Gears of War / Unreal Engine 3 Preview
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THE FUTURE OF THE FPS

The hottest games, the hottest engine, the hottest previews. We take an exhaustive look at the shooters of tomorrow – today

THE EXACT origin of the FPS is a tricky one to pin down. Some say it began in the 1980s behind the Iron Curtain at the heart of the Cold War, with one Anton Shootovich, a decryption programmer in the political wing of the Kremlin holding the rank of First People's Commissar, developing a simple little time-waster during lunch hour. The code was accidentally stolen by a deep-cover CIA operative, mistaking it for Comrade Andropov's credit card details, smuggled out to the West and eventually landing in the hands of three enterprising teenagers at MIT. They enhanced the code, added basic 3D graphics and mistranslated the title as 'First-Person Shooter's Game'.

Others claim that's a load of bollocks and that the genre began in earnest with an '80s shareware program on early IBM PC machines called *Wolfenstein 3D*, in which crudely pixellated Nazis tried to kill an American GI in a gothic castle, ending with a one-on-one encounter with Mecha-Hitler. Movement was restricted to forwards, backwards, left and right, and you couldn't look up or down. That milestone didn't arrive until *Dark Forces* some three years later, with complete 3D debuting in the seminal *Quake* a year after that – although vertical movement was touched upon by classics such as *Descent*, *Magic Carpet* and the RPG legend that was *Ultima Underworld*.

ION TOMORROW

Regardless of which origin you put your faith in, the first-person shooter technology has evolved beyond all recognition in the last decade, at a speed that makes a mockery of any Moore's Law interpretation that can be applied to gaming development. Case in point – Epic's Unreal Engine 3.0 is already so many light years beyond the previous incarnation, games developers can only use it by looking through high-powered radar telescopes atop mountains in Peru. Or something.

Over the page we begin our look at the future of the first-person shooter, or at least the immediate future. These are the games you can expect to be causing divorces, exam failures, job losses and outraged tabloid headlines over the next few years. We start with the most in-depth analysis anywhere of Epic's technological marvel, the engine that will lead the genre to new heights.

Don't believe us? At the recent public unveiling at E3, even the likes of Warren '*Deus Ex*' Spector was seen by *ZONE*'s own spies sitting quietly at the back of a demonstration, feverishly making notes and muttering into his beard like a crazy game-making Rasputin. Imagine that little scenario if you will. One of the greatest game designers in the world today finally getting an engine that can do his ideas justice. No more half-hearted Xbox ports and frustrating limitations hinting at what could have been.

Epic's monster is just the tip of this particular iceberg. There are still the likes of *Half-Life 2*'s Source engine, the new *Doom* code, rumours of Havok 3 being in the works and more proprietary single-game engines than you can mention. All bring ground-breaking developments in the realms of eye candy, all promise to be capable of providing the most immersive, realistic gaming experiences ever seen (with perhaps the exception of the *Serious Sam 2* engine).

COMING SOON

But then they would, wouldn't they? The real questions are what do we, the gamers on the street, want from our games of tomorrow and how closely are these technological miracles mirroring those needs? Throughout this look at the future of god's own gaming genre, we'll be answering those very questions, taking in all aspects of the shooter, from storylines to physics. From the quality of AI to the hardware you'll be needing to run the damn things at anything above one-frame-per-hour. And naturally, you'll be finding out everything you could ever need to know about the key games in those fields.

How *Star Wars Battlefront* is not only giving the online world a *Star Wars* game it actually wants to play, but it's also finally creating a *Star Wars* game that really captures the spirit of the film's epic battles (minus any yipping toddlers or crazy-eared Rastafarian knock-offs).

How *Brothers In Arms* is taking the shock tactics of *Call Of Duty* and *Medal Of Honor*, while adding real tactics to up the feeling of leading a squad of teenagers to their death in war-torn France.

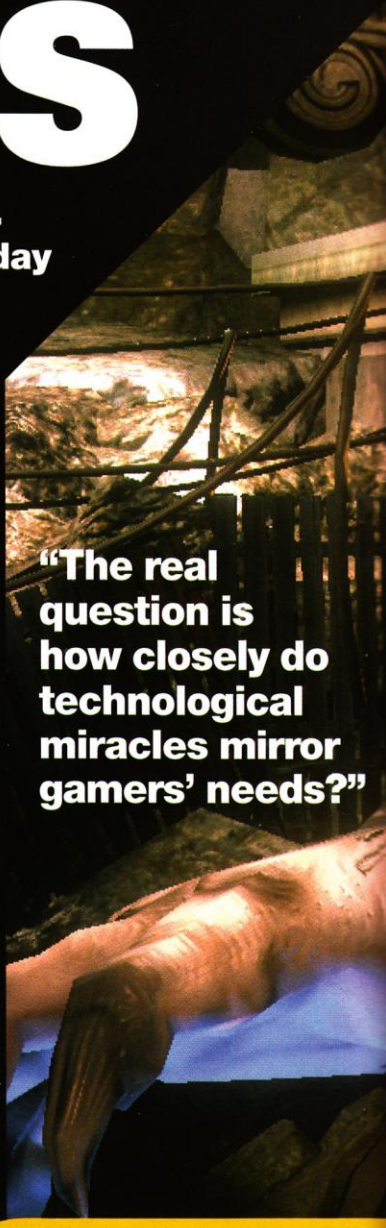
How *F.E.A.R.* is finally taking the little-girls-are-scary dynamic from the medium of film and showing how to do it properly in a game. Along with adding so much viscera even Quentin Tarantino would chuck his lunch.

How *Stalker* is experimenting with AI so intelligent and so capable of making believable decisions independently of your actions that there's precious little need to even install the game as the bots are quite happy to play the thing without you even being there.

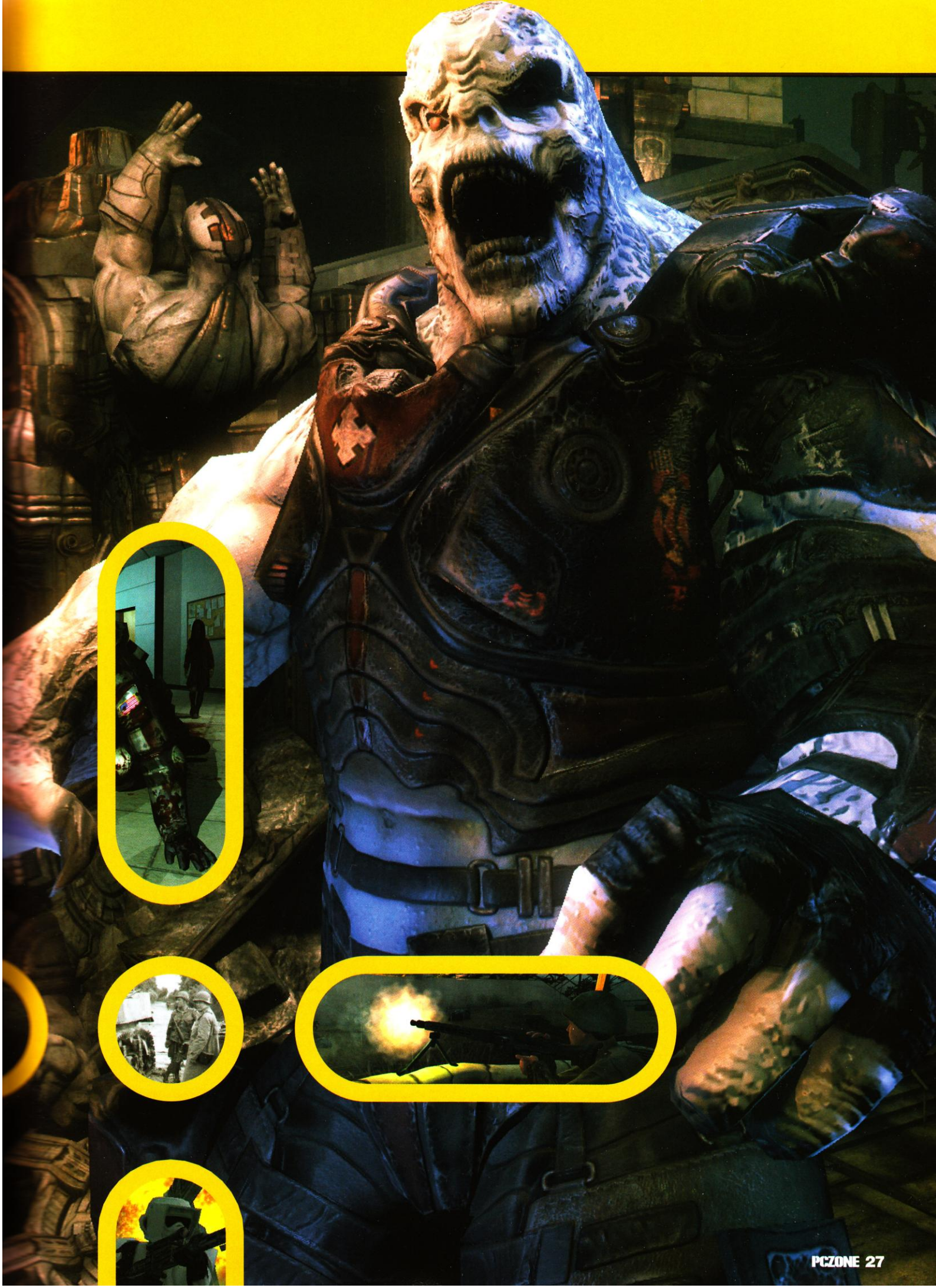
TOYS FOR THE BOYS

Ultimately, everything comes back to the engines. Anyone can make predictions about what the future holds, most of which boil down to little more than listing the obvious. Photo-realism, ultra-realistic physics, so many more polygons piled on top of each other that the German gaming press explode in an orgiastic high. Techno marvels such as Unreal Engine 3.0 are not only capable of giving development teams the tools to make their games do anything imaginable, but also eliminate the need for lengthy design time that would only result in inferior ways of rotating coloured lights around the screen anyway.

About the only thing us commentators can stroke our beards towards with any degree of confidence is that shooters will be incorporating more elements of every other genre – just take a look at the RTS mode in *Brothers In Arms*. These games will be providing every possible experience you can hope for. Except any involving *Duke Nukem Forever*. PCZ



"The real question is how closely do technological miracles mirror gamers' needs?"



Look! This is what games are going to be like in two years!

UNREAL: THE NEXT GENERATION

THE DETAILS

DEVELOPER Epic Games
PUBLISHER TBC
WEBSITE www.unrealtechnology.com
ETA 2006

WHAT'S THE BIG DEAL?

- The next generation of graphics revealed
- Incredible rendering detail
- Awesome new physics capabilities
- Amazing ease of use for developers and modders

The future is now! Epic gives us a glimpse of the games of 2006 with the first in-depth look at Unreal Engine 3.0. *Anthony Holden* gapes in wonderment

2006 sounds like science fiction. It sounds like a world of whizzing hover-cars and shiny silver jumpsuits, of erotic robots and punctual, air-conditioned British trains (*Witchcraft! –Ed*). But brace yourselves for a shock, because 2006 is in fact a mere 18 months away and, the occasional ill-advised shellsuit notwithstanding, you're not going to see any of those things.

How do we know? Because we've just been given our first real glimpse of the future by the people who're busy making it – Epic Games, creator of the world-beating *Unreal* and *UT* franchises.

But while the lack of a *Jetsons*-esque world of tomorrow is a tad disappointing, there is good news: the PC games of tomorrow look phenomenally, heart-stoppingly gorgeous. While the rest of the world has been hanging around waiting to play *Half-Life 2*, Epic has taken the next step, creating an engine for a new era of PC gaming. And if what we've seen is anything to go by, it's going to be a golden age indeed.

Epic demonstrates how much detail can easily be applied to wireframes.

NOT OLD, BORROWED OR BLUE

"The Unreal Engine 3.0 has been redesigned from the ground up for DirectX 9 and next generation consoles," says Tim Sweeney, celebrated code boffin and programmer at Epic. "We have a 100 per cent new renderer, new sound system, new physics system, new particle system, new terrain system, new animation system. Basically, if you can see it, we've rewritten it completely."

Right now, there's nothing else out there that comes close. As Tim points out, other engines – including Doom 3 and Source – are still very much hybrid solutions, compromises designed to support DirectX 7, 8 and 9 at various levels. "We've been able to do a lot more by focusing on a single target," says Tim. "We're only just at a point where this engine will run decently – NVIDIA's GeForce 6800 is the first card that lets us show it as it was designed to be shown." And the results, according to Tim, are a tenfold increase in visual quality over *UT2004*. Now, pardon my l33t but: holy sh1t!

If that sounds far-fetched, just take a look at these screenshots, mostly taken by us while we played around with the engine. Despite what you may be thinking, they're all 100 per cent in-game (including the one on the cover) and running on consumer hardware. Running at fairly decent frame-rates too – though this is set to double as soon as NVIDIA's latest SLI feature comes into play (which enables you to run two or more 6800s in parallel).

And honestly, we can't say enough how amazing it looks (especially in motion, as you'll see on next month's

Nice teeth! Game characters have come a long way since Pac-Man.

PC ZONE cover discs). The level of detail is phenomenal – thanks not only to a massive poly-count but also to a variety of graphical tricks such as virtual displacement mapping (which gives the illusion of shape and contour where none exists architecturally), realistic skin diffraction and a lovely new soft shadowing technique.

In fact, the only thing we can't confirm is what the hell the game *is*, as Epic is keeping resolutely tight-lipped on this matter. All it'd tell us was that all the environments and creatures you see here are indeed from a 'new action game', not connected with the *Unreal* series but part of a secret new franchise coming to PC and next-gen consoles in early 2006. "We don't waste much time making stuff purely for demo purposes," winks Epic vice president Mark Rein.

From what we've seen, however, it's clearly a shooter of some variety – probably not a pure FPS, but following some pretty familiar themes. You've got massive outdoor and indoor environments, a variety of unpleasant reptilian enemies (known as the Geist), and a human protagonist from some sort of futuristic military organisation called the CDU. Or at least, that's how it looked to us – all we know for sure is that it's the most gorgeous game of all time.

ANYTHING GOES

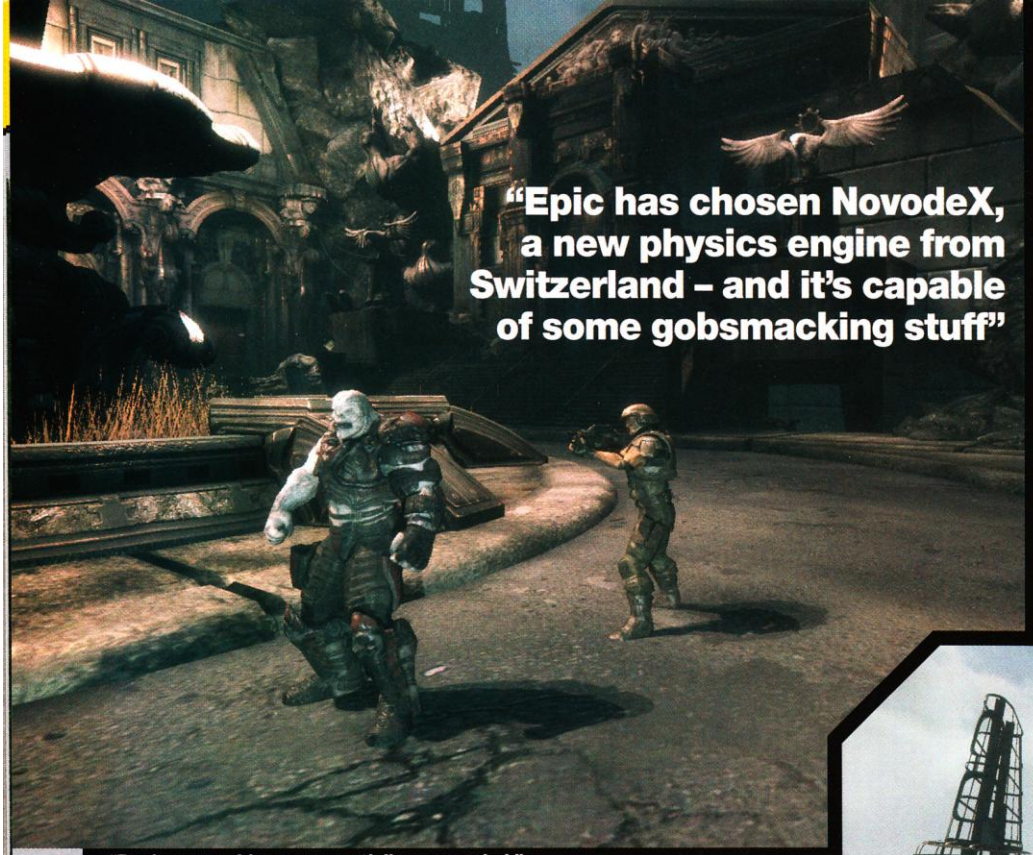
However, it's only because Epic is a shooter developer at heart that the game is a shooter at all, and the lads are keen to point out that you can make any game you want with UE3.0. Indeed, aside from the rendering and the physics, the broad support for different genres is perhaps the most impressive thing about the new tech.

Tim Sweeney explains: "The first-generation Unreal engine was very much an FPS engine, developed for a very narrow set of games. With Unreal Engine 2.0, there's already been massively multiplayer games, a pinball game, first- and third-person games in a lot of different genres. Now, engines are finally at a point where you can develop pretty much anything: a shooter, a car racing game, sports games, RPGs..."

"You can already see it in some of the *UT2004* mods," chips in Mark Rein. "People have done *Marble Madness* games, golf games, *Xevious*-style games. There's going to be some real

"The Unreal Engine 3.0 has been redesigned from the ground up. If you can see it, we've rewritten it completely"

TIM SWEENEY
CODER/PROGRAMMER, EPIC



"Epic has chosen NovodeX, a new physics engine from Switzerland – and it's capable of some gobsmacking stuff"

"Don't move – I have you partially surrounded."

I can see for miles: the broad outdoor environments are a wonder to behold.

surprising stuff with UE3.0. We've already got some licensees doing pretty interesting things."

BACK TO NATURE

Part of what makes the engine so generalised is that it is, in a way, truer to reality than any technology before it. The way light and sound behave, the way materials work, the way the laws of physics operate – they're all tangibly closer to how things work in the natural world.

Take the new Light Transmission technique, for example. Proving hugely effective in removing that 'plastic' quality that you see on the faces of current-gen game characters, it's an innovation based precisely on how light operates in real life – penetrating the skin and diffusing to some degree, rather than just bouncing off like a cue-ball.

Before and after: the new Light Transmission mask brings characters to life.

However, even more compelling examples come from the engine's physics capabilities.

"When we implement a vehicle now," explains Tim Sweeney, "we don't hard-code how the vehicle should respond to the environment. We just build a physical object, we put in springs for the shock absorbers, add dampers and so on. So when you press the gas pedal in a vehicle, it doesn't actually say 'move the vehicle forward', it says 'apply this much torque to the wheels' and the physics takes over and does the rest."

BOFFINS FROM NASA

In principle of course, this is true even in *UT2004*, but game physics are set to take a massive step towards reality with UE3.0, thanks in part to the appearance of a new player on the market. NovodeX, a new physics engine from Switzerland, has been chosen by Epic to look after Newton's Laws in UE3.0, in favour of heavyweights like Havok and Karma. The engine is capable of some pretty gobsmacking stuff, not least in terms of destructible objects and ragdolls.

In fact, the very term 'ragdoll' is in jeopardy, because though it's a very good way of describing the rubbish, floppy bodies we see in current games, it's an utter misnomer when applied to NovodeX's uncannily realistic bodies. With far more advanced constraints put on limb movement, accurate friction applied to joints and every joint and limb potentially breakable, NovodeX is set to make current ragdolls look like, well, kids' toys.

As an aside, it also makes *Soldier Of Fortune*-style dismemberment an out-of-the-box option. "Yeah, that type of stuff is easy to do," laughs Mark. "Plus, whenever a joint breaks, you can ping off some events from that. So you get your particle system to spew out some blood, say. And with the new material system, you'll be able to have blood spraying *on* people now as well." Oh dear, just wait till the *Leisure Suit Larry* people get their hands on this...

SCIENCE IN ACTION

The thing is, this is only the beginning. Epic only implemented NovodeX in April, and it's barely scratched the surface of its potential. "They've

NO UT2005

NEXT-GEN *UT* CONFIRMED, BUT NOT FOR NEXT YEAR

It seems Atari, erstwhile publisher of the *Unreal Tournament* series, may have given us all a bum steer. When *UT2003* came out, it suggested that the series was to follow the EA Sports model, releasing slightly updated versions every year. Now, however, it seems that's not the case.

When we met with Epic boss Mark Rein, he confirmed that there are plans for a *UT* game on Unreal Engine 3.0 (a mouth-watering prospect if ever there was one), but that it won't appear until 2006. As for details of the game, the usually effusive Canadian would say only this: "As we're re-building everything on the new engine, we probably can't match the amount of content we've got in *UT2004*. So I'd say we'll concentrate on the really popular stuff like Onslaught and Assault and make sure those are really cool."

In the future, all hair will look like this.

We're guessing this is not a friendly character.

THE FUTURE OF THE FPS...

HOLLYWOOD CALLING

WILL UNREAL TECHNOLOGY ONE DAY REPLACE CAMERAS AND CELLULOID?

The Epic crew are a forward-thinking bunch. Not only do they imagine a day when Unreal technology is used to make all games, they also envisage a day when it's used to power the very films we watch.

Indeed, the team is already making inroads into Hollywood, encouraging filmmakers to use Unreal technology in situations where once pre-rendered CGI was the norm. At the moment, this isn't material you actually see, more proof-of-concept work and moving storyboards – but even so, the advantages of doing everything in real time are vast. Says Epic boss Mark Rein: "In a couple of years, when a director says, 'I want to make this happen in my movie', they're not going to bother with CG; they're just going to get an engine like this and set up the situations and see if it works or not."

However, as Mark's keen to point out, it doesn't stop there: "I'm going to go on record as predicting that, maybe ten years from now, they'll be making movies with our technology – for the final rendering. We're not that far away from being able to do a *Toy Story* or something even more realistic in this version of the engine, in real time."

Nemo beware: the Unreal Engine 3.0 is fast catching up with CG.

It's a remarkable thought that game engines could one day supplant the entire machinery of making cinema. Perhaps even more exciting, it means that any one of us could get the Unreal modding tools and – even as early as 2006 – create a movie to rival Pixar. "We're not going to put Pixar out of business," laughs Mark. "We're just going to license our engine to them."

demonstrated some pretty cool stuff to us," says Tim. "Soft-body dynamics, fluid dynamics, some very realistic breaking of objects. They've done a lot of research on that, where they can analyse existing objects and figure out how they'd respond in certain situations. So, you start with a solid object and apply forces to it and the engine calculates how a real material of that type would break. It then fragments the object, adds polygons in the interior and gives you multiple objects as a result."

BREAKING THE MOULD

Think about that for a second. Not only does this mean you'll be seeing far more breakable objects in games, it introduces a random element never seen before. So, if you're shooting (say) palings off a wooden fence, then theoretically NovodeX can make every single one splinter and break in a completely different and convincing way. Now that's what you call science.

"You'll also see things like entire rooms or buildings that are destructible," enthuses Tim. "We have basic examples of that running right now, but over the next few years you'll see dramatic improvements in this area, to the point of entire cities being destroyable. In fact there's no reason why we couldn't build every building out of individual bricks now and do it all true to life, but you'd need a ridiculous amount of computing power to do that – by today's standards."

Clearly however, it's only a matter of time. If not in Epic's next game, then very soon after you'll be treated to environments where every building and object can be destroyed or broken or dealt with arbitrarily – within the limitations imposed by gameplay at least. And if we ever get sick of blowing stuff up, then maybe we'll try *con*structible environments instead. Nah.

STYLE WARS

But of course, reality is not the be-all and end-all. In fact, some of us at *PC ZONE* are sick and tired of the obsession with 'reality' (and certain Hollywood variants thereof) that dominates the whole PC gaming arena, especially shooters. There've been some commendable departures from this in recent years – *XIII*, *Tron 2.0*, *NOLF2* – but we want to see more twisted, unusual and heavily stylised games in the future. Luckily, Epic has the same ideas.

"Get that camera out of my face before I cave your puny skull in with it."

"UE3.0 has the potential to do some amazing things that seemed impossible even a year or two ago"

"It's not just about realism," agrees Mark. "Any computing power that can be applied to making scenes more realistic can also be applied to making them like, reality-plus. And I think this is where you're going to see the changes with what people do with Unreal Engine 3.0. Now that we can have shaders on every surface, the most important job of a programmer will be to stylise the game. It's the last 50-100 lines of code between your game and the end-user's eyes – not engine code but pixel shaders – that are going to make the biggest difference. So you can have a gritty, stylised environment, a film noir movie environment – whatever you want."

THE STAGE IS SET

Clearly, Unreal Engine 3.0 has the potential to do some pretty amazing things – things that seemed distant possibilities as little as a year or two ago.

Indeed, you could say the shackles are effectively off for developers now. Epic has done the hard work: it's made the engine, built the tools and it's delivered the full power of DirectX 9 in a uniquely intuitive, cutting-edge package. It's now up to the development community to rise to the challenge and deliver some equally amazing gameplay. This time around, there's no excuses. PCZ

VISUAL INTERFACE

The new Unreal Engine tools are super-intuitive to use.

DEVELOPERS HAVE AN EASY TIME OF IT WITH UNREAL ENGINE 3.0

One of the most astounding things about Unreal Engine 3.0 is just how easy it is to use. Following an idea of intuitive 'tree-like' interfaces, the new Unreal Editor 3.0 toolset puts a huge amount of power in the hands of artists, level designers and gameplay scripters, enabling them to create and manipulate huge amounts of game material in real-time and drop it straight into the game – all without programmer intervention.

"UE3.0 really gives artists far more control over the whole development pipeline than they've ever had in the past," agrees Tim Sweeney.

All the systems – physics, materials, sound, shaders and so on – are also cleverly linked together. As such, if you change the properties of an object in one system, it automatically affects properties in all the other systems. "So let's say you've got an object, a block of something," explains technical artist/designer Alan Willard. "If you set the physical material to wood, straight away your wooden block floats and hits with a certain weight, and you get splinters instead of sparks if you shoot it and so on."

"It's all far more intuitive and easier to understand," raves Mark Rein. "My mind boggles at what mod-makers are going to be able to do with this."

THE FUTURE OF THE FPS... GRAPHICS

HOW FAR AWAY IS TRUE PHOTOREALISM?

As amazing as these visuals are by today's standards, true photorealism remains a pipe dream for the games industry. However, according to Epic programmer Tim Sweeney, it's not as inconceivable as you may think. "All the programmers at Epic got together one day," recalls the rangy coder, "and just for fun did a computation of how much more computing power we need before graphics is 'done'. We define 'done' as like, take double the resolution of the highest res HDTV and what it takes to render a completely photorealistic scene at that level of detail and that resolution. We came to a conclusion that it'd take between 10,000 and 40,000 times more computing power than we have right now."

Scary numbers sure, but Tim insists that this is only 15-18 years away, according to Moore's (increasingly out of date) Law and other advances that are happening right now. "It's in our lifetime," grins Tim, "but we certainly have a lot of work to do."

Good, but no photo.