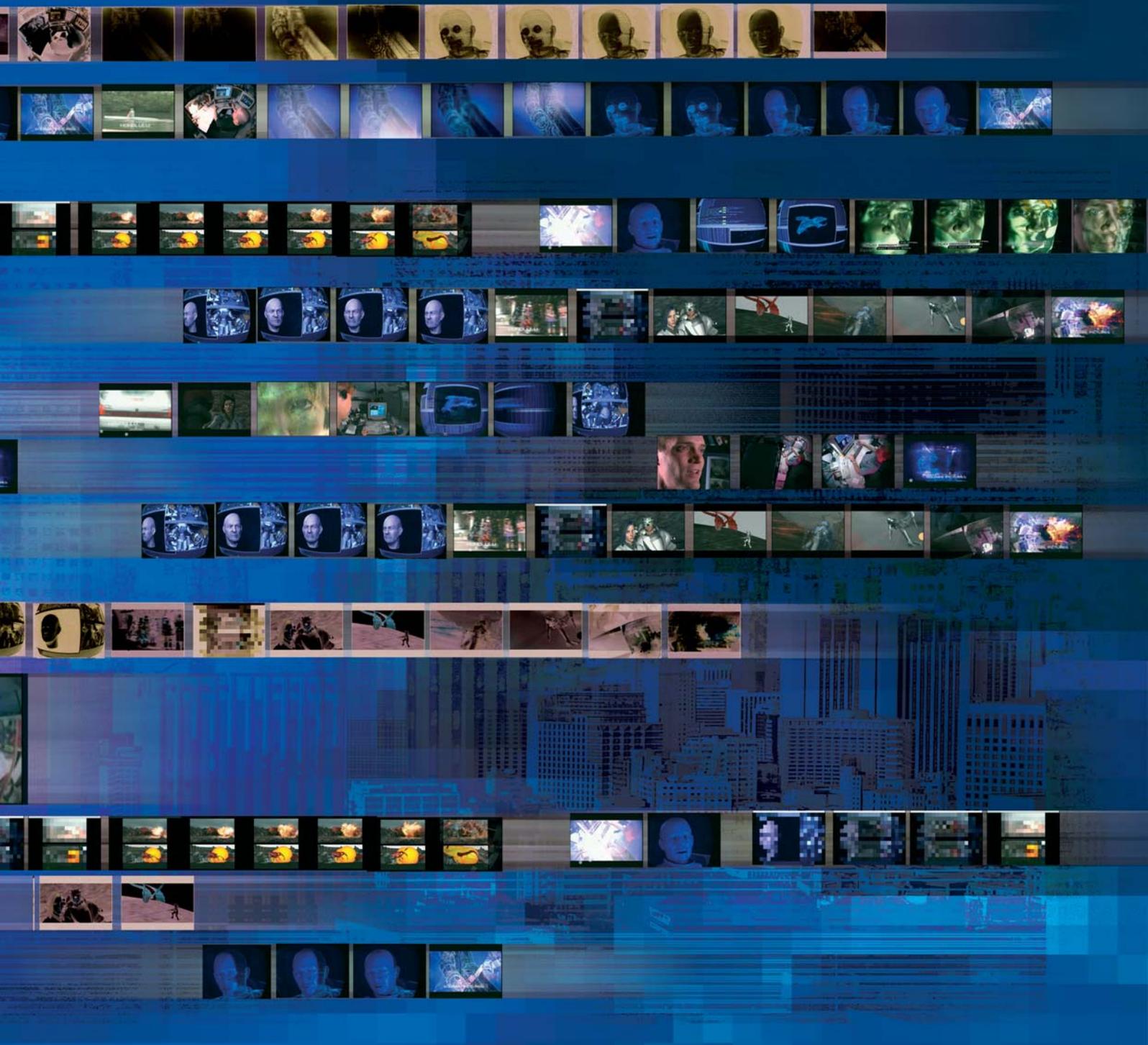
In this article, we will compare mid- and professional-level applications, the former ranging from just over £100 to £500, the latter reaching anywhere up to £3,000. We won't cover the most expensive packages, such as Softimage XSI or Houdini, but programs such as Maya and LightWave, which have been used in a number of films and TV programmes, such as *The Matrix* or *Babylon 5*, are well within our scope.

Mid-level applications

Nearly all the programs reviewed here offer, at the very least, basic tools to model simple shapes such as spheres and cubes (known as primitives) and engines to raytrace images (so-called because software traces imaginary rays of light). These five applications also offer animation tools – something that would have been inconceivable five years ago but is now regarded as standard.

Amapi 3D 6.1

Amapi is a keenly priced application that excels at modelling. It is best used as a complementary program to enhance the



features of another package (Amapi 3D 5.0 is bundled with Carrara Studio), but it also includes tools for animation and rendering. Version 6.1 addresses some of the glitches that affected the previous release, making the program more stable.

Amapi's 'natural design' interface is somewhat unusual (though less so than applications such as Bryce, Poser or Vue D'Esprit) but it's intuitive and offers tools for modelling and deforming polygons and nurbs (a line with control points along it that allows sophisticated manipulation). These enable you to create complex skins and wraps with greater ease. You can even export files to the web using 3Space, which provides very compact output.

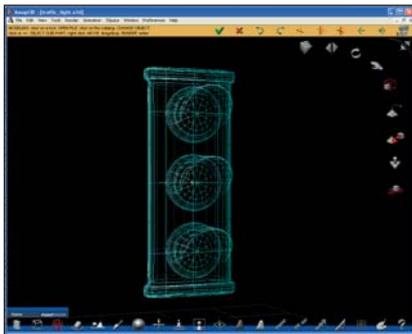
Bryce 5.0

Bryce was already established as one of the most popular modelling and animation packages around when Corel acquired Bryce from MetaCreations last year. The new owners inherited an attractively priced product of remarkable scope and quickly introduced an upgraded version with some interesting features.

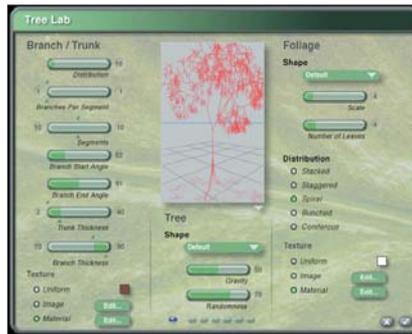
Bryce's *pièce de résistance* is its landscape modelling: with a couple of mouse-clicks you can create a mountain and cover it with forests, then animate the terrain via a timeline. New to version 5.0 is a Tree Lab which can be used to create fully customisable vegetation that also renders fairly quickly in a landscape.

Extra rendering options, such as blurring effects designed to simulate depth of field, have been added and there's now a network rendering system that lets you spread the load of producing images and animations across several PCs. It's particularly useful that the relevant components, Bryce Lightning, can be copied to as many machines as needed without requiring further licenses.

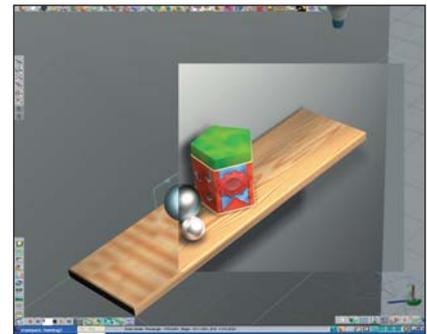
Version 5.0 is sure to be a welcome upgrade for Bryce's sizeable devoted following around the world but, despite its celebrated interface, it is not the easiest program to use once you move beyond the basics and those new to 3D will probably prefer the slightly less pricey Vue D'Esprit.



↑ Amapi's easy-to-follow interface offers a neat, uncluttered approach to modelling



↑ New to Bryce 5.0 is the Tree Lab, which you can use to create realistic-looking foliage



↑ Caligari TrueSpace has a good quality image rendering engine for a package at this price

Caligari TrueSpace 5.2

Last year, MetaCreations divested itself of Carrara Studio and it briefly disappeared before being purchased by Eovia. This enabled Caligari's TrueSpace to dominate the field for mid-level 3D packages.

Fortunately, Carrara is back and has been much improved, meaning there is once more a high level of competition.

TrueSpace's interface can become very complex: Caligari has hidden many of the floating toolbars and buttons onscreen, so commonly-used tools are hard to locate. For experienced users this enables a much greater degree of customisation than in comparable programs.

TrueSpace boasts extremely good modelling tools, including nurbs and a 'Magic Ring' that makes it easy to deform and manipulate primitives. There is also a free-flowing metaball, Metamuscle, that combines spheres to create shapes that can be manipulated easily. The rendering options are much better than any other application in this group and, though the package is more expensive than Carrara, it is also by far the best for under £500.

Carrara Studio 1.1

Carrara Studio is divided into five main sections for assembling, modelling, storyboarding, texturing and rendering. Selecting an option from the top right changes the functions and tools available, making it easy for new users to get to grips with 3D graphic design.

For a very reasonable outlay of £299 you get a decent modeller that can create primitives via splines as well as metaballs for creating blobs. What's more, Amapi 5.0 is included on the Carrara CD for more serious modelling work.

The rendering engine is not as good as TrueSpace and it will be worth waiting a month or so for Carrara 2.0, which will offer an improved rendering engine and extra character animation tools. It's well-featured for the price, however, especially as Amapi 5.0 is part of the bundle.

Poser 4.0

If you want a 3D graphics package that lets you create and animate humans easily and without spending a small fortune, the market has long been dominated by one immensely useful program: Poser. Editable models of men, women, children and animals are provided, so users can create a range of characters with minimal fuss.

The application is not without its problems – despite an interim upgrade version 4.0 is starting to look long in the tooth and its rendering engine is not great. Some of these problems are addressed by the Poser Pro Pack, a £175 add-on that also supports plug-ins for 3ds max and LightWave (details of which can be found on page 148). Despite its limitations, once you dig beneath the surface you'll find Poser has some incredible features including support for motion capture to create complex animations.

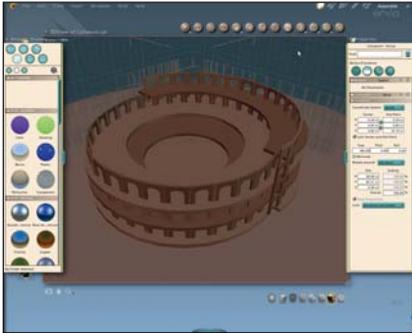
Vue D'Esprit 4.0

Like Bryce, Vue D'Esprit is dedicated to creating 3D landscapes. The interface has been redesigned for version 4.0, offering quick access to materials and object properties. As with Bryce, it excels at terrain creation. Vue D'Esprit is easier to use than its rival, allowing you to make changes directly to landscapes. Its vistas are also detailed and there is a new volumetric option that provides enhanced control over interaction between light and atmosphere. Note, though, that Vue D'Esprit does not offer particularly fast render times with such options enabled. Animating scenes is simple, operating via a timeline and keyframes.

We do not recommend Vue D'Esprit for use with Windows XP or if you require network rendering. Otherwise, this

Glossary

- Anti-aliasing **Selecting and dithering halftones between pixels to reduce jagged lines.**
- Caustics **Light patterns created by reflections from shiny or moving objects such as water.**
- Inverse kinematics **As kinematics studies motion, so IK applies to relations of motion that may be reversed (for example pushing your elbow down raises your hand).**
- Metaballs **Primitives whose shapes flow into each other.**
- Nurbs (non-uniform rational B-spline) **A line (or spline) in which points are interpolated between control points, enabling it to be manipulated in more sophisticated ways.**
- Phong/gouraud **Different types of shading the surface of objects.**
- Primitives **Basic 3D shapes (often referred to as Platonic objects) such as cylinders, spheres and cubes used for modelling.**
- Radiosity **The imitation of natural, reflected light in a scene.**
- Raytracing **The process of drawing (tracing) imaginary rays of light that hit and reflect from 3D objects in a scene.**
- Volumetric **Refers to light or atmospheric conditions that interact with 3D objects.**



↑ Carrara Studio offers the best combination of features for a mid-level package



↑ Poser provides excellent figure modelling and animation tools at a reasonable price



↑ Vue D'Esprit is a superb 3D landscape creator, but no good for Windows XP users

landscape generator manages to squeeze ahead of Corel's offering.

Verdict

If you're primarily intending to use your 3D graphics package to create realistic-looking

scenes, both Bryce and Vue D'Esprit will suit your purposes well. Neither program, however, is a general-purpose 3D package. The same is true of people-focused Poser.

For more flexibility, the real choice is between Carrara Studio and Caligari

TrueSpace. Carrara is more competitively priced and the eagerly anticipated version 2.0 promises some real improvements. At the moment, however, TrueSpace is the more comprehensive application with an excellent image-rendering engine.

Professional applications

If it is possible to use a package such as Carrara Studio or TrueSpace for modelling, rendering and animation, then why should anyone spend more than £1,000 on 3D software? For many users, such a cost cannot be justified, but someone who wishes to make broadcast-ready video or high-quality graphics will appreciate options such as radiosity (which simulates the effect of natural, indirect illumination), faster rendering engines and a wealth of plug-ins for recreating anything from fur to explosions of light.

3ds max 4.0

One of the most versatile and flexible 3D design packages, 3ds max's considerable power is enhanced by

↓ 3ds max is a popular but expensive 3D designer package that is enhanced by its range of plug-ins

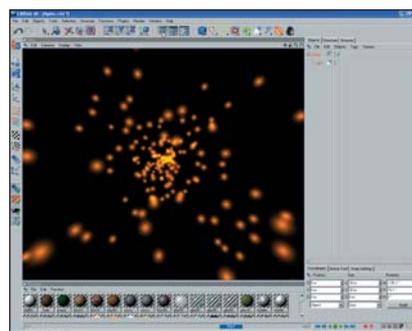


support for a range of plug-ins, such as character studio, which you can use to model and animate entire crowds. Despite the fact that this is an expensive package (costing nearly £3,000) it has become immensely popular and was used on a number of films, including *Men in Black* and *Pearl Harbor*.

It is easy to see what the additional expense buys you: models are created from extensive meshes that can be adjusted and distorted in every conceivable way and there's a greater degree of control over character animation and surface meshes being attached to skeletons that use inverse kinematics for more realistic motion.

You'll find it particularly fun using 3ds max to create action scenes with effects like explosions and streams of fire. By using motion blur and alpha channels, 3ds' rendering engine creates final images

↓ Cinema 4D renders images, including complex systems like particle animation, exceptionally quickly



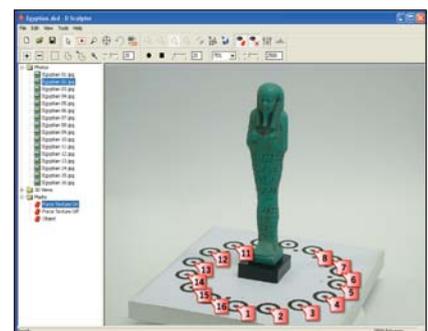
as good as anything you will see in the movies. The only drawbacks are that you pay for such good effects and this is a program that takes time to master.

Cinema 4D XL 7.0

Cinema 4D is the closest competitor to LightWave and in version 7.0 its rendering engine has been upgraded to provide final output that is both of high quality and extraordinarily fast. The full package, XL, offers a complete suite of modelling, animation and rendering tools, but there are other versions – Art (XL without the animation) and Go (a reduced set of tools and options) – that are much cheaper.

Version 7.0's main improvements are to the rendering quality, including caustics and radiosity (imitating natural light) but when all options are set to provide the most realistic results, rendering speeds can be reduced considerably. However, for

↓ For designers in need of a quick and easy way to create models, D Sculptor is an excellent tool

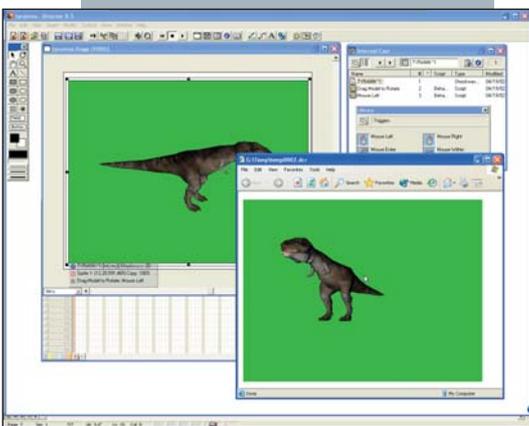


3D for the web

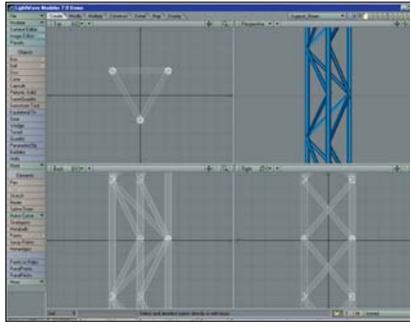
During the mid 90s, 3D animation on the internet and VRML (virtual reality modelling language) was one of the many online revolutions that failed to materialise, mainly because the results were too crude and web connections too slow. Half a decade later, online 3D graphics are starting to demonstrate real potential.

One problem that has dogged the adoption of 3D graphics on websites is that there are several conflicting standards, such as Eovia's 3Space or Viewpoint (formerly MetaStream). Yet proprietary formats, albeit ones that have been extensively taken up, may be the saviour of simple online 3D. For example, in the use of applications such as Swift 3D (www.swift3d.com), you can convert 3D content to a format compatible with Macromedia Flash.

Yet such 3D applications are not 'real' 3D and it is with Director, another of Macromedia's flagship multimedia products, that the most exciting advance has been made. Director 8.5 includes a format called W3D that can be used to convert content from software applications such as LightWave and 3ds max into Shockwave-compatible files. You will need the latest version of the Shockwave plug-in to view your designs, but this has become the simplest way to create remarkable and immersive 3D sites for the web.



↑ Director 8.5 makes it simpler to turn 3D into Shockwave-viewable content for use on the web



↑ LightWave takes a different approach to 3D modelling and animation, with tabbed buttons providing access to most tools

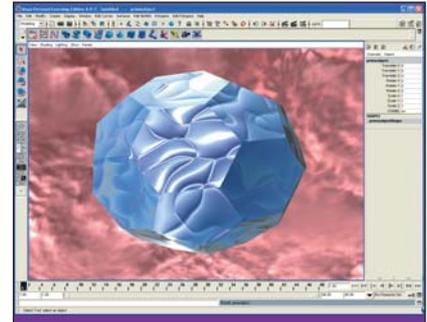
most jobs, especially animation, Cinema employs 'adaptive' or geometric anti-aliasing that assesses which jagged lines to remove before rendering the scene. This provides superior results with virtually no speed penalty, though there is also a 'best' option for static rendering.

The animation effects don't quite compare with Maya's or 3ds max's and Cinema 4D does not support as many plug-ins, but then it is between a half and a quarter the price of each of these applications. The rendering engine is on a par with anything else in this category (in speed terms, at least) and it's surprisingly easy to create such things as dynamic particle effects or complex textures using the plug-in, Smells Like Almonds. Overall, we rate Cinema 4D as the best, most competitively priced all-rounder.

D Sculptor 2.0

D Sculptor does not seem at first glance to fit in the professional 3D graphics category. It's a relatively inexpensive program that provides a budget alternative to a 3D scanner: take a series of pictures with a digital camera, trace around (or calibrate) these in D Sculptor and the program generates a mesh and texture from the model that can be used in other applications. Version 2.0's masking tools make them more like those found in painting applications and it can now detect some calibration points automatically as well as export to Shockwave 3D.

D Sculptor is a specialist product intended for use with other rendering, modelling and animation packages, but it will be appreciated, too, for its quick and easy 3D model creation features.



↑ One of the most comprehensive 3D packages ever, Maya is now available as a free learning edition

LightWave 7.0

One of the best-known professional 3D packages, LightWave has been used to create a multitude of onscreen effects, as seen on *Babylon 5*. On firing up the program, the user is faced with a sober interface with a steep learning curve. Part of the reason for this is that, like 3ds max, LightWave is more of a collection of plug-ins and related programs for modelling, rendering and layout than an integrated application.

No matter because the 3D scene and animation options are endless. Version 7.0 includes hair and fur rendering and there's the ability to create more realistic output using radiosity, caustics and depth of field (speeded up via a feature called Digital Confusion). The particle dynamics have been improved, enabling such things as collision detection, but LightWave still feels very complicated to use compared to programs such as Cinema 4D.

As with some of the other high-end applications, the animation options are detailed and complex, providing not merely keyframe changes but a Motion Mixer that can be used to control multiple actors and apply behaviours such as oscillation.

LightWave is not the easiest program to learn but it offers some of the best quality renders around.

Maya 4.0

Huge price drops have made Maya as affordable as LightWave. AliasWavefront has also released a free personal learning edition (which you'll find, together with our PDF format tutorial, on this month's cover disc) so users can learn professional techniques before splashing out.

Maya 4.0 is a heavyweight package with multiple modelling features including

3D software products compared

In the preceding pages we have compared products designed for use by professional- and mid-level users. Since the features found in these individual applications vary a great deal, it is difficult to provide a realistic like-for-like comparison, particularly as the pricing varies greatly, too. Instead, having gleaned basic details about various packages from this article, we recommend you obtain more detailed information about the software that interests you and try the three demo versions on our cover discs. Experience also tells us that a professional package that may be relatively simple for an experienced 3D user may not be so simple for novices, while a feature-packed, mid-level program would not compare quite so well with top-level applications.

Mid-level packages

★★★★★★ = best

	Amapi 3D 6.1	Bryce 5.0	Caligari TrueSpace 5.2	Carrara Studio 1.1	Poser 4.0	Vue D'Esprit 4.0
Price (inc VAT)	£299	£238	£395	£299	£235	£169
Contact	order online	0800 581 028	01752 211 313	order online	020 8200 8282	01525 718 181
Website	www.eovia.com	www3.corel.com	www.caligari.com	www.eovia.com	www.curiouslabs.com	www.maxon.com
Ease of use	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★
Features	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★
Value for money	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★
Overall	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★

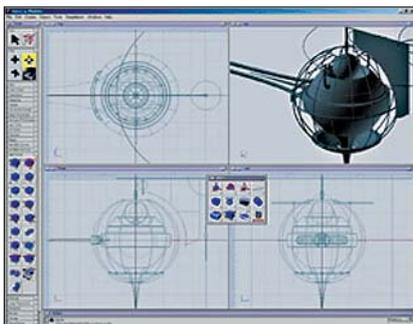
Professional-level packages

	3ds max 4.0	Cinema 4D XL 7.0	D Sculptor 2.0	LightWave 7.0	Maya 4.0	Universe 4.02
Price (inc VAT)	£3,167	£1,395	£500 Standard £900 Pro	£1,293	£1,702 Complete £6,360 Unlimited	£1,057
Contact	0800 181 738	01525 718 181	01235 437 109	01273 707 200	01494 441 273	020 8200 8282
Website	www.discreet.com	www.cinema4d.com	www.d-vw.com	www.newtek.com	www.aliaswavefront.com	www.electricimage.com
Ease of use	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★
Features	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★
Value for money	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★	★★★★★★
Overall	★★★★★★	★★★★★★	Pro★★★★★★	Unlimited★★★★★★	★★★★★★	★★★★★★

nurbs tools, a powerful attributes editor that controls all elements of an object and an improved rendering engine.

Despite Maya's complexity, Alias has attempted to make it simple to use from the outset, with preconstructed materials and shaders that can be dragged on to objects and an improved interface that provides one-click access to most tools.

↓ The value-for-money Universe offers professional tools at a distinctly mid-range price



However, it has a steep learning curve and most materials, for example, are built up in Hypershade. This allows the construction of very complex textures but involves a great deal of meticulous work. Similarly, the animation effects in Maya are complex but you'll find them superb once you get to grips with the program.

The Trax editor allows animation of multiple objects and effects across a timeline, the new 'jiggle' deformer being particular fun. Significant price cuts mean this powerful application is now within the means of many more users, but it will still require time and effort to master.

Universe 4.02

A reasonably-priced professional-level tool (particularly after a welcome recent price drop), Electric Image's Universe offers a versatile range of tools for rendering, modelling and animation. As with most of the applications aimed at serious users,

the modelling tools include nurbs (here called übernurbs) and a new Shell tool with which you can create thick surfaces quickly and easily.

The OpenGL interface is fast and responsive, as is the phong rendering, while the raytracing ability compares well with Cinema 4D (the other quick-render engine). The character animation tools are impressive, with bones controlled by very good inverse kinematics and a newly added skinning tool to link skin meshes to character skeletons.

Verdict

If money is no object, Maya and 3ds max are the programs of choice for their sheer versatility, with Cinema 4D following close behind for its speedy rendering engine. However, Universe's lower price brings it into the range of users who require a mid-level application but also want an excellent modeller. ■